A MULTI-SCALE ASSESSMENT OF THE GEOGRAPHIC AND ECOLOGICAL DISTRIBUTION OF MIDWESTERN NEOTROPICAL MIGRATORY BIRDS

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ABSTRACT.—Multi-scale assessments of species status are valuable for natural resource management because of interactions between local and regional populations. Such assessments can be broad and cost-effective if done by step-wise successive approximation. We described the distribution of landcover and neotropical migratory birds (NTMBs) in the Midwest at several different geographic and ecological scales. First, we mapped the distribution of major land-cover types in the Midwest. Next, we identified 187 NTMBs that breed in the Midwest, and 47 regional high-priority species for conservation from the Partners in Flight (PIF) NTMB database. We also identified 57 Midwestern species that are declining nationally based on the Breeding Bird Survey (BBS). We report the number of species, number of priority species, and number of declining species across seven ecological provinces within the region. We reviewed literature to determine important breeding habitats and report the number of species, number of priority species, and number of declining species by general land-cover types and by finer-resolution habitat types. At the next level of resolution we suggest ordinating species along relevant ecological gradients, and present two examples. This type of multi-scale assessment provides information on species at different levels of current concern, and identifies ecological provinces, landcovers, and habitats with large numbers species, priority species, and declining species.

INTRODUCTION

Both scientists and the public have become disillusioned with the narrow, expensive, crisis management of Endangered Species. Species viability cannot be insured only by evaluating and improving local habitats (e.g., USFWS 1980) without of a general conservation plan covering much (e.g., Thomas *et al.* 1990) or all of the species range (e.g., Probst and Weinrich 1993) . To supplement single-species approaches, biologists have been developing more holistic, multi-species approaches to conservation (e.g., Scott *et al.* 1993). Such approaches should not only include most vertebrate species, but should also be integrated with disturbance regimes and forest harvesting (e.g., Probst and Crow 1991, Thompson *et al.* 1993). Because of the interaction between local and regional populations (e.g., Askins *et al.* 1987, Probst and Weinrich 1993), multi-scale assessments of species (or other resources) are useful in addressing both process and cumulative effects, and they can be both broad and cost-effective if done by step-wise, successive approximation of population processes (Freemark *et al.* 1993). By placing local decisions in a regional, multi-resource context, land managers and planners can direct local planning to meet different but complementary objectives.

This symposium (Thompson 1996) presents a multi-scale approach to the conservation of neotropical migratory birds (NTMBs) in Midwestern North America. Many of the papers in this symposium review landscape and local factors affecting the status of NTMBs (Johnson 1996, Herkert *et al.* 1996, Howe *et al.* 1996, Knutson *et al.* 1996, Koford and Best 1996, Thompson *et al.* 1996). We provide context for

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these papers with a coarser-grain, successive-approximation overview at broader geographic and ecological scales to facilitate subregional assessment and management. We began by mapping the distribution of major land-cover types in the Midwest. Next we identified Midwestern NTMBs from the PIF NTMB database and regional high-priority species for conservation based on this database. We also identified Midwestern species that are declining nationally based on the Breeding Bird Survey. We determined the distribution of NTMBs across 7 ecological provinces within the region. We then examined the distribution NTMBs, high-priority NTMBs, and declining NTMBs by general land-cover types, by finer-resolution habitat types, and by landcover types within ecological provinces. And finally, as an example of a finer level of resolution, we hypothesize habitat relationships by ordinating species along two ecological gradients.

METHODS

Land Cover in Midwestern U.S.

We assessed landcover in the region from AVHRR imagery (1990 Conterminous U.S. Land Cover Characteristics Data Set CD-ROM, EROS Data Center, USGS, Sioux Falls, South Dakota). These data are 1-km resolution and were developed for large-scale assessments. We extracted coverage for all or much of 15 Midwestern States and pooled vegetation classes into 11 land-cover classes (reported in results). Because of the low resolution of these data, landcover classes contain mixed vegetation types. Therefore, these data should be used only for assessing large-scale patterns.

Midwestern NTMBs

We used the PIF NTMB database to identify Midwestern NTMBs and to determine the distribution and status of species within the region. This database includes long- and short-distance NTMBs (Gauthreaux 1992), listed by State and physiographic regions. We defined Midwestern species as those occurring in any of 24 physiographic regions in midwestern North America (fig. 1). These physiographic regions were delineated for the Breeding Bird Survey and are used by the PIF database. This definition of Midwestern North America was somewhat problematic because some of the boreal, grassland, and forest regions extend across the continent and include eastern and western avifaunas. However, we thought this approach was superior to one based on political (State) boundaries and it is compatible with ongoing PIF conservation efforts.

The PIF NTMB database also includes information used to prioritize species for conservation efforts. Species priority scores are based on 7 criteria: global abundance, breeding distribution, winter distribution, threats on breeding grounds, threats on wintering grounds, importance of the area under consideration (State or physiographic region) to the species, and population trend (Hunter *et al.* 1993, Carter and Barker 1993). Each criterion is scored from 1 to 5, and species are prioritized by their total score (35 = highest priority). We identified regional priorities by calculating a regional priority score for each species from these data. For each species, we calculated the mean value for each of the 7 criteria across physiographic regions, except for the importance of area criterion. Our regional assessment of this criterion needed to take into account the total value of all physiographic regions (not their mean). We transformed scores for this criterion for each species in each physiographic region back to an estimated percentage of the species range. To do this we assumed the percentage was the midpoint of the interval used to assign the original score (i.e., a score of 3 indicated 11 to 25 percent of the species range was in the region, so we assigned the midpoint, 18 percent). We calculated the sum of these percentages and then re-scored this regional percentage 1-5 based on the original criteria. We then summed scores for all seven criteria, now all adjusted to reflect regional values, to create our regional priority score. As with the original physiographic scores, these scores could range from 7 to 35. Various criteria have been used to select priority species from these scores (Carter and Barker 1993, Thompson *et al.* 1993). In this paper, we refer to species with priority scores greater than the 75th percentile (22.2) as priority species.

We also identified midwestern NTMBs that had declining populations. We examined population trends of the 187 midwestern NTMBs for the United States calculated from the Breeding Bird Survey (BBS) and identified species with significant population declines ($P < 0.1$) for the period 1966-1994 (information provided by Bruce G. Peterjohn, National Biological Service, Patuxent Environmental Science Center, Laurel, Maryland).

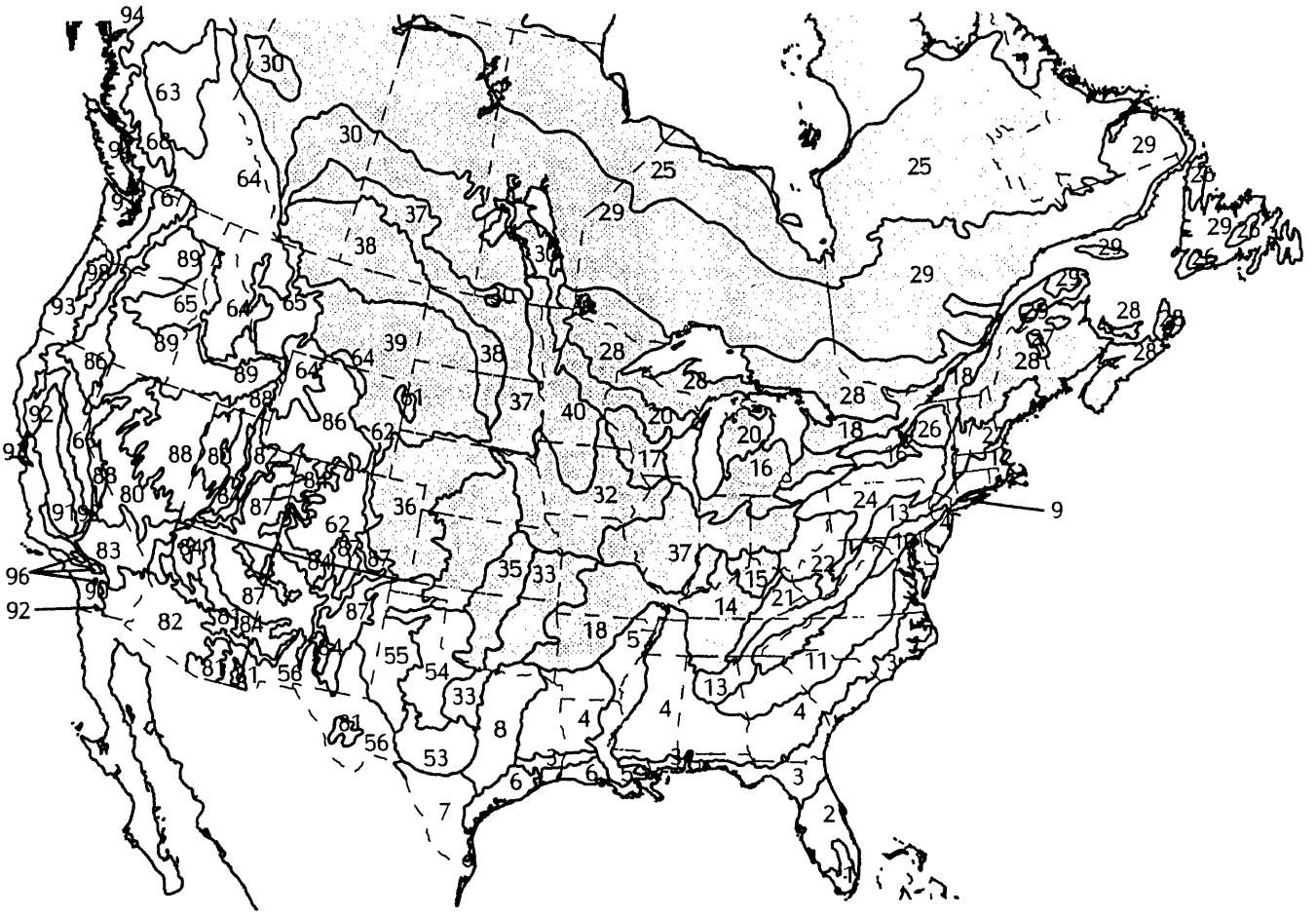


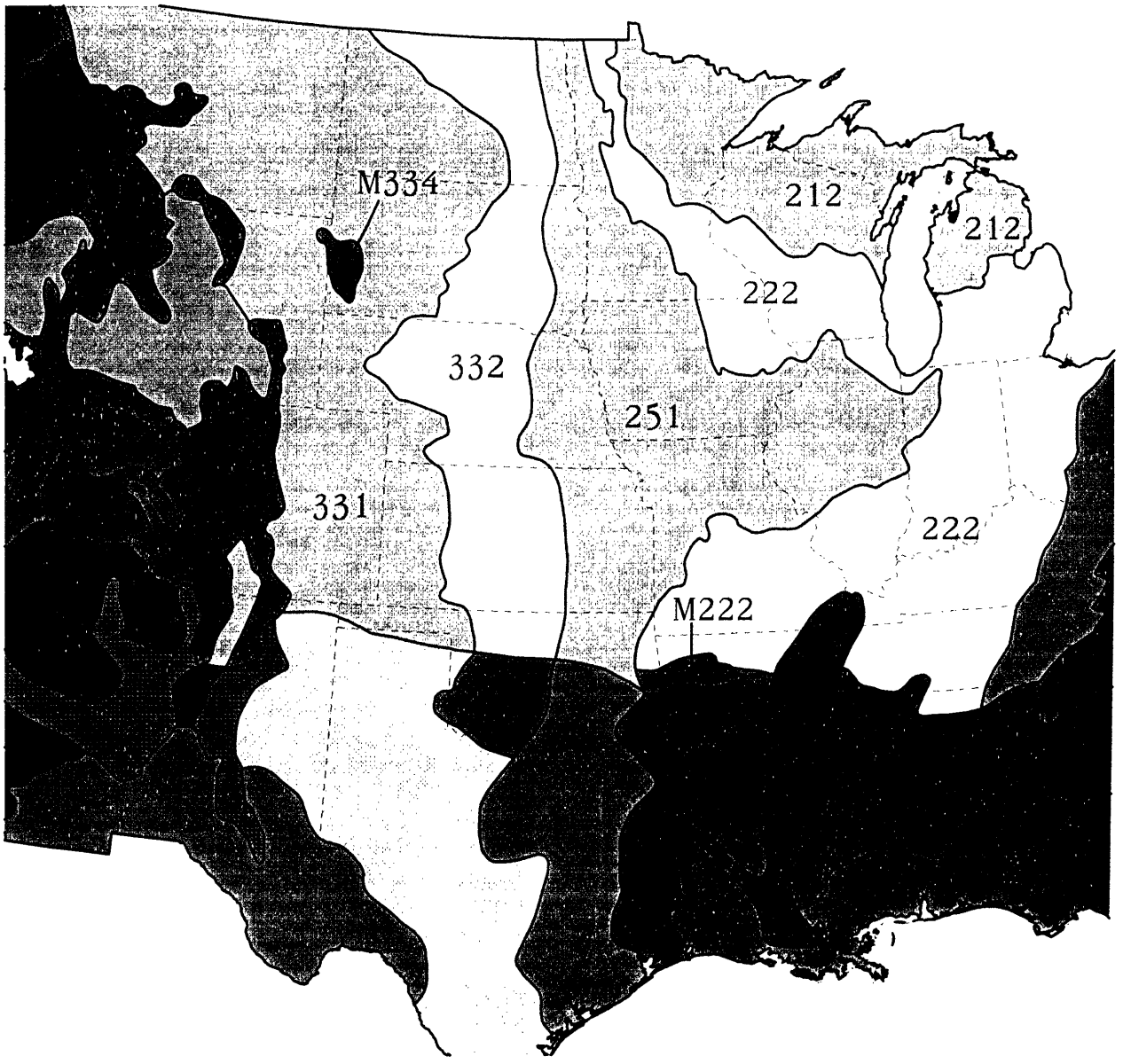
Figure 1.—*Physiographic regions of the United States used by the Breeding Bird Survey and the Partners in Flight Database. We summarized data from the Partners in Flight Database for the shaded regions in this map to identify NTMB species and priority species in the Midwest.*

Distribution of NTMBs Across Ecological Provinces

We determined the occurrence of midwestern NTMBs and priority NTMBs across seven ecological provinces in the Midwest (fig. 2). Ecological provinces are part of the National Hierarchical Framework of Ecological Units adopted by the USDA Forest Service (Bailey *et al.* 1994, McNab and Avers 1994). At this scale patterns of species distribution can be examined at geographically broad but ecologically defined land units. We identified species associated with ecological provinces by relating them to the physiographic region used in the original database. Species were included in a province from all physiographic regions that overlapped a province by approximately 15 percent or more.

NTMB Distribution Across Land Cover and Habitats

We identified up to five breeding habitats used by each species based on a literature review of published midwestern studies (F. Thompson and J. Probst, on file) and our own experience. Habitat types were: agriculture (cropland, pasture, fence rows, farmyards), developed (suburban, urban, commercial development), grassland (prairie, rangeland), shrub-sapling (oldfields, regenerating forest), shrub wetlands, upland conifer forest, lowland conifer forest, upland deciduous forest, lowland deciduous forest, savanna, and specialized (nesting requirements such as buildings or eaves, cliffs or banks). For initial, coarser-grained assessments, we used a reduced land cover list:



PROVINCES	
212	Laurentian Mixed Forest Province
222	Eastern Broadleaf Forest (Continental) Province
M222	Ozark Broadleaf Forest - Meadow Province
251	Prairie Parkland (Temperate) Province
331	Great Plains - Palouse Dry Steppe Province
332	Great Plains Steppe Province
M334	Black Hills Coniferous Forest Province

Figure 2.—*Ecological Provinces of the Midwestern United States; Provinces are one level in the Forest Service National Hierarchical Framework of Ecological Units (adapted from Bailey* et al. *1994 and McNab and Avers 1994).*

aquatic, agriculture/developed (agriculture + developed + specialized), grassland, shrub/sapling (shrub-sapling + shrub wetlands), forest (upland conifer forest + lowland conifer forest + upland deciduous forest + lowland deciduous forest) and savanna. We also determined the distribution of species by landcovers within ecological provinces. For a finer scale assessment we also report numbers of species by habitats. Species were often associated with more than one landcover and habitat and counted in more than one category.

Arranging species on ecological gradients is a more general method for describing habitat use. Gradients can be used as a basis for multiple characterizations of species associations, including more common classifications systems. As an example, we hypothesized relationships of forest birds along gradients of seral stages and coniferous to deciduous trees. These hypotheses can guide verification through surveys, including modification of gradient relationships across geographic ranges.

Geographic Links and Conservation Planning

Many Midwestern species' ranges extend beyond midwestern North America so effective conservation may require coordination of conservation efforts across geographic areas. To demonstrate this, we identified Midwestern high priority species that had a large portion of their range outside midwestern North America. We examined range maps of these species and noted if a significant portion of their range and ecosystem was in northeast, southeast, southwest, or northwest North America.

RESULTS AND DISCUSSION

Land Cover in Midwestern U.S.

Dominant landcover in the region is cropland, woodland cropland mix, forestland, and grassland (fig. 3). Savanna, desert shrubland, shrubland/grassland, and grassland/cropland make up smaller proportions of the area. There are strong regional patterns in landcover in the Midwest, with heavily forested landscapes in the northern and southern regions, grasslands in the western region, and predominately cropland and fragmented forest and grasslands in the central region. Johnson (1996), Herkert *et al.* (1996), Howe *et al.* (1996), Knutson *et al.* (1996), Koford and Best (1996), and Thompson *et al.* (1996) provide more detailed information on the distribution of some Midwestern ecosystems.

Midwestern NTMBs and Their Distribution

We identified 187 species that occurred within the region (Appendix 1). Forty-seven species had priority scores greater than the 75th percentile (22.2). These priority species represent diverse taxonomic orders of birds and use a wide range of habitats. Fifty-seven of the 187 Midwestern NTMBs were declining in the US (Appendix 1).

Distribution of NTMBs Across Ecological Provinces

The number of species within Ecological Provinces ranges from 81 in the Black Hills Coniferous to 136 in Prairie Parkland. Number of priority species ranges from 10 in the Black Hills Coniferous to 33 in the Prairie Parklands. Most of the midwestern provinces contain high numbers of NTMB species and priority species because these provinces represent both east-west and north-south continental ecotones, and contain prairies, forest and wetlands. Trends and species numbers appear related to the geographic scope and habitat diversity of the Provinces. For example, the Prairie Parkland, with high numbers of species and priority species, was originally a forest-openland mosaic that has largely been converted to agriculture.

NTMB Distribution Across Land Cover and Habitats

The 187 species of NTMBs were broadly distributed across land cover types. Approximately 51 percent of these species were associated with shrub/sapling land cover, 50 percent with forest, 25 percent agricultural/developed land cover, 24 percent with grassland, 21 percent with savanna, and 4 percent with aquatic landcover (percentages sum to >100 percent because species were associated with >1 habitat) (fig. 4). The distribution of priority species shifted slightly from agricultural/developed habitats to grassland land cover; 51 percent were associated with forest, 47 percent with shrub sapling, 34 percent with grassland,

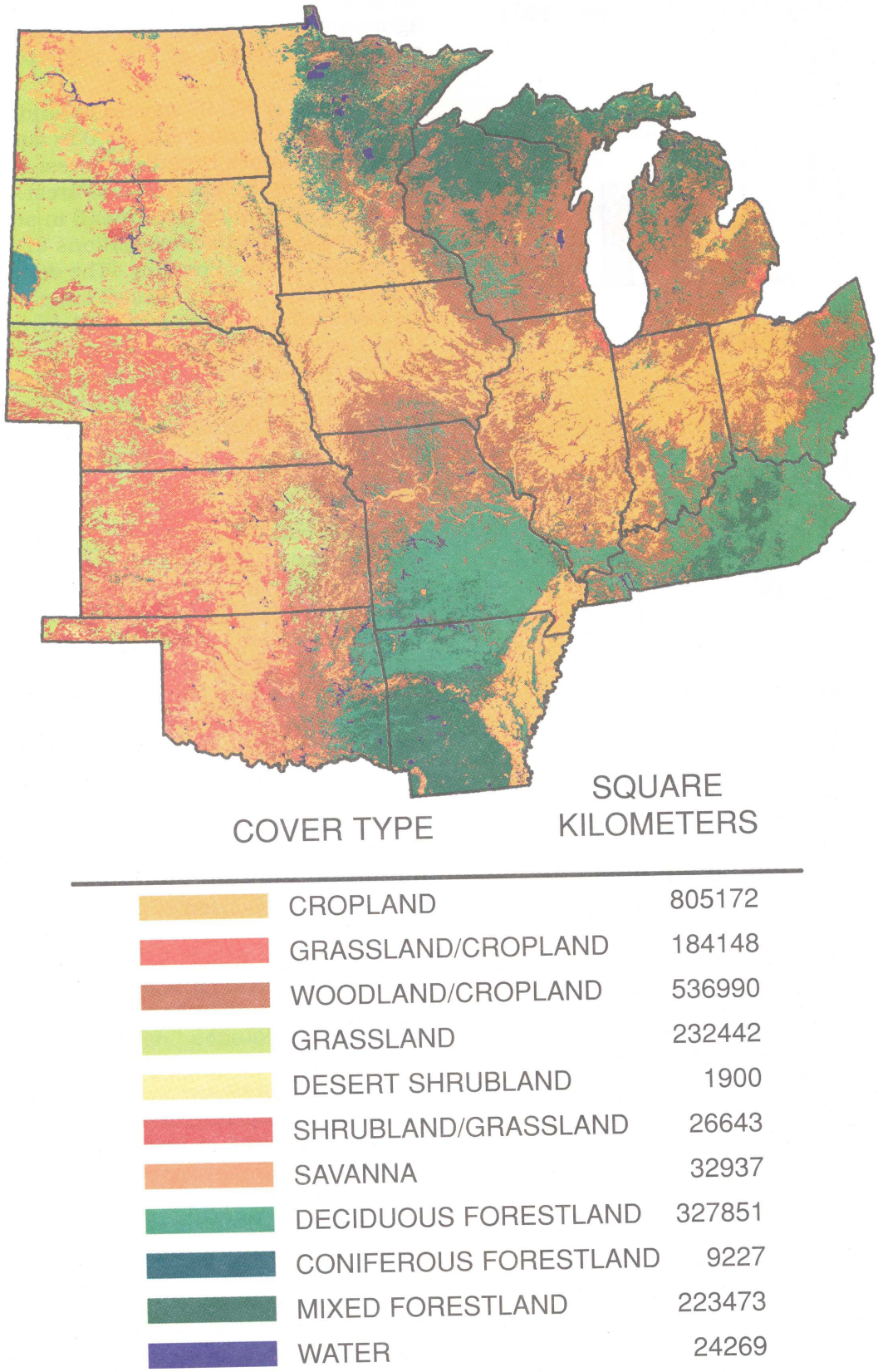


Figure 3.—Land cover of the Midwestern United States interpreted form AVHRR imagery: see text for methods.

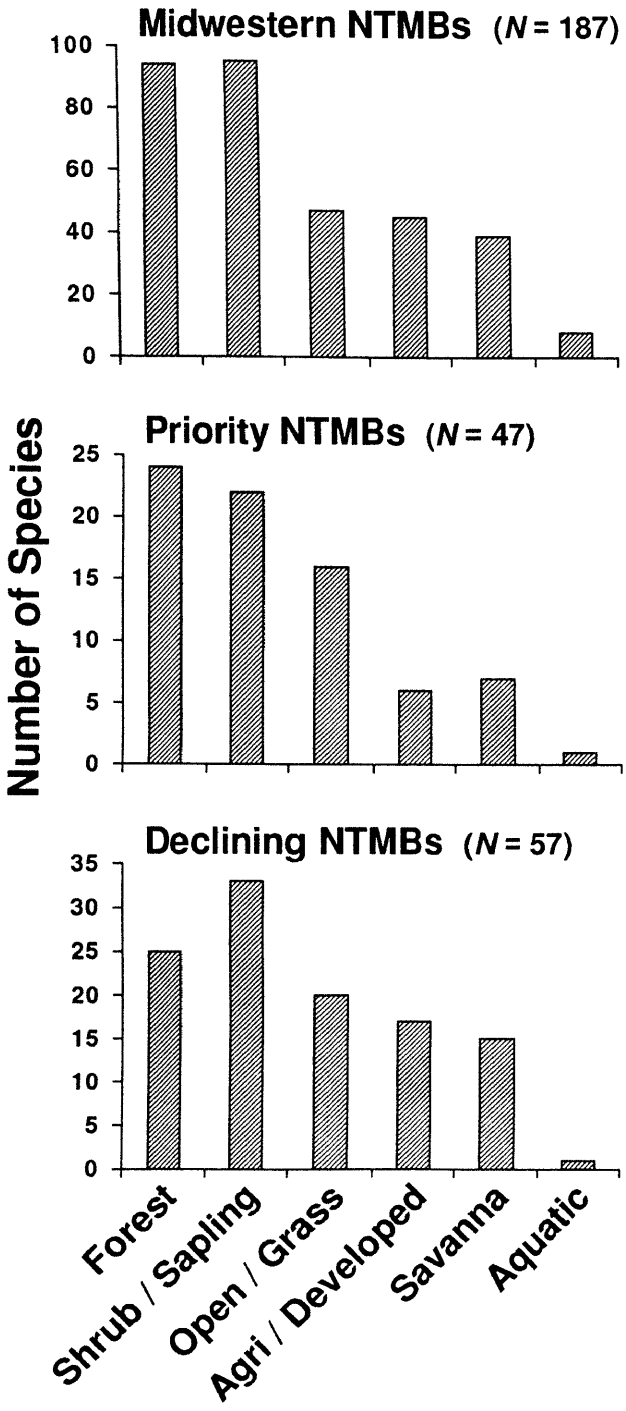


Figure 4.—*Number of Midwestern neotropical migratory birds, declining NTMBs, and priority NTMBs in five general land cover classes. Species may be associated with more than one land cover, so the bars may sum to more than the total number of species (N).*

15 percent with savanna, 13 percent with agricultural/developed, and 2 percent with aquatic habitats (fig. 4).

The number of NTMB species in land covers within Provinces ranged from 0 in aquatic land cover in the Ozark Broadleaf Forest-Meadow to 71 in forest in the Laurentian Forest. Number of priority species ranged from 0 in several land cover-Province combinations to 19 in Laurentian Forest Province. The distribution of species and priority species largely followed the expected distribution of land covers within provinces. For instance the highest numbers of priority species occurred within forests in the Laurentian Forest Province and within shrublands in the Eastern Broadleaf Forest Province and within grassland provinces in the Great Plains (table 1).

The finer breakdown of some land covers into habitat types revealed additional patterns. Within forested habitats, there were slightly more species, priority species, and declining species associated with deciduous than coniferous forests. More species were associated with upland forests than with lowland. More shrub species were associated with upland shrub-sapling habitats than with shrub wetland habitats (fig. 5). NTMBs, priority species, and declining species associated with agricultural habitats are largely dependent on pasture, hayfields, and fencerows as opposed to cropland (Koford and Best 1996). Indeed, the high relative proportion of priority and declining species in grasslands and agricultural habitats is a reflection of the lower proportion of grassland remaining relative to agricultural areas (fig. 3) converted from grassland, forest, or wetland.

Distribution of declining species among landcovers and habitats in many ways mirrored the distribution of species and priority species. Shrub and forest landcovers had the greatest number of declining species; savanna, grassland, and agriculture/developed landcovers had intermediate numbers, and aquatic landcovers had the fewest declining species (fig. 4). Caution should be used when interpreting these figures because some of these land covers may actually be ecological traps or sinks. For instance, many agricultural habitats may be ecological traps for grassland birds (Koford and Best 1996).

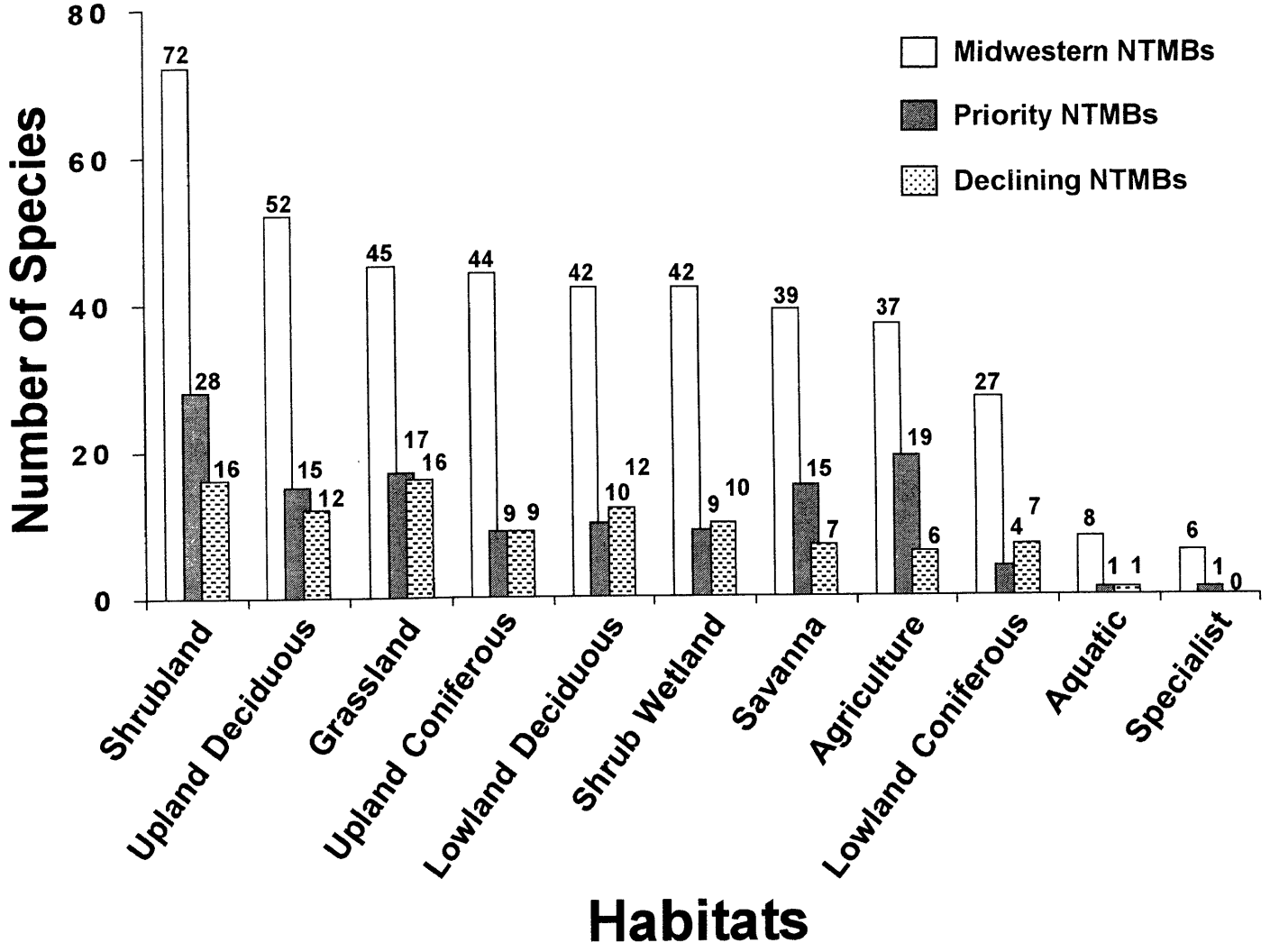


Figure 5.—*Number of neotropical migratory birds, high priority neotropical migratory birds, and declining neotropical migratory birds in Midwestern North America.*

Cover types, forest types, and their area and distribution are important determinants of animal distributions and populations. In addition, habitat age and age-distribution as affected by forest maturity and plant succession are also critical to landscape composition and structure, as well as to avian habitat associations. Midwestern NTMBs showed patterns among upland (dry) versus lowland (wet) ecosystems, conifer versus deciduous forests, and shrub/sapling versus mature forest, so we suggest the use of such gradients in future classification work (e.g., fig. 6). Thompson *et al.* (1996) show overlapping distributions of central hardwood birds across a disturbance gradient. These patterns illustrate that NTMB conservation is far broader than issues concerning forest birds and forest fragmentation. Gradients are easily related to maps of climate, landform, vegetation types, or tables of forest age distribution. Further, gradient approaches to classification are well-adapted to temporal change due to succession, climate, or land use modification. Thus, the general habitat area information can be modified to provide specific information on potential habitat area for species or species groups at several levels of resolution. We provide examples and applications of these types of habitat gradients for some grassland and forest NTMBs; full development of gradient classification is beyond the scope of this paper.

Geographic Links

Midwestern priority species have substantial geographic links to other regions of North America. Not surprisingly, many of the priority species in the Midwest are grassland species whose conservation must be coordinated with

Table 1.—*Numbers of midwestern neotropical migratory birds and priority species (in parentheses) that breed in land covers and ecological provinces. Species can be associated with more than one land cover, so rows and columns do not sum to species totals.*

Habitat	Ecological Province[1]							
	212	222	251	331	332	M222	M334	Total
Shrub/sapling	65 (14)	54 (16)	54 (11)	51 (8)	48 (8)	35 (8)	29 (3)	95 (22)
Forest	71 (19)	34 (10)	35 (6)	31 (3)	27 (4)	20 (5)	20 (2)	94 (24)
Agri./Developed	38 (5)	38 (5)	40 (6)	39 (6)	39 (6)	31 (4)	29 (4)	47 (6)
Grassland	26 (6)	25 (6)	39 (15)	35 (9)	33 (8)	20 (5)	21 (4)	45 (16)
Savanna	27 (6)	30 (6)	33 (6)	31 (3)	34 (5)	27 (5)	20 (2)	39 (7)
Aquatic	8 (1)	6 (1)	6 (1)	6 (1)	6 (1)	4 (1)	0 (0)	8 (1)
Total	129 (30)	124 (30)	136 (33)	126 (23)	125 (27)	93 (21)	81 (10)	187 (47)

[1]Based on Bailey *et al.* (1994) and McNab and Avers (1994); 212 = Laurentian Mixed Forest Province; 222 = Eastern Broadleaf Forest (continental); 251 = Prairie Parkland (Temperate); 331 = Great Plains Palouse Dry Steppe; 332 = Great Plains Steppe; M222 = Ozark Broadleaf Forest-Meadow; M334 = Black Hill Coniferous Forest.

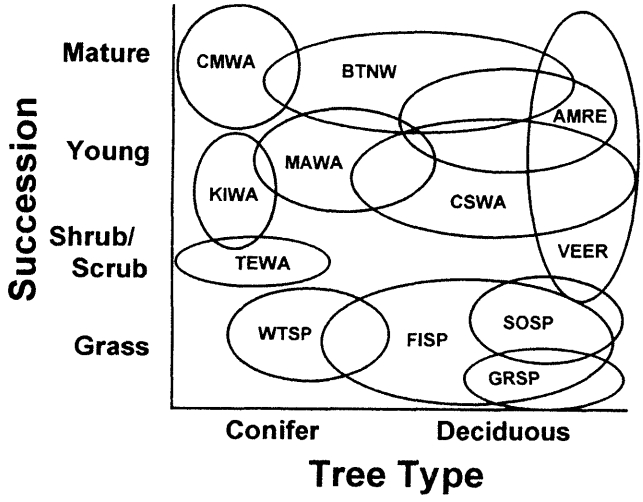


Figure 6.—*Hypothesized habitat relationships of some Midwestern neotropical migratory birds along gradients of forest seral stages and coniferous to deciduous tree life forms.*

Canada and the Western US (table 2). The Midwest is particularly important for the mountain plover, long-billed curlew, scissor-tailed flycatcher, Sprague's pipit, sedge wren, McCown's longspur, chestnut-collared longspur, and lark lunting. Species associated with deciduous forest are predominately linked to the Northeast (e.g., Canada warbler, black-throated blue warbler) and Southeast (e.g., Acadian flycatcher, wood thrush), which again is not suprising given the distribution of the eastern deciduous forest. Priority species associated with coniferous habitats were predominately linked to both the Northeast and Northwest, reflecting the boreal distribution of northern coniferous forests.

CONSERVATION PLANNING

We believe planning for optimal populations of migrant birds or other species requires spatial planning across a species range and integration with other resource values. A broad geographic perspective has several advantages: (1) Viability of individual populations is increased by allocating the largest possible area to each species and associated resource values such as other species or human uses. (2) Broad-based planning for integrated resource values minimizes resource conflicts by sorting resource objectives according to land capabilities and complementary ownership objectives. (3) Large-scale planning allows for consideration of trends in global change at multiple scales. Planning that is broad in scale and scope of issues can simplify legal compliance with laws such as NEPA of 1968, ESA of 1973, or NFMA of 1976 by simultaneous consideration of issues. Population processes can be assessed comprehensively and cost-effectively by a step-wise, successive approximation procedure that adds resolution in a strategic, systematic way (Freemark *et al.* 1993).

The geographical and ecological distribution information summarized here are examples of the types of data needed for Habitat Conservation Assessments (HCAs) to plan for both

Table 2.—*Overlap of priority species in the Midwest with other regions of North America. See text for methods used to identify priority species*

Species	NW	SW	NE	SE
Acadian flycatcher				X
Baird's sparrow	X			
Bay-breasted warbler	X		X	
Bell's vireo		X		
Black-billed cuckoo	X		X	
Black-throated blue warbler			X	
Blackburnian warbler			X	
Blue-winged warbler			X	X
Bobolink	X		X	
Burrowing Owl	X	X		
Canada warbler	X		X	
Cape May warbler	X		X	
Cassin's sparrow		X		
Cerulean warbler			X	
Chestnut-collared longspur	X			
Chestnut-sided warbler			X	
Clay-colored sparrow	X			
Connecticut warbler	X		X	
Dickcissel	X	X		X
Ferruginous hawk	X	X		
Golden-winged warbler			X	
Grasshopper sparrow	X	X	X	X
Gray-cheeked thrush	X		X	
Great crested flycatcher			X	X
Kirtland's warbler			X	
Lark bunting	X	X		
Loggerhead Shrike	X	X	X	X
Long-billed curlew	X	X		
Louisiana waterthrush			X	X
MacGillivray's warbler	X	X		
McCown's longspur	X	X		
Mississippi kite		X		X
Mountain plover	X	X		
Mourning warbler	X		X	
Nashville warbler	X	X	X	
Olive-sided flycatcher	X		X	
Painted bunting		X		
Philadelphia vireo	X		X	
Prairie warbler			X	X
Prothonotary warbler				X
Sedge wren	X		X	X
Sprague's pipit	X			
Swainson's warbler				X
Upland sandpiper	X	X	X	
Wood thrush			X	X
Worm-eating warbler			X	X
Yellow-billed cuckoo	X	X	X	X

viable species populations and ecologically effective populations (e.g., Connor 1988). Often, holistic management objectives require re-alignment of conventional approaches, including simultaneous planning for ecosystems as different as wetlands and grasslands. For example, at continental to landscape scales, conservation and management of wetlands, barrens and grasslands are often conveniently considered together. Not only do wetlands and grasslands or barrens frequently occur in the same landscapes, but they are often affected by agriculture at the same time and place. Prairie-wetland complexes may contain extreme moisture gradients, with overlapping bird species distributions along this and other gradients, which is a more general and dynamic way of classifying and assessing avian distribution. Single and multiple gradients such as this can help explain species distribution and abundance at scales from continental to local by accommodating variability within Ecological Units or vegetation zones.

At regional scales, the area and distribution of ecosystems (Howe *et al.* 1996) and their trends in vegetation, succession, land use, and landscape structure should be considered (Thompson *et al.* 1993). Geographic locations of productive sources should be emphasized as much as places where species are rare. It is critical to match landscape and local prescriptions to land capabilities and ownership objectives in a complementary manner. Much of the difference between Ecosystem Management and older concepts of multiple use involves planning in space and time rather than attempting to do all things in too small an area, or on lands with inappropriate capabilities. Thus, what we choose NOT to do in an ecosystem or ownership category may be as important as what we choose to do.

At subregional and human landscape scales, major considerations include distribution of forest types, forest age classes, and non-forest habitats within the context of ecosystem capabilities, disturbance frequency and pattern, and successional pathways (Thompson *et al.* 1993). At the level of administrative units within an ownership, the distribution of conditions in space and time becomes finer and stand-specific. Considerations include age classes of ecosystems since harvest or disturbance, as well as the mix and distribution of stand conditions such as vegetative

composition, vertical and horizontal structure of life forms, and special features such as dead and down material. At the stand level, silvicultural and rangeland prescriptions are chosen to achieve appropriate conditions for present and future landscape conditions within and across management units.

Conditions and cultural techniques can be chosen to emphasize, where appropriate, area-sensitive birds, cavity-nesters, canopy gleaners, understory gleaners, ground-foraging birds, or early succession species. In the past, coarse-filter approaches to landscape composition and structure have been used to try to provide for most species needs by creating a variety of ecosystems and conditions (e.g., Hunter *et al.* 1993, Hunter 1990, Crow *et al.* 1994). Matching species (and other resource objectives) to geographic and ecological distributions at broad scales is the first step to a finer filter for biodiversity and other more traditional human values for which we manage. Subsequent assessments at subregional and landscape scales for birds, other wildlife and plants, commodities, and other resource values will provide the necessary context for citizens, managers, and decision-makers to assess most cumulative and indirect effects in a more direct and reliable way.

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Appendix 1.—Neotropical migratory birds that occur in physiographic regions in Midwestern North America. Species are ranked by levels of decreasing management concern based on the Partners in Flight species prioritization scheme. Physiographic level scores were adjusted to reflect the Midwestern region of North America (see text for methods). Population trends are calculated from Breeding Bird Survey data for the period 1966-1994. Habitats are commonly used breeding habitats in the Midwest (see text for methods).

Rank	Species	Type1	PIF Scores2								Popn. trend3		Habitats4		
			No.	AB	TB	TW	BD	WD	IA	TR	Prior.	Trend	Signif.			
1	Kirtland's warbler	A	2	5.0	5.0	5.0	5.0	5.0	5.0	3.0	33.0	.		UCON	SHSA	
2	Baird's sparrow	A	4	4.0	4.5	4.0	4.5	4.0	5.0	3.8	29.8	-0.9		GRAS		
3	Mountain plover	A	2	4.0	5.0	3.0	5.0	4.0	5.0	3.0	29.0	-2.9	***	GRAS		
4	McCown's longspur	B	4	3.0	4.8	4.0	4.8	4.0	5.0	2.5	28.0	3.6		GRAS		
5	Chestnut-collared longspur	B	5	3.0	4.6	4.0	4.0	4.0	5.0	3.0	27.6	-0.3		GRAS		
6	Chestnut-sided warbler	A	10	3.0	4.0	4.0	3.0	5.0	5.0	2.7	26.7	-0.4		SHSA		
7	Golden-winged warbler	A	5	4.0	4.0	4.0	4.0	4.0	3.0	3.6	26.6	-3.6	***	SHSA	UDEC	
8	Sprague's pipit	B	4	3.5	3.0	3.0	4.0	3.5	5.0	3.8	25.8	-0.1		GRAS		
9	Cassin's sparrow	B	4	4.0	4.0	3.0	4.0	4.0	3.0	3.5	25.5	-2.4	***	SHSA	GRAS	
10	Connecticut warbler	A	4	4.0	3.0	3.0	4.0	4.0	5.0	2.5	25.5	3.0		LCON	SHWE	
11	Cerulean warbler	A	10	4.0	4.0	4.0	4.0	4.0	2.0	3.3	25.3	-4.3	***	LDEC	UDEC	
12	Black-billed cuckoo	A	21	3.0	3.0	3.8	3.0	4.0	5.0	3.3	25.1	-1.2	**	SHSA	SAVA	UDEC
13	Swainson's warbler	A	1	4.0	4.0	4.0	4.0	5.0	1.0	3.0	25.0	1.6		SHWE	LDEC	
14	Long-billed curlew	A	7	3.0	3.6	3.0	4.0	4.0	4.0	3.3	24.9	-1.3		GRAS		
15	Blackburnian warbler	A	6	3.0	4.0	4.0	3.0	4.0	4.0	2.8	24.8	0.6		UCON	LCON	
16	Sedge wren	B	16	4.0	4.0	3.0	3.0	3.8	4.0	3.1	24.8	1.7	*	SHWE	AQUA	GRAS
17	Philadelphia vireo	A	4	4.0	3.0	4.0	3.0	5.0	3.0	2.5	24.5	4.2		SHSA	SHWE	SAVA
18	Clay-colored sparrow	A	14	3.0	3.7	2.9	3.1	3.1	5.0	3.4	24.2	-1.3		SHSA	SAVA	
19	Bay-breasted warbler	A	3	2.0	2.0	4.0	3.0	5.0	5.0	3.0	24.0	-0.2		UCON	LCON	
20	Black-throated blue warbler	A	5	3.0	4.0	4.0	3.0	4.0	3.0	3.0	24.0	0.6		UDEC	LDEC	
21	Lark bunting	A	9	2.0	4.0	3.0	3.4	3.0	5.0	3.6	24.0	-0.7		GRAS		
22	Mississippi kite	A	6	3.0	3.0	3.0	3.0	4.0	5.0	3.0	24.0	0.1		UDEC	LDEC	SAVA
23	Bobolink	A	18	2.0	4.0	3.0	3.0	3.2	5.0	3.8	23.9	-1.8	***	GRAS	AGRI	
24	Ferruginous hawk	B	7	4.0	4.0	3.0	3.0	3.0	4.0	2.7	23.7	4.7	**	GRAS		
25	Bell's vireo	A	13	3.0	4.2	3.2	3.0	4.0	3.0	3.4	23.7	-3.0	**	SHWE	SHSA	
26	Dickcissel	A	19	2.0	4.0	2.8	3.0	4.0	4.0	3.8	23.6	-1.6	***	GRAS	AGRI	
27	Yellow-billed cuckoo	A	20	3.0	3.4	3.8	2.0	3.0	5.0	3.3	23.5	-1.4	***	UDEC	LDEC	

Appendix 1. Continued.

Rank	Species	Type1	PIF Scores2									Popn. trend3		Habitats4			
			No.	AB	TB	TW	BD	WD	IA	TR	Prior.	Trend	Signif.				
28	Mourning warbler	A	9	3.0	3.0	3.0	3.0	4.0	5.0	2.4	23.4	1.3	*	SHSA	SHWE	UDEC	UCON
29	Gray-cheeked thrush	A	3	3.0	2.3	3.0	3.0	4.0	5.0	3.0	23.3			UCON	LCON		
30	Wood thrush	A	16	2.0	4.0	4.0	3.0	4.0	3.0	3.3	23.3	-1.7	***	LDEC	UDEC		
31	Painted bunting	A	4	3.0	4.0	3.0	4.0	3.0	3.0	3.3	23.3	-3.3	***	SHSA			
32	Grasshopper sparrow	A	20	2.2	4.0	2.8	2.0	3.0	5.0	4.2	23.2	-3.7	***	GRAS	AGRI		
33	Canada warbler	A	6	2.0	4.0	4.0	3.0	4.0	3.0	3.2	23.2	-3.1	**	UCON	UDEC	SHWE	
34	Louisiana waterthrush	A	9	4.0	4.0	4.0	3.0	3.0	2.0	3.1	23.1	0.3		LDEC			
35	Great crested flycatcher	A	19	2.0	3.0	4.0	3.0	4.0	4.0	3.1	23.1	-0.2		UDEC	LDEC		
36	MacGillivray's warbler	A	3	3.0	3.0	3.0	4.0	4.0	3.0	3.0	23.0	-1.0		SHWE	LCON	LDEC	SHSA
37	Worm-eating warbler	A	5	3.0	4.0	4.0	3.0	4.0	2.0	3.0	23.0	1.0		UDEC	LDEC	SHSA	
38	Loggerhead shrike	B	21	3.0	4.2	4.0	2.0	3.0	3.0	3.6	22.8	-3.5	***	SAVA	SHSA	GRAS	AGRI
39	Blue-winged warbler	A	11	3.0	3.0	4.0	4.0	4.0	2.0	2.7	22.7	0.4		SHSA	SHWE	SAVA	
40	Prothonotary warbler	A	7	3.0	4.0	4.0	3.0	4.0	2.0	2.7	22.7	-1.6	**	LDEC	SHWE		
41	Cape May warbler	A	5	3.0	2.0	4.0	3.0	4.0	4.0	2.6	22.6	-7.9		UCON	LCON		
42	Nashville warbler	A	7	3.0	3.0	3.0	3.0	4.0	4.0	2.6	22.6	0.1		SHSA	UCON	LCON	
43	Olive-sided flycatcher	A	11	3.0	3.2	4.0	2.2	3.2	4.0	2.9	22.5	-4.1	***	UCON	SHSA		
44	Prairie warbler	A	11	2.0	4.0	3.0	3.0	4.0	3.0	3.5	22.5	-2.7	***	SHSA	SAVA		
45	Upland sandpiper	A	18	3.0	3.0	3.0	3.0	3.0	5.0	2.4	22.4	2.0	***	GRAS	AGRI		
46	Acadian flycatcher	A	9	2.0	3.0	4.0	3.0	4.0	3.0	3.2	22.2	0.5		LDEC	UDEC		
47	Burrowing owl	A	9	4.0	4.3	3.0	1.7	1.7	4.0	3.6	22.2	-0.5		GRAS	AGRI		
48	Ovenbird	A	19	2.0	3.2	3.2	3.0	3.0	5.0	2.7	22.2	1.2	***	UDEC	LDEC		
49	Veery	A	13	2.0	3.0	3.0	3.0	3.0	5.0	3.1	22.1	-1.1	***	LDEC	SHSA		
50	Hooded warbler	A	8	3.0	3.0	4.0	3.0	4.0	2.0	3.0	22.0	0.4		LDEC	UDEC	SHSA	
51	Lewis' woodpecker	B	3	2.0	4.0	3.0	4.0	3.0	3.0	3.0	22.0	-3.4	**	SAVA			
52	Northern parula	A	10	2.0	4.0	3.0	3.0	3.0	4.0	3.0	22.0	0.1		LDEC	LCON	UCON	
53	Gray catbird	A	21	2.0	2.8	3.6	2.0	3.0	5.0	3.5	21.9	-0.2		SHSA	SHWE		
54	Tennessee warbler	A	7	3.0	2.1	3.0	3.0	4.0	4.0	2.7	21.9	6.3		UCON	LCON	UDEC	LDEC
55	Orchard oriole	A	18	3.0	3.2	2.8	3.0	3.0	4.0	2.8	21.8	-1.9	***	SAVA	AGRI	DEVE	
56	Blackpoll warbler	A	4	2.0	2.3	3.0	3.0	4.0	5.0	2.5	21.8	-0.2		UCON	LCON	SHSA	
57	Scissor-tailed flycatcher	A	6	2.0	2.0	2.0	4.0	4.0	4.0	3.7	21.7	0.1		GRAS	AGRI	SHSA	SAVA

Appendix 1. Continued.

Rank	Species	Type1	PIF Scores2									Popn. trend3		Habitats4				
			No.	AB	TB	TW	BD	WD	IA	TR	Prior.	Trend	Signif.					
58	Rose-breasted grosbeak	A	19	2.0	3.0	2.8	3.0	3.0	5.0	2.8	21.6	0.0		UDEC	SAVA			
59	Scarlet tanager	A	14	2.0	3.0	4.0	3.0	4.0	3.0	2.6	21.6	0.2		UDEC	LDEC			
60	Yellow-throated vireo	A	14	3.0	3.0	4.0	3.0	3.0	3.0	2.5	21.5	1.1	***	LDEC	UDEC			
61	Eastern wood-pewee	A	17	2.0	2.0	3.0	3.0	4.0	4.0	3.4	21.4	-1.7	***	UDEC				
62	Kentucky warbler	A	7	2.0	3.0	3.0	3.0	4.0	3.0	3.3	21.3	-1.0	*	LDEC	UDEC	SHSA		
63	Merlin	A	10	4.0	2.4	3.0	2.0	2.0	5.0	2.8	21.2	.		UCON	LCON	GRAS	SHSA	SHWE
64	Yellow-headed blackbird	A	15	2.2	3.2	3.0	3.0	3.0	4.0	2.8	21.2	0.2		AQUA	SHWE			
65	Allen's hummingbird	A	1	2.0	3.0	3.0	5.0	4.0	1.0	3.0	21.0	-1.5		SHSA	SHWE			
66	Black-throated gray warbler	A	1	3.0	4.0	3.0	3.0	4.0	1.0	3.0	21.0	1.3		UCON	UDEC			
67	Cordilleran flycatcher	A	2	2.0	3.0	3.0	4.0	4.0	2.0	3.0	21.0	.		UCON	LCON			
68	Dusky flycatcher	A	2	2.0	3.0	3.0	4.0	4.0	2.0	3.0	21.0	3.0	*	UDEC	UCON	SHSA		
69	Hammond's flycatcher	A	1	2.0	3.0	4.0	4.0	4.0	1.0	3.0	21.0	0.7		UCON				
70	Northern goshawk	B	8	3.0	4.0	3.0	2.0	2.0	4.0	3.0	21.0	.		UCON	UDEC			
71	Prairie falcon	B	6	3.0	4.0	3.0	3.0	2.0	3.0	3.0	21.0	0.3		GRAS				
72	Red-naped sapsucker	B	20	2.0	3.0	4.0	4.0	3.0	2.0	3.0	21.0	.		UCON				
73	Sage sparrow	B	2	3.0	3.0	3.0	4.0	4.0	1.0	3.0	21.0	-0.5		SAVA	GRAS			
74	Willow flycatcher	A	12	3.0	3.7	3.0	2.3	3.0	3.0	2.8	20.8	.		SHSA	SHWE			
75	Least flycatcher	A	16	3.0	3.3	2.5	2.0	3.0	4.0	3.1	20.8	-1.6	***	UDEC	LDEC			
76	Marsh wren	B	17	2.0	4.0	4.0	2.2	1.8	4.0	2.8	20.8	2.6		SHWE	AQUA			
77	Brewer's sparrow	A	5	2.0	3.0	3.6	3.0	3.0	3.0	3.0	20.6	-3.7	***	SHSA	SAVA			
78	Black-throated green warbler	A	6	3.0	3.0	3.0	3.0	3.0	3.0	2.5	20.5	-0.2		UCON	UDEC			
79	Magnolia warbler	A	6	3.0	2.0	3.0	3.0	3.0	4.0	2.5	20.5	2.3	**	UCON	LCON	SHSA		
80	Northern harrier	B	19	4.0	4.0	4.0	1.0	1.0	3.0	3.5	20.5	-1.2	*	GRAS	SAVA	SHWE	AGRI	
81	Swainson's hawk	A	10	3.0	2.7	3.0	2.0	3.0	4.0	2.7	20.4	1.8	**	GRAS	AGRI			
82	Cassin's kingbird	A	3	3.0	3.0	2.3	3.0	4.0	2.0	3.0	20.3	-1.9		GRAS	SAVA	SHSA		
83	Peregrine falcon	A	6	4.0	4.3	4.0	1.7	1.3	2.0	3.0	20.3	.		SPEC				
84	Whip-poor-will	A	12	2.0	3.0	3.0	3.0	3.0	3.0	3.3	20.3	-1.2	*	UDEC				
85	Yellow-bellied flycatcher	A	5	2.0	2.0	4.0	3.0	4.0	3.0	2.2	20.2	0.1		UCON	SHWE			
86	Short-eared owl	B	20	4.0	4.0	4.0	1.0	1.0	3.0	3.2	20.2	1.9		GRAS	SAVA			
87	Western kingbird	A	15	2.0	1.7	2.7	3.0	4.0	4.0	2.7	20.1	0.9	***	SAVA	AGRI			

Appendix 1. Continued.

Rank	Species	Type1	PIF Scores2									Popn. trend3		Habitats4			
			No.	AB	TB	TW	BD	WD	IA	TR	Prior.	Trend	Signif.				
88	Summer tanager	A	8	2.0	3.0	3.0	3.0	3.0	3.0	3.1	20.1	-0.2		UDEC	SAVA		
89	Alder flycatcher	A	8	3.0	3.0	3.0	2.0	4.0	2.0	3.0	20.0	.		SHWE			
90	Gray kingbird	D	1	2.0	3.0	3.0	4.0	4.0	1.0	3.0	20.0	.					
91	Lark sparrow	A	17	3.0	2.8	2.8	2.0	3.0	3.0	3.4	19.9	-3.4	***	SHSA	GRAS	AGRI	
92	Red-shouldered hawk	B	11	3.0	3.0	3.0	3.0	3.0	2.0	2.9	19.9	1.6	**	LDEC	SHWE		
93	Eastern kingbird	A	22	2.0	2.0	3.0	2.0	3.0	5.0	2.9	19.9	-0.5	**	SHSA	SAVA	GRAS	AGRI
94	Purple finch	B	7	3.0	3.0	2.0	3.0	3.0	3.0	2.7	19.7	-1.0	**	UCON	SHSA	UDEC	
95	Western meadowlark	B	19	1.0	3.0	3.0	2.0	1.8	5.0	3.9	19.7	-0.6	*	GRAS	AGRI		
96	Palm warbler	A	3	3.0	2.0	2.0	3.0	3.0	4.0	2.7	19.7	.		LCON	SHWE		
97	Golden-crowned kinglet	B	8	3.0	3.0	2.0	3.0	2.0	4.0	2.5	19.5	-3.3	***	UCON	LCON		
98	Yellow-breasted chat	A	18	2.0	3.0	3.0	2.0	3.0	3.0	3.5	19.5	-0.5	*	SHSA			
99	Yellow-throated warbler	A	6	3.0	3.0	3.0	3.0	3.0	2.0	2.5	19.5	0.8		UDEC	LDEC		
100	Northern oriole	A	20	2.0	3.0	2.8	3.0	3.0	3.0	2.7	19.5	-0.4	*	SAVA	AGRI	DEVE	
101	Black-and-white warbler	A	16	2.0	4.0	2.8	2.0	2.0	4.0	2.6	19.4	-1.2	***	UDEC	LDEC		
102	Vesper sparrow	B	21	3.0	2.0	2.0	2.0	2.0	5.0	3.4	19.4	-0.9	**	SHSA	SAVA	GRAS	AGRI
103	White-throated sparrow	B	8	1.9	2.0	1.0	3.0	3.0	5.0	3.5	19.4	-1.1	**	SHSA	SHWE	LCON	
104	Mountain bluebird	B	6	2.0	3.0	3.0	3.0	2.3	3.0	3.0	19.3	.		UCON	UDEC	SHSA	
105	Swainson's thrush	A	10	3.0	3.0	3.4	2.0	2.0	3.0	2.9	19.3	-0.8	*	UCON	LCON	SHSA	
106	Wilson's warbler	A	7	3.0	2.3	2.0	2.3	3.0	4.0	2.7	19.3	-0.2		SHWE	SHSA		
107	Lazuli bunting	A	4	2.0	3.0	2.0	3.0	4.0	2.0	3.3	19.3	-0.9		SHSA	SHWE		
108	Solitary vireo	A	8	3.0	3.3	3.0	2.8	3.0	2.0	2.3	19.3	3.3	***	UCON	UDEC		
109	White-eyed vireo	A	8	2.0	3.0	3.0	3.0	3.0	2.0	3.3	19.3	0.0		SHSA	SAVA	SHWE	
110	Indigo bunting	A	21	1.0	2.0	2.0	3.0	3.0	5.0	3.2	19.2	-0.7	***	SHSA	SAVA	SHWE	
111	American redstart	A	19	2.0	2.7	3.0	2.0	2.3	4.0	3.1	19.1	-0.7		UDEC	LDEC		
112	Common poorwill	B	4	3.0	2.0	3.0	3.0	3.0	2.0	3.0	19.0	3.5		SAVA	SHSA	GRAS	
113	Green-tailed towhee	A	2	3.0	2.0	2.0	4.0	3.0	2.0	3.0	19.0	-0.3		SHSA			
114	Purple martin	A	20	2.0	3.0	3.0	2.0	3.0	3.0	3.0	19.0	0.0		AQUA	DEVE	AGRI	
115	Townsend's solitaire	B	2	3.0	3.0	3.0	3.0	3.0	1.0	3.0	19.0	1.5		UCON	SHSA		
116	Cooper's hawk	B	21	3.0	4.0	3.0	1.0	2.0	3.0	2.9	18.9	6.8	***	UCON	LCON	UDEC	LDEC
117	Sharp-shinned hawk	B	20	3.0	4.0	3.0	1.0	1.0	4.0	2.9	18.9	-0.2		UCON	UDEC		

Appendix 1. Continued.

Rank	Species	Type1	PIF Scores2									Popn. trend3		Habitats4				
			No.	AB	TB	TW	BD	WD	IA	TR	Prior.	Trend	Signif.					
118	Broad-winged hawk	A	14	3.0	3.0	3.0	2.0	2.0	3.0	2.9	18.9	0.8		UDEC	LDEC			
119	Black-headed grosbeak	A	5	2.0	3.0	2.2	3.0	4.0	2.0	2.6	18.8	0.0		UDEC	LDEC	SHSA		
120	Hermit thrush	B	9	3.0	3.0	3.0	2.0	2.0	3.0	2.8	18.8	1.7	***	UCON	LCON	SHSA	SHWE	
121	Chuck-will's-widow	A	8	2.0	3.0	3.0	3.0	3.0	2.0	2.8	18.8	-1.4	***	UDEC	UCON			
122	Osprey	B	11	3.0	4.0	3.0	1.0	1.0	4.0	2.7	18.7	6.8	***	AQUA	LDEC	LCON		
123	Chimney swift	A	21	1.0	2.6	2.8	2.0	3.0	4.0	3.2	18.7	-0.9	***	SPEC				
124	Sage thrasher	B	2	2.0	2.0	2.0	4.0	3.0	3.0	2.5	18.5	0.6		SHSA				
125	Bank swallow	A	21	3.0	2.2	2.0	1.0	3.0	4.0	3.2	18.4	-1.4		AQUA				
126	Western tanager	A	3	2.0	3.0	2.3	3.0	3.0	2.0	3.0	18.3	0.0		UCON	LCON	UDEC		
127	Rock wren	B	5	3.0	2.0	2.0	2.8	2.2	3.0	3.2	18.2	-1.0		SPEC				
128	Blue grosbeak	A	12	3.0	2.2	2.0	2.0	3.0	3.0	2.9	18.1	1.5	***	SHSA	SAVA	SHWE	AGRI	
129	American pipit	B	3	2.0	2.0	3.0	3.0	2.0	3.0	3.0	18.0	.		GRAS				
130	Black-throated sparrow	B	1	3.0	2.0	3.0	3.0	3.0	1.0	3.0	18.0	-3.9	**	GRAS				
131	Northern waterthrush	A	9	2.0	2.1	3.1	2.0	2.0	4.0	2.8	18.0	0.0		LDEC	SHWE			
132	Orange-crowned warbler	A	5	3.0	2.0	2.0	2.4	3.0	3.0	2.6	18.0	-1.0		SHSA	SHWE			
133	Violet-green swallow	A	4	2.0	3.0	2.0	3.0	3.0	2.0	3.0	18.0	-0.9	*	UCON	UDEC			
134	White-throated swift	A	3	3.0	2.0	2.0	3.0	3.0	2.0	3.0	18.0	-2.3		SPEC				
135	Yellow-bellied sapsucker	B	12	2.0	2.0	3.0	3.0	2.0	3.0	3.0	18.0	.		UDEC				
136	Eastern phoebe	B	21	2.0	3.0	3.0	2.0	2.0	3.0	2.9	17.9	0.9	***	SPEC				
137	Eastern bluebird	B	22	2.0	3.0	3.0	2.2	2.0	3.0	2.6	17.8	2.4	***	SAVA	AGRI	SHSA	GRAS	
138	Say's phoebe	B	8	3.0	2.0	3.0	2.0	3.0	2.0	2.8	17.8	0.8		SHSA	SAVA	GRAS	AGRI	
139	Western wood-pewee	A	9	2.0	2.0	3.0	2.0	4.0	2.0	2.7	17.7	-2.0	***	UDEC	UCON	SHSA		
140	Savannah sparrow	B	18	2.2	3.0	3.0	1.0	2.0	3.0	3.3	17.6	-1.2	***	GRAS	AGRI			
141	Swamp sparrow	B	12	2.8	1.8	1.8	2.8	2.8	3.0	2.6	17.5	1.9	***	SHWE				
142	Tree swallow	B	20	2.0	3.0	3.0	1.0	2.0	4.0	2.3	17.3	1.3	***	SAVA	SHWE	AQUA		
143	Warbling vireo	A	21	2.0	2.4	2.8	1.2	3.0	3.0	2.7	17.1	0.3		LDEC	LCON	SAVA	SHSA	
144	Black-chinned hummingbird	A	1	2.0	2.0	2.0	3.0	4.0	1.0	3.0	17.0	1.2		UDEC	LDEC			
145	Cassin's finch	B	1	2.0	3.0	2.0	3.0	2.0	2.0	3.0	17.0	0.4		UCON				
146	Golden eagle	B	5	3.0	2.0	2.0	2.0	2.0	3.0	3.0	17.0	2.1		GRAS				
147	Ruby-throated hummingbird	A	18	2.0	2.0	2.0	2.0	3.0	3.0	2.9	16.9	1.2	**	UDEC	LDEC	UCON	LCON	SHSA

Appendix 1. Continued.

Rank	Species	Type1	PIF Scores2									Popn. trend3		Habitats4			
			No.	AB	TB	TW	BD	WD	IA	TR	Prior.	Trend	Signif.				
148	Brewer's blackbird	B	16	2.0	2.0	2.0	3.0	2.0	3.0	2.9	16.9	-1.6	***	SHWE	SHSA	AGRI	LDEC
149	Blue-gray gnatcatcher	A	12	2.0	3.0	2.0	2.0	3.0	2.0	2.8	16.8	1.2	**	UDEC	LDEC	UCON	SHSA
150	Northern rough-winged swallow	A	21	3.0	2.2	2.0	1.0	3.0	3.0	2.4	16.6	-0.5		SAVA	SHWE	GRAS	
151	Common nighthawk	A	22	2.0	3.0	2.0	1.0	1.8	4.0	2.8	16.6	-0.9		SAVA	GRAS	AGRI	DEVE
152	Lincoln's sparrow	A	7	2.0	2.0	2.0	2.3	2.0	4.0	2.3	16.6	1.6		SHWE	SHSA		
153	Fox sparrow	B	4	3.0	2.0	2.0	2.0	2.0	3.0	2.5	16.5	0.8		LDEC	LCON	SHWE	
154	Rufous-sided towhee	B	20	1.0	3.0	2.0	2.0	2.0	3.0	3.5	16.5	-1.9	***	SHSA	SAVA		
155	Cedar waxwing	B	21	2.0	2.0	2.0	2.0	2.0	4.0	2.3	16.3	1.6	***	SHSA	SHWE	DEVE	UCON
156	Eastern meadowlark	B	16	1.0	3.0	3.0	1.0	1.0	3.0	4.3	16.3	-2.6	***	GRAS	AGRI		
157	Ruby-crowned kinglet	B	8	2.0	2.0	3.0	2.0	2.0	2.0	3.3	16.3	3.7		UCON	LCON	SHSA	
158	Ash-throated flycatcher	A	1	2.0	2.0	2.0	3.0	3.0	1.0	3.0	16.0	1.9	**	LDEC			
159	Lesser goldfinch	B	1	2.0	2.0	2.0	3.0	3.0	1.0	3.0	16.0	-2.1	**	SAVA	SHSA	AGRI	DEVE
160	Cliff swallow	A	22	2.0	2.2	2.0	1.0	3.0	3.0	2.7	16.0	0.8	*	SPEC			
161	Red-eyed vireo	A	22	1.0	2.2	2.0	2.0	3.0	3.0	2.7	16.0	1.0	***	UDEC	LDEC		
162	Long-eared owl	B	17	3.0	2.0	3.0	1.0	1.0	2.0	3.0	15.0	.		UCON	UDEC	AGRI	
163	Vermilion flycatcher	A	1	3.0	3.0	3.0	1.0	1.0	1.0	3.0	15.0	-2.9	*	LDEC	SHSA	SHWE	
164	White-crowned sparrow	B	5	1.6	2.0	1.0	2.0	2.0	3.0	3.0	14.6	-2.6	***	SHSA	SAVA		
165	Common yellowthroat	A	21	1.0	2.4	2.0	1.0	2.0	3.0	3.0	14.4	-0.2		SHSA	SHWE		
166	Belted kingfisher	B	22	2.0	2.0	2.0	1.0	1.0	3.0	3.2	14.2	-1.3	***	AQUA			
167	Chipping sparrow	A	22	1.0	2.2	2.0	1.0	2.0	3.0	2.8	14.0	-0.1		SAVA	SHSA		
168	Yellow warbler	A	22	1.0	3.2	2.0	1.0	1.0	3.0	2.7	14.0	0.6	**	SHWE			
169	American goldfinch	B	20	1.0	2.0	1.0	1.9	1.9	3.0	3.1	13.8	-1.1	***	SHSA	AGRI		
170	Northern mockingbird	B	17	1.9	1.0	1.0	2.0	2.0	2.0	3.5	13.4	-1.0	***	SHSA	DEVE	AGRI	
171	Brown creeper	B	11	2.0	2.0	2.0	1.0	1.0	2.0	3.1	13.1	-1.0		UDEC	LDEC		
172	Song sparrow	B	21	1.0	3.0	1.0	1.0	1.0	3.0	3.0	13.0	-0.2		SHSA	SHWE		
173	Brown-headed cowbird	B	21	1.0	1.0	1.0	1.0	2.0	3.0	3.5	12.5	-0.7	***	AGRI	GRAS	SAVA	
174	Red-winged blackbird	B	22	1.0	2.0	1.0	1.0	1.0	3.0	3.4	12.4	-1.2	***	SHWE	GRAS		
175	American kestrel	B	22	1.0	1.8	2.0	1.0	1.0	3.0	2.5	12.3	0.2		AGRI	SAVA		
176	Yellow-rumped warbler	B	11	1.0	2.0	1.0	1.0	1.3	3.0	3.0	12.3	3.7	***	UCON	LCON		
177	Northern flicker	B	22	1.0	1.0	1.0	1.0	1.0	3.0	4.1	12.1	.		SAVA	DEVE		

Appendix 1. Continued.

Rank	Species	Type1	PIF Scores2									Popn. trend3		Habitats4			
			No.	AB	TB	TW	BD	WD	IA	TR	Prior.	Trend	Signif.				
178	Turkey vulture	B	18	1.0	2.0	2.0	1.0	1.0	3.0	2.1	12.1	0.9	*	UDEC	LDEC	AGRI	
179	Dark-eyed junco	B	9	1.0	2.0	1.0	1.0	1.0	3.0	2.9	11.9	-0.6		UCON	SHSA		
180	Pine siskin	B	12	1.0	1.0	1.0	2.0	1.0	3.0	2.8	11.8	-2.5	*	UCON	LCON	SHSA	
181	Barn swallow	A	22	1.0	1.0	2.0	1.0	1.0	3.0	2.6	11.6	0.3	*	AGRI	GRAS	DEVE	
182	Horned lark	B	22	1.0	1.0	1.0	1.0	1.0	3.0	3.3	11.3	-0.8	**	GRAS	AGRI		
183	Killdeer	B	22	1.0	1.0	1.0	1.0	1.0	3.0	2.6	10.6	0.1		GRAS	AGRI	DEVE	
184	Mourning dove	B	21	1.0	1.0	1.0	1.0	1.0	3.0	2.5	10.5	-0.2		SAVA	GRAS	AGRI	SHSA
185	Red-tailed hawk	B	22	1.0	1.0	1.2	1.0	1.0	3.0	2.3	10.5	3.2	***	UDEC	AGRI	GRAS	SHSA
186	House wren	A	21	1.0	1.0	1.0	1.0	1.0	3.0	2.1	10.1	1.4	***	UDEC	LDEC	DEVE	
187	American robin	B	22	1.0	1.0	1.0	1.0	1.0	3.0	1.7	9.7	0.9	***	DEVE	AGRI	UDEC	

[1]A = species winters primarily south of the U.S.; B = species winters primarily in the U.S. but a portion of population winters south of the U.S.

[2]Partners in Flight species priority scores. No. = number of physiographic regions species was included in; AB = global abundance; TB = threats on breeding grounds; TW = threats on wintering grounds; BD = breeding distribution; WD = wintering distribution; IA = importance of area; TR = 26-year population trend; Prior. = species priority score. Score of 1 for all criteria indicates least concern, 5 indicates greatest concern; see text and references for details.

[3]Trend is percent annual change for period 1966-1994. Significance values are: ***, $p<0.01$; **$p<0.05$; *, $p<0.1$. Estimates based on Breeding Bird Survey (information provided by Bruce G. Peterjohn, National Biological Service, Patuxent Environmental Science Center, Laurel, Maryland).

[4]Breeding habits. AQUA = aquatic; AGRI = agriculture, DEVE = developed; GRAS = grassland; SHSA = shrub-sapling; SHWE = shrub-wetland; SAVA = savanna; UDEC = upland deciduous forest; UCON = upland conifer forest; LDEC = lowland deciduous forest; LCON = lowland conifer forest; see text for habitat descriptions.