

Population Trends and Management Opportunities for Neotropical Migrants

Chandler S. Robbins¹, John R. Sauer¹, and Bruce G. Peterjohn¹

Abstract — The Breeding Bird Survey shows that certain Neotropical migrant songbird populations have been declining over the past 26 years. Among them are forest birds that require extensive forest on the breeding grounds and also forested habitats on tropical wintering grounds. Other species have shown significant declines only since the early 1980's. Birds with broader habitat tolerance, such as those that winter commonly in agricultural and early-successional habitats as well as primary forest, show fewer consistent declines. Several grassland species have also been declining for more than two decades. Populations of many other Neotropical migrants have been stable or increasing over these periods. Examples of 26-year population trends are given. A dozen recommendations are given for managing nesting habitat for Neotropical migrants.

WHAT DO WE KNOW ABOUT POPULATION TRENDS?

Certain species of neotropical migrant songbirds have been decreasing in abundance throughout their breeding range for prolonged periods and are a cause of immediate concern. Examples of continuing declines from 26 years of Breeding Bird Survey (BBS) data are Olive-sided Flycatcher, Cerulean Warbler, Kentucky Warbler, Lark Bunting, Dickcissel, Grasshopper Sparrow (fig. 1); Rock Wren, Prairie Warbler, Painted Bunting, and Black-throated Sparrow (fig. 2). Many other species not declining in the 1960's and 1970's show strong declines during 1982-1991. Trend graphs are presented for two of these species, Wood Thrush and Bobolink (fig. 2). Other examples are Yellow-billed Cuckoo, Ruby-crowned Kinglet, Veery, Chestnut-sided Warbler, Macgillivray's Warbler, Rose-breasted Grosbeak, and Savannah Sparrow. Many additional species are decreasing in portions of their breeding range where their nesting habitats have been disappearing rapidly. Examples are Lark Sparrow in the west, White-eyed Vireo and Hooded Warbler in the central states, Canada Warbler in Canada, and Yellow-breasted Chat and Vesper Sparrow in the east. There are also many neotropical migrants whose populations have been increasing during the period 1966-1991. Examples are Ash-throated Flycatcher, Western Kingbird, Solitary Vireo,

Magnolia Warbler, Blue Grosbeak, and Lincoln's Sparrow (fig. 3). Continental populations of the majority of neotropical migrants have remained stable or increased during the 26-year period, but with regional population declines for many species.

Discussion of trends in species other than neotropical migrants is beyond the scope of this paper, but important negative trends have been noted for grassland and early successional species at continental as well as regional scales (Robbins *et al.* 1986, Hagan *et al.* 1992, Hussell *et al.* 1992, James *et al.* 1992, Witham and Hunter 1992).

THE BREEDING BIRD SURVEY

These latest population trends are from unpublished BBS analyses. BBS is a cooperative monitoring program administered by the U.S. and Canadian Wildlife Services. This annual survey consists of a network of randomly distributed roadside routes, each with 50 3-minute stops at 0.8 km (half mile) intervals along secondary roads (Robbins *et al.* 1986). Participants are almost entirely experienced volunteers, hand-selected by state and provincial coordinators. At present more than 2,200 routes, representing more than 110,000 point counts, are run each year. The resulting records, for more than a million birds per year, go through intensive editing procedures before being added to the data bank. Sophisticated analysis programs compensate for density of coverage and changing observers on a route (Geissler and Sauer 1990, Sauer and Geissler 1990). Estimates of

¹ U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Maryland, U.S.A. 20708-4015.

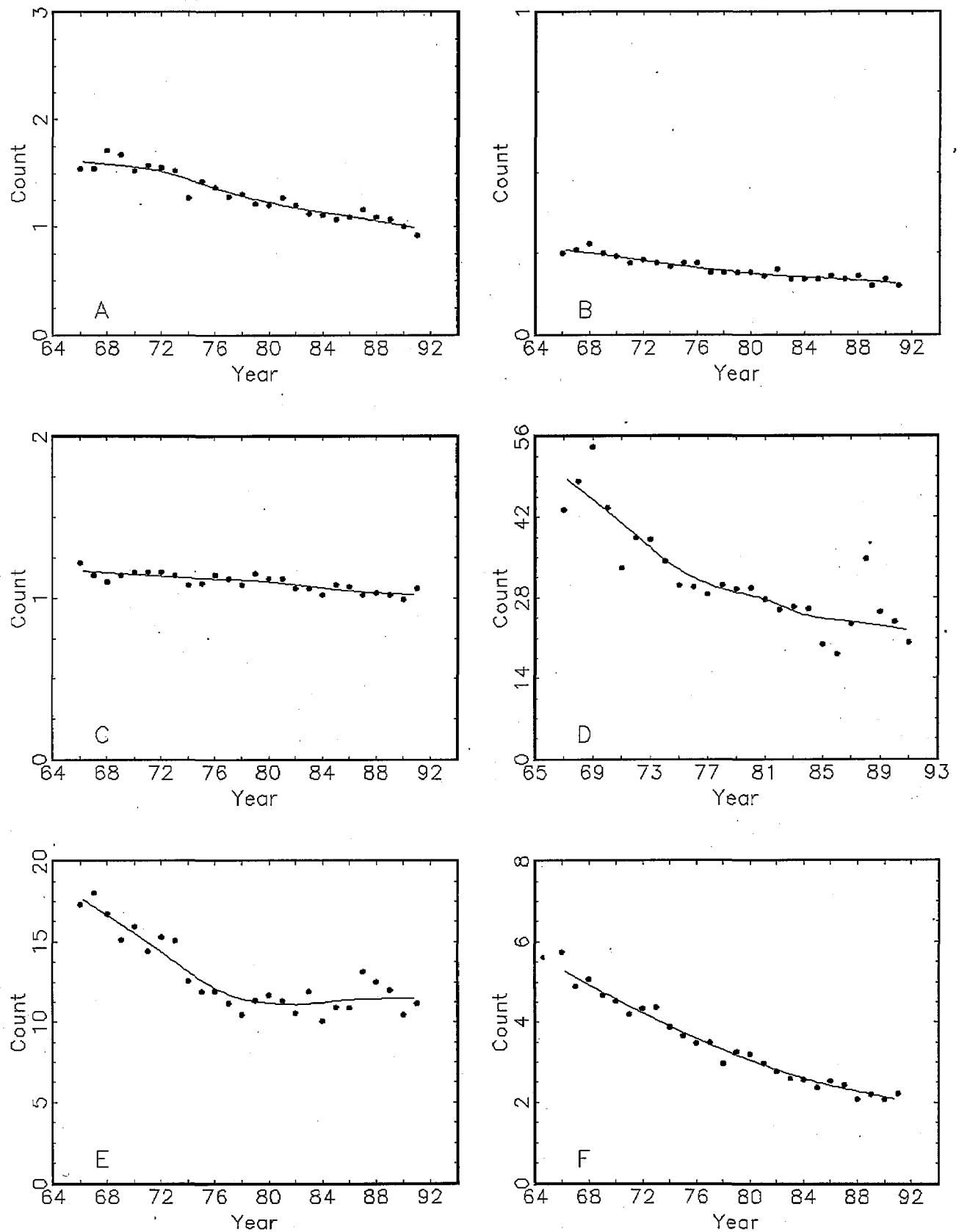


Figure 1. — Examples of long-term continental declines in three woodland (A, B, C) and three grassland species (D, E, F). A - Olive-sided Flycatcher, B -Cerulean Warbler, C - Kentucky Warbler; D - Lark Bunting, E - Dickcissel, F - Grasshopper Sparrow.

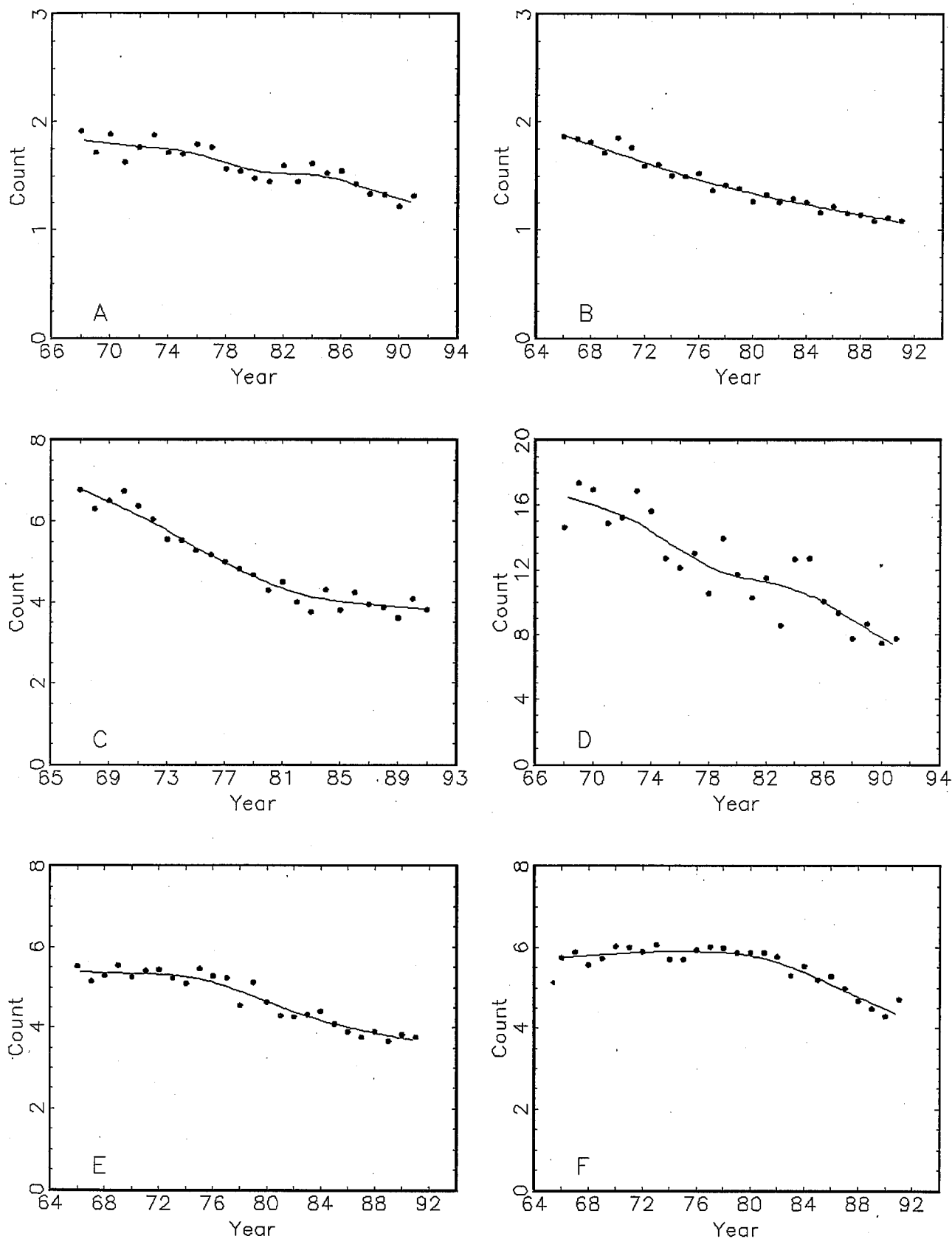


Figure 2. — Examples of long-term continental declines in four brushland and early second-growth species (A, B, C, D), representing four different portions of the continent, and short-term declines of a woodland (E) and a grassland species (F) whose populations were stable until the 1980's. A - Rock Wren, B - Prairie Warbler, C - Painted Bunting, D - Black-throated Sparrow; E - Wood Thrush, F - Bobolink.

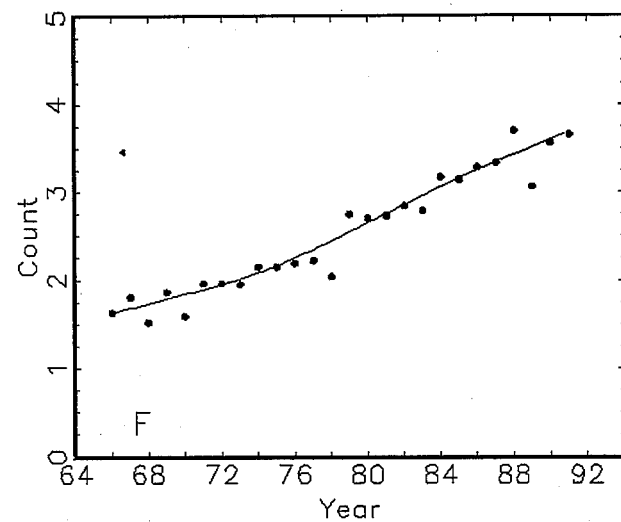
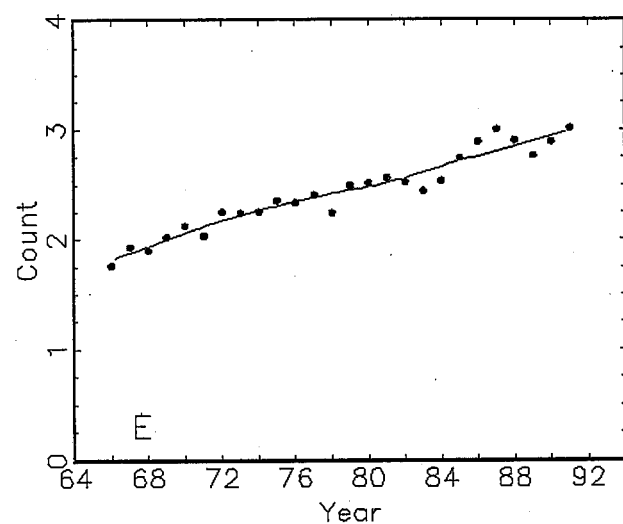
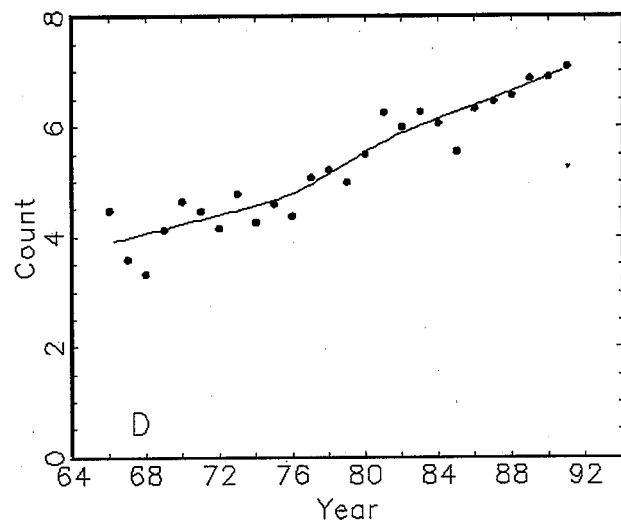
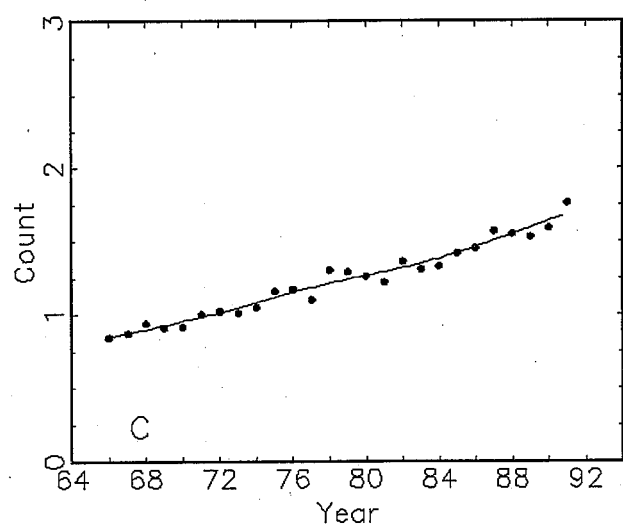
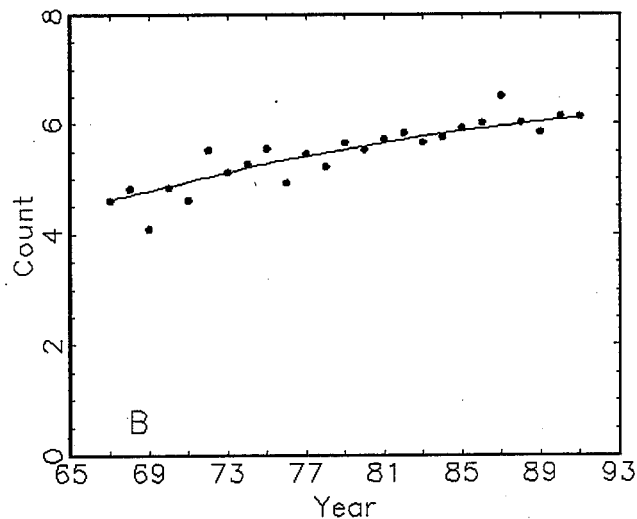
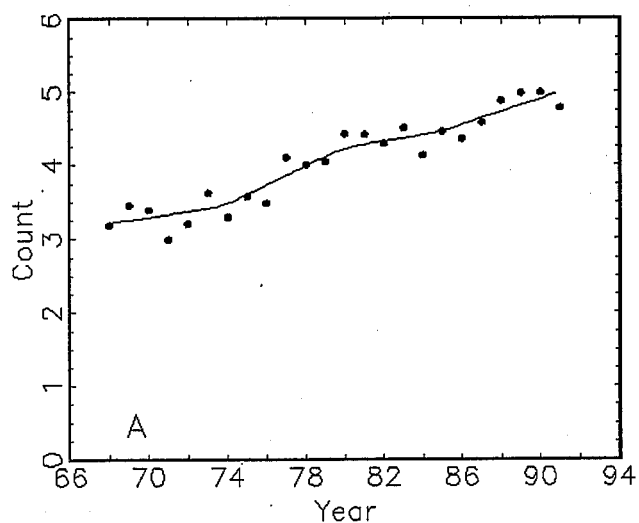


Figure 3.—Examples of long-term continental increases in six species of forest, field, or brush-nesting birds, representing all parts of North America south of the tundra. A - Ash-throated Flycatcher, B - Western Kingbird, C - Solitary Vireo, D - Magnolia Warbler, E - Blue Grosbeak, F - Lincoln's Sparrow.

population change, together with statistical probabilities, are generated by species for each state, province, physiographic region, major region of the continent, and the entire continent.

BBS adequately monitors 204 species of North American birds that have a mean abundance of more than one bird per route and a sample size such that the degrees of freedom (number of routes on which the species is recorded minus the number of state-strata units) exceeds 14. For these species a change of 3%/year over a 25-year period can be estimated. This survey has its limitations, however. Rare birds and birds of locally distributed habitats poorly sampled by roads (e.g., mountain tops and wetlands) are undersampled. Birds that breed primarily north of the road system in Canada (such as ptarmigans, jaegers, and shorebirds) or south of the U.S. border (such as trogons, becardes, and tropical raptors and hummingbirds) and birds most active at night and at dusk (rails, owls, goatsuckers) are also undersampled. Habitat changes along roadsides may not be representative of the entire landscape, so changes in some bird populations may be exaggerated on the survey. On the other hand, effects of extensive clearcutting in the west are underestimated if an amenity strip of undisturbed forest is retained along roadsides.

Although survey procedures have not changed during the 26 years, analysis techniques and coverage are still being improved (Sauer *et al.* unpubl. data, Peterjohn *et al.* 19—). From the beginning, routes have been grouped by physiographic regions within states and provinces, and weighted according to the area they represent. Formerly, only routes run in consecutive years were included in the analyses, but now all routes covered at least two years by the same observer are analyzed. No two observers are identical in knowledge and identification skills, necessitating use of observer covariables in data analysis (Sauer *et al.* unpubl. data).

Even when observers are not changed, bias is likely for some species. Observers' acuity increases with experience. This positive bias, though slight, is detectible when comparing first and second years a new observer runs a route. Increased familiarity with a route may also result in higher counts, though this may be partially offset by a tendency for increasing disturbance from traffic over a period of years. After about 50 years of age, an observer's ability to hear distant high-pitched songs may decrease gradually. Hearing aids can compensate in part for loss of hearing. Unfortunately, most hearing aids are designed for assisting with comprehension of speech rather than amplifying higher frequencies. Even some hearing aids with special "bird circuits" do not live up to claims to amplify sounds higher than 6 kHz. Thus birds with high-pitched songs such as waxwings, gnatcatchers, several spruce forest warblers, and Grasshopper Sparrows, cannot be heard by most observers over 60 years of age unless birds are close at hand. In actual practice, this is only a minor problem on BBS routes as the proportion of observers unable to hear these few species is very small; the Cape May Warbler at 8-10 kHz and Blue-gray Gnatcatcher at 4-7 kHz are among the species reported as increasing. See Robbins *et al.* (1983) and Bondesen (1977) for frequency ranges of songs of North American birds.

WHY ARE SOME NEOTROPICAL MIGRANTS DECLINING WHILE OTHERS ARE NOT?

Although BBS detects population changes, it does not provide reasons that some species decline while others increase. It is up to biologists to provide hypotheses based on land-use changes on breeding and wintering grounds, increased predation and nest parasitism, weather conditions (especially extreme conditions), and environmental conditions during migration periods. If these hypotheses are tested to determine whether future changes can be predicted accurately, it may be possible to explain some observed changes. Effects of severe weather on breeding grounds are easy to document (Robbins *et al.* 1986). On the other hand, land-use changes usually occur so gradually that dramatic effects on bird populations seldom occur on a continental scale. Nesting and wintering habitats are being lost at the same time cowbirds are expanding their ranges, and migration casualties are increasing, making it difficult to determine from a breeding season survey whether the greatest stress occurs in the U.S. and Canada or in the tropics. Nearly all tropical American countries are losing rain forests, and no part of Latin America has been identified as showing greater declines of migrants than another, based on wintering ranges. In the U.S., however, bird population declines are more pronounced in eastern states than farther west.

In comparing species characteristics in the first two paragraphs, a few hypotheses begin to emerge. Among declining species are Wood Thrush and Kentucky Warbler, both of which need extensive forest on breeding grounds and are restricted largely in winter to mature rain forest in Latin America, where they feed on the ground. The Magnolia Warbler, however, an increasing species, nests in regenerating forest and winters commonly in citrus groves and other agricultural habitats as well as in primary forest. Common birds of grassland habitats may be in as much trouble as forest birds, though they have received less attention. Among species in trouble are the Bobolink, Dickcissel, and Vesper and Grasshopper Sparrows. We are still in the early stages of isolating specific factors that control populations of the many neotropical migrants, but we can make several recommendations for reducing pressures on these birds.

EDUCATION AND MANAGEMENT RECOMMENDATIONS

Stimulate Public Awareness of the Problem

We must stimulate public awareness of and grass roots interest in the neotropical migrant problem throughout school systems and through the media, both in North America and in the tropics. Literature and training programs are needed for land managers, together with mandates for appropriate action. The Chesapeake Bay Critical Area legislation could be used as an

example of long-range land-use planning. There is also a continuing need to promote natural history education and ecotourism in tropical countries.

Improve Size, Shape, and Connectivity of Forest Habitats

Much can be done to improve forest habitats for neotropical migrants (Robbins 1979, 1991, Harris 1984, Hunter 1990). For example, land managers should keep forests in large blocks with minimum edge, maximize the interior portion of the forest (that portion farther than 100 meters from edge), minimize isolation from other forests, and promote connecting wooded corridors.

Promote Diversity of Microhabitats

A high diversity of bird life within a forest requires a high diversity of microhabitats with green vegetation at all heights. A grazed or heavily browsed forest, for example, lacks the critical ground layer of vegetation on which so many birds depend for feeding and nesting. An even-aged forest lacks the natural diversity of an uneven-aged forest.

Protect Against Exotics

Many native species of shrubs and trees cannot compete with an invasion of exotic species.

Cherish Old-growth Forest

Preservation of even small tracts of old-growth forest helps promote diversity by providing habitats not otherwise present. Where old-growth forest does not exist at present, it can be created through long-range planning.

Cluster Snags Near the Forest Edge

Dead trees are important to many species of birds and mammals for nesting sites, perches, and feeding opportunities. However, dead trees are also used as perches by cowbirds searching for songbird nests to parasitize. Many land managers are retaining dead trees, often at some prescribed rate of two or three per acre. We believe it would be more appropriate to leave dead trees in clusters, preferably close to forest edge, rather than scattered throughout the forest interior, because neotropical migrants are most heavily impacted by cowbird parasitism.

Collaborate With Neighbors

Land owners can collaborate with neighbors and community groups in maintaining the maximum amount of forest interior, in promoting wooded corridors, and pushing for tax incentives for leaving land forested.

Reduce Mowing Frequency at Nesting Season Peak

For field-nesting birds, managers can reduce mowing frequency at the peak of nesting season and increase grassland area that is more than 100 meters from other habitats. When economically feasible it helps to leave some fields fallow two or more successive years to provide habitat for sparrows such as Vesper, Lark, and Henslow's and for Dickcissels. As in forested habitats, it helps to favor native vegetation and to prevent overgrazing.

Provide Also for Early Successional Birds

For early successional species such as Prairie Warbler and Yellow-breasted Chat that do not nest in narrow hedgerows, extensive tracts of regenerating forest are needed. In some areas this habitat is provided by succession following clearcuts; in other places specific management may be needed.

Protect Wetland and Other Ground-nesting Species

For wetland birds it helps to protect shores of ponds and marshes from grazing so dense cover will be available for nest sites. Access should be restricted during the peak of the nesting season. In fact, for better breeding success of birds that nest on or near the ground, household pets should be restrained during at least the nesting season peak.

WHY ARE WE CONCERNED?

If long-term declines in neotropical migrants are limited to a relatively short list of species, why are we concerned?

We are concerned because changes detected to date may be symptomatic of much greater changes still to come. The trend toward more declines in the recent decade suggests a deterioration of habitat conditions. There is still time to slow declines and to make environmental changes to prevent these and other species from disappearing from larger and larger areas of our continent.

We are concerned over loss of species diversity for many reasons. Aside from moral considerations, there are compelling practical reasons for concern, many of which are summarized in Paul Kerlinger's paper in this symposium.

An intact ecosystem is of inestimable value for scientific and educational reasons. Although we know many component parts of our natural ecosystems, our knowledge of complex interactions between various parts is rudimentary. Birds are among the best understood members of the environment, yet we are ignorant of the complex cycles of food abundance on which they depend from week to week, and we are largely ignorant of their role as seed dispersers and pollinators here in North America and in the tropics.

By recognizing the problems, scientists, land use planners, foresters, farmers, and other land managers can work together to improve the landscape of this planet, not just for migratory birds, but for all of us who live here.

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