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Population Trends and Habitat Occurrence of Forest Birds on Southern National Forests, 1992-2004

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Abstract

We determined population trends and habitat occurrences for bird species in 14 national forests located in the Southern Region from 1992-2004. We estimated population trends for 144 species within: 14 national forests, 10 physiographic areas, and in the Southern Region as a whole. Habitat occurrences were estimated for 114 species based on 13 forest types and four successional stages. We discussed results for 48 species of management concern along with information compiled on conservation status and the U.S. Geological Survey's (USGS) Breeding Bird Survey population trend estimates. There was evidence that populations increased for 42 species and decreased for 38 species on national forests in the Southern Region as a whole. Trends for many species varied widely across physiographic areas and national forests. Most species were found across a variety of habitats, though associations with particular forest types and structural conditions were often apparent.

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Photographs

Courtesy of the U.S. Geological Survey Patuxent Bird Identification Infocenter: blue-winged warbler, chestnut-sided warbler, northern parula, summer tanager, yellow-breasted chat, yellow-throated vireo, golden-winged warbler, and Swainson's warbler, Chandler S. Robbins, photographer; black-billed cuckoo, eastern wood pewee, worm-eating warbler, Jeffrey A. Spendelow, photographer; field sparrow, great crested flycatcher, pine warbler, prairie warbler, yellow-throated warbler, Deanna K. Dawson, photographer; Acadian flycatcher, Brad Bergstrom, photographer.

Courtesy of the U.S. Fish & Wildlife Service: red-headed woodpecker, eastern bluebird, northern cardinal, Dave Menke, photographer; wood thrush, black-throated blue warbler, scarlet tanager, Steve Maslowski, photographer; prothontary warbler, John and Karen Hollingsworth, photographers; Kentucky warbler, hooded warbler, yellow-billed cuckoo.

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INTRODUCTION

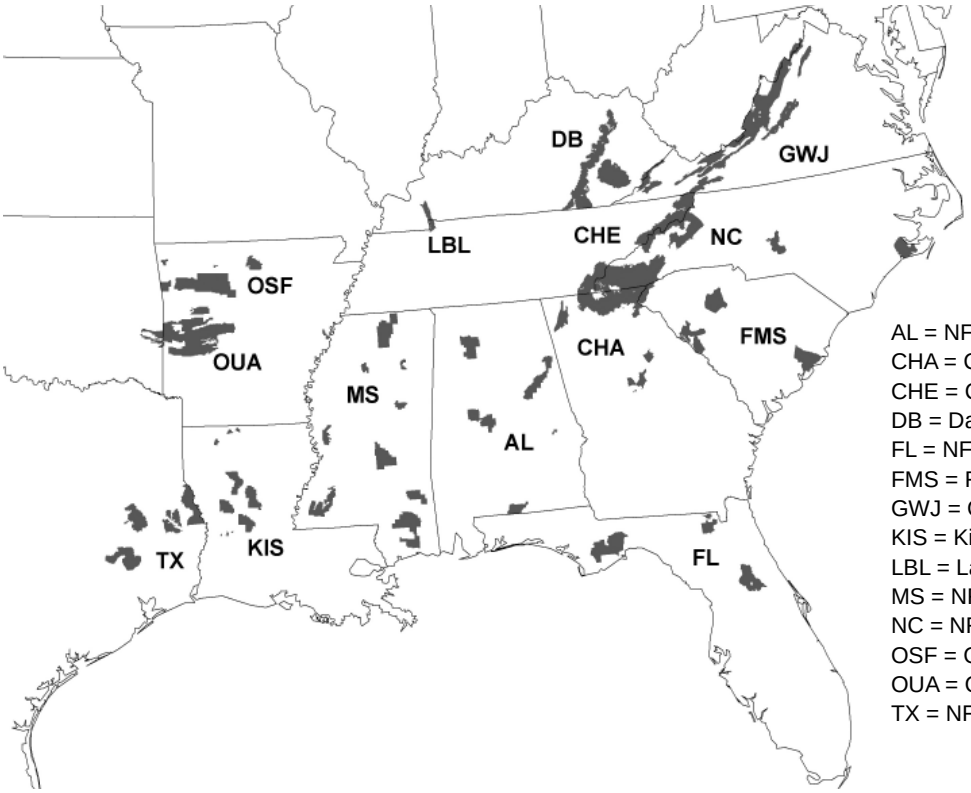
In 1996, the Southern Region of USDA Forest Service adopted "The Southern National Forest's Migrant and Resident Landbird Conservation Strategy" (Gaines and Morris 1996) to improve monitoring, research, and management programs affecting forest birds and their habitats. A regionwide program of monitoring avian populations based on point-counts was initiated as part of this strategy. We report the results of this monitoring effort on southern national forests based on data collected from 1992 to 2004. We estimated population trends and annual abundances of birds in the Southern Region as a whole, for 10 physiographic areas, and for 14 national forests (Fig. 1) as well as habitat occurrences in the Region. In addition to these monitoring results, we summarized information on 48 species identified as management indicator species for southern national forests by the Forest Service or as species of concern in bird conservation regions of the Southern United States (USDI Wild. Serv. 2002). To provide context for our trend analysis, we compiled information on conservation status and habitat associations for the 48 species from Hamel (1992) and "The Birds of North America" (see Literature Cited section). We also present population trend estimates for each selected species from the U.S. Geological Survey's (USGS) Breeding Bird Survey (Sauer et al. 2005). In the appendices we report population trend estimates for 144 species, including the 48 management indicator species for the same geographic areas. We also summarized habitat occurrence for 114 species, which was defined by combinations of forest types and successional stages.

METHODS

Sampling Design and Point-count Methods

Sampling strategy and point-count methodology are described in detail in Gaines and Morris (1996). The sampling strategy was based on a stratified random design, with habitat strata defined collaboratively by national forest personnel within each physiographic region. Each habitat strata was to receive a minimum of 30 points. Departures from this design are evident on some national forests, often due to constraining randomization to reduce distance between points for monitoring efficiency. In some cases, points were allocated to strata in proportion to strata abundance; in others, they were allocated equally among strata. Due to poor records of the initial point stratification, we treated the sample of points as a representative sample of each national forest and used post-stratification analysis to show to the extent to which this assumption was true. Points were established no closer than 250 m from each other and at least 50 m from habitat-type edges. Although some point-count stations were considered permanent and were monitored once annually, many points were added or subtracted over time.

Counts on some forests began as early as 1992, but most were initiated in the first several years following adoption of the conservation strategy in 1996 (Gaines and Morris 1996). Point-count methodology followed Hamel et al. (1996). Counts at each point were conducted for 10 minutes between sunrise and 10 a.m. and between April 12 and June 30. All birds seen or heard during this time period were recorded. Data on vegetation conditions at each point also were collected at various intervals over time, with most vegetation data collected toward the end of the survey period.



AL = NFs in Alabama
CHA = Chattahoochee and Oconee NFs
CHE = Cherokee NF
DB = Daniel Boone NF
FL = NFs in Florida
FMS = Francis Marion and Sumter NFs
GWJ = George Washington and Jefferson NFs
KIS = Kisatchie NF
LBL = Land Between the Lakes NRA
MS = NFs in Mississippi
NC = NFs in North Carolina
OSF = Ozark and St. Francis NFs
OUA = Ouachita NF
TX = NFs in Texas

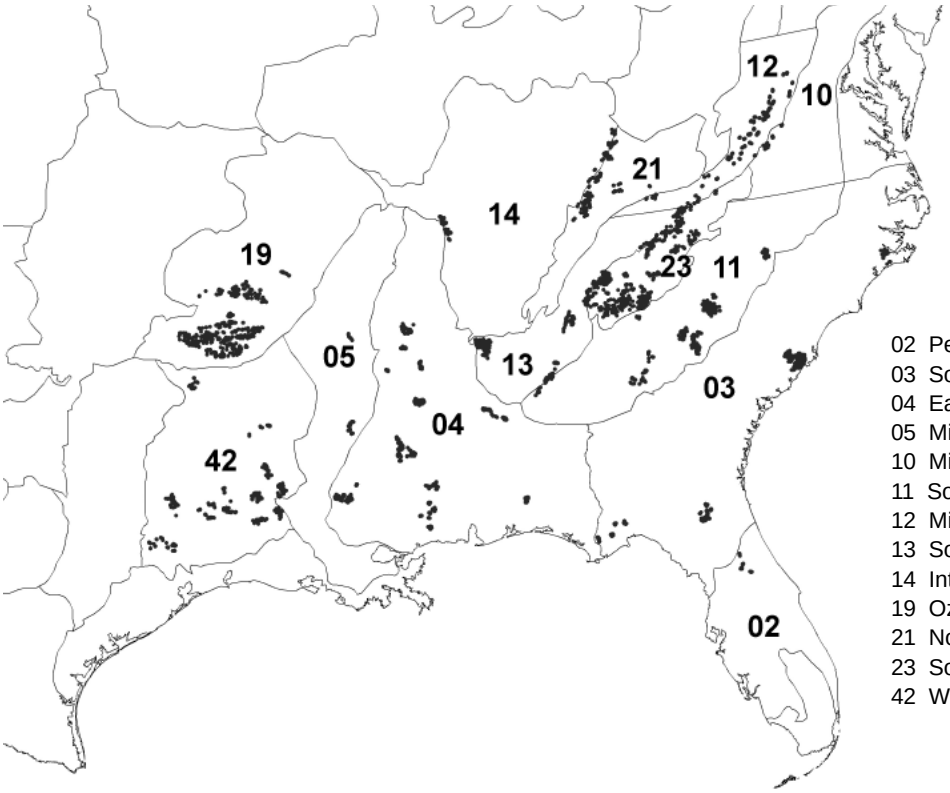


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Figure 1.—Location of 14 national forests (top) and 10 physiographic areas (bottom), including 4,945 point-count stations, in the Southern Region of the USDA Forest Service. Due to small numbers of points in some physiographic areas, analysis combines points from the Mid-Atlantic Piedmont (10) with the Mid-Atlantic Ridge and Valley (12), Peninsular Florida (02) with South Atlantic Coastal Plain (03), and Mississippi Alluvial Valley (05) with East Gulf Coastal Plain (04).

We performed post-stratification analysis of the distribution of points by forest type and successional stage. Only data from 2000 to 2004 were included because most points lacked vegetation measurements before 2000. Habitat features were applied to a point for the year in which the measurements were taken and to previous and subsequent years in the interval from 2000 to 2004 until the point was remeasured. We report the number of counts (visits to a point) during this interval by forest type and successional class as a measure of effort by habitat. To determine the degree to which this sample was representative, we compared this assessment with the Forest Service's Forest Inventory and Analysis (FIA) Program for national forest lands and all forested lands in the Southern Region (USDA For. Inventory and Analy. Data Cent. 2006). We pooled the hardwood-pine and sand pine-oak classes used by the Southern Region bird monitoring program to compare to the FIA hardwood-pine class and combined the grass/forb and shrub/seedling classes used by the program to compare to the FIA shrub/seedling class. Other classes matched exactly or by the dominant species.

Population Trend Analysis: Procedure

We estimated population trends for 144 species in national forests in the Southern Region as a whole, 10 physiographic areas, and in 14 individual national forests. Trend estimates for individual national forests were based on all available data collected from 1992 to 2004. Regional and physiographic area trend analyses were limited to data collected from 1997 to 2004. We excluded early years in these analyses due to poor sampling in many national forests before 1997. We included species in the trend analysis that were known to breed in forested habitats in southern national forests; though some species might have been migrants. We also included species that may not be detected adequately by our survey design for use in trend analysis, for example nocturnal and low-density species with a large home range (raptors), because there may be interest in knowing that these species were detected. Points were included in the trend analysis for a given species if it was observed at least once at that point during the time of survey. All observations of a species at a point were included in the analysis with no consideration of its estimated distance from the point.

To estimate population trends, we used marginal longitudinal models with a Poisson probability distribution fitted using generalized estimating equations (GEE) (Fitzmaurice et al. 2004: 291-323). We treated the number of detections of a species at a point as the response, and estimated population trends, or the annual rate of change in detections, by including year as a fixed effect. We conducted separate analyses for the Southern Region, each of the 10 physiographic areas, and each of the 14 national forests. The GEE procedure represents an extension of generalized linear models by allowing for the consideration of temporal correlation within the data (i.e., the correlation of the number of detections at a point from one year to the next). We estimated temporal correlation using a first-order autoregressive model. This approach allowed us to model differences in annual variability in the number of detections at a point. Poisson models are well suited to count data where values are integers and the events being modeled are relatively infrequent. However, overdispersion is a common feature where variability in the number of counts exceeds that estimated by a Poisson model. Our approach took this into consideration by estimating an annual correction factor to account for overdispersion. Sampling variability or standard error of trend estimates was calculated using the empirical or 'sandwich' estimator.

The GEE approach with the sandwich estimator provides robust estimates of population trends and sampling variability even if the within-point associations are not modeled correctly (Fitzmaurice et

al. 2004). We implemented the GEE analysis using the library "geepack" and the function "geese" available in the statistical package R, version 2.2.1 (R Dev. Core Team 2006). On the basis of an assessment of trend estimates and sampling variability as a function of the number of points used in the analysis, we concluded that a minimum sample size of six points produced estimates that, on average, displayed levels of variability similar to that with species with larger sample sizes. A comparison of three jack-knife estimators with the sandwich estimator suggested that this minimum sample size was appropriate.

These analyses represent a comparatively simple design-based approach to these data that enabled us to estimate trends for many species and for all national forest and physiographic regions for selected years. We recognize that model-based approaches that include covariates such as habitat or observer, or methods that estimate detectability directly, can improve estimates. We are pursuing these approaches with subsets of the data that include the necessary information.

Population Trend Analysis: Interpretation

Users should use caution when interpreting the results of the trend analysis. First, changes in observer ability over time and differences between observers can affect the analysis of population trends (Faanes and Bystrak 1981, Kendall et al. 1996, Sauer et al. 1994, Link and Sauer 1998). The pattern of occurrence of observers was highly variable both within and among forests, so we were unable to model a consistent observer effect across all forests. Second, it is typically assumed that detectability is constant for a species over time and across habitats independent of observer differences, but this is rarely the case. Our approach accounted for nonconstant detectability to a limited degree by including within-point temporal correlation as a factor in the analysis. Third, the level of rarity of a species can influence the reliability of trend estimates, that is, observations at a limited number of points or at many points but at low densities can result in unreliable trend estimates. This is due at least in part to the many zero values that occur for some species because zeros convey less information than variation in count values greater than zero. Multiple zeros also inflated the dispersion of counts in the GEE Poisson models, requiring the addition of overdispersion correction factors. Hence, when interpreting population trends, consider carefully the number of points where each species was observed and the average abundance at those points. The most reliable estimates will be associated with species found in high abundance at many points.

The magnitude of the trend estimate and its biological relevance and the breadth of the confidence interval also should be considered when interpreting trend estimates. Each estimate should be considered in association with how well the population was sampled if the magnitude is large enough to represent a biologically significant trend, and if there is evidence that the trend could occur by chance alone. For example, change of -3.0 percent annually would represent a decrease of 26 percent in counts over 10 years (((0.97^{10})-1)*100); this might be biologically important. Further, if the estimate is based on a reasonable sample of points and the confidence interval does not include zero, it might be considered reliable. Estimates for species present at few points and at low abundance that present biologically significant trends whose confidence intervals do not include zero would be somewhat less reliable. Finally, estimates for species present at few points and at low abundance that present biologically significant trends whose confidence intervals include zero would be the least reliable. In the narrative accounts for the 48 management indicator species or species of conservation concern, we highlight trends supported by relatively strong evidence of increases or decreases. For

consistency, we define strong evidence as having a 90 percent confidence interval that excludes zero and a sample that includes 30 or more points where the species was detected.

Habitat Association Analysis

We summarized habitat associations for 114 species based on unique combinations of four successional classes and 13 forest types. We included only data from 2000 to 2004 in our analysis of habitat associations because, most points lacked vegetation measurements before 2000. Habitat features were applied to a point for the year in which the measurements were taken and to previous and subsequent years in the interval from 2000 to 2004 until the point was remeasured. We report the proportion of counts for each combination of successional class and forest type at which a species was detected. These proportions can be compared directly as measures of selection and generally represent how often one would expect to observe a species in a given habitat type. We also report the proportion of counts for each forest type across all successional stages and the proportion of counts for each stage across all forest types. Proportions are based on detections, so they are not true estimates of actual occurrence and are subject to bias caused by differences in detectability among habitats and observers.

RESULTS

We analyzed data from 35,486 counts at 4,945 point-count stations in 10 physiographic regions and 14 national forests in the Southern Region from 1992 to 2004 (Table 1). The most common habitat surveyed was mature oak-hickory forest followed by loblolly-shortleaf-pine, mixed hardwoods and pine, and longleaf-slash pine forest (Table 2). The percentages of counts in each forest type generally followed a pattern similar as the percentage of national forest land and percentage of all land in each forest type (Table 3). The percentage of counts in stands of each tree-size class also was similar to the percentage of national forest land in each size class; however, all forest lands had a greater percentage of small tree sizes than the point-count survey and national forest lands (Table 4). We conclude that at the region level, the point-count survey generally is representative of national forest lands.

In all, 210 species were detected across all 14 national forests (Appendices 1-2). We modeled population trends for 144 of these species (Appendices 3-5), including the 48 management indicator species or species of conservation concern (Tables 5-52). On the basis of trend estimates and 90 percent confidence intervals where zero was excluded, there was evidence that populations increased for 42 species on national forests and decreased for 38 species on national forests in the Southern Region as a whole (Appendix 3). Species detected on more than 30 points with large negative trend estimates (< -10 percent), and 90 percent confidence intervals excluding zero were northern bobwhite (-10.2 percent, 1045 points), sharp-shinned hawk (-10.9 percent, 37 points), common nighthawk (-11.9 percent, 60 points), brown creeper (-13.4 percent, 45 points), winter wren (-13.8 percent, 127 points), blue-winged warbler (-15.6 percent, 293 points), and golden-winged warbler (-24.3 percent, 37 points). Species meeting the same criteria with large positive trend estimates (> 10 percent) were whip-poor-will (12.2 percent, 93 points), fish crow (10.3 percent, 284 points), and prothonotary warbler (12.5 percent, 287 points). The barn owl and alder flycatcher had annual trend estimates that represented extreme values (increases of 414 and 155 percent, respectively) and had 90 percent confidence intervals that excluded zero. However, given the extreme trend estimates and small number of points at which detections were made (barn owl = 12 points, alder flycatcher = 17 points), we suggest limited or no inference be drawn for these species.

Table 1.—Number of avian point counts conducted annually in 10 physiographic areas and in 14 national forests in the Southern Region from 1992 to 2004

Physiographic area or national forest	Forest[a]	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Mid Atlantic Ridge & Valley	GWJ	0	0	202	285	348	615	590	625	637	636	498	633	561	5630
Southern Blue Ridge	GWJ	0	0	59	59	60	167	170	170	167	171	170	145	170	1508
	NC	0	0	0	0	0	239	251	245	246	244	202	201	245	1873
	CHE	184	212	91	212	225	238	214	231	229	227	224	225	222	2734
	CHA	28	41	22	40	85	91	82	82	82	64	101	110	112	940
	FMS	0	0	91	90	71	87	72	59	55	106	74	84	80	869
	Subtotal	212	253	263	401	441	822	789	787	779	812	771	765	829	7924
Northern Cumberland Plateau	DB	0	0	0	0	0	188	172	189	188	188	178	152	172	1427
Southern Cumberland Plateau/Ridge & Valley	CHA	8	10	6	10	15	34	29	39	41	37	40	35	30	334
	AL	0	0	0	0	0	23	72	122	154	155	171	161	166	1024
	Subtotal	8	10	6	10	15	57	101	161	195	192	211	196	196	1358
Southern Piedmont	NC	0	0	0	0	0	55	55	55	53	55	0	32	41	346
	CHA	17	22	8	22	13	11	19	5	0	21	17	25	46	226
	FMS	0	0	120	82	55	122	134	102	127	71	101	90	81	1085
	Subtotal	17	22	128	104	68	188	208	162	180	147	118	147	168	1657
Interior Low Plateaus	LBL	0	208	143	191	176	198	200	194	187	203	202	191	201	2294
Ozark-Ouachita Interior Highlands	OSF	0	0	0	0	0	219	220	220	220	220	220	220	220	1759
	OUA	0	0	0	0	0	281	284	284	283	256	278	285	282	2233
	Subtotal						500	504	504	503	476	498	505	502	3992
West Gulf Coastal Plain	OUA	0	0	0	0	0	21	21	24	24	24	24	24	24	186
	TX	0	0	0	0	0	0	180	180	180	180	180	180	180	1260
	KIS	0	0	0	0	0	0	130	128	131	99	128	129	129	874
	Subtotal						21	331	332	335	303	332	333	333	2320
East Gulf Coastal Plain	AL	0	0	0	0	0	52	130	151	151	151	151	147	151	1084
	OSF	0	0	0	0	0	0	16	16	16	16	16	16	16	112
	MS	0	0	212	215	215	0	39	661	753	812	818	764	826	5315
	Subtotal			212	215	215	52	185	828	920	979	985	927	993	6511

Continued

Table 1.—Continued

Physiographic area or national forest	Forest[a]	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
South Atlantic Coastal Plain	NC	0	0	0	0	0	1	0	36	38	40	40	40	40	235
	FMS	0	0	105	110	109	106	112	111	104	99	102	103	104	1165
	FL	0	0	0	0	0	80	80	80	110	110	169	169	175	973
	Subtotal			105	110	109	187	192	227	252	249	311	312	319	2373
National Forests	GWJ	0	0	261	344	408	782	760	795	804	807	668	778	731	7138
	NC	0	0	0	0	0	295	306	336	337	339	242	273	326	2454
	CHE	184	212	91	212	225	238	214	231	229	227	224	225	222	2734
	CHA	53	73	36	72	113	136	130	126	123	122	158	170	188	1500
	FMS	0	0	316	282	235	315	318	272	286	276	277	277	265	3119
	DB	0	0	0	0	0	188	172	189	188	188	178	152	172	1427
	AL	0	0	0	0	0	75	202	273	305	306	322	308	317	2108
	LBL	0	208	143	191	176	198	200	194	187	203	202	191	201	2294
	OSF	0	0	0	0	0	219	236	236	236	236	236	236	236	1871
	OUA	0	0	0	0	0	302	305	308	307	280	302	309	306	2419
	TX	0	0	0	0	0	0	180	180	180	180	180	180	180	1260
	KIS	0	0	0	0	0	0	130	128	131	99	128	129	129	874
	MS	0	0	212	215	215	0	39	661	753	812	818	764	826	5315
	FL	0	0	0	0	0	80	80	80	110	110	169	169	175	973
	Total	237	493	1059	1316	1372	2828	3272	4009	4176	4185	4104	4161	4274	35486

[a] GWJ = George Washington and Jefferson; NC = NFs in North Carolina; CHE = Cherokee; CHA = Chattahoochee and Oconee; FMS = Francis Marion and Sumter; DB = Daniel Boone; AL = NFs in Alabama; LBL = Land Between the Lakes; OSF = Ozark and St Francis; OUA = Ouachita; TX = NFs in Texas; KIS = Kisatchie; MS = NFs in Mississippi; FL = NFs in Florida

Table 2.—Number of counts (point visits) at 4,945 point-count stations for four successional stages and 13 forest types on 14 national forests, Southern Region, 2000-2004

Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
Oak-hickory	0	113	595	2516	3224
Loblolly-shortleaf	28	315	1047	1645	3035
Hardwood-pine	17	155	464	2131	2767
Longleaf-slash	20	222	477	985	1704
Oak-gum-cypress	0	77	144	314	535
Elm-ash-cottonwood	18	37	69	275	399
White pine-hemlock	10	12	92	112	226
Sand pine-oak	0	120	45	30	195
Glade-shrub-savanna	57	36	12	26	131
Cove hardwood	0	0	25	81	106
Maple-beech-birch	0	0	46	59	105
Riparian	0	0	0	95	95
Spruce-fir	0	0	0	15	15
All forest types	150	1087	3016	8284	12537

Table 3.—Percentage of counts (point visits) from 2000 to 2004 at 4,945 point-count stations, percentage of national forest lands, and percentage of all lands, by forest type, Southern Region

Forest type	Counts	NF lands	All lands
Oak-hickory	25.7	43.7	36.7
Loblolly-shortleaf	24.2	24.2	24.5
Hardwood-pine	23.6	16.1	14.1
Longleaf-slash	13.6	8.1	6.5
Oak-gum-cypress	4.3	3.6	11.8
Elm-ash-cottonwood	3.9	0.9	3.6
Maple-beech-birch	1.7	1.0	0.6
Spruce-fir	0.1	0.1	0.0
White pine	1.8	2.1	0.5
Nonstock	1.0	0.0	0.4
Other	0.0	0.2	1.3

Table 4.—Percentage of counts (point visits) from 2000 to 2004 at 4,945 point-count stations, percentage of national forest lands, and percentage of all lands by tree-size class in the Southern Region

Tree-size class	Counts	NF lands	All lands
Mature	66.1	63.6	43.0
Sapling/pole	24.1	23.9	28.3
Shrub/seedling	9.9	12.4	28.7

Trend estimates for many species varied widely across physiographic areas (Appendix 4) and national forests (Appendix 5). Frequency of occurrence of species within 13 forest types and four successional stages (Appendix 6) shows that most species were found across a variety of habitats, though associations with particular forest types and structural conditions often were apparent. In the next section we present a detailed look at trend estimates and habitat associations for the 48 management indicator species and species of conservation concern.

MANAGEMENT INDICATOR SPECIES AND SPECIES OF CONSERVATION CONCERN

Ruffed Grouse (*Bonasa umbellus*)

The ruffed grouse is distributed throughout deciduous and coniferous forests of North America (Rusch et al. 2000). In the Eastern United States it occurs in the Appalachian Mountains as far south as Georgia and Alabama. This species is associated with mixed deciduous-coniferous forest types in early stages of succession. Optimal year-round cover includes a mixture of young and old forest that provides both food and cover. Management practices that create early successional forest in relatively small blocks, e.g., logging and prescribed burning, provide optimum habitat conditions.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-2.4 percent; 95 percent CI: -4.1 to -0.8). It is a species of concern due to declining populations that may be the result of reduction in early successional habitats. Ruffed grouse also is of interest because it is a game species. A management indicator species on the Nantahala and Pisgah National Forests, this species indicates management effects on species associated with early successional habitat, production of soft mast, and the ability of these national forests to provide public hunting opportunities.

Population trends for the ruffed grouse were estimated in three physiographic areas and five national forests (Table 5, Fig. 2). Trend estimates suggest that populations were stable to increasing on national forests across the Southern Region and in the Mid-Atlantic Ridge and Valley physiographic area. However, these trends were strongly influenced by the large number of occurrences and large increases on the George Washington and Jefferson National Forests. By contrast, trend estimates on the Cherokee and Nantahala/Pisgah National Forests showed large decreases, resulting in a large decreasing trend for the Southern Blue Ridge. Detections on the Chattahoochee and Daniel Boone National Forests were limited.

Although frequency of occurrence is relatively low, ruffed grouse was associated most frequently with glade-shrub-savanna habitats and both mature and sapling/pole stages of maple-beech-birch forests (Appendix 6).

Table 5.—Mean number of observations per count and percent annual change in number of observations per count of ruffed grouse on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.009	218	4.4	-0.3	9.4
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.044	130	11.4	5.7	17.3
Southern Blue Ridge	0.012	80	-11.6	-18.9	-3.5
Northern Cumberland Plateau	0.004	6	-15.6	-24.9	-5.1
National Forest					
George Washington and Jefferson	0.034	142	16.1	11.5	20.9
NFs in North Carolina	0.011	25	-12.4	-21.8	-1.9
Cherokee	0.020	42	-12.1	-16.6	-7.3
Chattahoochee and Oconee	0.004	6	14.3	9.9	18.8
Daniel Boone	0.004	6	-15.6	-24.9	-5.1

[a] Physiographic areas and national forests in which ruffed grouse occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

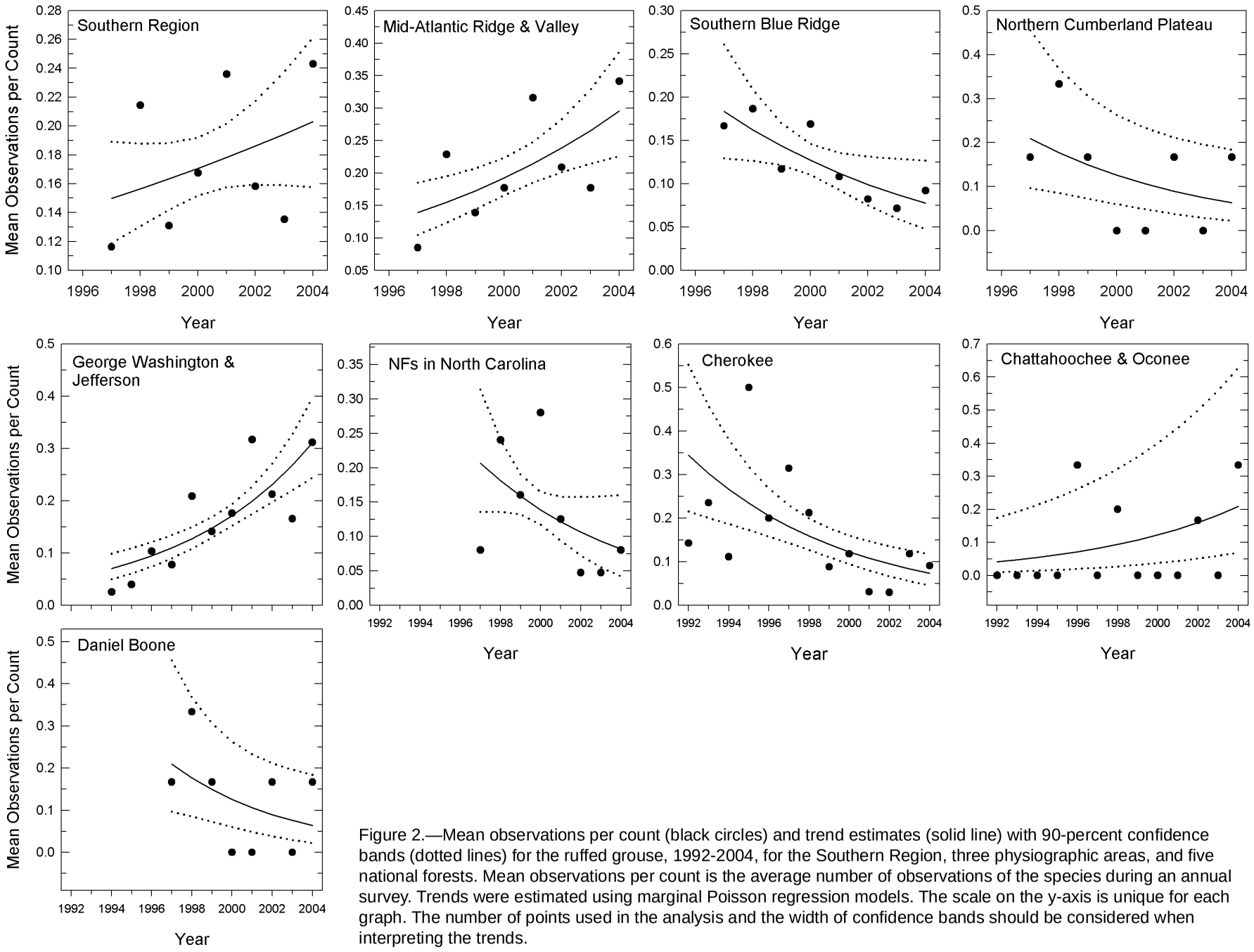


Figure 2.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the ruffed grouse, 1992-2004, for the Southern Region, three physiographic areas, and five national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Wild Turkey (*Meleagris gallopavo*)

The wild turkey is distributed widely throughout Eastern North America, from Southern Canada to the Gulf Coast (Eaton 1992). In the South, wild turkey uses upland forests of oaks, hickories, and pines as well as bottomland forest habitats, which include beech, gum, bald cypress, tupelo, and water ash. Habitat management centers on maintaining mature bottomland hardwood forest, open upland forests maintained with fire, and scattered openings dominated by herbaceous cover.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (13.6 percent; 95 percent CI: 11.5 to 15.6). Wild turkey is of interest because it is a game species in high demand and because of its association with both open, fire-maintained habitat and mature hardwood forests. A management indicator species on 13 national forests in the Southern Region, the eastern wild turkey indicates management effects for a variety of habitats and the ability of national forest land to meet hunting demand.

Population trends for the wild turkey were estimated in 10 physiographic areas and 14 national forests (Table 6, Fig. 3). Trend estimates suggest that populations were stable on national forests across the Southern Region and in most physiographic areas. Large increases were indicated for the Southern Cumberland Plateau/Ridge and Valley and for the West Gulf Coastal Plain. Increases also were indicated for the George Washington and Jefferson National Forests, Chattahoochee and Oconee National Forests, and National Forests in Alabama. Decreases were indicated for the Cherokee National Forest and National Forests in Florida.

Wild turkey was associated with a variety of habitat types but showed the greatest association with grass/forb stages of loblolly-shortleaf pine and hardwood-pine forest types, and shrub/seedling and sapling/pole stages of sand pine-scrub oak forests (Appendix 6).

Table 6.—Mean number of observations per count and percent annual change in number of observations per count of wild turkey on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.028	606	2.0	-1.3	5.4
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.031	113	0.3	-5.9	7.0
Southern Blue Ridge	0.021	108	-3.8	-9.6	2.4
Northern Cumberland Plateau	0.039	35	7.5	-4.6	21.1
Southern Cumberland Plateau/Ridge & Valley	0.030	34	18.3	8.3	29.2
Southern Piedmont	0.058	47	-2.4	-12.9	9.4
Interior Low Plateaus	0.044	52	9.4	-2.8	23.2
Ozark-Ouachita Interior Highlands	0.026	78	6.6	-3.0	17.1
West Gulf Coastal Plain	0.017	26	16.4	0.7	34.5
East Gulf Coastal Plain	0.024	80	-5.5	-12.3	1.8
South Atlantic Coastal Plain	0.025	33	-8.3	-16.8	1.1
National Forest					
George Washington and Jefferson	0.027	134	4.2	0.2	8.4
NFs in North Carolina	0.018	37	-3.6	-10.6	3.9
Cherokee	0.021	29	-5.6	-10.1	-0.9
Chattahoochee and Oconee	0.022	20	18.9	10.2	28.3
Francis Marion and Sumter	0.035	62	-0.8	-5.8	4.4
Daniel Boone	0.039	35	7.5	-4.6	21.1
NFs in Alabama	0.024	46	25.9	10.0	44.2
Land Between the Lakes	0.051	52	-2.4	-9.6	5.4
Ozark and St. Francis	0.012	20	-3.2	-11.8	6.1
Ouachita	0.036	60	9.4	-1.4	21.4
NFs in Texas	0.011	10	1.8	-16.8	24.6
Kisatchie	0.025	14	28.2	-0.4	64.8
NFs in Mississippi	0.026	63	-2.0	-5.2	1.4
NFs in Florida	0.049	28	-11.8	-20.2	-2.5

[a] Physiographic areas and national forests in which wild turkey occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

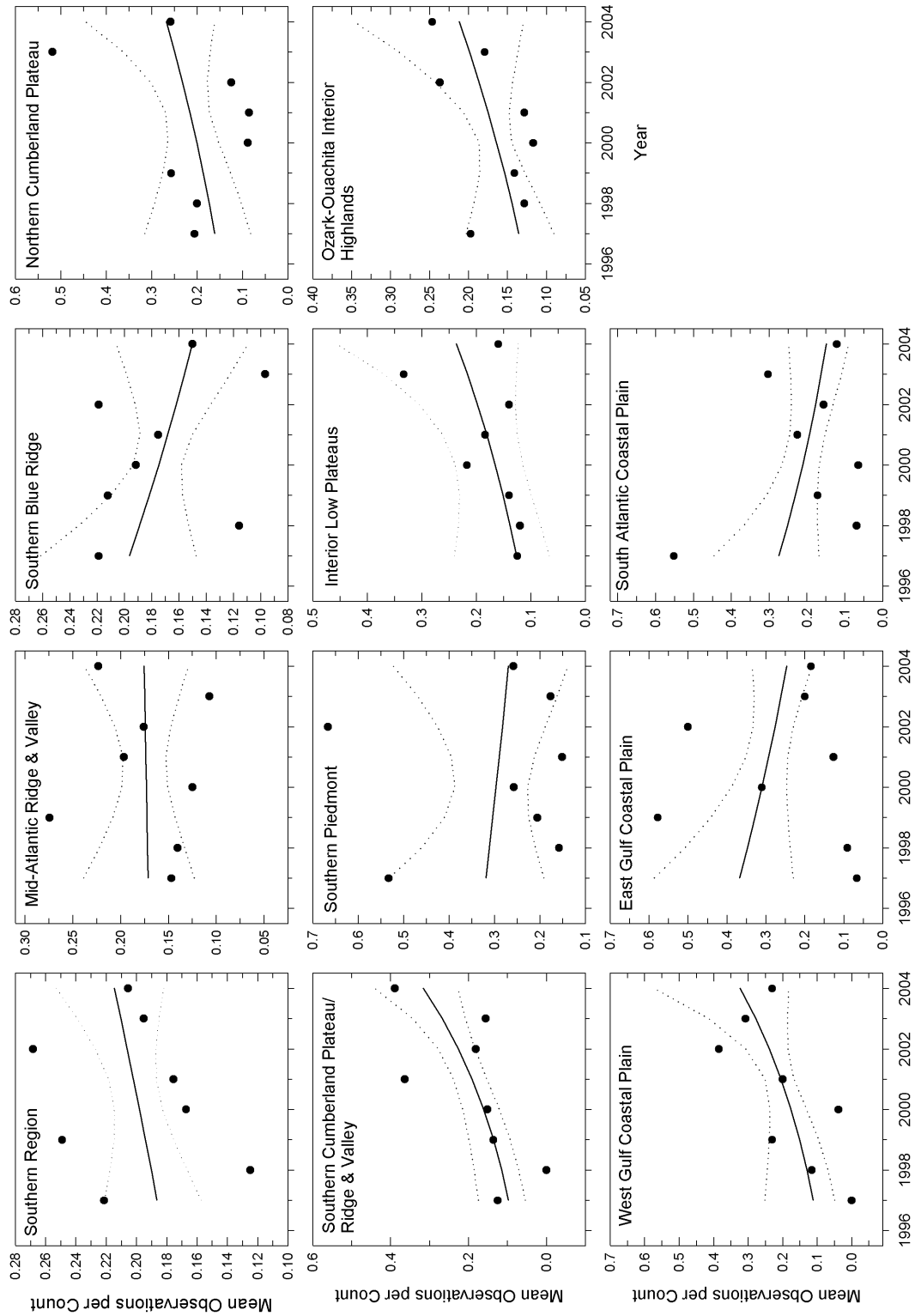
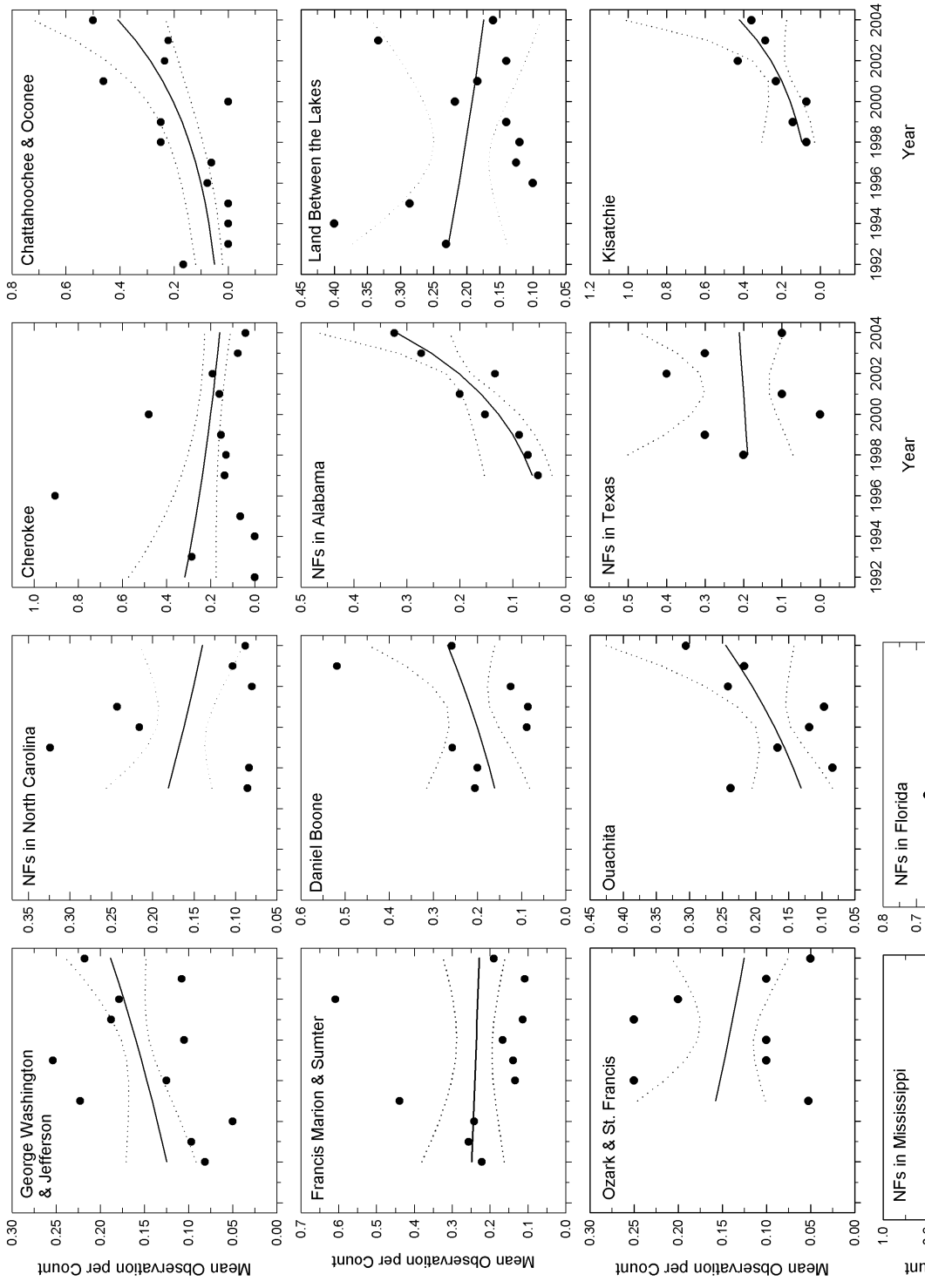


Figure 3.(continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the wild turkey, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 3.—Continued



Northern Bobwhite (*Colinus virginianus*)

The northern bobwhite is distributed widely throughout the Eastern United States and Mexico (Brennan 1999). In forest habitats, this bird prefers early seral conditions across a variety of vegetation types created by disturbance, e.g., fire, agriculture, and timber harvesting. In forest habitats, opportunities for management are best in well-drained upland pine and mixed pine-hardwood stands. It is essential that tree canopy cover be maintained at less than 50 percent to create open, park-like conditions. Frequent use of prescribed fire maintains optimum habitat conditions in southern pine forests.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-3.0 percent; 95 percent CI: -3.3 to -2.7). Northern bobwhite is of interest and concern because it is an important game bird and because the abundance and quality of its habitats have declined significantly, primarily due to clean farming practices and fire suppression. A management indicator species on 11 national forests in the Southern Region, northern bobwhite indicates management effects on fire-maintained open forest and grassland habitats and the ability of national forests to meet hunting demand.

Population trends for the northern bobwhite were estimated in nine physiographic areas and in 14 national forests (Table 7, Fig. 4). Trend estimates suggest populations experienced large decreases on national forests across the Southern Region. Estimates were negative for all physiographic areas, with six of nine having 90 percent confidence intervals excluding zero. Estimates for all but one national forest were negative, with 9 of 14 having 90 percent confidence intervals excluding zero.

Northern bobwhite was associated most frequently with grass/forb stages of pine and hardwood-pine forests (Appendix 6). It also was highly associated with all successional stages of longleaf-slash pine forests, and to a lesser extent with later successional stages of loblolly-shortleaf pine forests. Across forest types, northern bobwhite was associated most frequently with longleaf-slash pine forests.

Table 7.—Mean number of observations per count and percent annual change in number of observations per count of northern bobwhite on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.071	1045	-10.2	-12.0	-8.3
Physiographic Area					
Southern Blue Ridge	0.013	66	-17.2	-22.7	-11.4
Northern Cumberland Plateau	0.015	13	-12.4	-26.6	4.6
Southern Cumberland Plateau/Ridge & Valley	0.031	35	-5.0	-11.6	2.1
Southern Piedmont	0.256	139	-17.3	-21.7	-12.8
Ozark-Ouachita Interior Highlands	0.087	141	-1.1	-6.3	4.4
West Gulf Coastal Plain	0.081	98	-10.4	-16.9	-3.4
East Gulf Coastal Plain	0.096	312	-15.6	-18.3	-12.7
South Atlantic Coastal Plain	0.297	191	-6.1	-9.5	-2.6
National Forest					
George Washington and Jefferson	0.004	12	-28.7	-33.2	-23.8
NFs in North Carolina	0.043	50	3.9	-4.0	12.3
Cherokee	0.009	14	-9.3	-15.1	-3.0
Chattahoochee and Oconee	0.045	36	-6.2	-10.0	-2.3
Francis Marion and Sumter	0.296	210	-10.0	-12.6	-7.3
Daniel Boone	0.015	13	-12.4	-26.6	4.6
NFs in Alabama	0.073	82	-11.3	-16.0	-6.3
Land Between the Lakes	0.062	49	-24.5	-26.9	-21.9
Ozark and St. Francis	0.042	26	-2.2	-10.1	6.3
Ouachita	0.114	120	-0.8	-7.0	5.8
NFs in Texas	0.063	40	-12.8	-21.8	-2.7
Kisatchie	0.119	53	-8.4	-17.1	1.1
NFs in Mississippi	0.097	253	-6.1	-7.9	-4.2
NFs in Florida	0.258	91	-10.2	-14.2	-5.9

[a] Physiographic areas and national forests in which northern bobwhite occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

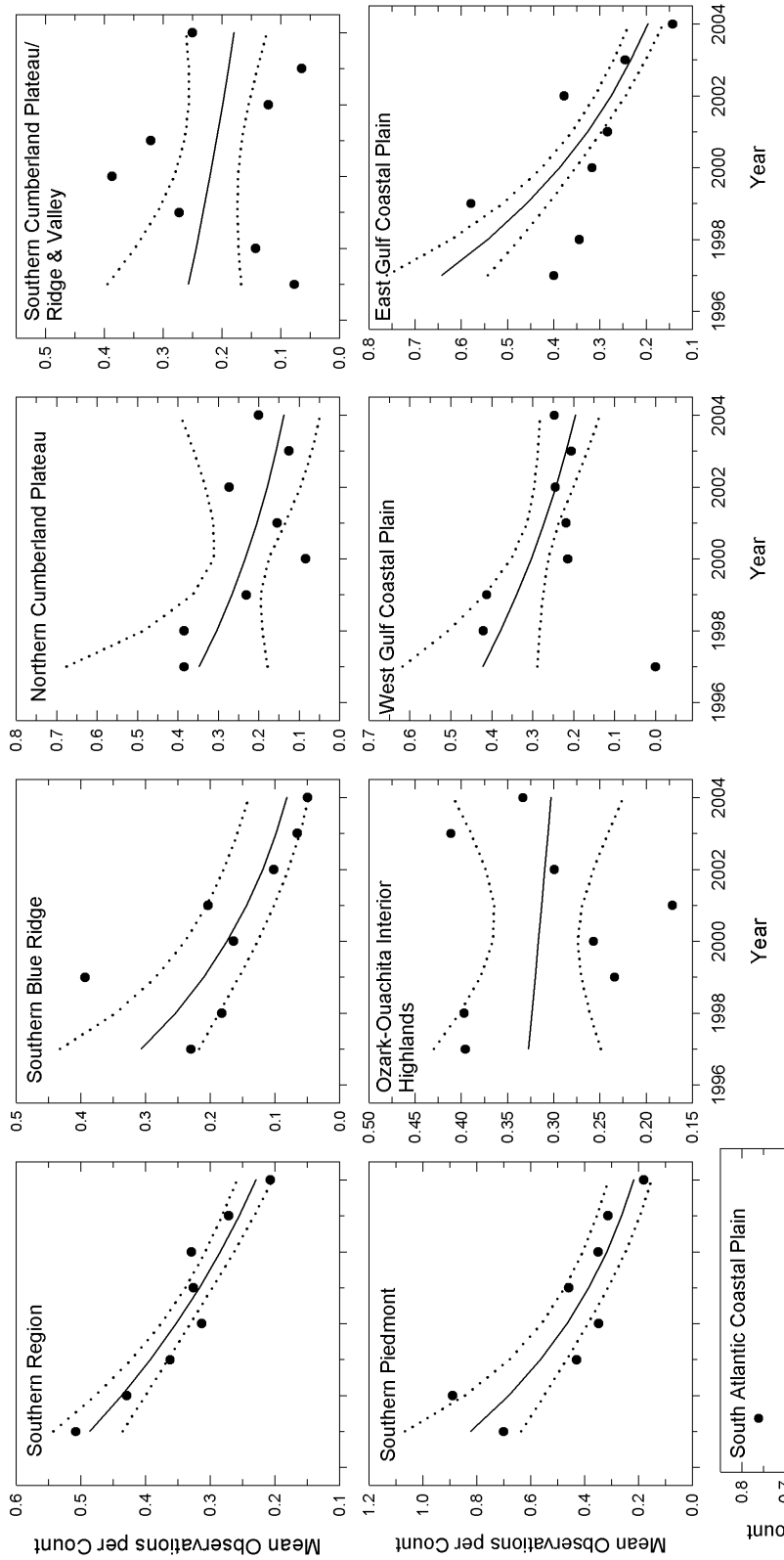
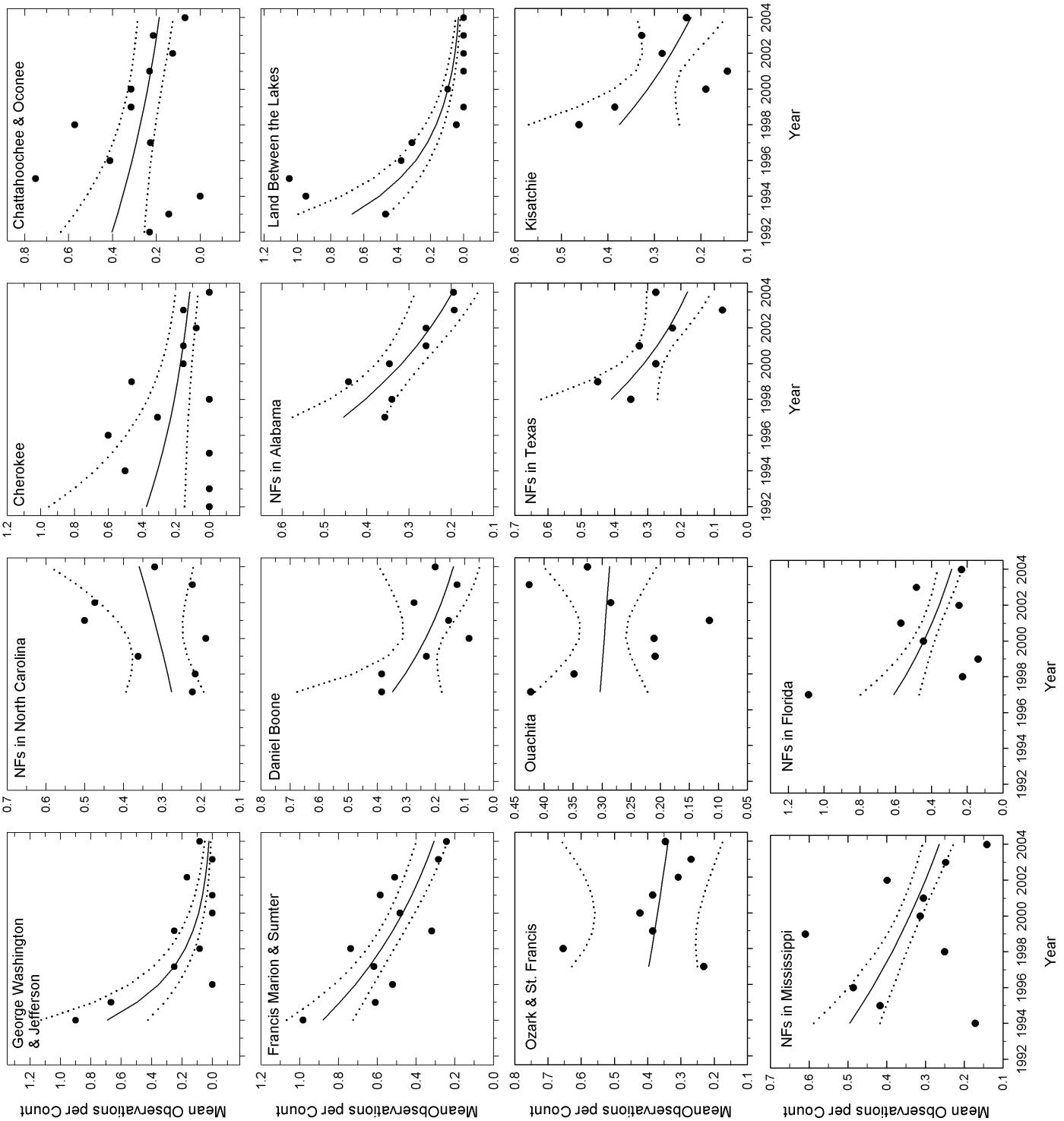


Figure 4.(continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the northern bobwhite, 1992-2004, for the Southern Region, nine physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 4.—Continued



Black-billed Cuckoo (*Coccyzus erythropthalmus*)

The black-billed cuckoo's (Hughes 2001) breeding range includes most of the Northern United States east of the Rocky Mountains (Hughes 2001). In the South, it breeds in the Appalachian Mountains and Cumberland Plateau regions. Habitat for this species is variable as it occurs in high-elevation hardwood forests, cove hardwoods, and oak-hickory forest types, often where tangles are present. This bird is often found in edges and clearings of young deciduous and mixed deciduous-coniferous woods, orchards, and berry patches. There is no consensus as to what constitutes appropriate management for the black-billed cuckoo.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-1.5 percent; 95 percent CI: -2.4 to -0.7). It is a bird of conservation concern in the Appalachian Mountains Region due to declining populations. Causes for this decline are not well understood, but may include pesticide use and a reduction in the availability of insect prey. Because of its rarity and variable habitat association, this species is not selected as a management indicator species.

Population trends for the black-billed cuckoo were estimated in two physiographic areas and two national forests (Table 8, Fig. 5). Estimates indicate a stable to declining population on national forests across the Southern Region. Declines are indicated for the George Washington and Jefferson National Forests, where the number of detections is relatively large. There were insufficient detections on other national forests for reliable estimates, but this species was associated most frequently with glade-shrub-savanna habitats and mature maple-beech-birch forests (Appendix 6).

Table 8.—Mean number of observations per count and percent annual change in the number of observations per count of black-billed cuckoo on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.004	114	-3.1	-9.5	3.8
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.017	80	-5.2	-13.0	3.3
Southern Blue Ridge	0.004	23	2.0	-7.1	12.1
National Forest					
George Washington and Jefferson	0.018	95	-5.3	-9.6	-0.8
Cherokee	0.004	6	12.5	-2.6	30.1

[a] Physiographic areas and national forests in which black-billed cuckoo occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

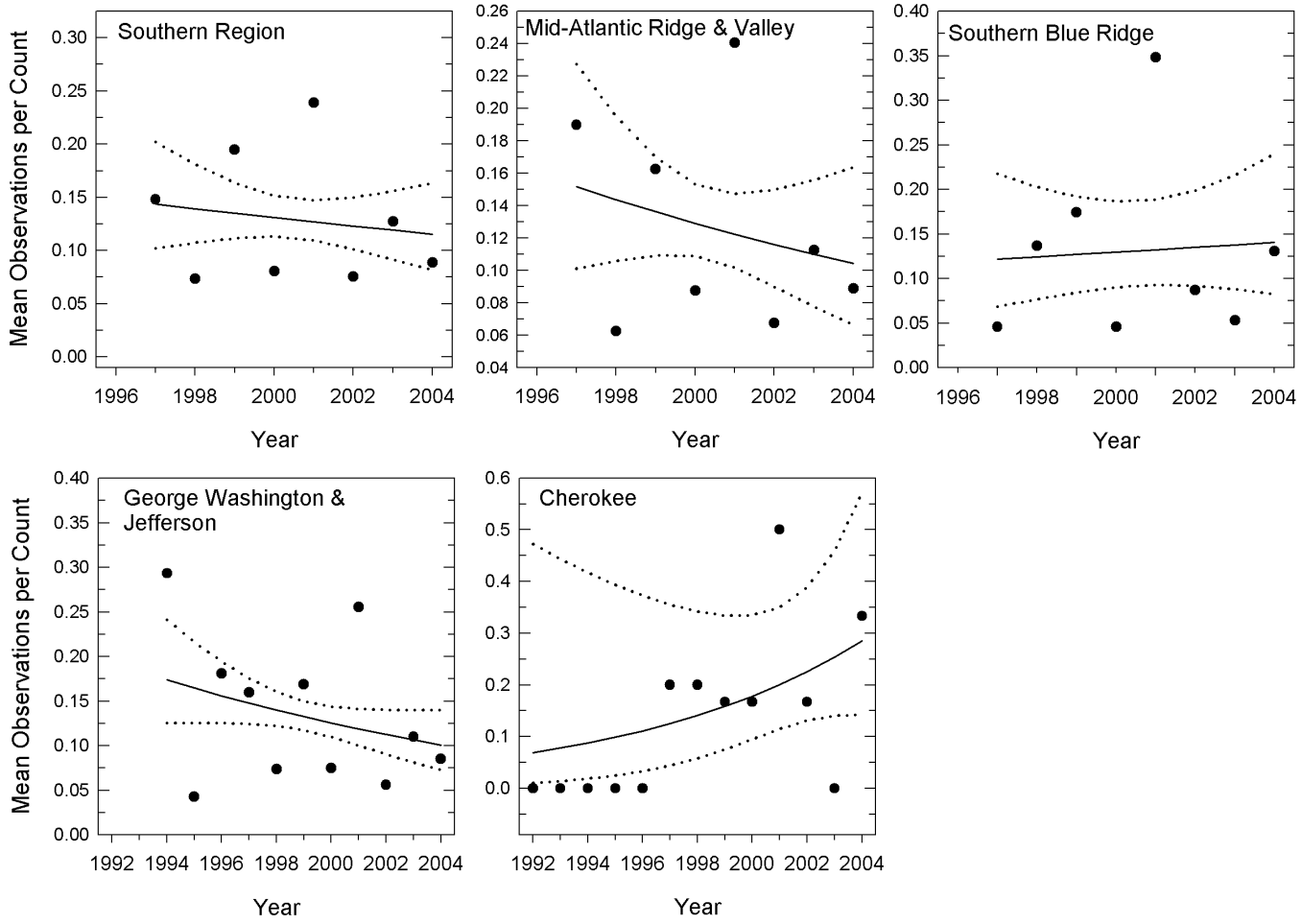


Figure 5.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the black-billed cuckoo, 1992-2004, for the Southern Region, two physiographic areas, and two national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Yellow-billed Cuckoo (*Coccyzus americanus*)

The yellow-billed cuckoo breeds throughout much of the United States, Southeastern Canada, the Greater Antilles, and Mexico (Hughes 1999), wintering primarily in South America. This species prefers to nest in open woodlands with clearings as well as low scrubby vegetation associated with riparian areas. In the South, it occupies hammocks and hardwood forests. Management centers on the maintenance of riparian areas with dense understory vegetation.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-1.7 percent; 95 percent CI: -2.0 to -1.5). This bird is of concern due to population declines associated with habitat loss and fragmentation. The yellow-billed cuckoo is a management indicator species only on the Kisatchie National Forest, where it indicates management effects on small-stream riparian habitats.

Population trends for the yellow-billed cuckoo were estimated in 10 physiographic areas and in 14 national forests (Table 9, Fig. 6). Estimates indicate that populations increased moderately on national forests across the Southern Region. Estimates were positive for 7 of 10 physiograpic areas, with 5 having 90 percent confidence intervals excluding zero. Similarly, trend estimates for 9 of 14 national forests were positive, with 6 having 90 percent confidence intervals excluding zero. Declines were indicated only for the Interior Low Plateau represented by Land Between the Lakes, and the East Gulf Coastal Plain, influenced by declines on National Forests in Mississippi.

The yellow-billed cuckoos is associated with a variety of habitats but was associated most frequently with riparian, elm-ash-cottonwood, and oak-gum-cypress forest types (Appendix 6). It generally was equally associated with each successional stage across all forest types.

Table 9.—Mean number of observations per count and percent annual change in number of observations per count of yellow-billed cuckoo on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.318	3318	3.4	2.7	4.2
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.195	400	9.1	7.1	11.0
Southern Blue Ridge	0.134	393	19.8	16.9	22.8
Northern Cumberland Plateau	0.393	136	8.0	5.0	11.1
Southern Cumberland Plateau/Ridge & Valley	0.277	173	6.3	2.6	10.1
Southern Piedmont	0.357	205	3.1	-0.4	6.7
Interior Low Plateaus	0.604	207	-5.9	-7.8	-3.9
Ozark-Ouachita Interior Highlands	0.449	459	3.0	1.4	4.6
West Gulf Coastal Plain	0.480	289	-0.8	-3.2	1.7
East Gulf Coastal Plain	0.392	881	-2.0	-3.8	-0.3
South Atlantic Coastal Plain	0.256	175	3.3	-0.3	7.0
National Forest					
George Washington and Jefferson	0.194	496	6.1	4.7	7.4
NFs in North Carolina	0.073	77	17.5	12.0	23.2
Cherokee	0.142	162	3.4	1.0	5.8
Chattahoochee and Oconee	0.212	135	1.7	-0.8	4.3
Francis Marion and Sumter	0.449	342	-0.3	-2.0	1.4
Daniel Boone	0.393	136	8.0	5.0	11.1
NFs in Alabama	0.249	250	9.7	6.6	13.0
Land Between the Lakes	0.691	207	-7.0	-8.1	-5.9
Ozark and St. Francis	0.371	208	6.7	4.2	9.2
Ouachita	0.527	290	0.6	-1.2	2.5
NFs in Texas	0.457	152	1.3	-2.2	4.8
Kisatchie	0.491	114	-0.8	-4.7	3.2
NFs in Mississippi	0.432	755	-2.5	-3.6	-1.4
NFs in Florida	0.069	44	-3.6	-18.6	14.2

[a] Physiographic areas and national forests in which yellow-billed cuckoo occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

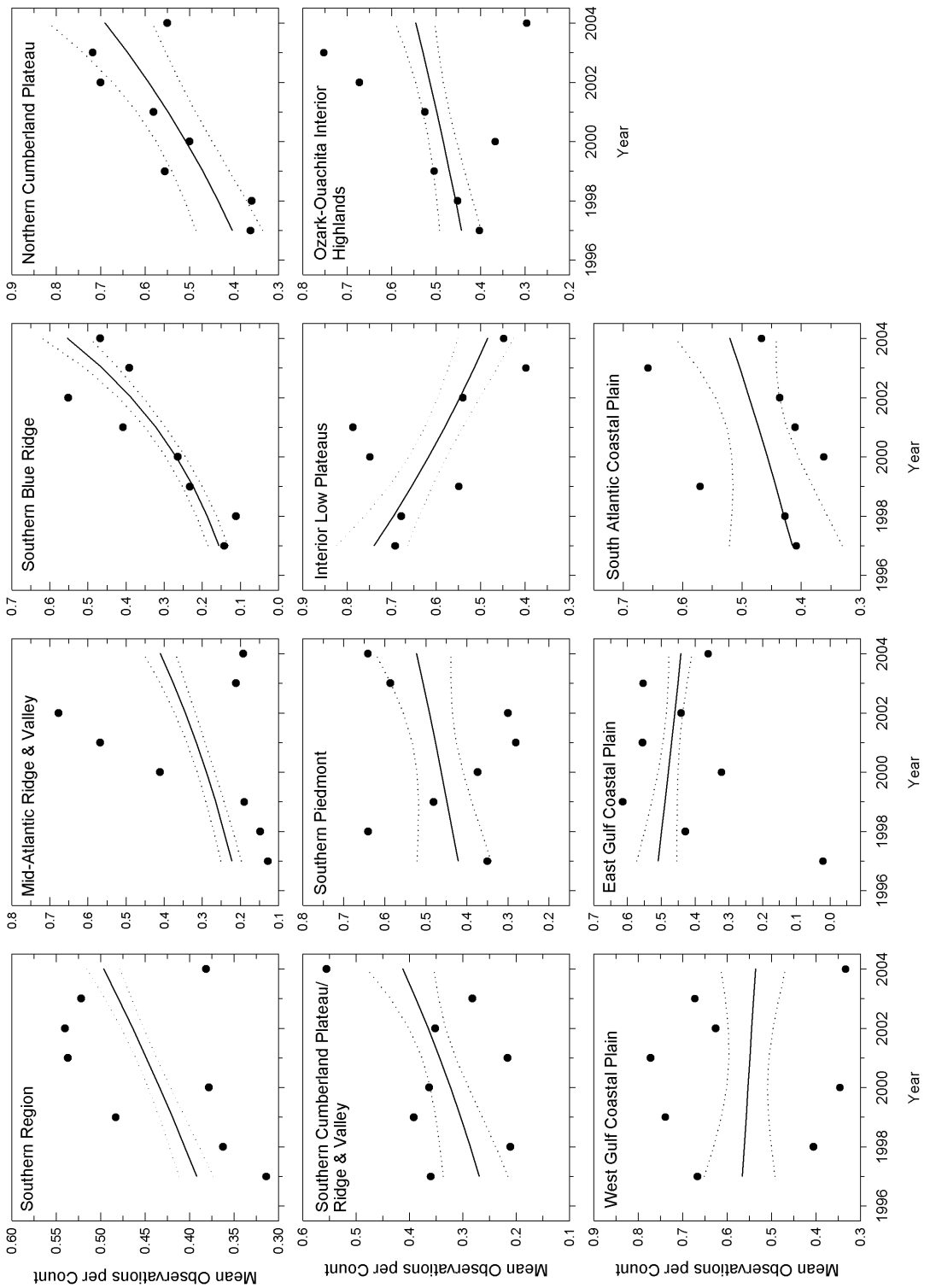
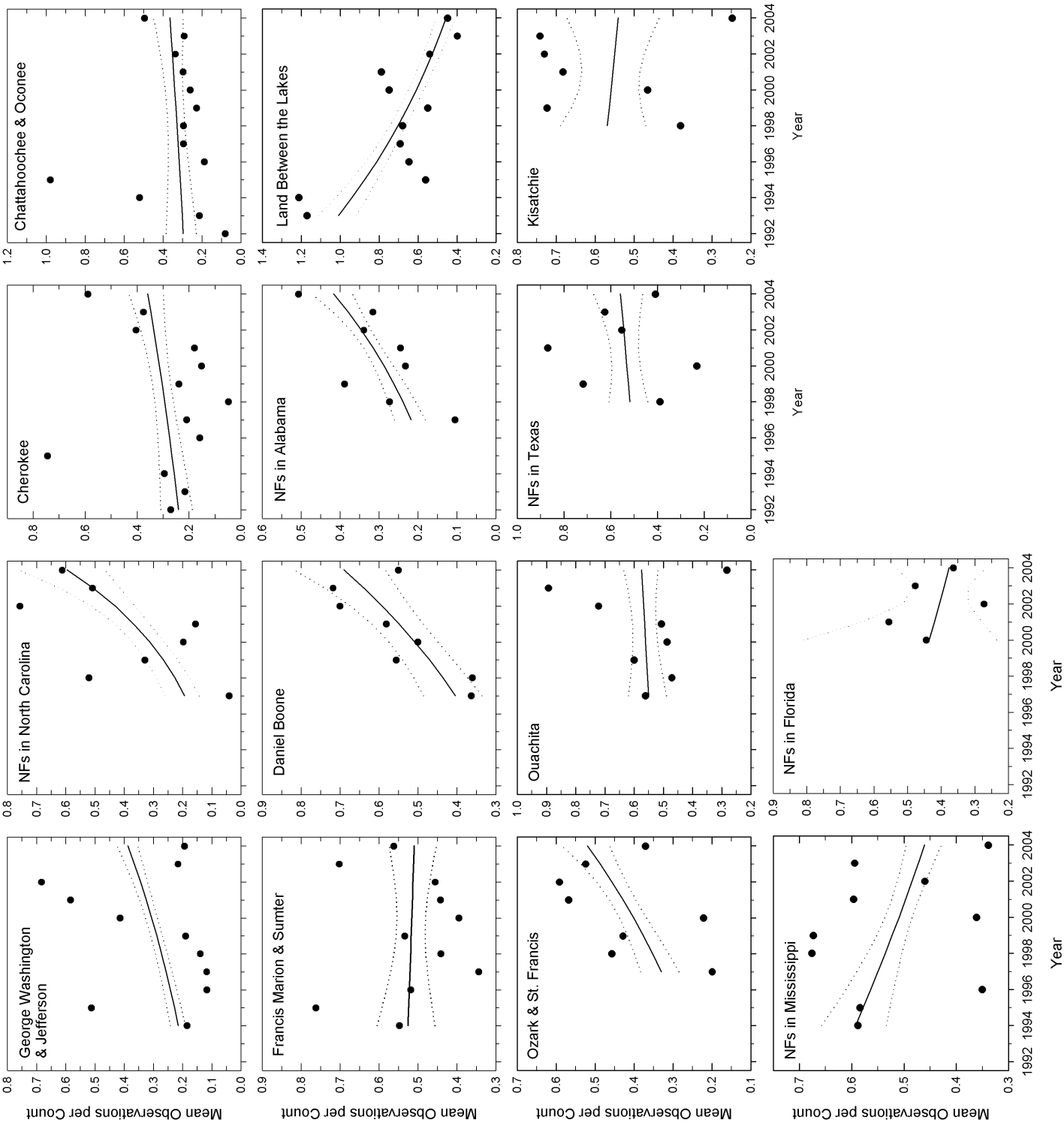


Figure 6. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the yellow-billed cuckoo, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 6.—Continued



Red-headed Woodpecker (*Melanerpes erythrocephalus*)

The red-headed woodpecker breeds throughout the Eastern United States and Southern Canada east of the Rocky Mountains (Smith et al. 2000). It winters within the same area except for the western and northern extremes of its range. This species is commonly found in deciduous woodlands. In the South, it is found in pine scrub, mixed pine and hardwood forest, pine flatwoods, pine-oak savanna and long-leaf pine forests. The red-headed woodpecker prefers open forests with a sparse understory and abundant snags. Management programs that focus on creating or maintaining snags benefit this species. Prescribed burning, thinning, and woodland restoration have also a positive effect.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-2.7 percent; 95 percent CI: -3.3 to -2.1). This bird is of concern because of the loss of suitable forest habitat. It is a bird of conservation concern in the Central Hardwoods, West Gulf Coastal Plain/ Ouachitas, Mississippi Alluvial Valley, Appalachian Mountains, and Peninsular Florida regions. The red-headed woodpecker is a management indicator species on the Kisatchie National Forest, where it indicates management effects on longleaf pine forests and woodlands, and on the Ozark National Forest, where it indicates management effects on the restoration of oak woodland.

Population trends for the red-headed woodpecker were estimated in nine physiographic areas and in 13 national forests (Table 10, Fig. 7). Estimates indicate stable populations on national forests across the region. Several estimates for physiographic areas and individual national forests (Northern Cumberland Plateau, Interior Low Plateau, Daniel Boone National Forest, and National Forests in North Carolina) represent both positive and negative extreme values. Although the 90 percent confidence intervals for these estimates may exclude zero, they are based on relatively small numbers of detections and should be interpreted with caution. More robust estimates of note are declines suggested for the Southern Blue Ridge, the Francis Marion and Sumter National Forests, and the Ouachita National Forest, and increases on the National Forests in Alabama.

The red-headed woodpecker was associated with a variety of forest types and successional conditions but was associated most frequently with early successional stages of pine forest types (Appendix 6). Later successional stages of pine forest types also supported relatively high frequency of occurrence.

Table 10.—Mean number of observations per count and percent annual change in number of observations per count of red-headed woodpecker on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.062	995	-1.0	-3.3	1.3
Physiographic Area					
Southern Blue Ridge	0.005	33	-14.7	-25.9	-2.0
Northern Cumberland Plateau	0.021	20	119.4	103.5	136.6
Southern Cumberland Plateau/Ridge & Valley	0.062	55	9.6	-0.6	20.9
Southern Piedmont	0.171	106	1.5	-4.4	7.8
Interior Low Plateaus	0.004	19	-54.4	-57.5	-51.2
Ozark-Ouachita Interior Highlands	0.013	35	-13.1	-24.5	0.1
West Gulf Coastal Plain	0.137	94	-4.4	-9.9	1.5
East Gulf Coastal Plain	0.107	411	-0.6	-4.6	3.6
South Atlantic Coastal Plain	0.268	217	-2.0	-5.6	1.8
National Forest					
George Washington and Jefferson	0.001	6	6.9	0.1	14.2
NFs in North Carolina	0.015	22	31.6	19.1	45.4
Chattahoochee and Oconee	0.037	31	3.7	-2.5	10.3
Francis Marion and Sumter	0.184	195	-7.1	-9.8	-4.4
Daniel Boone	0.021	20	119.4	103.5	136.6
NFs in Alabama	0.075	108	10.0	3.4	17.0
Land Between the Lakes	0.010	19	-16.4	-17.3	-15.6
Ozark and St. Francis	0.010	10	0.5	-13.3	16.6
Ouachita	0.020	35	-13.9	-25.7	-0.3
NFs in Texas	0.179	46	-5.5	-12.5	2.2
Kisatchie	0.089	39	-2.9	-11.7	6.9
NFs in Mississippi	0.121	354	-2.0	-4.1	0.3
NFs in Florida	0.359	114	3.5	-1.3	8.5

[a] Physiographic areas and national forests in which red-headed woodpecker occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

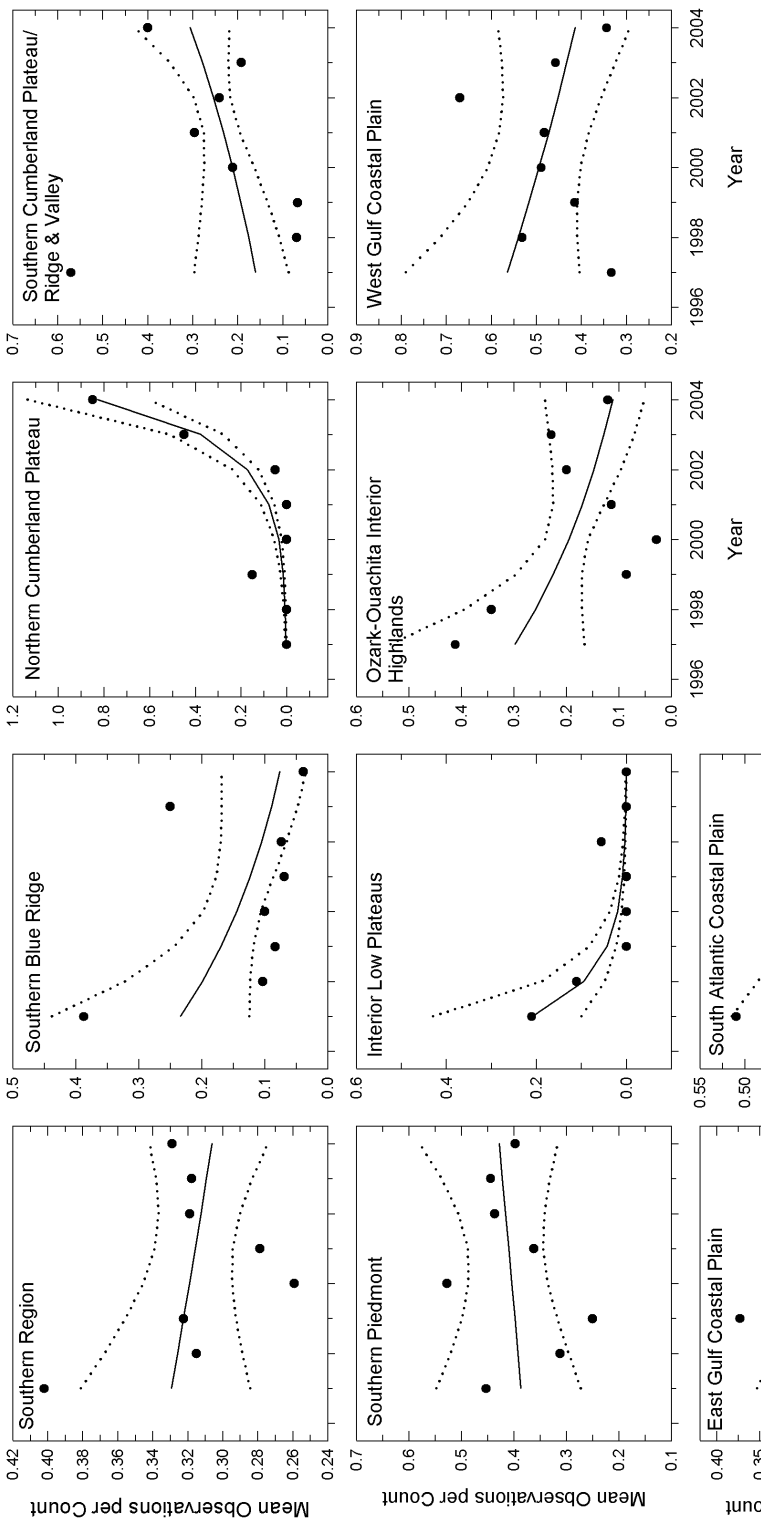
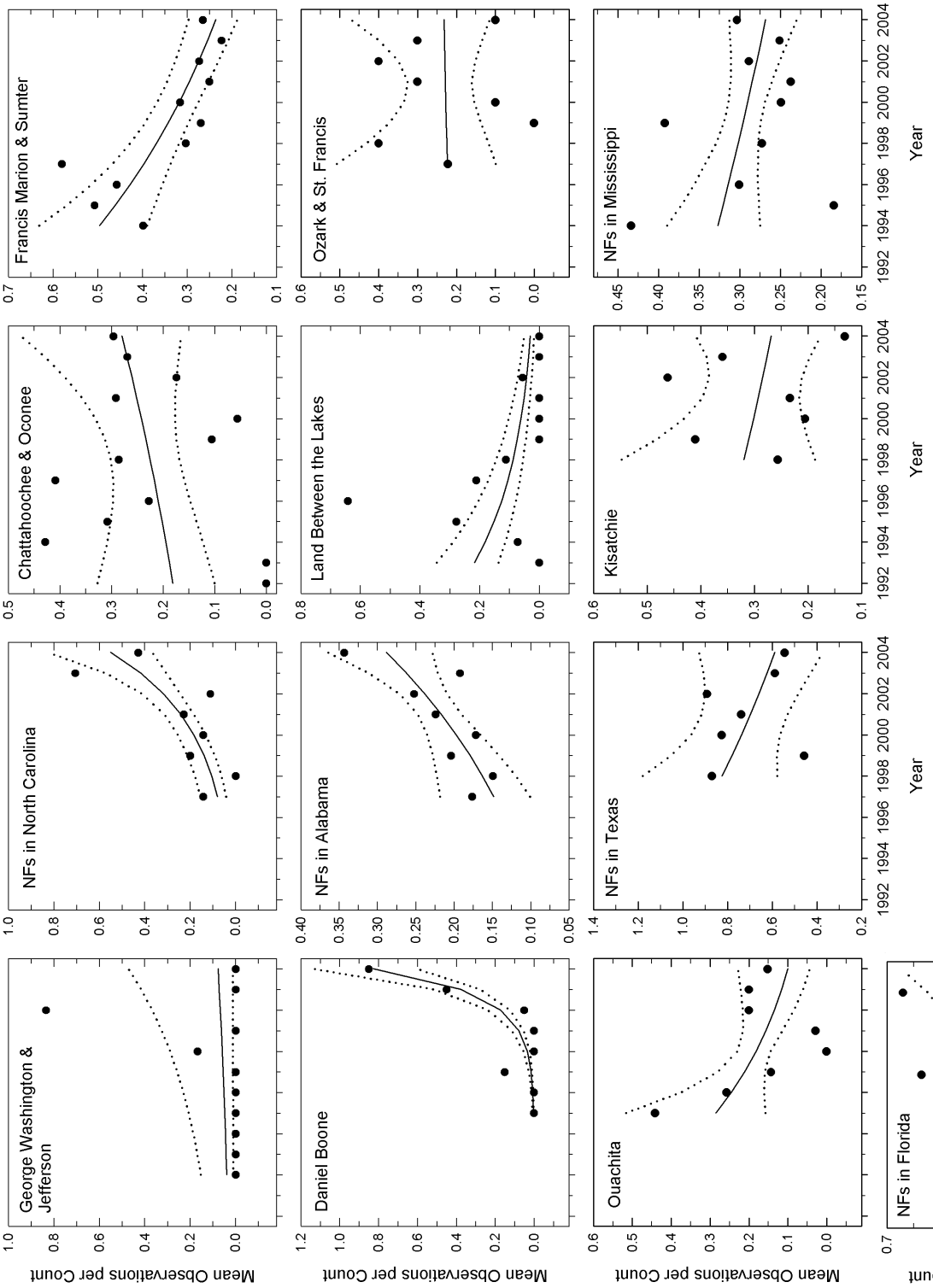


Figure 7. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the red-headed woodpecker, 1992-2004, for the Southern Region, nine physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 7.—Continued



Downy Woodpecker (*Picoides pubescens*)

The downy woodpecker is a year-round resident coast to coast and from the tree line in Canada and Alaska to southern Florida and the forests of southern California (Jackson and Ouellet 2002). Often it is found in open, deciduous forests and riparian corridors throughout its range. This species is less abundant in coniferous forests except when it is associated with deciduous understory. Thinning of forest habitats is beneficial for this species as it prefers more open forests.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.0 percent; 95 percent CI: -0.3 to 0.4). The downy woodpecker is a management indicator species only for the national forests in Mississippi, where it indicates effects of management on mature slash pine forests.

Population trends for the downy woodpecker were estimated in 10 physiographic areas and in 14 national forests (Table 11, Fig. 8). Trend estimates suggest that populations have increased moderately on national forests across the region. Estimates were positive for six physiographic areas, with five having 90 percent confidence intervals excluding zero. Similarly, trend estimates for 10 of 14 national forests were positive, with 7 having 90 percent confidence intervals excluding zero. Declines were indicated only for the Mid-Atlantic Ridge and Valley represented by the George Washington and Jefferson National Forests, for the East Gulf Coastal Plain, and for the Francis Marion and Sumter National Forests.

The downy woodpecker was detected with relatively high frequency of occurrence across a variety of habitats (Appendix 6). It was associated most frequently with all successional stages of elm-ash-cottonwood forest and sand pine-oak forest.

Table 11.—Mean number of observations per count and percent annual change in number of observations per count of downy woodpecker on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.110	2111	3.3	1.9	4.7
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.070	263	-6.3	-9.8	-2.7
Southern Blue Ridge	0.076	343	-1.2	-4.5	2.2
Northern Cumberland Plateau	0.128	105	14.0	8.9	19.3
Southern Cumberland Plateau/Ridge & Valley	0.066	71	15.6	5.6	26.7
Southern Piedmont	0.148	123	-3.9	-9.4	1.8
Interior Low Plateaus	0.167	164	13.3	8.5	18.3
Ozark-Ouachita Interior Highlands	0.146	312	7.0	3.4	10.8
West Gulf Coastal Plain	0.121	135	7.8	2.8	13.1
East Gulf Coastal Plain	0.120	432	-3.8	-6.9	-0.7
South Atlantic Coastal Plain	0.148	163	2.6	-1.2	6.5
National Forest					
George Washington and Jefferson	0.075	337	-2.7	-4.8	-0.4
NFs in North Carolina	0.056	83	-2.2	-9.2	5.4
Cherokee	0.078	136	4.4	1.3	7.6
Chattahoochee and Oconee	0.139	115	0.1	-2.8	3.1
Francis Marion and Sumter	0.113	177	-6.5	-9.4	-3.6
Daniel Boone	0.128	105	14.0	8.9	19.3
NFs in Alabama	0.059	96	1.0	-5.1	7.5
Land Between the Lakes	0.160	164	6.7	3.9	9.5
Ozark and St. Francis	0.174	165	-0.4	-4.5	3.9
Ouachita	0.136	176	12.0	6.8	17.6
NFs in Texas	0.125	76	14.9	8.2	21.9
Kisatchie	0.103	45	3.6	-5.0	12.9
NFs in Mississippi	0.116	372	4.9	2.5	7.4
NFs in Florida	0.184	79	6.4	1.3	11.7

[a] Physiographic areas and national forests in which downy woodpecker occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

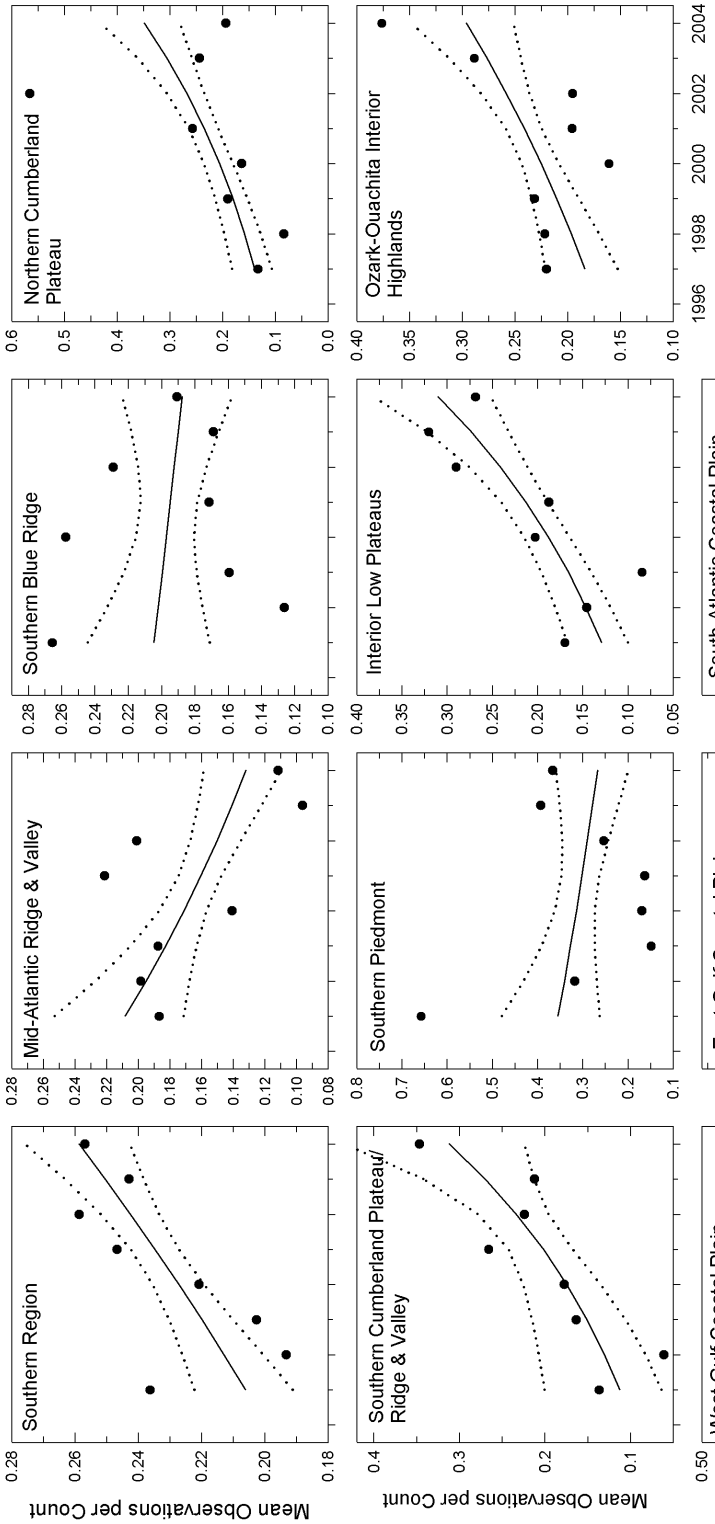
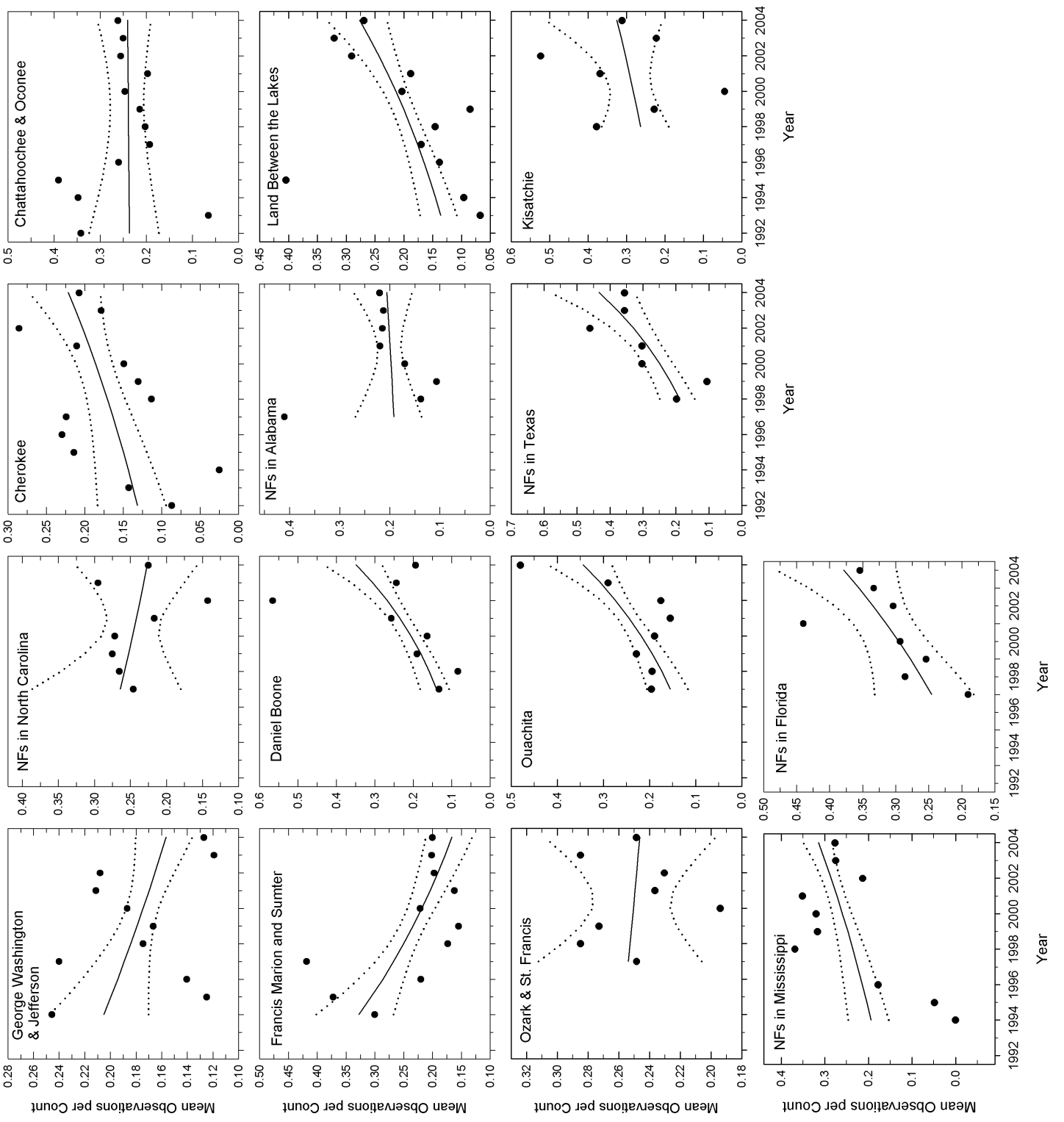


Figure 8. (contunied on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the downy woodpecker, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 8.—Continued



Northern Flicker (*Colaptes auratus*)

The northern flicker is a year-round resident of most of the United States (Moore 1995). This species prefers forest edge and open woodlands and savannas; however, the variation in tree species composition of its habitat is as broad as the species' geographic range. Forest management practices that restore woodlands and retain snags greatly benefit this bird.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-2.0 percent; 95 percent CI: -2.3 to -1.7). It is of interest because as a primary cavity excavator, the northern flicker creates many of the cavities used later by other hole-nesting species. It is a management indicator species on the George Washington National Forest, where it indicates management effects on cavity nesters.

Population trends for the northern flicker were estimated in 10 physiographic areas and in 14 national forests (Table 12, Fig. 9). Trend estimates suggest that populations have been stable on national forests across the region. Positive trends were indicated for the Mid-Atlantic Ridge and Valley represented by the George Washington and Jefferson National Forests, the West Gulf Coastal Plain, National Forests in North Carolina, Cherokee National Forest, and National Forests in Texas. Declines were indicated for the Interior Low Plateaus represented by Land Between the Lakes, Ozark-Ouachita Interior Highlands influenced by large declines on the Ouachita National Forest, Francis Marion and Sumter National Forests, and National Forests in Florida.

The northern flickers was detected in a variety of habitat types, but was associated most frequently with the grass/forb stage of longleaf-slash pine forest and all successional stages of elm-ash-cottonwood forest and sand pine-oak forest (Appendix 6). Across forest types, flickers were more highly associated with early successional stages than later successional stages.

Table 12.—Mean number of observations per count and percent annual change in number of observations per count of northern flicker on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.061	1312	1.3	-0.6	3.3
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.050	167	7.5	2.5	12.7
Southern Blue Ridge	0.060	283	0.3	-3.3	4.1
Northern Cumberland Plateau	0.066	70	8.4	-0.4	18.0
Southern Cumberland Plateau/Ridge & Valley	0.090	86	2.3	-3.5	8.4
Southern Piedmont	0.114	118	-0.4	-6.4	6.0
Interior Low Plateaus	0.007	27	-27.8	-31.5	-23.8
Ozark-Ouachita Interior Highlands	0.034	85	-11.6	-17.8	-4.9
West Gulf Coastal Plain	0.038	59	17.2	7.2	28.1
East Gulf Coastal Plain	0.046	226	0.7	-4.5	6.2
South Atlantic Coastal Plain	0.196	191	-0.5	-5.1	4.4
National Forest					
George Washington and Jefferson	0.052	235	6.0	3.1	9.0
NFs in North Carolina	0.056	73	16.7	7.4	26.8
Cherokee	0.065	103	9.0	5.1	13.0
Chattahoochee and Oconee	0.065	67	-4.0	-7.8	0.0
Francis Marion and Sumter	0.184	238	-6.6	-9.0	-4.2
Daniel Boone	0.066	70	8.4	-0.4	18.0
NFs in Alabama	0.055	87	-1.8	-6.9	3.6
Land Between the Lakes	0.014	27	-16.5	-19.2	-13.8
Ozark and St. Francis	0.039	37	-4.0	-11.5	4.2
Ouachita	0.029	54	-16.7	-24.5	-8.2
NFs in Texas	0.040	29	30.4	13.7	49.5
Kisatchie	0.038	25	-0.7	-14.0	14.6
NFs in Mississippi	0.052	205	-0.4	-3.1	2.5
NFs in Florida	0.157	78	-8.1	-14.3	-1.4

[a] Physiographic areas and national forests in which northern flicker occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

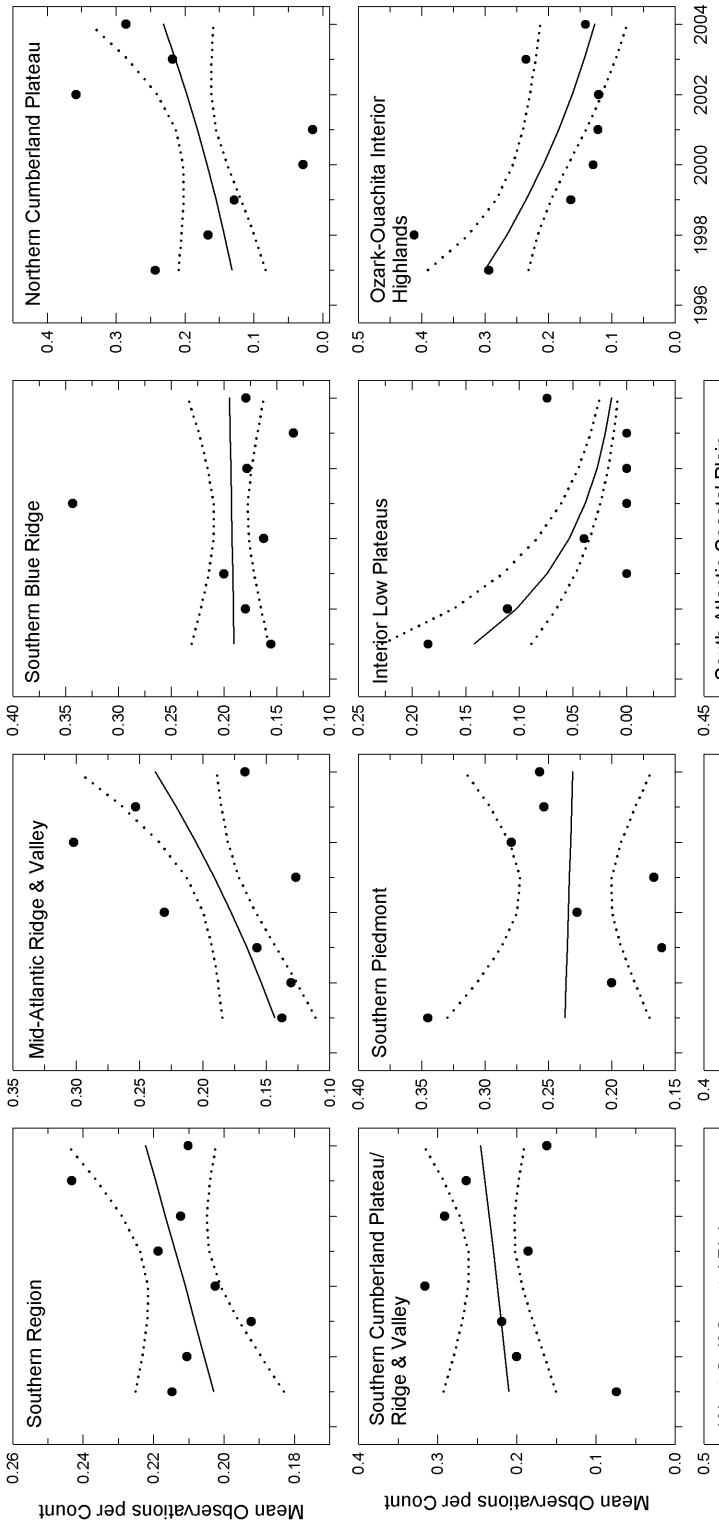
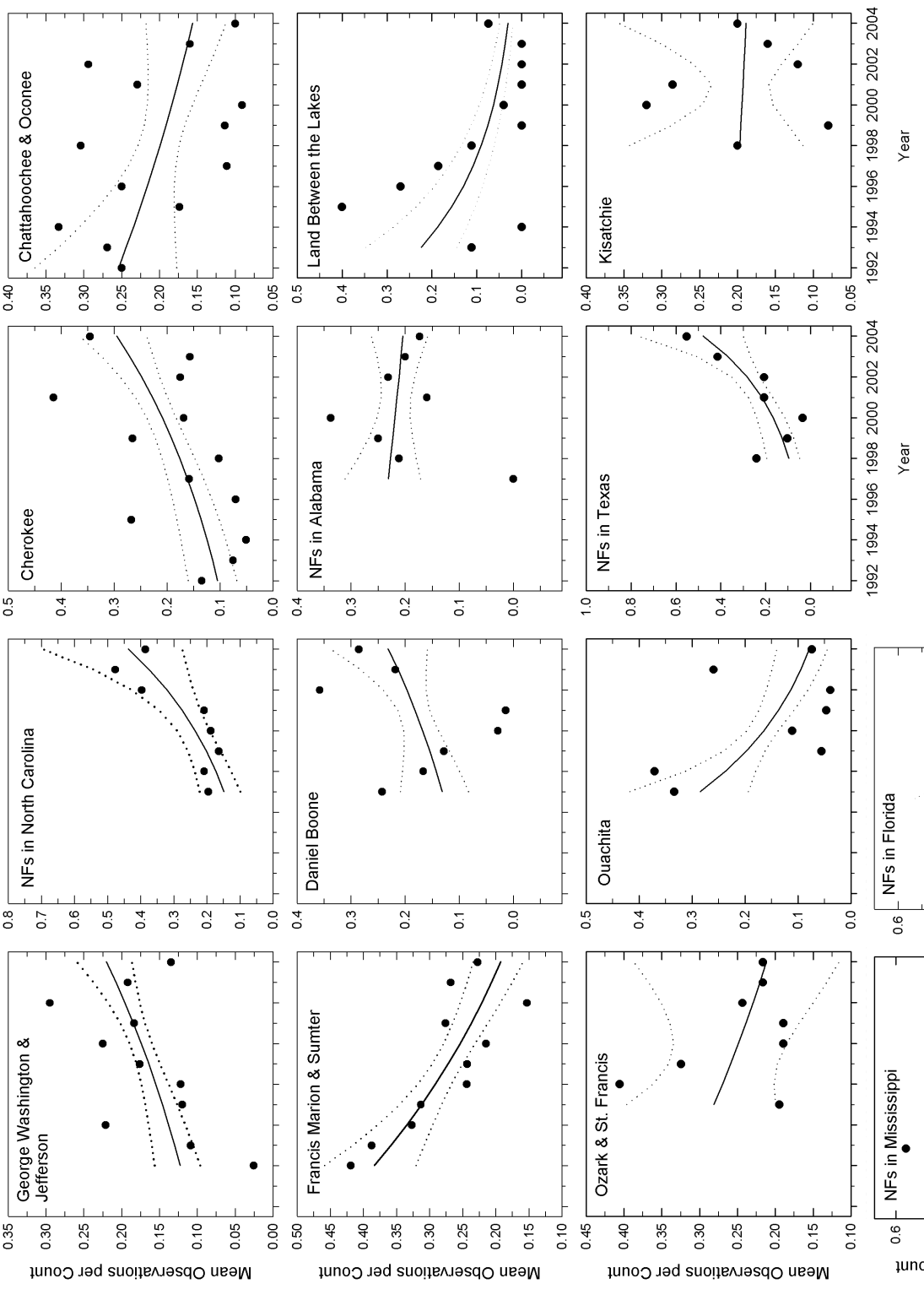


Figure 9. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the northern (yellow-shafted) flicker, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 9.—Continued



Pileated Woodpecker (*Dryocopus pileatus*)

The pileated woodpecker is a permanent resident of deciduous or coniferous forests in Southern Canada and in the Western, Midwestern, and Eastern United States (Bull and Jackson 1995). Habitat for this species consists of extensive areas of late successional coniferous or deciduous forest. However, young forests that retain scattered, large, dead trees also provide suitable habitat. It roosts in cavities in both live and dead trees. Forest management activities that favor this species include maintaining older forests and retaining dead trees, hollow trees, and older live trees to replace existing snags over time.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (1.8 percent; 95 percent CI: 1.4 to 2.3). This bird is of interest because of its association with large diameter snags and because many species use the cavities it excavates for shelter and nesting. The pileated woodpecker is a management indicator species on 15 national forests in the Southern Region, where it helps indicate management effects on the availability of large snags.

Population trends for the pileated woodpecker were estimated in 10 physiographic areas and in 14 national forests (Table 13, Fig. 10). Trend estimates indicate that populations are stable on national forests across the region. At the physiographic area scale, positive trends are indicated for the Southern Blue Ridge, Northern Cumberland Plateau, Ozark-Ouachita Highlands, and West Gulf Coastal Plain. Negative trends are indicated for the Mid-Atlantic Ridge and Valley, Southern Piedmont, and Interior Low Plateaus. At the national forest scale, positive trends are indicated for the Cherokee, Daniel Boone, Ouachita, and Kisatchie National Forests, and for National Forests in Mississippi, Alabama, and Florida. Negative trends are indicated for the George Washington and Jefferson National Forests and Land Between the Lakes.

The pileated woodpecker was relatively uniformly associated with all forest types and successional stages except for sand pine-oak and spruce-fire forest types (Appendix 6). This may reflect the fact that this species is wide ranging and can be heard from great distances; its detection during a point-count does not necessarily reflect the bird's association with the habitat at that point.

Table 13.—Mean number of observations per count and percent annual change in number of observations per count of pileated woodpecker on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.334	3701	0.5	-0.3	1.3
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.296	503	-2.7	-4.5	-0.8
Southern Blue Ridge	0.397	746	2.8	1.5	4.1
Northern Cumberland Plateau	0.373	170	4.1	0.9	7.4
Southern Cumberland Plateau/Ridge & Valley	0.212	160	3.7	-0.6	8.3
Southern Piedmont	0.435	201	-7.1	-10.3	-3.8
Interior Low Plateaus	0.147	180	9.8	4.8	15.1
Ozark-Ouachita Interior Highlands	0.458	476	3.9	2.0	5.9
West Gulf Coastal Plain	0.397	293	3.7	1.0	6.5
East Gulf Coastal Plain	0.247	748	-2.7	-4.9	-0.5
South Atlantic Coastal Plain	0.290	224	-0.1	-3.3	3.1
National Forest					
George Washington and Jefferson	0.325	637	-1.6	-2.7	-0.4
NFs in North Carolina	0.264	219	-2.3	-4.7	0.1
Cherokee	0.310	296	2.1	0.6	3.7
Chattahoochee and Oconee	0.509	174	-0.5	-2.0	1.0
Francis Marion and Sumter	0.549	364	-1.2	-2.7	0.2
Daniel Boone	0.373	170	4.1	0.9	7.4
NFs in Alabama	0.169	213	7.1	3.3	10.9
Land Between the Lakes	0.235	180	-10.3	-12.2	-8.2
Ozark and St. Francis	0.419	217	1.4	-1.1	4.1
Ouachita	0.477	293	5.4	2.8	8.1
NFs in Texas	0.474	171	2.5	-1.0	6.1
Kisatchie	0.293	103	7.2	2.3	12.3
NFs in Mississippi	0.248	644	4.3	2.9	5.8
NFs in Florida	0.210	104	7.5	2.0	13.3

[a] Physiographic areas and national forests in which pileated woodpecker occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

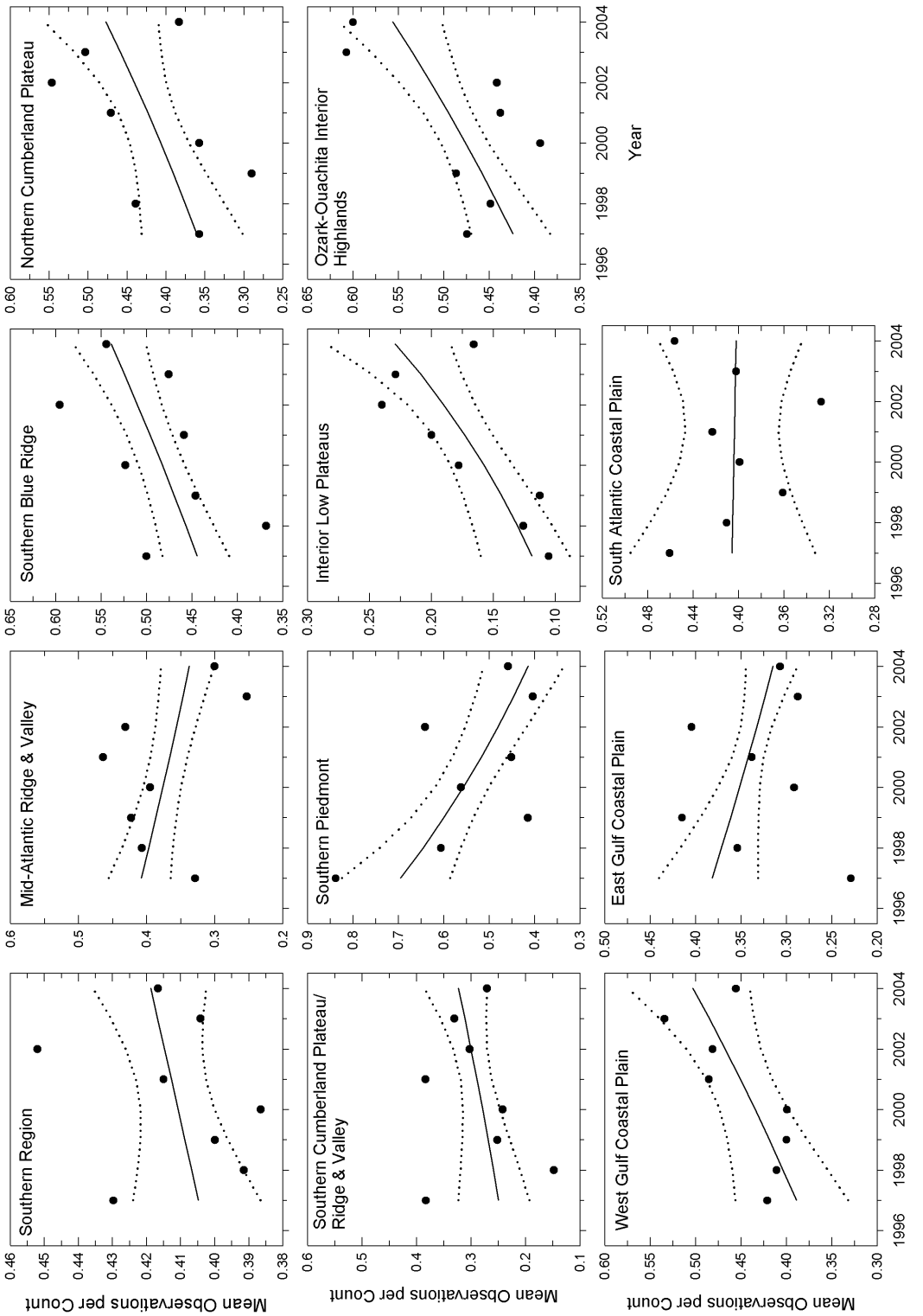
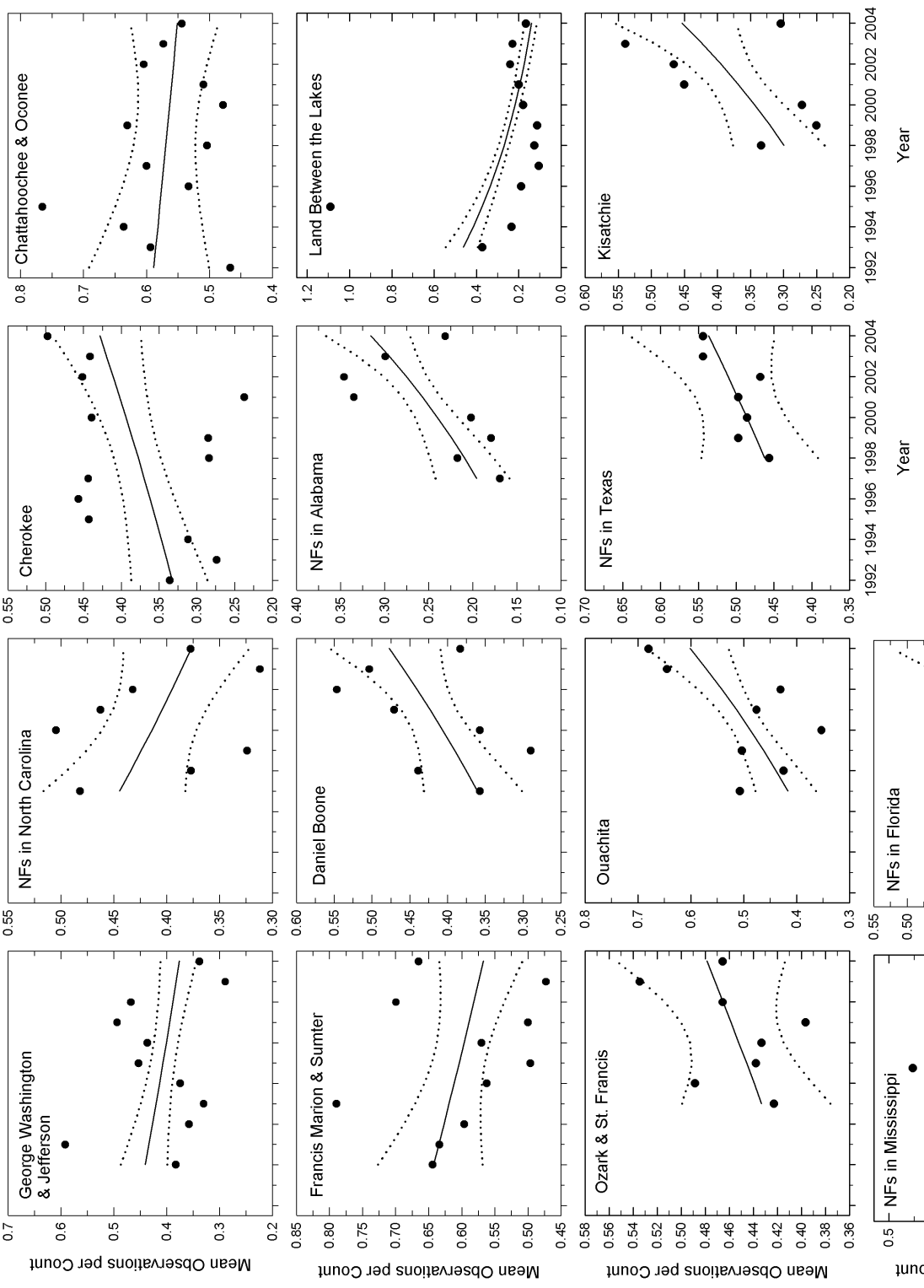


Figure 10. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the pileated woodpecker, 1992-2004, for the Southern Region, nine physiographic areas, and 10 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 10.—Continued



Eastern Wood-pewee (*Contopus virens*)

The eastern wood-pewee breeds throughout Eastern North America from Southern Canada to the Gulf Coast, and winters in South America (McCarty 1996). This species prefers to breed in open to medium-density mature forests in dry conditions. It uses both pine and hardwood forests and may inhabit parks and wooded residential areas as well as remote forests. Forest management that benefits this species includes maintaining large tracts of open forests through thinning and burning.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-1.8 percent; 95 percent CI: -2.1 to -1.5). It is of concern because of a loss of open forest habitats due to fire suppression. The eastern wood-pewee is a management indicator species on the Kisatchie National Forest, where it indicates management effects on pine-oak forests.

Population trends for the eastern wood-pewee were estimated in 10 physiographic areas and in 14 national forests (Table 14, Fig. 11). Estimates indicate that populations are stable on national forests across the region. At the physiographic area scale, positive trends are indicated for the Southern Cumberland Plateau and Ridge and Valley, and the East Gulf Coastal Plain. Negative trends are indicated for the Mid-Atlantic Ridge and Valley, Southern Blue Ridge, Interior Low Plateaus, and West Gulf Coastal Plain. At the national forest scale, positive trends are indicated for the Chattahoochee and Oconee National Forests, and for National Forests in Alabama and Mississippi. Negative trends are indicated for the George Washington and Jefferson National Forests, Land Between the Lakes, and Kisatchie National Forest.

The eastern peewee was associated most frequently with elm-ash-cottonwood forests of all successional stages (Appendix 6). It also was associated with a variety of other conditions, especially with oak-hickory, loblolly-shortleaf pine, oak-gum-cypress, hardwood-pine, and longleaf-slash pine forests.

Table 14.—Mean number of observations per count and percent annual change in number of observations per count of eastern wood-pewee on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.183	2112	-1.0	-2.0	0.1
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.223	406	-4.5	-6.8	-2.2
Southern Blue Ridge	0.107	260	-5.1	-8.1	-2.0
Northern Cumberland Plateau	0.203	108	0.0	-4.2	4.3
Southern Cumberland Plateau/Ridge & Valley	0.039	36	13.2	1.2	26.7
Southern Piedmont	0.213	121	3.1	-1.2	7.6
Interior Low Plateaus	0.466	190	-2.5	-4.4	-0.5
Ozark-Ouachita Interior Highlands	0.179	247	0.1	-2.6	2.8
West Gulf Coastal Plain	0.184	147	-7.6	-11.7	-3.4
East Gulf Coastal Plain	0.192	481	5.4	2.8	8.1
South Atlantic Coastal Plain	0.150	116	4.4	-1.5	10.7
National Forest					
George Washington and Jefferson	0.247	521	-2.9	-4.4	-1.4
NFs in North Carolina	0.114	99	-0.1	-6.8	7.1
Cherokee	0.050	70	0.2	-3.7	4.2
Chattahoochee and Oconee	0.076	59	6.1	1.4	11.0
Francis Marion and Sumter	0.161	151	-3.1	-6.2	0.0
Daniel Boone	0.203	108	0.0	-4.2	4.3
NFs in Alabama	0.053	68	10.5	3.6	17.8
Land Between the Lakes	0.558	190	-5.0	-6.1	-3.9
Ozark and St. Francis	0.288	155	1.5	-1.5	4.6
Ouachita	0.106	117	-1.9	-6.4	2.8
NFs in Texas	0.187	75	2.7	-3.7	9.5
Kisatchie	0.176	61	-24.9	-31.4	17.8
NFs in Mississippi	0.210	435	4.0	2.1	5.9
NFs in Florida	0.031	17	-24.7	-33.8	-4.3

[a] Physiographic areas and national forests in which eastern wood-pewee occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

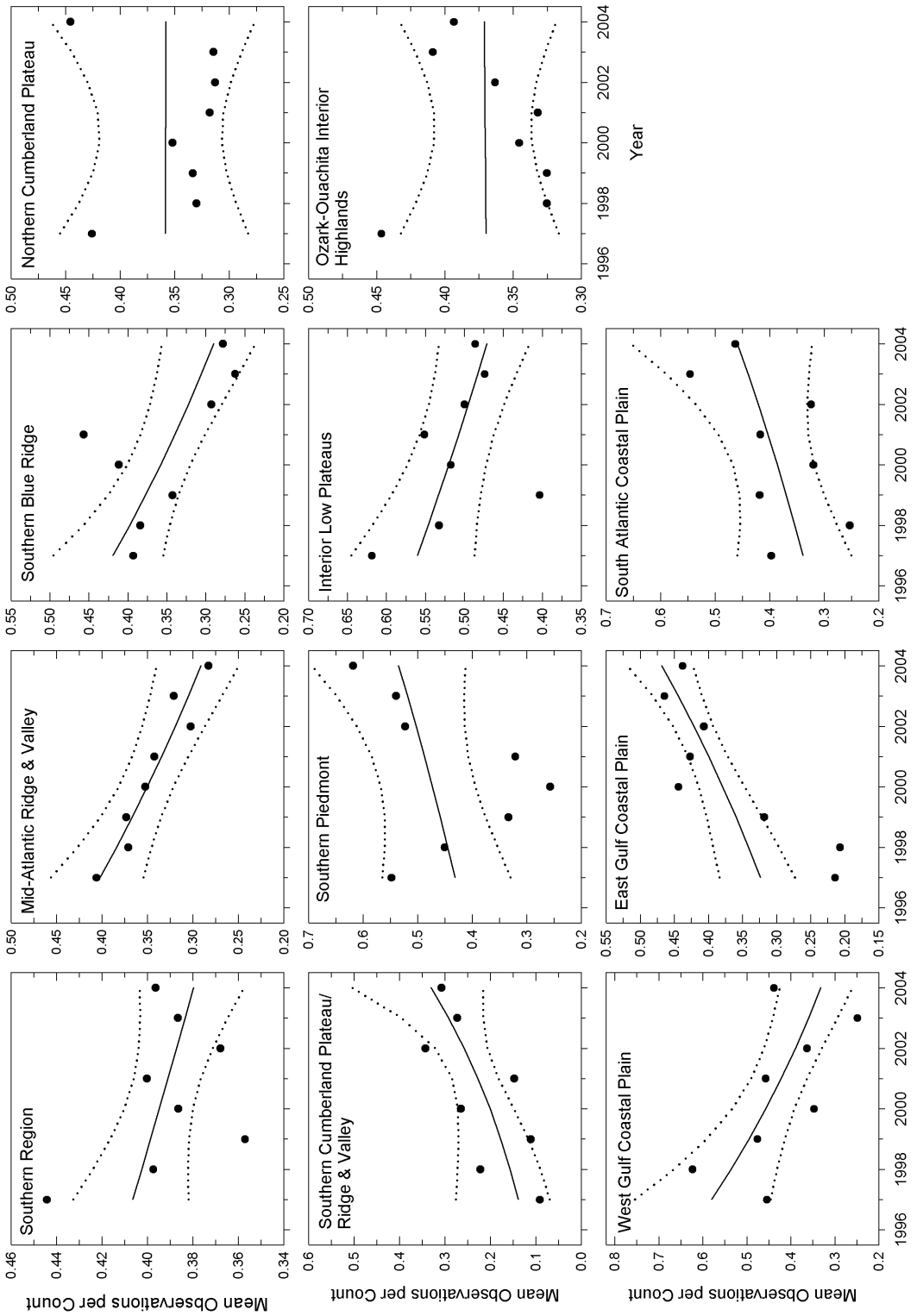
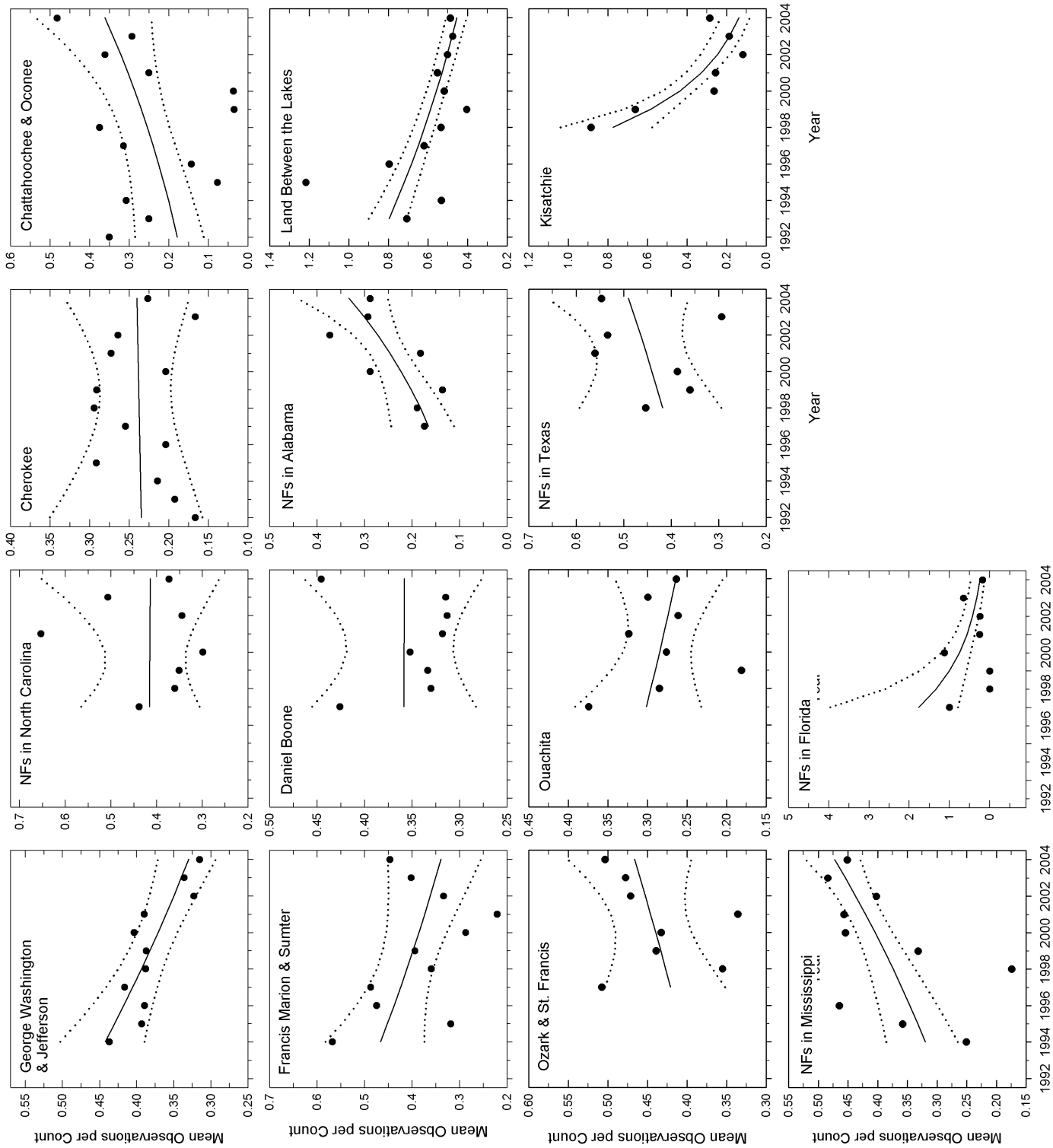


Figure 11. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the eastern wood-pewee, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 11.—Continued



Acadian Flycatcher (*Empidonax virescens*)

The Acadian flycatcher breeds throughout Eastern North America including most of the South. It winters in Central and Northern South America (Whitehead and Taylor 2002). Breeding habitat for this species is mature mesic deciduous forests, often near streams. Habitat management includes maintaining relatively undisturbed, mature, deciduous forests in riparian areas and coves within larger blocks of mature forest.

The USGS Breeding Bird Survey indicates a relatively stable trend for this species from 1966 to 2004 (-0.1 percent; 95 percent CI: -0.5 to 0.3). It is of concern because a loss of habitat due to fragmentation and land-use conversion. This species is a bird of conservation concern in the Appalachian Mountains and West Gulf Coastal Plain/Ouachitas Bird Conservation regions. The Acadian flycatcher also is a management indicator species on 10 national forests in the Southern Region, where it indicates management effects on mature riparian and mesic cove forests.

Population trends for the Acadian flycatcher were estimated in 10 physiographic areas and in 14 national forests (Table 15, Fig. 12). Estimates indicate that populations are stable to increasing slightly on national forests across the region. At the physiographic area scale, positive trends are indicated for the Northern Cumberland Plateau, Interior Low Plateaus, and Ozark-Ouachita Interior Highlands; negative trends are indicated for the Mid-Atlantic Ridge and Valley. At the national forest scale, positive trends are indicated for 7 of 14 national forests; negative trends are indicated only for the George Washington and Jefferson National Forests.

The Acadian flycatcher was associated most frequently with later successional stages of riparian, elm-ash-cottonwood, and oak-gum-cypress forests (Appendix 6). It also was highly associated with cove hardwood forests and to a lesser extent with mature oak-hickory, hardwood-pine, and white-pine-hemlock forests.

Table 15.—Mean number of observations per count and percent annual change in number of observations per count of Acadian flycatcher on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.262	2052	1.0	0.0	2.0
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.215	261	-4.7	-7.0	-2.4
Southern Blue Ridge	0.146	287	-1.3	-4.2	1.8
Northern Cumberland Plateau	0.290	104	3.8	0.7	7.1
Southern Cumberland Plateau/Ridge & Valley	0.137	74	3.2	-1.1	7.8
Southern Piedmont	0.483	146	2.2	-1.6	6.2
Interior Low Plateaus	0.456	184	2.4	0.1	4.7
Ozark-Ouachita Interior Highlands	0.181	190	3.6	0.8	6.5
West Gulf Coastal Plain	0.491	150	1.2	-2.0	4.5
East Gulf Coastal Plain	0.337	583	0.5	-1.5	2.6
South Atlantic Coastal Plain	0.179	73	4.1	-1.5	10.0
National Forest					
George Washington and Jefferson	0.207	311	-4.1	-5.9	-2.3
NFs in North Carolina	0.222	128	11.8	7.8	15.9
Cherokee	0.101	88	-0.3	-4.2	3.8
Chattahoochee and Oconee	0.209	79	3.2	-0.4	6.9
Francis Marion and Sumter	0.324	188	-1.2	-3.5	1.1
Daniel Boone	0.290	104	3.8	0.7	7.1
NFs in Alabama	0.116	109	4.6	0.7	8.5
Land Between the Lakes	0.407	184	7.5	6.1	8.9
Ozark and St. Francis	0.243	114	5.7	2.5	9.0
Ouachita	0.149	106	7.0	2.2	11.9
NFs in Texas	0.626	74	0.4	-3.1	4.0
Kisatchie	0.340	59	-2.1	-8.7	5.1
NFs in Mississippi	0.408	531	1.4	0.2	2.7
NFs in Florida	0.027	11	4.2	-35.1	67.3

[a] Physiographic areas and national forests in which Acadian flycatcher occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

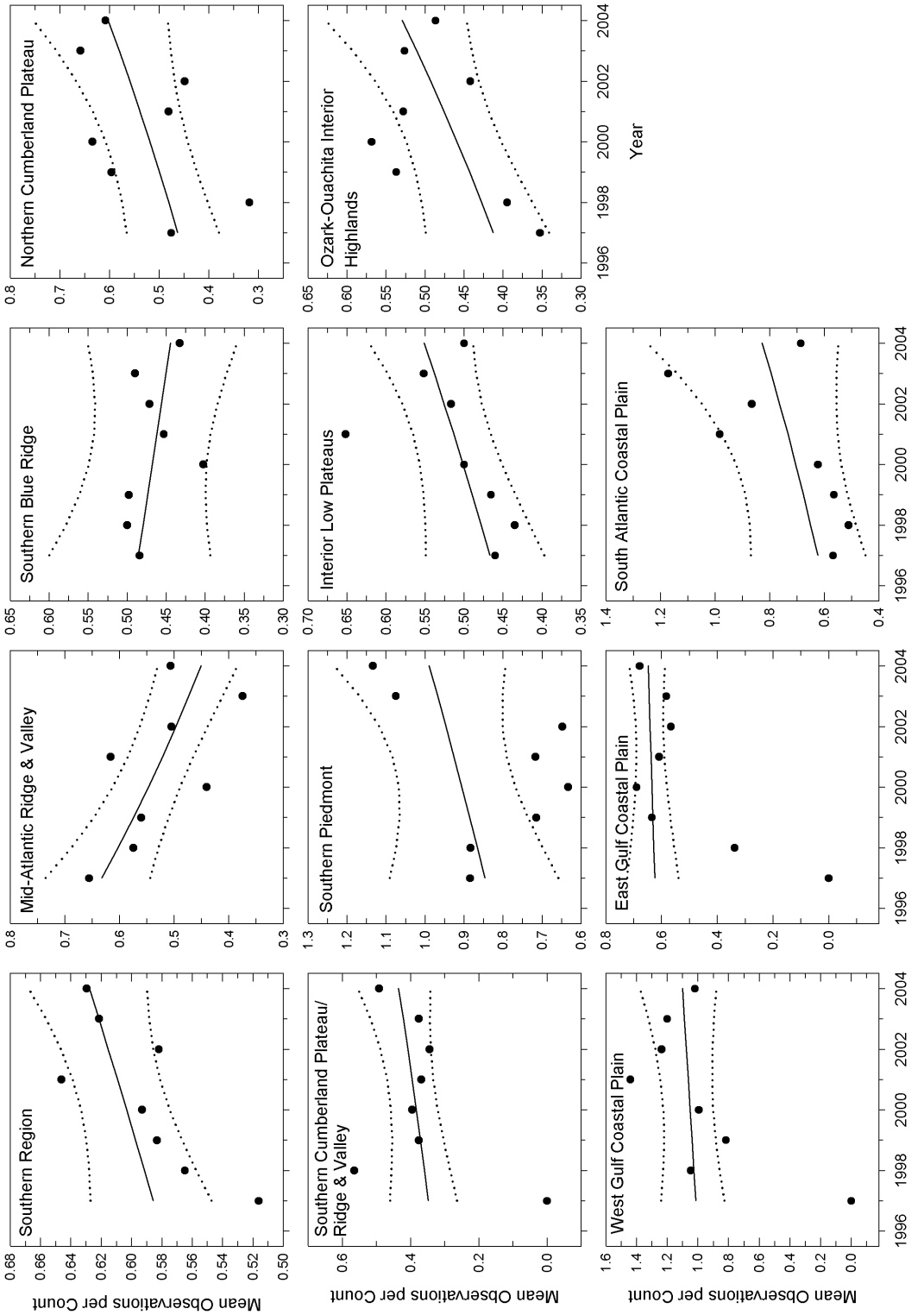
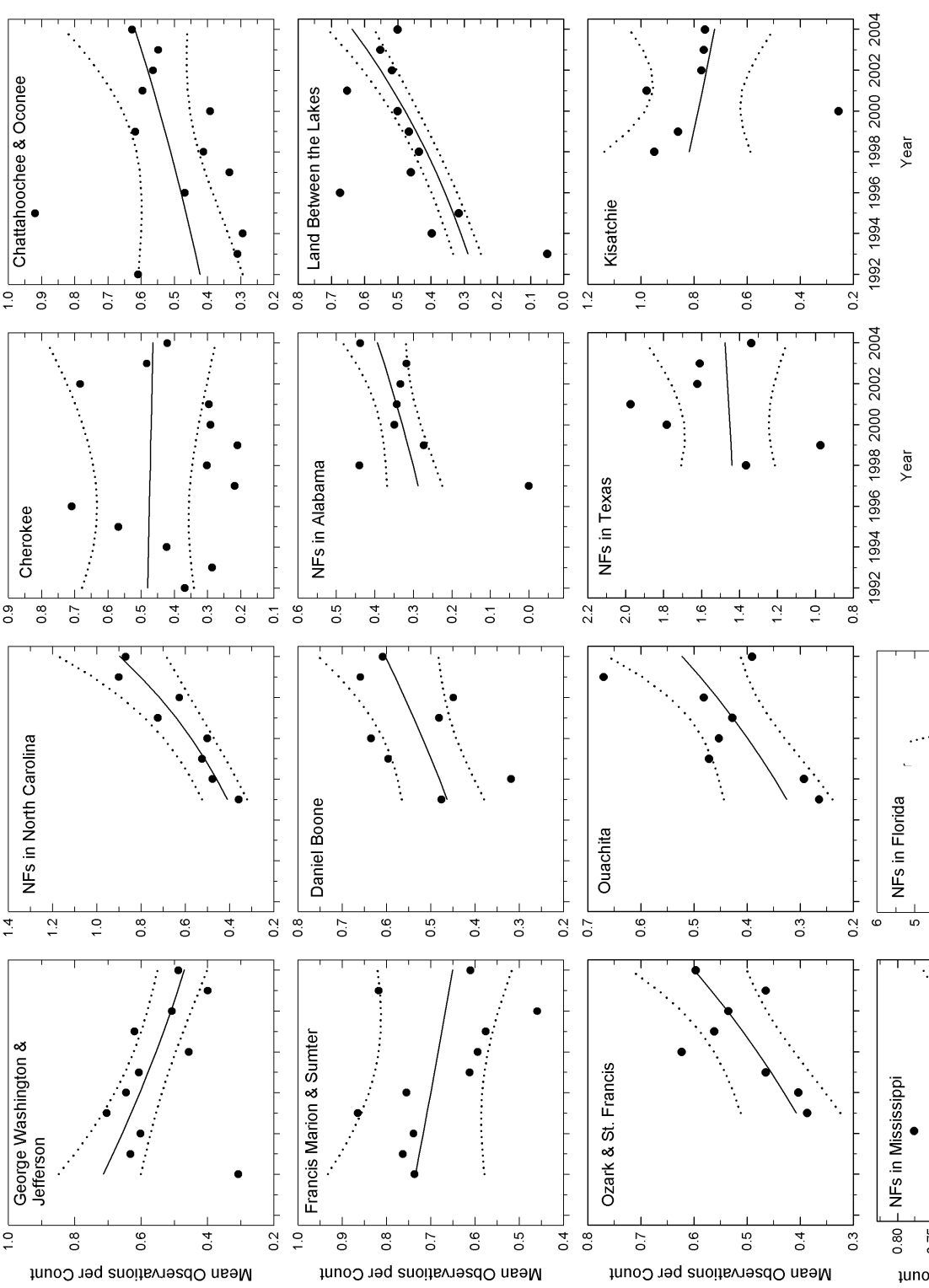


Figure 12. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the Acadian flycatcher, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 12.—Continued



Great Crested Flycatcher (*Myiarchus crinitus*)

The great crested flycatcher's breeding habitat extends from Southern Canada south throughout the Eastern United States to the Gulf Coast and the Florida Keys (Lanyon 1997). It winters in Central and South America. This species generally favors open deciduous or mixed woodlands and edges of clearings, but also uses woodlands, savannas, riparian corridors, and wooded swamps. The great-crested flycatcher favors isolated woodlots and open forests over closed-canopy forest. Beneficial forest management includes practices that enhance edge and open canopies while preserving dead snags and trees with natural cavities.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.0 percent; 95 percent CI: -0.3 to 0.3). The bird is of interest because of its dependence on cavities for nesting. The great-crested flycatcher is a management indicator species on the Land Between the Lakes National Recreation Area, where it indicates management effects on mature open oak forests.

Population trends for this species were estimated in 10 physiographic areas and in 14 national forests (Table 16, Fig. 13). Trend estimates indicate that populations are stable on national forests across the region though trends are highly variable from area to area. At the physiographic area scale, positive trends are indicated for the Southern Cumberland/Ridge and Valley, East Gulf Coastal Plain, and South Atlantic Coastal Plain; negative trends are indicated for six physiographic areas. At the national forest scale, positive trends are indicated for National Forests in North Carolina, Alabama, and Mississippi, while negative trends are indicated for the George Washington and Jefferson National Forests, Land Between the Lakes, Ouachita National Forest, and Kisatchie National Forest.

The great crested flycatcher was associated with a variety of forest types and successional conditions, occurring with high frequency in sand pine-oak forests (Appendix 6). This species occurred at relatively equal frequencies across successional stages. It was least associated with the spruce-fir and maple-beech-birch forest types.

Table 16.—Mean number of observations per count and percent annual change in number of observations per count of great crested flycatcher on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.247	2783	0.7	-0.3	1.7
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.203	414	-4.6	-6.9	-2.3
Southern Blue Ridge	0.062	282	-6.3	-10.1	-2.3
Northern Cumberland Plateau	0.057	60	1.1	-7.2	10.1
Southern Cumberland Plateau/Ridge & Valley	0.187	150	5.5	0.8	10.3
Southern Piedmont	0.399	198	-5.3	-9.0	-1.5
Interior Low Plateaus	0.154	161	-8.8	-13.0	-4.3
Ozark-Ouachita Interior Highlands	0.100	220	-8.3	-11.8	-4.6
West Gulf Coastal Plain	0.234	209	-5.6	-9.2	-2.0
East Gulf Coastal Plain	0.265	766	10.5	8.2	12.8
South Atlantic Coastal Plain	1.320	323	1.7	0.3	3.2
National Forest					
George Washington and Jefferson	0.192	486	-4.4	-6.0	-2.8
NFs in North Carolina	0.160	98	15.1	9.5	20.9
Cherokee	0.044	71	-4.7	-9.3	0.1
Chattahoochee and Oconee	0.201	134	-2.0	-4.8	0.8
Francis Marion and Sumter	0.675	298	-0.7	-1.9	0.6
Daniel Boone	0.057	60	1.1	-7.2	10.1
NFs in Alabama	0.186	216	9.8	6.7	12.9
Land Between the Lakes	0.209	161	-10.5	-12.4	-8.5
Ozark and St. Francis	0.048	57	-2.3	-8.1	3.8
Ouachita	0.160	192	-6.5	-10.4	-2.5
NFs in Texas	0.229	100	-3.5	-7.9	1.1
Kisatchie	0.223	90	-12.3	-18.5	-5.7
NFs in Mississippi	0.284	662	5.3	3.6	7.0
NFs in Florida	1.411	173	1.4	-0.5	3.2

[a] Physiographic areas and national forests in which great crested flycather occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

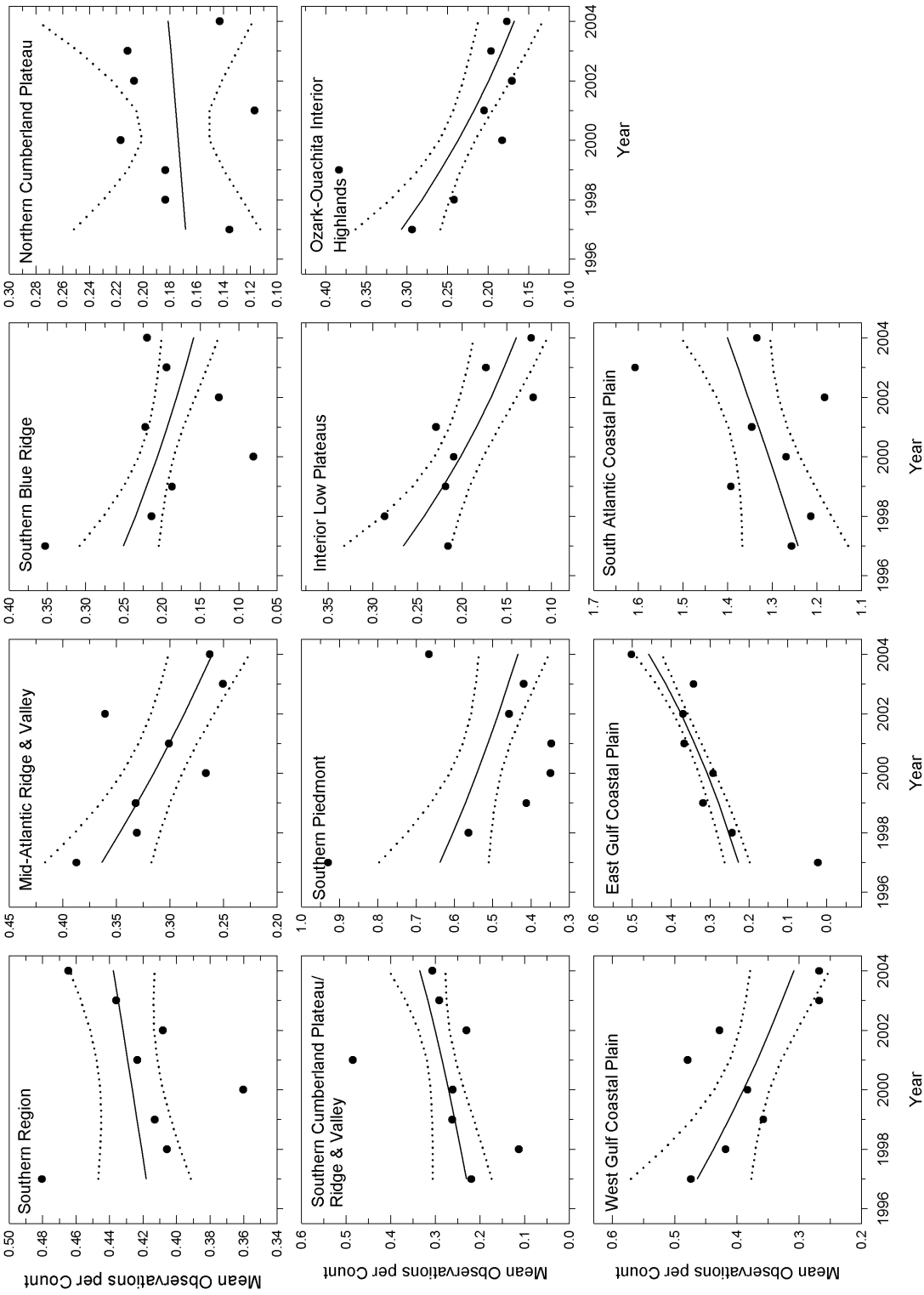
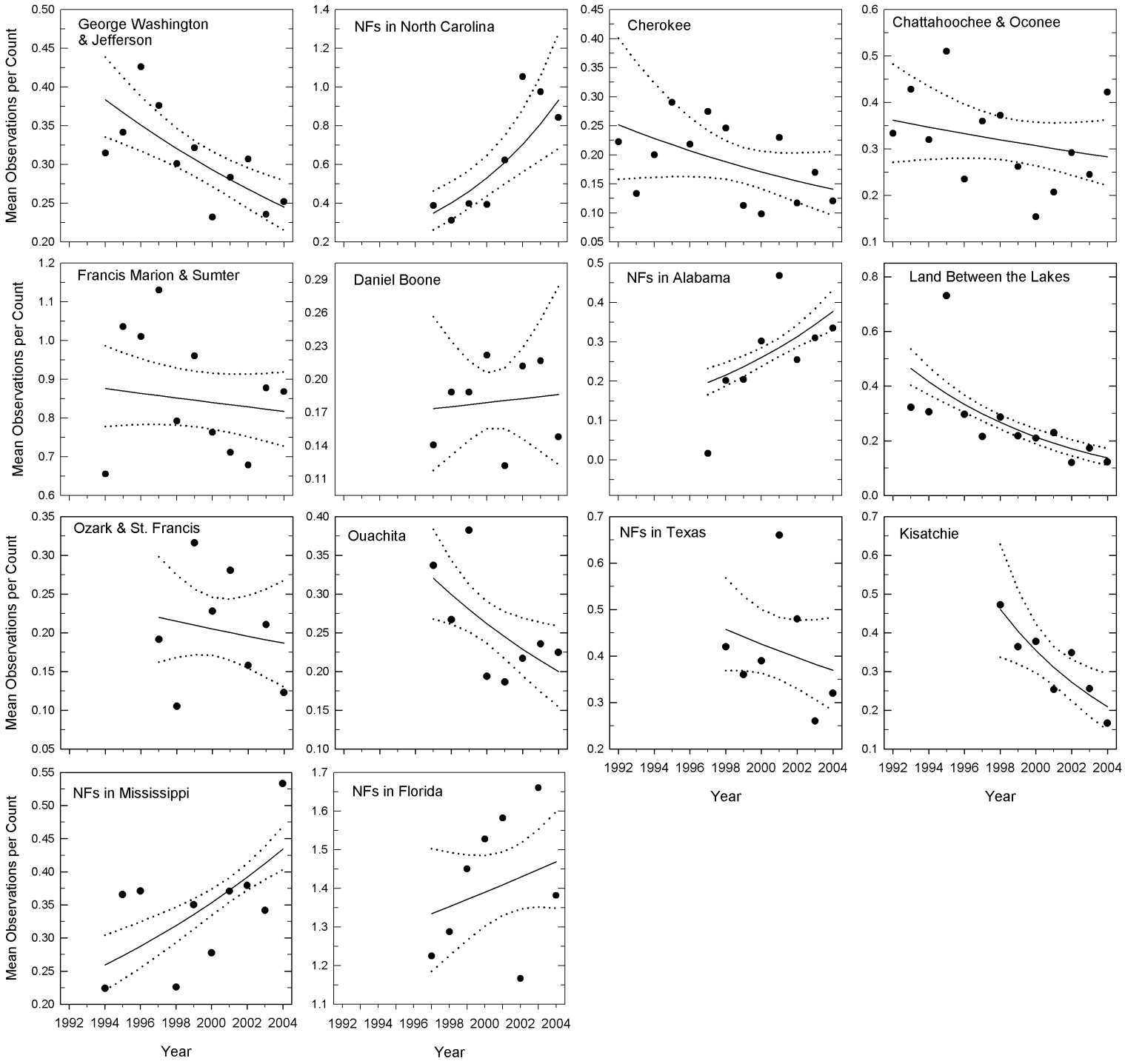


Figure 13. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the great crested flycatcher, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 13.—Continued



White-eyed Vireo (*Vireo griseus*)

The white-eyed vireo breeds in Eastern North America from Southern Canada to south Florida and westward to the Great Plains (Hopp et al. 1995). It winters from coastal Virginia to Texas and as far south as Central America and several islands in the Caribbean. This species breeds in variable habitat conditions, including those with extensive undergrowth, shrubs, brambles, and saplings that are interspersed with taller trees. These habitats are found in deciduous scrub, overgrown pastures, abandoned farmland, middle- to late-stage succession forests, and streamside thickets. Forest management that promotes dense brushy habitat is beneficial.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.3 percent; 95 percent CI: -0.1 to 0.7). The white-eyed vireo is a management indicator species on the Kisatchie National Forest, where it indicates management effects on the availability of canopy gaps in small-stream riparian forests and early successional forests within mixed hardwood/loblolly pine communities.

Population trends for the white-eyed vireo were estimated in 10 physiographic areas and in 14 national forests (Table 17, Fig. 14). Estimates indicate that populations are showing limited increases on national forests across the region though trends are highly variable from area to area. At the physiographic area scale, positive trends are indicated for the Southern Cumberland/Ridge and Valley and West Gulf Coastal Plain; negative trends are indicated for the Southern Blue Ridge and Southern Piedmont. At the national forest scale, positive trends are indicated for five national forests; negative trends also are indicated for five national forests.

The white-eyed vireo was associated with a variety of forest types and successional conditions, occurring with high frequency in sand pine-oak forests, especially shrub-seedling stages (Appendix 6). This species also occurred frequently in riparian, elm-ash-cottonwood, and oak-gum-cypress forests, as well as early successional stages of most forest types.

Table 17.—Mean number of observations per count and percent annual change in number of observations per count of white-eyed vireo on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.226	1920	1.8	0.6	3.1
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.002	6	13.1	4.5	22.4
Southern Blue Ridge	0.028	109	-9.2	-15.0	-2.9
Northern Cumberland Plateau	0.209	85	-0.2	-4.5	4.2
Southern Cumberland Plateau/Ridge & Valley	0.114	80	5.9	0.2	12.0
Southern Piedmont	0.269	134	-6.9	-11.3	-2.3
Interior Low Plateaus	0.383	151	2.0	-0.6	4.7
Ozark-Ouachita Interior Highlands	0.163	211	1.8	-1.7	5.3
West Gulf Coastal Plain	0.726	241	7.3	4.3	10.4
East Gulf Coastal Plain	0.297	665	-0.7	-3.1	1.7
South Atlantic Coastal Plain	0.652	238	1.7	-1.0	4.4
National Forest					
George Washington and Jefferson	0.002	9	16.5	7.9	25.7
NFs in North Carolina	0.135	61	14.2	7.8	21.0
Cherokee	0.041	47	-9.7	-13.6	-5.6
Chattahoochee and Oconee	0.086	68	5.6	0.5	11.0
Francis Marion and Sumter	0.347	223	-3.4	-5.4	-1.3
Daniel Boone	0.209	85	-0.2	-4.5	4.2
NFs in Alabama	0.105	126	7.9	3.0	13.0
Land Between the Lakes	0.401	151	-1.9	-3.7	-0.1
Ozark and St. Francis	0.164	87	6.9	2.6	11.3
Ouachita	0.209	156	1.8	-2.1	5.9
NFs in Texas	0.979	127	7.1	3.4	10.9
Kisatchie	0.429	97	3.8	-2.1	10.0
NFs in Mississippi	0.348	596	-3.6	-5.1	-2.2
NFs in Florida	0.655	99	-4.1	-7.3	-0.8

[a] Physiographic areas and national forests in which white-eyed vireo occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

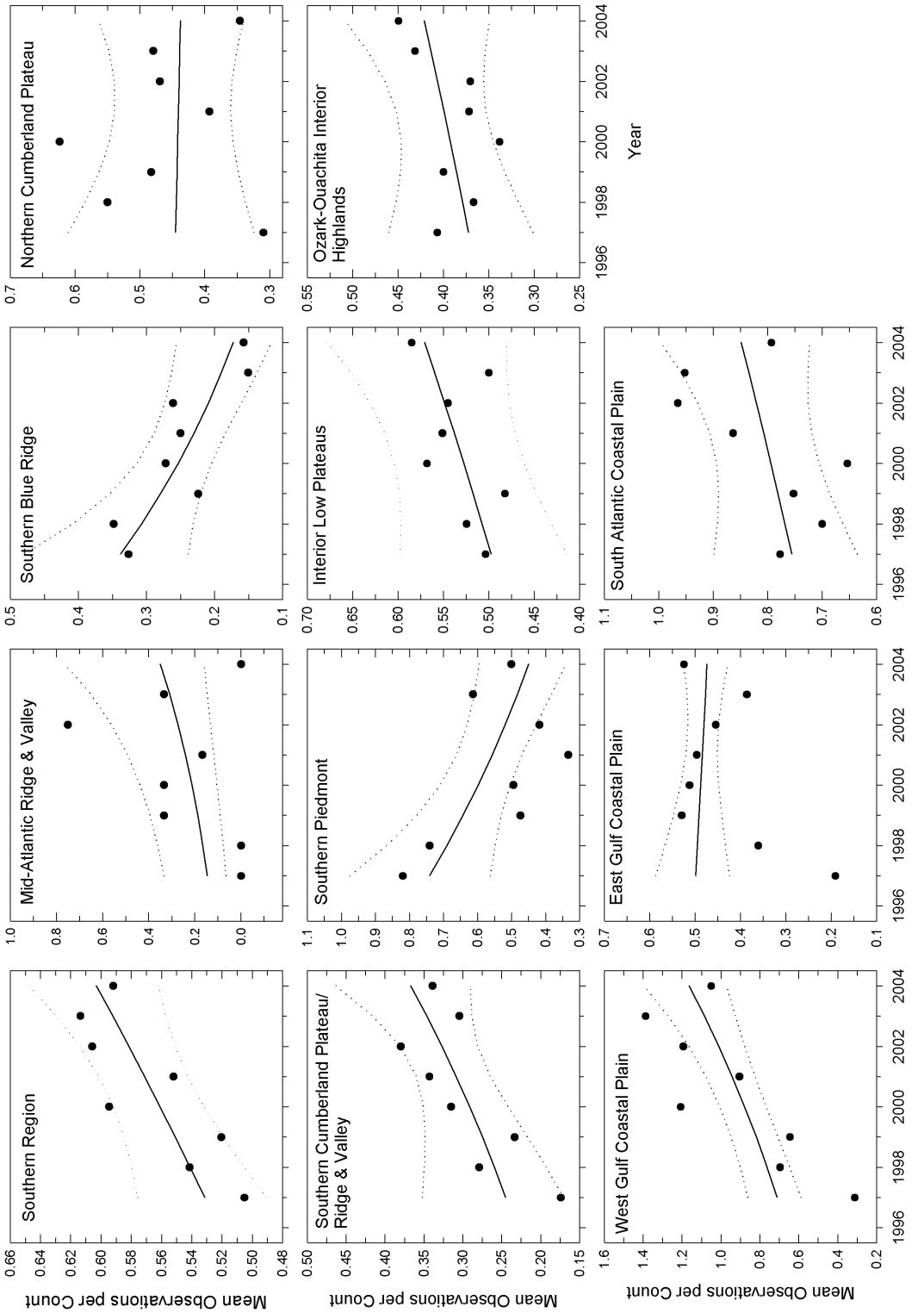
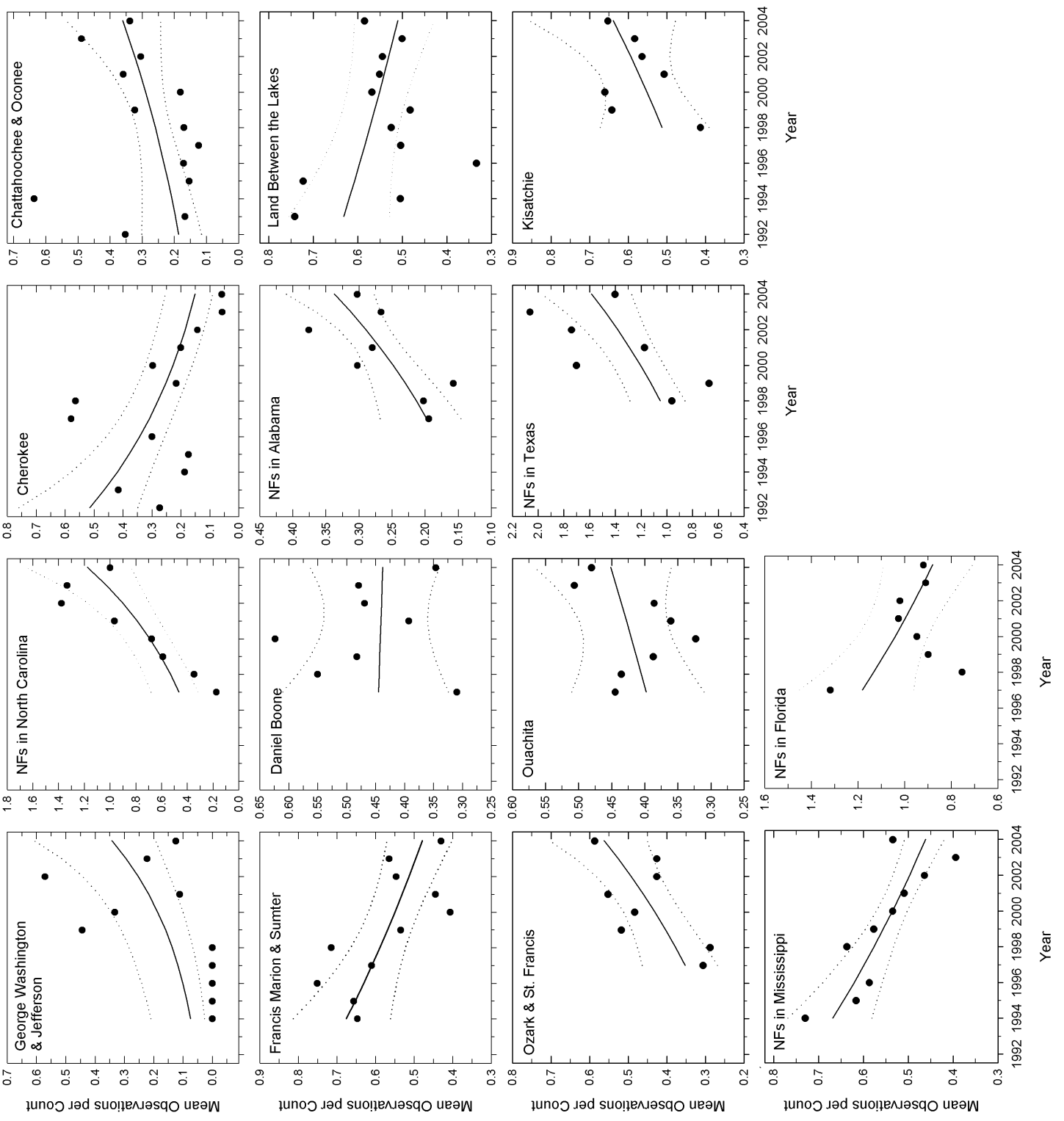


Figure 14. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the white-eyed vireo, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 14.—Continued



Yellow-throated Vireo (*Vireo flavifrons*)

The yellow-throated vireo breeds in the Eastern United States from the Canadian border to the Gulf Coast (Rodewald and James 1996). It winters in Central and South America. This species breeds in open forests and edge habitats of bottomland, upland deciduous, and mixed deciduous-coniferous forests. While associated with forest edge, it requires large blocks of forest for successful breeding. Forest management that creates small openings, e.g., group or single-tree selection, or thinned canopies may benefit the species.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (1.1 percent; 95 percent CI: 0.5 to 1.8). The bird is of interest due to its association with openings and open conditions in riparian and bottomland hardwood forests. The yellow-throated vireo is a management indicator species on the Francis Marion National Forest, where it indicates management effects on bottomland and riparian forests.

Population trends for the yellow-throated vireo were estimated in 10 physiographic areas and in 14 national forests (Table 18, Fig. 15). Estimates indicate that populations are increasing moderately on national forests across the region. Positive trends are indicated for four physiographic areas, and six national forests. Negative trends are indicated only for the Francis Marion and Sumter National Forests, and National Forests in Florida.

The yellow-throated vireo was associated with a variety of forest types and successional conditions at relatively low frequencies (Appendix 6). The species was associated most frequently with a diverse mix of habitats, including mature sand pine-oak, riparian forest, shrub/seedling stage of white pine-hemlock forest, and early successional stages of loblolly-shortleaf pine forest.

Table 18.—Mean number of observations per count and percent annual change in number of observations per count of yellow-throated vireo on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.059	1092	4.5	2.6	6.4
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.004	14	6.5	-4.8	19.1
Southern Blue Ridge	0.014	72	-6.4	-13.3	1.0
Northern Cumberland Plateau	0.079	72	7.9	1.2	15.0
Southern Cumberland Plateau/Ridge & Valley	0.060	66	20.0	11.4	29.3
Southern Piedmont	0.108	83	3.4	-2.5	9.7
Interior Low Plateaus	0.099	120	17.1	10.1	24.5
Ozark-Ouachita Interior Highlands	0.052	116	3.1	-2.6	9.1
West Gulf Coastal Plain	0.173	163	3.9	0.3	7.6
East Gulf Coastal Plain	0.065	274	2.8	-1.9	7.7
South Atlantic Coastal Plain	0.123	112	-1.0	-5.0	3.2
National Forest					
George Washington and Jefferson	0.003	15	14.8	7.1	23.1
NFs in North Carolina	0.047	64	0.7	-7.4	9.5
Cherokee	0.005	11	-6.5	-11.4	-1.4
Chattahoochee and Oconee	0.025	30	11.0	6.2	15.9
Francis Marion and Sumter	0.075	108	-4.4	-7.9	-0.7
Daniel Boone	0.079	72	7.9	1.2	15.0
NFs in Alabama	0.049	85	19.0	11.9	26.5
Land Between the Lakes	0.096	120	7.2	3.9	10.5
Ozark and St. Francis	0.028	31	6.2	-1.8	14.9
Ouachita	0.069	96	2.6	-4.0	9.7
NFs in Texas	0.125	68	7.9	2.0	14.1
Kisatchie	0.264	84	0.0	-4.4	4.6
NFs in Mississippi	0.079	254	-1.6	-3.8	0.5
NFs in Florida	0.175	58	-5.2	-9.1	-1.1

[a] Physiographic areas and national forests in which yellow-throated vireo occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

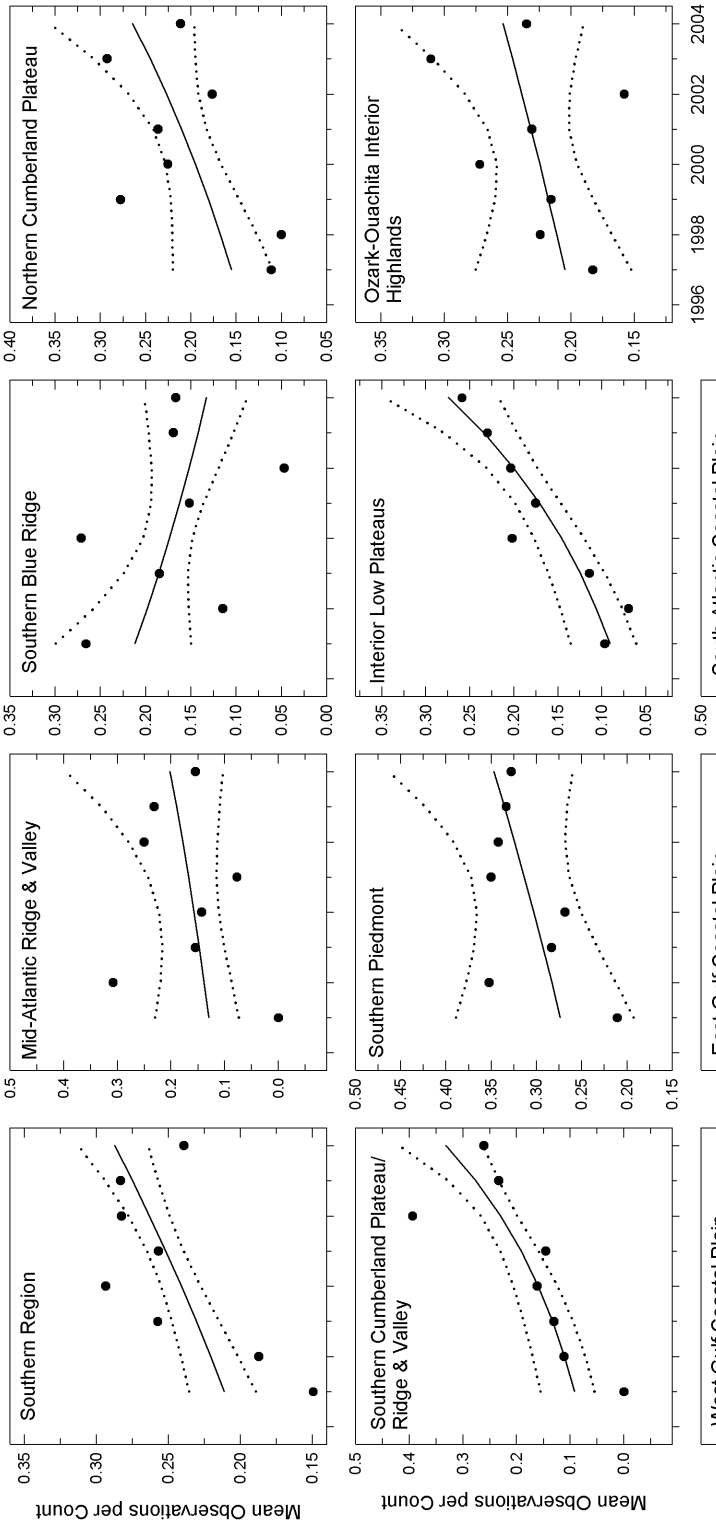
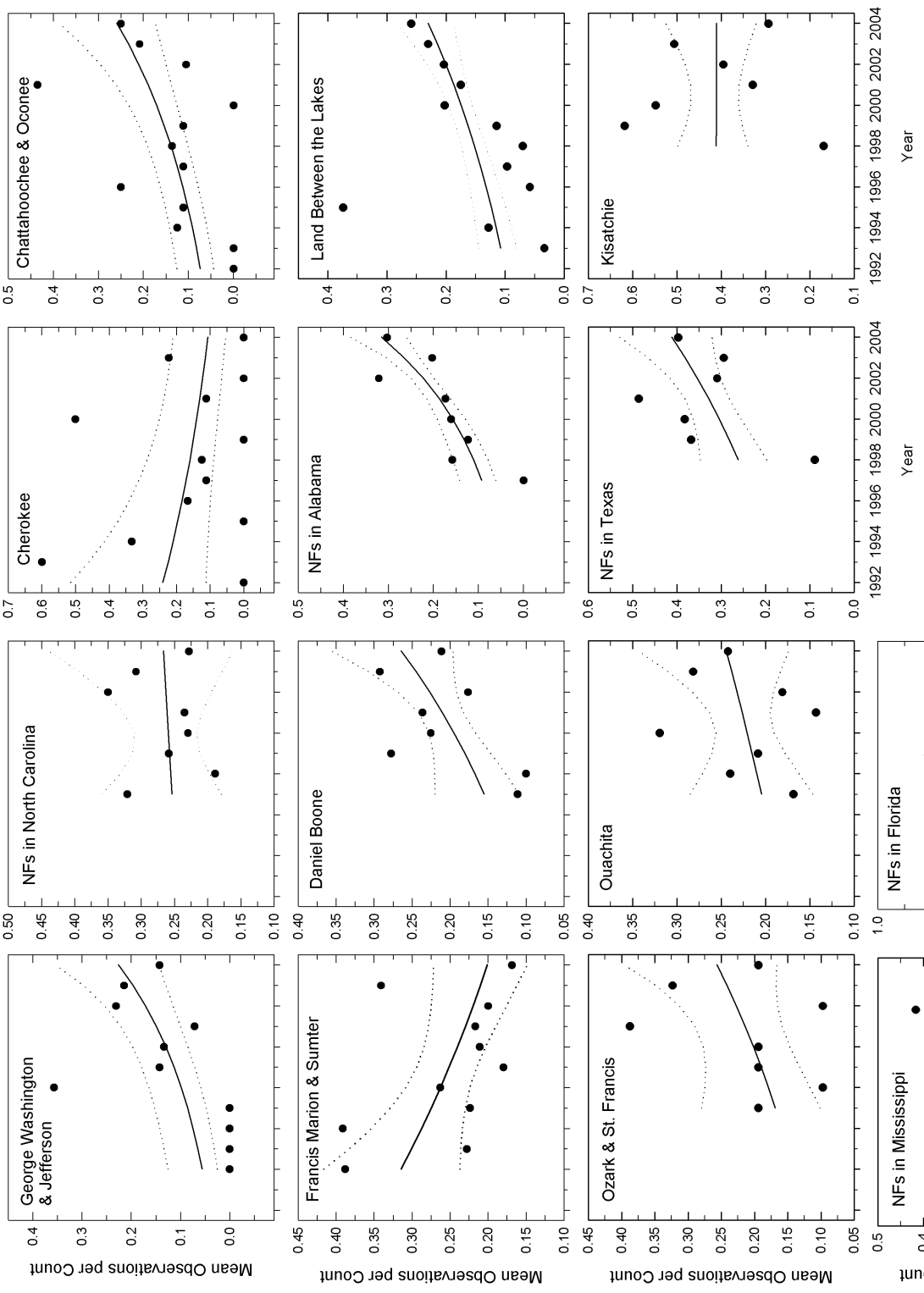


Figure 15. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the yellow-throated vireo, 1992–2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graphs. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 15.—Continued



Black-capped Chickadee (*Poecile atricapillus*)

The black-capped chickadee is found across most of the northern two-thirds of the United States and Southern Canada (Smith 1993). In the South, it is found at higher elevations in the Appalachian Mountains from Virginia to Tennessee and North Carolina. Habitat for this species includes a variety of deciduous and mixed deciduous/coniferous open forest and woodland. It is common near edges of wooded areas but also can be found in the middle of large wooded tracts. Forest management centers on maintaining a diverse landscape and adequate snags for cavity nesting.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (1.3 percent; 95 percent CI: 0.9 to 1.7). The species is of regional concern due to population declines and a variety of threats to ecosystems at the upper elevations of the Southern Appalachian Mountains. It is a bird of conservation concern across the Appalachian Mountains. Because of its limited range and general habitat requirements, the black-capped chickadee has not been selected as a management indicator species.

Population trends for the black-capped chickadee were estimated in two physiographic areas and in three national forests (Table 19, Fig. 16). Trend estimates indicate that populations showed large increases on national forests in the region. This trend is driven largely the George Washington and Jefferson National Forests within the Southern Blue Ridge. Trends for the Mid-Atlantic Ridge and Valley were stable to increasing slightly. Detections were limited on the only two other national forests within the range of this species.

The black-capped chickadee was associated most frequently with later successional stages of white pine-hemlock. It also was associated with glade-shrub-savanna, and maple-beech-birch, hardwood pine, and oak hickory forests.

Table 19.—Mean number of observations per count and percent annual change in number of observations per count of black-capped chickadee on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.019	354	6.7	3.4	10.2
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.082	250	2.9	-1.0	7.0
Southern Blue Ridge	0.031	103	15.2	10.5	20.1
National Forest					
George Washington and Jefferson	0.091	332	6.1	3.5	8.8
NFs in North Carolina	0.008	8	77.3	55.9	101.7
Cherokee	0.008	15	-1.6	-4.3	1.2

[a] Physiographic areas and national forests in which black-capped chickadee occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

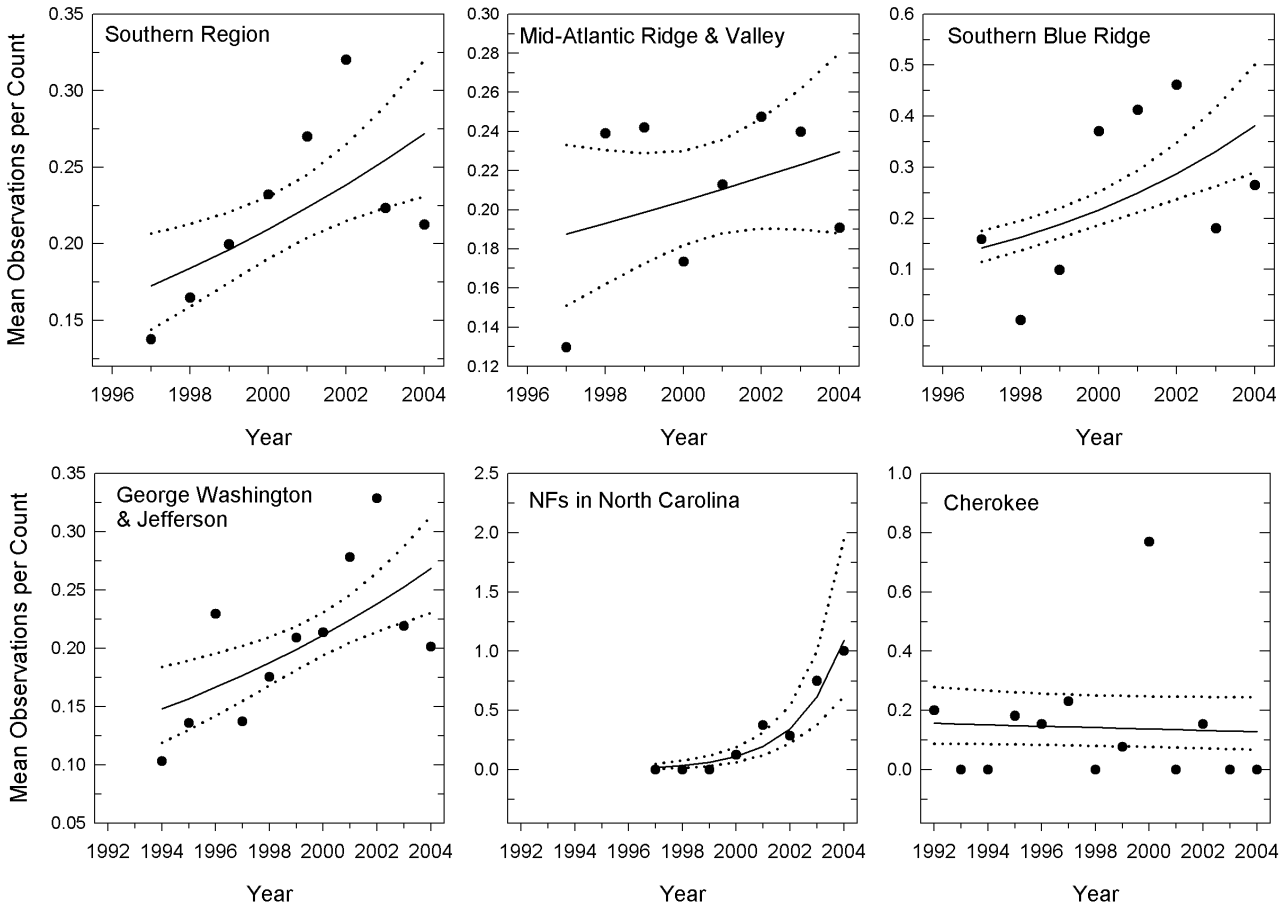


Figure 16.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the black-capped chickadee, 1992–2004, for the Southern Region, two physiographic areas, and three national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

White-breasted Nuthatch *(Sitta carolinensis)*

The white-breasted nuthatch is a resident species in forests across North America from Southern Canada to the Gulf Coast and Mexico (Pravosudov and Grubb 1993). This species generally breeds in mature deciduous woodland but also uses mixed deciduous and coniferous forests. It nests in natural holes in large, old trees and prefers woodland edges. Forest management in hardwoods that retains old trees and snags with natural cavities provides habitat for this species.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (8.6 percent; 95 percent CI: 1.1 to 16.2). The white-breasted nuthatch is a management indicator species on the Kisatchie National Forest, where it indicates management effects on large-stream riparian forests.

Population trends for the white-breasted nuthatch were estimated in 10 physiographic areas and 13 national forests (Table 20, Fig. 17). Trend estimates indicate moderate increases in populations on national forests across the region. Positive trends are indicated for four physiographic areas and five national forests. Negative trends are indicated only for the Interior Low Plateaus represented solely by Land Between the Lakes.

The white-breasted nuthatch was associated with a variety of forest types and successional stages but was associated most frequently across successional stages with oak-hickory, maple-beech-birch, white pine-hemlock, and hardwood-pine forests, as well as with glade-shrub-savanna habitats (Appendix 6).

Table 20.—Mean number of observations per count and percent annual change in number of observations per count of white-breasted nuthatch on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.116	1816	3.4	2.0	4.7
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.159	375	0.1	-2.4	2.6
Southern Blue Ridge	0.127	421	1.1	-1.6	3.8
Northern Cumberland Plateau	0.298	156	2.9	-0.8	6.7
Southern Cumberland Plateau/Ridge & Valley	0.152	129	9.5	3.2	16.2
Southern Piedmont	0.055	46	8.5	1.7	15.8
Interior Low Plateaus	0.235	177	1.6	-2.8	6.1
Ozark-Ouachita Interior Highlands	0.142	273	9.0	5.6	12.6
West Gulf Coastal Plain	0.018	19	10.4	0.2	21.7
East Gulf Coastal Plain	0.048	186	4.4	-1.0	10.1
South Atlantic Coastal Plain	0.032	34	22.8	9.6	37.6
National Forest					
George Washington and Jefferson	0.167	475	0.1	-1.5	1.7
NFs in North Carolina	0.141	152	0.9	-3.0	5.0
Cherokee	0.082	119	4.1	0.6	7.8
Chattahoochee and Oconee	0.136	104	1.2	-2.8	5.3
Francis Marion and Sumter	0.037	76	-6.0	-11.7	0.1
Daniel Boone	0.298	156	2.9	-0.8	6.7
NFs in Alabama	0.120	155	9.2	4.1	14.5
Land Between the Lakes	0.278	177	-5.0	-6.9	-3.1
Ozark and St. Francis	0.179	140	7.1	2.7	11.6
Ouachita	0.095	133	12.2	6.9	17.7
NFs in Texas	0.010	8	17.0	9.2	25.3
Kisatchie	0.033	11	7.2	-1.9	17.1
NFs in Mississippi	0.033	127	19.3	15.6	23.1

[a] Physiographic areas and national forests in which white-breasted nuthatch occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

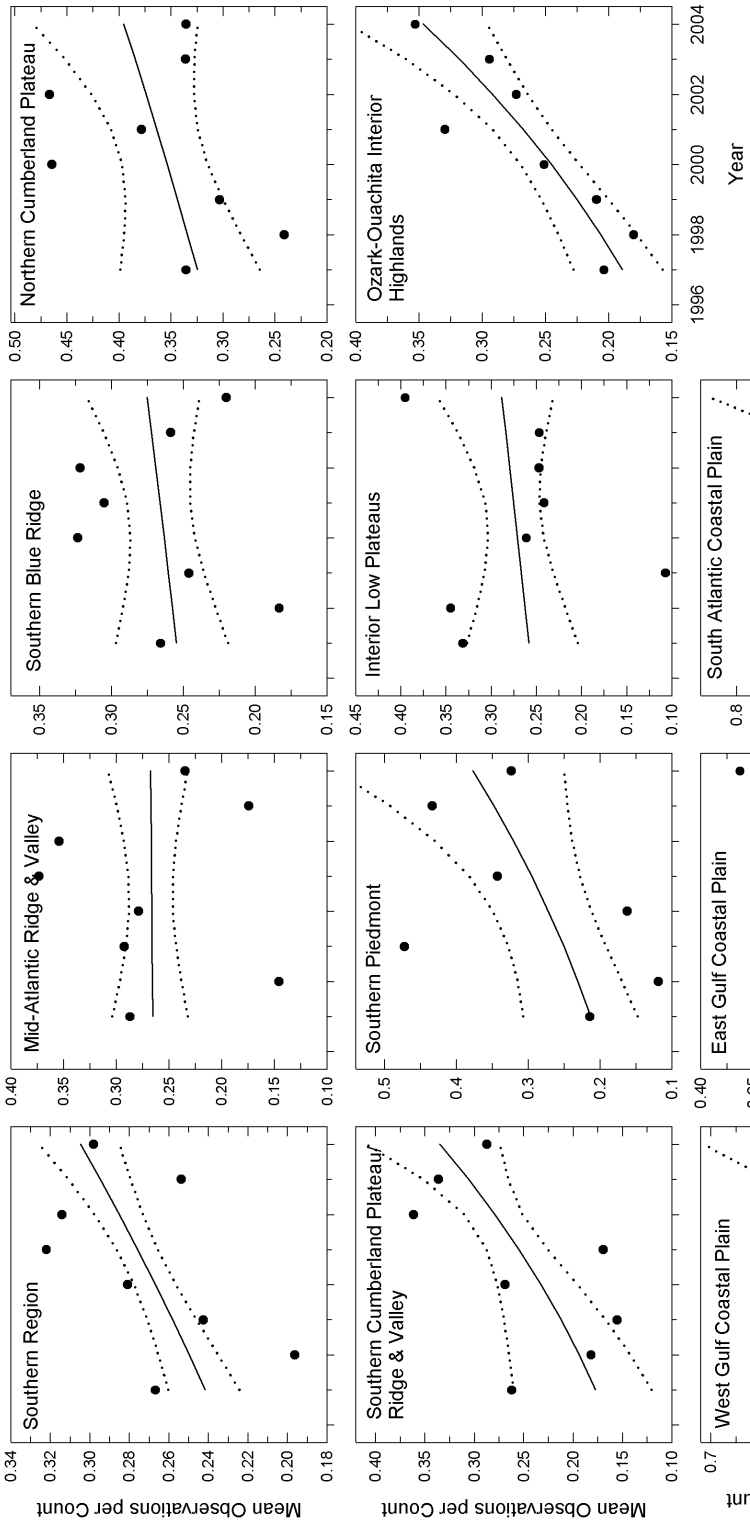
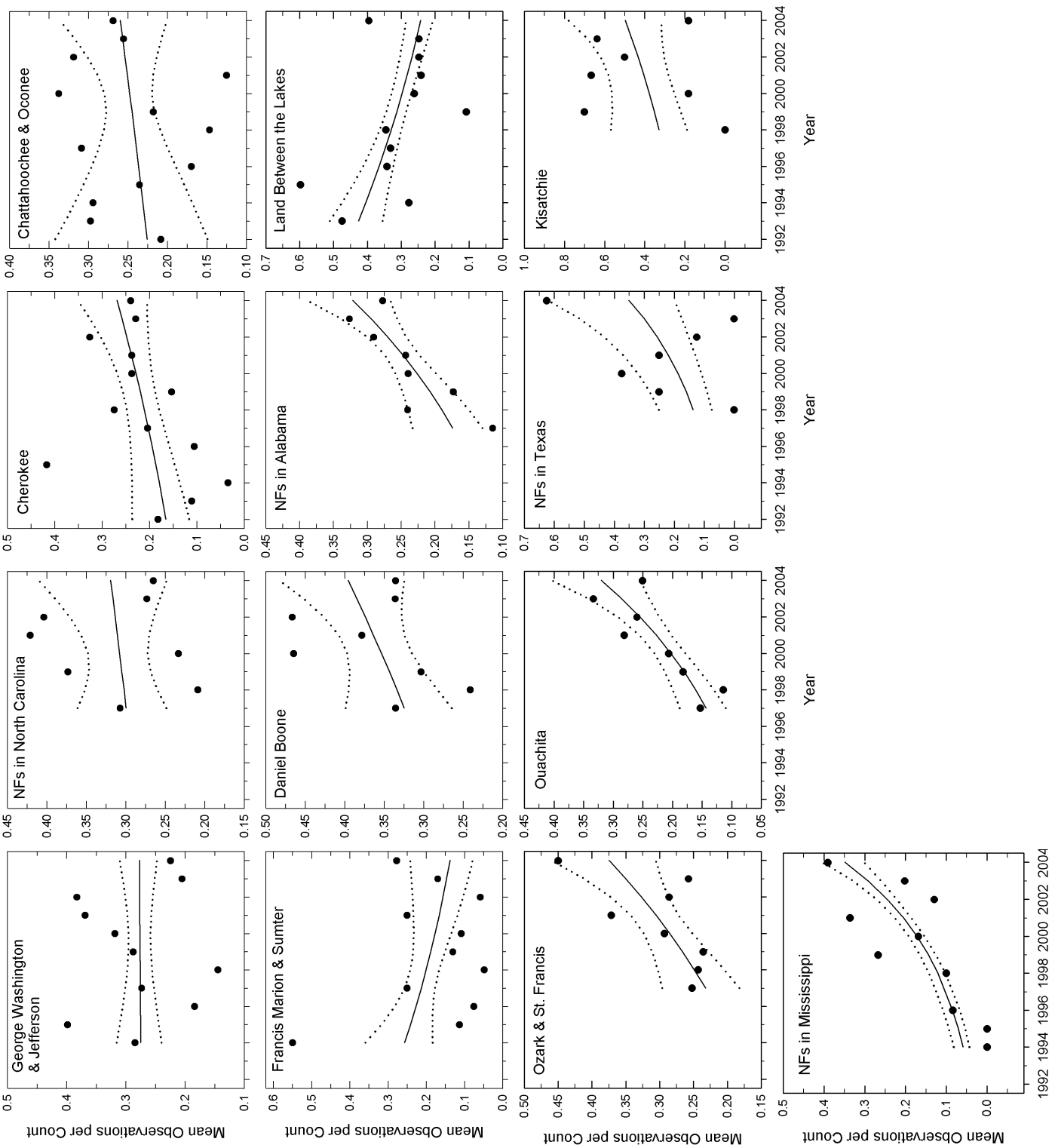


Figure 17. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the white-breasted nuthatch, 1992-2004, for the Southern Region, 10 physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 17.—Continued



Brown-headed Nuthatch *(Sitta pusilla)*

The range of the brown-headed nuthatch coincides with the geographic distribution of southern pine forests on the Lower Coastal Plain, Upper Coastal Plain, and Southern Piedmont regions (Withgott and Smith 1998). It is a resident from east Texas and extreme southeast Oklahoma, east to the Atlantic Coast and north to Virginia. This species is associated primarily with mature pine habitat that has been managed with prescribed fire and, thus, lacks a dense hardwood midstory and understory. Conservation needs center on maintaining mature pine forests and restoring/maintaining appropriate fire regimes.

The USGS Breeding Bird Survey indicates a nearly stable trend for this species from 1966 to 2004 (-1.4 percent; 95 percent CI: -3.0 to 0.2). It is a bird of conservation concern in the West Gulf Coastal Plain/Ouachitas, Southeastern Coastal Plain, and Peninsular Florida regions. The bird is of concern due to local population declines related to the loss of fire-maintained pine forests. Habitat fragmentation also may be detrimental as weak flying ability and sedentary character make it unlikely that individuals will disperse to distant fragments following local extirpations. The brown-headed nuthatch is a management indicator species on three national forests in the Southern Region, where it indicates management effects related to maintaining open, fire-maintained pine forests.

Population trends for the brown-headed nuthatch were estimated in seven physiographic areas and in nine national forests (Table 21, Fig. 18). Trend estimates indicate moderate increases in populations on national forests across the region. Positive trends are indicated for the Southern Cumberland/ Ridge and Valley, and East Gulf Coastal Plain as well as the Francis Marion and Sumter National Forests and national forests in Alabama. No physiographic areas or national forests showed negative trends.

The brown-headed nuthatch was primarily associated with longleaf-slash pine forests and to a lesser extent with loblolly-shortleaf pine forests (Appendix 6). Association was stronger with early than with later successional stages.

Table 21.—Mean number of observations per count and percent annual change in number of observations per count of brown-headed nuthatch on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.042	451	3.7	0.4	7.0
Physiographic Area					
Southern Blue Ridge	0.001	6	-1.5	-17.9	18.2
Southern Cumberland Plateau/Ridge & Valley	0.031	33	86.5	72.7	
Southern Piedmont	0.139	61	2.7	-3.5	9.3
Ozark-Ouachita Interior Highlands	0.007	7	10.4	-10.6	36.4
West Gulf Coastal Plain	0.191	108	0.5	-5.3	6.7
East Gulf Coastal Plain	0.036	114	11.2	4.1	18.7
South Atlantic Coastal Plain	0.192	122	1.7	-2.8	6.4
National Forest					
NFs in North Carolina	0.050	22	-2.1	-15.1	12.8
Chattahoochee and Oconee	0.011	12	28.3	19.3	37.9
Francis Marion and Sumter	0.124	109	5.4	2.8	8.0
NFs in Alabama	0.036	54	43.6	33.1	55.0
Ouachita	0.008	7	-6.7	-19.2	7.7
NFs in Texas	0.249	64	0.8	-6.5	8.6
Kisatchie	0.145	43	-0.3	-9.6	10.0
NFs in Mississippi	0.042	94	3.6	-0.3	7.6
NFs in Florida	0.122	44	0.7	-9.9	12.7

[a] Physiographic areas and national forests in which brown-headed nuthatch occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

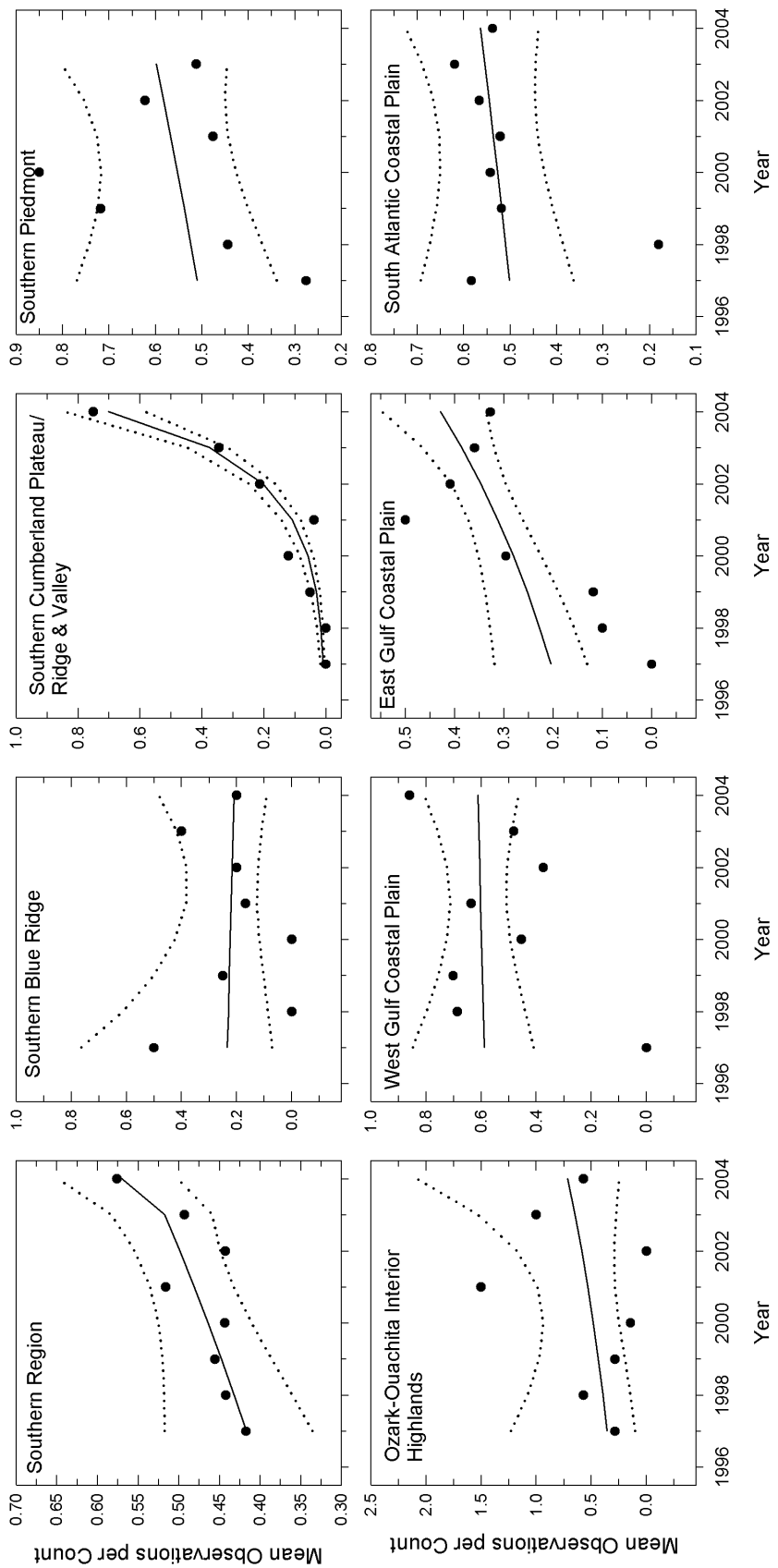
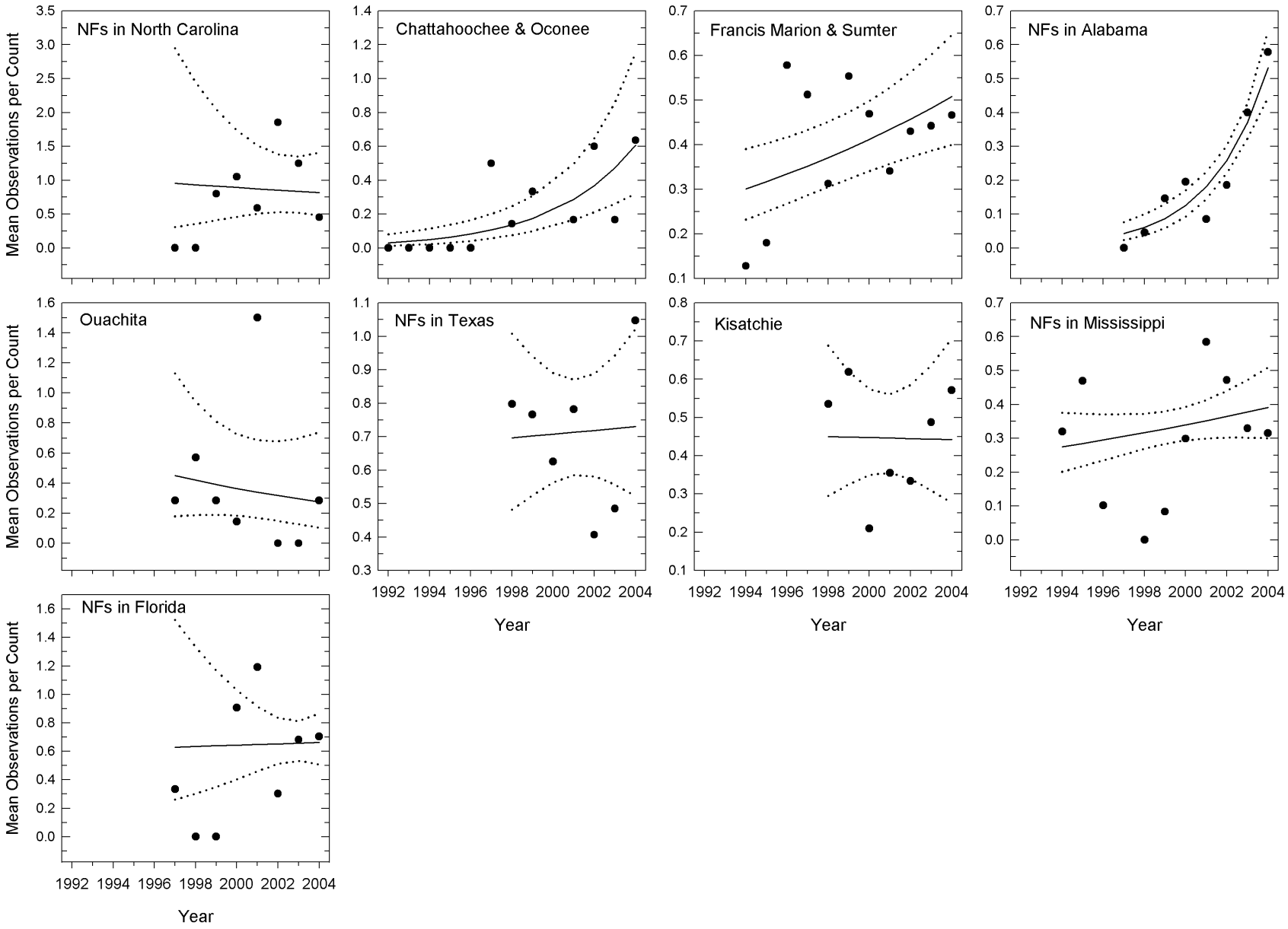


Figure 18. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the brown-headed nuthatch, 1992-2004, for the Southern Region, seven physiographic areas, and 9 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 18.—Continued



Eastern Bluebird (*Sialia sialis*)

The eastern bluebird breeds from Canada, south throughout the Eastern United States to the Gulf Coast, and west into the riparian corridors of the Great Plains (Gowaty and Plissner 1998). This species is a year-round resident of the South. Natural habitats probably were fire-maintained savannas, mature open pine forests, snags adjacent to open water, and xeric forest openings in the eastern deciduous forest. This cavity nester depends on cavities in snags or nest boxes. Forest practices such as thinning and prescribed burning to provide open habitats benefit this species. Maintaining standing dead trees within silvicultural treatment areas provides vital nesting cavities.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (2.4 percent; 95 percent CI: 2.0 to 2.8). The bird is of interest because it is limited by nest-site availability and is valued for wildlife watching. The eastern bluebird is a management indicator species on Land Between the Lakes National Recreation Area, where it indicates management effects on the abundance of snags in open habitats and on wildlife viewing opportunities.

Population trends for the eastern bluebird were estimated in nine physiographic areas and in 12 national forests (Table 22; Fig. 19). Trend estimates indicate stable populations on national forests across the region. Positive trends are indicated for the East Gulf Coastal Plain and National Forests in Mississippi. Negative trends are indicated for the Southern Blue Ridge and the Francis Marion and Sumter National Forests.

The eastern bluebird was associated primarily with glade-shrub-savanna habitats and early successional stages of pine forests (Appendix 6).

Table 22.—Mean number of observations per count and percent annual change in number of observations per count of eastern bluebird on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.017	365	-0.9	-4.9	3.2
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.004	22	6.9	-6.3	21.9
Southern Blue Ridge	0.009	40	-14.6	-23.6	-4.4
Northern Cumberland Plateau	0.012	12	-3.2	-16.0	11.5
Southern Cumberland Plateau/Ridge & Valley	0.011	13	11.1	-1.1	24.8
Southern Piedmont	0.090	54	-2.7	-12.1	7.7
Interior Low Plateaus	0.015	34	9.6	-4.3	25.5
Ozark-Ouachita Interior Highlands	0.012	33	12.9	1.4	25.6
West Gulf Coastal Plain	0.016	19	-42.6	-46.7	-38.1
East Gulf Coastal Plain	0.015	62	16.0	5.6	27.5
South Atlantic Coastal Plain	0.047	76	-2.2	-7.5	3.5
National Forest					
George Washington and Jefferson	0.005	28	2.4	-4.4	9.6
NFs in North Carolina	0.015	19	9.3	-3.8	24.1
Chattahoochee and Oconee	0.025	21	11.5	3.7	19.9
Francis Marion and Sumter	0.083	97	-10.8	-14.4	-7.0
Daniel Boone	0.012	12	-3.2	-16.0	11.5
NFs in Alabama	0.022	29	8.4	-2.0	19.9
Land Between the Lakes	0.024	34	-13.7	-19.4	-7.7
Ozark and St. Francis	0.013	15	12.6	-2.0	29.5
Ouachita	0.010	18	13.2	-2.6	31.4
Kisatchie	0.040	17	-42.8	-47.2	-38.0
NFs in Mississippi	0.011	42	24.6	16.3	33.4
NFs in Florida	0.042	29	-12.6	-21.2	-3.1

[a] Physiographic areas and national forests in which eastern bluebird occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

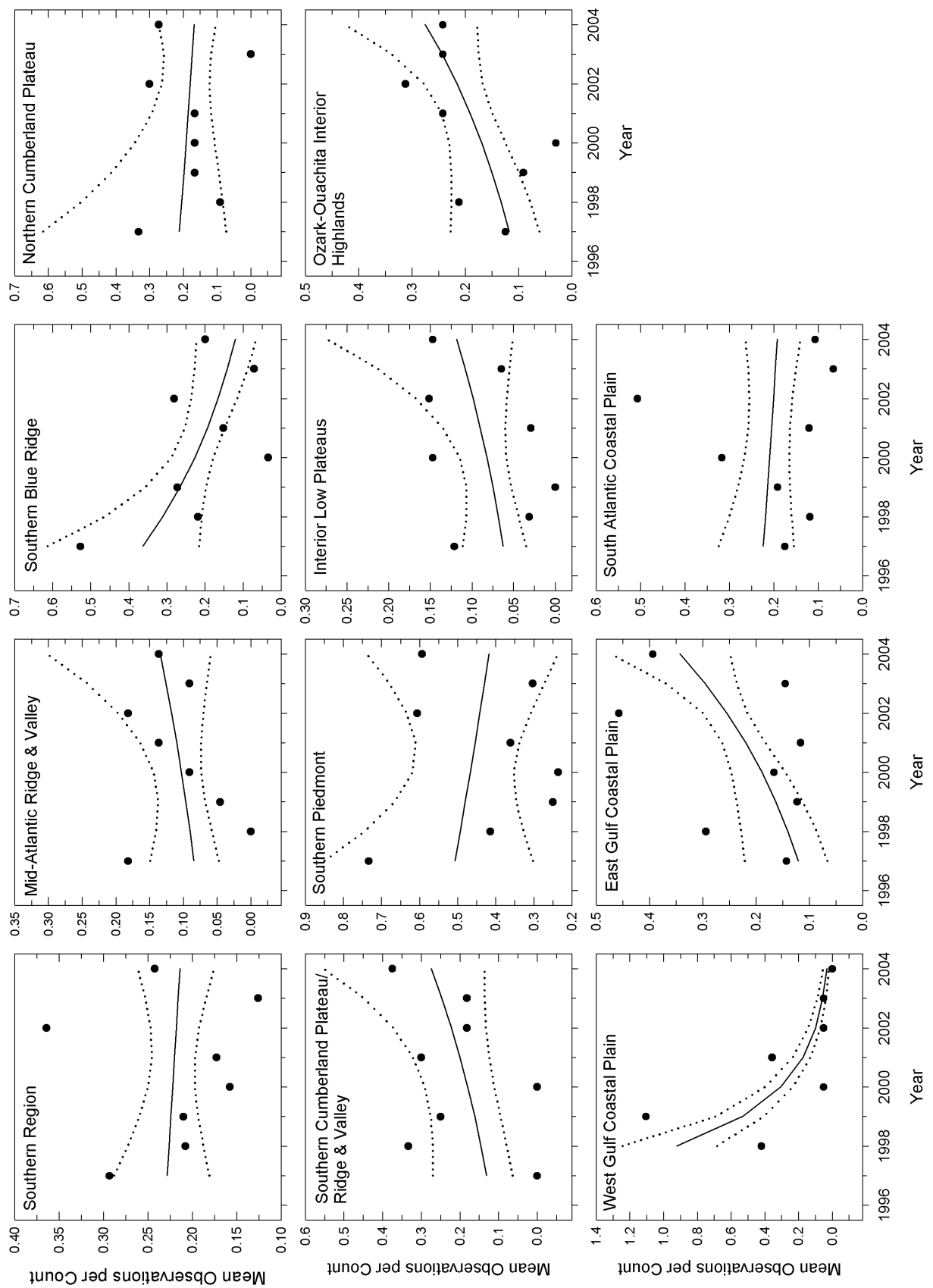
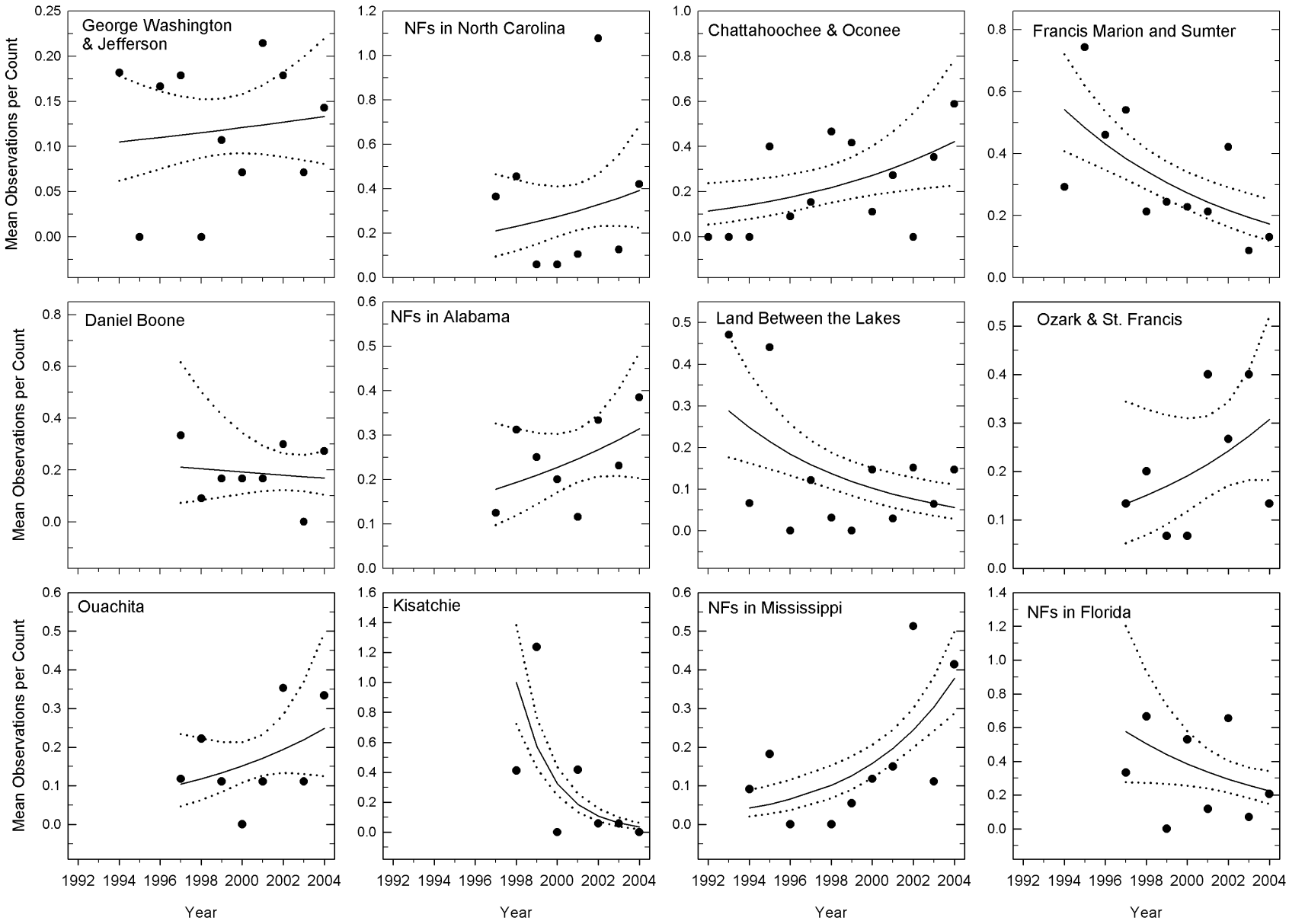


Figure 19. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the eastern bluebird, 1992-2004, for the Southern Region, nine physiographic areas, and 12 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 19.—Continued



Wood Thrush (*Hylocichla mustelina*)

The wood thrush breeds in a variety of wooded habitats in Eastern North America from Southern Canada to the Gulf Coast (Roth et al. 1996). It winters in Mexico, Central America, and the western Caribbean. This species breeds in both the interior and forest edges of deciduous and mixed forests. Key elements of preferred sites include a variety of deciduous tree species, moderate subcanopy and shrub density, shade, and a fairly open, moist forest floor. Habitat management centers on maintaining large tracts of deciduous forest habitat.

The USGS Breeding Bird Survey indicates a negative trend for the species from 1966 to 2004 (-1.8 percent; 95 percent CI: -2.1 to -1.4). It is a bird of conservation concern in the Central Hardwoods, West Gulf Coastal Plain/Ouachitas, Mississippi Alluvial Valley, Southeastern Coastal Plain, Appalachian Mountains, and Piedmont regions. The bird is of concern because of the loss and fragmentation of forest habitats and nest parasitism by the brown-headed cowbird. The wood thrush is a management indicator species on four national forests in the Southern Region, where it indicates management effects on interior forest habitats, mesic hardwood forest communities, and mature mixed pine hardwood forests.

Population trends for the wood thrush were estimated in 10 physiographic areas and in 13 national forests (Table 23, Fig. 20). Trend estimates indicate moderately declining populations on national forests across the region. Negative trends are indicated for five physiographic areas and four forests. Positive trends are indicated only for the South Atlantic Coastal Plain though the number of points where wood thrush was detected in this physiographic area was relatively small.

The wood thrush was associated with a variety of forest types and successional stages, with highest association indicated for mature maple-beech-birch, cove hardwood, and white-pine hemlock forests (Appendix 6). Association also was high for oak hickory, hardwood pine, loblolly-shortleaf pine, and riparian forests. The wood thrush was detected at points across successional stages.

Table 23.—Mean number of observations per count and percent annual change in number of observations per count of wood thrush on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.225	2623	-3.3	-4.3	-2.3
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.304	475	-3.4	-5.5	-1.2
Southern Blue Ridge	0.253	528	1.3	-0.6	3.3
Northern Cumberland Plateau	0.396	148	-0.1	-3.2	3.2
Southern Cumberland Plateau/Ridge & Valley	0.115	82	-1.2	-7.1	5.1
Southern Piedmont	0.467	204	-10.8	-14.1	-7.4
Interior Low Plateaus	0.189	162	-10.3	-14.1	-6.4
Ozark-Ouachita Interior Highlands	0.086	163	-0.8	-4.5	3.0
West Gulf Coastal Plain	0.097	110	-15.4	-20.8	-9.7
East Gulf Coastal Plain	0.282	717	-4.8	-7.1	-2.5
South Atlantic Coastal Plain	0.036	34	18.0	5.2	32.3
National Forest					
George Washington and Jefferson	0.335	602	-2.1	-3.4	-0.8
NFs in North Carolina	0.211	155	0.5	-3.3	4.3
Cherokee	0.252	203	-1.7	-3.7	0.4
Chattahoochee and Oconee	0.240	123	1.2	-1.5	3.9
Francis Marion and Sumter	0.239	224	-9.9	-12.1	-7.6
Daniel Boone	0.396	148	-0.1	-3.2	3.2
NFs in Alabama	0.105	139	-4.0	-8.6	0.7
Land Between the Lakes	0.271	162	-12.8	-14.8	-10.7
Ozark and St. Francis	0.137	109	-1.4	-5.5	2.9
Ouachita	0.048	66	2.8	-4.1	10.2
NFs in Texas	0.111	64	-25.1	-32.3	-17.2
Kisatchie	0.090	44	2.7	-5.7	11.9
NFs in Mississippi	0.316	629	-0.2	-1.7	1.2

[a] Physiographic areas and national forests in which wood thrush occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

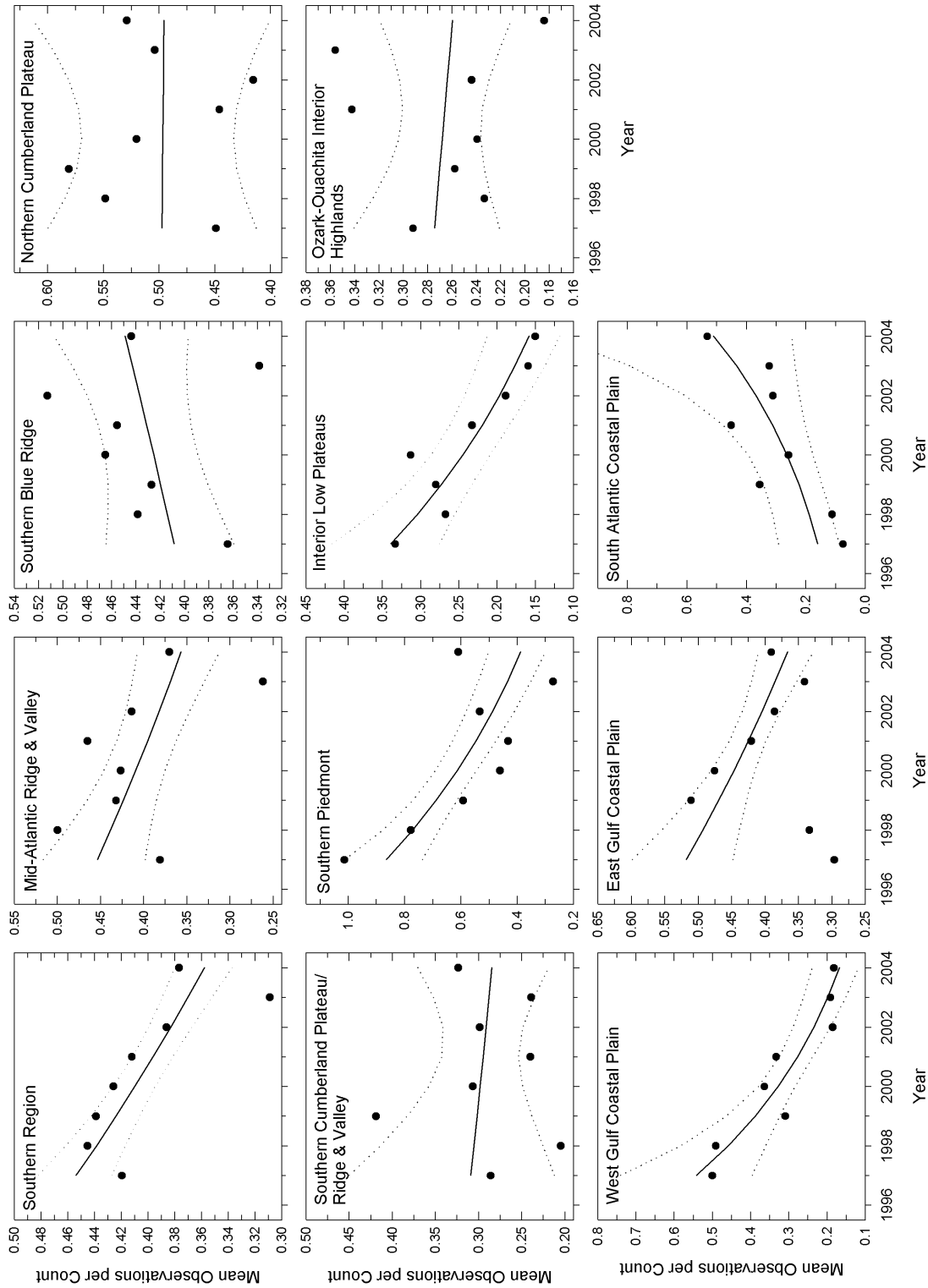
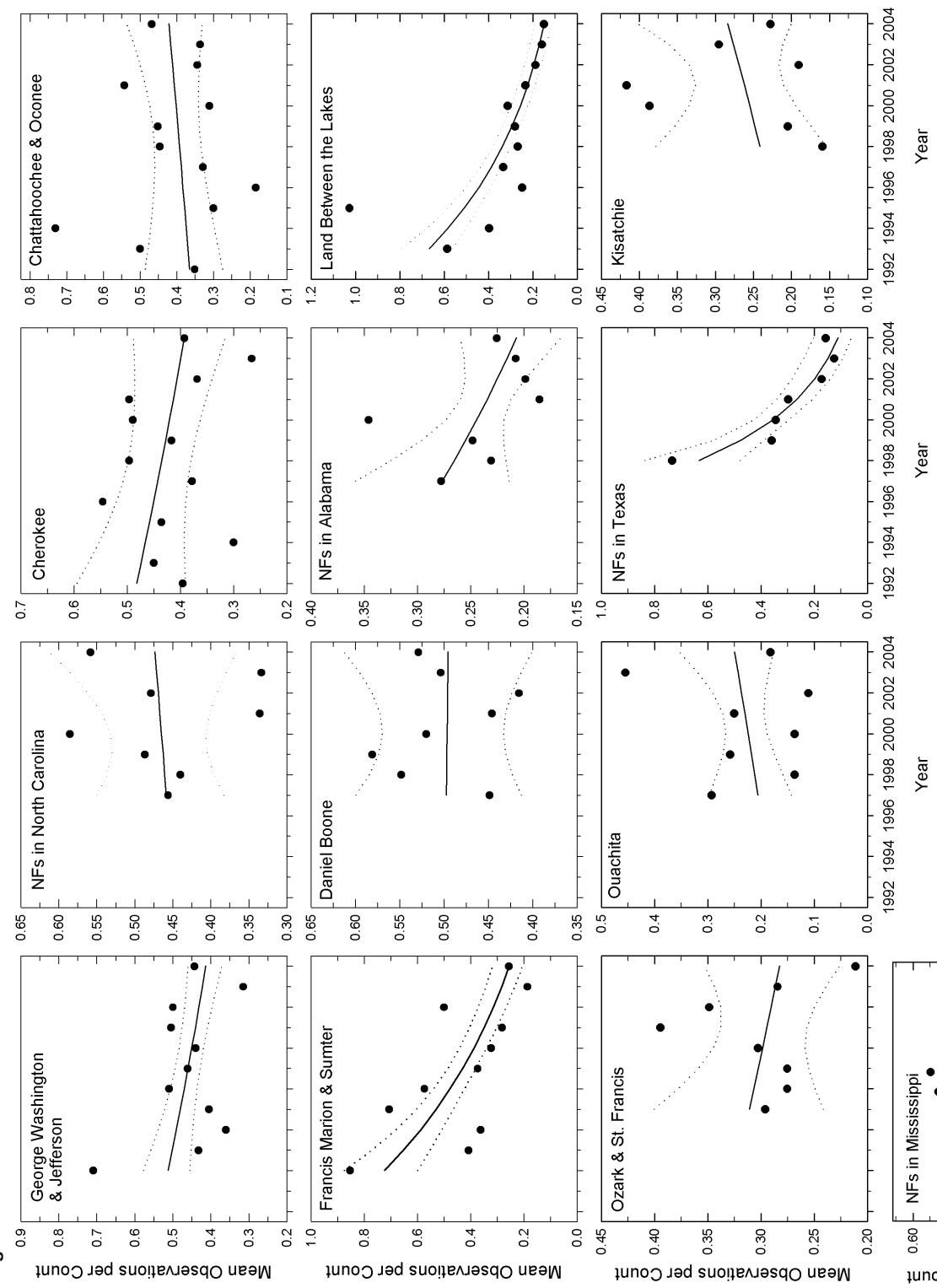
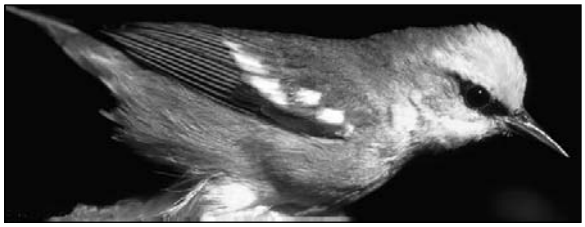


Figure 20. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the wood thrush, 1992-2004, for the Southern Region, 10 physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 20.—Continued





Blue-winged Warbler (*Vermivora pinus*)

The blue-winged warbler breeds in the Eastern United States as far south as Oklahoma, Arkansas, northern Alabama and northern Georgia (Gill et al. 2001). Most descriptions of breeding habitat refer to the use of saplings, forest edge, or forest clearings and dense shrub understory. This species also is common in overgrown old fields and brushy swamps. Management focuses on maintaining adequate early successional nesting habitat.

The USGS Breeding Bird Survey indicates a nearly stable trend for this species from 1966 to 2004 (-0.7 percent; 95 percent CI: -1.6 to 0.3). It is a bird of conservation concern in the Central Hardwoods region. The bird is of concern due to loss of early-serial forest habitat. The blue-winged warbler has not been selected as a management indicator species.

Population trends for the blue-winged warbler were estimated in seven physiographic areas and in eight national forests (Table 24, Fig. 21). Trend estimates indicate large declines on national forests across the region. The number of points where this species was detected is somewhat limited for many physiographic areas and national forests; however, negative trend estimates associated with 90 percent confidence intervals that exclude zero and 30 or more points are indicated for two physiographic areas and four national forests. Positive trend estimates meeting these criteria are indicated only for the Francis Marion and Sumter National Forests.

The blue-winged warbler was associated most frequently with glade-shrub-savanna habitats and early successional stages of white-pine hemlock and loblolly-shortleaf pine forest (Appendix 6).

Table 24.—Mean number of observations per count and percent annual change in number of observations per count of blue-winged warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.014	293	-15.6	-19.0	-12.0
Physiographic Area					
Southern Blue Ridge	0.032	133	-11.2	-14.1	-8.3
Northern Cumberland Plateau	0.021	23	-26.8	-35.9	-16.5
Southern Cumberland Plateau/Ridge & Valley	0.030	35	-12.6	-18.7	-6.2
Southern Piedmont	0.018	23	11.4	2.9	20.6
Interior Low Plateaus	0.016	30	-15.5	-16.4	-14.6
Ozark-Ouachita Interior Highlands	0.019	33	-9.4	-18.0	0.1
East Gulf Coastal Plain	0.002	9	113.5	78.2	
National Forest					
NFs in North Carolina	0.064	76	-32.3	-36.8	-27.6
Chattahoochee and Oconee	0.066	56	-7.6	-12.5	-2.4
Francis Marion and Sumter	0.013	32	12.9	7.5	18.6
Daniel Boone	0.021	23	-26.8	-35.9	-16.5
NFs in Alabama	0.016	30	2.1	-8.3	13.7
Land Between the Lakes	0.016	30	-15.5	-16.4	-14.6
Ozark and St. Francis	0.040	32	-9.6	-18.3	-0.1
NFs in Mississippi	0.002	9	113.5	78.2	

[a] Physiographic areas and national forests in which blue-winged warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

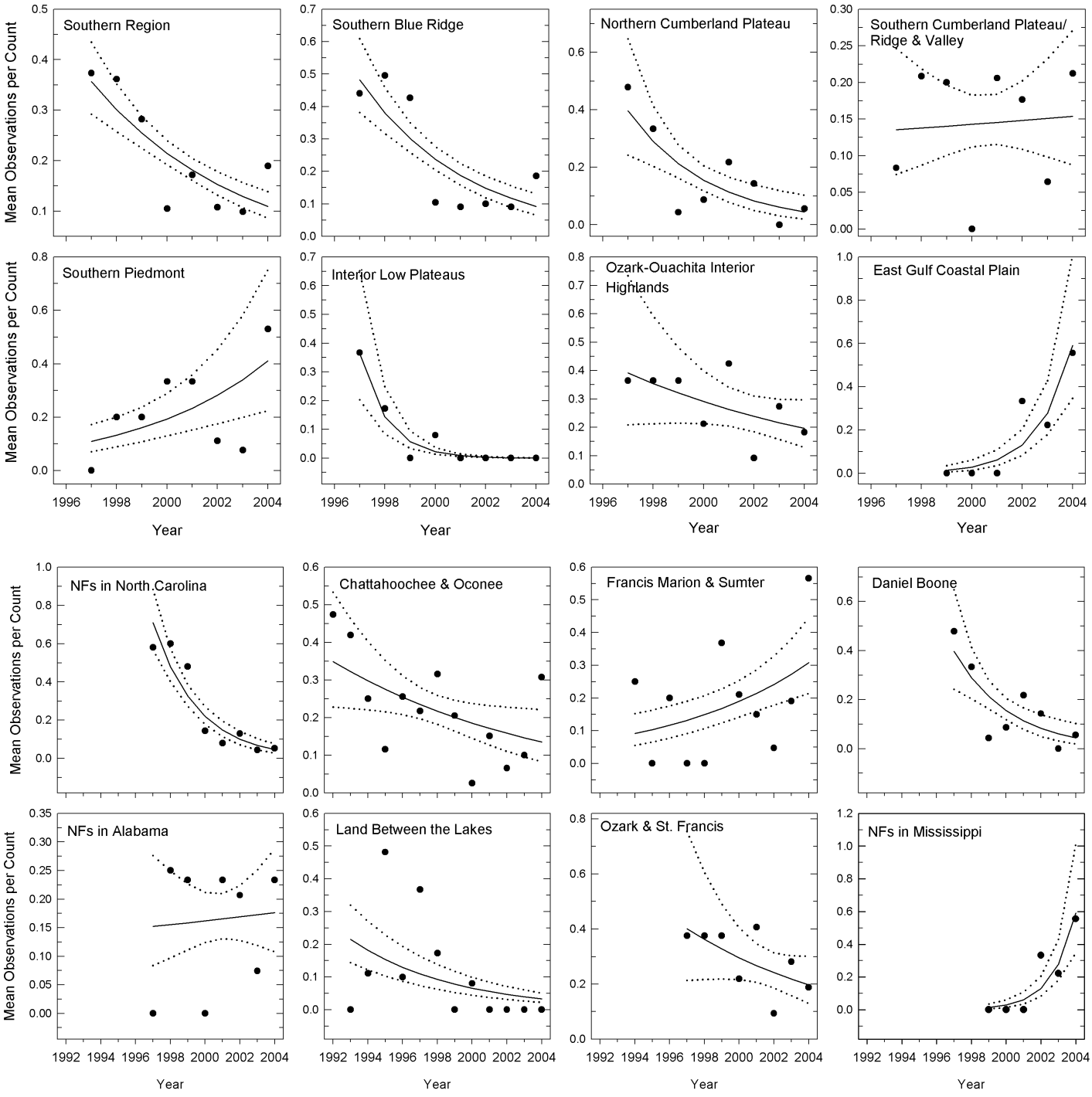


Figure 21.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the blue-winged warbler, 1992-2004, for the Southern Region, seven physiographic areas, and eight national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Golden-winged Warbler (*Vermivora chrysoptera*)

The golden-winged warbler's breeding habitat is distributed in the Northeastern and North-central United States and southern Ontario (Confer 1992). In the South, it occurs at mid to upper elevations in the Appalachian Mountains from Virginia to Georgia, and it winters in Central and South America. Breeding habitat includes patches of grass-dominated herbaceous cover, shrubs, scattered trees, and forested edge. Often, this habitat is associated with shrubby fields and marshes and bogs with a forest edge. Management that provides for grassy patches within early succession forest or field conditions, particularly at higher elevations, provides suitable breeding habitat.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-2.5 percent; 95 percent CI: -4.0 to -0.9). The bird is of concern because of advancing forest succession, nest parasitism by the brown-headed cowbird, and hybridization with blue-winged warblers. Because of its rarity, the golden-winged warbler has not been selected as a management indicator species but it is increasingly targeted as part of habitat improvement projects on national forests of the Southern Appalachians.

Population trends for the golden-winged warbler were estimated in one physiographic area and in two national forests (Table 25, Fig. 22). Although points where the species was detected are limited, evidence suggests that populations are declining on national forests within the Southern Blue Ridge, the extent of its range in the Southern Region. Habitat associations of the golden-winged warbler were not determined due to the small number of points at which they were detected.

Table 25.—Mean number of observations per count and percent annual change in number of observations per count of golden-winged warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.012	34	-27.0	-34.2	-18.9
Physiographic Area					
Southern Blue Ridge	0.011	34	-10.4	-14.5	-6.0
National Forest					
NFs in North Carolina	0.028	22	-27.0	-34.7	-18.4
Cherokee	0.006	10	-11.2	-14.1	-8.2

[a] Physiographic areas and national forests in which golden-winged warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

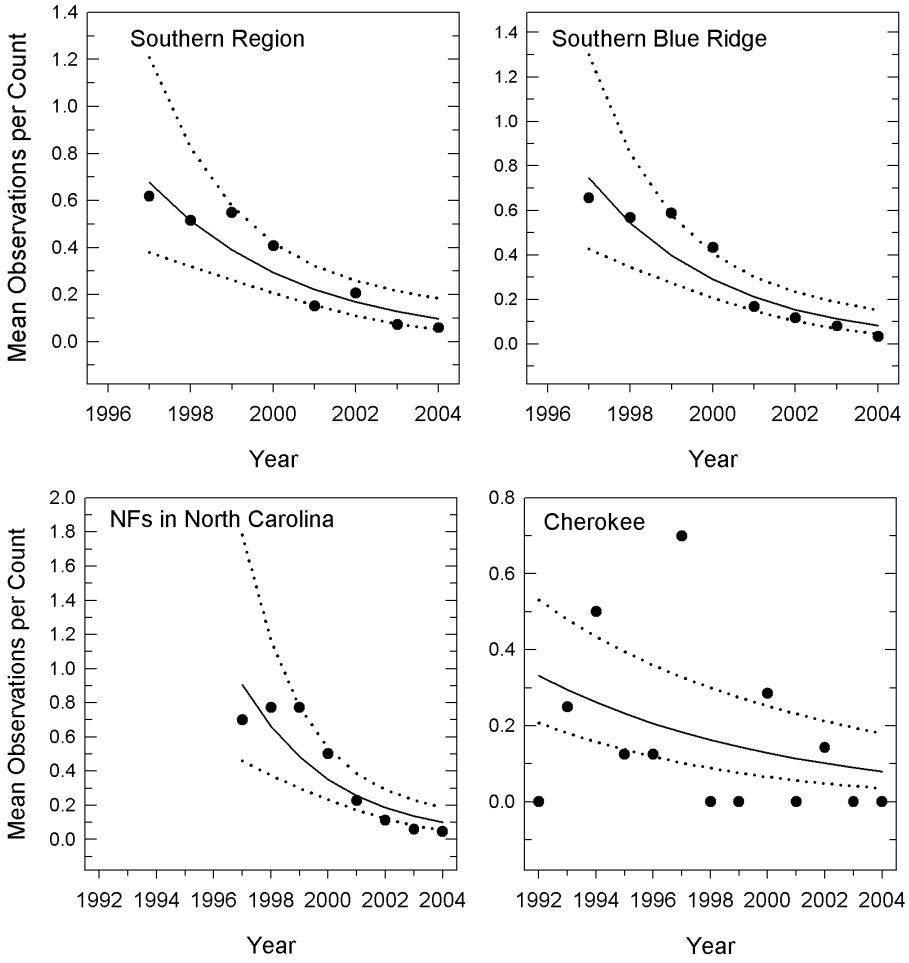


Figure 22.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the golden-winged warbler, 1992-2004, for the Southern Region, one physiographic area, and two national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Northern Parula (*Parula americana*)

The northern parula breeds throughout the eastern half of the United States and in Southern Canada (Moldenhauer and Regelski 1996). It winters primarily in Eastern Mexico and on islands of the West Indies. This species is associated primarily with mature forest with epiphytic growth such as Spanish moss. It is commonly found in the canopy and subcanopy of bottomland forest next to rivers, swamps, and lakes. Southern populations nest in Spanish moss in hardwood bottomlands along rivers and swamps. Forest management should center on maintaining large tracts of undisturbed breeding habitat or allowing disturbed habitat to mature to the point where it can support the species.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (0.8 percent; 95 percent CI: 0.2 to 1.4). It is a bird of conservation concern in the Mississippi Alluvial Valley and Southeastern Coastal Plain regions. The bird is of concern because of the loss of riparian habitats suitable for nesting. The northern parula is a management indicator species on three national forests in the Southern Region, where it indicates management effects on riparian forests.

Population trends for the northern parula were estimated in 10 physiographic areas and in 14 national forests (Table 26, Fig. 23). Trend estimates indicate small increases for this species on national forests across the region. Increases were indicated for five physiographic areas and three national forests; decreases were indicated for three physiographic areas and one national forest. Increases were indicated for western and coastal plain areas, with decreases clustered in the Appalachians and Southern Piedmont.

The northern parula was associated most frequently with mature oak-gum-cypress, elm-ash-cottonwood, and riparian forests types, and was highly associated with mature cove hardwood and white-pine hemlock forests (Appendix 6). Unexpectedly, this species also was recorded relatively frequently at early successional points in glade-shrub-savanna and loblolly-shortleaf pine forests.

Table 26.—Mean number of observations per count and percent annual change in number of observations per count of northern parula on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.129	1355	1.8	0.3	3.3
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.066	118	-5.2	-8.6	-1.6
Southern Blue Ridge	0.123	278	-3.2	-5.7	-0.5
Northern Cumberland Plateau	0.111	60	3.0	-2.8	9.1
Southern Cumberland Plateau/Ridge & Valley	0.074	62	4.5	-3.8	13.6
Southern Piedmont	0.367	149	-5.7	-9.8	-1.4
Interior Low Plateaus	0.217	138	14.9	10.6	19.4
Ozark-Ouachita Interior Highlands	0.109	115	3.1	0.0	6.2
West Gulf Coastal Plain	0.143	58	6.5	0.4	12.9
East Gulf Coastal Plain	0.081	216	5.8	1.9	9.8
South Atlantic Coastal Plain	0.289	161	6.8	2.2	11.6
National Forest					
George Washington and Jefferson	0.059	151	-1.6	-4.3	1.2
NFs in North Carolina	0.248	152	2.8	-2.3	8.1
Cherokee	0.076	89	2.7	-0.1	5.6
Chattahoochee and Oconee	0.098	56	-1.5	-6.1	3.3
Francis Marion and Sumter	0.340	219	-4.1	-6.3	-1.9
Daniel Boone	0.111	60	3.0	-2.8	9.1
NFs in Alabama	0.070	90	4.4	-2.0	11.2
Land Between the Lakes	0.176	138	15.8	13.2	18.4
Ozark and St. Francis	0.149	68	8.4	4.5	12.3
Ouachita	0.093	65	-0.9	-5.5	4.0
NFs in Texas	0.179	34	10.8	4.8	17.2
Kisatchie	0.094	19	-2.9	-18.5	15.7
NFs in Mississippi	0.094	169	-2.2	-4.3	0.0
NFs in Florida	0.225	71	3.8	-2.2	10.2

[a] Physiographic areas and national forests in which northern parula occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

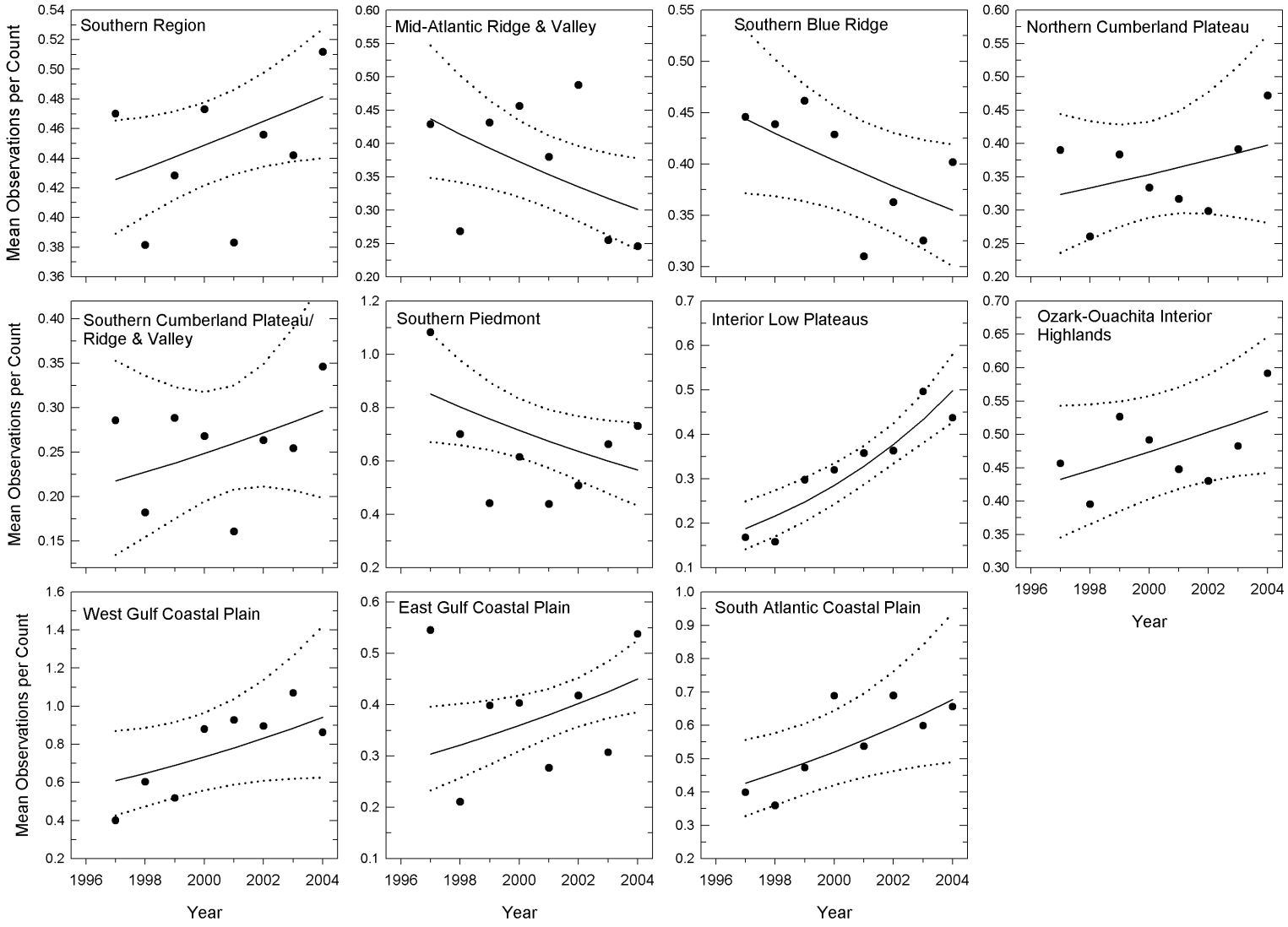
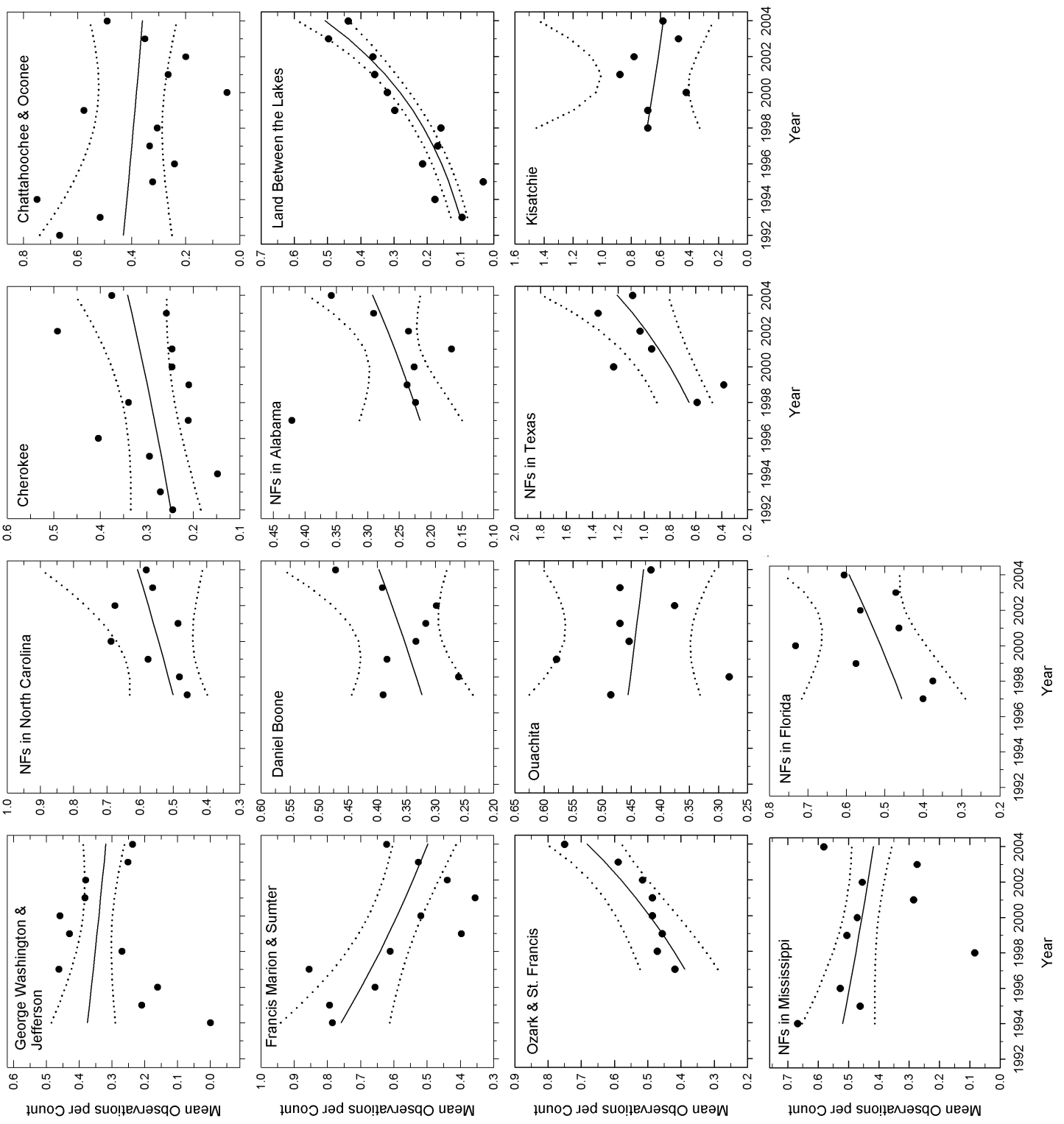


Figure 23. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the northern parula, 1992–2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 23.—Continued



Yellow Warbler (*Dendroica petechia*)

The yellow warbler breeds across North America from south of the tundra to Arkansas, Georgia, and Virginia (Lowther et al. 1999). It winters in Mexico and Central and South America, and occasionally along the Gulf Coast. This species is commonly found in wet, deciduous thickets dominated by willows, and uses other early successional habitats associated with streams, rivers or lakes. Habitat management centers on creating and maintaining early successional nesting habitat in riparian areas.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.3 percent; 95 percent CI: 0.0 to 0.5). The yellow warbler is a bird of conservation concern in the Peninsular Florida region and is of concern due to habitat loss in riparian areas. The yellow warbler has not been selected as a management indicator species.

Population trends for the yellow warbler were estimated in seven physiographic areas and in nine national forests (Table 27, Fig. 24). Trend estimates indicate stable populations for this species on national forests across the region. Subdivided by physiographic area and forest, sample sizes are relatively small but evidence indicates declines in the Southern Blue Ridge and increases on the Daniel Boone National Forest in the Southern Cumberland Plateau/Ridge and Valley area.

The yellow warbler was associated most frequently with glade-shrub-savanna, early successional elm-ash-cottonwood forest, and mature cove hardwood forest (Appendix 6).

Table 27.—Mean number of observations per count and percent annual change in number of observations per count of yellow warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.007	198	0.6	-4.7	6.1
Physiographic Area					
Southern Blue Ridge	0.008	51	-15.9	-24.7	-6.0
Northern Cumberland Plateau	0.027	31	17.6	3.3	33.9
Southern Cumberland Plateau/Ridge & Valley	0.017	20	20.5	8.3	34.0
Southern Piedmont	0.030	32	0.1	-12.2	14.1
Ozark-Ouachita Interior Highlands	0.013	34	-4.1	-12.4	5.1
East Gulf Coastal Plain	0.002	12	75.2	55.4	97.5
National Forest					
George Washington and Jefferson	0.002	13	-21.7	-27.6	-15.4
NFs in North Carolina	0.011	21	-12.3	-18.3	-6.0
Cherokee	0.009	22	1.8	-3.5	7.3
Chattahoochee and Oconee	0.021	22	9.7	2.8	17.2
Francis Marion and Sumter	0.007	13	-15.9	-23.5	-7.6
Daniel Boone	0.027	31	17.6	3.3	33.9
NFs in Alabama	0.015	29	45.4	33.2	58.6
Land Between the Lakes	0.005	10	-25.1	-29.5	-20.4
Ozark and St. Francis	0.025	30	-5.6	-14.0	3.6

[a] Physiographic areas and national forests in which yellow warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

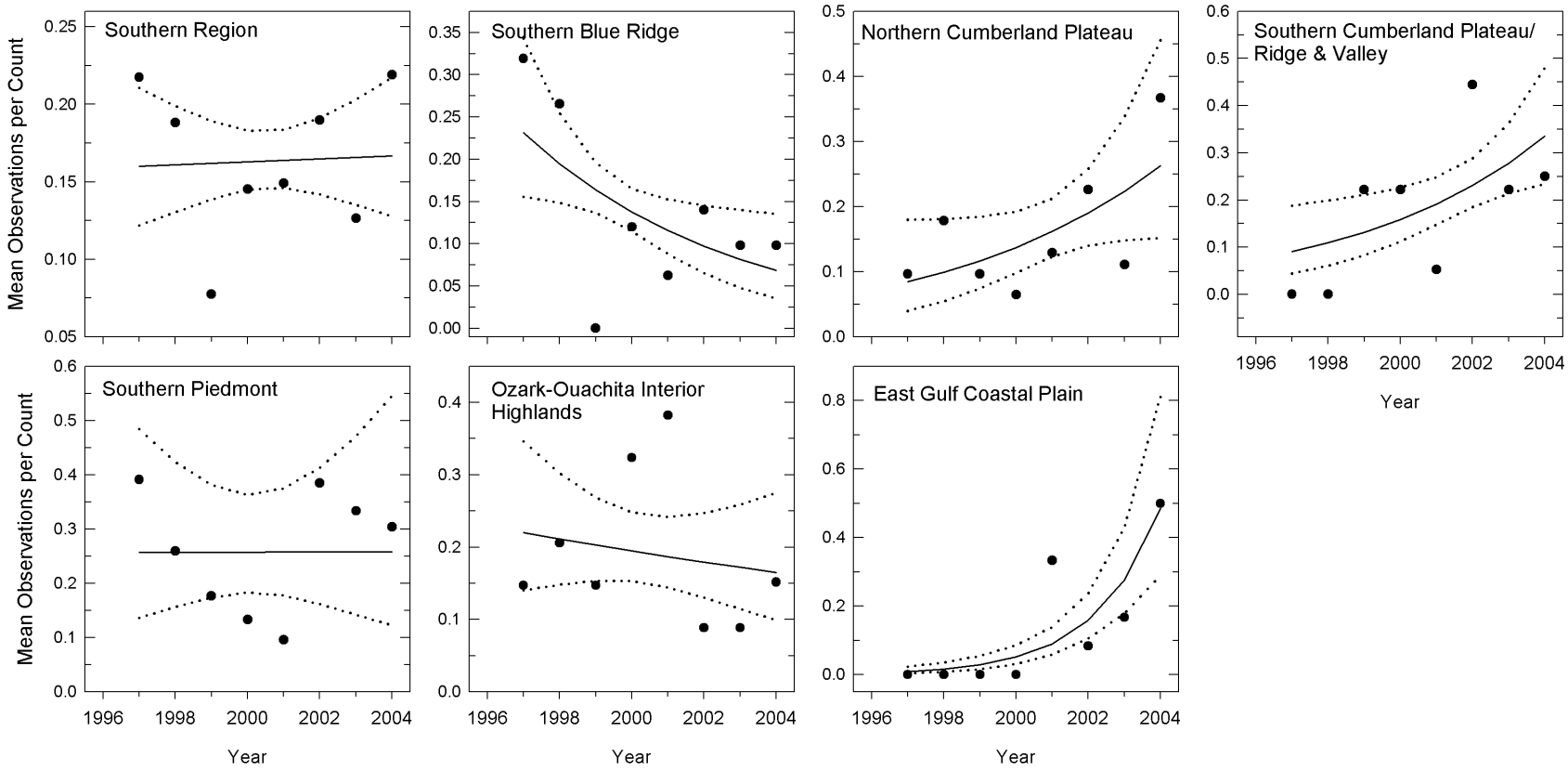
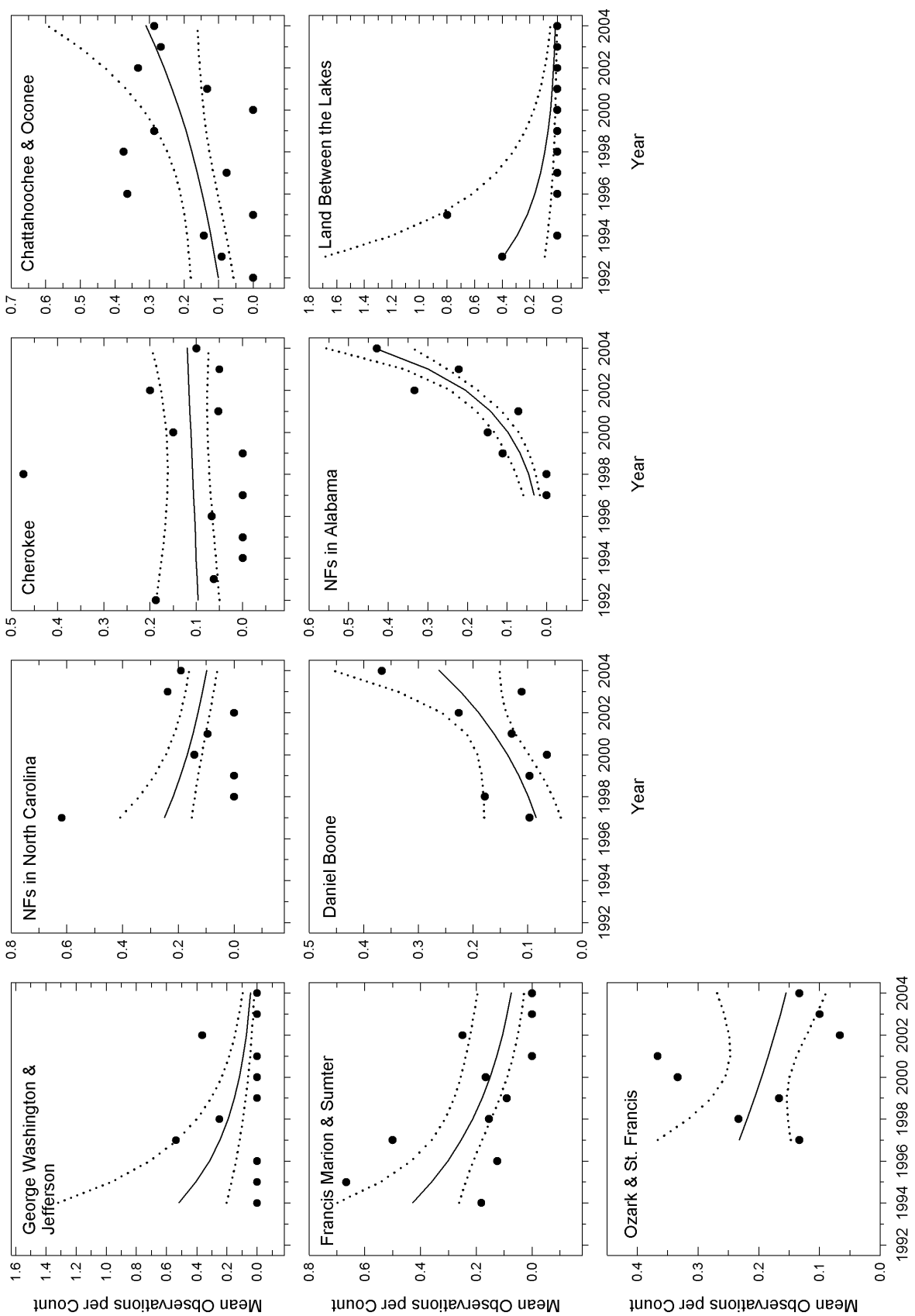


Figure 24. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the yellow warbler, 1992-2004, for the Southern Region, seven physiographic areas, and nine national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 24.—Continued



Chestnut-sided Warbler (*Dendroica pensylvanica*)

The chestnut-sided warbler breeds primarily in northern hardwood and mixed forests of Eastern North America from Canada southward through the Appalachian Mountains (Richardson and Brauning 1995). In the South, the species breeds at higher elevations from Virginia to northern Georgia. It is associated with early successional habitats, e.g., abandoned farmlands and regenerating clearcut areas, and is considered as one of the most abundant breeding warblers in second-growth deciduous woodlands. The chestnut-sided warbler is responsive to forest management associated with stand regeneration. Despite declines since the 1960s, this species appears to be maintaining healthy populations throughout its range.

The USGS Breeding Bird Survey indicates a nearly stable trend for this species from 1966 to 2004 (-0.6 percent; 95 percent CI: -1.2 to 0.0). The bird is of interest because it is a good indicator of the intensity of forest management activities. The chestnut-sided warbler is a management indicator species on three national forests in the Appalachian Mountains, where it indicates management effects on the abundance of early successional forest habitats.

Population trends for the chestnut-sided warbler were estimated in two physiographic areas and in four national forests (Table 28, Fig. 25). Trend estimates indicate relatively large population declines on national forests across the region. This trend is driven largely by declines for the Southern Blue Ridge, which, in turn, is driven primarily by large declines on National Forests in North Carolina. Increases are indicated for the Chattahoochee and Oconee National Forests.

The chestnut-sided warbler was associated most frequently with glade-shrub-savanna and mature stages of the high elevation forest types of maple-beech-birch and spruce-fir (Appendix 6). It also was highly associated with early successional oak-hickory forest.

Table 28.—Mean number of observations per count and percent annual change in number of observations per count of chestnut-sided warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.114	570	-6.8	-8.6	-4.9
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.132	146	-2.5	-6.4	1.6
Southern Blue Ridge	0.452	406	-7.5	-9.5	-5.3
National Forest					
George Washington and Jefferson	0.140	236	1.6	-0.7	4.0
NFs in North Carolina	0.789	199	-10.0	-12.2	-7.7
Cherokee	0.252	94	-2.4	-4.9	0.1
Chattahoochee and Oconee	0.123	45	7.7	2.4	13.2

[a] Physiographic areas and national forests in which chestnut-sided warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

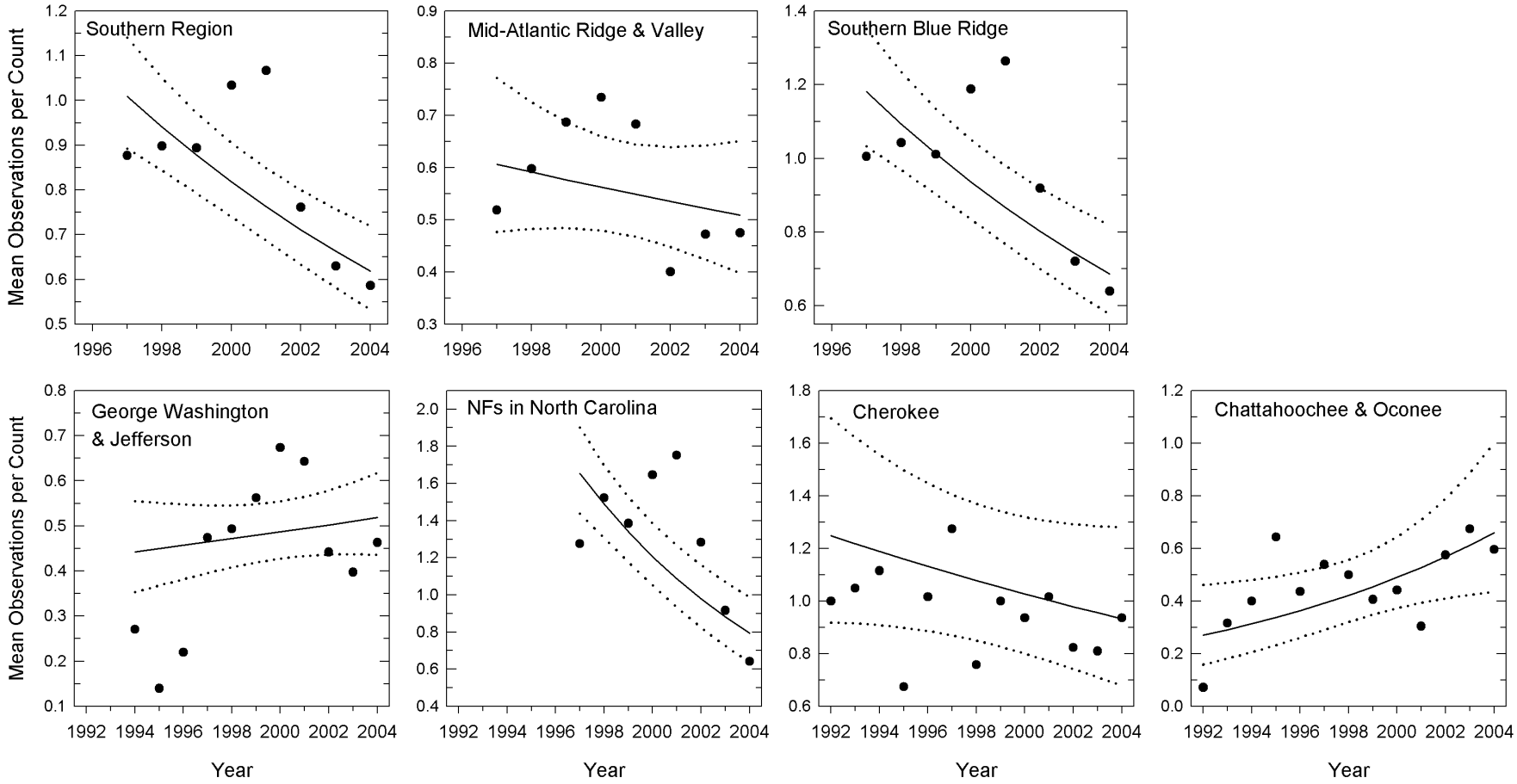


Figure 25.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the chestnut-sided warbler, 1992-2004, for the Southern Region, two physiographic areas, and four national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Black-throated Blue Warbler (*Dendroica caerulescens*)

The breeding range for the black-throated blue warbler includes the Northeastern United States and Southern Canada southward along the higher elevations of the Appalachian Mountains to northern Georgia (Holmes et al. 2005). Habitat for this species includes large tracts of relatively undisturbed hardwood and mixed deciduous-coniferous forests along the higher elevations in the Southern Appalachians from northern Georgia to Kentucky. Management of breeding habitat centers on maintaining a variety of forest types with relatively thick understory conditions in patches larger than 100 hectares.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (1.0 percent; 95 percent CI: -0.8 to 2.7). The black-throated blue warbler is a management indicator species only on the Caribbean National Forest, where it indicates management effects on migratory bird wintering habitat.

Population trends for the black-throated blue warbler were estimated in three physiographic areas and in five national forests (Table 29, Fig. 26). Trend estimates indicate moderate declines for populations on national forests across the region. This trend is driven largely by declines for the Southern Blue Ridge, which in turn, is driven primarily by large declines on National Forests in North Carolina and smaller declines on the Cherokee National Forest. Increases are indicated for the George Washington and Jefferson National Forests.

The black-throated blue warbler was most strongly associated with maple-beech-birch forest (Appendix 6). It was also associated with white-pine hemlock and cove hardwood forests, though at much lower frequency.

Table 29.—Mean number of observations per count and percent annual change in number of observations per count of black-throated blue warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.056	426	-3.5	-5.5	-1.5
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.063	93	8.5	3.6	13.7
Southern Blue Ridge	0.220	306	-4.4	-6.5	-2.2
Southern Piedmont	0.027	21	-45.9	-48.5	-43.2
National Forest					
George Washington and Jefferson	0.054	123	7.4	4.1	10.9
NFs in North Carolina	0.311	137	-6.1	-9.1	-2.9
Cherokee	0.247	127	-2.6	-4.7	-0.4
Chattahoochee and Oconee	0.136	49	0.0	-4.6	4.8
Francis Marion and Sumter	0.018	23	-5.9	-9.2	-2.6

[a] Physiographic areas and national forests in which black-throated blue warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

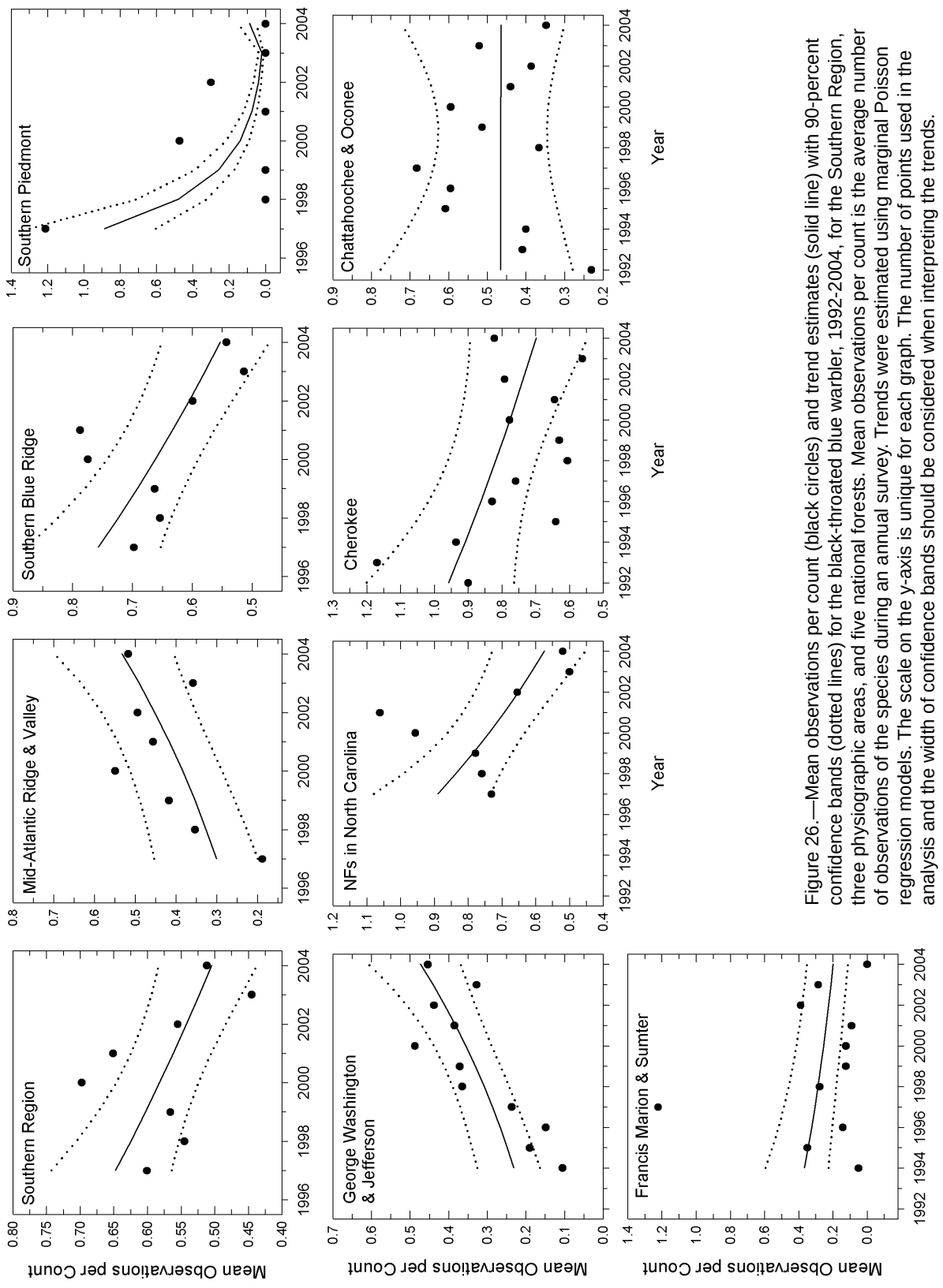


Figure 26.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the black-throated blue warbler, 1992-2004, for the Southern Region, three physiographic areas, and five national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Black-throated Green Warbler *(Dendroica virens*)

The breeding habitat for the black-throated green warbler in the South includes the Appalachian Mountains from Alabama to Virginia (Morse and Poole 2005). There is a disjunct population in the Ozarks of Arkansas and a Coastal Plain race from Virginia to South Carolina. This forest-interior species occupies a variety of habitats over its range. Effective management centers on maintaining relatively mature forest habitats in contiguous blocks.

The USGS Breeding Bird Survey indicates a nearly stable trend for this species from 1966 to 2004 (-1.8 percent; 95 percent CI: -6.8 to 3.3). It is a bird of conservation concern in the Southeastern Coastal Plain region. The bird is of concern in the Coastal Plain due to small, narrowly distributed populations associated with rare and declining wetland habitats. In the Appalachian Mountains, this species is of management interest because of its association with eastern hemlock and fir forests, which are threatened by infestations of wooly adelgids (*Adelges tsugae*). In the Southern Region, the black-throated green warbler is a management indicator species on the Daniel Boone National Forest, where it indicates management effects on forest structure within mature mesic deciduous cove forests.

Population trends for the black-throated green warbler were estimated in seven physiographic areas and in nine national forests (Table 30, Fig. 27). Trend estimates indicate moderate increases in populations on national forests across the region. There is strong evidence of increases in four physiographic areas and four national forests. Among all physiographic areas and national forests, the trend estimate is negative only for the Southern Piedmont based on a relatively small numbers of points.

The black-throated blue warbler was associated most frequently with white pine-hemlock, maple-beech-birch, and cove hardwood forests (Appendix 6).

Table 30.—Mean number of observations per count and percent annual change in number of observations per count of black-throated green warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.114	947	4.1	2.5	5.7
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.073	128	0.7	-4.1	5.8
Southern Blue Ridge	0.398	563	3.9	2.2	5.7
Northern Cumberland Plateau	0.254	95	1.6	-3.3	6.8
Southern Cumberland Plateau/Ridge & Valley	0.105	77	18.9	10.8	27.6
Southern Piedmont	0.014	15	-40.7	-48.3	-32.0
Ozark-Ouachita Interior Highlands	0.019	34	21.3	8.7	35.4
East Gulf Coastal Plain	0.008	30	39.7	31.0	49.1
National Forest					
George Washington and Jefferson	0.077	181	6.7	3.3	10.2
NFs in North Carolina	0.306	147	-0.8	-4.1	2.6
Cherokee	0.516	288	1.9	0.4	3.4
Chattahoochee and Oconee	0.306	103	-1.6	-4.5	1.4
Francis Marion and Sumter	0.110	96	6.4	2.6	10.3
Daniel Boone	0.254	95	1.6	-3.3	6.8
NFs in Alabama	0.078	88	22.8	16.2	29.8
Ozark and St. Francis	0.022	15	7.4	-4.2	20.5
Ouachita	0.013	19	45.5	19.5	77.2

[a] Physiographic areas and national forests in which black-throated green warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

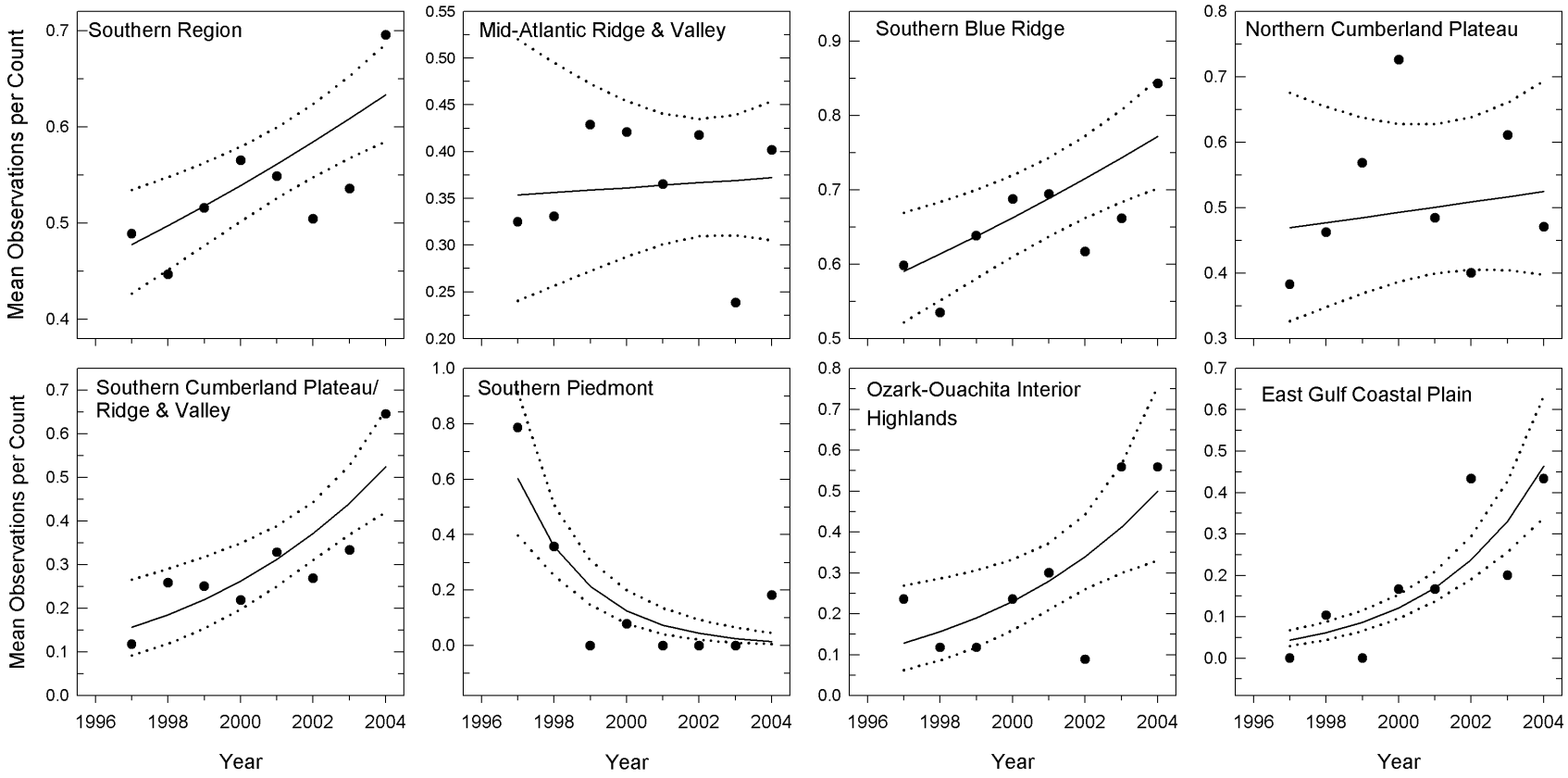
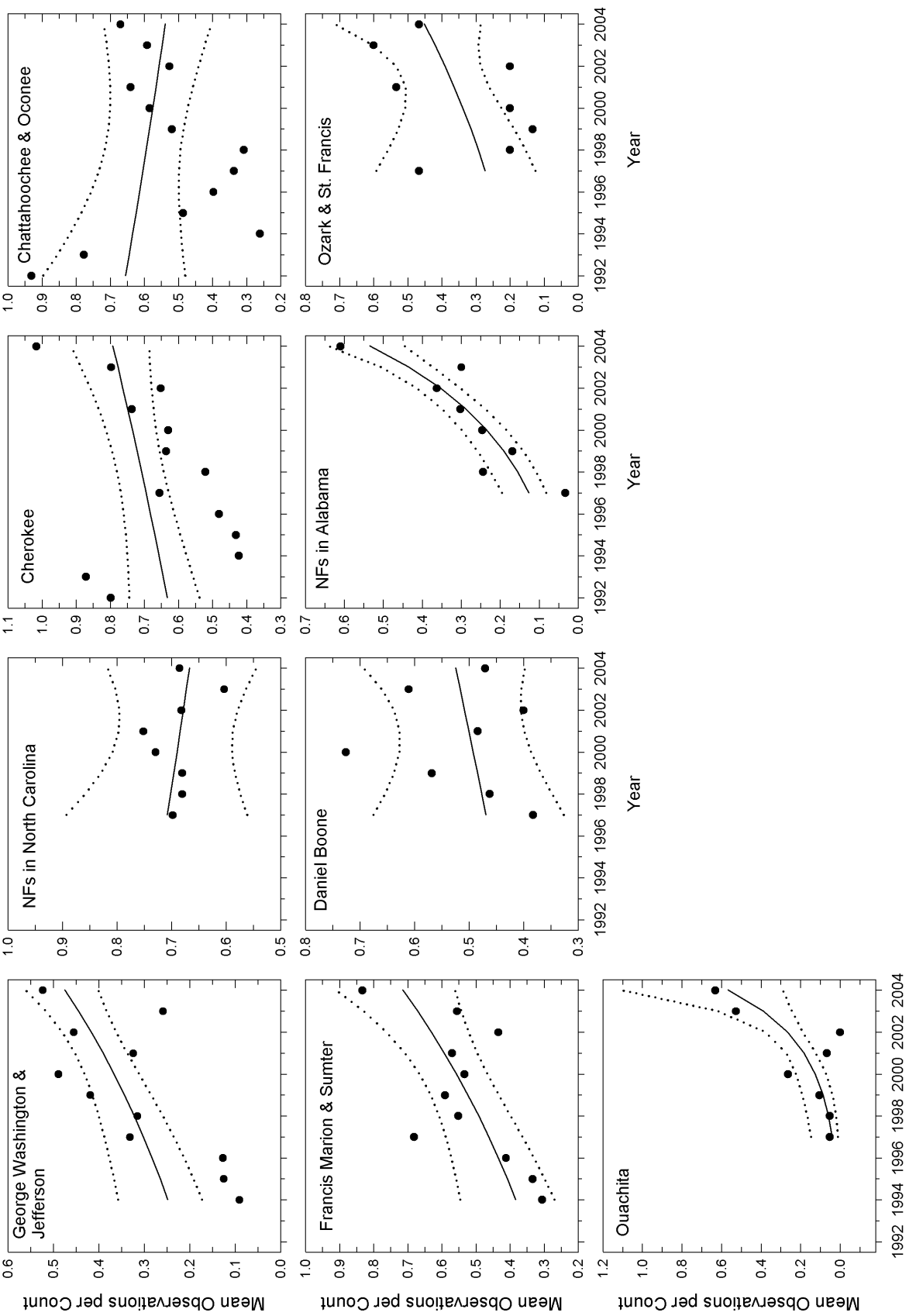


Figure 27.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the black-throated green warbler, 1992-2004, for the Southern Region, seven physiographic areas, and nine national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 27.—Continued



Yellow-throated Warbler (*Dendroica dominica*)

The yellow-throated warbler breeds throughout the Eastern United States from the Great Lakes to the Gulf Coast (Hall 1996). It winters from coastal South Carolina and Georgia south throughout the Florida peninsula and west along the Gulf Coast to Central America as well as throughout the Caribbean. This species occupies heavily wooded stream bottomlands or swamps, and drier upland pine or mixed pine-hardwood forests. On the Atlantic Coastal Plain, it is common in cypress swamps and live oak stands. In other areas, yellow-throated warbler is numerous in bottomland forest containing large sycamore trees. The bird nests in mixed pine-deciduous forest on ridge tops and occasionally in pure hardwood stands.

The USGS Breeding Bird Survey indicates a stable to slightly increasing trend for this species from 1966 to 2004 (0.9 percent; 95 percent CI: 0.0 to 1.9). It is a bird of conservation concern in the Peninsular Florida region. This species is of concern due to loss of breeding habitat. The yellow-throated warbler has not been selected as a management indicator species.

Population trends for the yellow-throated warbler were estimated in 10 physiographic areas and in 14 national forests (Table 31, Fig. 28). Trend estimates indicate relatively large population increases on national forests across the region. There is strong evidence of increases in four physiographic areas and five national forests. There is strong evidence of negative trends only for the Cherokee National Forest.

The yellow-throated warbler was associated with a variety of habitats (Appendix 6). It was associated most frequently with glade-shrub savannas and early successional stages of white pine-hemlock, loblolly-shortleaf pine, and oak hickory forests. Association with early successional forests was greater than with later successional stages.

Table 31.—Mean number of observations per count and percent annual change in number of observations per count of yellow-throated warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.038	626	5.5	3.0	8.0
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.002	8	-17.7	-19.1	-16.1
Southern Blue Ridge	0.035	139	-2.7	-7.7	2.6
Northern Cumberland Plateau	0.159	101	3.8	-0.8	8.6
Southern Cumberland Plateau/Ridge & Valley	0.039	33	20.0	12.7	27.8
Southern Piedmont	0.136	81	9.5	3.5	15.9
Interior Low Plateaus	0.027	31	9.8	1.4	19.0
Ozark-Ouachita Interior Highlands	0.013	36	-5.8	-13.8	3.0
West Gulf Coastal Plain	0.022	27	13.0	-0.6	28.4
East Gulf Coastal Plain	0.017	86	6.5	-0.2	13.7
South Atlantic Coastal Plain	0.114	84	13.3	6.8	20.2
National Forest					
George Washington and Jefferson	0.002	13	-10.2	-15.2	-4.9
NFs in North Carolina	0.102	81	11.1	4.7	17.8
Cherokee	0.059	72	-10.0	-13.1	-6.7
Chattahoochee and Oconee	0.044	35	8.3	1.8	15.3
Francis Marion and Sumter	0.082	108	9.4	5.4	13.5
Daniel Boone	0.159	101	3.8	-0.8	8.6
NFs in Alabama	0.026	34	15.5	8.3	23.1
Land Between the Lakes	0.025	31	6.2	-0.4	13.1
Ozark and St. Francis	0.020	23	5.0	-4.6	15.6
Ouachita	0.007	15	-22.4	-36.3	-5.6
NFs in Texas	0.013	10	13.5	-16.8	55.0
Kisatchie	0.038	15	8.0	-5.5	23.3
NFs in Mississippi	0.018	83	6.8	0.3	13.8
NFs in Florida	0.031	18	23.3	5.5	44.1

[a] Physiographic areas and national forests in which yellow-throated warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

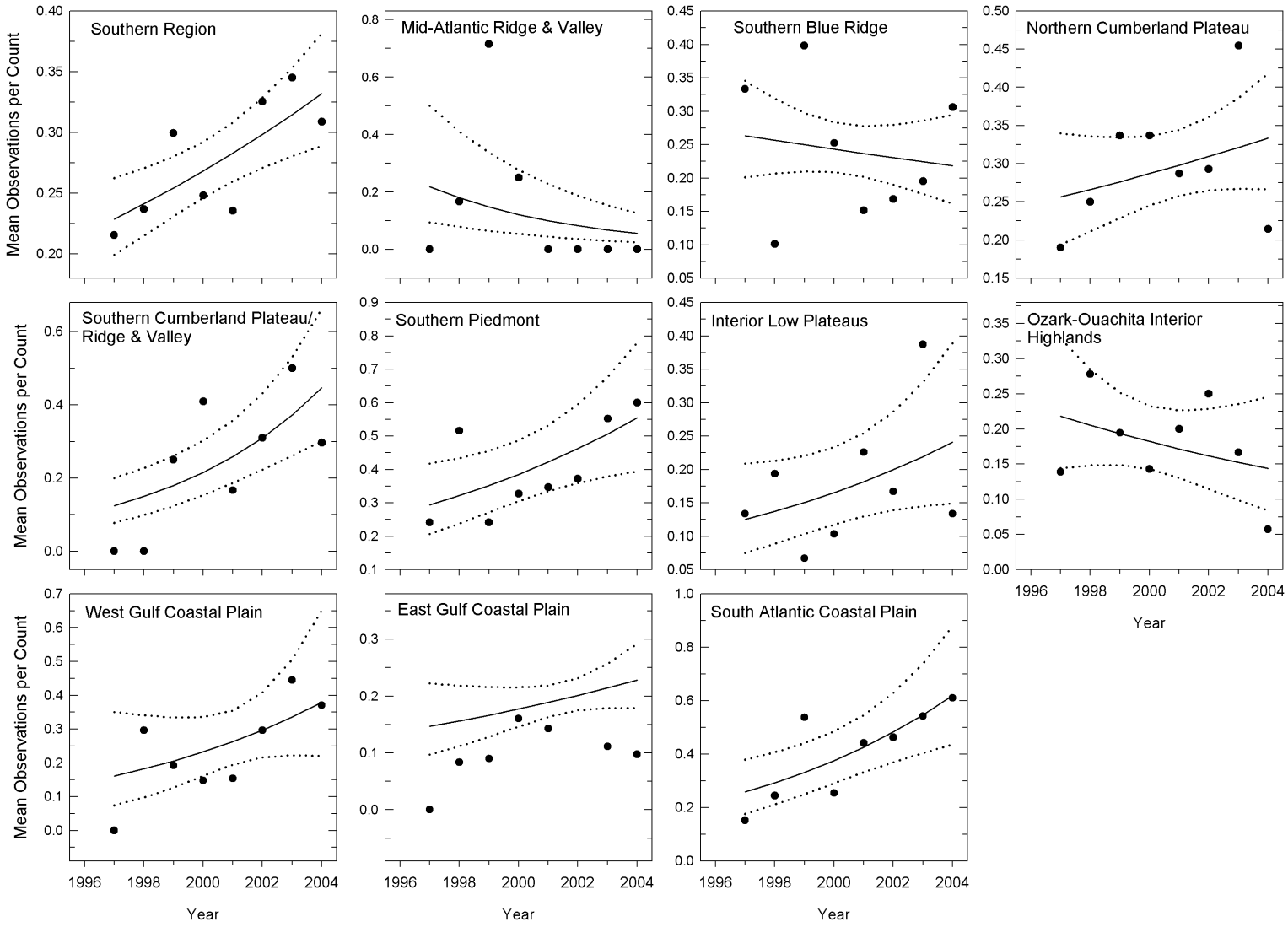
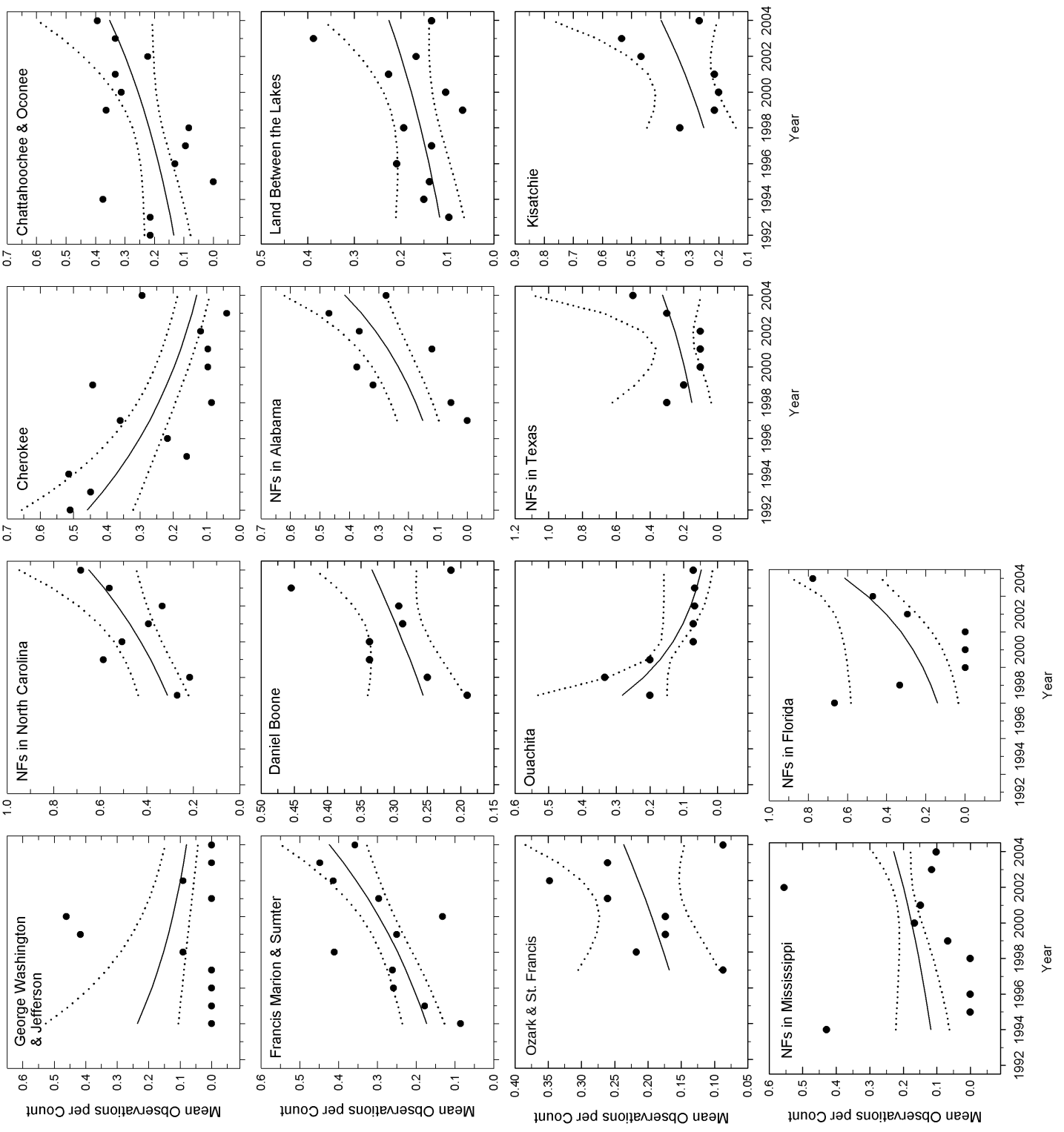


Figure 28. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the yellow-throated warbler, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 28.—Continued



Pine Warbler (*Dendroica pinus*)

The pine warbler breeds in pine forests of Eastern North America (Rodewald et al. 1999). It is a common breeding bird in pine habitats and a permanent resident in the South in both Atlantic and Gulf Coast States. This species uses a variety of upland pine and pine-hardwood forest types throughout its range, and will nest in deciduous forest with scattered individual or small groves of pines. The density of forest understory habitat (pine or deciduous) can vary greatly; this species is most abundant where the understory is sparse. Forest management centers on the retaining mature pine trees with sparse understory maintained by prescribed burning.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (0.9 percent; 95 percent CI: 0.4 to 1.5). The bird is of interest because of its close association with pine forests. The pine warbler is a management indicator species on seven national forests in the Southern Region, where it indicates management effects on pine forests.

Population trends for the pine warbler were estimated in 10 physiographic areas and in 14 national forests (Table 32, Fig. 29). Trend estimates indicate stable populations on national forests across the region. There is strong evidence of increases in four physiographic areas and four national forests. There is similar evidence of negative trends for four physiographic areas and three national forests.

The pine warbler was associated with a variety of habitats but most frequently with pine forest types and riparian forests (Appendix 6). This species occurred with higher frequency in early successional stages of pine forests with slightly higher frequency in mature forests.

Table 32.—Mean number of observations per count and percent annual change in number of observations per count of pine warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.559	2890	0.7	-0.2	1.6
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.138	269	-4.4	-6.8	-1.9
Southern Blue Ridge	0.122	302	-1.4	-4.2	1.4
Northern Cumberland Plateau	0.200	80	-7.8	-12.0	-3.4
Southern Cumberland Plateau/Ridge & Valley	0.355	180	9.2	5.9	12.5
Southern Piedmont	1.127	236	-4.2	-7.0	-1.3
Interior Low Plateaus	0.051	46	12.4	3.7	21.8
Ozark-Ouachita Interior Highlands	0.772	370	0.5	-1.0	2.1
West Gulf Coastal Plain	2.128	301	5.4	3.5	7.3
East Gulf Coastal Plain	0.598	825	3.4	1.7	5.1
South Atlantic Coastal Plain	1.007	281	-7.3	-9.3	-5.2
National Forest					
George Washington and Jefferson	0.119	283	-3.0	-4.9	-1.0
NFs in North Carolina	0.189	106	2.8	-1.4	7.1
Cherokee	0.132	136	6.7	4.4	9.0
Chattahoochee and Oconee	0.273	119	0.4	-2.4	3.2
Francis Marion and Sumter	0.813	344	-0.2	-2.2	1.9
Daniel Boone	0.200	80	-7.8	-12.0	-3.4
NFs in Alabama	0.355	266	10.8	8.3	13.4
Land Between the Lakes	0.054	46	-0.1	-4.3	4.3
Ozark and St. Francis	0.437	103	0.8	-1.8	3.4
Ouachita	0.998	280	-0.2	-2.0	1.7
NFs in Texas	3.221	173	7.1	5.1	9.1
Kisatchie	0.831	115	0.0	-4.1	4.3
NFs in Mississippi	0.633	708	5.4	4.2	6.6
NFs in Florida	1.383	151	-13.5	-15.9	-11.0

[a] Physiographic areas and national forests in which pine warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

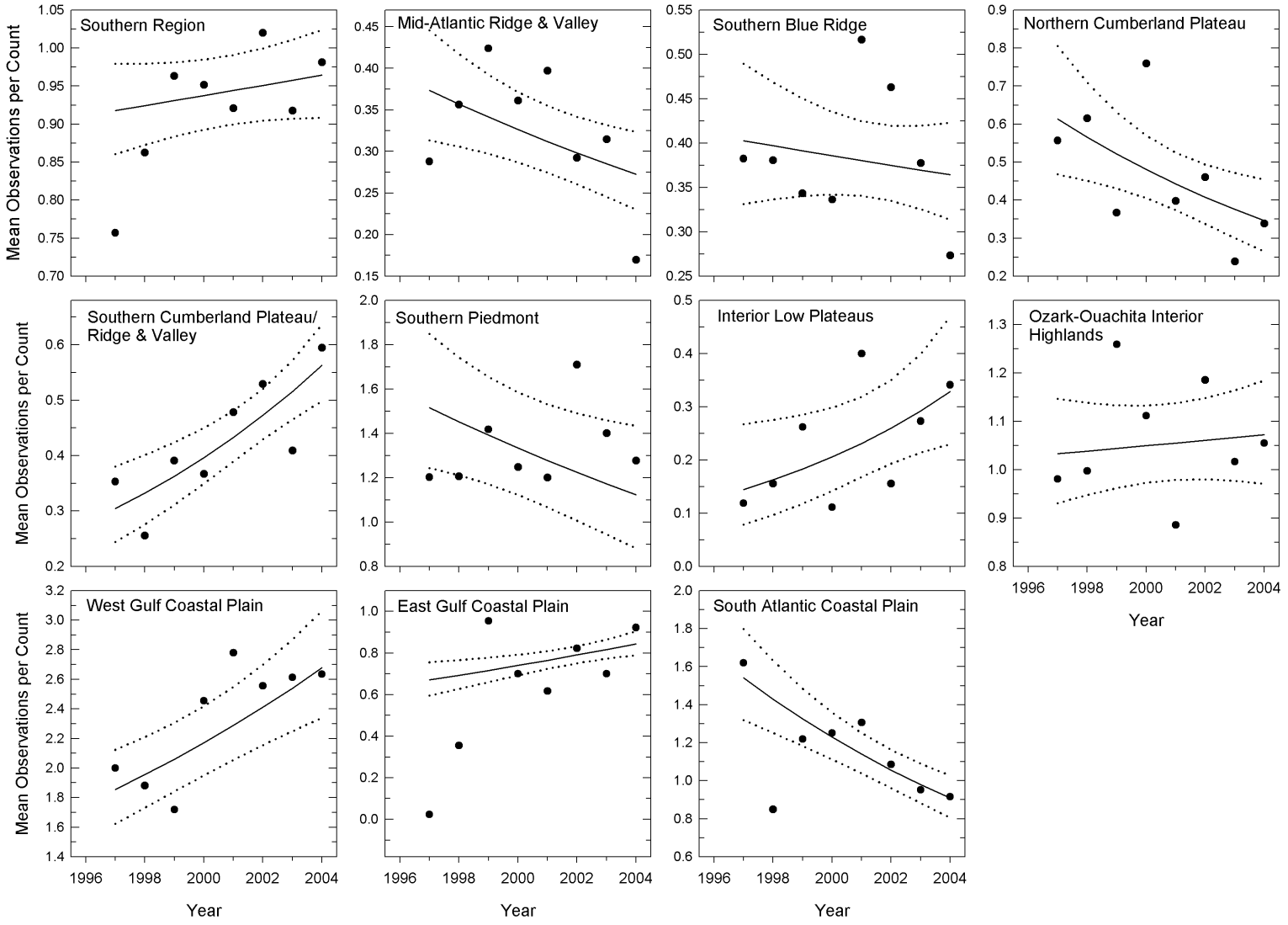


Figure 29. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the pine warbler, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

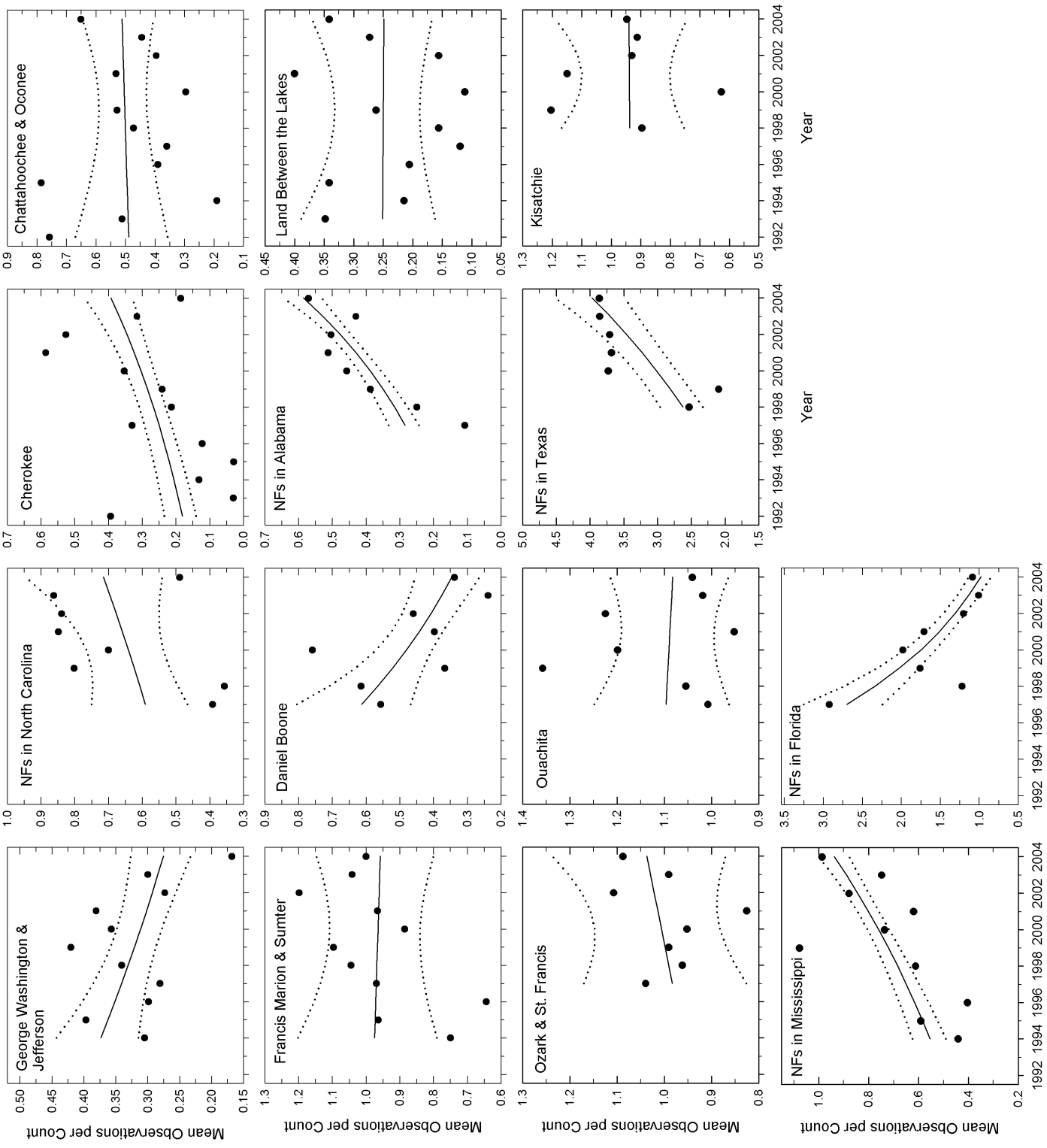


Figure 28.—Continued

Prairie Warbler (*Dendroica discolor*)

The prairie warbler breeds throughout most of the Eastern United States and Southern Canada (Nolan et al. 1999). It winters in the Bahamas, on Caribbean islands, and in southern Florida. Typical habitat is southern pine forests with scattered trees and a shrub layer present. The prairie warbler also breeds in fire-maintained woodlands, shrubby old fields, regenerating forests, dunes, and other early successional habitats. Effective forest management includes timber harvests that result in early successional forests and the restoration of open woodlands.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-2.1 percent; 95 percent CI: -2.9 to -1.4). It is a bird of conservation concern in the Central Hardwoods, West Gulf Coastal Plain/Ouachitas, Southeastern Coastal Plain, Appalachian Mountains, Piedmont, and Peninsular Florida regions; and is of concern due to loss of quality early successional forest and woodland habitats upon which it depends. The prairie warbler is a management indicator species on 11 national forests in the Southern Region; where it indicates management effects on the maintenance of early successional forest and restoration of woodlands.

Population trends for the prairie warbler were estimated in 10 physiographic areas and in 14 national forests (Table 33, Fig. 30). Trend estimates indicate small population decreases on national forests across the region. There is strong evidence of decreases in four physiographic areas and four national forests. There is similar evidence of positive trends for two physiographic areas and four national forests.

The prairie warbler was associated most frequently with early succesional stages of hardwood-pine, and loblolly-shortleaf forests, and to a lesser extent with all successional stages of longleaf-slash pine forests (Appendix 6). Some association was observed with later successional stages of loblolly-shortleaf pine forest and with glade-shrub-savanna habitats.

Table 33.—Mean number of observations per count and percent annual change in number of observations per count of prairie warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.160	1212	-2.3	-4.0	-0.5
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.027	50	3.5	-5.0	12.8
Southern Blue Ridge	0.085	147	-7.5	-11.8	-3.0
Northern Cumberland Plateau	0.178	58	-13.1	-18.9	-7.0
Southern Cumberland Plateau/Ridge & Valley	0.270	111	-0.4	-4.1	3.4
Southern Piedmont	0.424	143	-8.9	-13.6	-4.1
Interior Low Plateaus	0.107	95	-0.4	-5.4	5.0
Ozark-Ouachita Interior Highlands	0.201	160	-5.4	-8.6	-2.1
West Gulf Coastal Plain	0.120	49	-4.9	-13.6	4.6
East Gulf Coastal Plain	0.144	292	3.1	0.6	5.7
South Atlantic Coastal Plain	0.498	107	6.4	2.7	10.3
National Forest					
George Washington and Jefferson	0.020	52	8.7	1.8	16.1
NFs in North Carolina	0.375	71	7.8	4.3	11.5
Cherokee	0.054	57	4.1	-0.5	8.9
Chattahoochee and Oconee	0.286	86	0.0	-3.1	3.1
Francis Marion and Sumter	0.399	194	-8.1	-11.1	-5.0
Daniel Boone	0.178	58	-13.1	-18.9	-7.0
NFs in Alabama	0.272	192	2.7	0.4	5.1
Land Between the Lakes	0.140	95	-7.7	-10.4	-4.9
Ozark and St. Francis	0.096	32	-5.2	-10.6	0.6
Ouachita	0.262	130	-5.5	-9.3	-1.6
NFs in Texas	0.075	16	9.3	-4.4	24.9
Kisatchie	0.198	31	-12.5	-23.9	0.5
NFs in Mississippi	0.109	188	3.6	0.8	6.5
NFs in Florida	0.026	14	48.5	27.8	72.7

[a] Physiographic areas and national forests in which prairie warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

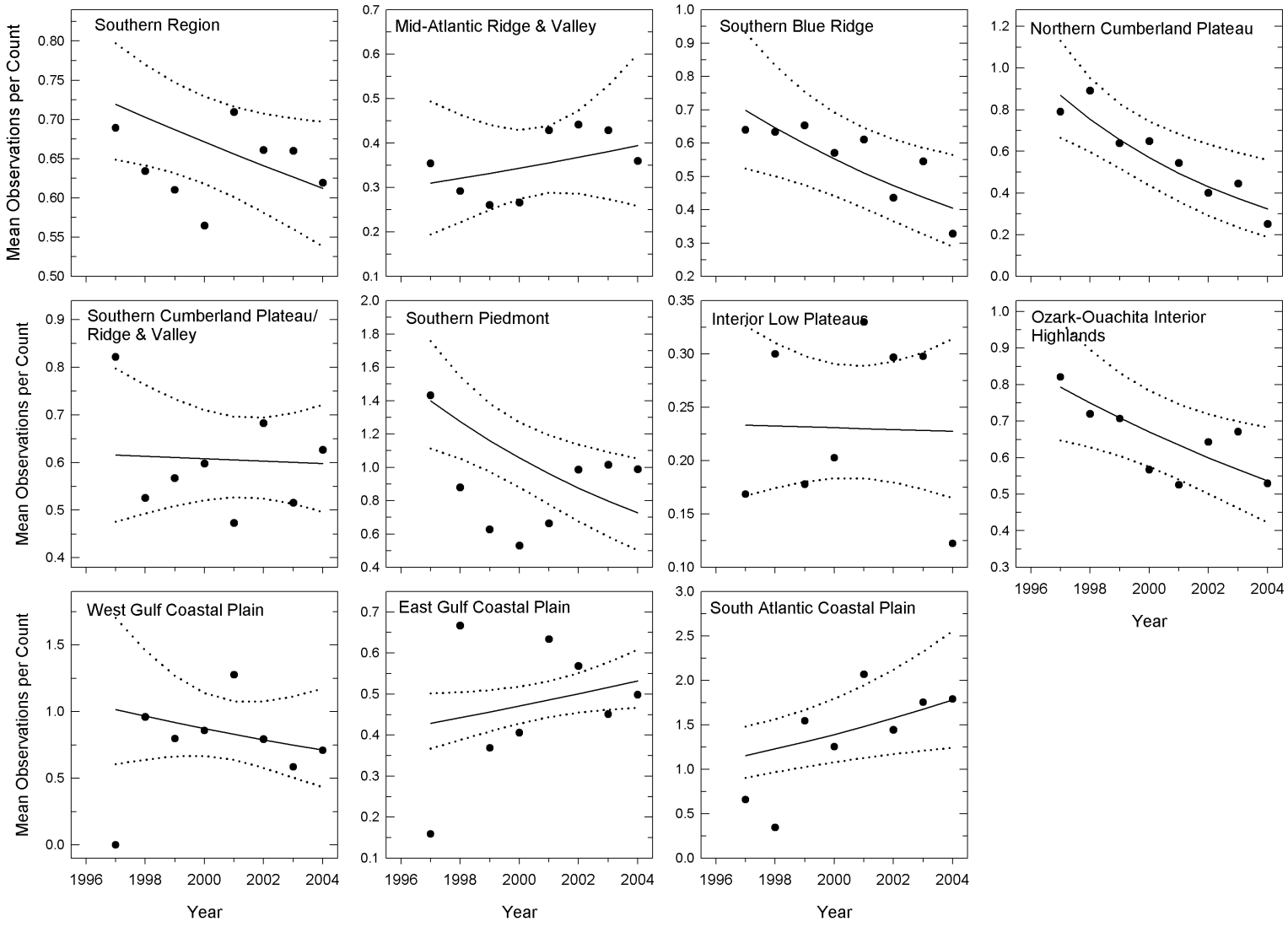
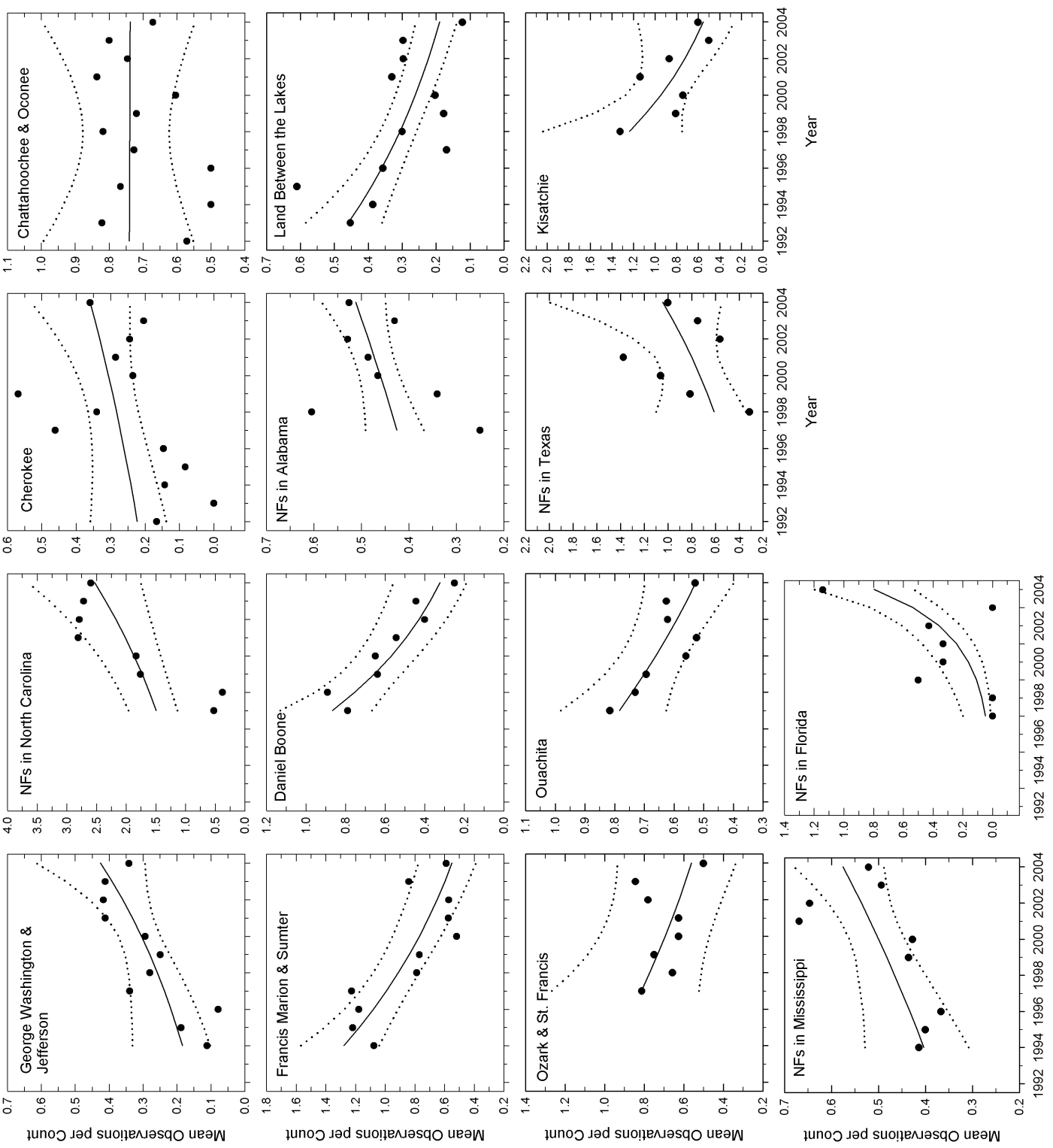


Figure 30. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the prairie warbler, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 28.—Continued



Cerulean Warbler (*Dendroica cerulean*)

The cerulean warbler breeds locally in mature and older deciduous forests with broken canopies across much of the Eastern United States (Hamel 2000). In the South, this species breeds from the mountains of Virginia and North Carolina and extreme northeast Georgia west to central Arkansas. Primary breeding habitat is mature deciduous forests with broken canopies. Population densities appear highest in extensive tracts of forest along the Cumberland Mountains and in the Mississippi Alluvial Plain, where canopy gaps are present.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-4.3 percent; 95 percent CI: -5.7 to -3.0). It is a bird of conservation concern in the Central Hardwoods, West Gulf Coastal Plain/Ouachitas, Mississippi Alluvial Valley, Southeastern Coastal Plain, Appalachian Mountains, and Piedmont regions. This species is of concern because forest fragmentation and land-use changes have resulted in the increasing isolation of remaining mature, deciduous forest. In addition, extensive closed-canopy, second-growth forests may not provide appropriate canopy structure for the cerulean warbler. The bird is a management indicator species on two national forests in the Southern Region, where it indicates management effects on canopy structure within mature hardwood forests.

Population trends for the cerulean warbler were estimated in four physiographic areas and in three national forests (Table 34, Fig. 31). Trend estimates indicate large decrease on national forests across the region. All trend estimates for each physiographic area and national forest are negative, though in some cases the number of points where the species was detected is relatively small. There is strong evidence of large declines on the George Washington and Jefferson National Forests in the Mid-Atlantic Ridge and Valley area and on national forests within the Southern Blue Ridge.

Frequency of occurrence was low for this species across forest types and successional stages. Habitat association was highest for all successional stages of oak-hickory forests and glade-shrub-savanna, perhaps indicating an association with canopy gaps (Appendix 6).

Table 34.—Mean number of observations per count and percent annual change in number of observations per count of cerulean warbler on southern national forests by region, physiographic area, and national forest, 1992–2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.010	162	-5.7	-10.1	-0.9
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.011	49	-15.2	-24.4	-4.8
Southern Blue Ridge	0.007	31	-10.7	-19.7	-0.7
Northern Cumberland Plateau	0.098	58	-4.8	-10.2	0.8
Ozark-Ouachita Interior Highlands	0.014	16	-12.0	-22.4	-0.1
National Forest					
George Washington and Jefferson	0.017	78	-12.4	-17.7	-6.6
Daniel Boone	0.098	58	-4.8	-10.2	0.8
Ozark and St. Francis	0.027	15	-7.8	-18.8	4.7

[a] Physiographic areas and national forests in which cerulean warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

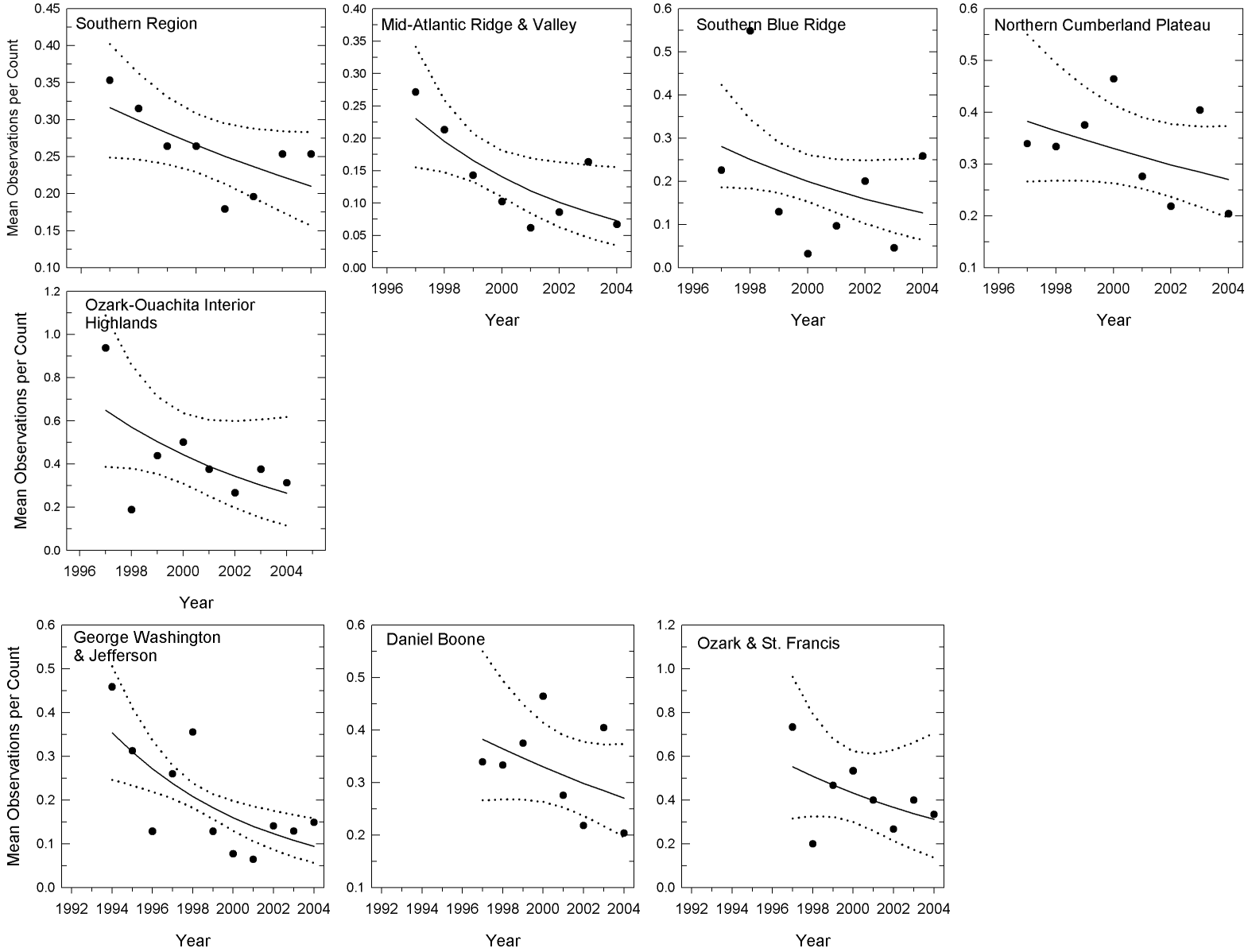


Figure 31.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the cerulean warbler, 1992-2004, for the Southern Region, four physiographic areas, and three national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Prothonotary Warbler (*Protonotaria citrea*)

The prothonotary warbler breeds in bottomland hardwood forest throughout its range in the Eastern United States (Petit 1999). It is abundant in appropriate lowland habitats throughout most of the South. This species winters in mangrove forests of Central and South America. Breeding habitat is bottomland hardwood forests and other forested wetlands. The prothonotary warbler nests in tree cavities over or near large bodies of standing or slow-moving water, e.g., bald cypress swamps, large rivers, and lakes. Effective forest management maintains wetlands and riparian areas to protect nesting habitat.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-1.5 percent; 95 percent CI: -2.7 to -0.3). It is a bird of conservation concern in the West Gulf Coastal Plain/Ouachitas, Mississippi Alluvial Valley, Appalachian Mountains, and Piedmont regions. This species is of concern because of the continuing loss of bottomland hardwood forests. The prothonotary warbler is a management indicator species only on National Forests in Florida, where it indicates management effects on bottomland hardwood forests and wetlands.

Population trends for the prothonotary warbler were estimated in five physiographic areas and in six national forests (Table 35, Fig. 32). Trend estimates indicate large increases on national forests across the region. There is strong evidence of increases in the East Gulf Coastal Plain, driven primarily by increases on National Forests in Mississippi, and in the South Atlantic Coastal Plain. There is strong evidence of declines only for the Francis Marion and Sumter National Forests.

Table 35.—Mean number of observations per count and percent annual change in number of observations per count of prothonotary warbler on southern national forests by region, physiographic area, and national forest, 1992–2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.039	287	12.5	8.9	16.2
Physiographic Area					
Southern Piedmont	0.012	10	24.7	-4.7	63.2
Interior Low Plateaus	0.032	23	5.4	-2.6	14.2
West Gulf Coastal Plain	0.014	9	4.8	-11.4	23.9
East Gulf Coastal Plain	0.108	131	13.2	8.9	17.6
South Atlantic Coastal Plain	0.230	101	12.8	6.0	20.0
National Forest					
NFs in North Carolina	0.100	23	38.5	25.1	53.4
Francis Marion and Sumter	0.101	69	-3.9	-7.3	-0.3
Land Between the Lakes	0.039	23	-7.3	-12.5	-1.7
Ouachita	0.005	6	-34.5	-43.2	-24.5
NFs in Mississippi	0.120	128	13.4	10.2	16.7
NFs in Florida	0.022	16	-21.9	-33.8	-7.9

[a] Physiographic areas and national forests in which prothonotary warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

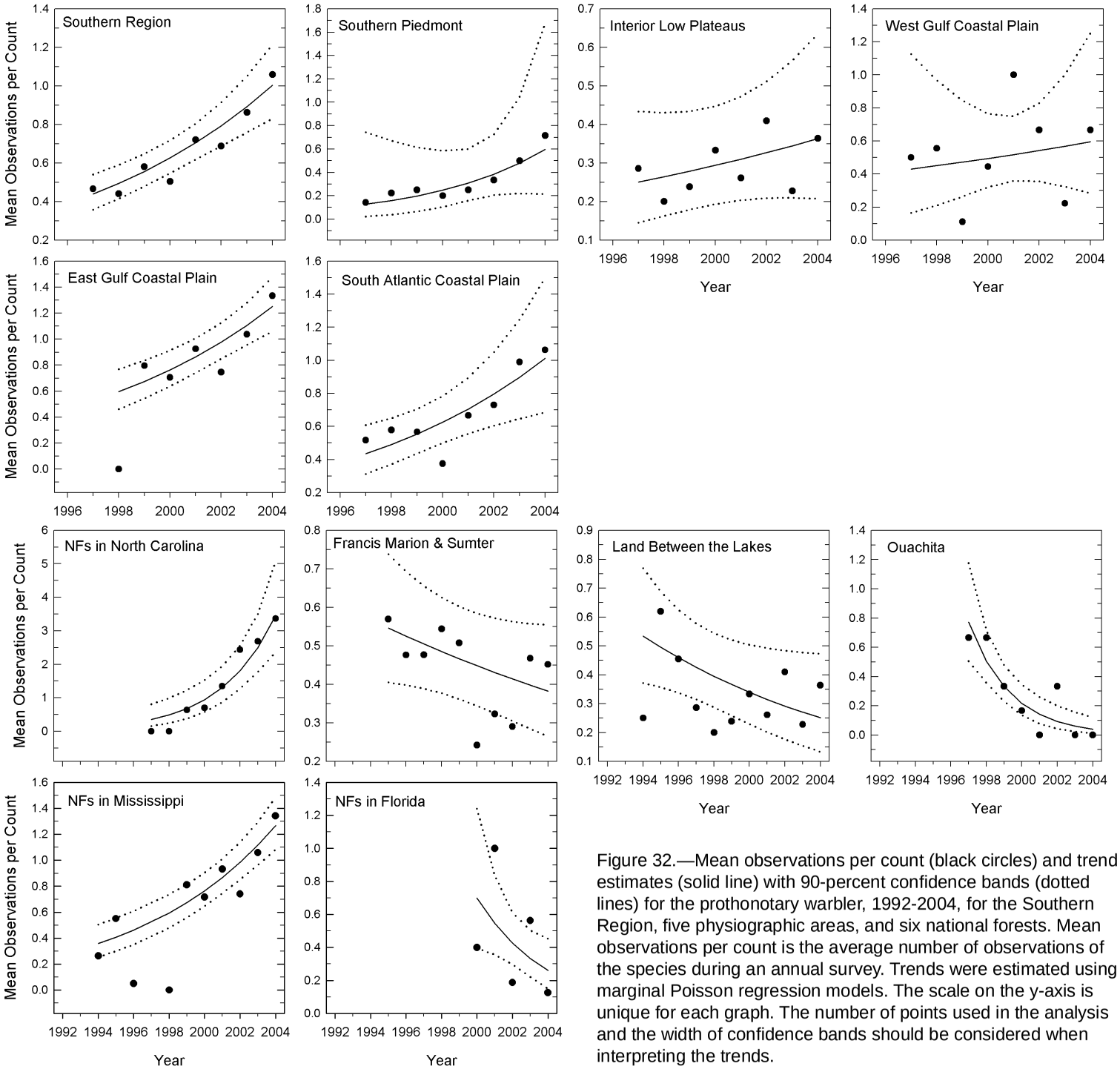
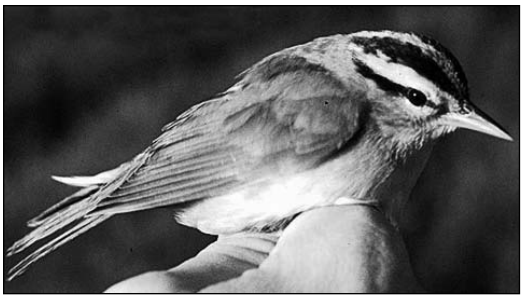


Figure 32.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the prothonotary warbler, 1992-2004, for the Southern Region, five physiographic areas, and six national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.



Worm-eating Warbler (*Helmitheros vermivorum*)

The worm-eating warbler breeds in hardwood forests throughout the Southeast except in areas of the Lower Coastal Plain (Hanners and Patton 1998). It winters in Central America and the eastern Caribbean. This species nests in areas of moderate to steep slopes and patches of dense understory shrubs within large tracts of deciduous and mixed forest. In the Coastal Plain, breeding populations occur in bottomland hardwoods with an understory of dense evergreen shrubs. Management is focused primarily on retaining large forested blocks with dense shrub understories.

The USGS Breeding Bird Survey indicates a nearly stable trend for this species from 1966 to 2004 (1.2 percent; 95 percent CI: -0.3 to 2.7). It is a bird of conservation concern in the Central Hardwoods, West Gulf Coastal Plain/Ouachitas, and Appalachian Mountains regions. This species is of concern because of the loss of forest habitat and fragmentation of forest blocks. The worm-eating warbler is a management indicator species on the George Washington National Forest where it indicates management effects on forest interior habitats, and on the Kisatchie National Forest, where it indicates management effects on large stream riparian habitats.

Population trends for the worm-eating warbler were estimated in 10 physiographic areas and in 13 national forests (Table 36, Fig. 33). Trend estimates indicate small population increases on national forests across the region. There is strong evidence of increases in three physiographic areas and five national forests. There is strong evidence of negative trends for two physiographic areas and the Kisatchie National Forest.

The worm-eating warbler was associated with a variety of successional stages and forest types, including white pine-hemlock forests, oak-hickory, hardwood pine, and cove hardwood forests (Appendix 6). Somewhat unexpectedly, its occurrence was greatest in early successional white pine-hemlock forests, perhaps due to high densities of deciduous shrubs and saplings there. Across forest types, occurrence was slightly greater in late successional than in early successional forests.

Table 36.—Mean number of observations per count and percent annual change in number of observations per count of worm-eating warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.151	1883	2.4	1.2	3.6
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.269	421	0.6	-1.6	3.0
Southern Blue Ridge	0.198	471	4.0	1.7	6.4
Northern Cumberland Plateau	0.387	152	2.4	-0.6	5.5
Southern Cumberland Plateau/Ridge & Valley	0.105	86	-1.3	-7.1	5.0
Southern Piedmont	0.038	50	-16.4	-25.1	-6.7
Interior Low Plateaus	0.195	143	8.1	4.0	12.2
Ozark-Ouachita Interior Highlands	0.113	197	3.9	-0.3	8.3
West Gulf Coastal Plain	0.045	46	-18.1	-26.1	-9.2
East Gulf Coastal Plain	0.084	299	12.5	8.2	16.9
South Atlantic Coastal Plain	0.025	18	19.2	6.6	33.2
National Forest					
George Washington and Jefferson	0.287	547	3.8	2.4	5.2
NFs in North Carolina	0.095	109	-2.0	-7.5	3.9
Cherokee	0.195	195	-1.7	-3.5	0.2
Chattahoochee and Oconee	0.101	81	0.5	-3.6	4.8
Francis Marion and Sumter	0.075	95	7.7	3.7	11.8
Daniel Boone	0.387	152	2.4	-0.6	5.5
NFs in Alabama	0.060	85	3.2	-2.7	9.6
Land Between the Lakes	0.185	143	4.9	2.4	7.5
Ozark and St. Francis	0.122	83	4.5	0.1	9.0
Ouachita	0.092	115	3.5	-3.7	11.2
NFs in Texas	0.016	12	-4.2	-18.6	12.8
Kisatchie	0.095	33	-21.6	-31.0	-10.8
NFs in Mississippi	0.102	279	5.2	2.4	8.0

[a] Physiographic areas and national forests in which worm-eating warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

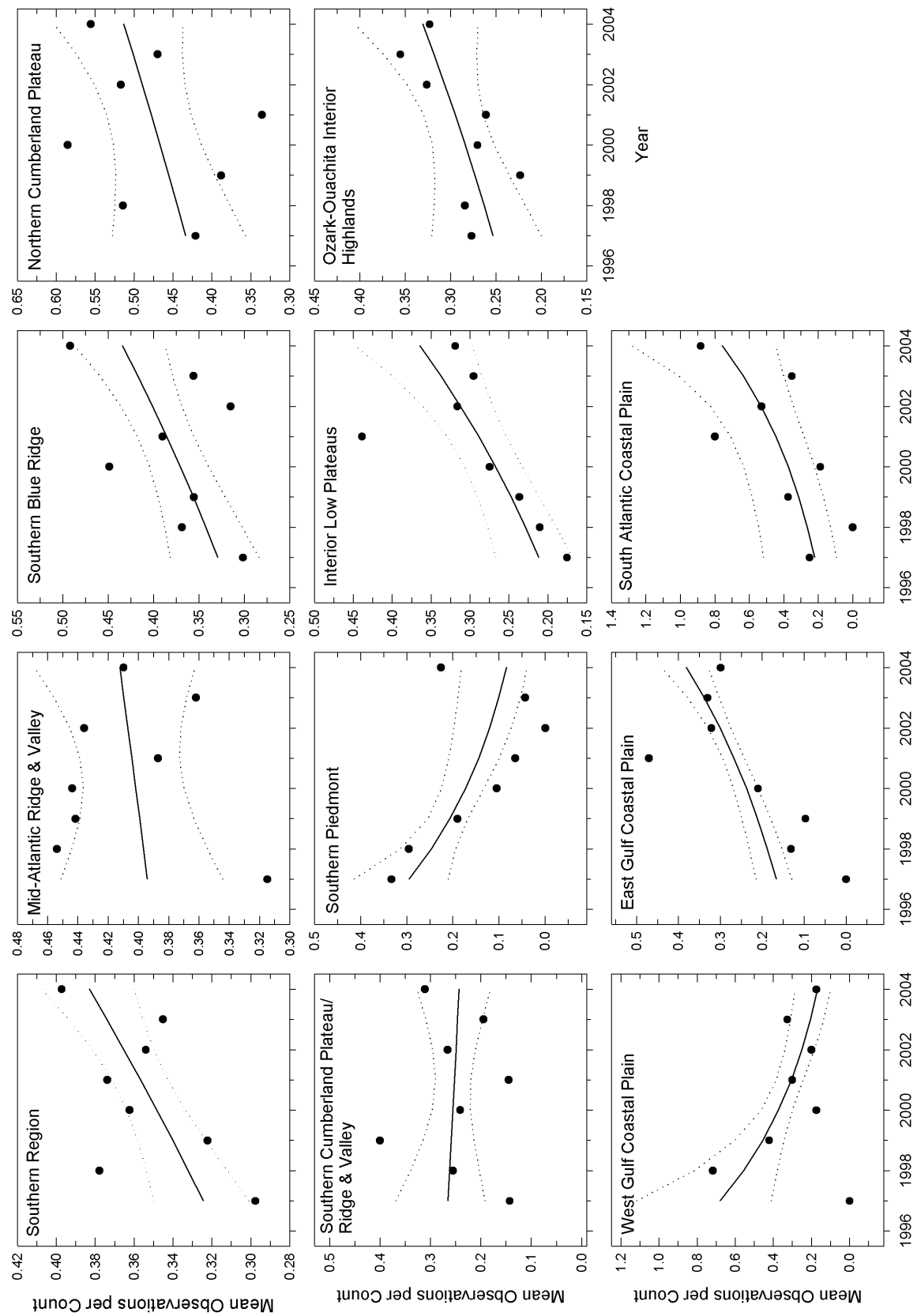
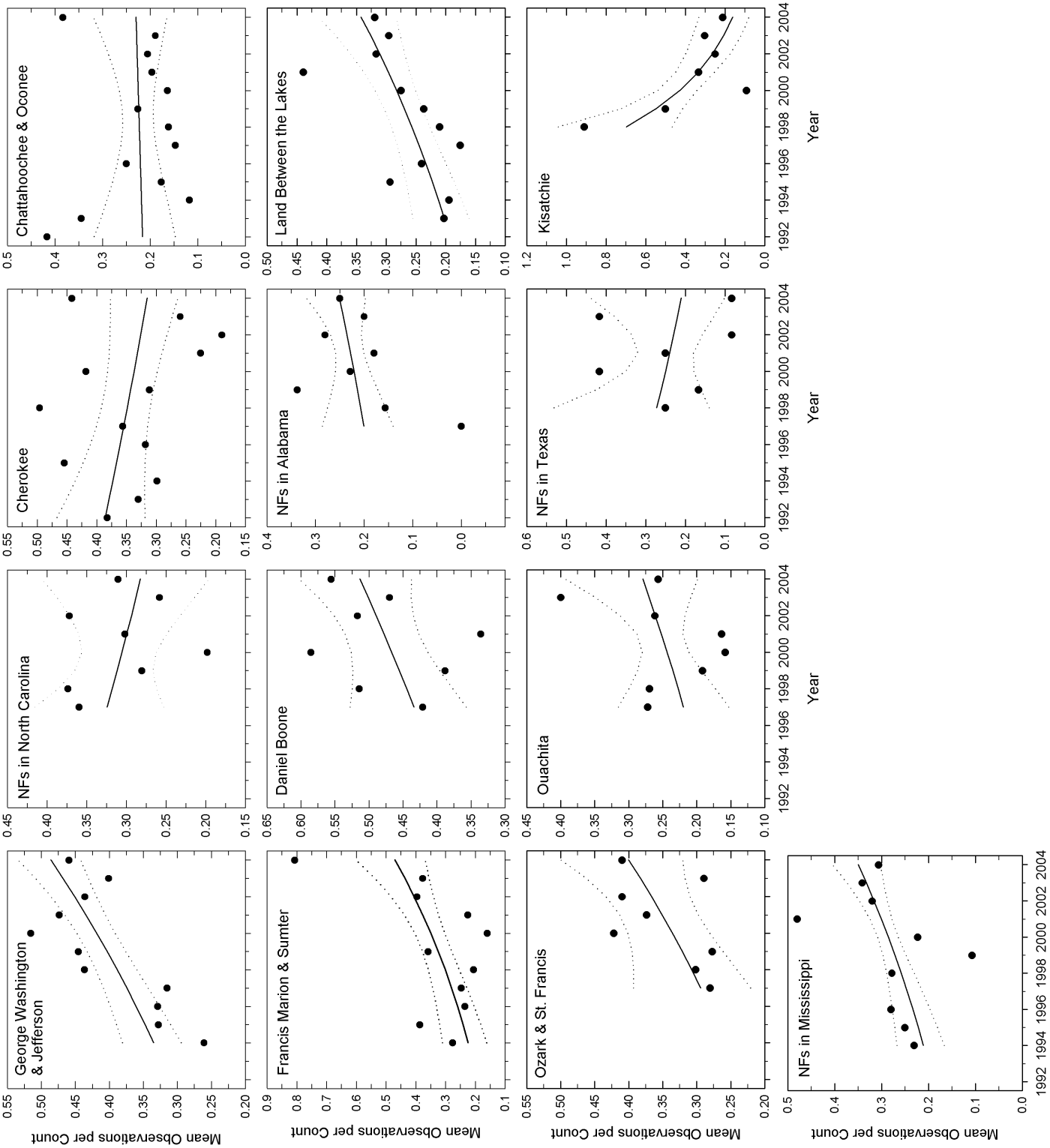


Figure 33. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the worm-eating warbler, 1992-2004, for the Southern Region, 10 physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 33.—Continued



Swainson's Warbler (*Limnothlypis swainsonii*)

The Swainson's warbler breeds primarily in the South and winters in the Yucatán Peninsula, Belize, and on the Caribbean islands (Brown and Dickson 1994). It is a bird of conservation concern in the Central Hardwoods, West Gulf Coastal Plain/Ouachitas, Mississippi Alluvial Valley, Southeastern Coastal Plain, Appalachian Mountains, and Piedmont regions. Swainson's warbler breeds in understory thickets and canebrakes of the swamps and bottomlands of the South Atlantic and Gulf Coastal Plains, and in dense shrub layers of mixed mesophytic forests of the southern Appalachian Mountains. Beneficial management for this species includes conserving and promoting bottomland and riparian forests with dense understories. Breeding habitat also is promoted by canebrake restoration.

The USGS Breeding Bird Survey indicates a positive trend for this species from 1966 to 2004 (8.6 percent; 95 percent CI: 1.1 to 16.2). This species is of concern in the South due to the loss of bottomland hardwood forests with appropriate understory structure. The Swainson's warbler is a management indicator species on three national forests in the Southern Region, where it indicates management effects on understory structure and early successional habitats within riparian areas.

Population trends for the Swainson's warbler were estimated in six physiographic areas and in eight national forests (Table 37, Fig. 34). Trend estimates indicate stable to decreasing populations on national forests across the region. Trend estimates for three physiographic areas and three forests were negative and had 90 percent confidence intervals excluding zero. However, the number of points included in these estimates is limited. On the basis of larger numbers of points, there is strong evidence of increases in the East Gulf and South Atlantic Coastal Plains, and on the Francis Marion and Sumter National Forests.

Although frequency of occurrence was low for this species, habitat association levels were highest for shrub/seedling stages of oak-gum-cypress and riparian forests (Appendix 6).

Table 37.—Mean number of observations per count and percent annual change in number of observations per count of Swainson's warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.013	208	-4.2	-8.7	0.6
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.024	22	-11.2	-15.0	-7.1
Southern Blue Ridge	0.011	46	-4.3	-11.9	3.8
Northern Cumberland Plateau	0.016	16	-15.6	-28.8	-0.1
West Gulf Coastal Plain	0.019	29	-23.6	-33.0	-12.8
East Gulf Coastal Plain	0.009	57	22.6	7.0	40.4
South Atlantic Coastal Plain	0.045	33	16.9	6.8	27.9
National Forest					
George Washington and Jefferson	0.017	25	-11.4	-15.2	-7.5
NFs in North Carolina	0.030	17	11.9	-0.7	26.0
Cherokee	0.010	19	0.1	-6.8	7.6
Francis Marion and Sumter	0.022	46	8.2	1.1	15.8
Daniel Boone	0.016	16	-15.6	-28.8	-0.1
NFs in Texas	0.025	17	-33.3	-39.7	-26.2
Kisatchie	0.010	9	4.4	-17.5	32.2
NFs in Mississippi	0.012	56	1.6	-3.6	7.1

[a] Physiographic areas and national forests in which Swainson's warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

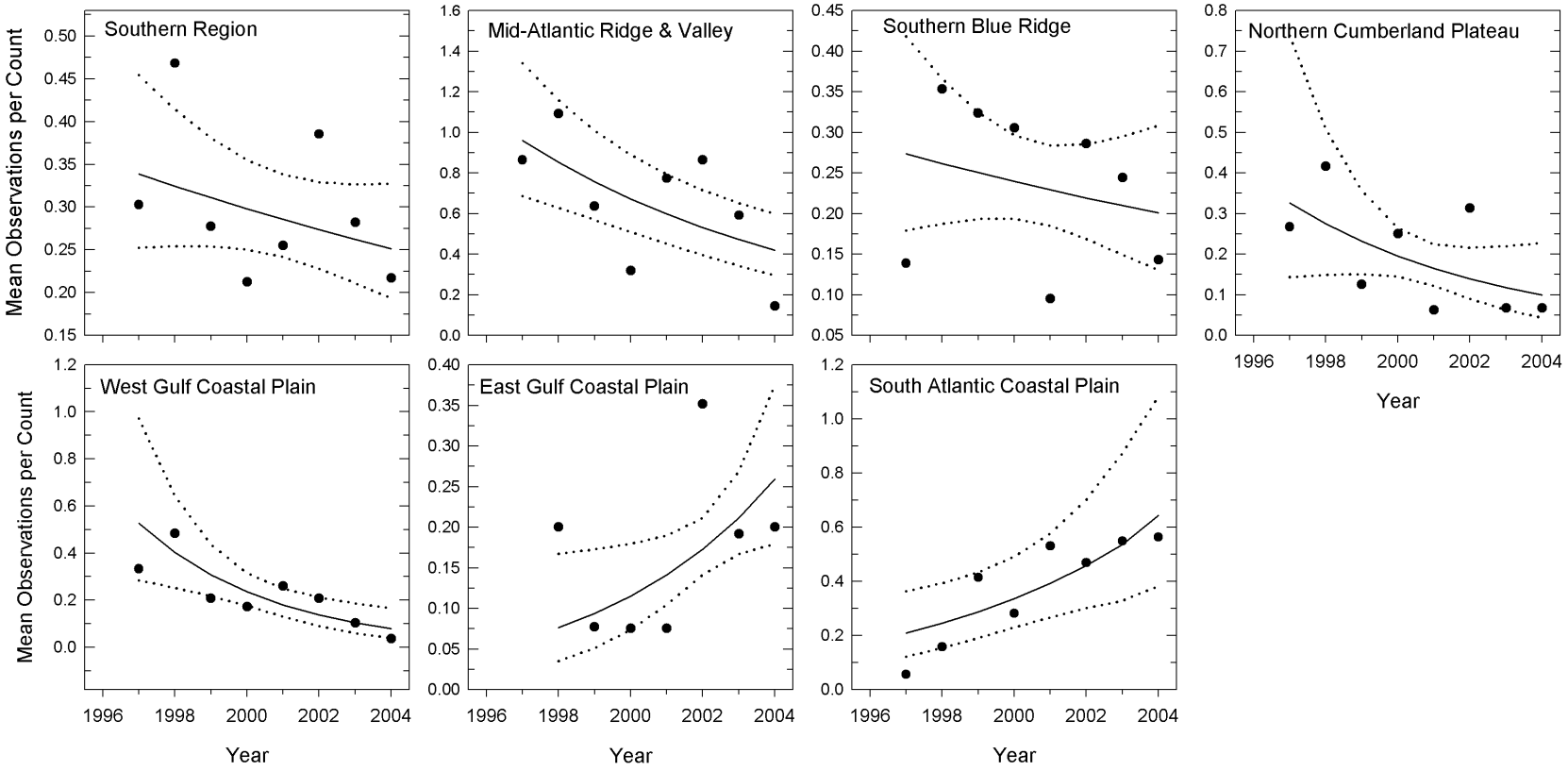


Figure 34. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the Swainson's warbler, 1992-2004, for the Southern Region, six physiographic areas, and eight national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

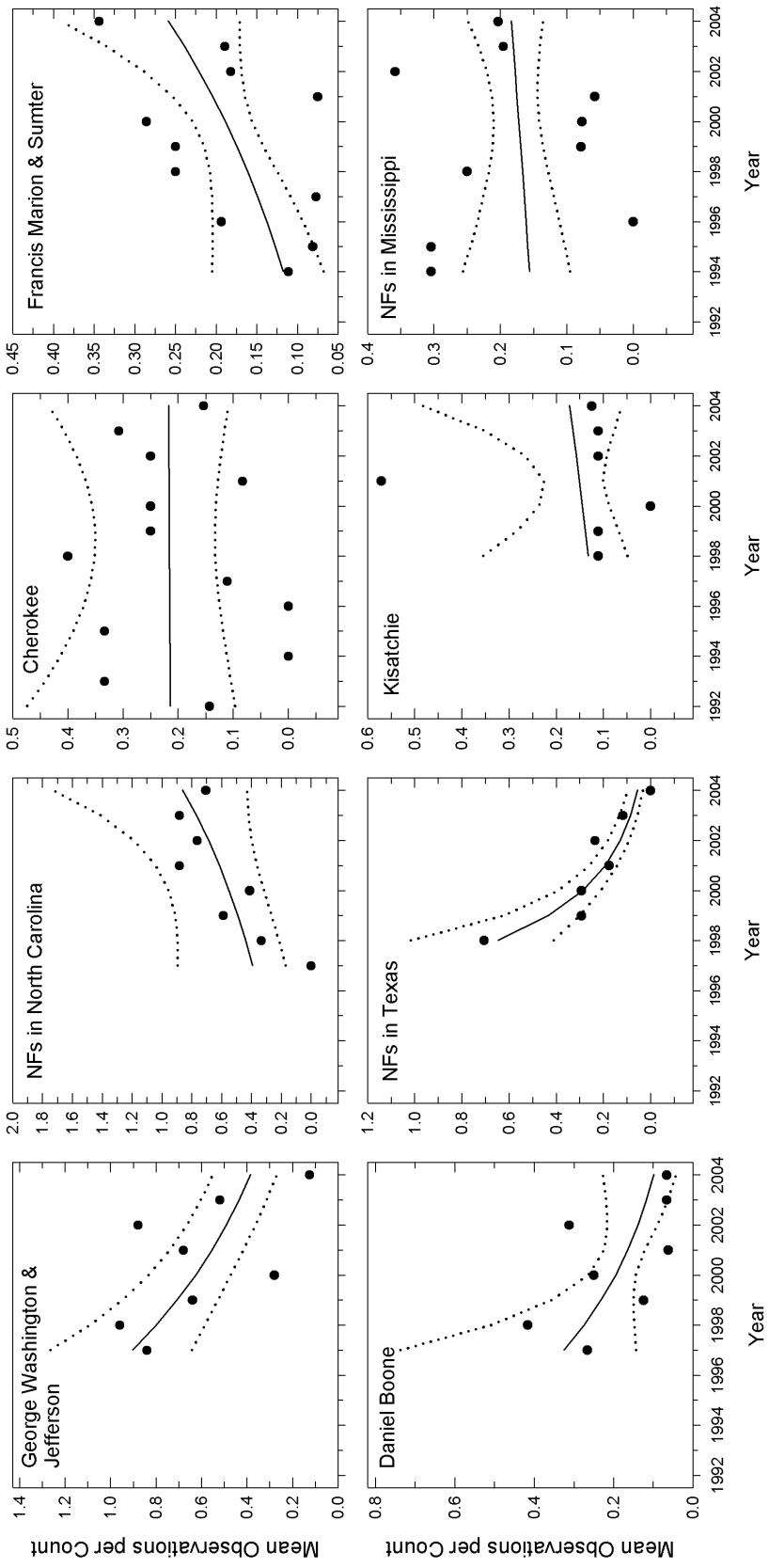


Figure 34.—Continued

Ovenbird (*Seiurus aurocapilla*)

The ovenbird breeds in Northern North America and winters in southern Florida, Mexico, Central America, and on the Caribbean islands (Van Horn and Donovan 1994). This species requires large, contiguous mature forests for successful breeding. It is commonly found in mature mesic deciduous forests. Typical forested communities where ovenbirds breed include oak-hickory and oak-pine forests. Forest management requires the retention of large forest tracts (100 to 885 ha) and relatively closed canopies.

The USGS Breeding Bird Survey indicates a stable to slightly increasing trend for this species from 1966 to 2004 (0.5 percent; 95 percent CI: 0.2 to 0.8). This species is of interest because of its association with large patches of relatively closed-canopied hardwood forest. The ovenbird is a management indicator species on seven national forests in the Southern Region, where it indicates management effects on mature forest interior habitats.

Population trends for the ovenbird were estimated in 10 physiographic areas and in 11 national forests (Table 38, Fig. 35). Trend estimates indicate small population increases on national forests across the region. There is strong evidence of increases within three physiographic areas and six national forests. There was similar evidence of decreases within the East Gulf Coastal Plain.

The ovenbird was associated with a wide variety of forest types and successional stages (Appendix 6). It was associated most frequently with white pine-hemlock, maple-beech-birch, oak-hickory, cove hardwood, and hardwood-pine forests, but also was frequently detected at points in glade-shrub-savanna habitats. The ovenbird was more highly associated with late successional than early successional stages.

Table 38.—Mean number of observations per count and percent annual change in number of observations per count of ovenbird on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.456	2316	1.4	0.7	2.2
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.944	614	2.2	1.1	3.4
Southern Blue Ridge	0.749	760	-0.1	-1.3	1.2
Northern Cumberland Plateau	1.125	179	4.7	2.7	6.6
Southern Cumberland Plateau/Ridge & Valley	0.240	132	3.8	-1.2	9.2
Southern Piedmont	0.376	119	2.1	-2.0	6.4
Interior Low Plateaus	0.062	60	2.0	-5.5	10.1
Ozark-Ouachita Interior Highlands	0.489	325	2.2	0.2	4.2
West Gulf Coastal Plain	0.005	6	-1.6	-2.0	-1.1
East Gulf Coastal Plain	0.028	83	-8.0	-11.8	-3.9
South Atlantic Coastal Plain	0.103	38	5.7	-4.5	17.0
National Forest					
George Washington and Jefferson	0.908	754	2.6	1.8	3.5
NFs in North Carolina	0.705	255	-0.6	-3.1	2.0
Cherokee	0.744	330	1.4	0.0	2.8
Chattahoochee and Oconee	0.643	148	-0.1	-1.9	1.7
Francis Marion and Sumter	0.216	178	-1.0	-3.4	1.5
Daniel Boone	1.125	179	4.7	2.7	6.6
NFs in Alabama	0.145	135	5.2	1.3	9.4
Land Between the Lakes	0.048	60	10.3	6.4	14.4
Ozark and St. Francis	0.787	191	1.0	-0.9	2.9
Ouachita	0.198	134	6.4	0.8	12.3
NFs in Mississippi	0.011	45	-2.7	-13.3	9.3

[a] Physiographic areas and national forests in which ovenbird occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

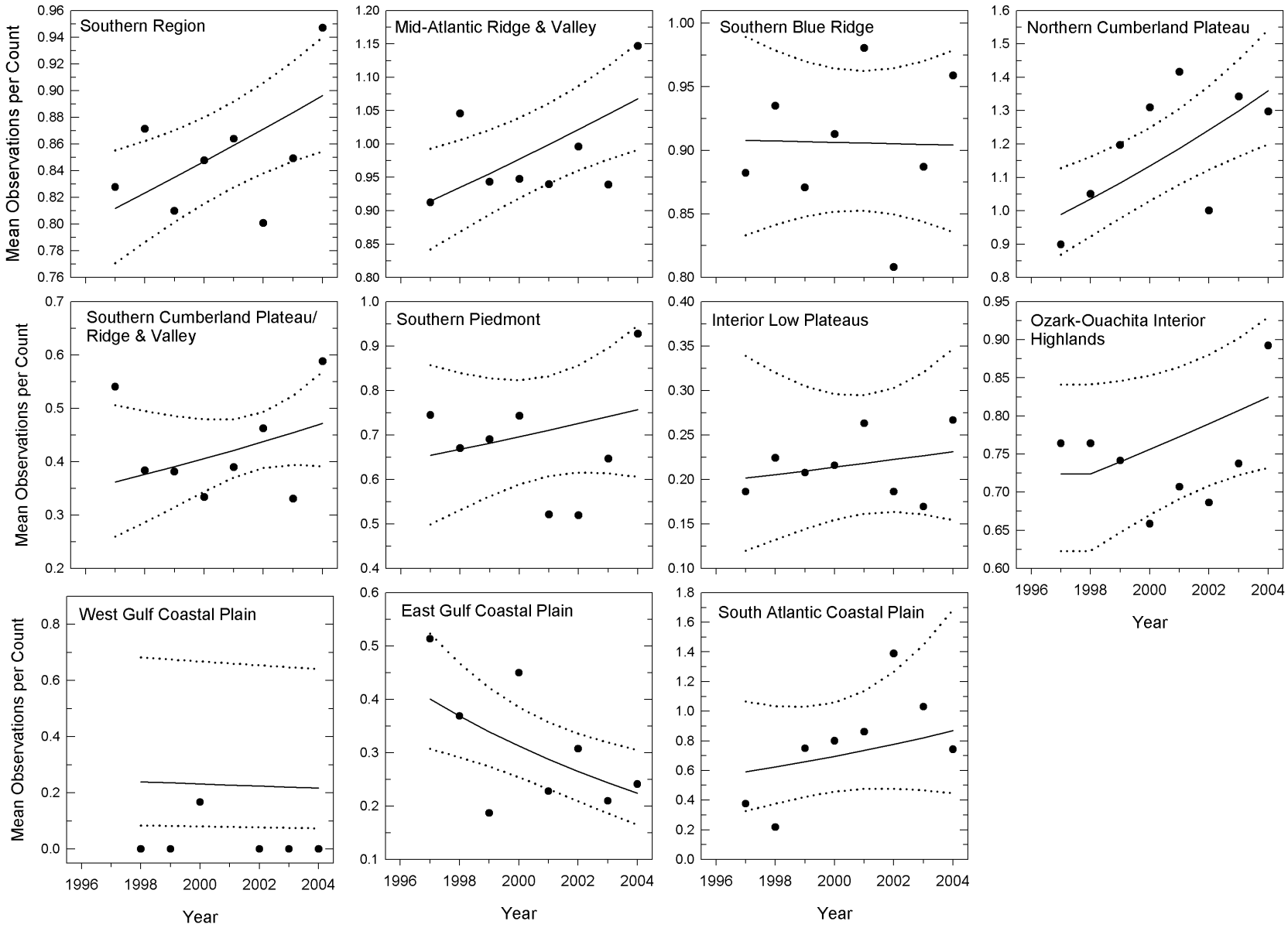
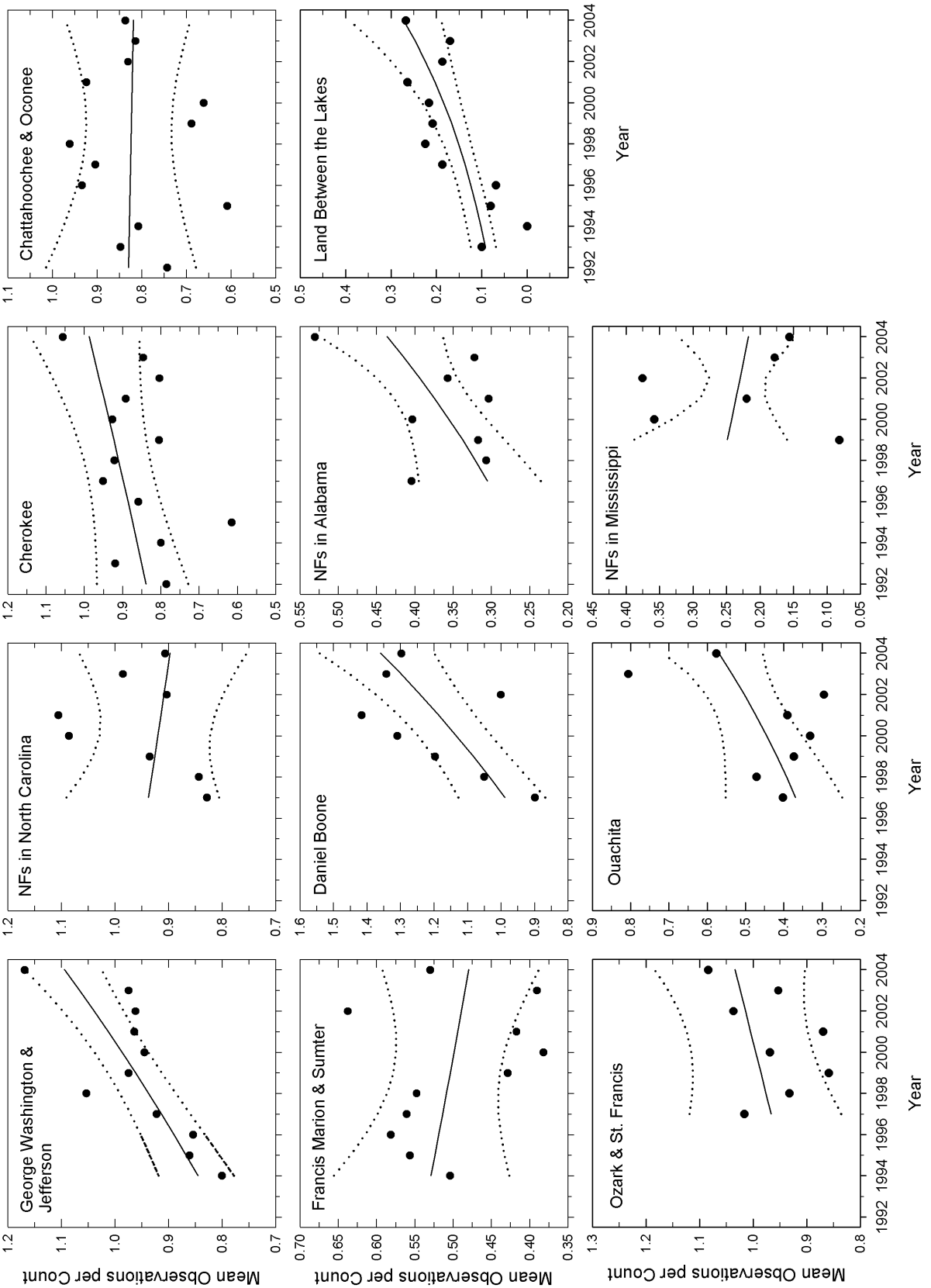


Figure 35. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the ovenbird, 1992-2004, for the Southern Region, 10 physiographic areas, and 11 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 35.—Continued



Louisiana Waterthrush (*Seiurus motacilla*)

The Louisiana waterthrush breeds in the Eastern United States except for peninsular Florida (Robinson 1995). It winters in Central and South America and the West Indies. This species frequently breeds adjacent to gravel-bottomed streams flowing through hilly, deciduous forest. It also breeds in cypress swamps and bottomland forest along mud-bottomed streams, though in lower densities than in upland forest. Habitat management centers on protecting riparian forests and stream systems used during the breeding season.

The USGS Breeding Bird Survey indicates a stable to slightly increasing trend for this species from 1966 to 2004 (0.8 percent; 95 percent CI: 0.0 to 1.6). It is a bird of conservation concern in the Central Hardwoods, West Gulf Coastal Plain/Ouachitas, and Appalachian Mountains regions. This species is of concern due to fragmentation and loss of riparian forests. The Louisiana waterthrush is a management indicator species only on the Kisatchie National Forest, where it indicates management effects on small-stream riparian forests.

Population trends for the Louisiana waterthrush were estimated in nine physiographic areas and in 13 national forests (Table 39, Fig. 36). Trend estimates indicate that populations were stable on national forests across the region as a whole. There is strong evidence of increases on national forests in two physiographic areas and five national forests. There is strong evidence of declines only for national forests within the Southern Blue Ridge particularly on the Cherokee National Forest.

The Louisiana waterthrush was associated most frequently with the grass/forb stage of elm-ash-cottonwood, mature white pine-hemlock, and riparian forests (Appendix 6).

Table 39.—Mean number of observations per count and percent annual change in number of observations per count of Louisiana waterthrush on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.029	471	2.4	-0.3	5.1
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.038	88	-2.0	-6.6	2.8
Southern Blue Ridge	0.028	100	-7.1	-11.9	-1.9
Northern Cumberland Plateau	0.028	26	7.1	-4.8	20.5
Southern Cumberland Plateau/Ridge & Valley	0.026	17	-4.2	-17.4	11.2
Southern Piedmont	0.052	36	3.0	-5.3	12.0
Interior Low Plateaus	0.023	25	2.6	-7.9	14.2
Ozark-Ouachita Interior Highlands	0.038	73	14.0	6.9	21.6
West Gulf Coastal Plain	0.048	47	4.1	-3.0	11.7
East Gulf Coastal Plain	0.013	56	19.8	10.6	29.7
National Forest					
George Washington and Jefferson	0.042	119	-0.1	-3.0	2.9
NFs in North Carolina	0.006	11	-7.1	-23.2	12.4
Cherokee	0.035	51	-5.8	-9.4	-2.0
Chattahoochee and Oconee	0.043	31	8.2	3.6	13.0
Francis Marion and Sumter	0.017	31	8.8	3.2	14.8
Daniel Boone	0.028	26	7.1	-4.8	20.5
NFs in Alabama	0.017	19	9.9	-4.5	26.5
Land Between the Lakes	0.022	25	1.7	-4.0	7.7
Ozark and St. Francis	0.038	34	18.4	8.8	28.7
Ouachita	0.042	48	13.7	5.1	22.9
NFs in Texas	0.056	26	-0.9	-9.6	8.7
Kisatchie	0.030	15	2.6	-12.0	19.7
NFs in Mississippi	0.013	50	23.0	17.2	29.0

[a] Physiographic areas and national forests in which Louisiana waterthrush occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

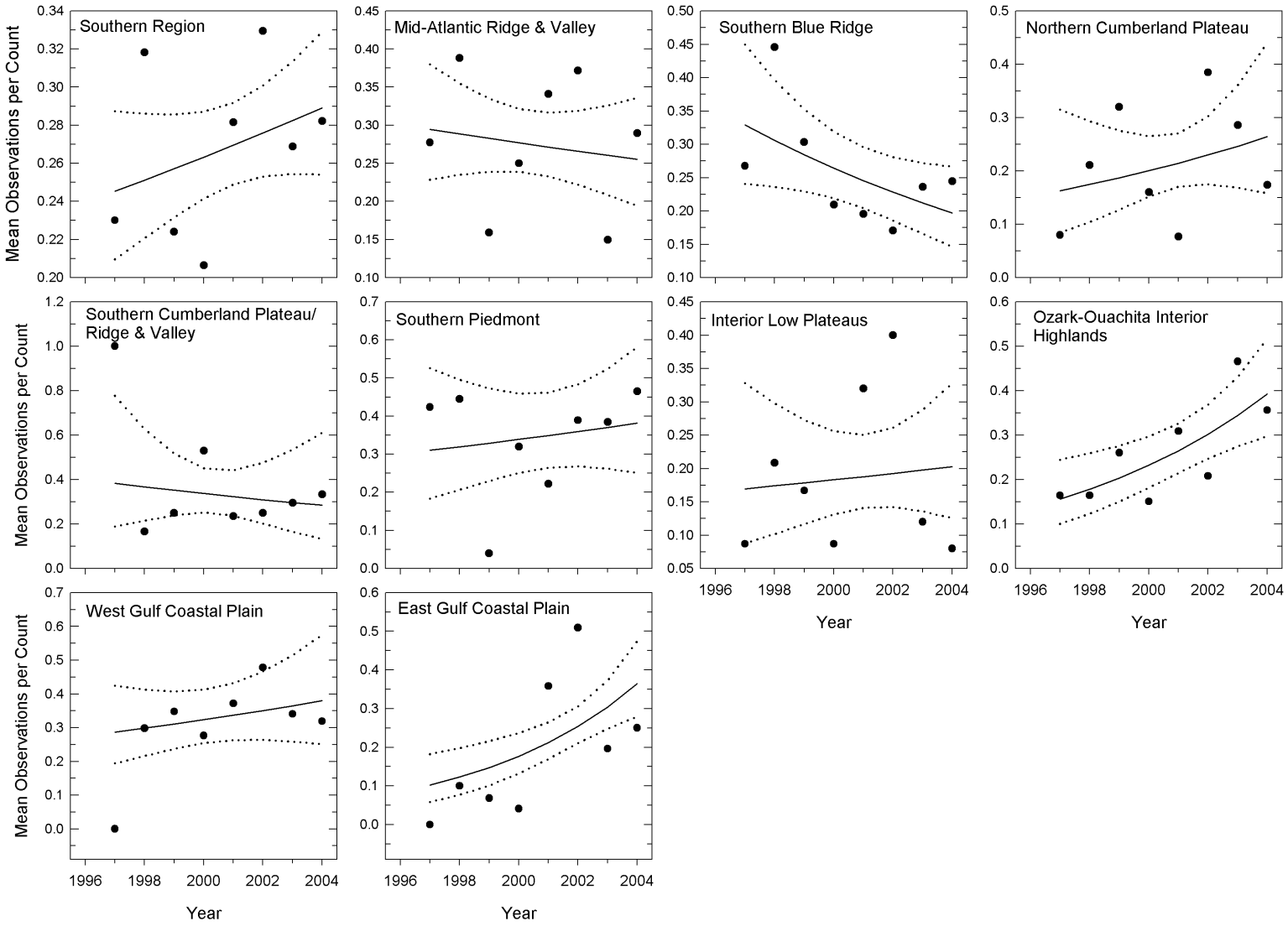
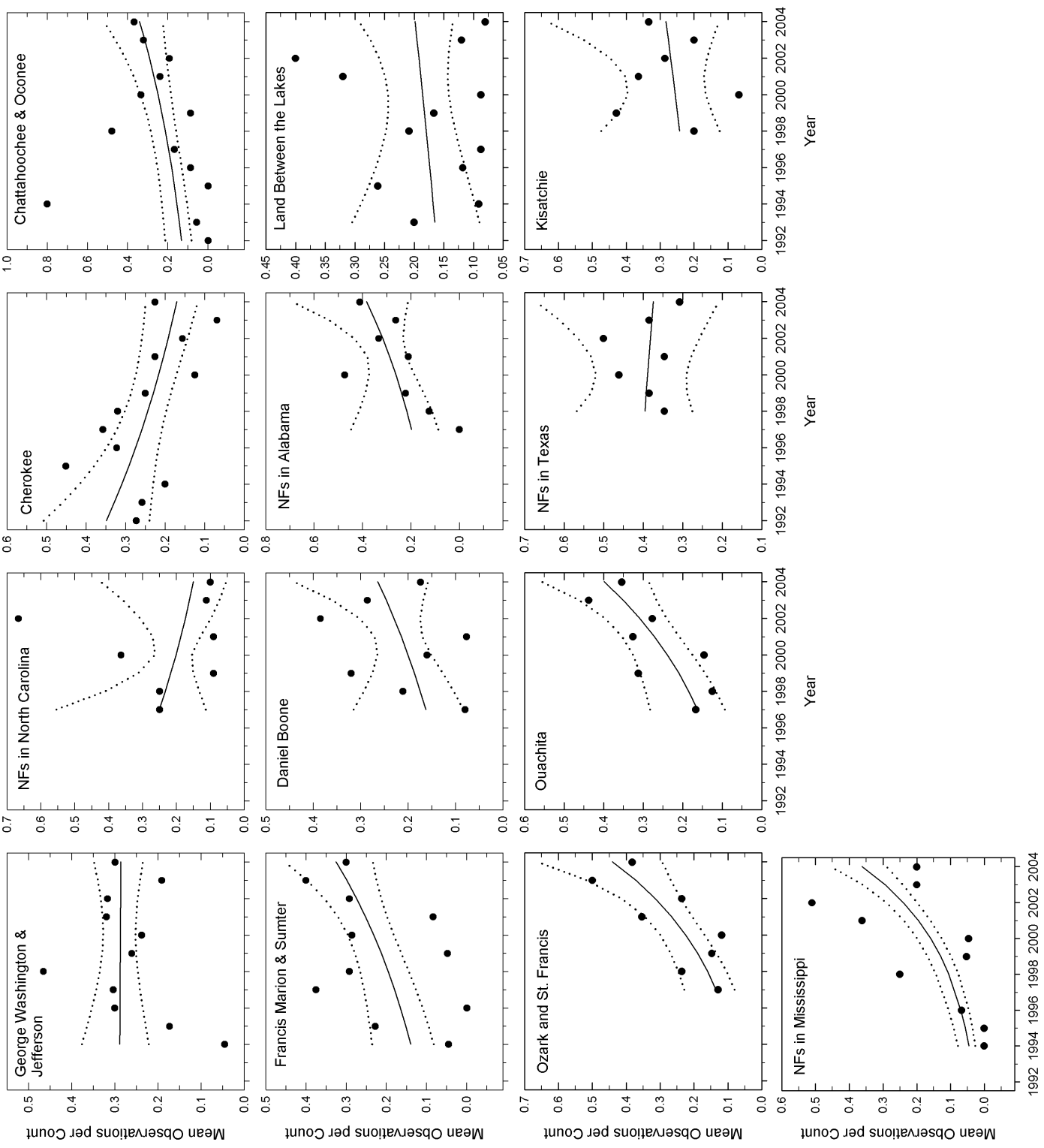


Figure 36. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the Louisiana waterthrush, 1992-2004, for the Southern Region, nine physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 36.—Continued



Kentucky Warbler (*Oporornis formosus*)

The Kentucky warbler breeds throughout most of the Eastern United States south of the Great Lakes to the Gulf Coast (McDonald 1998). It winters in Central and South America. This species inhabits rich, moist, deciduous forests. Bottomland hardwoods and woods near streams with a dense understory provide nesting habitat. Forest management practices that encourage a dense understory and well-developed ground cover should benefit this species.

The USGS Breeding Bird Survey indicates a small negative trend for this species from 1966 to 2004 (-1.0 percent; 95 percent CI: -1.7 to -0.3). It is a bird of conservation concern in the West Gulf Coastal Plain/Ouachitas, Appalachian Mountains, and Piedmont regions. This species is of concern due to loss and fragmentation of habitat. The Kentucky warbler is a management indicator species on the Kisatchie National Forest, where it indicates management effects on large-stream riparian forests.

Population trends for the Kentucky warbler were estimated in 10 physiographic areas and in 13 national forests (Table 40, Fig. 37). Trend estimates indicate large increases of this species on national forests across the region. There is strong evidence of positive trends for national forests in four physiographic areas in the western and southern portions of the region and evidence of declines on national forests in two of three physiographic areas in the Appalachian Mountains. There is strong evidence of increases on six national forests and strong evidence of declines on the George Washington, Jefferson, and Daniel Boone National Forests, and on National Forests in North Carolina.

The Kentucky warbler was associated with a variety of forest types and successional stages (Appendix 6). It was associated most frequently with oak-gum-cypress, riparian, loblolly-shortleaf, and elm-ash-cottonwood forests.

Table 40.—Mean number of observations per count and percent annual change in number of observations per count of Kentucky warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.086	1349	5.5	3.8	7.3
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.009	88	-0.1	-10.4	11.5
Southern Blue Ridge	0.014	100	-12.7	-19.3	-5.5
Northern Cumberland Plateau	0.140	26	-6.8	-11.7	-1.5
Southern Cumberland Plateau/Ridge & Valley	0.089	17	18.6	13.4	24.0
Southern Piedmont	0.080	36	6.8	-0.7	14.8
Interior Low Plateaus	0.099	25	-0.6	-6.1	5.3
Ozark-Ouachita Interior Highlands	0.180	73	7.2	4.0	10.4
West Gulf Coastal Plain	0.194	47	6.0	1.3	10.9
East Gulf Coastal Plain	0.126	56	8.0	4.1	12.1
South Atlantic Coastal Plain	0.027	88	25.0	11.8	39.7
National Forest					
George Washington and Jefferson	0.011	58	-8.2	-12.7	-3.5
NFs in North Carolina	0.023	34	-18.5	-27.8	-8.1
Cherokee	0.007	15	-31.3	-34.3	-28.3
Chattahoochee and Oconee	0.049	47	-2.5	-7.2	2.4
Francis Marion and Sumter	0.056	96	8.4	3.1	13.9
Daniel Boone	0.140	101	-6.8	-11.7	-1.5
NFs in Alabama	0.062	81	25.7	19.0	32.8
Land Between the Lakes	0.098	110	-1.8	-5.5	1.9
Ozark and St. Francis	0.174	106	7.9	3.4	12.5
Ouachita	0.196	165	6.2	2.2	10.4
NFs in Texas	0.138	61	-4.6	-11.2	2.5
Kisatchie	0.232	78	16.2	8.5	24.4
NFs in Mississippi	0.139	400	10.9	8.3	13.5

[a] Physiographic areas and national forests in which Kentucky warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

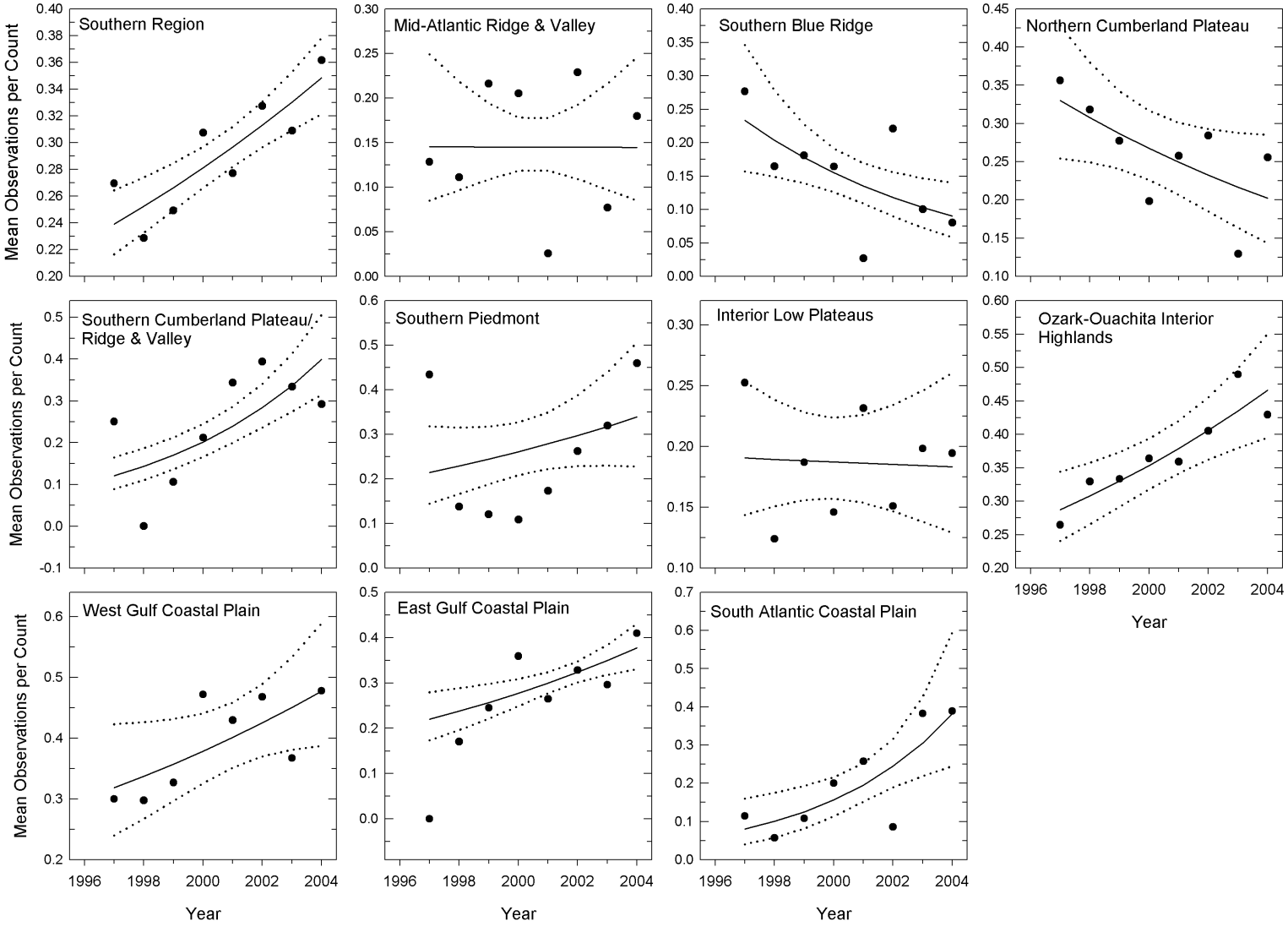
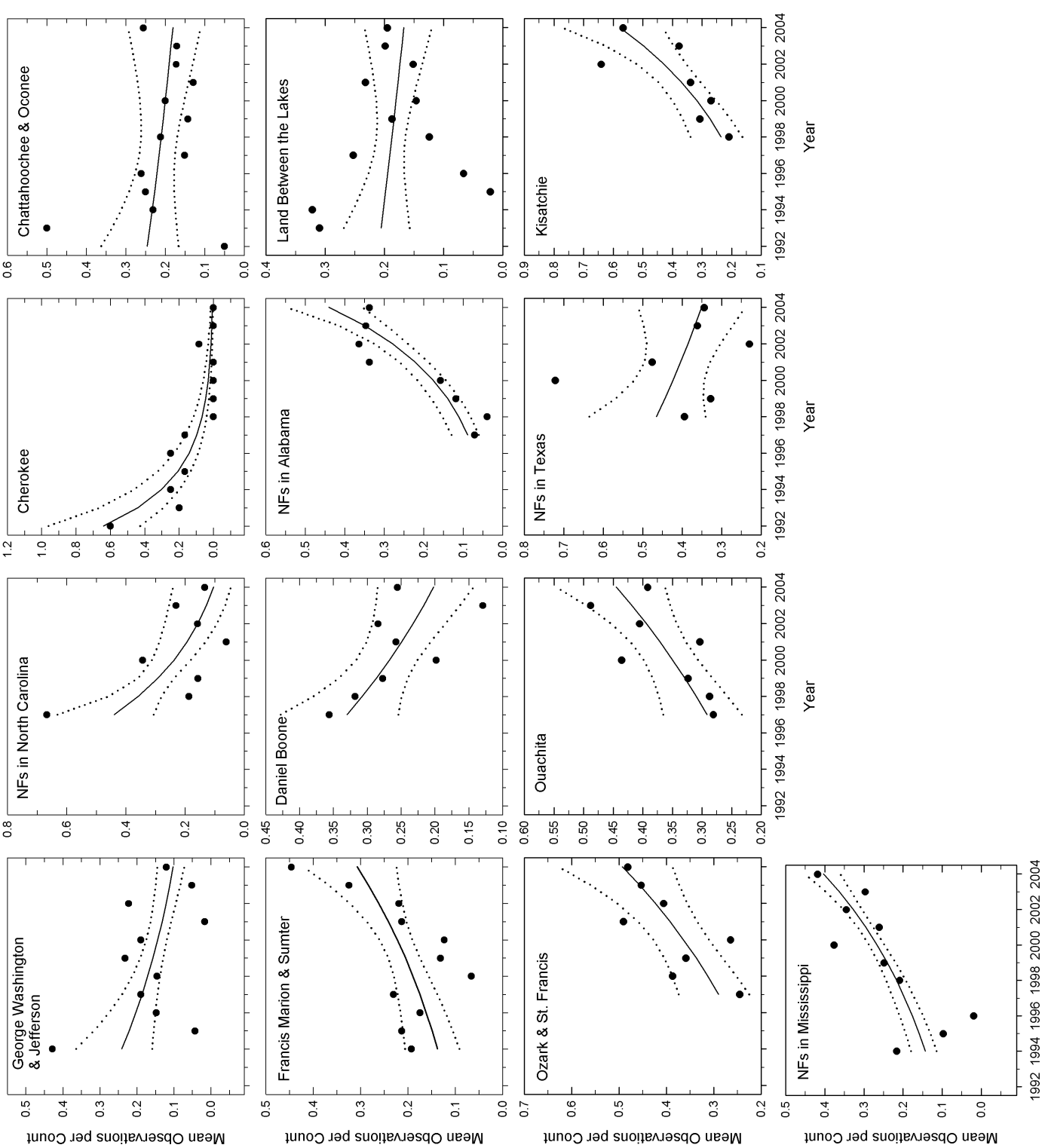
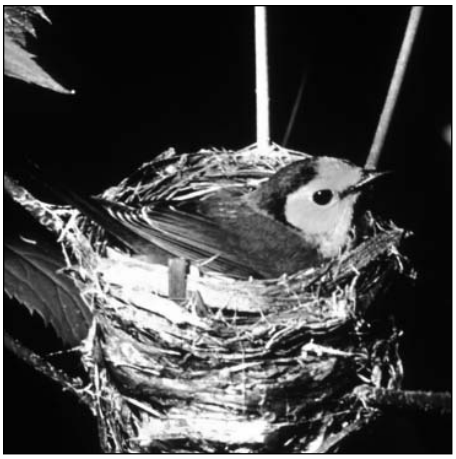


Figure 37. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the Kentucky warbler, 1992-2004, for the Southern Region, 10 physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 37.—Continued





Hooded Warbler (*Wilsonia citrine*)

The hooded warbler breeds from southernmost Canada throughout the Eastern United States as far south as the Gulf Coast (Evans Ogden and Stutchbury 1994), and winters in Central America. This species favors moist deciduous forests with a fairly dense understory. Nesting locations are restricted to large forest patches. It typically inhabits mature forests where large trees fall to create canopy gaps. Management may entail creating canopy gaps where they are absent and maintaining a shrub layer.

The Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.7 percent; 95 percent CI: -1.1 to 2.5). The bird is of interest because it is sensitive to forest fragmentation but also requires well-developed understories and midstories. The hooded warbler is a management indicator species on seven national forests in the Southern Region, where it indicates management effects on mature mesic hardwood forests, with special focus on the presence of canopy gaps and structural diversity.

Population trends for the hooded warbler were estimated in 10 physiographic areas and in 14 national forests (Table 41, Fig. 38). Trend estimates indicate that populations are stable on national forests across the region. There is strong evidence of increases for the Southern Cumberland Plateau/ Ridge and Valley and the three coastal plain physiographic areas and for four national forests. There is strong evidence of declines for national forests in the Southern Blue Ridge and Southern Piedmont, including National Forests in North Carolina and the Cherokee National Forest.

The hooded warbler occurred frequently within a variety of forest types and successional stages (Appendix 6). It was associated most frequently with riparian, shrub/seedling oak-hickory, and mature white pine-hemlock forests, and was frequently associated with all successional stages, showing a slightly higher association with later successional stages.

Table 41.—Mean number of observations per count and percent annual change in number of observations per count of hooded warbler on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.371	2855	0.5	-0.4	1.4
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.220	311	-2.5	-4.9	0.1
Southern Blue Ridge	0.522	702	-1.5	-3.0	-0.1
Northern Cumberland Plateau	0.798	178	2.0	-0.1	4.0
Southern Cumberland Plateau/Ridge & Valley	0.147	106	13.4	7.5	19.6
Southern Piedmont	0.452	179	-11.5	-15.4	-7.3
Interior Low Plateaus	0.018	22	22.0	11.3	33.7
Ozark-Ouachita Interior Highlands	0.219	229	1.9	-0.7	4.6
West Gulf Coastal Plain	0.754	254	5.3	2.5	8.3
East Gulf Coastal Plain	0.399	768	3.2	1.1	5.3
South Atlantic Coastal Plain	0.102	106	23.0	15.4	31.1
National Forest					
George Washington and Jefferson	0.236	421	0.2	-1.3	1.8
NFs in North Carolina	0.376	211	-4.5	-7.4	-1.5
Cherokee	0.626	327	-1.8	-3.1	-0.4
Chattahoochee and Oconee	0.462	138	2.7	0.6	4.8
Francis Marion and Sumter	0.474	295	-0.6	-2.6	1.4
Daniel Boone	0.798	178	2.0	-0.1	4.0
NFs in Alabama	0.172	176	7.8	3.8	11.9
Land Between the Lakes	0.018	22	1.5	-6.5	10.1
Ozark and St. Francis	0.311	139	1.1	-1.8	4.1
Ouachita	0.131	104	3.8	-1.2	9.1
NFs in Texas	0.965	140	6.7	3.2	10.3
Kisatchie	0.590	104	1.5	-3.0	6.2
NFs in Mississippi	0.465	691	2.1	0.9	3.3
NFs in Florida	0.026	16	14.5	-10.8	47.0

[a] Physiographic areas and national forests in which hooded warbler occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

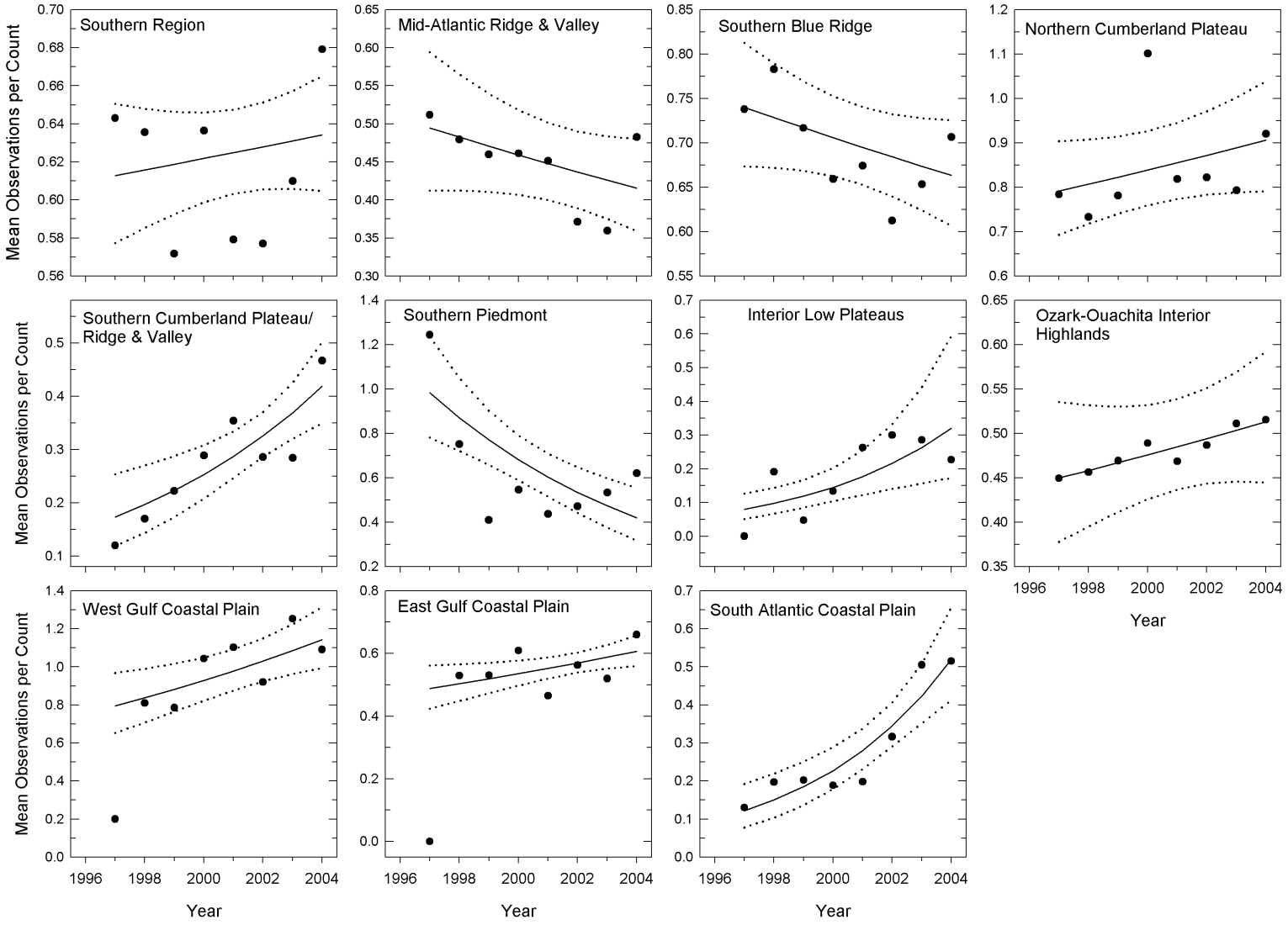
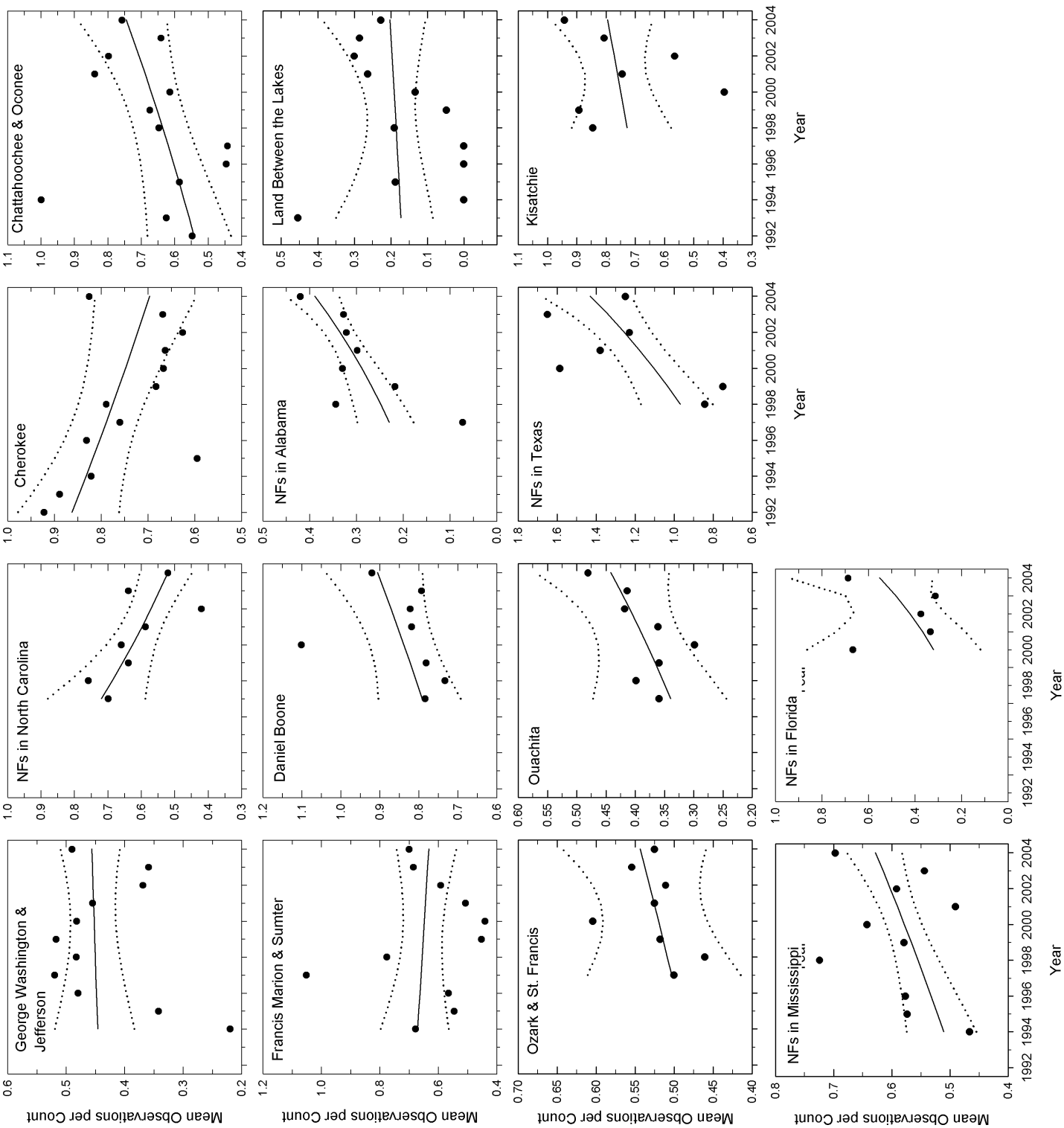


Figure 38. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the hooded warbler, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 38.—Continued



Yellow-breasted Chat (*Icteria virens*)

The yellow-breasted chat breeds primarily in Eastern North America from Southern Canada to the Gulf Coast (Eckerle and Thompson 2001). This species winters in Mexico and Central America with some individuals known to winter in the southern United States. The yellow-breasted chat occurs in dense shrubby vegetation in regenerating forests and forest edges. It is classified as an open-canopy obligatory species; population densities are directly related to shrub density. Management practices that promote early successional habitat benefit this species.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.0 percent; 95 percent CI: -0.4 to 0.5). The bird is of interest because of its association with early successional forest habitats. The yellow-breasted chat is a management indicator species on four national forests in the Southern Region, where it indicates management effects on early successional forest habitats.

Population trends for the yellow-breasted chat were estimated in 10 physiographic areas and in 14 national forests (Table 42, Fig. 39). Trend estimates indicate population declines on national forests across the region. There is strong evidence of declines within four physiographic areas and five national forests. There is strong evidence of increases only for the Mid-Atlantic Ridge and Valley and West Gulf Coastal Plain.

The yellow-breasted chat was associated with a variety of forest types but was associated most frequently with early successional stages (Appendix 6). Associations were highest with early successional stages of loblolly-shortleaf pine, hardwood-pine, longleaf-slash pine, and elm-ash-cottonwood forests.

Table 42.—Mean number of observations per count and percent annual change in number of observations per count of yellow-breasted chat on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.306	2157	-3.1	-4.2	-1.9
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.015	37	10.6	1.3	20.8
Southern Blue Ridge	0.101	227	-9.9	-13.2	-6.4
Northern Cumberland Plateau	0.313	106	-3.6	-7.7	0.7
Southern Cumberland Plateau/Ridge & Valley	0.403	153	2.0	-1.0	5.2
Southern Piedmont	0.605	188	-13.1	-16.8	-9.3
Interior Low Plateaus	0.219	137	4.2	0.5	7.9
Ozark-Ouachita Interior Highlands	0.298	235	-1.8	-4.4	1.0
West Gulf Coastal Plain	1.040	221	2.9	0.2	5.6
East Gulf Coastal Plain	0.444	740	-3.7	-5.5	-1.9
South Atlantic Coastal Plain	0.226	113	-4.8	-8.9	-0.5
National Forest					
George Washington and Jefferson	0.017	54	0.8	-6.1	8.2
NFs in North Carolina	0.134	84	-2.1	-7.3	3.4
Cherokee	0.098	85	-9.2	-12.6	-5.6
Chattahoochee and Oconee	0.321	109	0.1	-2.9	3.2
Francis Marion and Sumter	0.621	273	-10.4	-12.3	-8.4
Daniel Boone	0.313	106	-3.6	-7.7	0.7
NFs in Alabama	0.323	226	1.1	-1.2	3.5
Land Between the Lakes	0.288	137	-7.5	-9.6	-5.4
Ozark and St. Francis	0.224	79	3.4	-1.4	8.4
Ouachita	0.346	170	-3.7	-6.7	-0.6
NFs in Texas	1.079	102	3.6	-0.3	7.6
Kisatchie	1.146	108	1.4	-2.4	5.2
NFs in Mississippi	0.488	639	-1.4	-2.7	-0.1
NFs in Florida	0.006	6	-7.4	-15.5	1.4

[a] Physiographic areas and national forests in which yellow-breasted chat occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

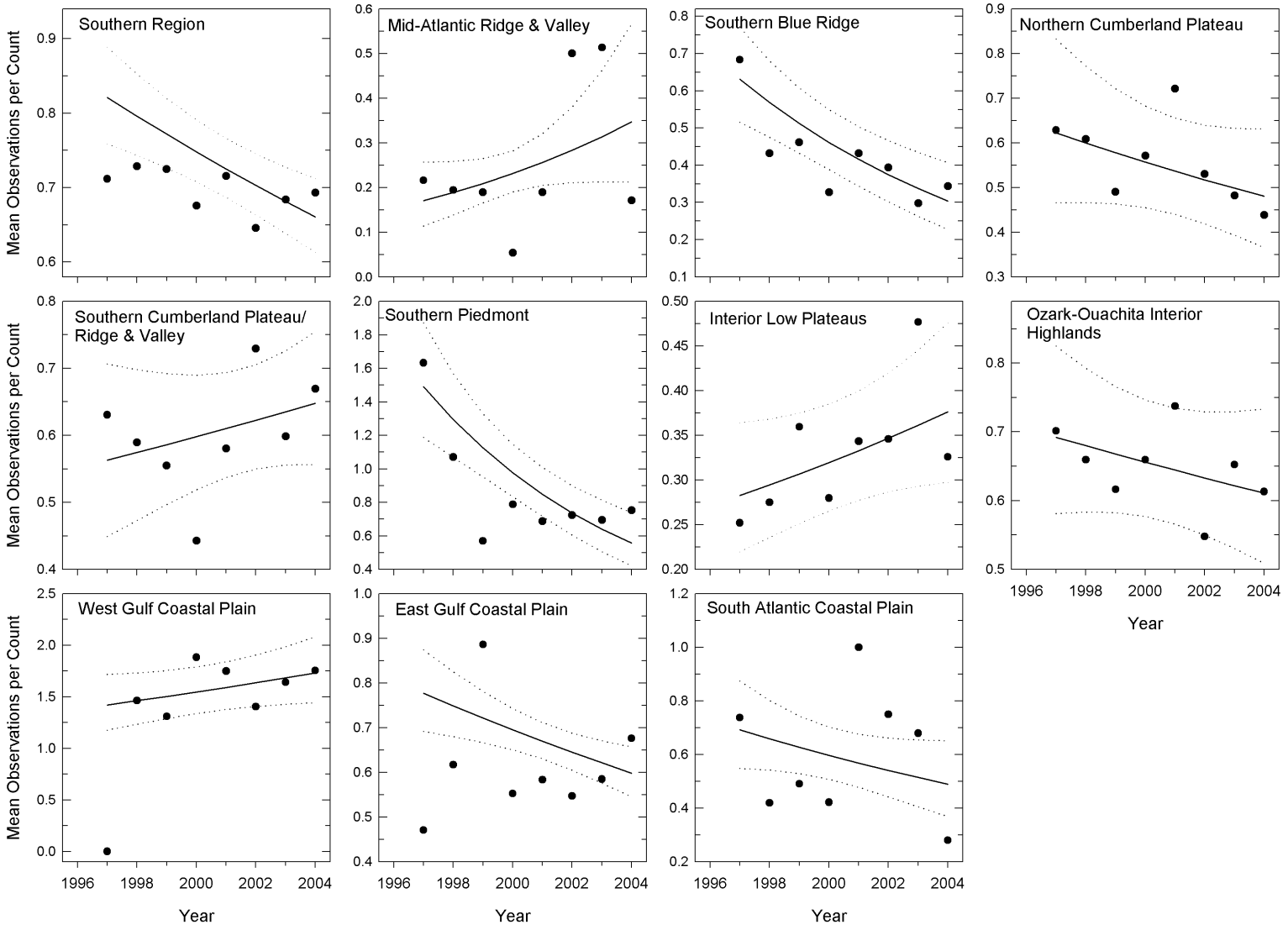
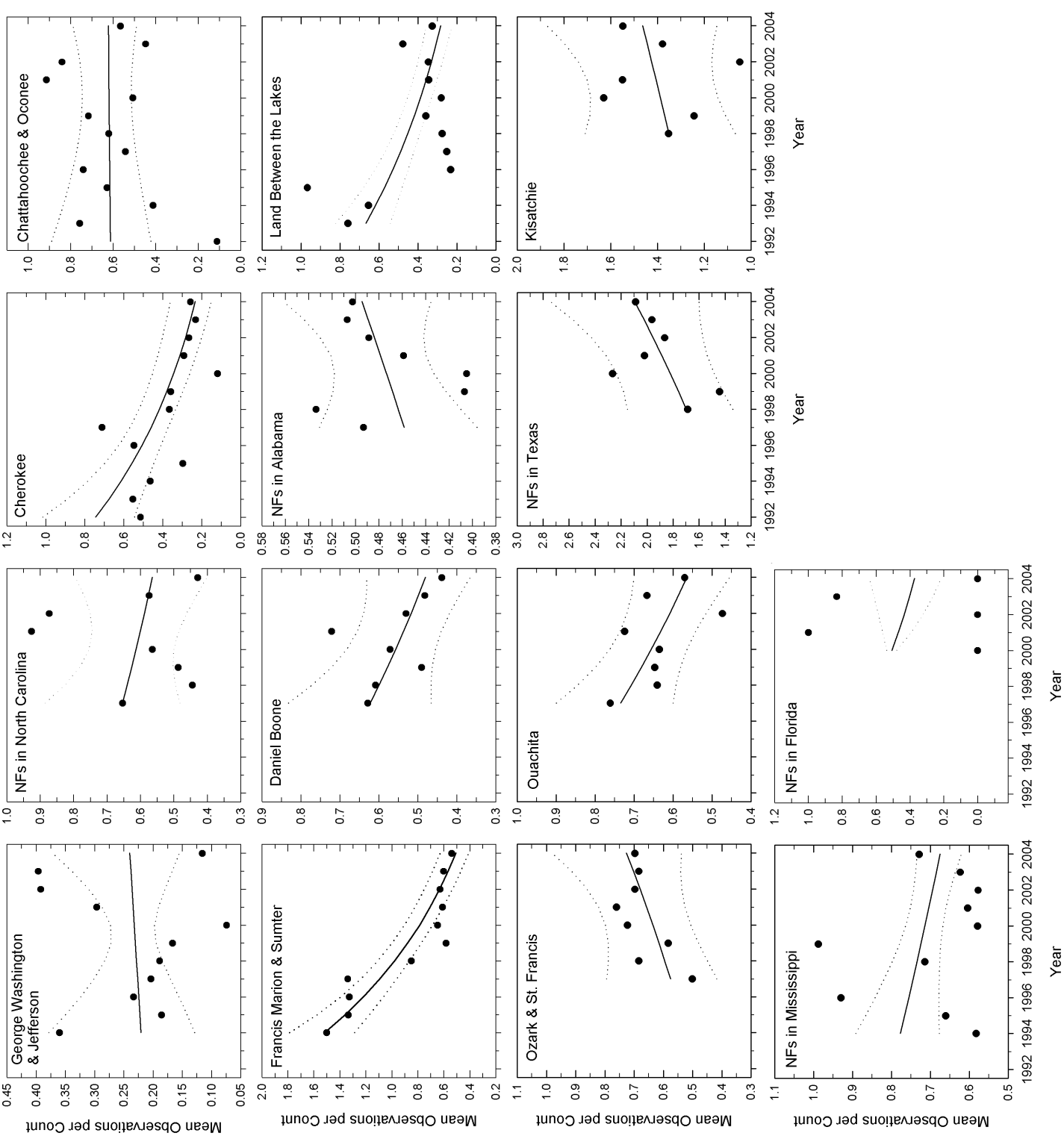


Figure 39. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the yellow-breasted chat, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 39.—Continued



Summer Tanager (*Piranga rubra*)

The summer tanager breeds throughout the Eastern United States primarily south of the Great Lakes to the Gulf Coast (Robinson 1996). It winters from central Mexico to South America. Eastern populations favor open deciduous forests often near large gaps or along forest edge. In the South, it occurs commonly in pine-oak forests. Forest management activities such as prescribed burning and thinning benefit this species.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.4 percent; 95 percent CI: -0.3 to 1.0). The bird is of concern because of the loss of habitat. The summer tanager is a management indicator species on the Kisatchie National Forest, where it indicates management effects on shortleaf pine/oak-hickory forests, and on the Daniel Boone National Forest, where it indicates management effects on restoration of woodlands.

Population trends for the summer tanager were estimated in nine physiographic areas and in 13 national forests (Table 43, Fig. 40). Trend estimates indicate that populations were stable on national forests across the region. There is strong evidence of increases on national forests in the Southern Cumberland Plateau/Ridge and Valley, particularly on National Forests in Alabama; in the Interior Low Plateaus represented solely by Land Between the Lakes; and in the East Gulf Coastal Plain, particularly on National Forests in Mississippi; National Forests in Texas also showed increases. There is strong evidence of decreases on national forests in the Southern Piedmont, the Ozark-Ouachita Interior Highlands as a whole, particularly on the Ozark and St. Francis National Forests, and on National Forests in Florida.

The summer tanager was associated with a variety of forest types and successional stages (Appendix 6). The association was highest with riparian, loblolly-shortleaf pine, longleaf-slash pine, elm-ash-cottonwood, and oak-gum-cypress forests.

Table 43.—Mean number of observations per count and percent annual change in number of observations per count of summer tanager on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.263	2526	0.6	-0.4	1.5
Physiographic Area					
Southern Blue Ridge	0.008	56	2.0	-4.9	9.4
Northern Cumberland Plateau	0.048	51	8.2	-2.0	19.4
Southern Cumberland Plateau/Ridge & Valley	0.206	153	10.0	5.4	14.8
Southern Piedmont	0.534	227	-4.1	-7.1	-1.0
Interior Low Plateaus	0.456	201	5.9	3.2	8.6
Ozark-Ouachita Interior Highlands	0.383	409	-2.7	-4.7	-0.7
West Gulf Coastal Plain	0.642	316	1.2	-0.8	3.2
East Gulf Coastal Plain	0.444	897	2.3	0.4	4.3
South Atlantic Coastal Plain	0.346	211	-2.9	-6.0	0.3
National Forest					
NFs in North Carolina	0.093	72	-2.1	-7.5	3.7
Cherokee	0.004	9	1.9	-2.9	6.9
Chattahoochee and Oconee	0.142	79	2.0	-1.6	5.7
Francis Marion and Sumter	0.285	267	0.2	-1.7	2.2
Daniel Boone	0.048	51	8.2	-2.0	19.4
NFs in Alabama	0.218	228	10.7	7.3	14.3
Land Between the Lakes	0.449	201	2.7	1.1	4.2
Ozark and St. Francis	0.266	159	-7.2	-10.2	-4.1
Ouachita	0.478	283	0.4	-2.0	2.8
NFs in Texas	0.702	174	3.4	1.0	5.8
Kisatchie	0.580	121	-3.6	-7.3	0.2
NFs in Mississippi	0.488	778	2.2	1.0	3.4
NFs in Florida	0.460	106	-7.6	-11.0	-4.1

[a] Physiographic areas and national forests in which summer tanager occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

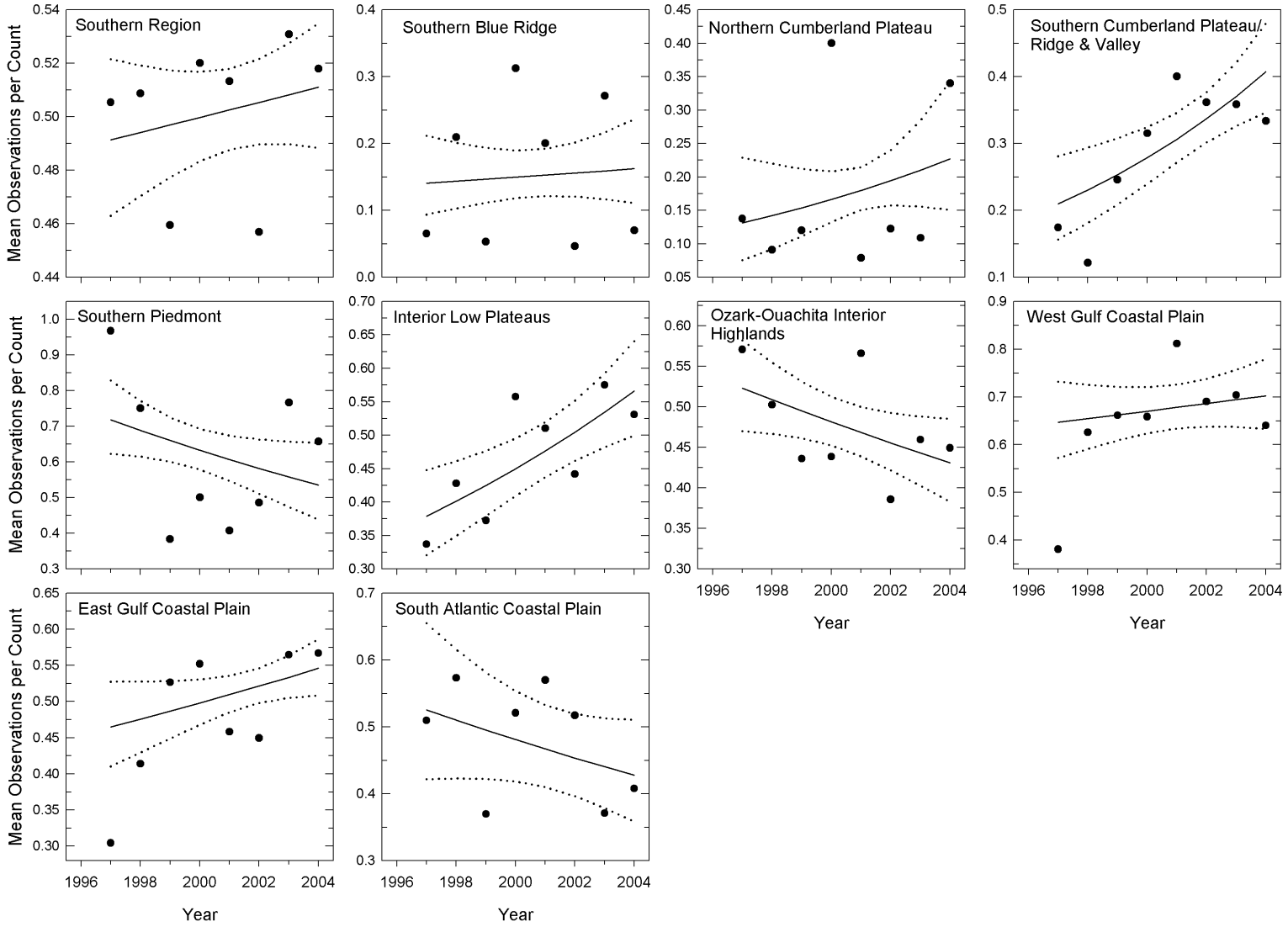


Figure 40. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the summer tanager, 1992-2004, for the Southern Region, nine physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

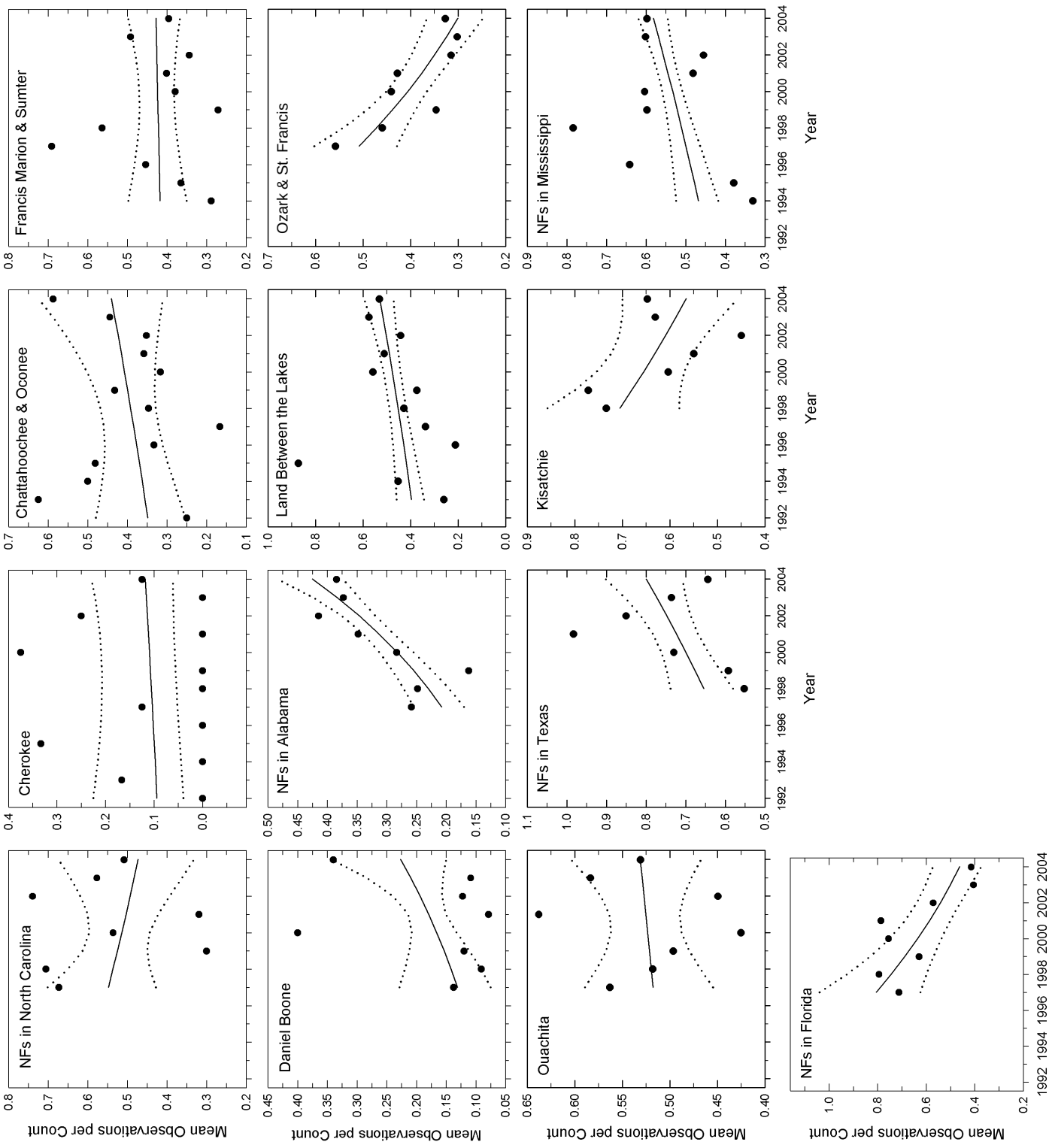


Figure 40.—Continued

Scarlet Tanager (*Piranga olivacea*)

The scarlet tanager breeds in Eastern North America from Southern Canada to northern Georgia and Louisiana (Mowbray 1999). It winters in Central and South America. This species breeds in a variety of deciduous and mixed deciduous-coniferous forest habitats from mixed mesophytic to xeric pine-oak woodlands. It prefers large blocks of mature forest, especially where oaks are common, but also may occur in young successional woodlands. As a forest interior species, the scarlet tanager is sensitive to fragmentation of forested blocks by non-forest cover types. Nest predation and parasitism rates appear to be inversely related to size of forest fragments. Management emphasis centers on maintaining large forest tracts and creating open canopies or canopy gaps.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (-0.2 percent; 95 percent CI: -0.5 to 0.2). The bird is of interest because of its association with large blocks of mature forest. The scarlet tanager is a management indicator species on seven national forests in the Southern Region, where it primarily represents management effects on upland oak forests.

Population trends for the scarlet tanager were estimated in eight physiographic areas and in 11 national forests (Table 44, Fig. 41). Trend estimates indicate small population increases on national forests across the region. There is strong evidence of increases on national forests within three physiographic areas and six national forests. There is strong evidence of decreases only for the George Washington and Jefferson National Forests, and for National Forests in North Carolina.

The scarlet tanager was associated with a variety of forest types and successional stages (Appendix 6). It was associated most frequently with white pine-hemlock and oak-hickory forests; there was a slightly higher association with mature forests than with early successional stages.

Table 44.—Mean number of observations per count and percent annual change in number of observations per count of scarlet tanager on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.299	2494	1.4	0.6	2.2
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.665	625	-0.1	-1.3	1.1
Southern Blue Ridge	0.417	753	0.1	-1.3	1.6
Northern Cumberland Plateau	0.451	173	1.8	-0.8	4.6
Southern Cumberland Plateau/Ridge & Valley	0.252	145	5.9	1.5	10.4
Southern Piedmont	0.122	96	3.7	-2.1	9.8
Interior Low Plateaus	0.400	196	4.9	2.2	7.6
Ozark-Ouachita Interior Highlands	0.363	379	5.9	3.7	8.2
East Gulf Coastal Plain	0.034	121	4.9	-0.7	10.7
National Forest					
George Washington and Jefferson	0.621	769	-1.6	-2.4	-0.7
NFs in North Carolina	0.300	211	-4.8	-7.4	-2.2
Cherokee	0.433	319	0.5	-1.0	1.9
Chattahoochee and Oconee	0.451	157	5.0	3.0	7.1
Francis Marion and Sumter	0.146	151	-1.0	-3.8	1.8
Daniel Boone	0.451	173	1.8	-0.8	4.6
NFs in Alabama	0.146	151	4.8	0.8	9.0
Land Between the Lakes	0.339	196	9.0	7.5	10.6
Ozark and St. Francis	0.365	170	3.6	0.5	6.7
Ouachita	0.319	211	8.1	4.7	11.5
NFs in Mississippi	0.017	71	21.0	11.7	31.0

[a] Physiographic areas and national forests in which scarlet tanager occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

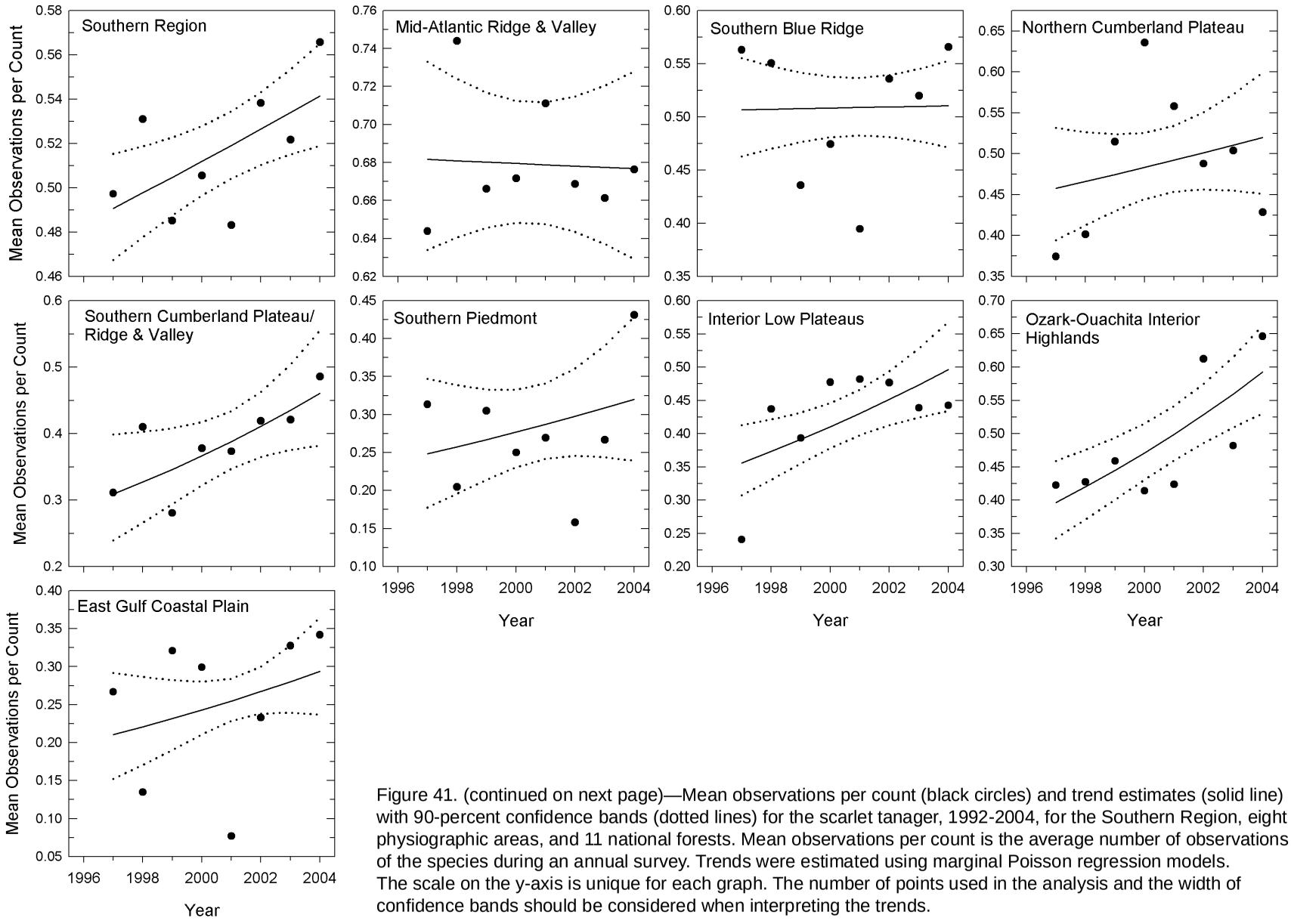
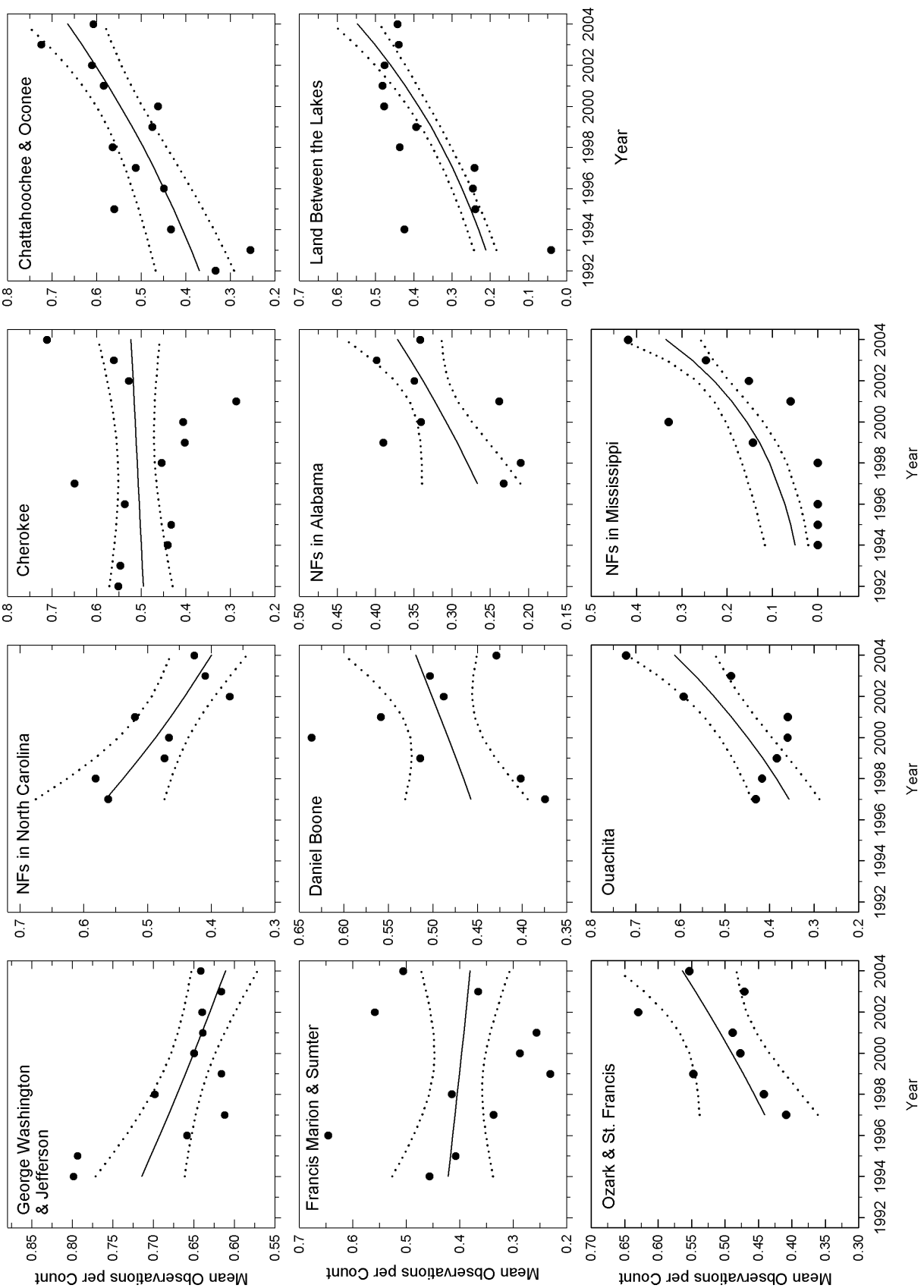


Figure 41. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the scarlet tanager, 1992-2004, for the Southern Region, eight physiographic areas, and 11 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 41.—Continued



Eastern Towhee (*Pipilo erythrophthalmus*)

The eastern towhee is distributed widely across most of Eastern North America (Greenlaw 1996). Northern populations are migratory while populations in the South are mostly resident. This species is an edge-associated generalist that occupies varied habitats characterized by dense shrub and small trees with a well-developed layer of hardwood leaf litter. Overstory trees may or may not be present; if present, open-canopy situations are favored. Habitat management centers on maintaining an array of woody plant communities in early and mid-successional stages.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-1.7 percent; 95 percent CI: -2.0 to -1.4). The bird is of concern because of a loss of quality early and mid-successional forest habitats in some settings. The eastern towhee is a management indicator species on four national forests in the Southern Region, where it indicates management effects on the availability of early successional forests, particularly those dominated by hardwood.

Population trends for the eastern towhee were estimated in 10 physiographic areas and in 13 national forests (Table 45, Fig. 42). Trend estimates indicate that populations have experienced moderate declines on national forests across the region. There is strong evidence of declines on national forests within four physiographic areas and on five national forests. Evidence of increases is strong only for national forests within the Southern Cumberland Plateau/Ridge and Valley, particularly on National Forests in Alabama, Mississippi, and North Carolina.

The eastern towhee was common and occurred in association with a variety of forest types and successional stages (Appendix 6). It was associate more frequently with early successional than late successional stages.

Table 45.—Mean number of observations per count and percent annual change in number of observations per count of eastern towhee on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.585	2796	-4.1	-5.2	-3.0
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.501	439	-3.7	-5.3	-2.1
Southern Blue Ridge	0.637	697	-3.7	-5.0	-2.3
Northern Cumberland Plateau	0.197	88	-2.8	-6.6	1.2
Southern Cumberland Plateau/Ridge & Valley	0.186	113	6.7	0.8	12.9
Southern Piedmont	0.737	205	-10.6	-13.6	-7.5
Interior Low Plateaus	0.134	139	-17.6	-21.8	-13.1
Ozark-Ouachita Interior Highlands	0.071	88	-4.2	-8.5	0.3
West Gulf Coastal Plain	0.050	49	-0.1	-8.9	9.6
East Gulf Coastal Plain	0.349	673	0.7	-1.3	2.8
South Atlantic Coastal Plain	3.677	305	-3.1	-5.4	-0.7
National Forest					
George Washington and Jefferson	0.568	589	-4.0	-5.1	-2.9
NFs in North Carolina	1.005	274	2.6	0.1	5.1
Cherokee	0.459	231	-2.5	-4.3	-0.6
Chattahoochee and Oconee	0.576	154	0.2	-1.9	2.2
Francis Marion and Sumter	0.909	319	-5.2	-6.6	-3.8
Daniel Boone	0.197	88	-2.8	-6.6	1.2
NFs in Alabama	0.186	188	6.1	2.4	9.9
Land Between the Lakes	0.219	139	-14.9	-16.8	-12.9
Ozark and St. Francis	0.142	75	-2.2	-6.5	2.2
Ouachita	0.008	15	-35.8	-42.6	-28.1
Kisatchie	0.133	48	0.5	-8.5	10.4
NFs in Mississippi	0.363	572	4.8	3.3	6.4
NFs in Florida	6.062	163	-5.9	-9.0	-2.6

[a] Physiographic areas and national forests in which eastern towhee occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

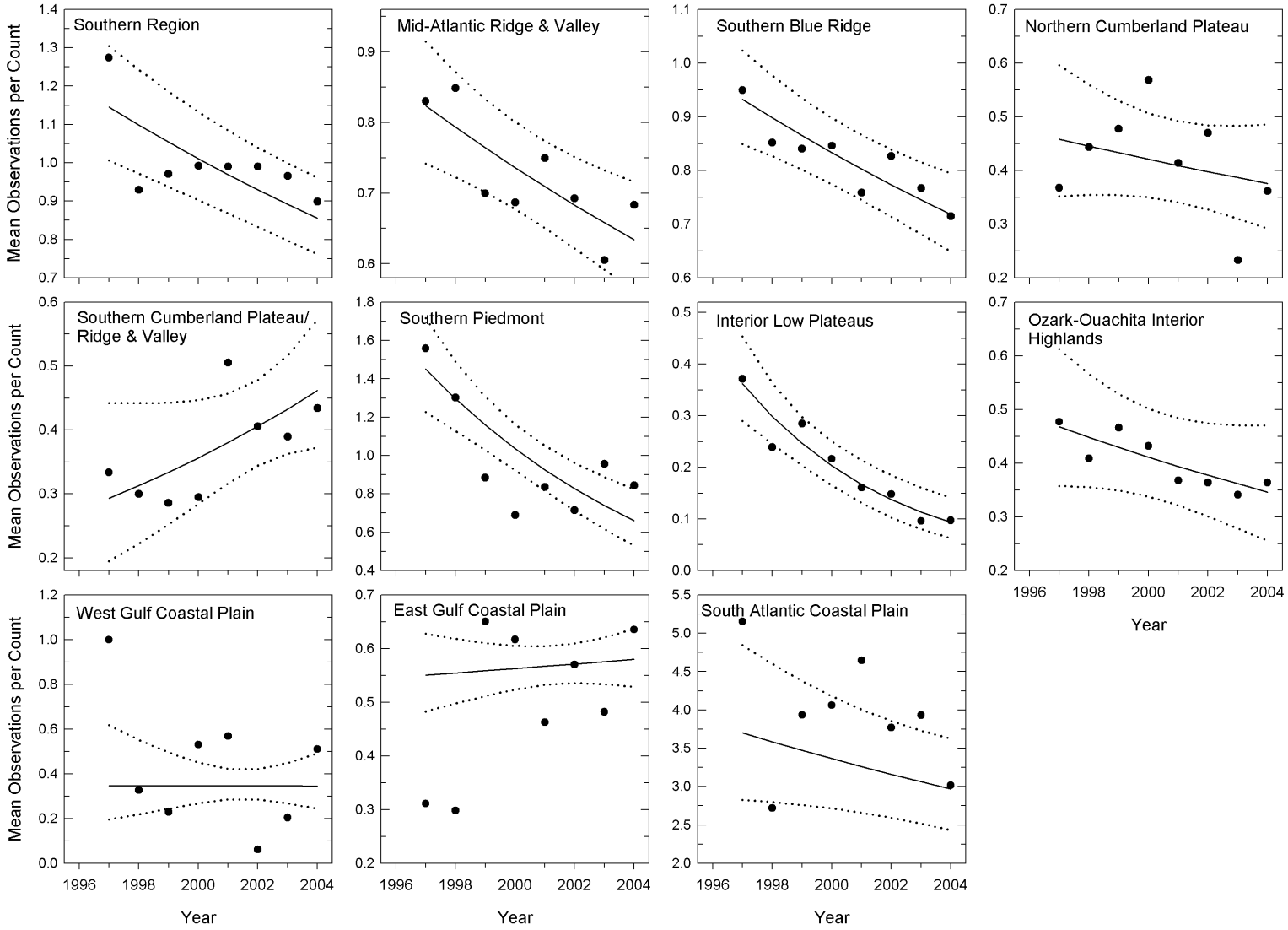
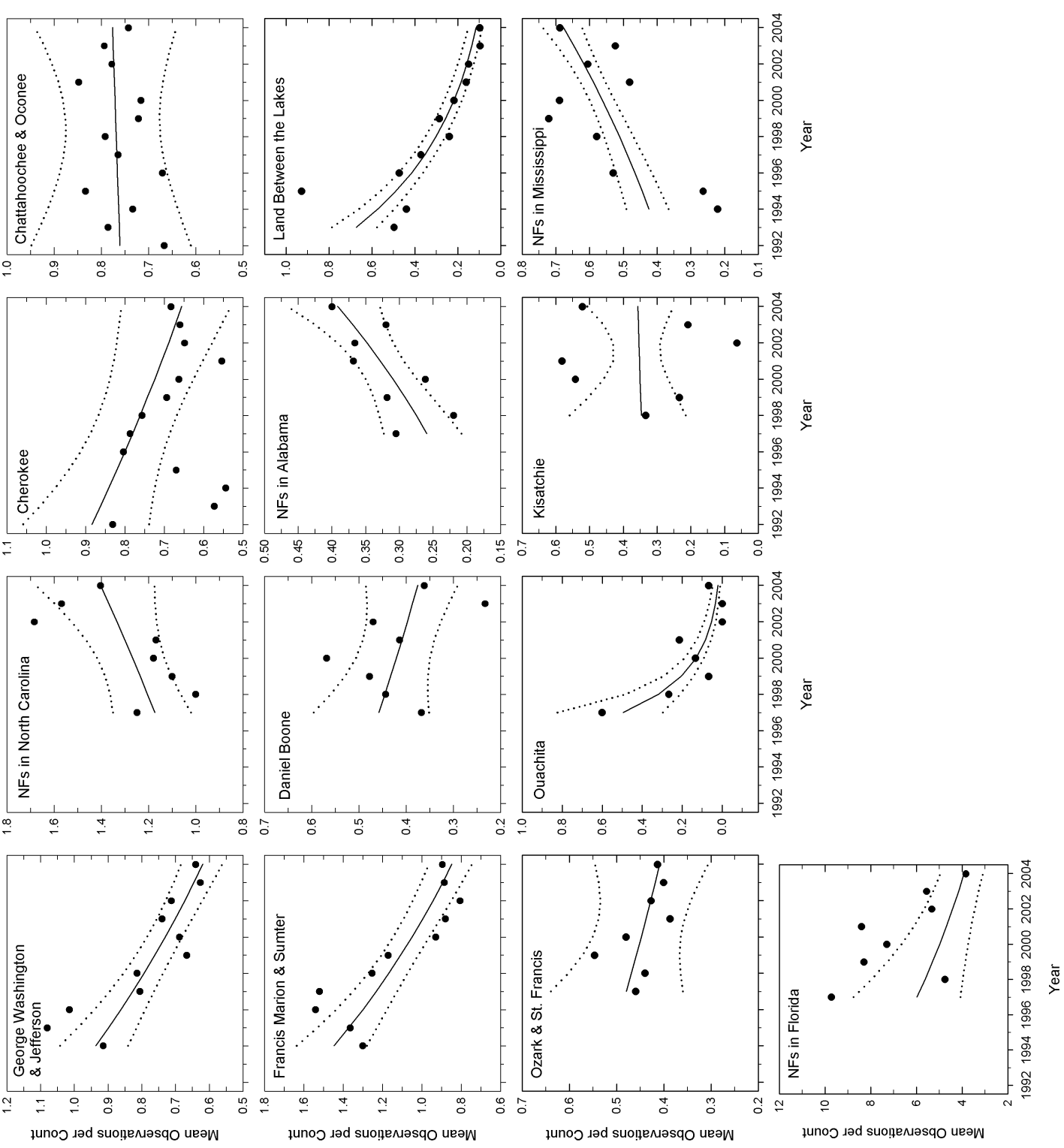


Figure 42. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the eastern towhee, 1992-2004, for the Southern Region, 10 physiographic areas, and 13 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 42.—Continued



Bachman's Sparrow (*Aimophila aestivalis*)

The Bachman's sparrow breeds and winters primarily in the Coastal Plain and Piedmont regions of the South (Dunning 2006). Habitat for this species is open pine woodlands or other open habitats that support a dense ground layer of grasses and forbs. These habitats are typically maintained by periodic understory fires. Habitat management entails maintaining relatively low tree densities and regular prescribed burning, which suppresses woody understory and increases cover of native grasses and forbs.

The USGS Breeding Bird Survey indicates a stable to slightly declining trend for this species from 1966 to 2004 (-2.0 percent; 95 percent CI: -4.9 to 1.0). It is a bird of conservation concern throughout much of its range, including the Central Hardwoods, West Gulf Coastal Plain/Ouachitas, Southeastern Coastal Plain, Appalachian Mountains, Piedmont, and Peninsular Florida regions. The bird is of concern because of a loss of fire-maintained habitats due to fire suppression and land-use conversion. The Bachman's sparrow is a management indicator species on two national forests in the Southern Region, where it indicates management effects on maintaining dense grass/forb understories in longleaf pine forests.

Population trends for the Bachman's sparrow were estimated in four physiographic areas and in six national forests (Table 46, Fig. 43). Trend estimates indicate large declines on national forests across the region. All trend estimates by physiographic area and national forest are negative except for National Forests in Mississippi, for which there is strong evidence of moderate increases. There is strong evidence of decreases for national forests within the East Gulf and South Atlantic Coastal Plains, and on the Kisatchie National Forest and National Forests in Alabama and Texas.

The Bachman's sparrow was associated most frequently with late successional stages of longleaf-slash pine forests (Appendix 6). It was associated with grass/forb stages of loblolly-shortleaf pine forest and with glade-shrub-savanna habitats.

Table 46.—Mean number of observations per count and percent annual change in number of observations per count of Bachman's sparrow on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.054	345	-6.0	-8.6	-3.2
Physiographic Area					
Southern Piedmont	0.024	6	-6.0	-23.8	15.9
West Gulf Coastal Plain	0.214	12	-4.2	-8.6	0.6
East Gulf Coastal Plain	0.039	87	-0.1	-6.7	7.1
South Atlantic Coastal Plain	0.444	106	-6.6	-10.2	-2.9
National Forest					
Francis Marion and Sumter	0.051	42	-6.3	-10.0	-2.4
NFs in Alabama	0.034	22	-1.3	-7.9	5.6
NFs in Texas	0.283	49	-4.3	-9.7	1.4
Kisatchie	0.160	38	-3.9	-9.9	2.5
NFs in Mississippi	0.038	90	4.6	0.9	8.4
NFs in Florida	0.817	93	-10.0	-13.7	-6.1

[a] Physiographic areas and national forests in which Bachman's sparrow occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

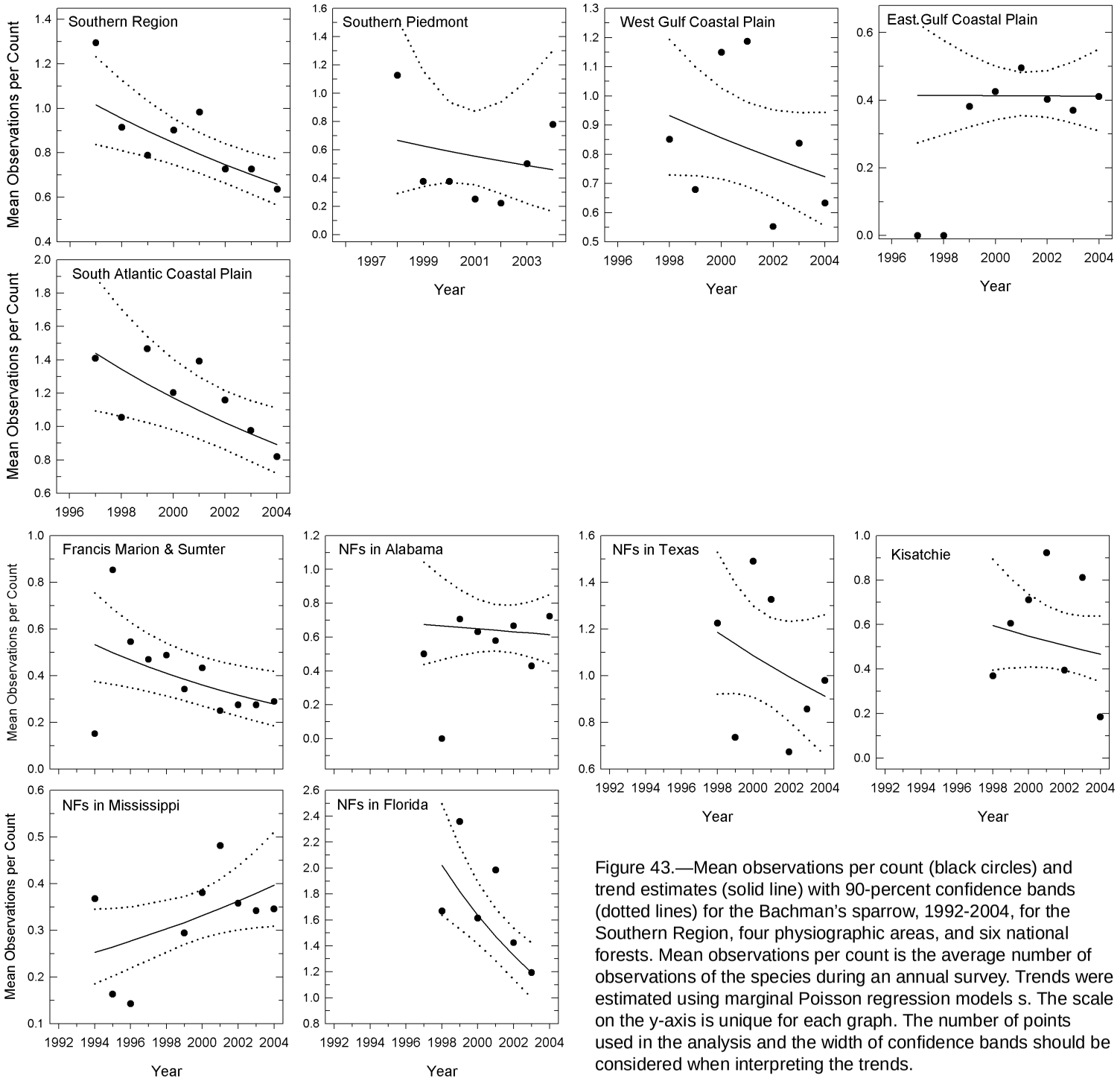


Figure 43.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the Bachman's sparrow, 1992-2004, for the Southern Region, four physiographic areas, and six national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models s. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Chipping Sparrow (*Spizella passerina*)

The chipping sparrow (Middleton 1998) is distributed widely throughout most of North America from the tree line in Canada, south to the Gulf Coast, Mexican highlands, and Baja California. This species is a year-round resident throughout much of the South. Breeding habitats vary with geographic location; however, this bird generally prefers open, grassy areas, coniferous forests, woodland glades or edge, weedy fields, and river and lake shorelines. Because of its preference for breeding in shrubby, coniferous habitats bordering open grassy spaces, the chipping sparrow has benefited from human occupation as its population levels are thought to be higher than in pre-settlement times.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (-0.2 percent; 95 percent CI: -0.4 to 0.1). The bird is of interest because of its association with grassland habitats. The chipping sparrow is a management indicator species on the Daniel Boone National Forest, where it indicates management effects on the restoration of open woodlands, grasslands, and shrublands.

Population trends for the chipping sparrow were estimated in 10 physiographic areas and in 12 national forests (Table 47, Fig. 44). Trend estimates indicate large increases on national forests across the region. There is strong evidence of increases on national forests in four physiographic areas and four national forests. There is strong evidence of declines only for Land Between the Lakes of the Interior Low Plateaus. However, if the first years of the survey are excluded, a stable or increasing trend is evident (Fig. 44).

The chipping sparrow was found at relatively low frequencies across a variety of forest types and successional stages (Appendix 6). It was associated most frequently with grass/forb conditions within the hardwood-pine forest type.

Table 47.—Mean number of observations per count and percent annual change in number of observations per count of chipping sparrow on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.029	547	5.2	3.3	8.1
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.017	129	-6.5	-11.9	-0.9
Southern Blue Ridge	0.015	73	-14.6	-22.7	-5.7
Northern Cumberland Plateau	0.065	56	-3.6	-8.2	1.2
Southern Cumberland Plateau/Ridge & Valley	0.036	40	11.4	3.0	20.5
Southern Piedmont	0.050	35	25.6	14.0	38.5
Interior Low Plateaus	0.011	33	45.4	30.9	61.6
Ozark-Ouachita Interior Highlands	0.045	84	0.6	-5.3	6.9
West Gulf Coastal Plain	0.036	39	8.5	-0.2	18.1
East Gulf Coastal Plain	0.037	132	18.4	13.4	23.6
South Atlantic Coastal Plain	0.007	6	32.5	14.1	53.8
National Forest					
George Washington and Jefferson	0.018	75	0.6	-3.2	4.6
NFs in North Carolina	0.024	33	-10.9	-21.0	0.4
Cherokee	0.003	7	2.4	-2.3	7.3
Chattahoochee and Oconee	0.037	33	16.5	10.1	23.3
Francis Marion and Sumter	0.014	22	8.0	1.3	15.2
Daniel Boone	0.065	56	-3.6	-8.2	1.2
NFs in Alabama	0.040	62	22.2	11.9	33.4
Land Between the Lakes	0.021	33	-15.5	-19.1	-11.7
Ozark and St. Francis	0.049	33	9.3	3.2	15.7
Ouachita	0.038	55	-8.5	-16.9	0.8
Kisatchie	0.085	32	11.1	-0.3	23.7
NFs in Mississippi	0.033	103	17.2	12.5	22.0

[a] Physiographic areas and national forests in which chipping sparrow occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

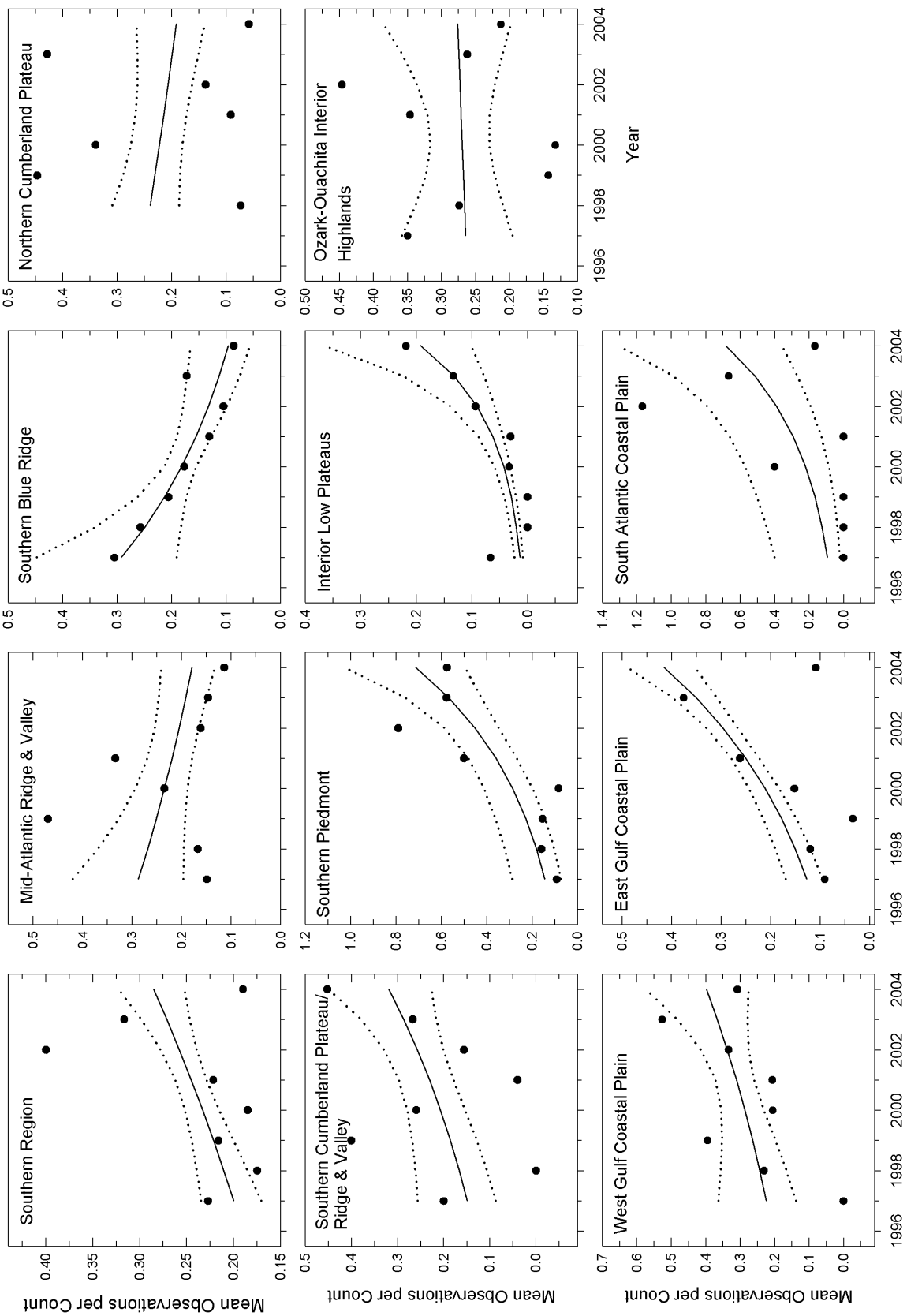
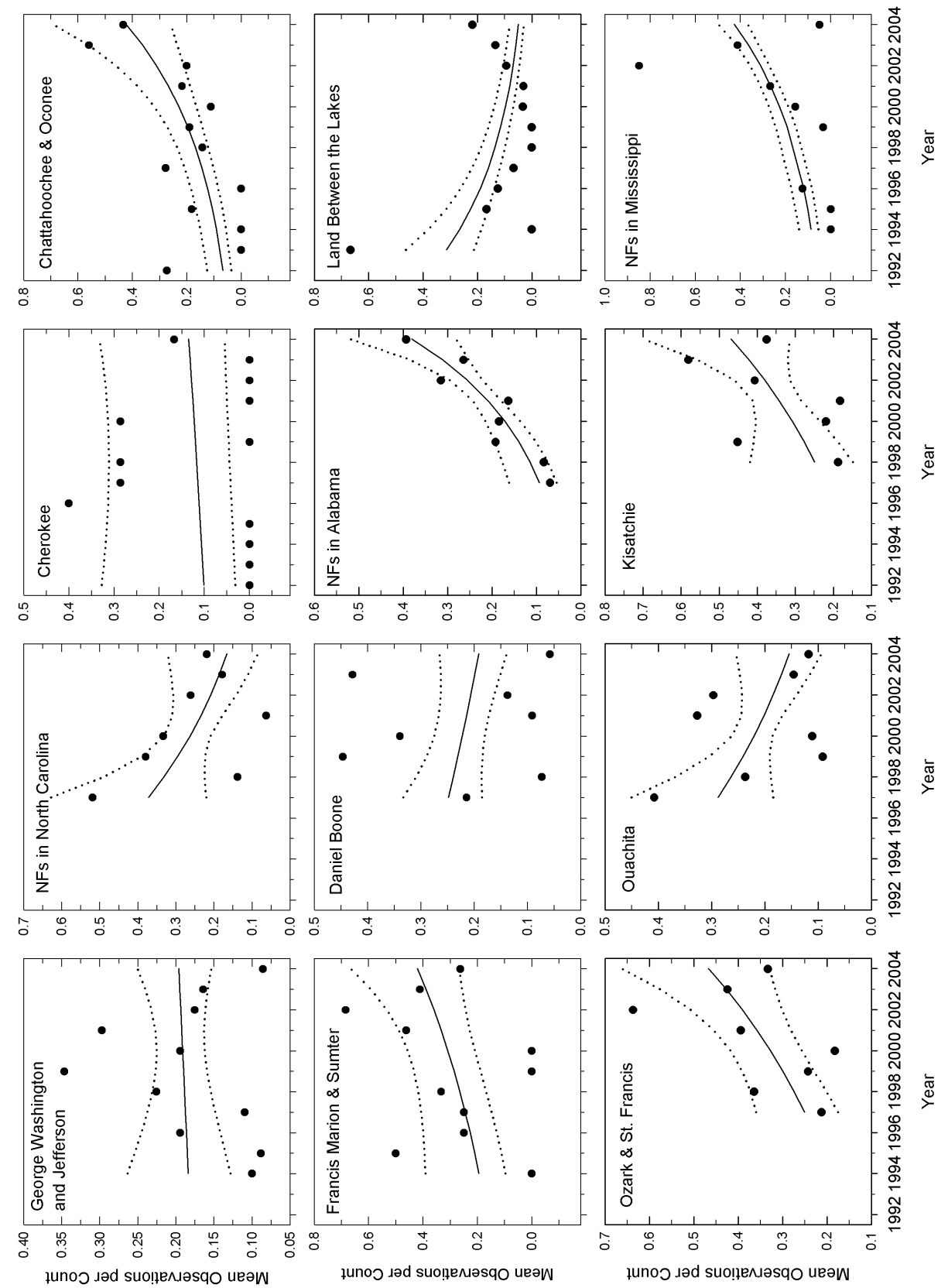


Figure 44. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the chipping sparrow, 1992-2004, for the Southern Region, 10 physiographic areas, and 12 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 44.—Continued



Field Sparrow (*Spizella pusilla*)

The field sparrow is a partial migrant that is found throughout the Eastern United States east of the Rocky Mountains (Carey et al. 1994). This species breeds in open grassy areas within forested communities. Its nests are composed almost entirely of grasses and are located near the ground in early spring. Later in the year, nests may be built in small saplings and shrubs in woodland openings. Maintaining early successional forest openings and grassy woodlands benefits this species.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-3.0 percent; 95 percent CI: -3.3 to -2.7). The bird is of concern due to a loss of quality grassland habitats. The field sparrow is a management indicator species on three national forests in the Southern Region, where it indicates management effects on the restoration of open woodlands and grasslands.

Population trends for the field sparrow were estimated in eight physiographic areas and in 11 national forests (Table 48, Fig. 45). Trend estimates indicate large declines on national forests across the region. There is strong evidence of declines for national forests within the Southern Piedmont, Interior Low Plateaus, and Ozark-Ouachita Interior Highlands. There also is strong evidence of declines for the Francis Marion and Sumter National Forests, Ouachita National Forest, and Land Between the Lakes National Recreation Area.

The field sparrow was associated most frequently with glade-shrub-savanna habitats and the grass/forb stage of hardwood-pine and loblolly-shortleaf pine forests (Appendix 6). Across forest types, this species was detected with greater frequency at early than at late-successional points.

Table 48.—Mean number of observations per count and percent annual change in number of observations per count of field sparrow on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.034	448	-8.3	-11.1	-5.3
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.011	35	-4.9	-13.6	4.7
Southern Blue Ridge	0.062	86	-4.5	-9.6	1.0
Northern Cumberland Plateau	0.057	25	-0.9	-10.8	10.1
Southern Cumberland Plateau/Ridge & Valley	0.042	34	-3.9	-11.2	3.9
Southern Piedmont	0.104	66	-16.6	-25.0	-7.3
Interior Low Plateaus	0.041	57	-13.6	-21.5	-5.0
Ozark-Ouachita Interior Highlands	0.026	50	-12.2	-20.0	-3.6
East Gulf Coastal Plain	0.026	86	-1.2	-8.0	6.2
National Forest					
George Washington and Jefferson	0.037	55	-2.9	-8.5	3.0
NFs in North Carolina	0.056	37	-5.5	-13.6	3.3
Cherokee	0.016	15	-7.9	-15.7	0.6
Chattahoochee and Oconee	0.043	30	-1.8	-8.5	5.5
Francis Marion and Sumter	0.106	69	-19.1	-23.0	-15.0
Daniel Boone	0.057	25	-0.9	-10.8	10.1
NFs in Alabama	0.057	75	1.7	-5.9	9.9
Land Between the Lakes	0.079	57	-19.7	-22.9	-16.3
Ozark and St. Francis	0.020	13	-9.0	-20.6	4.2
Ouachita	0.030	39	-14.4	-22.0	-6.0
NFs in Mississippi	0.012	34	-3.2	-11.0	5.3

[a] Physiographic areas and national forests in which field sparrow occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

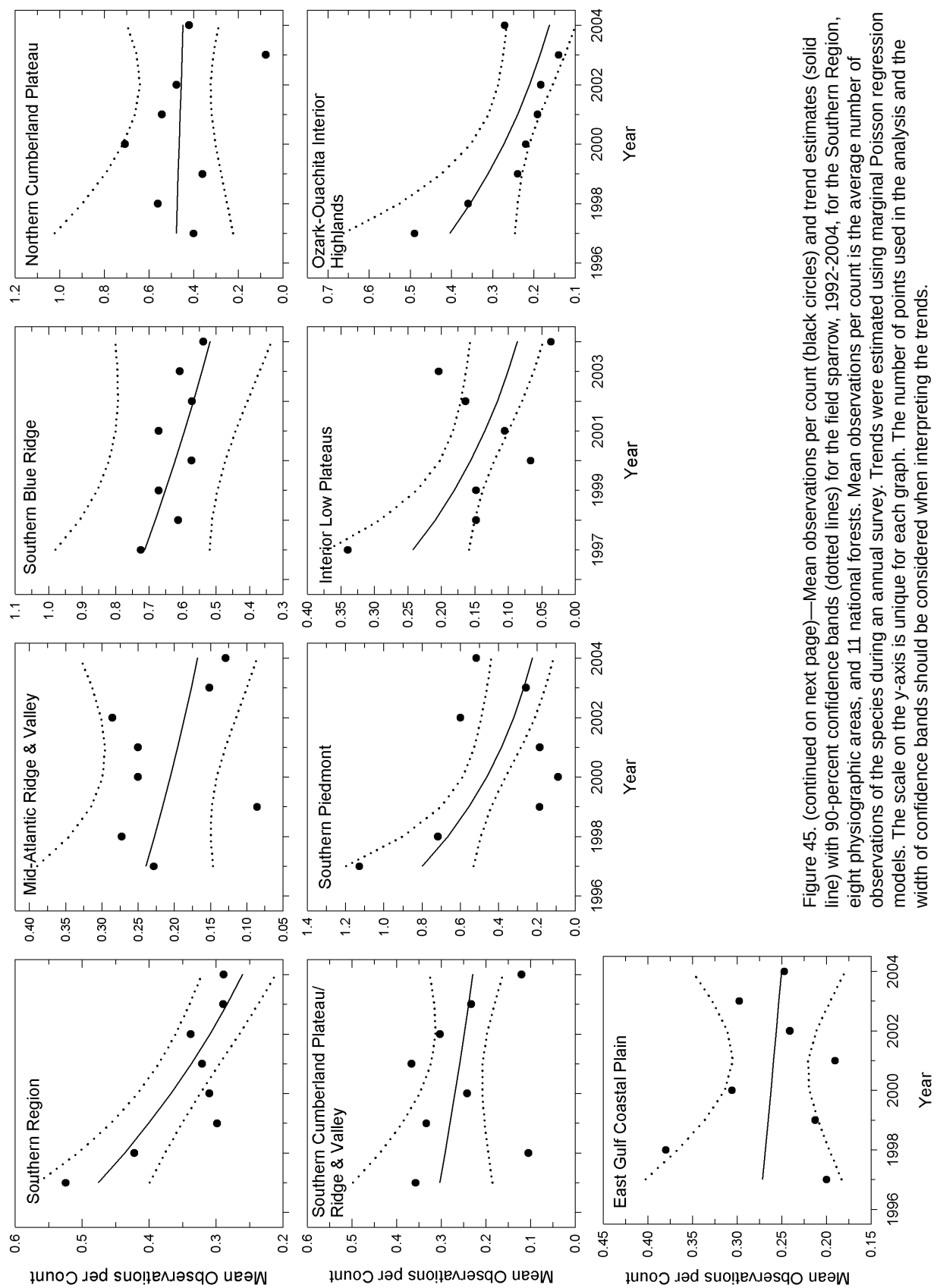
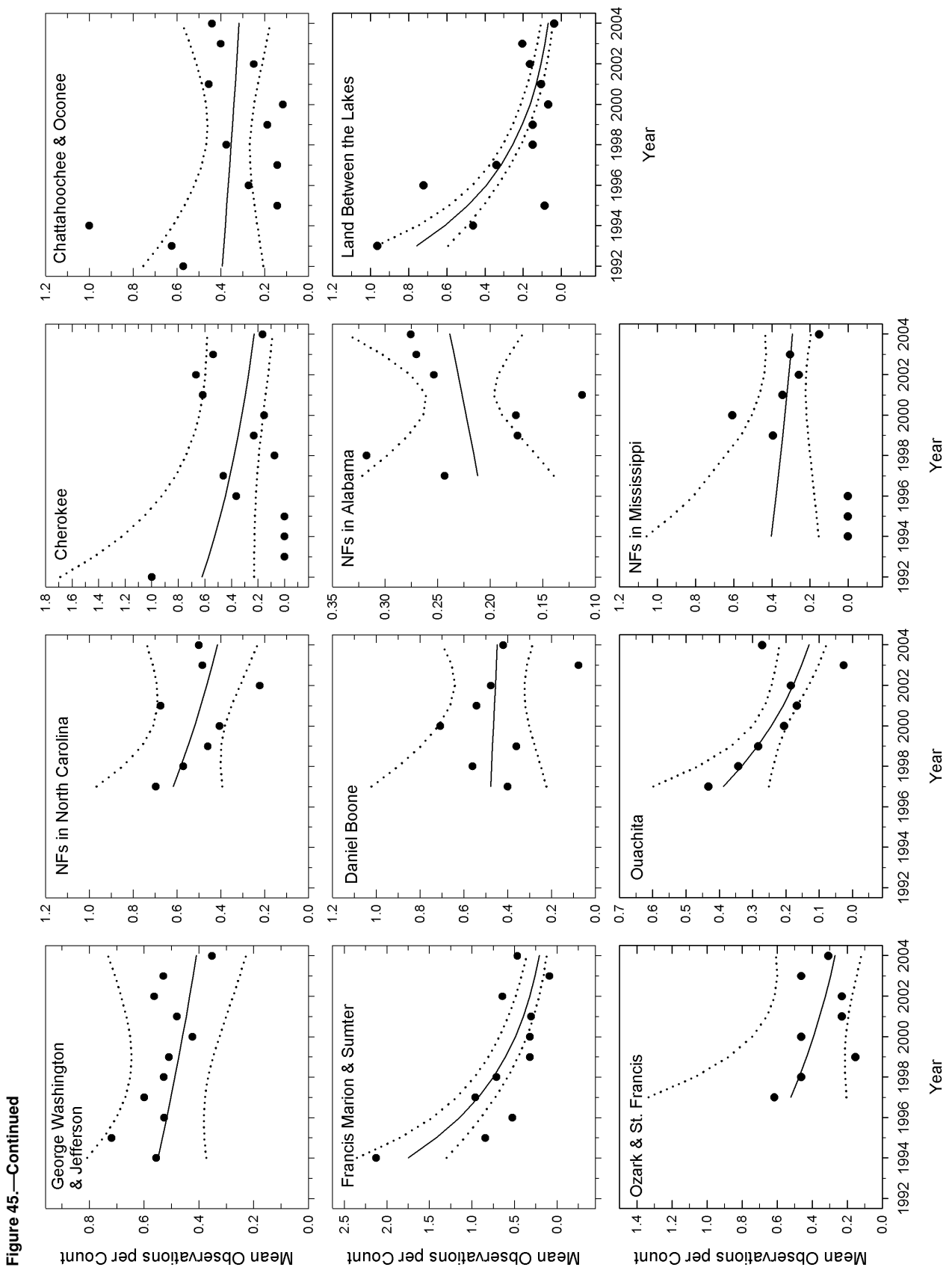


Figure 45. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the field sparrow, 1992-2004, for the Southern Region, eight physiographic areas, and 11 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 45.—Continued



Northern Cardinal (*Cardinalis cardinalis*)

The northern cardinal is a resident species throughout Eastern and Central North America from Southern Canada into Mexico and Central America (Halkin and Linville 1999). This species inhabits areas with shrubs and/or small trees ranging from forest edges to forest interiors, shrubby areas in logged and second-growth forests, and grasslands. Breeding areas require woody plants with dense foliage for nesting and conspicuous locations for song perches. Forest management that provides a diversity of age classes benefits this species.

The USGS Breeding Bird Survey indicates a stable trend for this species from 1966 to 2004 (0.1 percent; 95 percent CI: -0.1 to 0.3). The northern cardinal is a management indicator species only on the Daniel Boone National Forest, where it indicates management effects on restored woodlands and shrublands.

Population trends for the northern cardinal were estimated in 10 physiographic areas and in 14 national forests (Table 49, Fig. 46). Trend estimates indicate small increases on national forests across the region. There is strong evidence of increases for national forests within six physiographic areas and on 10 national forests. There is strong evidence of decreases for national forests within the Southern Piedmont, including the Francis Marion and Sumter National Forests, the East Gulf Coastal Plain, and Land Between the Lakes of the Interior Low Plateaus.

The northern cardinal was detected frequently in a variety of forest types and successional stages (Appendix 6).

Table 49.—Mean number of observations per count and percent annual change in number of observations per count of northern cardinal on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.541	3383	1.5	0.7	2.3
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.046	142	15.9	10.5	21.5
Southern Blue Ridge	0.227	499	8.1	6.2	10.2
Northern Cumberland Plateau	0.247	122	5.9	1.5	10.4
Southern Cumberland Plateau/Ridge & Valley	0.332	179	6.5	3.0	10.2
Southern Piedmont	1.024	251	-6.6	-8.7	-4.4
Interior Low Plateaus	0.288	196	0.9	-2.1	4.0
Ozark-Ouachita Interior Highlands	0.279	329	9.5	6.8	12.3
West Gulf Coastal Plain	2.104	334	3.1	1.5	4.7
East Gulf Coastal Plain	0.799	1028	-2.8	-4.1	-1.6
South Atlantic Coastal Plain	0.903	303	1.3	-0.8	3.3
National Forest					
George Washington and Jefferson	0.066	224	13.2	9.9	16.7
NFs in North Carolina	0.271	169	14.4	10.6	18.2
Cherokee	0.155	148	5.7	3.0	8.5
Chattahoochee and Oconee	0.422	157	-1.7	-4.2	1.0
Francis Marion and Sumter	1.057	405	-1.6	-2.6	-0.6
Daniel Boone	0.247	122	5.9	1.5	10.4
NFs in Alabama	0.336	279	9.3	6.8	11.8
Land Between the Lakes	0.351	196	-4.9	-6.4	-3.5
Ozark and St. Francis	0.157	119	12.0	7.5	16.8
Ouachita	0.445	248	5.8	3.2	8.6
NFs in Texas	2.713	179	3.8	2.0	5.6
Kisatchie	1.459	131	2.9	0.4	5.5
NFs in Mississippi	0.890	887	0.0	-0.8	0.8
NFs in Florida	0.673	155	9.1	5.7	12.6

[a] Physiographic areas and national forests in which northern cardinal occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

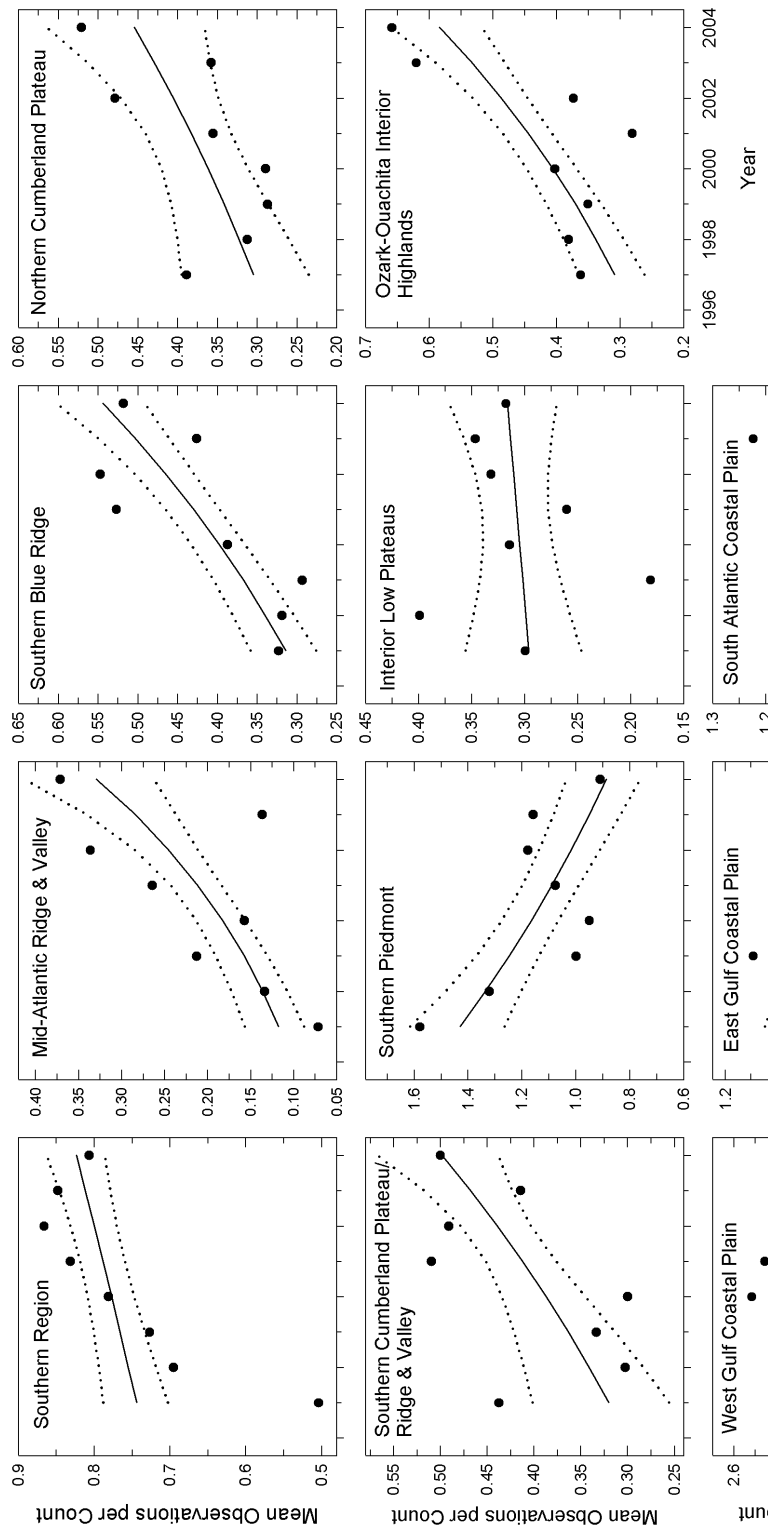
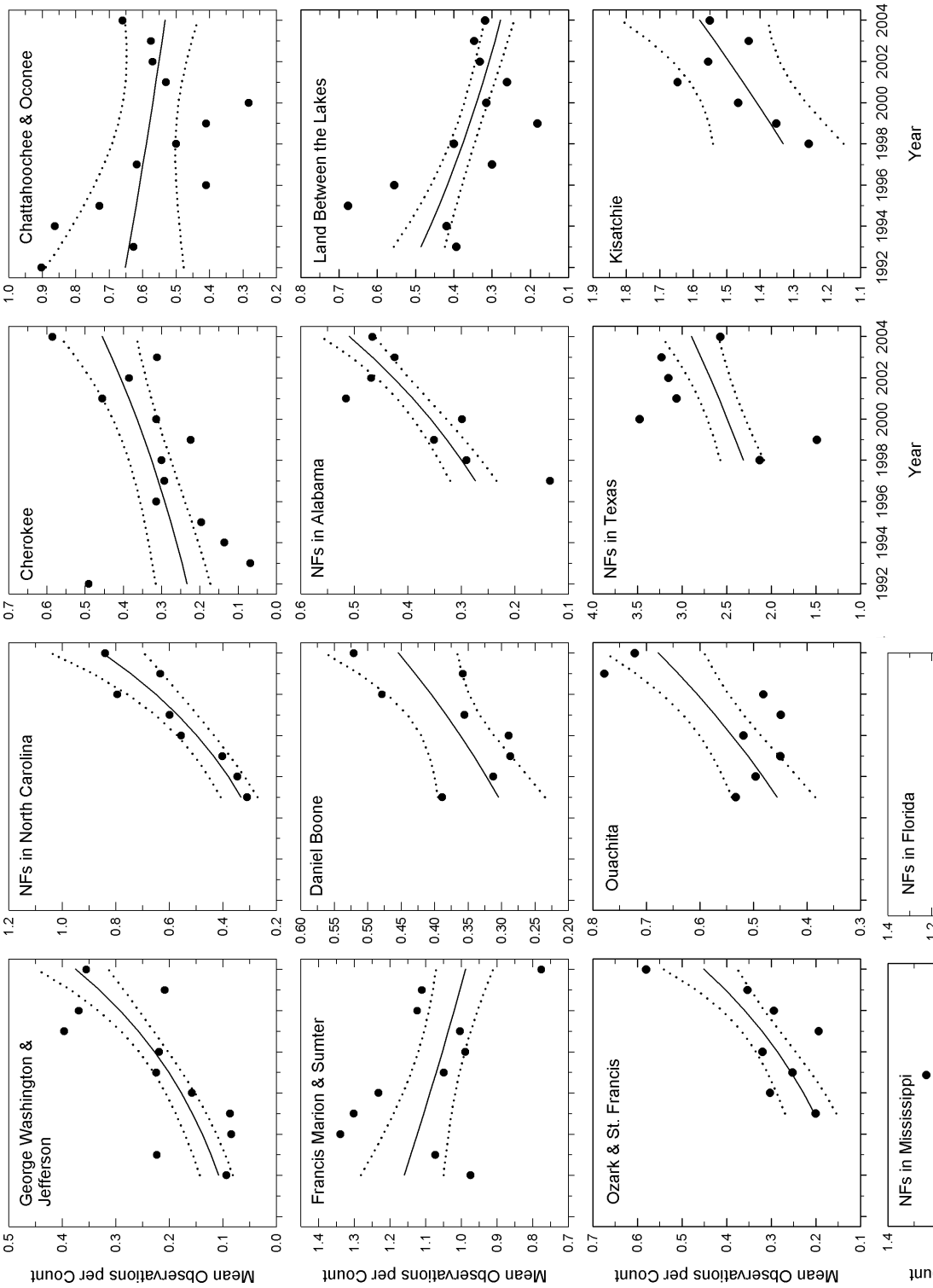


Figure 46. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the northern cardinal, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 46.—Continued



Eastern Meadowlark (*Sturnella magna*)

The eastern meadowlark is a resident species in open country from the grassy dunes of the Atlantic Coast west to the river valleys of the Great Plains, and from the grasslands of southern Canada south through the savannas of Central America and northern South America (Lanyon 1995). This species is most common in native grasslands, pastures, and savannas; it also is found in hay and alfalfa fields, reclaimed strip mines, and shrubby overgrown fields, along roadsides, and in other open areas. It prefers habitats with grass and litter cover, usually maintained by prescribed burning.

The USGS Breeding Bird Survey indicates a negative trend for this species from 1966 to 2004 (-2.9 percent; 95 percent CI: -3.3 to -2.5). The bird is of concern because of a loss of quality grassland habitats primarily due to fire suppression and land-use conversion. The eastern meadowlark is a management indicator species for National Forests in Mississippi, where it indicates management effects on early successional pine forests. It also is a management indicator on Land Between the Lakes, where it indicates management effects on grasslands.

Population trends for the eastern meadowlark were estimated in two physiographic areas and in one national forest (Table 50, Fig. 47). Trend estimates indicate stable to increasing populations on national forests across the region. However, points where this species was detected are limited, resulting in weak evidence of trends. Data on habitat association also are limited. Levels of association were highest with glade-shrub-savanna habitats (Appendix 6).

Table 50.—Mean number of observations per count and percent annual change in number of observations per count of eastern meadowlark on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.002	39	5.5	-2.2	13.8
Physiographic Area					
Southern Piedmont	0.005	7	10.9	-1.2	24.4
South Atlantic Coastal Plain	0.014	11	7.1	-3.3	18.7
National Forest					
NFs in Florida	0.030	11	7.1	-3.3	18.7

[a] Physiographic areas and national forests in which eastern meadowlark occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

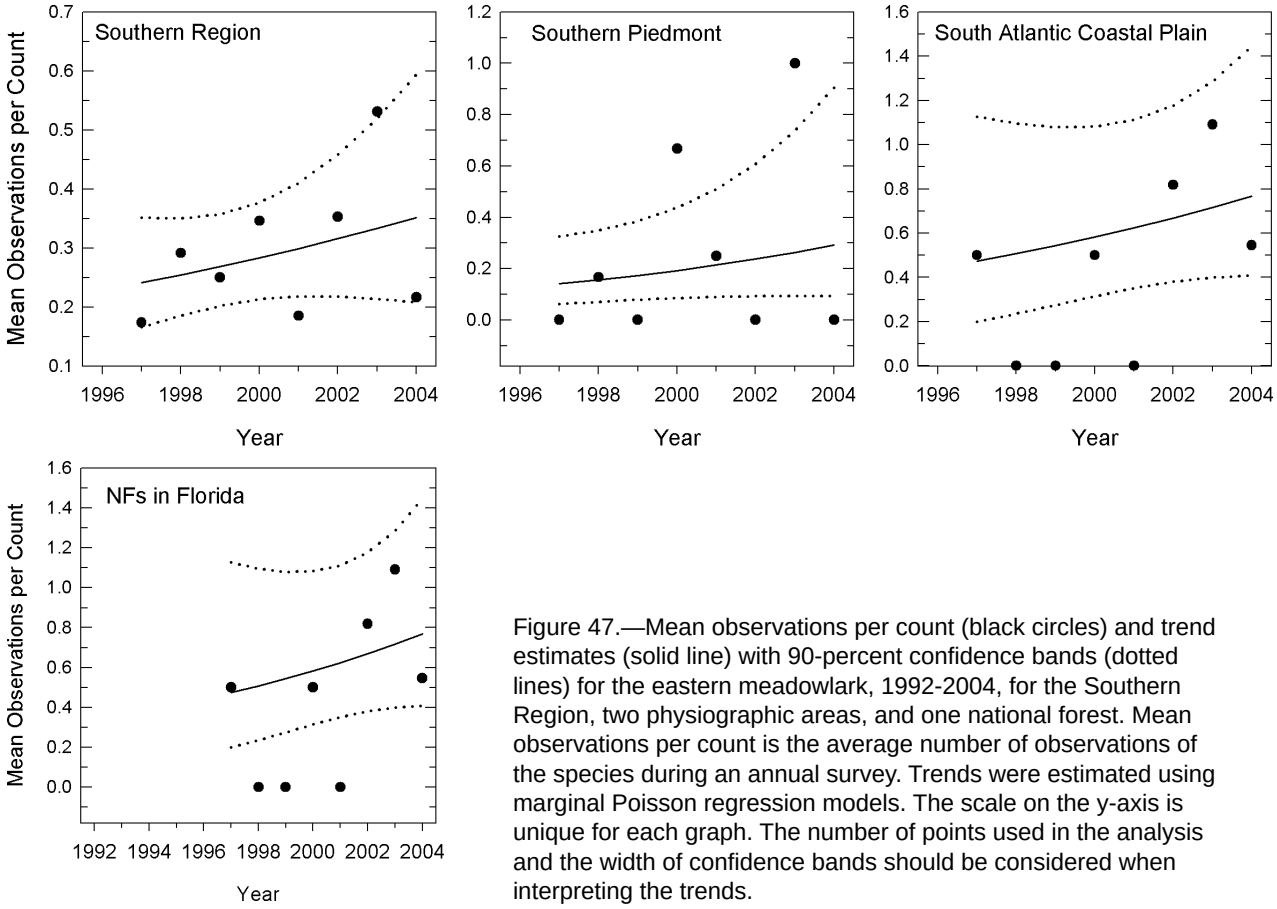


Figure 47.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the eastern meadowlark, 1992-2004, for the Southern Region, two physiographic areas, and one national forest. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Brown-headed Cowbird (*Molothrus ater*)

The brown-headed cowbird is a year-round resident throughout the South where it is a brood parasite laying its eggs in the nests of many different species (Lowther 1993). This species prefers habitats such as old fields with low or scattered trees interspersed with grassland vegetation, woodland edges, or brushy thickets. Breeding habitats (as indicated by parasitized nests) indicate that this bird prefers forest-field ecotones rather than extensive forests, fields, or prairies. Fragmentation of eastern forests has made large areas accessible to cowbird nest parasitism. There is concern that host species with small populations may be threatened by parasitism. Habitat management to reduce this species centers on maintaining high levels of forest cover and reducing the amount of forest edge across the landscape.

The USGS Breeding Bird Survey indicates a declining trend for this species from 1966 to 2004 (-1.2 percent; CI: -1.4 to -1.0). The bird is of concern because it is a brood parasite and selects many passerine birds as its hosts. The brown-headed cowbird is a management indicator species on the George Washington National Forest, where it indicates management effects on brood parasitism of forest birds.

Population trends for the brown-headed cowbird were estimated in 10 physiographic areas and in 14 national forests (Table 51, Fig. 48). Trend estimates indicate that populations have been stable on national forests across the region. There is strong evidence of increases for national forests within the Southern Cumberland Plateau/Ridge and Valley and the South Atlantic Coastal Plain. There is evidence of increases on National Forests in North Carolina, the Chattahoochee and Oconee National Forests, and National Forests in Texas and Florida. Decreases are evident in the Mid-Atlantic Ridge and Valley represented by the George Washington and Jefferson National Forests, in the Ozark-Ouachita Interior Highlands, on the Ozark and St. Francis and Ouachita National Forests, in the Interior Low Plateaus represented by Land Between the Lakes, and on the Francis Marion and Sumter National Forests.

The brown-headed cowbird was associated most frequently with early successional stages of elm-ash-cottonwood, oak-gum-cypress, and loblolly-shortleaf pine forests (Appendix 6). Across forest types, it was associated more highly with early than with late successional stages.

Table 51.—Mean number of observations per count and percent annual change in number of observations per count of brown-headed cowbird on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.081	1295	0.3	-1.5	2.1
Physiographic Area					
Mid-Atlantic Ridge & Valley	0.055	187	-15.6	-20.0	-11.0
Southern Blue Ridge	0.025	112	-5.2	-11.1	1.1
Northern Cumberland Plateau	0.116	90	3.6	-3.3	10.9
Southern Cumberland Plateau/Ridge & Valley	0.045	38	17.6	4.6	32.2
Southern Piedmont	0.133	98	6.2	-1.4	14.4
Interior Low Plateaus	0.202	180	5.6	1.0	10.4
Ozark-Ouachita Interior Highlands	0.068	120	-11.0	-15.2	-6.6
West Gulf Coastal Plain	0.125	113	0.0	-4.3	4.6
East Gulf Coastal Plain	0.091	222	-1.6	-6.1	3.2
South Atlantic Coastal Plain	0.130	135	4.9	0.3	9.6
National Forest					
George Washington and Jefferson	0.064	248	-7.9	-10.5	-5.1
NFs in North Carolina	0.058	60	10.4	3.3	18.0
Cherokee	0.013	25	0.0	-5.9	6.3
Chattahoochee and Oconee	0.065	42	9.0	3.7	14.6
Francis Marion and Sumter	0.096	128	-4.2	-7.7	-0.6
Daniel Boone	0.116	90	3.6	-3.3	10.9
NFs in Alabama	0.027	42	5.6	-4.7	17.0
Land Between the Lakes	0.278	180	-10.7	-13.2	-8.1
Ozark and St. Francis	0.066	45	-7.4	-14.0	-0.3
Ouachita	0.102	95	-8.0	-12.8	-2.9
NFs in Texas	0.125	72	8.5	2.6	14.7
Kisatchie	0.047	23	-11.0	-22.8	2.6
NFs in Mississippi	0.100	208	1.4	-1.7	4.7
NFs in Florida	0.066	38	9.8	1.5	18.8

[a] Physiographic areas and national forests in which brown-headed cowbird occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are ore reliable than estimates based on few points with confidence intervals that include zero.

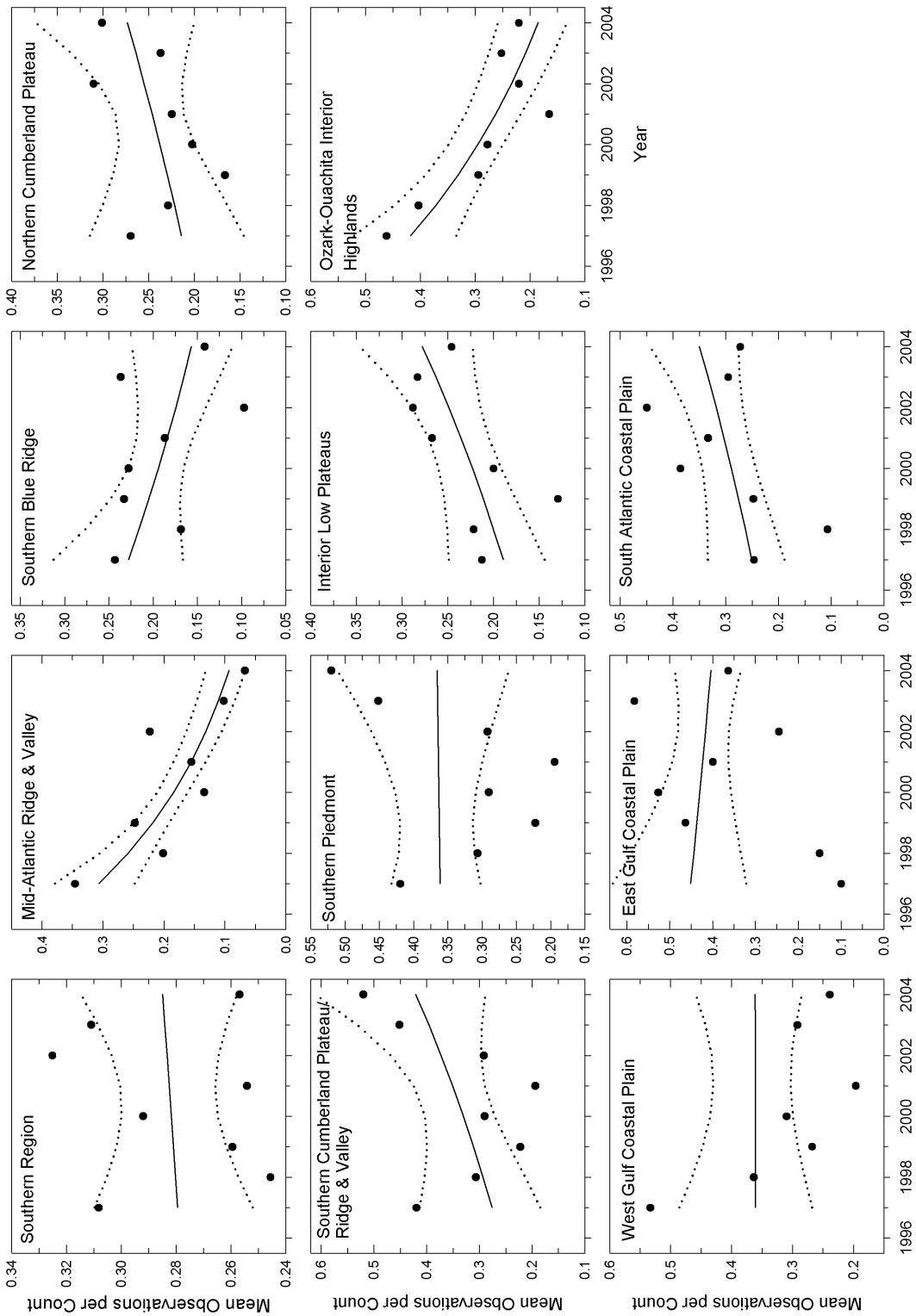
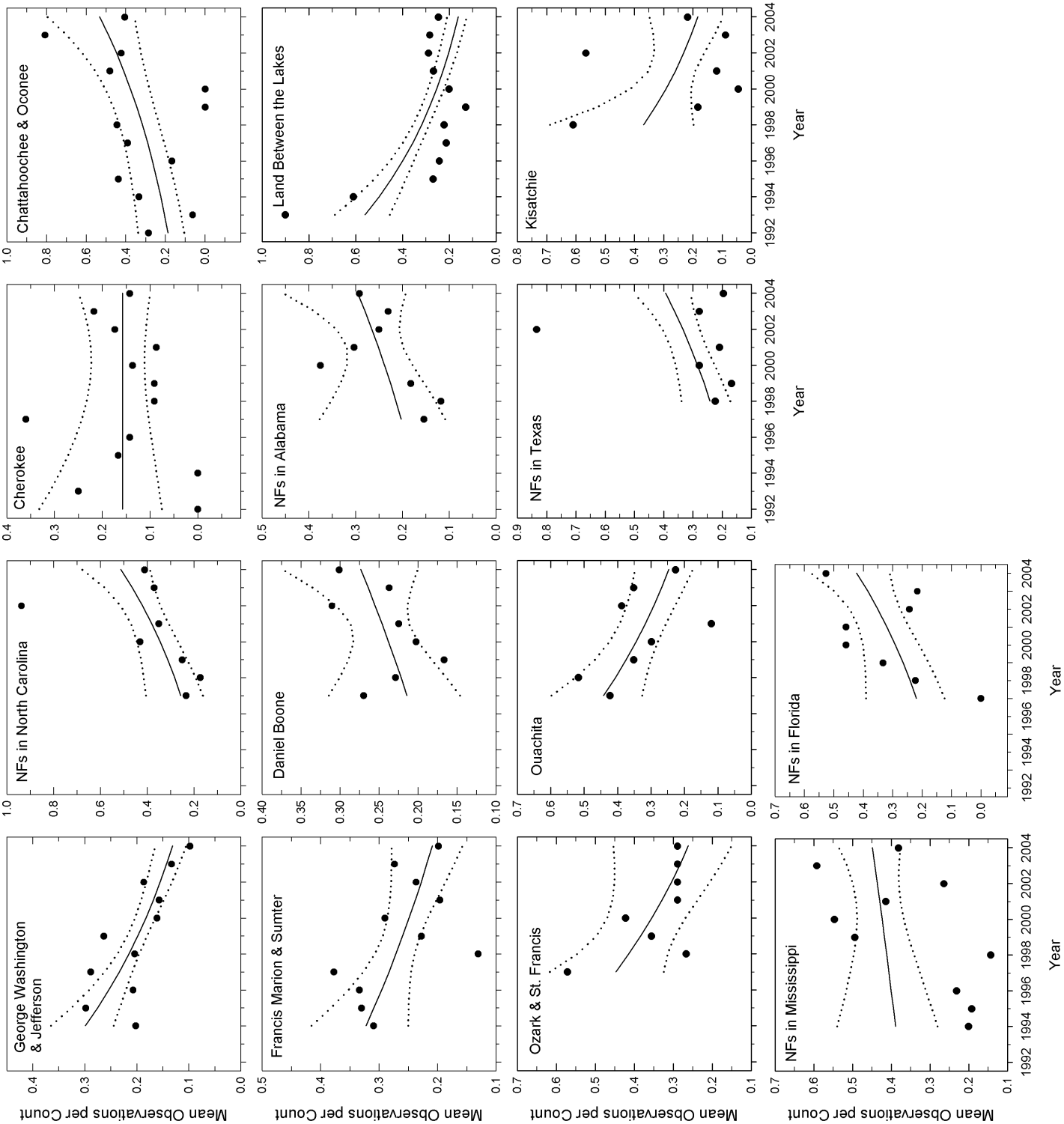


Figure 48. (continued on next page)—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the brown-headed cowbird, 1992-2004, for the Southern Region, 10 physiographic areas, and 14 national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

Figure 48.—Continued



Orchard Oriole (*Icterus spurious*)

The orchard oriole breeds throughout the Eastern United States from the Great Plains to the Atlantic and Gulf Coasts (Scharf and Kren 1996). It winters in Central and South America. This species shows a distinct preference for riparian zones, floodplains, marshes, and shorelines of large rivers and lakes. It also nests in shrublands and scattered hardwoods in open country. Forest management centers on creating and/or maintaining open riparian forests and upland woodland communities by prescribed burning or thinning activities.

The USGS Breeding Bird Survey indicates a stable to declining trend for the species from 1966 to 2004 (-0.8 percent; 95 percent CI: -1.5 to 0.0). It is a bird of conservation concern in the West Gulf Coastal Plain/Ouachitas, Mississippi Alluvial Valley and Southeastern Coastal Plain regions. The bird is of concern due to a loss and degradation of riparian forests.

Population trends for the orchard oriole were estimated in five physiographic areas and in six national forests (Table 52, Fig. 49). Trend estimates indicate that populations have been stable on national forests across the region. There is strong evidence of increases on National Forests in Mississippi and for decreases on the Land Between the Lakes National Recreation Area.

The orchard oriole was associated most frequently with early successional stages of elm-ash-cottonwood and longleaf-slash pine forests, and with glade-shrub-savanna habitats (Appendix 6). Across forest types, it was associated most frequently with early than with late successional stages.

Table 52.—Mean number of observations per count and percent annual change in number of observations per count of orchard oriole on southern national forests by region, physiographic area, and national forest, 1992-2004[a]

Location	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Southern Region	0.010	221	1.7	-2.6	6.2
Physiographic Area					
Southern Piedmont	0.011	9	12.6	-1.2	28.4
Interior Low Plateaus	0.032	69	-10.0	-16.9	-2.5
West Gulf Coastal Plain	0.028	28	20.1	5.7	36.3
East Gulf Coastal Plain	0.012	48	-8.0	-18.4	3.8
South Atlantic Coastal Plain	0.038	52	-6.9	-14.5	1.3
National Forest					
NFs in North Carolina	0.015	10	-11.9	-24.6	3.1
Francis Marion and Sumter	0.022	47	-5.4	-11.0	0.5
Land Between the Lakes	0.055	69	-14.8	-17.6	-12.0
NFs in Texas	0.027	14	65.4	51.9	80.1
Kisatchie	0.034	13	-8.6	-20.0	4.4
NFs in Mississippi	0.014	47	10.5	5.8	15.5

[a] Physiographic areas and national forests in which orchard oriole occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

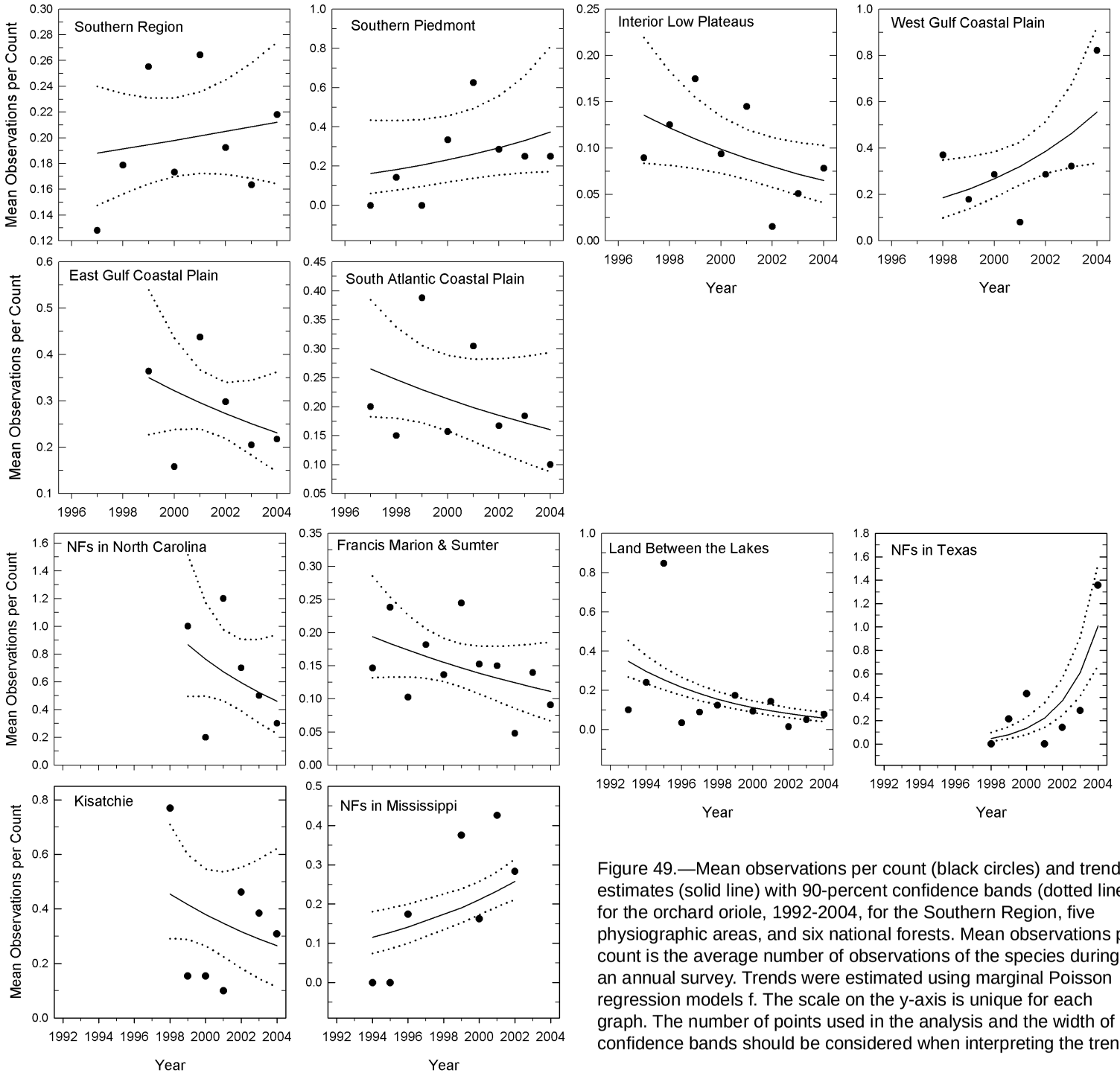


Figure 49.—Mean observations per count (black circles) and trend estimates (solid line) with 90-percent confidence bands (dotted lines) for the orchard oriole, 1992-2004, for the Southern Region, five physiographic areas, and six national forests. Mean observations per count is the average number of observations of the species during an annual survey. Trends were estimated using marginal Poisson regression models f. The scale on the y-axis is unique for each graph. The number of points used in the analysis and the width of confidence bands should be considered when interpreting the trends.

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LITERATURE CITED

Brennan, L.A. 1999. **Northern bobwhite (*Colinus virginianus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 397. Philadelphia, PA: The Birds of North America, Inc.

Brown, R.E.; Dickson, J.G. 1994. **Swainson's warbler (*Limnothlypis swainsonii*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 126. Philadelphia, PA: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Bull, E.L., Jackson, J.E. 1995. **Pileated woodpecker (*Dryocopus pileatus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 148. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Carey, M.; Burhans, D.E.; Nelson, D.A. 1994. **Field sparrow (*Spizella pusilla*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 103. Philadelphia, PA: Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Confer, J.L. 1992. **Golden-winged warbler (*Vermivora chrysoptera*)**. In: Poole, A.; Stettenheim, P.; Gill, F., eds. The birds of North America. No. 20. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Dunning, J.B. 2006. **Bachman's sparrow. (*Aimophila aestivalis*)**. In: Poole A., ed. The birds of North America online. Ithaca, NY: Cornell Laboratory of Ornithology. http://bna.birds.cornell.edu/BNA/account/Bachmans_Sparrow/. Accessed 19 March 2007.

Eaton, S.W. 1992. **Wild turkey (*Meleagris gallopavo*)**. In: Poole, A.; Stettenheim, P.; Gill, F., eds. The birds of North America. No. 22. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Eckerle, K.P.; Thompson, C.F. 2001. **Yellow-breasted chat (*Icteria virens*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 575. Philadelphia, PA: The Birds of North America.

Evans Ogden, L.J.; Stutchbury, B.J. 1994. **Hooded warbler (*Wilsonia citrina*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 110. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Faanes, C.A.; Bystrak, D. 1981. **The role of observer bias in the North American breeding bird survey**. Studies in Avian Biology. 6: 353-359.

Fitzmaurice, G.M.; Laird, N.M.; Ware, J.H. 2004. **Applied longitudinal analysis**. Hoboken, NJ: Wiley.

Gaines, D.; Morris, E. 1996. **The Southern National Forest's migratory and resident landbird conservation strategy**. Atlanta, GA: U.S. Department of Agriculture, Forest Service, Southern Region.

Gill, F.B.; Canterbury, R.A.; Confer, J.L. 2001. **Blue-winged warbler (*Vermivora pinus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 584. Philadelphia, PA: The Birds of North America, Inc.

Gowaty, P. A.; Plissner, J. H. 1998. **Eastern bluebird (*Sialia sialis*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 381. Philadelphia, PA: The Birds of North America, Inc.

Greenlaw, J.S. 1996. **Eastern towhee (*Pipilo erythrophthalmus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 262. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Halkin, S.L.; Linville, S.U. 1999. **Northern cardinal (*Cardinalis cardinalis*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 440. Philadelphia, PA: The Birds of North America, Inc.

Hall, G.A. 1996. **Yellow-throated warbler (*Dendroica dominica*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 223. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Hamel, P.B. 1992. **The land manager's guide to the birds of the South**. Chapel Hill, NC: The Nature Conservancy, Southeastern Region.

Hamel, P.B. 2000. **Cerulean warbler (*Dendroica cerulea*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 511. Philadelphia, PA: The Birds of North America, Inc.

Hanners, L.A.; Patton, S.R. 1998. **Worm-eating warbler (*Helmitheros vermivorus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 367. Philadelphia, PA: The Birds of North America, Inc.

Holmes, R.T.; Rodenhouse, N.L.; Sillett, T.S. 2005. **Black-throated blue warbler (*Dendroica caerulescens*)**. In: Poole, A., ed. The birds of North America online. Ithaca, NY: Cornell Laboratory of Ornithology. http://bna.birds.cornell.edu/BNA/account/Black-throated_Blue_Warbler/. Accessed 19 March 2007.

Hopp, S.L.; Kirby A.; Boone, C.A. 1995. **White-eyed vireo (*Vireo griseus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 168. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Hughes, J.M. 1999. **Yellow-billed cuckoo (*Coccyzus americanus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 418. Philadelphia, PA: The Birds of North America, Inc.

Hughes, J.M. 2001. **Black-billed cuckoo (*Coccyzus erythropthalmus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 587. Philadelphia, PA: The Birds of North America, Inc.

Jackson, J.A; Ouellet, H.R. 2002. **Downy woodpecker (*Picoides pubescens*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 613. Philadelphia, PA: The Birds of North America, Inc.

Kendall, W.L.; Peterjohn, B.G.; Sauer, J.R. 1996. **First-time observer effects in the North American breeding bird survey**. The Auk. 113: 823-829.

Lanyon, W.E. 1995. **Eastern meadowlark (*Sturnella magna*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 160. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Lanyon, W.E. 1997. **Great crested flycatcher (*Myiarchus crinitus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 300. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Link, W.A.; Sauer, J.R. 1998. **Estimating population change from count data: application to the North American breeding bird survey**. Ecological Applications. 8: 258-268.

Lowther, P.E. 1993. **Brown-headed cowbird (*Molothrus ater*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 47. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Lowther, P.E.; Celada, C.; Klein, N.K.; Rimmer, C.C.; Spector, D.A. 1999. **Yellow warbler (*Dendroica petechia*)**. In: Poole, A., ed. The birds of North America online. Ithaca, NY: Cornell Laboratory of Ornithology. http://bna.birds.cornell.edu/BNA/account/Yellow_Warbler/. Accessed 19 March 2007.

McCarty, J.P. 1996. **Eastern wood-pewee (*Contopus virens*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 245. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

McDonald, M.V. 1998. **Kentucky warbler (*Oporornis formosus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 324. Philadelphia, PA: The Birds of North America, Inc.

Middleton, A.L. 1998. **Chipping sparrow (*Spizella passerina*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 334. Philadelphia, PA: The Birds of North America, Inc.

Moldenhauer, R.R.; Regelski, D.J. 1996. **Northern parula (*Parula americana*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 215. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Moore, W.S. 1995. **Northern flicker (*Colaptes auratus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 166. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Morse, D.H.; Poole, A.F. 2005. **Black-throated green warbler (*Dendroica virens*)**. In: Poole, A., ed. The birds of North America Online. Ithaca, NY: Cornell Laboratory of Ornithology. http://bna.birds.cornell.edu/BNA/account/Black-throated_Green_Warbler/. Accessed 19 March 2007.

Mowbray, T.B. 1999. **Scarlet tanager (*Piranga olivacea*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 479. Philadelphia, PA: The Birds of North America, Inc.

Nolan, V., Jr.; Ketterson, E.D.; Buerkle, C.A. 1999. **Prairie warbler (*Dendroica discolor*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 455. Philadelphia, PA: The Birds of North America, Inc.

Petit, L.J. 1999. **Prothonotary warbler (*Protonotaria citrea*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 408. Philadelphia, PA: The Birds of North America, Inc.

Pravosudov, V.V.; Grubb, T.C., Jr. 1993. **White-breasted nuthatch (*Sitta carolinensis*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 54. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

R Development Core Team. 2006. **A language and environment for statistical computing**. Vienna, Austria: R Foundation for Statistical Computing. R Development Core Team. [online]. http://www.R-project.org. Accessed 19 March 2007.

Richardson, M.; Brauning, D.W. 1995. **Chestnut-sided warbler (*Dendroica pensylvanica*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 190. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Robinson, W.D. 1995. **Louisiana waterthrush (*Seiurus motacilla*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 151. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Robinson, W.D. 1996. **Summer tanager (*Piranga rubra*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 248. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Rodewald, P.G.; James, R.D. 1996. **Yellow-throated vireo (*Vireo flavifrons*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 247. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Rodewald, P.G.; Withgott, J.H.; Smith, K.G. 1999. **Pine warbler (*Dendroica pinus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 438. Philadelphia, PA: The Birds of North America, Inc.

Roth, R.R.; Johnson, M.S.; Underwood, T.J. 1996. **Wood thrush (*Hylocichla mustelina*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 246. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Rusch, D.H.; DeStefano, S.; Reynolds, M.C.; Lauten, D. 2000. **Ruffed grouse (*Bonasa umbellus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 515. Philadelphia, PA: The Birds of North America, Inc.

Sauer, J.R.; Hines, J.E.; Fallon, J. 2005. **The North American Breeding Bird Survey, results and analysis 1966-2004**. Version 2005.2. Laurel, MD: U.S. Geological Survey, Patuxent Wildlife Research Center.

Sauer, J.R.; Peterjohn, B.G.; Link, W.A. 1994. **Observer differences in the North American breeding bird survey**. The Auk. 111: 50-62.

Scharf, W.C.; Kren, J. 1996. **Orchard oriole (*Icterus spurius*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 255. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Smith, K.G., Withgott, J.H.; Rodewald, P.G. 2000. **Red-headed woodpecker (*Melanerpes erythrocephalus*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 518. Philadelphia, PA: The Birds of North America, Inc.

Smith, S.M. 1993. **Black-capped chickadee (*Poecile atricapilla*)**. In: Poole, A.; Stettenheim, P.; Gill, F., eds. The birds of North America. No. 39. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

U.S. Department of Agriculture, Forest Inventory and Analysis Data Center. 2006. USDA Forest Inventory and Analysis Data Center. [online]. **Forest inventory mapmaker version 2.1**. http://ncrs2.fs.fed.us/4801/fiadb/fim21/fim21.asp. Accessed 2 June 2006.

U.S. Department of the Interior, Fish and Wildlife Service 2002. **Birds of conservation concern 2002**. Arlington, VA: U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management.

Van Horn, M.A.; Donovan, T. 1994**. Ovenbird (*Seiurus aurocapilla*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 88. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union.

Whitehead, D.R.; Taylor, T. 2002. **Acadian flycatcher (*Empidonax virescens*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 614. Philadelphia, PA: The Birds of North America, Inc.

Withgott, J.H.; Smith, K.G. 1998. **Brown-headed nuthatch (*Sitta pusilla*)**. In: Poole, A.; Gill, F., eds. The birds of North America. No. 349. Philadelphia, PA: The Birds of North America, Inc.

APPENDIX 1

Common and Scientific Names of 210 Avian Species Recorded on Point Counts on 14 National Forests, Southern Region, 1992-2004

Common name	Scientific name
Black-bellied whistling-duck	*Dendrocygna autumnalis*
Canada goose	*Branta canadensis*
Wood duck	*Aix sponsa*
Mallard	*Anas platyrhynchos*
Blue-winged teal	*Anas discors*
Hooded merganser	*Lophodytes cucullatus*
Ruffed grouse	*Bonasa umbellus*
Wild turkey	*Meleagris gallopavo*
Northern bobwhite	*Colinus virginianus*
Pied-billed grebe	*Podilymbus podiceps*
Northern gannet	*Morus bassanus*
Double-crested cormorant	*Phalacrocorax auritus*
Anhinga	*Anhinga anhinga*
American bittern	*Botaurus lentiginosus*
Least bittern	*Ixobrychus exilis*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Little blue heron	*Egretta caerulea*
Tricolored heron	*Egretta tricolor*
Reddish egret	*Egretta rufescens*
Cattle egret	*Bubulcus ibis*
Green heron	*Butorides virescens*
Black-crowned night-heron	*Nycticorax nycticorax*
Yellow-crowned night-heron	*Nyctanassa violacea*
White ibis	*Eudocimus albus*
Glossy ibis	*Plegadis falcinellus*
Wood stork	*Mycteria americana*
Black vulture	*Coragyps atratus*
Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Swallow-tailed kite	*Elanoides forficatus*
White-tailed kite	*Elanus leucurus*
Mississippi kite	*Ictinia mississippiensis*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Red-shouldered hawk	*Buteo lineatus*
Broad-winged hawk	*Buteo platypterus*
Red-tailed hawk	*Buteo jamaicensis*
Golden eagle	*Aquila chrysaetos*
American kestrel	*Falco sparverius*
Peregrine falcon	*Falco peregrinus*
Common moorhen	*Gallinula chloropus*
American coot	*Fulica americana*
Sandhill crane	*Grus canadensis*
Killdeer	*Charadrius vociferus*
Black-necked stilt	*Himantopus mexicanus*
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Spotted sandpiper	*Actitis macularius*
Upland sandpiper	*Bartramia longicauda*
Common snipe	*Gallinago gallinago*
American woodcock	*Scolopax minor*
Laughing gull	*Larus atricilla*
Least tern	*Sterna antillarum*
Rock pigeon	*Columba livia*
Eurasian collared-dove	*Streptopelia decaocto*
Mourning dove	*Zenaida macroura*
Common ground-dove	*Columbina passerina*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Yellow-billed cuckoo	*Coccyzus americanus*
Greater roadrunner	*Geococcyx californianus*
Barn owl	*Tyto alba*
Eastern screech-owl	*Megascops asio*
Great horned owl	*Bubo virginianus*
Barred owl	*Strix varia*
Common nighthawk	*Chordeiles minor*
Chuck-will's-widow	*Caprimulgus carolinensis*
Whip-poor-will	*Caprimulgus vociferus*
Chimney swift	*Chaetura pelagica*
Ruby-throated hummingbird	*Archilochus colubris*
Belted kingfisher	*Ceryle alcyon*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Red-bellied woodpecker	*Melanerpes carolinus*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Red-cockaded woodpecker	*Picoides borealis*
Northern flicker	*Colaptes auratus*
Pileated woodpecker	*Dryocopus pileatus*
Olive-sided flycatcher	*Contopus cooperi*
Eastern wood-pewee	*Contopus virens*
Acadian flycatcher	*Empidonax virescens*
Alder flycatcher	*Empidonax alnorum*
Willow flycatcher	*Empidonax traillii*
Least flycatcher	*Empidonax minimus*
Eastern phoebe	*Sayornis phoebe*
Great crested flycatcher	*Myiarchus crinitus*
Brown-crested flycatcher	*Myiarchus tyrannulus*
Eastern kingbird	*Tyrannus tyrannus*
Scissor-tailed flycatcher	*Tyrannus forficatus*
Loggerhead shrike	*Lanius ludovicianus*
White-eyed vireo	*Vireo griseus*
Bell's vireo	*Vireo bellii*

Continued

Appendix 1—continued

Common name	Scientific name
Yellow-throated vireo	*Vireo flavifrons*
Blue-headed vireo	*Vireo solitarius*
Warbling vireo	*Vireo gilvus*
Philadelphia vireo	*Vireo philadelphicus*
Red-eyed vireo	*Vireo olivaceus*
Blue jay	*Cyanocitta cristata*
Florida scrub-jay	*Aphelocoma coerulescens*
American crow	*Corvus brachyrhynchos*
Fish crow	*Corvus ossifragus*
Common raven	*Corvus corax*
Purple martin	*Progne subis*
Tree swallow	*Tachycineta bicolor*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Bank swallow	*Riparia riparia*
Cliff swallow	*Petrochelidon pyrrhonota*
Barn swallow	*Hirundo rustica*
Carolina chickadee	*Poecile carolinensis*
Black-capped chickadee	*Poecile atricapillus*
Tufted titmouse	*Baeolophus bicolor*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Brown-headed nuthatch	*Sitta pusilla*
Brown creeper	*Certhia americana*
Carolina wren	*Thryothorus ludovicianus*
Bewick's wren	*Thryomanes bewickii*
House wren	*Troglodytes aedon*
Winter wren	*Troglodytes troglodytes*
Sedge wren	*Cistothorus platensis*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*
Blue-gray gnatcatcher	*Polioptila caerulea*
Eastern bluebird	*Sialia sialis*
Veery	*Catharus fuscescens*
Gray-cheeked thrush	*Catharus minimus*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
Wood thrush	*Hylocichla mustelina*
American robin	*Turdus migratorius*
Gray catbird	*Dumetella carolinensis*
Northern mockingbird	*Mimus polyglottos*
Brown thrasher	*Toxostoma rufum*
European starling	*Sturnus vulgaris*
Cedar waxwing	*Bombycilla cedrorum*
Blue-winged warbler	*Vermivora pinus*
Golden-winged warbler	*Vermivora chrysoptera*
Tennessee warbler	*Vermivora peregrina*
Nashville warbler	*Vermivora ruficapilla*
Northern parula	*Parula americana*
Yellow warbler	*Dendroica petechia*
Chestnut-sided warbler	*Dendroica pensylvanica*
Magnolia warbler	*Dendroica magnolia*
Black-throated blue warbler	*Dendroica caerulescens*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated green warbler	*Dendroica virens*
Blackburnian warbler	*Dendroica fusca*
Yellow-throated warbler	*Dendroica dominica*
Pine warbler	*Dendroica pinus*
Prairie warbler	*Dendroica discolor*
Palm warbler	*Dendroica palmarum*
Bay-breasted warbler	*Dendroica castanea*
Cerulean warbler	*Dendroica cerulea*
Black-and-white warbler	*Mniotilta varia*
American redstart	*Setophaga ruticilla*
Prothonotary warbler	*Protonotaria citrea*
Worm-eating warbler	*Helmitheros vermivorum*
Swainson's warbler	*Limnothlypis swainsonii*
Ovenbird	*Seiurus aurocapilla*
Northern waterthrush	*Seiurus noveboracensis*
Louisiana waterthrush	*Seiurus motacilla*
Kentucky warbler	*Oporornis formosus*
Mourning warbler	*Oporornis philadelphia*
Common yellowthroat	*Geothlypis trichas*
Hooded warbler	*Wilsonia citrina*
Wilson's warbler	*Wilsonia pusilla*
Canada warbler	*Wilsonia canadensis*
Yellow-breasted chat	*Icteria virens*
Summer tanager	*Piranga rubra*
Scarlet tanager	*Piranga olivacea*
Eastern towhee	*Pipilo erythrophthalmus*
Bachman's sparrow	*Aimophila aestivalis*
Chipping sparrow	*Spizella passerina*
Field sparrow	*Spizella pusilla*
Vesper sparrow	*Pooecetes gramineus*
Lark sparrow	*Chondestes grammacus*
Savannah sparrow	*Passerculus sandwichensis*
Grasshopper sparrow	*Ammodramus savannarum*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
Swamp sparrow	*Melospiza georgiana*
White-throated sparrow	*Zonotrichia albicollis*
White-crowned sparrow	*Zonotrichia leucophrys*
Dark-eyed junco	*Junco hyemalis*
Northern cardinal	*Cardinalis cardinalis*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Blue grosbeak	*Passerina caerulea*
Indigo bunting	*Passerina cyanea*
Painted bunting	*Passerina ciris*
Dickcissel	*Spiza americana*
Red-winged blackbird	*Agelaius phoeniceus*
Eastern meadowlark	*Sturnella magna*
Western meadowlark	*Sturnella neglecta*
Common grackle	*Quiscalus quiscula*

Continued

Appendix 1—continued

Common name	Scientific name
Boat-tailed grackle	*Quiscalus major*
Great-tailed grackle	*Quiscalus mexicanus*
Bronzed cowbird	*Molothrus aeneus*
Brown-headed cowbird	*Molothrus ater*
Orchard oriole	*Icterus spurius*
Baltimore oriole	*Icterus galbula*
Purple finch	*Carpodacus purpureus*
House finch	*Carpodacus mexicanus*
Red crossbill	*Loxia curvirostra*
Pine siskin	*Carduelis pinus*
American goldfinch	*Carduelis tristis*
House sparrow	*Passer domesticus*

APPENDIX 2

Number of Occurrences for 210 Avian Species by National Forest[a], Southern Region, 1992-2004

Species	GWJ	NC	CHE	CHA	FMS	DB	AL	LBL	OSF	OUA	TX	KIS	MS	FL	Total
Black-bellied whistling-duck										1					1
Canada goose	13	16	9	10	67	8		5	2	3					133
Wood duck		2	2	5	23	4	2	9	1	7	23	14	11	4	107
Mallard	3		5	2	2	5		1		3		1			22
Blue-winged teal										1					1
Hooded merganser													1		1
Ruffed grouse	181	26	47	6		6									266
Wild turkey	159	40	32	25	76	43	51	62	21	72	12	17	67	37	714
Northern bobwhite	17	76	19	52	509	21	154	96	56	208	56	81	417	161	1923
Pied-billed grebe						3				8					11
Northern gannet					1										1
Double-crested cormorant		1		1	1									7	10
Anhinga					4							1			5
American bittern					1					1		1			3
Least bittern					2										2
Great blue heron	5	1	3	14	48	5	8	96	5	27	20	7	37	5	281
Great egret				2	19					13	3	9	32	6	84
Snowy egret				1	4					5		1	3		14
Little blue heron				1	13					8	2	2	15		41
Tricolored heron													1		1
Reddish egret					1										1
Cattle egret				2	2		1			3	7	3	6	2	26
Green heron		4	3	3	3	4		7	1	13		4	1		43
Black-crowned night-heron													1		1
Yellow-crowned night-heron							1			4	3	11			19
White ibis				1	6					4	1			1	13
Glossy ibis				1											1
Wood stork				1	9								1		11
Black vulture	9		1	4	22		17	1	5	12	11	3	20	1	106
Turkey vulture	48	13	16	32	69	36	51	7	47	38	84	31	68	16	556
Osprey	1		2	2	2	1		1	1					3	13
Swallow-tailed kite					4									1	5
White-tailed kite													1		1
Mississippi kite					3				3		3		21	1	31
Bald eagle					1			2			1		1		5
Northern harrier													2		2
Sharp-shinned hawk	6	2	6	5	1	1	1			5	10	1	2	1	41
Cooper's hawk	3	1	5	9	4	3	1	6	2	6		2	13	3	58
Red-shouldered hawk	27	7	25	28	106	35	52	66	39	57	52	59	227	40	820
Broad-winged hawk	30	15	32	33	20	7	17	3	41	49	30	12	64		353
Red-tailed hawk	32	12	9	49	75	15	37	25	18	15	27	29	40	6	389

Continued

Appendix 2—continued

Species	GWJ	NC	CHE	CHA	FMS	DB	AL	LBL	OSF	OUA	TX	KIS	MS	FL	Total
Golden eagle				1											1
American kestrel	1				1		2		2		28	14	3	40	91
Peregrine falcon		2	1												3
Common moorhen														2	2
American coot	34	3	3		10	1		7	2				1		61
Sandhill crane														22	22
Killdeer	1			3	6	1		1		3					15
Black-necked stilt										1					1
Greater yellowlegs										1					1
Lesser yellowlegs										1					1
Spotted sandpiper										1					1
Upland sandpiper			1												1
Common snipe					1										1
American woodcock	1					1	2	1		1					6
Laughing gull					57										57
Least tern										3					3
Rock pigeon	1														1
Eurasian collared-dove														1	1
Mourning dove	810	316	212	272	938	204	321	199	170	246	428	164	520	404	5204
Common ground-dove							7							2	9
Black-billed cuckoo	103	4	8	3		4		1		1					124
Yellow-billed cuckoo	1078	136	324	264	987	420	524	1162	580	962	411	300	1847	57	9052
Greater roadrunner										10		2			12
Barn owl				2								4	6		12
Eastern screech-owl	7	3	4	2	5	3	1		3		2	2	6	4	42
Great horned owl	4	3	5	3	8	1	4	1	2	2	1	1	4	5	44
Barred owl	43	19	19	11	47	4	10	28	19	28	48	6	156	4	442
Common nighthawk		4	1		5	1	2				2	4	2	60	81
Chuck-will's-widow		3			8	1	5	1	1	23	4	19	6	11	82
Whip-poor-will	45	8	15		12	2	7	6	8	4			3		110
Chimney swift	45	72	92	62	112	15	88	40	38	38	42	30	140	9	823
Ruby-throated hummingbird	129	77	75	47	112	69	33	91	59	70	21	12	318	1	1114
Belted kingfisher	8	2	11	15	15	7	12	12	3	7	4	2	9	1	108
Red-headed woodpecker	6	27	2	47	403	23	159	20	14	41	118	60	529	244	1693
Red-bellied woodpecker	242	190	65	232	1221	281	413	619	214	177	528	261	2091	614	7148
Yellow-bellied sapsucker		3	6	3	5				10	1					28
Downy woodpecker	487	112	196	180	284	165	124	333	305	269	130	72	562	155	3374
Hairy woodpecker	346	96	97	74	145	78	72	54	78	125	48	18	129	12	1372
Red-cockaded woodpecker		9		2	77		19			6	48	36	69	65	331
Northern flicker	331	103	160	88	433	85	116	29	71	59	38	30	248	125	1916
Pileated woodpecker	1859	546	743	625	1208	464	357	439	670	913	447	218	1131	177	9797
Olive-sided flycatcher									1		3				4
Eastern wood-pewee	1438	171	119	95	363	245	111	1014	485	219	164	114	952	24	5514

Continued

Appendix 2—continued

Species	GWJ	NC	CHE	CHA	FMS	DB	AL	LBL	OSF	OUA	TX	KIS	MS	FL	Total
Acadian flycatcher	1068	340	200	236	595	340	245	808	395	240	343	152	1610	21	6593
Alder flycatcher	9	5	1		3										18
Willow flycatcher	3	14		2				1		2	1				23
Least flycatcher	16	29	5		1	1	3			1					56
Eastern phoebe	80	18	47	42	55	86	27	48	48	61		1	46		559
Great crested flycatcher	1129	222	107	242	1239	76	393	391	83	344	198	151	1305	774	6654
Brown-crested flycatcher													1		1
Eastern kingbird	2	18	1	12	63	13	18	25		6	26	29	30	13	256
Scissor-tailed flycatcher										3	2				5
Loggerhead shrike				1	1									1	3
White-eyed vireo	12	155	74	111	706	226	222	729	263	385	501	238	1431	373	5426
Bell's vireo										6		3			10
Yellow-throated vireo	17	83	12	35	183	105	103	195	52	141	123	178	347	131	1705
Blue-headed vireo	773	565	383	107	193	58	38						6		2123
Warbling vireo	1		1			1		5		2		1	2		13
Philadelphia vireo											1				1
Red-eyed vireo	4682	1493	2086	1168	1703	1195	1242	1247	1493	2012	778	361	2658	50	22168
Blue jay	1142	407	488	363	985	241	425	461	349	517	738	322	1942	364	8744
Florida scrub-jay														46	46
American crow	2265	840	1169	912	1967	794	626	1116	887	1542	870	545	1828	339	15700
Fish crow	4	31		1	117		2	2	6	54		59	86	18	380
Common raven	616	57	22	3	4										702
Purple martin	2	15	1	11	57		13	25	5	28	69	35	7	7	275
Tree swallow		6	3		4	9		1		2			3	13	41
Northern rough-winged swallow	4	2	5	6		4	1			4			1		27
Bank swallow		1		6		1					1				9
Cliff swallow										2					2
Barn swallow	3	4	2	4	11	7		28		12	6	5	22	9	113
Carolina chickadee	267	389	625	350	615	267	332	317	487	731	438	146	1034	80	6078
Black-capped chickadee	508	15	15												538
Tufted titmouse	2091	866	747	572	1567	596	583	1024	734	1124	742	396	2608	462	14112
Red-breasted nuthatch	61	92	37		15							1			206
White-breasted nuthatch	968	281	181	161	94	354	252	503	291	196	9	17	149		3456
Brown-headed nuthatch		46	2	14	249		76		2	11	149	67	137	76	829
Brown creeper	12	77	6		1		3								99
Carolina wren	242	544	336	391	1452	325	412	687	402	677	1062	475	2499	438	9942
Bewick's wren								2		1					3
House wren	7	24		1						1				7	40
Winter wren	39	225	126	5											395
Sedge wren														3	3
Golden-crowned kinglet	23	235	28			2									289
Ruby-crowned kinglet	3	18			4					1	1			8	35
Blue-gray gnatcatcher	436	211	150	178	766	230	210	820	532	542	142	73	737	269	5296

Continued

Appendix 2—continued

Species	GWJ	NC	CHE	CHA	FMS	DB	AL	LBL	OSF	OUA	TX	KIS	MS	FL	Total
Eastern bluebird	32	23	5	31	169	15	46	45	21	21	2	20	45	33	508
Veery	512	449	414	8			1			2	1		10		1397
Gray-cheeked thrush											1				1
Swainson's thrush	3		4		25					21	11				64
Hermit thrush	16	17	3	2	6				1						45
Wood thrush	1676	371	498	266	446	426	222	453	225	91	100	67	1307	2	6150
American robin	337	291	184	23	17	49	19	31	3	1		6	24		985
Gray catbird	232	304	112	43	106	18	47	26	12	12	5	15	76	71	1079
Northern mockingbird	9	8		14	48	2	30		4	9	12	7	33	25	201
Brown thrasher	29	54	25	39	183	12	59	90	3	19	7	7	130	254	911
European starling	2	5	1	1	4	4							1		18
Cedar waxwing	200	49	117	2	4	6	1		2	8	2	3	2	11	407
Blue-winged warbler		121		85	34	29	34	32	60	1		4	7		409
Golden-winged warbler	3	40	15	2	1										61
Tennessee warbler			2							17	6		2		27
Nashville warbler										5					5
Northern parula	356	369	177	100	618	131	147	386	249	157	118	42	395	154	3399
Yellow warbler	13	24	24	28	14	37	32	10	43	7			3	1	236
Chestnut-sided warbler	631	838	326	114	1	4	1		1	2	4	1			1923
Magnolia warbler	60	1	3								6				70
Black-throated blue warbler	285	442	409	133	34	1			1					3	1308
Yellow-rumped warbler	13	1	1		3				1	5				1	25
Black-throated green warbler	408	466	941	306	224	259	165		36	23	2		1		2831
Blackburnian warbler	94	129	59	14	2				1	8	1				308
Yellow-throated warbler	13	150	137	50	199	199	55	53	35	16	13	24	86	21	1051
Pine warbler	657	281	279	285	1206	205	749	106	492	1316	1009	373	2153	585	9696
Prairie warbler	112	238	110	265	564	168	574	262	110	388	44	71	425	18	3349
Palm warbler	1	1	1		3				1	1			1	14	23
Bay-breasted warbler											2				2
Cerulean warbler	108	2				118	10	1	39	1	1	1		1	282
Black-and-white warbler	1084	370	603	190	206	372	132	52	569	666	41	27	412		4724
American redstart	506	48	49	7	34	44	11	2	2	11	15	48	210	1	988
Prothonotary warbler		71		11	236	4	3	77	11	11	9	8	374	19	834
Worm-eating warbler	1593	175	427	135	184	445	127	369	213	173	16	51	445	1	4354
Swainson's warbler	81	34	26	1	62	19	1	2		3	26	9	60	3	327
Ovenbird	3907	1007	1252	637	447	929	305	97	918	288	2	4	51	3	9847
Northern waterthrush	1									2		1	6		12
Louisiana waterthrush	263	13	81	51	44	39	36	42	61	78	58	21	60		847
Kentucky warbler	72	49	15	67	144	172	131	206	271	359	121	148	618		2373
Mourning warbler	2									1	1				4
Common yellowthroat	55	342	15	24	773	83	100	283	27	159	71	36	627	208	2803
Hooded warbler	1236	621	1135	480	865	774	362	35	480	234	549	317	1871	24	8983

Continued

Appendix 2—continued

Species	GWJ	NC	CHE	CHA	FMS	DB	AL	LBL	OSF	OUA	TX	KIS	MS	FL	Total
Wilson's warbler	2				1										3
Canada warbler	170	195	157	11	1					1	3			1	539
Yellow-breasted chat	97	196	182	321	917	316	680	504	257	519	394	400	1762	6	6551
Summer tanager	5	170	9	166	621	60	459	817	429	869	638	353	2021	310	6927
Scarlet tanager	3315	572	932	550	341	538	308	695	544	532		3	75		8405
Eastern towhee	2520	1101	787	545	1426	215	392	392	216	18		80	1356	771	9819
Bachman's sparrow		10		5	111		72		1	6	174	86	164	325	954
Chipping sparrow	110	40	8	44	29	82	84	40	79	70	3	53	136		778
Field sparrow	166	81	30	49	133	57	120	136	28	59		3	49		911
Vesper sparrow	10	6	2												18
Lark sparrow									2						2
Savannah sparrow										2	1				3
Grasshopper sparrow		1			5					1			2		9
Song sparrow	34	129	28	20	34	13	3			1					262
Lincoln's sparrow											2				2
Swamp sparrow						1									1
White-throated sparrow		4			3				1	1					9
White-crowned sparrow													1		1
Dark-eyed junco	618	593	446	31	1	1	3								1693
Northern cardinal	383	439	328	454	1858	291	708	662	266	781	1042	634	3155	461	11462
Rose-breasted grosbeak	698	271	163	20	9	5				4	2				1172
Blue grosbeak		20		11	112		60	18	19	55	68	52	76	11	502
Indigo bunting	2118	809	1259	768	916	548	897	1000	1050	1434	544	285	1818	2	13448
Painted bunting					4					4	3	16	6		33
Dickcissel									1	17					18
Red-winged blackbird	17	7	3	14	21	25	4	46		19		6	19	2	183
Eastern meadowlark	5		2	6	4	3	1	3	2	13			3	19	61
Western meadowlark													1		1
Common grackle	72	41	18	26	167	7	46	28	2	3	8	5	14	17	454
Boat-tailed grackle					4									1	5
Great-tailed grackle										3					3
Bronzed cowbird													25		25
Brown-headed cowbird	400	104	30	70	219	148	56	454	95	190	118	30	339	50	2303
Orchard oriole	2	19	2	4	63	5	9	97	5	3	22	23	58	1	313
Baltimore oriole	4		1	1	4			6			3	2	1		22
Purple finch					1				1	2					4
House finch		2			3				4						9
Red crossbill	7	9								5	1				22
Pine siskin		54													54
American goldfinch	755	327	255	111	220	119	54	111	53	56		1	31	29	2122
House sparrow					2										2
Total	50148	22057	21329	13895	34347	14202	15364	20549	15953	21207	14342	8256	48822	9296	309767

[a] GWJ = George Washington and Jefferson; NC = NFs in North Carolina; CHE = Cherokee; CHA = Chattahoochee and Oconee; FMS = Francis Marion and Sumter; DB = Daniel Boone; AL = NFs in Alabama; LBL = Land Between the Lakes; OSF = Ozark and St Francis; OUA = Ouachita; TX = NFs in Texas; KIS = Kisatchie; MS = NFs in Mississippi; FL = NFs in Florida

APPENDIX 3

Mean Number of Observations per Count and Percent Annual Change in Observations per Count for 144 Avian Species, Southern Region, 1997-2004[a]

Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Wood duck	0.007	86	-5.2	-11.9	2.0
Ruffed grouse	0.009	218	4.4	-0.3	9.4
Wild turkey	0.028	606	2.0	-1.3	5.4
Northern bobwhite	0.071	1045	-10.2	-12.0	-8.3
Black vulture	0.004	100	8.1	1.1	15.5
Turkey vulture	0.022	452	1.3	-2.1	4.9
Mississippi kite	0.002	27	4.8	-5.5	16.1
Sharp-shinned hawk	0.001	37	-10.9	-19.2	-1.9
Cooper's hawk	0.002	56	2.5	-5.2	10.8
Red-shouldered hawk	0.027	637	1.5	-1.3	4.3
Broad-winged hawk	0.011	326	5.8	1.7	10.1
Red-tailed hawk	0.012	330	-7.6	-11.2	-4.0
American kestrel	0.004	69	-3.4	-11.4	5.4
Killdeer	0.001	12	-6.4	-19.2	8.4
American woodcock	0.000	6	-5.4	-10.5	0.0
Mourning dove	0.197	2301	2.2	1.1	3.3
Common ground-dove	0.000	8	-15.5	-30.0	1.9
Black-billed cuckoo	0.004	114	-3.1	-9.5	3.8
Yellow-billed cuckoo	0.318	3318	3.4	2.7	4.2
Greater roadrunner	0.000	11	-3.4	-12.1	6.2
Barn owl	0.000	12	413.6	352.5	482.9
Eastern screech-owl	0.002	42	-6.6	-15.9	3.7
Great horned owl	0.001	40	6.4	0.3	12.8
Barred owl	0.015	350	2.8	-0.5	6.3
Common nighthawk	0.004	60	-11.9	-18.9	-4.3
Chuck-will's-widow	0.004	72	-0.1	-8.0	8.4
Whip-poor-will	0.004	93	12.2	2.3	23.1
Chimney swift	0.035	641	4.0	0.5	7.7
Ruby-throated hummingbird	0.037	821	5.9	3.6	8.3
Belted kingfisher	0.003	88	-2.1	-10.2	6.8
Red-headed woodpecker	0.062	995	-1.0	-3.3	1.3
Red-bellied woodpecker	0.264	2724	4.1	3.1	5.1
Yellow-bellied sapsucker	0.001	26	-15.4	-23.6	-6.2
Downy woodpecker	0.110	2111	3.3	1.9	4.7
Hairy woodpecker	0.043	1089	-3.3	-5.4	-1.1
Red-cockaded woodpecker	0.016	169	-1.9	-6.3	2.6
Northern flicker	0.061	1312	1.3	-0.6	3.3
Pileated woodpecker	0.334	3701	0.5	-0.3	1.3
Eastern wood-pewee	0.183	2112	-1.0	-2.0	0.1
Acadian flycatcher	0.262	2052	1.0	0.0	2.0
Alder flycatcher	0.001	17	155.4	135.1	177.4
Willow flycatcher	0.001	20	-17.2	-28.3	-4.4
Least flycatcher	0.004	35	-3.8	-14.0	7.6
Eastern phoebe	0.019	412	3.6	0.3	7.0
Great crested flycatcher	0.247	2783	0.7	-0.3	1.7
Eastern kingbird	0.010	178	-3.9	-8.9	1.4
White-eyed vireo	0.226	1920	1.8	0.6	3.1
Bell's vireo	0.000	9	-14.6	-21.7	-6.9
Yellow-throated vireo	0.059	1092	4.5	2.6	6.4
Blue-headed vireo	0.083	945	-7.2	-9.2	-5.2
Warbling vireo	0.000	9	-3.2	-16.7	12.5
Red-eyed vireo	1.162	4195	0.3	-0.2	0.8
Blue jay	0.359	3544	2.3	1.4	3.3
Florida scrub-jay	0.003	24	-31.1	-38.7	-22.5
American crow	0.753	4021	-1.9	-2.5	-1.3

Continued

Appendix 3—continued

Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Fish crow	0.016	284	10.3	4.8	16.0
Common raven	0.026	351	-8.2	-10.5	-5.8
Purple martin	0.012	214	6.3	-0.2	13.2
Tree swallow	0.003	39	-0.5	-9.9	9.8
Northern rough-winged swallow	0.002	22	25.4	5.4	49.3
Bank swallow	0.000	9	-24.1	-31.0	-16.5
Barn swallow	0.009	68	1.6	-8.4	12.7
Carolina chickadee	0.261	2918	4.0	2.8	5.2
Black-capped chickadee	0.019	354	6.7	3.4	10.2
Tufted titmouse	0.575	4115	2.2	1.6	2.9
Red-breasted nuthatch	0.009	106	-5.9	-10.4	-1.2
White-breasted nuthatch	0.116	1816	3.4	2.0	4.7
Brown-headed nuthatch	0.042	451	3.7	0.4	7.0
Brown creeper	0.005	45	-13.4	-17.8	-8.6
Carolina wren	0.434	3298	7.4	6.5	8.2
House wren	0.003	27	14.9	7.9	22.3
Winter wren	0.024	127	-13.8	-17.0	-10.5
Golden-crowned kinglet	0.030	73	-5.5	-9.7	-1.1
Ruby-crowned kinglet	0.001	21	-13.8	-19.4	-7.9
Blue-gray gnatcatcher	0.200	2305	4.7	3.6	5.9
Eastern bluebird	0.017	365	-0.9	-4.9	3.2
Veery	0.065	374	-1.7	-3.6	0.2
Swainson's thrush	0.003	62	3.6	-1.6	9.1
Hermit thrush	0.002	40	5.1	-3.3	14.2
Wood thrush	0.225	2623	-3.3	-4.3	-2.3
American robin	0.039	499	-0.1	-2.4	2.3
Gray catbird	0.042	595	2.2	-0.8	5.4
Northern mockingbird	0.006	148	6.5	0.3	13.0
Brown thrasher	0.030	591	-2.1	-4.6	0.4
European starling	0.001	17	-1.9	-16.4	15.1
Cedar waxwing	0.036	267	8.8	2.5	15.5
Blue-winged warbler	0.014	293	-15.6	-19.0	-12.0
Golden-winged warbler	0.003	37	-24.3	-32.1	-15.6
Tennessee warbler	0.001	23	-31.1	-41.7	-18.7
Northern parula	0.129	1355	1.8	0.3	3.3
Yellow warbler	0.007	198	0.6	-4.7	6.1
Chestnut-sided warbler	0.114	570	-6.8	-8.6	-4.9
Magnolia warbler	0.003	44	3.3	-2.9	10.0
Black-throated blue warbler	0.056	426	-3.5	-5.5	-1.5
Yellow-rumped warbler	0.002	25	6.3	-1.6	15.0
Black-throated green warbler	0.114	947	4.1	2.5	5.7
Blackburnian warbler	0.012	172	1.7	-2.4	6.0
Yellow-throated warbler	0.038	626	5.5	3.0	8.0
Pine warbler	0.559	2890	0.7	-0.2	1.6
Prairie warbler	0.160	1212	-2.3	-4.0	-0.5
Palm warbler	0.001	19	-0.5	-6.1	5.4
Cerulean warbler	0.010	162	-5.7	-10.1	-0.9
Black-and-white warbler	0.166	2116	1.8	0.7	2.9
American redstart	0.034	548	-7.3	-9.9	-4.7
Prothonotary warbler	0.039	287	12.5	8.9	16.2
Worm-eating warbler	0.151	1883	2.4	1.2	3.6
Swainson's warbler	0.013	208	-4.2	-8.7	0.6
Ovenbird	0.456	2316	1.4	0.7	2.2
Northern waterthrush	0.001	12	0.3	-9.5	11.1
Louisiana waterthrush	0.029	471	2.4	-0.3	5.1
Kentucky warbler	0.086	1349	5.5	3.8	7.3
Common yellowthroat	0.126	1098	1.0	-0.9	2.9

Continued

Appendix 3—continued

Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
				Lower	Upper
Hooded warbler	0.371	2855	0.5	-0.4	1.4
Canada warbler	0.021	224	-4.3	-7.4	-1.0
Yellow-breasted chat	0.306	2157	-3.1	-4.2	-1.9
Summer tanager	0.263	2526	0.6	-0.4	1.5
Scarlet tanager	0.299	2494	1.4	0.6	2.2
Eastern towhee	0.585	2796	-4.1	-5.2	-3.0
Bachman's sparrow	0.054	345	-6.0	-8.6	-3.2
Chipping sparrow	0.029	547	5.2	2.4	8.1
Field sparrow	0.034	448	-8.3	-11.1	-5.3
Vesper sparrow	0.001	8	-1.5	-14.3	13.2
Grasshopper sparrow	0.000	8	-2.9	-22.4	21.4
Song sparrow	0.013	118	-2.2	-7.2	3.0
White-throated sparrow	0.000	9	-5.6	-21.5	13.5
Dark-eyed junco	0.101	445	-7.1	-8.9	-5.2
Northern cardinal	0.541	3383	1.5	0.7	2.3
Rose-breasted grosbeak	0.040	520	-6.2	-8.5	-3.9
Blue grosbeak	0.019	320	3.4	-0.3	7.3
Indigo bunting	0.633	3424	0.8	0.1	1.5
Painted bunting	0.001	28	-21.4	-32.1	-9.0
Dickcissel	0.001	6	-16.5	-27.2	-4.2
Red-winged blackbird	0.011	93	2.0	-6.0	10.8
Eastern meadowlark	0.002	39	5.5	-2.2	13.8
Common grackle	0.018	323	0.7	-4.6	6.3
Boat-tailed grackle	0.000	6	41.0	19.6	66.2
Bronzed cowbird	0.001	23	5.0	3.9	6.1
Brown-headed cowbird	0.081	1295	0.3	-1.5	2.1
Orchard oriole	0.010	221	1.7	-2.6	6.2
Baltimore oriole	0.000	22	-0.5	-14.3	15.6
House finch	0.001	9	-17.4	-20.7	-13.9
Red crossbill	0.004	20	-10.0	-17.2	-2.2
Pine siskin	0.003	23	-4.3	-11.4	3.4
American goldfinch	0.087	1230	1.7	-0.1	3.6

[a] Estimates based on point-count surveys on 14 national forests in the Southern Region. Species that occurred at fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

APPENDIX 4

Mean Number of Observations per Count and Percent Annual Change in Number of Observations per Count for 144 Avian Species in 10 Physiographic Areas, Southern Region, 1997-2004[a]

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
Mid-Atlantic Ridge & Valley	Ruffed grouse	0.044	130	11.4	5.7	17.3
	Wild turkey	0.031	113	0.3	-5.9	7.0
	Turkey vulture	0.010	30	13.0	6.6	19.8
	Red-shouldered hawk	0.006	23	5.5	-5.1	17.2
	Broad-winged hawk	0.005	28	-7.2	-19.9	7.5
	Red-tailed hawk	0.004	20	13.0	9.1	17.1
	Mourning dove	0.139	272	1.9	-0.4	4.2
	Black-billed cuckoo	0.017	80	-5.2	-13.0	3.3
	Yellow-billed cuckoo	0.195	400	9.1	7.1	11.0
	Eastern screech-owl	0.002	6	-37.2	-44.4	-29.0
	Barred owl	0.008	36	-4.0	-12.8	5.7
	Whip-poor-will	0.009	33	31.0	28.6	33.3
	Chimney swift	0.008	36	-10.1	-15.8	-4.0
	Ruby-throated hummingbird	0.020	77	-4.7	-10.2	1.0
	Red-bellied woodpecker	0.036	133	6.6	0.4	13.2
	Downy woodpecker	0.070	263	-6.3	-9.8	-2.7
	Hairy woodpecker	0.054	209	3.6	-1.2	8.5
	Northern flicker	0.050	167	7.5	2.5	12.7
	Pileated woodpecker	0.296	503	-2.7	-4.5	-0.8
	Eastern wood-pewee	0.223	406	-4.5	-6.8	-2.2
	Acadian flycatcher	0.215	261	-4.7	-7.0	-2.4
	Alder flycatcher	0.002	9	131.3	96.8	171.8
	Least flycatcher	0.003	8	20.6	7.7	35.0
	Eastern phoebe	0.015	38	-1.4	-8.4	6.3
	Great crested flycatcher	0.203	414	-4.6	-6.9	-2.3
	White-eyed vireo	0.002	6	13.1	4.5	22.4
	Yellow-throated vireo	0.004	14	6.5	-4.8	19.1
	Blue-headed vireo	0.133	312	-0.7	-3.8	2.5
	Red-eyed vireo	1.164	630	0.1	-0.8	1.1
	Blue jay	0.205	442	6.2	3.4	9.0
	American crow	0.411	492	-7.0	-8.5	-5.5
	Common raven	0.106	208	-7.6	-10.8	-4.4
	Carolina chickadee	0.052	161	-9.0	-12.7	-5.2
	Black-capped chickadee	0.082	250	2.9	-1.0	7.0
	Tufted titmouse	0.379	540	-2.8	-4.5	-1.1
	Red-breasted nuthatch	0.001	8	10.5	2.9	18.6
	White-breasted nuthatch	0.159	375	0.1	-2.4	2.6
	Carolina wren	0.045	125	5.0	-0.1	10.3
	Winter wren	0.004	12	-15.8	-26.3	-3.8
	Blue-gray gnatcatcher	0.054	158	3.4	-0.9	7.8
	Eastern bluebird	0.004	22	6.9	-6.3	21.9
	Veery	0.119	106	1.3	-2.4	5.2
	Wood thrush	0.304	475	-3.4	-5.5	-1.2
	American robin	0.042	104	3.5	-1.5	8.8
	Gray catbird	0.021	63	0.9	-6.5	8.9
	Brown thrasher	0.004	18	2.9	-5.7	12.3

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Cedar waxwing	0.055	100	18.0	10.6	25.9
	Northern parula	0.066	118	-5.2	-8.6	-1.6
	Chestnut-sided warbler	0.132	146	-2.5	-6.4	1.6
	Magnolia warbler	0.009	27	3.9	-5.6	14.3
	Black-throated blue warbler	0.063	93	8.5	3.6	13.7
	Yellow-rumped warbler	0.002	10	42.6	31.2	54.9
	Black-throated green warbler	0.073	128	0.7	-4.1	5.8
	Blackburnian warbler	0.017	50	6.3	-2.3	15.6
	Yellow-throated warbler	0.002	8	-17.7	-19.1	-16.1
	Pine warbler	0.138	269	-4.4	-6.8	-1.9
	Prairie warbler	0.027	50	3.5	-5.0	12.8
	Cerulean warbler	0.011	49	-15.2	-24.4	-4.8
	Black-and-white warbler	0.170	392	-1.2	-3.7	1.3
	American redstart	0.096	178	-4.5	-7.9	-0.9
	Worm-eating warbler	0.269	421	0.6	-1.6	3.0
	Swainson's warbler	0.024	22	-11.2	-15.0	-7.1
	Ovenbird	0.944	614	2.2	1.1	3.4
	Louisiana waterthrush	0.038	88	-2.0	-6.6	2.8
	Kentucky warbler	0.009	39	-0.1	-10.4	11.5
	Common yellowthroat	0.009	23	20.5	5.0	38.3
	Hooded warbler	0.220	311	-2.5	-4.9	0.1
	Canada warbler	0.039	68	-7.4	-11.3	-3.3
	Yellow-breasted chat	0.015	37	10.6	1.3	20.8
	Scarlet tanager	0.665	625	-0.1	-1.3	1.1
	Eastern towhee	0.501	439	-3.7	-5.3	-2.1
	Chipping sparrow	0.017	49	-6.5	-11.9	-0.9
	Field sparrow	0.011	35	-4.9	-13.6	4.7
	Song sparrow	0.004	8	-6.8	-18.2	6.2
	Dark-eyed junco	0.104	146	-2.0	-5.0	1.2
	Northern cardinal	0.046	142	15.9	10.5	21.5
	Rose-breasted grosbeak	0.131	278	-4.6	-7.6	-1.4
	Indigo bunting	0.430	434	-3.9	-5.5	-2.3
	Red-winged blackbird	0.004	7	11.0	-6.7	32.1
	Common grackle	0.014	41	-8.5	-15.6	-0.7
	Brown-headed cowbird	0.055	187	-15.6	-20.0	-11.0
	American goldfinch	0.126	300	4.3	1.3	7.4
Southern Blue Ridge	Ruffed grouse	0.012	80	-11.6	-18.9	-3.5
	Wild turkey	0.021	108	-3.8	-9.6	2.4
	Northern bobwhite	0.013	66	-17.2	-22.7	-11.4
	Black vulture	0.001	9	6.5	4.0	9.0
	Turkey vulture	0.008	43	0.6	-5.6	7.2
	Sharp-shinned hawk	0.001	10	-20.1	-29.0	-10.0
	Cooper's hawk	0.002	12	8.3	3.0	14.0
	Red-shouldered hawk	0.007	38	38.7	22.3	57.2
	Broad-winged hawk	0.012	71	8.0	0.4	16.1
	Red-tailed hawk	0.011	56	-12.6	-20.5	-4.0
	Mourning dove	0.149	385	6.6	4.2	9.1
	Black-billed cuckoo	0.004	23	2.0	-7.1	12.1

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Yellow-billed cuckoo	0.134	393	19.8	16.9	22.8
	Eastern screech-owl	0.001	9	-1.0	-8.1	6.7
	Great horned owl	0.001	8	45.7	34.9	57.3
	Barred owl	0.008	48	-2.7	-11.7	7.3
	Whip-poor-will	0.006	29	2.2	-13.2	20.3
	Chimney swift	0.040	152	-2.2	-8.1	4.0
	Ruby-throated hummingbird	0.031	154	8.1	1.9	14.7
	Belted kingfisher	0.005	22	-8.7	-22.7	7.9
	Red-headed woodpecker	0.005	33	-14.7	-25.9	-2.0
	Red-bellied woodpecker	0.057	227	8.7	4.2	13.5
	Yellow-bellied sapsucker	0.002	9	-7.1	-21.9	10.5
	Downy woodpecker	0.076	343	-1.2	-4.5	2.2
	Hairy woodpecker	0.044	248	-6.3	-10.4	-2.1
	Northern flicker	0.060	283	0.3	-3.3	4.1
	Pileated woodpecker	0.397	746	2.8	1.5	4.1
	Eastern wood-pewee	0.107	260	-5.1	-8.1	-2.0
	Acadian flycatcher	0.146	287	-1.3	-4.2	1.8
	Alder flycatcher	0.002	8	262.2	216.2	314.9
	Willow flycatcher	0.003	11	-23.7	-32.3	-14.0
	Least flycatcher	0.014	21	-7.4	-17.1	3.5
	Eastern phoebe	0.018	92	4.6	-2.1	11.8
	Great crested flycatcher	0.062	282	-6.3	-10.1	-2.3
	White-eyed vireo	0.028	109	-9.2	-15.0	-2.9
	Yellow-throated vireo	0.014	72	-6.4	-13.3	1.0
	Blue-headed vireo	0.272	498	-10.6	-12.9	-8.3
	Red-eyed vireo	1.351	884	-0.2	-1.1	0.6
	Blue jay	0.253	646	3.5	1.4	5.6
	American crow	0.771	799	3.0	1.6	4.5
	Common raven	0.046	142	-8.0	-11.7	-4.1
	Purple martin	0.002	14	-1.6	-6.6	3.8
	Tree swallow	0.002	7	-7.5	-13.8	-0.6
	Northern rough-winged swallow	0.002	9	-20.7	-31.1	-8.6
	Barn swallow	0.003	10	-19.4	-28.1	-9.7
	Carolina chickadee	0.225	548	2.2	-0.1	4.6
	Black-capped chickadee	0.031	103	15.2	10.5	20.1
	Tufted titmouse	0.419	747	0.8	-0.6	2.2
	Red-breasted nuthatch	0.041	94	-5.9	-10.5	-1.1
	White-breasted nuthatch	0.127	421	1.1	-1.6	3.8
	Brown-headed nuthatch	0.001	6	-1.5	-17.9	18.2
	Brown creeper	0.022	35	-14.0	-18.6	-9.2
	Carolina wren	0.157	454	5.9	3.2	8.7
	Winter wren	0.116	115	-13.5	-16.7	-10.1
	Golden-crowned kinglet	0.146	70	-5.3	-9.5	-0.9
	Ruby-crowned kinglet	0.004	8	-14.6	-22.4	-6.0
	Blue-gray gnatcatcher	0.089	270	3.7	-0.1	7.6
	Eastern bluebird	0.009	40	-14.6	-23.6	-4.4
	Veery	0.226	248	-1.8	-4.1	0.4
	Swainson's thrush	0.006	26	14.2	11.3	17.1
	Hermit thrush	0.007	32	14.2	4.7	24.7

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Wood thrush	0.253	528	1.3	-0.6	3.3
	American robin	0.137	262	0.9	-1.9	3.8
	Gray catbird	0.100	219	1.2	-2.0	4.4
	Northern mockingbird	0.003	13	6.8	-7.3	23.1
	Brown thrasher	0.017	87	-8.3	-14.5	-1.7
	Cedar waxwing	0.089	130	11.4	3.4	19.9
	Blue-winged warbler	0.035	133	-21.0	-25.2	-16.6
	Golden-winged warbler	0.012	34	-27.0	-34.2	-18.9
	Northern parula	0.123	278	-3.2	-5.7	-0.5
	Yellow warbler	0.008	51	-15.9	-24.7	-6.0
	Chestnut-sided warbler	0.452	406	-7.5	-9.5	-5.3
	Magnolia warbler	0.005	10	8.2	-0.3	17.6
	Black-throated blue warbler	0.220	306	-4.4	-6.5	-2.2
	Yellow-rumped warbler	0.003	6	-13.5	-25.1	-0.1
	Black-throated green warbler	0.398	563	3.9	2.2	5.7
	Blackburnian warbler	0.044	110	0.0	-4.8	5.2
	Yellow-throated warbler	0.035	139	-2.7	-7.7	2.6
	Pine warbler	0.122	302	-1.4	-4.2	1.4
	Prairie warbler	0.085	147	-7.5	-11.8	-3.0
	Cerulean warbler	0.007	31	-10.7	-19.7	-0.7
	Black-and-white warbler	0.227	554	3.4	1.3	5.5
	American redstart	0.033	118	-23.6	-28.7	-18.2
	Worm-eating warbler	0.198	471	4.0	1.7	6.4
	Swainson's warbler	0.011	46	-4.3	-11.9	3.8
	Ovenbird	0.749	760	-0.1	-1.3	1.2
	Louisiana waterthrush	0.028	100	-7.1	-11.9	-1.9
	Kentucky warbler	0.014	85	-12.7	-19.3	-5.5
	Common yellowthroat	0.060	66	-1.3	-4.9	2.4
	Hooded warbler	0.522	702	-1.5	-3.0	-0.1
	Canada warbler	0.070	151	-3.0	-7.1	1.2
	Yellow-breasted chat	0.101	227	-9.9	-13.2	-6.4
	Summer tanager	0.008	56	2.0	-4.9	9.4
	Scarlet tanager	0.417	753	0.1	-1.3	1.6
	Eastern towhee	0.637	697	-3.7	-5.0	-2.3
	Chipping sparrow	0.015	73	-14.6	-22.7	-5.7
	Field sparrow	0.062	86	-4.5	-9.6	1.0
	Vesper sparrow	0.003	8	-1.5	-14.3	13.2
	Song sparrow	0.051	79	1.6	-4.2	7.7
	Dark-eyed junco	0.415	295	-7.7	-9.8	-5.7
	Northern cardinal	0.227	499	8.1	6.2	10.2
	Rose-breasted grosbeak	0.092	227	-7.8	-11.2	-4.3
	Blue grosbeak	0.005	13	-7.1	-20.9	9.2
	Indigo bunting	0.664	711	-1.3	-2.7	0.1
	Red-winged blackbird	0.003	11	-18.1	-28.3	-6.4
	Common grackle	0.011	58	-15.1	-21.5	-8.1
	Brown-headed cowbird	0.025	112	-5.2	-11.1	1.1
	Baltimore oriole	0.001	8	-2.8	-14.7	10.8
	Red crossbill	0.005	11	42.6	20.0	69.3
	Pine siskin	0.015	23	-4.3	-11.4	3.4

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	American goldfinch	0.184	456	0.3	-2.3	3.0
Northern Cumberland Plateau	Ruffed grouse	0.004	6	-15.6	-24.9	-5.1
	Wild turkey	0.039	35	7.5	-4.6	21.1
	Northern bobwhite	0.015	13	-12.4	-26.6	4.6
	Turkey vulture	0.033	28	-14.7	-20.3	-8.8
	Red-shouldered hawk	0.025	31	-4.2	-10.8	2.9
	Broad-winged hawk	0.005	7	-26.7	-33.4	-19.4
	Red-tailed hawk	0.013	14	-19.7	-34.5	-1.6
	Mourning dove	0.167	102	13.8	8.6	19.2
	Yellow-billed cuckoo	0.393	136	8.0	5.0	11.1
	Chimney swift	0.016	13	-13.6	-30.9	8.1
	Ruby-throated hummingbird	0.050	54	8.6	1.2	16.6
	Red-headed woodpecker	0.021	20	119.4	103.5	136.6
	Red-bellied woodpecker	0.214	130	11.8	7.2	16.5
	Downy woodpecker	0.128	105	14.0	8.9	19.3
	Hairy woodpecker	0.061	62	4.1	-3.0	11.6
	Northern flicker	0.066	70	8.4	-0.4	18.0
	Pileated woodpecker	0.373	170	4.1	0.9	7.4
	Eastern wood-pewee	0.203	108	0.0	-4.2	4.3
	Acadian flycatcher	0.290	104	3.8	0.7	7.1
	Eastern phoebe	0.067	60	9.8	2.2	18.0
	Great crested flycatcher	0.057	60	1.1	-7.2	10.1
	Eastern kingbird	0.010	6	4.1	-13.7	25.4
	White-eyed vireo	0.209	85	-0.2	-4.5	4.2
	Yellow-throated vireo	0.079	72	7.9	1.2	15.0
	Blue-headed vireo	0.046	44	5.0	-3.2	14.0
	Red-eyed vireo	1.477	188	1.5	0.2	2.9
	Blue jay	0.200	123	5.6	1.2	10.2
	American crow	0.893	179	0.1	-2.0	2.3
	Tree swallow	0.009	9	69.3	47.9	93.9
	Carolina chickadee	0.242	131	-2.4	-6.7	2.2
	Tufted titmouse	0.501	175	5.7	3.3	8.1
	White-breasted nuthatch	0.298	156	2.9	-0.8	6.7
	Carolina wren	0.275	152	15.3	10.4	20.5
	Blue-gray gnatcatcher	0.192	123	7.0	2.5	11.6
	Eastern bluebird	0.012	12	-3.2	-16.0	11.5
	Wood thrush	0.396	148	-0.1	-3.2	3.2
	American robin	0.036	33	-4.9	-11.5	2.3
	Gray catbird	0.013	14	-8.0	-19.8	5.6
	Brown thrasher	0.009	11	5.2	-8.5	21.1
	Blue-winged warbler	0.021	23	-26.8	-35.9	-16.5
	Northern parula	0.111	60	3.0	-2.8	9.1
	Yellow warbler	0.027	31	17.6	3.3	33.9
	Black-throated green warbler	0.254	95	1.6	-3.3	6.8
	Yellow-throated warbler	0.159	101	3.8	-0.8	8.6
	Pine warbler	0.200	80	-7.8	-12.0	-3.4
	Prairie warbler	0.178	58	-13.1	-18.9	-7.0
	Cerulean warbler	0.098	58	-4.8	-10.2	0.8

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Black-and-white warbler	0.297	141	4.6	1.5	7.8
	American redstart	0.035	27	4.7	-4.9	15.3
	Worm-eating warbler	0.387	152	2.4	-0.6	5.5
	Swainson's warbler	0.016	16	-15.6	-28.8	-0.1
	Ovenbird	1.125	179	4.7	2.7	6.6
	Louisiana waterthrush	0.028	26	7.1	-4.8	20.5
	Kentucky warbler	0.140	101	-6.8	-11.7	-1.5
	Common yellowthroat	0.074	36	-7.9	-13.7	-1.8
	Hooded warbler	0.798	178	2.0	-0.1	4.0
	Yellow-breasted chat	0.313	106	-3.6	-7.7	0.7
	Summer tanager	0.048	51	8.2	-2.0	19.4
	Scarlet tanager	0.451	173	1.8	-0.8	4.6
	Eastern towhee	0.197	88	-2.8	-6.6	1.2
	Chipping sparrow	0.065	56	-3.6	-8.2	1.2
	Field sparrow	0.057	25	-0.9	-10.8	10.1
	Song sparrow	0.010	6	-1.1	-13.2	12.7
	Northern cardinal	0.247	122	5.9	1.5	10.4
	Indigo bunting	0.580	147	0.1	-3.0	3.2
	Red-winged blackbird	0.062	9	0.4	-8.2	9.8
	Common grackle	0.006	7	40.4	36.0	45.0
	Brown-headed cowbird	0.116	90	3.6	-3.3	10.9
	American goldfinch	0.123	79	7.3	-0.1	15.3
Southern Cumberland Plateau/Ridge & Valley	Wild turkey	0.030	34	18.3	8.3	29.2
	Northern bobwhite	0.031	35	-5.0	-11.6	2.1
	Turkey vulture	0.022	30	46.6	35.0	59.3
	Red-shouldered hawk	0.031	38	17.3	5.2	30.8
	Broad-winged hawk	0.015	26	31.2	20.6	42.8
	Red-tailed hawk	0.012	14	-0.9	-11.9	11.5
	Mourning dove	0.161	109	9.6	3.7	15.8
	Yellow-billed cuckoo	0.277	173	6.3	2.6	10.1
	Great horned owl	0.005	6	9.8	0.7	19.9
	Barred owl	0.005	8	3.0	-4.4	11.1
	Chimney swift	0.034	35	20.9	4.7	39.5
	Ruby-throated hummingbird	0.026	27	21.8	10.2	34.5
	Belted kingfisher	0.008	9	40.5	17.5	68.0
	Red-headed woodpecker	0.062	55	9.6	-0.6	20.9
	Red-bellied woodpecker	0.175	141	16.9	12.6	21.3
	Downy woodpecker	0.066	71	15.6	5.6	26.7
	Hairy woodpecker	0.045	51	-1.5	-10.3	8.2
	Northern flicker	0.090	86	2.3	-3.5	8.4
	Pileated woodpecker	0.212	160	3.7	-0.6	8.3
	Eastern wood-pewee	0.039	36	13.2	1.2	26.7
	Acadian flycatcher	0.137	74	3.2	-1.1	7.8
	Eastern phoebe	0.014	17	-3.7	-15.1	9.2
	Great crested flycatcher	0.187	150	5.5	0.8	10.3
	Eastern kingbird	0.008	10	38.1	17.8	61.8
	White-eyed vireo	0.114	80	5.9	0.2	12.0
	Yellow-throated vireo	0.060	66	20.0	11.4	29.3

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Blue-headed vireo	0.029	26	25.4	12.9	39.1
	Red-eyed vireo	0.817	215	2.8	0.9	4.7
	Blue jay	0.241	163	13.8	9.0	18.9
	American crow	0.461	179	-0.9	-3.6	1.9
	Purple martin	0.007	9	69.5	40.5	104.6
	Carolina chickadee	0.188	146	12.7	7.1	18.5
	Tufted titmouse	0.313	192	10.7	6.3	15.2
	White-breasted nuthatch	0.152	129	9.5	3.2	16.2
	Brown-headed nuthatch	0.031	33	86.5	72.7	101.3
	Carolina wren	0.214	146	10.9	5.5	16.5
	Blue-gray gnatcatcher	0.156	125	10.9	4.5	17.8
	Eastern bluebird	0.011	13	11.1	-1.1	24.8
	Wood thrush	0.115	82	-1.2	-7.1	5.1
	American robin	0.009	13	24.3	11.7	38.3
	Gray catbird	0.033	30	10.2	1.1	20.0
	Northern mockingbird	0.008	9	-5.8	-15.4	4.8
	Brown thrasher	0.023	29	9.6	0.2	19.9
	Blue-winged warbler	0.027	35	1.8	-9.5	14.6
	Northern parula	0.074	62	4.5	-3.8	13.6
	Yellow warbler	0.017	20	20.5	8.3	34.0
	Black-throated green warbler	0.105	77	18.9	10.8	27.6
	Yellow-throated warbler	0.039	33	20.0	12.7	27.8
	Pine warbler	0.355	180	9.2	5.9	12.5
	Prairie warbler	0.270	111	-0.4	-4.1	3.4
	Black-and-white warbler	0.077	80	3.4	-4.3	11.7
	American redstart	0.008	9	-18.3	-26.5	-9.2
	Worm-eating warbler	0.105	86	-1.3	-7.1	5.0
	Ovenbird	0.240	132	3.8	-1.2	9.2
	Louisiana waterthrush	0.026	17	-4.2	-17.4	11.2
	Kentucky warbler	0.089	71	18.6	13.4	24.0
	Common yellowthroat	0.031	27	9.5	-0.5	20.5
	Hooded warbler	0.147	106	13.4	7.5	19.6
	Yellow-breasted chat	0.403	153	2.0	-1.0	5.2
	Summer tanager	0.206	153	10.0	5.4	14.8
	Scarlet tanager	0.252	145	5.9	1.5	10.4
	Eastern towhee	0.186	113	6.7	0.8	12.9
	Chipping sparrow	0.036	40	11.4	3.0	20.5
	Field sparrow	0.042	34	-3.9	-11.2	3.9
	Northern cardinal	0.332	179	6.5	3.0	10.2
	Blue grosbeak	0.014	14	5.2	-1.7	12.5
	Indigo bunting	0.406	177	1.5	-2.1	5.2
	Common grackle	0.006	9	10.8	2.6	19.6
	Brown-headed cowbird	0.045	38	17.6	4.6	32.2
	American goldfinch	0.042	38	13.7	7.1	20.7
Southern Piedmont	Wood duck	0.053	11	-29.9	-39.3	-19.1
	Wild turkey	0.058	47	-2.4	-12.9	9.4
	Northern bobwhite	0.256	139	-17.3	-21.7	-12.8
	Black vulture	0.008	9	20.8	4.6	39.5

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Turkey vulture	0.031	25	25.8	5.9	49.3
	Red-shouldered hawk	0.035	37	6.2	-3.6	16.9
	Broad-winged hawk	0.004	7	26.7	9.1	47.1
	Red-tailed hawk	0.054	59	-7.8	-15.1	0.2
	Mourning dove	0.539	214	-5.6	-8.3	-2.8
	Yellow-billed cuckoo	0.357	205	3.1	-0.4	6.7
	Great horned owl	0.005	7	-17.9	-22.6	-12.9
	Barred owl	0.008	13	-10.7	-18.5	-2.1
	Chuck-will's-widow	0.005	6	-44.2	-53.0	-33.8
	Chimney swift	0.083	52	-1.6	-10.7	8.5
	Ruby-throated hummingbird	0.075	81	12.8	5.9	20.1
	Belted kingfisher	0.013	12	19.3	5.9	34.3
	Red-headed woodpecker	0.171	106	1.5	-4.4	7.8
	Red-bellied woodpecker	0.481	223	-0.4	-3.2	2.6
	Downy woodpecker	0.148	123	-3.9	-9.4	1.8
	Hairy woodpecker	0.071	83	-19.7	-26.6	-12.1
	Northern flicker	0.114	118	-0.4	-6.4	6.0
	Pileated woodpecker	0.435	201	-7.1	-10.3	-3.8
	Eastern wood-pewee	0.213	121	3.1	-1.2	7.6
	Acadian flycatcher	0.483	146	2.2	-1.6	6.2
	Eastern phoebe	0.046	40	-7.3	-21.3	9.0
	Great crested flycatcher	0.399	198	-5.3	-9.0	-1.5
	Eastern kingbird	0.065	42	-18.2	-27.6	-7.6
	White-eyed vireo	0.269	134	-6.9	-11.3	-2.3
	Yellow-throated vireo	0.108	83	3.4	-2.5	9.7
	Blue-headed vireo	0.078	57	2.6	-4.6	10.3
	Red-eyed vireo	1.577	262	-6.1	-8.2	-4.0
	Blue jay	0.678	209	-1.8	-5.1	1.7
	American crow	1.408	262	-10.1	-12.1	-8.0
	Fish crow	0.020	22	-7.2	-19.4	6.8
	Purple martin	0.052	17	31.2	6.5	61.6
	Carolina chickadee	0.533	224	-5.7	-9.1	-2.0
	Tufted titmouse	0.925	253	-5.2	-7.1	-3.2
	White-breasted nuthatch	0.055	46	8.5	1.7	15.8
	Brown-headed nuthatch	0.139	61	2.7	-3.5	9.3
	Carolina wren	0.738	255	-1.8	-4.1	0.7
	Blue-gray gnatcatcher	0.470	224	0.8	-2.8	4.6
	Eastern bluebird	0.090	54	-2.7	-12.1	7.7
	Veery	0.005	6	-34.0	-37.2	-30.7
	Wood thrush	0.467	204	-10.8	-14.1	-7.4
	American robin	0.012	20	-14.5	-24.8	-2.7
	Gray catbird	0.056	49	-13.7	-22.1	-4.4
	Northern mockingbird	0.029	23	14.9	3.1	28.0
	Brown thrasher	0.074	66	-3.6	-10.3	3.7
	Blue-winged warbler	0.018	23	20.7	12.1	29.9
	Northern parula	0.367	149	-5.7	-9.8	-1.4
	Yellow warbler	0.030	32	0.1	-12.2	14.1
	Black-throated blue warbler	0.027	21	-45.9	-48.5	-43.2
	Black-throated green warbler	0.014	15	-40.7	-48.3	-32.0

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Yellow-throated warbler	0.136	81	9.5	3.5	15.9
	Pine warbler	1.127	236	-4.2	-7.0	-1.3
	Prairie warbler	0.424	143	-8.9	-13.6	-4.1
	Black-and-white warbler	0.175	125	-13.2	-17.9	-8.2
	American redstart	0.047	40	-7.4	-16.1	2.2
	Prothonotary warbler	0.012	10	24.7	-4.7	63.2
	Worm-eating warbler	0.038	50	-16.4	-25.1	-6.7
	Ovenbird	0.376	119	2.1	-2.0	6.4
	Louisiana waterthrush	0.052	36	3.0	-5.3	12.0
	Kentucky warbler	0.080	78	6.8	-0.7	14.8
	Common yellowthroat	0.140	93	-4.1	-11.9	4.4
	Hooded warbler	0.452	179	-11.5	-15.4	-7.3
	Yellow-breasted chat	0.605	188	-13.1	-16.8	-9.3
	Summer tanager	0.534	227	-4.1	-7.1	-1.0
	Scarlet tanager	0.122	96	3.7	-2.1	9.8
	Eastern towhee	0.737	205	-10.6	-13.6	-7.5
	Bachman's sparrow	0.024	12	-6.0	-23.8	15.9
	Chipping sparrow	0.050	35	25.6	14.0	38.5
	Field sparrow	0.104	66	-16.6	-25.0	-7.3
	Song sparrow	0.023	20	-20.6	-28.3	-12.1
	Northern cardinal	1.024	251	-6.6	-8.7	-4.4
	Blue grosbeak	0.050	29	13.4	5.4	22.0
	Indigo bunting	0.647	205	-2.6	-5.9	0.7
	Red-winged blackbird	0.022	10	29.1	7.4	55.1
	Eastern meadowlark	0.005	7	10.9	-1.2	24.4
	Common grackle	0.033	24	21.4	13.2	30.1
	Brown-headed cowbird	0.133	98	6.2	-1.4	14.4
	Orchard oriole	0.011	9	12.6	-1.2	28.4
	American goldfinch	0.228	128	1.1	-4.7	7.2
Interior Low Plateaus	Wood duck	0.006	6	-2.7	-16.0	12.7
	Wild turkey	0.044	52	9.4	-2.8	23.2
	Cooper's hawk	0.004	6	-6.4	-12.9	0.6
	Red-shouldered hawk	0.040	48	4.2	-4.9	14.1
	Red-tailed hawk	0.008	23	-4.0	-20.3	15.8
	Mourning dove	0.066	111	-10.9	-16.4	-5.1
	Yellow-billed cuckoo	0.604	207	-5.9	-7.8	-3.9
	Barred owl	0.013	26	-10.9	-24.0	4.4
	Chimney swift	0.034	36	15.3	2.2	30.2
	Ruby-throated hummingbird	0.051	65	11.7	3.4	20.6
	Belted kingfisher	0.002	12	-43.0	-46.3	-39.5
	Red-headed woodpecker	0.004	19	-54.4	-57.5	-51.2
	Red-bellied woodpecker	0.263	188	7.0	3.4	10.7
	Downy woodpecker	0.167	164	13.3	8.5	18.3
	Hairy woodpecker	0.025	48	6.3	-5.8	20.0
	Northern flicker	0.007	27	-27.8	-31.5	-23.8
	Pileated woodpecker	0.147	180	9.8	4.8	15.1
	Eastern wood-pewee	0.466	190	-2.5	-4.4	-0.5
	Acadian flycatcher	0.456	184	2.4	0.1	4.7

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Eastern phoebe	0.010	31	23.9	10.9	38.4
	Great crested flycatcher	0.154	161	-8.8	-13.0	-4.3
	Eastern kingbird	0.008	11	19.8	15.0	24.7
	White-eyed vireo	0.383	151	2.0	-0.6	4.7
	Yellow-throated vireo	0.099	120	17.1	10.1	24.5
	Red-eyed vireo	0.981	205	10.5	8.7	12.4
	Blue jay	0.168	181	-18.9	-23.2	-14.3
	American crow	0.765	202	1.9	0.1	3.8
	Purple martin	0.018	24	-6.5	-19.9	9.0
	Carolina chickadee	0.148	162	5.3	-0.3	11.1
	Tufted titmouse	0.491	205	3.0	0.5	5.6
	White-breasted nuthatch	0.235	177	1.6	-2.8	6.1
	Carolina wren	0.319	200	6.4	3.8	9.1
	Blue-gray gnatcatcher	0.438	199	13.2	10.2	16.3
	Eastern bluebird	0.015	34	9.6	-4.3	25.5
	Wood thrush	0.189	162	-10.3	-14.1	-6.4
	American robin	0.004	28	-20.4	-22.8	-17.8
	Gray catbird	0.002	24	-48.5	-51.9	-44.9
	Brown thrasher	0.025	62	-12.4	-16.9	-7.6
	Blue-winged warbler	0.011	30	-60.5	-62.8	-58.1
	Northern parula	0.217	138	14.9	10.6	19.4
	Yellow-throated warbler	0.027	31	9.8	1.4	19.0
	Pine warbler	0.051	46	12.4	3.7	21.8
	Prairie warbler	0.107	95	-0.4	-5.4	5.0
	Black-and-white warbler	0.029	41	25.0	17.7	32.8
	Prothonotary warbler	0.032	23	5.4	-2.6	14.2
	Worm-eating warbler	0.195	143	8.1	4.0	12.2
	Ovenbird	0.062	60	2.0	-5.5	10.1
	Louisiana waterthrush	0.023	25	2.6	-7.9	14.2
	Kentucky warbler	0.099	110	-0.6	-6.1	5.3
	Common yellowthroat	0.098	89	-6.6	-11.3	-1.7
	Hooded warbler	0.018	22	22.0	11.3	33.7
	Yellow-breasted chat	0.219	137	4.2	0.5	7.9
	Summer tanager	0.456	201	5.9	3.2	8.6
	Scarlet tanager	0.400	196	4.9	2.2	7.6
	Eastern towhee	0.134	139	-17.6	-21.8	-13.1
	Chipping sparrow	0.011	33	45.4	30.9	61.6
	Field sparrow	0.041	57	-13.6	-21.5	-5.0
	Northern cardinal	0.288	196	0.9	-2.1	4.0
	Blue grosbeak	0.009	14	85.3	72.2	99.4
	Indigo bunting	0.607	186	5.0	2.7	7.3
	Red-winged blackbird	0.015	22	-21.3	-25.4	-16.9
	Common grackle	0.014	23	-17.5	-19.8	-15.1
	Brown-headed cowbird	0.202	180	5.6	1.0	10.4
	Orchard oriole	0.032	69	-10.0	-16.9	-2.5
	American goldfinch	0.065	74	13.5	4.8	23.0
Ozark-Ouachita Interior Highlands	Wild turkey	0.026	78	6.6	-3.0	17.1
	Northern bobwhite	0.087	141	-1.1	-6.3	4.4

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Black vulture	0.003	9	56.9	45.0	69.7
	Turkey vulture	0.022	61	-2.0	-8.8	5.2
	Cooper's hawk	0.002	8	19.0	9.4	29.5
	Red-shouldered hawk	0.021	62	-12.5	-19.4	-5.0
	Broad-winged hawk	0.025	82	2.5	-4.8	10.2
	Red-tailed hawk	0.008	26	-18.7	-24.5	-12.5
	Mourning dove	0.099	201	9.4	5.5	13.5
	Yellow-billed cuckoo	0.449	459	3.0	1.4	4.6
	Greater roadrunner	0.003	9	-6.1	-13.4	1.9
	Barred owl	0.010	36	-13.4	-24.1	-1.1
	Chuck-will's-widow	0.006	19	7.6	-8.0	25.8
	Whip-poor-will	0.004	11	11.7	1.6	22.7
	Chimney swift	0.029	63	14.1	4.7	24.4
	Ruby-throated hummingbird	0.028	84	-0.2	-6.4	6.4
	Belted kingfisher	0.002	9	-3.1	-16.4	12.4
	Red-headed woodpecker	0.013	35	-13.1	-24.5	0.1
	Red-bellied woodpecker	0.074	182	8.1	2.7	13.8
	Yellow-bellied sapsucker	0.003	10	-14.5	-17.9	-11.0
	Downy woodpecker	0.146	312	7.0	3.4	10.8
	Hairy woodpecker	0.054	151	-1.9	-7.1	3.6
	Northern flicker	0.034	85	-11.6	-17.8	-4.9
	Pileated woodpecker	0.458	476	3.9	2.0	5.9
	Eastern wood-pewee	0.179	247	0.1	-2.6	2.8
	Acadian flycatcher	0.181	190	3.6	0.8	6.5
	Eastern phoebe	0.030	80	1.0	-4.7	7.1
	Great crested flycatcher	0.100	220	-8.3	-11.8	-4.6
	White-eyed vireo	0.163	211	1.8	-1.7	5.3
	Yellow-throated vireo	0.052	116	3.1	-2.6	9.1
	Red-eyed vireo	1.793	507	3.0	2.0	3.9
	Blue jay	0.274	376	5.9	2.9	8.9
	American crow	0.979	489	2.2	0.9	3.5
	Fish crow	0.017	45	18.9	3.7	36.4
	Purple martin	0.008	16	11.4	2.0	21.6
	Carolina chickadee	0.450	443	13.2	10.2	16.2
	Tufted titmouse	0.558	478	9.8	7.9	11.6
	White-breasted nuthatch	0.142	273	9.0	5.6	12.6
	Brown-headed nuthatch	0.007	7	10.4	-10.6	36.4
	Carolina wren	0.267	379	0.4	-2.0	2.8
	Blue-gray gnatcatcher	0.313	375	6.6	4.4	8.9
	Eastern bluebird	0.012	33	12.9	1.4	25.6
	Swainson's thrush	0.007	20	-19.9	-28.3	-10.6
	Wood thrush	0.086	163	-0.8	-4.5	3.0
	Gray catbird	0.005	14	-22.7	-31.4	-12.9
	Northern mockingbird	0.004	10	-13.3	-26.6	2.5
	Brown thrasher	0.006	17	-17.1	-31.8	0.9
	Cedar waxwing	0.025	10	-47.1	-52.8	-40.7
	Blue-winged warbler	0.019	33	-9.4	-18.0	0.1
	Tennessee warbler	0.004	13	-47.4	-51.8	-42.7
	Northern parula	0.109	115	3.1	0.0	6.2

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Yellow warbler	0.013	34	-4.1	-12.4	5.1
	Yellow-rumped warbler	0.003	6	172.1	133.0	217.8
	Black-throated green warbler	0.019	34	21.3	8.7	35.4
	Blackburnian warbler	0.003	9	34.1	28.5	39.9
	Yellow-throated warbler	0.013	36	-5.8	-13.8	3.0
	Pine warbler	0.772	370	0.5	-1.0	2.1
	Prairie warbler	0.201	160	-5.4	-8.6	-2.1
	Cerulean warbler	0.014	16	-12.0	-22.4	-0.1
	Black-and-white warbler	0.357	434	3.9	2.0	5.9
	American redstart	0.005	11	-18.0	-36.8	6.4
	Worm-eating warbler	0.113	197	3.9	-0.3	8.3
	Ovenbird	0.489	325	2.2	0.2	4.2
	Louisiana waterthrush	0.038	73	14.0	6.9	21.6
	Kentucky warbler	0.180	244	7.2	4.0	10.4
	Common yellowthroat	0.052	90	-7.9	-14.1	-1.2
	Hooded warbler	0.219	229	1.9	-0.7	4.6
	Yellow-breasted chat	0.298	235	-1.8	-4.4	1.0
	Summer tanager	0.383	409	-2.7	-4.7	-0.7
	Scarlet tanager	0.363	379	5.9	3.7	8.2
	Eastern towhee	0.071	88	-4.2	-8.5	0.3
	Chipping sparrow	0.045	84	0.6	-5.3	6.9
	Field sparrow	0.026	50	-12.2	-20.0	-3.6
	Northern cardinal	0.279	329	9.5	6.8	12.3
	Blue grosbeak	0.019	44	-9.4	-18.4	0.6
	Indigo bunting	1.081	483	6.9	5.4	8.5
	Brown-headed cowbird	0.068	120	-11.0	-15.2	-6.6
	American goldfinch	0.038	78	-10.9	-18.2	-3.0
West Gulf Coastal Plain	Wood duck	0.029	35	20.2	6.0	36.2
	Wild turkey	0.017	26	16.4	0.7	34.5
	Northern bobwhite	0.081	98	-10.4	-16.9	-3.4
	Yellow-crowned night-heron	0.009	10	19.2	7.4	32.2
	Black vulture	0.014	20	2.6	-5.4	11.3
	Turkey vulture	0.082	89	-2.9	-8.8	3.3
	Sharp-shinned hawk	0.006	10	-22.7	-32.8	-11.0
	Red-shouldered hawk	0.070	92	-9.7	-16.4	-2.6
	Broad-winged hawk	0.020	39	8.3	-3.4	21.3
	Red-tailed hawk	0.028	45	-1.8	-10.6	7.8
	American kestrel	0.022	33	2.4	-10.4	17.0
	Mourning dove	0.434	243	0.8	-2.3	4.1
	Yellow-billed cuckoo	0.480	289	-0.8	-3.2	1.7
	Barred owl	0.036	42	4.7	-3.4	13.4
	Common nighthawk	0.004	6	-18.7	-27.9	-8.3
	Chuck-will's-widow	0.019	20	2.6	-10.8	18.1
	Chimney swift	0.054	56	-9.0	-17.8	0.7
	Ruby-throated hummingbird	0.023	43	4.1	-7.3	16.9
	Belted kingfisher	0.003	7	-29.8	-38.3	-20.1
	Red-headed woodpecker	0.137	94	-4.4	-9.9	1.5
	Red-bellied woodpecker	0.541	292	1.7	-0.7	4.2

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Downy woodpecker	0.121	135	7.8	2.8	13.1
	Hairy woodpecker	0.041	59	4.8	-4.1	14.4
	Red-cockaded woodpecker	0.069	39	-16.0	-22.7	-8.8
	Northern flicker	0.038	59	17.2	7.2	28.1
	Pileated woodpecker	0.397	293	3.7	1.0	6.5
	Eastern wood-pewee	0.184	147	-7.6	-11.7	-3.4
	Acadian flycatcher	0.491	150	1.2	-2.0	4.5
	Great crested flycatcher	0.234	209	-5.6	-9.2	-2.0
	Eastern kingbird	0.034	40	-7.5	-17.7	4.0
	White-eyed vireo	0.726	241	7.3	4.3	10.4
	Yellow-throated vireo	0.173	163	3.9	0.3	7.6
	Red-eyed vireo	1.509	279	1.8	-0.4	4.0
	Blue jay	0.836	318	5.3	3.2	7.5
	American crow	1.556	330	1.2	-0.6	3.1
	Fish crow	0.067	39	39.9	27.6	53.4
	Purple martin	0.067	86	-7.0	-13.3	-0.3
	Barn swallow	0.016	13	25.5	3.0	52.8
	Carolina chickadee	0.485	265	9.7	6.5	13.0
	Tufted titmouse	1.101	310	4.2	2.1	6.4
	White-breasted nuthatch	0.018	19	10.4	0.2	21.7
	Brown-headed nuthatch	0.191	108	0.5	-5.3	6.7
	Carolina wren	1.516	329	7.1	5.4	8.8
	Blue-gray gnatcatcher	0.198	131	8.5	3.8	13.4
	Eastern bluebird	0.016	19	-42.6	-46.7	-38.1
	Swainson's thrush	0.006	11	-11.5	-13.6	-9.3
	Wood thrush	0.097	110	-15.4	-20.8	-9.7
	American robin	0.004	6	-87.6	-89.9	-84.7
	Gray catbird	0.009	20	3.7	-10.4	20.0
	Northern mockingbird	0.011	16	-29.1	-34.5	-23.3
	Brown thrasher	0.006	14	12.4	-10.0	40.4
	Tennessee warbler	0.003	6	15.6	3.5	29.1
	Northern parula	0.143	58	6.5	0.4	12.9
	Magnolia warbler	0.003	6	13.8	3.2	25.5
	Yellow-throated warbler	0.022	27	13.0	-0.6	28.4
	Pine warbler	2.128	301	5.4	3.5	7.3
	Prairie warbler	0.120	49	-4.9	-13.6	4.6
	Black-and-white warbler	0.043	61	7.0	-3.5	18.5
	American redstart	0.033	41	-10.2	-17.2	-2.7
	Prothonotary warbler	0.014	9	4.8	-11.4	23.9
	Worm-eating warbler	0.045	46	-18.1	-26.1	-9.2
	Swainson's warbler	0.019	29	-23.6	-33.0	-12.8
	Ovenbird	0.005	6	-1.6	-2.0	-1.1
	Louisiana waterthrush	0.048	47	4.1	-3.0	11.7
	Kentucky warbler	0.194	159	6.0	1.3	10.9
	Common yellowthroat	0.081	61	-12.3	-18.9	-5.0
	Hooded warbler	0.754	254	5.3	2.5	8.3
	Yellow-breasted chat	1.040	221	2.9	0.2	5.6
	Summer tanager	0.642	316	1.2	-0.8	3.2
	Eastern towhee	0.050	49	-0.1	-8.9	9.6

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Bachman's sparrow	0.214	87	-4.2	-8.6	0.6
	Chipping sparrow	0.036	39	8.5	-0.2	18.1
	Northern cardinal	2.104	334	3.1	1.5	4.7
	Blue grosbeak	0.069	66	-5.2	-11.5	1.6
	Indigo bunting	0.926	226	-1.4	-3.8	1.1
	Painted bunting	0.013	19	-27.4	-36.6	-16.9
	Red-winged blackbird	0.039	8	-3.5	-12.8	6.8
	Common grackle	0.008	15	-3.4	-18.4	14.3
	Brown-headed cowbird	0.125	113	0.0	-4.3	4.6
	Orchard oriole	0.028	28	20.1	5.7	36.3
East Gulf Coastal Plain	Wood duck	0.005	11	1.6	-4.6	8.2
	Wild turkey	0.024	80	-5.5	-12.3	1.8
	Northern bobwhite	0.096	312	-15.6	-18.3	-12.7
	Black vulture	0.007	33	-9.4	-17.9	-0.1
	Turkey vulture	0.019	84	-1.9	-8.9	5.8
	Mississippi kite	0.007	20	7.0	-10.5	27.8
	Cooper's hawk	0.002	13	-6.0	-13.5	2.2
	Red-shouldered hawk	0.039	187	-3.5	-8.9	2.3
	Broad-winged hawk	0.011	63	7.9	-2.6	19.5
	Red-tailed hawk	0.011	61	-11.2	-18.8	-2.8
	Mourning dove	0.136	410	-1.3	-4.5	2.0
	Common ground-dove	0.001	6	-34.5	-44.1	-23.2
	Yellow-billed cuckoo	0.392	881	-2.0	-3.8	-0.3
	Eastern screech-owl	0.001	6	-24.8	-39.2	-7.0
	Barred owl	0.032	111	2.2	-3.4	8.2
	Chuck-will's-widow	0.002	9	-16.2	-31.0	1.7
	Chimney swift	0.046	154	10.7	4.0	17.9
	Ruby-throated hummingbird	0.062	201	-5.6	-10.5	-0.4
	Belted kingfisher	0.002	10	-20.9	-34.3	-4.7
	Red-headed woodpecker	0.107	411	-0.6	-4.6	3.6
	Red-bellied woodpecker	0.445	905	7.7	5.9	9.6
	Downy woodpecker	0.120	432	-3.8	-6.9	-0.7
	Hairy woodpecker	0.028	147	-18.0	-22.9	-12.7
	Red-cockaded woodpecker	0.018	49	-2.5	-13.1	9.3
	Northern flicker	0.046	226	0.7	-4.5	6.2
	Pileated woodpecker	0.247	748	-2.7	-4.9	-0.5
	Eastern wood-pewee	0.192	481	5.4	2.8	8.1
	Acadian flycatcher	0.337	583	0.5	-1.5	2.6
	Eastern phoebe	0.014	51	8.0	3.8	12.3
	Great crested flycatcher	0.265	766	10.5	8.2	12.8
	Eastern kingbird	0.007	32	15.1	5.9	25.1
	White-eyed vireo	0.297	665	-0.7	-3.1	1.7
	Yellow-throated vireo	0.065	274	2.8	-1.9	7.7
	Red-eyed vireo	0.677	900	1.9	0.6	3.3
	Blue jay	0.484	858	-4.6	-6.4	-2.8
	American crow	0.464	842	-2.6	-4.5	-0.6
	Fish crow	0.020	78	-8.9	-17.9	1.1
	Purple martin	0.003	13	15.9	-14.5	57.1

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Barn swallow	0.016	17	5.9	-12.0	27.5
	Carolina chickadee	0.278	676	0.1	-2.4	2.8
	Tufted titmouse	0.648	957	6.0	4.3	7.6
	White-breasted nuthatch	0.048	186	4.4	-1.0	10.1
	Brown-headed nuthatch	0.036	114	11.2	4.1	18.7
	Carolina wren	0.581	943	8.6	6.9	10.4
	Blue-gray gnatcatcher	0.170	460	8.1	4.7	11.7
	Eastern bluebird	0.015	62	16.0	5.6	27.5
	Veery	0.003	10	-40.5	-44.1	-36.8
	Wood thrush	0.282	717	-4.8	-7.1	-2.5
	American robin	0.007	26	2.5	-1.5	6.6
	Gray catbird	0.016	74	8.7	2.5	15.3
	Northern mockingbird	0.009	40	11.6	-0.4	25.1
	Brown thrasher	0.030	132	16.7	9.4	24.5
	Blue-winged warbler	0.002	9	113.5	78.2	155.8
	Northern parula	0.081	216	5.8	1.9	9.8
	Yellow warbler	0.002	12	75.2	55.4	97.5
	Black-throated green warbler	0.008	30	39.7	31.0	49.1
	Yellow-throated warbler	0.017	86	6.5	-0.2	13.7
	Pine warbler	0.598	825	3.4	1.7	5.1
	Prairie warbler	0.144	292	3.1	0.6	5.7
	Black-and-white warbler	0.093	281	-1.0	-5.0	3.0
	American redstart	0.029	121	14.5	6.6	22.9
	Prothonotary warbler	0.108	131	13.2	8.9	17.6
	Worm-eating warbler	0.084	299	12.5	8.2	16.9
	Swainson's warbler	0.009	57	22.6	7.0	40.4
	Ovenbird	0.028	83	-8.0	-11.8	-3.9
	Northern waterthrush	0.001	6	-26.1	-39.1	-10.2
	Louisiana waterthrush	0.013	56	19.8	10.6	29.7
	Kentucky warbler	0.126	425	8.0	4.1	12.1
	Common yellowthroat	0.140	372	1.2	-2.5	5.0
	Hooded warbler	0.399	768	3.2	1.1	5.3
	Yellow-breasted chat	0.444	740	-3.7	-5.5	-1.9
	Summer tanager	0.444	897	2.3	0.4	4.3
	Scarlet tanager	0.034	121	4.9	-0.7	10.7
	Eastern towhee	0.349	673	0.7	-1.3	2.8
	Bachman's sparrow	0.039	106	-0.1	-6.7	7.1
	Chipping sparrow	0.037	132	18.4	13.4	23.6
	Field sparrow	0.026	86	-1.2	-8.0	6.2
	Northern cardinal	0.799	1028	-2.8	-4.1	-1.6
	Blue grosbeak	0.022	83	21.9	11.8	32.9
	Indigo bunting	0.580	762	0.6	-0.9	2.2
	Painted bunting	0.001	6	-51.9	-65.1	-33.7
	Red-winged blackbird	0.005	12	-6.6	-17.0	5.1
	Common grackle	0.009	46	-39.1	-45.1	-32.4
	Bronzed cowbird	0.006	23	5.0	3.9	6.1
	Brown-headed cowbird	0.091	222	-1.6	-6.1	3.2
	Orchard oriole	0.012	48	-8.0	-18.4	3.8
	American goldfinch	0.010	41	25.2	16.2	34.8

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
South Atlantic Coastal Plain	Wood duck	0.006	12	0.4	-12.8	15.5
	Wild turkey	0.025	33	-8.3	-16.8	1.1
	Northern bobwhite	0.297	191	-6.1	-9.5	-2.6
	Black vulture	0.004	15	1.9	0.1	3.7
	Turkey vulture	0.034	55	-6.0	-12.9	1.5
	Red-shouldered hawk	0.052	81	12.2	5.4	19.4
	Red-tailed hawk	0.005	12	18.5	8.9	29.0
	American kestrel	0.028	28	-8.5	-20.2	4.9
	Mourning dove	0.510	254	1.5	-1.0	4.1
	Yellow-billed cuckoo	0.256	175	3.3	-0.3	7.0
	Great horned owl	0.004	6	3.9	-7.5	16.7
	Barred owl	0.015	26	1.9	-5.9	10.4
	Common nighthawk	0.048	48	-11.2	-18.9	-2.7
	Chuck-will's-widow	0.009	11	-11.0	-20.3	-0.6
	Chimney swift	0.028	44	17.4	8.1	27.4
	Ruby-throated hummingbird	0.015	35	7.2	-5.4	21.5
	Red-headed woodpecker	0.268	217	-2.0	-5.6	1.8
	Red-bellied woodpecker	0.936	303	-4.2	-5.9	-2.5
	Downy woodpecker	0.148	163	2.6	-1.2	6.5
	Hairy woodpecker	0.017	31	-2.5	-15.7	12.7
	Red-cockaded woodpecker	0.100	75	11.1	4.0	18.7
	Northern flicker	0.196	191	-0.5	-5.1	4.4
	Pileated woodpecker	0.290	224	-0.1	-3.3	3.1
	Eastern wood-pewee	0.150	116	4.4	-1.5	10.7
	Acadian flycatcher	0.179	73	4.1	-1.5	10.0
	Great crested flycatcher	1.320	323	1.7	0.3	3.2
	Eastern kingbird	0.028	30	10.4	1.3	20.3
	White-eyed vireo	0.652	238	1.7	-1.0	4.4
	Yellow-throated vireo	0.123	112	-1.0	-5.0	3.2
	Red-eyed vireo	0.202	125	-12.3	-17.9	-6.3
	Blue jay	0.449	228	-6.5	-9.6	-3.2
	Florida scrub-jay	0.046	24	-31.1	-38.7	-22.5
	American crow	0.635	247	-12.3	-14.0	-10.5
	Fish crow	0.063	95	-0.9	-5.9	4.3
	Purple martin	0.026	33	26.3	16.0	37.6
	Tree swallow	0.022	17	-14.7	-20.0	-9.1
	Barn swallow	0.008	12	36.1	25.8	47.3
	Carolina chickadee	0.160	162	-6.0	-9.9	-2.0
	Tufted titmouse	0.799	258	-9.6	-11.4	-7.8
	White-breasted nuthatch	0.032	34	22.8	9.6	37.6
	Brown-headed nuthatch	0.192	122	1.7	-2.8	6.4
	Carolina wren	1.023	315	6.7	4.6	8.8
	House wren	0.042	17	10.5	2.4	19.2
	Ruby-crowned kinglet	0.004	7	-15.8	-20.8	-10.6
	Blue-gray gnatcatcher	0.424	240	-6.0	-8.7	-3.3
	Eastern bluebird	0.047	76	-2.2	-7.5	3.5
	Wood thrush	0.036	34	18.0	5.2	32.3
	Gray catbird	0.149	88	11.7	3.4	20.6
	Northern mockingbird	0.020	34	24.7	10.5	40.8

Continued

Appendix 4—continued

Physiographic area	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limit	
					Lower	Upper
	Brown thrasher	0.211	155	-5.1	-8.3	-1.8
	European starling	0.003	7	40.2	13.8	72.8
	Cedar waxwing	0.028	13	-20.2	-25.0	-15.1
	Northern parula	0.289	161	6.8	2.2	11.6
	Yellow-throated warbler	0.114	84	13.3	6.8	20.2
	Pine warbler	1.007	281	-7.3	-9.3	-5.2
	Prairie warbler	0.498	107	6.4	2.7	10.3
	Palm warbler	0.010	10	-8.9	-13.3	-4.4
	Black-and-white warbler	0.005	7	67.5	33.2	110.8
	Prothonotary warbler	0.230	101	12.8	6.0	20.0
	Worm-eating warbler	0.025	18	19.2	6.6	33.2
	Swainson's warbler	0.045	33	16.9	6.8	27.9
	Ovenbird	0.103	38	5.7	-4.5	17.0
	Kentucky warbler	0.027	37	25.0	11.8	39.7
	Common yellowthroat	0.871	241	4.9	2.0	7.9
	Hooded warbler	0.102	106	23.0	15.4	31.1
	Yellow-breasted chat	0.226	113	-4.8	-8.9	-0.5
	Summer tanager	0.346	211	-2.9	-6.0	0.3
	Eastern towhee	3.677	305	-3.1	-5.4	-0.7
	Bachman's sparrow	0.444	129	-6.6	-10.2	-2.9
	Chipping sparrow	0.007	6	32.5	14.1	53.8
	Northern cardinal	0.903	303	1.3	-0.8	3.3
	Blue grosbeak	0.043	57	4.3	-1.7	10.5
	Indigo bunting	0.149	93	13.2	7.3	19.4
	Red-winged blackbird	0.009	10	22.0	10.4	34.9
	Eastern meadowlark	0.014	11	7.1	-3.3	18.7
	Common grackle	0.132	98	14.8	7.2	22.9
	Brown-headed cowbird	0.130	135	4.9	0.3	9.6
	Orchard oriole	0.038	52	-6.9	-14.5	1.3

[a] Estimates are based on point-count surveys on 14 national forests in the Southern Region. Species that occurred at fewer than 6 points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

APPENDIX 5

Mean Number of Observations per Count and Percent Annual Change in Number of Observations per Count for 144 Avian Species in National Forests, Southern Region, 1992-2004[a]

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
George Washington and Jefferson	Ruffed grouse	0.034	142	16.1	11.5	20.9
	Wild turkey	0.027	134	4.2	0.2	8.4
	Northern bobwhite	0.004	12	-28.7	-33.2	-23.8
	Black vulture	0.002	8	-15.6	-19.2	-11.8
	Turkey vulture	0.010	37	21.8	17.3	26.5
	Sharp-shinned hawk	0.001	6	-13.9	-23.6	-3.1
	Red-shouldered hawk	0.004	23	10.5	1.1	20.8
	Broad-winged hawk	0.004	30	-4.1	-10.6	2.9
	Red-tailed hawk	0.005	31	16.6	13.7	19.7
	Mourning dove	0.143	360	5.3	3.4	7.2
	Black-billed cuckoo	0.018	95	-5.3	-9.6	-0.8
	Yellow-billed cuckoo	0.194	496	6.1	4.7	7.4
	Eastern screech-owl	0.001	7	-10.0	-16.0	-3.6
	Barred owl	0.007	42	-0.7	-6.1	4.9
	Whip-poor-will	0.011	40	10.9	7.9	14.0
	Chimney swift	0.007	43	-4.7	-9.1	-0.1
	Ruby-throated hummingbird	0.019	108	5.5	1.1	10.1
	Belted kingfisher	0.001	7	24.2	12.8	36.6
	Red-headed woodpecker	0.001	6	6.9	0.1	14.2
	Red-bellied woodpecker	0.037	168	6.7	3.0	10.5
	Downy woodpecker	0.075	337	-2.7	-4.8	-0.4
	Hairy woodpecker	0.054	257	1.4	-1.6	4.5
	Northern flicker	0.052	235	6.0	3.1	9.0
	Pileated woodpecker	0.325	637	-1.6	-2.7	-0.4
	Eastern wood-pewee	0.247	521	-2.9	-4.4	-1.4
	Acadian flycatcher	0.207	311	-4.1	-5.9	-2.3
	Alder flycatcher	0.001	9	124.7	86.2	171.1
	Least flycatcher	0.003	11	27.4	10.6	46.8
	Eastern phoebe	0.014	50	1.9	-4.0	8.0
	Great crested flycatcher	0.192	486	-4.4	-6.0	-2.8
	White-eyed vireo	0.002	9	16.5	7.9	25.7
	Yellow-throated vireo	0.003	15	14.8	7.1	23.1
	Blue-headed vireo	0.136	384	-1.7	-3.6	0.2
	Red-eyed vireo	1.078	793	2.6	1.9	3.3
	Blue jay	0.210	569	7.6	5.7	9.5
	American crow	0.493	638	-2.9	-4.0	-1.8
	Common raven	0.120	290	-2.6	-4.5	-0.7
	Carolina chickadee	0.049	207	-6.9	-9.4	-4.3
	Black-capped chickadee	0.091	332	6.1	3.5	8.8
	Tufted titmouse	0.374	665	-1.5	-2.7	-0.3
	Red-breasted nuthatch	0.011	29	-6.6	-12.2	-0.8
	White-breasted nuthatch	0.167	475	0.1	-1.5	1.7
	Carolina wren	0.037	159	10.8	8.3	13.4
	House wren	0.001	6	44.2	35.8	53.0
	Winter wren	0.007	27	-5.6	-13.4	2.9
	Golden-crowned kinglet	0.006	11	-9.7	-22.3	5.0
	Blue-gray gnatcatcher	0.072	246	13.0	10.0	16.0
	Eastern bluebird	0.005	28	2.4	-4.4	9.6
	Veery	0.114	148	2.0	-0.5	4.6
	Hermit thrush	0.003	13	21.7	13.7	30.3
	Wood thrush	0.335	602	-2.1	-3.4	-0.8
	American robin	0.063	161	-1.5	-5.0	2.1
	Gray catbird	0.039	113	5.7	2.0	9.7
	Northern mockingbird	0.001	7	13.9	2.3	26.9

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Brown thrasher	0.005	25	10.5	3.6	17.8
	Cedar waxwing	0.064	136	10.9	5.4	16.7
	Northern parula	0.059	151	-1.6	-4.3	1.2
	Yellow warbler	0.002	13	-21.7	-27.6	-15.4
	Chestnut-sided warbler	0.140	236	1.6	-0.7	4.0
	Magnolia warbler	0.010	36	11.8	5.3	18.7
	Black-throated blue warbler	0.054	123	7.4	4.1	10.9
	Yellow-rumped warbler	0.002	13	48.7	38.7	59.5
	Black-throated green warbler	0.077	181	6.7	3.3	10.2
	Blackburnian warbler	0.015	62	7.0	-0.9	15.4
	Yellow-throated warbler	0.002	13	-10.2	-15.2	-4.9
	Pine warbler	0.119	283	-3.0	-4.9	-1.0
	Prairie warbler	0.020	52	8.7	1.8	16.1
	Cerulean warbler	0.017	78	-12.4	-17.7	-6.6
	Black-and-white warbler	0.177	504	3.8	2.0	5.6
	American redstart	0.095	243	-6.3	-9.0	-3.4
	Worm-eating warbler	0.287	547	3.8	2.4	5.2
	Swainson's warbler	0.017	25	-11.4	-15.2	-7.5
	Ovenbird	0.908	754	2.6	1.8	3.5
	Louisiana waterthrush	0.042	119	-0.1	-3.0	2.9
	Kentucky warbler	0.011	58	-8.2	-12.7	-3.5
	Common yellowthroat	0.009	32	9.4	1.4	18.1
	Hooded warbler	0.236	421	0.2	-1.3	1.8
	Canada warbler	0.031	81	-0.2	-3.6	3.4
	Yellow-breasted chat	0.017	54	0.8	-6.1	8.2
	Scarlet tanager	0.621	769	-1.6	-2.4	-0.7
	Eastern towhee	0.568	589	-4.0	-5.1	-2.9
	Chipping sparrow	0.018	75	0.6	-3.2	4.6
	Field sparrow	0.037	55	-2.9	-8.5	3.0
	Song sparrow	0.006	18	-14.5	-20.4	-8.1
	Dark-eyed junco	0.143	190	-1.5	-3.9	1.1
	Northern cardinal	0.066	224	13.2	9.9	16.7
	Rose-breasted grosbeak	0.117	331	-3.9	-5.9	-1.9
	Indigo bunting	0.421	560	-1.5	-2.7	-0.4
	Red-winged blackbird	0.003	9	21.4	9.3	34.9
	Common grackle	0.016	56	-1.7	-5.8	2.6
	Brown-headed cowbird	0.064	248	-7.9	-10.5	-5.1
	Red crossbill	0.001	7	6.4	-3.7	17.5
	American goldfinch	0.136	416	9.7	7.6	11.9
NFs in North Carolina	Ruffed grouse	0.011	25	-12.4	-21.8	-1.9
	Wild turkey	0.018	37	-3.6	-10.6	3.9
	Northern bobwhite	0.043	50	3.9	-4.0	12.3
	Turkey vulture	0.006	9	6.3	-3.8	17.3
	Red-shouldered hawk	0.003	7	24.7	10.4	40.9
	Broad-winged hawk	0.006	14	-4.8	-20.6	14.1
	Red-tailed hawk	0.005	11	-37.1	-45.6	-27.1
	Mourning dove	0.183	141	8.5	4.3	12.9
	Yellow-billed cuckoo	0.073	77	17.5	12.0	23.2
	Barred owl	0.009	18	-3.6	-15.7	10.3
	Whip-poor-will	0.004	8	-0.2	-4.9	4.7
	Chimney swift	0.051	59	-1.2	-9.2	7.6
	Ruby-throated hummingbird	0.034	63	7.4	-0.7	16.1
	Red-headed woodpecker	0.015	22	31.6	19.1	45.4
	Red-bellied woodpecker	0.101	103	9.4	3.5	15.6
	Downy woodpecker	0.056	83	-2.2	-9.2	5.4
	Hairy woodpecker	0.043	81	-8.0	-15.2	-0.2
	Northern flicker	0.056	73	16.7	7.4	26.8

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Pileated woodpecker	0.264	219	-2.3	-4.7	0.1
	Eastern wood-pewee	0.114	99	-0.1	-6.8	7.1
	Acadian flycatcher	0.222	128	11.8	7.8	15.9
	Willow flycatcher	0.007	10	-28.2	-36.1	-19.4
	Least flycatcher	0.032	13	-9.9	-17.5	-1.5
	Eastern phoebe	0.009	13	8.3	-8.8	28.7
	Great crested flycatcher	0.160	98	15.1	9.5	20.9
	Eastern kingbird	0.014	11	-1.4	-14.3	13.5
	White-eyed vireo	0.135	61	14.2	7.8	21.0
	Yellow-throated vireo	0.047	64	0.7	-7.4	9.5
	Blue-headed vireo	0.365	195	-11.2	-13.5	-8.9
	Red-eyed vireo	1.229	287	-2.5	-4.5	-0.5
	Blue jay	0.208	205	-3.0	-6.3	0.4
	American crow	0.558	255	1.6	-0.8	4.2
	Fish crow	0.017	27	-4.2	-14.5	7.4
	Common raven	0.031	40	-8.5	-16.1	-0.1
	Purple martin	0.009	11	57.1	20.8	104.4
	Tree swallow	0.003	6	-6.6	-13.0	0.2
	Carolina chickadee	0.217	208	1.8	-1.7	5.4
	Black-capped chickadee	0.008	8	77.3	55.9	101.7
	Tufted titmouse	0.483	260	-0.3	-2.4	1.9
	Red-breasted nuthatch	0.059	38	-3.1	-9.6	3.9
	White-breasted nuthatch	0.141	152	0.9	-3.0	5.0
	Brown-headed nuthatch	0.050	22	-2.1	-15.1	12.8
	Brown creeper	0.055	34	-13.3	-18.2	-8.2
	Carolina wren	0.448	199	11.8	8.6	15.1
	House wren	0.033	12	14.1	7.3	21.3
	Winter wren	0.246	61	-15.2	-18.5	-11.7
	Golden-crowned kinglet	0.337	54	-5.7	-9.9	-1.2
	Blue-gray gnatcatcher	0.135	90	10.9	6.5	15.5
	Eastern bluebird	0.015	19	9.3	-3.8	24.1
	Veery	0.305	132	-1.0	-3.7	1.8
	Hermit thrush	0.011	15	10.6	1.2	20.8
	Wood thrush	0.211	155	0.5	-3.3	4.3
	American robin	0.187	100	-0.4	-4.3	3.7
	Gray catbird	0.233	117	5.8	0.4	11.4
	Northern mockingbird	0.003	8	-47.4	-53.3	-40.9
	Brown thrasher	0.029	43	8.1	-2.2	19.4
	Cedar waxwing	0.060	33	-11.4	-23.2	2.2
	Blue-winged warbler	0.064	76	-32.3	-36.8	-27.6
	Golden-winged warbler	0.028	22	-27.0	-34.7	-18.4
	Northern parula	0.248	152	2.8	-2.3	8.1
	Yellow warbler	0.011	21	-12.3	-18.3	-6.0
	Chestnut-sided warbler	0.789	199	-10.0	-12.2	-7.7
	Black-throated blue warbler	0.311	137	-6.1	-9.1	-2.9
	Black-throated green warbler	0.306	147	-0.8	-4.1	2.6
	Blackburnian warbler	0.084	61	-0.1	-5.8	6.1
	Yellow-throated warbler	0.102	81	11.1	4.7	17.8
	Pine warbler	0.189	106	2.8	-1.4	7.1
	Prairie warbler	0.375	71	7.8	4.3	11.5
	Black-and-white warbler	0.187	169	1.5	-2.5	5.7
	American redstart	0.021	36	-12.0	-20.7	-2.4
	Prothonotary warbler	0.100	23	38.5	25.1	53.4
	Worm-eating warbler	0.095	109	-2.0	-7.5	3.9
	Swainson's warbler	0.030	17	11.9	-0.7	26.0
	Ovenbird	0.705	255	-0.6	-3.1	2.0
	Louisiana waterthrush	0.006	11	-7.1	-23.2	12.4
	Kentucky warbler	0.023	34	-18.5	-27.8	-8.1

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Common yellowthroat	0.410	88	13.8	10.0	17.8
	Hooded warbler	0.376	211	-4.5	-7.4	-1.5
	Canada warbler	0.123	86	-4.0	-8.9	1.2
	Yellow-breasted chat	0.134	84	-2.1	-7.3	3.4
	Summer tanager	0.093	72	-2.1	-7.5	3.7
	Scarlet tanager	0.300	211	-4.8	-7.4	-2.2
	Eastern towhee	1.005	274	2.6	0.1	5.1
	Chipping sparrow	0.024	33	-10.9	-21.0	0.4
	Field sparrow	0.056	37	-5.5	-13.6	3.3
	Song sparrow	0.108	41	4.9	-2.6	13.0
	Dark-eyed junco	0.690	144	-11.4	-13.7	-9.0
	Northern cardinal	0.271	169	14.4	10.6	18.2
	Rose-breasted grosbeak	0.147	92	-6.6	-10.8	-2.1
	Blue grosbeak	0.015	14	-20.1	-30.9	-7.6
	Indigo bunting	0.584	232	-3.4	-6.1	-0.7
	Common grackle	0.037	27	9.0	-4.2	24.1
	Brown-headed cowbird	0.058	60	10.4	3.3	18.0
	Orchard oriole	0.015	10	-11.9	-24.6	3.1
	Red crossbill	0.012	7	49.0	27.7	73.9
	Pine siskin	0.040	23	-4.3	-11.4	3.4
	American goldfinch	0.205	180	-3.6	-7.1	-0.0
Cherokee	Ruffed grouse	0.020	42	-12.1	-16.6	-7.3
	Wild turkey	0.021	29	-5.6	-10.1	-0.9
	Northern bobwhite	0.009	14	-9.3	-15.1	-3.0
	Turkey vulture	0.007	16	-10.3	-14.5	-5.9
	Red-shouldered hawk	0.011	21	8.9	1.4	17.0
	Broad-winged hawk	0.013	29	-5.4	-11.2	0.8
	Red-tailed hawk	0.004	9	-8.8	-16.5	-0.4
	Mourning dove	0.091	102	10.3	6.6	14.2
	Black-billed cuckoo	0.004	6	12.5	-2.6	30.1
	Yellow-billed cuckoo	0.142	162	3.4	1.0	5.8
	Barred owl	0.009	18	11.6	8.7	14.5
	Whip-poor-will	0.008	12	-8.8	-13.0	-4.4
	Chimney swift	0.047	67	-0.6	-4.4	3.5
	Ruby-throated hummingbird	0.030	48	1.4	-4.5	7.6
	Belted kingfisher	0.005	8	2.1	-9.1	14.8
	Red-bellied woodpecker	0.025	44	3.9	-1.8	9.9
	Downy woodpecker	0.078	136	4.4	1.3	7.6
	Hairy woodpecker	0.041	85	-4.3	-7.6	-0.9
	Northern flicker	0.065	103	9.0	5.1	13.0
	Pileated woodpecker	0.310	296	2.1	0.6	3.7
	Eastern wood-pewee	0.050	70	0.2	-3.7	4.2
	Acadian flycatcher	0.101	88	-0.3	-4.2	3.8
	Eastern phoebe	0.018	37	12.1	7.3	17.1
	Great crested flycatcher	0.044	71	-4.7	-9.3	0.1
	White-eyed vireo	0.041	47	-9.7	-13.6	-5.6
	Yellow-throated vireo	0.005	11	-6.5	-11.4	-1.4
	Blue-headed vireo	0.241	168	-5.4	-7.2	-3.6
	Red-eyed vireo	1.447	396	2.6	1.8	3.4
	Blue jay	0.231	222	-0.3	-2.4	1.8
	American crow	0.689	345	5.1	3.7	6.5
	Common raven	0.011	15	-16.1	-22.2	-9.5
	Carolina chickadee	0.340	265	2.2	0.2	4.3
	Black-capped chickadee	0.008	15	-1.6	-4.3	1.2
	Tufted titmouse	0.329	262	3.2	1.4	5.0
	Red-breasted nuthatch	0.016	24	9.3	4.6	14.2
	White-breasted nuthatch	0.082	119	4.1	0.6	7.8

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Carolina wren	0.150	174	7.3	5.0	9.8
	Winter wren	0.058	55	-4.7	-8.3	-1.0
	Blue-gray gnatcatcher	0.083	77	-3.1	-6.7	0.7
	Veery	0.277	101	-1.9	-4.1	0.4
	Wood thrush	0.252	203	-1.7	-3.7	0.4
	American robin	0.094	101	4.3	0.8	8.0
	Gray catbird	0.051	60	-7.0	-11.1	-2.7
	Brown thrasher	0.010	24	-3.1	-7.4	1.4
	Cedar waxwing	0.121	66	16.2	9.7	23.0
	Golden-winged warbler	0.006	10	-11.2	-14.1	-8.2
	Northern parula	0.076	89	2.7	-0.1	5.6
	Yellow warbler	0.009	22	1.8	-3.5	7.3
	Chestnut-sided warbler	0.252	94	-2.4	-4.9	0.1
	Black-throated blue warbler	0.247	127	-2.6	-4.7	-0.4
	Black-throated green warbler	0.516	288	1.9	0.4	3.4
	Blackburnian warbler	0.028	35	-11.8	-16.0	-7.4
	Yellow-throated warbler	0.059	72	-10.0	-13.1	-6.7
	Pine warbler	0.132	136	6.7	4.4	9.0
	Prairie warbler	0.054	57	4.1	-0.5	8.9
	Black-and-white warbler	0.263	243	2.7	1.0	4.5
	American redstart	0.022	30	-17.4	-20.9	-13.6
	Worm-eating warbler	0.195	195	-1.7	-3.5	0.2
	Swainson's warbler	0.010	19	0.1	-6.8	7.6
	Ovenbird	0.744	330	1.4	-0.0	2.8
	Louisiana waterthrush	0.035	51	-5.8	-9.4	-2.0
	Kentucky warbler	0.007	15	-31.3	-34.3	-28.3
	Common yellowthroat	0.006	7	2.0	-6.7	11.4
	Hooded warbler	0.626	327	-1.8	-3.1	-0.4
	Canada warbler	0.086	72	-6.4	-10.8	-1.8
	Yellow-breasted chat	0.098	85	-9.2	-12.6	-5.6
	Summer tanager	0.004	9	1.9	-2.9	6.9
	Scarlet tanager	0.433	319	0.5	-1.0	1.9
	Eastern towhee	0.459	231	-2.5	-4.3	-0.6
	Chipping sparrow	0.003	7	2.4	-2.3	7.3
	Field sparrow	0.016	15	-7.9	-15.7	0.6
	Song sparrow	0.012	13	-8.6	-16.1	-0.4
	Dark-eyed junco	0.296	115	-2.7	-4.9	-0.5
	Northern cardinal	0.155	148	5.7	3.0	8.5
	Rose-breasted grosbeak	0.075	88	-7.0	-10.5	-3.2
	Indigo bunting	0.752	305	2.2	0.7	3.6
	Common grackle	0.016	17	-22.4	-25.7	-18.9
	Brown-headed cowbird	0.013	25	-0.0	-5.9	6.3
	American goldfinch	0.142	118	-0.6	-3.2	2.0
Chattahoochee and Oconee	Ruffed grouse	0.004	6	14.3	9.9	18.8
	Wild turkey	0.022	20	18.9	10.2	28.3
	Northern bobwhite	0.045	36	-6.2	-10.0	-2.3
	Turkey vulture	0.026	26	13.4	6.9	20.2
	Cooper's hawk	0.007	8	18.4	13.0	24.1
	Red-shouldered hawk	0.019	23	17.2	8.5	26.6
	Broad-winged hawk	0.023	30	2.7	-3.9	9.8
	Red-tailed hawk	0.036	40	5.4	1.0	10.0
	Mourning dove	0.217	121	3.3	0.8	5.9
	Yellow-billed cuckoo	0.212	135	1.7	-0.8	4.3
	Barred owl	0.008	10	-15.9	-22.0	-9.2
	Chimney swift	0.055	45	16.0	11.0	21.2
	Ruby-throated hummingbird	0.033	37	14.0	9.1	19.0
	Belted kingfisher	0.012	8	5.6	-2.6	14.6

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Red-headed woodpecker	0.037	31	3.7	-2.5	10.3
	Red-bellied woodpecker	0.195	111	0.3	-3.0	3.8
	Downy woodpecker	0.139	115	0.1	-2.8	3.1
	Hairy woodpecker	0.054	59	-6.2	-10.5	-1.7
	Northern flicker	0.065	67	-4.0	-7.8	0.0
	Pileated woodpecker	0.509	174	-0.5	-2.0	1.0
	Eastern wood-pewee	0.076	59	6.1	1.4	11.0
	Acadian flycatcher	0.209	79	3.2	-0.4	6.9
	Eastern phoebe	0.033	27	5.4	-1.9	13.3
	Great crested flycatcher	0.201	134	-2.0	-4.8	0.8
	Eastern kingbird	0.011	8	4.0	-8.1	17.7
	White-eyed vireo	0.086	68	5.6	0.5	11.0
	Yellow-throated vireo	0.025	30	11.0	6.2	15.9
	Blue-headed vireo	0.085	55	20.6	16.9	24.4
	Red-eyed vireo	1.247	204	0.5	-0.5	1.7
	Blue jay	0.321	148	-0.1	-2.7	2.5
	American crow	1.006	206	-1.0	-2.3	0.4
	Purple martin	0.015	9	29.4	19.2	40.5
	Bank swallow	0.005	6	-10.4	-19.4	-0.4
	Carolina chickadee	0.354	161	-1.3	-3.8	1.4
	Tufted titmouse	0.509	193	-0.9	-2.8	1.1
	White-breasted nuthatch	0.136	104	1.2	-2.8	5.3
	Brown-headed nuthatch	0.011	12	28.3	19.3	37.9
	Carolina wren	0.332	156	0.7	-1.6	3.0
	Blue-gray gnatcatcher	0.177	100	5.1	0.9	9.4
	Eastern bluebird	0.025	21	11.5	3.7	19.9
	Wood thrush	0.240	123	1.2	-1.5	3.9
	American robin	0.017	19	-6.7	-13.8	1.0
	Gray catbird	0.033	27	3.6	-2.8	10.4
	Northern mockingbird	0.013	8	22.6	7.9	39.4
	Brown thrasher	0.031	30	-4.0	-12.3	5.2
	Blue-winged warbler	0.066	56	-7.6	-12.5	-2.4
	Northern parula	0.098	56	-1.5	-6.1	3.3
	Yellow warbler	0.021	22	9.7	2.8	17.2
	Chestnut-sided warbler	0.123	45	7.7	2.4	13.2
	Black-throated blue warbler	0.136	49	-0.0	-4.6	4.8
	Black-throated green warbler	0.306	103	-1.6	-4.5	1.4
	Blackburnian warbler	0.011	12	16.3	8.0	25.3
	Yellow-throated warbler	0.044	35	8.3	1.8	15.3
	Pine warbler	0.273	119	0.4	-2.4	3.2
	Prairie warbler	0.286	86	-0.0	-3.1	3.1
	Black-and-white warbler	0.139	109	4.3	0.8	7.9
	American redstart	0.005	7	53.3	39.3	68.7
	Worm-eating warbler	0.101	81	0.5	-3.6	4.8
	Ovenbird	0.643	148	-0.1	-1.9	1.7
	Louisiana waterthrush	0.043	31	8.2	3.6	13.0
	Kentucky warbler	0.049	47	-2.5	-7.2	2.4
	Common yellowthroat	0.023	15	11.6	3.2	20.7
	Hooded warbler	0.462	138	2.7	0.6	4.8
	Yellow-breasted chat	0.321	109	0.1	-2.9	3.2
	Summer tanager	0.142	79	2.0	-1.6	5.7
	Scarlet tanager	0.451	157	5.0	3.0	7.1
	Eastern towhee	0.576	154	0.2	-1.9	2.2
	Chipping sparrow	0.037	33	16.5	10.1	23.3
	Field sparrow	0.043	30	-1.8	-8.5	5.5
	Song sparrow	0.015	12	3.1	-5.5	12.5
	Dark-eyed junco	0.026	17	18.1	12.6	23.8
	Northern cardinal	0.422	157	-1.7	-4.2	1.0

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Rose-breasted grosbeak	0.021	10	6.0	0.4	12.0
	Blue grosbeak	0.013	9	21.0	10.2	33.0
	Indigo bunting	0.803	174	2.1	0.4	3.7
	Red-winged blackbird	0.021	6	7.9	-11.1	31.1
	Common grackle	0.025	20	-1.0	-6.0	4.3
	Brown-headed cowbird	0.065	42	9.0	3.7	14.6
	American goldfinch	0.094	78	5.6	2.7	8.6
Francis Marion and Sumter	Wood duck	0.013	18	-4.0	-9.6	2.0
	Wild turkey	0.035	62	-0.8	-5.8	4.4
	Northern bobwhite	0.296	210	-10.0	-12.6	-7.3
	Black vulture	0.017	22	-18.2	-21.1	-15.1
	Turkey vulture	0.034	58	-3.5	-8.2	1.5
	Red-shouldered hawk	0.044	77	4.5	0.5	8.6
	Broad-winged hawk	0.007	18	10.3	3.7	17.3
	Red-tailed hawk	0.035	56	-9.8	-15.8	-3.3
	Mourning dove	0.448	320	-3.0	-4.9	-1.1
	Yellow-billed cuckoo	0.449	342	-0.3	-2.0	1.4
	Great horned owl	0.003	8	1.5	-2.9	6.1
	Barred owl	0.020	37	-9.7	-14.6	-4.6
	Chuck-will's-widow	0.003	8	7.0	1.1	13.4
	Whip-poor-will	0.005	11	-24.9	-31.3	-18.0
	Chimney swift	0.064	85	-13.5	-17.6	-9.1
	Ruby-throated hummingbird	0.047	96	-1.1	-6.0	4.1
	Belted kingfisher	0.006	14	-3.9	-8.6	1.0
	Red-headed woodpecker	0.184	195	-7.1	-9.8	-4.4
	Red-bellied woodpecker	0.588	327	-1.8	-3.0	-0.6
	Downy woodpecker	0.113	177	-6.5	-9.4	-3.6
	Hairy woodpecker	0.063	115	-11.2	-14.8	-7.5
	Red-cockaded woodpecker	0.033	30	1.1	-2.4	4.9
	Northern flicker	0.184	238	-6.6	-9.0	-4.2
	Pileated woodpecker	0.549	364	-1.2	-2.7	0.2
	Eastern wood-pewee	0.161	151	-3.1	-6.2	-0.0
	Acadian flycatcher	0.324	188	-1.2	-3.5	1.1
	Eastern phoebe	0.027	46	-9.5	-14.7	-4.0
	Great crested flycatcher	0.675	298	-0.7	-1.9	0.6
	Eastern kingbird	0.035	47	-10.4	-15.8	-4.6
	White-eyed vireo	0.347	223	-3.4	-5.4	-1.3
	Yellow-throated vireo	0.075	108	-4.4	-7.9	-0.7
	Blue-headed vireo	0.083	121	-1.4	-4.7	2.0
	Red-eyed vireo	1.237	367	-2.6	-3.8	-1.3
	Blue jay	0.549	342	-1.5	-3.3	0.3
	American crow	1.333	400	-6.4	-7.4	-5.4
	Fish crow	0.044	73	-3.6	-7.8	0.7
	Purple martin	0.037	39	6.9	-2.4	17.1
	Barn swallow	0.008	9	-9.1	-14.2	-3.8
	Carolina chickadee	0.324	305	-3.5	-5.5	-1.5
	Tufted titmouse	0.817	389	-0.5	-1.6	0.7
	Red-breasted nuthatch	0.005	14	17.9	11.2	24.9
	White-breasted nuthatch	0.037	76	-6.0	-11.7	0.1
	Brown-headed nuthatch	0.124	109	5.4	2.8	8.0
	Carolina wren	0.710	363	-0.5	-1.6	0.7
	Blue-gray gnatcatcher	0.351	292	-5.7	-7.4	-3.9
	Eastern bluebird	0.083	97	-10.8	-14.4	-7.0
	Swainson's thrush	0.013	25	6.7	2.6	11.0
	Hermit thrush	0.004	6	-23.7	-33.9	-12.0
	Wood thrush	0.239	224	-9.9	-12.1	-7.6
	American robin	0.008	17	-16.1	-22.1	-9.6

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Gray catbird	0.045	69	-11.6	-16.0	-6.9
	Northern mockingbird	0.019	33	-6.8	-13.5	0.5
	Brown thrasher	0.068	118	4.0	0.2	8.0
	Blue-winged warbler	0.013	32	12.9	7.5	18.6
	Northern parula	0.340	219	-4.1	-6.3	-1.9
	Yellow warbler	0.007	13	-15.9	-23.5	-7.6
	Black-throated blue warbler	0.018	23	-5.9	-9.2	-2.6
	Black-throated green warbler	0.110	96	6.4	2.6	10.3
	Yellow-throated warbler	0.082	108	9.4	5.4	13.5
	Pine warbler	0.813	344	-0.2	-2.2	1.9
	Prairie warbler	0.399	194	-8.1	-11.1	-5.0
	Black-and-white warbler	0.103	129	-7.6	-10.4	-4.8
	American redstart	0.015	31	-2.4	-8.1	3.7
	Prothonotary warbler	0.101	69	-3.9	-7.3	-0.3
	Worm-eating warbler	0.075	95	7.7	3.7	11.8
	Swainson's warbler	0.022	46	8.2	1.1	15.8
	Ovenbird	0.216	178	-1.0	-3.4	1.5
	Louisiana waterthrush	0.017	31	8.8	3.2	14.8
	Kentucky warbler	0.056	96	8.4	3.1	13.9
	Common yellowthroat	0.459	177	-5.8	-7.9	-3.7
	Hooded warbler	0.474	295	-0.6	-2.6	1.4
	Yellow-breasted chat	0.621	273	-10.4	-12.3	-8.4
	Summer tanager	0.285	267	0.2	-1.7	2.2
	Scarlet tanager	0.146	151	-1.0	-3.8	1.8
	Eastern towhee	0.909	319	-5.2	-6.6	-3.8
	Bachman's sparrow	0.051	42	-6.3	-10.0	-2.4
	Chipping sparrow	0.014	22	8.0	1.3	15.2
	Field sparrow	0.106	69	-19.1	-23.0	-15.0
	Song sparrow	0.016	27	-10.9	-17.1	-4.4
	Northern cardinal	1.057	405	-1.6	-2.6	-0.6
	Rose-breasted grosbeak	0.003	9	6.7	1.9	11.7
	Blue grosbeak	0.047	69	7.1	2.4	12.0
	Indigo bunting	0.570	300	-6.8	-8.7	-4.8
	Red-winged blackbird	0.010	15	-1.2	-8.7	6.9
	Common grackle	0.096	92	2.4	-1.9	7.0
	Brown-headed cowbird	0.096	128	-4.2	-7.7	-0.6
	Orchard oriole	0.022	47	-5.4	-11.0	0.5
	American goldfinch	0.128	134	-2.0	-5.2	1.3
Daniel Boone	Ruffed grouse	0.004	6	-15.6	-24.9	-5.1
	Wild turkey	0.039	35	7.5	-4.6	21.1
	Northern bobwhite	0.015	13	-12.4	-26.6	4.6
	Turkey vulture	0.033	28	-14.7	-20.3	-8.8
	Red-shouldered hawk	0.025	31	-4.2	-10.8	2.9
	Broad-winged hawk	0.005	7	-26.7	-33.4	-19.4
	Red-tailed hawk	0.013	14	-19.7	-34.5	-1.6
	Mourning dove	0.167	102	13.8	8.6	19.2
	Yellow-billed cuckoo	0.393	136	8.0	5.0	11.1
	Chimney swift	0.016	13	-13.6	-30.9	8.1
	Ruby-throated hummingbird	0.050	54	8.6	1.2	16.6
	Red-headed woodpecker	0.021	20	119.4	103.5	136.6
	Red-bellied woodpecker	0.214	130	11.8	7.2	16.5
	Downy woodpecker	0.128	105	14.0	8.9	19.3
	Hairy woodpecker	0.061	62	4.1	-3.0	11.6
	Northern flicker	0.066	70	8.4	-0.4	18.0
	Pileated woodpecker	0.373	170	4.1	0.9	7.4
	Eastern wood-pewee	0.203	108	-0.0	-4.2	4.3
	Acadian flycatcher	0.290	104	3.8	0.7	7.1

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Eastern phoebe	0.067	60	9.8	2.2	18.0
	Great crested flycatcher	0.057	60	1.1	-7.2	10.1
	Eastern kingbird	0.010	6	4.1	-13.7	25.4
	White-eyed vireo	0.209	85	-0.2	-4.5	4.2
	Yellow-throated vireo	0.079	72	7.9	1.2	15.0
	Blue-headed vireo	0.046	44	5.0	-3.2	14.0
	Red-eyed vireo	1.477	188	1.5	0.2	2.9
	Blue jay	0.200	123	5.6	1.2	10.2
	American crow	0.893	179	0.1	-2.0	2.3
	Tree swallow	0.009	9	69.3	47.9	93.9
	Carolina chickadee	0.242	131	-2.4	-6.7	2.2
	Tufted titmouse	0.501	175	5.7	3.3	8.1
	White-breasted nuthatch	0.298	156	2.9	-0.8	6.7
	Carolina wren	0.275	152	15.3	10.4	20.5
	Blue-gray gnatcatcher	0.192	123	7.0	2.5	11.6
	Eastern bluebird	0.012	12	-3.2	-16.0	11.5
	Wood thrush	0.396	148	-0.1	-3.2	3.2
	American robin	0.036	33	-4.9	-11.5	2.3
	Gray catbird	0.013	14	-8.0	-19.8	5.6
	Brown thrasher	0.009	11	5.2	-8.5	21.1
	Blue-winged warbler	0.021	23	-26.8	-35.9	-16.5
	Northern parula	0.111	60	3.0	-2.8	9.1
	Yellow warbler	0.027	31	17.6	3.3	33.9
	Black-throated green warbler	0.254	95	1.6	-3.3	6.8
	Yellow-throated warbler	0.159	101	3.8	-0.8	8.6
	Pine warbler	0.200	80	-7.8	-12.0	-3.4
	Prairie warbler	0.178	58	-13.1	-18.9	-7.0
	Cerulean warbler	0.098	58	-4.8	-10.2	0.8
	Black-and-white warbler	0.297	141	4.6	1.5	7.8
	American redstart	0.035	27	4.7	-4.9	15.3
	Worm-eating warbler	0.387	152	2.4	-0.6	5.5
	Swainson's warbler	0.016	16	-15.6	-28.8	-0.1
	Ovenbird	1.125	179	4.7	2.7	6.6
	Louisiana waterthrush	0.028	26	7.1	-4.8	20.5
	Kentucky warbler	0.140	101	-6.8	-11.7	-1.5
	Common yellowthroat	0.074	36	-7.9	-13.7	-1.8
	Hooded warbler	0.798	178	2.0	-0.1	4.0
	Yellow-breasted chat	0.313	106	-3.6	-7.7	0.7
	Summer tanager	0.048	51	8.2	-2.0	19.4
	Scarlet tanager	0.451	173	1.8	-0.8	4.6
	Eastern towhee	0.197	88	-2.8	-6.6	1.2
	Chipping sparrow	0.065	56	-3.6	-8.2	1.2
	Field sparrow	0.057	25	-0.9	-10.8	10.1
	Song sparrow	0.010	6	-1.1	-13.2	12.7
	Northern cardinal	0.247	122	5.9	1.5	10.4
	Indigo bunting	0.580	147	0.1	-3.0	3.2
	Red-winged blackbird	0.062	9	0.4	-8.2	9.8
	Common grackle	0.006	7	40.4	36.0	45.0
	Brown-headed cowbird	0.116	90	3.6	-3.3	10.9
	American goldfinch	0.123	79	7.3	-0.1	15.3
NFs in Alabama	Wild turkey	0.024	46	25.9	10.0	44.2
	Northern bobwhite	0.073	82	-11.3	-16.0	-6.3
	Black vulture	0.008	15	-16.0	-30.3	1.4
	Turkey vulture	0.024	46	8.2	-1.7	19.0
	Red-shouldered hawk	0.025	48	15.1	3.7	27.8
	Broad-winged hawk	0.008	17	18.0	2.6	35.8
	Red-tailed hawk	0.018	33	-15.2	-26.2	-2.6

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Mourning dove	0.152	160	14.0	9.3	18.9
	Common ground-dove	0.003	6	-34.5	-44.1	-23.2
	Yellow-billed cuckoo	0.249	250	9.7	6.6	13.0
	Barred owl	0.005	10	3.8	-9.7	19.3
	Whip-poor-will	0.003	6	-9.2	-21.3	4.8
	Chimney swift	0.042	64	2.4	-5.2	10.5
	Ruby-throated hummingbird	0.016	27	11.8	0.8	24.0
	Belted kingfisher	0.006	10	26.0	3.7	53.1
	Red-headed woodpecker	0.075	108	10.0	3.4	17.0
	Red-bellied woodpecker	0.196	212	9.0	5.3	12.8
	Downy woodpecker	0.059	96	1.0	-5.1	7.5
	Hairy woodpecker	0.034	62	-2.3	-10.6	6.9
	Red-cockaded woodpecker	0.009	12	-12.6	-27.1	4.9
	Northern flicker	0.055	87	-1.8	-6.9	3.6
	Pileated woodpecker	0.169	213	7.1	3.3	10.9
	Eastern wood-pewee	0.053	68	10.5	3.6	17.8
	Acadian flycatcher	0.116	109	4.6	0.7	8.5
	Eastern phoebe	0.013	25	-5.9	-15.3	4.6
	Great crested flycatcher	0.186	216	9.8	6.7	12.9
	Eastern kingbird	0.009	15	18.1	2.4	36.1
	White-eyed vireo	0.105	126	7.9	3.0	13.0
	Yellow-throated vireo	0.049	85	19.0	11.9	26.5
	Blue-headed vireo	0.018	26	25.4	12.9	39.1
	Red-eyed vireo	0.589	302	5.0	3.6	6.3
	Blue jay	0.202	215	11.3	7.2	15.7
	American crow	0.297	251	4.3	1.8	6.8
	Purple martin	0.006	13	39.9	18.0	65.9
	Carolina chickadee	0.157	203	6.4	2.3	10.7
	Tufted titmouse	0.277	265	12.1	8.9	15.5
	White-breasted nuthatch	0.120	155	9.2	4.1	14.5
	Brown-headed nuthatch	0.036	54	43.6	33.1	55.0
	Carolina wren	0.196	202	3.1	-0.4	6.8
	Blue-gray gnatcatcher	0.100	136	15.8	9.8	22.2
	Eastern bluebird	0.022	29	8.4	-2.0	19.9
	Wood thrush	0.105	139	-4.0	-8.6	0.7
	American robin	0.009	19	-7.1	-14.0	0.3
	Gray catbird	0.022	34	10.7	1.2	21.1
	Northern mockingbird	0.014	19	3.2	-9.6	17.8
	Brown thrasher	0.028	52	33.3	25.1	42.1
	Blue-winged warbler	0.016	30	2.1	-8.3	13.7
	Northern parula	0.070	90	4.4	-2.0	11.2
	Yellow warbler	0.015	29	45.4	33.2	58.6
	Black-throated green warbler	0.078	88	22.8	16.2	29.8
	Yellow-throated warbler	0.026	34	15.5	8.3	23.1
	Pine warbler	0.355	266	10.8	8.3	13.4
	Prairie warbler	0.272	192	2.7	0.4	5.1
	Black-and-white warbler	0.063	95	12.4	5.5	19.8
	American redstart	0.005	9	-18.3	-26.5	-9.2
	Worm-eating warbler	0.060	85	3.2	-2.7	9.6
	Ovenbird	0.145	135	5.2	1.3	9.4
	Louisiana waterthrush	0.017	19	9.9	-4.5	26.5
	Kentucky warbler	0.062	81	25.7	19.0	32.8
	Common yellowthroat	0.047	61	12.5	5.2	20.3
	Hooded warbler	0.172	176	7.8	3.8	11.9
	Yellow-breasted chat	0.323	226	1.1	-1.2	3.5
	Summer tanager	0.218	228	10.7	7.3	14.3
	Scarlet tanager	0.146	151	4.8	0.8	9.0
	Eastern towhee	0.186	188	6.1	2.4	9.9

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Bachman's sparrow	0.034	22	-1.3	-7.9	5.6
	Chipping sparrow	0.040	62	22.2	11.9	33.4
	Field sparrow	0.057	75	1.7	-5.9	9.9
	Northern cardinal	0.336	279	9.3	6.8	11.8
	Blue grosbeak	0.028	31	1.8	-6.0	10.2
	Indigo bunting	0.426	275	2.5	0.7	4.4
	Common grackle	0.022	39	-43.9	-47.3	-40.4
	Brown-headed cowbird	0.027	42	5.6	-4.7	17.0
	American goldfinch	0.026	38	20.5	13.5	28.0
Land Between the Lakes	Wood duck	0.005	6	3.1	0.3	6.0
	Wild turkey	0.051	52	-2.4	-9.6	5.4
	Northern bobwhite	0.062	49	-24.5	-26.9	-21.9
	Turkey vulture	0.005	7	-7.3	-15.8	2.0
	Cooper's hawk	0.003	6	1.3	-4.3	7.2
	Red-shouldered hawk	0.033	48	9.9	2.8	17.4
	Red-tailed hawk	0.011	23	-9.2	-16.6	-1.1
	Mourning dove	0.114	111	-16.7	-19.6	-13.7
	Yellow-billed cuckoo	0.691	207	-7.0	-8.1	-5.9
	Barred owl	0.017	26	-10.4	-17.1	-3.1
	Chimney swift	0.040	36	-5.6	-10.9	-0.1
	Ruby-throated hummingbird	0.043	65	12.9	9.2	16.6
	Belted kingfisher	0.006	12	-26.1	-29.6	-22.4
	Red-headed woodpecker	0.010	19	-16.4	-17.3	-15.6
	Red-bellied woodpecker	0.306	188	-2.6	-4.4	-0.9
	Downy woodpecker	0.160	164	6.7	3.9	9.5
	Hairy woodpecker	0.026	48	1.4	-1.8	4.8
	Northern flicker	0.014	27	-16.5	-19.2	-13.8
	Pileated woodpecker	0.235	180	-10.3	-12.2	-8.2
	Eastern wood-pewee	0.558	190	-5.0	-6.1	-3.9
	Acadian flycatcher	0.407	184	7.5	6.1	8.9
	Eastern phoebe	0.026	31	-50.0	-54.6	-44.8
	Great crested flycatcher	0.209	161	-10.5	-12.4	-8.5
	Eastern kingbird	0.013	11	-10.6	-15.4	-5.4
	White-eyed vireo	0.401	151	-1.9	-3.7	-0.1
	Yellow-throated vireo	0.096	120	7.2	3.9	10.5
	Red-eyed vireo	0.856	205	7.3	5.8	8.8
	Blue jay	0.294	181	-18.0	-19.7	-16.2
	American crow	0.770	202	0.9	-0.3	2.1
	Purple martin	0.014	24	8.5	4.6	12.6
	Carolina chickadee	0.174	162	-2.3	-4.8	0.2
	Tufted titmouse	0.589	205	-4.4	-5.6	-3.1
	White-breasted nuthatch	0.278	177	-5.0	-6.9	-3.1
	Carolina wren	0.356	200	-2.1	-3.7	-0.5
	Blue-gray gnatcatcher	0.441	199	3.2	1.6	4.9
	Eastern bluebird	0.024	34	-13.7	-19.4	-7.7
	Wood thrush	0.271	162	-12.8	-14.8	-10.7
	American robin	0.016	28	-28.6	-32.0	-25.1
	Gray catbird	0.014	24	-33.3	-35.7	-30.8
	Brown thrasher	0.048	62	-19.8	-21.6	-18.0
	Blue-winged warbler	0.016	30	-15.5	-16.4	-14.6
	Northern parula	0.176	138	15.8	13.2	18.4
	Yellow warbler	0.005	10	-25.1	-29.5	-20.4
	Yellow-throated warbler	0.025	31	6.2	-0.4	13.1
	Pine warbler	0.054	46	-0.1	-4.3	4.3
	Prairie warbler	0.140	95	-7.7	-10.4	-4.9
	Black-and-white warbler	0.024	41	18.9	12.0	26.2
	Prothonotary warbler	0.039	23	-7.3	-12.5	-1.7

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Worm-eating warbler	0.185	143	4.9	2.4	7.5
	Ovenbird	0.048	60	10.3	6.4	14.4
	Louisiana waterthrush	0.022	25	1.7	-4.0	7.7
	Kentucky warbler	0.098	110	-1.8	-5.5	1.9
	Common yellowthroat	0.164	89	-15.5	-18.1	-12.7
	Hooded warbler	0.018	22	1.5	-6.5	10.1
	Yellow-breasted chat	0.288	137	-7.5	-9.6	-5.4
	Summer tanager	0.449	201	2.7	1.1	4.2
	Scarlet tanager	0.339	196	9.0	7.5	10.6
	Eastern towhee	0.219	139	-14.9	-16.8	-12.9
	Chipping sparrow	0.021	33	-15.5	-19.1	-11.7
	Field sparrow	0.079	57	-19.7	-22.9	-16.3
	Northern cardinal	0.351	196	-4.9	-6.4	-3.5
	Blue grosbeak	0.008	14	12.2	3.2	22.1
	Indigo bunting	0.621	186	-0.3	-1.7	1.2
	Red-winged blackbird	0.032	22	-23.7	-26.9	-20.4
	Common grackle	0.018	23	-13.6	-16.3	-10.8
	Brown-headed cowbird	0.278	180	-10.7	-13.2	-8.1
	Orchard oriole	0.055	69	-14.8	-17.6	-12.0
	Baltimore oriole	0.004	6			
	American goldfinch	0.076	74	-2.3	-6.6	2.2
Ozark and St. Francis	Wild turkey	0.012	20	-3.2	-11.8	6.1
	Northern bobwhite	0.042	26	-2.2	-10.1	6.3
	Turkey vulture	0.027	33	1.6	-7.6	11.6
	Red-shouldered hawk	0.022	31	-5.4	-14.7	4.9
	Broad-winged hawk	0.024	36	7.2	-3.6	19.2
	Red-tailed hawk	0.010	14	-13.2	-21.0	-4.7
	Mourning dove	0.097	81	12.7	7.0	18.7
	Yellow-billed cuckoo	0.371	208	6.7	4.2	9.2
	Barred owl	0.010	17	-22.0	-35.4	-5.9
	Whip-poor-will	0.006	8	2.7	-0.9	6.4
	Chimney swift	0.029	32	16.0	4.5	28.7
	Ruby-throated hummingbird	0.032	49	-0.3	-8.6	8.7
	Red-headed woodpecker	0.010	10	0.5	-13.3	16.6
	Red-bellied woodpecker	0.122	113	6.2	1.0	11.8
	Yellow-bellied sapsucker	0.005	9	-15.3	-18.5	-12.0
	Downy woodpecker	0.174	165	-0.4	-4.5	3.9
	Hairy woodpecker	0.045	60	-9.7	-16.4	-2.3
	Northern flicker	0.039	37	-4.0	-11.5	4.2
	Pileated woodpecker	0.419	217	1.4	-1.1	4.1
	Eastern wood-pewee	0.288	155	1.5	-1.5	4.6
	Acadian flycatcher	0.243	114	5.7	2.5	9.0
	Eastern phoebe	0.029	33	1.3	-6.2	9.3
	Great crested flycatcher	0.048	57	-2.3	-8.1	3.8
	White-eyed vireo	0.164	87	6.9	2.6	11.3
	Yellow-throated vireo	0.028	31	6.2	-1.8	14.9
	Red-eyed vireo	1.487	232	2.4	1.1	3.7
	Blue jay	0.236	165	0.3	-3.8	4.6
	American crow	0.717	209	1.7	-0.4	3.9
	Carolina chickadee	0.366	193	13.1	8.7	17.7
	Tufted titmouse	0.480	218	8.3	5.9	10.7
	White-breasted nuthatch	0.179	140	7.1	2.7	11.6
	Carolina wren	0.253	158	6.7	3.1	10.4
	Blue-gray gnatcatcher	0.362	180	8.5	5.4	11.7
	Eastern bluebird	0.013	15	12.6	-2.0	29.5
	Wood thrush	0.137	109	-1.4	-5.5	2.9
	Gray catbird	0.006	10	-41.2	-46.3	-35.6

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Blue-winged warbler	0.040	32	-9.6	-18.3	-0.1
	Northern parula	0.149	68	8.4	4.5	12.3
	Yellow warbler	0.025	30	-5.6	-14.0	3.6
	Black-throated green warbler	0.022	15	7.4	-4.2	20.5
	Yellow-throated warbler	0.020	23	5.0	-4.6	15.6
	Pine warbler	0.437	103	0.8	-1.8	3.4
	Prairie warbler	0.096	32	-5.2	-10.6	0.6
	Cerulean warbler	0.027	15	-7.8	-18.8	4.7
	Black-and-white warbler	0.330	191	3.1	0.4	5.9
	Worm-eating warbler	0.122	83	4.5	0.1	9.0
	Ovenbird	0.787	191	1.0	-0.9	2.9
	Louisiana waterthrush	0.038	34	18.4	8.8	28.7
	Kentucky warbler	0.174	106	7.9	3.4	12.5
	Common yellowthroat	0.016	16	-5.7	-17.8	8.3
	Hooded warbler	0.311	139	1.1	-1.8	4.1
	Yellow-breasted chat	0.224	79	3.4	-1.4	8.4
	Summer tanager	0.266	159	-7.2	-10.2	-4.1
	Scarlet tanager	0.365	170	3.6	0.5	6.7
	Eastern towhee	0.142	75	-2.2	-6.5	2.2
	Chipping sparrow	0.049	33	9.3	3.2	15.7
	Field sparrow	0.020	13	-9.0	-20.6	4.2
	Northern cardinal	0.157	119	12.0	7.5	16.8
	Blue grosbeak	0.010	11	7.0	-12.5	30.9
	Indigo bunting	0.955	216	5.0	2.7	7.2
	Brown-headed cowbird	0.066	45	-7.4	-14.0	-0.3
	American goldfinch	0.037	30	2.8	-8.6	15.7
Ouachita	Wood duck	0.005	6	40.1	15.4	70.2
	Wild turkey	0.036	60	9.4	-1.4	21.4
	Northern bobwhite	0.114	120	-0.8	-7.0	5.8
	Black vulture	0.007	11	29.8	17.0	44.0
	Turkey vulture	0.018	34	-6.0	-15.9	5.0
	Cooper's hawk	0.002	6	44.0	30.8	58.4
	Red-shouldered hawk	0.024	42	-20.2	-28.1	-11.6
	Broad-winged hawk	0.023	47	-0.2	-9.4	10.0
	Red-tailed hawk	0.006	14	-22.5	-32.1	-11.5
	Mourning dove	0.119	149	7.7	2.5	13.2
	Yellow-billed cuckoo	0.527	290	0.6	-1.2	2.5
	Greater roadrunner	0.005	9	-6.1	-13.4	1.9
	Barred owl	0.013	26	-8.2	-19.8	5.1
	Chuck-will's-widow	0.011	20	6.0	-8.7	23.0
	Chimney swift	0.024	31	12.7	-1.2	28.5
	Ruby-throated hummingbird	0.031	51	3.7	-4.1	12.1
	Belted kingfisher	0.003	7	26.3	19.6	33.4
	Red-headed woodpecker	0.020	35	-13.9	-25.7	-0.3
	Red-bellied woodpecker	0.087	107	13.1	7.3	19.3
	Downy woodpecker	0.136	176	12.0	6.8	17.6
	Hairy woodpecker	0.056	95	3.6	-3.3	11.0
	Northern flicker	0.029	54	-16.7	-24.5	-8.2
	Pileated woodpecker	0.477	293	5.4	2.8	8.1
	Eastern wood-pewee	0.106	117	-1.9	-6.4	2.8
	Acadian flycatcher	0.149	106	7.0	2.2	11.9
	Eastern phoebe	0.028	50	0.1	-6.8	7.6
	Great crested flycatcher	0.160	192	-6.5	-10.4	-2.5
	White-eyed vireo	0.209	156	1.8	-2.1	5.9
	Yellow-throated vireo	0.069	96	2.6	-4.0	9.7
	Red-eyed vireo	1.917	307	3.2	2.0	4.4
	Blue jay	0.302	242	7.4	3.8	11.2

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	American crow	1.166	308	1.0	-0.6	2.6
	Fish crow	0.028	48	16.7	2.5	32.9
	Purple martin	0.015	19	-0.3	-12.5	13.6
	Carolina chickadee	0.508	282	11.9	8.3	15.5
	Tufted titmouse	0.677	297	8.6	6.4	10.9
	White-breasted nuthatch	0.095	133	12.2	6.9	17.7
	Brown-headed nuthatch	0.008	7	-6.7	-19.2	7.7
	Carolina wren	0.350	260	-0.9	-3.4	1.7
	Blue-gray gnatcatcher	0.291	226	3.8	0.9	6.7
	Eastern bluebird	0.010	18	13.2	-2.6	31.4
	Swainson's thrush	0.010	18	-16.3	-24.9	-6.8
	Wood thrush	0.048	66	2.8	-4.1	10.2
	Gray catbird	0.005	10	-5.6	-17.7	8.3
	Northern mockingbird	0.005	8	-17.2	-25.7	-7.6
	Brown thrasher	0.008	14	-21.8	-36.2	-4.1
	Cedar waxwing	0.035	8	-42.0	-48.5	-34.6
	Tennessee warbler	0.007	13	-47.4	-51.8	-42.7
	Northern parula	0.093	65	-0.9	-5.5	4.0
	Black-throated green warbler	0.013	19	45.5	19.5	77.2
	Blackburnian warbler	0.004	8	8.9	2.6	15.5
	Yellow-throated warbler	0.007	15	-22.4	-36.3	-5.6
	Pine warbler	0.998	280	-0.2	-2.0	1.7
	Prairie warbler	0.262	130	-5.5	-9.3	-1.6
	Black-and-white warbler	0.341	254	4.6	2.0	7.3
	American redstart	0.007	9	-20.9	-30.5	-10.0
	Prothonotary warbler	0.005	6	-34.5	-43.2	-24.5
	Worm-eating warbler	0.092	115	3.5	-3.7	11.2
	Ovenbird	0.198	134	6.4	0.8	12.3
	Louisiana waterthrush	0.042	48	13.7	5.1	22.9
	Kentucky warbler	0.196	165	6.2	2.2	10.4
	Common yellowthroat	0.084	84	-7.2	-13.4	-0.6
	Hooded warbler	0.131	104	3.8	-1.2	9.1
	Yellow-breasted chat	0.346	170	-3.7	-6.7	-0.6
	Summer tanager	0.478	283	0.4	-2.0	2.8
	Scarlet tanager	0.319	211	8.1	4.7	11.5
	Eastern towhee	0.008	15	-35.8	-42.6	-28.1
	Chipping sparrow	0.038	55	-8.5	-16.9	0.8
	Field sparrow	0.030	39	-14.4	-22.0	-6.0
	Northern cardinal	0.445	248	5.8	3.2	8.6
	Blue grosbeak	0.026	35	-12.4	-21.5	-2.2
	Indigo bunting	1.117	299	8.9	6.9	10.9
	Brown-headed cowbird	0.102	95	-8.0	-12.8	-2.9
	American goldfinch	0.035	49	-22.5	-28.5	-16.0
NFs in Texas	Wood duck	0.028	21	16.1	-0.4	35.3
	Wild turkey	0.011	10	1.8	-16.8	24.6
	Northern bobwhite	0.063	40	-12.8	-21.8	-2.7
	Black vulture	0.012	10	3.1	-11.8	20.5
	Turkey vulture	0.106	56	3.5	-4.8	12.5
	Sharp-shinned hawk	0.010	9	-20.6	-31.6	-7.8
	Red-shouldered hawk	0.053	37	-1.5	-12.4	10.8
	Broad-winged hawk	0.027	26	5.2	-8.4	20.8
	Red-tailed hawk	0.025	23	6.8	-7.4	23.1
	American kestrel	0.027	23	14.7	-0.8	32.7
	Mourning dove	0.575	147	2.4	-1.2	6.2
	Yellow-billed cuckoo	0.457	152	1.3	-2.2	4.8
	Barred owl	0.051	31	9.4	-0.5	20.3

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Chimney swift	0.061	29	-8.8	-20.3	4.5
	Ruby-throated hummingbird	0.017	19	-11.0	-23.5	3.6
	Red-headed woodpecker	0.179	46	-5.5	-12.5	2.2
	Red-bellied woodpecker	0.647	160	2.5	-0.5	5.6
	Downy woodpecker	0.125	76	14.9	8.2	21.9
	Hairy woodpecker	0.055	41	13.2	1.9	25.7
	Red-cockaded woodpecker	0.082	17	-12.7	-22.5	-1.6
	Northern flicker	0.040	29	30.4	13.7	49.5
	Pileated woodpecker	0.474	171	2.5	-1.0	6.1
	Eastern wood-pewee	0.187	75	2.7	-3.7	9.5
	Acadian flycatcher	0.626	74	0.4	-3.1	4.0
	Great crested flycatcher	0.229	100	-3.5	-7.9	1.1
	Eastern kingbird	0.029	15	8.6	-7.1	27.0
	White-eyed vireo	0.979	127	7.1	3.4	10.9
	Yellow-throated vireo	0.125	68	7.9	2.0	14.1
	Red-eyed vireo	1.961	159	5.7	3.3	8.2
	Blue jay	1.123	178	6.9	4.3	9.5
	American crow	1.772	178	5.6	3.4	7.8
	Purple martin	0.073	52	-11.5	-19.3	-2.8
	Barn swallow	0.006	6	9.4	-1.7	21.8
	Carolina chickadee	0.669	157	15.3	11.5	19.3
	Tufted titmouse	1.326	168	9.0	6.3	11.8
	White-breasted nuthatch	0.010	8	17.0	9.2	25.3
	Brown-headed nuthatch	0.249	64	0.8	-6.5	8.6
	Carolina wren	2.134	179	7.6	5.7	9.6
	Blue-gray gnatcatcher	0.174	64	13.9	7.3	21.0
	Swainson's thrush	0.011	11	-11.5	-13.6	-9.3
	Wood thrush	0.111	64	-25.1	-32.3	-17.2
	Northern mockingbird	0.012	8	-51.2	-56.6	-45.1
	Brown thrasher	0.006	7	-3.9	-33.2	38.2
	Tennessee warbler	0.006	6	15.6	3.5	29.1
	Northern parula	0.179	34	10.8	4.8	17.2
	Magnolia warbler	0.005	6	13.8	3.2	25.5
	Yellow-throated warbler	0.013	10	13.5	-16.8	55.0
	Pine warbler	3.221	173	7.1	5.1	9.1
	Prairie warbler	0.075	16	9.3	-4.4	24.9
	Black-and-white warbler	0.034	32	-4.5	-16.0	8.6
	American redstart	0.013	9	6.7	-5.1	19.9
	Worm-eating warbler	0.016	12	-4.2	-18.6	12.8
	Swainson's warbler	0.025	17	-33.3	-39.7	-26.2
	Louisiana waterthrush	0.056	26	-0.9	-9.6	8.7
	Kentucky warbler	0.138	61	-4.6	-11.2	2.5
	Common yellowthroat	0.087	29	-1.1	-9.5	8.0
	Hooded warbler	0.965	140	6.7	3.2	10.3
	Yellow-breasted chat	1.079	102	3.6	-0.3	7.6
	Summer tanager	0.702	174	3.4	1.0	5.8
	Bachman's sparrow	0.283	49	-4.3	-9.7	1.4
	Northern cardinal	2.713	179	3.8	2.0	5.6
	Blue grosbeak	0.072	33	-2.8	-12.1	7.5
	Indigo bunting	1.176	120	0.4	-2.6	3.6
	Common grackle	0.007	8	-19.2	-33.3	-2.1
	Brown-headed cowbird	0.125	72	8.5	2.6	14.7
	Orchard oriole	0.027	14	65.4	51.9	80.1
Kisatchie	Wood duck	0.027	10	7.4	-11.8	30.8
	Wild turkey	0.025	14	28.2	-0.4	64.8
	Northern bobwhite	0.119	53	-8.4	-17.1	1.1
	Turkey vulture	0.056	27	-21.1	-27.1	-14.5

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Red-shouldered hawk	0.088	44	-13.8	-22.9	-3.7
	Broad-winged hawk	0.014	12	12.1	-8.9	38.0
	Red-tailed hawk	0.035	20	-9.8	-20.8	2.7
	American kestrel	0.021	10	-16.7	-30.0	-0.7
	Mourning dove	0.264	79	-6.5	-12.3	-0.2
	Yellow-billed cuckoo	0.491	114	-0.8	-4.7	3.2
	Chuck-will's-widow	0.042	14	2.0	-11.3	17.2
	Chimney swift	0.056	27	-8.4	-21.1	6.3
	Ruby-throated hummingbird	0.015	11	18.8	-9.5	56.0
	Red-headed woodpecker	0.089	39	-2.9	-11.7	6.9
	Red-bellied woodpecker	0.407	110	-4.1	-8.1	-0.1
	Downy woodpecker	0.103	45	3.6	-5.0	12.9
	Hairy woodpecker	0.029	17	-12.7	-25.8	2.6
	Red-cockaded woodpecker	0.065	22	-23.0	-32.2	-12.6
	Northern flicker	0.038	25	-0.7	-14.0	14.6
	Pileated woodpecker	0.293	103	7.2	2.3	12.3
	Eastern wood-pewee	0.176	61	-24.9	-31.4	-17.8
	Acadian flycatcher	0.340	59	-2.1	-8.7	5.1
	Great crested flycatcher	0.223	90	-12.3	-18.5	-5.7
	Eastern kingbird	0.039	22	-22.0	-35.3	-5.9
	White-eyed vireo	0.429	97	3.8	-2.1	10.0
	Yellow-throated vireo	0.264	84	-0.0	-4.4	4.6
	Red-eyed vireo	0.911	100	-7.5	-11.4	-3.4
	Blue jay	0.545	121	2.6	-2.0	7.4
	American crow	1.295	128	-2.5	-5.6	0.7
	Fish crow	0.170	33	45.0	32.8	58.3
	Purple martin	0.057	26	4.1	-5.9	15.2
	Carolina chickadee	0.252	90	-4.9	-10.8	1.5
	Tufted titmouse	0.772	121	-4.2	-7.6	-0.8
	White-breasted nuthatch	0.033	11	7.2	-1.9	17.1
	Brown-headed nuthatch	0.145	43	-0.3	-9.6	10.0
	Carolina wren	0.770	127	6.7	3.6	9.8
	Blue-gray gnatcatcher	0.150	46	6.7	-2.0	16.2
	Eastern bluebird	0.040	17	-42.8	-47.2	-38.0
	Wood thrush	0.090	44	2.7	-5.7	11.9
	American robin	0.010	6	-87.6	-89.9	-84.7
	Gray catbird	0.017	15	11.5	0.7	23.5
	Northern mockingbird	0.009	7	-7.8	-19.8	6.1
	Brown thrasher	0.008	7	33.5	19.2	49.6
	Northern parula	0.094	19	-2.9	-18.5	15.7
	Yellow-throated warbler	0.038	15	8.0	-5.5	23.3
	Pine warbler	0.831	115	0.0	-4.1	4.3
	Prairie warbler	0.198	31	-12.5	-23.9	0.5
	Black-and-white warbler	0.045	18	19.6	-1.5	45.2
	American redstart	0.069	32	-14.4	-21.3	-6.8
	Worm-eating warbler	0.095	33	-21.6	-31.0	-10.8
	Swainson's warbler	0.010	9	4.4	-17.5	32.2
	Louisiana waterthrush	0.030	15	2.6	-12.0	19.7
	Kentucky warbler	0.232	78	16.2	8.5	24.4
	Common yellowthroat	0.064	26	-36.2	-43.8	-27.6
	Hooded warbler	0.590	104	1.5	-3.0	6.2
	Yellow-breasted chat	1.146	108	1.4	-2.4	5.2
	Summer tanager	0.580	121	-3.6	-7.3	0.2
	Eastern towhee	0.133	48	0.5	-8.5	10.4
	Bachman's sparrow	0.160	38	-3.9	-9.9	2.5
	Chipping sparrow	0.085	32	11.1	-0.3	23.7
	Northern cardinal	1.459	131	2.9	0.4	5.5
	Blue grosbeak	0.072	31	-8.5	-17.5	1.6

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Indigo bunting	0.665	90	-7.2	-10.7	-3.5
	Painted bunting	0.029	14	-40.7	-46.9	-33.7
	Red-winged blackbird	0.008	6	19.6	-5.4	51.1
	Brown-headed cowbird	0.047	23	-11.0	-22.8	2.6
	Orchard oriole	0.034	13	-8.6	-20.0	4.4
NFs in Mississippi	Wood duck	0.005	11	1.6	-4.6	8.2
	Wild turkey	0.026	63	-2.0	-5.2	1.4
	Northern bobwhite	0.097	253	-6.1	-7.9	-4.2
	Black vulture	0.005	20	9.1	2.5	16.2
	Turkey vulture	0.017	62	10.4	4.4	16.7
	Mississippi kite	0.005	18	-9.5	-18.3	0.3
	Cooper's hawk	0.003	13	-6.0	-13.5	2.2
	Red-shouldered hawk	0.045	175	0.1	-2.8	3.1
	Broad-winged hawk	0.012	61	19.3	14.2	24.6
	Red-tailed hawk	0.008	37	1.0	-4.6	6.9
	Mourning dove	0.121	317	-1.2	-3.3	1.0
	Yellow-billed cuckoo	0.432	755	-2.5	-3.6	-1.4
	Barn owl	0.001	6			
	Eastern screech-owl	0.002	6	-24.8	-39.2	-7.0
	Barred owl	0.036	106	5.3	1.3	9.5
	Chuck-will's-widow	0.001	6	19.0	1.0	40.3
	Chimney swift	0.046	121	13.2	6.4	20.4
	Ruby-throated hummingbird	0.068	195	7.3	4.2	10.5
	Belted kingfisher	0.002	9	-3.7	-23.5	21.3
	Red-headed woodpecker	0.121	354	-2.0	-4.1	0.3
	Red-bellied woodpecker	0.494	795	4.6	3.4	5.9
	Downy woodpecker	0.116	372	4.9	2.5	7.4
	Hairy woodpecker	0.026	117	-2.8	-5.7	0.2
	Red-cockaded woodpecker	0.024	39	0.9	-3.7	5.8
	Northern flicker	0.052	205	-0.4	-3.1	2.5
	Pileated woodpecker	0.248	644	4.3	2.9	5.8
	Eastern wood-pewee	0.210	435	4.0	2.1	5.9
	Acadian flycatcher	0.408	531	1.4	0.2	2.7
	Eastern phoebe	0.013	40	12.1	9.0	15.4
	Great crested flycatcher	0.284	662	5.3	3.6	7.0
	Eastern kingbird	0.007	26	17.1	9.8	25.0
	White-eyed vireo	0.348	596	-3.6	-5.1	-2.2
	Yellow-throated vireo	0.079	254	-1.6	-3.8	0.5
	Red-eyed vireo	0.736	762	1.0	0.1	1.9
	Blue jay	0.535	764	2.1	0.9	3.3
	American crow	0.525	728	-1.0	-2.2	0.3
	Fish crow	0.026	77	-3.5	-7.6	0.8
	Purple martin	0.002	7	21.1	11.5	31.6
	Barn swallow	0.017	17	10.4	-7.1	31.3
	Carolina chickadee	0.294	571	3.5	1.8	5.2
	Tufted titmouse	0.717	832	3.2	2.1	4.2
	White-breasted nuthatch	0.033	127	19.3	15.6	23.1
	Brown-headed nuthatch	0.042	94	3.6	-0.3	7.6
	Carolina wren	0.639	841	7.1	5.8	8.4
	Blue-gray gnatcatcher	0.194	418	3.2	1.1	5.4
	Eastern bluebird	0.011	42	24.6	16.3	33.4
	Veery	0.003	10	-40.5	-44.1	-36.8
	Wood thrush	0.316	629	-0.2	-1.7	1.2
	American robin	0.007	19	11.3	4.2	18.8
	Gray catbird	0.016	65	11.8	4.2	19.8
	Northern mockingbird	0.007	29	6.8	-2.0	16.3
	Brown thrasher	0.028	104	5.5	-0.4	11.7

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Blue-winged warbler	0.002	9	113.5	78.2	155.8
	Northern parula	0.094	169	-2.2	-4.3	0.0
	Yellow-throated warbler	0.018	83	6.8	0.3	13.8
	Pine warbler	0.633	708	5.4	4.2	6.6
	Prairie warbler	0.109	188	3.6	0.8	6.5
	Black-and-white warbler	0.096	248	6.2	3.7	8.8
	American redstart	0.047	122	0.6	-3.0	4.4
	Prothonotary warbler	0.120	128	13.4	10.2	16.7
	Worm-eating warbler	0.102	279	5.2	2.4	8.0
	Swainson's warbler	0.012	56	1.6	-3.6	7.1
	Ovenbird	0.011	45	-2.7	-13.3	9.3
	Northern waterthrush	0.002	6	-4.3	-21.7	16.9
	Louisiana waterthrush	0.013	50	23.0	17.2	29.0
	Kentucky warbler	0.139	400	10.9	8.3	13.5
	Common yellowthroat	0.155	338	5.0	2.8	7.3
	Hooded warbler	0.465	691	2.1	0.9	3.3
	Yellow-breasted chat	0.488	639	-1.4	-2.7	-0.1
	Summer tanager	0.488	778	2.2	1.0	3.4
	Scarlet tanager	0.017	71	21.0	11.7	31.0
	Eastern towhee	0.363	572	4.8	3.3	6.4
	Bachman's sparrow	0.038	90	4.6	0.9	8.4
	Chipping sparrow	0.033	103	17.2	12.5	22.0
	Field sparrow	0.012	34	-3.2	-11.0	5.3
	Northern cardinal	0.890	887	0.0	-0.8	0.8
	Blue grosbeak	0.016	65	45.4	39.1	51.9
	Indigo bunting	0.547	620	4.5	2.9	6.1
	Painted bunting	0.002	6	-51.9	-65.1	-33.7
	Red-winged blackbird	0.005	11	-5.0	-12.7	3.4
	Common grackle	0.003	14	-10.1	-24.8	7.6
	Bronzed cowbird	0.007	23	5.0	3.9	6.1
	Brown-headed cowbird	0.100	208	1.4	-1.7	4.7
	Orchard oriole	0.014	47	10.5	5.8	15.5
	American goldfinch	0.007	25	20.5	-6.0	54.4
NFs in Florida	Wild turkey	0.049	28	-11.8	-20.2	-2.5
	Northern bobwhite	0.258	91	-10.2	-14.2	-5.9
	Turkey vulture	0.017	16	3.0	-7.8	15.0
	Red-shouldered hawk	0.044	33	11.5	0.6	23.7
	Red-tailed hawk	0.006	6	8.6	-9.2	29.9
	American kestrel	0.058	27	-9.7	-21.4	3.8
	Mourning dove	0.614	127	-2.0	-4.8	1.0
	Yellow-billed cuckoo	0.069	44	-3.6	-18.6	14.2
	Common nighthawk	0.083	42	-13.8	-20.8	-6.2
	Chuck-will's-widow	0.016	9	-15.8	-25.3	-5.1
	Chimney swift	0.015	7	28.4	1.5	62.4
	Red-headed woodpecker	0.359	114	3.5	-1.3	8.5
	Red-bellied woodpecker	1.124	171	-7.0	-9.2	-4.7
	Downy woodpecker	0.184	79	6.4	1.3	11.7
	Hairy woodpecker	0.015	12	-28.5	-34.3	-22.2
	Red-cockaded woodpecker	0.100	40	17.6	9.3	26.4
	Northern flicker	0.157	78	-8.1	-14.3	-1.4
	Pileated woodpecker	0.210	104	7.5	2.0	13.3
	Eastern wood-pewee	0.031	17	-24.7	-33.8	-14.3
	Acadian flycatcher	0.027	11	4.2	-35.1	67.3
	Great crested flycatcher	1.411	173	1.4	-0.5	3.2
	Eastern kingbird	0.016	9	6.8	-18.8	40.5
	White-eyed vireo	0.655	99	-4.1	-7.3	-0.8
	Yellow-throated vireo	0.175	58	-5.2	-9.1	-1.1

Continued

Appendix 5—continued

National forest	Species	Mean observations per count	Total number of points	Percent annual change	90-percent confidence limits	
					Lower	Upper
	Red-eyed vireo	0.074	43	-34.5	-41.7	-26.4
	Blue jay	0.626	121	-13.1	-16.6	-9.4
	Florida scrub-jay	0.097	24	-31.1	-38.7	-22.5
	American crow	0.604	117	-15.7	-18.3	-13.0
	Fish crow	0.024	16	-4.7	-13.7	5.1
	Purple martin	0.010	6	-6.3	-15.1	3.3
	Tree swallow	0.042	13	-15.6	-21.5	-9.3
	Barn swallow	0.011	8	30.4	27.1	33.8
	Carolina chickadee	0.119	49	-7.3	-12.1	-2.2
	Tufted titmouse	0.856	122	-18.0	-20.3	-15.6
	Brown-headed nuthatch	0.122	44	0.7	-9.9	12.7
	Carolina wren	0.697	163	10.5	6.9	14.2
	House wren	0.007	7	10.5	2.4	19.3
	Ruby-crowned kinglet	0.009	7	-15.8	-20.8	-10.6
	Blue-gray gnatcatcher	0.425	122	-11.4	-14.9	-7.8
	Eastern bluebird	0.042	29	-12.6	-21.2	-3.1
	Gray catbird	0.086	41	-0.2	-4.7	4.5
	Northern mockingbird	0.029	18	54.2	29.0	84.4
	Brown thrasher	0.342	97	-11.3	-14.4	-8.1
	Cedar waxwing	0.057	11	-19.5	-24.9	-13.7
	Northern parula	0.225	71	3.8	-2.2	10.2
	Yellow-throated warbler	0.031	18	23.3	5.5	44.1
	Pine warbler	1.383	151	-13.5	-15.9	-11.0
	Prairie warbler	0.026	14	48.5	27.8	72.7
	Palm warbler	0.021	10	-8.9	-13.3	-4.4
	Prothonotary warbler	0.022	16	-21.9	-33.8	-7.9
	Common yellowthroat	0.339	105	21.1	17.2	25.1
	Hooded warbler	0.026	16	14.5	-10.8	47.0
	Yellow-breasted chat	0.006	6	-7.4	-15.5	1.4
	Summer tanager	0.460	106	-7.6	-11.0	-4.1
	Eastern towhee	6.062	163	-5.9	-9.0	-2.6
	Bachman's sparrow	0.817	93	-10.0	-13.7	-6.1
	Northern cardinal	0.673	155	9.1	5.7	12.6
	Blue grosbeak	0.011	8	-68.0	-73.4	-61.5
	Eastern meadowlark	0.030	11	7.1	-3.3	18.7
	Common grackle	0.028	14	37.1	18.7	58.4
	Brown-headed cowbird	0.066	38	9.8	1.5	18.8
	American goldfinch	0.043	22	-8.9	-11.5	-6.2

[a] Estimates are based on point-count surveys on 14 national forests in Southern Region. Species that occurred on fewer than six points are not shown. Estimates based on many points with confidence intervals that exclude zero are more reliable than estimates based on few points with confidence intervals that include zero.

APPENDIX 6

Frequency of Occurrence for 114 Avian Species in Four Successional Stages for 13 Forest Types in the Southern Region[a]

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
Wood duck	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.01	0.00	0.00	0.00
	Longleaf-slash	0.00	0.01	0.01	0.01	0.01
	Oak-gum-cypress		0.03	0.01	0.01	0.01
	Elm-ash-cottonwood	0.00	0.00	0.01	0.01	0.01
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.08	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.01	0.00	0.00	
Ruffed grouse	Oak-hickory		0.01	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.01	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.01	0.00	0.00
	Sand pine-scrub oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.04	0.01
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.02	0.02	0.02
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Wild turkey	Oak-hickory		0.02	0.02	0.02	0.02
	Loblolly-shortleaf	0.14	0.02	0.02	0.02	0.02
	Hardwood-pine	0.06	0.02	0.04	0.02	0.02
	Longleaf-slash	0.00	0.04	0.01	0.02	0.02
	Oak-gum-cypress		0.00	0.02	0.01	0.01
	Elm-ash-cottonwood	0.00	0.00	0.01	0.01	0.01
	White pine-hemlock	0.00	0.00	0.00	0.04	0.02
	Sand pine-oak		0.08	0.09	0.10	0.09
	Glade-shrub-savanna	0.02	0.00	0.00	0.00	0.01
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.03	0.02
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.04	0.03	0.02	0.02	
Northern bobwhite	Oak-hickory		0.01	0.03	0.02	0.02
	Loblolly-shortleaf	0.32	0.09	0.09	0.08	0.09
	Hardwood-pine	0.24	0.08	0.04	0.04	0.04
	Longleaf-slash	0.15	0.14	0.19	0.19	0.18
	Oak-gum-cypress		0.03	0.17	0.03	0.07
	Elm-ash-cottonwood	0.00	0.00	0.04	0.02	0.02
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.07	0.09	0.00	0.07
	Glade-shrub-savanna	0.02	0.06	0.00	0.04	0.03
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.12	0.08	0.09	0.06	
Black vulture	Oak-hickory		0.01	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.02	0.00	0.01	0.01
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.01	0.01	0.01	0.01
	Oak-gum-cypress		0.00	0.00	0.01	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.01	0.00	0.00	
Turkey vulture	Oak-hickory		0.02	0.01	0.01	0.01
	Loblolly-shortleaf	0.04	0.10	0.02	0.02	0.03
	Hardwood-pine	0.00	0.01	0.02	0.01	0.01
	Longleaf-slash	0.05	0.09	0.04	0.03	0.04
	Oak-gum-cypress		0.01	0.01	0.01	0.01
	Elm-ash-cottonwood	0.06	0.00	0.00	0.00	0.00
	White pine-hemlock	0.10	0.00	0.01	0.01	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.03	0.08	0.00	0.04
	Cove hardwood			0.00	0.02	0.02
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.03	0.03
	Spruce-fir				0.00	0.00
	All forest types	0.05	0.06	0.02	0.02	
Mississippi kite	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.01	0.00	0.00	0.00
	Oak-gum-cypress		0.04	0.00	0.00	0.01
	Elm-ash-cottonwood	0.06	0.03	0.00	0.03	0.03
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.04	0.00	0.00	0.00	0.02
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.01	0.00	0.00	
Sharp-shinned hawk	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.01	0.01	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Cooper's hawk	Oak-hickory		0.01	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.01	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.01	0.00	0.01
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Red-shouldered hawk	Oak-hickory		0.02	0.03	0.03	0.03
	Loblolly-shortleaf	0.00	0.03	0.03	0.02	0.03
	Hardwood-pine	0.00	0.04	0.02	0.03	0.03
	Longleaf-slash	0.00	0.02	0.04	0.02	0.02
	Oak-gum-cypress		0.04	0.08	0.08	0.07
	Elm-ash-cottonwood	0.06	0.05	0.14	0.06	0.07
	White pine-hemlock	0.00	0.08	0.02	0.02	0.02
	Sand pine-oak		0.06	0.02	0.00	0.04
	Glade-shrub-savanna	0.02	0.00	0.00	0.00	0.01
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.04	0.04
	Spruce-fir				0.00	0.00
	All forest types	0.01	0.03	0.04	0.03	
Broad-winged hawk	Oak-hickory		0.00	0.01	0.01	0.01
	Loblolly-shortleaf	0.00	0.01	0.01	0.02	0.02
	Hardwood-pine	0.00	0.01	0.02	0.02	0.02
	Longleaf-slash	0.00	0.01	0.01	0.00	0.01
	Oak-gum-cypress		0.00	0.02	0.02	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.01	0.01
	White pine-hemlock	0.00	0.00	0.00	0.03	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.03	0.02
	Riparian				0.04	0.04
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.01	0.01	0.02	
Red-tailed hawk	Oak-hickory		0.01	0.01	0.01	0.01
	Loblolly-shortleaf	0.11	0.05	0.00	0.01	0.01
	Hardwood-pine	0.06	0.01	0.01	0.01	0.01
	Longleaf-slash	0.00	0.03	0.00	0.01	0.01
	Oak-gum-cypress		0.01	0.00	0.00	0.00
	Elm-ash-cottonwood	0.06	0.00	0.06	0.01	0.02
	White pine-hemlock	0.00	0.00	0.01	0.02	0.01
	Sand pine-oak		0.01	0.00	0.00	0.01
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.02	0.02
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.05	0.03	0.01	0.01	
American kestrel	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.05	0.01	0.02	0.02
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.08	0.02	0.03	0.06
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.03	0.00	0.00	
Mourning dove	Oak-hickory		0.20	0.13	0.09	0.10
	Loblolly-shortleaf	0.32	0.37	0.17	0.16	0.18
	Hardwood-pine	0.18	0.24	0.13	0.13	0.13
	Longleaf-slash	0.30	0.34	0.23	0.28	0.27
	Oak-gum-cypress		0.29	0.17	0.13	0.16
	Elm-ash-cottonwood	0.33	0.11	0.25	0.31	0.28
	White pine-hemlock	0.20	0.33	0.21	0.13	0.18
	Sand pine-oak		0.43	0.69	0.40	0.49
	Glade-shrub-savanna	0.18	0.11	0.08	0.12	0.14
	Cove hardwood			0.16	0.06	0.08
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.25	0.25
	Spruce-fir				0.27	0.20
	All forest types	0.24	0.31	0.18	0.15	
Black-billed cuckoo	Oak-hickory		0.01	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.03	0.00	0.00	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.02	0.01
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Yellow-billed cuckoo	Oak-hickory		0.31	0.29	0.28	0.28
	Loblolly-shortleaf	0.36	0.29	0.29	0.25	0.27
	Hardwood-pine	0.12	0.26	0.35	0.32	0.32
	Longleaf-slash	0.20	0.23	0.19	0.15	0.17
	Oak-gum-cypress		0.58	0.53	0.38	0.45
	Elm-ash-cottonwood	0.44	0.54	0.59	0.52	0.53
	White pine-hemlock	0.00	0.33	0.15	0.12	0.14
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.30	0.22	0.17	0.35	0.27
	Cove hardwood			0.16	0.17	0.17
	Maple-beech-birch			0.02	0.05	0.04
	Riparian				0.52	0.52

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.28	0.31	0.29	0.28	
Eastern screech-owl	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.01	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Great horned owl	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.01	0.01	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Barred owl	Oak-hickory		0.00	0.01	0.01	0.01
	Loblolly-shortleaf	0.00	0.00	0.01	0.01	0.01
	Hardwood-pine	0.00	0.01	0.00	0.02	0.02
	Longleaf-slash	0.00	0.00	0.00	0.01	0.00
	Oak-gum-cypress		0.17	0.13	0.08	0.10
	Elm-ash-cottonwood	0.11	0.27	0.23	0.16	0.18
	White pine-hemlock	0.00	0.00	0.01	0.02	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.00	0.00	0.00	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.03	0.02
	Riparian				0.06	0.06
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.03	0.02	0.02	
Common nighthawk	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.02	0.01	0.01
	Oak-gum-cypress		0.00	0.01	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.03	0.02	0.00	0.03
	Glade-shrub-savanna	0.04	0.00	0.00	0.00	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.01	0.01	0.00	
Chuck-will's-widow	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.01	0.01	0.00	0.01
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.01	0.00	0.00	0.01
	Glade-shrub-savanna	0.00	0.03	0.00	0.00	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Whip-poor-will	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.01	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Chimney swift	Oak-hickory		0.05	0.01	0.02	0.02
	Loblolly-shortleaf	0.07	0.04	0.04	0.03	0.03
	Hardwood-pine	0.06	0.03	0.02	0.03	0.03
	Longleaf-slash	0.00	0.06	0.02	0.04	0.04
	Oak-gum-cypress		0.03	0.01	0.04	0.03
	Elm-ash-cottonwood	0.06	0.03	0.03	0.03	0.03
	White pine-hemlock	0.00	0.17	0.01	0.02	0.02
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.06	0.08	0.08	0.05
	Cove hardwood			0.00	0.02	0.02
	Maple-beech-birch			0.13	0.12	0.12
	Riparian				0.02	0.02
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.05	0.03	0.03	
Ruby-throated hummingbird	Oak-hickory		0.10	0.04	0.03	0.04
	Loblolly-shortleaf	0.04	0.05	0.02	0.03	0.03
	Hardwood-pine	0.12	0.02	0.03	0.03	0.03
	Longleaf-slash	0.05	0.01	0.00	0.01	0.01
	Oak-gum-cypress		0.38	0.10	0.09	0.13
	Elm-ash-cottonwood	0.39	0.51	0.23	0.23	0.27
	White pine-hemlock	0.00	0.00	0.02	0.06	0.04
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.09	0.19	0.00	0.08	0.11
	Cove hardwood			0.04	0.04	0.04
	Maple-beech-birch			0.02	0.12	0.08
	Riparian				0.02	0.02

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.11	0.09	0.03	0.04	
Belted kingfisher	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.11	0.00	0.03	0.01	0.02
	White pine-hemlock	0.00	0.00	0.00	0.02	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.04	0.03	0.00	0.00	0.02
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.00	0.00	0.00	
Red-headed woodpecker	Oak-hickory		0.02	0.02	0.02	0.02
	Loblolly-shortleaf	0.21	0.22	0.05	0.11	0.10
	Hardwood-pine	0.12	0.08	0.04	0.05	0.05
	Longleaf-slash	0.20	0.19	0.13	0.14	0.14
	Oak-gum-cypress		0.08	0.10	0.05	0.07
	Elm-ash-cottonwood	0.11	0.03	0.07	0.07	0.07
	White pine-hemlock	0.00	0.00	0.01	0.01	0.01
	Sand pine-oak		0.20	0.11	0.10	0.16
	Glade-shrub-savanna	0.00	0.06	0.08	0.04	0.03
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.02	0.02
	Spruce-fir				0.00	0.00
	All forest types	0.09	0.15	0.06	0.06	
Red-bellied woodpecker	Oak-hickory		0.15	0.15	0.18	0.18
	Loblolly-shortleaf	0.29	0.32	0.27	0.28	0.28
	Hardwood-pine	0.18	0.30	0.14	0.29	0.26
	Longleaf-slash	0.45	0.27	0.37	0.44	0.40
	Oak-gum-cypress		0.61	0.69	0.52	0.58
	Elm-ash-cottonwood	0.67	0.65	0.68	0.63	0.64
	White pine-hemlock	0.00	0.00	0.07	0.09	0.07
	Sand pine-oak		0.39	0.38	0.60	0.42
	Glade-shrub-savanna	0.18	0.19	0.08	0.19	0.18
	Cove hardwood			0.08	0.16	0.14
	Maple-beech-birch			0.00	0.03	0.02
	Riparian				0.43	0.43
	Spruce-fir				0.00	0.00
	All forest types	0.29	0.32	0.26	0.29	
Downy woodpecker	Oak-hickory		0.13	0.09	0.13	0.12
	Loblolly-shortleaf	0.14	0.12	0.09	0.09	0.09
	Hardwood-pine	0.00	0.12	0.06	0.12	0.11
	Longleaf-slash	0.10	0.08	0.08	0.07	0.08
	Oak-gum-cypress		0.25	0.22	0.15	0.18
	Elm-ash-cottonwood	0.28	0.41	0.35	0.26	0.29
	White pine-hemlock	0.00	0.25	0.05	0.05	0.06
	Sand pine-oak		0.24	0.13	0.50	0.26
	Glade-shrub-savanna	0.05	0.11	0.25	0.12	0.10
	Cove hardwood			0.12	0.06	0.08
	Maple-beech-birch			0.07	0.07	0.07
	Riparian				0.14	0.14

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.09	0.15	0.10	0.11	
Hairy woodpecker	Oak-hickory		0.07	0.05	0.05	0.05
	Loblolly-shortleaf	0.04	0.03	0.02	0.02	0.03
	Hardwood-pine	0.00	0.05	0.03	0.05	0.04
	Longleaf-slash	0.00	0.05	0.03	0.02	0.03
	Oak-gum-cypress		0.04	0.02	0.04	0.04
	Elm-ash-cottonwood	0.00	0.03	0.07	0.04	0.05
	White pine-hemlock	0.00	0.08	0.04	0.06	0.05
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.04	0.03	0.00	0.04	0.03
	Cove hardwood			0.00	0.04	0.03
	Maple-beech-birch			0.02	0.03	0.03
	Riparian				0.02	0.02
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.05	0.03	0.04	
Red-cockaded woodpecker	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.02	0.01
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.05	0.05	0.04	0.08	0.06
	Oak-gum-cypress		0.00	0.04	0.01	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.00	0.17	0.04	0.03
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.01	0.01	0.02	
Northern flicker	Oak-hickory		0.08	0.05	0.02	0.03
	Loblolly-shortleaf	0.11	0.10	0.06	0.05	0.06
	Hardwood-pine	0.12	0.11	0.06	0.04	0.05
	Longleaf-slash	0.30	0.06	0.05	0.05	0.06
	Oak-gum-cypress		0.08	0.14	0.06	0.08
	Elm-ash-cottonwood	0.17	0.16	0.13	0.15	0.15
	White pine-hemlock	0.10	0.17	0.09	0.00	0.05
	Sand pine-oak		0.20	0.18	0.23	0.20
	Glade-shrub-savanna	0.07	0.06	0.08	0.12	0.08
	Cove hardwood			0.00	0.05	0.04
	Maple-beech-birch			0.02	0.03	0.03
	Riparian				0.04	0.04
	Spruce-fir				0.00	0.00
	All forest types	0.13	0.10	0.06	0.04	
Pileated woodpecker	Oak-hickory		0.36	0.29	0.30	0.30
	Loblolly-shortleaf	0.21	0.31	0.26	0.26	0.27
	Hardwood-pine	0.24	0.37	0.31	0.33	0.33
	Longleaf-slash	0.20	0.25	0.21	0.22	0.22
	Oak-gum-cypress		0.40	0.36	0.28	0.32
	Elm-ash-cottonwood	0.28	0.30	0.23	0.29	0.28
	White pine-hemlock	0.30	0.58	0.45	0.31	0.38
	Sand pine-oak		0.09	0.04	0.07	0.08
	Glade-shrub-savanna	0.30	0.17	0.42	0.19	0.25
	Cove hardwood			0.40	0.41	0.41
	Maple-beech-birch			0.22	0.20	0.21
	Riparian				0.45	0.45

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.27	0.29	0.28	0.29	
Eastern wood-pewee	Oak-hickory		0.20	0.12	0.19	0.18
	Loblolly-shortleaf	0.11	0.19	0.10	0.21	0.17
	Hardwood-pine	0.18	0.06	0.08	0.13	0.12
	Longleaf-slash	0.15	0.12	0.05	0.16	0.12
	Oak-gum-cypress		0.18	0.24	0.13	0.16
	Elm-ash-cottonwood	0.39	0.51	0.33	0.35	0.36
	White pine-hemlock	0.00	0.00	0.01	0.07	0.04
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.03	0.08	0.19	0.08
	Cove hardwood			0.08	0.10	0.09
	Maple-beech-birch			0.00	0.05	0.03
	Riparian				0.04	0.04
	Spruce-fir				0.00	0.00
	All forest types	0.13	0.16	0.10	0.17	
Acadian flycatcher	Oak-hickory		0.12	0.18	0.28	0.26
	Loblolly-shortleaf	0.07	0.02	0.10	0.14	0.11
	Hardwood-pine	0.06	0.08	0.12	0.28	0.24
	Longleaf-slash	0.10	0.00	0.03	0.03	0.02
	Oak-gum-cypress		0.27	0.44	0.56	0.49
	Elm-ash-cottonwood	0.28	0.19	0.75	0.63	0.59
	White pine-hemlock	0.00	0.33	0.09	0.33	0.22
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.30	0.11	0.00	0.00	0.16
	Cove hardwood			0.16	0.58	0.48
	Maple-beech-birch			0.00	0.05	0.03
	Riparian				0.47	0.47
	Spruce-fir				0.00	0.00
	All forest types	0.18	0.07	0.14	0.25	
Eastern phoebe	Oak-hickory		0.03	0.03	0.03	0.03
	Loblolly-shortleaf	0.00	0.02	0.01	0.02	0.02
	Hardwood-pine	0.00	0.00	0.02	0.02	0.02
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.01	0.01	0.01	0.01
	Elm-ash-cottonwood	0.00	0.00	0.01	0.02	0.02
	White pine-hemlock	0.00	0.00	0.04	0.07	0.05
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.03	0.08	0.00	0.02
	Cove hardwood			0.00	0.07	0.06
	Maple-beech-birch			0.02	0.00	0.01
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.01	0.01	0.02	0.02	
Great crested flycatcher	Oak-hickory		0.13	0.11	0.12	0.12
	Loblolly-shortleaf	0.11	0.18	0.26	0.20	0.22
	Hardwood-pine	0.41	0.27	0.18	0.20	0.20
	Longleaf-slash	0.55	0.22	0.42	0.42	0.39
	Oak-gum-cypress		0.45	0.41	0.34	0.38
	Elm-ash-cottonwood	0.28	0.27	0.30	0.28	0.29
	White pine-hemlock	0.00	0.17	0.08	0.14	0.11
	Sand pine-oak		0.78	0.82	0.90	0.81
	Glade-shrub-savanna	0.14	0.14	0.33	0.35	0.20
	Cove hardwood			0.20	0.14	0.15
	Maple-beech-birch			0.00	0.02	0.01
	Riparian				0.31	0.31

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.23	0.28	0.25	0.21	
Eastern kingbird	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.04	0.04	0.00	0.01	0.01
	Hardwood-pine	0.06	0.02	0.00	0.00	0.00
	Longleaf-slash	0.00	0.06	0.01	0.01	0.02
	Oak-gum-cypress		0.00	0.01	0.00	0.00
	Elm-ash-cottonwood	0.06	0.00	0.01	0.00	0.01
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.03	0.00	0.12	0.05
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.04	0.03	0.01	0.01	
White-eyed vireo	Oak-hickory		0.31	0.11	0.09	0.10
	Loblolly-shortleaf	0.43	0.53	0.27	0.20	0.26
	Hardwood-pine	0.29	0.27	0.11	0.13	0.14
	Longleaf-slash	0.45	0.25	0.16	0.14	0.16
	Oak-gum-cypress		0.62	0.45	0.37	0.43
	Elm-ash-cottonwood	0.56	0.57	0.35	0.44	0.44
	White pine-hemlock	0.10	0.00	0.01	0.03	0.02
	Sand pine-oak		0.90	0.67	0.63	0.81
	Glade-shrub-savanna	0.28	0.19	0.33	0.19	0.24
	Cove hardwood			0.04	0.07	0.07
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.57	0.57
	Spruce-fir				0.00	0.00
	All forest types	0.36	0.45	0.20	0.16	
Yellow-throated vireo	Oak-hickory		0.04	0.03	0.06	0.05
	Loblolly-shortleaf	0.11	0.11	0.03	0.06	0.06
	Hardwood-pine	0.00	0.04	0.03	0.08	0.06
	Longleaf-slash	0.05	0.05	0.04	0.08	0.07
	Oak-gum-cypress		0.03	0.06	0.05	0.05
	Elm-ash-cottonwood	0.00	0.00	0.06	0.07	0.06
	White pine-hemlock	0.00	0.17	0.01	0.05	0.04
	Sand pine-oak		0.04	0.07	0.20	0.07
	Glade-shrub-savanna	0.09	0.00	0.00	0.00	0.04
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.02	0.00	0.01
	Riparian				0.17	0.17
	Spruce-fir				0.00	0.00
	All forest types	0.06	0.06	0.03	0.07	
Blue-headed vireo	Oak-hickory		0.09	0.05	0.05	0.05
	Loblolly-shortleaf	0.00	0.01	0.01	0.02	0.01
	Hardwood-pine	0.00	0.01	0.05	0.04	0.04
	Longleaf-slash	0.00	0.01	0.00	0.01	0.01
	Oak-gum-cypress		0.01	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.01	0.01	0.01
	White pine-hemlock	0.00	0.17	0.08	0.09	0.08
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.08	0.08	0.00	0.05
	Cove hardwood			0.12	0.02	0.05
	Maple-beech-birch			0.24	0.46	0.36
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.20	0.15
	All forest types	0.02	0.02	0.03	0.04	
Red-eyed vireo	Oak-hickory		0.80	0.79	0.81	0.81
	Loblolly-shortleaf	0.46	0.42	0.55	0.57	0.55
	Hardwood-pine	0.82	0.57	0.72	0.77	0.75
	Longleaf-slash	0.15	0.31	0.19	0.26	0.25
	Oak-gum-cypress		0.17	0.34	0.55	0.44
	Elm-ash-cottonwood	0.22	0.00	0.28	0.42	0.35
	White pine-hemlock	0.80	0.75	0.91	0.79	0.84
	Sand pine-oak		0.02	0.00	0.00	0.01
	Glade-shrub-savanna	0.51	0.47	0.67	0.27	0.47
	Cove hardwood			0.80	0.90	0.88
	Maple-beech-birch			0.57	0.63	0.60
	Riparian				0.96	0.96
	Spruce-fir				0.00	0.00
	All forest types	0.47	0.38	0.56	0.66	
Blue jay	Oak-hickory		0.19	0.22	0.21	0.21
	Loblolly-shortleaf	0.18	0.37	0.40	0.37	0.38
	Hardwood-pine	0.29	0.25	0.26	0.31	0.30
	Longleaf-slash	0.40	0.44	0.35	0.41	0.40
	Oak-gum-cypress		0.22	0.24	0.23	0.23
	Elm-ash-cottonwood	0.06	0.05	0.10	0.18	0.15
	White pine-hemlock	0.20	0.42	0.27	0.10	0.19
	Sand pine-oak		0.38	0.31	0.37	0.36
	Glade-shrub-savanna	0.16	0.11	0.08	0.08	0.12
	Cove hardwood			0.24	0.11	0.14
	Maple-beech-birch			0.09	0.08	0.09
	Riparian				0.63	0.63
	Spruce-fir				0.13	0.10
	All forest types	0.20	0.32	0.31	0.29	
Florida scrub-jay	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.17	0.09	0.03	0.13
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types		0.17	0.09	0.03	
American crow	Oak-hickory		0.52	0.46	0.41	0.42
	Loblolly-shortleaf	0.32	0.57	0.52	0.44	0.48
	Hardwood-pine	0.76	0.54	0.49	0.47	0.48
	Longleaf-slash	0.25	0.54	0.41	0.38	0.41
	Oak-gum-cypress		0.12	0.31	0.35	0.31
	Elm-ash-cottonwood	0.11	0.00	0.14	0.20	0.17
	White pine-hemlock	0.30	0.67	0.57	0.61	0.58
	Sand pine-oak		0.41	0.38	0.30	0.38
	Glade-shrub-savanna	0.28	0.56	0.67	0.42	0.42
	Cove hardwood			0.24	0.33	0.31
	Maple-beech-birch			0.33	0.22	0.27
	Riparian				0.71	0.71

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.27	0.35
	All forest types	0.32	0.49	0.46	0.42	
Fish crow	Oak-hickory		0.00	0.01	0.00	0.01
	Loblolly-shortleaf	0.00	0.01	0.02	0.01	0.02
	Hardwood-pine	0.00	0.01	0.01	0.01	0.01
	Longleaf-slash	0.00	0.00	0.03	0.02	0.02
	Oak-gum-cypress		0.04	0.03	0.04	0.04
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.01	0.02	0.00	0.01
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.01	0.02	0.01	
Common raven	Oak-hickory		0.00	0.01	0.01	0.01
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.01	0.01	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.01	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.00	0.00	0.00	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.13	0.10
	All forest types	0.01	0.00	0.01	0.01	
Purple martin	Oak-hickory		0.01	0.00	0.00	0.00
	Loblolly-shortleaf	0.04	0.02	0.02	0.01	0.01
	Hardwood-pine	0.00	0.01	0.01	0.01	0.01
	Longleaf-slash	0.00	0.06	0.04	0.01	0.03
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01
	Spruce-fir				0.00	0.00
	All forest types	0.01	0.02	0.02	0.01	
Tree swallow	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.03	0.02	0.03	0.03
	Glade-shrub-savanna	0.05	0.00	0.00	0.04	0.03
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.01	0.00	0.00	
Northern rough-winged swallow	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.11	0.00	0.00	0.00	0.01
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.03	0.00	0.00	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.00	0.00	0.00	
Barn swallow	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.01	0.00
	Longleaf-slash	0.00	0.00	0.01	0.00	0.00
	Oak-gum-cypress		0.00	0.01	0.01	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.02	0.04	0.00	0.02
	Glade-shrub-savanna	0.00	0.00	0.00	0.04	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Carolina chickadee	Oak-hickory		0.24	0.16	0.19	0.18
	Loblolly-shortleaf	0.25	0.24	0.26	0.23	0.24
	Hardwood-pine	0.35	0.15	0.20	0.25	0.24
	Longleaf-slash	0.05	0.19	0.12	0.14	0.14
	Oak-gum-cypress		0.40	0.27	0.23	0.26
	Elm-ash-cottonwood	0.39	0.49	0.49	0.45	0.46
	White pine-hemlock	0.20	0.25	0.29	0.21	0.24
	Sand pine-oak		0.04	0.02	0.00	0.03
	Glade-shrub-savanna	0.14	0.22	0.50	0.23	0.21
	Cove hardwood			0.04	0.22	0.18
	Maple-beech-birch			0.11	0.08	0.10
	Riparian				0.52	0.52
	Spruce-fir				0.00	0.00
	All forest types	0.21	0.22	0.21	0.22	
Black-capped chickadee	Oak-hickory		0.00	0.02	0.01	0.01
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.03	0.01	0.01
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.03	0.04	0.03
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.04	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.02	0.00	0.01
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.01	0.01	
Tufted titmouse	Oak-hickory		0.35	0.43	0.42	0.42
	Loblolly-shortleaf	0.36	0.47	0.49	0.49	0.49
	Hardwood-pine	0.29	0.43	0.41	0.52	0.49
	Longleaf-slash	0.25	0.36	0.31	0.38	0.36
	Oak-gum-cypress		0.35	0.58	0.62	0.57
	Elm-ash-cottonwood	0.39	0.54	0.55	0.57	0.56
	White pine-hemlock	0.50	0.25	0.48	0.41	0.43
	Sand pine-oak		0.33	0.27	0.67	0.36
	Glade-shrub-savanna	0.37	0.31	0.25	0.27	0.32
	Cove hardwood			0.28	0.37	0.35
	Maple-beech-birch			0.24	0.14	0.18
	Riparian				0.83	0.83
	Spruce-fir				0.00	0.00
	All forest types	0.36	0.40	0.43	0.47	
Red-breasted nuthatch	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.01	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.01	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.00	0.00	0.00	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.02	0.03	0.03
	Riparian				0.00	0.00
	Spruce-fir				0.47	0.35
	All forest types	0.01	0.00	0.00	0.00	
White-breasted nuthatch	Oak-hickory		0.13	0.10	0.18	0.16
	Loblolly-shortleaf	0.00	0.05	0.05	0.06	0.05
	Hardwood-pine	0.12	0.11	0.05	0.10	0.09
	Longleaf-slash	0.05	0.02	0.02	0.04	0.03
	Oak-gum-cypress		0.00	0.02	0.04	0.03
	Elm-ash-cottonwood	0.00	0.00	0.00	0.01	0.01
	White pine-hemlock	0.10	0.08	0.09	0.13	0.11
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.12	0.00	0.08	0.15	0.09
	Cove hardwood			0.12	0.11	0.11
	Maple-beech-birch			0.15	0.12	0.13
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.07	0.06	0.05	0.11	
Brown-headed nuthatch	Oak-hickory		0.00	0.01	0.00	0.00
	Loblolly-shortleaf	0.29	0.11	0.02	0.05	0.05
	Hardwood-pine	0.00	0.05	0.01	0.01	0.01
	Longleaf-slash	0.15	0.21	0.10	0.14	0.14
	Oak-gum-cypress		0.01	0.03	0.00	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.00	0.08	0.00	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.02	0.02

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.10	0.10	0.03	0.03	
Carolina wren	Oak-hickory		0.25	0.23	0.24	0.24
	Loblolly-shortleaf	0.32	0.54	0.40	0.40	0.41
	Hardwood-pine	0.18	0.41	0.23	0.38	0.36
	Longleaf-slash	0.50	0.55	0.45	0.41	0.44
	Oak-gum-cypress		0.65	0.69	0.60	0.63
	Elm-ash-cottonwood	0.78	0.54	0.68	0.72	0.70
	White pine-hemlock	0.50	0.17	0.20	0.19	0.20
	Sand pine-oak		0.40	0.42	0.53	0.43
	Glade-shrub-savanna	0.35	0.19	0.67	0.27	0.32
	Cove hardwood			0.28	0.23	0.25
	Maple-beech-birch			0.07	0.03	0.05
	Riparian				0.93	0.93
	Spruce-fir				0.00	0.00
	All forest types	0.41	0.47	0.36	0.37	
Winter wren	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.01	0.04	0.02
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.00	0.00	0.00	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.26	0.15	0.20
	Riparian				0.00	0.00
	Spruce-fir				0.40	0.30
	All forest types	0.01	0.00	0.02	0.01	
Golden-crowned kinglet	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.02	0.00	0.01
	Riparian				0.00	0.00
	Spruce-fir				1.00	0.75
	All forest types	0.00	0.00	0.00	0.01	
Ruby-crowned kinglet	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.03	0.00	0.03	0.02
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.01	0.00	0.00	
Blue-gray gnatcatcher	Oak-hickory		0.16	0.13	0.20	0.19
	Loblolly-shortleaf	0.32	0.17	0.10	0.13	0.12
	Hardwood-pine	0.06	0.18	0.10	0.17	0.15
	Longleaf-slash	0.10	0.13	0.11	0.11	0.11
	Oak-gum-cypress		0.35	0.51	0.30	0.36
	Elm-ash-cottonwood	0.61	0.35	0.49	0.47	0.47
	White pine-hemlock	0.00	0.17	0.09	0.14	0.12
	Sand pine-oak		0.29	0.22	0.47	0.30
	Glade-shrub-savanna	0.28	0.06	0.25	0.31	0.22
	Cove hardwood			0.00	0.20	0.15
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.23	0.23
	Spruce-fir				0.00	0.00
	All forest types	0.26	0.19	0.14	0.18	
Eastern bluebird	Oak-hickory		0.01	0.01	0.01	0.01
	Loblolly-shortleaf	0.14	0.06	0.02	0.01	0.02
	Hardwood-pine	0.00	0.03	0.02	0.01	0.01
	Longleaf-slash	0.15	0.04	0.04	0.03	0.04
	Oak-gum-cypress		0.00	0.01	0.00	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.08	0.00	0.00	0.00
	Sand pine-oak		0.00	0.02	0.00	0.01
	Glade-shrub-savanna	0.05	0.00	0.08	0.19	0.07
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.07	0.03	0.02	0.01	
Veery	Oak-hickory		0.09	0.02	0.03	0.03
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.01	0.04	0.03
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.12	0.33	0.00	0.00	0.15
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.61	0.61	0.61
	Riparian				0.00	0.00
	Spruce-fir				0.67	0.70
	All forest types	0.05	0.04	0.02	0.02	
Swainson's thrush	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.03	0.03

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Wood thrush	Oak-hickory		0.22	0.19	0.22	0.21
	Loblolly-shortleaf	0.21	0.09	0.16	0.20	0.18
	Hardwood-pine	0.24	0.11	0.12	0.20	0.18
	Longleaf-slash	0.10	0.03	0.04	0.06	0.05
	Oak-gum-cypress		0.08	0.09	0.14	0.12
	Elm-ash-cottonwood	0.22	0.08	0.16	0.15	0.15
	White pine-hemlock	0.00	0.08	0.24	0.29	0.25
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.12	0.08	0.25	0.19	0.14
	Cove hardwood			0.16	0.32	0.28
	Maple-beech-birch			0.20	0.34	0.28
	Riparian				0.16	0.16
	Spruce-fir				0.00	0.00
	All forest types	0.15	0.09	0.14	0.19	
American robin	Oak-hickory		0.05	0.03	0.01	0.01
	Loblolly-shortleaf	0.00	0.00	0.01	0.01	0.01
	Hardwood-pine	0.06	0.02	0.01	0.02	0.01
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.03	0.04	0.04
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.12	0.33	0.08	0.00	0.15
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.07	0.08	0.08
	Riparian				0.00	0.00
	Spruce-fir				0.60	0.65
	All forest types	0.05	0.03	0.01	0.01	
Gray catbird	Oak-hickory		0.06	0.01	0.01	0.01
	Loblolly-shortleaf	0.04	0.05	0.01	0.02	0.02
	Hardwood-pine	0.06	0.03	0.01	0.02	0.02
	Longleaf-slash	0.10	0.01	0.02	0.01	0.01
	Oak-gum-cypress		0.06	0.03	0.00	0.02
	Elm-ash-cottonwood	0.06	0.05	0.01	0.02	0.02
	White pine-hemlock	0.00	0.08	0.05	0.02	0.04
	Sand pine-oak		0.29	0.13	0.13	0.23
	Glade-shrub-savanna	0.04	0.44	0.08	0.00	0.15
	Cove hardwood			0.04	0.01	0.02
	Maple-beech-birch			0.07	0.00	0.03
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.05
	All forest types	0.05	0.08	0.02	0.01	
Northern mockingbird	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.04	0.01	0.01	0.00	0.01
	Hardwood-pine	0.12	0.03	0.00	0.00	0.00
	Longleaf-slash	0.05	0.05	0.03	0.02	0.03
	Oak-gum-cypress		0.00	0.01	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.01	0.01
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.06	0.00	0.00	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.02	0.01	0.01	
Brown thrasher	Oak-hickory		0.02	0.02	0.00	0.01
	Loblolly-shortleaf	0.07	0.02	0.03	0.03	0.03
	Hardwood-pine	0.06	0.08	0.03	0.01	0.02
	Longleaf-slash	0.20	0.07	0.08	0.08	0.08
	Oak-gum-cypress		0.05	0.03	0.03	0.03
	Elm-ash-cottonwood	0.00	0.03	0.03	0.01	0.02
	White pine-hemlock	0.20	0.08	0.01	0.01	0.02
	Sand pine-oak		0.53	0.44	0.23	0.46
	Glade-shrub-savanna	0.05	0.06	0.00	0.04	0.05
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.02	0.00	0.01
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.08	0.10	0.04	0.02	
Cedar waxwing	Oak-hickory		0.08	0.01	0.00	0.01
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.02	0.01	0.01
	Longleaf-slash	0.00	0.02	0.00	0.00	0.01
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.03	0.00	0.01
	Sand pine-oak		0.02	0.00	0.00	0.01
	Glade-shrub-savanna	0.05	0.17	0.17	0.12	0.11
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.07	0.04
	Riparian				0.01	0.01
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.02	0.01	0.00	
Blue-winged warbler	Oak-hickory		0.02	0.03	0.02	0.02
	Loblolly-shortleaf	0.07	0.02	0.01	0.01	0.01
	Hardwood-pine	0.00	0.00	0.04	0.01	0.02
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.08	0.03	0.01	0.02
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.08	0.02
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.01	0.02	0.02	
Northern parula	Oak-hickory		0.04	0.07	0.12	0.11
	Loblolly-shortleaf	0.25	0.03	0.03	0.03	0.03
	Hardwood-pine	0.12	0.06	0.05	0.12	0.10
	Longleaf-slash	0.05	0.01	0.03	0.05	0.04
	Oak-gum-cypress		0.10	0.16	0.36	0.27
	Elm-ash-cottonwood	0.17	0.08	0.25	0.23	0.22
	White pine-hemlock	0.00	0.00	0.10	0.21	0.14
	Sand pine-oak		0.11	0.02	0.07	0.08
	Glade-shrub-savanna	0.30	0.17	0.00	0.08	0.19
	Cove hardwood			0.00	0.28	0.22
	Maple-beech-birch			0.00	0.02	0.01
	Riparian				0.15	0.15

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.20	0.05	0.05	0.11	
Yellow warbler	Oak-hickory		0.01	0.02	0.01	0.01
	Loblolly-shortleaf	0.00	0.01	0.01	0.00	0.00
	Hardwood-pine	0.00	0.00	0.01	0.01	0.01
	Longleaf-slash	0.00	0.01	0.00	0.01	0.01
	Oak-gum-cypress		0.00	0.01	0.01	0.01
	Elm-ash-cottonwood	0.06	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.01	0.01	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.03	0.08	0.04	0.05
	Cove hardwood			0.00	0.05	0.04
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.01	0.01	0.01	
Chestnut-sided warbler	Oak-hickory		0.19	0.06	0.03	0.04
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.03	0.05	0.02	0.02
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.05	0.08	0.06
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.09	0.39	0.42	0.00	0.18
	Cove hardwood			0.08	0.02	0.04
	Maple-beech-birch			0.37	0.25	0.30
	Riparian				0.00	0.00
	Spruce-fir				0.13	0.25
	All forest types	0.04	0.07	0.04	0.02	
Magnolia warbler	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.01	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Black-throated blue warbler	Oak-hickory		0.01	0.02	0.03	0.02
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.02	0.02	0.02
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.17	0.01	0.17	0.10
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.06	0.00	0.00	0.02
	Cove hardwood			0.00	0.06	0.05
	Maple-beech-birch			0.48	0.58	0.53
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.01	0.01	0.01	0.02	
Black-throated green warbler	Oak-hickory		0.12	0.11	0.09	0.10
	Loblolly-shortleaf	0.00	0.01	0.02	0.03	0.02
	Hardwood-pine	0.12	0.08	0.05	0.11	0.10
	Longleaf-slash	0.00	0.01	0.01	0.02	0.02
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.42	0.39	0.39	0.38
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.21	0.11	0.00	0.00	0.12
	Cove hardwood			0.20	0.22	0.22
	Maple-beech-birch			0.13	0.34	0.25
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.09	0.04	0.06	0.08	
Blackburnian warbler	Oak-hickory		0.00	0.01	0.01	0.01
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.01	0.00	0.01	0.01
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.05	0.03
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.02	0.07	0.05
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.01	
Yellow-throated warbler	Oak-hickory		0.08	0.05	0.04	0.04
	Loblolly-shortleaf	0.14	0.06	0.01	0.04	0.03
	Hardwood-pine	0.00	0.05	0.03	0.03	0.03
	Longleaf-slash	0.00	0.01	0.01	0.02	0.02
	Oak-gum-cypress		0.00	0.06	0.05	0.04
	Elm-ash-cottonwood	0.00	0.03	0.03	0.04	0.03
	White pine-hemlock	0.40	0.08	0.04	0.07	0.08
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.18	0.06	0.00	0.04	0.10
	Cove hardwood			0.00	0.06	0.05
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.12	0.04	0.03	0.03	
Pine warbler	Oak-hickory		0.12	0.16	0.16	0.16
	Loblolly-shortleaf	0.50	0.55	0.55	0.67	0.61
	Hardwood-pine	0.18	0.28	0.29	0.38	0.36
	Longleaf-slash	0.60	0.60	0.65	0.71	0.68
	Oak-gum-cypress		0.05	0.17	0.16	0.15
	Elm-ash-cottonwood	0.06	0.00	0.04	0.11	0.09
	White pine-hemlock	0.00	0.17	0.17	0.15	0.15
	Sand pine-oak		0.26	0.40	0.77	0.37
	Glade-shrub-savanna	0.05	0.14	0.17	0.12	0.10
	Cove hardwood			0.00	0.04	0.03
	Maple-beech-birch			0.02	0.03	0.03
	Riparian				0.71	0.71

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.22	0.37	0.39	0.39	
Prairie warbler	Oak-hickory		0.09	0.06	0.03	0.04
	Loblolly-shortleaf	0.64	0.33	0.15	0.14	0.17
	Hardwood-pine	0.71	0.43	0.09	0.05	0.08
	Longleaf-slash	0.25	0.41	0.20	0.23	0.25
	Oak-gum-cypress		0.01	0.04	0.00	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.01	0.01
	White pine-hemlock	0.00	0.17	0.03	0.01	0.03
	Sand pine-oak		0.01	0.00	0.00	0.01
	Glade-shrub-savanna	0.11	0.06	0.17	0.04	0.08
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.02	0.01
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.27	0.25	0.11	0.08	
Palm warbler	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.01	0.01	0.01
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.03	0.02	0.00	0.03
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Cerulean warbler	Oak-hickory		0.03	0.02	0.03	0.03
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.01	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.04	0.00	0.00	0.00	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.01	0.01	0.02	
Black-and-white warbler	Oak-hickory		0.18	0.24	0.20	0.21
	Loblolly-shortleaf	0.07	0.10	0.13	0.17	0.15
	Hardwood-pine	0.12	0.10	0.17	0.14	0.14
	Longleaf-slash	0.05	0.04	0.02	0.02	0.02
	Oak-gum-cypress		0.00	0.00	0.07	0.04
	Elm-ash-cottonwood	0.06	0.00	0.03	0.05	0.04
	White pine-hemlock	0.00	0.08	0.20	0.15	0.16
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.12	0.03	0.08	0.00	0.07
	Cove hardwood			0.12	0.21	0.19
	Maple-beech-birch			0.28	0.20	0.24
	Riparian				0.11	0.11

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.09	0.08	0.14	0.15	
American redstart	Oak-hickory		0.01	0.05	0.04	0.04
	Loblolly-shortleaf	0.00	0.00	0.01	0.01	0.01
	Hardwood-pine	0.00	0.01	0.02	0.03	0.03
	Longleaf-slash	0.00	0.00	0.01	0.00	0.00
	Oak-gum-cypress		0.00	0.01	0.08	0.05
	Elm-ash-cottonwood	0.06	0.00	0.01	0.06	0.05
	White pine-hemlock	0.00	0.00	0.00	0.01	0.00
	Sand pine-oak		0.01	0.00	0.00	0.01
	Glade-shrub-savanna	0.11	0.00	0.00	0.04	0.05
	Cove hardwood			0.00	0.02	0.02
	Maple-beech-birch			0.04	0.02	0.03
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.05	0.00	0.02	0.03	
Prothonotary warbler	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.01	0.01	0.00	0.00
	Hardwood-pine	0.00	0.06	0.01	0.01	0.01
	Longleaf-slash	0.00	0.01	0.01	0.01	0.01
	Oak-gum-cypress		0.44	0.53	0.25	0.35
	Elm-ash-cottonwood	0.56	0.49	0.65	0.43	0.48
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.12	0.07	0.05	0.03	
Worm-eating warbler	Oak-hickory		0.15	0.18	0.19	0.18
	Loblolly-shortleaf	0.04	0.06	0.07	0.11	0.09
	Hardwood-pine	0.00	0.11	0.15	0.14	0.14
	Longleaf-slash	0.00	0.00	0.00	0.01	0.01
	Oak-gum-cypress		0.00	0.00	0.04	0.02
	Elm-ash-cottonwood	0.06	0.00	0.00	0.02	0.02
	White pine-hemlock	0.30	0.33	0.14	0.20	0.19
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.09	0.00	0.00	0.15	0.07
	Cove hardwood			0.12	0.11	0.11
	Maple-beech-birch			0.04	0.03	0.04
	Riparian				0.06	0.06
	Spruce-fir				0.00	0.00
	All forest types	0.07	0.06	0.09	0.12	
Swainson's warbler	Oak-hickory		0.01	0.01	0.01	0.01
	Loblolly-shortleaf	0.00	0.03	0.01	0.00	0.01
	Hardwood-pine	0.00	0.01	0.01	0.01	0.01
	Longleaf-slash	0.00	0.00	0.01	0.00	0.00
	Oak-gum-cypress		0.05	0.03	0.02	0.03
	Elm-ash-cottonwood	0.00	0.00	0.03	0.01	0.02
	White pine-hemlock	0.00	0.00	0.02	0.02	0.02
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.00	0.00	0.00	0.01
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.04	0.04

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.01	0.02	0.01	0.01	
Ovenbird	Oak-hickory		0.29	0.47	0.46	0.46
	Loblolly-shortleaf	0.00	0.04	0.07	0.11	0.09
	Hardwood-pine	0.18	0.19	0.38	0.24	0.26
	Longleaf-slash	0.00	0.02	0.03	0.04	0.04
	Oak-gum-cypress		0.00	0.02	0.04	0.03
	Elm-ash-cottonwood	0.00	0.00	0.03	0.03	0.03
	White pine-hemlock	0.00	0.50	0.53	0.59	0.54
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.35	0.17	0.00	0.23	0.24
	Cove hardwood			0.44	0.46	0.45
	Maple-beech-birch			0.54	0.53	0.53
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.15	0.10	0.21	0.25	
Louisiana waterthrush	Oak-hickory		0.01	0.02	0.03	0.03
	Loblolly-shortleaf	0.04	0.00	0.00	0.01	0.01
	Hardwood-pine	0.00	0.01	0.03	0.04	0.04
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.01	0.05	0.04
	Elm-ash-cottonwood	0.17	0.00	0.04	0.06	0.06
	White pine-hemlock	0.00	0.08	0.04	0.13	0.09
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.11	0.00	0.00	0.05
	Cove hardwood			0.04	0.09	0.08
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.13	0.13
	Spruce-fir				0.00	0.00
	All forest types	0.05	0.01	0.01	0.03	
Kentucky warbler	Oak-hickory		0.08	0.06	0.10	0.09
	Loblolly-shortleaf	0.04	0.11	0.09	0.14	0.12
	Hardwood-pine	0.00	0.02	0.05	0.10	0.09
	Longleaf-slash	0.05	0.03	0.02	0.03	0.03
	Oak-gum-cypress		0.05	0.13	0.17	0.14
	Elm-ash-cottonwood	0.06	0.03	0.07	0.14	0.11
	White pine-hemlock	0.00	0.00	0.00	0.02	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.14	0.00	0.00	0.00	0.06
	Cove hardwood			0.00	0.11	0.08
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.12	0.12
	Spruce-fir				0.00	0.00
	All forest types	0.07	0.06	0.06	0.10	
Common yellowthroat	Oak-hickory		0.05	0.02	0.02	0.02
	Loblolly-shortleaf	0.21	0.17	0.08	0.11	0.11
	Hardwood-pine	0.06	0.11	0.08	0.03	0.04
	Longleaf-slash	0.50	0.37	0.27	0.24	0.27
	Oak-gum-cypress		0.14	0.23	0.06	0.12
	Elm-ash-cottonwood	0.06	0.03	0.01	0.03	0.03
	White pine-hemlock	0.00	0.00	0.07	0.03	0.04
	Sand pine-oak		0.08	0.04	0.00	0.06
	Glade-shrub-savanna	0.19	0.28	0.17	0.38	0.25
	Cove hardwood			0.04	0.00	0.01
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.01	0.01

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.20	0.17	0.11	0.07	
Hooded warbler	Oak-hickory		0.62	0.34	0.31	0.32
	Loblolly-shortleaf	0.11	0.33	0.33	0.33	0.33
	Hardwood-pine	0.12	0.29	0.26	0.31	0.30
	Longleaf-slash	0.40	0.13	0.12	0.14	0.14
	Oak-gum-cypress		0.10	0.18	0.39	0.29
	Elm-ash-cottonwood	0.22	0.14	0.07	0.19	0.17
	White pine-hemlock	0.40	0.42	0.42	0.51	0.46
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.23	0.14	0.08	0.08	0.16
	Cove hardwood			0.40	0.33	0.35
	Maple-beech-birch			0.26	0.19	0.22
	Riparian				0.80	0.80
	Spruce-fir				0.00	0.00
	All forest types	0.22	0.28	0.28	0.30	
Canada warbler	Oak-hickory		0.06	0.01	0.00	0.01
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.10	0.00	0.00	0.02	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.03	0.08	0.00	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.15	0.20	0.18
	Riparian				0.00	0.00
	Spruce-fir				0.27	0.25
	All forest types	0.01	0.03	0.01	0.01	
Yellow-breasted chat	Oak-hickory		0.33	0.10	0.08	0.10
	Loblolly-shortleaf	0.75	0.70	0.34	0.31	0.37
	Hardwood-pine	0.71	0.54	0.18	0.15	0.18
	Longleaf-slash	0.65	0.61	0.26	0.29	0.33
	Oak-gum-cypress		0.48	0.15	0.10	0.17
	Elm-ash-cottonwood	0.67	0.57	0.16	0.31	0.32
	White pine-hemlock	0.10	0.17	0.07	0.04	0.06
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.26	0.19	0.33	0.38	0.27
	Cove hardwood			0.00	0.05	0.04
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.21	0.21
	Spruce-fir				0.00	0.00
	All forest types	0.49	0.56	0.23	0.18	
Summer tanager	Oak-hickory		0.11	0.10	0.17	0.16
	Loblolly-shortleaf	0.36	0.38	0.34	0.39	0.37
	Hardwood-pine	0.12	0.17	0.13	0.29	0.26
	Longleaf-slash	0.15	0.35	0.29	0.39	0.35
	Oak-gum-cypress		0.35	0.28	0.29	0.30
	Elm-ash-cottonwood	0.39	0.30	0.35	0.36	0.35
	White pine-hemlock	0.00	0.00	0.00	0.02	0.01
	Sand pine-oak		0.19	0.18	0.33	0.21
	Glade-shrub-savanna	0.04	0.08	0.00	0.04	0.05
	Cove hardwood			0.00	0.22	0.17
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.51	0.51

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.16	0.27	0.23	0.29	
Scarlet tanager	Oak-hickory		0.27	0.35	0.34	0.34
	Loblolly-shortleaf	0.04	0.09	0.08	0.11	0.10
	Hardwood-pine	0.24	0.22	0.31	0.22	0.24
	Longleaf-slash	0.00	0.04	0.04	0.04	0.04
	Oak-gum-cypress		0.00	0.01	0.01	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.02	0.01
	White pine-hemlock	0.30	0.42	0.38	0.39	0.38
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.21	0.22	0.17	0.38	0.24
	Cove hardwood			0.48	0.20	0.26
	Maple-beech-birch			0.24	0.31	0.28
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.13	0.12	0.17	0.20	
Eastern towhee	Oak-hickory		0.51	0.23	0.13	0.16
	Loblolly-shortleaf	0.46	0.37	0.29	0.28	0.29
	Hardwood-pine	0.53	0.62	0.36	0.13	0.20
	Longleaf-slash	0.75	0.30	0.46	0.51	0.47
	Oak-gum-cypress		0.23	0.31	0.12	0.19
	Elm-ash-cottonwood	0.11	0.14	0.10	0.11	0.11
	White pine-hemlock	0.80	0.25	0.34	0.13	0.25
	Sand pine-oak		1.00	1.00	1.00	1.00
	Glade-shrub-savanna	0.25	0.56	0.50	0.42	0.39
	Cove hardwood			0.24	0.09	0.12
	Maple-beech-birch			0.30	0.39	0.35
	Riparian				0.00	0.00
	Spruce-fir				0.27	0.35
	All forest types	0.41	0.46	0.33	0.21	
Bachman's sparrow	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.14	0.01	0.01	0.04	0.03
	Hardwood-pine	0.00	0.01	0.00	0.00	0.00
	Longleaf-slash	0.05	0.18	0.22	0.32	0.27
	Oak-gum-cypress		0.00	0.03	0.00	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.07	0.00	0.08	0.08	0.05
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.07	0.05	0.04	0.05	
Chipping sparrow	Oak-hickory		0.01	0.02	0.02	0.02
	Loblolly-shortleaf	0.04	0.05	0.03	0.08	0.06
	Hardwood-pine	0.24	0.03	0.02	0.02	0.02
	Longleaf-slash	0.00	0.01	0.02	0.03	0.02
	Oak-gum-cypress		0.03	0.01	0.01	0.01
	Elm-ash-cottonwood	0.00	0.03	0.00	0.01	0.01
	White pine-hemlock	0.00	0.00	0.03	0.03	0.03
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.02	0.03	0.00	0.00	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.04	0.03	0.02	0.03	
Field sparrow	Oak-hickory		0.01	0.02	0.01	0.01
	Loblolly-shortleaf	0.14	0.08	0.03	0.02	0.03
	Hardwood-pine	0.24	0.10	0.02	0.01	0.02
	Longleaf-slash	0.00	0.03	0.03	0.03	0.03
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.08	0.04	0.01	0.03
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.31	0.42	0.31	0.21
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.07	0.07	0.03	0.01	
Song sparrow	Oak-hickory		0.00	0.00	0.01	0.00
	Loblolly-shortleaf	0.00	0.02	0.00	0.00	0.00
	Hardwood-pine	0.00	0.01	0.01	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.02	0.00	0.01
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.14	0.08	0.08	0.08
	Cove hardwood			0.12	0.00	0.03
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.02	0.00	0.00	
Dark-eyed junco	Oak-hickory		0.12	0.02	0.03	0.03
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.02	0.00	0.01
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.01	0.04	0.03
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.16	0.17	0.00	0.00	0.11
	Cove hardwood			0.12	0.00	0.03
	Maple-beech-birch			0.63	0.81	0.73
	Riparian				0.00	0.00
	Spruce-fir				0.87	0.90
	All forest types	0.07	0.03	0.02	0.02	
Northern cardinal	Oak-hickory		0.37	0.28	0.23	0.24
	Loblolly-shortleaf	0.50	0.66	0.56	0.49	0.53
	Hardwood-pine	0.65	0.54	0.32	0.42	0.41
	Longleaf-slash	0.25	0.65	0.53	0.45	0.49
	Oak-gum-cypress		0.86	0.74	0.64	0.70
	Elm-ash-cottonwood	0.83	0.84	0.91	0.76	0.80
	White pine-hemlock	0.50	0.25	0.29	0.25	0.28
	Sand pine-oak		0.41	0.47	0.50	0.44
	Glade-shrub-savanna	0.37	0.31	0.58	0.50	0.40
	Cove hardwood			0.32	0.19	0.22
	Maple-beech-birch			0.02	0.02	0.02
	Riparian				0.97	0.97

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.47	0.59	0.46	0.40	
Rose-breasted grosbeak	Oak-hickory		0.04	0.04	0.02	0.03
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.01	0.01
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.04	0.02	0.03
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.03	0.00	0.00	0.01
	Cove hardwood			0.00	0.01	0.01
	Maple-beech-birch			0.22	0.24	0.23
	Riparian				0.00	0.00
	Spruce-fir				0.07	0.10
	All forest types	0.00	0.01	0.02	0.02	
Blue grosbeak	Oak-hickory		0.00	0.01	0.00	0.00
	Loblolly-shortleaf	0.21	0.06	0.02	0.03	0.03
	Hardwood-pine	0.00	0.06	0.01	0.01	0.01
	Longleaf-slash	0.00	0.20	0.07	0.04	0.07
	Oak-gum-cypress		0.01	0.01	0.01	0.01
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.08	0.02
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.04	0.08	0.03	0.01	
Indigo bunting	Oak-hickory		0.51	0.41	0.36	0.37
	Loblolly-shortleaf	0.61	0.74	0.42	0.47	0.48
	Hardwood-pine	0.82	0.53	0.46	0.33	0.37
	Longleaf-slash	0.30	0.68	0.37	0.41	0.43
	Oak-gum-cypress		0.53	0.40	0.23	0.32
	Elm-ash-cottonwood	0.94	0.73	0.74	0.59	0.64
	White pine-hemlock	0.60	0.58	0.68	0.21	0.44
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.53	0.69	0.83	0.50	0.60
	Cove hardwood			0.52	0.21	0.28
	Maple-beech-birch			0.20	0.19	0.19
	Riparian				0.07	0.07
	Spruce-fir				0.00	0.10
	All forest types	0.60	0.65	0.43	0.37	
Painted bunting	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.01	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.03	0.00	0.01	0.01
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.00	0.00	0.00	0.00	0.00
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.00	0.00	0.00	
Red-winged blackbird	Oak-hickory		0.00	0.01	0.00	0.00
	Loblolly-shortleaf	0.04	0.00	0.01	0.00	0.00
	Hardwood-pine	0.00	0.01	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.02	0.01
	Elm-ash-cottonwood	0.00	0.00	0.03	0.00	0.01
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.05	0.00	0.00	0.31	0.08
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.03	0.00	0.01	0.00	
Eastern meadowlark	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.00	0.00	0.00	0.00
	Hardwood-pine	0.00	0.00	0.00	0.00	0.00
	Longleaf-slash	0.00	0.00	0.00	0.00	0.00
	Oak-gum-cypress		0.00	0.00	0.00	0.00
	Elm-ash-cottonwood	0.00	0.00	0.00	0.00	0.00
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.02	0.00	0.01
	Glade-shrub-savanna	0.05	0.00	0.17	0.08	0.05
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.02	0.00	0.00	0.00	
Common grackle	Oak-hickory		0.01	0.01	0.01	0.01
	Loblolly-shortleaf	0.00	0.01	0.01	0.01	0.01
	Hardwood-pine	0.00	0.01	0.02	0.00	0.01
	Longleaf-slash	0.00	0.01	0.03	0.01	0.02
	Oak-gum-cypress		0.10	0.06	0.01	0.04
	Elm-ash-cottonwood	0.00	0.00	0.01	0.01	0.01
	White pine-hemlock	0.00	0.00	0.00	0.01	0.00
	Sand pine-oak		0.01	0.02	0.00	0.01
	Glade-shrub-savanna	0.00	0.00	0.08	0.00	0.01
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.00	0.02	0.02	0.01	
Brown-headed cowbird	Oak-hickory		0.09	0.05	0.04	0.04
	Loblolly-shortleaf	0.25	0.19	0.05	0.06	0.08
	Hardwood-pine	0.12	0.08	0.06	0.04	0.05
	Longleaf-slash	0.05	0.09	0.07	0.03	0.05
	Oak-gum-cypress		0.32	0.10	0.05	0.10
	Elm-ash-cottonwood	0.50	0.54	0.14	0.25	0.27
	White pine-hemlock	0.00	0.00	0.00	0.06	0.03
	Sand pine-oak		0.00	0.00	0.03	0.01
	Glade-shrub-savanna	0.07	0.06	0.25	0.12	0.09
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.06	0.06

Continued

Appendix 6—continued

Species	Forest type	Grass/ forb	Shrub/ seedling	Sapling/ pole	Mature	All stages
	Spruce-fir				0.00	0.00
	All forest types	0.15	0.14	0.06	0.05	
Orchard oriole	Oak-hickory		0.00	0.00	0.00	0.00
	Loblolly-shortleaf	0.00	0.05	0.00	0.01	0.01
	Hardwood-pine	0.00	0.02	0.00	0.00	0.00
	Longleaf-slash	0.15	0.05	0.00	0.01	0.01
	Oak-gum-cypress		0.03	0.01	0.01	0.01
	Elm-ash-cottonwood	0.28	0.03	0.03	0.01	0.03
	White pine-hemlock	0.00	0.00	0.00	0.00	0.00
	Sand pine-oak		0.00	0.00	0.00	0.00
	Glade-shrub-savanna	0.04	0.00	0.17	0.04	0.04
	Cove hardwood			0.00	0.00	0.00
	Maple-beech-birch			0.00	0.00	0.00
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.00
	All forest types	0.07	0.04	0.00	0.00	
American goldfinch	Oak-hickory		0.18	0.07	0.04	0.05
	Loblolly-shortleaf	0.21	0.10	0.03	0.03	0.04
	Hardwood-pine	0.18	0.06	0.10	0.04	0.05
	Longleaf-slash	0.00	0.06	0.02	0.02	0.03
	Oak-gum-cypress		0.00	0.01	0.01	0.01
	Elm-ash-cottonwood	0.06	0.00	0.01	0.02	0.02
	White pine-hemlock	0.30	0.00	0.07	0.15	0.12
	Sand pine-oak		0.05	0.07	0.00	0.05
	Glade-shrub-savanna	0.19	0.22	0.75	0.19	0.25
	Cove hardwood			0.00	0.05	0.04
	Maple-beech-birch			0.02	0.00	0.01
	Riparian				0.00	0.00
	Spruce-fir				0.00	0.05
	All forest types	0.16	0.08	0.05	0.04	

[a] Data are from 12,537 point-count surveys on 14 national forests, 2000-2004. Each entry can be interpreted as the frequency or proportion of the counts in Table 2.

La Sorte, Frank A.; Thompson, Frank R., III; Trani, Margaret K.; Mersmann, Timothy J. 2007. **Population trends and habitat occurrence of forest birds on southern national forests, 1992-2004.** Gen. Tech. Rep. NRS-9. Newton Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 260 p.

We determined population trends and habitat occurrences for bird species in 14 national forests located in the Southern Region from 1992-2004. We estimated population trends for 144 species within: 14 national forests, 10 physiographic areas, and in the Southern Region as a whole. Habitat occurrences were estimated for 114 species based on 13 forest types and four successional stages. We discussed results for 48 species of management concern along with information compiled on conservation status and the U.S. Geological Survey's (USGS) Breeding Bird Survey population trend estimates. There was evidence that populations increased for 42 species and decreased for 38 species on national forests in the Southern Region as a whole. Trends for many species varied widely across physiographic areas and national forests. Most species were found across a variety of habitats, though associations with particular forest types and structural conditions were often apparent.

KEY WORDS: avian populations, habitat, indicator species, southeastern United States

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