Neotropical Migratory Landbird Species and Their Habitats of Special Concern Within the Southeast Region

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Abstract — The Southeast Management Working Group for Partners in Flight initiated a prioritization scheme in April 1991 to help guide regional and local conservation efforts for Neotropical migratory landbirds. Preliminary breeding season priorities have been established in each of 24 physiographic areas for species and habitats, with some non-breeding season priorities set as well. Interested parties have met in most physiographic areas in the Southeast to review preliminary priorities and organize for future action. Species of regional concern, habitats of regional and physiographic area concern, and examples of priorities at a local land management level are discussed. Ongoing and future actions are listed.

Priorities within the Southeast Region are based on two principles. First, a habitat/ecosystem (hereafter, habitat) approach is the goal of the Partners in Flight conservation effort. Identifying species most at risk and grouping them by habitats assists in targeting habitats that require special consideration (Hunter et al. these proceedings). A multi-species/habitat approach is more efficient and provides for better coordination of ongoing conservation efforts at higher spatial scales (regional, national, etc.).

Second, the physiographic area (ecologically classified land units used in the Breeding Bird Survey, Robbins et al. 1986) is the appropriate spatial scale for establishment of initial conservation priorities. Twenty-four physiographic areas covering 16 states are encompassed within the Southeast Region (Figure 1, Table 1). Physiographic area working groups set priorities without regard for state boundaries, but implementation of priority actions can be tailored to the needs of individual states as state working groups are formed (see Tables 1 and 2 in Hunter et al. these proceedings). The approach outlined here encourages (1) identification of ecological issues for states sharing bird and habitat resources, (2) coordination of conservation efforts by habitats within and across state boundaries, and (3) consolidation of limited financial and logistical resources to address shared conservation needs.

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SPECIES OF REGIONAL CONCERN

Forty-six species (including subspecies and isolated populations of conservation concern) of Neotropical migratory landbirds (not including those described as temperate migrants in Gauthreaux 1992) receive ranks indicating a need for increased conservation attention in the Southeast on the basis of the regional prioritization scheme described in Hunter et al. (these proceedings; Table 2). Of these, the Black-capped Vireo (*Vireo atricapillus*) and Golden-cheeked Warbler (*Dendroica chrysoparia*) already receive intensive management and monitoring attention. Bachman's Warbler (*Vermivora bachmanii*; possibly extinct), Southwestern Willow Flycatcher (*Empidonax traillii extimus*), and Sonoran Yellow Warbler (*Dendroica petechia sonorana*) formally occurred but are not presently known to breed in the Southeast Region. Many of the remaining 41 species in need of increased conservation attention are still relatively common and may not be declining everywhere they occur. However, all suffer from one or more of the following problems: (1) limited distribution and a high degree of threat

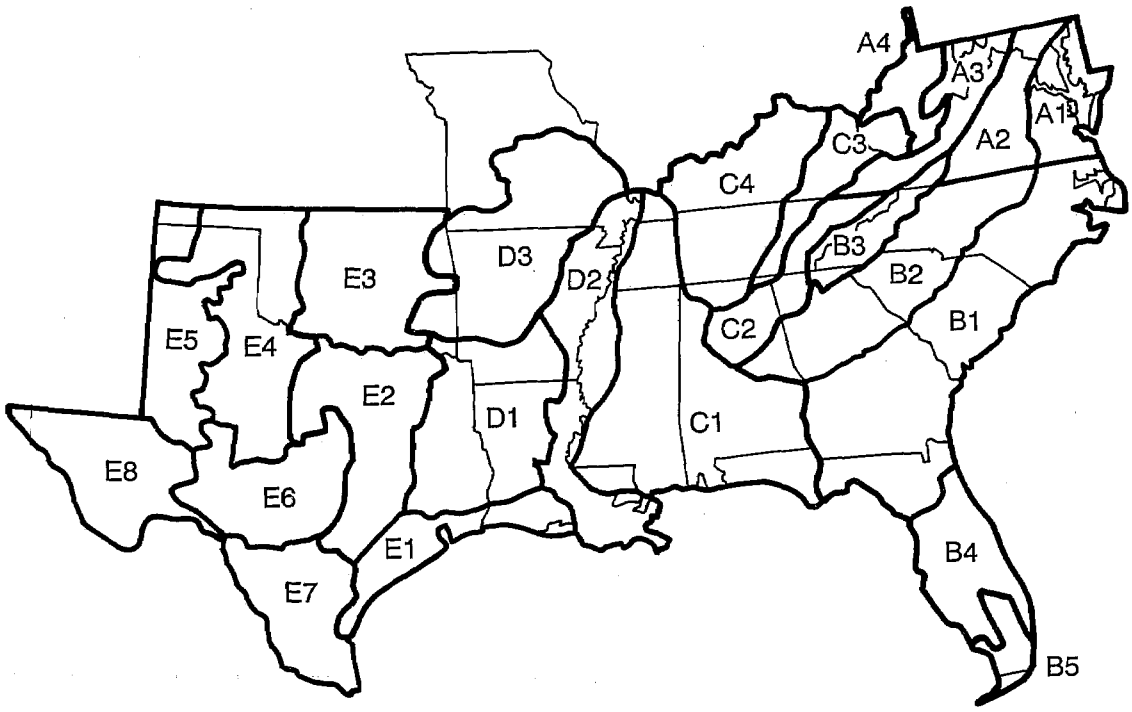

Figure 1. — Map of states and physiographic areas in the Southeast Region. Refer to Table 1 for names and component states for each physiographic area.

during breeding and/or non-breeding seasons, (2) widespread signs of recent or long-term decline, and/or (3) use of habitats within the Southeast Region that are essential for conservation of the full variation inherent within the species.

The regional ranking scheme differs from the physiographic area/state scheme in the specific information used to derive CONCERN SCORES (measures of each species' degree of vulnerability; Hunter et al. these proceedings). The regional scheme is a tracking tool to assess progress on priorities set by physiographic area/state working groups, which cumulatively fulfill the goals and objectives identified at the regional level. Specific conservation action for the regionally identified species (including increased survey, management, land protection, monitoring, and/or research) is best determined at the local land management level based on priorities set and coordinated at the physiographic area/state scale.

Along this line of organization, regionally identified species of concern are not necessarily the highest priority species in every physiographic area in which they occur. Where regionally identified species of highest concern are (1) on the periphery of their distribution, (2) are stable or increasing, and/or (3) incur a relatively low degree of local threat, they may be eclipsed by other species requiring more local attention. Locally vulnerable species that are more common outside of the Southeast are especially relevant in physiographic areas on the peripheries of the region. High priority species on the edge of their range in West Texas and Oklahoma include the Mountain Plover (*Charadrius montanus*), Gray Vireo (*Vireo vicinior*), and Lucy's Warbler (*Vermivora luciae*). The many primarily Mexican species that warrant attention in West and South Texas include the Red-billed Pigeon (*Columba flavirostris*), Buff-bellied Hummingbird (*Amazilia yucatanensis*), Lucifer Hummingbird (*Calothorax lucifer*), and Colima Warbler (*Vermivora crissalis*). South Florida is occupied by West Indies species that may require some actions, including the White-crowned Pigeon (*Columba leucocephala*), Mangrove Cuckoo (*Coccyzus minor*), Black-whiskered Vireo (*Vireo altiloquus*), and Cuban Yellow Warbler (*Dendroica petechia gundlachi*).

HABITATS OF REGIONAL AND PHYSIOGRAPHIC AREA CONCERN

Habitats identified for conservation of Neotropical migratory landbirds vary widely among physiographic areas across the Southeast Region. However, some broadly defined habitat types are frequently recognized. The MATURE BOTTOMLAND HARDWOOD-BALDCYPRESS FOREST and/or RIPARIAN (STREAMSIDE) WOODLANDS that provide optimal breeding habitat for many of the highest priority species are consistently identified as needing the highest attention. In addition, these habitats serve as corridors, providing important stop-over habitats during migration, particularly among the western physiographic areas within the Southeast Region.

MARITIME (COASTAL) SHRUB-SCRUB AND WOODLANDS (UPLANDS) on both the Atlantic and Gulf coasts (including the cheniers of Louisiana and oak mottes of the Upper Texas Coast) are critically important for many transient Neotropical migrants. The Atlantic and Florida

Table 1. — Physiographic areas defined for the Southeast Region.

Alpha-numeric identification	Physiographic Area	States
A1	Mid Atlantic Coastal Plain	Maryland, Virginia
A2	Mid Atlantic Piedmont	Maryland, Virginia
A3	Mid Atlantic Ridge and Valley	West Virginia, Maryland, Virginia
A4	Ohio Hills	West Virginia
B1	South Atlantic Coastal Plain	North Carolina, South Carolina, Georgia, Florida
B2	Southern Piedmont	North Carolina, South Carolina, Georgia, Alabama
B3	Blue Ridge	Virginia, Tennessee, North Carolina, South Carolina, Georgia
B4	Peninsular Florida	Florida
B5	Subtropical Florida	Florida
C1	East Gulf Coastal Plain	Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Florida
C2	Southern Ridge and Valley	Tennessee, Alabama, Georgia
C3	Cumberland Plateau	West Virginia, Kentucky, Tennessee, Georgia, Alabama
C4	Highland Rim and Lexington Plain	Kentucky, Tennessee, Alabama
D1	West Gulf Coastal Plain	Louisiana, Arkansas, Oklahoma, Texas
D2	Mississippi Alluvial Plain	Louisiana, Mississippi, Arkansas, Tennessee, Kentucky, Missouri
D3	Ozark-Ouachita Highlands	Missouri, Arkansas, Oklahoma
E1	Texas Coastal Prairies	Louisiana, Texas
E2	Oaks and Prairies	Texas
E3	Osage Plains	Oklahoma
E4	Colorado and Unita Basins	Oklahoma, Texas
E5	Staked and Pecos Plains	Oklahoma, Texas
E6	Edwards Plateau	Texas
E7	South Texas Brushlands	Texas
E8	Trans-Pecos Texas	Texas

Table 2. — Highly ranked species identified for the Southeast Region in need of management and/or monitoring attention (see Hunter et al. these proceedings) and the physiographic areas where they occur.

Species	Regional score*	Physiographic areas**
Southwestern Willow Flycatcher *Empidonax traillii extimus*	35	E8 (extirpated)
Bachman's Warbler *Vermivora bachmanii*	35	A1,B1,C1,D1,D2 (extinct?)
Golden-cheeked Warbler *Dendroica chrysoparia*	35	*E6,E2 (peripheral E7)*
Black-capped Vireo *Vireo atricapillus*	33	E6,E2,E3 (peripheral E8,E7)
Brownsville Common Yellowthroat *Geothlypis trichas insperata*	31	E7
Texas Botteri's Sparrow *Aimophila botterii texana*	31	E7
Florida Short-tailed Hawk *Buteo brachyurus fuliginosus*	30	B4,B5 (peripheral B1)
Colima Warbler *Vermivora crissalis*	30	E8
Cerulean Warbler *Dendroica cerulea*	30	*see Appendix 1*
"South Atlantic" Painted Bunting *Passerina ciris "ciris"****	30	B1 (peripheral B4)
Sennett's Hooded Oriole *Icterus cucullatus sennetti*	30	E7
American Swallow-tailed Kite *Elanoides forficatus forficatus*	29	B4,B5,B1,C1,D2,D1,E1
Golden-winged Warbler *Vermivora chrysoptera*	29	B3,A3,C3,A4
Cuban Yellow Warbler *Dendroica petechia gundlachi*	29	B5
Florida Prairie Warbler *Dendroica discolor paludicola*	29	B5,B4
Swainson's Warbler *Limnothlypis swainsonii*	29	see Appendix 1
Wayne's Black-throated Green Warbler South Atlantic coastal population *Dendroica virens waynei*	28	B1,A1
Prothonotary Warbler *Protonotaria citrea*	28	see Appendix 1
Wood Thrush *Hylocichla mustelina*	27	see Appendix 1
Sonoran Yellow Warbler *Dendroica petechia sonorana*	27	*E8 (extirpated)*
Northern Prairie Warbler *Dendroica discolor discolor*	27	see Appendix 1
"Western" Painted Bunting *Passerina ciris "pallidor"****	27	see Table 4, Appendix 1
White-crowned Pigeon *Columba leucocephala*	26	B5
Texas Elf Owl *Micrathene whitneyi idonea*	26	E7
Bell's Vireo *Vireo bellii*peripheral	26	see Table 4 (also E6,D3,D2,C4,D1,E2,E1)
Blue-winged Warbler *Vermivora pinus*	26	see Appendix 1
Chestnut-sided Warbler *Dendroica pensylvanica*	26	*B3,A3,C3,A4*
Blackburnian Warbler *Dendroica fusca*	26	*B3,A3 (peripheral* C3,A4)
Worm-eating Warbler *Helmitheros vermivorous*	26	see Appendix 1
Louisiana Waterthrush *Seiurus motacilla*	26	see Appendix 1
Hooded Warbler *Wilsonia citrina*	26	see Appendix 1
Mississippi Kite *Ictinia mississippiensis*	25	E4,D2,E3,B1,C1,D1 (peripheral E8,B4,E1,E5,A1,C4)
Acadian Flycatcher *Empidonax virescens*	25	see Appendix 1
Gray Vireo *Vireo vicinior*	25	E8
Yellow-throated Vireo *Vireo flavifrons*	25	see Appendix 1
Lucy's Warbler *Vermivora luciae*	25	*E8*
Mountain Plover *Charadrius montanus*	24	E5 (peripheral E4,E8)
Black-billed Cuckoo *Coccyzus erythropthalmus*	24	*A4,A3,E3 (peripheral* C3,A2,B3,A1,D3,C2,B2,B1,C1)
Yellow-billed Cuckoo *Coccyzus americanus*	24	see Table 4, Appendix 1
Eastern Wood-Pewee *Contopus virens*	24	see Appendix 1
Great Crested Flycatcher *Myiarchus crinitus*	24	see Appendix 1
White-eyed Vireo *Vireo griseus*	24	see Appendix 1
Black-throated Blue Warbler *Dendroica caerulescens*	24	B3,A3,C3 (peripheral A4,B2)
Kentucky Warbler *Oporornis formosus*	24	see Appendix 1
Canada Warbler *Wilsonia canadensis*	24	B3,A3,C3 (peripheral A4)
Orchard Oriole *Icterus spurius*	24	see Table 4, Appendix 1

*See Hunter et al. (these proceedings).
**See Table 1; physiographic areas are ordered by decreasing relative abundance.
***See Thompson (1991)

coastlines are particularly important during migration for the Cape May Warbler (*Dendroica tigrina*), Black-throated Blue Warbler (*Dendroica caerulescens*), Kirtland's Warbler (*Dendroica kirtlandii*), and Connecticut Warbler (*Oporornis agilis*). In addition, some breeding species are dependent upon MARITIME UPLANDS along the South Atlantic Coast (especially, Painted Bunting [*Passerina ciris "ciris"*]; see Thompson 1991). Finally, many Neotropical migrant species that reach the northern edge of their winter ranges along Gulf coastlines typically concentrate in MARITIME UPLAND habitats.

A third frequently recognized habitat type needing conservation attention is growing-season fire-maintained LONGLEAF PINE. Properly managed LONGLEAF PINE habitats are not only important for providing habitat for a number of endangered species (most notably the Red-cockaded Woodpecker [*Picoides borealis*]), but also should support many shrub-scrub Neotropical migrant species. These open pine habitats when managed on a large scale (1000's of hectares) should provide a more natural habitat for many species presently dependent upon oldfields and clearcuts and undergoing widespread declines (e.g., Prairie Warbler [*Dendroica discolor*]; see Nolan 1978).

An unprioritized list of locally identified important habitats includes: (1) POCOSINS and CAROLINA BAYS; (2) MANGROVE WOODLANDS and (3) TROPICAL HARDWOODS (both important for breeding, migrant, and northerly wintering populations); (4) MIXED SPRUCE-FIR/NORTHERN HARDWOODS; (5) various types of MATURE UPLAND HARDWOOD FORESTS in all interior physiographic areas; (6) HIGH ELEVATION HEATH BALDS, OLDFIELDS, and SHRUB-SCRUB; (7) UPLAND HARDWOOD-PINE MIX of the West Gulf Coastal Plain; (8) COASTAL PRAIRIES of Texas and Louisiana; (9) POST OAK WOODLANDS of the Oaks and Prairies and Osage Plains; (10) SAVANNA-PRAIRIES-GRASSLANDS of central Oklahoma and Texas; (11) JUNIPER-OAK WOODLANDS of the Edwards Plateau; (12) TAMAULIPAN THORN FOREST AND SCRUB of the Lower Rio Grande Valley (important for breeding as well as northerly wintering populations); and (13) all MONTANE WOODLAND HABITATS, CHAPARRAL, and SEMI-DESERT GRASSLAND within the Trans-Pecos.

INTERPRETING MULTI-SPECIES PATTERNS AT THE REGIONAL LEVEL

Priorities set for species and habitats within a physiographic area can be used to some extent for comparisons among physiographic areas. Examples from (1) southern forests and (2) western riparian areas follow.

Southern Forests

Population trends for species using forested landscapes (including those that occupy shrub-scrub habitats) can provide insight into habitat trends among physiographic areas within the Southeast Region. Breeding Bird Survey (hereafter BBS) population trend data for the last 26 years (1966-1991) were used to copare trends among 19 southweastern geographic areas for 22 species that are widespread in their use of mature forest, 6 predominately forest edge species, and 6 declining shrub/scrub species, all at elevations below 1000 m (appendix 1). Population trends were considered reasonably definite with a significance level of P0.10, using the linear route-regression method of Geissler and Noon (1981); otherwise population trends were considered possible increases or decreases. Many mature forest species are declining in physiographic areas where they are most commonly detected on BBS routes, as reflected by high average IMPORTANCE OF AREA SCORES in those areas where there are higher numbers of declining species (Table 3). Detection rate is a measure of a species' relative abundance, which in turn is a measure of how important an area is to a species (see Hunter et al. these proceedings). Declining trends combined with high relative detection rates for many mature forest species also result in high average CONCERN SCORES for physiographic areas. In essence, many mature forest species have declined over the last 26 years in physiographic areas where they are most common. These are the areas that may serve as sources of excess young dispersing to other areas.

Despite the declining trends, mature forest species are not imminently threatened in areas where they remain common, nor are they undergoing declines in all land management units (i.e., Great Smoky Mountains National Park in the Blue Ridge; Wilcove 1988). Further, short-term (e.g., last 10 years) population trends may or may not correspond with long-term trends for each species in each physiographic area. A review of land use patterns within physiographic areas with many declining mature forest species can determine whether management adjustments are needed to stall ongoing regional declines.

Three physiographic areas (Mississippi Alluvial Plain, Southern Ridge and Valley, and Osage Plains) with many declining mature forest species did not have high average IMPORTANCE OF AREA SCORES (Table 3). However, local management units (e.g., state wildlife management areas, national wildlife refuges, national forests) in those areas are locally important population centers for mature forest species, but do not cover enough of the landscape to influence overall BBS species detection rates. There are also declining population trends for many forest edge and shrub-scrub species in the Mississippi Alluvial Plain and Southern Ridge and Valley. Conservation actions in these physiographic areas must consider not only mature forest species, but also inhabitants of shrub-scrub and forest edge habitats.

Table 3. — A comparison of Neotropical migrant population trends among physiographic areas with Southeastern forested landscapes based on 26 years of Breeding Bird Survey data. Species are grouped into three categories: (1) mature forest, (2) forest edge, and (3) shrub-scrub (see Appendix 1).

Species/ Physiographic area	Species declining*	Species possibly declining	Species with unclear trends	High area importance and concern scores**
Mature forest (n=species; total=22)				
Blue Ridge (n=22)	12	5	1	Yes, Yes
Southern Ridge and Valley (n=22)	11	3	2	No, No
Mississippi Alluvial Plain (n=22)	7	3	5	No, Yes
Osage Plains (n=18)	7	3	5	No, No
Ohio Hills (n=21)	7	1	1	Yes, Yes
Mid Atlantic Ridge and Valley (n=22)	6	4	2	Yes, Yes
West Gulf Coastal Plain (n=22)	5	8	3	Yes, Yes
Cumberland Plateau (n=22)	5	5	2	Yes, Yes
Ozark-Ouachita Highlands (n=22)	4	7	1	Yes, Yes
Oaks and Prairies (n=15)	4	3	9	No, No
Southern Piedmont (n=22)	4	0	3	No, No
East Gulf Coastal Plain (n=22)	4	0	3	No, No
Highland Rim (n=22)	3	3	1	No, No
Mid Atlantic Coastal Plain (n=22)	2	3	2	Yes, No
South Atlantic Coastal Plain (n=22)	2	2	1	No, No
Peninsular Florida (n=11)	2	2	2	No, No
Mid Atlantic Piedmont (n=21)	1	2	1	No, No
Texas Coastal Prairies (n=14)	1	1	8	No, No
Edwards Plateau (n=12)	1	0	5	No, No
Forest edge (n=species; total=6)				
Mississippi Alluvial Plain (n=6)	6	0	0	Yes, Yes
Southern Ridge and Valley (n=5)	4	0	1	No, No
Ozark-Ouachita Highlands (n=6)	3	1	0	No, Yes
Cumberland Plateau (n=5)	3	1	0	Yes, Yes
Osage Plains (n=6)	3	1	0	No, Yes
West Gulf Coastal Plain (n=6)	3	0	0	No, Yes
East Gulf Coastal Plain (n=6)	2	2	0	No, Yes
Oaks and Prairies (n=6)	2	1	0	No, No
Edwards Plateau (n=6)	2	1	2	No, No
Highland Rim (n=5)	2	1	0	Yes, Yes
South Atlantic Coastal Plain (n=6)	1	3	0	Yes, Yes
Blue Ridge (n=5)	1	3	0	No, No
Mid Atlantic Ridge and Valley (n=5)	1	1	0	Yes, No
Mid Atlantic Coastal Plain (n=5)	1	0	0	No, No
Ohio Hills (n=5)	1	0	0	Yes, No
Southern Piedmont (n=6)	1	0	2	No, No
Mid Atlantic Piedmont (n=5)	0	2	0	Yes, No
Texas Coastal Prairies (n=6)	0	1	2	No, No
Peninsular Florida (n=5)	0	0	3	No, No

Table 3. Continued.

Species/ Physiographic area	Species declining*	Species possibly declining	Species with unclear trends	High area importance and concern scores**
Shrub-scrub (n=species; total=6)				
Southern Ridge and Valley (n=6)	5	0	0	No, Yes
Blue Ridge (n=6)	4	1	0	No, Yes
Mid Atlantic Ridge and Valley (n=6)	4	0	0	No, No
Mississippi Alluvial Plain (n=5)	4	0	0	No, No
Mid Atlantic Coastal Plain (n=5)	3	1	0	Yes, No
Osage Plains (n=5)	3	1	0	No, No
East Gulf Coastal Plain (n=6)	3	0	1	Yes, Yes
Cumberland Plateau (n=6)	3	0	0	No, Yes
Southern Piedmont (n=6)	2	2	0	Yes, Yes
Ohio Hills (n=6)	2	0	0	Yes, Yes
Mid Atlantic Piedmont (n=6)	2	0	0	Yes, No
West Gulf Coastal Plain (n=5)	2	0	0	Yes, No
Oaks and Prairies (n=4)	1	1	0	No, No
Highland Rim (n=6)	1	1	0	Yes, Yes
Peninsular Florida (n=4)	1	1	0	No, No
Ozark-Ouachita Highlands (n=6)	1	0	0	No, No
South Atlantic Coastal Plain (n=5)	1	0	0	Yes, No
Texas Coastal Prairies (n=4)	0	0	0	No, No
Edwards Plateau (n=4)	0	0	2	No, No

*Significance at P0.10

**For detailed discussions on "Importance of Area" scores and "Concern" scores, see Hunter et al. (these proceedings). In summary, the Importance of Area criterion reflects the distribution and abundance levels of a species within an area under consideration relative to the total distribution of the species, with higher scores given to species that are either relatively common compared with other areas or occur only within this and a few other areas. Concern Score is the culmination of all criteria used to judge relative vulnerability of each species within each physiographic area. "High" refers to the 7 to 9 (depending on ties) highest scores among physiographic areas for species' Importance of Area and Concern scores (Appendix 1).

Differences or similarities in trends among physiographic areas that share many land cover and land use patterns can raise broader questions concerning the relationship among these birds and their habitats. For example, why are more mature forest species declining in the West Gulf Coastal Plain than in the physiographically similar East Gulf Coastal Plain, South Atlantic Coastal Plain, and Mid Atlantic Coastal Plain (Table 3)? An analysis of long-term trends among these physiographic areas in forest cover, average patch size of contiguous mature forest, and geographic relationships among patches may address this question. However, a relationship between forest trends and the number of declining mature forest species among physiographic areas does not necessarily imply a cause and effect relationship in that species are affected by factors (or combinations of factors) independent of co-occurring species (see James et al. 1984). Forest trend data can, nonetheless, provide clues to direct investigations into specific details of habitat-bird relationships.

Southwestern Riparian

Although it may seem inappropriate, Texas and Oklahoma and thus many habitats and birds generally associated with the West are included in the Partners in Flight Southeastern region. Frequently cited literature (particularly MacArthur 1959) has lead to the misconception that there are relatively few Neotropical migratory landbirds in the West. In fact, there are often more Neotropical migrant species and individuals than residents and short-distance migrants in western forested habitats, especially within southwestern riparian zones (i.e., Rosenberg et al. 1991). Although BBS data show few major population declines for most Neotropical migrants in the West (Sauer and Droege 1992), there have been more local extirpations and severe population declines during recent years for Neotropical migratory species in southwestern riparian habitats than in most other North American habitats (Hunter et

al. 1987, Rosenberg et al. 1991). In the Southeastern region, two riparian habitat subspecies, the Southwestern Willow Flycatcher and the Sonoran Yellow Warbler, are thought to be extirpated from west Texas. A closer look at western species in general, and southwestern riparian species in particular, is required for effective conservation of Neotropical migrants.

Population trends were reviewed for 15 species using riparian habitats in central and western Oklahoma and in western and southern Texas (Table 4). Whereas consistent declines were found in the Colorado and Unita Basins and in the South Texas Brushlands physiographic areas, increasing trends were found for most species in the Staked and Pecos Plains and Trans-Pecos physiographic areas. Some riparian species may be increasing in these latter two physiographic areas, due in part to population expansions accompanying the spread of exotic saltcedar (*Tamarix chinensis*) (Hunter et al. 1988). However, interpretation of population trends in the Staked and Pecos Plains and Trans-Pecos is tenuous due to the small number of BBS routes upon which they are based. The lack of any data for Lucy's Warbler and inadequate data for Yellow-billed Cuckoo, Bell's Vireo (*Vireo bellii*), Yellow-breasted Chat (*Icteria virens*), and Summer Tanager (*Piranga rubra*) are notable as these species are at least locally fairly common along the Rio Grande system (Engel-Wilson and Ohmart 1978).

Increased conservation attention, to include surveys and monitoring, should be focused on western riparian birds and their habitats. The BBS is presently an ineffective technique for assessing population changes of western riparian birds because roadways tend to run perpendicular to streams and rivers. Thus, very few BBS stops sample the riparian habitats in which most Neotropical migrant species are concentrated. The general need for other monitoring and survey techniques to complement BBS routes throughout the Southeast Region is clearly greatest in southwestern riparian habitats.

USING THE HABITAT APPROACH AT THE LOCAL LEVEL

Land managers can be provided with lists of species that occur in each identified habitat in each physiographic area (e.g., bottomland hardwoods/riparian in the Ozark-Ouachita

Table 4.— A comparison of Neotropical migrant population trends based on 26 years of Breeding Bird Survey data for selected western riparian landbirds in four physiographic areas where sample sizes for all species are low. N=number of Breeding Bird Survey routes species was detected from; -*=decline (≤P0.10), -=possible decline, O=no trend, +=possible increase, +*=increase (≤P0.10), ?=present but trends unclear or no available data.

Species	Colorado and Unita Basins		Staked and Pecos Plains		South Texas Brushlands		Trans-Pecos	
	N	Trend	N	Trend	N	Trend	N	Trend
White-winged Dove *Zenaida asiatica*					16	-	9	0
Yellow-billed Cuckoo	18	-	7	0	18	0	8	-*
Southwestern Willow Flycatcher								extirpated
Vermilion Flycatcher *Pyrocephalus rubinus*					15	0	6	+
Bell's Vireo	5	-*			10	-*	8	+*
Lucy's Warbler							?	?
Yellow Warbler (various subsp.)		extirpated				extirpated		
Sonoran Yellow Warbler								extirpated
Yellow-breasted Chat *Icteria virens*	?	?	2	+	5	-	10	+*
Summer Tanager	4	-	?	?	7	-	10	-
Blue Grosbeak *Guiraca caerulea*	17	1	11	+*	16	-*	14	+
"Western" Painted Bunting	15	+	2	+	18	-*	11	+
Orchard Oriole	16	-			15	-*	9	+
Northern Baltimore Oriolem *Icterus galbula galbula*	11	0			3	0		
Northern Bullock's Oriole *Icterus galbula bullockii*	18	-*	12	+	17	0	9	+*

Highlands; Appendix 2). If some species are absent or rare, as determined by local surveys, managers can consult with local experts and appropriate works on bird-habitat relationships (i.e., Hamel 1992) to draft appropriate management strategies. Once surveys are satisfactorily complete, management strategies implemented, and appropriate questions framed, populations can be monitored to determine the response of target species or whether other species are suffering because of actions taken. Research may become necessary to investigate alternate management approaches or to identify causal factors of decline.

Persistent patterns in the rarity of species or species groups among land management units should be evaluated at the physiographic area or state level to devise an overall management strategy. Management emphasis differs among landowners and an understanding of who is doing what will allow better coordination of efforts. Similarly, persistent and widespread problems within any particular habitat among physiographic areas or states can be coordinated at the regional level to develop corrective strategies.

ONGOING AND FUTURE ACTIONS

Meetings to review preliminary species and habitat priorities and identify action needs have occurred in almost all of the 24 Southeastern physiographic areas. A variety of habitat acquisition and enhancement actions should be recognized as important for the conservation of Neotropical migrants. Ongoing land acquisition and reforestation efforts in bottomlands, especially within the Mississippi Alluvial Plain and the coastal plain physiographic areas, often are associated with implementation of the North American Waterfowl Management Plan and related wetland protection and enhancement programs. Elsewhere, efforts along the lower Rio Grande Valley (South Texas Brushlands Physiographic Area), intended to conserve overall biological diversity, are providing critical benefits for breeding and wintering Neotropical migrant populations as well as for stable migration habitat to and from the Neotropics. Current research, such as the efforts to understand migrant bird ecology along the Gulf Coast (i.e., Moore and Simons 1992), will be instrumental in development of strategies to improve the amount and condition of stopover habitat for trans-Gulf and circum-Gulf migrants.

Although recent initiatives undertaken by many federal, state and private landowners involve reviews of various activities to improve habitat conditions for Neotropical migrants, there remain many questions before major shifts in management direction will be undertaken. The great variety of habitat needs for all the species involved and the general lack of population trend data available at local levels require that land managers remain cautious before redirecting limited logistical and financial resources towards new and untested management approaches. The most important management need is identification of those habitat factors that allow relative stability of species and species groups in order to suggest management practices that may reverse declines where they are occurring.

It is difficult to differentiate breeding season effects from those during migration or on the wintering grounds. An indirect approach would be to determine whether or not improvement of habitat conditions on land management units or within a physiographic area are reflected in population trends among species of concern (as tracked by BBS). If so, breeding season effects are at least partially responsible for population changes and local efforts toward habitat restoration or improvement could be effective. If not, conservation efforts for these species may need to concentrate on migration and winter habitat.

The temptation may arise to identify and monitor indicator species from which the response of many species to management change can be inferred. Although there is a valid logistical justification for this approach, there is little evidence that indicator Neotropical migrants reflect trends for the guilds they are purported to represent. In general, each species has different microhabitat needs and, specifically, Neotropical migrants sharing breeding habitats often have differing needs during migration and winter.

Nevertheless, managers throughout the Southeast are beginning to develop sound management practices along with their neighbors (private and public, within states and across state boundaries) that are consistent with other established management objectives using the information that is presently applicable. Initiatives involving (1) educating the public on what they can do to conserve these species, (2) implementing surveys to determine local bird-habitat associations, (3) monitoring populations at the local level, and (4) addressing specific issues through research, are all under development to complement developing management plans within most physiographic areas in the Southeast Region.

One of the more important future needs for the Southeast Region is greater attention to monitoring technique and subsequent data analysis. Monitoring standards need to be set and implemented to judge the success of management activities and to identify the threshold of population change at which management prescriptions would be reevaluated. Development of a consistent monitoring approach for all land managers is desirable for comparative reasons, but uniformity in implementation will be difficult to achieve. Enthusiasm among land managers in the Southeast to initiate surveys is very high, but we risk losing the initiative because there is as yet no consensus at the national level on a number of important issues. These issues include but are not limited to: (1) habitat definitions and how samples should be stratified among habitat types, (2) sample sizes necessary to provide valid information at the local land management level and for each habitat sampled, and (3) decision rules for when a management approach should be reevaluated.

In particular, disagreements over the most appropriate probability level (e.g., $P \leq 0.05$, $P \leq 0.10$, or even $P \leq 0.25$) to identify significant declines must be resolved as this influences

the probability of wrongly ignoring a possible decline when a decline has in fact occurred. The probability level chosen has obvious ramifications for conservation priorities as detection of a serious population decline may not be assured until it is too late to effectively stabilize the population (e.g., $P \leq 0.05$) while at the other extreme conservation attention may be directed toward a species not undergoing a severe decline ($P \leq 0.25$). Also, the selection of a probability level influences sample size needs for monitoring efforts, with greater assurance in the population trend requiring a larger sample size. Sample size considerations are critical for judging the logistical and financial commitment land managers must make for implementation of a monitoring program that will tell them what they need to know.

Another important action to be undertaken within the Southeast Region is an increased effort to link breeding, migrating, and wintering factors together to understand the conservation needs of each Neotropical migratory landbird species. The Southeast Region is critically important during migration as Neotropical migrants breeding east of the Rocky Mountains must pass through the Southeast en-route to their wintering grounds. The Southeast also includes important wintering areas, especially in south Texas and peninsular Florida. Along these lines, an important objective is to gain a better understanding about where specific breeding populations spend the winter and what migration routes they use. Member agencies and organizations within the Southeast Regional Working Group are actively involved in joint projects with the West Indies Neotropical Migratory Bird Conservation Committee and with Latin American nations that may eventually lead to a better understanding of the annual cycle for at least some species (i.e., the National Audubon Society's Birds in the Balance Campaign, The Sister Forest Program of the U.S.D.A. Forest Service, The Migratory Birdwatch Program of the National Park Service).

CONCLUSION

The Southeast Management Working Group has made substantial progress in identifying specific priority actions for conservation of Neotropical migratory landbirds in the 24 physiographic areas comprising the region. However, actual conservation action still requires frequent discussion and constant refinement within each physiographic area and at state and regional levels. The establishment of effective feedback mechanisms at local, physiographic area, state, regional, national, and international organizational levels (as we are attempting to establish in the Southeast) will be critical for effective sharing of information and ultimately the measure by which the Partners in Flight program will be judged as a conservation success story.

ACKNOWLEDGMENTS

Many individuals have contributed to the development of the prioritization scheme used in this paper and in the actual establishment of priorities at the physiographic area scale within the Southeast and beyond. To all we extend our sincerest appreciation for sharing with us their expertise. We would especially like to thank the following individuals for their help on this and other efforts undertaken by the Southeast Management Working Group: Fred Alsop, Ray Aycock, Carol Beardmore, Dana Bradshaw, Kelly Bryan, Dawn Carrie, Mike Carter, John Cely, Fred Collins, Jerry Davis, Ted Eubanks, Bob Ford, Sid Gauthreaux, Gary Graham, Bryan Hale, Paul Hamel, Steve Helfert, Brad Jacobs, Scott Klinger, Harry LeGrand, Madge Lindsey, Jane Lyons, Tony Melchoirs, Laura Mitchell, Frank Moore, Eddie Morris, Allan Mueller, Chuck Nicholson, Lance Peacock, Rick Reynolds, Steve Rickerson, Ted Simons, Jan Self, Winston Smith, Ted Stevens, Frank Thompson, Bill Vermillion, Gary Waggerman, E.G. White-Swift, and Karen Yaich. The BBS data presented here are the result of a collaborative effort by many volunteers in the field and researchers and data managers with the U.S. Fish and Wildlife Service at Patuxent, Maryland. Specifically, we wish to thank John Sauer and Bruce Peterjohn for adapting their analysis of BBS data to the physiographic area structure of the Southeast Management Working Group. Richard Coon, John Dunning, Daniel Petit, and Peter Stangel kindly provided comments that improved the content of this manuscript.

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Appendix 1. — Population trends (26-year) for selected species grouped by their use of mature forest, forest edge, or shrub-scrub habitats below 1000 meters in elevation. Physiographic areas are as listed in Table 1. The raw importance of area rank scores and mean concern scores for each species are on file with the Southeast Management Working Group and these are averaged for all species in each group, within each physiographic area. The physiographic areas with the highest average scores are underlined (see Table 3). NP=species not known to be present in the physiographic area; ?=present but trends unclear or no available data; trends in parentheses refer to a species occurring peripherally in the physiographic area; -*=decline (P≤0.10), -=possible decline, O=no trend, +=possible increase, +*=increase (P≤0.10).

Species Group/Species	Physiographic Area																		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	E1	E2	E3	E6
Mature Forest																			
Yellow-billed Cuckoo	0	0	-	-*	0	-*	+*	-*	-*	-*	0	-*	-*	-*	0	0	-*	0	-*
Eastern Wood-Pewee	-	0	-*	-*	0	0	-*	(?)	-*	-*	-*	0	-*	-*	-	(+*)	-	-*	+*
Acadian Flycatcher	0	-	+*	0	+*	-*	-*	?	+*	-*	-	+*	-	-	-*	(?)	(?)	(-*)	(?)
Great Crested Flycatcher	0	0	0	-*	0	+	0	0	0	0	0	0	+	-	-	(+)	-	-*	(+)
Blue-gray Gnatcatcher *Polioptila melanura*	0	0	-	0	+*	+*	-	-	+*	0	-	-	-*	-*	0	(?)	(-)	0	+
Wood Thrush	-*	0	-*	+*	-*	-*	-*	NP	-*	-*	0	-*	-	-*	-*	(?)	(?)	(-*)	NP
Yellow-throated Vireo	-	0	-	+	+*	+*	-	+	0	-*	-	+*	-	0	0	NP	(?)	(-)	0
Red-eyed Vireo *Vireo olivaceus*	0	+*	0	0	-*	+*	0	+	+*	-	0	0	-	-*	0	(-*)	(-*)	(-*)	0
Northern Parula *Parula americana*	0	+*	-*	0	-	+	-*	+	+*	+*	0	+*	-	-*	0	(?)	(-*)	-*	(?)
Yellow-throated Warbler *Dendroica dominica*	0	0	(0)	+	-	+	0	-	0	-*	+	+*	0	+	0	(?)	(?)	(?)	(?)
Cerulean Warbler	(?)	(+)	-*	-*	(?)	(?)	-	NP	(?)	(?)	-*	-*	(?)	(?)	-*	NP	(?)	NP	NP
Black-and-white Warbler *Mniotilta varia*	-	+	-*	-*	(+*)	+	-*	NP	0	-*	-	-	-	+*	0	NP	(?)	(0)	(?)
American Redstart *Setophaga ruticilla*	+*	-*	-*	-	(+)	+	-*	NP	0	-*	-*	-	-	+*	-	NP	NP	(?)	NP
Prothonotary Warbler	0	(?)	(?)	NP	+*	-*	(?)	-*	-*	-	(?)	+*	-*	-*	0	-	(?)	(+)	NP
Worm-eating Warbler	0	+*	+	-*	+	(?)	-	NP	(+*)	0	0	+	0	(?)	-	NP	NP	NP	NP
Swainson's Warbler	(?)	NP	(?)	(?)	+*	?	-*	NP	0	(?)	?	(?)	+	-	?	(?)	NP	NP	NP
Ovenbird *Seiurus aurocapillus*	0	+*	0	+	+*	0	-*	NP	(?)	+	-*	+*	(?)	(?)	-*	NP	NP	NP	NP
Louisiana Waterthrush	0	0	0	-*	+*	+*	-*	NP	+*	-*	-	0	+	(?)	-	NP	(?)	(+)	NP
Kentucky Warbler	0	-	0	+	+*	0	-*	NP	+	-*	0	0	-*	+*	0	(?)	(?)	-	(?)
Hooded Warbler	0	+*	0	0	0	+	-*	NP	+*	-	0	0	-	+	-	(?)	NP	(?)	NP
Summer Tanager *Piranga rubra*	0	0	-	0	0	0	-*	+	0	-*	-*	0	0	0	0	0	-*	-*	0
Scarlet Tanager *Piranga olivacea*	-*	+	+*	+	(+*)	0	-	NP	(?)	+*	+*	+*	(?)	(?)	-	NP	NP	(0)	NP
Average Importance of Area	3.9	3.6	3.9	4.0	3.6	3.4	4.4	3.2	3.6	3.3	4.6	3.5	4.1	3.2	3.9	2.2	2.4	2.6	2.7
Average Concern Score	3.2	3.0	3.3	3.3	3.1	3.1	3.5	3.0	3.1	3.2	3.4	3.1	3.3	3.3	3.3	2.9	3.0	3.0	2.8
Forest Edge																			
Gray Catbird *Dumetella carolinensis*	-*	-	-	0	-	-*	-*	(?)	-*	-*	-*	-*	0	-*	-*	(?)	(-)	0	(?)
White-eyed Vireo	0	+*	-*	+*	0	+	-	+	0	-*	-	-	-*	-*	-	0	+*	(0)	+*
Indigo Bunting *Passerina cyanea*	0	0	0	0	-	+	-	(+)	0	-*	-*	-*	-*	-*	0	0	0	-	-
"Western" Painted Bunting	NP	NP	NP	NP	NP	NP	NP	NP	(-)	NP	NP	NP	0	-*	-*	-	-*	-*	-*
"South Atlantic" Painted Bunting	NP	NP	NP	NP	-*	(?)	NP	(?)	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Orchard Oriole	+*	+*	0	+	+*	+	-	(?)	-	-*	+	0	-*	-*	-*	+	-*	-*	-*
Northern Baltimore Oriole	+*	-	0	-*	-	(?)	+	NP	-*	(?)	(-*)	+*	0	-*	0	(?)	(0)	-*	(?)
Average Importance of Area	3.8	4.2	4.2	4.2	4.0	3.6	3.8	2.8	3.5	3.6	4.2	4.6	3.7	4.3	3.7	3.0	3.0	3.5	3.2
Average Concern Score	2.9	2.8	3.0	3.0	3.1	3.0	3.0	2.9	3.1	3.1	3.1	3.1	3.1	3.4	3.1	2.9	2.9	3.0	3.0
Shrub-scrub																			
Eastern Kingbird *Tyrannus tyrannus*	-	-*	-*	0	0	-	-*	-*	-*	0	+	0	0	-*	0	+	0	-*	(?)
Blue-winged Warbler	NP	(0)	(0)	+	NP	(-)	0	NP	(?)	-*	+*	-	NP	NP	+	NP	NP	NP	NP
Northern Prairie Warbler	-*	+	-*	-*	0	-*	(-*)	NP	-*	-*	-*	-*	-*	(-*)	-*	NP	NP	(-*)	NP
Common Yellowthroat *Geothlypis trichas*	-*	-*	-*	0	-*	-*	-*	-	-*	-*	-*	0	-*	-*	0	0	(0)	-	(?)
Yellow-breasted Chat	-*	+	-*	-*	+*	0	-*	NP	+	-*	-*	+*	+*	-*	0	0	(-)	-*	+*
Blue Grosbeak	+*	+*	0	(0)	+*	+*	-	+	+*	-*	0	+*	+	0	0	(+*)	-*	0	+
Average Importance of Area	4.2	5.0	2.8	4.2	4.6	4.2	2.8	3.7	4.2	4.0	4.0	4.3	4.2	3.6	3.7	3.3	2.5	2.8	2.5
Average Concern Score	2.9	2.8	2.9	3.0	2.8	3.0	3.0	2.6	3.0	3.1	3.0	3.1	2.8	2.9	2.9	2.4	2.5	2.9	2.3

Appendix 2. — Information on priority habitats and their associated species developed by the Ozark-Ouachita Highlands physiographic area working group using the procedure developed by the Southeast Management Working Group. This appendix provides an example of a list from one habitat type to be given to managers for determining which habitats are present on lands under their jurisdiction, and to encourage them to survey these habitats to determine if species expected to occur are absent or occur in lower than expected numbers. This is the first step towards identifying whether shifts in management emphasis may be needed locally for conservation of Neotropical migrants. ?=species present, but no available data; -*=decline (P≤0.10), -=possible decline, O=no trend, +=possible increase, +*=increase (P≤0.10).

Habitat/ecosystem	Guild	Species (physiographic area concern score, 26-year population trend)
Bottomland hardwoods/riparian	Canopy	Cerulean Warbler (27, -*), Yellow-throated Vireo (24, -), Northern Parula (23, -), Summer Tanager (23, -), Yellow-throated Warbler (22, -), Red-eyed Vireo (17, +)
	Midstory	Prothonotary Warbler (25, -), Great Crested Flycatcher (24, -), Eastern Wood-Pewee (23, -), Yellow-billed Cuckoo (21, +), Blue-gray Gnatcatcher (21, -), American Redstart (19, -), Ruby-throated Hummingbird (*Archilochus colubris*; 18, -)
	Understory	Swainson's Warbler (26, ?), Wood Thrush (25, -*), Worm-eating Warbler (25, -), Acadian Flycatcher (24, -*), Hooded Warbler (24, -)
	Ground	Kentucky Warbler (24, -), Louisiana Waterthrush (23, -), Chuck-will's-widow (21, +)
	Edge	Painted Bunting (26, -*), Orchard Oriole (24, -*), Gray Catbird (22, -*), White-eyed Vireo (21, -), Northern Oriole (20, -), Indigo Bunting (18, O), Warbling Vireo (*Vireo gilvus*; 17, +), Yellow Warbler (16, +*),