

**MAKING CONNECTIONS
for Bird Conservation:**

**Linking States, Provinces & Territories to
Important Wintering and Breeding Grounds**



Partners in Flight Science Committee

**Partners in Flight Technical Series No. 4
March 2006**

MAKING CONNECTIONS for Bird Conservation:

Linking States, Provinces & Territories to Important Wintering and Breeding Grounds

March 2006

Authors

Peter J. Blancher¹ – Canadian Wildlife Service
Brad Jacobs – Missouri Department of Conservation
Andrew Couturier – Bird Studies Canada
Carol J. Beardmore – U.S. Fish and Wildlife Service
Randy Dettmers – U.S. Fish and Wildlife Service
Erica H. Dunn – Canadian Wildlife Service
Wendy Easton – Environment Canada
Eduardo E. Iñigo-Elias – Cornell Laboratory of Ornithology
Terrell D. Rich – U.S. Fish and Wildlife Service
Kenneth V. Rosenberg – Cornell Laboratory of Ornithology
Janet M. Ruth – Biological Resources Division, U.S. Geological Survey

Suggested Citation:

Blancher, P.J., B. Jacobs, A. Couturier, C.J. Beardmore, R. Dettmers, E.H. Dunn, W. Easton, E.E. Iñigo-Elias, T.D. Rich, K.V. Rosenberg and J.M. Ruth. 2006. Making Connections for Bird Conservation: Linking States, Provinces & Territories to Important Wintering and Breeding Grounds. Partners in Flight Technical Series No. 4. Partners in Flight website: <http://www.partnersinflight.org/pubs/ts/04-Connections>

¹ primary contact: Peter.Blancher@ec.gc.ca

Making Connections for Bird Conservation:

Linking States, Provinces & Territories to Important Wintering and Breeding Grounds

To effectively conserve migratory landbirds, we need to be involved in conservation beyond our political borders. This has been a central tenet of Partners in Flight (PIF) since the initiative began in 1990 with a focus on Nearctic-Neotropical migrants. Implementation of this concept has also been fundamental to the success of the North American Waterfowl Management Plan (e.g., NAWMP 2004).

Actions by individual states, provinces and territories are key to the success of PIF efforts at the continental scale, and great progress has been made in recent years through various initiatives. Currently, U.S. state Wildlife Action Plans are outlining a vast array of actions to benefit priority species. However, it is also very important to take action in regions that support these same species at the other end of their migratory movements, to ensure effective protection year-round (Rappole et al. 1983, Webster and Marra 2005, Elliott et al. 2005). For instance, conservation action is needed on the wintering grounds for many birds that breed in Canada and the U.S. but spend a large proportion of their annual cycle in Mexico, the West Indies, Central and/or South America.

In this document we use maps to summarize migratory connections between individual U.S. states, Canadian provinces & territories and the regions that support the same birds at the other end of migration. The maps give a general picture of where birds go, providing a starting point for targeting action. With this information in hand, decision-makers can explore partnerships and mechanisms that would help further conservation action outside their borders.

Maps in the PIF North American Landbird Conservation Plan (Rich et al. 2004) showed composite wintering distribution of landbirds breeding in seven avifaunal biomes across Canada and the United States. Maps presented in this document go farther, showing composite migratory links specific to each state, province and territory. These maps are restricted to species of high conservation importance that migrate entirely out of the state, province or territory, to highlight migratory connections for species most in need of attention.

Methods

Maps have been produced for all Canadian provinces & territories, and all U.S. states except Hawaii, which remains a special case due to its geographic location and avifauna.

Species included in the maps:

We used only species of high conservation importance in the maps, rather than whole avifaunas. The PIF species assessment database provides a tool for determining species of conservation importance in individual regions (Carter et al. 2000, Panjabi et al. 2001, 2005). The International Association of Fish and Wildlife Agencies (IAFWA) has taken this tool and produced guides and priority species lists for individual U.S. states (Rosenberg 2004), as aids for incorporating landbird conservation into state-wide Wildlife Action Plans. Maps presented here for U.S. states use the same species lists as in those state guides, for consistency. These lists were based on the PIF Species Assessment Database (Panjabi et al. 2001), and included species from each bird conservation region (BCR) overlapping each state. They focused primarily on landbirds, but also – at the request of states – included some priority shorebirds and non-colonial waterbirds that share upland and marsh habitats with landbirds. Landbirds of conservation importance in Canadian provinces and territories were derived in a similar manner, using the newly revised PIF Species Assessment Database (Panjabi et al. 2005; <http://www.rmbo.org/pif/pifdb.html>) to identify birds of importance from each BCR overlapping each province or territory. Waterfowl, colonial waterbirds, and coastally-restricted shorebirds are not included in any of the maps shown here.

Maps include only those species that migrate entirely out of the state², to emphasize migratory connections. An exception was made to include migrants that have at least 90% of their winter range south or south-east of the United States, even if those species did not leave a state entirely (e.g., Prothonotary Warbler was included in the winter link map for Louisiana, Northern Parula for Florida). This approach helped ensure that short migratory connections to areas of northern Mexico and the West Indies were included. A similar exception would have been made when mapping connections northwards into Canada from states with wintering species of conservation importance, but no species qualified in those states that were mapped.

Range maps as the basis for migratory links:

NatureServe produced digital range maps for over 4,000 bird species of the Western Hemisphere, making use of range data from a wide variety of sources (Ridgely et al. 2003, <http://www.natureserve.org/getData/birdMaps.jsp>). We relied on these digital maps to show breeding and winter distribution of priority³ species.

² "state" here and elsewhere in this document is used as a short form for "U.S. state or Canadian province or territory"

³ "priority species" here and in map legends is used interchangeably with "species of conservation importance"; these species were determined as outlined in the Methods

Each species map was digitally assigned to degree blocks of latitude and longitude (i.e., 1° latitude by 1° longitude) according to season of occurrence (breeding, winter). This allowed maps to be combined (stacked) across species by summing the number of priority species occurring in each degree block in each season. Thus all maps we show are composites of the ranges of many species.

Ideally, migratory connections would be based on migratory pathways of individual birds known to breed or winter in a particular jurisdiction, obtained from banding data, telemetry or other types of markers (e.g., stable isotope ratios). Resulting maps would be focused on connections important to subpopulations breeding or wintering in a jurisdiction. Though these types of data exist for some species, low sample sizes, large geographic gaps and/or recovery biases limit the usefulness of these approaches when dealing with large suites of species across much of the Western Hemisphere.

The main advantage of using range maps to show migratory connections is that they provide an almost complete coverage of the Western Hemisphere that is comparable across species. Although NatureServe's digital range maps do not show range outside of the Western Hemisphere nor in Greenland, this affects only a very few of the species dealt with here. It is important to keep in mind that our use of range maps implies that all areas within a species' winter range are equal in importance to the species. We know that this is not true and so reiterate that these maps are just a starting point for illustrating migratory connections. At some point in the future it may be possible to map relative abundance across both breeding and winter range to focus more closely on places with highest abundance within each species' range at both ends of migration. More detailed banding, telemetry, and other data will almost always assist in designing the most effective conservation action.

Migration Links in Two Directions - Winter connections, breeding connections:

For most birds of conservation importance in Canada and the United States, migratory links are southwards; that is, most are migrants that breed in a state and then leave for wintering grounds to the south or southeast. As a result, every state, province and territory has a map that shows winter connections for a substantial number of breeding species that migrate out of state.

Some priority species in the United States are migrants that winter in a state and then migrate northward out of the state to breed. There are a significant number of these wintering species in states across the southern U.S. Decision-makers will want to know where they breed. For 18 states with at least 5 species of conservation importance linking northwards we included a map showing breeding connections to the north.

Weighting the maps:

To focus on the strongest links to each individual state, province or territory, species included in maps were weighted by the estimated percent of their population in the jurisdiction. Thus, priority species with a large proportion of their breeding population in a state were weighted highly in maps showing wintering connections for that state. Similarly, priority species with a large proportion of their wintering population in a state were weighted highly in maps showing breeding connections. Species with a low percent of population in the state received little weight. For example, in Wisconsin the Golden-winged Warbler with an estimated 22% of its world breeding population in that state received a much higher weight than the Acadian Flycatcher which has <1% of its breeding population there.

Percent of population (%Pop) data applicable to each state were determined from a combination of bird survey data (typically Breeding Bird Survey in the breeding season and Christmas Bird Count in winter) and range maps for unsurveyed parts of a species' range. Details of %Pop calculations are given in Rich et al. (2004) and Panjabi et al. (2005).

These weights were applied to each degree block in a species' range prior to combining maps across species. Weights were capped at 10 times the average weight across species in the jurisdiction to prevent single species from masking connections for other species. However, this cap was only applied to a few species and jurisdictions (e.g., Kirtland's Warbler in Michigan winter links map).

Results: The Maps

Maps showing migratory connections for individual states, provinces and territories are available for viewing or download at the PIF web site: <http://www.partnersinflight.org/pubs/ts/04-Connections>. Below we outline some general patterns observed among states, and provide some guidance on the use of maps.

Links between States, Provinces and Territories, and Wintering Grounds to the South:

A total of 365 species were identified as species of conservation importance in at least one of the 49 states, 10 provinces or 3 territories. Of these, 254 (70%) were included in maps linked to wintering areas beyond borders of individual states, provinces or territories (i.e., they breed in the state, province or territory but migrate beyond those borders in winter). Individual states averaged 43 priority breeding species that migrate beyond their borders, varying from 20 for Rhode Island and Prince Edward Island to 75 for Quebec.

Although each map is unique, some strong general patterns place most states, provinces and territories into four groups:

- The three northern Canadian territories (Yukon, Northwest Territories, Nunavut) all show widespread wintering links to the United States (e.g., Fig. 1a), particularly central and western states where species such as Harris's Sparrow, Smith's Longspur and Lapland Longspur spend the winter. Though Alaska shares some of the same priority species, it shows a pattern of migratory links more closely aligned with western states and provinces.
- Western states and provinces, from the Pacific Coast east through the Rocky Mountains to western grasslands, all show pronounced wintering concentrations in Mexico (excluding southeastern Mexico) involving many species of high conservation importance. Northern states and provinces in this group tend to show strong links to the southwestern U.S. and northern Mexico. Weaker migratory connections extend southward into Central America, but there are few links to the Yucatan peninsula, the West Indies or to South America (e.g. Fig. 1b).
- In contrast, most states and provinces in the eastern half of North America show strong links to the West Indies, southeastern Mexico, Central America, and northern South America (e.g., Fig. 1c). For several states, the connection to South America extends south along the Andes through Ecuador and Peru, where a variety of priority forest birds winter (e.g., Scarlet Tanager, Canada and Cerulean warblers). The more northern states and provinces also show notable connections to the southeastern coastal U.S.
- Central states and provinces, especially from South Dakota and Minnesota south to Texas, show connections intermediate between those above, and in addition show a secondary area of concentration farther south in South America (e.g., Fig. 1d). The latter concentration area is due to a variety of birds that winter in open habitats stretching into central Argentina (e.g., Upland Sandpiper, Bobolink, Swainson's Hawk, Mississippi Kite, and Common Nighthawk).

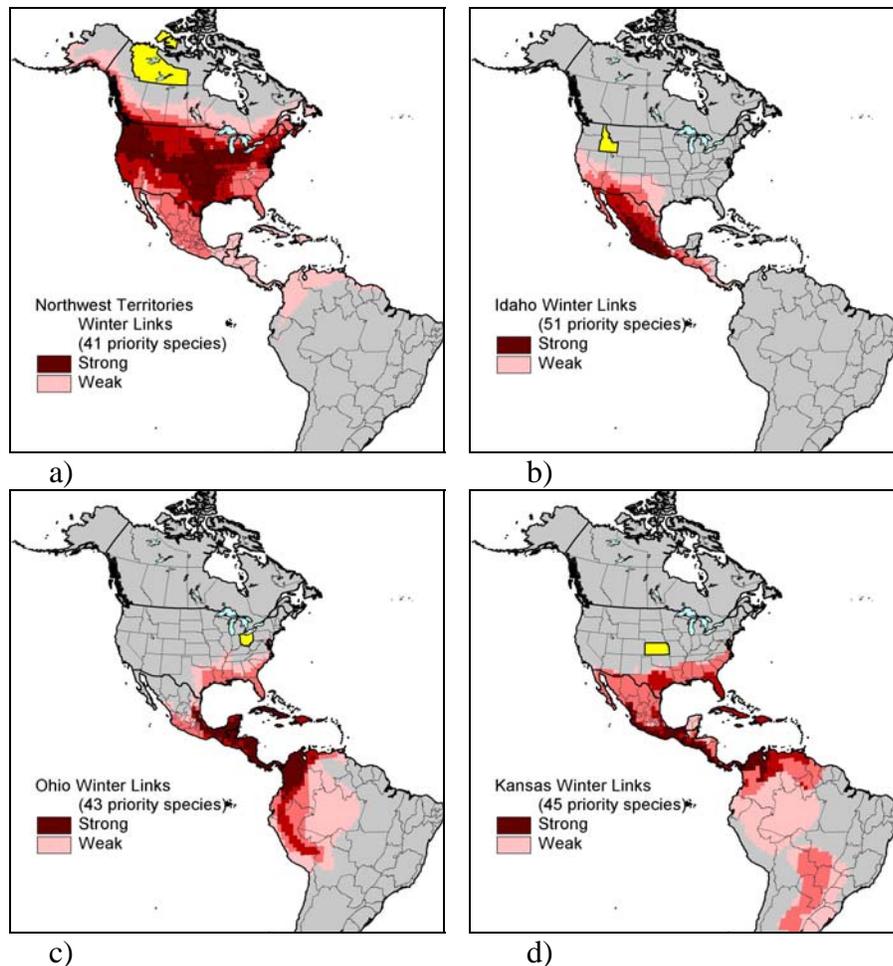


Figure 1: Examples of maps showing connections for birds of conservation importance breeding in individual states and wintering out of state: a) Northwest Territories; b) Idaho; c) Ohio; d) Kansas.

Links between States and Breeding Grounds to the North:

A total of 33 species, 9% of all priority species, winter in states and migrate north to breed. U.S. states average less than 4 priority species migrating north, but this varies considerably, from none for several northwestern and northeastern states to 21 species for Texas.

The 33 species are mostly short-distance migrants that breed in grassland, tundra or northern wetlands, with only a few forest species - northern forest birds tend to be Nearctic-Neotropical migrants. As a result, state connection maps tend to highlight breeding areas in the prairie grasslands (e.g. Fig. 2a - New Mexico) or the low arctic and taiga (e.g. Fig. 2b - Oklahoma), with some links as well from states farther southeast (e.g. Fig. 2c - Georgia).

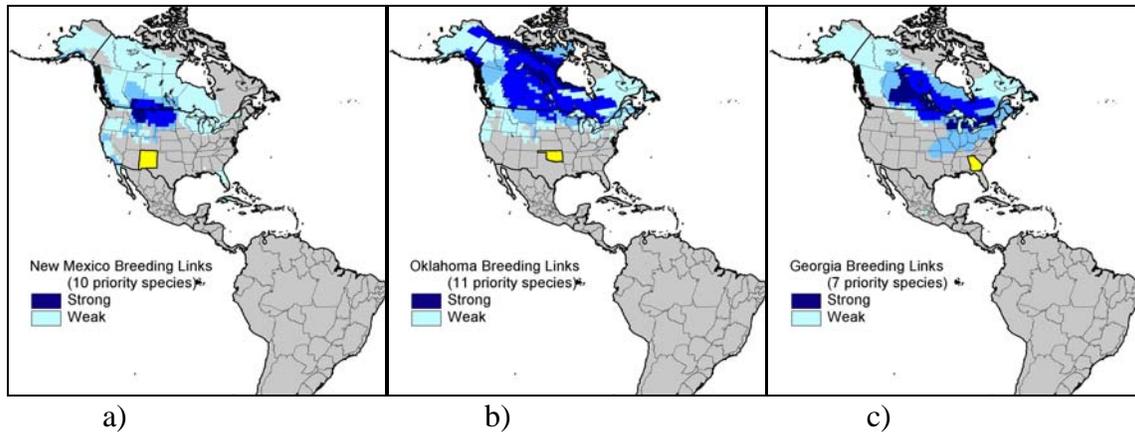


Figure 2: Examples of maps showing connections for priority birds wintering in individual states and breeding out of state: a) New Mexico; b) Oklahoma; c) Georgia.

Using the Maps

These maps are a starting point to help identify regions beyond state borders that could be targeted for conservation attention.

Guidelines to consider when making use of the maps

1. Focus on the broad-scale, general patterns in the map. Don't assume that fine-scale differences are real, as maps are based on range outlines and don't reflect relative abundance within that range.
2. Make use of additional data on bird species and their habitat preferences to target areas with known presence / abundance of priority species or their habitats.
3. Many established organizations already have international partnerships for bird and habitat conservation and should be consulted for guidance in initial planning and partnership development. Coordination of international partnerships will be important to avoid redundant effort and competing goals and objectives.
4. Good partnerships, as always, will involve finding areas of mutual interest and working together on joint objectives. Local priorities typically involve imperiled resident bird species (Ceballos and Márquez Valdemar 2000, Stattersfield and Capper 2000), but may also include a wide variety of other wildlife and plants. Because the focus of conservation in most parts of the world is on habitat, defining overlapping objectives is often relatively straightforward.
5. Finally, in pursuing conservation action in countries beyond Canada and the United States, it is very important to keep in mind that federal government agencies in each country, local non-government organizations (NGOs), research centers, and multi-lateral

agencies (e.g., Canadian International Development Agency (CIDA), U.S. Agency for International Development (USAID), Global Environment Facility (GEF)/World Bank) always have their own priorities for conservation action.

Within Partners in Flight, the PIF International Working Group (see <http://www.partnersinflight.org/contactus.cfm> for current PIF International WG co-chairs) and *La Tangara* (<http://www.latangara.org>), the newsletter of the International WG, are good resources for communicating with potential partners south of the U.S. border. The Partners in Flight – Canada website hosted by Canadian Wildlife Service (<http://www.cws-scf.ec.gc.ca/mbc-com/default.asp?lang=en&n=7AEDFD2C>) provides links to potential partners in Canada. The Partners in Flight – U.S. website (<http://www.partnersinflight.org>) provides resources for potential partners within the U.S.

Here are a few additional examples of existing international partnerships and resources.

- The North American Bird Conservation Initiative – Mexico Committee has a network of partners with information throughout Mexico.
- Bird data from banding stations, such as those operated by the Institute for Bird Populations (<http://www.birdpop.org/>) in Mesoamerica and the Caribbean provide local detail on species abundance and season of occurrence.
- Important Bird Area programs within countries maintain species lists for their sites (e.g., Mexico - Arizmendi and Valdelamar (2000), CONABIO (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad) (2006) (in Spanish) (<http://conabioweb.conabio.gob.mx/aicas/doctos/aicas.html>), Panama - Angehr (2003)).
- Data from a variety of research projects operated by in-country NGOs (e.g., Fundacion Cocibolca in Nicaragua (<http://www.mombacho.org>)), are also useful for focusing action.
- The Western Hemisphere Migratory Species Initiative (<http://www.fws.gov/international/whc/AboutWHMSC.htm>) is a new network of conservation partners throughout the Western Hemisphere where contacts within any country can be found.
- In the case of implementing projects in Mexico, an official table for bird conservation has already been established - the Trilateral Committee for Wildlife and Ecosystem Conservation and Management (Mexico, Canada, and U.S.). Trilateral Committee (2006) (<http://www.trilat.org/index.htm>).
- Latin America and Caribbean PIF groups are in the process of assessing bird conservation needs and prioritizing conservation efforts in their respective countries.

- Information on a wide variety of wildlife and plant priorities have been identified in National Biodiversity Conservation Strategy and Action Plans in most Latin American countries – Convention on Biological Diversity (2006) (most in Spanish) (<https://www.biodiv.org/reports/list.aspx?type=nbsap&alpha=A>). These series of documents guide national conservation strategies.

Acknowledgements

Digital range maps were provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy - Migratory Bird Program, Conservation International - Center for Applied Biodiversity Science, World Wildlife Fund - US, and Environment Canada - WILDSPACE. The Missouri Dept. of Conservation provided for initial preparation of the maps. Special thanks to Lois Loges for her technical help in setting up the web version of the document.

References

- Angehr, G. 2003. Directory of Important Bird Areas in Panama. Panama Audubon Society. BirdLife/Vogelbescherming Nederland. Panama.
- Arizmendi M.C., and L. Márquez Valdelamar. (Eds). 2000. Áreas de Importancia para la Conservación de las Aves en México. CIPAMEX. D.F., México.
- Carter, M.F., W.C. Hunter, D.N. Pashley, and K.V. Rosenberg. 2000. Setting conservation priorities for landbirds in the United States: the Partners in Flight approach. *Auk* 117:541-548.
- Ceballos, G. y L. Márquez Valdelamar. 2000. Las aves de México en peligro de extinción. CONABIO, Instituto de Ecología-UNAM, Fondo de Cultura Económica. DF, México. 430 pp.
- CONABIO. 2006. Áreas de Importancia para la Conservación de las Aves (AICAS). <http://conabioweb.conabio.gob.mx/aicas/doctos/aicas.html>. 21 February, 2006. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO).
- Convention on Biological Diversity. 2006. National Biodiversity Strategy and Action Plans. <https://www.biodiv.org/reports/list.aspx?type=nbsap&alpha=A>.
- Elliott, G., B. Altman, W. Easton, R. Estrella, G. Geupel, M. Chase, E. Cohen, and A. Chrisney. 2005. Integrated Bird Conservation along the Pacific Coast of North America: An Action Agenda. Pp. 107-111 In: C.J. Ralph and T.D. Rich (Eds). Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference. 2002 March 20-24; Asilomar, California, Volume 1. Gen. Tech. Rep. PSW-GTR-191. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 651 p.
- NAWMP. 2004. The 2004 North American Waterfowl Management Plan. Strengthening the Biological Foundation. Strategic Guidance. U.S. Department of the Interior – Fish and Wildlife Service, Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT), Environment Canada – Canadian Wildlife Service.
- Panjabi, A., C. Beardmore, P. Blancher, G. Butcher, M. Carter, D. Demarest, E. Dunn, C. Hunter, D. Pashley, K. Rosenberg, T. Rich and T. Will. 2001. The Partners in Flight handbook on species assessment and prioritization. Version 1.1. Rocky Mountain Bird Observatory. Brighton, Colorado.

- Panjabi, A.O., E.H. Dunn, P.J. Blancher, W.C. Hunter, B. Altman, J. Bart, C.J. Beardmore, H. Berlanga, G.S. Butcher, S.K. Davis, D.W. Demarest, R. Dettmers, W. Easton, H. Gomez de Silva Garza, E.E. Iñigo-Elias, D.N. Pashley, C.J. Ralph, T.D. Rich, K.V. Rosenberg, C.M. Rustay, J.M. Ruth, J.S. Wendt, and T.C. Will. 2005. The Partners in Flight handbook on species assessment. Version 2005. Partners in Flight Technical Series No. 3. Rocky Mountain Bird Observatory website: <http://www.rmbo.org/pubs/downloads/Handbook2005.pdf>
- Rappole, J.H., E.S. Morton, T.E. Lovejoy, and J. L. Ruos. 1983. Nearctic avian migrants in the Neotropics. USDI Fish and Wildlife Service. Washington, D.C. 646 pp.
- Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Iñigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, and T.C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, New York. http://www.partnersinflight.org/cont_plan/default.htm
- Ridgely, R.S., T.F. Allnutt, T. Brooks, D.K. McNicol, D.W. Mehlman, B.E. Young, and J.R. Zook. 2003. Digital Distribution Maps of the Birds of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.
- Rosenberg, K.V. 2004. Partners In Flight Continental Priorities and Objectives defined at the State and Bird Conservation Region Levels. Part 1: Users' Guide: Methods and Assumptions. Part II: Individual States. Cornell Lab of Ornithology. Ithaca, New York. http://www.iafwa.org/bird_conservation/landbird_reports.htm
- Stattersfield, A.J., and D.R. Capper (Eds.). 2000. Threatened Birds of the World. Lynx Edicions and BirdLife International, Barcelona, Spain and Cambridge, United Kingdom.
- Trilateral Committee for Wildlife and Ecosystem Conservation and Management. 2006. <http://www.trilat.org/index.htm>.
- Webster, M.S. and P.P. Marra. 2005. The importance of understanding migratory connectivity and seasonal interactions. Pp. 199-209 In: Greenberg, R. and P. P. Marra, (Eds). Birds of Two Worlds: the ecology and evolution of migration. The Johns Hopkins University Press, Baltimore. 466 pp.

Appendices – Species Weights used in the Maps

Values shown in these appendices are weights that reflect the estimated percent of the species' world population that relies on the individual state, province or territory. They are included here to give an indication of the relative contributions of priority species to individual maps, and can help understand patterns observed in those maps.

These weights have been adjusted to an average weight of 1.0 across priority species within a state in the same season, so that species with above average contributions can be quickly identified. The weights are not directly comparable across states, provinces and territories because the adjustment factor was different in each state.

Species without weights in the following tables are either not on the priority list that we used for the state, province or territory, or do not occur in the state during breeding (Appendix A) or winter (Appendix B), or do not migrate entirely out of the state according to range maps.

Appendix A: Weights used to connect individual states, provinces and territories to Wintering grounds farther south

Available as separate pdf files, as follows:

[A1. Weights for winter links from Canadian provinces and territories](#)

[A2. Weights for winter links from western U.S. states \(PIF-West Region\)](#)

[A3. Weights for winter links from midwestern U.S. states \(PIF-Midwest Region\)](#)

[A4. Weights for winter links from northeastern U.S. states \(PIF-Northeast Region\)](#)

[A5. Weights for winter links from southeastern U.S. states \(PIF-Southeast Region\)](#)

Also available as a [downloadable Excel file](#) that includes all states, provinces and territories, and includes scientific names and file sequence numbers for re-sorting file to taxonomic order.

Appendix B: Weights used to connect individual states to Breeding grounds farther north

Available as a separate pdf file:

[Appendix B](#)

Also available as a [downloadable Excel file](#) that includes scientific names and file sequence numbers for re-sorting file to taxonomic order. Excel file also includes states that were not mapped, because they had fewer than five priority species with out of state links to breeding grounds.