

# *Partners in Flight*



## *North American Landbird Conservation Plan*

### *Part 1. The Continental Plan*





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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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*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.*

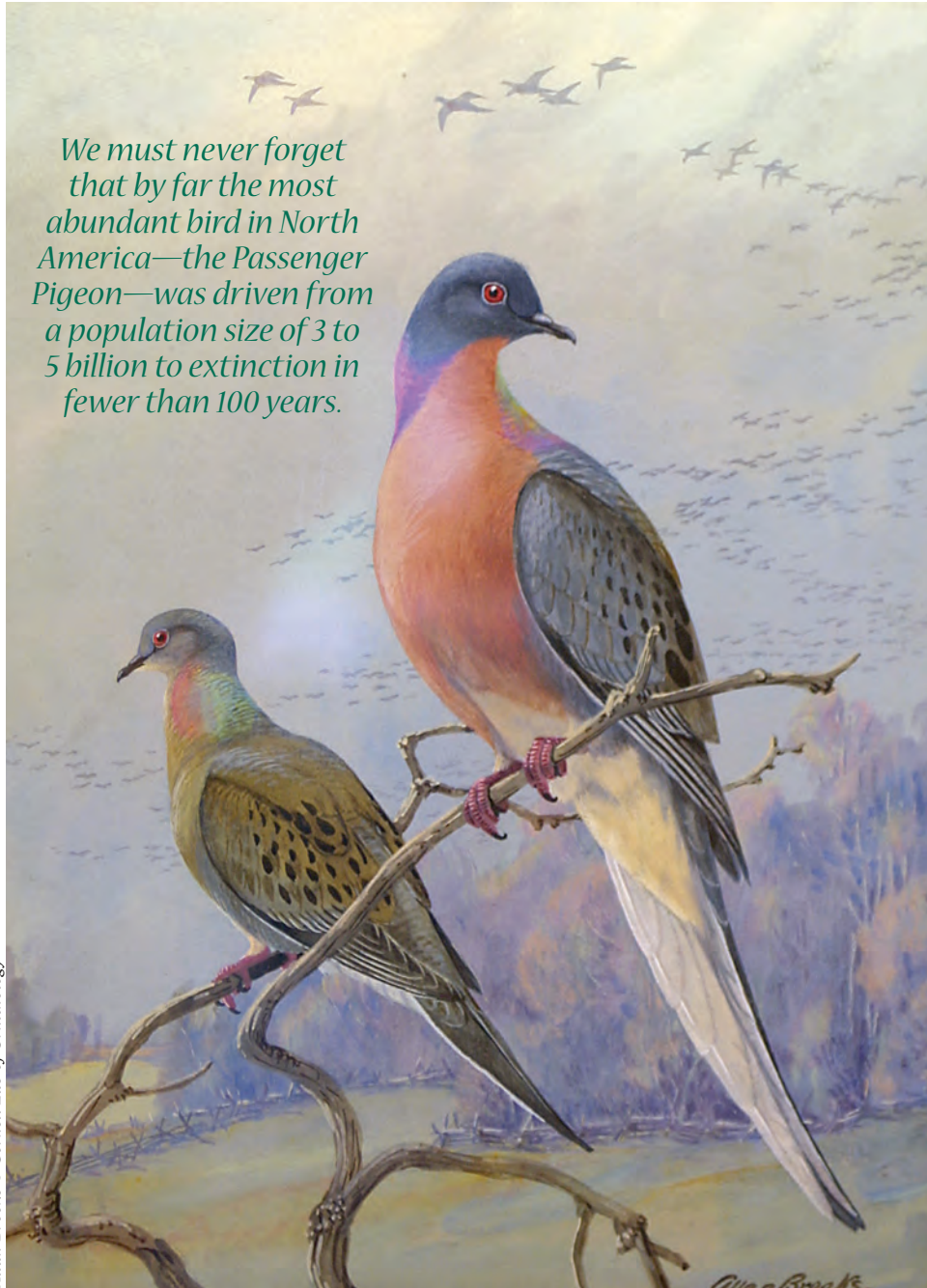
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*We must never forget  
that by far the most  
abundant bird in North  
America—the Passenger  
Pigeon—was driven from  
a population size of 3 to  
5 billion to extinction in  
fewer than 100 years.*

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 •*

# Part 1. The Continental Plan

## INTRODUCTION

### *Development of Partners in Flight*

Birds are perhaps the most highly valued and actively appreciated component of North America's biological diversity. Approximately 1,200 species, representing nearly 15% of the world's known bird species, inhabit Canada, the U.S., and Mexico. Approximately three-fourths of these, including warblers, thrushes, sparrows, finches, hummingbirds, flycatchers, raptors and other groups, occupy terrestrial habitats. These "landbirds" are the focus of this document.

Landbirds are an important contributor to our economy, providing untold billions of dollars in ecosystem services each year. Through their consumption of pest insects, pollination of plants, dispersal of native seeds, and other services, birds contribute to the maintenance of ecosystems that also support human life. Nature-based recreation, a high proportion of which involves observing birds, is the fastest growing segment of the tourism industry, increasing approximately 30% annually since 1987. In 2001 in the U.S. alone, 46 million birders spent \$32 billion to observe, photograph or feed wildlife. The overall economic output of this activity was \$85 billion (La Rouche 2003).

Because birds are valuable to humans in so many ways, declines in numerous landbird populations are creating serious concern for their futures. Some species, such as the Golden-winged Warbler, are in sufficient trouble to merit immediate conservation action. Others, including the Wood Thrush, remain widespread but deserve attention to prevent continued decreases. Because landbird habitats are directly affected by human use of the land, the health of all North American species is in our hands. We have a stewardship responsibility for maintaining healthy populations of still-common species and not simply for preventing extinctions. We must never forget that by far the most abundant bird in North America—the Passenger Pigeon—was driven from a population size of 3–5 billion to extinction in fewer than 100 years (Blockstein 2002).

The causes of population declines in birds are numerous, but the loss, modification, degradation, and fragmentation of habitat almost always play a major role. Threats to habitats come primarily from intensified land-use practices in agricultural and forested regions and from other impacts associated with human population growth.

Climate change is producing new threats to birds and vegetation which may be particularly severe in arctic and alpine regions. Birds are a vital element of every terrestrial habitat in North America. Conserving habitat for birds will therefore contribute to meeting the needs of other wildlife and entire ecosystems.

Recognition that a cooperative, nonadversarial conservation approach was required to address bird and habitat issues at a continental scale led to formation in 1990 of Partners in Flight/Compañeros en Vuelo/Partenaires d'Envol (National Fish and Wildlife Foundation 1990). This voluntary, nonadvocacy, international coalition was originally dedicated to reversing declines of Neotropical migratory songbirds, but soon expanded its mission to include all landbirds. Current partners include federal, state, provincial, and territorial government agencies, First Nations, tribes, nongovernmental organizations, numerous universities, concerned individuals, and private industry in Canada, the U.S., Mexico, the Caribbean, and Central America. We expect to expand into South America in the near future.

The Partners in Flight (PIF) mission is expressed through three related concepts:

- *Helping species at risk.* Species exhibiting warning signs today must be conserved before they become imperiled. Allowing species to become threatened or endangered results in long-term and costly recovery efforts whose success often is not guaranteed. Species that have attained endangered or threatened status must not only be protected from extinction, but also must be recovered.



In 2001 in the U.S. alone, 46 million birders spent \$32 billion to observe, photograph or feed wildlife. The overall economic output of this activity was \$85 billion (La Rouche 2003).

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- *Keeping common birds common.* Native birds, both resident and migratory, must be retained in healthy numbers throughout their natural ranges. Humans have a responsibility to be good stewards of species that are fundamental to the integrity of North America's diverse and unique ecosystems.
- *Voluntary partnerships for birds, habitat, and people.* A central premise of PIF is that the resources of public and private organizations throughout the Americas must be combined, coordinated, and increased in order to achieve success in conserving bird populations in this hemisphere. The power of PIF lies in the synergy that builds when diverse, committed partners who care about birds work together for a common goal.

### *Purpose and Scope of this Plan*

#### **PURPOSE**

This Plan provides a continental perspective on North American landbird conservation, presenting geographic, species, and habitat priorities. An international approach is essential because most species breed, migrate, and winter in more than one country, such that Canada, the U.S., and Mexico share many of the same birds at different times of year. Migratory birds are an international resource that requires conservation planning at a continental scale and beyond—a different approach than what may be suitable for more sedentary wildlife.

Our audience includes decision-makers, land-managers and scientists at national and international levels, who collectively have the ability to meet PIF's ambitious goals for landbirds.

Based on a comprehensive, top-down, continental assessment of the 448 native landbird species that breed in the United States and Canada, we establish population objectives and recommended actions for Species of Continental Importance (see Box 1). These objectives and recommendations will facilitate the integration of landbird conservation actions with those described in continental and national plans for other groups of birds such as the North American Waterfowl Management Plan (North American Waterfowl Management Plan Committee 1998), Canadian

#### **BOX 1**

#### *What the PIF North American Landbird Conservation Plan does:*

- Summarizes the conservation status of landbirds across North America, illustrating broad patterns based on a comprehensive, biologically-based species assessment.
- Identifies species most in need of attention at the continental scale, recognizing that additional species will need attention in each region.
- Emphasizes the important need for stewardship of biome-restricted species that may not otherwise be in need of immediate conservation attention.
- Promotes conservation throughout birds' seasonal cycles, and in all regions of North America—not just during breeding periods or where species at risk occur.
- Presents continental-scale population objectives for species identified as continentally important and identifies general actions necessary to meet those objectives.
- Demonstrates the need for greater resources for landbird conservation.
- Outlines ways in which continental scale issues and objectives relate to regional conservation efforts.
- Promotes a coordinated approach to landbird conservation among nations and regions of North America, which will serve as a stepping stone to even broader geographic cooperation in the future.

(Donaldson et al. 2000) and U.S. Shorebird Conservation Plans (Brown et al. 2001), and Waterbird Conservation for the Americas (Kushlan et al. 2002).

We consider two types of landbirds to be of high conservation importance—those that show some combination of population declines, small ranges, or distinct threats to habitat, and those that are restricted to distinct geographical areas, but otherwise not currently at risk. This rationale forms the basis for grouping species into the PIF Watch List (those warranting attention due to concern) and the Stewardship Species (those that are recognized as responsibilities due to restricted range).

Although this Plan identifies Species of Continental Importance, we do not advocate conservation based on single species as the only, or best, approach to addressing issues. That approach is required in some cases, particularly when protecting already-endangered species. Rather, we encourage planners to identify common issues or habitats among suites of high priority species. This enables a more practical approach for implementing conservation actions, which will simultaneously benefit many bird species and other organisms as well.



This Plan is a blueprint for continental landbird conservation and, as such, is not intended to replace existing or developing regional and state PIF plans. The conservation and management strategies required 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.

Over the last seven years, PIF has engaged in a comprehensive planning effort, resulting in several dozen regional bird conservation plans covering all states or physiographic areas in the U.S. (Pashley et al. 2000, [www.partnersinflight.org](http://www.partnersinflight.org)). Similar regional efforts are underway in Canada and Mexico. These regional and state PIF plans (see [www.partnersinflight.org](http://www.partnersinflight.org)) identify priority species and habitats, set goals and objectives, discuss local issues and opportunities, and outline strategies

for local or regional partners to implement bird conservation objectives. Content of regional plans may not be in full synchrony with the content of this plan as a natural consequence of working at different scales. It will be a primary task of PIF partners over the next few years to resolve differences and arrive at ever better conservation objectives at all scales. Part 2 of this Plan summarizes the salient issues faced by North American landbirds, reflecting the recurring messages of the regional plans.

## SCOPE

### Geographic

For the purposes of this document, “North America” includes Canada, the continental U.S., and Mexico. However, this version of the Plan is limited to landbirds that regularly breed in the continental U.S. and Canada. Nonetheless, Mexican scientists provided important ideas and strategies for this plan as well as considerable data on the status in Mexico of many species included here.

## BOX 2

*The PIF Continental Plan considers 448 landbird species native to the United States and Canada from 45 families, listed below. Colored bold text shows 13 additional families with landbirds native to Mexico that will be treated in future versions of the Plan.*

Family	Taxa	Family	Taxa
<b>Tinamidae</b>	<b>Tinamous</b>	<b>Pipridae</b>	<b>Manakins</b>
Cracidae	Chachalacas & allies	Laniidae	Shrikes
Phasianidae	Pheasants, Grouse, Turkeys	Vireonidae	Vireos & Greenlets
Odontophoridae	Quail & allies	Corvidae	Jays, Crows & allies
Cathartidae	Vultures	Alaudidae	Horned Lark
Accipitridae	Hawks, Eagles & allies	Hirundinidae	Swallows
Falconidae	Falcons & Caracaras	Paridae	Chickadees & Titmice
Columbidae	Doves & Pigeons	Remizidae	Verdin
Psittacidae	Parrots & Parakeets	Aegithalidae	Bushtit
Cuculidae	Cuckoos & Anis	Sittidae	Nuthatches
Tytonidae	Barn Owls	Certhiidae	Brown Creeper
Strigidae	True Owls	Troglodytidae	Wrens
Caprimulgidae	Nightjars	Cinclidae	American Dipper
<b>Nyctibiidae</b>	<b>Potoos</b>	Regulidae	Kinglets
Apodidae	Swifts	Sylviidae	Arctic Warbler, Gnatcatchers & allies
Trochilidae	Hummingbirds	Turdidae	Thrushes
Trogonidae	Trogons & Quetzals	Timaliidae	Wrentit
<b>Momotidae</b>	<b>Motmots</b>	Mimidae	Mockingbirds, Thrashers & Catbirds
Alcedinidae	Kingfishers	Motacillidae	Wagtails & Pipits
<b>Bucconidae</b>	<b>Puffbirds</b>	Bombycillidae	Waxwings
<b>Galbulidae</b>	<b>Jacamars</b>	Ptilonotidae	Silky Flycatchers
<b>Ramphastidae</b>	<b>Barbets &amp; Toucans</b>	Peucedramidae	Olive Warbler
Picidae	Woodpeckers & allies	Parulidae	Wood Warblers
<b>Furnariidae</b>	<b>Spinetails, Leaf-tossers &amp; allies</b>	<b>Coerebidae</b>	<b>Bananaquit</b>
<b>Dendrocolaptidae</b>	<b>Woodcreepers</b>	Thraupidae	Tanagers, Euphonias & allies
<b>Thamnophilidae</b>	<b>Antshrikes, Antwrens, Antbirds &amp; allies</b>	Emberizidae	Towhees, Sparrows, Seed-eaters & allies
<b>Formicariidae</b>	<b>Antthrushes &amp; Antpittas</b>	Cardinalidae	Saltators, Grosbeaks, Buntings & allies
Tyrannidae	Flycatchers, Becards, & Tityras	Icteridae	Blackbirds, Orioles & allies
<b>Cotingidae</b>	<b>Cotingas</b>	Fringillidae	Finches



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The introduced European Starling, which now numbers at least 120 million in North America, outnumbers native Northern Flickers by more than 10-to-1 in most regions. Starlings compete with flickers for nest cavities.

Under the guidance of the Mexican Committee of the North American Bird Conservation Initiative (ICAN-NABCI), a working group was established in 2002 to develop the species assessment process for all bird species present in that country (approximately 1,100 species). Mexico is following the PIF methodology for their continental species status assessment, which includes all bird species occurring in the country and is expected to be complete by the end of 2004. Thus, we are preparing for integration of about 450 Mexican landbird species in the next version of this Plan. Species assessment also has taken place for portions of the Caribbean, and partners are coordinating bird conservation across that region as well.

Considering for now only Canada and the U.S., the highest diversity of breeding landbirds occurs in the western U.S., especially near the Mexican border, and in the transition between eastern deciduous and northern boreal forest types in eastern Canada (Fig. 1a). Arctic regions support the fewest breeding landbird species. In the non-breeding season, these same species are most concentrated from the southwestern U.S. through Mexico and into Central America (Fig. 1b).

### ***Taxonomic***

This document provides status information for the 448 native landbird species with manageable populations that breed in Canada and the U.S., including Neotropical migrant, short-distance migrant, and largely resident species. Landbirds are defined here as those species having principally terrestrial life cycles (see Box 2). Scientific names for bird species are given in Appendix A.

Although this Plan deals only with native species, we recognize that the important negative effects of intro-

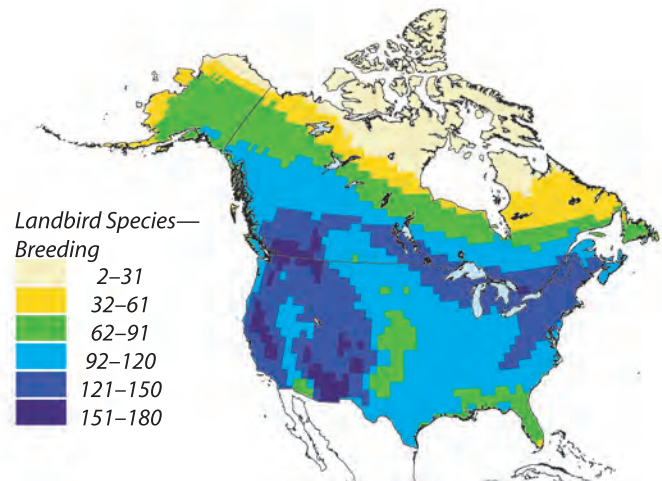


Figure 1a. Number of landbird species during the breeding season in each lat-long block of the U.S. and Canada, from an overlay of range maps of all 448 species.

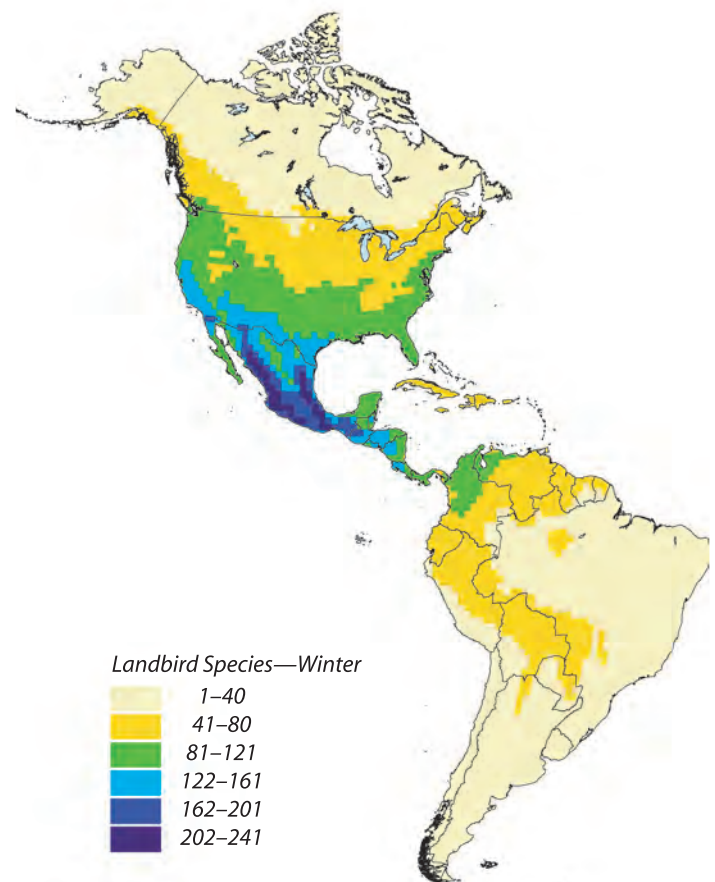
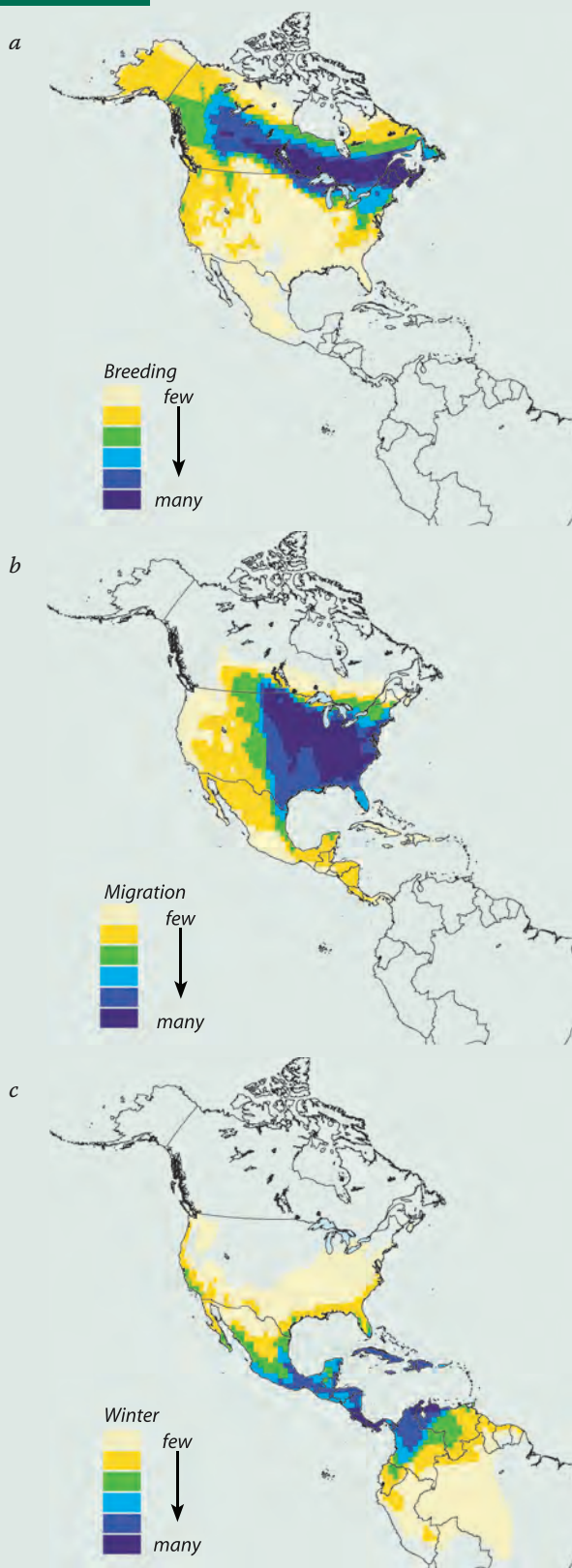


Figure 1b. Number of landbird species during winter for the 448 species that breed in the U.S. and Canada.

duced species should be considered during conservation planning for native birds (Dunn et al. 2001). There are relatively few introduced landbird species of consequence in North America, but their influence can be disproportionately large. For example, three introduced species—European Starling (120 million birds), House Sparrow (82 million) and Rock Pigeon (26 million)—comprise an estimated 5 percent of all landbirds breeding in Canada





Species of boreal-breeding warblers occurring in each lat-long block (a) during the breeding season, (b) during migration, and (c) during winter, illustrating important linkages among boreal forest, habitats in eastern U.S., and tropical habitats in Central America, northern South America, and the Greater Antilles.

and the U.S. and are among the most widespread birds on the continent.

In this Plan we only address full species (American Ornithologists' Union 1998 and supplements). We recognize the importance of conserving subspecies and populations, but there is not yet a consistent way to identify those that truly are in need of conservation attention. Thus, it is important to emphasize that subspecies and populations treated in many regional PIF plans can have continental significance that is not reflected in this document.

### Seasonal

In this assessment, we considered information from both the breeding and nonbreeding seasons. We provide information on geographic links between seasons highlighting areas, for example, where most breeding species of a particular region spend the winter. For species that winter in tropical areas, these geographic links reveal the need for better information and greatly increased development of partnerships for conservation action. The Plan also discusses conservation issues that apply to the migration seasons, such as loss of stopover habitats and mortality from collisions with buildings and towers. These issues remain a critical priority for PIF to address.

### The Partners in Flight Planning Approach

Throughout the development of regional bird conservation plans, PIF has followed a stepwise planning approach that ensures a sound scientific basis for decision-making and a logical process for setting, implementing, and evaluating conservation objectives. Originally described as the PIF "Flight Plan" (Pashley et al. 2000), we have adopted this approach for use at the continental scale here. These steps include:

- assessing conservation vulnerability among all native landbird species,
- identifying species most in need of conservation attention at a continental level, including consideration of their geographic and habitat affinities,
- setting quantitative population objectives for Species of Continental Importance,
- identifying conservation needs and recommended actions for priority species and their habitats,
- outlining an implementation strategy for meeting species and habitat objectives at a continental scale, and
- evaluating success, making revisions, and setting updated objectives for the future.



## Uncertainty, Assumptions and Rule Sets

Numerous experts and many rounds of review have helped bring this plan to life, and we hope that it will become a valuable tool in landbird conservation. But realize that the authors intend for this Plan to be a starting point, not a final answer. Many new discussions have already begun as a result of the Plan's content, and we look forward to substantial improvements with every Plan update as data, analysis and concepts improve.

Therefore, it is important for readers of this version to understand the following:

- All species assessment scores have a degree of uncertainty in the underlying information and professional judgments were made in setting each score. See Carter et al. 2000 and Panjabi et al. 2001 for details.
- The global population size estimates rely on several assumptions and have a level of error that can only be approximated. Estimates will be revised as data improve and as the estimation process is refined. Revised estimates will be posted regularly on the PIF web site ([www.partnersinflight.org](http://www.partnersinflight.org)). See Appendix B for details.
- Rule sets were used to select Species of Continental Importance and to assign those species to categories for Conservation Action and Monitoring Need. Different rule sets would produce different lists, but the ones used here are the result of exhaustive discussion and analysis by landbird experts.
- Population objectives are based on past population trend and are independent of population size estimates. Changes in population size estimates will have no effect on objectives, but improved trend information could have large effects. Objectives will be revised as appropriate.
- The rule set used for setting population objectives does not incorporate priority-setting. Much work remains on refining objectives and priorities where species are sympatric and have different habitat requirements.

## ASSESSING CONSERVATION VULNERABILITY

The first step in PIF's planning process is a conservation status assessment of each species throughout its range and annual cycle. PIF has developed a process that evaluates several components of species vulnerability and provides an overall conservation assessment of the species



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*The Elegant Trogon, ranging from southern Arizona to Costa Rica, is among the 192 Species of Continental Importance identified in this plan.*

(Hunter et al. 1993, Carter et al. 2000, Panjabi et al. 2001). This process has been tested, reviewed, and updated, and its scientific credibility acknowledged by the American Ornithologists' Union (Beissinger et al. 2000). During the development of this Plan, the process was further improved to address issues raised by Beissinger et al. (2000) and by other reviewers.

Notably, this assessment process is based entirely on biological criteria. While political, economic, and social considerations frequently must be factored into decisions on setting priorities, we believe those decisions should be made after a biologically based assessment has identified species and issues truly in need of attention. This will increase the probability of making good conservation decisions and efficiently using limited resources.

### *Species Assessment Factors*

Species assessment was based on the PIF North American Species Assessment Database, which contains standardized data on the status of North American landbirds at the continental scale ([www.rmbo.org/pif/pifdb.html](http://www.rmbo.org/pif/pifdb.html)). The PIF Science Committee reviewed the

### *The Six PIF Species Assessment Factors:*

**Population Size (PS)** indicates vulnerability due to the total number of adult individuals in the global population. Evaluation of PS is based on the assumption that species with small populations are more vulnerable to extirpation or extinction than species with large populations. Scores were assigned using population estimates derived from Breeding Bird Survey abundance data (Rosenberg and Blancher in press) or from other sources (see Appendix B).

**Breeding Distribution (BD)** indicates vulnerability due to the geographic extent of a species' breeding range. The underlying assumption of BD is that species with narrowly distributed breeding populations are more vulnerable than those with widely distributed populations. BD was assessed at a truly global scale, whereby the entire range of the species was considered in the evaluation.

**Non-breeding Distribution (ND)** indicates vulnerability due to the geographic extent of a species' non-breeding range, with the assumption that species narrowly distributed in the non-breeding season are more vulnerable than those that are widely distributed. In practice, we did not consider range size during migratory periods, or phenomena such as migratory bottlenecks. Instead, evaluation of ND was based on the range of a species when populations are relatively sedentary (i.e., "winter"). As with BD, ND was assessed at a truly global scale.

**Threats to Breeding (TB)** indicates vulnerability due to the effects of current and probable future extrinsic conditions that threaten the ability of populations to survive and successfully reproduce in breeding areas within North America. Evaluation of TB included anthropogenic threats to breeding habitats, as well as other factors (e.g., competition with exotic species) that interfere with reproduction.

**Threats to Non-breeding (TN)** indicates vulnerability due to the effects of current and probable future extrinsic conditions that threaten the ability of North American breeding populations to survive over the non-breeding season. Evaluation of TN included anthropogenic threats to habitat, as well as other factors affecting survival during winter and migration periods.

**Population Trend (PT)** indicates vulnerability due to the direction and magnitude of changes in population size over the past 30 years. Species declining by 50% or more over this period are considered most vulnerable, whereas species with increasing trends are least vulnerable. The Breeding Bird Survey was the primary source of data, but Christmas Bird Count or specialized data sources were used where available and appropriate. Thus, PT was based on the best available breeding or non-breeding data indicating overall trend in those populations that breed in North America.

data and consulted other appropriate experts for all factors in the database to ensure that our assessment reflects the current state of knowledge. Close coordination among Canada, the U.S., and Mexico made it possible for the update to consider the entire North American continent as defined herein.

Each species was given scores for six factors that assess distinct aspects of vulnerability: Population Size (PS), Breeding Distribution (BD), Nonbreeding Distribution (ND), Threats to Breeding (TB), Threats to Nonbreeding (TN), and Population Trend (PT) (see Box 4). Scores for each factor reflect the degree of each species' vulnerability (i.e., risk of significant population decline or range-wide extinction) as a result of that factor. Scores ranged from "1" for low vulnerability to "5" for high vulnerability. Complete descriptions, justifications, scoring criteria, and definitions for each factor can be found in Panjabi et al. (2001), available at the Rocky Mountain Bird Observatory web site ([www.rmbo.org/pif/pifdb.html](http://www.rmbo.org/pif/pifdb.html)). Scores and selected other data for all 448 native landbird species regularly breeding in the continental U.S. and Canada are provided in Appendix A.



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*The Black-capped Vireo, already recognized as federally Endangered, exhibits a combination of high vulnerability scores.*





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Center: Roger Eriksson © Cornell Lab of Ornithology;

Three similar thrushes illustrate how species assessment works: The Bicknell's Thrush (a), with its tiny world distribution (BD,ND=5) and population (PS=5), as well as severely threatened winter habitat (TN=5), is among the highest scoring North American landbirds (Combined Score=18). The Wood Thrush (b) has a much larger breeding distribution (BD=2) and population (PS=2), but a small and threatened winter range (ND,TN=4) and declining trend (PT=4) warrant its inclusion on the PIF Watch List (Combined Score=14). In contrast, the very large population (PS=1) and range size (BD=1) of the Hermit Thrush (c), combined with low threats (TB,TN=2) and increasing population (PT=1), make this one of the least vulnerable of North American landbirds (Combined Score=6).

An important departure from Panjabi et al. (2001) and past PIF assessments of landbirds is the use of estimated Population Size to replace Relative Abundance. Use of Population Size is now possible because of recently developed methodology to estimate population sizes from survey data (Appendix B; Rosenberg and Blancher in press). In addition to providing perspective on an important component of vulnerability, population estimates serve as the critical foundation for setting measurable population objectives at the continental level. Note that our estimates of population size rely on many assumptions and that error is associated with each part of the process (Appendix B). We provide accuracy ratings and a measure of repeatability for the population estimates to give a sense of the possible error involved. We offer these population estimates and accuracy ratings as starting points and look forward to steadily refining these estimates as they are cross-checked with both regional data and continental estimates from other sources. Regular updates of population estimates, with information documenting changes made, will be posted on the PIF web site ([www.partnersinflight.org](http://www.partnersinflight.org)).

For each species we calculated the Combined Score, which is a single metric of a species' relative conservation importance. The Combined Score is calculated as (highest of TB or TN scores) + (highest of BD or ND scores) + PT + PS. This score can range from 4 for a widespread, relatively secure species for which we have few concerns, to 20 for a species of the very highest concern. The most vulnerable species are those with a combination of small

and declining populations, limited distributions, and deteriorating habitats. The latter often are already recognized as Threatened or Endangered at federal levels. We group species with high Combined Scores into categories corresponding to the reasons for those scores.

Note that our method of calculating the Combined Score represents a departure from our previous method of simply totaling all six factor scores (Carter et al. 2000, Pashley et al. 2000). This refined approach addresses some theoretical concerns raised by Beissinger et al. (2000). Specifically, by reducing redundancy among breeding and nonbreeding factors, we elevate the importance of some widespread but declining species. Further work is required to determine whether or not this new approach should be incorporated into assessment at sub-continental scales, for example, in regional PIF plans.

### *Geographic Patterns in Assessment Scores*

An overview of assessment scores shows regional differences in the average vulnerability of species. The following maps were created by combining PIF assessment data with digital range maps from NatureServe and partners (Ridgely et al. 2003). Maps variously depict average scores, number of species, or number of species weighted by population size in a particular area. In each case, values were calculated based on all landbird species present in each degree block of latitude and longitude (lat-long block). Maps of average threats and trends (Fig. 5–7) used range-wide scores for each species, not scores



specific to each degree block. These maps are intended to show broad geographic patterns and are not meant to be interpreted at small scales, such as degree blocks. Where maps show values south of the U.S., they include only the 448 landbirds breeding in Canada and the U.S. Future Plan versions will have maps revised to include all Mexican landbirds.

**Population Size:** Mean PS scores in the breeding season (Fig. 2) show that there are numerous species with small populations breeding in the desert southwest, although much of the western U.S., Florida, and parts of northern Canada and Alaska also have concentrations of species with relatively small population sizes. In contrast, most species breeding across the eastern two-thirds of the continent have relatively large global populations.

**Breeding Distribution:** Mean BD scores (Fig. 3) exhibit a very clear NE-SW gradient, with species in northern regions on average having larger breeding ranges (lower BD scores) and species in the southwestern U.S. having smaller ranges (higher BD scores). Note that BD scores for southwestern species are calculated on the basis of their global ranges, including the Mexican portions of range, though the score is only mapped onto the U.S. portion of the range. Landbirds in the Arctic not only tend to have large breeding distributions in North America, but also generally have breeding ranges in the Eurasian Arctic. This also is true for some circumboreal species found in northern forests.

**Nonbreeding Distribution:** Mean ND scores show small distributions for landbird species wintering throughout Mexico, Central America, and the West Indies (Fig. 4), indicating that species migrating south of the U.S. con-

centrate in a smaller land area than those wintering in the U.S. or Canada. This pattern also illustrates why many Neotropical migrant species are thought to be more vulnerable on their wintering grounds.

**Threats to Breeding:** Mean TB scores (Fig. 5) also show a NE-SW gradient, with species concentrated in the Southwest and Pacific regions facing higher threats, and species in the Arctic, on average, facing lower

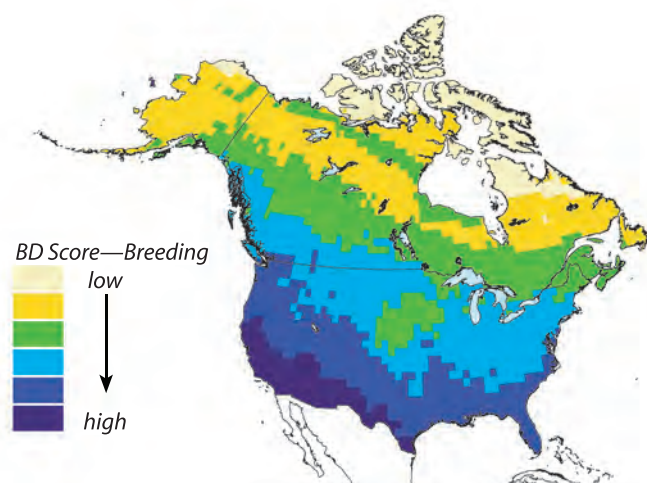


Figure 3. Average vulnerability among species occurring in each lat-long block during the breeding season, based on Breeding Distribution (BD) scores for 448 landbird species. Smallest range size = highest vulnerability (high BD score); largest range size = lowest vulnerability (low BD score).

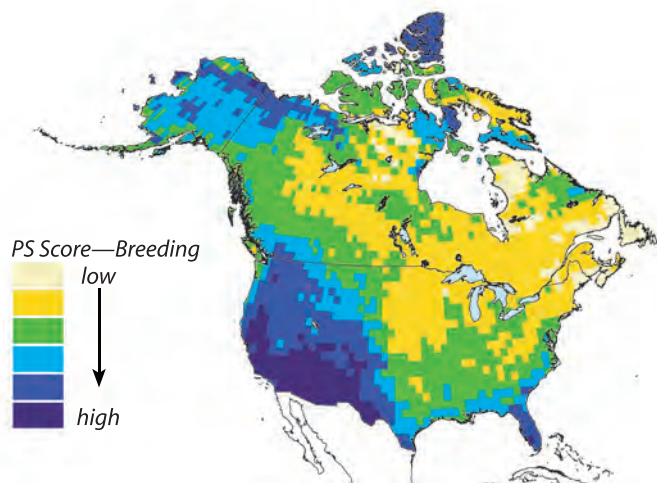


Figure 2. Average vulnerability among species occurring in each lat-long block during the breeding season, based on Population Size (PS) scores for 448 landbird species. Smallest population size = highest vulnerability (high PS score); largest population size = lowest vulnerability (low PS score).

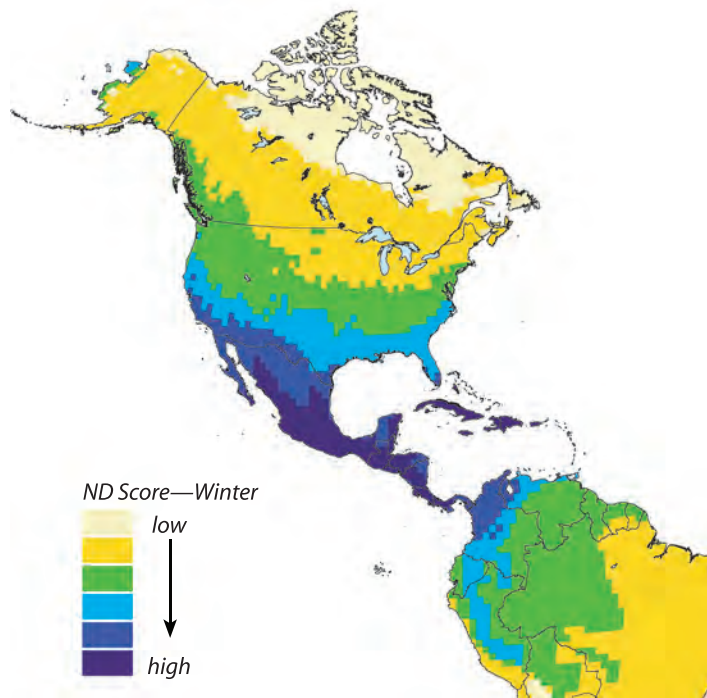


Figure 4. Average vulnerability among species occurring in each lat-long block during winter, based on Nonbreeding Distribution (ND) scores for 448 landbird species. Smallest range size = highest vulnerability (high ND score); largest range size = lowest vulnerability (low ND score).

threats. Given the larger number of species breeding in the Southwest (Fig. 1a), this pattern of elevated overall threats is even more striking.

**Threats to Nonbreeding:** Mean TN scores are highest for Canadian and U.S. breeding species that winter in northern South America, the West Indies, and Central America (Fig. 6). Average nonbreeding threats also are elevated in wintering areas in the southwestern U.S.

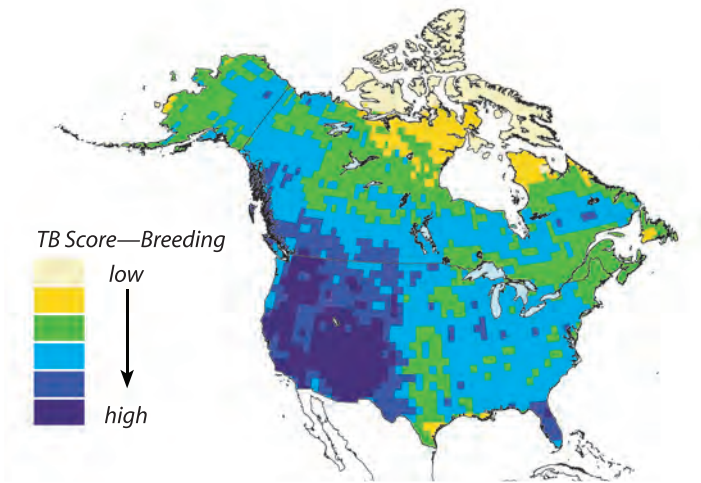


Figure 5. Average vulnerability among species occurring in each lat-long block during the breeding season, based on Threats to Breeding (TB) scores for 448 landbird species. Severe threats = highest vulnerability (high TB score); no threats = lowest vulnerability (low TB score).

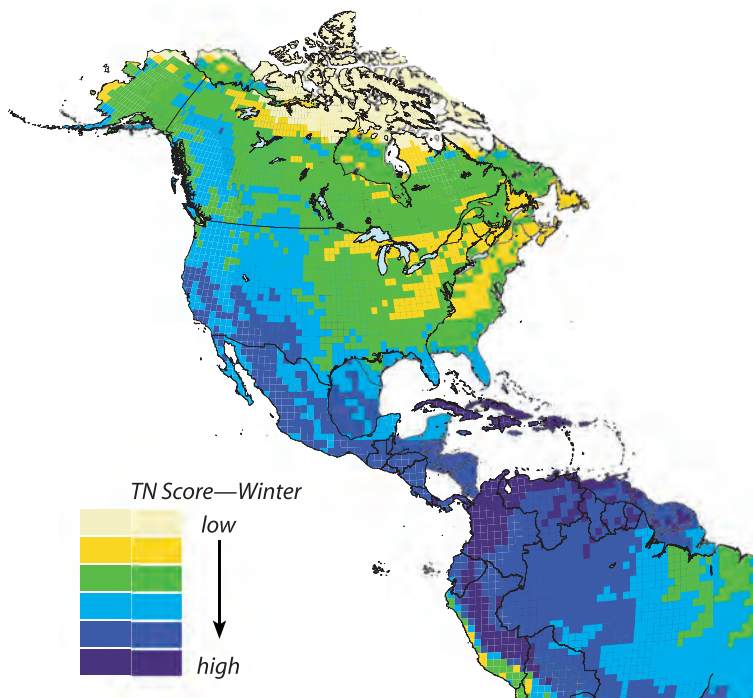


Figure 6. Average vulnerability among species occurring in each lat-long block during winter, based on Threats to Nonbreeding (TN) scores for 448 landbird species. Severe threats = highest vulnerability (high TN score); no threats = lowest vulnerability (low TN score).



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While the Cerulean Warbler is among the most vulnerable breeding species in Eastern forests, it may be even more highly threatened within its narrow cloud-forest winter range in northern South America.

through Mexico, but are quite low for species wintering throughout most of the U.S. and Canada.

**Population Trend:** The pattern of mean PT scores on the breeding grounds (Fig. 7a) is notably unlike patterns of the other vulnerability factors. A higher proportion of species in the prairie regions have undergone significant population declines (higher average PT scores) than in most other regions. Other areas with concentrations of declining species include the southwestern U.S. and some areas around Hudson Bay. Note, however, that trend data for large areas of Canada and Alaska are not adequate (see Monitoring Needs, p. 27). The general lack of correspondence in geographic patterns between PT and other factors suggests that whether or not a species has declined significantly over the past 30 years is largely independent of its range or population size. Further, trend is mostly independent of whether future threats are perceived to be high.

The pattern of mean PT scores on the wintering grounds (Fig. 7b) indicates that a higher proportion of short-distance migrants wintering in the central and southern U.S., northern Mexico, and the Greater Antilles are exhibiting significant declines, compared with species migrating to Central America or resident in Canada and Alaska. Declining species also are concentrated in northwestern South America.

**Combined Score:** The mean Combined Score across all assessment factors, reflective of overall vulnerability to serious decline or extinction (Fig. 8a), mirrors the NE-SW pattern seen in many of the individual factors. In general, levels of risk are highest for landbird species breeding in



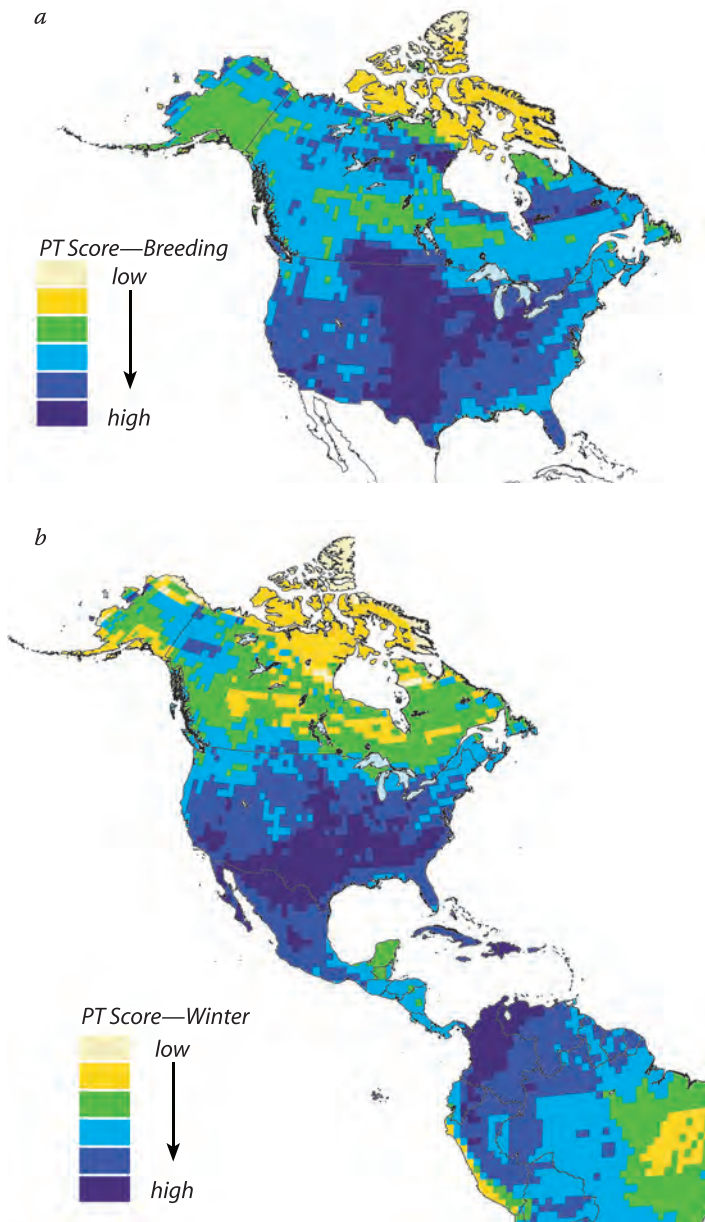


Figure 7. Average vulnerability among species occurring in each lat-long block during the breeding season (a) and in winter (b), based on Population Trend (PT) scores for 448 landbird species. Declines  $\geq$  50% over 30 years = highest vulnerability (high PT score); increasing populations = lowest vulnerability (low PT score).

the southwestern U.S., California, the Colorado Plateau, and southern Great Plains, whereas vulnerability is lowest for landbirds in the Arctic region.

In winter, species with higher Combined Scores are clearly concentrated in the Greater Antilles and Mexico, particularly western Mexico, illustrating the tremendous conservation importance of these areas (Fig. 8b). Overall risk is relatively high for residents and migrants wintering in the southwestern U.S and California through Central America into northern South America, but is relatively low (on average) for species wintering farther north or east.

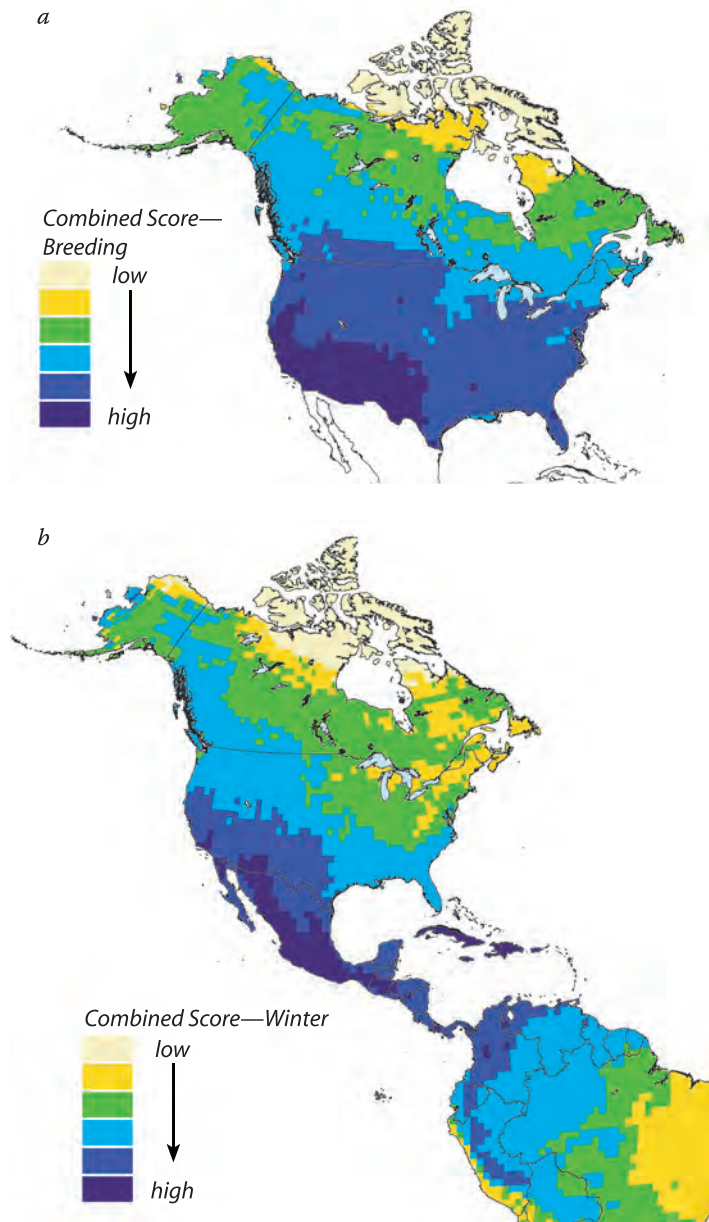


Figure 8. Average overall vulnerability among species occurring in each lat-long block during the breeding season (a) and in winter (b), based on Combined Scores for 448 landbird species. High Combined Score = highest vulnerability; low Combined Score = lowest vulnerability.

## SPECIES OF CONTINENTAL IMPORTANCE

### *Selection Criteria*

PIF goals include protection and restoration of species that are at risk of extinction or serious decline, as well as stewardship of native species that are characteristic of North America's varied and unique ecosystems. These represent two rather different yet interrelated goals, and we address them both in identifying Species of Continental Importance.



*Watch List Species:* Conservation of species that are in trouble will allow us to safeguard our historic biodiversity, and attention paid to those species will benefit other less vulnerable species that use the same habitats. In many cases, statutory requirements to address the conservation needs of endangered and threatened species do exist, because these species often rank high on public and political agendas. Here we present the PIF Watch List, comprised of species that have multiple reasons for conservation concern across their entire ranges. Our intent is that Watch List designation will improve the chances that species at risk are given appropriate attention, whether that is immediate intervention, long-term planning and management to maintain populations, or only a close watch for change in existing conditions.

Species were selected for the Watch List according to the Combined Score, which reflects the level of concern across multiple vulnerability factors. Species were placed on the Watch List if they had a Combined Score  $\geq 14$ , or a Combined Score = 13 with Population Trend score = 5 (the latter representing a 50% decline over 30 years).

*Stewardship Species and Avifaunal Biomes:* Conservation of Watch List Species alone will not address the PIF vision of maintaining healthy populations of all native birds across their ranges. In order to plan appropriately for the conservation of all species, PIF traditionally has stressed the importance of responsibility or “stewardship,” where-



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*The Blackburnian Warbler is one of many “spruce-woods warblers” largely restricted to the Northern Forest Avifaunal Biome. Although most are not highly threatened at present, this plan recognizes the important stewardship responsibility for maintaining the characteristic avifauna of this vast region.*

by conservation responsibilities are highlighted for species that have a high proportion of their global population or range within a particular regional planning area (Dunn et al. 1999, Rosenberg and Wells 1999). Here we address this concept at the continental scale by identifying Stewardship Species.

To identify Stewardship Species that represent all major biogeographic regions in North America, we first used cluster analyses to identify groups of Bird Conservation Regions (BCRs, NABCI 2000) that share similar avifaunas. We based this analysis on the percentage of the total global breeding population of each species that occurs in each BCR. We refer to the resulting clusters as “Avifaunal Biomes” (Fig. 9). Next, we defined Stewardship Species as species that have a proportionately high percentage of their world population within a single Avifaunal Biome during either the breeding or wintering season. The cutoff for “high per-



Figure 9. Avifaunal Biomes in North America, based on degree of shared landbird avifauna among Bird Conservation Regions (BCRs; outlined in black). See inside back cover for names and numbers of BCRs.

centage” varied among the biomes according to their size: 90% for large biomes, 75% for medium biomes, and 50% for small biomes. It is important to note that these Avifaunal Biomes do not represent new geographic regions for conservation implementation purposes. Rather, they constitute a tool for identifying species characteristic of different areas of the continent. We use them also in Part 2 of this Plan to summarize conservation issues and objectives that are particular to major regions of North America. We eliminated from the final Stewardship Species list those species for which threats are considered very low (i.e. TB=1).

Although the analysis identified Stewardship Species by biome, the combined list of Stewardship Species across all biomes represents a continental picture of responsibility. Note that Watch List Species can also have a high proportion of their global population within a given Avifaunal Biome and therefore can also be identified as Stewardship Species. In this document the phrase “additional Stewardship Species” refers to those Stewardship Species not also identified on the Watch List.

### *Species of Continental Importance*

Collectively, we refer to the 192 Watch List and Stewardship Species as Species of Continental Importance (Table 1). These species deserve special consideration in conservation planning and implementation at the continental scale. However, this does not imply that every Species of Continental Importance has an equally high level of concern or equal priority for conservation action in any given area. We generally suggest that Watch List Species be afforded attention wherever they occur. We suggest that action for Stewardship Species be carefully considered in areas where these species are most common, particularly where actions taken on behalf of Watch List Species are likely to leave Stewardship Species and their habitats lacking in attention.

### **WATCH LIST SPECIES**

The PIF Watch List for Landbirds (Table 1) includes 100 species (22% of the 448 species assessed), for which we have the greatest range-wide concerns, and which are most in need of conservation attention. The geographic distribution of Watch List Species during the breeding season (Fig. 10a) shows a concentration of these species in California and the arid southwest, with a moderate number distributed across the eastern and western U.S. The fewest species breed across northern Canada and Alaska, with none in the High Arctic islands. In winter, the highest concentration of Watch List Species occurs in western Mexico, with high numbers of species from the southwestern U.S. and Caribbean through

Central America (Fig. 10b). When the approximately 450 Mexican species are brought into this plan, the importance of Mexico for conservation of North American landbirds will become even more evident.

Although the Watch List represents species of greatest concern at the continental level, not every species for which we have legitimate concerns appears on this list. For example, there are several species that have declined by more than half over the past 30 years, but which do not qualify for the Watch List because they are still relatively abundant and widespread, and do not face high threats across their entire range (e.g., Loggerhead Shrike, Northern Bobwhite). Other species that have undergone severe declines have done so only in a portion of their

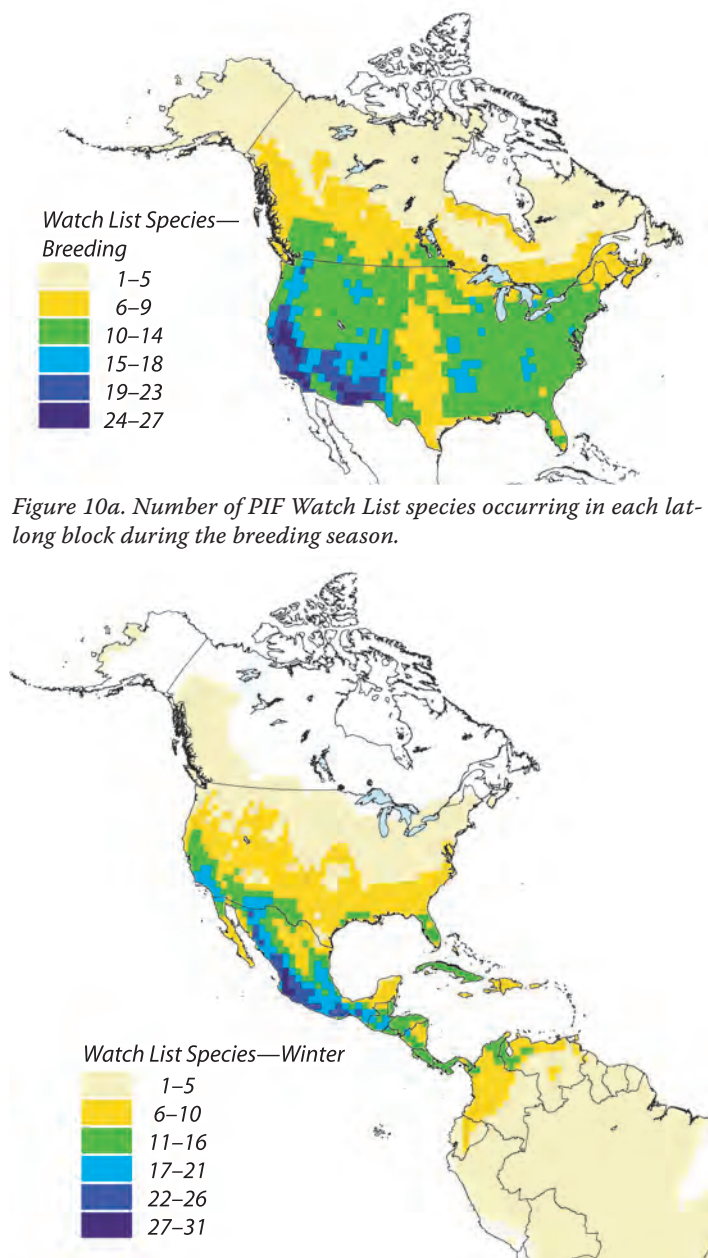


Figure 10b. Number of PIF Watch List species occurring in each lat-long block during winter.



ranges (e.g., Burrowing Owl, Bewick's Wren). Such species often are included on lists of regionally important species and may have incipient problems at broader scales. Further discussion is needed on how future versions of this Plan might address conservation concerns of subspecies and populations.

We place Watch List Species into three groups (Table 1) that are distinguished by the reasons they are considered to be continentally important:

*Species with multiple causes for concern across their entire range:* Twenty-one species are on the Watch List because they have a combination of small population, narrow distribution, high threats, and declining population trends. These species are of highest continental concern and priority for conservation action at national and international scales. A majority of these are legally listed as Endangered or Threatened in either the U.S. or Canada, and as such have recovery plans in place. Notable in this group, however, are several species without legal status, including Bicknell's Thrush and Saltmarsh Sharp-tailed



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*With an extremely small and shrinking global range and population, the recently recognized Gunnison Sage-Grouse is among the most vulnerable of North American landbirds.*

Sparrow. Henslow's Sparrow has status in Canada, but not in the U.S. Ivory-billed Woodpecker and Bachman's Warbler already may be extinct, and California Condor exists in the wild only as a reintroduced population.

Note that Red-crowned and Thick-billed parrots and Green Parakeet are included here on the basis of small present-day or historic breeding populations within the U.S. Both are highly threatened within their Mexican breeding range and require collaborative conservation measures between the U.S. and Mexico. Both Gunnison Sage-Grouse and Lesser Prairie-Chicken are resident game birds with notably low populations.

Ten of the Watch List Species in this group are essentially resident year-round within their range, whereas eight are classified as Neotropical migrants (species breeding north of Mexico and for the most part migrating south of the U.S. for the winter). Three are temperate migrants (wintering primarily in the U.S.). As a group, these species are found primarily across the U.S. Further, 86% also are Stewardship Species, which means they are relatively concentrated within a single Avifaunal Biome. It is, therefore, the responsibility of regional groups to meet the global conservation needs of those species.

*Moderately abundant or widespread species with declines or high threats:* Thirty-seven species are on the Watch List primarily because they are declining and/or threatened throughout their ranges, although they remain fairly widespread or have moderately large populations. Many of these species still number in the millions (e.g., Dickcissel, Wood Thrush), but their futures are threatened by serious reductions in population or geographic



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*The Saltmarsh Sharp-tailed Sparrow exhibits multiple causes for concern across its narrow range; its coastal marsh habitat is shared with numerous waterbird and waterfowl species.*



**Table 1. PIF Species of Continental Importance for the U.S. & Canada**

Species <sup>1</sup>	Conservation Action <sup>2</sup>	Continental Population Objective	Monitoring Need <sup>3</sup>	US & Canada Population Estimate <sup>4</sup>	Accuracy Rating & Precision <sup>5</sup>	Avifaunal Biome with Global Stewardship Responsibility <sup>6</sup>
<b>Watch List Species—Multiple causes for concern across entire range</b>						
Gunnison Sage-Grouse	IM	Increase 100%	**	2,000	5	Intermountain West
Lesser Prairie-Chicken	IM	Increase 100%	**	32,000	5	Prairie
California Condor	IM	Recovery Plan	**	< 100	6	Pacific
Green Parakeet	IM	Increase 50%	Mo1	< 5,000	1	*
Thick-billed Parrot	IM	Poss. Reintroduction	Mo1	0 ?	6	Southwest
Red-crowned Parrot	IM	Increase 100%	Mo1	< 2,500	2	*
Red-cockaded Woodpecker	IM	Recovery Plan	Mo2	20,000	2 D	Eastern
Ivory-billed Woodpecker	IM	Locate	**	0 ?	6	Eastern
Black-capped Vireo	IM	Recovery Plan	Mo1	4,800	4	Southwest
Florida Scrub-Jay	IM	Recovery Plan	**	10,000	5	Eastern
Island Scrub-Jay	IM	Maintain/Increase	Mo1	9,000	5	Pacific
Bicknell's Thrush	IM	Maintain/Increase	**	40,000	4	Northern Forest
Bachman's Warbler	IM	Locate	**	0 ?	6	Eastern
Golden-winged Warbler	IM	Increase 100%	**	210,000	4 B	*
Colima Warbler	IM	Maintain/Increase	Mo1	< 250	3	Southwest
Golden-cheeked Warbler	IM	Recovery Plan	Mo1	21,000	4	Southwest
Kirtland's Warbler	IM	Recovery Plans	**	2,100	6	Northern Forest
Bachman's Sparrow	IM	Increase 100%	Mo2	250,000	3 C	Eastern
Henslow's Sparrow	IM	Increase 100%	Mo2	79,000	3 B	Eastern
Saltmarsh Sharp-tailed Sparrow	IM	Increase 100%	Mo2	250,000	3	Eastern
Tricolored Blackbird	IM	Increase 100%	Mo2	250,000	5	Pacific
<b>Watch List Species—Moderately abundant or widespread with declines or high threats</b>						
Greater Sage-Grouse	IM	Increase 100%	Mo2	150,000	4	Intermountain West
Blue Grouse	MA	Increase 100%	Mo2	2,600,000	3 B	Pacific
Greater Prairie-Chicken	IM	Increase 100%	Mo2	690,000	2 C	Prairie
Scaled Quail	MA	Increase 50%	**	610,000	3 B	Southwest
Swallow-tailed Kite	IM	Increase 100%	Mo2	3,700	5	*
Swainson's Hawk	MA	Maintain/Increase	**	460,000	4 A	*
White-crowned Pigeon	MA	Increase 100%	Mo1	15,000	4	*
Band-tailed Pigeon	MA	Increase 100%	Mo2	970,000	3 B	*
Mangrove Cuckoo	MA	Increase 50%	Mo1	6,100	1 F	*
Short-eared Owl	MA	Increase 100%	Mo3	710,000	3 A	*
White-throated Swift	MA	Increase 100%	Mo2	280,000	3 B	*
Rufous Hummingbird	MA	Increase 100%	**	6,500,000	3 B	Pacific
Elegant Trogon	MA	Increase 50%	Mo1	340	1 F	*
Red-headed Woodpecker	MA	Increase 100%	**	2,500,000	4 A	*
Olive-sided Flycatcher	MA	Increase 100%	Mo3	1,200,000	3 A	*
Willow Flycatcher	MA	Increase 50%	**	3,300,000	4 A	*
Bell's Vireo	IM	Increase 100%	**	1,100,000	4 B	*
Pinyon Jay	MA	Increase 100%	**	4,100,000	4 B	Intermountain West
Oak Titmouse	MA	Increase 50%	**	900,000	4 C	Pacific
Brown-headed Nuthatch	MA	Increase 50%	**	1,500,000	4 B	Eastern
Wood Thrush	MA	Increase 50%	**	14,000,000	4 A	Eastern
Sprague's Pipit	MA	Increase 100%	**	870,000	4 C	Prairie
Grace's Warbler	MA	Increase 50%	**	1,000,000	2 C	*
Prairie Warbler	MA	Increase 50%	**	1,400,000	4 A	Eastern
Bay-breasted Warbler	MA	Increase 50%	Mo2,3	3,100,000	3 B	Northern Forest
Cerulean Warbler	MA	Increase 100%	**	560,000	4 B	Eastern
Prothonotary Warbler	MA	Increase 50%	**	1,800,000	4 A	Eastern
Worm-eating Warbler	MA	Maintain/Increase	Mo2	750,000	3 A	Eastern
Kentucky Warbler	MA	Increase 50%	**	1,100,000	4 A	Eastern

(continued)

**Table 1. PIF Species of Continental Importance for the U.S. & Canada (continued)**

Species <sup>1</sup>	Conservation Action <sup>2</sup>	Continental Population Objective	Monitoring Need <sup>3</sup>	US & Canada Population Estimate <sup>4</sup>	Accuracy Rating & Precision <sup>5</sup>	Avifaunal Biome with Global Stewardship Responsibility <sup>6</sup>
Canada Warbler	MA	Increase 50%	Mo3	1,400,000	3 A	Northern Forest
Brewer's Sparrow	MA	Increase 100%	**	16,000,000	4 A	Int.West & Southwest
Baird's Sparrow	IM	Increase 100%	**	1,200,000	4 C	Prairie & Southwest
Harris's Sparrow	MA	Increase 100%	Mo2,3	3,700,000	3	Arctic & Prairie
Varied Bunting	MA	Increase 50%	Mo1	31,000	2 D	*
Painted Bunting	MA	Increase 100%	**	3,600,000	4 A	*
Dickcissel	MA	Increase 50%	**	22,000,000	4 A	Prairie
Rusty Blackbird	MA	Increase 100%	Mo2,3	2,000,000	3 B	*
<b>Watch List Species—Restricted distribution or low population size</b>						
Mountain Quail	PR	Maintain/Increase	**	160,000	3 C	Pacific
Montezuma Quail	MA	Increase 50%	Mo1	150,000	2	*
Flammulated Owl	PR	Maintain/Increase	Mo1	29,000	1 F	*
Elf Owl	PR	Maintain/Increase	Mo1	47,000	1 E	*
Spotted Owl	IM	Recovery Plans	**	11,000	5	*
Antillean Nighthawk	PR	Maintain/Increase	Mo1	< 500	4	*
Black Swift	MA	Increase 50%	Mo2	84,000	2 C	*
Costa's Hummingbird	PR	Maintain/Increase	Mo2	1,800,000	2 D	*
Calliope Hummingbird	PR	Maintain/Increase	Mo2	1,000,000	3 B	Intermountain West
Allen's Hummingbird	PR	Maintain/Increase	Mo2	530,000	2 E	Pacific
Lewis's Woodpecker	MA	Maintain/Increase	Mo2	130,000	3 B	Intermountain West
Nuttall's Woodpecker	MA	Maintain/Increase	**	290,000	4 C	Pacific
Arizona Woodpecker	PR	Maintain/Increase	Mo1	4,300	1 F	*
White-headed Woodpecker	PR	Maintain	Mo2	72,000	2 C	Pacific
Thick-billed Kingbird	PR	Maintain/Increase	Mo1	2,300	1 F	*
Gray Vireo	PR	Maintain	Mo2	360,000	2 D	*
Yellow-billed Magpie	PR	Maintain/Increase	**	180,000	2 D	Pacific
California Gnatcatcher	PR	Recovery Plan	Mo1	6,000	4	*
Black-capped Gnatcatcher	PR	Maintain/Increase	Mo1	< 100	1	*
Wrentit	MA	Increase 50%	**	1,300,000	4 C	Pacific
Bendire's Thrasher	IM	Increase 100%	Mo2	130,000	2 C	Southwest
California Thrasher	MA	Increase 50%	Mo2	190,000	3 D	Pacific
Le Conte's Thrasher	PR	Maintain/Increase	Mo2	150,000	2 D	Southwest
Blue-winged Warbler	MA	Increase 50%	**	390,000	4 A	Eastern
Virginia's Warbler	PR	Maintain/Increase	Mo2	410,000	3 C	*
Lucy's Warbler	MA	Maintain/Increase	**	920,000	3 C	Southwest
Hermit Warbler	MA	Maintain/Increase	**	2,400,000	4 B	Pacific
Swainson's Warbler	PR	Maintain	**	84,000	4 B	Eastern
Red-faced Warbler	PR	Maintain/Increase	Mo1	110,000	1 E	Southwest
Abert's Towhee	PR	Maintain/Increase	Mo2	210,000	2 E	Southwest
Rufous-winged Sparrow	PR	Maintain/Increase	Mo1	8,900	1 E	Southwest
Five-striped Sparrow	MA	Increase 50%	Mo1	< 100	1	*
Black-chinned Sparrow	MA	Increase 50%	Mo2	310,000	2 D	Southwest
Nelson's Sharp-tailed Sparrow	PR	Maintain	Mo2	510,000	3 B	Eastern
Seaside Sparrow	PR	Maintain/Increase	Mo2	110,000	2 D	Eastern
McCown's Longspur	PR	Maintain/Increase	**	1,100,000	2 C	Prairie
Smith's Longspur	PR	Maintain/Increase	Mo2,3	75,000	3	Prairie
McKay's Bunting	PR	Maintain/Increase	Mo1,3	6,000	3	Arctic
Audubon's Oriole	MA	Maintain/Increase	Mo1	8,600	1 E	*
Black Rosy-Finch	PR	Maintain/Increase	Mo2	20,000	1	Intermountain West
Brown-capped Rosy-Finch	PR	Maintain/Increase	Mo2	45,000	3	Intermountain West
Lawrence's Goldfinch	PR	Maintain/Increase	Mo2	130,000	3 D	Pacific

(continued)



**Table 1. PIF Species of Continental Importance for the U.S. & Canada (continued)**

Species <sup>1</sup>	Conservation Action <sup>2</sup>	Continental Population Objective	Monitoring Need <sup>3</sup>	US & Canada Population Estimate <sup>4</sup>	Accuracy Rating & Precision <sup>5</sup>	Avifaunal Biome with Global Stewardship Responsibility <sup>6</sup>
<b>Additional Stewardship Species—High percent of Global Population in single biome (breeding or winter)</b>						
Spruce Grouse	PR	Maintain	Mo2,3	1,200,000	2 C	Northern Forest
Sharp-tailed Grouse	PR	Maintain	Mo2	1,200,000	3 B	Prairie
Gambel's Quail	PR	Maintain	**	1,100,000	3 B	Southwest
Mississippi Kite	PR	Maintain	Mo2	190,000	3 B	Prairie
Bald Eagle	PR	Maintain	Mo3	330,000	3 A	Pacific
Red-shouldered Hawk	PR	Maintain	**	820,000	3 A	Eastern
Chuck-will's-widow	MA	Maintain	**	15,000,000	3 A	Eastern
Lucifer Hummingbird	PR	Maintain	Mo1	< 150	1	Southwest
Red-bellied Woodpecker	PR	Maintain	**	10,000,000	4 A	Eastern
Williamson's Sapsucker	PR	Maintain	Mo2	310,000	3 B	Intermountain West
Yellow-bellied Sapsucker	PR	Maintain	Mo2,3	9,200,000	3 A	Northern Forest
Red-naped Sapsucker	PR	Maintain	**	2,200,000	4 B	Intermountain West
Red-breasted Sapsucker	PR	Maintain	Mo3	2,500,000	3 C	Pacific
Black-backed Woodpecker	PR	Maintain	Mo2,3	1,300,000	3 A	Northern Forest
Yellow-bellied Flycatcher	PR	Maintain	Mo3	6,200,000	3 A	Northern Forest
Acadian Flycatcher	PR	Maintain	**	4,700,000	4 A	Eastern
Alder Flycatcher	PR	Maintain	Mo3	49,000,000	3 A	Northern Forest
Gray Flycatcher	PR	Maintain	Mo2	1,200,000	3 B	Intermountain West
Dusky Flycatcher	PR	Maintain	**	3,500,000	4 A	Intermountain West
Pacific-slope Flycatcher	PR	Maintain	**	7,900,000	4 B	Pacific
Northern Shrike	PR	Maintain	Mo2,3	210,000	2 B	Northern Forest
White-eyed Vireo	PR	Maintain	**	16,000,000	4 A	Eastern
Yellow-throated Vireo	PR	Maintain	**	1,400,000	4 A	Eastern
Blue-headed Vireo	PR	Maintain	Mo2,3	6,900,000	3 A	Northern Forest
Philadelphia Vireo	PR	Maintain	Mo2,3	4,300,000	3 B	Northern Forest
Gray Jay	PR	Maintain	Mo3	16,000,000	3 A	Northern Forest
Steller's Jay	PR	Maintain	**	3,700,000	4 A	Pacific
Western Scrub-Jay	PR	Maintain	**	2,700,000	4 A	Pacific
Clark's Nutcracker	PR	Maintain	**	1,000,000	4 B	Intermountain West
Chestnut-backed Chickadee	PR	Maintain	**	6,900,000	4 B	Pacific
Boreal Chickadee	MA	Maintain	Mo2,3	7,800,000	3 A	Northern Forest
Black-crested Titmouse	PR	Maintain	Mo1	760,000	3 C	Southwest
Verdin	MA	Maintain	**	4,500,000	4 B	Southwest
Cactus Wren	PR	Maintain	**	4,100,000	4 B	Southwest
Carolina Wren	PR	Maintain	**	15,000,000	4 A	Eastern
Black-tailed Gnatcatcher	PR	Maintain	Mo2	1,800,000	2 C	Southwest
Mountain Bluebird	PR	Maintain	**	5,200,000	4 A	Intermountain West
Varied Thrush	PR	Maintain	Mo3	26,000,000	3 A	Pacific
Sage Thrasher	PR	Maintain	**	7,900,000	4 B	Intermountain West
Brown Thrasher	MA	Maintain	**	7,300,000	4 A	Eastern
Curve-billed Thrasher	PR	Maintain	Mo2	1,200,000	3 C	Southwest
Crissal Thrasher	PR	Maintain	Mo2	130,000	2 C	Southwest
Phainopepla	PR	Maintain	Mo2	900,000	3 B	Southwest
Tennessee Warbler	PR	Maintain	Mo3	62,000,000	3 A	Northern Forest
Nashville Warbler	PR	Maintain	**	34,000,000	4 A	Northern Forest
Chestnut-sided Warbler	MA	Maintain	**	9,400,000	4 A	Northern Forest
Magnolia Warbler	PR	Maintain	Mo3	32,000,000	3 A	Northern Forest
Cape May Warbler	PR	Maintain	Mo2,3	3,200,000	3 B	Northern Forest
Black-throated Gray Warbler	PR	Maintain	**	2,900,000	4 B	Pacific
Black-throated Green Warbler	PR	Maintain	Mo2,3	9,600,000	3 A	Northern Forest
Blackburnian Warbler	PR	Maintain	**	5,900,000	4 A	Northern Forest

(continued)

**Table 1. PIF Species of Continental Importance for the U.S. & Canada (continued)**

Species <sup>1</sup>	Conservation Action <sup>2</sup>	Continental Population Objective	Monitoring Need <sup>3</sup>	US & Canada Population Estimate <sup>4</sup>	Accuracy Rating & Precision <sup>5</sup>	Avifaunal Biome with Global Stewardship Responsibility <sup>6</sup>
Yellow-throated Warbler	PR	Maintain	**	1,600,000	4 A	Eastern
Pine Warbler	PR	Maintain	**	11,000,000	4 A	Eastern
Palm Warbler	PR	Maintain	Mo2,3	23,000,000	3 B	Northern Forest
Louisiana Waterthrush	PR	Maintain	**	260,000	4 A	Eastern
Connecticut Warbler	MA	Maintain	Mo3	1,200,000	3 B	Northern Forest
Mourning Warbler	PR	Maintain	Mo3	7,000,000	3 A	Northern Forest
Hooded Warbler	PR	Maintain	**	4,000,000	4 A	Eastern
Green-tailed Towhee	PR	Maintain	**	4,100,000	4 B	Int.West & Southwest
Eastern Towhee	MA	Maintain	**	11,000,000	4 A	Eastern
Canyon Towhee	PR	Maintain	**	1,600,000	4 B	Southwest
California Towhee	PR	Maintain	**	2,400,000	4 C	Pacific
Cassin's Sparrow	MA	Maintain	**	10,000,000	4 B	Southwest
American Tree Sparrow	PR	Maintain	Mo2,3	26,000,000	3	Prairie
Black-throated Sparrow	MA	Maintain	**	14,000,000	4 A	Southwest
Sage Sparrow	PR	Maintain	**	3,900,000	4 B	Intermountain West
Lark Bunting	MA	Maintain	**	27,000,000	4 A	Prairie
Grasshopper Sparrow	MA	Maintain	**	14,000,000	4 A	Prairie
Fox Sparrow	PR	Maintain	Mo3	16,000,000	3 A	Pacific
Lincoln's Sparrow	PR	Maintain	Mo3	39,000,000	3 A	Northern Forest
Swamp Sparrow	PR	Maintain	Mo3	9,000,000	3 A	Northern Forest
White-throated Sparrow	PR	Maintain	Mo3	140,000,000	3 A	N.Forest & Eastern
Golden-crowned Sparrow	PR	Maintain	Mo3	5,200,000	2 C	Pacific
Chestnut-collared Longspur	MA	Maintain	**	5,600,000	4 B	Prairie
Pyrrhuloxia	MA	Maintain	**	1,900,000	3 C	Southwest
Indigo Bunting	PR	Maintain	**	28,000,000	4 A	Eastern
Yellow-headed Blackbird	PR	Maintain	Mo2	23,000,000	3 A	Southwest
Scott's Oriole	PR	Maintain	**	820,000	4 B	Southwest
Cassin's Finch	MA	Maintain	**	1,900,000	4 B	Intermountain West
<b>Additional Stewardship Species—High percent of Western Hemisphere Population in single biome (breeding or winter)</b>						
Willow Ptarmigan	PR	Maintain	Mo1,3	11,000,000	2 D	Arctic
Rock Ptarmigan	PR	Maintain	Mo1,3	4,100,000	3	Arctic
Rough-legged Hawk	PR	Maintain	Mo2,3	260,000	2	Arctic
Gyr Falcon	PR	Maintain	Mo2,3	53,000	1	Arctic
Peregrine Falcon	PR	Maintain	Mo2,3	340,000	2	Arctic
Snowy Owl	PR	Maintain	Mo2,3	140,000	2	Arctic
Winter Wren	PR	Maintain	Mo3	18,000,000	3 A	Pacific
Bohemian Waxwing	PR	Maintain	Mo2,3	1,400,000	2 B	Northern Forest
Lapland Longspur	PR	Maintain	Mo2,3	74,000,000	3	Arctic & Prairie
Snow Bunting	PR	Maintain	Mo2,3	19,000,000	3	Arctic
Pine Grosbeak	PR	Maintain	Mo3	2,200,000	3 B	Northern Forest
White-winged Crossbill	PR	Maintain	Mo2,3	21,000,000	3 A	Northern Forest
Hoary Redpoll	PR	Maintain	Mo2,3	13,000,000	2	Arctic

<sup>1</sup> Species are sorted by reason for inclusion on the list of continental importance, then by taxonomy. Species shaded in yellow are Watch List Species; those in green (in species or biome columns) are Stewardship Species.

<sup>2</sup> Recommended Conservation Action: IM=Immediate Action, MA=Management, PR=Long-term Planning & Responsibility.

<sup>3</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.

<sup>4</sup> United States & Canada Population: estimates are rounded to two greatest digits, not meant to imply accuracy or precision.

<sup>5</sup> Accuracy Ratings for US & Canada Population estimates (see Appendix B for more information): 6=Accurate, 5=Good, 4=Moderate, 3=Fair, 2=Poor, 1=Guesstimate; Estimated Precision (Repeatability) of U.S. & Canada Population estimates, based on BBS count variance (see Appendix B for more information): A=Very High, B=High, C=Good, D=Moderate, E=Low, F=Very Low, No letter=population estimate not based primarily on BBS.

<sup>6</sup> Avifaunal Biome: indicates biome of high stewardship responsibility; Watch List species merit attention wherever they occur, while Stewardship Species require attention in those biomes where they are most common; where more than one biome is listed, first is for breeding season, second is for winter.

\*These Watch List species are not concentrated in any single biome.

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



range. Several other species (e.g., Swallow-tailed Kite, Mangrove Cuckoo, Elegant Trogon) are fairly widespread outside the U.S. and Canada, but are threatened in the U.S. portion of their range. Five species are afforded U.S. federal legal status in part of their range or for a particular recognized subspecies. This group also includes four resident game bird species with seriously declining populations.

About half the species in this group are classified as Neotropical migrants. Ten species are temperate migrants, and nine are essentially resident. As a group, these species breed in all parts of the U.S. and Canada. At the same time, 57% are concentrated enough within a single Avifaunal Biome to be classified as Stewardship Species.

*Species with restricted distributions or low population size:* Another 42 species are on the Watch List because they are restricted to a small range or have small global populations (often both). Many of these species are not known to be declining or seriously threatened at present, but many others are (e.g., Spotted Owl, Montezuma Quail, Bendire's Thrasher, Rufous-winged Sparrow, Audubon's Oriole). PIF recognizes that these species with small populations and restricted ranges are particularly vulnerable to relatively minor changes from current conditions, whether or not their populations are currently in decline.

Twenty-seven species in this group also are Stewardship Species, indicating relatively high concentration in a single Avifaunal Biome. All but five are endemic to parts of western North America, with a disproportionate num-



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*Although still fairly widespread and with a moderately large population, the Red-headed Woodpecker warrants Watch List status because of steep, yet unexplained, range-wide declines.*

ber restricted to the southwestern U.S. and northern Mexico. Fourteen species have their world distributions concentrated along the Pacific Coast. The Yellow-billed Magpie, for example, is restricted entirely to California. The few eastern species include Swainson's and Blue-winged warbler, Seaside Sparrow, and in winter, Nelson's Sharp-tailed Sparrow. Fifteen species in this category are classified as Neotropical migrants. However, most are relatively short-distance migrants wintering primarily within Mexico.

## STEWARDSHIP SPECIES

Of the 100 Watch List Species, 66 also are Stewardship Species, defined as being characteristic of a single

Avifaunal Biome. These species merit special attention for conservation action within their core ranges. There are an additional 92 continentally important Stewardship Species beyond those included in the Watch List (Table 1). Most (58%) of the additional Stewardship Species have stable or unknown population trends, although four species (Boreal Chickadee, Verdin, Black-throated Sparrow, Grasshopper Sparrow) have declined by 50% or more in the past 30 years.

Thirteen species have extensive populations in the Old World, but a high proportion of their Western Hemispheric population is restricted to a North American Avifaunal Biome (usually Arctic or Northern Forest). These are included as additional Stewardship



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*Not all Watch List species are at high risk; the Yellow-billed Magpie is not threatened, but its small population is entirely restricted to a small area of California, making it highly sensitive to future environmental changes.*

Species (Table 1) because they represent a significant and characteristic component of the North American biomes in which they occur.

Stewardship Species are broadly distributed across Canada and the U.S. during the breeding seasons (Fig. 11a), in a pattern that mirrors the richness of all land-bird species (Fig. 1a). In winter, Stewardship Species are heavily concentrated in the southern U.S. (Fig. 11b), particularly the Southwest and into Mexico, and along the West Coast of the U.S. In total, 74 Stewardship Species are biome-restricted in their winter range, illustrating the importance of conservation action in nonbreeding areas.

Watch List and Stewardship Species are identified based on criteria that reflect the way in which we should think

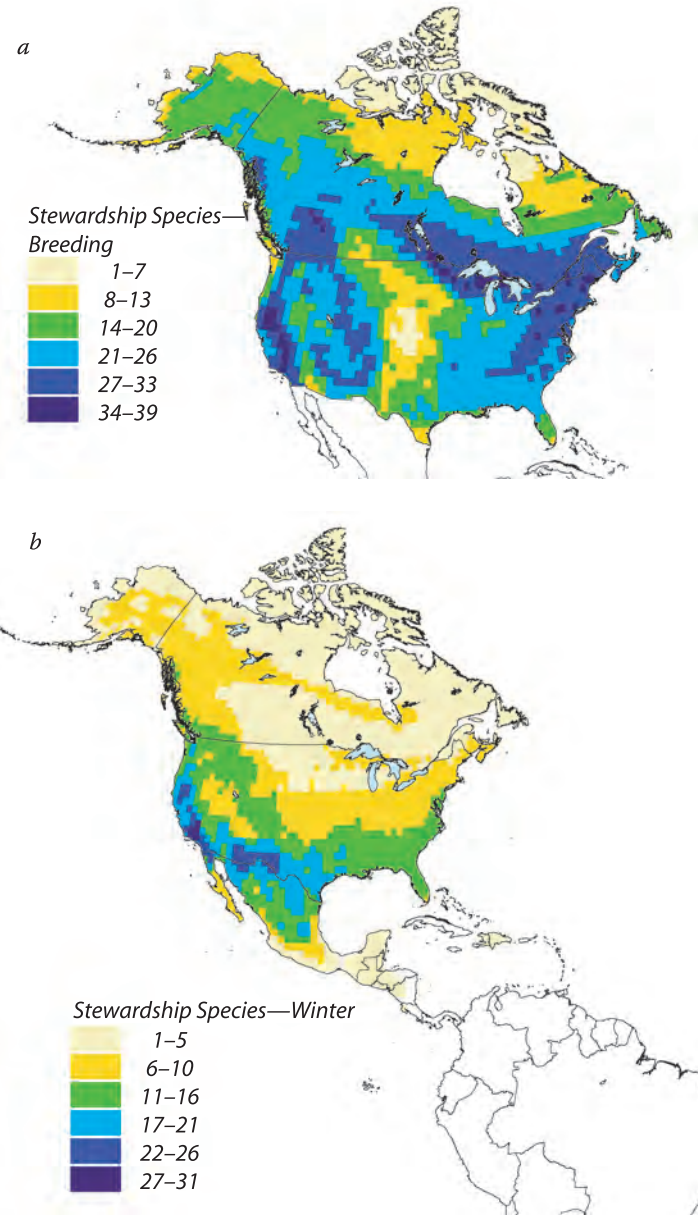


Figure 11. Number of PIF Stewardship Species occurring in each lat-long block (a) during the breeding season and (b) in winter.



While not highly threatened at present, the Snow Bunting and other Stewardship Species in northern biomes require long-term planning and habitat protection to maintain this characteristic component of the continent's avifauna.

about conservation for these two groups of birds. We intend Watch List Species to receive focused management attention that may or may not consider the needs of an entire faunal suite. That is, for Watch List Species, the species themselves take precedence. With Stewardship Species, our intent is to develop a pool of species that represents all major biomes across the continent and that will bring attention to habitats and birds characteristic of each of these biomes. For Stewardship Species, the implied conservation need is almost always to be taken in the much broader context of a species suite and related to habitat.

By highlighting Stewardship Species, we draw attention to them and afford some attention to all biomes of the continent. Additionally, this puts a high value on abundance. The ecological roles and services provided by a species, as well as social benefits to consumptive and nonconsumptive users, increase with bird abundance. The benefits of bird abundance are an integral part of the PIF vision and are as important to our success as protecting diversity.

## CONTINENTAL LANDBIRD OBJECTIVES

Using the list of Species of Continental Importance, the next step is to set specific, measurable population objectives. In the following section, we describe how we have established population objectives for the 192 Species of Continental Importance (Table 1). For the remaining landbird species, we do not set objectives but rather rely



on regional plans to set those objectives as appropriate. We next assign each Species of Continental Importance to an “action category,” according to the level and immediacy of conservation action required to meet the population objectives. We also categorize each species according to its monitoring needs and summarize general research needs. Finally, we outline the overarching conservation issues and threats facing landbirds in North America.

### *Population Objectives*

The establishment of population objectives is one of the more difficult tasks in the practice of conservation biology. Setting objectives as minimum viable population size—that number of individuals necessary to keep a species from the brink of extinction—is a desperate standard. PIF does not operate in that realm. We believe a more desirable objective is to sustain healthy, genetically diverse populations of birds, well distributed across their historical ranges. Because this is a large continent, this often means maintaining millions, or even tens of millions, of individuals of a given species. These numbers may sound high, but they represent what is required if we are to have healthy, intact ecosystems and biotic integrity across the continent. “Keeping Common Birds Common” is more than a catch phrase. For PIF it’s a true goal.

Setting population objectives requires knowledge of population size and trends, as well as agreement on historic baselines to which present-day populations can be compared. As a starting point, the target for Watch List species is to maintain current populations, or to return declining populations at least to their numbers in the late 1960s. This date was selected because we believe that target is achievable and realistic for most species on the Watch List. Acceptance of this baseline recognizes that the extensive losses and modifications of habitat since the European settlement of North America are historical realities that are not likely to be reversed to a significant extent at the continental level. It also recognizes that prior to 1966 and the start of the Breeding Bird Survey, there were no consistent data for most landbird species upon which to base measurable population objectives.

Targets for additional Stewardship Species are based on maintaining populations at levels of the 1990s. This is presented as a reasonable baseline for species that are not as vulnerable as Watch List species but still need a clear, measurable objective. However, some of these species’ populations are declining (e.g., Cactus Wren, Grasshopper Sparrow). These population declines indicate that maintenance of Stewardship Species, as a step toward maintaining broader suites of species within all



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*The very small world population and distribution of the Florida Scrub-Jay contribute to its Threatened status.*

biomes, may in some instances require actions and immediacy similar to those for Watch List Species.

Our continental perspective should not prevent the setting of more aggressive population objectives at the regional level for any Species of Continental Importance, especially in those regions where species’ declines may be driving continental population trends.

Population objectives were determined for Watch List Species based on degree of population change since 1966, according to the trend data used in the species assessment process. However, we recognize that trend estimates are not exact. Rather than proposing population objectives that represent estimates of the actual number of birds in 1966 (which would generate a different target for each species), we assigned each Watch List Species to one of four population objective categories (Table 1), as described below. For species that are the subject of legally mandated Recovery Plans, we defer to the objectives of those plans.

**Double Population:** For all Watch List Species that have undergone severe declines of 50% or more over 30 years (i.e., those with Population Trend scores of 5), the objective is to double the current population over the next 30 years. Reversing declines and doubling present-day populations is warranted for nearly a third of the 100 Watch List Species (Table 1).

**Increase Population by 50%:** For Watch List Species that have undergone moderate declines (15–50% over 30 years, as indicated by Population Trend scores of 4), the objective is to increase the population by 50% over the next 30 years. This objective is warranted for 23 Watch List Species.

**Maintain/Increase Population:** Watch List Species with uncertain or unknown past trend (Population Trend

scores of 3) may be seriously declining without our knowledge. Our conservative objective for these species, therefore, is to maintain or increase current populations in the next 30 years while simultaneously improving our knowledge of population status. This is the objective for 33 Watch List Species.

*Maintain Population:* For species with stable or increasing populations, and for all additional Stewardship Species, PIF's objective is to at least maintain current populations. This objective applies to 4 Watch List Species and to all 92 additional Stewardship Species.

By combining the suggested population objectives with our initial estimates of population size (Table 1), a first approximation of a numerical population target for each species at the continental level can be determined. For example, this Plan calls for a doubling of present-day Brewer's Sparrow populations over the next 30 years to restore a range-wide population of roughly 32 million breeding individuals.

Presenting numerical population targets for smaller planning units and jurisdictions is beyond the scope of this plan. On the PIF web site ([www.partnersinflight.org](http://www.partnersinflight.org)), we will post estimates of that portion of the continental population target for each species within a given state, BCR, or other geographic unit. We emphasize that the continental population estimates presented here, and all derivative population targets as just described, are preliminary and rely on many assumptions. Further, target population sizes depend on factors such as body weight, longevity, productivity, and a host of other factors that vary among species and populations. As smaller planning units work with both population objectives and population estimates, we anticipate a productive dialogue that will lead to ever more refined objectives upon which we can all agree. And as always, it is important for regions to work together so that our efforts collectively will meet continental objectives for the most important species.

### *Recommended Conservation Action*

Meeting PIF's population objectives will require a significant level of coordinated, on-the-ground conservation action. Of the 192 landbird Species of Continental Importance, however, not all require the same level or immediacy of conservation attention. We used combinations of assessment scores to place each Species of Continental Importance into one of three groups that indicate the relative level and immediacy of conservation action required. Categories of Conservation Action were assigned independent of population objectives, though there is a close relationship between the two. Specific actions required to

conserve each species or groups of species will vary across the continent, and we do not attempt to list them in this Plan. Further, we do not imply that we always understand what those specific actions should be. Research or demographic monitoring may be needed before we can take the necessary actions effectively. Instead, specific needs and strategies for local action are detailed in the many finer-scale PIF plans ([www.partnersinflight.org](http://www.partnersinflight.org)).

*Immediate Action (IM):* Immediate Action is needed for 28 Watch List Species, either to reverse or stabilize significant, long-term population declines of species with small populations, or to protect species with the smallest populations for which trends are poorly known (Table 1). Populations of these species are at risk of extirpation over broad portions of their range, and immediate and focused attention to their needs represents the highest conservation priority for landbirds. Nine species in this group already are the subject of intensive recovery efforts or are feared extinct. Other species do not have federal legal status at present, but are of serious concern. These include several resident game bird species, most notably Lesser Prairie-Chicken and Gunnison Sage-Grouse, as well as songbirds such as Bendire's Thrasher, Golden-winged Warbler, and Tricolored Blackbird. A few other



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*Like several other grassland specialists, the Baird's Sparrow warrants Immediate Action to reverse long-term population declines and reduce high threats to its habitat.*



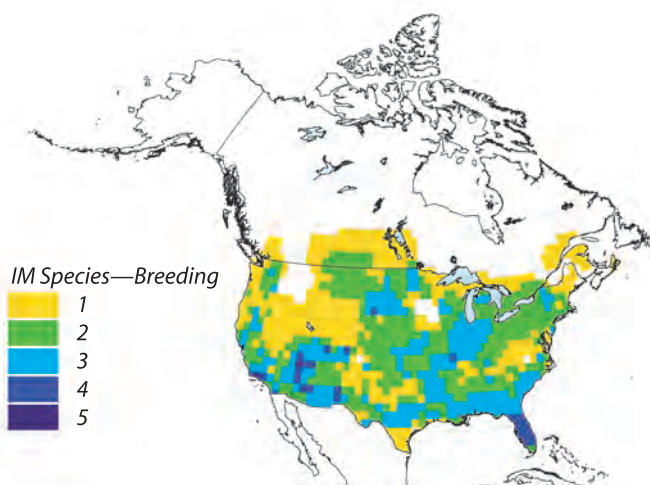


Figure 12. Number of PIF Species of Continental Importance breeding in each lat-long block that require Immediate Action (IM). These species typically exhibit a combination of very small population size or range, high threats, and declining population trend.

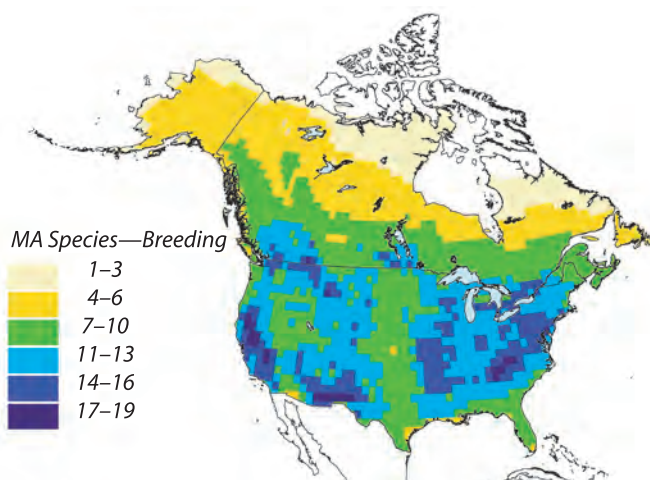


Figure 13. Number of PIF Species of Continental Importance breeding in each lat-long block that require Management (MA) to reverse significant long-term population declines or eliminate high threats.

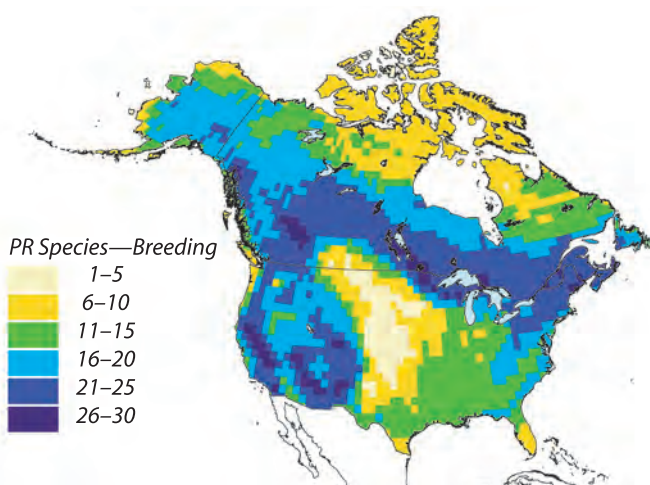


Figure 14. Number of PIF Species of Continental Importance breeding in each lat-long block that require Long-term Planning and Responsibility (PR) to sustain healthy populations. These are primarily biome-restricted species that are not known to be declining or highly threatened at present.

species in this category, such as Bicknell's Thrush, Colima Warbler, and Island Scrub-Jay, require the highest level of vigilance to sustain their tiny world populations.

Species in need of immediate action occur throughout the U.S. and southern Canada, but no single location supports more than 4–5 species (Fig. 12). Immediate actions in Florida and parts of the southwestern U.S. will benefit the greatest number of species, while so far, vast areas of northern Canada and Alaska have no landbirds in such dire need.

**Management (MA):** Management or other on-the-ground conservation actions are needed to reverse significant, long-term population declines or sustain vulnerable populations for 44 Watch List Species (Table 1). Although many of these species are still relatively widespread, actions are necessary to prevent these species from becoming in danger of regional or range-wide extirpation in the future. Of the additional Stewardship Species (Table 1), 14 also require Management in order to meet population objectives. However, because the causes of species declines often are not understood, research is needed to identify these causes so that management can be effective (see Research Needs).

Every part of North America south of the Arctic supports multiple Species of Continental Importance in need of Management (Fig. 13). High concentrations of species are found in such diverse regions as the Appalachian Mountains, southern Ontario, U.S. Midwest, Northern Rockies, California, and along the Mexican border in



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Le Conte's Thrasher is one of 28 Watch List species with restricted distribution and small population size that require long-term planning in the regions that support the bulk of their global population—in this case the Southwest Avifaunal Biome.



*Montezuma Quail is one of many southwestern species for which we have inadequate data on population trends. Developing a bird-monitoring program within Mexico is one of PIF's highest continental priorities.*

Arizona and New Mexico. Although total numbers of species in the Great Plains are lower, more than 50% of the Species of Continental Importance in that region are in need of Management due to population decline (Fig. 7a).

*Long-Term Planning and Responsibility (PR):* Long-term Planning is needed to maintain sustainable populations of 28 Watch List Species, and of the majority of additional Stewardship Species (Table 1). This action level applies to species with relatively stable or increasing populations regardless of population size, or relatively abundant species for which population trends are poorly known. A majority of species in this category are found mainly in a single Avifaunal Biome, emphasizing the stewardship responsibility of jurisdictions in those areas. Although Long-term Planning may be considered a lower conservation priority, such action is critical to achieving PIF's continental goals. Taking action to protect vulnerable species when they are still relatively healthy will be far less expensive—and more successful—than waiting until they are endangered.

The number of Species of Continental Importance in this action category is highest across the northern and boreal forests of Canada, the northern Rocky Mountains, and in many parts of the western U.S. (Fig. 14). Although there are fewer PR species in the Arctic, these represent a high proportion of that region's landbird avifauna. Throughout much of Canada and in Alaska, the highest priority for conservation action consists of careful planning and implementation of land-use choices that lead to long-term sustainability of the many Species of Continental Importance supported there.

For many Species of Continental Importance in the PR action category, population trends are unknown and knowledge of threats and limiting factors is poor. If populations of these species were known to be declining, close to three-quarters would be reassigned to the Management category or, in some cases, to the Immediate Action category. Thus, it is very important to fill the many gaps in monitoring and research identified in the following sections of this plan.

## LANDBIRD MONITORING AND RESEARCH NEEDS

### *Monitoring Needs*

Population monitoring is critical for all stages of conservation planning, including assessment of population status, identification of causal factors in population change, setting of population targets, and evaluating success of conservation action. Without continued attention to information needs, PIF will be unable to evaluate the success of our conservation actions or refine our objectives for the future.

In this Plan, the primary use of monitoring data is to assign a Population Trend (PT) score. In many cases, however, data on population trend are inadequate to assign PT scores within a defined level of certainty. While the BBS provides data for many landbirds that breed in the U.S. and Canada, work is needed to improve survey precision (Bart et al. in review). For other species, BBS is unsuitable, and will remain so even if survey coverage and analysis is enhanced. These species will require different survey approaches. Based on the source and quality of data for assigning PT scores, we define three groups of species with the greatest needs for better trend information:

*Species for which we have no trend data (Mo1):* These are species for which there are essentially no data on population trend. There are 85 species in this category, of which 24 are on the Watch List and 4 are additional Stewardship Species (Table 1). Many of these species breed along the U.S.-Mexico border (Fig. 15a), have large breeding populations south of the Mexican border, and winter in Mexico and Central America, so it is unlikely that increased monitoring efforts in the U.S. alone will permit accurate estimation of range-wide trends. The distribution of these species shows the need to expand bird-monitoring programs as Mexico becomes a full participant in the next version of this plan.

*Species with poor trend data (Mo2):* This category includes 106 species for which BBS trends have very low



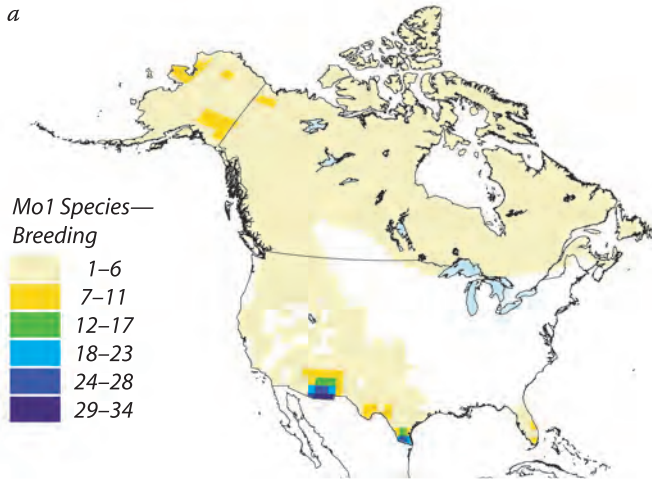


Figure 15a. Number of species in Monitoring Need category Mo1 (no trend data) that occur in each lat-long block during the breeding season.

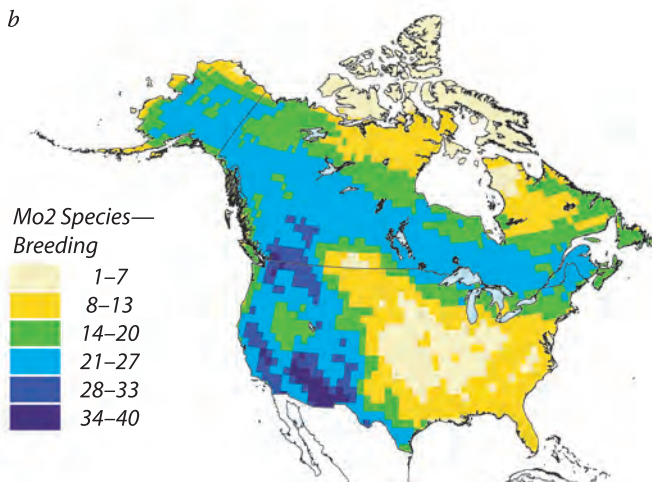


Figure 15b. Number of species in Monitoring Need category Mo2 (poor trend data; high or unquantified variance) that occur in each lat-long block during the breeding season.

precision (SE of 20-yr trend > 0.02; Bart et al. in review), or whose trend scores were based on Christmas Bird Count trend graphs, for which precision estimates were not available. Some Mo2 species have narrow ranges, but many broadly distributed species also are sampled sporadically or not at all by BBS. The latter include raptors, nocturnal species, grouse, and species of Boreal and Arctic regions (Fig. 15b). Many of these species will require surveys targeted at certain habitats or species groups, such as raptor migration counts or nocturnal owl monitoring. Mo2 species include 34 Watch List and 29 additional Stewardship Species.

*Species with inadequate northern coverage (Mo3):* Species in this category have more than one-third of their range in boreal and Arctic regions, north of the BBS coverage area (Fig. 15c). Significant bias can be present in trend estimates based on <1/3 of a species' range (Bart et al. in

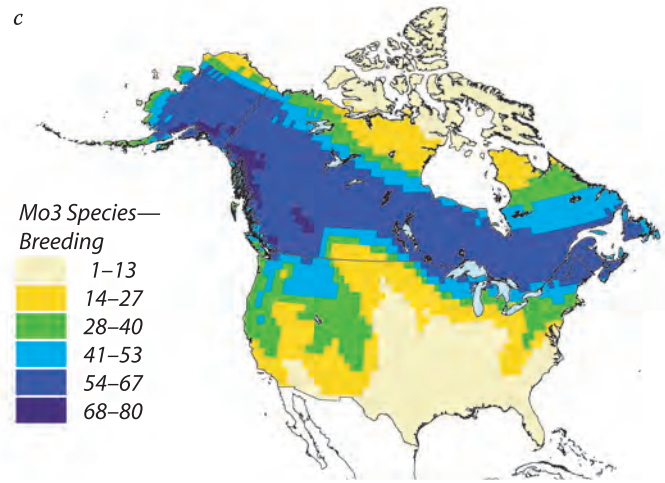


Figure 15c. Number of species in Monitoring Need category Mo3 (inadequate northern coverage) that occur in each lat-long block during the breeding season.

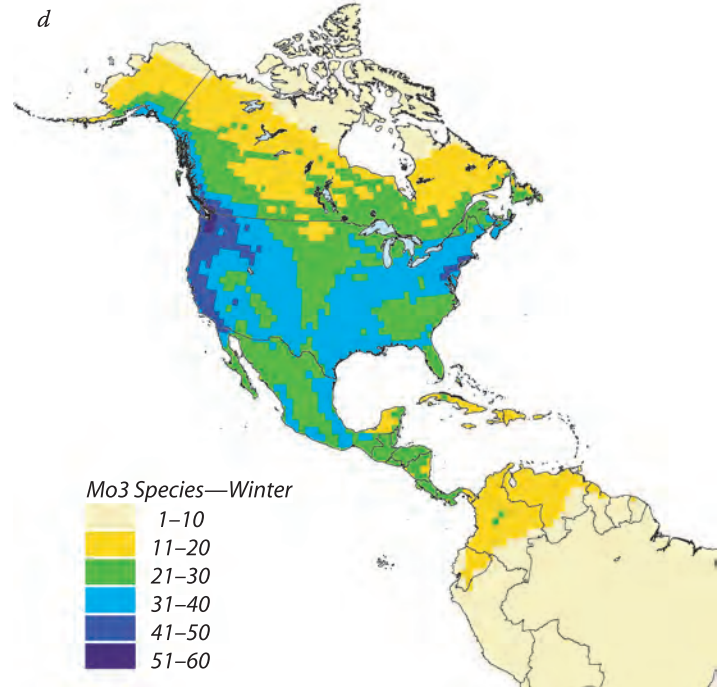


Figure 15d. Number of species in Monitoring Need category Mo3 (inadequate northern coverage) that occur in each lat-long block during winter.

review). This category includes 96 species, 8 of which are on the Watch List and 39 of which are additional Stewardship Species. Most Mo3 species are migratory, wintering in the U.S., Mexico, or Central America (Fig. 15d) such that they are amenable to monitoring by migration counts or winter surveys such as the Christmas Bird Count.

PIF has long been involved in identifying gaps in monitoring, developing monitoring strategies, and recommending best monitoring practices (e.g. Butcher et al. 1993, Downes et al. 2000, [www.nabci-us.org/aboutnabci/monstratframe.pdf](http://www.nabci-us.org/aboutnabci/monstratframe.pdf), Bart et al. in review). There is a new

emphasis on Coordinated Bird Monitoring (CBM, Bart 2003), an initiative aimed at improving efficiency through coordination of monitoring efforts among neighboring jurisdictions and major bird initiatives (particularly waterbirds, shorebirds and landbirds). Initial actions of CBM are focused on improved monitoring in the western U.S. and Canada, and in the Arctic.

Coordinated Bird Monitoring supports monitoring that includes hypothesis testing and assessment of demographic parameters. However, it is not feasible to conduct detailed, hypothesis-testing monitoring on all species, and recommendations for higher levels of monitoring are not covered in this Plan. Rather, the recommendations below are aimed at increasing the number of species with reliable long-term population trend estimates. These recommendations treat all species equally. Because priorities for action may vary among regions and agencies, it is important to coordinate across jurisdictions to carry out these recommendations:

- Strategically increase the number of routes in the BBS and other similar programs, and institute efforts to estimate and correct for potential bias. With enhancements that could realistically be achieved, BBS should be able to meet precision targets (Bart et al. in review) for 80% of the landbirds currently sampled by this survey.
- Through the Mexican NABCI Committee (ICAAN), support the Mexican government and partners to develop and implement the Mexican Bird Monitoring Strategy, particularly standardized breeding season monitoring.
- Establish new programs for species that can be monitored in the breeding season but which cannot be adequately sampled by even an improved BBS (including most species with restricted ranges). Most effort should be focused on Watch List Species, developing surveys designed to investigate population change and potential causal factors simultaneously. All new monitoring programs should be designed with clearly defined and achievable objectives and should take into account such issues as detectability, sample frames, unbiased population estimates, and statistical power, and should cover multiple species whenever possible.
- Institute a standardized, breeding-season monitoring program for birds in the boreal forest, as recommended by a recent PIF workshop on boreal monitoring (Machtans 2003).
- Improve the quality of data for the many northern

and arctic species which can most easily be monitored on their temperate wintering grounds, by conducting additional critical evaluation of winter surveys, especially the Christmas Bird Count. Research is needed on best analysis methods and precision estimation, and analysis and reporting should be done on an annual basis. The Bird Monitoring Program in Protected Areas in Mexico (part of the ICAAN Mexican plan with CONABIO-CONANP-INE) should be pursued as a means of monitoring Neotropical migrants in the nonbreeding season.

- Continue improvement of migration monitoring to meet information needs of many raptors and of the large group of northern nesting Neotropical migrants that are largely inaccessible for monitoring both in the breeding or wintering seasons. More evaluation and research is needed on best analysis methods and precision estimation, and annual analysis and reporting should be instituted (Dunn in press).



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*Research is urgently needed to understand the response by priority species such as White-headed Woodpecker to forest management, fire suppression, habitat fragmentation, and other land uses.*



- Improve standardization, management, and accessibility of the many existing bird-monitoring data sets and improve analysis capabilities across multiple programs, taking advantage of rapid advances in computer and internet technologies (Bart et al. in review).

Another important monitoring need is to track the amount, condition, and configuration of the habitats on which birds depend ([www.nabci-us.org/aboutnabci/monstratframe.pdf](http://www.nabci-us.org/aboutnabci/monstratframe.pdf)). Habitat monitoring cannot substitute for population monitoring, because bird numbers may fluctuate independently of habitat condition. Nonetheless, knowledge of habitat change is a crucial component of effective land-use planning at the landscape level. Analysis of remote-sensing data has often been used for this purpose regionally, but is lacking at the national and continental scale. We recommend a coordinated program of regular habitat assessment at the continental scale, as a tool for ensuring that landbirds have sufficient habitat to support healthy populations in all parts of North America during all phases of their life cycle.

### *Research Needs*

PIF has summarized and published research needs in order to encourage researchers and funding agencies to focus on the issues of greatest importance to landbird conservation. Perspectives and general guidance are available in several publications (Marzluff and Sallabanks 1998, Fitzpatrick 2002, Ruth et al. 2003, Williams 2003), while more specific priorities are outlined in Donovan et al. (2002).

New research should be applied, and should move away from descriptive, correlative and short-term work in small geographic areas, to large-scale replicated studies, controlled experiments, and long-term studies of demography (Donovan et al. 2002). Results that lead to concrete recommendations for habitat management are needed. Finally, there is a need for collaborative research with practitioners of other disciplines, particularly in fields other than biology (climatologists, land use planners, contaminants specialists).

Many of the priority information needs that should be addressed by research are too specific to local or regional circumstances to be summarized at the continental level. These needs are included in regional conservation plans and are available in a searchable database ([www.partnersinflight.org/pifneeds/searchform.cfm](http://www.partnersinflight.org/pifneeds/searchform.cfm)). There are, however, some common themes reflected by these regional research priorities, many of which are inter-related.

- *Identifying critical habitat components:* General habitat associations of landbirds are well known. However, we lack important information on specific structural features, landscape configurations, and amounts of habitat that are required by priority species. Such information is critical for guiding the development of effective management strategies for meeting continental population objectives. Habitat needs during nonbreeding seasons, particularly during migration, are even less well known.
- *Demographics:* Measurement of demographic parameters (nest success, productivity, survival, immigration) is needed to identify factors limiting populations and to contribute to understanding of metapopulation dynamics (gene flow, source vs. sink populations). Measurement of survival, particularly during juvenile, migration, and winter periods, is needed to both assess when landbirds are most at risk and to identify sources of mortality.
- *Examining responses of bird populations to land uses:* There is a critical need to determine the effects of various types of land use on avian populations in order to devise effective measures for minimizing the negative consequences of such land use. Land uses affecting bird populations include livestock grazing, silviculture, recreation, fire management, oil and gas development, mining, water control and development, agriculture, suburbanization, communication towers, and wind-power development. Only by understanding the responses and tolerances of birds to land use and management regimes can effective mitigation actions be developed. Research should involve stakeholders from the beginning so that solutions will be accepted and used by those who control the land.
- *GIS and landscape modeling:* Continue to develop tools such as the Grassland Bird Conservation Area Model to identify geographic focus areas for habitat protection, restoration, and management.
- *Examining the effects of abiotic environmental factors:* Research is needed on the importance of abiotic factors on bird population regulation, including climate change, drought, and contaminants (acid deposition, pesticides).
- *Testing assumptions:* Many assumptions have been explicitly identified in this plan and in Bird Conservation Plans written at the state and physiographic area level. These assumptions must be tested so that we can continue to improve the scientific basis for our decisions and our actions.

- *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



*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.*

to the needs and conservation issues specific to a region. Detailed PIF landbird conservation plans have already been written for most physiographic areas and states in the U.S. (linked at [www.partnersinflight.org](http://www.partnersinflight.org)) and are currently being written for remaining portions of the U.S. and Canada. Implementation actions, programs, and initiatives will vary among the three countries represented in this Plan. Each country has developed or is developing a separate national strategic plan, which outlines the goals and steps that need to be taken to conserve landbird populations and their habitats and to integrate with conservation of other wildlife.

Regional planners are naturally focused on regional objectives, but the effectiveness of landbird conservation action can be increased by linking objectives for BCRs or physiographic regions to those identified here at the continental scale. For example, although this Plan represents a revised assessment of conservation vulnerability for all species of landbirds, many Species of Continental Importance are likely to have been identified through past assessments in regional plans. If not, planners should consider whether revisions to existing plans could better address the needs of these species in their area. We generally suggest that Watch List Species be afforded attention wherever they occur. We suggest that action for Stewardship Species be carefully considered in areas where these species are most common, particularly where actions taken on behalf of Watch List Species are likely to leave Stewardship Species and their habitats lacking in attention. Additionally, where an individual Stewardship Species has a high regional population decline, specific action may be warranted, and an appropriate local objective might be to increase that species' population.

Continental population objectives can be stepped down to regional, provincial, territorial, or state-level objectives, adjusted as needed based on the capacity within the region, and then rolled up again to ensure that continental objectives will be met. PIF will continue to provide guidance throughout this process. Although only numbers for continental populations are presented in this plan, data on the percent of population present in each BCR, state, province, or territory will be posted on the PIF web site ([www.partnersinflight.org](http://www.partnersinflight.org)) to aid in stepping down numerical objectives.

While on-the-ground conservation action will take place at sub-continental scales, there are additional actions required for meeting PIF objectives that are appropriate for implementation at the national and international level. These tasks include the following:

- Coordinate conservation planning and action across geographic scales and political boundaries. Provide leadership in ensuring this Plan is implemented.
- Promote landscape-level natural resource planning that will lead to retention in all parts of North America of sufficient and suitably diverse habitat for sustaining healthy native bird populations.
- Develop and support bird-friendly guidelines for agriculture, forestry, energy industry, urban planning, water management, and other human activities that have the most impact on bird habitats.
- Encourage international treaties and policies that protect species, habitats, and the environment either directly or indirectly (e.g., trade policies).
- Encourage coordinated international legal protection for species at risk.
- Work with other conservation initiatives to integrate landbird conservation objectives with those for other taxa.
- Forge national- and international-scale partnerships to accomplish PIF objectives.
- Lead in the coordination and development of monitoring and research to provide critical information needed for truly effective adaptive management.

### *Implementation*

Implementation of this Plan consists of a variety of actions. They include habitat and nonhabitat based actions that lead to reaching the population objectives for landbird species outlined above. Successful implementation also depends on meeting the diverse needs identified in regional plans for monitoring, research, education, and outreach. These actions must occur at several scales, but in this Plan we focus on actions that are appropriate for implementation at national and international scales.

PIF needs many and varied partners to implement the conservation actions discussed in this plan. Good partnerships develop shared goals and objectives, synergy, and excitement. Because partners bring different skills to a common task, each partner sees its capacity enhanced. Each partner may also tap different sources of funding, and cooperation among partners creates new opportunities for involving new segments of society in maintaining a healthy environment.

A key role of PIF, therefore, is to work with individuals, agencies, and other organizations responsible for public



and private lands to integrate their management objectives with those outlined here. Those entities that manage the greatest amount of land and whose current management priorities have the greatest potential for compatibility with birds are the ones that can have the greatest positive effects. These should be the primary targets for PIF implementation activity. Fortunately, many of these agencies and organizations already are part of PIF, and this partnership has the primary responsibility for meeting PIF objectives.

The Joint Ventures, which were formed to implement the North American Waterfowl Management Plan, provide a very effective model for a public/private conservation partnership. The Joint Ventures involve multiple levels of government, industry, landowners, and a wide range of nongovernmental organizations in effective partnerships to deliver conservation on the ground. Most of the existing Joint Ventures have embraced the goal of integrated bird conservation, including attention to landbirds. In areas that do not have existing Joint Ventures, similar partnerships are in the process of forming. While collectively these partnerships will deliver integrated habitat conservation for all birds, PIF's role will be to promote

the needs of landbirds, develop the biological foundation, and evaluate landbird implementation.

Most implementation programs take place within jurisdictional units, such as states, provinces, and territories. In the U.S., an important opportunity exists over the next few years to increase resources for nongame birds within state agencies. Incorporation of PIF objectives into Comprehensive Wildlife Conservation Plans will be a critical step in this process. Each state will develop its own priorities and procedures for developing these plans and for incorporating the needs of all birds (see Hodgman, in press, for an example).

Management of specific sites for particular bird species and their habitats has always played an important role in conservation. To date, National Wildlife Refuges in the U.S. have been delineated primarily in wetland systems, and priority landbirds will benefit from establishing more refuges in upland habitats. A successful model for identifying and evaluating specific land parcels that can contribute to meeting population targets of priority bird species has been presented for the mid-Atlantic Coastal region (Watts and Bradshaw, in press). A valuable program for identifying and conserving specific sites is the Important Bird Areas program of BirdLife International. Important Bird Areas have been established in Europe, Africa, and South America, and this successful approach is now being implemented in the U.S., Canada, and Mexico. Finally, public land management agencies have mechanisms for identifying special management areas in their land-use planning processes that can be used to identify and protect important bird habitat. Bird populations cannot survive using protected areas alone, of course, but special areas are important for ensuring protection of key habitats and places that might otherwise be lost.

PIF Bird Conservation Plans, Joint Venture Implementation Plans, and other regional, state, provincial, territorial, and local implementation plans should be the foundations for presenting and accomplishing site-specific conservation actions. While natural links exist among other bird groups through the NABCI framework, integration with programs for other taxa can also produce mutual benefits, and finding the best management practices across landscapes can have broadscale implications for habitat availability and quality. The Wildlands Project, Yellowstone to Yukon Conservation Initiative, North American Bat Conservation Plan, Partners in Amphibian and Reptile Conservation, and Mesoamerican Biological Corridor are examples of excellent initiatives focusing on species other than birds, but with which we inevitably have shared goals. By combining our efforts, we not only



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*Meeting habitat objectives for this Mountain Quail and the other landbird species identified in this Plan will require effective partnerships among state and federal wildlife agencies, as well as industrial and other private landowners.*

enhance our opportunities to protect landbirds, but we also increase our chances of improving the quality of the environment upon which we all depend.

The following three administrative structures will facilitate coordination of conservation planning and action across geographic scales and political boundaries:

*National Councils:* Each country included in this Plan has a national forum or council that will guide PIF activities at a national level. The exact structures vary nationally in response to the needs and desires of PIF partners, but are generally composed of representatives of Federal and State/Provincial/Territorial governments, nongovernmental agencies, academia, and others. National councils serve in an advisory role in each country to identify program-wide priorities, discuss policy issues, facilitate effective communication and coordination, and identify issues for discussion and resolution at other national and international fora.

*Continental Council:* As more countries join in the Plan, formation of an international council, composed of representatives designated by the National Councils, may be considered to help facilitate international cooperation. This Continental Council would serve in an advisory role

to oversee the implementation, evaluation, and revision of the PIF North American Landbird Conservation Plan.

*Science Committee:* Guidance on the biological foundation for PIF will be provided by an international Science Committee (formerly the PIF Technical Committee) composed of representatives from the U.S., Canada, and Mexico. The Science Committee is responsible for maintaining, revising, and evaluating the technical content of this Plan and PIF Species Assessment Databases. The Science Committee will be responsible for addressing all other technical issues concerning landbird conservation at national and international levels, including, in particular, research and monitoring. Further, the Science Committee will provide assistance in stepping down continental objectives to smaller scales and revising continental objectives based on input.

### *Evaluation and Revision*

Evaluation is a critical component of conservation planning and implementation. Plans must be periodically upgraded to reflect improved knowledge. Importantly, there are assumptions behind every recommendation made in the bird conservation planning process. All of these assumptions should be explicitly stated, and the degree of support for them addressed. Elements of evaluation include examining the relationships between habitat and population responses to actions, assessing the completeness of conservation planning, and revising plans.

Regular assessment of the success of this Plan will provide important opportunities to modify approaches, bring in new partners, or redirect efforts, maximizing the likelihood of conservation success on an ongoing basis. Population monitoring is one important means of determining conservation success, but there are many other criteria that can be used to determine whether this Plan is being successfully implemented (see Box 5).

This Plan will be revised once Mexico concludes the species assessment and becomes a full partner, and the Plan will then be evaluated and revised every five years thereafter. The Continental Council, in cooperation with the national councils and the Science Committee, will oversee this process. Input will be actively solicited from national and regional PIF committees and regional implementation bodies. These periodic reassessments will ensure that this Plan responds effectively to changing conservation requirements and opportunities and, most importantly, addresses the highest priority needs for landbirds.

#### BOX 5

##### *Examples of measurable criteria for evaluating success of the Continental Plan:*

- Number of species on the Watch List and in the various categories of recommended conservation action
- Number of Species of Continental Importance on track for meeting 30-year population objectives
- Number of landbird habitat improvement projects supported by the Neotropical Migratory Conservation Act, North American Wetlands Conservation Act, and similar granting authorities
- Number of hectares of habitat protected and restored, by Bird Conservation Region and habitat type
- Number of species with monitoring needs
- Number of peer-reviewed research publications addressing priority landbird conservation issues
- Number of delivery mechanisms (e.g., Joint Ventures) in place throughout the continent to meet landbird population and habitat objectives
- Number of agency plans into which landbird objectives have been incorporated



## *Landbird Conservation Goals for the Next Decade*

Landbird conservation in North America has made major advances in the past decade, and a maturing infrastructure is prepared to accomplish largescale, long-term conservation across the continent. Evidence of this change was apparent at the Third International PIF Conference: A Workshop on Bird Conservation Implementation and Integration, in Monterey, California, 20-24 March 2002 (Ralph and Rich, in press). In order to see that the momentum continues, we propose the following goals, adapted from Fitzpatrick (2002), to guide us into the next decade.

### **GOAL 1: Ensure an active scientifically based conservation design process that identifies and develops solutions to threats and risks to landbird populations.**

#### *Reduce gaps in our understanding of populations and trends*

- Create and implement comprehensive monitoring schemes for all priority species in North America, Mexico, the Caribbean, and Central and South America.
- Develop an expanded array of census approaches so that the results for individual species can be compared and pooled among species.
- Develop new programs for nocturnal species, certain raptors and others whose ecology or behavior make them difficult to detect by conventional census methods.
- Conduct research of single species and ecological assemblages to increase our understanding of causes of population expansions, declines, and fluctuations.

#### *Develop a scientific auditing process to produce adaptive responses to monitoring projects and conservation plans*

- Modify conservation plans and management practices to reflect current knowledge.
- Conduct field experiments to test the assumptions of conservation plans and directly dictate new management decisions (adaptive management).
- Support national and regional specialists to track research and management accomplishments, keep plans fresh and updated, coordinate research objectives, and catalyze interactions among partners and funding sources.
- Update plans, measure accomplishments, and set new population objectives.

### **Expand the PIF North American Landbird Conservation Plan to incorporate additional countries**

- Include the results of the species assessment process from Mexico in the Plan and collaborate with Mexican government agencies, conservation groups, and academic institutions to include all winter and breeding landbirds.
- Help initiate PIF assessment and planning activities in the Caribbean, Central America, and South America in cooperation with Plan partners.

### **GOAL 2: Create a coordinated network of conservation partners implementing the objectives of landbird conservation plans at multiple scales.**

#### *Ensure that habitat management is in place to meet objectives of all high-priority species throughout their life cycles in Canada, the U.S., Mexico, and the rest of Latin America.*

- Put measurable actions and results on the ground based on best current information and adaptive management practices.
- Help establish and coordinate conservation implementation efforts through regional partnerships to protect priority bird species and habitats in Canada, the U.S., and Mexico.
- Expand conservation implementation efforts to encompass the Caribbean, Central America, and South America.

#### *Encourage wildlife agencies within countries, states, provinces, and territories to fully embrace all-bird conservation as a high priority for resource allocation and program implementation*

- Help create and coordinate information on priorities and objectives for landbirds so that they are incorporated into all appropriate agency activities.

#### *Assist Joint Ventures in delivering habitat programs for all birds*

- Work with Joint Ventures by providing information on priority species and habitats in forms that are useful to JV planning and implementation.
- Seek additional resources to strengthen the capacity of JVs to deliver landbird conservation.
- Assist in developing increased cooperation and coordination among agencies and jurisdictions.

*Assist nongovernmental organizations so that they can shepherd bird conservation*

- Provide information and coordination necessary so that mission-focused, not-for-profits can supply important guidance for setting long-term objectives, adjusting management strategies, measuring results, and sharing the labor required to achieve long-term conservation.
- Assist nongovernment organizations in coordinating among themselves and taking full advantage of their respective strengths.
- Provide industry with information, priorities, and plan components that are most useful to them in accomplishing their missions while also benefiting landbirds.
- Provide needs assessments and other opportunities for the academic sector to fully engage its capacity in science, leadership, and communication.

*Greatly increase education programs aimed at the general public*

- Incorporate bird conservation messages into classroom curricula.
- Fully support International Migratory Bird Day and other public education initiatives.

*Greatly increase the contributions of citizens to the conservation of landbirds*

- Conduct effective communication and outreach so that the numbers of amateur bird watchers directly involved in bird conservation reflect the level of their participation in the enjoyment of wild birds in wild places.
- Provide incentives and training so that bird watchers play an important role in conservation science by participating in organized monitoring programs and large-scale studies.
- Provide clear objectives and priorities for action so that the bird-watching public is an effective constituency, influencing government policy and willing to contribute resources in proportion to their numbers.

**GOAL 3: Secure sufficient commitment and resources to support vigorous implementation of landbird conservation objectives.**

*Work to ensure that there is substantial new funding to support all-bird conservation*

- Provide information necessary so that government and private funding is increased significantly to meet the challenges of all-bird, all-season conservation action.
- Work to ensure full funding at appropriate levels for sources such as the Neotropical Migratory Bird Conservation Act, the North American Wetlands Conservation Act, State Wildlife Grants, and other equivalent legislation in the U.S., Canada, and Mexico.
- Support significant increases in staff and resources devoted to nongame wildlife within all partners.
- Ensure that budgets of public land agencies are increased so that they can adequately assess their bird and habitat resources, and then take appropriate actions to secure or improve those resources.
- Ensure that policies and programs of public land agencies are directed toward conservation and management of high-priority landbirds.



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*Conservation of the Red-faced Warbler, and many other popular “border birds”, depends on full participation of Mexico in future versions of the PIF North American Landbird Conservation Plan.*