



North Coast and Cascades Network Landbird Monitoring

Report for the 2014 Field Season

Natural Resource Report NPS/NCCN/NRR—2015/1048



**ON THIS PAGE**

Interns Tamara Payton and Maria Goller at North Cascades National Park Complex
Photograph by: Mandy Holmgren (The Institute for Bird Populations)

ON THE COVER

American Dipper (*Cinclus mexicanus*)
Photograph by: Tamara Payton (The Institute for Bird Populations)

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Report for the 2014 Field Season

Natural Resource Report NPS/NCCN/NRR—2015/1048

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Executive Summary

In 2014 the North Coast and Cascades Network (NCCN) continued to implement the Network's landbird monitoring protocol, in partnership with The Institute for Bird Populations. The protocol was partially implemented (with data collected from the annual panel only) as part of protocol development (2005–2006), and has subsequently been implemented fully (including data collection on the annual panel as well as all of the five alternating panels) for the past eight years (2007–2014). In 2014 we conducted 1,114 point counts at point count survey stations located along 68 transects in the large wilderness parks of the NCCN, including Mount Rainier National Park (MORA), North Cascades National Park Complex (NOCA), and Olympic National Park (OLYM).

We detected 138 bird species in the three large parks, 92 of which were detected during one or more point counts. For 57 species (all species detected at least 40 times on annual-panel transects between 2005 and 2014), we present the total number of detections on annual-panel transects in each park during the 2005–2014 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 our periodic trend analyses (e.g., Saracco et al. 2014).

At Lewis and Clark National Historical Park (LEWI), we conducted 74 point counts, including 37 at Cape Disappointment, 29 at Fort Clatsop, five at Sunset Beach, and three at the recently acquired Yeon unit. Our field crew detected 85 bird species while in the park, 70 of which were detected during point counts. We present the number of detections, and the number of points with detections, for each species detected during point counts at LEWI.

The 2014 season yielded the highest number of bird detections on annual-panel transects since the start of the monitoring project, about 200 more than the previous high count in 2012. However, in 2012 the high number of detections was largely due to a spike in red crossbill and pine siskin detections, both species being at an all-time high since the start of the monitoring project. In contrast, red crossbill detections remained very low in 2014 after the substantial decrease in 2013 (105 detections on annual-panel transects in 2014 compared to 503 detections in 2012). Pine siskin detections were also much lower in 2014 than in 2012, but increased relative to 2013 levels (Holmgren et al. 2014). In general, finch detections were down in 2014 compared to other families, many of which increased during this time period.

Many species were detected in slightly or moderately greater numbers in 2014 than in previous years. While many of these upticks in numbers of birds counted may reflect real population increases in 2014, it should also be noted that we conducted more point counts across the large parks than in any previous year, which would affect the number of birds we detected. The Landbird Monitoring Project's periodic trend analyses will explicitly account for annual variation in survey effort.

Acknowledgments

We thank the 2014 crew members for their hard work and dedication to the project: R. Gaudefroy-Demombynes, M. Goller, T. Payton, R. Roush, D. Rousseau, and T. Setubal. We thank K. Jenkins (FRESH Olympic Field Station) and the entire NCCN Landbird Monitoring Group for their contributions toward developing the NCCN Landbird monitoring protocol. We thank R. Christophersen, M. Reid, and C. Clatterbuck for providing program oversight at the respective parks; S. Gremel and B. Boekelheide for assistance during training. We thank L. Myers for instructing the crew in backcountry safety; E. McKay and W. Allen for leading the crew in ice axe and snow travel training; K. Beirne for GIS training and support and for providing maps for this report; J. Boetsch for extensive help with data management; L. Grace for help with formatting this report to National Park Service standards; M. Huff, NCCN Inventory and Monitoring Program Manager, for his support of the project; J. Ransom, S. Gremel, and J. Boetsch for reviews of the draft report; and the ESRI Nonprofit Organization Program for software support provided to The Institute for Bird Populations. This is Contribution No. 502 of The Institute for Bird Populations.

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 have been declining (Andelman and Stock 1994a, 1994b, Sharp 1996, Saab and Rich 1997, Altman 1999, 2000, Sauer et al. 2008, North American Bird Conservation Initiative, U.S. Committee 2009).

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 (Bolsinger and Waddell 1993). 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 1999).

Pacific Northwest landbirds breeding in habitats other than conifer forests face substantial threats as well. Species that breed in the subalpine and alpine zones may be 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 National Park Service to take responsibility for monitoring birds in high-elevation areas throughout the Pacific Northwest (Altman and Bart 2001). Pacific Northwest migratory landbirds also face additional threats on their wintering grounds and along migration routes, including loss or alteration of stopover habitat.

The three large parks in the North Coast and Cascades Network (NCCN)—Olympic National Park (OLYM), North Cascades National Park Service Complex (NOCA), and Mount Rainier National Park (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. NOCA also contains substantial tracts of more arid conifer forest typical of the east side of the Cascades, which hosts a somewhat distinct avifauna (Altman 2000) compared to other areas in the three large parks. San Juan Island National Historical Park (SAJH), in the rain shadow of the Olympic Mountains, contains small but important examples of coastal prairie and Garry Oak (*Quercus garryana*) 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. 2009e). Lewis and Clark National Historical Park (LEWI) contains 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 at all five parks (Siegel et al. 2009e, Siegel et al. 2009a, Siegel et al. 2009d, Wilkerson et al. 2009a, Siegel et al. 2009c), have provided baseline information for assessing changes in bird abundance and distribution over time due to climate change or other factors, as well as reference information for assessing the effects of more intensive land management practices elsewhere in the region (Siegel et al. 2012).

National parks in the NCCN and elsewhere fulfill vital roles as both refuges for bird species dependent on late-successional forest conditions (American Bird Conservation Initiative, U.S. Committee 2011), and as reference sites for assessing the effects of climate change, land use, and land cover changes on bird populations throughout the larger Pacific Northwest region (Silsbee and Peterson 1991, Siegel et al. 2012). Monitoring population trends at reference sites in national parks is especially important because 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 influence 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 Project 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 Project 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, conducted in conjunction with periodic detailed trend analyses. For the first trend analysis report, which summarizes data from 2005–2012, see Saracco et al. 2014. The next trend report is scheduled to be conducted following the 2016 field season.

Study Area

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

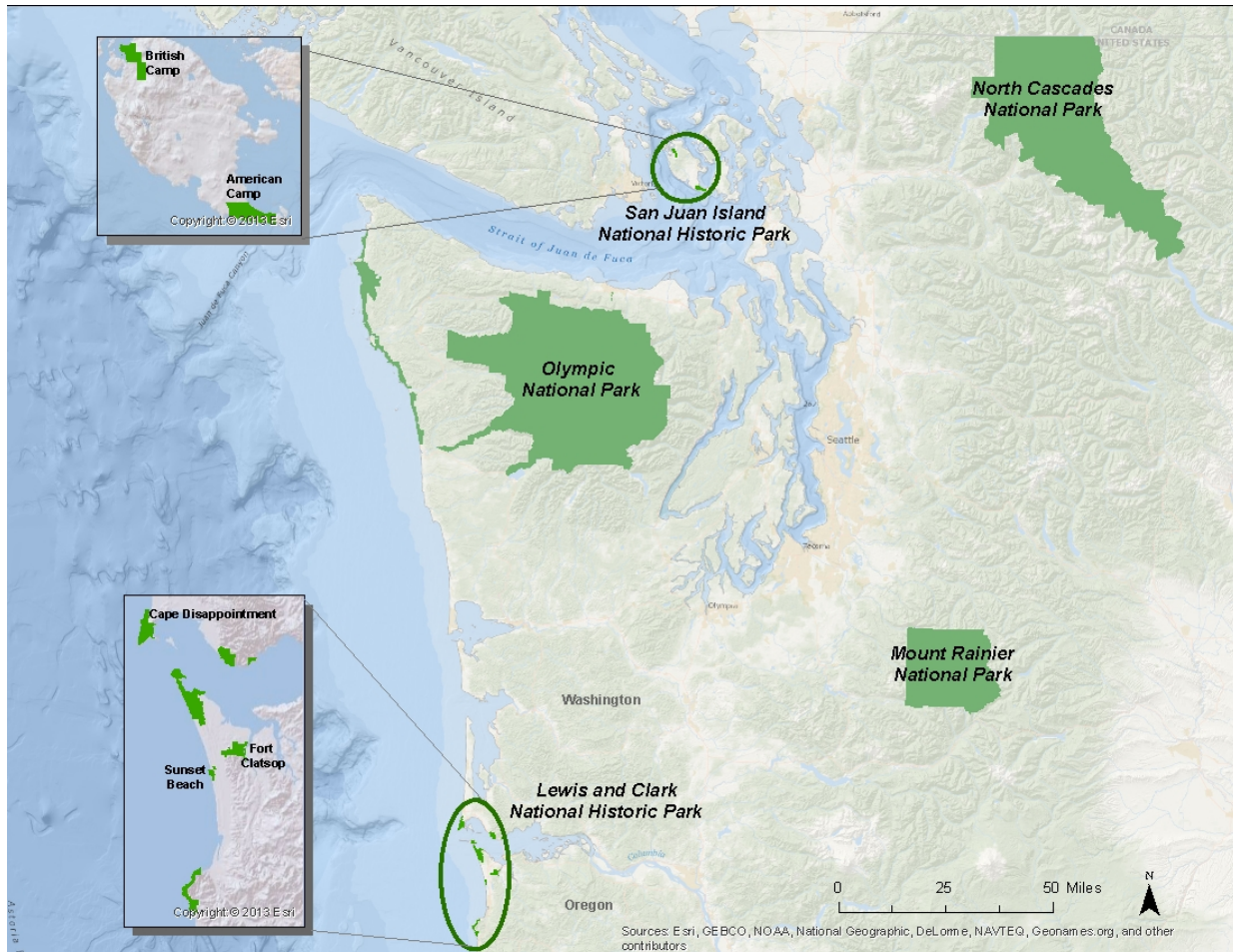


Figure 1. National Park Service units participating in the North Coast and Cascades Network landbird monitoring project.

Methods

Sample Design

A detailed description of the sample design for the NCCN Landbird Monitoring Project is provided in the NCCN landbird monitoring protocol (Siegel et al. 2007). 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 points 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, and the transects consist of a line of approximately 10–15 points, extending perpendicularly (or as close to perpendicularly as topographic and physiographic features allow) in both directions away from the trail.

In 2014 we implemented the full study design in the three large parks for the eighth consecutive year, including surveys of the annual panel ('Ann1') as well as the third alternating panel ('Alt4') (Figures 2–4). During the first two years of protocol development (2005–2006) we surveyed only the annual panel (Siegel et al. 2006, 2009b). We provide results from each of the first seven years of full implementation in Siegel et al. (2008), Wilkerson et al. (2009b, 2010), and Holmgren et al. (2011, 2012, 2013, and 2014).

At the two smaller parks (LEWI and SAJH), the sample design consists of a systematic grid of point count survey stations, with the two parks scheduled to be surveyed in alternating years. In the summer of 2014 we surveyed the grid at LEWI (Figure 5).

Crew Training and Certification

Mandy Holmgren, a Staff Biologist with The Institute for Bird Populations (IBP), served as the 2014 Field Lead. Mandy began training six field technicians on April 30, with assistance from IBP Staff Biologist Bob Wilkerson and NPS Biologist Scott Gremel. Training followed guidelines described in the NCCN landbird monitoring protocol (Siegel et al. 2007). By the end of the official training session on May 19, two of the six field technicians had passed the rigorous point count certification exam, and were ready to begin collecting data. Four technicians were certified about three days later. All individuals who collected data during the 2014 field season (Table 1) were employees or field biologist interns of The Institute for Bird Populations.

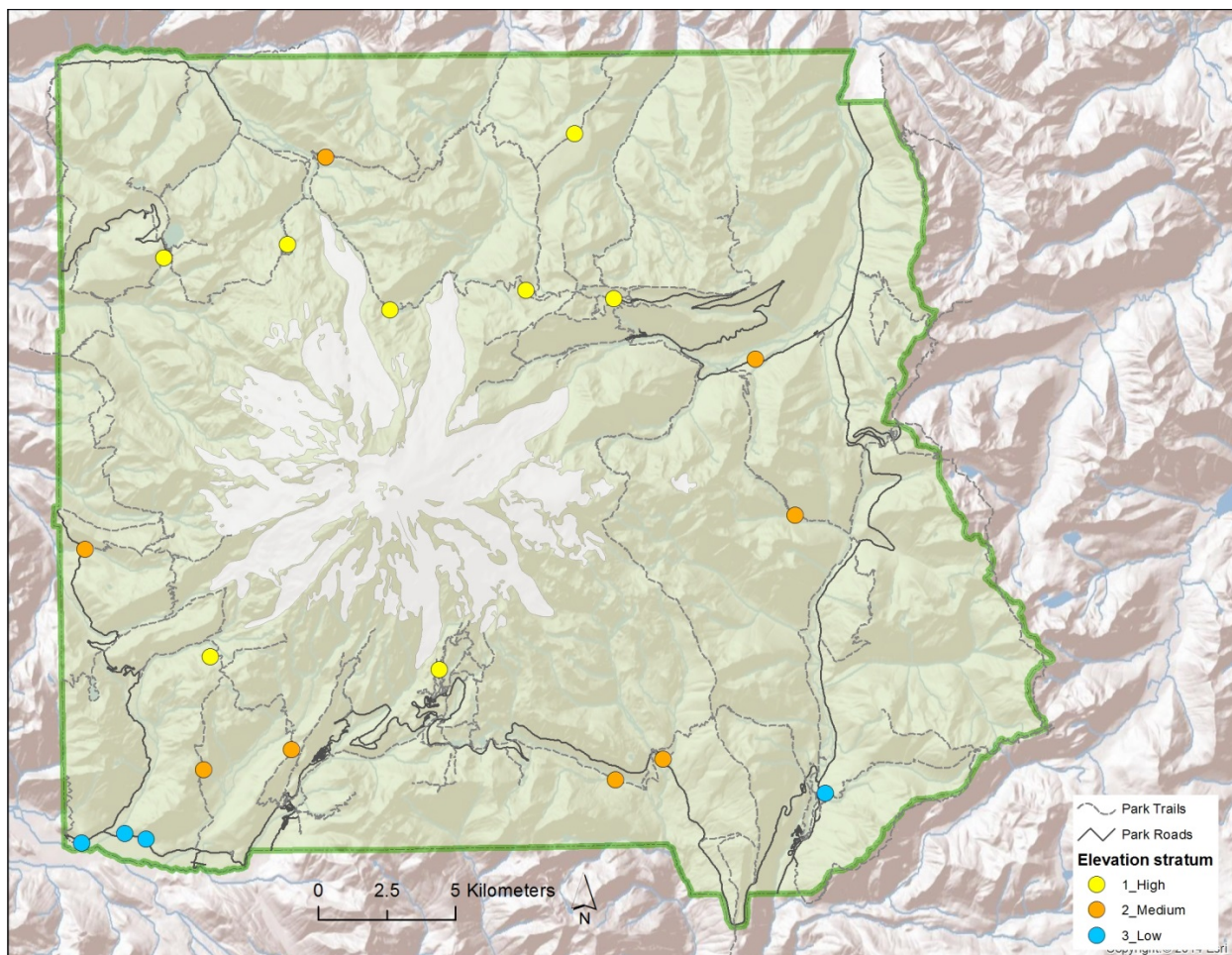


Figure 2. Approximate locations of transects conducted at Mount Rainier National Park in 2014.

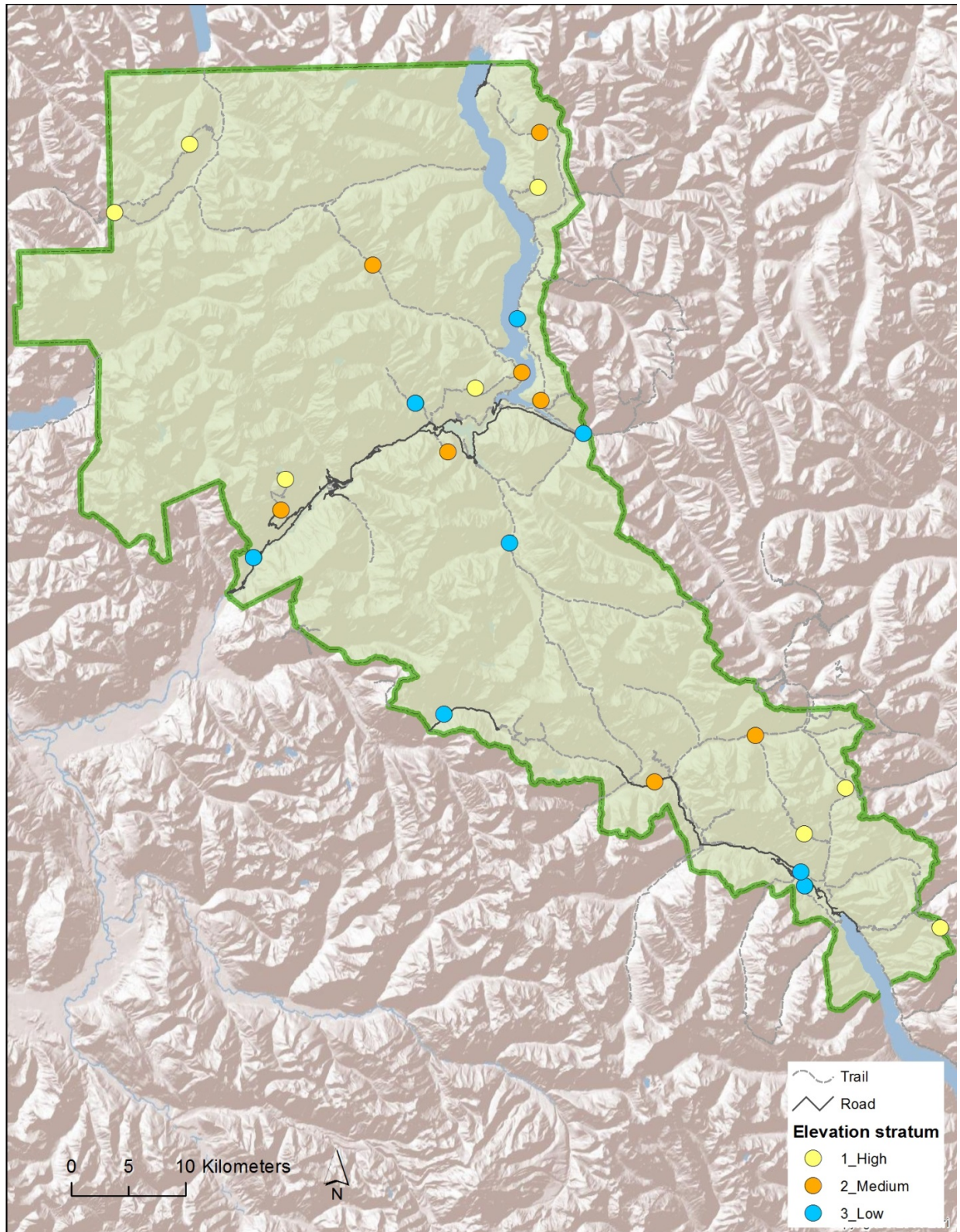


Figure 3. Approximate locations of transects conducted at North Cascades National Park Complex in 2014.

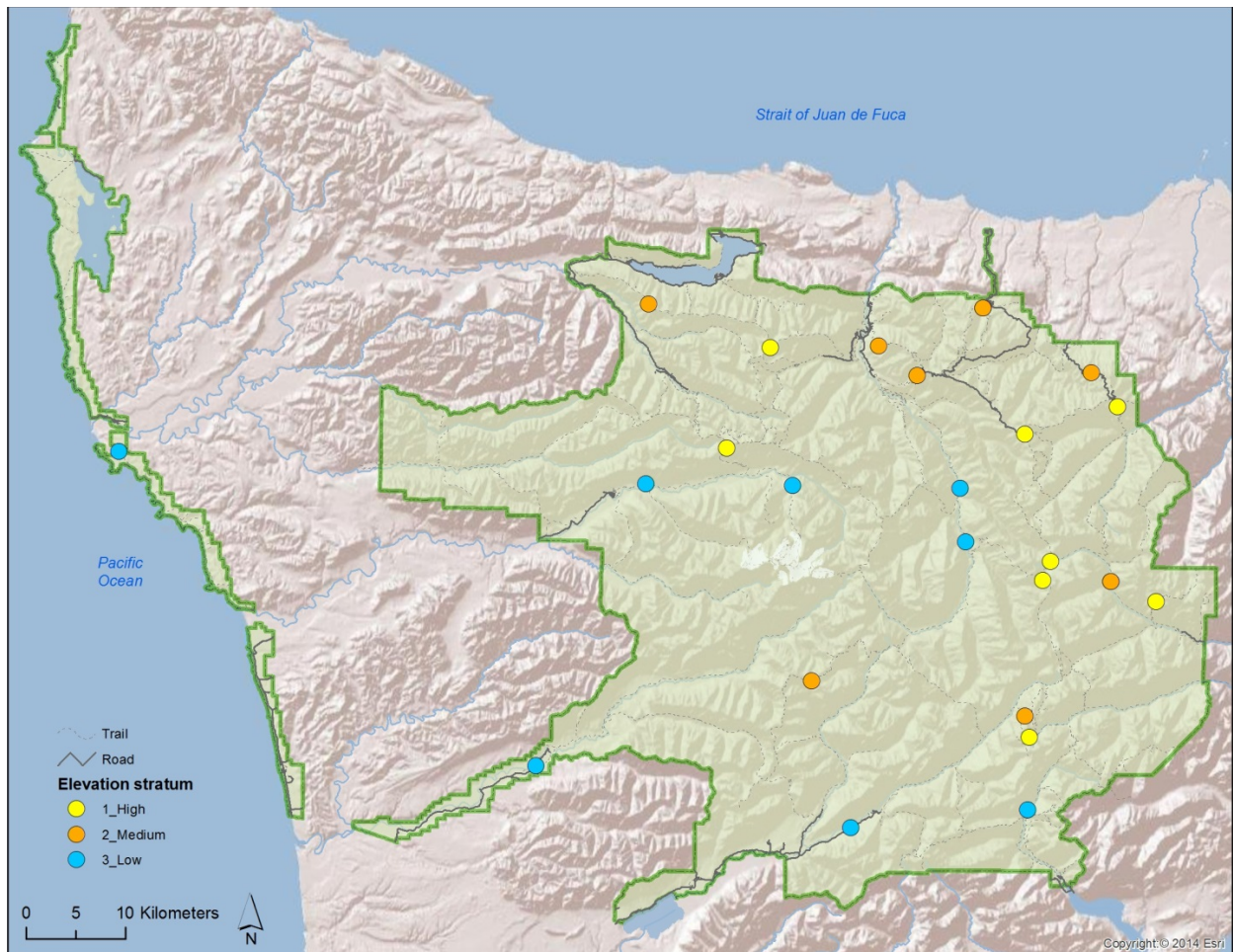


Figure 4. Approximate locations of transects conducted at Olympic National Park in 2014.

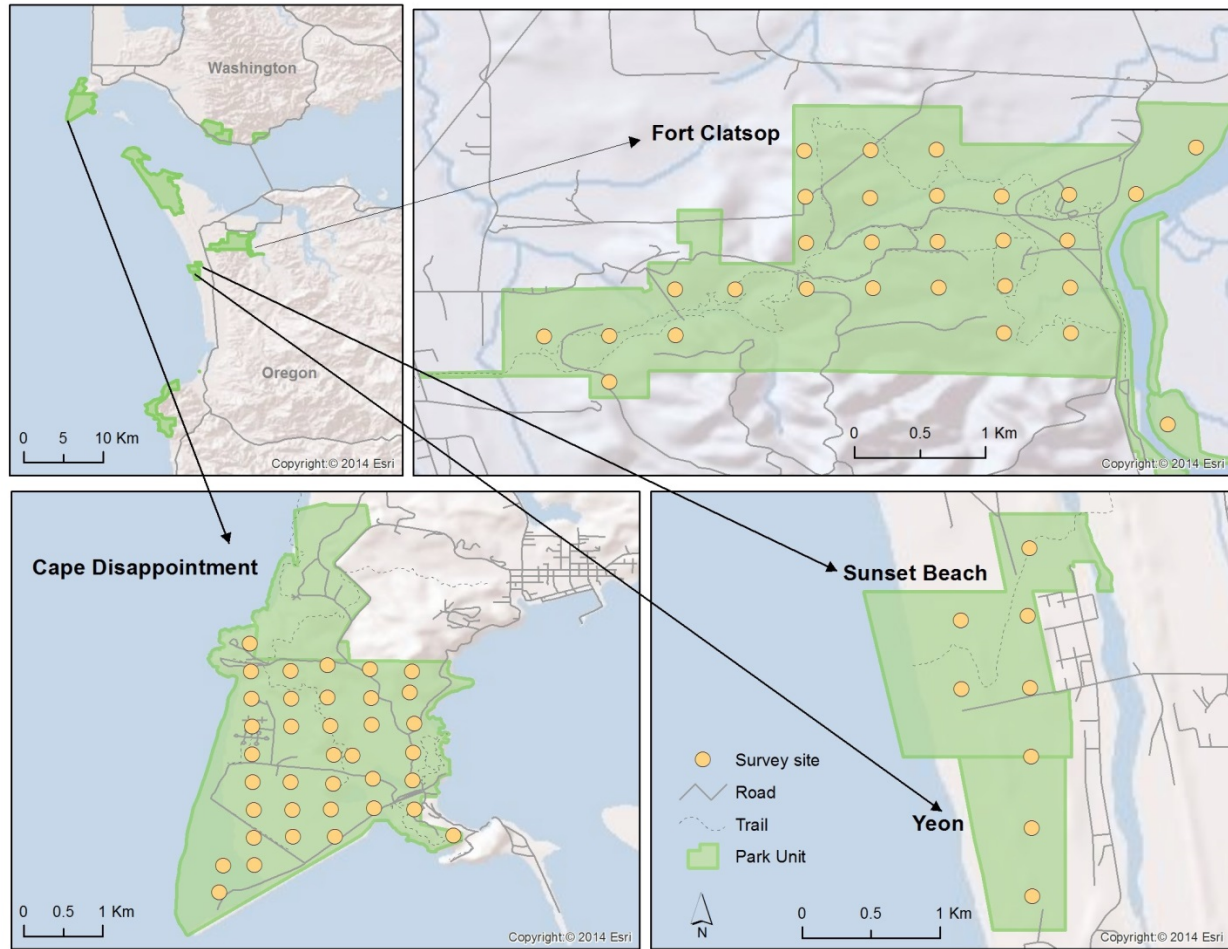


Figure 5. Locations of point count stations surveyed at Lewis and Clark National Historical Park in 2014; adjacent point count stations are 350 m apart.

Table 1. Observers who conducted point counts in the North Coast and Cascades Network in 2014.

Observer	Role
Roland Gaudefroy-Demombynes	Technician
Maria Goller	Technician
Mandy Holmgren	Field Lead
Tamara Payton	Technician
Richard Roush	Technician
Daniel Rousseau	Technician
Tomás Setubal	Technician

Data Collection

All point count data were collected between May 24 and May 26 at LEWI, between June 1 and July 21 at MORA, between June 1 and July 31 at NOCA, and between May 22 and July 29 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. 2007). Crew members generally worked in pairs to survey a single transect each morning. All of the transects visited in 2014 had already been established in previous years. Crew members were provided maps and coordinates of all point count station locations on the transects, as well as narrative descriptions of point count stations and the travel routes between successive stations. These were used to locate the same point count stations that were previously established and surveyed. Beginning within 10 minutes of official sunrise, each observer conducted a point count, and then continued along the transect route, conducting another point count every 200 m until 3.5 hours after official local sunrise.

At each point count station 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 seven-minute point count. The point count was broken into three time intervals (0–3:00, 3:01–5:00, and 5:01–7:00). Observers noted each time interval in which they detected each individual bird. Birds observed in the first three minutes allow comparison with Breeding Bird Survey data (Sauer et al. 2008), 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. Prior to 2011 we used point count with durations of only five minutes broken into two time intervals (0–3:00, 3:01–5:00), but in 2011 we added the third time interval to make the data more useful for possible future analyses conducted in an occupancy modeling framework.

After completing their last point count each morning, observers retraced their steps back to the starting point. Along the way, they conducted a brief habitat assessment at each of the survey points. The brief habitat assessment consisted of characterizing 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. Where necessary, observers amended narrative descriptions of the point locations.

Whenever crew members detected species thought to be rare in the park or difficult to detect during diurnal point count surveys, 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. Additionally, crew members recorded a complete list of all incidental bird species detected in the park throughout the field season, including common species that might not have been recorded during point counts or were not rare enough to warrant a rare bird report.

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 Management

Our protocol requires crews working at each large park to enter their own data into the NCCN Landbird Monitoring Project's Microsoft Access database throughout the field season. The crew worked three additional days at the end of the field season to work on data entry and verification. The Field Lead finished verifying the remaining data after the field season. Data entry procedures followed the guidelines in Siegel et al. (2007).

The database includes built-in quality assurance components such as pick-lists and validation rules to test for missing data or illogical combinations. After entering the data, the crew members verified the database records for complete and accurate transcription by retrieving and visually comparing the data associated with each sampling event against the original forms.

Once all data for the season were entered and verified, the Field Lead conducted a rigorous quality review on the data set by running a set of pre-built validation queries to check for completeness, missing or out-of-range values, logical consistency, and structural integrity. Errors identified during this review were corrected where possible, and annotations related to specific issues raised by each query were stored within the project database as needed and appropriate. The data set was then certified as complete and ready for use. Output for this report was generated using standard summary queries in the project database.

At the end of the field season, field forms were scanned and stored with digital records. Photographic images were processed to remove poor quality or duplicative files, given names according to convention, and organized according to project requirements. GPS data associated with sampling events were downloaded and processed, and the resulting coordinate data were then uploaded into the project database.

Data Analysis

We summarized and tabulated data according to the template in Siegel et al. (2007). We present survey results without making any adjustments for detectability, which may vary substantially by species, habitat, observer, or other factors. In conjunction with periodic trend analyses for this monitoring project, factors affecting detectability of birds during point counts are assessed quantitatively, allowing for annual results to be adjusted to account for variable detectability (Buckland et al. 2001, Nichols et al. 2009). Results in this report that have not yet been adjusted to account for detectability should be viewed as provisional only.

Results

In 2014 we surveyed all of the intended transects in the large parks, including 34 annual-panel, and 34 third-alternating-panel transects (Table 2), totaling 68 transects surveyed (Table 3). Appendix 1 provides a detailed multi-year survey history of all transects sampled in the large parks to date. We conducted 330 individual point counts at MORA, 429 point counts at NOCA and 355 point counts at OLYM (Table 2). We also conducted 74 point counts at LEWI, including 37 at Cape Disappointment, 29 at Fort Clatsop, five at Sunset Beach, and three at the recently acquired Yeon unit. During the 1,114 point counts in the three large parks, we counted 10,479 individual birds. Across the three large parks, we documented the presence of 138 species (Table 4), 92 of which were detected during point counts; the remaining 46 species were recorded only as incidental detections or on “Rare Bird Report Forms”. At LEWI our field crew detected 85 species while in the park, 70 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 48 bird species during point counts at MORA, 73 species during point counts at NOCA, and 52 species during point counts at OLYM (Table 5). Pooling detections on annual-panel transects across all species, we amassed 1,374 individual bird detections (average of 8.18 detections/point) at MORA, 2,367 detections (average of 10.86 detections/point) at NOCA, and 1,709 detections (average of 9.19 detections per point) at OLYM (Table 5). The five most frequently detected species on the annual-panel transects in 2014 were: pine siskin (691 detections), varied thrush (453 detections), dark-eyed junco (406 detections), Pacific wren (345 detections), and chestnut-backed chickadee (309 detections).

Pooling data across the annual-panel transects as well as the transects in the third alternating panel (“Alt3”), 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. Using data pooled across all transects, we detected 53 bird species during point counts at MORA, 78 species during point counts at NOCA, and 58 species during point counts at OLYM (Table 6). Considering data from all 68 surveyed transects, the five most frequently detected species were: pine siskin (1,221 detections), dark-eyed junco (877 detections), varied thrush (770 detections), Pacific wren (648 detections), and Townsend’s warbler (574 detections).

Marbled murrelet and spotted owl, the two bird species occurring in these parks that are listed under the Endangered Species Act, were detected both during point counts and at times other than point counts this year and were documented on “Rare Bird Report Forms.” Detections of these species at times other than point counts are summarized in Table 7.

For 57 species (all species for which we amassed at least 40 point count detections over the period between 2005 and 2014), we present the total number of detections of each species on each park’s annual panel transects during the 2005–2014 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 a future multi-year report.

At LEWI our 74 point counts yielded 1,377 detections of 70 species (Table 8), a detection rate of 18.61 birds per point. The most frequently detected species was Swainson's thrush (157 detections), followed by Pacific wren (88 detections), American robin (82 detections), Pacific-slope flycatcher (79 detections), and Wilson's warbler (71 detections).

Table 2. North Coast and Cascades Network landbird monitoring transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks that were surveyed in 2014.

Park	Panel	Elevation	Transect	No. of points surveyed
MORA	Ann1	Low	4001	16
MORA	Ann1	Low	4005	14
MORA	Ann1	Medium	4002	15
MORA	Ann1	Medium	4004	18
MORA	Ann1	Medium	4009	15
MORA	Ann1	Medium	4012	20
MORA	Ann1	High	4003	15
MORA	Ann1	High	4007	20
MORA	Ann1	High	4011	17
MORA	Ann1	High	4014	18
MORA	Alt4	Low	4021	13
MORA	Alt4	Low	4022	17
MORA	Alt4	Medium	4057	14
MORA	Alt4	Medium	4060	24
MORA	Alt4	Medium	4061	17
MORA	Alt4	Medium	4065	15
MORA	Alt4	High	4035	14
MORA	Alt4	High	4036	16
MORA	Alt4	High	4039	13
MORA	Alt4	High	4043	19
NOCA	Ann1	Low	1013	15
NOCA	Ann1	Low	1017	15
NOCA	Ann1	Low	1020	18
NOCA	Ann1	Low	1023	21
NOCA	Ann1	Medium	1015	19
NOCA	Ann1	Medium	1018	25
NOCA	Ann1	Medium	1022	17
NOCA	Ann1	Medium	1024	13
NOCA	Ann1	High	1014	21
NOCA	Ann1	High	1016	17
NOCA	Ann1	High	1019	13
NOCA	Ann1	High	1021	24
NOCA	Alt4	Low	1036	25
NOCA	Alt4	Low	1054	16
NOCA	Alt4	Low	1061	13
NOCA	Alt4	Low	1122	22
NOCA	Alt4	Medium	1033	23

Table 2. North Coast and Cascades Network landbird monitoring transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks that were surveyed in 2014 (continued).

Park	Panel	Elevation	Transect	No. of points surveyed
NOCA	Alt4	Medium	1035	18
NOCA	Alt4	Medium	1038	18
NOCA	Alt4	Medium	1041	17
NOCA	Alt4	High	1048	13
NOCA	Alt4	High	1049	17
NOCA	Alt4	High	1050	16
NOCA	Alt4	High	1052	13
OLYM	Ann1	Low	3001	13
OLYM	Ann1	Low	3121	17
OLYM	Ann1	Low	3126	14
OLYM	Ann1	Low	3134	19
OLYM	Ann1	Medium	3122	18
OLYM	Ann1	Medium	3123	16
OLYM	Ann1	Medium	3130	10
OLYM	Ann1	Medium	3200	22
OLYM	Ann1	High	3124	13
OLYM	Ann1	High	3125	15
OLYM	Ann1	High	3127	15
OLYM	Ann1	High	3128	14
OLYM	Alt4	Low	3155	12
OLYM	Alt4	Low	3159	12
OLYM	Alt4	Low	3161	12
OLYM	Alt4	Low	3163	15
OLYM	Alt4	Medium	3160	12
OLYM	Alt4	Medium	3167	14
OLYM	Alt4	Medium	3168	15
OLYM	Alt4	Medium	3174	15
OLYM	Alt4	High	3158	18
OLYM	Alt4	High	3164	17
OLYM	Alt4	High	3171	15
OLYM	Alt4	High	3173	12

Table 3. Summary history of North Coast and Cascades Network landbird monitoring transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks completed through 2014.

Park	Elevation Stratum	Number of transects completed									
		2005 ^a	2006 ^a	2007 ^b	2008 ^c	2009 ^d	2010 ^e	2011 ^f	2012 ^b	2013 ^c	2014 ^d
MORA	Low	2	2	4	4	4	4	4	4	4	4
MORA	Medium	4	4	8	8	8	8	6	8	8	8
MORA	High	4	4	8	8	8	7	3	8	8	8
ALL	All	10	10	20	20	20	19	13	20	20	20
NOCA	Low	4	4	8	8	7	8	8	8	8	8
NOCA	Medium	4	4	7	7	8	8	8	8	7	8
NOCA	High	4	4	7	5	8	6	5	8	8	8
ALL	All	12	12	22	20	23	22	21	24	24	24
OLYM	Low	4	4	8	8	8	8	8	8	8	8
OLYM	Medium	4	3	8	7	8	8	7	8	8	8
OLYM	High	4	4	7	8	8	8	8	8	8	8
ALL	All	12	11	23	23	24	24	23	24	24	24
ALL	Low	10	10	20	20	20	20	20	20	20	20
ALL	Medium	12	11	23	22	24	24	21	24	24	24
ALL	High	12	12	22	21	24	21	16	24	24	24
ALL	All	34	33	65	63	68	65	57	68	68	68

^aOnly the annual panel transects were surveyed in 2005 and 2006, during the protocol development phase of the project.

^bThe annual panel along with the first alternating panel were surveyed in 2007 and 2012.

^cThe annual panel along with the second alternating panel were surveyed in 2008 and 2013.

^dThe annual panel along with the third alternating panel were surveyed in 2009 and 2014.

^eThe annual panel along with the fourth alternating panel were surveyed in 2010.

^fThe annual panel along with the fifth alternating panel were surveyed in 2011.

Table 4. All species recorded in the three large North Coast and Cascades Network parks during the 2014 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
Greater White-fronted Goose*	<i>Anser albifrons</i>
Canada Goose	<i>Branta canadensis</i>
Wood Duck*	<i>Aix sponsa</i>
American Wigeon*	<i>Anas americana</i>
Mallard*	<i>Anas platyrhynchos</i>
Northern Shoveler*	<i>Anas clypeata</i>
Green-winged Teal*	<i>Anas crecca</i>
Ring-necked Duck*	<i>Aythya collaris</i>
Harlequin Duck*	<i>Histrionicus histrionicus</i>
Surf Scoter*	<i>Melanitta perspicillata</i>
Bufflehead*	<i>Bucephala albeola</i>
Barrow's Goldeneye*	<i>Bucephala islandica</i>
Hooded Merganser*	<i>Lophodytes cucullatus</i>
Common Merganser	<i>Mergus merganser</i>
Red-breasted Merganser*	<i>Mergus serrator</i>
Ruffed Grouse	<i>Bonasa umbellus</i>
White-tailed Ptarmigan*	<i>Lagopus leucura</i>
Sooty Grouse	<i>Dendragapus fuliginosus</i>
Common Loon	<i>Gavia immer</i>
Red-necked Grebe*	<i>Podiceps grisegena</i>
Turkey Vulture*	<i>Cathartes aura</i>
Osprey	<i>Pandion haliaetus</i>
Bald Eagle*	<i>Haliaeetus leucocephalus</i>
Sharp-shinned Hawk*	<i>Accipiter striatus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Northern Goshawk*	<i>Accipiter gentilis</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Golden Eagle*	<i>Aquila chrysaetos</i>
Black Oystercatcher*	<i>Haematopus bachmani</i>
Killdeer*	<i>Charadrius vociferus</i>
Spotted Sandpiper	<i>Actitis macularius</i>
Solitary Sandpiper*	<i>Tringa solitaria</i>
Greater Yellowlegs*	<i>Tringa melanoleuca</i>
Marbled Murrelet	<i>Brachyramphus marmoratus</i>
Heermann's Gull*	<i>Larus heermanni</i>
Ring-billed Gull*	<i>Larus delawarensis</i>
Caspian Tern*	<i>Hydroprogne caspia</i>
Band-tailed Pigeon	<i>Patagioenas fasciata</i>
Eurasian Collared-dove*	<i>Streptopelia decaocto</i>
Western Screech-Owl*	<i>Megascops kennicottii</i>
Great Horned Owl*	<i>Bubo virginianus</i>
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>
Spotted Owl*	<i>Strix occidentalis</i>

Table 4. All species recorded in the three large North Coast and Cascades Network parks during the 2014 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
Barred Owl	<i>Strix varia</i>
Common Nighthawk	<i>Chordeiles minor</i>
Vaux's Swift	<i>Chaetura vauxi</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Calliope Hummingbird	<i>Selasphorus calliope</i>
Belted Kingfisher	<i>Megasceryle alcyon</i>
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Hairy Woodpecker	<i>Picoides villosus</i>
American Three-toed Woodpecker	<i>Picoides dorsalis</i>
Northern Flicker	<i>Colaptes auratus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
American Kestrel*	<i>Falco sparverius</i>
Merlin*	<i>Falco columbarius</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Hammond's Flycatcher	<i>Empidonax hammondii</i>
Dusky Flycatcher	<i>Empidonax oberholseri</i>
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>
Say's Phoebe	<i>Sayornis saya</i>
Cassin's Vireo	<i>Vireo cassinii</i>
Hutton's Vireo	<i>Vireo huttoni</i>
Warbling Vireo	<i>Vireo gilvus</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Gray Jay	<i>Perisoreus canadensis</i>
Steller's Jay	<i>Cyanocitta stelleri</i>
Clark's Nutcracker	<i>Nucifraga columbiana</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
Horned Lark	<i>Eremophila alpestris</i>
Tree Swallow*	<i>Tachycineta bicolor</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Cliff Swallow*	<i>Petrochelidon pyrrhonota</i>
Barn Swallow*	<i>Hirundo rustica</i>
Black-capped Chickadee*	<i>Poecile atricapillus</i>
Mountain Chickadee	<i>Poecile gambeli</i>
Chestnut-backed Chickadee	<i>Poecile rufescens</i>
Bushtit*	<i>Psaltiriparus minimus</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Brown Creeper	<i>Certhia americana</i>

Table 4. All species recorded in the three large North Coast and Cascades Network parks during the 2014 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
Canyon Wren*	<i>Catherpes mexicanus</i>
House Wren*	<i>Troglodytes aedon</i>
Pacific Wren	<i>Troglodytes pacificus</i>
American Dipper	<i>Cinclus mexicanus</i>
Golden-crowned Kinglet	<i>Regulus satrapa</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Mountain Bluebird	<i>Sialia currucoides</i>
Townsend's Solitaire	<i>Myadestes townsendi</i>
Veery	<i>Catharus fuscescens</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Hermit Thrush	<i>Catharus guttatus</i>
American Robin	<i>Turdus migratorius</i>
Varied Thrush	<i>Ixoreus naevius</i>
Gray Catbird*	<i>Dumetella carolinensis</i>
European Starling*	<i>Sturnus vulgaris</i>
American Pipit	<i>Anthus rubescens</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Orange-crowned Warbler	<i>Oreothlypis celata</i>
Nashville Warbler	<i>Oreothlypis ruficapilla</i>
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
American Redstart	<i>Setophaga ruticilla</i>
Yellow Warbler	<i>Setophaga petechia</i>
Yellow-rumped Warbler	<i>Setophaga coronata</i>
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>
Townsend's Warbler	<i>Setophaga townsendi</i>
Townsend's x Hermit Warbler hybrid	<i>Setophaga townsendi x occidentalis</i>
Hermit Warbler	<i>Setophaga occidentalis</i>
Wilson's Warbler	<i>Cardellina pusilla</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Chipping Sparrow	<i>Spizella passerina</i>
Vesper Sparrow*	<i>Poocetes gramineus</i>
Savannah Sparrow*	<i>Passerculus sandwichensis</i>
Fox Sparrow	<i>Passerella iliaca</i>
Song Sparrow	<i>Melospiza melodia</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned Sparrow*	<i>Zonotrichia atricapilla</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Western Tanager	<i>Piranga ludoviciana</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Lazuli Bunting	<i>Passerina amoena</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Bullock's Oriole*	<i>Icterus bullockii</i>
Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>

Table 4. All species recorded in the three large North Coast and Cascades Network parks during the 2014 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
Pine Grosbeak	<i>Pinicola enucleator</i>
House Finch*	<i>Haemorhous mexicanus</i>
Purple Finch	<i>Haemorhous purpureus</i>
Cassin's Finch	<i>Haemorhous cassinii</i>
Red Crossbill	<i>Loxia curvirostra</i>
Pine Siskin	<i>Spinus pinus</i>
Evening Grosbeak	<i>Coccothraustes vespertinus</i>

Table 5. Number of transects with detections and number of individual detections for each species detected during point counts on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014.

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Common Merganser		1		1		1		1
Ruffed Grouse		1	1	2		1	1	2
Sooty Grouse	2	8	9	19	4	16	27	47
Osprey		1	1	2		1	1	2
Cooper's Hawk		1		1		1		1
Red-tailed Hawk		1		1		1		1
Spotted Sandpiper	2	1	2	5	3	1	3	7
Marbled Murrelet			1	1			6	6
Band-tailed Pigeon		1	6	7		6	16	22
Northern Pygmy-Owl			1	1			2	2
Barred Owl		1	1	2		2	1	3
Common Nighthawk		1		1		2		2
Vaux's Swift	3		4	7	8		18	26
Rufous Hummingbird	4	7	5	16	5	22	14	41
Calliope Hummingbird	1	3		4	2	5		7
Belted Kingfisher			2	2			3	3
Red-naped Sapsucker		1		1		1		1
Red-breasted Sapsucker	2	4	1	7	2	17	1	20
Downy Woodpecker		1		1		1		1
Hairy Woodpecker	6	5	5	16	10	10	8	28
Northern Flicker	1	4	9	14	2	5	30	37
Pileated Woodpecker	1	2		3	1	3		4
Peregrine Falcon	1			1	1			1
Olive-sided Flycatcher	3	6	5	14	4	15	26	45
Western Wood-Pewee		3		3		22		22
Willow Flycatcher		1		1		5		5
Hammond's Flycatcher	6	10	7	23	16	120	21	157

Table 5. Number of transects with detections and number of individual detections for each species detected during point counts on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Dusky Flycatcher		3		3		6		6
Pacific-slope Flycatcher	6	3	8	17	31	13	124	168
Say's Phoebe		1		1		1		1
Cassin's Vireo		5		5		13		13
Hutton's Vireo	1		1	2	1		1	2
Warbling Vireo	4	8	5	17	8	73	9	90
Red-eyed Vireo		3		3		10		10
Gray Jay	7	6	8	21	21	26	52	99
Steller's Jay	5	2	3	10	8	2	14	24
Clark's Nutcracker	1	1		2	2	7		9
American Crow			2	2			3	3
Common Raven	1	1	1	3	1	1	2	4
Violet-green Swallow	1			1	4			4
Northern Rough-winged Swallow			1	1			1	1
Mountain Chickadee	1	2		3	1	15		16
Chestnut-backed Chickadee	9	9	12	30	87	80	142	309
Red-breasted Nuthatch	9	10	10	29	43	59	49	151
Brown Creeper	8	7	10	25	26	24	28	78
Pacific Wren	9	7	11	27	109	92	144	345
American Dipper	2	2	2	6	2	3	4	9
Golden-crowned Kinglet	9	9	12	30	64	46	96	206
Ruby-crowned Kinglet		2	2	4		6	6	12
Mountain Bluebird		1		1		3		3
Townsend's Solitaire		1	1	2		1	4	5
Veery		1		1		6		6
Swainson's Thrush	4	8	3	15	24	162	11	197
Hermit Thrush	9	5	8	22	91	68	79	238

Table 5. Number of transects with detections and number of individual detections for each species detected during point counts on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
American Robin	8	11	8	27	27	78	78	183
Varied Thrush	9	8	12	29	227	89	137	453
American Pipit	2		2	4	25		12	37
Cedar Waxwing		2		2		26		26
Orange-crowned Warbler		2	1	3		2	3	5
Nashville Warbler		4		4		18		18
MacGillivray's Warbler		9		9		51		51
Common Yellowthroat		1		1		1		1
American Redstart		1		1		2		2
Yellow Warbler	1	5	1	7	1	72	2	75
Yellow-rumped Warbler	6	9	1	16	17	109	5	131
Black-throated Gray Warbler		4	3	7		14	16	30
Townsend's Warbler	9	8	5	22	101	137	51	289
Hermit Warbler	3			3	4			4
Wilson's Warbler	2	2	4	8	2	2	31	35
Chipping Sparrow		5		5		40		40
Fox Sparrow	2	3		5	14	11		25
Song Sparrow	1	6	2	9	4	11	4	19
White-crowned Sparrow	1	1	2	4	4	2	9	15
Dark-eyed Junco	10	10	11	31	105	88	213	406
Western Tanager	3	9	4	16	8	87	11	106
Black-headed Grosbeak		6	2	8		28	3	31
Lazuli Bunting		1		1		1		1
Red-winged Blackbird	1			1	1			1
Brown-headed Cowbird		1		1		1		1
Gray-crowned Rosy-Finch	2			2	10			10
Pine Grosbeak	1	1	4	6	1	3	9	13

Table 5. Number of transects with detections and number of individual detections for each species detected during point counts on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Purple Finch		1		1		1		1
Cassin's Finch		4		4		29		29
Red Crossbill	6	3	3	12	70	11	24	105
Pine Siskin	8	11	5	24	130	447	114	691
Evening Grosbeak	9	6	7	22	42	31	40	113
All species pooled					1,374	2,367	1,709	5,450
Detections per point (all species pooled)					8.18	0.86	9.19	9.53

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) at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014.

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Canada Goose		1		1		2		2
Common Merganser		3		3		9		9
Ruffed Grouse		1	1	2		1	1	2
Sooty Grouse	4	18	13	35	9	40	38	87
Common Loon		1		1		1		1
Osprey		4	2	6		5	2	7
Cooper's Hawk		2	1	3		2	1	3
Red-tailed Hawk		1		1		1		1
Spotted Sandpiper	2	2	3	7	3	2	4	9
Marbled Murrelet			3	3			11	11
Band-tailed Pigeon		1	8	9		6	23	29
Northern Pygmy-Owl			3	3			4	4
Barred Owl		1	2	3		2	3	5
Common Nighthawk		1		1		2		2
Vaux's Swift	8	2	8	18	19	7	43	69
Rufous Hummingbird	8	13	9	30	10	39	20	69
Calliope Hummingbird	1	5		6	2	8		10
Belted Kingfisher			4	4			5	5
Red-naped Sapsucker		1		1		1		1
Red-breasted Sapsucker	3	10	2	15	3	36	2	41
Downy Woodpecker		2		2		2		2
Hairy Woodpecker	13	11	14	38	19	19	26	64
American Three-toed Woodpecker		1		1		2		2
Northern Flicker	3	8	13	24	5	9	36	50
Pileated Woodpecker	3	2	1	6	3	3	1	7
Peregrine Falcon	1			1	1			1
Olive-sided Flycatcher	7	12	10	29	9	22	37	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) at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Western Wood-Pewee		6		6		34		34
Willow Flycatcher		3		3		7		7
Hammond's Flycatcher	11	19	12	42	48	204	51	303
Dusky Flycatcher		4		4		8		8
Pacific-slope Flycatcher	12	6	19	37	85	27	227	339
Say's Phoebe		1		1		1		1
Cassin's Vireo		10		10		34		34
Hutton's Vireo	2		1	3	2		1	3
Warbling Vireo	5	14	10	29	12	105	24	141
Red-eyed Vireo		5		5		16		16
Gray Jay	16	12	17	45	61	43	85	189
Steller's Jay	7	9	5	21	14	23	19	56
Clark's Nutcracker	3	3		6	7	12		19
American Crow			3	3			6	6
Common Raven	6	4	1	11	9	6	2	17
Horned Lark			1	1			8	8
Violet-green Swallow	3	1		4	9	3		12
Northern Rough-winged Swallow			1	1			1	1
Mountain Chickadee	4	4		8	24	18		42
Chestnut-backed Chickadee	18	17	24	59	164	152	250	566
Red-breasted Nuthatch	18	21	21	60	110	130	117	357
Brown Creeper	15	15	18	48	40	39	51	130
Pacific Wren	17	17	22	56	224	165	259	648
American Dipper	3	2	2	7	3	3	4	10
Golden-crowned Kinglet	19	21	24	64	141	101	202	444
Ruby-crowned Kinglet	2	3	2	7	2	9	6	17

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) at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Mountain Bluebird	2	2		4	12	4		16
Townsend's Solitaire		3	3	6		3	9	12
Veery		3		3		8		8
Swainson's Thrush	6	16	5	27	44	278	27	349
Hermit Thrush	18	12	15	45	183	138	116	437
American Robin	16	19	19	54	54	134	144	332
Varied Thrush	18	15	22	55	375	172	223	770
American Pipit	2		4	6	25		21	46
Cedar Waxwing		4	1	5		31	1	32
Orange-crowned Warbler		2	1	3		2	3	5
Nashville Warbler		8		8		67		67
MacGillivray's Warbler		16		16		84		84
Common Yellowthroat		1		1		1		1
American Redstart		2		2		3		3
Yellow Warbler	2	7	2	11	4	94	4	102
Yellow-rumped Warbler	10	17	4	31	49	211	24	284
Black-throated Gray Warbler		11	5	16		30	28	58
Townsend's Warbler	16	19	10	45	181	291	102	574
Hermit Warbler	5		1	6	7		1	8
Wilson's Warbler	4	3	10	17	7	3	48	58
Spotted Towhee			1	1			4	4
Chipping Sparrow	2	11		13	11	83		94
Fox Sparrow	5	4		9	20	29		49
Song Sparrow	3	8	6	17	9	15	12	36
White-crowned Sparrow	2	1	3	6	6	2	10	18
Dark-eyed Junco	20	22	23	65	244	189	444	877

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) at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks in 2014 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Western Tanager	6	17	11	34	15	210	33	258
Black-headed Grosbeak	1	9	2	12	2	43	3	48
Lazuli Bunting		1		1		1		1
Red-winged Blackbird	1			1	1			1
Brown-headed Cowbird		1		1		1		1
Gray-crowned Rosy-Finch	2			2	10			10
Pine Grosbeak	3	1	10	14	8	3	20	31
Purple Finch		1		1		1		1
Cassin's Finch	1	5		6	4	33		37
Red Crossbill	15	10	8	33	215	52	56	323
Pine Siskin	17	22	13	52	251	712	258	1221
Evening Grosbeak	18	10	15	43	89	38	125	252
All species pooled					2,864	4,327	3,286	10,477
Detections per point (all species pooled)					8.68	10.09	9.26	9.40
Number of species detected during point counts					53	78	58	91

Table 7. Species listed under the Endangered Species Act recorded on “Rare Bird Detection Forms” in each park in 2014, excluding individuals that were also detected during point counts.

Species	Number of birds detected (excluding individuals also detected during point counts)		
	Mount Rainier	North Cascades	Olympic
Spotted Owl	1		1
Marbled Murrelet			2

Table 8. Number of points with detections and number of individual detections for each species detected during point counts at Lewis and Clark National Historical Park in 2014.

Species	Number of points with detections	Number of individual detections
Pied-billed Grebe	2	2
Brown Pelican	2	31
Great Blue Heron	1	1
Canada Goose	8	42
Mallard	4	5
Cackling Goose	1	1
Osprey	2	3
Bald Eagle	8	14
Red-tailed Hawk	1	1
Peregrine Falcon	2	3
Killdeer	1	1
Glaucous-winged Gull	2	3
Caspian Tern	3	24
Band-tailed Pigeon	7	7
Eurasian Collared-dove	2	2
Barred Owl	1	1
Anna's Hummingbird	6	6
Rufous Hummingbird	3	3
Downy Woodpecker	4	4
Hairy Woodpecker	5	5
Northern Flicker	3	3
Olive-sided Flycatcher	6	7
Western Wood-Pewee	1	1
Hammond's Flycatcher	1	1
Pacific-slope Flycatcher	47	79
Hutton's Vireo	3	3
Warbling Vireo	4	4
Steller's Jay	12	14
American Crow	30	60
Common Raven	14	18
Tree Swallow	1	1
Violet-green Swallow	7	31
Northern Rough-winged Swallow	2	6
Barn Swallow	3	19
Black-capped Chickadee	11	15
Chestnut-backed Chickadee	20	28

Table 8. Number of points with detections and number of individual detections for each species detected during point counts at Lewis and Clark National Historical Park in 2014 (continued).

Species	Number of points with detections	Number of individual detections
Bushtit	1	1
Red-breasted Nuthatch	9	9
Brown Creeper	7	7
Bewick's Wren	11	16
Pacific Wren	49	88
Marsh Wren	13	18
Golden-crowned Kinglet	36	48
Swainson's Thrush	64	157
American Robin	48	82
European Starling	1	5
Cedar Waxwing	12	32
Orange-crowned Warbler	20	28
Yellow Warbler	9	13
Yellow-rumped Warbler	8	8
Black-throated Gray Warbler	13	19
Townsend's Warbler	2	2
Hermit Warbler	17	28
MacGillivray's Warbler	2	2
Common Yellowthroat	14	18
Wilson's Warbler	41	71
Western Tanager	24	27
Spotted Towhee	6	11
Savannah Sparrow	3	4
Song Sparrow	30	43
White-crowned Sparrow	15	25
Dark-eyed Junco	22	37
Black-headed Grosbeak	20	24
Red-winged Blackbird	13	23
Brown-headed Cowbird	18	25
Purple Finch	23	31
House Finch	1	1
Red Crossbill	1	6
American Goldfinch	11	17
Evening Grosbeak	1	2

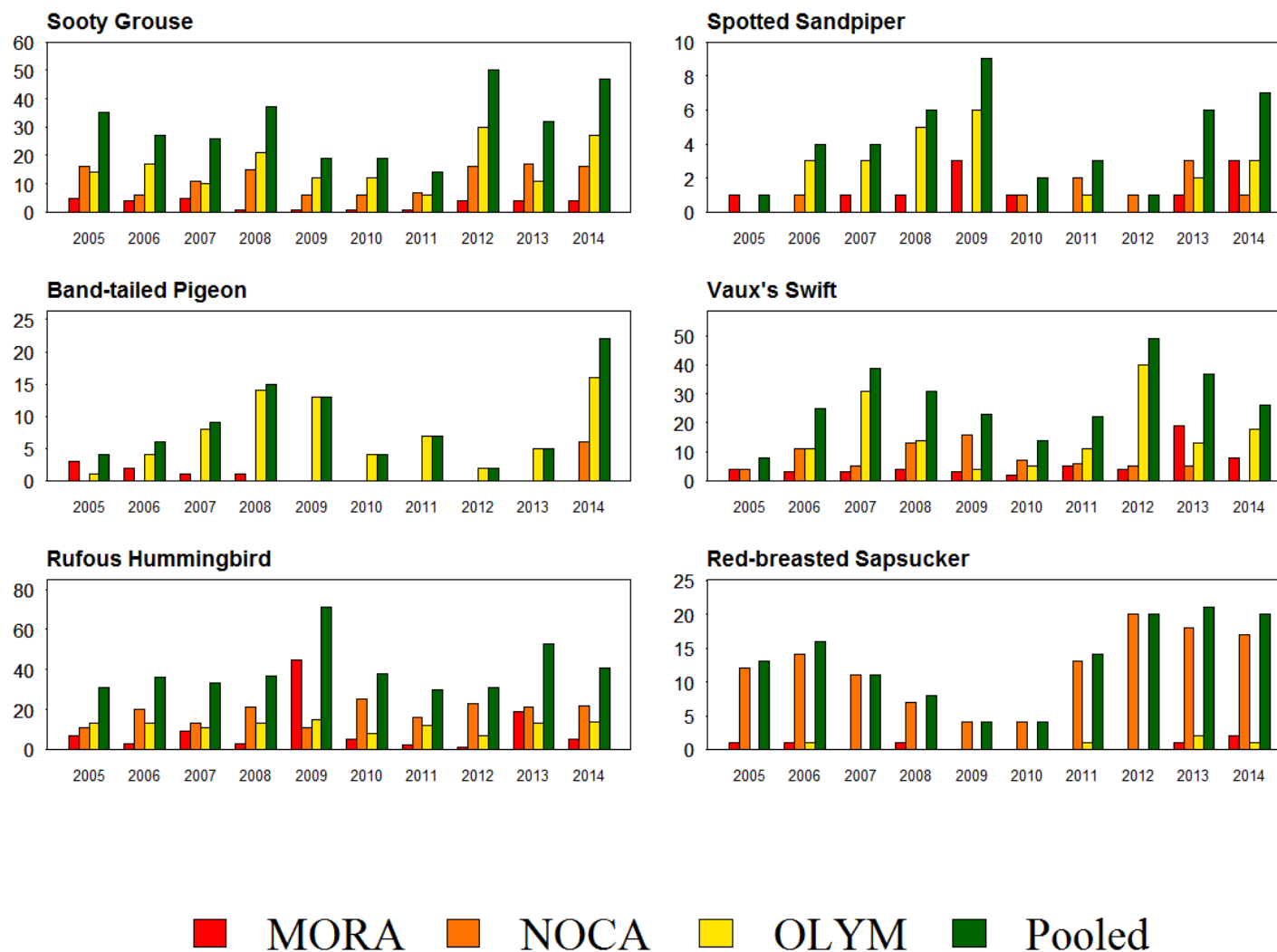


Figure 6. Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005–2014 field seasons. The figure includes all species for which we amassed at least 40 point count detections on annual-panel transects over the ten 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 our periodic trend analyses.

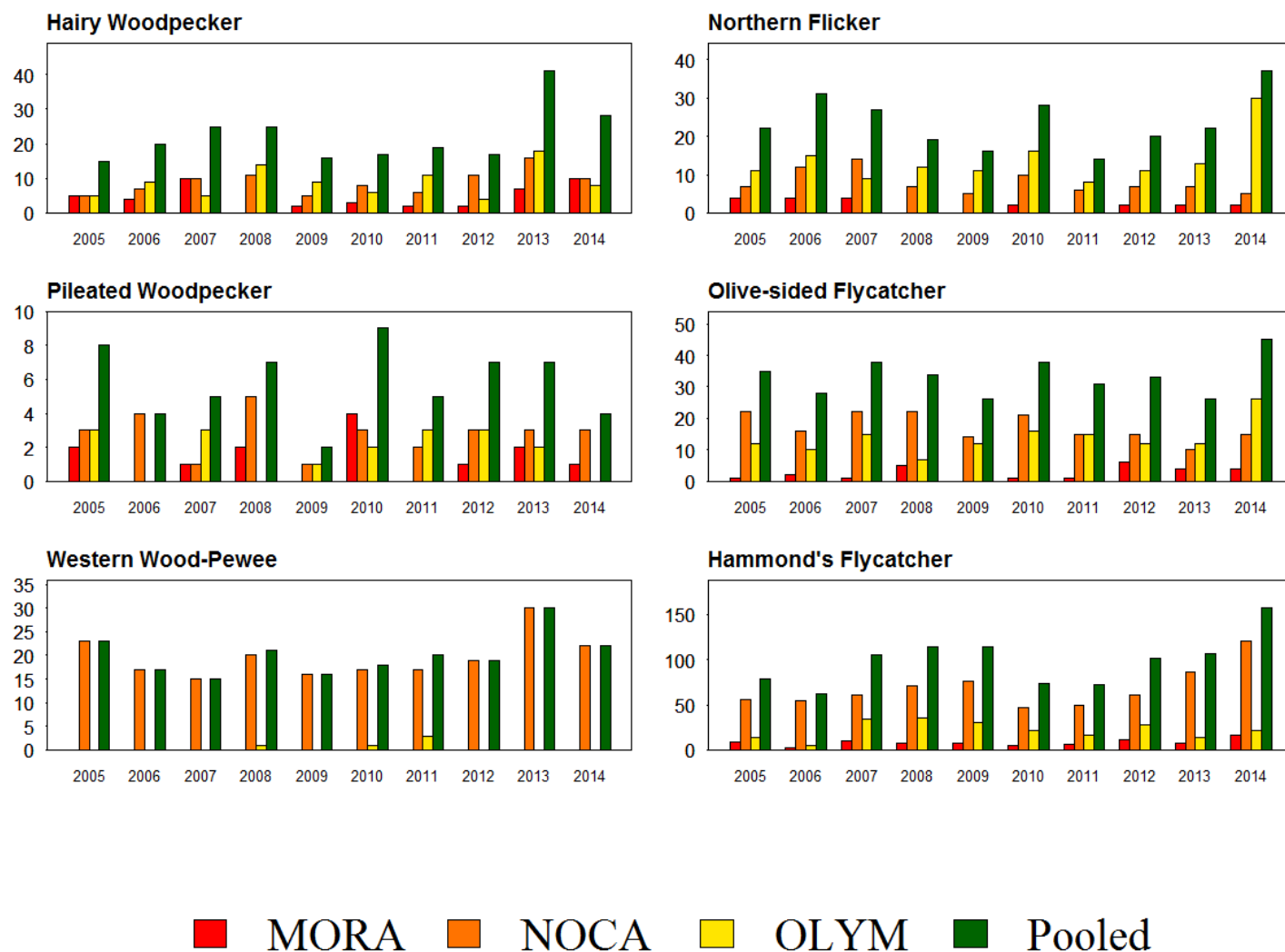


Figure 6. Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005–2014 field seasons. The figure includes all species for which we amassed at least 40 point count detections on annual-panel transects over the ten 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 our periodic trend analyses (continued).

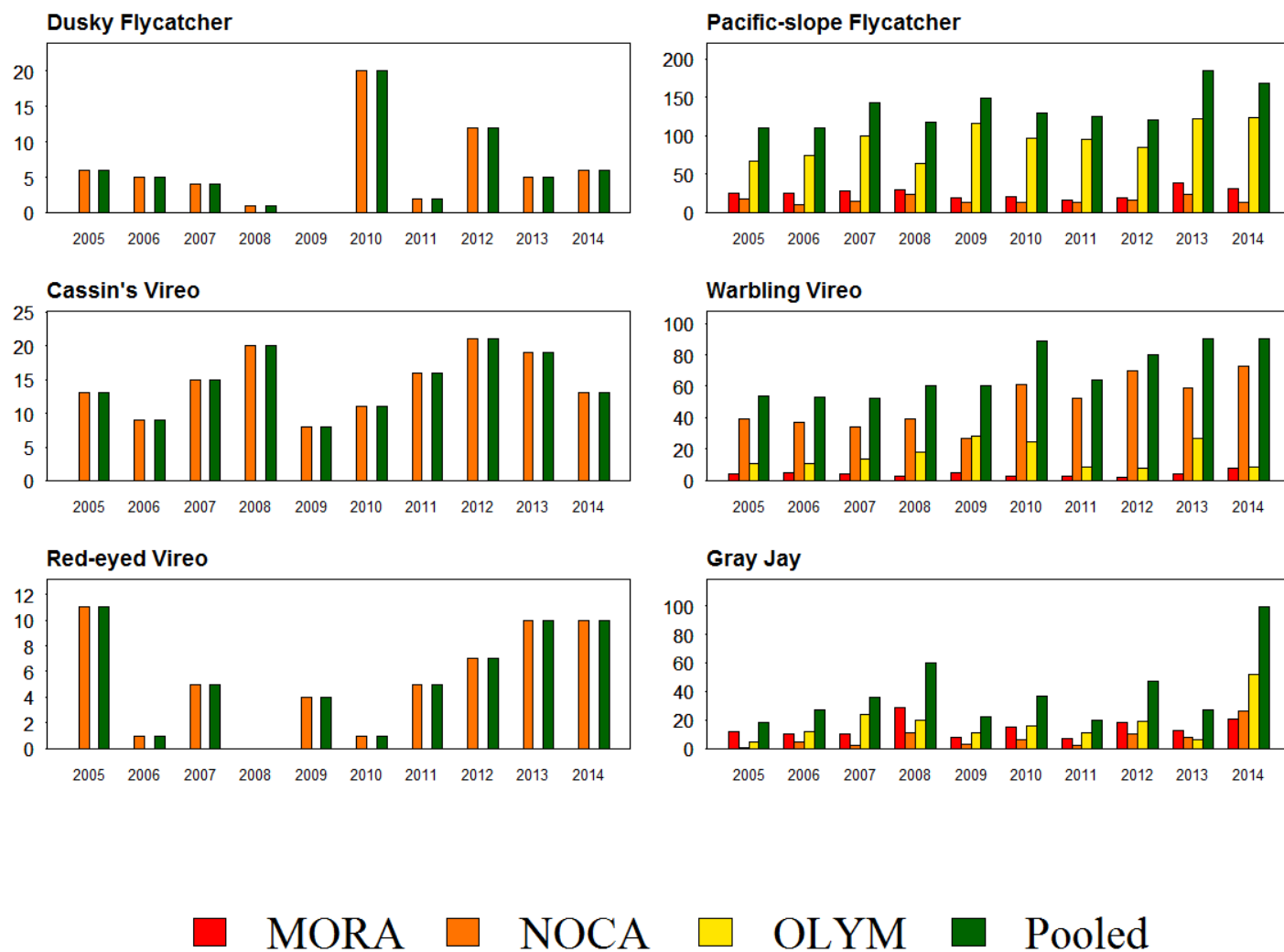


Figure 6. Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005–2014 field seasons. The figure includes all species for which we amassed at least 40 point count detections on annual-panel transects over the ten 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 our periodic trend analyses (continued).

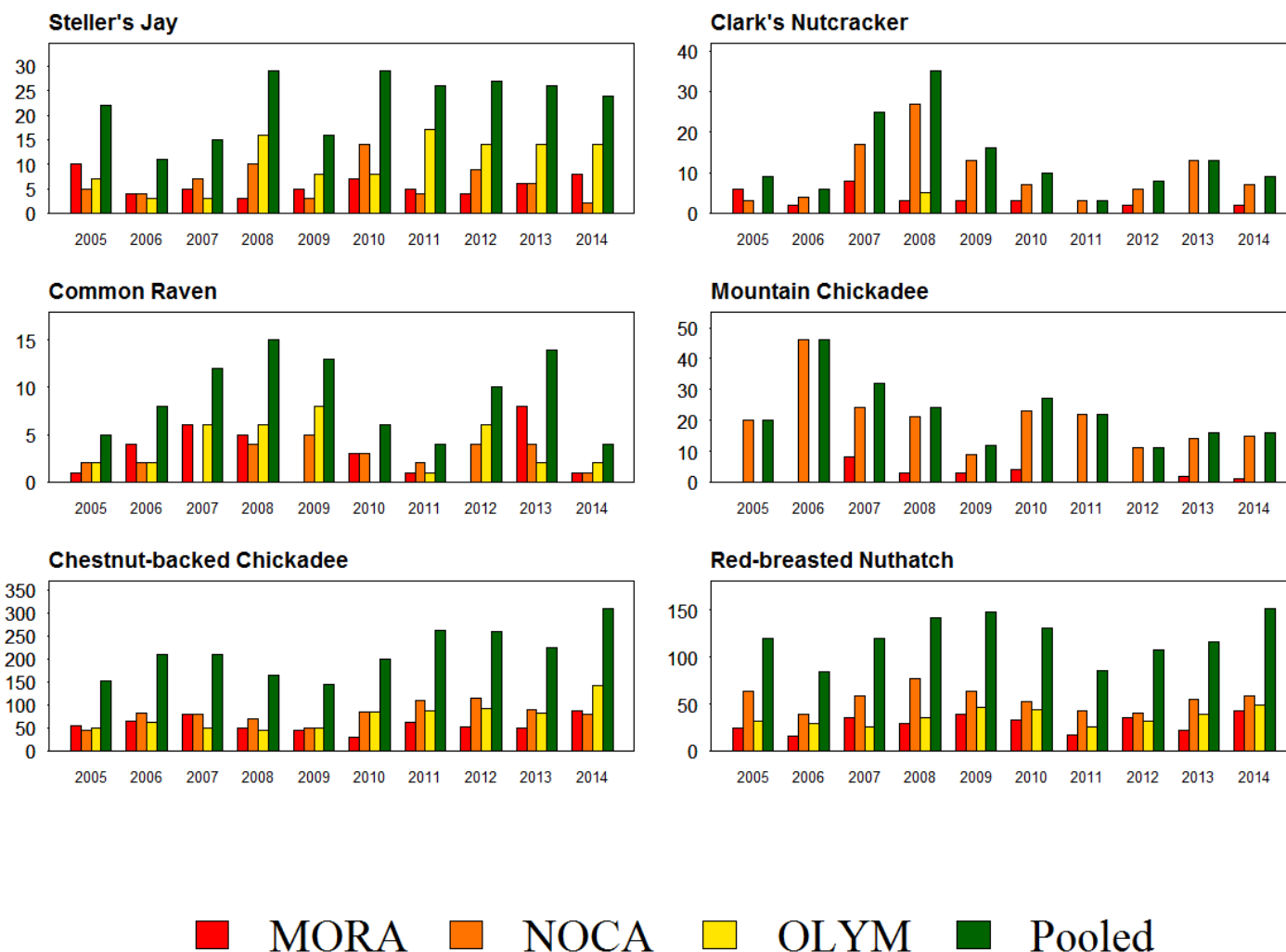


Figure 6. Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005–2014 field seasons. The figure includes all species for which we amassed at least 40 point count detections on annual-panel transects over the ten 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 our periodic trend analyses (continued).

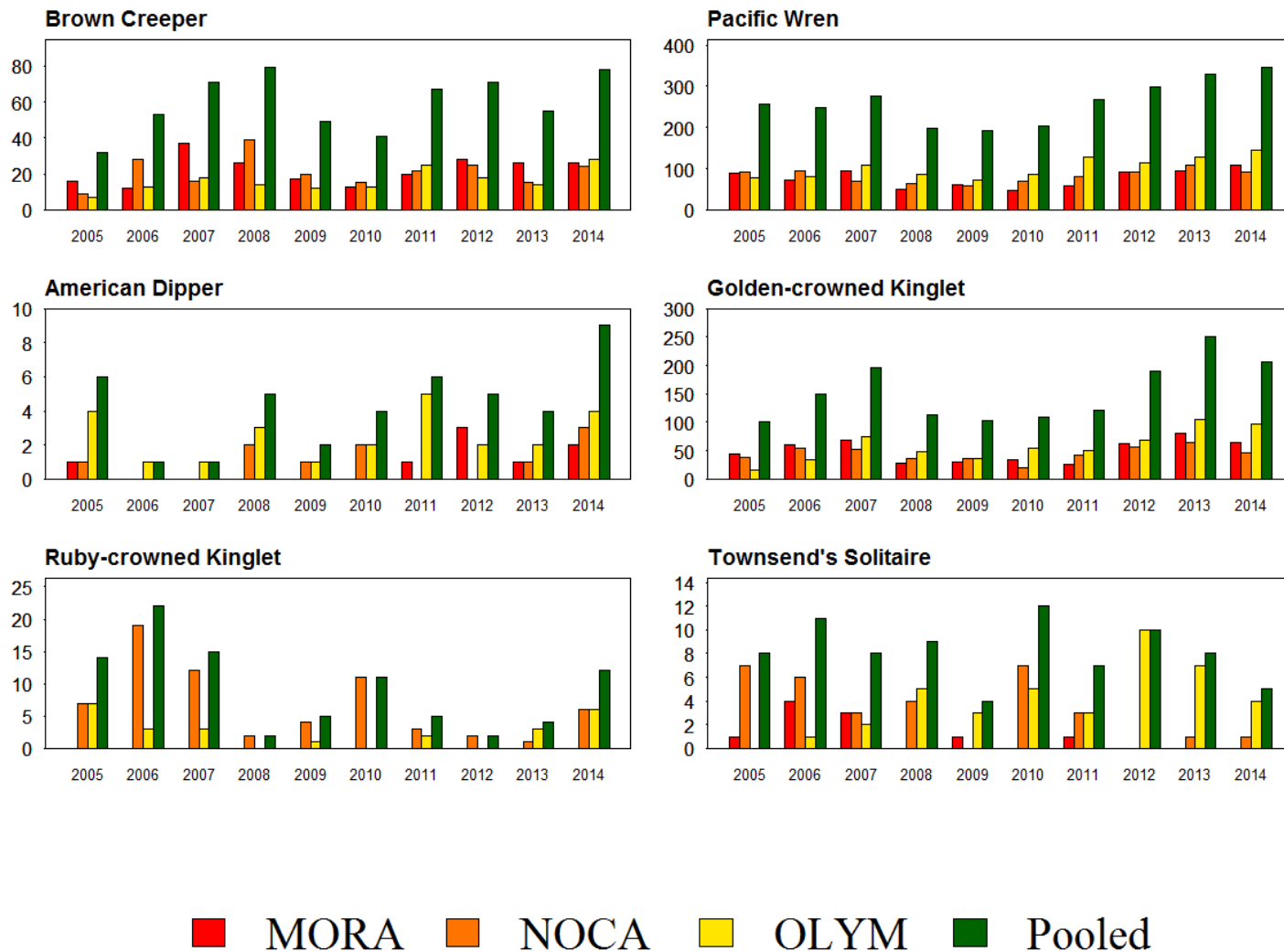


Figure 6. Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005–2014 field seasons. The figure includes all species for which we amassed at least 40 point count detections on annual-panel transects over the ten 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 our periodic trend analyses (continued).

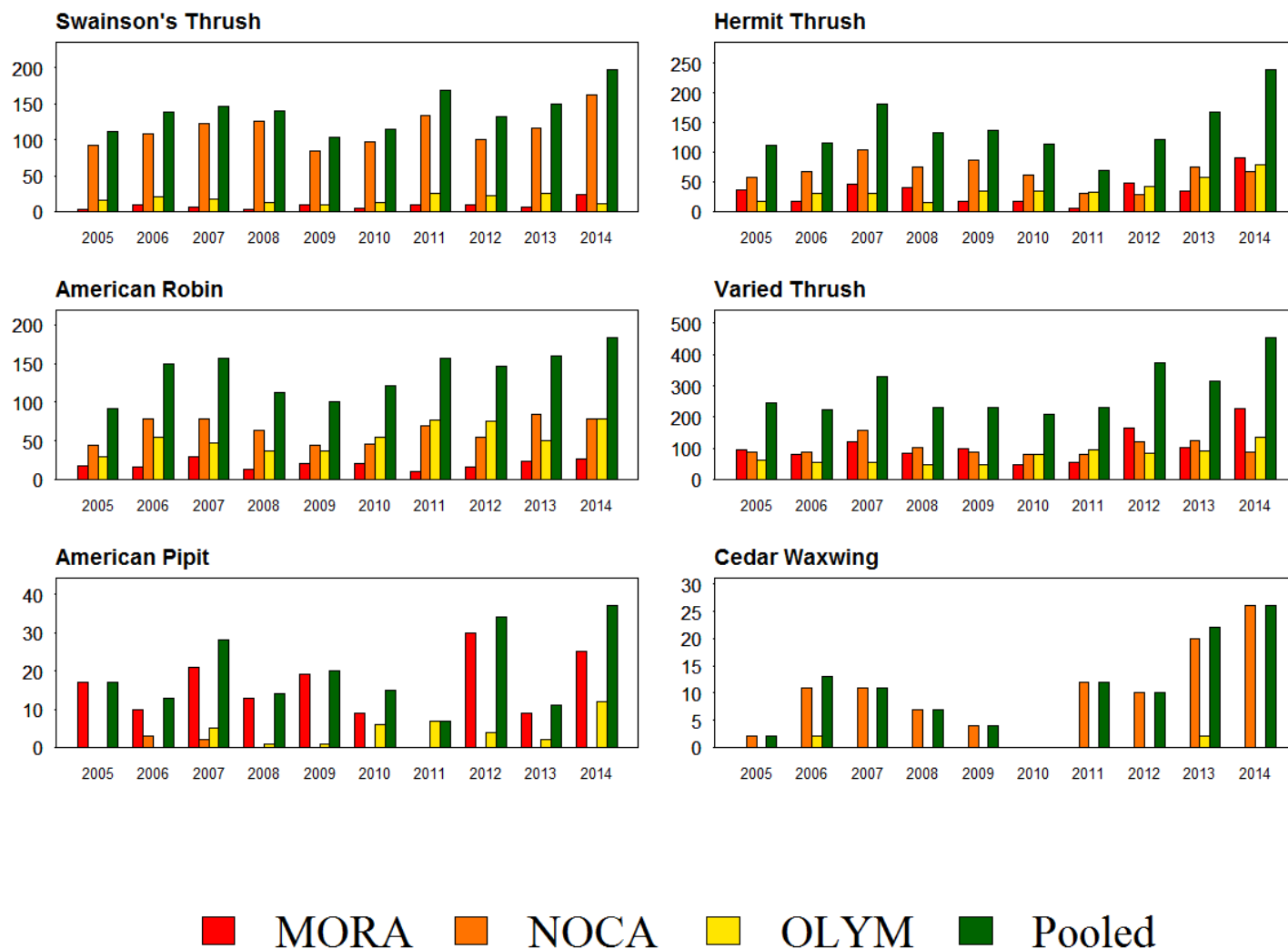


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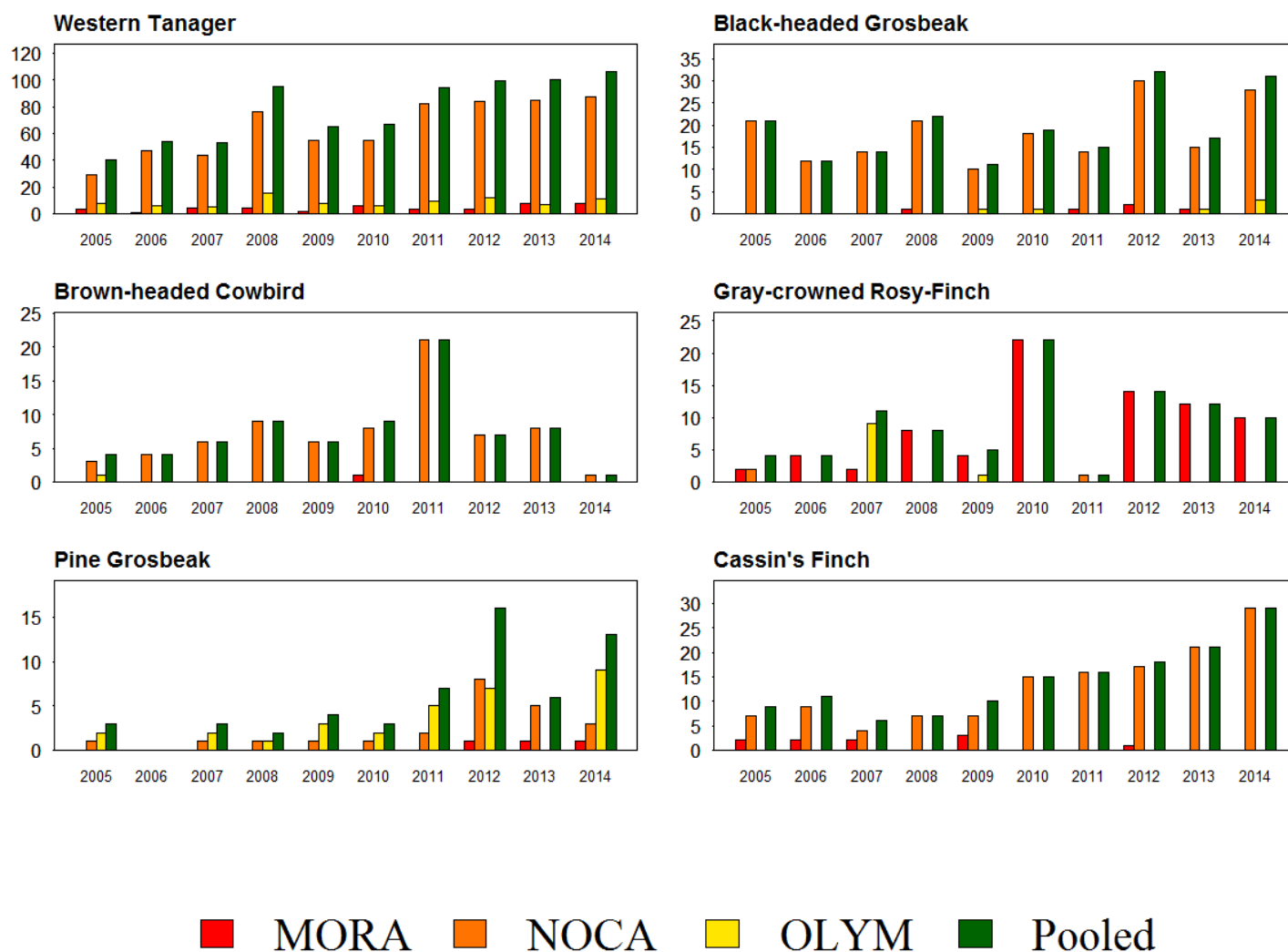


Figure 6. Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005–2014 field seasons. The figure includes all species for which we amassed at least 40 point count detections on annual-panel transects over the ten 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 our periodic trend analyses (continued).

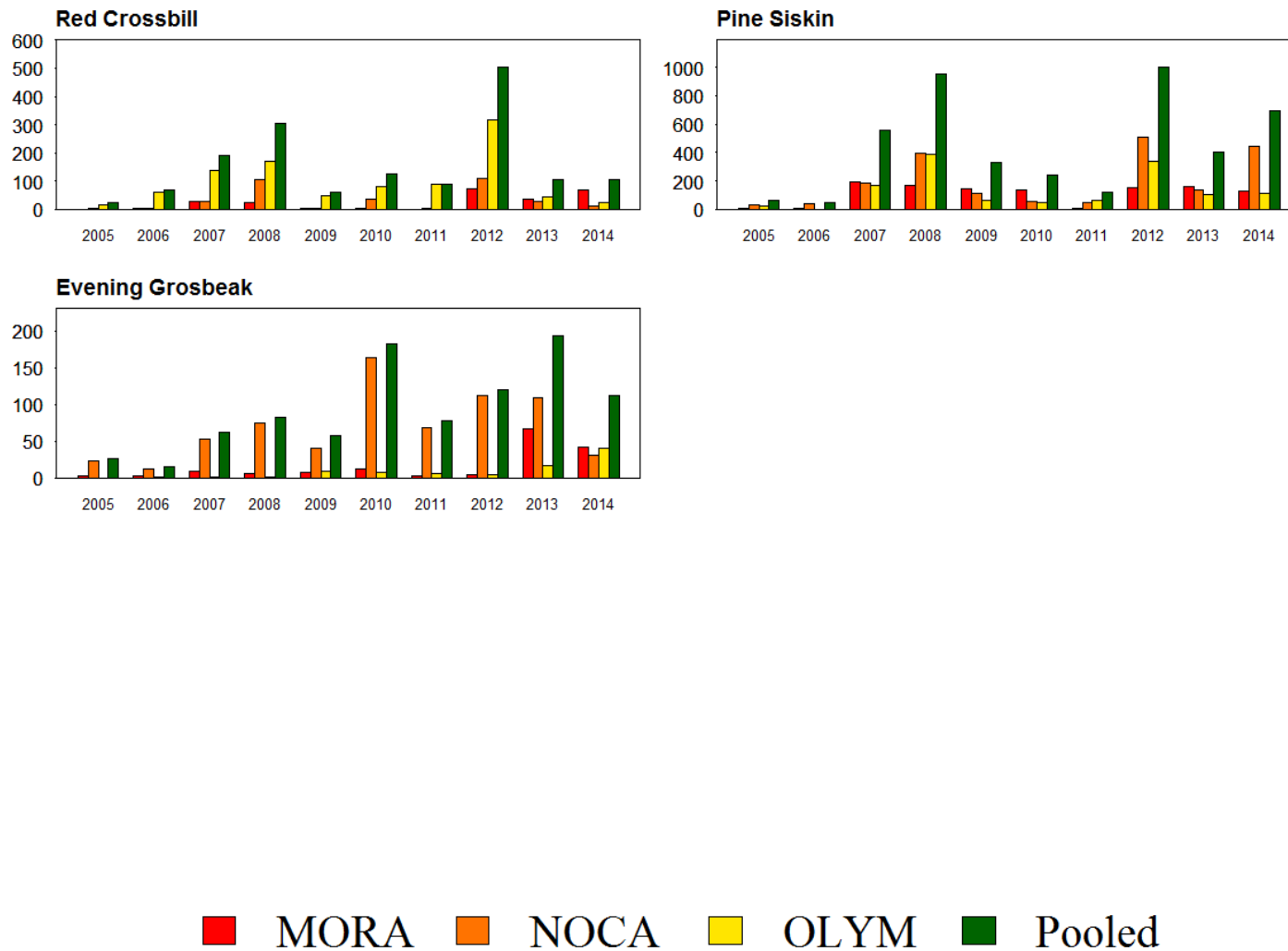


Figure 6. Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005–2014 field seasons. The figure includes all species for which we amassed at least 40 point count detections on annual-panel transects over the ten 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 our periodic trend analyses (continued).

Discussion

With the experience gained from two pilot field seasons (2005 and 2006) and seven previous years of full protocol implementation, our eighth year of fully implementing the NCCN Landbird Monitoring Project proceeded very smoothly. Our procedures for season preparation, data collection, data management, data analysis, and reporting (Siegel et al. 2007) have all been well vetted, and required no substantial changes this year.

In the three large parks we were able to survey all 68 of the intended transects easily this year due in part to a below-average snowpack. The 2014 season yielded the highest number of bird detections on annual-panel transects in the three large parks since the start of the monitoring project, about 200 more than the previous high count in 2012. However, in 2012 the high number of detections was largely due to a spike in red crossbill and pine siskin detections, both species being at an all-time high since the start of the monitoring project. In contrast, red crossbill detections remained very low in 2014 after the substantial decrease in 2013 (105 detections on annual-panel transects in 2014 compared to 503 detections in 2012). Pine siskin detections were also much lower in 2014 than in 2012, but increased from 2013 levels. There were 691 pine siskin detections on annual-panel transects in 2014, compared to 403 detections in 2013 and 999 detections in 2012 (Holmgren et al. 2014). In general, finch detections were down in 2014 compared to other families, many of which increased during this time period. However, Cassin's finch detections have been gradually increasing over the years, with the highest number of detections in 2014.

There were many other species detected in slightly or moderately greater numbers in the three large parks in 2014 than in previous years. A few of these species include Hammond's flycatcher, gray jay, hermit thrush, varied thrush, and Townsend's warbler. Each of these species had more detections in 2014 than in any of the previous nine years. Red-breasted nuthatch detections also seem to be on the increase, after a substantial decrease in 2011. There were 151 detections on annual-panel transects in 2014, compared to 116 detections in 2013 and 107 detections in 2012 (Holmgren et al. 2012). While many of these upticks in numbers of birds counted may reflect real population increases in 2014, it should also be noted that we conducted more point counts across the large parks than in any previous year (Appendix A), which likely accounts for at least a portion of the increased detections. The Landbird Monitoring Project's periodic trend analyses will explicitly account for annual variation in survey effort.

There were several species that showed a decrease in detections in 2014, including Vaux's swift, which had 26 detections on annual-panel transects in 2014, compared to 37 detections in 2013 and 49 detections in 2012 (Holmgren et al. 2014). Brown-headed cowbird detections also declined, and were detected at their lowest numbers in 2014 since the start of the monitoring project.

There were no Eurasian collared-doves detected in MORA, NOCA, or OLYM during point counts in 2014, but they were detected at OLYM at times or locations outside of point counts. The range of this non-native bird has expanded rapidly across North America. Breeding Bird Survey data from 1966 to 2010 have showed increases in numbers everywhere the species has been recorded. The success of this species can be attributed to widespread seed availability in the form of backyard

feeders as well as increased tree planting in urban and suburban areas (Romagosa 2012). While the doves are less common in more rural or natural areas, they will inhabit such areas if there is food available (Romagosa 2012). The areas we detected them were in more developed parts of the parks (near campgrounds or roads), but we will continue to take particular note of them, as this project presents a good opportunity to monitor this species and whether it expands into more natural areas.

At LEWI, overall detections remained high in 2014, after having increased in 2012. The average number of detections per point remained almost exactly the same, averaging 18.61 birds per point in 2014 compared to 18.56 birds per point in 2012. There were notable increases in detections of a few species, including Swainson's thrush, American robin, and Pacific-slope flycatcher. There were also decreases in detections of a few species, including red crossbill and song sparrow. There was no substantial change in brown-headed cowbird detections, which increased by four detections from 2012 numbers, the same number of detections as in 2010. Two Eurasian collared-doves were detected in point counts in LEWI in 2014, the same number as in the 2012 surveys (Holmgren et al. 2013).

Detailed interpretation of 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. These analyses will take place in conjunction with our next periodic trend analyses, which is scheduled to take place following the 2016 field season.

Conclusions

The NCCN Landbird Monitoring Project has had another successful year, with a comprehensive, field-tested protocol, two years of annual-panel data collected during the protocol development phase (2005–2006), and eight full years of project implementation (2007–2014) that includes data collection on the annual panel as well as all five of the alternating panels. We were able to survey all 68 of the intended transects in 2014. Preliminary analysis indicates a substantial uptick in numbers of many bird species in 2014, but interpretation of this result will need to wait until our next multi-year trend analysis, which will account for annual variation in survey effort and detection probability.

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

Park	Panel	Elevation class	Transect	Number of points surveyed									
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
MORA	Ann1	Low	4001	10	12	12	12	12	10	11	14	16	16
MORA	Ann1	Low	4005	11	11	11	11	12	9	10	13	13	14
MORA	Ann1	Medium	4002	11	11	11	12	11	13	13	15	15	15
MORA	Ann1	Medium	4004	18	17	18	18	13	15	10	17	17	18
MORA	Ann1	Medium	4009	14	14	15	15	11	13	10	15	15	15
MORA	Ann1	Medium	4012	16	16	14	19	19	13	0	17	19	20
MORA	Ann1	High	4003	12	12	12	12	12	10	12	13	14	15
MORA	Ann1	High	4007	20	20	20	20	20	20	0	20	20	20
MORA	Ann1	High	4011	13	11	14	17	17	15	0	16	16	17
MORA	Ann1	High	4014	10	16	14	16	16	15	0	17	17	18
MORA	Alt2	Low	4006	0	0	10	0	0	0	0	9	0	0
MORA	Alt2	Low	4008	0	0	9	0	0	0	0	12	0	0
MORA	Alt2	Medium	4015	0	0	11	0	0	0	0	12	0	0
MORA	Alt2	Medium	4017	0	0	12	0	0	0	0	13	0	0
MORA	Alt2	Medium	4020	0	0	9	0	0	0	0	8	0	0
MORA	Alt2	Medium	4026	0	0	10	0	0	0	0	11	0	0
MORA	Alt2	High	4016	0	0	19	0	0	0	0	20	0	0
MORA	Alt2	High	4019	0	0	20	0	0	0	0	20	0	0
MORA	Alt2	High	4027	0	0	13	0	0	0	0	14	0	0
MORA	Alt2	High	4075	0	0	14	0	0	0	0	11	0	0
MORA	Alt3	Low	4010	0	0	0	13	0	0	0	0	14	0
MORA	Alt3	Low	4018	0	0	0	12	0	0	0	0	14	0
MORA	Alt3	Medium	4028	0	0	0	11	0	0	0	0	12	0
MORA	Alt3	Medium	4042	0	0	0	12	0	0	0	0	13	0
MORA	Alt3	Medium	4044	0	0	0	15	0	0	0	0	16	0
MORA	Alt3	Medium	4048	0	0	0	13	0	0	0	0	12	0
MORA	Alt3	High	4029	0	0	0	14	0	0	0	0	14	0
MORA	Alt3	High	4030	0	0	0	12	0	0	0	0	15	0
MORA	Alt3	High	4032	0	0	0	15	0	0	0	0	15	0
MORA	Alt3	High	4033	0	0	0	18	0	0	0	0	19	0

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

Park	Panel	Elevation class	Transect	Number of points surveyed									
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
MORA	Alt4	Low	4021	0	0	0	0	12	0	0	0	0	13
MORA	Alt4	Low	4022	0	0	0	0	17	0	0	0	0	17
MORA	Alt4	Medium	4057	0	0	0	0	10	0	0	0	0	14
MORA	Alt4	Medium	4060	0	0	0	0	24	0	0	0	0	24
MORA	Alt4	Medium	4061	0	0	0	0	15	0	0	0	0	17
MORA	Alt4	Medium	4065	0	0	0	0	13	0	0	0	0	15
MORA	Alt4	High	4035	0	0	0	0	12	0	0	0	0	14
MORA	Alt4	High	4036	0	0	0	0	14	0	0	0	0	16
MORA	Alt4	High	4039	0	0	0	0	11	0	0	0	0	13
MORA	Alt4	High	4043	0	0	0	0	18	0	0	0	0	19
MORA	Alt5	Low	4024	0	0	0	0	0	25	0	0	0	0
MORA	Alt5	Low	4025	0	0	0	0	0	9	0	0	0	0
MORA	Alt5	Medium	4068	0	0	0	0	0	9	0	0	0	0
MORA	Alt5	Medium	4073	0	0	0	0	0	13	0	0	0	0
MORA	Alt5	Medium	4074	0	0	0	0	0	13	0	0	0	0
MORA	Alt5	Medium	4076	0	0	0	0	0	15	0	0	0	0
MORA	Alt5	High	4045	0	0	0	0	0	12	0	0	0	0
MORA	Alt5	High	4046	0	0	0	0	0	10	0	0	0	0
MORA	Alt5	High	4052	0	0	0	0	0	12	0	0	0	0
MORA	Alt5	High	4055	0	0	0	0	0	0	0	0	0	0
MORA	Alt6	Low	4031	0	0	0	0	0	0	10	0	0	0
MORA	Alt6	Low	4034	0	0	0	0	0	0	10	0	0	0
MORA	Alt6	Medium	4077	0	0	0	0	0	0	12	0	0	0
MORA	Alt6	Medium	4078	0	0	0	0	0	0	9	0	0	0
MORA	Alt6	Medium	4081	0	0	0	0	0	0	10	0	0	0
MORA	Alt6	Medium	4084	0	0	0	0	0	0	0	0	0	0
MORA	Alt6	High	4058	0	0	0	0	0	0	0	0	0	0
MORA	Alt6	High	4062	0	0	0	0	0	0	0	0	0	0
MORA	Alt6	High	4064	0	0	0	0	0	0	10	0	0	0
MORA	Alt6	High	4067	0	0	0	0	0	0	13	0	0	0

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

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Park	Panel	Elevation class	Transect	Number of points surveyed									
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NOCA	Ann1	Low	1013	12	11	14	12	11	9	13	15	15	15
NOCA	Ann1	Low	1017	13	12	9	12	12	12	13	14	14	15
NOCA	Ann1	Low	1020	15	12	13	15	16	12	16	17	17	18
NOCA	Ann1	Low	1023	18	19	19	20	21	20	21	21	21	21
NOCA	Ann1	Medium	1015	12	16	17	17	15	15	16	17	17	19
NOCA	Ann1	Medium	1018	16	21	21	23	22	25	25	23	25	25
NOCA	Ann1	Medium	1022	13	13	11	13	14	13	14	15	15	17
NOCA	Ann1	Medium	1024	9	10	11	12	10	11	10	13	13	13
NOCA	Ann1	High	1014	15	19	19	0	20	0	0	20	21	21
NOCA	Ann1	High	1016	14	15	14	16	15	14	15	17	17	17
NOCA	Ann1	High	1019	12	12	10	12	12	12	12	13	13	13
NOCA	Ann1	High	1021	18	21	22	23	22	19	17	24	24	24
NOCA	Alt2	Low	1001	0	0	11	0	0	0	0	13	0	0
NOCA	Alt2	Low	1005	0	0	13	0	0	0	0	15	0	0
NOCA	Alt2	Low	1006	0	0	10	0	0	0	0	12	0	0
NOCA	Alt2	Low	1010	0	0	12	0	0	0	0	16	0	0
NOCA	Alt2	Medium	1003	0	0	12	0	0	0	0	15	0	0
NOCA	Alt2	Medium	1004	0	0	13	0	0	0	0	14	0	0
NOCA	Alt2	Medium	1009	0	0	0	0	0	0	0	16	0	0
NOCA	Alt2	Medium	1011	0	0	19	0	0	0	0	19	0	0
NOCA	Alt2	High	1002	0	0	18	0	0	0	0	20	0	0
NOCA	Alt2	High	1007	0	0	13	0	0	0	0	14	0	0
NOCA	Alt2	High	1008	0	0	0	0	0	0	0	14	0	0
NOCA	Alt2	High	1012	0	0	15	0	0	0	0	19	0	0
NOCA	Alt3	Low	1027	0	0	0	13	0	0	0	0	16	0
NOCA	Alt3	Low	1028	0	0	0	13	0	0	0	0	14	0
NOCA	Alt3	Low	1029	0	0	0	13	0	0	0	0	15	0
NOCA	Alt3	Low	1034	0	0	0	13	0	0	0	0	14	0
NOCA	Alt3	Medium	1025	0	0	0	15	0	0	0	0	15	0
NOCA	Alt3	Medium	1026	0	0	0	14	0	0	0	0	15	0

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

Park	Panel	Elevation class	Number of points surveyed										
			Transect	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NOCA	Alt3	Medium	1057	0	0	0	0	0	0	0	0	16	0
NOCA	Alt3	Medium	1031	0	0	0	19	0	0	0	0	20	0
NOCA	Alt3	High	1032	0	0	0	0	0	0	0	0	13	0
NOCA	Alt3	High	1037	0	0	0	0	0	0	0	0	20	0
NOCA	Alt3	High	1039	0	0	0	20	0	0	0	0	20	0
NOCA	Alt3	High	1040	0	0	0	21	0	0	0	0	19	0
NOCA	Alt4	Low	1036	0	0	0	0	20	0	0	0	0	25
NOCA	Alt4	Low	1054	0	0	0	0	11	0	0	0	0	16
NOCA	Alt4	Low	1061	0	0	0	0	10	0	0	0	0	13
NOCA	Alt4	Low	1122	0	0	0	0	0	0	0	0	0	22
NOCA	Alt4	Medium	1033	0	0	0	0	20	0	0	0	0	23
NOCA	Alt4	Medium	1035	0	0	0	0	16	0	0	0	0	18
NOCA	Alt4	Medium	1038	0	0	0	0	13	0	0	0	0	18
NOCA	Alt4	Medium	1041	0	0	0	0	14	0	0	0	0	17
NOCA	Alt4	High	1048	0	0	0	0	11	0	0	0	0	13
NOCA	Alt4	High	1049	0	0	0	0	12	0	0	0	0	17
NOCA	Alt4	High	1050	0	0	0	0	13	0	0	0	0	16
NOCA	Alt4	High	1052	0	0	0	0	11	0	0	0	0	13
NOCA	Alt5	Low	1062	0	0	0	0	0	8	0	0	0	0
NOCA	Alt5	Low	1063	0	0	0	0	0	9	0	0	0	0
NOCA	Alt5	Low	1065	0	0	0	0	0	11	0	0	0	0
NOCA	Alt5	Low	1067	0	0	0	0	0	8	0	0	0	0
NOCA	Alt5	Medium	1042	0	0	0	0	0	15	0	0	0	0
NOCA	Alt5	Medium	1043	0	0	0	0	0	9	0	0	0	0
NOCA	Alt5	Medium	1044	0	0	0	0	0	11	0	0	0	0
NOCA	Alt5	Medium	1045	0	0	0	0	0	10	0	0	0	0
NOCA	Alt5	High	1055	0	0	0	0	0	13	0	0	0	0
NOCA	Alt5	High	1058	0	0	0	0	0	0	0	0	0	0
NOCA	Alt5	High	1060	0	0	0	0	0	9	0	0	0	0
NOCA	Alt5	High	1064	0	0	0	0	0	10	0	0	0	0

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

Park	Panel	Elevation class	Transect	Number of points surveyed									
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NOCA	Alt6	Low	1068	0	0	0	0	0	0	13	0	0	0
NOCA	Alt6	Low	1070	0	0	0	0	0	0	12	0	0	0
NOCA	Alt6	Low	1074	0	0	0	0	0	0	14	0	0	0
NOCA	Alt6	Low	1075	0	0	0	0	0	0	11	0	0	0
NOCA	Alt6	Medium	1047	0	0	0	0	0	0	13	0	0	0
NOCA	Alt6	Medium	1051	0	0	0	0	0	0	11	0	0	0
NOCA	Alt6	Medium	1053	0	0	0	0	0	0	13	0	0	0
NOCA	Alt6	Medium	1056	0	0	0	0	0	0	13	0	0	0
NOCA	Alt6	High	1072	0	0	0	0	0	0	0	0	0	0
NOCA	Alt6	High	1088	0	0	0	0	0	0	12	0	0	0
NOCA	Alt6	High	1090	0	0	0	0	0	0	0	0	0	0
NOCA	Alt6	High	1092	0	0	0	0	0	0	14	0	0	0
OLYM	Ann1	Low	3001	11	10	8	10	11	12	12	13	12	13
OLYM	Ann1	Low	3121	11	15	17	17	17	14	17	15	17	17
OLYM	Ann1	Low	3126	9	10	11	13	13	13	15	15	15	14
OLYM	Ann1	Low	3134	16	16	18	18	18	18	19	19	19	19
OLYM	Ann1	Medium	3122	14	12	14	0	16	16	0	16	17	18
OLYM	Ann1	Medium	3123	10	10	12	14	14	15	15	15	15	16
OLYM	Ann1	Medium	3130	9	9	8	9	9	9	9	10	10	10
OLYM	Ann1	Medium	3200	0	0	22	23	21	23	22	23	23	22
OLYM	Ann1	High	3124	9	10	10	11	11	11	11	12	12	13
OLYM	Ann1	High	3125	9	11	13	13	14	15	11	14	12	15
OLYM	Ann1	High	3127	7	9	13	15	14	15	15	15	15	15
OLYM	Ann1	High	3128	10	11	11	11	10	11	12	13	12	14
OLYM	Alt2	Low	3138	0	0	10	0	0	0	0	12	0	0
OLYM	Alt2	Low	3142	0	0	14	0	0	0	0	14	0	0
OLYM	Alt2	Low	3144	0	0	13	0	0	0	0	13	0	0
OLYM	Alt2	Low	3145	0	0	13	0	0	0	0	14	0	0
OLYM	Alt2	Medium	3133	0	0	8	0	0	0	0	16	0	0
OLYM	Alt2	Medium	3135	0	0	11	0	0	0	0	13	0	0

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

Park	Panel	Elevation class	Transect	Number of points surveyed									
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
OLYM	Alt2	Medium	3137	0	0	10	0	0	0	0	11	0	0
OLYM	Alt2	Medium	3141	0	0	14	0	0	0	0	15	0	0
OLYM	Alt2	High	3132	0	0	19	0	0	0	0	19	0	0
OLYM	Alt2	High	3136	0	0	11	0	0	0	0	11	0	0
OLYM	Alt2	High	3139	0	0	16	0	0	0	0	13	0	0
OLYM	Alt2	High	3140	0	0	0	0	0	0	0	12	0	0
OLYM	Alt3	Low	3146	0	0	0	15	0	0	0	0	15	0
OLYM	Alt3	Low	3149	0	0	0	10	0	0	0	0	12	0
OLYM	Alt3	Low	3151	0	0	0	12	0	0	0	0	17	0
OLYM	Alt3	Low	3153	0	0	0	11	0	0	0	0	16	0
OLYM	Alt3	Medium	3143	0	0	0	10	0	0	0	0	11	0
OLYM	Alt3	Medium	3150	0	0	0	11	0	0	0	0	12	0
OLYM	Alt3	Medium	3152	0	0	0	11	0	0	0	0	13	0
OLYM	Alt3	Medium	3154	0	0	0	15	0	0	0	0	16	0
OLYM	Alt3	High	3147	0	0	0	19	0	0	0	0	19	0
OLYM	Alt3	High	3148	0	0	0	14	0	0	0	0	16	0
OLYM	Alt3	High	3156	0	0	0	10	0	0	0	0	11	0
OLYM	Alt3	High	3157	0	0	0	11	0	0	0	0	12	0
OLYM	Alt4	Low	3155	0	0	0	0	10	0	0	0	0	12
OLYM	Alt4	Low	3159	0	0	0	0	11	0	0	0	0	12
OLYM	Alt4	Low	3161	0	0	0	0	11	0	0	0	0	12
OLYM	Alt4	Low	3163	0	0	0	0	15	0	0	0	0	15
OLYM	Alt4	Medium	3160	0	0	0	0	10	0	0	0	0	12
OLYM	Alt4	Medium	3167	0	0	0	0	11	0	0	0	0	14
OLYM	Alt4	Medium	3168	0	0	0	0	10	0	0	0	0	15
OLYM	Alt4	Medium	3174	0	0	0	0	14	0	0	0	0	15
OLYM	Alt4	High	3158	0	0	0	0	14	0	0	0	0	18
OLYM	Alt4	High	3164	0	0	0	0	14	0	0	0	0	17
OLYM	Alt4	High	3171	0	0	0	0	12	0	0	0	0	15
OLYM	Alt4	High	3173	0	0	0	0	10	0	0	0	0	12

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

Park	Panel	Elevation class	Transect	Number of points surveyed									
				2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
OLYM	Alt5	Low	3165	0	0	0	0	0	10	0	0	0	0
OLYM	Alt5	Low	3166	0	0	0	0	0	12	0	0	0	0
OLYM	Alt5	Low	3169	0	0	0	0	0	8	0	0	0	0
OLYM	Alt5	Low	3170	0	0	0	0	0	11	0	0	0	0
OLYM	Alt5	Medium	3178	0	0	0	0	0	11	0	0	0	0
OLYM	Alt5	Medium	3183	0	0	0	0	0	13	0	0	0	0
OLYM	Alt5	Medium	3184	0	0	0	0	0	16	0	0	0	0
OLYM	Alt5	Medium	3185	0	0	0	0	0	9	0	0	0	0
OLYM	Alt5	High	3175	0	0	0	0	0	12	0	0	0	0
OLYM	Alt5	High	3179	0	0	0	0	0	16	0	0	0	0
OLYM	Alt5	High	3180	0	0	0	0	0	16	0	0	0	0
OLYM	Alt5	High	3188	0	0	0	0	0	12	0	0	0	0
OLYM	Alt6	Low	3172	0	0	0	0	0	0	14	0	0	0
OLYM	Alt6	Low	3177	0	0	0	0	0	0	10	0	0	0
OLYM	Alt6	Low	3181	0	0	0	0	0	0	16	0	0	0
OLYM	Alt6	Low	3182	0	0	0	0	0	0	16	0	0	0
OLYM	Alt6	Medium	3187	0	0	0	0	0	0	20	0	0	0
OLYM	Alt6	Medium	3190	0	0	0	0	0	0	14	0	0	0
OLYM	Alt6	Medium	3195	0	0	0	0	0	0	12	0	0	0
OLYM	Alt6	Medium	3198	0	0	0	0	0	0	11	0	0	0
OLYM	Alt6	High	3189	0	0	0	0	0	0	16	0	0	0
OLYM	Alt6	High	3191	0	0	0	0	0	0	15	0	0	0
OLYM	Alt6	High	3192	0	0	0	0	0	0	14	0	0	0
OLYM	Alt6	High	3196	0	0	0	0	0	0	15	0	0	0

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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National Park Service
U.S. Department of the Interior



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