

Partners in Flight



North American Landbird Conservation Plan

Literature Cited,

Appendices





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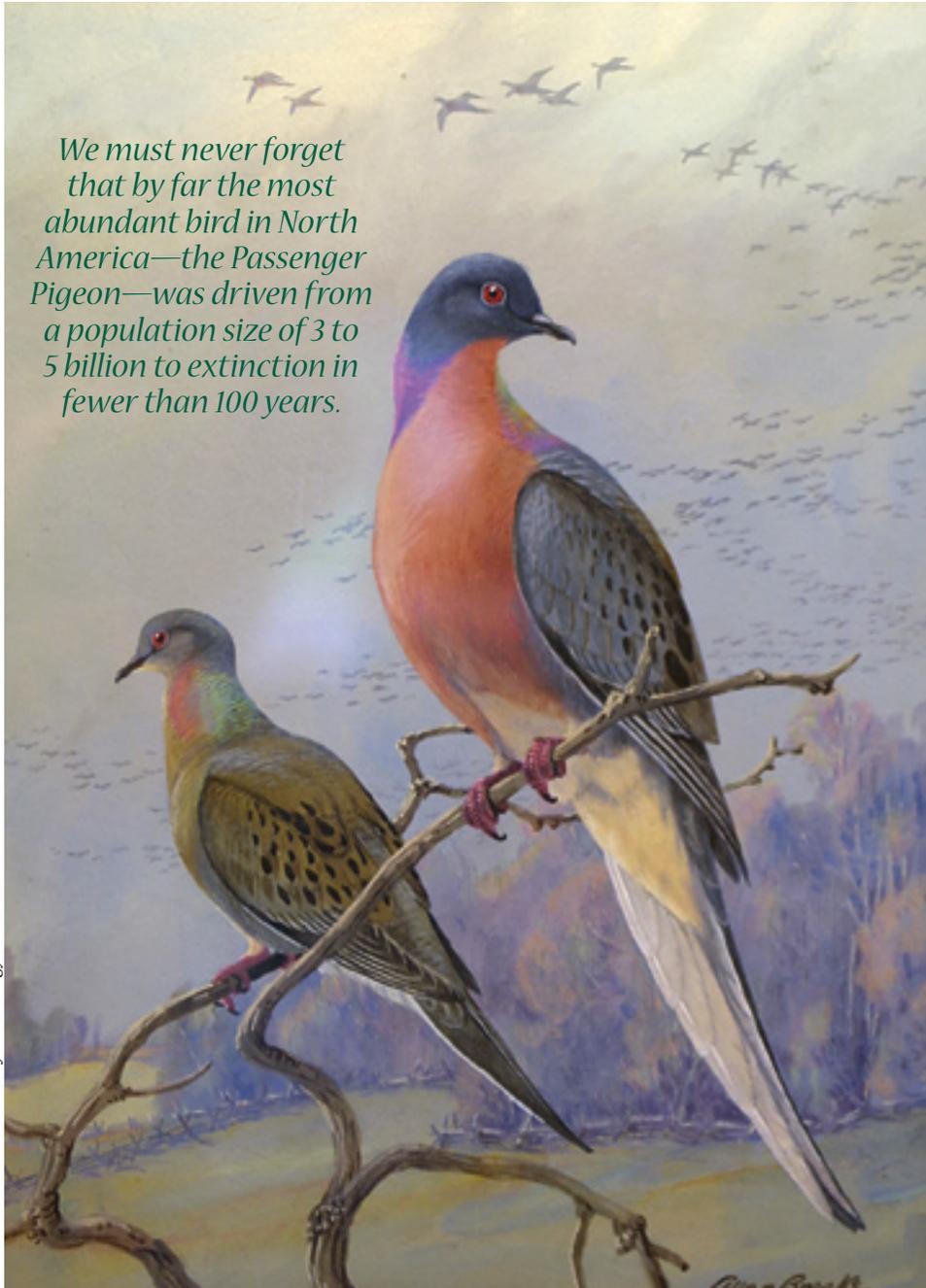
The Prairie Warbler, one of 101 species identified in this Plan on Partners in Flight's continental Watch List, breeds in disturbance-dependent habitats in eastern North America and migrates to the West Indies in winter.

TABLE OF CONTENTS

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

*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 •*

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Appendices

APPENDIX A. Assessment scores and estimated population size of North American landbirds

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Plain Chachalaca	<i>Ortalis vetula</i>	3	4	4	2	2	2	11	2,000,000	1 F	≤ 1%	Mo1
Ruffed Grouse	<i>Bonasa umbellus</i>	2	2	2	2	2	4	10	8,300,000	3 A	100%	Mo2,3
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	4	3	3	4	4	5	16	150,000	4	100%	Mo2
Gunnison Sage-Grouse	<i>Centrocercus minimus</i>	5	5	5	5	5	5	20	2,000	5	100%	**
Spruce Grouse	<i>Falciennis canadensis</i>	3	1	1	2	2	1	7	1,200,000	2 C	100%	Mo2,3
Willow Ptarmigan	<i>Lagopus lagopus</i>	2	1	1	2	2	3	8	37,000,000	1 D	30%	Mo1,3
Rock Ptarmigan	<i>Lagopus mutus</i>	2	1	1	2	2	3	8	8,200,000	3	50%	Mo1,3
White-tailed Ptarmigan	<i>Lagopus leucurus</i>	3	3	3	2	2	3	11	2,000,000	1	100%	Mo1,3
Blue Grouse	<i>Dendragapus obscurus</i>	3	3	3	3	3	5	14	2,600,000	3 B	100%	Mo2
Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>	3	2	2	3	2	3	11	1,200,000	3 B	100%	Mo2
Greater Prairie-Chicken	<i>Tympanuchus cupido</i>	3	5	5	4	4	5	17	690,000	2 C	100%	Mo2
Lesser Prairie-Chicken	<i>Tympanuchus pallidicinctus</i>	5	5	5	5	5	5	20	32,000	5	100%	**
Wild Turkey	<i>Meleagris gallopavo</i>	3	2	2	2	2	1	8	1,300,000	3 A	90%	Mo2
Mountain Quail	<i>Oreortyx pictus</i>	4	4	4	3	3	3	14	160,000	3 C	100%	**
Scaled Quail	<i>Callipepla squamata</i>	3	3	3	4	3	4	14	1,200,000	3 B	50%	**
California Quail	<i>Callipepla californica</i>	3	4	4	2	2	3	12	990,000	4 B	87%	**
Gambel's Quail	<i>Callipepla gambelii</i>	3	4	4	2	2	3	12	1,800,000	2 B	60%	**
Northern Bobwhite	<i>Colinus virginianus</i>	2	2	2	3	3	5	12	9,200,000	4 A	82%	**
Montezuma Quail	<i>Cyrtonyx montezumae</i>	3	4	4	3	3	4	14	1,500,000	2	10%	Mo1
Black Vulture	<i>Coragyps atratus</i>	2	1	1	1	1	1	5	20,000,000	1 A	≤ 1%	**
Turkey Vulture	<i>Cathartes aura</i>	3	1	1	1	1	1	6	4,500,000	3 A	29%	**
California Condor	<i>Gymnogyps californianus</i>	5	5	5	5	5	5	20	< 100	6	93%	**
Osprey	<i>Pandion haliaetus</i>	4	1	1	2	2	1	8	460,000	3 A	46%	Mo2,3
Hook-billed Kite	<i>Chondrohierax uncinatus</i>	4	1	1	2	2	2	9	200,000	1	≤ 1%	Mo1
Swallow-tailed Kite	<i>Elanoides forficatus</i>	4	3	3	4	3	5	16	150,000	3	≤ 5%	Mo2
White-tailed Kite	<i>Elanus leucurus</i>	4	1	1	1	1	2	8	53,000	2 C	20%	**
Snail Kite	<i>Rostrhamus sociabilis</i>	3	3	3	3	3	2	11	2,000,000	1 F	≤ 1%	Mo1
Mississippi Kite	<i>Ictinia mississippiensis</i>	4	3	3	2	3	3	13	190,000	3 B	100%	Mo2
Bald Eagle	<i>Haliaeetus leucocephalus</i>	4	2	1	3	3	1	10	330,000	3 A	>99%	Mo3
Northern Harrier	<i>Circus cyaneus</i>	3	1	1	3	3	4	11	1,300,000	3 A	35%	Mo3
Sharp-shinned Hawk	<i>Accipiter striatus</i>	3	1	1	2	2	2	8	1,100,000	3 A	53%	Mo3
Cooper's Hawk	<i>Accipiter cooperii</i>	3	1	1	2	3	1	8	570,000	3 A	97%	Mo2
Northern Goshawk	<i>Accipiter gentilis</i>	4	1	1	3	3	3	11	490,000	3 A	49%	Mo2,3
Gray Hawk	<i>Asturina nitida</i>	3	1	1	2	1	1	7	2,000,000	1 E	≤ 1%	Mo1
Common Black-Hawk	<i>Buteogallus anthracinus</i>	3	3	3	3	3	2	11	2,000,000	1 F	≤ 1%	Mo1
Harris's Hawk	<i>Parabuteo unicinctus</i>	4	1	1	3	3	4	12	390,000	2 C	10%	**
Red-shouldered Hawk	<i>Buteo lineatus</i>	3	2	2	2	2	1	8	830,000	3 A	99%	**
Broad-winged Hawk	<i>Buteo platypterus</i>	3	1	1	3	3	2	9	1,800,000	3 A	96%	**
Short-tailed Hawk	<i>Buteo brachyurus</i>	3	1	1	3	3	3	10	2,000,000	1	≤ 5%	Mo1
Swainson's Hawk	<i>Buteo swainsoni</i>	4	2	3	3	4	3	14	490,000	4 A	94%	**
White-tailed Hawk	<i>Buteo albicaudatus</i>	3	1	1	3	3	3	10	2,000,000	1 D	≤ 1%	Mo1
Zone-tailed Hawk	<i>Buteo albonotatus</i>	3	1	1	3	2	3	10	2,000,000	1 D	≤ 1%	Mo1
Red-tailed Hawk	<i>Buteo jamaicensis</i>	3	1	1	1	1	1	6	2,200,000	4 A	89%	**
Ferruginous Hawk	<i>Buteo regalis</i>	5	2	3	4	3	1	13	23,000	3 A	100%	**
Rough-legged Hawk	<i>Buteo lagopus</i>	3	1	1	2	2	2	8	530,000	2	50%	Mo2,3

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Golden Eagle	<i>Aquila chrysaetos</i>	4	1	1	3	3	3	11	170,000	3 A	47%	Mo3
Crested Caracara	<i>Caracara cheriway</i>	3	1	1	2	2	2	8	2,000,000	1 C	≤ 5%	Mo2
American Kestrel	<i>Falco sparverius</i>	2	1	1	2	2	2	7	5,800,000	4 A	75%	**
Merlin	<i>Falco columbarius</i>	3	1	1	2	2	1	7	1,300,000	3 A	50%	Mo2,3
Aplomado Falcon	<i>Falco femoralis</i>	4	1	1	3	2	4	12	200,000	1	≤ 1%	Mo1
Gyrfalcon	<i>Falco rusticolus</i>	4	1	1	2	2	1	8	110,000	1	50%	Mo2,3
Peregrine Falcon	<i>Falco peregrinus</i>	3	1	1	3	3	1	8	1,200,000	2	23%	Mo2,3
Prairie Falcon	<i>Falco mexicanus</i>	5	2	2	3	3	2	12	36,000	3 A	96%	Mo2
White-crowned Pigeon	<i>Patagioenas leucocephala</i>	3	4	4	4	4	5	16	550,000	3	≤ 5%	Mo1
Red-billed Pigeon	<i>Patagioenas flavirostris</i>	3	3	3	3	3	3	12	2,000,000	1 F	≤ 1%	Mo1
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	3	3	3	3	3	5	14	3,900,000	2 B	25%	Mo2
White-winged Dove	<i>Zenaida asiatica</i>	2	2	3	2	2	3	10	19,000,000	3 B	25%	**
Mourning Dove	<i>Zenaida macroura</i>	1	1	1	1	1	2	5	130,000,000	4 A	85%	**
Inca Dove	<i>Columbina inca</i>	3	3	3	2	2	1	9	1,900,000	2 C	25%	Mo2
Common Ground-Dove	<i>Columbina passerina</i>	3	1	1	3	3	4	11	2,300,000	3 B	50%	Mo2
White-tipped Dove	<i>Leptotila verreauxi</i>	2	1	1	2	2	2	7	20,000,000	1 F	≤ 1%	Mo1
Green Parakeet	<i>Aratinga holochlora</i>	4	5	5	4	4	4	17	200,000	1	≤ 1%	Mo1
Thick-billed Parrot	<i>Rhynchopsitta pachyrhyncha</i>	5	5	5	5	4	5	20	2,500	3	≤ 1%	Mo1
Red-crowned Parrot	<i>Amazona viridigenalis</i>	5	5	5	5	5	5	20	< 5,000	3	50%	Mo1
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	3	2	2	3	3	4	12	1,100,000	4 A	100%	**
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	2	1	2	3	3	4	11	9,200,000	3 A	92%	**
Mangrove Cuckoo	<i>Coccyzus minor</i>	4	3	3	3	3	4	14	200,000	1 F	≤ 5%	Mo1
Greater Roadrunner	<i>Geococcyx californianus</i>	3	2	2	2	2	3	10	1,100,000	3 A	50%	**
Smooth-billed Ani	<i>Crotophaga ani</i>	2	1	1	3	3	4	10	20,000,000	1 F	≤ 1%	Mo1
Groove-billed Ani	<i>Crotophaga sulcirostris</i>	3	2	2	1	1	1	7	2,000,000	1 D	≤ 5%	Mo2
Barn Owl	<i>Tyto alba</i>	3	1	1	2	2	3	9	4,900,000	1 B	7%	Mo2
Flammulated Owl	<i>Otus flammeolus</i>	5	3	4	3	3	3	15	37,000	1 F	77%	Mo1
Western Screech-Owl	<i>Megascops kennicottii</i>	3	2	2	3	2	3	11	740,000	1 C	73%	Mo2
Eastern Screech-Owl	<i>Megascops asio</i>	3	2	2	2	2	3	10	770,000	2 A	96%	Mo2
Whiskered Screech-Owl	<i>Megascops trichopsis</i>	4	4	4	2	2	3	13	200,000	1 F	≤ 5%	Mo1
Great Horned Owl	<i>Bubo virginianus</i>	2	1	1	1	1	3	7	5,300,000	3 A	43%	**
Snowy Owl	<i>Bubo scandiacus</i>	4	1	1	2	2	2	9	290,000	2	50%	Mo2,3
Northern Hawk Owl	<i>Surnia ulula</i>	4	1	1	2	2	2	9	130,000	2 C	50%	Mo2,3
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	4	2	2	3	3	2	11	100,000	2 B	84%	Mo2
Ferruginous Pygmy-Owl	<i>Glaucidium brasilianum</i>	2	1	1	2	2	2	7	20,000,000	1 F	≤ 1%	Mo1
Elf Owl	<i>Micrathene whitneyi</i>	4	4	5	3	3	3	15	190,000	1 E	24%	Mo1
Burrowing Owl	<i>Athene cunicularia</i>	3	1	2	4	3	4	13	2,000,000	2 B	31%	**
Spotted Owl	<i>Strix occidentalis</i>	5	3	3	4	4	4	16	15,000	4	70%	**
Barred Owl	<i>Strix varia</i>	3	1	1	2	2	1	7	560,000	3 A	100%	**
Great Gray Owl	<i>Strix nebulosa</i>	4	1	1	2	2	3	10	63,000	2 C	50%	Mo2,3
Long-eared Owl	<i>Asio otus</i>	4	1	1	3	3	4	12	120,000	1 C	30%	Mo2
Short-eared Owl	<i>Asio flammeus</i>	3	1	1	3	4	5	13	2,400,000	2 A	29%	Mo3
Boreal Owl	<i>Aegolius funereus</i>	3	1	1	3	2	3	10	2,000,000	2	30%	Mo1,3
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	3	2	2	2	2	2	9	2,000,000	2	96%	Mo2
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	2	1	1	2	2	2	7	5,900,000	2 B	25%	**
Common Nighthawk	<i>Chordeiles minor</i>	2	1	1	3	3	4	10	11,000,000	3 A	96%	**
Antillean Nighthawk	<i>Chordeiles gundlachii</i>	4	5	2	2	2	3	14	200,000	3	≤ 1%	Mo1
Common Pauraque	<i>Nyctidromus albicollis</i>	2	1	1	2	2	2	7	20,000,000	1 D	≤ 1%	Mo1
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	3	2	3	2	2	2	10	2,900,000	2 B	98%	**
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>	2	2	3	3	3	4	12	15,000,000	3 A	100%	**
Buff-collared Nightjar	<i>Caprimulgus ridgwayi</i>	3	4	4	3	3	3	13	2,000,000	1	≤ 5%	Mo1
Whip-poor-will	<i>Caprimulgus vociferus</i>	3	2	3	3	3	4	13	2,100,000	3 A	75%	**
Black Swift	<i>Cypseloides niger</i>	4	3	4	3	2	4	15	150,000	2 C	58%	Mo2

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Chimney Swift	<i>Chaetura pelagica</i>	2	1	3	3	3	4	12	15,000,000	4 A	100%	**
Vaux's Swift	<i>Chaetura vauxi</i>	3	3	3	3	2	3	12	1,500,000	3 B	47%	**
White-throated Swift	<i>Aeronautes saxatalis</i>	4	2	3	2	2	5	14	410,000	3 B	69%	Mo2
Broad-billed Hummingbird	<i>Cyananthus latirostris</i>	3	4	4	2	2	2	11	2,000,000	1 F	≤ 5%	Mo1
White-eared Hummingbird	<i>Hylocharis leucotis</i>	3	4	4	2	2	2	11	2,000,000	1	≤ 1%	Mo1
Berylline Hummingbird	<i>Amazilia beryllina</i>	3	4	4	3	2	3	13	2,000,000	1	≤ 1%	Mo1
Buff-bellied Hummingbird	<i>Amazilia yucatanensis</i>	3	5	5	2	2	2	12	2,000,000	1 F	≤ 5%	Mo1
Violet-crowned Hummingbird	<i>Amazilia violiceps</i>	3	4	4	2	2	3	12	2,000,000	1	≤ 5%	Mo1
Blue-throated Hummingbird	<i>Lampornis clemenciae</i>	3	4	4	3	2	3	13	2,000,000	1 F	≤ 5%	Mo1
Magnificent Hummingbird	<i>Eugenes fulgens</i>	3	3	3	3	3	2	11	2,000,000	1 F	≤ 1%	Mo1
Lucifer Hummingbird	<i>Calothorax lucifer</i>	4	5	5	2	2	2	13	200,000	1	≤ 5%	Mo1
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	2	1	3	2	2	1	8	7,300,000	3 A	100%	**
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	3	3	5	2	2	2	12	2,000,000	3 A	93%	Mo2
Anna's Hummingbird	<i>Calypte anna</i>	3	4	4	1	1	2	10	1,500,000	3 C	100%	**
Costa's Hummingbird	<i>Calypte costae</i>	3	5	5	3	2	3	14	3,600,000	2 D	50%	Mo2
Calliope Hummingbird	<i>Stellula calliope</i>	3	3	5	3	2	3	14	1,000,000	3 B	100%	Mo2
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	3	3	5	2	2	2	12	3,800,000	3 B	80%	**
Rufous Hummingbird	<i>Selasphorus rufus</i>	2	3	5	2	2	5	14	6,500,000	3 B	100%	**
Allen's Hummingbird	<i>Selasphorus sasin</i>	3	5	5	3	2	3	14	530,000	2 E	100%	Mo2
Elegant Trogon	<i>Trogon elegans</i>	4	3	3	3	3	4	14	200,000	1 F	≤ 1%	Mo1
Ringed Kingfisher	<i>Ceryle torquata</i>	2	1	1	2	2	2	7	20,000,000	1 F	≤ 1%	Mo1
Belted Kingfisher	<i>Ceryle alcyon</i>	3	1	1	2	2	4	10	2,200,000	3 A	100%	Mo3
Green Kingfisher	<i>Chloroceryle americana</i>	2	1	1	2	2	2	7	20,000,000	1	≤ 1%	Mo1
Lewis's Woodpecker	<i>Melanerpes lewis</i>	4	3	4	4	3	3	15	130,000	3 B	100%	Mo2
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	3	2	2	3	3	5	13	2,500,000	4 A	100%	**
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	3	2	2	2	2	2	9	3,700,000	3 B	50%	**
Gila Woodpecker	<i>Melanerpes uropygialis</i>	3	4	4	2	2	3	12	3,300,000	2 D	25%	**
Golden-fronted Woodpecker	<i>Melanerpes aurifrons</i>	3	3	3	3	3	4	13	1,700,000	2 C	50%	**
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	2	2	3	2	2	2	9	10,000,000	4 A	100%	**
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	4	3	3	3	3	3	13	310,000	3 B	100%	Mo2
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	2	2	2	2	2	3	9	9,200,000	3 A	100%	Mo2,3
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	3	3	3	3	3	3	12	2,200,000	4 B	100%	**
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	3	3	4	3	3	3	13	2,500,000	3 C	100%	Mo3
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	3	2	2	2	2	4	11	2,100,000	2 B	33%	Mo2
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	4	5	5	4	4	3	16	290,000	4 C	100%	**
Downy Woodpecker	<i>Picoides pubescens</i>	2	1	1	2	1	2	7	13,000,000	4 A	100%	**
Hairy Woodpecker	<i>Picoides villosus</i>	2	1	1	2	2	1	6	9,400,000	4 A	80%	**
Arizona Woodpecker	<i>Picoides arizonae</i>	4	5	5	3	3	3	15	200,000	1 F	≤ 5%	Mo1
Red-cockaded Woodpecker	<i>Picoides borealis</i>	5	4	4	5	5	4	18	20,000	2 D	100%	Mo2
White-headed Woodpecker	<i>Picoides albolarvatus</i>	4	4	4	4	3	2	14	72,000	2 C	100%	Mo2
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	3	1	1	3	3	2	9	830,000	2 B	100%	Mo2,3
Black-backed Woodpecker	<i>Picoides arcticus</i>	3	2	2	3	3	3	11	1,300,000	3 A	100%	Mo2,3
Northern Flicker	<i>Colaptes auratus</i>	2	1	1	2	2	4	9	16,000,000	3 A	91%	Mo3
Gilded Flicker	<i>Colaptes chrysoides</i>	3	5	5	3	3	2	13	1,100,000	1 D	25%	Mo2
Pileated Woodpecker	<i>Dryocopus pileatus</i>	3	1	1	2	2	1	7	930,000	4 A	100%	**
Ivory-billed Woodpecker	<i>Campephilus principalis</i>	5	5	5	5	5	5	20	0 ?	6	100%	**
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>	3	3	3	2	2	2	10	2,000,000	1 E	≤ 5%	Mo1
Olive-sided Flycatcher	<i>Contopus cooperi</i>	3	1	2	3	4	5	14	1,200,000	3 A	99%	Mo3
Greater Pewee	<i>Contopus pertinax</i>	3	4	4	3	3	3	13	2,000,000	1 F	≤ 1%	Mo1
Western Wood-Pewee	<i>Contopus sordidulus</i>	2	1	2	3	3	4	11	9,700,000	4 A	80%	**
Eastern Wood-Pewee	<i>Contopus virens</i>	2	1	2	2	2	4	10	6,000,000	4 A	100%	**
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	2	2	4	3	3	1	10	6,200,000	3 A	100%	Mo3
Acadian Flycatcher	<i>Empidonax virescens</i>	3	2	4	3	3	2	12	4,700,000	4 A	100%	**

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Alder Flycatcher	<i>Empidonax alnorum</i>	2	1	3	2	2	2	9	49,000,000	3 A	100%	Mo3
Willow Flycatcher	<i>Empidonax traillii</i>	3	1	4	3	2	4	14	3,300,000	4 A	100%	**
Least Flycatcher	<i>Empidonax minimus</i>	2	1	3	2	2	4	11	14,000,000	3 A	100%	Mo3
Hammond's Flycatcher	<i>Empidonax hammondi</i>	2	3	4	3	2	2	11	13,000,000	4 B	100%	**
Gray Flycatcher	<i>Empidonax wrightii</i>	3	4	4	3	2	1	11	1,200,000	3 B	100%	Mo2
Dusky Flycatcher	<i>Empidonax oberholseri</i>	3	3	4	2	2	4	13	3,600,000	4 A	99%	**
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	2	4	5	3	2	3	13	8,300,000	4 B	96%	**
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	3	3	4	3	2	3	13	2,600,000	4 B	85%	**
Buff-breasted Flycatcher	<i>Empidonax fulvifrons</i>	3	4	4	3	3	3	13	2,000,000	1	≤ 1%	Mo1
Black Phoebe	<i>Sayornis nigricans</i>	3	2	2	3	2	1	9	970,000	3 B	33%	**
Eastern Phoebe	<i>Sayornis phoebe</i>	2	1	2	2	2	2	8	16,000,000	4 A	100%	**
Say's Phoebe	<i>Sayornis saya</i>	3	1	3	2	2	2	10	3,700,000	4 A	91%	**
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	3	1	1	2	2	2	8	2,000,000	2 B	10%	Mo2
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>	2	1	1	2	2	3	8	20,000,000	1 F	≤ 1%	Mo1
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	2	2	3	2	2	2	9	8,900,000	4 A	75%	**
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	2	1	3	2	2	2	9	7,500,000	4 A	100%	**
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	2	1	1	2	2	2	7	7,700,000	2 C	10%	Mo2
Great Kiskadee	<i>Pitangus sulphuratus</i>	2	1	1	2	2	3	8	20,000,000	1 D	≤ 1%	Mo2
Sulphur-bellied Flycatcher	<i>Myiodynastes luteiventris</i>	3	3	3	2	3	3	12	2,000,000	1 F	≤ 1%	Mo1
Tropical Kingbird	<i>Tyrannus melancholicus</i>	1	1	1	1	1	2	5	200,000,000	1 F	≤ 1%	Mo1
Couch's Kingbird	<i>Tyrannus couchii</i>	3	4	4	2	2	2	11	1,700,000	2 D	10%	Mo2
Cassin's Kingbird	<i>Tyrannus vociferans</i>	3	3	4	2	2	3	12	4,300,000	3 B	50%	Mo2
Thick-billed Kingbird	<i>Tyrannus crassirostris</i>	3	4	5	3	3	3	14	2,000,000	1 F	≤ 1%	Mo1
Western Kingbird	<i>Tyrannus verticalis</i>	2	1	4	2	2	2	10	19,000,000	4 A	96%	**
Eastern Kingbird	<i>Tyrannus tyrannus</i>	2	1	2	2	2	4	10	13,000,000	4 A	100%	**
Gray Kingbird	<i>Tyrannus dominicensis</i>	3	4	4	3	3	3	13	780,000	1 E	10%	Mo2
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	2	4	5	2	2	3	12	7,900,000	4 B	90%	**
Rose-throated Becard	<i>Pachyramphus aglaiae</i>	3	3	3	3	3	3	12	2,000,000	1	≤ 1%	Mo1
Loggerhead Shrike	<i>Lanius ludovicianus</i>	3	1	1	3	3	5	12	4,200,000	4 A	88%	**
Northern Shrike	<i>Lanius excubitor</i>	4	3	1	2	2	2	11	210,000	2 B	100%	Mo2,3
White-eyed Vireo	<i>Vireo griseus</i>	2	2	4	2	2	2	10	17,000,000	4 A	92%	**
Bell's Vireo	<i>Vireo bellii</i>	3	3	5	4	3	5	17	1,500,000	4 B	75%	**
Black-capped Vireo	<i>Vireo atricapilla</i>	5	5	5	5	3	5	20	8,000	4	60%	Mo1
Gray Vireo	<i>Vireo vicinior</i>	4	4	5	4	4	2	15	410,000	2 D	90%	Mo2
Yellow-throated Vireo	<i>Vireo flavifrons</i>	3	2	3	3	3	2	11	1,400,000	4 A	100%	**
Plumbeous Vireo	<i>Vireo plumbeus</i>	3	2	4	3	2	2	12	2,700,000	4 B	80%	**
Cassin's Vireo	<i>Vireo cassinii</i>	3	3	3	3	2	2	11	4,600,000	4 B	100%	**
Blue-headed Vireo	<i>Vireo solitarius</i>	2	2	3	2	2	1	8	6,900,000	3 A	100%	Mo2,3
Hutton's Vireo	<i>Vireo huttoni</i>	3	3	3	3	2	2	11	2,100,000	3 B	39%	Mo2
Warbling Vireo	<i>Vireo gilvus</i>	2	1	4	3	2	2	11	22,000,000	4 A	80%	**
Philadelphia Vireo	<i>Vireo philadelphicus</i>	3	2	4	2	2	1	10	4,300,000	3 B	100%	Mo2,3
Red-eyed Vireo	<i>Vireo olivaceus</i>	1	2	2	2	2	2	7	140,000,000	4 A	100%	**
Yellow-green Vireo	<i>Vireo flavoviridis</i>	3	3	3	3	3	3	12	2,000,000	1	≤ 1%	Mo1
Black-whiskered Vireo	<i>Vireo altiloquus</i>	3	4	3	3	3	3	13	780,000	1 F	10%	Mo1
Gray Jay	<i>Perisoreus canadensis</i>	2	1	1	2	2	2	7	16,000,000	3 A	100%	Mo3
Steller's Jay	<i>Cyanocitta stelleri</i>	3	2	2	2	2	2	9	4,400,000	4 A	85%	**
Blue Jay	<i>Cyanocitta cristata</i>	2	1	2	1	1	4	9	22,000,000	4 A	100%	**
Green Jay	<i>Cyanocorax yncas</i>	3	3	3	2	2	3	11	2,000,000	1 D	≤ 5%	Mo2
Brown Jay	<i>Cyanocorax morio</i>	3	3	3	1	1	2	9	2,000,000	1	≤ 1%	Mo1
Florida Scrub-Jay	<i>Aphelocoma coerulescens</i>	5	5	5	5	5	5	20	10,000	5	100%	**
Island Scrub-Jay	<i>Aphelocoma insularis</i>	5	5	5	4	3	3	17	9,000	5	100%	Mo1
Western Scrub-Jay	<i>Aphelocoma californica</i>	3	3	3	2	2	2	10	3,400,000	4 A	80%	**
Mexican Jay	<i>Aphelocoma ultramarina</i>	3	4	4	3	3	3	13	2,200,000	1 F	11%	Mo1

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	3	3	3	4	3	5	15	4,100,000	4 B	100%	**
Clark's Nutcracker	<i>Nucifraga columbiana</i>	3	2	2	2	2	1	8	1,000,000	4 B	99%	**
Black-billed Magpie	<i>Pica hudsonia</i>	3	2	2	2	2	2	9	3,400,000	4 A	100%	**
Yellow-billed Magpie	<i>Pica nuttalli</i>	4	5	5	3	3	3	15	180,000	2 D	100%	**
American Crow	<i>Corvus brachyrhynchos</i>	2	1	1	1	1	2	6	31,000,000	4 A	100%	**
Northwestern Crow	<i>Corvus caurinus</i>	3	5	5	1	1	2	11	1,400,000	2 C	100%	Mo3
Tamaulipas Crow	<i>Corvus imparatus</i>	4	5	5	2	2	2	13	200,000	1	≤ 1%	Mo1
Fish Crow	<i>Corvus ossifragus</i>	3	3	4	1	1	1	9	790,000	4 A	100%	**
Chihuahuan Raven	<i>Corvus cryptoleucus</i>	3	3	3	2	1	4	12	740,000	3 B	50%	Mo2
Common Raven	<i>Corvus corax</i>	2	1	1	2	1	1	6	16,000,000	3 A	24%	Mo3
Horned Lark	<i>Eremophila alpestris</i>	1	1	1	2	2	4	8	140,000,000	3 A	70%	Mo3
Purple Martin	<i>Progne subis</i>	2	1	1	2	3	2	8	11,000,000	3 A	90%	**
Tree Swallow	<i>Tachycineta bicolor</i>	2	1	2	2	2	2	8	20,000,000	3 A	100%	Mo3
Violet-green Swallow	<i>Tachycineta thalassina</i>	2	1	3	2	2	2	9	11,000,000	4 A	79%	**
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	2	1	3	2	2	3	10	15,000,000	3 A	34%	**
Bank Swallow	<i>Riparia riparia</i>	2	1	1	2	2	3	8	46,000,000	2 A	30%	Mo3
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	1	1	1	1	2	2	6	89,000,000	3 A	92%	**
Cave Swallow	<i>Petrochelidon fulva</i>	2	4	5	2	2	2	11	7,400,000	2 C	29%	Mo2
Barn Swallow	<i>Hirundo rustica</i>	1	1	1	2	2	4	8	190,000,000	3 A	27%	**
Carolina Chickadee	<i>Poecile carolinensis</i>	2	3	3	2	1	4	11	18,000,000	4 A	100%	**
Black-capped Chickadee	<i>Poecile atricapillus</i>	2	1	1	2	1	1	6	34,000,000	4 A	100%	**
Mountain Chickadee	<i>Poecile gambeli</i>	2	2	2	2	2	4	10	12,000,000	4 A	99%	**
Mexican Chickadee	<i>Poecile sclateri</i>	3	4	4	3	3	3	13	2,000,000	1 F	≤ 1%	Mo1
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	2	4	4	2	2	3	11	6,900,000	4 B	100%	**
Boreal Chickadee	<i>Poecile hudsonica</i>	2	1	1	3	2	5	11	7,800,000	3 A	100%	Mo2,3
Gray-headed Chickadee	<i>Poecile cincta</i>	3	2	2	2	2	3	10	2,000,000	1	≤ 5%	Mo1,3
Bridled Titmouse	<i>Baeolophus wollweberi</i>	3	4	4	3	2	3	13	860,000	1 E	10%	Mo2
Oak Titmouse	<i>Baeolophus inornatus</i>	3	4	4	3	3	4	14	900,000	4 C	100%	**
Juniper Titmouse	<i>Baeolophus ridgwayi</i>	4	3	3	3	3	3	13	330,000	4 B	100%	**
Tufted Titmouse	<i>Baeolophus bicolor</i>	2	2	2	2	1	2	8	12,000,000	4 A	100%	**
Black-crested Titmouse	<i>Baeolophus atricristatus</i>	3	4	4	2	2	2	11	1,000,000	3 C	74%	Mo1
Verdin	<i>Auriparus flaviceps</i>	2	3	3	2	2	5	12	8,900,000	3 B	50%	**
Bushtit	<i>Psaltriparus minimus</i>	3	2	2	2	2	4	11	4,500,000	3 B	66%	**
Red-breasted Nuthatch	<i>Sitta canadensis</i>	2	1	1	2	2	1	6	18,000,000	4 A	100%	**
White-breasted Nuthatch	<i>Sitta carolinensis</i>	2	1	1	2	2	1	6	10,000,000	4 A	90%	**
Pygmy Nuthatch	<i>Sitta pygmaea</i>	3	3	3	3	3	3	12	2,300,000	3 B	74%	**
Brown-headed Nuthatch	<i>Sitta pusilla</i>	3	4	4	3	3	4	14	1,500,000	4 B	100%	**
Brown Creeper	<i>Certhia americana</i>	2	1	1	3	2	3	9	5,400,000	4 A	93%	**
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>	2	3	3	2	2	4	11	8,300,000	3 B	50%	**
Rock Wren	<i>Salpinctes obsoletus</i>	3	1	2	2	2	4	11	4,200,000	4 A	80%	**
Canyon Wren	<i>Catherpes mexicanus</i>	3	2	2	2	2	4	11	660,000	3 B	50%	**
Carolina Wren	<i>Thryothorus ludovicianus</i>	2	2	2	2	2	2	8	17,000,000	4 A	89%	**
Bewick's Wren	<i>Thryomanes bewickii</i>	2	2	2	3	3	3	10	6,000,000	4 A	76%	**
House Wren	<i>Troglodytes aedon</i>	2	1	1	1	1	2	6	21,000,000	4 A	90%	**
Winter Wren	<i>Troglodytes troglodytes</i>	2	1	1	3	2	1	7	36,000,000	3 A	50%	Mo3
Sedge Wren	<i>Cistothorus platensis</i>	2	3	3	3	3	1	9	6,500,000	4 A	100%	**
Marsh Wren	<i>Cistothorus palustris</i>	2	2	2	3	3	1	8	7,700,000	3 A	100%	**
American Dipper	<i>Cinclus mexicanus</i>	3	2	2	3	3	3	11	630,000	3 B	93%	**
Golden-crowned Kinglet	<i>Regulus satrapa</i>	2	2	1	2	2	3	9	34,000,000	3 A	100%	Mo3
Ruby-crowned Kinglet	<i>Regulus calendula</i>	1	1	2	2	2	4	9	72,000,000	3 A	100%	Mo3
Arctic Warbler	<i>Phylloscopus borealis</i>	2	1	1	2	3	3	9	27,000,000	1 D	10%	Mo2
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	1	1	2	2	2	2	7	57,000,000	4 A	74%	**
California Gnatcatcher	<i>Poliophtila californica</i>	4	5	5	3	3	2	14	77,000	2	8%	Mo1

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Black-tailed Gnatcatcher	<i>Polioptila melanura</i>	3	3	3	3	3	3	12	3,600,000	2 C	50%	Mo2
Black-capped Gnatcatcher	<i>Polioptila nigriceps</i>	4	5	5	3	3	3	15	200,000	1	≤ 1%	Mo1
Bluethroat	<i>Luscinia svecica</i>	3	1	1	2	3	3	10	2,000,000	1 E	≤ 5%	Mo1,3
Northern Wheatear	<i>Oenanthe oenanthe</i>	3	1	1	2	2	3	9	2,900,000	1	10%	Mo1,3
Eastern Bluebird	<i>Sialia sialis</i>	2	1	2	2	2	1	7	10,000,000	4 A	80%	**
Western Bluebird	<i>Sialia mexicana</i>	3	3	3	3	2	4	13	1,400,000	4 B	87%	**
Mountain Bluebird	<i>Sialia currucoides</i>	2	2	3	2	2	1	8	5,200,000	4 A	100%	**
Townsend's Solitaire	<i>Myadestes townsendi</i>	3	2	2	3	2	2	10	770,000	4 A	95%	**
Veery	<i>Catharus fuscescens</i>	2	2	2	2	3	4	11	14,000,000	4 A	100%	**
Gray-cheeked Thrush	<i>Catharus minimus</i>	2	1	1	2	3	3	9	12,000,000	3 B	90%	Mo3
Bicknell's Thrush	<i>Catharus bicknelli</i>	5	5	5	3	5	3	18	40,000	4	100%	**
Swainson's Thrush	<i>Catharus ustulatus</i>	1	1	2	3	3	4	10	100,000,000	3 A	100%	Mo3
Hermit Thrush	<i>Catharus guttatus</i>	1	1	2	2	2	1	6	56,000,000	3 A	100%	Mo3
Wood Thrush	<i>Hylocichla mustelina</i>	2	2	4	3	4	4	14	14,000,000	4 A	100%	**
Clay-colored Robin	<i>Turdus grayi</i>	2	3	3	2	2	3	10	20,000,000	1	≤ 1%	Mo1
American Robin	<i>Turdus migratorius</i>	1	1	1	1	1	2	5	320,000,000	3 A	96%	Mo3
Varied Thrush	<i>Ixoreus naevius</i>	2	2	4	3	2	2	11	26,000,000	3 A	100%	Mo3
Wrenit	<i>Chamaea fasciata</i>	3	5	5	3	3	4	15	1,500,000	4 C	90%	**
Gray Catbird	<i>Dumetella carolinensis</i>	2	1	3	2	2	2	9	10,000,000	4 A	100%	**
Northern Mockingbird	<i>Mimus polyglottos</i>	2	1	1	1	1	4	8	45,000,000	4 A	82%	**
Sage Thrasher	<i>Oreoscoptes montanus</i>	2	3	3	3	2	2	10	7,900,000	4 B	100%	**
Brown Thrasher	<i>Toxostoma rufum</i>	2	1	3	3	2	4	12	7,300,000	4 A	100%	**
Long-billed Thrasher	<i>Toxostoma longirostre</i>	4	5	5	2	2	2	13	390,000	1 D	25%	Mo2
Bendire's Thrasher	<i>Toxostoma bendirei</i>	4	5	5	3	3	5	17	170,000	2 C	75%	Mo2
Curve-billed Thrasher	<i>Toxostoma curvirostre</i>	3	3	3	2	2	4	12	2,300,000	3 C	50%	Mo2
California Thrasher	<i>Toxostoma redivivum</i>	4	5	5	3	3	4	16	220,000	3 D	90%	Mo2
Crissal Thrasher	<i>Toxostoma crissale</i>	4	4	4	3	3	2	13	260,000	2 C	50%	Mo2
Le Conte's Thrasher	<i>Toxostoma lecontei</i>	4	5	5	3	3	3	15	190,000	2 D	75%	Mo2
Yellow Wagtail	<i>Motacilla flava</i>	2	1	1	2	2	3	8	20,000,000	1 E	7%	Mo1,3
White Wagtail	<i>Motacilla alba</i>	4	1	1	2	2	3	10	200,000	1 F	≤ 5%	Mo1,3
Red-throated Pipit	<i>Anthus cervinus</i>	3	3	1	2	2	3	11	2,000,000	1	≤ 1%	Mo1,3
American Pipit	<i>Anthus rubescens</i>	2	1	1	2	2	2	7	22,000,000	3	90%	Mo2,3
Sprague's Pipit	<i>Anthus spragueii</i>	3	4	3	4	4	5	16	870,000	4 C	100%	**
Bohemian Waxwing	<i>Bombycilla garrulus</i>	3	1	1	2	2	2	8	2,800,000	2 B	50%	Mo2,3
Cedar Waxwing	<i>Bombycilla cedrorum</i>	2	1	1	2	2	2	7	15,000,000	4 A	100%	**
Phainopepla	<i>Phainopepla nitens</i>	3	3	3	3	2	2	11	3,600,000	2 B	25%	Mo2
Olive Warbler	<i>Peucedramus taeniatus</i>	3	4	4	3	3	3	13	2,000,000	1 F	≤ 5%	Mo1
Bachman's Warbler	<i>Vermivora bachmanii</i>	5	5	5	5	5	5	20	0?	6	100%	**
Blue-winged Warbler	<i>Vermivora pinus</i>	4	3	4	3	3	4	15	390,000	4 A	100%	**
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	4	4	4	4	3	5	17	210,000	4 B	100%	**
Tennessee Warbler	<i>Vermivora peregrina</i>	1	2	4	2	2	3	10	62,000,000	3 A	100%	Mo3
Orange-crowned Warbler	<i>Vermivora celata</i>	1	1	2	2	2	4	9	76,000,000	3 A	100%	Mo3
Nashville Warbler	<i>Vermivora ruficapilla</i>	2	2	4	2	2	1	9	34,000,000	4 A	100%	**
Virginia's Warbler	<i>Vermivora virginiae</i>	4	4	5	3	3	3	15	410,000	3 C	100%	Mo2
Colima Warbler	<i>Vermivora crissalis</i>	5	5	5	4	3	3	17	25,000	2	≤ 1%	Mo1
Lucy's Warbler	<i>Vermivora luciae</i>	3	5	5	4	3	3	15	1,200,000	3 C	80%	**
Northern Parula	<i>Parula americana</i>	2	2	4	2	2	2	10	7,300,000	4 A	100%	**
Tropical Parula	<i>Parula pityayumi</i>	2	1	1	3	3	3	9	20,000,000	1 F	≤ 1%	Mo1
Yellow Warbler	<i>Dendroica petechia</i>	2	1	1	2	2	2	7	39,000,000	3 A	85%	Mo3
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	2	2	4	2	3	4	13	9,400,000	4 A	100%	**
Magnolia Warbler	<i>Dendroica magnolia</i>	2	1	3	2	2	1	8	32,000,000	3 A	100%	Mo3
Cape May Warbler	<i>Dendroica tigrina</i>	3	2	4	3	2	2	12	3,200,000	3 B	100%	Mo2,3
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	3	3	4	3	3	2	12	2,000,000	4 A	100%	**

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Yellow-rumped Warbler	<i>Dendroica coronata</i>	1	1	1	2	2	2	6	130,000,000	3 A	98%	Mo3
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	3	3	4	3	3	3	13	2,900,000	4 B	98%	**
Golden-cheeked Warbler	<i>Dendroica chrysoparia</i>	5	5	5	5	5	5	20	21,000	4	100%	Mo1
Black-throated Green Warbler	<i>Dendroica virens</i>	2	2	3	3	2	3	11	9,600,000	3 A	100%	Mo2,3
Townsend's Warbler	<i>Dendroica townsendi</i>	2	3	3	4	3	2	11	12,000,000	3 B	100%	Mo3
Hermit Warbler	<i>Dendroica occidentalis</i>	3	5	5	4	3	3	15	2,400,000	4 B	100%	**
Blackburnian Warbler	<i>Dendroica fusca</i>	2	2	3	3	3	2	10	5,900,000	4 A	100%	**
Yellow-throated Warbler	<i>Dendroica dominica</i>	3	3	3	3	2	2	11	1,600,000	4 A	100%	**
Grace's Warbler	<i>Dendroica graciae</i>	3	3	4	3	3	4	14	2,000,000	2 C	50%	**
Pine Warbler	<i>Dendroica pinus</i>	2	3	3	2	2	2	9	11,000,000	4 A	99%	**
Kirtland's Warbler	<i>Dendroica kirtlandii</i>	5	5	5	4	5	5	20	2,100	6	100%	**
Prairie Warbler	<i>Dendroica discolor</i>	3	3	4	3	2	4	14	1,400,000	4 A	100%	**
Palm Warbler	<i>Dendroica palmarum</i>	2	2	3	2	2	1	8	23,000,000	3 B	100%	Mo2,3
Bay-breasted Warbler	<i>Dendroica castanea</i>	3	3	4	3	3	4	14	3,100,000	3 B	100%	Mo2,3
Blackpoll Warbler	<i>Dendroica striata</i>	2	2	4	3	2	3	12	21,000,000	3 A	100%	Mo3
Cerulean Warbler	<i>Dendroica cerulea</i>	3	4	4	4	4	5	16	560,000	4 B	100%	**
Black-and-white Warbler	<i>Mniotilta varia</i>	2	2	2	2	2	3	9	14,000,000	4 A	100%	**
American Redstart	<i>Setophaga ruticilla</i>	2	1	2	2	2	2	8	25,000,000	3 A	100%	Mo3
Prothonotary Warbler	<i>Protonotaria citrea</i>	3	3	4	3	4	4	15	1,800,000	4 A	100%	**
Worm-eating Warbler	<i>Helminthos vermivorus</i>	3	3	4	3	4	3	14	750,000	3 A	100%	Mo2
Swainson's Warbler	<i>Limnithlypis swainsonii</i>	4	4	5	4	4	1	14	84,000	4 B	100%	**
Ovenbird	<i>Seiurus aurocapilla</i>	2	2	3	2	3	2	10	24,000,000	4 A	100%	**
Northern Waterthrush	<i>Seiurus noveboracensis</i>	2	1	2	2	2	3	9	13,000,000	3 A	100%	Mo3
Louisiana Waterthrush	<i>Seiurus motacilla</i>	4	2	3	3	4	2	13	260,000	4 A	100%	**
Kentucky Warbler	<i>Oporornis formosus</i>	3	3	4	3	3	4	14	1,100,000	4 A	100%	**
Connecticut Warbler	<i>Oporornis agilis</i>	3	3	3	3	2	4	13	1,200,000	3 B	100%	Mo3
Mourning Warbler	<i>Oporornis philadelphia</i>	2	3	3	2	2	4	11	7,000,000	3 A	100%	Mo3
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	2	3	3	2	2	3	10	5,400,000	4 A	99%	**
Common Yellowthroat	<i>Geothlypis trichas</i>	2	1	2	2	2	2	8	32,000,000	4 A	100%	**
Hooded Warbler	<i>Wilsonia citrina</i>	3	2	4	3	3	3	13	4,000,000	4 A	100%	**
Wilson's Warbler	<i>Wilsonia pusilla</i>	2	1	3	3	2	4	12	36,000,000	3 A	100%	Mo3
Canada Warbler	<i>Wilsonia canadensis</i>	3	2	3	3	4	4	14	1,400,000	3 A	100%	Mo3
Red-faced Warbler	<i>Cardellina rubrifrons</i>	4	5	5	3	3	3	15	430,000	1 E	25%	Mo1
Painted Redstart	<i>Myioborus pictus</i>	3	3	4	3	3	3	13	2,000,000	1 D	≤ 5%	Mo1
Rufous-capped Warbler	<i>Basileuterus rufifrons</i>	3	3	3	2	2	3	11	2,000,000	1	≤ 1%	Mo1
Yellow-breasted Chat	<i>Icteria virens</i>	2	1	3	3	2	2	10	12,000,000	4 A	87%	**
Hepatic Tanager	<i>Piranga flava</i>	4	1	1	3	3	2	10	360,000	1 D	25%	Mo2
Summer Tanager	<i>Piranga rubra</i>	3	2	2	3	2	2	10	4,100,000	4 A	80%	**
Scarlet Tanager	<i>Piranga olivacea</i>	3	2	4	2	3	2	12	2,200,000	4 A	100%	**
Western Tanager	<i>Piranga ludoviciana</i>	2	2	3	2	2	2	9	8,900,000	4 A	99%	**
Flame-colored Tanager	<i>Piranga bidentata</i>	3	4	4	3	3	3	13	2,000,000	1	≤ 1%	Mo1
White-collared Seedeater	<i>Sporophila torqueola</i>	2	3	3	2	1	3	10	20,000,000	1	≤ 1%	Mo1
Olive Sparrow	<i>Arremonops rufivirgatus</i>	3	4	4	3	3	2	12	2,100,000	2 D	10%	Mo2
Green-tailed Towhee	<i>Pipilo chlorurus</i>	3	3	3	3	2	3	12	4,100,000	4 B	100%	**
Spotted Towhee	<i>Pipilo maculatus</i>	2	2	2	2	2	2	8	14,000,000	4 A	90%	**
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	2	2	2	3	2	4	11	11,000,000	4 A	100%	**
Canyon Towhee	<i>Pipilo fuscus</i>	2	3	3	2	2	2	9	6,500,000	3 B	25%	**
California Towhee	<i>Pipilo crissalis</i>	3	4	4	2	2	3	12	4,700,000	3 C	50%	**
Abert's Towhee	<i>Pipilo aberti</i>	4	5	5	3	3	3	15	230,000	2 E	90%	Mo2
Rufous-winged Sparrow	<i>Aimophila carpalis</i>	4	5	5	3	3	3	15	74,000	1 E	12%	Mo1
Cassin's Sparrow	<i>Aimophila cassinii</i>	2	3	4	3	3	4	13	20,000,000	3 B	50%	**
Bachman's Sparrow	<i>Aimophila aestivalis</i>	4	4	4	4	4	5	17	250,000	3 C	100%	Mo2
Botteri's Sparrow	<i>Aimophila botterii</i>	3	4	4	3	2	3	13	2,000,000	1 E	≤ 5%	Mo1

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	3	3	3	2	2	4	12	2,400,000	3 B	50%	**
Five-striped Sparrow	<i>Aimophila quinquestrata</i>	4	5	5	3	3	4	16	200,000	1	≤ 5%	Mo1
American Tree Sparrow	<i>Spizella arborea</i>	2	2	2	2	2	4	10	26,000,000	3	100%	Mo2,3
Chipping Sparrow	<i>Spizella passerina</i>	1	1	2	1	2	2	7	99,000,000	4 A	90%	**
Clay-colored Sparrow	<i>Spizella pallida</i>	2	2	3	2	2	4	11	23,000,000	4 A	100%	**
Brewer's Sparrow	<i>Spizella breweri</i>	2	3	3	3	2	5	13	16,000,000	4 A	100%	**
Field Sparrow	<i>Spizella pusilla</i>	2	2	2	3	2	5	12	8,200,000	4 A	100%	**
Black-chinned Sparrow	<i>Spizella atrogularis</i>	4	3	4	3	3	4	15	390,000	2 D	80%	Mo2
Vesper Sparrow	<i>Poocetes gramineus</i>	2	1	2	3	2	4	11	30,000,000	4 A	100%	**
Lark Sparrow	<i>Chondestes grammacus</i>	2	1	3	2	2	5	12	9,900,000	4 A	89%	**
Black-throated Sparrow	<i>Amphispiza bilineata</i>	2	3	3	2	2	5	12	27,000,000	3 A	50%	**
Sage Sparrow	<i>Amphispiza belli</i>	3	3	4	4	3	2	13	4,300,000	4 B	90%	**
Lark Bunting	<i>Calamospiza melanocorys</i>	2	3	3	3	3	4	12	27,000,000	4 A	100%	**
Savannah Sparrow	<i>Passerculus sandwichensis</i>	1	1	2	2	2	4	9	82,000,000	3 A	97%	Mo3
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	2	1	2	3	3	5	12	15,000,000	4 A	93%	**
Baird's Sparrow	<i>Ammodramus bairdii</i>	3	4	5	4	4	5	17	1,200,000	4 C	100%	**
Henslow's Sparrow	<i>Ammodramus henslowii</i>	4	3	5	4	4	5	18	79,000	3 B	100%	Mo2
Le Conte's Sparrow	<i>Ammodramus leconteii</i>	3	2	4	3	3	3	13	2,900,000	3 B	100%	Mo3
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	3	4	5	3	4	2	14	510,000	3 B	100%	Mo2
Saltmarsh Sharp-tailed Sparrow	<i>Ammodramus caudacutus</i>	4	5	5	4	4	5	18	250,000	3	100%	Mo2
Seaside Sparrow	<i>Ammodramus maritimus</i>	4	4	5	3	3	3	15	110,000	2 D	100%	Mo2
Fox Sparrow	<i>Passerella iliaca</i>	2	1	2	2	2	2	8	16,000,000	3 A	100%	Mo3
Song Sparrow	<i>Melospiza melodia</i>	1	1	1	2	2	4	8	54,000,000	4 A	98%	**
Lincoln's Sparrow	<i>Melospiza lincolni</i>	2	1	2	2	2	1	7	39,000,000	3 A	100%	Mo3
Swamp Sparrow	<i>Melospiza georgiana</i>	2	2	2	2	2	1	7	9,000,000	3 A	100%	Mo3
White-throated Sparrow	<i>Zonotrichia albicollis</i>	1	2	2	2	2	4	9	140,000,000	3 A	100%	Mo3
Harris's Sparrow	<i>Zonotrichia querula</i>	3	4	4	2	2	5	14	3,700,000	3	100%	Mo2,3
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	1	1	2	2	2	4	9	72,000,000	3 A	100%	Mo3
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	2	3	4	2	2	2	10	5,200,000	2 C	100%	Mo3
Dark-eyed Junco	<i>Junco hyemalis</i>	1	1	1	2	2	4	8	260,000,000	3 A	100%	Mo3
Yellow-eyed Junco	<i>Junco phaeonotus</i>	2	4	4	3	2	2	11	20,000,000	1 F	≤ 5%	Mo2
McCown's Longspur	<i>Calcarius mccownii</i>	3	5	5	3	2	3	14	1,100,000	2 C	100%	**
Lapland Longspur	<i>Calcarius lapponicus</i>	1	1	1	2	2	3	7	150,000,000	3	50%	Mo2,3
Smith's Longspur	<i>Calcarius pictus</i>	4	4	5	2	3	3	15	75,000	3	100%	Mo2,3
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	2	4	3	3	3	4	13	5,600,000	4 B	100%	**
Snow Bunting	<i>Plectrophenax nivalis</i>	2	1	1	2	2	2	7	39,000,000	3	50%	Mo2,3
McKay's Bunting	<i>Plectrophenax hyperboreus</i>	5	5	5	3	2	3	16	6,000	3	100%	Mo1,3
Northern Cardinal	<i>Cardinalis cardinalis</i>	1	1	1	1	1	2	5	100,000,000	4 A	82%	**
Pyrrhuloxia	<i>Cardinalis sinuatus</i>	2	3	3	3	3	4	12	7,700,000	2 C	25%	**
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	3	2	3	2	2	4	12	4,600,000	4 A	100%	**
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	3	2	4	2	2	2	11	4,900,000	4 A	80%	**
Blue Grosbeak	<i>Passerina caerulea</i>	2	1	3	2	2	2	9	7,700,000	4 A	80%	**
Lazuli Bunting	<i>Passerina amoena</i>	3	2	5	3	2	2	13	2,300,000	4 A	99%	**
Indigo Bunting	<i>Passerina cyanea</i>	2	1	3	2	2	4	11	28,000,000	4 A	100%	**
Varied Bunting	<i>Passerina versicolor</i>	3	3	4	3	3	4	14	2,000,000	1 D	≤ 5%	Mo1
Painted Bunting	<i>Passerina ciris</i>	3	4	3	3	4	5	16	4,500,000	4 A	80%	**
Dickcissel	<i>Spiza americana</i>	2	2	4	3	4	4	14	22,000,000	4 A	100%	**
Bobolink	<i>Dolichonyx oryzivorus</i>	2	2	2	3	3	4	11	11,000,000	4 A	100%	**
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	1	1	1	2	2	4	8	210,000,000	4 A	92%	**
Tricolored Blackbird	<i>Agelaius tricolor</i>	4	5	5	4	3	5	18	250,000	5	99%	Mo2
Eastern Meadowlark	<i>Sturnella magna</i>	2	1	1	3	3	5	11	10,000,000	4 A	80%	**
Western Meadowlark	<i>Sturnella neglecta</i>	2	1	2	3	3	4	11	32,000,000	4 A	92%	**
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	2	2	3	3	3	1	9	23,000,000	3 A	100%	Mo2

(continued)

APPENDIX A. Assessment scores and estimated population size of North American landbirds (continued)

Common Name ¹	Scientific Name	PS ²	BD ²	ND ²	TB ²	TN ²	PT ²	Com- bined Score ²	Global Population Estimate ³	Accuracy Rating & Precision ⁴	% Popula- tion in US & Canada ⁵	Monitoring Need ⁶
Rusty Blackbird	<i>Euphagus carolinus</i>	3	1	2	2	3	5	13	2,000,000	3 B	100%	Mo2,3
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	2	2	1	2	1	4	10	35,000,000	4 A	99%	**
Common Grackle	<i>Quiscalus quiscula</i>	1	1	2	1	1	4	8	97,000,000	4 A	100%	**
Boat-tailed Grackle	<i>Quiscalus major</i>	3	4	4	1	1	1	9	3,700,000	4 C	100%	**
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	2	2	2	1	1	1	6	31,000,000	3 B	25%	**
Shiny Cowbird	<i>Molothrus bonariensis</i>	1	1	1	1	1	1	4	200,000,000	1 E	≤ 1%	Mo2
Bronzed Cowbird	<i>Molothrus aeneus</i>	2	3	3	1	1	1	7	5,400,000	2 C	10%	**
Brown-headed Cowbird	<i>Molothrus ater</i>	1	1	1	1	1	4	7	56,000,000	4 A	91%	**
Orchard Oriole	<i>Icterus spurius</i>	3	2	3	3	2	3	12	4,300,000	4 A	87%	**
Hooded Oriole	<i>Icterus cucullatus</i>	3	3	4	2	2	2	11	610,000	2 C	25%	Mo2
Streak-backed Oriole	<i>Icterus pustulatus</i>	3	3	3	2	2	3	11	2,000,000	1	≤ 1%	Mo1
Bullock's Oriole	<i>Icterus bullockii</i>	3	1	4	2	2	4	13	3,800,000	4 A	75%	**
Altamira Oriole	<i>Icterus gularis</i>	3	4	4	3	2	3	13	2,000,000	1 F	≤ 1%	Mo1
Audubon's Oriole	<i>Icterus graduacauda</i>	4	5	5	4	3	3	16	200,000	1 E	≤ 5%	Mo1
Baltimore Oriole	<i>Icterus galbula</i>	2	2	3	2	2	4	11	6,000,000	4 A	100%	**
Scott's Oriole	<i>Icterus parisorum</i>	3	3	4	2	2	2	11	1,600,000	3 B	50%	**
Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>	4	3	2	2	2	2	11	200,000	1	100%	Mo1,3
Black Rosy-Finch	<i>Leucosticte atrata</i>	5	4	4	3	2	3	15	20,000	1	100%	Mo2
Brown-capped Rosy-Finch	<i>Leucosticte australis</i>	5	5	5	3	2	3	16	45,000	3	100%	Mo2
Pine Grosbeak	<i>Pinicola enucleator</i>	3	1	1	2	2	3	9	4,400,000	3 B	50%	Mo3
Purple Finch	<i>Carpodacus purpureus</i>	3	2	1	2	2	4	11	3,000,000	3 A	100%	Mo3
Cassin's Finch	<i>Carpodacus cassinii</i>	3	3	2	3	2	4	13	1,900,000	4 B	99%	**
House Finch	<i>Carpodacus mexicanus</i>	2	1	1	1	1	2	6	21,000,000	4 A	79%	**
Red Crossbill	<i>Loxia curvirostra</i>	2	1	1	3	3	3	9	15,000,000	3 A	38%	Mo2
White-winged Crossbill	<i>Loxia leucoptera</i>	2	1	1	3	2	2	8	41,000,000	3 A	50%	Mo2,3
Common Redpoll	<i>Carduelis flammea</i>	1	1	1	2	2	2	6	97,000,000	2 B	30%	Mo3
Hoary Redpoll	<i>Carduelis hornemanni</i>	2	1	1	2	2	3	8	26,000,000	2	50%	Mo2,3
Pine Siskin	<i>Carduelis pinus</i>	2	1	1	2	2	4	9	22,000,000	3 A	97%	Mo3
Lesser Goldfinch	<i>Carduelis psaltria</i>	3	2	2	2	2	4	11	3,100,000	3 B	50%	**
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>	4	5	5	3	2	3	15	150,000	3 D	90%	Mo2
American Goldfinch	<i>Carduelis tristis</i>	2	1	1	1	1	2	6	24,000,000	4 A	100%	**
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	2	2	1	2	2	4	10	6,000,000	4 A	95%	**

¹ Species are sorted taxonomically (AOU order). Species shaded yellow are Watch List Species, those shaded green are additional Stewardship Species. Some Watch List Species are also Stewardship Species (see Table 1).

² Assessment Scores (see text for more information): PS=Population Size, BD=Breeding Distribution, ND=Non-breeding Distribution, TB=Threats Breeding, TN=Threats Non-breeding, PT=Population Trend; 1=low vulnerability, 5=high vulnerability. Combined Score is calculated as PS + (highest of BD or ND scores) + (highest of TB or TN scores) + PT.

³ Global Population estimates are rounded to two greatest digits, not meant to imply accuracy or precision.

⁴ Accuracy Ratings for Global Population estimates (see Appendix B for more information): 6=Accurate, 5=Good, 4=Moderate, 3=Fair, 2=Poor, 1=Guesstimate; Estimated Precision (Repeatability) of Population estimates, based on BBS count variance in U.S. and Canada (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.

⁵ % Population in U.S. & Canada: Estimated percent of Global Population in continental United States and Canada combined. See Appendix B for methods.

⁶ Monitoring Need (this assessment addresses only the adequacy of long-term population trend monitoring at the continental scale): Mo1=no trend data, Mo2=imprecise trends, Mo3=inadequate northern coverage.

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

APPENDIX B. Methods used to estimate population sizes and percents

Estimates of global population size were needed for each species of landbird covered by this Plan for several reasons:

- To score the Population Size factor (PS) in our species assessment. For this purpose, we needed order of magnitude resolution on population sizes, using to the extent possible a single methodology to give comparable estimates across all species;
- To provide estimates of “current” population size for each landbird species. This gives an impression of the size of the landbird resource, and more importantly it emphasizes the magnitude of the task of attaining listed population objectives;
- To provide a starting point for estimating population sizes in states, provinces, territories, or Bird Conservation Regions, and an understanding of the magnitude of attaining objectives regionally. We emphasize that additional work to check and refine estimates in each region is highly desirable, because additional population data may be available, different analytical methods may provide more precision at the regional scale, and because assumptions applied at the continental level may need to be revisited within each region.

Population size estimates for the U.S. and Canada south of the Arctic

We used Breeding Bird Survey (BBS) data from the 1990s as the basis for population estimates across the U.S. and across Canada south of the arctic (i.e., excluding Bird Conservation Region [BCR] 3, see next section). BBS-based estimates of abundance were calculated according to the following steps:

1. For each BBS route run within acceptable weather conditions, counts were averaged across years to give a single average count for the 1990s for each species recorded on each route.
2. In the boreal forest portions of Canada, where BBS routes are widely scattered, routes not run during the 1990s were added to augment geographical coverage, using data from other decades for these routes (boreal routes that were run during the 1990s still provided the bulk of boreal count data, and species counts from those routes were restricted to the 1990s).
3. Species counts were averaged across all BBS routes in each geopolitical polygon defined by the inter-

section of a BCR and a province/state/territory; for example, separate averages were calculated for each of the three U.S. states and three Canadian provinces that together comprise the Boreal Hardwood Transition (BCR 12).

4. Where a geo-political polygon was not sampled by BBS routes, we assigned averages from adjacent polygon(s) in the same BCR. In the U.S., unsampled polygons were typically smaller than 1,000 km², so this procedure had minimal effect on continental population estimates. In boreal Canada, unsampled polygons were sometimes large (exceeding 100,000 km² in two instances) so that population estimates for boreal BCRs are less likely to be representative of the whole region.
5. Indices of abundance were calculated for each geopolitical polygon by multiplying average counts per BBS route (from step 4) times area of the geopolitical polygon, and dividing by the theoretical area covered by a BBS route (25.1 km², assuming 400-m radius around each of the 50 count circles). For example, the index of abundance for Wood Thrushes in the Ontario portion of BCR 12 equals 2.33 birds/route (55 routes sampled in 1990s) x 202,860 km² (area of Ontario in BCR 12)/25.1 km² (area per BBS route) equals approximately 19,000.
6. BCR-wide indices of abundance were calculated by simple addition across all polygons making up each BCR, thus giving a population index for Wood Thrushes in all of BCR 12 of approximately 40,000. State-, province-, and territory-wide indices of abundance can be calculated in the same manner.
7. BCR-wide population indices were converted to population estimates by applying three correction factors (see Rosenberg and Blancher, in press, for more detail on these correction factors):

Pair correction: Indices were multiplied by two on the assumption that typically a single member of a breeding pair is observed during BBS tallies;

Detection area correction: Most species are not detected out to the full 400-m BBS count circle. Each species was placed into one of five detection distance categories, based on presumed effective detection during 3-min BBS counts: 80m, 125m, 200m, 400m, and 800m. Because area of detection increases as the square of detection distance, the detection area correction is then simply the square of the ratio between

400m (theoretical BBS count circle) and species-specific effective distance. For example for Wood Thrush, placed in the 200m class, the population index is multiplied by a detection area correction of 4 (square of 400/200). Note that effective detection distances are intended to incorporate not only the distance at which a species is normally heard and seen, but also the distance the species moves during a 3-min count period—this is why some wide-ranging species have been assigned an 800-m detection distance despite being counted within a 400-m BBS circle.

Time-of-day correction: Almost all species show a temporal change in detection across the 50 BBS stops, some declining from a dawn chorus, others peaking after sunrise or later in the morning. A time-of-day correction is applied to the population index to adjust counts to the maximum time of detection. This adjusts for birds not detected at other times of the morning. The correction factor is the ratio of counts at the peak of detection (calculated using a polynomial curve fit to smooth out stop-by-stop variance) relative to the average count over whole BBS routes. Time-of-day correction factors were calculated from survey-wide BBS stop-by-stop data. For Wood Thrush, whose detectability declines from a peak at BBS stop 1, the time-of-day correction is 2.30.

For Wood Thrushes, the population estimate for BCR 12=40,000 (index from step 6) x 2 (pair correction) x 4 (detection area correction) x 2.30 (time-of-day correction)=roughly 740,000 breeding individuals.

Population size estimates for arctic Canada (BCR 3)

In the absence of BBS data, we used a combination of Breeding Bird Census (BBC) density estimates (Kennedy et al. 1999) and relative abundance data from the Northwest Territories/Nunavut Bird Checklist Survey <<http://www.mb.ec.gc.ca/nature/migratorybirds/nwtbcs/index.en.html>> to estimate population size of landbirds in the arctic (BCR 3) portion of Canada, as follows:

1. Total landbird density was calculated from BBC data for each of three terrestrial ecozones that make up BCR 3 in Canada (Arctic Cordillera, Northern Arctic, and Southern Arctic).
2. Total landbird density was split among three classes of landbirds—those likely to be detected at long distances (raptors, ravens), those at intermediate distances (birds of open country) and the rest (birds of woods and scrub).
3. Relative abundance of each landbird species was calculated from Checklist data for each of the ecozones and classes of birds above. Checklist data were first screened to remove lists in which all bird species were not recorded, or the observer self-identified as “fair” at species identification, or month was not June or July. Counts per species were averaged across years within sites before further analysis.
4. The ratio of BBC density to checklist abundance (density conversion factor) was calculated for each ecozone and class of landbird. The two northern ecozones were collapsed into one due to lack of difference in conversion factors.

5. Density conversion factors were applied to checklist abundance data to provide density estimates of each landbird species at 649 sites across the arctic (those in BCR 3 in Canada).

6. Bird densities from checklist sites were averaged within each of 30 Arctic ecoregions, then multiplied by size of region to convert to a population estimate for that ecoregion. Estimates for unsampled ecoregions were derived as area-weighted averages from all sampled ecoregions in the same terrestrial ecozone. Population estimates were then summed across ecoregions to provide a total population estimate for each landbird species in the arctic.



Richard Bird © Cornell Lab of Ornithology

Crepuscular species like Chuck-will's-widow are often detected on a large number of BBS routes, but detectability declines rapidly after the first few stops. As part of the process for estimating continental populations, we modeled temporal changes in detectability for many species and applied appropriate correction factors.

Estimating global populations

For species breeding entirely within the U.S. and Canada, our estimate of global population size was a simple sum of the above two estimates (BBS-based estimate plus arctic Canada estimate).

For species with broader breeding distributions, but still at least 10% of range in the U.S. and Canada, we extrapolated global population size on the basis of proportion of breeding range outside of the U.S. and Canada. Proportions of breeding range were estimated from range maps.

For species with more than 90% of breeding range outside the U.S. and Canada, we estimated global population size to order of magnitude (as for PS scores) based on range size and a comparison to population sizes of other landbird species that were judged to have similar relative abundance.

EXCEPTIONS TO THE METHODS PRESENTED ABOVE

We accepted independent estimates of population size for some landbird species that have been surveyed by other methods more appropriate and specific to the species, for which continental-scale estimates were available or could be estimated at a level of accuracy deemed to be superior to our standard estimates.

SOME ASSUMPTIONS IN ESTIMATING POPULATION SIZES

For a variety of reasons, the population estimates presented here are rough estimates, and will need to be improved over time, especially for use at smaller scales. Without attempting to be comprehensive, a few main assumptions of the approach are mentioned here (see Rosenberg and Blancher, in press).

Assumption: Habitats are sampled in approximate proportion to their occurrence in the regional landscape. Although BBS is designed to provide a random sample of the landscape, limitations of a road-based survey mean that the landscape sampled is a biased representation of available habitat—for example species characteristic of

high elevation habitats are likely to be undersampled by BBS simply because roads tend to follow valley bottoms in mountainous regions. In northern BCRs, there is a geographic bias, with most BBS data available from the southern portions of those BCRs. Checklist and Breeding Bird Census sites are determined by individual scientists and volunteers, so are not a random sample of arctic regions. We have not accounted for habitat bias in our continental estimates, in part because it will differ from region to region, and because the magnitude of bias has not yet been estimated in many regions or at a continental scale. Correction for habitat bias should be considered when using the methods described above at smaller scales.

Assumption: Birds present but not detected during BBS counts are accounted for, on balance, by one or more of the three density corrections applied above (pair, detection area, and time-of-day corrections). Species that have a peak of detection outside of the BBS sampling window (e.g., early-season breeders, most nocturnal species) are likely to have been underestimated. Pair corrections may result in overestimation of population size, if a high proportion of counts involve either both members of a pair, or unmated birds.

Assumption: Checklist/BBC-derived estimates from Arctic Canada are comparable to BBS estimates. There are no BBS data from BCR3 in Canada to test this assumption. However, checklist/BBC-derived landbird density was 79 birds/km² in arctic Canada, versus a BBS-derived 127 birds/km² in the BCR 3 portion of Alaska. This difference is

in the expected direction, because the Arctic Canada has a larger proportion of High Arctic where landbird density is typically low.

Assumption: Breeding density within the U.S. and Canada is similar to density elsewhere in the breeding range. Extrapolations of population size estimates to global population rely on this assumption, though it does not affect U.S./Canada population estimates, nor population objectives for the U.S. and Canada.



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Using a simple method to extrapolate from abundance on Breeding Bird Survey routes, we estimate a global population of 7.7 million breeding *Pyrrhuloxias*.

Accuracy and Precision of Population Estimates

ACCURACY

For most species we cannot give statistically-derived confidence limits on the population estimates presented in this Plan because variance and bias associated with some parameters and extrapolations have yet to be measured. Instead, we rated the accuracy of population estimates by considering known sources of variance and limitations of the methods for each species, as was done for North American shorebirds (Morrison et al. 2001).

In order to rate accuracy of population estimates, we considered data on the following:

- Proportion of breeding range sampled within U.S. and Canada;
- Proportion of global range outside of the U.S. and Canada (for global estimates);
- Quantity of sampling, e.g., number of BBS routes, or checklists, where species was recorded in the 1990s;
- Density of sampling, i.e., number of BBS routes where species was recorded per 10,000 km² of breeding range within BBS coverage;
- Variance of BBS counts relative to mean counts, combined across geo-political polygons (regions);
- Variance in population trends as a measure of year to year variability;
- Nocturnal or seasonal habits that limit applicability of early morning surveys in June, or require large correction factors.

Accuracy ratings were then assigned as follows:

6 “Accurate”

Most individuals counted, or accurate estimates available from thorough searches or color-marking most of species’ population. Applied to a few endangered species, and to a few possibly extinct species.

5 “Good”

Estimates based on species-specific surveys of appropriate design throughout a species’ range.

4 “Moderate”

Good coverage by BBS across most of breeding range, and BBS methods appropriate. Or species-specific estimates using appropriate data representative of the species’ range. Estimates

likely to be well within correct order of magnitude, often within 50% of true number.

3 “Fair”

Data available to calculate an estimate, but one or a few limitations increase uncertainty (low sample size, small portion of range sampled, inappropriate sampling methods/bias, high variance in counts). Estimates expected to be in correct order of magnitude.

2 “Poor”

Data available to calculate an estimate, but multiple limitations (some or all of: low sample size, small portion of range sampled, inappropriate sampling methods/bias, high variance in counts). Estimates expected to be in correct order of magnitude most of the time.

1 “Guesstimate”

Order of magnitude judgments made by PIF Science Committee, because few data available on relative abundance (e.g., <10 BBS routes with species present), and/or very small proportion of species’ population sampled. Estimates may not be in correct order of magnitude.

Overall, about two-thirds of the population estimates presented in this Plan are rated as having fair to moderate accuracy, expected to be within and usually well within an order of magnitude of the correct breeding population (see Table B1; also see Table 1, and Appendix A for individual species’ ratings). A substantial number of population estimates are simple guesstimates—these are almost entirely species that have a very small fraction of their global population within the U.S. (5% or less). A comparison of BBS-based estimates with atlas-derived population estimates suggested that population sizes are well within the correct order of magnitude for landbirds regularly encountered on BBS routes (Rosenberg and Blancher, in press). Additional comparisons will be useful for refining the estimates and independent estimates are sought for all species.

Table B1. Number of species according to Accuracy Rating

Accuracy Rating	Global Population Estimates	U.S. & Canada Population Estimates
6 Accurate	4	5
5 Good	4	6
4 Moderate	146	168
3 Fair	146	136
2 Poor	59	61
1 Guesstimate	89	52

PRECISION/REPEATABILITY OF POPULATION ESTIMATES

For 381 species whose U.S./Canada population estimates were based largely on BBS survey data, we used BBS count variance to assess repeatability of the estimates when using the same methodology and keeping correction factors constant within a species. Results show that most population estimates are repeatable within 10 or 20%, i.e., repeatability of the estimates is generally high or very high, even when accuracy is rated as fair to moderate (see Table B2).

Estimates of Percent of Global Population

Estimates of the percent of global population within BCRs and biomes were needed to assign BCRs to Avifaunal Biomes, to identify Stewardship Species in those biomes, to construct maps weighted by proportion of population in Avifaunal Biomes, and to provide an indication of degree of regional responsibility for Watch List and other species.

BREEDING SEASON

For the breeding season, estimates of proportion of global population were calculated by dividing regional population estimates by global population estimates.

WINTER PERCENTS

For resident species, we assumed percent of global population was the same as in the breeding season. For migratory species, we based our estimates for the U.S. and Canada on Christmas Bird Count (CBC) data, calculated as follows:

1. For each CBC count circle surveyed between 1990/91 and 1997/98, birds observed per 100 party-hours were calculated and then averaged across years to give a single effort-adjusted count per species per count circle.
2. Effort-adjusted counts were averaged across all CBC count circles in each geo-political polygon defined

by the intersection of a BCR and a province/state/territory. These average effort-adjusted counts were then multiplied by area of the geo-political polygon to yield an abundance index for each species in the polygon.

3. Abundance indices were summed across polygons within BCRs to give an abundance index for each BCR. Where a geo-political polygon was not sampled by CBC sites, an area-weighted average from other polygons in the same BCR was assigned. Most geo-political polygons without CBC count circles were in the boreal forest or arctic, where relatively few landbird species spend the winter.
4. Percent of U.S. and Canada winter population was then calculated for each BCR by dividing BCR abundance indices (from step 3) by the sum of all BCR indices across the U.S. and Canada.
5. Percent of global winter population was estimated in the same manner as summer population estimates, using proportion of winter range to estimate proportion of global range in the U.S. and Canada.

SOME ASSUMPTIONS IN ESTIMATING PERCENT OF POPULATION

Assumption: Habitat bias is consistent across the survey area. Because estimates of percent are relative measures, they are much less affected by habitat bias and density corrections than are population estimates, as long as biases are relatively consistent across the survey area. Thus, percent of population based on CBC circles can be reasonably accurate despite strong potential for bias in the non-random placement of circles.

Assumption: Differences in effort among CBC counts can be standardized by dividing by party-hour. In fact, numbers of some species are more influenced by driving miles (party-miles), feeder counts, or nocturnal effort than by hours of total effort. Also, response to increasing effort is likely to be non-linear, eventually becoming asymptotic.

However, estimates of percent of winter population by BCR or avifaunal biome were relatively insensitive to these issues. Comparison of percents of winter population gave similar results whether calculated without any effort correction, correcting with party-miles, or using party-hours to correct effort. Only for a few northern species were there important differences depending on which method of error correction was used.

Table B2. Number of species according to Precision/Repeatability category

Precision Category	95% Confidence Limits on estimates, based solely on variance in BBS counts	Species with estimates based largely on BBS	
A	Very High	within 5% of mean	190
B	High	within 10%	82
C	Good	within 20%	40
D	Moderate	within 50%	25
E	Low	within 80%	14
F	Very Low	outside 80%	30
Total BBS-based Estimates			381

APPENDIX C. Wetland-associated landbird Species of Continental Importance

To facilitate integration with other bird conservation initiatives, we identified 42 Watch List and 25 additional Stewardship Species that are associated with wetland habitats (including riparian) in all or part of their range (see Table C). These species can benefit from conservation projects in wetland habitats, including those under the North American Wetlands Conservation Act. This list is not meant to replace existing lists of wetland-associated species for specific Bird Conservation Regions.

Among the species most closely associated with wetlands, Saltmarsh Sharp-tailed Sparrow and Seaside Sparrow are obligate breeders in coastal saltmarshes, Tricolored Blackbird is a breeder in freshwater marshes in the Central Valley of California, and Louisiana Waterthrush is restricted to mature forest habitats with clear flowing streams. The remaining species are primarily birds of upland habitats, but with a marked affinity for wetter sites, especially riparian and other forested wetland habitats.



Western riparian habitats are critically important for a large number of Watch List and Stewardship Species.

Table C. Species of Continental Importance associated with wetland habitats in all or part of their range.

Wetland-associated Species ¹			
Greater Sage-Grouse	Red-headed Woodpecker	Blue-winged Warbler	American Tree Sparrow
Gunnison Sage-Grouse	Red-naped Sapsucker	Golden-winged Warbler	Henslow's Sparrow
Gambel's Quail	Red-breasted Sapsucker	Nashville Warbler	Nelson's Sharp-tailed Sparrow
Swallow-tailed Kite	Ivory-billed Woodpecker	Lucy's Warbler	Saltmarsh Sharp-tailed Sparrow
Mississippi Kite	Olive-sided Flycatcher	Yellow-throated Warbler	Seaside Sparrow
Bald Eagle	Yellow-bellied Flycatcher	Palm Warbler	Lincoln's Sparrow
Red-shouldered Hawk	Acadian Flycatcher	Cerulean Warbler	Swamp Sparrow
Swainson's Hawk	Alder Flycatcher	Prothonotary Warbler	Harris's Sparrow
White-crowned Pigeon	Willow Flycatcher	Swainson's Warbler	Varied Bunting
Mangrove Cuckoo	Pacific-slope Flycatcher	Louisiana Waterthrush	Painted Bunting
Elf Owl	Thick-billed Kingbird	Kentucky Warbler	Tricolored Blackbird
Short-eared Owl	White-eyed Vireo	Connecticut Warbler	Yellow-headed Blackbird
Black Swift	Bell's Vireo	Hooded Warbler	Rusty Blackbird
Calliope Hummingbird	Wood Thrush	Canada Warbler	Audubon's Oriole
Rufous Hummingbird	Crissal Thrasher	Red-faced Warbler	Scott's Oriole
Elegant Trogon	Phainopepla	Green-tailed Towhee	Lawrence's Goldfinch
Lewis's Woodpecker	Bachman's Warbler	Abert's Towhee	

¹ Species are sorted taxonomically (AOU order); see Appendix A for scientific names. Species shaded yellow are Watch List Species, those shaded green are additional Stewardship Species. Some Watch List Species are also Stewardship Species. Watch List Species merit attention wherever they are associated with wetlands, while Stewardship Species require attention in those biomes where they are most common (see Table 1).

APPENDIX D. Species of Conservation Importance in Bird Conservation Region 69—Puerto Rico and the Virgin Islands

Although recommendations and priorities regarding West Indian avifauna are not explicitly addressed in the body of this Plan, the inclusion of material pertaining to the Commonwealth of Puerto Rico and the U.S. Virgin Islands was felt to be warranted for several reasons: their participation in U.S. Joint Ventures; their consideration in North American Wetland Conservation Act project funding; their inclusion as domestic partners under the Neotropical Migratory Bird Conservation Act; and the mandate for development of proposals under State Wildlife Grants to consider Partners in Flight (and other continental bird) planning guidance. Future planning efforts will benefit from the participation and insights of all West Indian partners, ultimately leading to an avifaunal analysis that considers the entire West Indies. Such an analysis will take considerable coordination and time, and is beyond the scope of the present Plan. Nonetheless, we anticipate that the consideration given here to avifauna of Puerto Rico and the U.S. Virgin Islands might serve as a prelude for fully incorporating the highly vulnerable endemic avifauna of other West Indian islands into future Plan versions.

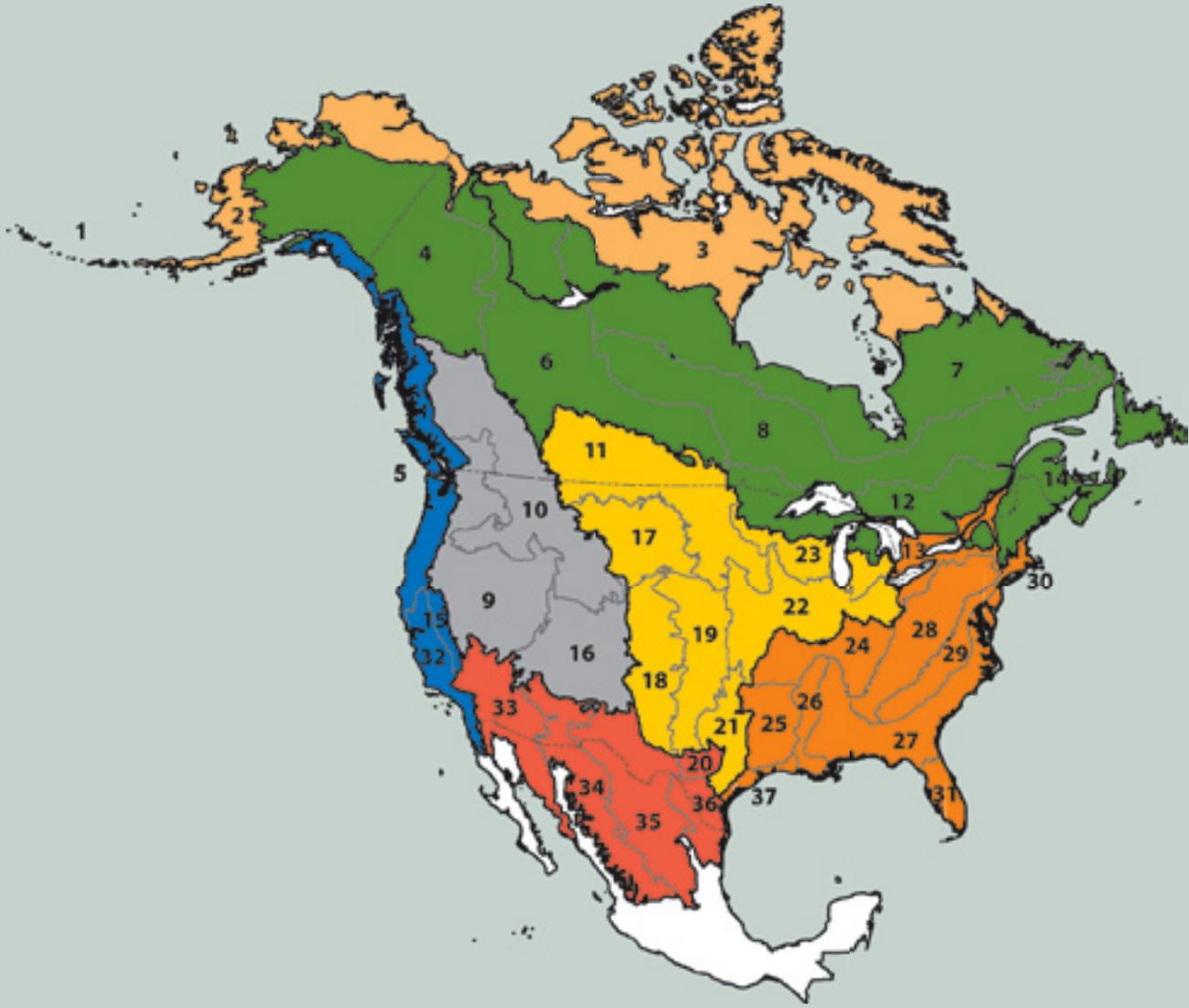
Here, we merely note which of the 448 species originally considered in this Plan and that are identified in the PIF Watch List also occur in Puerto Rico and the U.S. Virgin Islands. How these species become incorporated into species priority lists for conservation attention mixed in with West Indian endemic species is still to be determined. Additionally, we indicate which endemic species found on these islands would warrant identification as Watch List or Stewardship species if the procedures and criteria used in this Plan were to be extended to the West Indies. Note that many of the birds in the following lists are not adequately monitored throughout their respective distributions.

- Four breeding species and one wintering species currently on the PIF Watch List occur in BCR 69: White-crowned Pigeon, Mangrove Cuckoo, Antillean Nighthawk, Black Swift, and wintering Prairie Warblers.
- Six BCR 69 species would qualify for the Watch List under “multiple causes for inclusion”: Plain Pigeon (*Columba inornata*), Puerto Rican Parrot (*Amazona*

vittata), Puerto Rican Nightjar (*Caprimulgus noctitherus*), White-necked Crow (*Corvus leucognaphalus*; extirpated from both Puerto Rico and the U.S. Virgin Islands), Elfin-Woods Warbler (*Dendroica angelae*), and Yellow-shouldered Blackbird (*Agelaius xanthomus*). All of these species are in need of Immediate Action and all but one species (Elfin-Woods Warbler, which is a candidate for Federal listing) are already treated under the U.S. Endangered Species Act.

- Two BCR 69 species would qualify for the Watch List under “moderately abundant but undergoing declines or having high threats”: Puerto Rican Vireo (*Vireo latimeri*) and Greater Antillean Oriole (*Icterus dominicensis*).
- Two BCR 69 species would qualify for the Watch List under “restricted distributions and low population size”: Lesser Antillean Pewee (*Contopus latirostris*) and Adelaide’s Warbler (*Dendroica adelaidae*).
- Ten species endemic to Puerto Rico and the Virgin Islands would qualify as Stewardship Species for the West Indies: Puerto Rican Lizard-Cuckoo (*Saurothera vieilloti*), Puerto Rican Screech-Owl (*Otus nudipes*), Green Mango (*Anthracothorax viridis*), Puerto Rican Emerald (*Chlorostilbon maugaeus*), Puerto Rican Tody (*Todus mexicanus*), Puerto Rican Woodpecker (*Melanerpes portoricensis*), Puerto Rican Flycatcher (*Myarchus antillarum*), Puerto Rican Spindalis (*Spindalis portoricensis*), Puerto Rican Tanager (*Nesospingus speculariferus*), and Puerto Rican Bullfinch (*Loxigilla portoricensis*). Continentally, these endemic species are considered secure as their Puerto Rican populations are considered secure. However, populations of Puerto Rican Screech-Owl and Puerto Rican Flycatcher occurring on the Virgin Islands are nearing extirpation or are extirpated. These two regionally endemic but locally extirpated species, along with White-necked Crow mentioned above, join other regional species of high concern or threat (e.g., Antillean Mango [*Anthracothorax dominicus*], Bridled Quail-Dove [*Geotrygon mystacea*]) in representing the highest territorial priority species in need of conservation attention.

Avifaunal Biomes and Bird Conservation Regions covered by this Plan



Arctic

- 1. Aleutian/Bering Sea Islands
- 2. Western Alaska
- 3. Arctic Plains and Mountains

Northern Forest

- 4. Northwestern Interior Forest
- 6. Boreal Taiga Plains
- 7. Taiga Shield and Hudson Plains
- 8. Boreal Softwood Shield
- 12. Boreal Hardwood Transition
- 14. Atlantic Northern Forest

Pacific

- 5. Northern Pacific Rainforest
- 15. Sierra Nevada
- 32. Coastal California

Intermountain West

- 9. Great Basin
- 10. Northern Rockies
- 16. Southern Rockies/
Colorado Plateau

Southwest

- 20. Edwards Plateau
- 33. Sonoran and Mojave Deserts
- 34. Sierra Madre Occidental
- 35. Chihuahuan Desert
- 36. Tamaulipan Brushlands

Prairie

- 11. Prairie Potholes
- 17. Badlands and Prairies
- 18. Shortgrass Prairie

19. Central Mixed-grass Prairie

- 21. Oaks and Prairies
- 22. Eastern Tallgrass Prairie
- 23. Prairie Hardwood Transition

Eastern

- 13. Lower Great Lakes/St. Lawrence Plain
- 24. Central Hardwoods
- 25. West Gulf Coastal Plain/Ouachitas
- 26. Mississippi Alluvial Valley
- 27. Southeastern Coastal Plain
- 28. Appalachian Mountains
- 29. Piedmont
- 30. New England/Mid-Atlantic Coast
- 31. Peninsular Florida
- 37. Gulf Coastal Prairie