

Status of Neotropical Migratory Birds in the Northeast: A Preliminary Assessment

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Abstract—The Northeast Region encompasses a diversity of habitats, from the coastal plain of Virginia to the boreal spruce-fir forests of northern Maine, with a varied group of neotropical migratory bird species occupying these habitats. The geographic area of concern in this analysis includes the states of Maine, Vermont, New Hampshire, New York, Massachusetts, Connecticut, Rhode Island, New Jersey, Pennsylvania, Delaware, West Virginia, Maryland, Virginia, and the District of Columbia, corresponding to Administrative Region 5 of the U.S. Fish and Wildlife Service (USFWS). These states represent Administrative Regions 1, 2, and 3 of the U.S. Environmental Protection Agency, and parts of the Eastern and Southern Regions of the U.S. Forest Service. Portions of 16 physiographic strata, as defined by the USFWS Breeding Bird Survey (BBS), are included in the Northeast Region. A total of 132 species of neotropical migratory birds from Lists "A" and "B" (as defined by the "Preliminary Lists of Migrants for Partners in Flight," published in the *Partners in Flight Newsletter*, vol. 2, no. 1, p. 30), occur regularly in the Northeast Region. Of that species complement, 88 (66.7%) are List A species and 44 (33.3%) are List B species. There are no List C or D species in the Northeast Region. Of the species that regularly occur in the Northeast Region, 77 occur only as breeding species, 49 breed and winter in the region, 5 only winter in the region (Merlin, American Pipit, Orange-crowned Warbler, White-crowned Sparrow, and Fox Sparrow), and one species (Connecticut Warbler) occurs in the region only as a migrant. In addition, all 132 species are represented as migrants through the region.

Taken as a whole, the Northeast Region presents a somewhat different picture of the status of neotropical migrants than appears to be the case for other regions of the United States. We evaluated BBS data from 1966 through 1990, looking at sample size and trend significance and consistency (Table 1). We also used supplemental information for species not adequately sampled by the BBS (e.g. Peregrine Falcon and Upland Sandpiper). We find that 60 breeding species are

showing declining population trends over the 25-year period, but only 29 species (22.0%) are showing declining population trends that are significant at the 0.05 level or better. Thirty species are showing increasing population trends, with 16 of those trends significant at the 0.05 level or better. Of those remaining, data available for 32 species indicate no significant population changes over the 25-year period, and data do not exist for four species (Long-eared Owl, Willow and Alder Flycatchers, and Gray-cheeked Thrush). In effect, a majority of the 126 species (81 species, 64.3%) of neotropical migrants breeding in the Northeast Region have populations for which no significant increasing or decreasing trend can be discerned from BBS data (Table 1). The appearance of no population change could result either from no real change in population trend or from inadequacy of the sampling procedure.

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In the absence of a generally agreed upon scheme or vocabulary within the Partners in Flight initiative for identifying and classifying habitat types, we define two general types of habitat for the Northeast Region: relatively mature (arbitrarily defined as stands older than 50 years), forested habitats and disturbed or successional habitats (e.g. clear-cuts, beaver meadows, blow-downs, shrublands, pastures). If we examine the habitat affinities for those species in the Northeast Region that have significantly declining population trends, using our very coarse habitat classification scheme, some interesting patterns emerge (Tables 2 through 5). Among the 126 species of neotropical migrants breeding in the Northeast Region, we find that 74 species (58.7%) are species of disturbed or successional habitat types, while 52 species (41.3%) are species of mature, forested habitats, as we have defined them (Table 2). A majority of species of declining neotropical migrants in the Northeast Region (22 species, 75.9%) are species of disturbed or successional habitats (Tables 2 and 4).

For our region, considerable refinement of our interpretations of bird/habitat relationships will result from the Gap Analysis Project of the USFWS (Scott *et al.* 1991), now underway throughout the northern half of the Northeast Region (New York and New England), and scheduled to be completed for the entire region within five to eight years (possibly sooner). Conclusion of a regional gap analysis will give us a consistent, regionwide scheme of habitat classification, based on remotely sensed landscape imagery, as well as a better idea of the areas of different habitats, their spatial arrangements, and field-validated associations of migratory bird species within those habitats, at a resolution of approximately 30 x 30 meters on the ground. A preliminary scheme of community classification applicable to the Northeast Region will be available from the Eastern Heritage Task Force of The Nature Conservancy by the end of 1993, as part of the Gap Analysis Project. Any application of results from ranking schemes designed to assess status and set management priorities for neotropical migrants and their habitats would be premature for our region before TNC's community classification scheme has been fully tested and implemented.

A provisional, preliminary ranking of neotropical migrants for the Northeast Region, based upon perceptions of their status, is presented in Table 6, using the methods of Hunter *et al.* (in press). This system uses seven biological and habitat variables to rank and prioritize conservation needs of neotropical migrant species for a defined geographic area. Each of seven variables (global abundance, extent of winter distribution, threats on wintering grounds, extent of breeding distribution, threats on breeding grounds in area of consideration, importance of area of consideration to the species, and population trend in area of consideration) are ranked from one to five for each species, with five representing the highest level of concern. The values then are totalled for a possible high score of 35, and the species are subsequently ordered to identify those of highest concern (Table 6).

We believe that it is especially important to note that this is the first effort to apply the ranking scheme of Hunter *et al.* over large geographic areas different in character from the southeastern United States. Since the proposed ranking scheme has not been fully peer-reviewed at this time and has had very limited field testing, we offer its application here in a very tentative way, subject to further review and future modification. One difficulty we perceive with the current ranking scheme is that real numerical data, such as that provided by the BBS, are included in the ranking scheme with the same weight as very qualitative judgments that amount to little more than best guesses, given the primitive state of our knowledge of the biology of many of these species, especially their winter distributions and habitat requirements. Another difficulty is that the proposed ranking scheme does not provide for including an absence of information in its process, as currently is being applied in a ranking of migratory bird species of management concern by USFWS, applying a Delphi technique (J. Trapp, pers. comm.). Any ranking scheme should be carefully reviewed and thoroughly tested before it is adopted. In that context, this application of the scheme proposed by Hunter *et al.* is merely a first test of the approach in the Northeast and will be subject to ongoing modification, evaluation, and refinement. In a preliminary test of the ranking scheme at the Annual Meeting of the Northeast Working Group in November 1992, ten experienced observers were asked to rank five species (Broad-winged hawk, Whip-poor-will, House Wren, Yellow-throated Vireo, and Bobolink). The observers were given trend information from USFWS BBS data analysis and provided with range maps from Rappole *et al.* (1983). There was little or no agreement among our observers in the final sums of ranks (column T of Table 6) assigned to these five species. The ranges for sums of ranks assigned to the five species were as follows (ranges in parenthesis): Broad-winged Hawk (14-22), Whip-poor-will (21-27), House Wren (8-16), Yellow-throated Vireo (18-25), Bobolink (13-24). Unfortunately, the scheme proposed by Hunter *et al.* provides no guidance for reconciling differences among ranks or for assessing the significance of differences among different ranks assigned to the same species by different observers, all of which are experienced observers, familiar with the birds of their region.

In general, we feel that continued scrutiny of the assumptions, strengths, and weaknesses of the route-regression procedure applied to BBS data by the USFWS (Geissler and Sauer 1990) and others is prudent. Confirmation of trends suggested by the route regression method by use of alternative analytical procedures, such as the Mountford method (Mountford 1985) or nonparametric, nonlinear route regression (James *et al.* 1992), can strengthen our conclusions and lend to their credibility among fellow researchers. Those species with clearly declining population trends, identified by agreement among different analytical procedures, become high priority species for further study. Where they are available and applicable, other databases should be used to cross-check BBS

trends. We intend to follow this approach as outlined in our "Research Considerations" document of 30 September 1991 (Appendix A), for the Northeast Region.

We also believe it is important to point out that caution still should be applied in evaluating the population status of neotropical migrants, relying solely upon the BBS database. One of our group (R. O'Connor) is concluding an extensive analysis and evaluation of the BBS database for the Northeast Region and is satisfied that there are inconsistencies in the BBS database that can affect analytical results, thereby affecting management recommendations based on those results. For example, there is some evidence that "poorer" routes (i.e. those with fewer species or individuals) were abandoned by observers during the early years of the survey at a greater rate than "better" routes. Other researchers, using different analytical procedures (Wiedenfeld et al. 1992), also have found regional patterns of population change different from those previously reported. There is a clear need for further discussion and deliberation, with the objective of reaching a clearer consensus among professionals on the statistical procedures and interpretations that can be applied appropriately to the BBS database, or subsets of that database.

At this stage in the Partners in Flight initiative, a challenge before us is to evaluate thoroughly and objectively the nature of the BBS database and analytical procedures that can be applied to it. We should use the same care and precision employed by Chandler Robbins and his associates when the sampling design for the BBS originally was proposed, painstakingly field tested, and carefully peer reviewed. In the "Partners in Flight" initiative, as with other conservation efforts, it is important to be sure that the conservation cart is not in front of the research horse. Otherwise, we risk exaggerating the severity of declines that exist for neotropical migrants and making management recommendations that could be premature or, unfortunately, wrong, causing the credibility of our conservation efforts to be undermined.

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Table 1. — Northeastern neotropical migrants grouped by population trend from "A" and "B" Lists combined (132 species). AOU = American Ornithologists' Union species number. Oc = Occurrence: B = Breeds and migrates regularly; M = Migrates regularly; W = Winters and migrates regularly. PT = Population Trend in the Northeast Region (breeding species only): 1 = statistically significant increase; 2 = non-significant increase; 3 = no consistent trend; 4 = non-significant decline; 5 = statistically significant decline; NA = Not Applicable; U = Unknown. MS = Migrant Status: L = Long distance; S = Short distance. BH = Breeding Habitat: S = Successional; MF = Mature Forest. Trends are based on route regression analysis of Breeding Bird Survey data (1966-90), or inferred from other available information for species not well represented in the BBS database.

AOU	Species	Oc	PT	MS	BH
6240	Red-eyed Vireo	B	1	L	MF
6270	Warbling Vireo	B	1	L	MF
6290	Solitary Vireo	B	1	L	MF
6550	Yellow-rumped Warbler	B/W	1	S	MF
6570	Magnolia Warbler	B	1	L	MF
6630	Yellow-throated Warbler	B	1	L	MF
6740	Ovenbird	B	1	L	MF
3160	Mourning Dove	B/W	1	S	S
3250	Turkey Vulture	B/W	1	S	S
3370	Red-tailed Hawk	B/W	1	S	S
3560	Peregrine Falcon	B/W	1	L	S
5060	Orchard Oriole	B	1	L	S
5970	Blue Grosbeak	B	1	L	S
6190	Cedar Waxwing	B/W	1	S	S
6520	Yellow Warbler	B	1	L	S
7660	Eastern Bluebird	B/W	1	S	S
4650	Acadian Flycatcher	B	2	L	MF
5950	Rose-breasted Grosbeak	B	2	L	MF
6080	Scarlet Tanager	B	2	L	MF
6370	Prothonotary Warbler	B	2	L	MF
6500	Cape May Warbler	B	2	L	MF
6620	Blackburnian Warbler	B	2	L	MF
6750	Northern Waterthrush	B	2	L	MF
6840	Hooded Warbler	B	2	L	MF
7260	Brown Creeper	B/W	2	S	MF
7590	Hermit Thrush	B/W	2	S	MF

Table 1. — Continued.

AOU	Species	Oc	PT	MS	BH
5980	Indigo Bunting	B	2	L	S
6140	Tree Swallow	B/W	2	S	S
6410	Blue-winged Warbler	B	2	L	S
6790	Mourning Warbler	B	2	L	S
3330	Cooper's Hawk	B/W	3	S	MF
3390	Red-shouldered Hawk	B/W	3	S	MF
3490	Golden Eagle	B/W	3	S	MF
4520	Great Crested Flycatcher	B	3	L	MF
4630	Yellow-bellied Flycatcher	B	3	L	MF
5330	Pine Siskin	B/W	3	S	MF
6100	Summer Tanager	B	3	L	MF
6260	Philadelphia Vireo	B	3	L	MF
6280	Yellow-throated Vireo	B	3	L	MF
6470	Tennessee Warbler	B	3	L	MF
6480	Northern Parula	B	3	L	MF
6610	Blackpoll Warbler	B	3	L	MF
6670	Black-throated Green Warbler	B	3	L	MF
6720	Palm Warbler	B/W	3	L	MF
6850	Wilson's Warbler	B	3	L	MF
7510	Blue-gray Gnatcatcher	B	3	L	MF
2730	Killdeer	B/W	3	S	S
3600	American Kestrel	B/W	3	S	S
4020	Yellow-bellied Sapsucker	B/W	3	S	S
4160	Chuck-will's-widow	B	3	L	S
4280	Ruby-throated Hummingbird	B	3	L	S
5600	Chipping Sparrow	B/W	3	L	S
5610	Clay-colored Sparrow	B	3	L	S
5670	Dark-eyed Junco	B/W	3	S	S
5840	Swamp Sparrow	B/W	3	S	S
6110	Purple Martin	B	3	L	S
6310	White-eyed Vireo	B	3	L	S
6450	Nashville Warbler	B	3	L	S
6810	Common Yellowthroat	B/W	3	L	S

Table 1. — Continued.

AOU	Species	Oc	PT	MS	BH
7030	Northern Mockingbird	B/W	3	S	S
7040	Gray Catbird	B/W	3	L	S
7210	House Wren	B/W	3	L	S
3320	Sharp-shinned Hawk	B/W	4	S	MF
3340	Northern Goshawk	B/W	4	S	MF
3430	Broad-winged Hawk	B	4	L	MF
6390	Worm-eating Warbler	B	4	L	MF
6540	Black-throated Blue Warbler	B	4	L	MF
6580	Cerulean Warbler	B	4	L	MF
6600	Bay-breasted Warbler	B	4	L	MF
6770	Kentucky Warbler	B	4	L	MF
6870	American Redstart	B	4	L	MF
7490	Ruby-crowned Kinglet	B/W	4	S	MF
7560	Veery	B	4	L	MF
2610	Upland Sandpiper	B	4	L	S
3310	Northern Harrier	B/W	4	S	S
3670	Short-eared Owl	B/W	4	S	S
3870	Yellow-billed Cuckoo	B	4	L	S
3900	Belted Kingfisher	B/W	4	S	S
4560	Eastern Phoebe	B/W	4	S	S
4940	Bobolink	B	4	L	S
5070	Northern Oriole	B	4	L	S
5460	Grasshopper Sparrow	B	4	L	S
5830	Lincoln's Sparrow	B	4	L	S
6040	Dickcissel	B	4	L	S
6120	Cliff Swallow	B	4	L	S
6130	Barn Swallow	B	4	L	S
6160	Bank Swallow	B	4	L	S
6170	N. Rough-winged Swallow	B	4	L	S
6380	Swainson's Warbler	B	4	L	S
6590	Chestnut-sided Warbler	B	4	L	S
6730	Prairie Warbler	B	4	L	S
6760	Louisiana Waterthrush	B	4	L	S

Table 1. — Continued.

AOU	Species	Oc	PT	MS	BH
7610	American Robin	B/W	4	S	S
4610	Eastern Wood-Pewee	B	5	L	MF
4670	Least Flycatcher	B	5	L	MF
5170	Purple Finch	B/W	5	S	MF
6360	Black-and-white Warbler	B	5	L	MF
6860	Canada Warbler	B	5	L	MF
7550	Wood Thrush	B	5	L	MF
7580	Swainson's Thrush	B	5	L	MF
3880	Black-billed Cuckoo	B	5	L	S
4120	Northern Flicker	B/W	5	S	S
4170	Whip-poor-will	B	5	L	S
4200	Common Nighthawk	B	5	L	S
4230	Chimney Swift	B	5	L	S
4440	Eastern Kingbird	B	5	L	S
4590	Olive-sided Flycatcher	B	5	L	S
4740	Horned Lark	B/W	5	S	S
4950	Brown-headed Cowbird	B/W	5	S	S
4980	Red-winged Blackbird	B/W	5	S	S
5010	Eastern Meadowlark	B/W	5	S	S
5290	American Goldfinch	B/W	5	S	S
5400	Vesper Sparrow	B/W	5	S	S
5420	Savannah Sparrow	B/W	5	S	S
5580	White-throated Sparrow	B/W	5	S	S
5810	Song Sparrow	B/W	5	S	S
5870	Rufous-sided Towhee	B/W	5	S	S
6220	Loggerhead Shrike	B/W	5	S	S
6420	Golden-winged Warbler	B	5	L	S
6830	Yellow-breasted Chat	B	5	L	S
7240	Sedge Wren	B/W	5	S	S
7250	Marsh Wren	B/W	5	S	S
6780	Connecticut Warbler	M	NA	L	MF
3570	Merlin	W	NA	L	S
5540	White-crowned Sparrow	W	NA	S	S

Table 1. — Continued.

AOU	Species	Oc	PT	MS	BH
5850	Fox Sparrow	W	NA	S	S
6460	Orange-crowned Warbler	M	NA	L	S
6970	American Pipit	W	NA	S	S
7570	Gray-cheeked Thrush	B	U	L	MF
3660	Long-eared Owl	B/W	U	S	S
4660	Willow Flycatcher	B	U	L	S
4661	Alder Flycatcher	B	U	L	S

Table 2. — Comparison of neotropical migratory bird population trends for 126 species according to two very general habitat types in the Northeast Region. In this context, mature forest is arbitrarily defined as stands 50 or more years old. *-Trend based on a significance level of 0.05, or better.

	Mature Forest	Successional Habitats
Increasing Species*	7 (43.8%)	9 (56.2%)
Decreasing Species*	7 (24.1%)	22 (75.9%)
No detectable change*	38 (46.9%)	43 (53.1%)

Table 3. — Population trends for species associated with mature forests (stands 50 years of age or older) in the Northeast Region. Based on significance level of 0.05, or better.

<u>Increasing Species</u>	<u>Decreasing Species</u>
Solitary Vireo	Eastern Wood-Pewee
Warbling Vireo	Least Flycatcher
Red-eyed Vireo	Swainson's Thrush
Magnolia Warbler	Wood Thrush
Yellow-rumped Warbler	Black-and-white Warbler
Yellow-throated Warbler	Canada Warbler
Ovenbird	Purple Finch

Table 4. — Population trends for species associated with successional habitats in the Northeast Region. Based on significance level of 0.05, or better.

<u>Increasing Species</u>	<u>Decreasing Species</u>
Turkey Vulture	Black-billed Cuckoo
Red-tailed Hawk	Common Nighthawk
Mourning Dove	Whip-poor-will
Eastern Bluebird	Chimney Swift
Cedar Waxwing	Northern Flicker
Yellow Warbler	Olive-sided Flycatcher
Blue Grosbeak	Eastern Kingbird
Orchard Oriole	Horned Lark
	Sedge Wren
	Marsh Wren
	Loggerhead Shrike
	Golden-winged Warbler
	Yellow-breasted Chat
	Rufous-sided Towhee
	Vesper Sparrow
	Savannah Sparrow
	Song Sparrow
	White-throated Sparrow
	Red-winged Blackbird
	Eastern Meadowlark
	Brown-headed Cowbird
	American Goldfinch

Table 5. — Population trends of neotropical breeding birds in the Northeast Region, partitioned by habitat and migratory behavior.
Trends are from Table 1.

Number of Species							
	Increasing		Decreasing		Other		
	No. Trends	No. Significant	No. Trends	No. Significant	No Trend	Not known	
Wintering Habitat	No. Trends	No. Significant	No. Trends	No. Significant	No Trend	Not known	Total
Short-distance	9	6	23	15	10	1	43
Long-distance	21	10	37	14	22	3	83
Total	30	16	60	31	32	4	126

Number of Species							
	Increasing		Decreasing		Other		
	No. Trends	No. Significant	No. Trends	No. Significant	No Trend	Not known	
Breeding Habitat							Total
Mature Forest	17	7	18	7	16	1	52
Successional	13	9	42	22	16	3	74
Total	30	16	60	29	32	4	126

Breeding Habitat	Number of Species		
	Short-distance Migrant	Long-distance Migrant	Total
Mature Forest	11	41	52
Successional	32	42	74
Total	43	83	126

Table 6. — Summary of ranking scores for species of neotropical migrants in the Northeast Region (same as USFWS Region 5).
Oc = Occurrence; B = Breeds and migrates regularly; M = Migrates regularly; W = Winters and migrates regularly. GA = Global abundance of species; WD = Winter distribution; TW = Threats on wintering grounds; BD = Breeding distribution; TB = Threats on breeding grounds in area of consideration; IA = Importance of area of consideration; PT = Population trend in area of consideration; T = Total score. BH = Breeding habitat; S = Successional; MF = mature forest. All rankings are on a scale of 1 to 5, with a score of 5 indicating a maximum level of concern for the species. Higher total values indicate a greater level of perceived threat to the species, with 35 the maximum possible score. Only 82 species from the Partners in Flight List, "A" are included and species with a score less than 10 are not listed.

Species	Oc	GA	WD	TW	BD	TB	IA	PT	T	BH
Cerulean Warbler	B	4	4	4	4	4	4	4	28	MF
Golden-winged Warbler	B	4	4	4	4	3	4	5	28	S
Swainson's Warbler	B	4	5	4	4	5	1	4	27	S
Wood Thrush	B	2	4	4	3	3	4	5	25	MF
Black-throated Blue Warbler	B	3	4	4	3	3	3	4	24	MF
Blue-winged Warbler	B	3	4	4	4	3	4	2	24	S
Worm-eating Warbler	B	3	4	4	3	2	3	4	23	MF
Chestnut-sided Warbler	B	3	5	4	3	2	2	4	23	S
Black-billed Cuckoo	B	3	4	4	3	2	2	5	23	S
Philadelphia Vireo	B	4	5	4	3	3	1	3	23	MF
Canada Warbler	B	2	4	4	3	3	2	5	23	MF
Louisiana Waterthrush	B	4	3	3	3	2	3	4	22	S
Eastern Wood-Pewee	B	2	4	3	3	2	3	5	22	MF
Bobolink	B	2	4	3	3	4	2	4	22	S
Yellow-throated Vireo	B	3	3	4	3	3	3	3	22	MF
Scarlet Tanager	B	2	4	4	3	3	4	2	22	MF
Blackburnian Warbler	B	3	4	4	3	3	3	2	22	MF
Veery	B	2	3	3	3	3	3	4	21	MF
Prairie Warbler	B	2	4	4	3	2	2	4	21	S
Kentucky Warbler	B	2	4	3	3	3	2	4	21	MF
Bay-breasted Warbler	B	2	5	4	3	2	1	4	21	MF
Whip-poor-will	B	2	3	3	3	3	2	5	21	S
Olive-sided Flycatcher	B	3	3	4	2	3	1	5	21	S
Hooded Warbler	B	3	4	4	3	3	2	2	21	MF
Upland Sandpiper	B	3	3	3	3	4	1	4	21	S
Black-throated Green Warbler	B	3	3	3	3	3	3	3	21	MF
Great Crested Flycatcher	B	2	4	4	3	2	2	3	20	MF

Table 6. — Continued.

Species	Oc	GA	WD	TW	BD	TB	IA	PT	T	BH
Gray-cheeked Thrush	B	3	4	3	3	3	1	3	20	MF
Yellow-bellied Flycatcher	B	3	4	4	3	2	1	3	20	MF
Clay-colored Sparrow	B	3	4	3	4	2	1	3	20	S
Yellow-breasted Chat	B	2	3	3	2	3	2	5	20	S
Acadian Flycatcher	B	2	4	4	3	2	3	2	20	MF
Tennessee Warbler	B	3	4	3	3	3	1	3	20	MF
Northern Parula	B	2	3	3	3	3	3	3	20	MF
Nashville Warbler	B	3	4	3	3	3	1	3	20	S
Yellow-billed Cuckoo	B	3	3	4	2	2	2	3	19	S
Mourning Warbler	B	3	4	3	3	3	1	2	19	S
Prothonotary Warbler	B	3	4	4	3	2	1	2	19	MF
Cape May Warbler	B	3	4	4	3	2	1	2	19	MF
Magnolia Warbler	B	3	3	4	3	3	2	1	19	MF
Swainson's Thrush	B	3	2	3	2	3	1	5	19	MF
Eastern Kingbird	B	2	3	3	2	2	2	5	19	S
Northern Oriole	B	2	3	3	3	3	1	4	19	S
Broad-winged Hawk	B	3	2	3	2	2	2	4	18	MF
Chuck-will's-widow	B	2	3	3	3	2	2	3	18	S
Blackpoll Warbler	B	2	4	3	3	2	1	3	18	MF
Alder Flycatcher	B	2	4	3	3	2	1	3	18	S
Least Flycatcher	B	3	3	2	2	2	1	5	18	MF
American Redstart	B	2	2	3	2	2	3	4	18	MF
Black-and-white Warbler	B	2	2	3	2	2	2	5	18	MF
Ovenbird	B	2	3	3	3	3	3	1	18	MF
Rose-breasted Grosbeak	B	2	3	3	3	3	2	2	18	MF
Willow Flycatcher	B	3	3	3	2	2	2	3	18	S
Grasshopper Sparrow	B	3	3	3	2	2	1	4	18	S
Gray Catbird	B/W	2	3	4	2	1	3	3	18	S
Indigo Bunting	B	1	3	2	3	3	3	2	17	S
Yellow-throated Warbler	B	3	3	3	3	3	1	1	17	MF
Chimney Swift	B	1	3	3	2	1	2	5	17	S
Bank Swallow	B	3	3	2	1	2	2	4	17	S
White-eyed Vireo	B	2	3	3	3	2	1	3	17	S
Solitary Vireo	B	3	3	3	3	2	2	1	17	MF

Table 6. — Continued.

Species	Oc	GA	WD	TW	BD	TB	IA	PT	T	BH
Summer Tanager	B	2	3	3	3	2	1	3	17	MF
Wilson's Warbler	B	3	3	2	3	2	1	3	17	MF
Palm Warbler	B/W	3	3	2	3	2	1	3	17	MF
Purple Martin	B	2	3	3	2	3	1	3	17	S
N. Rough-winged Swallow	B	3	3	2	1	2	1	4	16	15
Peregrine Falcon	B/W	4	1	4	2	3	1	1	16	S
Blue-gray Gnatcatcher	B	2	3	2	2	2	2	3	16	MF
Common Nighthawk	B	2	2	2	1	2	1	5	15	S
Blue Grosbeak	B	3	3	2	2	3	1	1	15	S
Cliff Swallow	B	2	3	2	1	2	1	4	15	S
Ruby-throated Hummingbird	B	2	3	2	2	1	2	3	15	S
Orchard Oriole	B	2	3	3	3	2	1	1	15	S
Warbling Vireo	B	2	3	3	1	3	1	1	14	MF
Northern Waterthrush	B	2	2	3	2	2	1	2	14	MF
Lincoln's Sparrow	B	2	2	2	2	2	1	4	14	S
Barn Swallow	B	1	1	2	1	2	2	4	13	S
Red-eyed Vireo	B	1	3	2	2	2	2	1	13	MF
Chipping Sparrow	B/W	1	2	2	1	2	2	3	13	S
Common Yellowthroat	B/W	1	2	2	1	2	2	3	13	S
Yellow Warbler	B	1	1	2	1	2	2	1	10	S
House Wren	B/W	1	1	1	1	1	2	3	10	S

APPENDIX A

Research Considerations

Northeast Working Group Neotropical Migratory Bird Conservation Program "Partners in Flight--Aves de las Americas"

Geographic Area:

The geographic area of concern to the Northeast Working Group of the Neotropical Migratory Bird Conservation Program corresponds to Administrative Region 5 of the U.S. Fish and Wildlife Service. It includes the states of Maine, Vermont, New Hampshire, New York, Massachusetts, Connecticut, Rhode Island, New Jersey, Pennsylvania, Delaware, West Virginia, Maryland, Virginia, and the District of Columbia. These states represent Administrative Regions 1, 2, and 3 of the U.S. Environmental Protection Agency, and parts of the Eastern and Southern Regions of the U.S. Forest Service.

Initial Premises:

In general, the research direction must be determined by the needs of managers for information. In determining management priorities to achieve conservation of neotropical migrants, minimum essential information requirements include knowledge of geographic distributions, population status (trend and/or relative abundance), and habitat associations during the breeding season (Smith 1991). Initial research efforts should be focused upon collecting, evaluating, synthesizing, and reporting information that has the greatest likelihood of answering questions of immediate relevance to setting priorities and affecting policies leading to conservation of neotropical migratory birds in the Northeast. For those species of neotropical migratory birds occurring in the Northeast, it also would be useful to know with accuracy and precision that minimum set of variables that uniquely specifies their individual distributions and abundances in both time and space.

Research Needs (1991-1994):

Achieving the research objectives outlined here will require coordination and collaboration among individual researchers and cooperating agencies at both state and regional levels. In addition, long-term funding will be required from cooperating agencies to support qualified individuals who wish to pursue these research initiatives. The relative responsibilities of the national and regional working groups, especially with respect to funding, need to be clarified. For example, where does the boundary between national and regional research needs lie, and can the Northeastern Working Group assume that needs identified by the National Research Working Group will be addressed somewhere in the country?

Objective 1. From the working list of neotropical migratory bird species (prepared and distributed by the National Research Working Group), identify those species which breed in or migrate through the Northeast.

Objective 2. In general, explicit checking of the assumptions of the route-regression procedure of the USFWS as applied to Breeding Bird Survey (BBS) data (Geissler and Sauer 1990) is desirable. Confirmation of trends suggested by the route-regression method by use of alternative analytical procedures such as the Mountford method (Mountford 1985), and the chain method of the

Common Birds Census of the British Trust for Ornithology (Bailey 1967, Marchant *et al.* 1990) will strengthen our findings and lend to their credibility among fellow researchers. Those species with clearly declining population trends, identified by agreement among different analytical procedures, become high priority species for further study. Where they are available and applicable, other databases should be used to cross-check BBS trends.

- Objective 3.** Where it is available, synthesize breeding bird atlas information from each state to prepare maps of breeding season distributions for declining species identified in Objective 2. In spite of differing scales of geographic resolution among the various state atlases, the proportion of all blocks surveyed from which a species is reported as either actually or potentially breeding will provide a first approximation to the distributional ubiquity (O'Connor 1981) of the species for the Northeast.
- Objective 4.** Integrate results from Objectives 2 and 3 to identify those species with limited distributions (i.e. distributional rarity), low relative abundances (i.e. numerical rarity), and declining population trends as potential candidates for high priority research and management consideration.
- Objective 5.** Coordinate research efforts with The Nature Conservancy (state natural heritage programs), the USFWS Gap Analysis Program (Scott *et al.* 1991), and EPA's Environmental Monitoring and Assessment Program (EMAP, Hunsaker and Carpenter 1990) to identify unambiguous bird/habitat associations. A uniform, generalized habitat classification scheme based upon results from Gap Analysis and EMAP could be followed, building upon the work of DeGraaf (1991) and Reschke (1990), with the objective of identifying relatively rare habitats (possibly using TNC ranking criteria) and those bird species clearly associated with those habitats. Those species of birds identified through Objective 4, occurring in rare or threatened habitats identified through Objective 5, become the highest priority species for initial research and management consideration.
- Objective 6.** Through analysis of remotely-sensed landscape imagery, determine patterns of habitat change over time and the potential effects of such changes upon bird populations at local and regional scales. Use bird/habitat associations identified through Objective 5. Robust (i.e. both accurate and precise), cost-effective, and efficient procedures for estimating breeding densities of terrestrial birds would contribute significantly to assessing regional effects of changing land-use practices on bird populations.
- Objective 7.** It is especially important to integrate research, monitoring, and management information to address the following question of particular relevance to setting management priorities: Given a declining population trend, believed to be statistically valid, how steep does the rate of decline have to be, for how long a time period, and over how large a geographic area in order to determine that a species should be given high priority consideration for research or management (e.g. listing as a species of management concern, threatened, or endangered by USFWS)?
- Objective 8.** Through a comprehensive review of published information and existing databases, determine for which species sufficient information exists about population vital statistics (birth rates, death rates, dispersal patterns, and

related parameters) to undertake population viability analysis (Shaffer 1991) in the context of Objective 7. Identify efficient and effective protocols for collecting such information for those species for which it is lacking. Current ideas related to population sources and sinks (Pulliam 1988) and metapopulation dynamics (Gilpin and Hanski 1991) could provide useful conceptual models for such research.

Objective 9. *Impress upon decision-makers the ongoing necessity of intensive, long-term studies and regional, standardized monitoring of populations to facilitate Objectives 2 through 8. The value of such studies is clearly stated in Likens (1989), with several avian examples in Ralph and Scott (1981) and Hagan and Johnston (in press).*

Objective 10. *Sponsor a Regional Conference, with invited papers and a promptly published proceedings, to be held during October 1993, to report and evaluate progress toward Objectives 1 through 9, and determine future research directions.*

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