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Natural Resource Program Center

North Coast and Cascades Network Landbird Monitoring

Report for the 2007 Field Season

Natural Resource Technical Report NPS/NCCN/NRTR—2008/114

ON THE COVER
Wilson’s warbler
Photograph: courtesy of National Park Service files

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Natural Resource Technical Report NPS/NCCN/NRTR—2008/114

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March 2008

U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

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Please cite this publication as:

Siegel, R. B., R. L. Wilkerson, and R. C. Kuntz II. 2008. North Coast and Cascades Network landbird monitoring report for the 2007 field season. Natural Resource Technical Report NPS/NCCN/NRTR—2008/114. National Park Service, Fort Collins, Colorado.

This report was accomplished under Cooperative Agreement H9471061055,
Task Agreement Number J9471071093.

NPS D-42, March 2008

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Acknowledgments

We thank the 2007 crew members for their hard work and dedication to the project: P. Burke, A. Byrd, A. Gilmore, M. Holmgren (Field Lead), K. Kuhlman, and S. Marek. We thank K. Jenkins (FRESC Olympic Field Station) and the entire NCCN Landbird Monitoring Group for their contributions toward developing the NCCN landbird monitoring protocol. We thank S. Gremel, P. Happe, J. Schaberl, and C. Davis for assistance and logistical support at the respective parks, N. Antonova and K. Beirne for GIS training and support, and J. Boetsch for extensive help with data management. We thank R. Holmes for help with formatting this report to National Park Service standards. This is Contribution No. 337 of The Institute for Bird Populations.

Summary

In 2007 we fully implemented the landbird monitoring program in the North Coast and Cascades Network (NCCN) for the first time. The NCCN landbird monitoring protocol requires annual survey effort consisting of an annual panel (34 transects) plus one of five alternating panels (an additional 34 transects) in the large parks—Mount Rainier National Park (MORA), North Cascades National Park Service Complex (NOCA), or Olympic National Park (OLYM)—and the completion of a grid of survey points at either of the smaller parks—San Juan Island National Historical Park (SAJH) or Lewis and Clark National Historical Park (LEWI)—which are surveyed in alternating years. We previously surveyed the annual panel of transects in 2005 and 2006, during pilot field seasons devoted to protocol development and testing.

We conducted point counts at 881 point count stations arrayed along 65 transects in the three large parks in 2007. Three intended transects could not be surveyed because of unusually rainy conditions near the end of the field season. We detected 122 bird species in the three large parks, and recorded 86 of them during one or more point counts. For 57 species (all species detected at least 9 times on annual-panel transects between 2005 and 2007), we present the total number of detections on annual-panel transects in each park during the 2005, 2006 and 2007 field seasons. We caution, however, that these detection totals have not been adjusted for differences in survey effort or potential differences in detectability of birds between years; such adjustments will be made in conjunction with trend analyses in our five-year reports.

At SAJH, we conducted 54 point counts, comprising our entire survey grid. We detected 60 species during those point counts. We present the number of detections, and the number of points with detections, for each species detected during point counts at SAJH.

We conclude that the NCCN landbird monitoring program is off to an excellent start, with a comprehensive, field-tested protocol, two years of annual-panel data collected during the protocol development phase (2005 and 2006), and now a year of full project implementation, including data collection on the annual panel as well as the first alternating panel. All of our procedures for season preparation, data collection, data management, data analysis, and reporting appear to be working well.

Introduction

Reported declines of many Neotropical migratory bird species and other bird species breeding in North America have stimulated interest in avian population trends and mechanisms driving those trends (Robbins et al. 1989; DeSante and George 1994; Peterjohn et al. 1995). Data from the North American Breeding Bird Survey indicate that many landbird populations in Pacific Northwest coniferous forests are declining (Andelman and Stock 1994a, 1994b; Sharp 1996; Saab and Rich 1997; Altman 1999a, 1999b; Sauer et al. 2001). Indeed, Altman (1999a) reported that 30 species exhibit statistically significant, recent and/or long-term declining trends, while only 14 species in the region have significant increasing trends.

Threats to bird populations breeding in Pacific Northwest conifer forests include outright habitat loss as well as forest management practices that discourage the development of old-growth conditions. Since European settlement, large tracts of low-elevation coniferous forest have been lost to residential and agricultural development, with the overall extent of old-growth forest reduced by more than half since World War II (Bolsinger and Waddell 1993). Landscapes that have been managed for timber production are now dominated by early- and mid-successional forests (Bunnell et al. 1997), and exhibit increased fragmentation as well as a variety of altered structural characteristics that likely affect bird community composition (Meslow and Wight 1975; Hagar et al. 1995; Bunnell et al. 1997; Altman 1999a).

Pacific Northwest landbirds breeding in habitats other than conifer forests face substantial threats as well. Species that breed in the subalpine and alpine zones are exposed to visitor impacts, ecological changes resulting from alterations of the natural fire regime, and perhaps most importantly, may be among the birds most strongly affected by climate change during the coming decades. Indeed, Oregon-Washington Partners in Flight has explicitly called on the NPS to take responsibility for monitoring birds in high-elevation areas throughout the Pacific Northwest (Altman and Bart 2001). Additional threats also face the Pacific Northwest's migratory landbirds on their wintering grounds and along migration routes.

The three large parks in the North Coast and Cascades Network (NCCN)—Olympic (OLYM), North Cascades (NOCA), and Mount Rainier (MORA)—range from sea level to nearly 4,400 m and contain huge tracts of late-successional, conifer forest on the Olympic Peninsula and the west slope of the Cascades, as well as large areas dominated by subalpine and alpine plant communities. North Cascades National Park also includes substantial tracts of conifer forest typical of the east side of the Cascades, which hosts a somewhat distinct avifauna (Altman 1999b). San Juan Islands National Historical Park (SAJH), in the rain shadow of the Olympic Mountains, includes small but important examples of coastal prairie and Garry Oak woodlands, plant communities that are fairly rare in western Washington (Atkinson and Sharpe 1985) and host unusual bird communities (Lewis and Sharpe 1987; Siegel et al. 2002). Lewis and Clark National Historical Park (LEWI) includes lowland wetlands as well as coastal and upland forests, and extends our program's area of inference substantially southward. Avian inventory projects assessing park- and/or habitat-specific abundance of all commonly occurring bird species have been completed at all five parks (Siegel et al. 2002; Siegel et al. 2004a; Siegel et al. 2004b; Wilkerson et al. 2005, Siegel et al. 2007c).

National parks in the NCCN can fulfill vital roles as both refuges for bird species dependent on late successional forest conditions, and as reference sites for assessing the effects of land use and land cover changes on bird populations throughout the larger Pacific Northwest region (Silsbee and Peterson 1991). These changes may result from regional activities such as land conversion and forest management, or from broader-scale processes such as global climate change. Indeed, monitoring population trends at 'control' sites in national parks is especially important because the parks are among the sites in the United States where population trends due to large-scale regional or global change patterns are likely least confounded with local changes in land-use (Simons et al. 1999). Additionally, long-term monitoring of landbirds throughout the NCCN is expected to provide information that will inform future decisions about important management issues in the parks, including visitor impacts, fire management, and the effects of introduced species.

The specific objectives of the NCCN landbird monitoring program are:

1) to detect trends in the density of as many landbird species (including passerines, near-passerines, and galliformes) as possible throughout accessible areas of five NCCN parks during the breeding season.

2) to track changes in the breeding season distribution of landbird species throughout accessible areas of the three large wilderness parks.

This report and subsequent annual reports for the landbird monitoring program are intended primarily as administrative reports. More comprehensive analyses of the data, including trend analysis that accounts for the potentially confounding effects of variation in detectability and sampling effort, will be conducted in conjunction with the program's five-year reports, the first of which is expected to be completed after the 2011 field season.

Study Area

The study area for the NCCN landbird monitoring program (Figure 1) includes areas of MORA, NOCA and OLYM that are accessible by foot and lie within 1 km of a road or trail, as well as all of SAJH (including both American Camp and English Camp) and portions of LEWI.

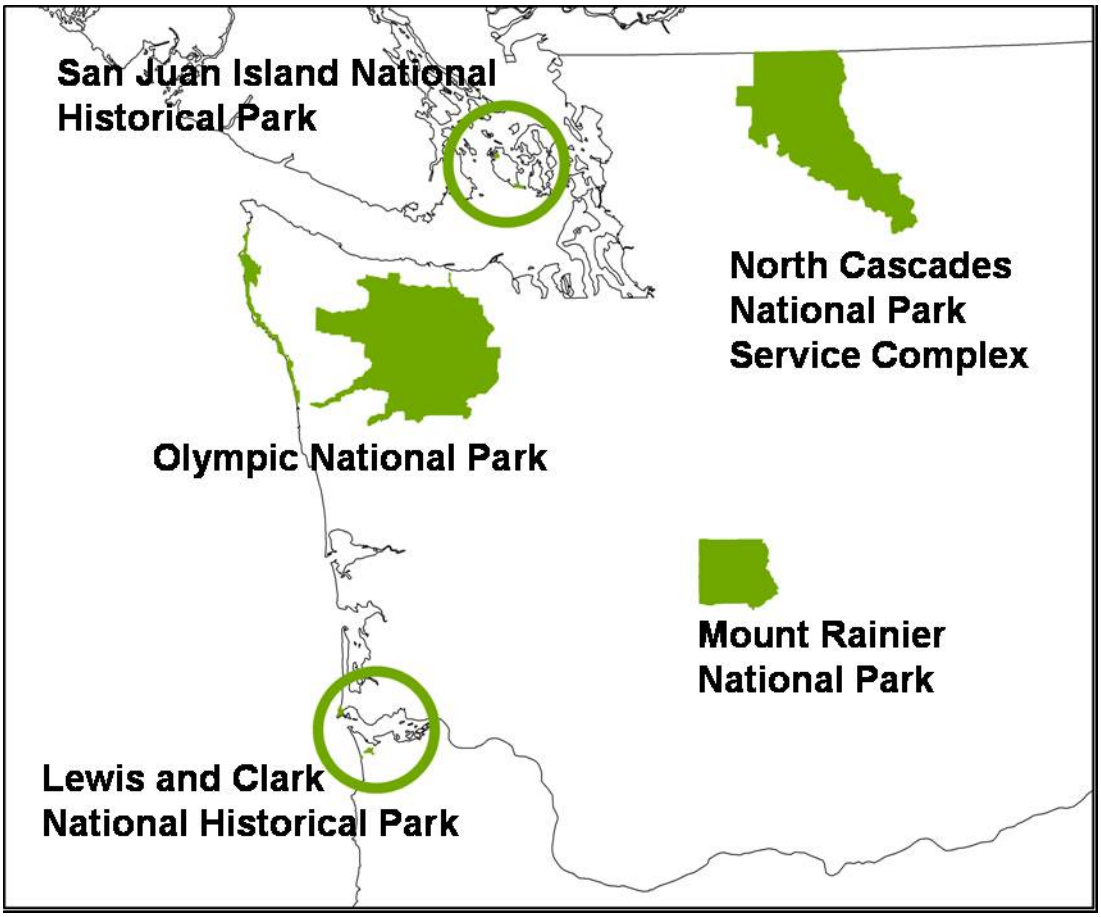

Figure 1. National Park Service units participating in the landbird monitoring program of the North Coast and Cascades Network.

Methods

Sample design

A detailed description of the sample design for the NCCN landbird monitoring program is provided in the NCCN landbird monitoring protocol (Siegel et al. 2007a). In brief, the sample design for the three large parks utilizes six panels of transects in each park. At NOCA and at OLYM each panel includes four low-elevation transects (transect starting points < 650 m), four mid-elevation transects (transect starting point between 650 m and 1,350 m) and four high-elevation transects (transect starting points >1,350 m). At MORA the sample design is the same as at the other two large parks, except there are only two low-elevation transects in each panel, and the cutoff between low-elevation transects and mid-elevation transects is 800 m rather than 650 m. All transect starting points are on park roads or trails, but the transects they define consist of a line of approximately 8-12 points, extending perpendicularly (or as close to perpendicularly as topographic and physiographic features allow) in both directions away from the trail. In 2007 we surveyed the annual panel of transects ('Ann1') and the first alternating panel of transects ('Alt2').

In 2007 we implemented the full study design in the three large parks for the first time, including surveys of the annual panel as well as the first alternating panel (Figures 2-4). During the two previous years of protocol development (2005-2006) we surveyed only the annual panel (Siegel et al. 2006, 2007b).

Our sample design, which requires 68 transects per year to be surveyed in the large parks, was developed under the assumption that the NCCN landbird monitoring program would be staffed by an 8-person field crew. Budgetary constraints have subsequently forced us to trim the field crew to 6 people, making completion of all 68 transects uncertain in years with challenging weather conditions.

At the two smaller parks (LEWI and SAJH) the sample design consists of a systematic grid of survey points, with the two parks scheduled to be surveyed in alternating years. In the summer of 2007 we surveyed the grid at SAJH (Figure 5).

Crew training and certification

Mandy Holmgren, a contract biologist with The Institute for Bird Populations (IBP) served as the 2007 Field Lead. Mandy began training the crew on May 1, with assistance from IBP Staff Biologist Bob Wilkerson and NPS Lead Bob Kuntz. Training followed the training guidelines in the NCCN landbird monitoring protocol (Siegel et al. 2007a). By the end of the official training session on May 19, two of five Field Technicians had passed the rigorous point count certification exam, and were ready to begin collecting data. Two of the other three Field Technicians passed the test a few days later. The fifth technician was certified within two weeks of the end of training. With the exception of Bob Kuntz, all individuals who collected data or

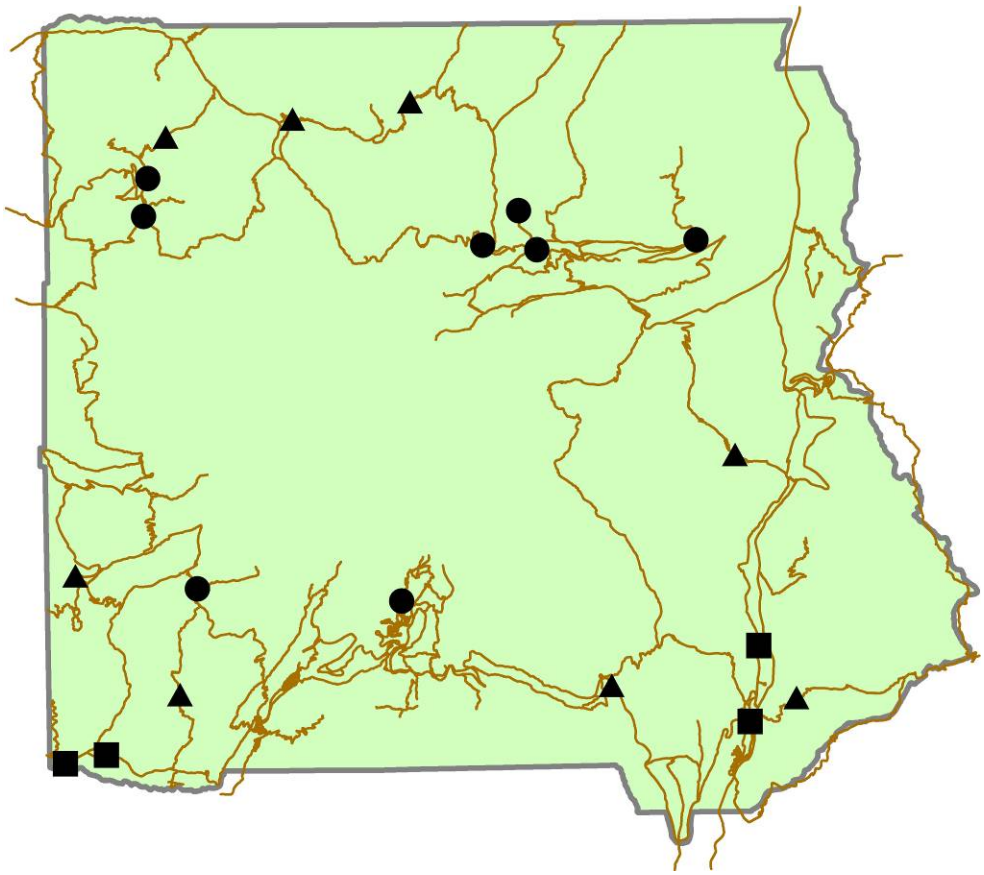

Figure 2. Approximate locations of transects conducted at MORA in 2007. Squares indicate low-elevation transects, triangles indicate mid-elevation transects, and circles indicate high-elevation transects.

Figure 3. Approximate locations of transects conducted at NOCA in 2007. Squares indicate low-elevation transects, triangles indicate mid-elevation transects, and circles indicate high-elevation transects.

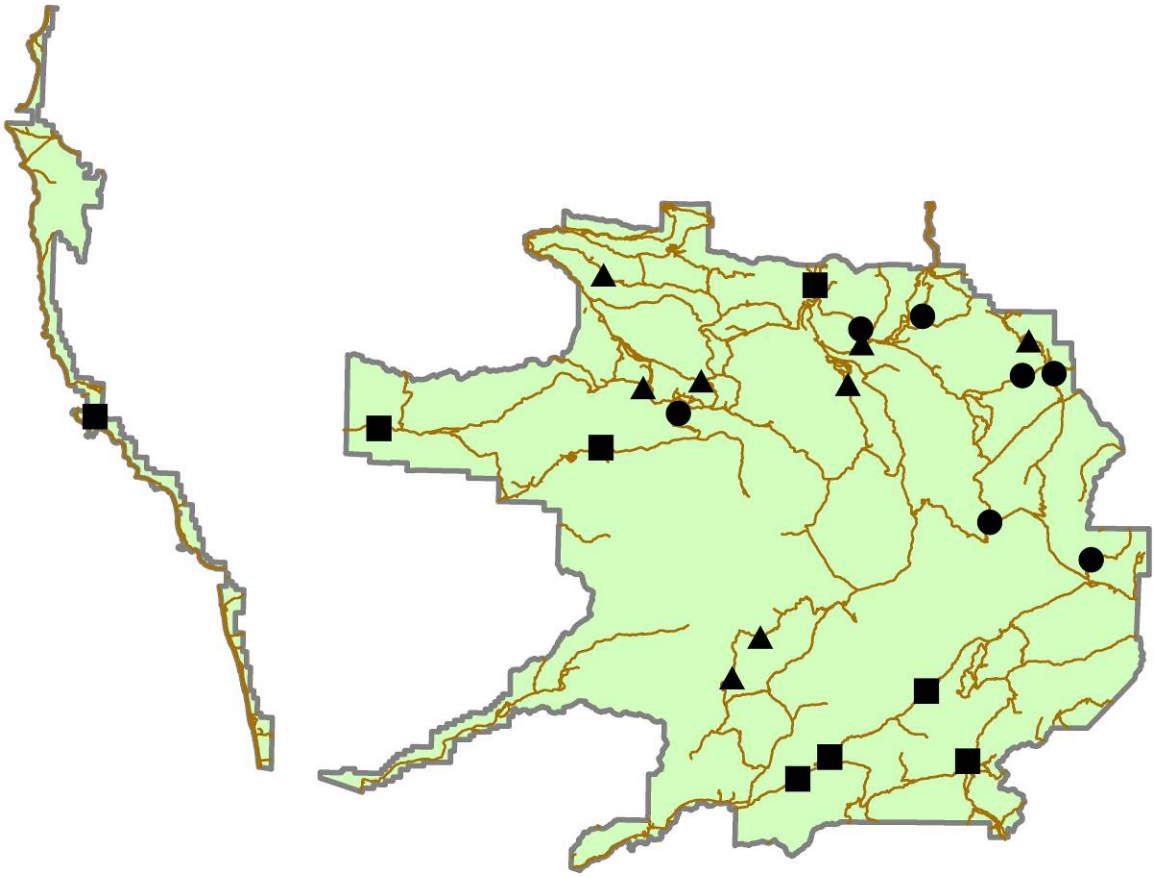

Figure 4. Approximate locations of transects conducted at OLYM in 2007. Squares indicate low-elevation transects, triangles indicate mid-elevation transects, and circles indicate high-elevation transects.

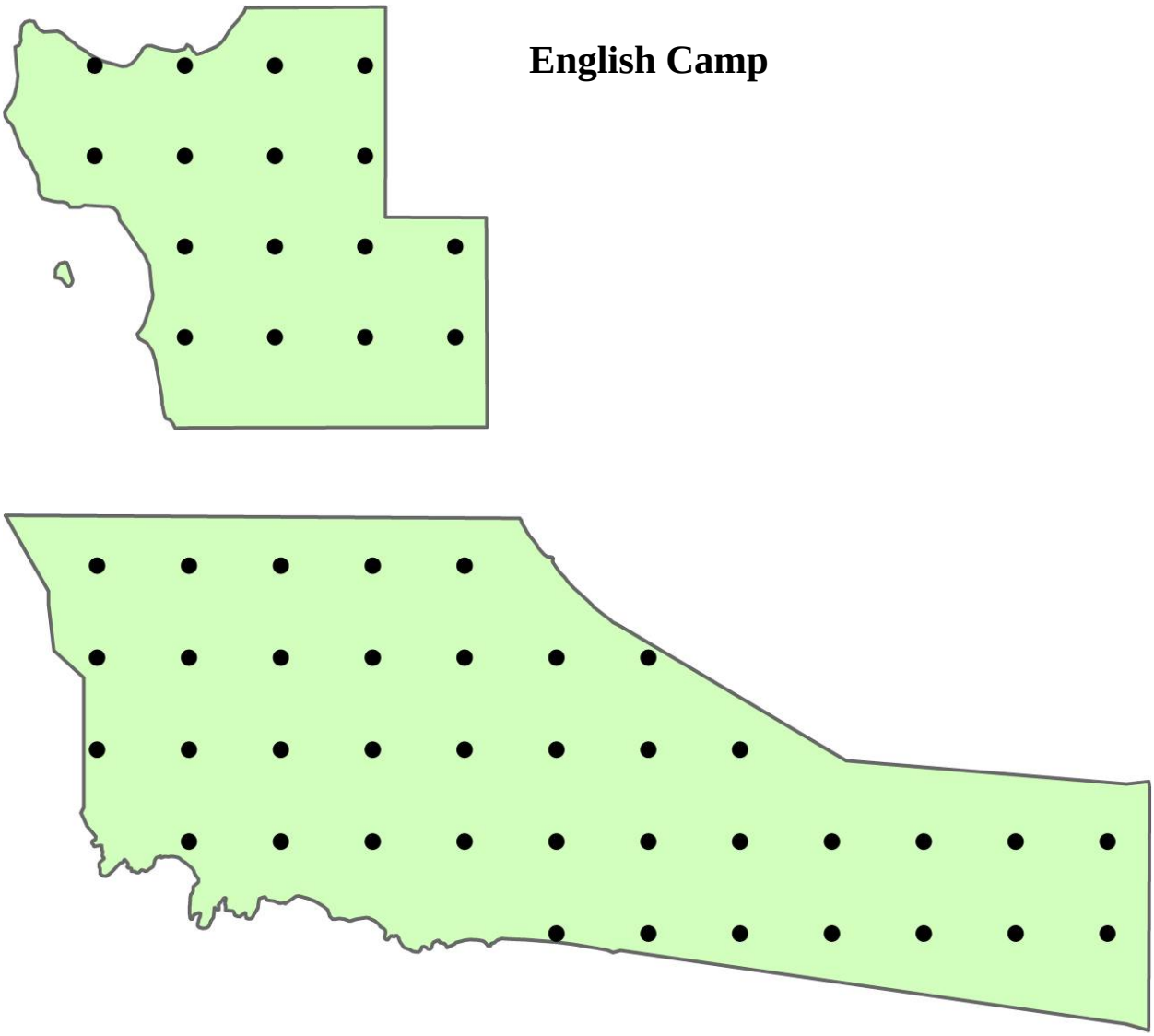

Figure 5. Locations of individual point counts conducted at San Juan Island National Historical Park in 2007.

participated in crew training during the 2007 field season (Table 1) were employees, contract biologists, or field biologist interns of The Institute for Bird Populations.

Table 1. Observers who conducted point counts in the NCCN in 2007.

Observer	Role
Patrick Burke	Technician
Allison Byrd	Technician
Ann Gilmore	Technician
Mandy Holmgren	Field Lead
Kara Kuhlman	Technician
Sarah Marek	Technician

Data collection

All point count data were collected between May 27 and May 30 at SAJH, between June 3 and July 26 at MORA, between May 27 and July 28 at NOCA, and between June 1 and July 30 at OLYM. At the three large parks, low-elevation transects were generally surveyed first, followed by the mid-elevation transects, and finally the high-elevation transects.

Data collection followed the detailed procedures explained in the NCCN landbird monitoring Protocol (Siegel et al. 2007a). Crew members worked in pairs to conduct a single transect each morning. Crew members were provided with a) maps and coordinates indicating the location of transect 'starting points', which lay directly on trails or roads, as well as all point count stations established in 2005, and b) narrative descriptions of point count stations and the travel routes between successive stations. Beginning within 10 min of official sunrise, each observer conducted a point count, and then continued along the transect, conducting another point count every 200 m until 3.5 hours after official local sunrise.

When surveying transects on the annual panel, crew members used the maps and narrative descriptions to locate the same point count stations that were established in 2005 or 2006. However, in a few instances, annual-panel transects had to be re-routed because routes chosen in previous years were deemed overly dangerous or difficult to traverse under present snow cover conditions. In these instances, observers established new routes, following the guidelines in Siegel et al. (2007a). When surveying transects on the alternating panel, crew members began from the indicated starting points, and then established transect routes according to the guidelines in Siegel et al. (2007a).

At each point the observers recorded the starting time, scored the degree of noise interference caused by such factors as flowing water or wind, recorded the weather conditions, and then began the five-minute point count. Birds observed in the first three minutes were recorded separately from those observed in the last two minutes, in order to allow comparison with Breeding Bird Survey data, which are based on three-minute counts. Observers estimated the horizontal distance, to the nearest meter, to each bird detected. The observers also recorded whether the distance estimates were based on an aural or visual detection, and whether the bird ever sang during the point count.

After completing their last point count each morning, observers retraced their steps back to the starting point. Along the way, they conducted a rapid habitat assessment at each of the survey points. The rapid habitat assessment consisted of characterizing the habitat within a 50-m radius of the survey point, noting the primary (and secondary, if appropriate) plant community type, canopy cover class, and tree size class, according to the categories developed by Pacific Meridian Resources (1996). While conducting the habitat assessments, observers also used Global Positioning System (GPS) units to collect location data files, and where necessary, amended narrative descriptions of the point locations.

Whenever crew members detected species thought to be rare in the park, they completed "Rare Bird Report Forms", including descriptions of the birds' appearance, behavior, and precise location. These reports covered not only birds detected during point counts, but also birds detected while sampling vegetation, hiking between transects, relaxing at camp in the evening, or at any other time during the field season, including the pre-season training session.

After completing their fieldwork each day, partners reviewed each other's data forms for missing or incorrectly recorded data, discussed any interesting or surprising bird detections, and completed a Transect Visit Log summarizing the day's efforts.

Data entry and validation

Our protocol requires crews working at each large park to enter their own data into the NCCN landbird monitoring program's Microsoft Access database throughout the field season. Although the crews were indeed able to enter some of their data during the field season, some early technical glitches combined with a very heavy fieldwork schedule prevented completion of data entry before the field season ended. All the remaining data were entered by the Field Lead after the field season. Data entry procedures followed the guidelines in Siegel et al. (2007a).

The database includes built-in quality assurance components such as pick-lists and validation rules to test for missing data or illogical combinations. While entering the data, the data entry person visually reviewed her work to ensure that the data on the screen matched the field form.

When all the data were entered, we inspected the database for incompleteness and errors, and used the built-in Quality Assurance Tools to check for logical inconsistencies and data outliers. Any errors or data omissions were then corrected.

Data analysis

We summarized and tabulated data according to the template in Siegel et al. (2007a). We present survey results without making any adjustments for detectability, which may vary substantially by species, habitat, observer, or other factors. In conjunction with the first five-year report for this monitoring program, a thorough analysis of factors affecting detectability of birds during point counts will be conducted, allowing for annual results to be adjusted to account for variable detectability (Buckland et al. 2001). Until that analysis is completed, any results should be viewed as provisional only.

Results

We surveyed all 34 of the annual-panel transects in the large parks, and 31 of the 34 transects in the first alternating panel (Table 2), for a total of 65 transects (Table 3). We were unable to sample one transect at OLYM and two transects at NOCA, mainly due to unusually rainy weather toward the end of the field season. The appendix provides a detailed multi-year survey history of all transects sampled in the large parks to date. We conducted 269 individual point counts at MORA, 316 point counts at NOCA and 296 point counts at OLYM (Table 2). We also conducted 54 point counts at SAJH. During these 935 point counts we counted 8,992 individual birds. Across the three large parks, we documented the presence of 122 species (Table 4), 86 of which were detected during point counts.

For the annual-panel transects only, the number of individuals of each species detected during point counts (unlimited radius) and the number of transects on which each species was detected are provided in Table 5. On the annual-panel transects we detected 46 bird species during point counts at MORA, 66 species during point counts at NOCA, and 50 species during point counts at OLYM (Table 5). Pooling detections across all species, we amassed 1,095 individual bird detections (7.71 detections/point) at MORA, 1,852 detections (10.29 detections/point) at NOCA, and 1211 detections (7.71 detections per point) at OLYM (Table 5). Detection rates at all three parks were up sharply from 2006 (Siegel et al. 2007b), but much of the rise is explained by marked increases in just a few species, including Hammond's Flycatcher, Varied Thrush, Red Crossbill, Evening Grosbeak, and especially Pine Siskin. In 2006 we recorded 46 Pine Siskin detections on the annual-panel transects, compared with 553 detections in 2007—more than a tenfold increase. The five most frequently detected species on the annual-panel transects were: Pine Siskin (553 detections), Dark-eyed Junco (375 detections), Varied Thrush (332 detections), Winter Wren (376 detections), and Chestnut-backed Chickadee (211 detections).

Pooling data across the annual-panel transects as well as the transects in the first alternating panel, the number of individuals of each species detected during point counts (unlimited radius) and the number of transects on which each species was detected are provided in Table 6. Pooling data across all transects, we detected 50 bird species during point counts at MORA, 76 species during point counts at NOCA, and 52 species during point counts at OLYM (Table 6). Considering data from all 65 surveyed transects, the five most frequently detected species were: Pine Siskin (1,132 detections), Dark-eyed Junco (750 detections), Varied Thrush (591 detections), Red Crossbill (557 detections), and Winter Wren (531 detections).

Two species of particular conservation interest—Golden Eagle and Northern Goshawk—were detected at times other than during point counts, and were documented on 'rare bird' detection forms. These detections are summarized in Table 7.

For 57 species (all species for which we amassed at least nine point count detections between 2005 and 2007), we present the total number of detections of each species on each park's annual-panel transects during the 2005, 2006 and 2007 field seasons (Figure 6). We caution, however, that these detection totals have not been adjusted for differences in survey effort or potential

differences in detectability of birds between years; such adjustments will be made in conjunction with trend analyses in our five-year reports.

At SAJH our 54 point counts yielded 874 detections of 60 species (Table 8), a detection rate of nearly 16.2 birds per point. The most frequently detected species was American Robin (110 detections), followed by American Goldfinch (65 detections), Savannah Sparrow (54 detections), White-crowned Sparrow (43 detections), and Pacific-slope Flycatcher and Swainson's Thrush (each with 42 detections)..

Table 2. NCCN landbird monitoring transects that were surveyed or intended to be surveyed in 2007.

Park	Panel	Elevation	Transect	No. of points completed
MORA	ann1	Low	4001	12
MORA	ann1	Low	4005	11
MORA	ann1	Medium	4002	12
MORA	ann1	Medium	4004	18
MORA	ann1	Medium	4009	15
MORA	ann1	Medium	4012	14
MORA	ann1	High	4003	12
MORA	ann1	High	4007	20
MORA	ann1	High	4011	14
MORA	ann1	High	4014	14
MORA	alt2	Low	4006	10
MORA	alt2	Low	4008	9
MORA	alt2	Medium	4015	11
MORA	alt2	Medium	4017	12
MORA	alt2	Medium	4020	9
MORA	alt2	Medium	4026	10
MORA	alt2	High	4016	19
MORA	alt2	High	4019	20
MORA	alt2	High	4027	13
MORA	alt2	High	4075	14
NOCA	ann1	Low	1013	14
NOCA	ann1	Low	1017	9
NOCA	ann1	Low	1020	13
NOCA	ann1	Low	1023	19
NOCA	ann1	Medium	1015	17
NOCA	ann1	Medium	1018	21
NOCA	ann1	Medium	1022	11
NOCA	ann1	Medium	1024	11
NOCA	ann1	High	1014	19
NOCA	ann1	High	1016	14
NOCA	ann1	High	1019	10

Table 2. NCCN landbird monitoring transects that were surveyed or intended to be surveyed in 2007 **(**continued).

Park	Panel	Elevation	Transect	No. of points completed
NOCA	ann1	High	1021	22
NOCA	alt2	Low	1001	11
NOCA	alt2	Low	1005	13
NOCA	alt2	Low	1006	10
NOCA	alt2	Low	1010	12
NOCA	alt2	Medium	1003	12
NOCA	alt2	Medium	1004	13
NOCA	alt2	Medium	1009	0
NOCA	alt2	Medium	1011	19
NOCA	alt2	High	1002	18
NOCA	alt2	High	1007	13
NOCA	alt2	High	1008	0
NOCA	alt2	High	1012	15
OLYM	ann1	Low	3001	8
OLYM	ann1	Low	3121	17
OLYM	ann1	Low	3126	11
OLYM	ann1	Low	3134	18
OLYM	ann1	Medium	3122	14
OLYM	ann1	Medium	3123	12
OLYM	ann1	Medium	3130	8
OLYM	ann1	Medium	3200	22
OLYM	ann1	High	3124	10
OLYM	ann1	High	3125	13
OLYM	ann1	High	3127	13
OLYM	ann1	High	3128	11
OLYM	alt2	Low	3138	10
OLYM	alt2	Low	3142	14
OLYM	alt2	Low	3144	13
OLYM	alt2	Low	3145	13
OLYM	alt2	Medium	3133	8
OLYM	alt2	Medium	3135	11
OLYM	alt2	Medium	3137	10
OLYM	alt2	Medium	3141	14
OLYM	alt2	High	3132	19
OLYM	alt2	High	3136	11
OLYM	alt2	High	3139	16
OLYM	alt2	High	3140	0

Table 3. Summary history of NCCN landbird monitoring transects completed through 2007.

Park	Elevation stratum	Number of transects completed 2005[a]	2006[a]	2007[b]
MORA	Low	2	2	4
MORA	Medium	4	4	8
MORA	High	4	4	8
MORA	ALL	10	10	20
NOCA	Low	4	4	8
NOCA	Medium	4	4	7
NOCA	High	4	4	7
NOCA	ALL	12	12	22
OLYM	Low	4	4	8
OLYM	Medium	4	3	8
OLYM	High	4	4	7
OLYM	ALL	12	11	23
ALL	Low	10	10	20
ALL	Medium	12	11	23
ALL	High	12	12	22
ALL	ALL	34	33	65

[a]Only the annual panel of transects was surveyed in 2005 and 2006, during the protocol development phase of the project.

[b]The annual panel as well as the first alternating panel were sampled in 2007.

Table 4. All species recorded in the three large parks during the 2007 field season, including the pre-season training session. Asterisks indicate species that were detected only at times other than during point counts.

Common Name	Scientific Name
Common Loon	*Gavia immer*
Great Blue Heron *	*Ardea herodias*
Canada Goose	*Branta canadensis*
Wood Duck *	*Aix sponsa*
Mallard	*Anas platyrhynchos*
Surf Scoter *	*Melanitta perspicillata*
Bufflehead *	*Bucephala albeola*
Barrow's Goldeneye *	*Bucephala islandica*
Osprey	*Pandion haliaetus*
Bald Eagle *	*Haliaeetus leucocephalus*
Sharp-shinned Hawk *	*Accipiter striatus*
Northern Goshawk *	*Accipiter gentiles*
Red-tailed Hawk	*Buteo jamaicensis*
Golden Eagle *	*Aquila chrysaetos*
Ruffed Grouse	*Bonasa umbellus*
White-tailed Ptarmigan *	*Lagopus leucurus*
Sooty Grouse	*Dendragapus fuliginosus*
Killdeer *	*Charadrius vociferus*
Black Oystercatcher *	*Haematopus bachmani*
Spotted Sandpiper	*Actitis macularia*
Western Gull *	*Larus occidentalis*
Glaucous-winged Gull *	*Larus glaucescens*
Caspian Tern *	*Sterna caspia*
Pigeon Guillemot *	*Cepphus columba*
Rhinoceros Auklet *	*Cerorhinca monocerata*
Tufted Puffin *	*Fratercula cirrhata*
Band-tailed Pigeon	*Patagioenas fasciata*
Great Horned Owl *	*Bubo virginianus*
Barred Owl *	*Strix varia*
Common Nighthawk	*Chordeiles minor*
Black Swift	*Cypseloides niger*
Vaux's Swift	*Chaetura vauxi*
Calliope Hummingbird	*Stellula calliope*
Rufous Hummingbird	*Selasphorus rufus*
Belted Kingfisher	*Ceryle alcyon*
Red-breasted Sapsucker	*Sphyrapicus rubber*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Pileated Woodpecker	*Dryocopus pileatus*
Olive-sided Flycatcher	*Contopus cooperi*

Table 4. All species recorded in the three large parks during the 2007 field season, including the pre-season training session. Asterisks indicate species that were detected only at times other than during point counts (continued).

Common Name	Scientific Name
Western Wood-Pewee	*Contopus sordidulus*
Willow Flycatcher	*Empidonax traillii*
Hammond's Flycatcher	*Empidonax hammondii*
Dusky Flycatcher	*Empidonax oberholseri*
Pacific-slope Flycatcher	*Empidonax difficilis*
Say's Phoebe *	*Sayornis saya*
Western Kingbird *	*Tyrannus verticalis*
Cassin's Vireo	*Vireo cassinii*
Hutton's Vireo *	*Vireo huttoni*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Gray Jay	*Perisoreus canadensis*
Steller's Jay	*Cyanocitta stelleri*
Clark's Nutcracker	*Nucifraga columbiana*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Horned Lark	*Eremophila alpestris*
Tree Swallow *	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow *	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*
Black-capped Chickadee	*Poecile atricapillus*
Mountain Chickadee	*Poecile gambeli*
Chestnut-backed Chickadee	*Poecile rufescens*
Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch *	*Sitta carolinensis*
Brown Creeper	*Certhia americana*
Canyon Wren *	*Catherpes mexicanus*
House Wren *	*Troglodytes aedon*
Winter Wren	*Troglodytes troglodytes*
Marsh Wren *	*Cistothorus palustris*
American Dipper	*Cinclus mexicanus*
Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*
Western Bluebird	*Sialia mexicana*
Mountain Bluebird	*Sialia currucoides*
Townsend's Solitaire	*Myadestes townsendi*
Veery	*Catharus fuscescens*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*

Table 4. All species recorded in the three large parks during the 2007 field season, including the pre-season training session. Asterisks indicate species that were detected only at times other than during point counts (continued).

Common Name	Scientific Name
American Robin	*Turdus migratorius*
Varied Thrush	*Ixoreus naevius*
European Starling *	*Sturnus vulgaris*
American Pipit	*Anthus rubescens*
Cedar Waxwing	*Bombycilla cedrorum*
Orange-crowned Warbler	*Vermivora celata*
Nashville Warbler	*Vermivora ruficapilla*
Yellow Warbler	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*
Black-throated Gray Warbler	*Dendroica nigrescens*
Townsend's Warbler	*Dendroica townsendi*
Hermit Warbler	*Dendroica occidentalis*
American Redstart	*Setophaga ruticilla*
MacGillivray's Warbler	*Oporornis tolmiei*
Common Yellowthroat	*Geothlypis trichas*
Wilson's Warbler	*Wilsonia pusilla*
Western Tanager	*Piranga ludoviciana*
Spotted Towhee	*Pipilo maculates*
Chipping Sparrow	*Spizella passerine*
Savannah Sparrow	*Passerculus sandwichensis*
Fox Sparrow	*Passerella iliaca*
Song Sparrow	*Melospiza melodia*
Lincoln's Sparrow *	*Melospiza lincolnii*
White-crowned Sparrow	*Zonotrichia leucophrys*
Dark-eyed Junco	*Junco hyemalis*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Lazuli Bunting	*Passerina amoena*
Red-winged Blackbird *	*Agelaius phoeniceus*
Brewer's Blackbird *	*Euphagus cyanocephalus*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole *	*Icterus bullockii*
Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*
Pine Grosbeak	*Pinicola enucleator*
Purple Finch	*Carpodacus purpureus*
Cassin's Finch	*Carpodacus cassinii*
House Finch *	*Carpodacus mexicanus*
Red Crossbill	*Loxia curvirostra*
White-winged Crossbill *	*Loxia leucoptera*
Pine Siskin	*Carduelis pinus*
Evening Grosbeak	*Coccothraustes vespertinus*

Table 5. Number of transects with detections and number of individual detections for each species detected during point counts on annual-panel transects in the three large parks in 2007.

	Number of transects with detections				Number of individual detections			
Species	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Common Loon		1		1		1		1
Canada Goose		1		1		1		1
Osprey	1			1	2			2
Red-tailed Hawk			1	1			1	1
Ruffed Grouse			1	1			1	1
Sooty Grouse	3	5	6	14	5	11	10	26
Spotted Sandpiper	1		2	3	1		3	4
Band-tailed Pigeon	1		4	5	1		8	9
Common Nighthawk			1	1			2	2
Black Swift		2		2		4		4
Vaux’s Swift	2	4	3	9	3	5	31	39
Calliope Hummingbird	1			1	1			1
Rufous Hummingbird	2	7	4	13	9	13	11	33
Belted Kingfisher		2		2		4		4
Red-breasted Sapsucker		4		4		11		11
Downy Woodpecker		4		4		4		4
Hairy Woodpecker	6	7	5	18	11	10	5	26
Northern Flicker	4	8	5	17	4	14	9	27
Pileated Woodpecker	1	1	2	4	1	1	3	5
Olive-sided Flycatcher	1	10	7	18	1	22	15	38
Western Wood-Pewee		4		4		15		15
Willow Flycatcher		1		1		1		1
Hammond's Flycatcher	3	10	4	17	10	61	34	105
Dusky Flycatcher		2		2		4		4
Pacific-slope Flycatcher	6	5	8	19	28	15	100	143
Cassin's Vireo		5		5		15		15
Warbling Vireo	2	7	4	13	4	34	14	52
Red-eyed Vireo		3		3		5		5

Table 5. Number of transects with detections and number of individual detections for each species detected during point counts on annual-panel transects in the three large parks in 2007 (continued).

	Number of transects with detections				Number of individual detections			
Species	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Gray Jay	5	1	7	13	10	2	24	36
Steller's Jay	2	4	3	9	5	7	3	15
Clark's Nutcracker	1	1		2	8	17		25
American Crow			2	2			2	2
Common Raven	2		5	7	6		6	12
Violet-green Swallow		1		1		1		1
N. Rough-winged Swallow			1	1			1	1
Mountain Chickadee	2	3		5	8	24		32
Chestnut-backed Chickadee	8	9	11	28	80	80	51	211
Red-breasted Nuthatch	8	11	7	26	36	59	26	121
Brown Creeper	8	4	6	18	38	16	18	72
Winter Wren	10	8	12	30	95	71	110	276
American Dipper			1	1			1	1
Golden-crowned Kinglet	8	11	10	29	70	53	74	197
Ruby-crowned Kinglet		1	2	3		12	3	15
Western Bluebird			1	1			2	2
Mountain Bluebird		1		1		1		1
Townsend's Solitaire	2	3	2	7	3	3	2	8
Veery		1		1		1		1
Swainson's Thrush	2	9	4	15	7	122	17	146
Hermit Thrush	8	8	6	22	46	103	31	180
American Robin	6	11	11	28	30	79	48	157
Varied Thrush	10	9	11	30	120	158	54	332
American Pipit	2	1	2	5	21	2	5	28
Cedar Waxwing		3		3		11		11
Orange-crowned Warbler		2		2		2		2
Nashville Warbler		4		4		10		10
Yellow Warbler		5	2	7		50	6	56

Table 5. Number of transects with detections and number of individual detections for each species detected during point counts on annual-panel transects in the three large parks in 2007 (continued).

	Number of transects with detections				Number of individual detections			
Species	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	All
Yellow-rumped Warbler	2	8	1	11	9	63	1	73
Black-throated Gray Warbler	1	4	1	6	1	5	12	18
Townsend's Warbler	6	9	4	19	54	69	13	136
Hermit Warbler	1			1	1			1
American Redstart		1		1		1		1
MacGillivray's Warbler	1	6	2	9	1	29	2	32
Wilson's Warbler	1	1	3	5	1	3	8	12
Western Tanager	2	7	3	12	4	44	5	53
Spotted Towhee		3		3		5		5
Chipping Sparrow	1	4		5	1	25		26
Fox Sparrow	2	1		3	9	4		13
Song Sparrow	1	5	3	9	1	16	4	21
White-crowned Sparrow		1	2	3		3	6	9
Dark-eyed Junco	9	11	10	30	116	153	106	375
Black-headed Grosbeak		5		5		14		14
Lazuli Bunting		1		1		3		3
Brown-headed Cowbird		2		2		6		6
Gray-crowned Rosy-Finch	2		1	3	2		9	11
Pine Grosbeak		1	1	2		1	2	3
Purple Finch		1	1	2		2	1	3
Cassin's Finch	1	2		3	2	4		6
Red Crossbill	4	3	12	19	27	27	137	191
Pine Siskin	9	7	8	24	193	187	173	553
Evening Grosbeak	5	9	1	15	9	53	1	63
All Species Pooled					1,095	1,852	1,211	4,158
Detections per Point (All Species Pooled)					7.71	10.29	7.71	8.68

Table 6. Number of transects with detections and number of individual detections for each species detected during point counts (annual- and alternating-panel transects combined) in the three large parks in 2007.

	Number of transects with detections				Number of individual detections			
Species	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Common Loon		2		2		2		2
Canada Goose		1		1		1		1
Mallard		1		1		1		1
Osprey	1	1		2	2	1		3
Red-tailed Hawk			1	1			1	1
Ruffed Grouse			2	2			2	2
Sooty Grouse	5	11	13	29	7	26	23	56
Spotted Sandpiper	1	2	3	6	1	3	4	8
Band-tailed Pigeon	2		5	7	2		9	11
Common Nighthawk			1	1			2	2
Black Swift		3		3		6		6
Vaux's Swift	5	8	6	19	6	11	37	54
Calliope Hummingbird	1			1	1			1
Rufous Hummingbird	5	13	9	27	14	37	16	67
Belted Kingfisher		2		2		4		4
Red-breasted Sapsucker		10		10		23		23
Downy Woodpecker		7		7		7		7
Hairy Woodpecker	11	11	8	30	17	18	13	48
Northern Flicker	6	14	8	28	6	24	14	44
Pileated Woodpecker	1	4	6	11	1	5	9	15
Olive-sided Flycatcher	4	17	10	31	6	59	24	89
Western Wood-Pewee		7		7		27		27
Willow Flycatcher		2		2		2		2
Hammond's Flycatcher	6	19	9	34	18	114	63	195
Dusky Flycatcher		3		3		8		8
Pacific-slope Flycatcher	12	7	17	36	62	30	220	312
Cassin's Vireo		12		12		37		37
Warbling Vireo	3	12	6	21	5	74	21	100
Red-eyed Vireo		6		6		13		13
Gray Jay	9	1	11	21	25	2	37	64
Steller's Jay	3	9	8	20	6	15	13	34

Table 6. Number of transects with detections and number of individual detections for each species detected during point counts (annual- and alternating-panel transects combined) in the three large parks in 2007 (continued).

	Number of transects with detections				Number of individual detections			
Species	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Clark's Nutcracker	4	2		6	35	18		53
American Crow			2	2			2	2
Common Raven	5	1	7	13	12	1	8	21
Horned Lark	1			1	5			5
Violet-green Swallow		1		1		1		1
N. Rough-winged Swallow		1	1	2		2	1	3
Barn Swallow		1		1		1		1
Black-capped Chickadee		1		1		3		3
Mountain Chickadee	4	7		11	14	49		63
Chestnut-backed Chickadee	16	18	19	53	120	125	86	331
Red-breasted Nuthatch	15	21	13	49	76	116	39	231
Brown Creeper	14	9	12	35	58	25	33	116
Winter Wren	18	15	23	56	184	110	237	531
American Dipper			1	1			1	1
Golden-crowned Kinglet	17	20	20	57	143	102	138	383
Ruby-crowned Kinglet		1	3	4		12	5	17
Western Bluebird			1	1			2	2
Mountain Bluebird		2		2		2		2
Townsend's Solitaire	5	6	3	14	10	6	3	19
Veery		2		2		3		3
Swainson's Thrush	2	18	6	26	7	236	26	269
Hermit Thrush	16	12	11	39	97	179	69	345
American Robin	13	20	21	54	54	151	84	289
Varied Thrush	17	17	22	56	235	208	148	591
American Pipit	4	3	3	10	55	5	7	67
Cedar Waxwing		5		5		15		15
Orange-crowned Warbler		3		3		3		3
Nashville Warbler		10		10		40		40
Yellow Warbler	1	12	2	15	1	101	6	108
Yellow-rumped Warbler	6	18	3	27	31	122	23	176
Black-throated Gray Warbler	2	9	1	12	7	25	12	44

Table 6. Number of transects with detections and number of individual detections for each species detected during point counts (annual- and alternating-panel transects combined) in the three large parks in 2007 (continued).

	Number of transects with detections				Number of individual detections			
Species	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Townsend's Warbler	11	17	8	36	69	155	42	266
Hermit Warbler	2			2	2			2
American Redstart		1		1		1		1
MacGillivray's Warbler	4	11	4	19	16	58	5	79
Common Yellowthroat		1		1		1		1
Wilson's Warbler	2	2	4	8	2	4	11	17
Western Tanager	3	15	5	23	7	101	10	118
Spotted Towhee		4		4		10		10
Chipping Sparrow	2	10	1	13	2	58	3	63
Savannah Sparrow	1	1		2	1	1		2
Fox Sparrow	5	4		9	22	21		43
Song Sparrow	1	8	4	13	1	21	5	27
White-crowned Sparrow		2	2	4		6	6	12
Dark-eyed Junco	19	21	20	60	237	292	221	750
Black-headed Grosbeak		9	2	11		26	3	29
Lazuli Bunting		5		5		10		10
Brown-headed Cowbird		4		4		10		10
Gray-crowned Rosy-Finch	3	1	1	5	6	1	9	16
Pine Grosbeak	2	1	1	4	2	1	2	5
Purple Finch		2	1	3		3	1	4
Cassin's Finch	2	5		7	4	10		14
Red Crossbill	10	7	19	36	140	59	358	557
Pine Siskin	15	14	14	43	503	346	283	1132
Evening Grosbeak	11	17	4	32	27	85	6	118
All Species Pooled					2,364	3,491	2,403	8,258
Detections per Point (All Species Pooled)					8.79	11.41	8.12	9.48
No. of Species Detected During Point Counts					50	76	52	86

Table 7. Species of potential management concern recorded on 'rare bird' detection forms in each park in 2007, excluding individuals that were also detected during point counts.

	No. of birds detected (excluding individuals also detected during point counts)		
Species	Mount Rainier	North Cascades	Olympic
Golden Eagle			1
Northern Goshawk			2

Table 8. Number of points with detections and number of individual detections for each species detected during point counts at San Juan Island National Historical Park in 2007.

Species	Number of points with detections	Number of individual detections
Common Loon	2	2
Pelagic Cormorant	1	3
Canada Goose	6	22
Mallard	1	1
Osprey	1	1
Bald Eagle	6	8
Red-tailed Hawk	1	1
California Quail	5	5
Glaucous-winged Gull	1	1
Band-tailed Pigeon	2	2
Mourning Dove	3	3
Rufous Hummingbird	6	6
Hairy Woodpecker	2	2
Northern Flicker	4	4
Pileated Woodpecker	6	6
Olive-sided Flycatcher	8	9
Hammond's Flycatcher	1	1
Pacific-slope Flycatcher	24	42
Cassin's Vireo	5	5
Hutton’s Vireo	2	3
Warbling Vireo	15	17
American Crow	25	41
Common Raven	4	7
Northern Rough-winged Swallow	1	1
Barn Swallow	7	11
Chestnut-backed Chickadee	17	26
Red-breasted Nuthatch	16	16
Brown Creeper	2	2
Bewick’s Wren	2	2
House Wren	18	25
Winter Wren	11	17
Golden-crowned Kinglet	5	6
Swainson’s Thrush	28	42
American Robin	45	110
European Starling	2	9
Cedar Waxwing	3	12
Orange-crowned Warbler	24	28
Yellow-rumped Warbler	2	2
Black-throated Gray Warbler	6	10
Townsend’s Warbler	11	16
Common Yellowthroat	7	7

Table 8. Number of points with detections and number of individual detections for each species detected during point counts at San Juan Island National Historical Park in 2007 (continued).

Species	Number of points with detections	Number of individuals detected
Wilson's Warbler	7	8
Western Tanager	10	10
Spotted Towhee	25	39
Chipping Sparrow	1	1
Clay-colored Sparrow	1	1
Vesper Sparrow	1	1
Savannah Sparrow	19	54
Song Sparrow	11	14
White-crowned Sparrow	26	43
Dark-eyed Junco	9	12
Black-headed Grosbeak	5	5
Red-winged Blackbird	11	24
Brewer's Blackbird	1	1
Brown-headed Cowbird	20	30
Purple Finch	10	11
House Finch	3	3
Red Crossbill	1	1
Pine Siskin	10	17
American Goldfinch	32	65

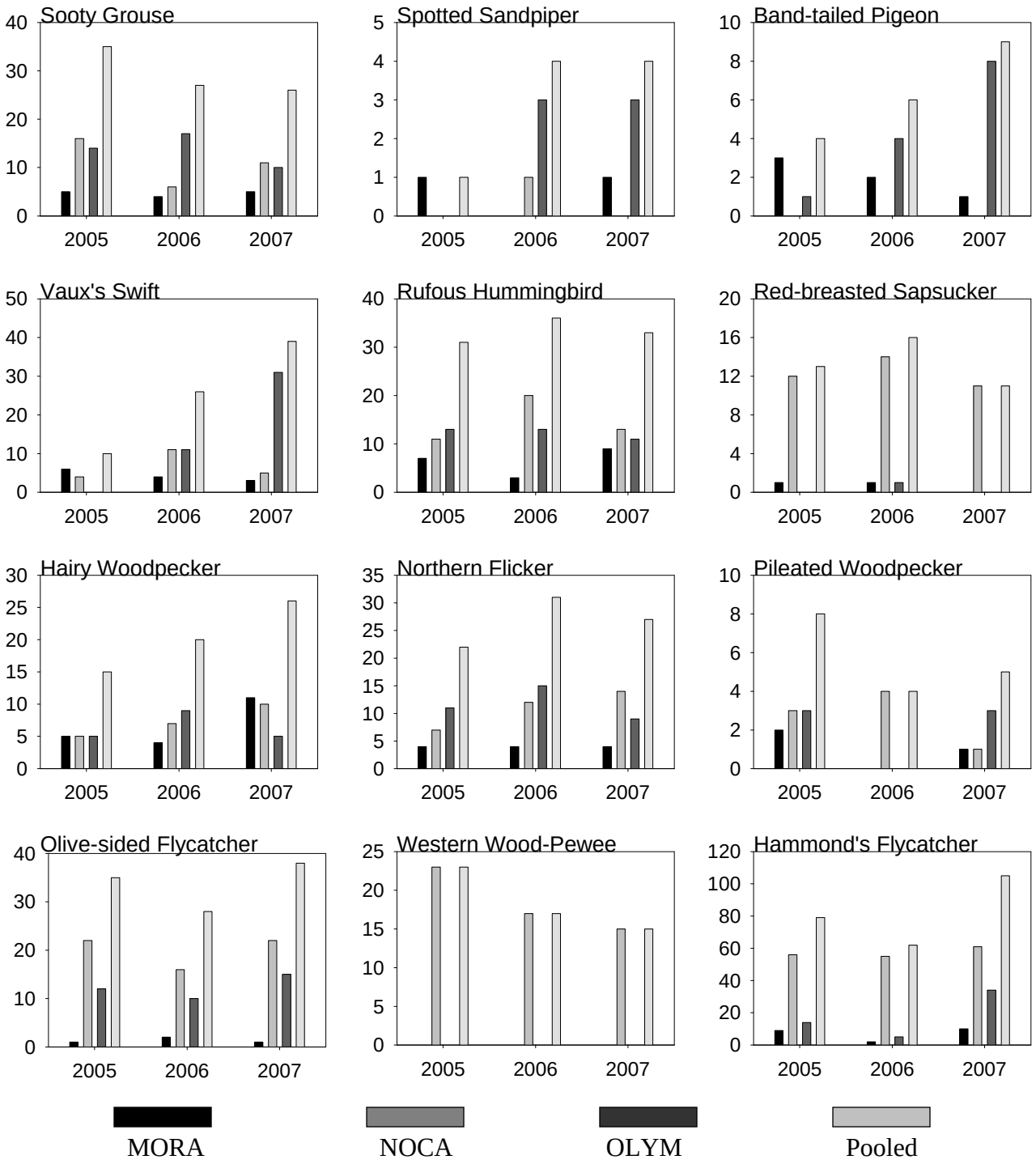

Figure 6. Number of times each species was detected on annual-panel transects at MORA, NOCA, OLYM, and all three parks pooled (always presented in that order) during the 2005, 2006, and 2007 field seasons. The figure includes all species for which we amassed at least nine point count detections on annual-panel transects over the three years indicated. Numbers of detections are unadjusted for differences in survey effort or potential differences in detectability of birds between years. These adjustments will be made in conjunction with trend analyses in our five-year reports.

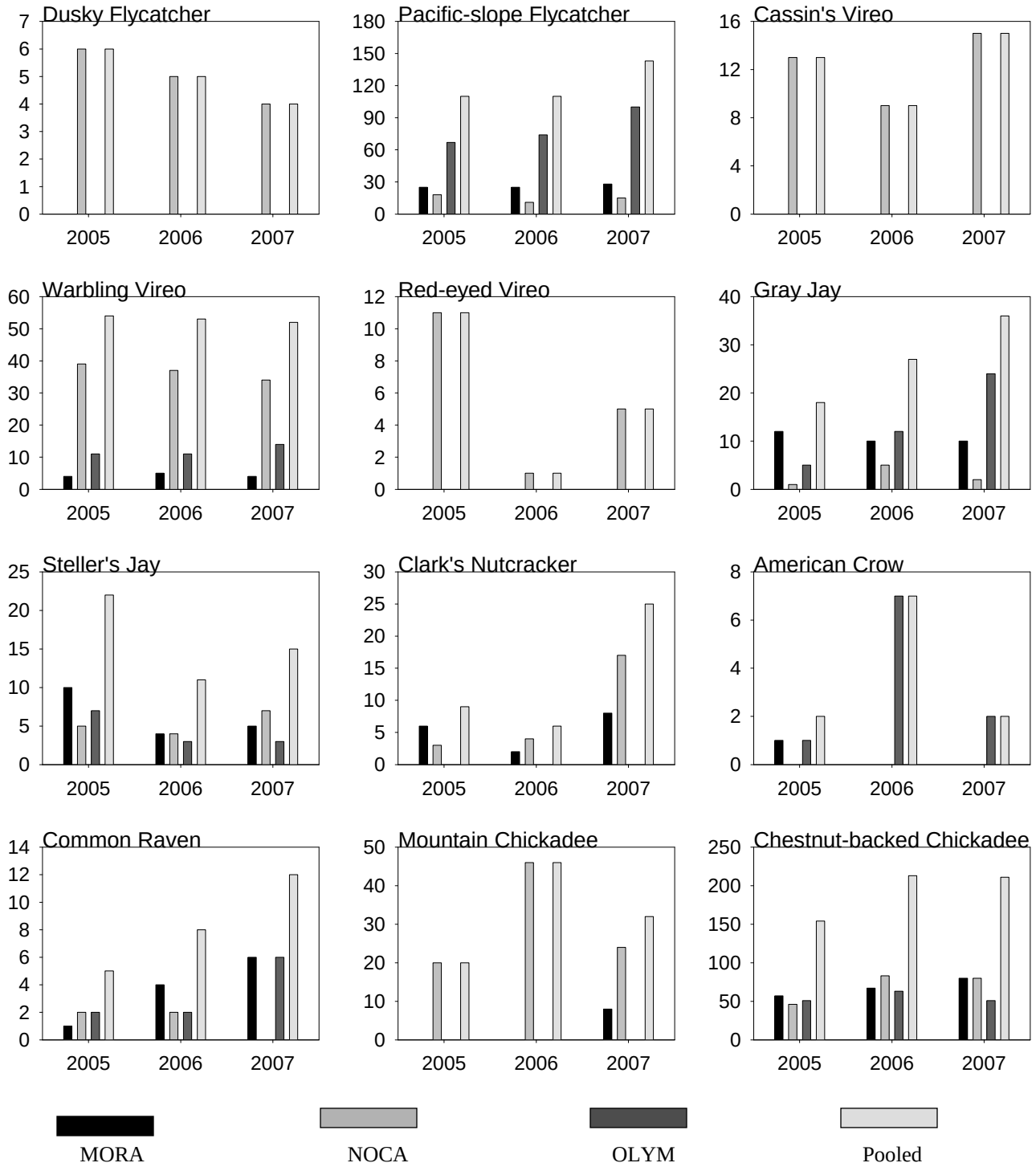

Figure 6. Number of times each species was detected on annual-panel transects at MORA, NOCA, OLYM, and all three parks pooled (always presented in that order) during the 2005, 2006, and 2007 field seasons. The figure includes all species for which we amassed at least nine point count detections on annual-panel transects over the three years indicated. Numbers of detections are unadjusted for differences in survey effort or potential differences in detectability of birds between years. These adjustments will be made in conjunction with trend analyses in our five-year reports (continued).

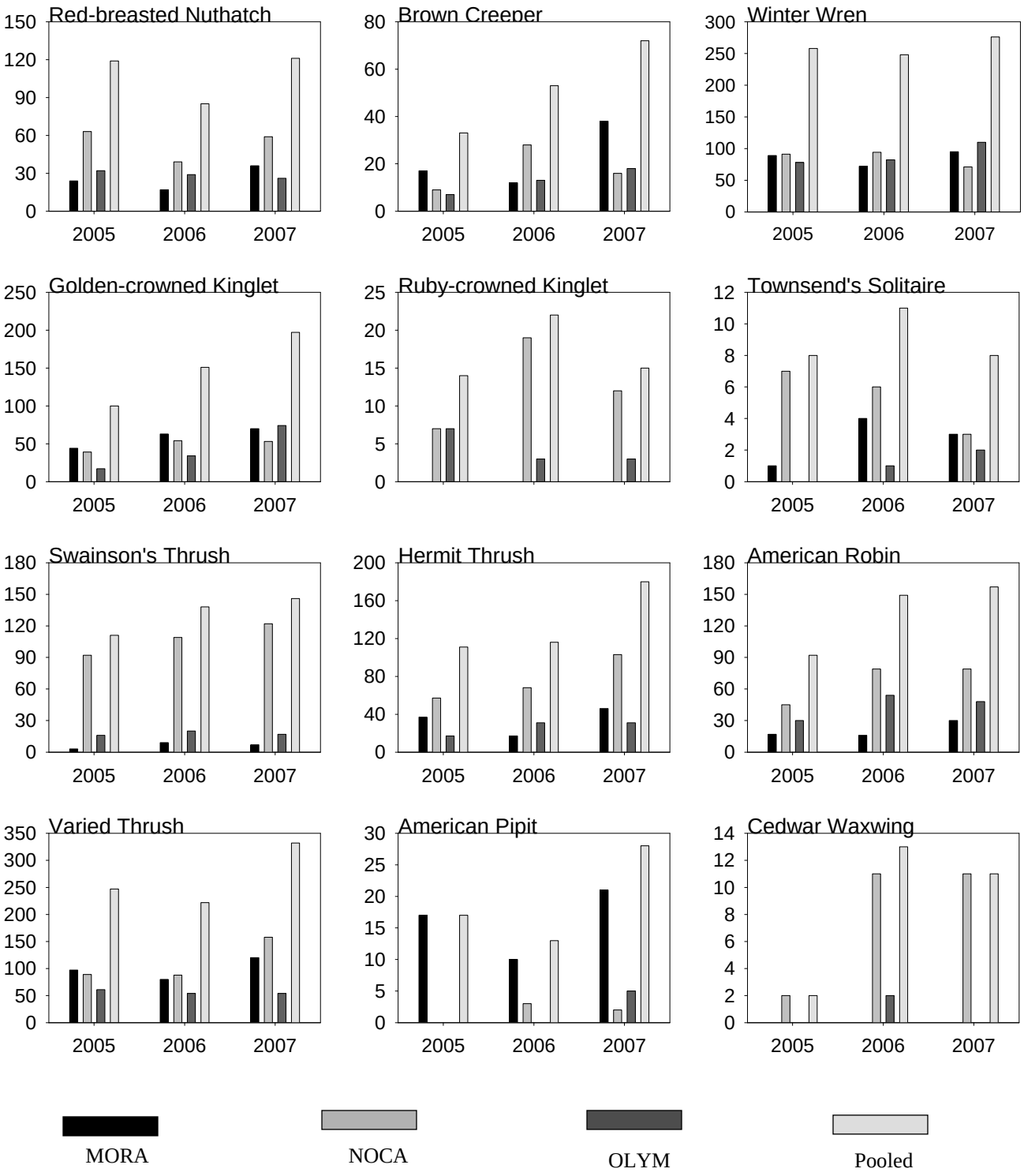

Figure 6. Number of times each species was detected on annual-panel transects at MORA, NOCA, OLYM, and all three parks pooled (always presented in that order) during the 2005, 2006, and 2007 field seasons. The figure includes all species for which we amassed at least nine point count detections on annual-panel transects over the three years indicated. Numbers of detections are unadjusted for differences in survey effort or potential differences in detectability of birds between years. These adjustments will be made in conjunction with trend analyses in our five-year reports (continued).

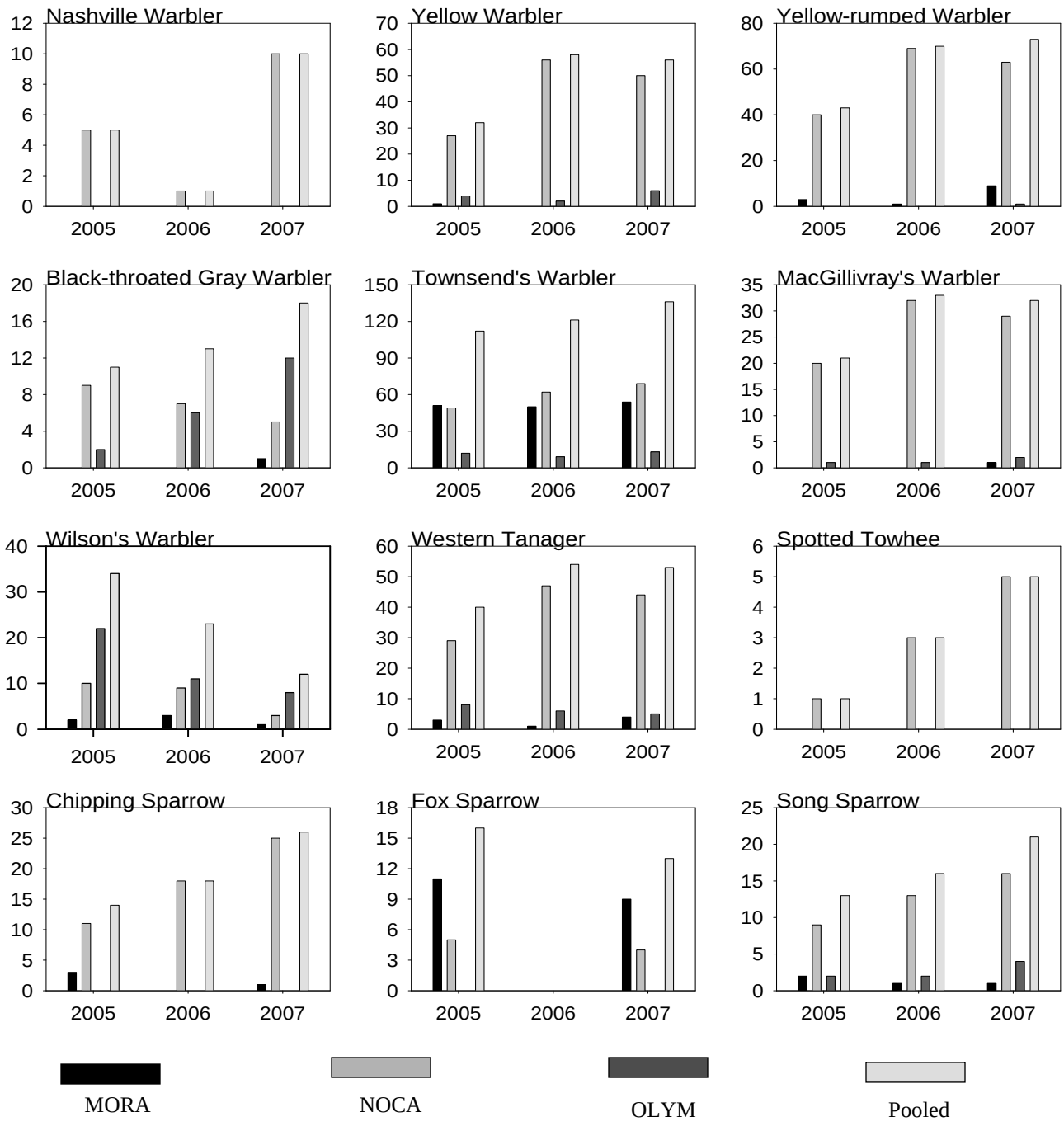

Figure 6. Number of times each species was detected on annual-panel transects at MORA, NOCA, OLYM, and all three parks pooled (always presented in that order) during the 2005, 2006, and 2007 field seasons. The figure includes all species for which we amassed at least nine point count detections on annual-panel transects over the three years indicated. Numbers of detections are unadjusted for differences in survey effort or potential differences in detectability of birds between years. These adjustments will be made in conjunction with trend analyses in our five-year reports (continued).

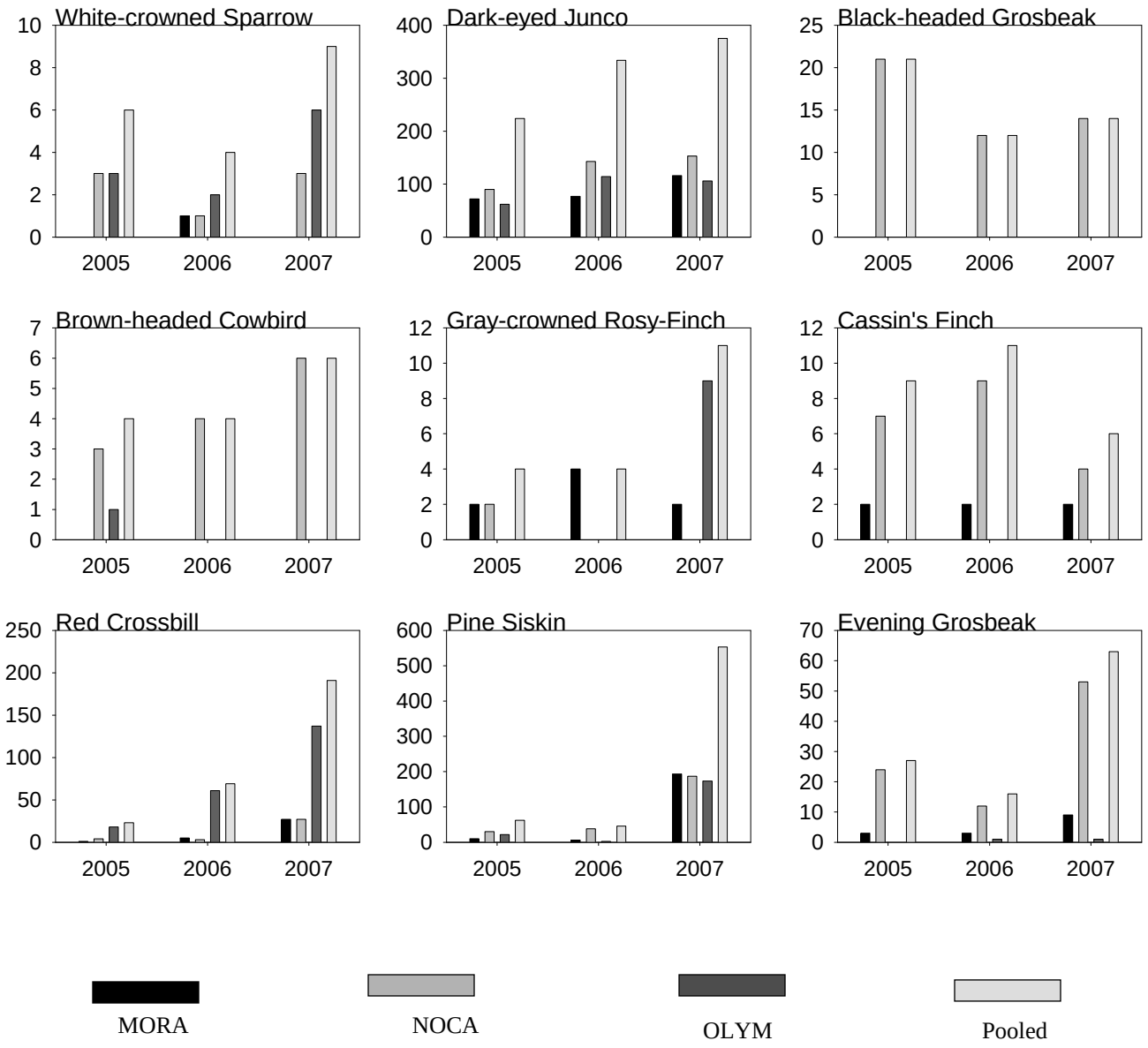

Figure 6. Number of times each species was detected on annual-panel transects at MORA, NOCA, OLYM, and all three parks pooled (always presented in that order) during the 2005, 2006, and 2007 field seasons. The figure includes all species for which we amassed at least nine point count detections on annual-panel transects over the three years indicated. Numbers of detections are unadjusted for differences in survey effort or potential differences in detectability of birds between years. These adjustments will be made in conjunction with trend analyses in our five-year reports (continued).

Discussion

With the experience gained from two pilot field seasons (2005 and 2006), our first year of fully implementing the NCCN landbird monitoring program proceeded very smoothly. Our procedures for season preparation, data collection, data management, data analysis, and reporting (Siegel et al. 2007a) have all been well vetted, and were found this year to require no substantial changes. However the sample design of 68 transects plus sampling in one of the small parks was originally intended for implementation with an 8-person crew. Financial constraints forced us to reduce the crew to six people. Through hard work and determination, our 6-person crew was able to nearly complete all of the intended sampling, and were it not for unusually rainy conditions towards the end of the field season, they likely would have done so. In the end they were able to sample 65 of the 68 intended transects, missing three transects on the alternating panel.

Interpreting our survey results at this juncture is premature, as they have not yet been adjusted for differences in survey effort or potential differences in detectability of birds between years, analyses which will take place in conjunction with trend analyses in our first five-year report. Nevertheless, it is striking that the number of birds detected on annual-panel transects in the large parks rose sharply between 2006 and 2007, even as the number of species detected along those transects remained virtually unchanged. While much of the increase in number of birds detected was due to the drastic increase in Pine Siskins, many species were detected in slightly or moderately greater numbers than in 2005 or 2006. With additional years of data (as well as the more nuanced analysis of detectability that will be conducted on the first five years of data) we will gain the capacity to rigorously assess apparent changes like these, and to generate and test hypotheses about their causes.

At SAJH, it is particularly notable that three of the four most frequently detected species, American Goldfinch, Savannah Sparrow, and White-crowned Sparrow, are relatively rare in, if not altogether absent from, the three large parks. This finding underscores the value of including the small parks in the NCCN landbird monitoring program—by doing so we not only extend our inference to the small parks, we also extend it to additional species that would otherwise not be effectively monitored by the program.

We conclude that the NCCN landbird monitoring program is off to an excellent start, with a comprehensive, field-tested protocol, two years of annual-panel data collected during the protocol development phase (2005 and 2006), and now a year of full project implementation, including data collection on the annual panel as well as the first alternating panel.

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Appendix. Detailed survey history of each transect sampled in the large parks to date.

Park	Panel membership	Elevation class	Transect	No. of points completed 2005	2006	2007
MORA	ann1	Low	4001	10	12	12
MORA	ann1	Low	4005	11	11	11
MORA	ann1	Medium	4002	12	12	12
MORA	ann1	Medium	4004	18	18	18
MORA	ann1	Medium	4009	14	14	15
MORA	ann1	Medium	4012	16	16	14
MORA	ann1	High	4003	12	12	12
MORA	ann1	High	4007	20	20	20
MORA	ann1	High	4011	13	11	14
MORA	ann1	High	4014	10	16	14
MORA	alt2	Low	4006	0	0	10
MORA	alt2	Low	4008	0	0	9
MORA	alt2	Medium	4015	0	0	11
MORA	alt2	Medium	4017	0	0	12
MORA	alt2	Medium	4020	0	0	9
MORA	alt2	Medium	4026	0	0	10
MORA	alt2	High	4016	0	0	19
MORA	alt2	High	4019	0	0	20
MORA	alt2	High	4027	0	0	13
MORA	alt2	High	4075	0	0	14
NOCA	ann1	Low	1013	12	11	14
NOCA	ann1	Low	1017	13	12	9
NOCA	ann1	Low	1020	15	12	13
NOCA	ann1	Low	1023	18	19	19
NOCA	ann1	Medium	1015	12	16	17
NOCA	ann1	Medium	1018	16	21	21
NOCA	ann1	Medium	1022	13	13	11
NOCA	ann1	Medium	1024	9	10	11
NOCA	ann1	High	1014	15	19	19
NOCA	ann1	High	1016	14	15	14
NOCA	ann1	High	1019	12	12	10
NOCA	ann1	High	1021	18	21	22
NOCA	alt2	Low	1001	0	0	11
NOCA	alt2	Low	1005	0	0	13
NOCA	alt2	Low	1006	0	0	10
NOCA	alt2	Low	1010	0	0	12
NOCA	alt2	Medium	1003	0	0	12
NOCA	alt2	Medium	1004	0	0	13
NOCA	alt2	Medium	1009	0	0	0
NOCA	alt2	Medium	1011	0	0	19

Appendix Detailed survey history of each transect sampled in the large parks to date (continued).

Park	Panel membership	Elevation class	Transect	No. of points completed 2005	2006	2007
NOCA	alt2	High	1002	0	0	18
NOCA	alt2	High	1007	0	0	13
NOCA	alt2	High	1008	0	0	0
NOCA	alt2	High	1012	0	0	15
OLYM	ann1	Low	3001	11	10	8
OLYM	ann1	Low	3121	11	15	17
OLYM	ann1	Low	3126	9	10	11
OLYM	ann1	Low	3134	16	16	18
OLYM	ann1	Medium	3122	14	12	14
OLYM	ann1	Medium	3123	10	10	12
OLYM	ann1	Medium	3130	9	9	8
OLYM	ann1	Medium	3131[a]	10	0	0
OLYM	ann1	Medium	3200[b]	0	0	22
OLYM	ann1	High	3124	9	10	10
OLYM	ann1	High	3125	9	11	13
OLYM	ann1	High	3127	7	9	13
OLYM	ann1	High	3128	10	11	11
OLYM	alt2	Low	3138	0	0	10
OLYM	alt2	Low	3142	0	0	14
OLYM	alt2	Low	3144	0	0	13
OLYM	alt2	Low	3145	0	0	13
OLYM	alt2	Medium	3133	0	0	8
OLYM	alt2	Medium	3135	0	0	11
OLYM	alt2	Medium	3137	0	0	10
OLYM	alt2	Medium	3141	0	0	14
OLYM	alt2	High	3132	0	0	19
OLYM	alt2	High	3136	0	0	11
OLYM	alt2	High	3139	0	0	16
OLYM	alt2	High	3140	0	0	0

[a]Transect 3131 was discarded after the 2006 field crew was unable to reach it because of later-lingering snowpack than had been present in 2005.

[b]Transect 3200 was added to the annual panel in 2007 to replace Transect 3131.

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NPS D-114, March 2008

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