High Priority Needs for Range-wide Monitoring of North American Landbirds

Partners in Flight Science Committee

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High Priority Needs for Range-wide Monitoring of North American Landbirds

This document is an extension of work done for the *Partners in Flight North American Landbird Conservation Plan* (Rich et al. 2004). The Continental Plan reviewed conservation status of the 448 native landbird species that regularly breed in the United States and Canada. Two groups of species were identified as having high conservation importance: the PIF *Watch List*, made up of species for which there is conservation concern, and *Stewardship Species* that are particularly characteristic of regional avifaunas. In addition, continental scale monitoring needs were identified for all species. Here we extend the monitoring needs aspect of the Plan, providing additional detail and suggesting the best means of filling the gaps in broad-scale, long-term trend monitoring. This analysis and report was compiled by the Partners in Flight (PIF) Science Committee as a contribution to current work by the North American Bird Conservation Initiative to assess the status of bird population monitoring in North America and to make recommendations for improvements.

PIF recognizes that the term "monitoring" covers a variety of methods and project goals. This document addresses only one aspect: long-term trend monitoring at the range-wide scale for the purposes of continental status assessment and evaluation of cumulative effects of conservation action. There are at least three other important types of monitoring not covered here. One is measuring the response by bird populations to specific habitat conditions or management actions. A second is measuring vital rates – reproductive success and survivorship – in efforts to better understand factors that limit the size of bird populations, and a third is monitoring the quantity and quality of habitat upon which bird populations depend. PIF may address these in future documents as the need arises.

Continental scale monitoring data formed a crucial pillar of the PIF Landbird Conservation Plan (Rich et al. 2004). Long-term (30+ years) population trend was one of the six criteria used to assess level of conservation concern for each species. The other criteria were size of the breeding population, area of breeding distribution, area of nonbreeding distribution, threats to breeding, and threats during nonbreeding seasons. The basic assumption of the assessment procedure is that the most vulnerable species are those with a combination of small population size, small area of distribution, high future threat, and declining numbers.

Of the six criteria, population trend is perhaps the best indicator of whether a species is actually in difficulty, as opposed to simply being vulnerable to future change. For example, an uncommon species with narrow range and high threats to future conditions may be vulnerable, but if the population is currently stable or increasing over the long term, our immediate concern for that species is lessened. Conversely, a widespread species that has been declining steeply over several decades merits a level of conservation attention even if it is not at risk of immediate extirpation.

In the PIF Continental Plan, range-wide, long-term (1966-2002) trends from the North American Breeding Bird Survey (BBS; Sauer et al. 2004) were used whenever possible to assign Population

Trend (PT) scores. Continental-scale data are the most appropriate for determining a species' range-wide conservation status (because population trends often vary regionally; Sauer et al. 2004), and using long term trends ensures that status assessment does not simply reflect short-term fluctuation (Dunn 2002).

The BBS is a broad-scale, multi-species survey with a stratified random road-side sampling scheme, in which data are collected primarily by volunteers. Data from this survey allow relatively inexpensive screening of a large number of species on an equal basis to help determine where further research or conservation action might be needed. However, BBS trends for many species are either lacking or have very low precision. Alternative sources of data of varying quality were available for some of these species, but for others there simply was not enough information for a credible score to be assigned (Table 1), even by species experts asked to give a simple verbal description of probable status.

As an aid to interpreting PT scores, the *Continental Plan* identified species with important shortcomings in the quality of the underlying data (Table 2), based on specific rule sets. This information, combined with data in the *Continental Plan* on continental conservation importance, allows us to identify the highest priorities for improving knowledge of range-wide population status.

The objective of this document is to indicate the monitoring approaches most likely to improve future PIF Population Trend scores at the continental scale. It would be foolish, of course, to wait for decades of monitoring to be completed before doing something to improve PT scores for species that lack credible data on past trends, especially as many of these species are of high conservation concern. However, the monitoring approaches we recommend can also contribute to assessing *current* population status within a short period, as well as providing a baseline for future comparison. Moreover, monitoring programs can be designed to fill many information needs other than range-wide status assessment, and whenever possible, new programs should be designed to simultaneously to test hypotheses on causes of population change or response to conservation action. Wherever possible, new surveys should also be designed to augment the power of BBS.

Methods

Of the 448 native species of landbirds that regularly breed in Canada and the U.S., 295 (listed in Appendix 1) are not adequately monitored according to specific, mainly quantitative criteria (Table 2). For each of these, we identified the single monitoring approach that would most effectively address the information gap for North America. Each of the selected approaches is detailed below. The first choice for monitoring was nearly always a breeding season program, as that allows localized trends to be linked to particular breeding populations. New breeding season status assessment programs can be designed to collect information simultaneously on density, habitat relations, or demography. For many species a second choice of survey approach was also listed (and more rarely, a third choice), indicating the survey(s) most likely to provide useful supplementary information.

Improve breeding season multi-species surveys

- **Improve BBS—**For species that already are sampled by the BBS (detected on at least 14 routes and sampled over at least 2/3 of the breeding range), improving the quality of BBS will often be the most efficient means of improving our knowledge of range-wide population trend. A precision target recommended for BBS (Bart et al. 2004) is 80% power to detect a 50% decline over 20 years with a P value of 0.1. This can be achieved by increasing the density of routes and/or by reducing bias. Another approach is to supplement the BBS with extra count data of a similar type (e.g. habitat-based point counts as in Alberta's Grassland Bird Monitoring program), but in this document we treat supplemental programs separately. Choice of method for enhancing BBS will vary by region, as well as by the set of priority species for which this is the best option, but any enhancement of the BBS will improve monitoring precision for many other species simultaneously, including those currently considered to have "adequate" monitoring.

  For species without a continental monitoring need (Table 2), but for which BBS trend precision is still somewhat high (0.0073<[20-yr trend SE]<0.02), we indicated "Improve BBS" as a second choice survey. Remaining species without a continental monitoring need and no mention of BBS as needing improvement have trend SE<0.0073, which meets the precision target of Bart et al. (2004).

New/expanded breeding season multi-species surveys

- **Boreal survey—**A large number of species are covered by the BBS in less than 2/3 of their North American breeding range and therefore are considered to be inadequately monitored (Bart et al. 2004). Few of these species are on the Watch List, but many are Stewardship Species. Migration and winter season monitoring provide clues to changes in abundance of some boreal birds. However, breeding season monitoring allows any declines to be traced to particular portions of the breeding range, and breeding season studies are needed to clarify the effects of forest resource management on birds. The Canadian Wildlife Service is currently developing a strategy for boreal monitoring which aims to combine research and trend-monitoring within new programs whenever feasible. "Boreal survey" was listed as the option for species with a substantial portion of breeding range likely to be sampled by a multi-species survey in the boreal region.

- **Arctic survey—**Current trend data for arctic-nesting species come from winter counts, which only sample species that migrate into human-populated areas for the winter. Moreover, the primary existing winter surveys were not designed for monitoring purposes, and have design characteristics that limit inference on trend estimates. Shorebird surveys have begun in the Arctic, and the best chance for monitoring breeding passerines in this region may be to continue including passerine counts in those surveys.

- **BBS in Mexico, and Caribbean surveys**—A large number of species with information gaps have ranges that barely extend into the southern U.S. Population trends could be very different south of the U.S. border. The primary need for most of these species is to institute bird monitoring protocols in Mexico and Caribbean countries. A pilot BBS

program in Mexican states bordering the U.S. ran from 1993 to 1995, and the Mexican and U.S. governments are now considering permanent BBS coverage of northern Mexico. 'Mexican BBS' was the monitoring option we selected for any species with more than 2/3 of its breeding range south of the U.S. border, for which a multi-species breeding bird survey in Mexico was likely to produce acceptable trend information. 'Caribbean survey' was chosen for those species with most of their distribution there, but in that case, we did not specify BBS as necessarily the best approach. The second choice for species whose range is largely south of the U.S. was usually a survey that would provide status information in the U.S. portion of the range.

- **South American surveys**—This document is focused on gaps in or knowledge for North America (defined for this document as Canada, the U.S. and Mexico), but some of the species covered here have the majority of their breeding range in South America. For these species, we listed the surveys most likely to improve t our knowledge within North America, but that improvement would not be sufficient for the species to be considered adequately monitored range wide. In recognition of this, we listed South American surveys as an additional choice for improved monitoring. No distinction was made for the most appropriate type of monitoring program in South America (multi-species, targeted, etc.). Further discussion with appropriate experts will be needed to complete a set of recommendations for these regions.

Targeted breeding season surveys

Some species are unlikely to be sampled adequately by the BBS even if route density is greatly increased. For these species, different approaches are needed. Once the authors had identified the types of specialized surveys needed for each species, it became clear that these could be grouped into categories. Developing surveys that target a group of species needing a similar approach will clearly be more efficient than developing many single species surveys.

- **High elevation surveys**—BBS routes rarely reach high elevations, yet certain species are primarily restricted to such habitats. A high elevation survey has already been developed for Bicknell's Thrush (see methodology at http://www.vinsweb.org/cbd/mtn_birdwatch.html). Similar specialized surveys are needed in western regions to monitor such species as rosy-finches and Blue Grouse.

- **Early spring surveys**—Certain birds are poorly sampled by BBS because conspicuous breeding activity takes place prior to the BBS survey period, such as woodpeckers, and many desert species of the American Southwest and Mexico.

- **Nocturnal surveys**—Some species can only be monitored effectively at night, or at dawn and dusk. Nocturnal owl surveys are underway in some regions, but despite progress in coordination of methods, there are still many gaps in geographic and species coverage. Few crepuscular species are monitored anywhere.

- **Southwest border birds survey**—Numerous species whose ranges are largely south of the U.S. have small to moderate populations in the southern U.S. that are currently poorly

monitored by BBS. Although the first choice for improving range-wide trend estimates was usually to develop BBS south of the border, there is often interest in knowing status of these species within the U.S. portion of their ranges as well. As a second choice of monitoring program, therefore, we suggested a U.S. "border birds" survey. Birders are good at keeping track of rare, narrowly-distributed birds, and their skills could be put to work on behalf of border birds by developing a special checklist survey or border-area atlas project.

- **Species-specific—**Some species will require a species-specific survey to collect good quality data on population status, such as very rare species or those that are unique to a particular place or habitat (e.g. McKay's Bunting, Island Scrub-Jay, mangrove birds). Many endangered species in the U.S. and Canada are already covered by such surveys, and therefore did not meet the monitoring needs criteria used by Rich et al. (2004). However, to highlight the need for continuing and improving coverage and coordination of surveys for such species, we have labelled them here as having "special" monitoring needs (Table 2), and list 'continue current monitoring' as a high priority need at the continental scale.

- **Integrate existing surveys—**This category was assigned to a few species for which some regional surveys exist (including several gallinaceous species), but which may use different methods, and do not combine results for range-wide status assessment.

Other season surveys

Monitoring outside the breeding season can provide estimates of population change, and in some cases can track annual productivity. Population change detected outside the breeding season can rarely be traced to particular breeding populations, and there are sampling problems with most of the existing surveys, but such programs can nonetheless provide useful supplementary and confirmatory data on a species' status.

- **Improve CBC**—The Christmas Bird Count (CBC) was not designed as a monitoring program, but appropriately analyzed results can produce credible information on population change in species that are wide spread and relatively abundant within the CBC coverage area. Recommendations to the National Audubon Society (Francis et al. 2004) are already being addressed, and improved trend results should soon be available.

- **New winter surveys**—A few species for which breeding season studies are less feasible than winter sampling, but which are poorly sampled by CBC, may best be assessed with new, well-designed winter surveys. Such surveys might be aimed at particular species (e.g., screech-owls or Long-eared Owls gathered at roost sites), but normally should sample all species encountered, even if the need for data on one or a few species is the main justification for the organizing the survey. Particular care will be needed in designing such surveys to ensure representative sampling (e.g. roost site surveys).

- **Migration monitoring**—Standardized counting of migrating birds can generate valuable information on regional trends for boreal species and is the main source of data in the absence of breeding season surveys in the boreal region. The method should be especially

valuable for raptors (boreal or otherwise), for which BBS data are often very imprecise. Recording the proportion of young birds in migrating populations may be a practical means of obtaining demographic data for many species on a broad geographic scale. Habitat-related monitoring of migrants could be used to identify landscape configurations that are important to migrants.

Results

Appendix 1 summarizes the conservation status of the 448 native landbird species and recommends monitoring approaches for those inadequately monitored at present. These results are summarized in Table 3.

There are 64 species for which improvement of BBS is the first choice for filling gaps in continental status information (Table 3), of which 36 are species of continental conservation importance. The species for which enhancement of BBS is the first choice are distributed throughout North America (Fig. 1), with a concentration in the west. Improvement of BBS should therefore be a goal in every region, and has the potential to improve the precision of trend estimates for more than 150 species overall.
Because surveys are lacking in arctic, boreal and regions south of the U.S., we have very few clues as to the impact of rapidly changing resource use in those areas on species that represent a very large segment of the North American avifauna. New or geographically extended multi-species surveys in these regions would address the status assessment needs for 60 species of continental conservation importance, including 27 Watch List species and 33 Stewardship Species (Table 3), as well as for 105 other species with important gaps in status information.

Although new or improved multi-species surveys can address status assessment needs for a large number of species, there are 30 Watch List and 4 Stewardship species for which a more targeted approach is required (Table 3). New breeding season surveys of the types recommended should be designed to ensure that the needs of these high priority species are addressed, although the surveys need not be limited to those species alone. Species needing coverage by certain targeted surveys are not evenly distributed in North America (Fig. 2), but are concentrated in specific regions. High elevation surveys are a priority for the Northwest, while early spring surveys are particularly needed in the Southwest. Nocturnal surveys will be useful almost everywhere, but especially in the U.S. west and Mexico. Species-specific surveys and rapid assessments are needed particularly in Mexico and the Caribbean, and many of these species could be covered with a 'border birds' survey.

Although a border birds survey was suggested as the second choice of monitoring approach for many species that have Mexican BBS listed as the main means of providing status information, development of such a survey is actually a high priority. The species most needing status assessment as soon as possible are those species on the PIF Watch List, or close to being on it, for which we have essentially no data on population trend (identified in Appendix 1). This group includes 23 Watch List species, 14 that would be added to that list if found to be in moderate decline (as defined in Table 2), and 8 that would be added if found to be declining severely. Nearly all of these are southwestern species for which current status, at least in the northern

portion of the range, could be quickly assessed with a well-designed checklist survey or mini-atlas program carried out on both sides of the border.

Monitoring in seasons other than the breeding season was selected as the first choice for only two species (Long-eared and Short-eared owls, the latter a Watch List species), for which good quality breeding season monitoring might be prohibitively expensive. Nonetheless, improved winter and migration season monitoring is expected to provide valuable supplementary information for 89 species with continental monitoring needs for which nonbreeding season monitoring was the second choice (Table 3). In the absence of broad-scale breeding season surveys in the arctic and boreal regions, which are unlikely to be established any time soon, these winter and migration season programs should be given high importance.

Next steps

This document can only provide general guidance on priorities for improving our knowledge of range-wide population status. Appendix 1 is therefore downloadable as an Excel file, for use as a tool to determine what surveys are most needed in a particular region. With the electronic file, users can select species that occur in a particular planning area and sort them to determine which monitoring approaches are most needed in that region. The highest priority should be for rapid assessment of the status of Watch List species for which essentially no data exist.

Watch List species are the most likely to be the subject of new monitoring, and it is also those species for which it is most important to gather information simultaneously to provide guidance for future conservation and management. Any new monitoring programs should be designed to address as many priority information needs as feasible, and where possible, to improve estimation of total population size. Good sources of information on high priority research needs include the Birds of North America series (http://bna.birds.cornell.edu/BNA/), the Nature Conservancy's Species Management Abstract series (http://www.conserveonline.org/programs/International/Regional_Divisions/Wings_of_the_Americas_Program;internal&action=buildframes.action), and the PIF Monitoring and Research Needs database (http://www.partnersinflight.org/pifneeds/searchform.cfm). Experts on the species in question should also be consulted as new surveys are being designed.

Once there is a refined list of the species, habitats and research objectives to be addressed by new or improved monitoring, the list can be brought to monitoring experts for advice on developing specific protocols and sampling plans (see Dunn et al. 2005 for background on monitoring design and listing of numerous technical resources for monitoring that are available on the web). The PIF Science Committee can help set up contacts with monitoring experts, and hopes to act as a communications hub to bring together people interested in the same species and monitoring approaches.

High priority monitoring action for a particular region is likely to include a mix of approaches, from development of new targeted surveys that address research questions simultaneously with species status assessment, to improvement of regional or continental multi-species surveys in which data are collected by volunteers. Both approaches are important for guiding local

management efforts. Broad-scale results highlight regionally-important species and habitats that require research and management at the local scale. Effects of management in a local area can only be interpreted in the context of regional population change, which often is known only from broader surveys. And finally, only broad-scale population monitoring can tell us whether the sum of local management efforts is benefiting the target species as a whole. Of course, many factors other than management actions affect species populations. Thus, broad-scale monitoring data is not the only information required for evaluation of success toward meeting objectives. At the same time, research-oriented monitoring is crucially needed to determine causes of important population change and to test effects of specific management actions. Monitoring therefore is needed at a variety of geographic scales, using a wide range of approaches. The challenge for monitoring personnel is to communicate and cooperate so that scarce resources can be allocated most effectively and data gathered at all scales can be integrated for the maximum benefit of bird conservation.

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Table 1. Partners in Flight Population Trend (PT) scores (Panjabi 2005)

PT score	% change over 30 years	Equivalent annual %change	Verbal Description
1	≥ 50% increase	trend ≥ 1.36%	Large population increase
2	15-49% increase OR <15% change	0.47 ≤ trend < 1.36% OR -0.54 < trend < 0.47%	Possible or moderate population increase OR Population stable
3	highly variable OR unknown	N/A	Uncertain population trend
4	15-49% decrease	-2.27% < trend ≤ -0.54	Possible or moderate population decrease
5	≥ 50% decrease	trend ≤-2.27%	Large population decrease

Table 2. Categories used to indicate important gaps in knowledge of range-wide, 30-year population trend

Monitoring Needs Category[a]	Explanation
Mo1	Little or no information on population status (PT=3 due to lack of data; see Table 2)
Mo2	*Mo2*: Trend information available from an existing survey, but trend precision over past 20 years is unknown or very low (SE > 0.02) *Mo2a*: PT=3 (see Table 2) because of wide confidence intervals on long-term trend
Mo3	1/3 or more of the Canadian/U.S. breeding range is not covered by a breeding-season survey, because much of the range is north of the BBS coverage area
Mo4	2/3 or more of Western Hemisphere breeding range is not covered by a breeding-season survey, because most of the range is south of the U.S. border
S	Rare and range-restricted species with some species-specific monitoring, but with high need for continuation, improvement and coordination

[a] From Rich et al. (2004) except for the Mo2a, Mo4 and S categories, newly developed for this document.

Table 3. Summary of monitoring approaches that would best address gaps in information on population status in North America

Survey	Watch List Species[1]			Stewardship Species[2]	Other Species [3]	Second Choice - Total[4]
	IM	MA	PR			
Improved breeding season multi-species surveys						
Improve BBS	2	8	9	17	28	22[5]
New/expanded breeding season multi-species surveys						
Boreal survey		4		19	36	7
Arctic survey		1	1	9	12	1
Mexican/Caribbean surveys[6]	4	8	8	5	56	14
South American surveys						1
Targeted breeding season monitoring programs[6]						
High elevation survey	1		3		1	
Early spring survey	1		3	2	1	6
Nocturnal survey (U.S./Can.)			1		4	4
Southwest border birds survey						64
Species-specific	17	3	2	1	1	21
Integrate existing surveys				1	2	6
Other season surveys						
Improve CBC		1			1	25
New winter surveys						15
Migration monitoring						49

[1] Species on the PIF Continental Watch List for which data on trend are inadequate (Rich et al. 2004), sorted by recommended conservation action. IM=Immediate action needed either to protect species with the smallest populations for which trends are poorly known, or to reverse or stabilize evidently important declines in species with small populations. MA=Management or other on-the-ground action needed to reverse evidently important declines or to sustain vulnerable populations of species that are still relatively widespread. PR=Planning and stewardship needed to maintain sustainable populations of vulnerable species that appear currently to be holding their own.

[2] Stewardship Species (those especially characteristic of an avifaunal biome; Rich et al. 2004) that are not on the Watch List, but have inadequate trend information.

[3] Additional U.S./Canadian breeding species (neither Watch List nor Stewardship) with inadequate trend information.

[4] Species with inadequate trend information (all previous categories combined) for which this survey was the second tier approach.

[5] Improvement in BBS would also increase statistical power for 82 species that were not classified as having continental monitoring needs, but for which BBS precision over the past 20 years is relatively low ($0.0073<SE<0.0200$).

[6] Breeding season surveys focused on a particular group of species, region, or habitat.

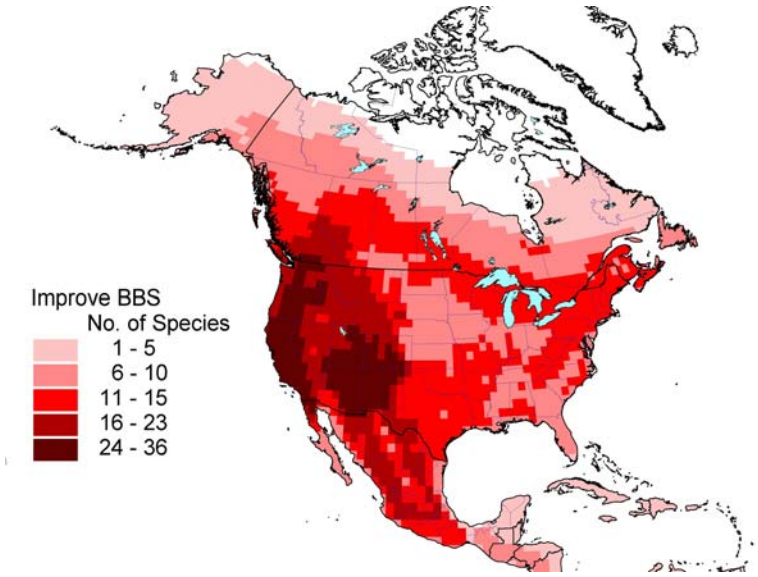

Fig 1. Number of species in each 1-degree latitude-longitude block for which improvement of BBS was the first choice for addressing short-comings in long-term trend Information.

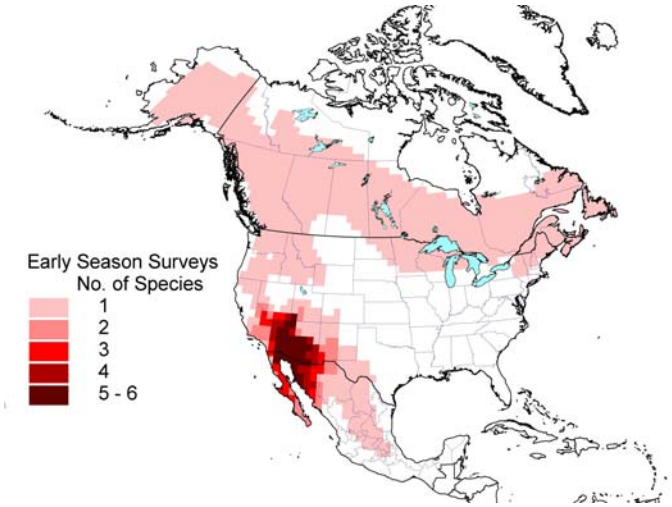

Fig 2A. Number of species in each 1-degree latitude-longitude block for which early spring surveys were the first choice for addressing short-comings in long-term trend information.

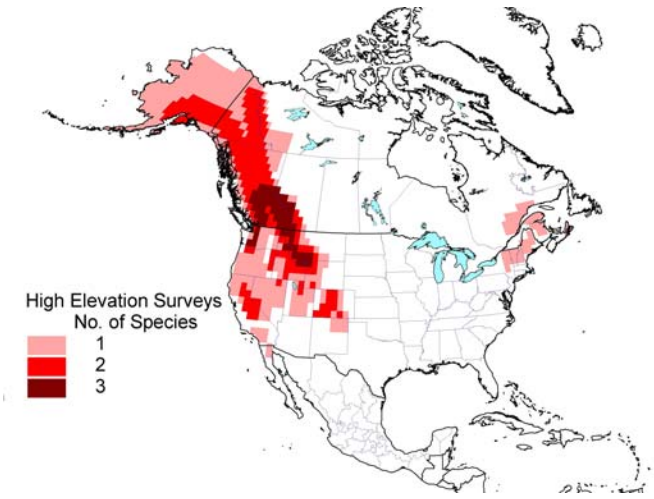

Fig 2B. Number of species in each 1-degree latitude-longitude block for which high elevation surveys were the first choice for addressing short-comings in long-term trend information.

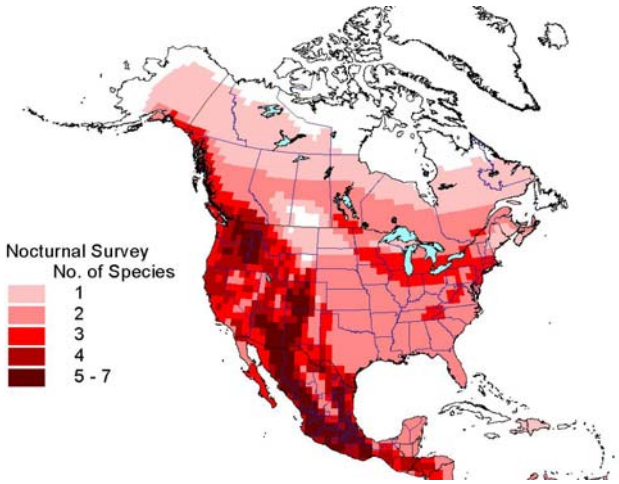

Fig 2C. Number of species in each 1-degree latitude-longitude block for which nocturnal surveys were the first choice for addressing short-comings in long-term trend information.

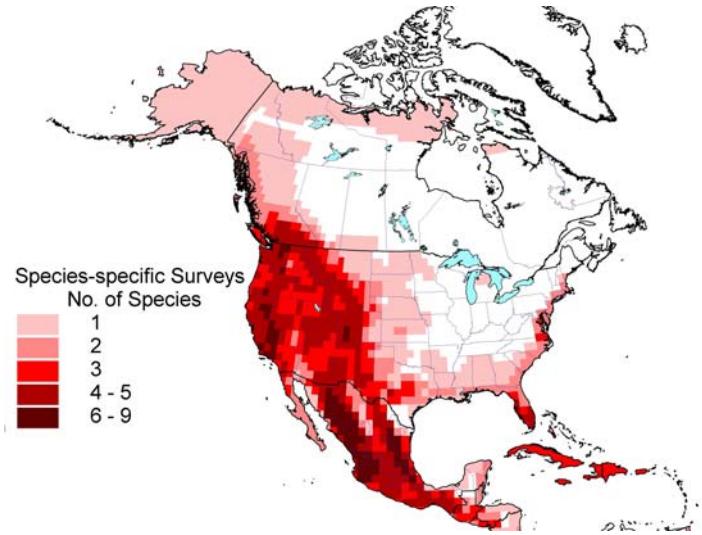

Fig 2D. Number of species in each 1-degree latitude-longitude block for which species-specific surveys were the first choice for addressing short-comings in long-term trend information.

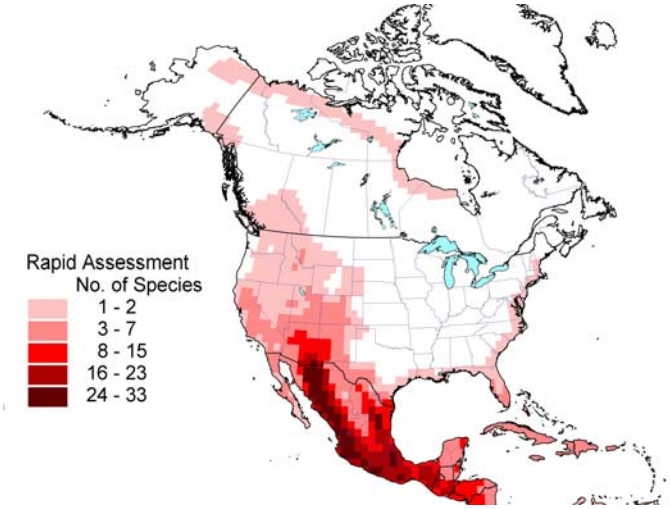

Fig 2E. Number of species in each 1-degree latitude-longitude block for which rapid assessment was the first choice for addressing short-comings in long-term trend information. Many of these species in the U.S. SW would be sampled by a border birds survey

Appendix 1. Conservation Status and Recommended Monitoring Approaches for Native Landbirds that Regularly Breed in the U.S. and Canada.
Last revised July 2005. This table is a work in progress, and subject to change. Comments are invited, and should be sent to ***Terry_Rich@fws.gov.***
Downloadable Excel file includes scientific names and file sequence numbers for re-sorting file to taxonomic order.

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed: Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
Plain Chachalaca				Mo1,4	MX BBS	border bird survey	
Ruffed Grouse				Mo2,3	integrate existing surveys	boreal survey	early spring survey?
Greater Sage-Grouse	1	IM	1	Mo2	spp-specific	integrate existing surveys	
Gunnison Sage-Grouse	1	IM	1	S	maintain spp-specific	integrate existing surveys	
Spruce Grouse			1	Mo2,3	boreal survey	spp-specific?	
Willow Ptarmigan			1	Mo1,3	arctic survey		
Rock Ptarmigan			1	Mo1,3	arctic survey		
White-tailed Ptarmigan	3			Mo1,3	high elev./arctic surveys	integrate existing surveys	
Blue Grouse	1	MA	1	Mo2	spp-specific	integrate existing surveys	
Sharp-tailed Grouse			1	Mo2	integrate existing surveys	improve BBS	
Greater Prairie-Chicken	1	IM	1	Mo2	spp-specific	integrate existing surveys	
Lesser Prairie-Chicken	1	IM	1	S	maintain spp-specific	integrate existing surveys	
Wild Turkey				Mo2	improve BBS	improve CBC	coordinate across jurisdictions
Mountain Quail	1	PR	1	Mo2a	improve BBS		
Scaled Quail	1	MA	1			improve BBS	
California Quail				Mo2a	improve BBS		
Gambel's Quail			1	Mo2a	improve BBS		
Northern Bobwhite							
Montezuma Quail[1]	1	MA		Mo1,4	MX spp-specific	spp-specific U.S.	
Black Vulture				Mo4	MX BBS	improve BBS	SA surveys
Turkey Vulture				Mo4	MX BBS	SA surveys	
California Condor	1	IM	1	S	maintain spp-specific		
Osprey				Mo2,3	improve BBS	migration monitoring	boreal survey
Hook-billed Kite				Mo1,4	MX BBS	border bird survey	SA surveys
Swallow-tailed Kite	1	IM		Mo2,4	spp-specific U.S.	migration monitoring	SA surveys
White-tailed Kite				Mo4	MX BBS	improve BBS	SA surveys

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Snail Kite				Mo1,4	MX BBS	spp-specific U.S.	SA surveys
Mississippi Kite			1	Mo2	improve BBS	migration monitoring	
Bald Eagle			1	Mo3	boreal survey	migration monitoring	improve CBC
Northern Harrier				Mo3	boreal survey	migration monitoring	improve CBC
Sharp-shinned Hawk				Mo3	boreal survey	migration monitoring	
Cooper's Hawk				Mo2	improve BBS	migration monitoring	improve CBC
Northern Goshawk				Mo2,3	integrate existing surveys	migration monitoring	boreal survey
Gray Hawk				Mo1,4	MX BBS	border bird survey	SA surveys
Common Black-Hawk				Mo1,4	MX BBS	border bird survey	
Harris's Hawk				Mo4	MX BBS	improve BBS	SA surveys
Red-shouldered Hawk			1			improve BBS	migration monitoring
Broad-winged Hawk						improve BBS	migration monitoring
Short-tailed Hawk				Mo1,4	MX BBS	border bird survey	SA surveys
Swainson's Hawk	1	MA		Mo2a	improve BBS	migration monitoring	
White-tailed Hawk				Mo1,4	MX BBS	border bird survey	SA surveys
Zone-tailed Hawk				Mo1,4	MX BBS	border bird survey	SA surveys
Red-tailed Hawk							
Ferruginous Hawk						improve BBS	migration monitoring
Rough-legged Hawk			1	Mo2,3	arctic survey	migration monitoring	improve CBC
Golden Eagle				Mo3	arctic survey	migration monitoring	improve CBC
Crested Caracara				Mo2,4	MX BBS	border bird survey	SA surveys
American Kestrel						improve BBS	migration monitoring
Merlin				Mo2,3	improve BBS	boreal survey	migration monitoring
Aplomado Falcon[1]	3			Mo1,4	spp-specific MX	border bird survey	SA surveys
Gyrfalcon			1	Mo2,3	arctic survey		
Peregrine Falcon			1	Mo2,3	spp-specific	migration monitoring	
Prairie Falcon				Mo2	improve BBS	migration monitoring	improve CBC
White-crowned Pigeon[1]	1	MA		Mo1,4	Caribbean spp-specific	spp-specific U.S.	
Red-billed Pigeon[1]	3			Mo1,4	MX BBS	border bird survey	
Band-tailed Pigeon	1	MA		Mo2,4	MX BBS	improve BBS	

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White-winged Dove				Mo2a,4	MX BBS	improve BBS	
Mourning Dove							
Inca Dove				Mo2,4	MX BBS	improve BBS	
Common Ground-Dove				Mo2	improve BBS	MX BBS	improve CBC
White-tipped Dove				Mo1,4	MX BBS	border bird survey	SA surveys
Green Parakeet[1]	1	IM		Mo1,4	MX spp-specific	spp-specific U.S.	
Thick-billed Parrot[1]	1	IM	1	Mo1,4	MX spp-specific	spp-specific U.S.	
Red-crowned Parrot[1]	1	IM		Mo1	MX spp-specific	spp-specific U.S.	
Black-billed Cuckoo						improve BBS	
Yellow-billed Cuckoo							
Mangrove Cuckoo[1]	1	MA		Mo1,4	Caribbean/MX spp-specific		
Greater Roadrunner				Mo2a	improve BBS		
Smooth-billed Ani				Mo1,4	Caribbean survey	spp-specific U.S.	SA surveys
Groove-billed Ani				Mo2,4	MX BBS	border bird survey	
Barn Owl				Mo2,4	MX nocturnal survey	winter survey (roosts)	SA surveys
Flammulated Owl[1]	1	PR		Mo1	US nocturnal survey	MX nocturnal survey	migration monitoring
Western Screech-Owl				Mo2	nocturnal survey	winter survey (owls)	
Eastern Screech-Owl				Mo2	nocturnal survey	winter survey (owls)	
Whiskered Screech-Owl[1]	2			Mo1,4	MX nocturnal survey	US nocturnal survey	
Great Horned Owl				Mo2a	improve BBS		
Snowy Owl			1	Mo2,3	arctic survey	improve CBC	
Northern Hawk Owl				Mo2,3	boreal survey		
Northern Pygmy-Owl				Mo2	improve BBS	improve CBC	nocturnal survey
Ferruginous Pygmy-Owl				Mo1,4	MX nocturnal survey	spp-specific U.S. (exists)	SA surveys
Elf Owl[1]	1	PR		Mo1,4	MX nocturnal survey	US nocturnal survey	
Burrowing Owl				Mo4	MX BBS	improve BBS	SA surveys
Spotted Owl	1	IM		S	maintain spp-specific		
Barred Owl						improve BBS	nocturnal survey
Great Gray Owl				Mo2,3	boreal survey		

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed: Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
Long-eared Owl				Mo2	improve CBC	winter survey (roosts)	
Short-eared Owl	1	MA		Mo3	improve CBC	arctic survey	spp-specific survey
Boreal Owl				Mo1,3	boreal (nocturnal)		
Northern Saw-whet Owl				Mo2	nocturnal survey	migration monitoring	
Lesser Nighthawk				Mo4	MX BBS	nocturnal (spp-specific)	
Common Nighthawk						improve BBS	nocturnal survey
Antillean Nighthawk[1]	1	PR		Mo1,4	Caribbean survey	spp-specific U.S.	
Common Pauraque				Mo1,4	MX nocturnal survey	US nocturnal survey	SA surveys
Common Poorwill						improve BBS	MX nocturnal survey
Chuck-will's-widow			1				
Buff-collared Nightjar[1]	2			Mo1,4	MX nocturnal survey		
Whip-poor-will						improve BBS	MX nocturnal survey
Black Swift	1	MA		Mo2	spp-specific	MX/Caribbean spp-specific	
Chimney Swift							
Vaux's Swift				Mo2a	improve BBS	spp-specific	
White-throated Swift	1	MA		Mo2	spp-specific	MX spp-specific	
Broad-billed Hummingbird				Mo1,4	MX BBS	border bird survey	
White-eared Hummingbird				Mo1,4	MX BBS	border bird survey	
Berylline Hummingbird[1]	2			Mo1,4	MX BBS	border bird survey	
Buff-bellied Hummingbird				Mo1,4	MX BBS	border bird survey	
Violet-crowned Hummingbird[1]	3			Mo1,4	MX BBS	border bird survey	
Blue-throated Hummingbird[1]	2			Mo1,4	MX BBS	border bird survey	
Magnificent Hummingbird				Mo1,4	MX BBS	border bird survey	
Lucifer Hummingbird			1	Mo1,4	MX BBS	border bird survey	
Ruby-throated Hummingbird						improve BBS	
Black-chinned Hummingbird				Mo2	improve BBS		
Anna's Hummingbird						improve BBS	winter survey
Costa's Hummingbird	1	PR		Mo2	early spring desert survey	MX BBS	
Calliope Hummingbird	1	PR	1	Mo2	high elevation survey	spp-specific	
Broad-tailed Hummingbird						improve BBS	

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Rufous Hummingbird	1	MA	1			improve BBS	
Allen's Hummingbird	1	PR	1	Mo2	improve BBS	improve CBC	
Elegant Trogon[1]	1	MA		Mo1,4	MX BBS	border bird survey	
Ringed Kingfisher				Mo1,4	MX BBS	border bird survey	SA surveys
Belted Kingfisher				Mo3	boreal survey		
Green Kingfisher				Mo1,4	MX BBS	border bird survey	SA surveys
Lewis's Woodpecker[1]	1	MA	1	Mo2	improve BBS		
Red-headed Woodpecker	1	MA					
Acorn Woodpecker						improve BBS	
Gila Woodpecker				Mo2a,4	MX BBS	improve BBS	
Golden-fronted Woodpecker						improve BBS	
Red-bellied Woodpecker			1				
Williamson's Sapsucker			1	Mo2	improve BBS	early spring survey	
Yellow-bellied Sapsucker			1	Mo2,3	improve BBS	boreal survey	improve CBC
Red-naped Sapsucker			1	Mo2a	improve BBS	migration monitoring	
Red-breasted Sapsucker			1	Mo3	boreal survey	improve CBC	
Ladder-backed Woodpecker				Mo2,4	MX BBS	improve BBS	improve CBC
Nuttall's Woodpecker	1	MA	1	Mo2a	improve BBS	early spring survey	
Downy Woodpecker						improve BBS	winter survey
Hairy Woodpecker						improve BBS	
Arizona Woodpecker[1]	1	PR		Mo1,4	MX BBS	border bird survey	
Red-cockaded Woodpecker	1	IM	1	Mo2	spp-specific		
White-headed Woodpecker	1	PR	1	Mo2	improve BBS	early spring survey	
American Three-toed Woodpecker				Mo2,3	boreal survey	early spring survey	
Black-backed Woodpecker			1	Mo2,3	early spring survey	boreal survey	improve BBS
Northern Flicker				Mo3	boreal survey	migration monitoring	improve CBC
Gilded Flicker				Mo2,4	early spring desert survey	MX BBS	improve CBC
Pileated Woodpecker							
Ivory-billed Woodpecker	1	IM	1	S	maintain spp-specific		

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Northern Beardless-Tyrannulet				Mo1,4	MX BBS	border bird survey	
Olive-sided Flycatcher	1	MA		Mo3	boreal survey	improve BBS	
Greater Pewee[1]	2			Mo1,4	MX BBS	border bird survey	
Western Wood-Pewee							
Eastern Wood-Pewee							
Yellow-bellied Flycatcher			1	Mo3	boreal survey	migration monitoring	
Acadian Flycatcher			1				
Alder Flycatcher			1	Mo3	boreal survey	migration monitoring	
Willow Flycatcher	1	MA					
Least Flycatcher				Mo3	boreal survey	migration monitoring	
Hammond's Flycatcher						improve BBS	
Gray Flycatcher			1	Mo2	improve BBS		
Dusky Flycatcher			1			improve BBS	
Pacific-slope Flycatcher			1	Mo2a	improve BBS		
Cordilleran Flycatcher				Mo2a	improve BBS		
Buff-breasted Flycatcher[1]	2			Mo1,4	MX BBS	border bird survey	
Black Phoebe				Mo4	MX BBS	improve BBS	
Eastern Phoebe							
Say's Phoebe						improve BBS	
Vermilion Flycatcher				Mo2,4	MX BBS	improve BBS	SA surveys
Dusky-capped Flycatcher				Mo1,4	MX BBS	border bird survey	SA surveys
Ash-throated Flycatcher						improve BBS	
Great Crested Flycatcher							
Brown-crested Flycatcher				Mo2,4	MX BBS	border bird survey	SA surveys
Great Kiskadee				Mo2,4	MX BBS	border bird survey	SA surveys
Sulphur-bellied Flycatcher[1]	3			Mo1,4	MX BBS	border bird survey	
Tropical Kingbird				Mo1,4	MX BBS	border bird survey	SA surveys
Couch's Kingbird				Mo2,4	MX BBS	border bird survey	
Cassin's Kingbird				Mo2	improve BBS	MX BBS	
Thick-billed Kingbird[1]	1	PR		Mo1,4	MX BBS	border bird survey	

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Western Kingbird							
Eastern Kingbird							
Gray Kingbird				Mo2,4	Caribbean survey	spp-specific U.S.	
Scissor-tailed Flycatcher				Mo2a	improve BBS		
Rose-throated Becard[1]	3			Mo1,4	MX BBS	border bird survey	
Loggerhead Shrike							
Northern Shrike			1	Mo2,3	arctic survey	improve CBC	
White-eyed Vireo			1				
Bell's Vireo	1	IM				improve BBS	
Black-capped Vireo	1	IM	1	Mo1	spp-specific	MX spp-specific	
Gray Vireo[1]	1	PR		Mo2	improve BBS	winter survey	
Yellow-throated Vireo			1			improve BBS	
Plumbeous Vireo						improve BBS	
Cassin's Vireo						improve BBS	
Blue-headed Vireo			1	Mo2,3	improve BBS	boreal survey	migration monitoring
Hutton's Vireo				Mo2	improve BBS	MX BBS	improve CBC
Warbling Vireo							
Philadelphia Vireo			1	Mo2,3	boreal survey	improve BBS	
Red-eyed Vireo							
Yellow-green Vireo[1]	3			Mo1,4	MX BBS	border bird survey	
Black-whiskered Vireo[1]	2			Mo1,4	Caribbean survey	spp-specific U.S.	
Gray Jay			1	Mo3	boreal survey		
Steller's Jay			1				
Blue Jay							
Green Jay				Mo2,4	MX BBS	border bird survey	
Brown Jay				Mo1,4	MX BBS	border bird survey	
Florida Scrub-Jay	1	IM	1	S	maintain spp-specific		
Island Scrub-Jay[1]	1	IM	1	Mo1	spp-specific		
Western Scrub-Jay			1				
Mexican Jay[1]	2			Mo1,4	MX BBS	border bird survey	

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Pinyon Jay	1	MA	1			improve BBS	winter survey
Clark's Nutcracker			1			improve BBS	winter survey
Black-billed Magpie							
Yellow-billed Magpie	1	PR	1	Mo2a	improve BBS		
American Crow							
Northwestern Crow				Mo3	boreal survey	improve CBC	
Tamaulipas Crow				Mo1,4	MX BBS	border bird survey	
Fish Crow							
Chihuahuan Raven				Mo2	improve BBS	MX BBS	
Common Raven				Mo3	boreal survey		
Horned Lark				Mo3	arctic survey	improve CBC	
Purple Martin							
Tree Swallow				Mo3	boreal survey		
Violet-green Swallow						improve BBS	
Northern Rough-winged Swallow				Mo2a	improve BBS		
Bank Swallow				Mo3	boreal survey	migration monitoring	
Cliff Swallow						improve BBS	
Cave Swallow				Mo2,4	Caribbean/MX survey	spp-specific U.S.	
Barn Swallow							
Carolina Chickadee							
Black-capped Chickadee							
Mountain Chickadee						improve BBS	winter survey
Mexican Chickadee[1]	2			Mo1,4	MX BBS	border bird survey	
Chestnut-backed Chickadee			1	Mo2a	improve BBS		
Boreal Chickadee			1	Mo2,3	boreal survey	improve BBS	
Gray-headed Chickadee				Mo1,3	arctic survey		
Bridled Titmouse				Mo2,4	MX BBS	border bird survey	
Oak Titmouse	1	MA	1			improve BBS	winter survey
Juniper Titmouse				Mo2a	improve BBS		

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Tufted Titmouse							
Black-crested Titmouse			1	Mo1	Improve BBS	MX BBS	
Verdin			1			improve BBS	
Bushtit						improve BBS	
Red-breasted Nuthatch							
White-breasted Nuthatch						improve BBS	
Pygmy Nuthatch				Mo2a	improve BBS	improve CBC	
Brown-headed Nuthatch	1	MA	1			improve BBS	
Brown Creeper				Mo2a	improve BBS	migration monitoring	
Cactus Wren			1			improve BBS	
Rock Wren						improve BBS	winter survey
Canyon Wren						improve BBS	winter survey
Carolina Wren			1				
Bewick's Wren				Mo2a	improve BBS		
House Wren							
Winter Wren				Mo3	boreal survey	migration monitoring	
Sedge Wren						improve BBS	
Marsh Wren						improve BBS	
American Dipper				Mo2a	improve BBS	spp-specific	
Golden-crowned Kinglet				Mo3	boreal survey	migration monitoring	
Ruby-crowned Kinglet				Mo3	boreal survey	migration monitoring	
Arctic Warbler				Mo2	arctic survey		
Blue-gray Gnatcatcher							
California Gnatcatcher[1]	1	PR		Mo1,4	MX BBS	border bird survey	
Black-tailed Gnatcatcher			1	Mo2	MX BBS	improve BBS	border bird survey
Black-capped Gnatcatcher[1]	1	PR		Mo1,4	MX BBS	border bird survey	
Bluethroat				Mo1,3	arctic survey		
Northern Wheatear				Mo1,3	arctic survey		
Eastern Bluebird							
Western Bluebird						improve BBS	

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Mountain Bluebird			1			improve BBS	
Townsend's Solitaire						improve BBS	
Veery							
Gray-cheeked Thrush				Mo3	boreal survey	migration monitoring	
Bicknell's Thrush	1	IM	1	Mo1	high elevation survey (begun)	spp-specific	
Swainson's Thrush				Mo3	boreal survey	migration monitoring	
Hermit Thrush				Mo3	boreal survey	migration monitoring	
Wood Thrush	1	MA	1				
Clay-colored Robin				Mo1,4	MX BBS	border bird survey	
American Robin				Mo3	boreal survey		
Varied Thrush				Mo3	boreal survey	improve CBC	
Wrentit	1	MA	1			improve BBS	winter survey
Gray Catbird							
Northern Mockingbird							
Sage Thrasher			1			improve BBS	
Brown Thrasher							
Long-billed Thrasher				Mo2,4	MX BBS	border bird survey	
Bendire's Thrasher[1]	1	IM		Mo2	early spring desert survey		
Curve-billed Thrasher			1	Mo2	improve BBS	MX BBS	early spring survey
California Thrasher	1	MA	1	Mo2	improve BBS	early spring desert survey	
Crissal Thrasher			1	Mo2	early spring desert survey	MX BBS	improve CBC
Le Conte's Thrasher[1]	1	PR	1	Mo2	early spring desert survey	spp-specific	
Yellow Wagtail				Mo1,3	arctic survey		
White Wagtail				Mo1,3	arctic survey		
Red-throated Pipit				Mo1,3	arctic survey		
American Pipit				Mo2,3	arctic survey	improve CBC	
Sprague's Pipit	1	MA	1			improve BBS	
Bohemian Waxwing			1	Mo2,3	boreal survey	improve BBS	improve CBC
Cedar Waxwing							

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed		
					Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
Phainopepla			1	Mo2,4	MX BBS	early spring desert survey	
Olive Warbler[1]	2			Mo1,4	MX BBS	border bird survey	
Bachman's Warbler	1	IM	1	S	Continue searches		
Blue-winged Warbler	1	MA	1			improve BBS	
Golden-winged Warbler	1	IM				improve BBS	
Tennessee Warbler			1	Mo3	boreal survey	migration monitoring	
Orange-crowned Warbler				Mo3	boreal survey	migration monitoring	
Nashville Warbler			1			improve BBS	
Virginia's Warbler	1	PR		Mo2	improve BBS		
Colima Warbler[1]	1	IM	1	Mo1,4	MX spp-specific	spp-specific U.S.	
Lucy's Warbler	1	MA	1	Mo2a	improve BBS		
Northern Parula						improve BBS	
Tropical Parula				Mo1,4	MX BBS	border bird survey	SA surveys
Yellow Warbler				Mo3	boreal survey	migration monitoring	
Chestnut-sided Warbler			1				
Magnolia Warbler			1	Mo3	boreal survey	migration monitoring	
Cape May Warbler			1	Mo2,3	improve BBS	boreal survey	migration monitoring
Black-throated Blue Warbler						improve BBS	migration monitoring
Yellow-rumped Warbler				Mo3	boreal survey	migration monitoring	improve CBC
Black-throated Gray Warbler			1	Mo2a	improve BBS		
Golden-cheeked Warbler	1	IM	1	Mo1	spp-specific		
Black-throated Green Warbler			1	Mo2,3	improve BBS	boreal survey	migration monitoring
Townsend's Warbler				Mo3	boreal survey		
Hermit Warbler	1	MA	1	Mo2a	improve BBS		
Blackburnian Warbler			1			improve BBS	migration monitoring
Yellow-throated Warbler			1			improve BBS	
Grace's Warbler	1	MA				improve BBS	
Pine Warbler			1				
Kirtland's Warbler	1	IM	1	S	maintain spp-specific		
Prairie Warbler	1	MA	1			improve BBS	

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed: Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
Palm Warbler			1	Mo2,3	boreal survey	migration monitoring	
Bay-breasted Warbler	1	MA	1	Mo2,3	boreal survey	migration monitoring	
Blackpoll Warbler				Mo3	boreal survey	migration monitoring	
Cerulean Warbler	1	MA	1			improve BBS	
Black-and-white Warbler				Mo2a	improve BBS	migration monitoring	
American Redstart				Mo3	boreal survey	migration monitoring	
Prothonotary Warbler	1	MA	1			improve BBS	
Worm-eating Warbler	1	MA	1	Mo2	improve BBS		
Swainson's Warbler	1	MA	1			improve BBS	
Ovenbird							
Northern Waterthrush				Mo3	boreal survey	migration monitoring	
Louisiana Waterthrush			1			improve BBS	
Kentucky Warbler	1	MA	1				
Connecticut Warbler			1	Mo3	boreal survey	migration monitoring	
Mourning Warbler			1	Mo3	boreal survey	migration monitoring	
MacGillivray's Warbler				Mo2a	improve BBS		
Common Yellowthroat							
Hooded Warbler			1	Mo2a	improve BBS		
Wilson's Warbler				Mo3	boreal survey	migration monitoring	
Canada Warbler	1	MA	1	Mo3	boreal survey	migration monitoring	
Red-faced Warbler[1]	1	PR	1	Mo1,4	MX BBS	border bird survey	
Painted Redstart[1]	2			Mo1,4	MX BBS	border bird survey	
Rufous-capped Warbler[1]	3			Mo1,4	MX BBS	border bird survey	
Yellow-breasted Chat							
Hepatic Tanager				Mo2,4	MX BBS	border bird survey	SA surveys
Summer Tanager							
Scarlet Tanager						improve BBS	
Western Tanager							
Flame-colored Tanager[1]	2			Mo1,4	MX BBS	border bird survey	
White-collared Seedeater				Mo1,4	MX BBS	border bird survey	

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed: Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
Olive Sparrow				Mo2,4	MX BBS	border bird survey	
Green-tailed Towhee			1	Mo2a	improve BBS		
Spotted Towhee							
Eastern Towhee			1				
Canyon Towhee			1	Mo4	MX BBS	improve BBS	
California Towhee			1	Mo2a	improve BBS	winter survey	
Abert's Towhee	1	PR	1	Mo2	early spring desert survey	improve CBC	
Rufous-winged Sparrow[1]	1	PR	1	Mo1,4	MX BBS	border bird survey	
Cassin's Sparrow						improve BBS	
Bachman's Sparrow	1	IM	1	Mo2	improve BBS	winter survey	
Botteri's Sparrow[1]	2			Mo1,4	MX BBS	border bird survey	
Rufous-crowned Sparrow						improve BBS	winter survey
Five-striped Sparrow[1]	1	MA		Mo1,4	MX spp-specific	border bird survey	
American Tree Sparrow				Mo2,3	arctic survey	improve CBC	
Chipping Sparrow							
Clay-colored Sparrow							
Brewer's Sparrow	1	MA	1			improve BBS	
Field Sparrow							
Black-chinned Sparrow	1	MA		Mo2	improve BBS	MX BBS	
Vesper Sparrow						improve BBS	
Lark Sparrow						improve BBS	
Black-throated Sparrow						improve BBS	
Sage Sparrow			1			improve BBS	winter survey
Lark Bunting			1				
Savannah Sparrow				Mo3	boreal survey	migration monitoring	improve CBC
Grasshopper Sparrow			1				
Baird's Sparrow	1	IM	1			improve BBS	
Henslow's Sparrow	1	IM		Mo2	improve BBS	winter survey	
Le Conte's Sparrow				Mo3	boreal survey		
Nelson's Sharp-tailed Sparrow	1	PR		Mo2	improve BBS	spp-specific (Maritime	

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed: Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
						Provinces, James Bay)	
Saltmarsh Sharp-tailed Sparrow[1]	1	IM	1	Mo2	spp-specific		
Seaside Sparrow[1]	1	PR	1	Mo2	spp-specific	improve CBC	
Fox Sparrow				Mo3	boreal survey	migration monitoring	
Song Sparrow							
Lincoln's Sparrow			1	Mo3	boreal survey	migration monitoring	
Swamp Sparrow			1	Mo3	boreal survey	migration monitoring	
White-throated Sparrow			1	Mo3	boreal survey	migration monitoring	improve CBC
Harris's Sparrow	1	MA	1	Mo2,3	arctic survey	improve CBC	
White-crowned Sparrow				Mo3	boreal survey	migration monitoring	improve CBC
Golden-crowned Sparrow				Mo3	boreal survey	improve CBC	
Dark-eyed Junco				Mo3	boreal survey	migration monitoring	improve CBC
Yellow-eyed Junco				Mo2,4	MX BBS	border bird survey	
McCown's Longspur	1	PR	1	Mo2a	improve BBS	winter survey	
Lapland Longspur			1	Mo2,3	arctic survey	improve CBC	
Smith's Longspur[1]	1	PR		Mo2,3	arctic survey	winter survey	
Chestnut-collared Longspur			1			improve BBS	winter survey
Snow Bunting			1	Mo2,3	arctic survey	improve CBC	
McKay's Bunting[1]	1	PR	1	Mo1,3	spp-specific		
Northern Cardinal							
Pyrrhuloxia			1	Mo4	MX BBS	improve BBS	
Rose-breasted Grosbeak							
Black-headed Grosbeak						improve BBS	
Blue Grosbeak							
Lazuli Bunting						improve BBS	
Indigo Bunting			1				
Varied Bunting[1]	1	MA		Mo1,4	MX BBS	border bird survey	
Painted Bunting	1	MA				improve BBS	
Dickcissel	1	MA	1				

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed: Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
Bobolink							
Red-winged Blackbird							
Tricolored Blackbird	1	IM	1	Mo2	spp-specific	winter survey	
Eastern Meadowlark							
Western Meadowlark							
Yellow-headed Blackbird				Mo2	improve BBS	winter survey (roosts)	winter survey
Rusty Blackbird	1	MA		Mo2,3	boreal survey	winter survey	
Brewer's Blackbird						improve BBS	
Common Grackle							
Boat-tailed Grackle						improve BBS	winter survey
Great-tailed Grackle				Mo4	MX BBS	improve BBS	
Shiny Cowbird				Mo2,4	Caribbean survey	spp-specific U.S.	SA surveys
Bronzed Cowbird				Mo4	MX BBS	improve BBS	
Brown-headed Cowbird							
Orchard Oriole				Mo2a	improve BBS		
Hooded Oriole				Mo2,4	MX BBS	border bird survey	
Streak-backed Oriole				Mo1,4	MX BBS	border bird survey	
Bullock's Oriole						improve BBS	
Altamira Oriole[1]	2			Mo1,4	MX BBS	border bird survey	
Audubon's Oriole[1]	1	MA		Mo1,4	MX BBS	border bird survey	
Baltimore Oriole						improve BBS	
Scott's Oriole			1			improve BBS	
Gray-crowned Rosy-Finch				Mo1,3	high elev./arctic surveys	improve CBC	
Black Rosy-Finch[1]	1	PR	1	Mo2	high elevation survey	winter survey	
Brown-capped Rosy-Finch[1]	1	PR	1	Mo2	high elevation survey	winter survey	
Pine Grosbeak			1	Mo3	boreal survey	improve CBC	
Purple Finch				Mo3	boreal survey	improve CBC	
Cassin's Finch			1				
House Finch						improve BBS	winter survey
Red Crossbill				Mo2	improve BBS	improve CBC	

Species[1]	Watch List[2]	Action[3]	Stewardship[4]	Monitoring need[5]	Monitoring Action Needed: Monitoring action most needed to remove species from high needs list[6]	Second tier monitoring action[7]	Third tier monitoring action[8]
White-winged Crossbill			1	Mo2,3	boreal survey	improve BBS	improve CBC
Common Redpoll				Mo3	arctic survey	improve CBC	
Hoary Redpoll			1	Mo2,3	arctic survey		
Pine Siskin				Mo3	boreal survey	improve CBC	
Lesser Goldfinch						improve BBS	
Lawrence's Goldfinch[1]	1	PR	1	Mo2	improve BBS	improve CBC	
American Goldfinch							
Evening Grosbeak						improve BBS	

[1] Species on or nearly on the Watch List (see note 2) that are high priority candidates for rapid status assessment.

[2] 1= Species of conservation concern at the continental scale (Rich et al. 2004); 2=species that would be on the PIF Watch List if population trend (currently unknown) proved to be moderate (equivalent to 15-49% decline over 30 years); 3=species that would be on the PIF Watch list if population trend (currently unknown) proved to be severe (equivalent to decline ≥ 50% over 30 years).

[3] Priority action (from Rich et al. 2004): IM=Immediate Management, MA=Management, PR=Planning and Stewardship.

[4] Stewardship species (breeding season) from the PIF Continental Landbird Conservation Plan (Rich et al. 2004).

[5] Monitoring need: Mo1 = little or no information on population status; Mo2 and Mo2a = Trend information available from an existing survey, but trend precision is low; Mo3 = 1/3 or more of the Canadian/U.S. breeding range is not covered by a breeding-season survey (i.e., much of range north of BBS coverage); Mo4 = 2/3 or more of Western Hemisphere breeding range is south of the U.S.; S = high concern species already subject to some species-specific specific monitoring. First three categories are from Rich et al. (2004). A blank indicates that BBS or a species-specific survey already provides acceptable data at the continental level.

[6] Priority action for addressing monitoring needs for improving knowledge of status in North America (coded in previous column). A blank indicates that BBS already provides acceptable data at the continental level.

[7] Next best approach to improving status information (after step in previous column).

[8] Third best approach to improving status information.