

# *Partners in Flight*



## *North American Landbird Conservation Plan*

### *Executive Summary*





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*Signed and approved by*

*United States:* Partners in Flight Council

*Canada:* Partners in Flight Canada National Working Group

*Mexico:* Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) y Comité Mexicano de la Iniciativa para la Conservación de las Aves en América del Norte (ICAAN-NABCI)



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*Front Cover: The Painted Bunting is on Partners in Flight's Continental Watch List because of troubling declines throughout its range and multiple threats, including continued trapping for the caged-bird trade in Mexico and Cuba. Photo © Tom Vezo*

*Back Cover: The Mountain Bluebird is a Stewardship Species of shrubland habitats in the Intermountain West Biome. The mullein on which this bluebird is perched is one of many invasive plant species threatening the integrity of native bird habitats. Photo © Marie Read*

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*January 2004*

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## TABLE OF CONTENTS

<i>Authors</i> .....	<i>i</i>
<i>Acknowledgments</i> .....	<i>ii</i>
<i>Executive Summary and Invitation to Action</i> .....	1
<i>Part 1. The Continental Plan</i> .....	4
Introduction.....	4
Assessing Conservation Vulnerability .....	9
Species of Continental Importance.....	14
Continental Landbird Objectives .....	23
Landbird Monitoring and Research Needs .....	27
Taking Action .....	33
<i>Part 2. Conservation Issues and Recommendations</i> .....	38
Arctic Avifaunal Biome .....	40
Northern Forest Avifaunal Biome .....	43
Pacific Avifaunal Biome.....	47
Intermountain West Avifaunal Biome.....	51
Southwest Avifaunal Biome.....	55
Prairie Avifaunal Biome.....	59
Eastern Avifaunal Biome .....	63
<i>Literature Cited</i> .....	67
<i>Appendices</i>	
Appendix A. Assessment scores and estimated population size of North American landbirds .....	69
Appendix B. Methods used to estimate population sizes and percents .....	78
Appendix C. Wetland-associated landbird Species of Continental Importance .....	83
Appendix D. Species of Continental Importance in Bird Conservation Region 69—Puerto Rico and the Virgin Islands .....	84
<i>Tables</i>	
Table 1. PIF Species of Continental Importance for the US & Canada .....	18
Table 2. Species of Continental Importance in the Arctic Avifaunal Biome .....	41
Table 3. Species of Continental Importance in the Northern Forest Avifaunal Biome.....	44
Table 4. Species of Continental Importance in the Pacific Avifaunal Biome.....	48
Table 5. Species of Continental Importance in the Intermountain West Avifaunal Biome .....	52
Table 6. Species of Continental Importance in the Southwest Avifaunal Biome .....	56
Table 7. Species of Continental Importance in the Prairie Avifaunal Biome .....	60
Table 8. Species of Continental Importance in the Eastern Avifaunal Biome.....	64

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We also deeply appreciate the contributions of all individuals who reviewed species assessment scores at various geographic scales over the past decade. Without this thorough review and evaluation from hundreds of experts, this Plan simply would not have been possible. We are especially grateful to the Rocky Mountain Bird Observatory, which has supported the database with substantial staff time over the past decade.

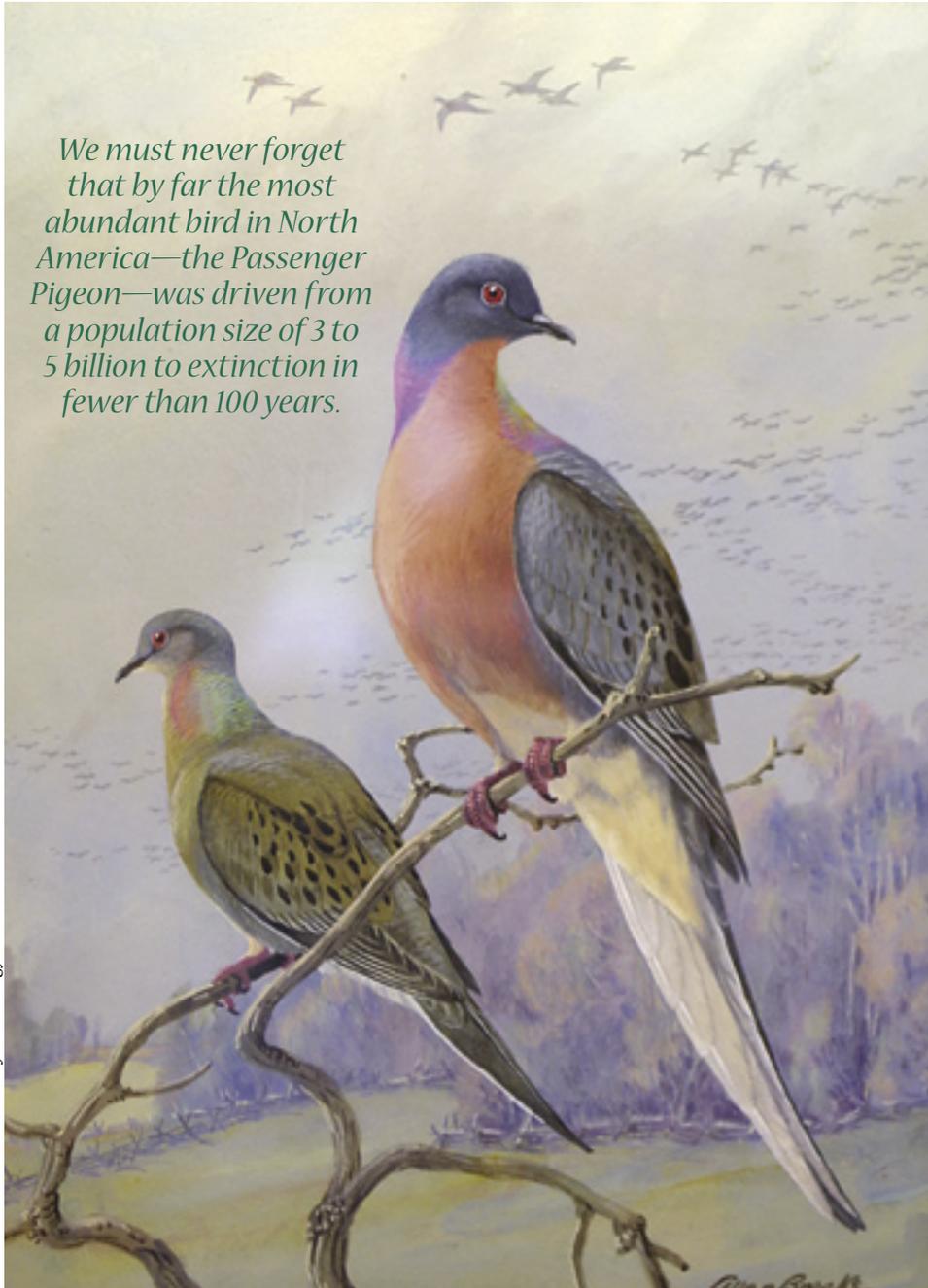


© Marie Read

*The Prairie Warbler, one of 101 species identified in this Plan on Partners in Flight's continental Watch List, breeds in disturbance-dependent habitats in eastern North America and migrates to the West Indies in winter.*

*We must never forget  
that by far the most  
abundant bird in North  
America—the Passenger  
Pigeon—was driven from  
a population size of 3 to  
5 billion to extinction in  
fewer than 100 years.*

Allan Brooks © Cornell Lab of Ornithology



## *Partners in Flight Mission*

- Helping species at risk •*
- Keeping common birds common •*
- Voluntary partnerships for birds, habitats, and people •*

# Executive Summary and Invitation to Action

Digital range map data were provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy/Migratory Bird Program, Conservation International/Center for Applied Biodiversity Science, World Wildlife Fund-US, and Environment Canada/WILDSPACE. Andrew Couturier, Bird Studies Canada, converted the maps to areas and assigned ranges to degree blocks. PIF recognizes a great debt to Chandler Robbins, who had the foresight to create the Breeding Bird Survey (BBS), and to the thousands of BBS volunteers who faithfully collect data year after year. We especially thank John Sauer for providing useful and timely analyses of BBS data that proved invaluable to our efforts. The BBS is one of the primary data sources for PIF species assessment, and it seems that everywhere we turn, we find BBS data to be of great value in both expected and novel ways.

**B**irds are the most familiar and widely enjoyed wildlife in North America. In 2001 in the U.S. alone, 46 million birders spent \$32 billion to observe, photograph or feed wildlife. Birds also fill critical roles in ecological systems. From predators to prey, and from pollinators to dispersers of seeds, the important functions of birds in our environment cannot be overstated. Equally important, birds have served as inspiration for our music, poetry, philosophy, and other fundamental components of human culture since the beginning of civilization itself. Yet, over the past several decades, populations of some once-common species have declined precipitously, and more species than ever are experiencing range reductions or becoming threatened and endangered. Although many species remain common, we must take proactive action now to preserve the full breadth of benefits that birds provide to human society.

The advent of this new millennium has seen a proliferation of conservation initiatives founded on voluntary partnerships and galvanized into action by documented declines of North American bird populations. Following the lead of the North American Waterfowl Management Plan, Partners in Flight (PIF) formed in 1990 with the collective commitment to conserve the resident, short-distance, and Neotropical migrant landbirds that occupy every major biome and habitat on the continent. Whereas the mandate to conserve waterfowl populations

was rooted in the economic importance of sport hunting, PIF's mandate is rooted in a broad constituency that represents the fastest growing and economically most important segment of outdoor nature enthusiasts in North America.

## Scope and Content of the Plan

This North American Landbird Conservation Plan (hereafter Plan) provides a continental synthesis of priorities and objectives that will guide landbird conservation actions at national and international scales. While our scope for this first version is limited to the 448 native landbirds that breed in the U.S. and Canada, full participation by our Mexican

partners will add another 450 breeding species to the next iteration of the Plan. Together with plans for shore-

*The Partners in Flight Vision:  
Populations of native birds  
will occur in their natural  
numbers, natural habitats, and  
natural geographic ranges,  
through coordinated efforts  
by scientists, government, and  
private citizens.*



Roger Eriksson © Cornell Lab of Ornithology

*One of 28 landbird species in the U.S. and Canada in need of immediate conservation attention, the rapidly declining Golden-winged Warbler is nearly extirpated from its historic range in the Northeast and Appalachian regions.*

birds, waterbirds, waterfowl, and other game birds, this document serves as the blueprint for continental habitat conservation under the North American Bird Conservation Initiative (NABCI).

As documented in this Plan, fully 100 land-bird species in Canada and the U.S. warrant inclusion on the PIF Watch List, due to a combination of threats to their habitats, declining populations, small population sizes, or limited distributions. Of these, 28 species require immediate action to protect small remaining populations, and 44 more are in need of management to reverse long-term declines. This Plan also highlights the need for stewardship of the species and landscapes characteristic of each portion of the continent, identifying 158 species (including 66 on the Watch List) that are particularly representative of large avifaunal biomes, and whose needs should be considered in conservation planning. Taken together, the pool of Watch List and Stewardship Species represents the landbirds of greatest continental importance for conservation action. Although the recommended actions may vary from region to region, no area in North America is without a conservation need for birds.

### *Research and Monitoring Needs*

A troubling finding of the Plan is that more than half the Species of Continental Importance warrant improved monitoring. Although population trend is only one of six equal assessment factors, it obviously is a key indicator. Also of concern are the many gaps in our knowledge of the causes of population declines and of the effectiveness of our conservation programs. Addressing these monitoring and research needs will be critical for prioritizing actions and evaluating their success.

### *Population Estimates and Objectives*

This Plan also presents the first estimates of total population size for all 448 landbird species and population objectives for the 192 Species of Continental Importance. These objectives are based on the extent of declines since the late 1960s and call for the reversal of those declines over the next 30 years. For some species it will be sufficient to maintain current population levels. For 29 Watch List species that have declined by more than 50 percent, however, our objective is to double current populations, possibly involving an increase in habitat for millions of



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*Breeding primarily in the Canadian Arctic and wintering in threatened grasslands of the southcentral U.S., the Smith's Longspur is a symbol of the need for international cooperation.*

birds, through active management or other appropriate actions.

Most conservation action necessary to meet these ambitious population objectives will take place at regional and local scales, within states, provinces, and territories. Issues and appropriate actions differ substantially from region to region, as detailed in existing regional and state PIF plans and as summarized in Part 2 of this plan. However, local initiatives by themselves, while essential, comprise only part of a balanced and comprehensive strategy.

### *A Critical Need for Strategic Approaches at the National and International Scales*

The following overarching threats are faced by landbirds across all of North America, and potential solutions must be sought at national and international levels:

- Significant direct loss of major bird habitats through intensified modern land-uses. Examples include massive conversion of the boreal forest through industrial forestry, permanent removal of diverse Appalachian hardwood forests via mountaintop-removal-valley-fill mining, as well as loss of western riparian, pinyon-juniper, sagebrush, California chaparral, native prairies, and barrens.

- Fragmentation and degradation of remaining habitats due to intensified agricultural practices, inappropriate grazing, pesticide use, urban and suburban development, fire suppression, and spread of exotic vegetation. Bird-friendly practices and mitigation measures to enhance habitats exist, but these need to be explicitly tied to objectives for priority bird species and combined with economic incentives to be effective at large scales on private lands. On public lands, land use plans must be based on sustaining or restoring long-term biotic integrity of ecosystems.
- Failure to identify and properly protect or manage habitat used during spring migration, fall migration, and winter. Birds are typically both concentrated and stressed during migratory periods and require quality habitats for both food and cover. Yet we know little about the location and condition of these habitats for most species. Habitat loss and other threats continue to increase for migratory species on their wintering grounds. These critical impacts occur beyond our borders and are compounded by lack of knowledge of species' distributions, habitat needs, or effects of land-use trends. Inclusion of Mexico and Caribbean nations in future updates of this plan will focus much greater attention on wintering ground issues for many species.
- A steady, widespread increase in dispersed mortality factors, not directly related to habitat, that accompany the growth of human populations and the advance of technology. Communication towers, wind power development, feral and domestic cats, and lighted buildings in migration corridors cause ever increasing direct mortality across the continent. Although some programs exist to minimize effects from these factors, no overall plan exists to address their cumulative impact on bird populations.

Collectively, these factors contribute to a high proportion of population declines and anticipated future threats among PIF Watch List Species. Addressing these issues at the highest possible administrative levels will be essential for meeting the continental population objectives outlined in this Plan. However, the required conservation and management strategies for several hundred landbird species are far too complex and variable across North America to be treated only at a continental scale. Implementation of on-the-ground bird conservation strategies must take place at state, provincial, territorial, and local levels, guided by regional and continental planning.

### *Infrastructure for Implementing the Plan*

Implementation of PIF objectives for landbirds will be led by existing national councils within each home country, cooperating to form an international PIF council that will address international issues, and advised by an international science group. While this Plan outlines the scientific foundation for landbird conservation at the continental scale, national strategic plans will outline the process for implementation within each country. Partnerships are key to this process, and PIF will work with existing and new Joint Ventures, federal, state, provincial, and territorial agencies, nongovernmental organizations, academia, and individuals to further landbird conservation.

Evaluation and reassessment are necessary components of adaptive implementation and we expect that this Plan will be revised at five-year intervals to incorporate the latest biological information. Mexican partners are rapidly completing assessment and planning for all birds, and full incorporation of conservation needs for this diverse segment of the North American avifauna is anticipated by 2005. We hope that full participation by Caribbean and other Latin American partners will proceed rapidly as well.

### *A Call for Collective Action by All Stakeholders*

This call to action is aimed at several critical audiences, whose collective action is absolutely necessary if the Plan's goals are to be met. We ask funding entities and decision-makers at all levels to allocate resources sufficient to address the major threats faced by high-priority landbirds and their habitats. We ask land managers to incorporate the needs of landbird Species of Continental Importance into existing management plans and on-the-ground conservation activities. We urge ornithologists and conservation biologists to fill in the many gaps in our knowledge of North American landbirds, throughout their annual cycles, and to work toward monitoring all bird species sufficiently well for us to detect significant population changes. Finally, all the agencies, organizations, corporations, and individuals that have joined in the PIF partnership must turn rhetoric into action on the vast lands we control and manage and through the scientific, educational, and management programs we administer. Together, our actions can halt the continuing loss of our wildlife habitats, reverse the declines of our bird species, and ensure a diverse and healthy avifauna across our entire continent far into the future.

- *Cumulative effects:* Because bird populations are affected by multiple factors, understanding the cumulative effects of these factors is critical to all future management strategies.
- *Investigating interactions among birds and other flora and fauna:* We need to understand the relative importance of disease, predation, nest parasitism, and introduced species. Effects may be magnified by land use and abiotic factors, so these should not be studied in isolation.
- *Combining research and management:* Bird conservation plans are built upon information about the ecological and environmental factors affecting bird populations that is inadequate for many species. Research should be combined with ongoing management to evaluate assumptions and contribute new information for revision and improvement of those plans (adaptive management). Combining research and management also is fundamental to testing the effects of management action on bird population response.
- *Improving monitoring:* As noted in the previous section, there is need for research on monitoring methods and analysis procedures, particularly for monitoring that takes place outside the breeding season.

Funding and institutional support are of course the foundation for ensuring that needed research is undertaken. Providing adequate resources will require cooperation and collaboration among management agencies, research facilities, industry, and nongovernmental organizations, all of which have a role to play in support of landbird research.

### *Continental Issues and Threats for Landbirds*

In many cases the general causes of bird population declines are already known and can be addressed, although additional research and monitoring are needed to pinpoint the most effective management actions for high-priority species and habitats. A majority of threats to landbird populations are those affecting many species at once, through modification or destruction of habitats. While special action may be required to meet the needs of the highest-priority species, PIF advocates conservation actions directed at habitat issues that will simultaneously benefit suites of priority species as well as other wildlife.

Conservation issues affecting Species of Continental Importance in particular regions are described in more detail in Part 2 of this Plan. Specific, on-the-

ground conservation actions at continental scales are difficult to define because variation in biogeography and conservation issues is far too great for such actions to be appropriate in all regions. Nonetheless, there are several overarching threats faced by landbirds across North America that can, at least in part, be addressed with action on the national or international stage, as summarized below.

- Habitat loss remains the paramount factor for most species. Although most native grassland was long ago converted to agriculture, loss of remnant grassland continues today. Other habitats in particular danger of significant loss in the near future include western pinyon-juniper, sagebrush, California chaparral, native prairies, and wetlands. Selective harvest of old-growth forests, and conversion of large areas of southern boreal forest to agriculture are additional examples of ongoing, large-scale habitat loss. Growth in dispersed recreation, such as off-road vehicle use, may make otherwise suitable habitat unsuitable. While a return to presettlement conditions is not feasible, land-use planning at broad scales can contribute to providing habitat sufficient to maintain healthy populations of North American landbirds throughout their native ranges.
- Habitat does not have to be lost entirely to have major effects on bird populations. Fragmentation and degradation of many habitat types is caused by most human activities, including development associated with urban and suburban growth. Such developmental sprawl is particularly rampant along the Atlantic and Gulf coasts, California, the Great Lakes region,



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*Threatened by extensive degradation of its sagebrush habitat by overgrazing and invasive plant species, the Greater Sage-Grouse has received much recent conservation attention.*

and most recently in the Rocky Mountain states. Models are available for growth that is more environmentally sensitive, but these models need to be implemented much more widely.

- Increasing intensity of agriculture continues to contribute to precipitous population declines in many species that use open, shrubland, and grassland habitats. Bird-friendly practices and mitigation measures to enhance these habitats exist (e.g., Farm Bill programs in the U.S.), but these need to be expanded to other jurisdictions, better leveraged by conservation interests, more explicitly linked to bird conservation objectives, and improved with respect to program funding and economic incentives.
- Forest-management practices over vast regions (including industrial forestry, selective planting, fire management, and management of forest pathogens) have led to changes in forest structure and composition that reduce suitability for some high-priority species, even in the face of increased overall forest cover in some regions. Needs and objectives for priority forest birds must be incorporated explicitly into forest-management plans within agencies, and incentives should be offered to encourage implementation on private lands.
- Livestock grazing has had enormous effects on native vegetation across most of the U.S. A century or more of the selective removal of palatable plant species, soil compaction, water developments, and livestock management activities have degraded ecosystems and have had significant impacts on native bird populations (Saab et al. 1995).
- Exotic invasive plants and animals are having increasingly serious direct and indirect impacts on many ecosystems, particularly in the U.S. The quantity and quality of habitat for many species is being reduced, often at alarming rates, by serious disruptions in natural processes.
- Habitat loss and degradation pose threats to bird populations not only when they occur in breeding areas, but also along migration routes and in wintering areas. At the same time, little is known of species' distributions, habitat needs, or responses to land-use trends in nonbreeding seasons. Inclusion of Mexico and Caribbean nations in future updates of this Plan will lead to much greater attention to nonbreeding issues for many species.
- Landbirds also face mortality from factors not directly related to habitat, which are difficult to quan-

tify. These include communication towers, wind power development, domestic and feral cats, lighted buildings, and competition with introduced species such as European Starlings and House Sparrows. Although some programs exist to locally minimize effects from these factors, no plan exists to comprehensively address their cumulative impact on bird populations.

Collectively, these factors contribute to a high proportion of population declines among Watch List Species, and addressing these issues at the largest possible administrative scales will go a long way toward meeting PIF's continental objectives for landbirds.

## TAKING ACTION

### *Linking Across Geographic Scales*

Most on-the-ground conservation action will take place at sub-continental scales, where action can be tailored



© Brian Small

*The steeply declining Olive-sided Flycatcher breeds across the coniferous forests of Canada and the western U.S. and migrates to winter in the mountains from southern Mexico to northern South America. Clearly, conservation of this species will require international cooperation and action.*

## SOUTHWEST AVIFAUNAL BIOME



The Southwest Avifaunal Biome is composed of five BCRs that encompass an area from the Texas hill country to the deserts of the U.S. and Mexico (Fig. 9).

9). Geography and natural environmental forces have combined to create a high diversity of habitats within this area, most adapted to little rainfall and periodic drought. Habitats in this region can be very broadly categorized as coniferous/mixed forest, shrubland, woodland, thorn forest, grassland, and riparian. This diversity has created a high number of habitat specialists.

Similar conservation issues affect landbirds in the southwestern U.S. and northwest Mexico. Both countries share responsibility for over half the Watch List Species with small populations or restricted ranges. Although the present version of this Plan covers only the U.S. portion of this Avifaunal Biome, clearly conservation of this diverse region will require international partnerships. Results of the species assessment of Mexican birds and full participation of Mexico in the next version of the Plan will highlight these needs.

In winter, birds of this biome are typically resident or migrate only short distances to Mexico and northern Central America (Fig. 20a, b). In addition, this area is important in winter to breeding birds of the Prairie and Intermountain West biomes. The pattern for most landbird species in this region is one of small population size (Fig. 2), narrow distributions in all seasons (Fig. 3 and 4), high threats (Fig. 5 and 6), and declining population trends (Fig. 7a). Watch List Species with multiple causes for concern are spread across many habitats here. However, the majority of Watch List Species with small populations or limited distributions are found within coniferous forest or riparian areas, whereas the majority of Watch List Species with declining trends or high threats are riparian or grassland birds. Southwestern shrub and woodland birds exhibit high habitat specialization. Thirty-seven Species of Continental Importance have inadequate population trend information.

### Primary Habitats

#### MIXED AND CONIFEROUS FORESTS

Coniferous forests of the southwestern mountains are important not only to breeding birds, but serve also as the primary migratory corridor for western hummingbirds and many other migrating birds from the

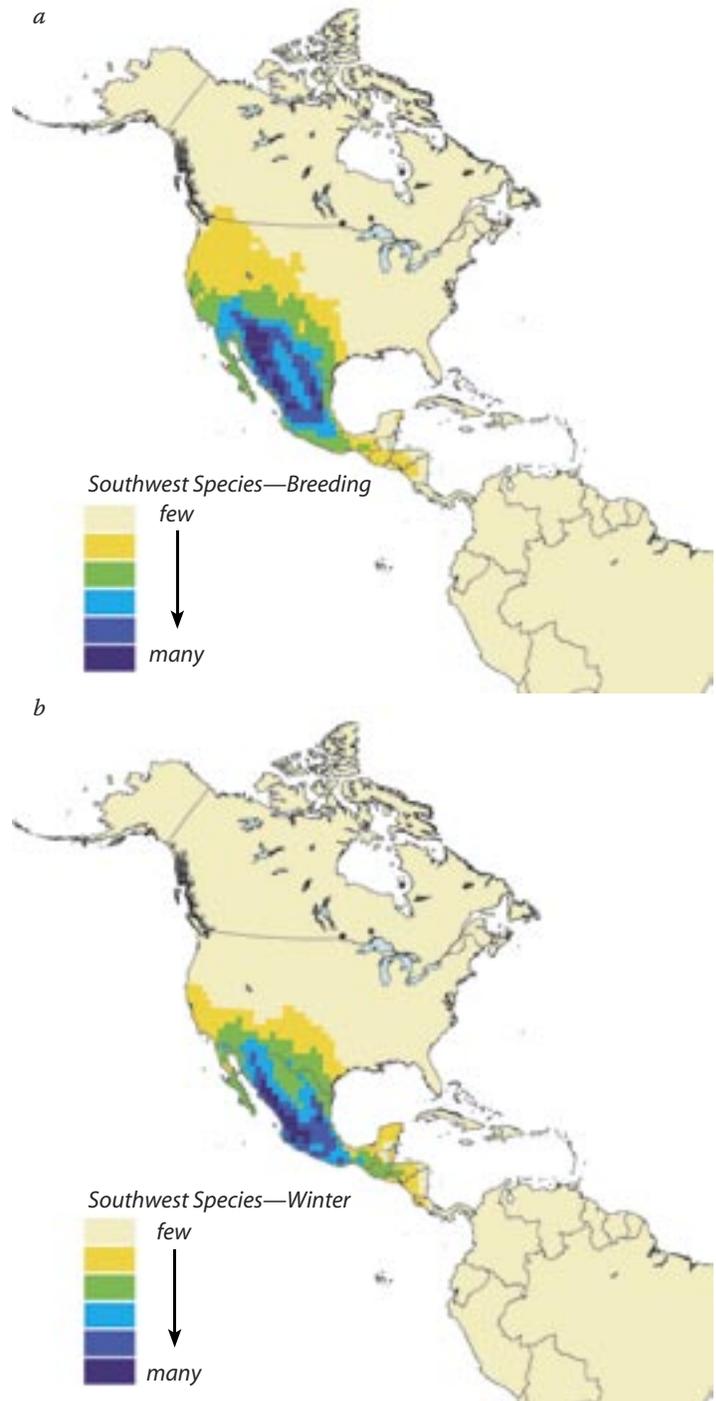


Figure 20. Number of species (a) during the breeding season and (b) during winter in each lat-long block, weighted by the percent of total population of each species breeding within the Southwest Avifaunal Biome.

Intermountain West and Pacific biomes. These forests support more breeding species lacking trend data than any other habitat in the Southwest. These forests include pine-oak mixed forest as well as higher elevation mixed-conifer. Timber harvest, inappropriate livestock grazing, and changes in fire regimes have affected birds such as Montezuma Quail, Spotted Owl, Arizona Woodpecker, and Red-faced Warbler. The Thick-billed Parrot used

**Table 6. Species of Continental Importance in the Southwest Avifaunal Biome: BCRs 20, 33–36**

Species <sup>1</sup>	% Breeding Population	% Winter Population	Primary Habitat	Continental Population Objective	Monitoring Need <sup>2</sup>
<b>Immediate Action</b>					
Golden-cheeked Warbler	100%	0%	Woodland	Recovery Plan	Mo1
Baird's Sparrow	0%	95%	Grassland	Increase 100%	**
Colima Warbler	94%	7%	Mixed forest	Maintain/Increase	Mo1
Black-capped Vireo	94%	3%	Western shrublands	Recovery Plan	Mo1
Thick-billed Parrot	90%	53%	Mixed forest	Poss. Reintroduction	Mo1
Bendire's Thrasher	51%	85%	Western shrublands	Increase 100%	Mo2
Bell's Vireo	63%	0%	Riparian	Increase 100%	**
Red-crowned Parrot	50%	50%	Woodland	Increase 100%	Mo1
Spotted Owl	33%	33%	Mixed forest	Recovery Plans	**
Tricolored Blackbird	2%	33%	Wetland	Increase 100%	Mo2
Green Parakeet	24%	24%	Woodland	Increase 50%	Mo1
<b>Management</b>					
Lucy's Warbler	98%	12%	Woodland	Maintain/Increase	**
Verdin	89%	89%	Western shrublands	Maintain	**
Cassin's Sparrow	63%	86%	Grassland	Maintain	**
Brewer's Sparrow	<1%	86%	Western shrublands	Increase 100%	**
Black-throated Sparrow	72%	83%	Western shrublands	Maintain	**
Scaled Quail	82%	82%	Grassland	Increase 50%	**
Pyrrhuloxia	80%	80%	Western shrublands	Maintain	**
Black-chinned Sparrow	45%	76%	Western shrublands	Increase 50%	Mo2
Varied Bunting	67%	16%	Riparian	Increase 50%	Mo1
Five-striped Sparrow	63%	63%	Western shrublands	Increase 50%	Mo1
Montezuma Quail	55%	55%	Mixed forest	Increase 50%	Mo1
Sprague's Pipit	0%	51%	Grassland	Increase 100%	**
White-throated Swift	24%	51%	Various	Increase 100%	Mo2
Grace's Warbler	50%	22%	Mixed forest	Increase 50%	**
Painted Bunting	46%	1%	Western shrublands	Increase 100%	**
Audubon's Oriole	32%	32%	Riparian	Maintain/Increase	Mo1
Hermit Warbler	<1%	22%	Mixed forest	Maintain/Increase	**
Elegant Trogon	21%	21%	Mixed forest	Increase 50%	Mo1
Lewis's Woodpecker	1%	17%	Riparian	Maintain/Increase	Mo2
Swainson's Hawk	15%	0%	Grassland	Maintain/Increase	**
Band-tailed Pigeon	12%	13%	Mixed forest	Increase 100%	Mo2
<b>Long-term Planning &amp; Responsibility</b>					
Abert's Towhee	>99%	>99%	Riparian	Maintain/Increase	Mo2
Black-tailed Gnatcatcher	96%	96%	Western shrublands	Maintain	Mo2
Gambel's Quail	95%	95%	Western shrublands	Maintain	**
Crissal Thrasher	94%	94%	Western shrublands	Maintain	Mo2
Red-faced Warbler	92%	25%	Coniferous forest	Maintain/Increase	Mo1
Le Conte's Thrasher	89%	89%	Western shrublands	Maintain/Increase	Mo2
Cactus Wren	82%	82%	Western shrublands	Maintain	**
Canyon Towhee	79%	79%	Western shrublands	Maintain	**
Rufous-winged Sparrow	78%	78%	Western shrublands	Maintain/Increase	Mo1
Curve-billed Thrasher	78%	78%	Western shrublands	Maintain	Mo2
Black-crested Titmouse	77%	77%	Woodland	Maintain	Mo1
Lucifer Hummingbird	76%	2%	Western shrublands	Maintain	Mo1

(continued)

**Table 6. Species of Continental Importance in the Southwest Avifaunal Biome: BCRs 20, 33–36 (continued)**

Species <sup>1</sup>	% Breeding Population	% Winter Population	Primary Habitat	Continental Population Objective	Monitoring Need <sup>2</sup>
Scott's Oriole	76%	43%	Woodland	Maintain	**
Yellow-headed Blackbird	1%	75%	Wetland	Maintain	Mo2
Green-tailed Towhee	1%	75%	Western shrublands	Maintain	**
Phainopepla	75%	3%	Woodland	Maintain	Mo2
Gray Vireo	23%	73%	Western shrublands	Maintain	Mo2
Elf Owl	73%	16%	Woodland	Maintain/Increase	Mo1
Lawrence's Goldfinch	14%	66%	Western shrublands	Maintain/Increase	Mo2
Costa's Hummingbird	62%	59%	Western shrublands	Maintain/Increase	Mo2
Arizona Woodpecker	56%	56%	Mixed forest	Maintain/Increase	Mo1
McCown's Longspur	0%	43%	Grassland	Maintain/Increase	**
Virginia's Warbler	38%	0%	Mixed forest	Maintain/Increase	Mo2
Black-capped Gnatcatcher	31%	31%	Western shrublands	Maintain/Increase	Mo1
Flammulated Owl	26%	22%	Mixed forest	Maintain/Increase	Mo1
Thick-billed Kingbird	21%	12%	Riparian	Maintain/Increase	Mo1

<sup>1</sup> Species are sorted by Action Category (Immediate Action, Management, Planning & Responsibility), then by decreasing % of global population that occurs in the biome (by greater of breeding or winter population). Species highlighted in yellow are Watch List species, with at least 10% of their global population in this biome. Species in green (in species or % population columns) are Stewardship Species, with  $\geq 75\%$  of their population in this biome.

<sup>2</sup> Monitoring Need (this assessment addresses only the adequacy of long-term population trend monitoring at the continental scale): Mo1=no trend data, Mo2=imprecise trends, Mo3=inadequate northern coverage.

\*\*Long-term population trend monitoring is generally considered adequate but some issues, such as bias, may not have been accounted for.

pine-oak forests in Arizona prior to the 1930's, but is now extirpated from the U.S. It still is resident, however, 80 km south of the border in Mexico.

## WESTERN SHRUBLANDS

These can be placed into four general types—Chihuahuan, Mojave, Sonoran desert shrubland, and shrublands in the Edwards Plateau—each of which supports different bird communities. In the Chihuahuan Desert, most of the Species of Continental Concern are Stewardship Species with adequate trend data. In contrast, Species of Continental Importance in the Sonoran and Mojave deserts are primarily Watch List Species and have poor or no trend data. These shrublands are important for Intermountain West shrub migrants and winterers as well as resident species. In some areas, these habitats are under heavy pressure from suburban development. In the Sonoran Desert, the protection and regeneration of columnar cacti and retention of large patches of shrubland are crucial to conservation of species such as Bendire's Thrasher and Rufous-winged Sparrow. Altered fire regimes in some shrublands have had a negative impact on Black-capped Vireo and Black-chinned Sparrow.

## WOODLAND

Ashe juniper/oak woodland on the Edwards Plateau in Texas supports the Golden-cheeked Warbler, the most highly restricted Watch List Species in the region. Farther west, some woodlands may be composed of tall shrubs rather than trees. Three quarters of all Species

of Continental Importance in southwestern woodlands have poor to no trend data. Alterations in fire regimes and other land-use decisions have resulted in high habitat fragmentation, affecting birds such as Elf Owl.

Thorn forests, primarily in Mexico but also bordering the Rio Grande or Rio Bravo along the border with Texas, are under heavy pressure from pollution and conversion for agricultural and residential development. Species of Continental Importance breeding in this habitat are all Watch List Species and none have reliable trend data. Little is known about this habitat compared with others in the Southwest. The Red-crowned Parrot is legally designated as an endangered species in Mexico (DOF 2002) and is in need of Immediate Action (Macias Caballero et al. 2000). We estimate that as much as 50 percent of its remaining world population now occurs in the U.S.

## GRASSLAND

Grasslands support the highest number of Species of Continental Importance with declining trends in any southwestern habitat type. These grasslands have as much value for their support of Prairie Biome breeding species during migration and winter as they do for breeding birds (Fig. 21b). Due to the nomadic nature of grassland species it is important to maintain large patches of high-quality grasslands across all BCRs in the Southwest in order to accommodate grassland birds through time. Impacts to these grasslands include historical overgrazing, altered fire regimes, shrub encroachment, and

eradication of prairie-dog colonies. Desert grasslands are important to such grassland specialists as Swainson's Hawk, Sprague's Pipit, Baird's Sparrow, and McCown's Longspur.

## RIPARIAN

Riparian woodlands support the highest diversity of landbird species of all habitats in this avifaunal biome. Riparian areas may be found within all of the above habitat types. Although they may not carry water year-round, riparian corridors are critical to many northern-breeding Neotropical migrants as well as breeding or wintering Species of Continental Importance in this region. Riparian Species of Continental Importance in the southwest are all Watch List Species. Those species with primary distributions in Mexico have poor monitoring data, and so may be of even greater concern than we realize. The retention or regeneration of riparian forests with the re-creation of natural flooding regimes hold high value for breeding species such as Bell's Vireo and Thick-billed Kingbird. Invasive exotic plants are a major problem in many areas. Wetlands in the region are largely restricted to riparian areas, so the health of riparian areas is critical to the maintenance of wetlands.

### *Conservation Issues*

- Changes in natural fire intensity and frequency.
- Alteration of hydrologic regimes, including greatly increased demands for water by rapidly growing urban and suburban areas, construction of dams and loss of regular flooding, river channelization, invasion of exotic plant species, and xerification.
- Grazing management (including overgrazing and prairie-dog eradication) in all habitats.
- Forest and woodland management (including changes in structure and age class composition, timber harvest, and suburban development).
- Agricultural or suburban development in thorn forest, Sonoran shrubland, and grasslands.
- Habitat fragmentation in all habitats through suburban development, habitat conversion, catastrophic fire, or other means.
- Shrub encroachment in grasslands.

### *Recommended Actions in the United States*

- Continue research and management for the listed Golden-cheeked Warbler and Black-capped Vireo, and support for reintroduction or natural recolonization of Thick-billed Parrot.
- Conduct monitoring in the following southwestern habitats: thorn forest, coniferous forests, woodlands, Sonoran and Mojave shrublands, and riparian. Additionally, conduct basic habitat research in thorn forest.
- Reintroduce or mimic intermittent flooding regimes on major rivers.
- Institute habitat-conserving livestock grazing practices wherever grazing occurs.
- Continue community-growth planning in high-development areas near Austin, San Antonio, Brownsville-McAllen, El Paso-Las Cruces, and the Tucson-Phoenix area.
- Develop community-involved, well planned fire management strategies in woodlands, grasslands, and coniferous forests.
- Maintain many patches of high-quality grasslands distributed throughout the entire region.



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*Although causes of its steep decline are not well known, the Bendire's Thrasher is in need of immediate conservation attention to protect its small global population in the arid shrublands of the Southwest.*