



# North Coast and Cascades Network Landbird Monitoring

## *Report for the 2013 Field Season*

Natural Resource Data Series NPS/NCCN/NRDS—2014/691





**ON THIS PAGE**

Intern Ben Dudek at North Cascades National Park Complex

Photograph by: Elizabeth Smith (The Institute for Bird Populations)

**ON THE COVER**

Olive-sided Flycatcher (*Contopus cooperi*)

Photograph by: Michael McCloy (The Institute for Bird Populations)

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## Executive Summary

In 2013 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 seven years (2007-2013). In 2013 we conducted 1,064 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 137 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 30 times on annual-panel transects between 2005 and 2013), we present the total number of detections on annual-panel transects in each park during the 2005-2013 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., *in press*).

At San Juan Island National Historical Park (SAJH), we conducted 54 point counts, including 38 at American Camp and 16 at English Camp. Our field crew detected 84 species while in the park, 68 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 SAJH.

After 2012, which yielded the highest number of bird detections on annual-panel transects in the three large parks since the start of the monitoring project, detections were down slightly across all three parks in 2013. This was largely due to a substantial drop in pine siskin and red crossbill detections from 2012. While pine siskin detection numbers were still higher than during five of the eight years we have been monitoring, detections on annual-panel transects decreased from 999 in 2012 to 403 in 2013. Red crossbill numbers also substantially decreased, falling from 503 detections on annual-panel transects in 2012 to 107 in 2013 (Holmgren et al. 2013). Interestingly, red crossbill detections rose at SAJH, from 3 detections in 2011 (our most recent previous survey) to 148 detections in 2013.

Despite the decrease in overall number of birds detected, many species were detected in slightly or moderately greater numbers than in previous years. While many of these upticks in numbers of birds counted may reflect real population increases in 2013, 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 next periodic trend analyses will explicitly account for annual variation in survey effort.



## Acknowledgments

We thank the 2013 crew members for their hard work and dedication to the project: W. Bowens, G. Cotterill, T. Johnson, M. Krzywicki, J. Love, and D. Rousseau. 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 B. Kuntz, R. Chistophersen, M. Reid, and J. Weaver for providing program oversight at the respective parks; S. Gremel and B. Boekelheide for assistance during training and S. Gremel for help with field work during the season. We thank First Aid instructor and backcountry ranger C. Conley for volunteering his time to instruct the crew in First Aid; K. Arackellian and E. McKay for leading the crew in ice axe and snow travel training; N. Antonova and 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; and the ESRI Conservation Program for software support provided to The Institute for Bird Populations. This is Contribution No. 475 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 are 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). 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 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 conifer forest typical of the east side of the Cascades, which hosts a somewhat distinct avifauna (Altman 2000). 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.

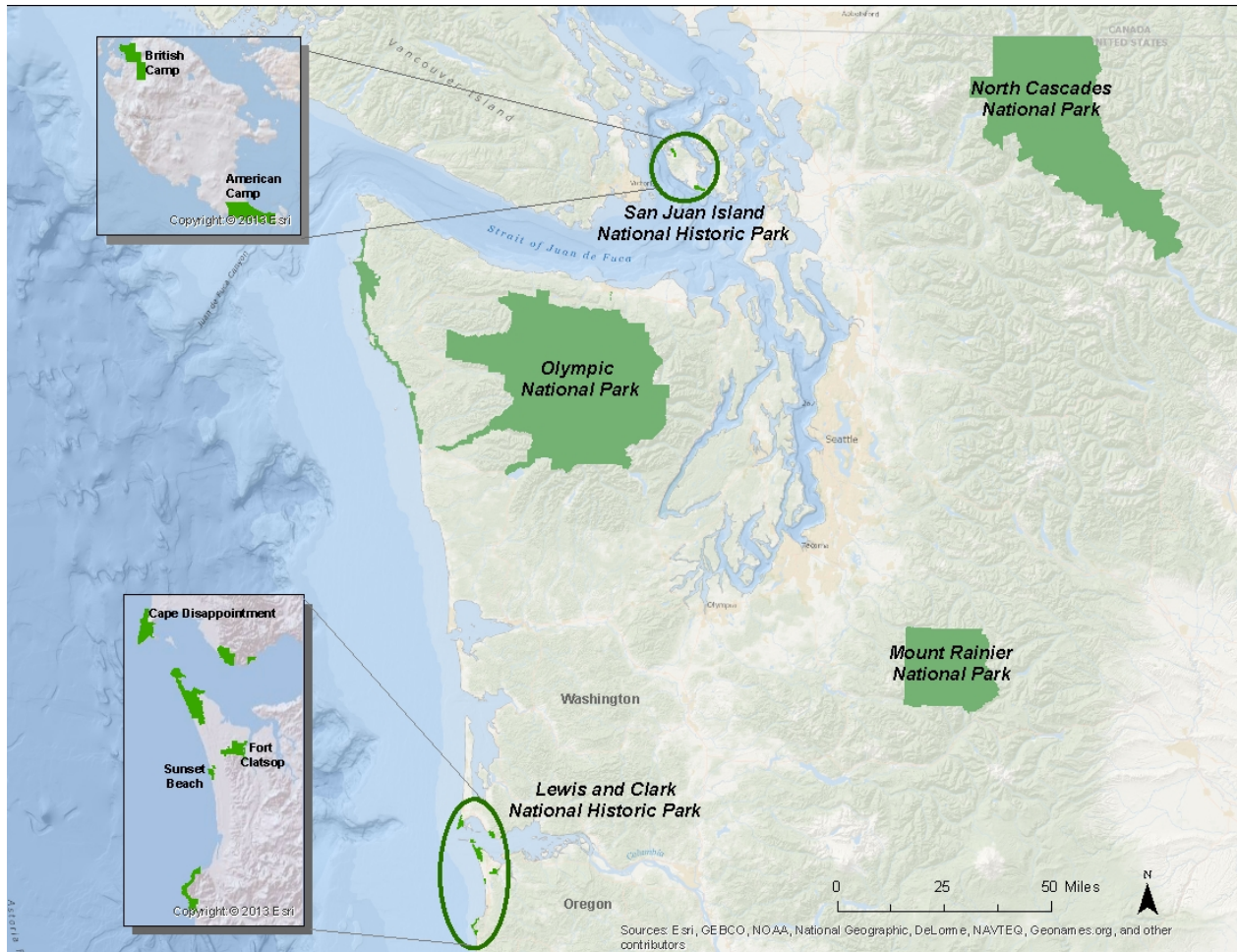
The specific objectives of the NCCN Landbird Monitoring Project are:

- 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, will be conducted in conjunction with periodic detailed trend analyses.

## 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 8-12 points, extending perpendicularly (or as close to perpendicularly as topographic and physiographic features allow) in both directions away from the trail.

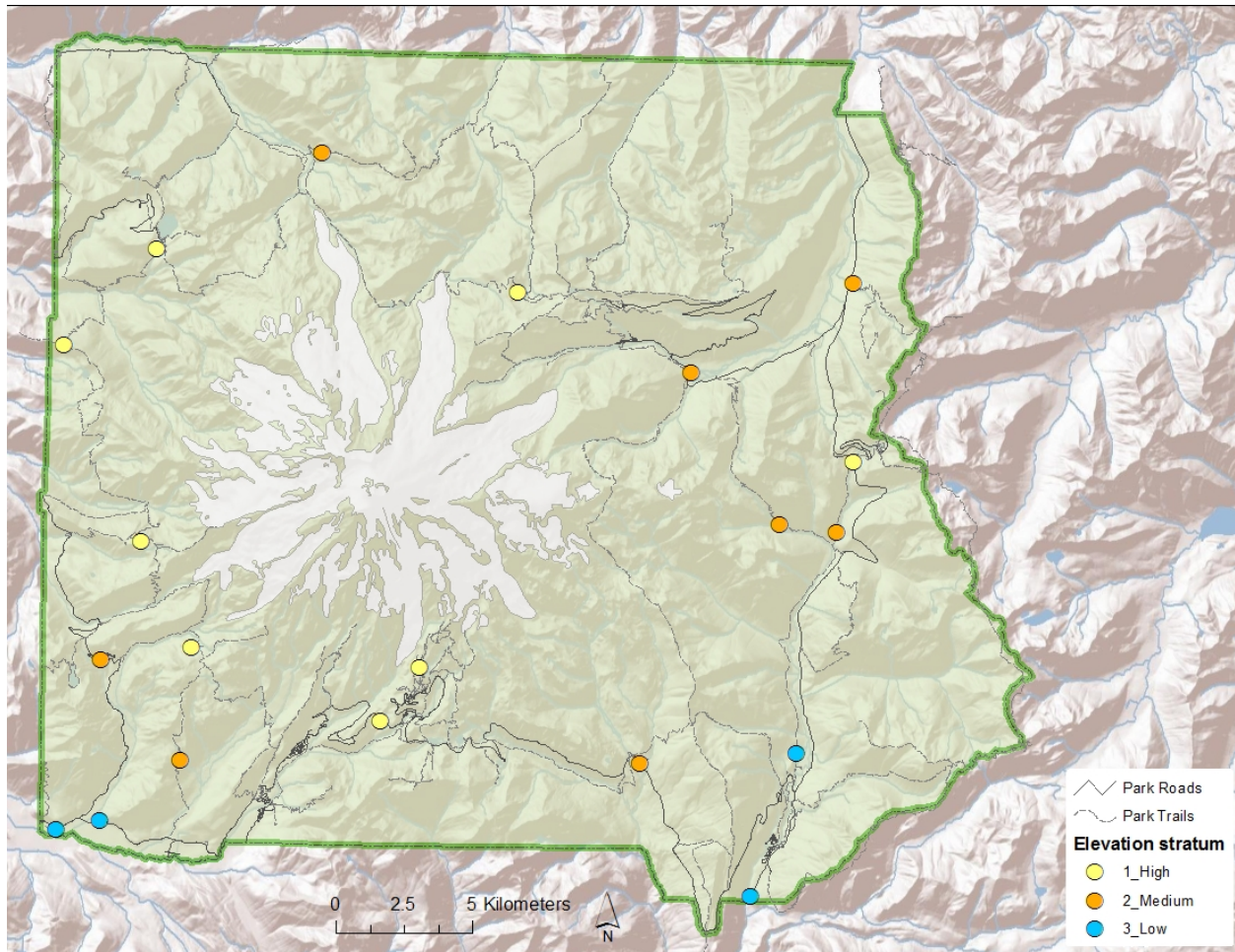
In 2013 we implemented the full study design in the three large parks for the seventh consecutive year, including surveys of the annual panel ('Ann1') as well as the second alternating panel ('Alt3') (Figures 2-4). During the first two years of protocol development (2005-2006) we surveyed only the annual panel (Siegel et al. 2006, 2009b). We provide results from each of the first six years of full implementation in Siegel et al. (2008), Wilkerson et al. (2009b, 2010), and Holmgren et al. (2011, 2012, 2013), and a more in-depth analysis of results multi-year trend results for the period 200-2012 in Saracco et al. (*in press*).

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 2013 we surveyed the grid at SAJH (Figure 5).

### Crew Training and Certification

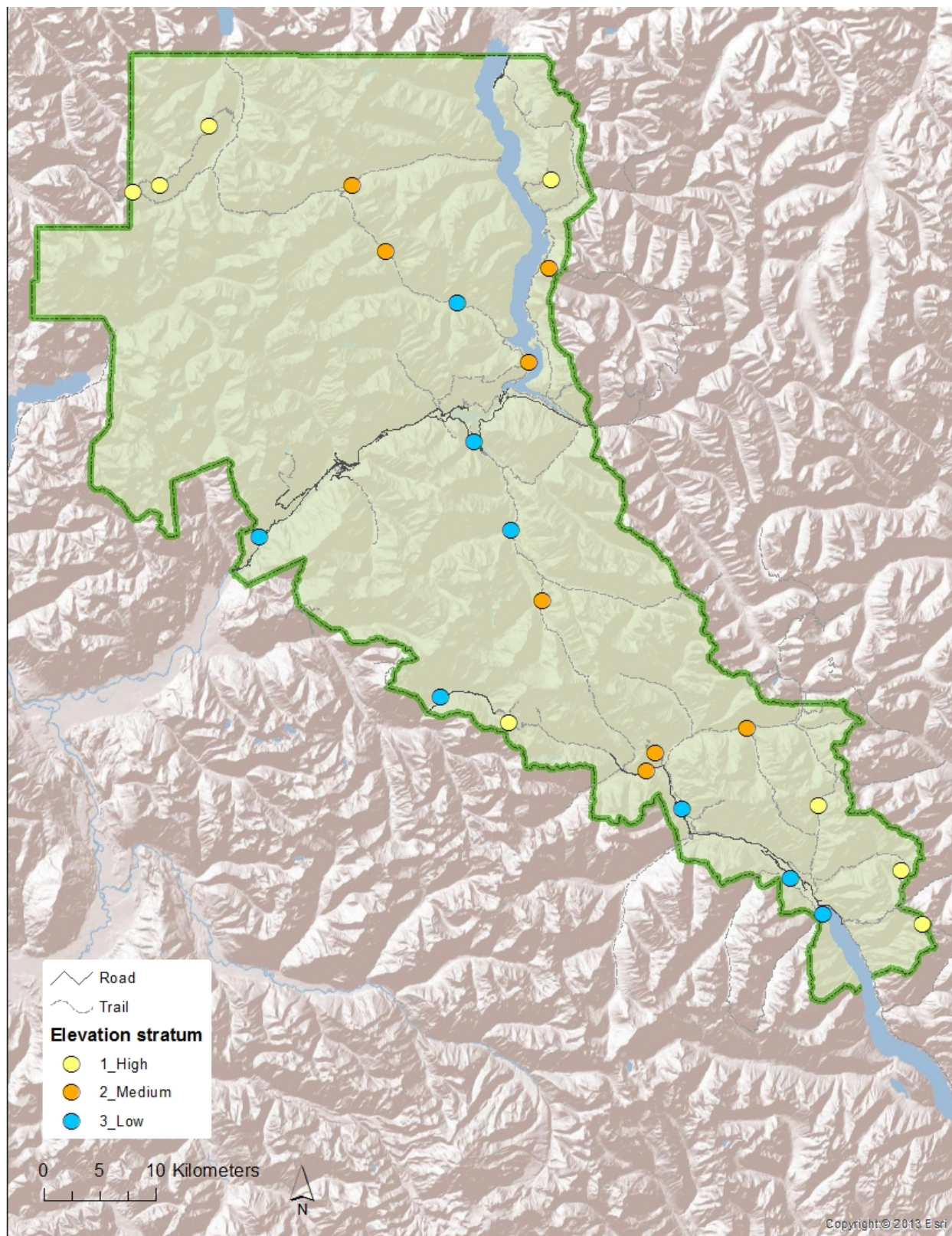
Mandy Holmgren, a Staff Biologist with The Institute for Bird Populations (IBP), served as the 2013 Field Lead. Mandy began training six field technicians on April 30, with assistance from IBP Staff Biologist Bob Wilkerson, former NPS Project Lead Bob Kuntz, and NPS Biologist Scott Gremel. Training followed guidelines described in the NCCN landbird monitoring protocol (Siegel et al. 2007). By the end of the official training session on May 19, three of the six field technicians had passed the rigorous point count certification exam, and were ready to begin collecting data. Two technicians were certified about two weeks later. One intern never passed the exam and consequently did not conduct any point counts during the field season. Instead, she worked on other field tasks and data entry. All individuals who collected data during the 2013 field season (Table 1) were employees or field biologist interns of The Institute for Bird Populations or employees of the National Park Service.





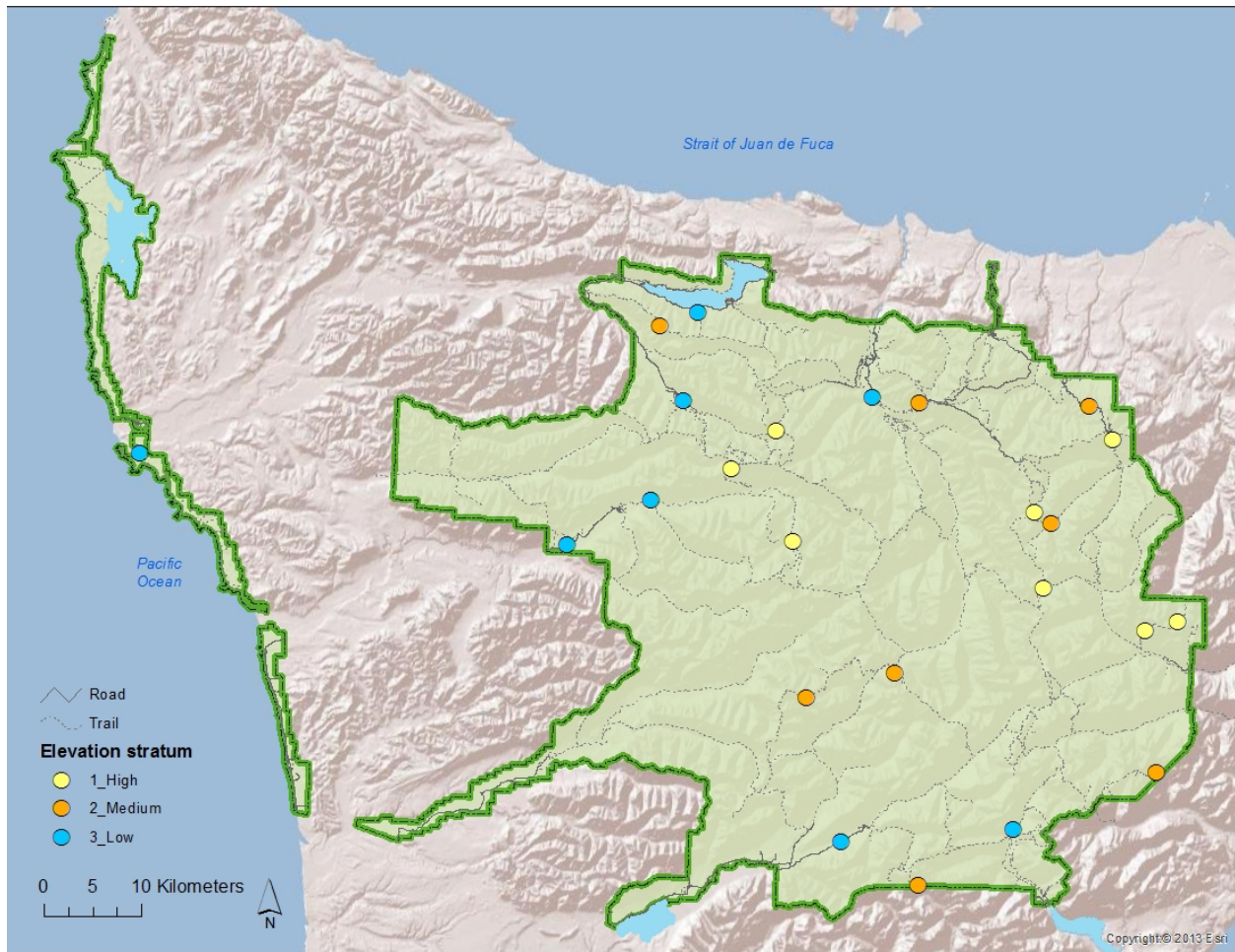
**Figure 2.** Approximate locations of transects conducted at Mount Rainier National Park in 2013.



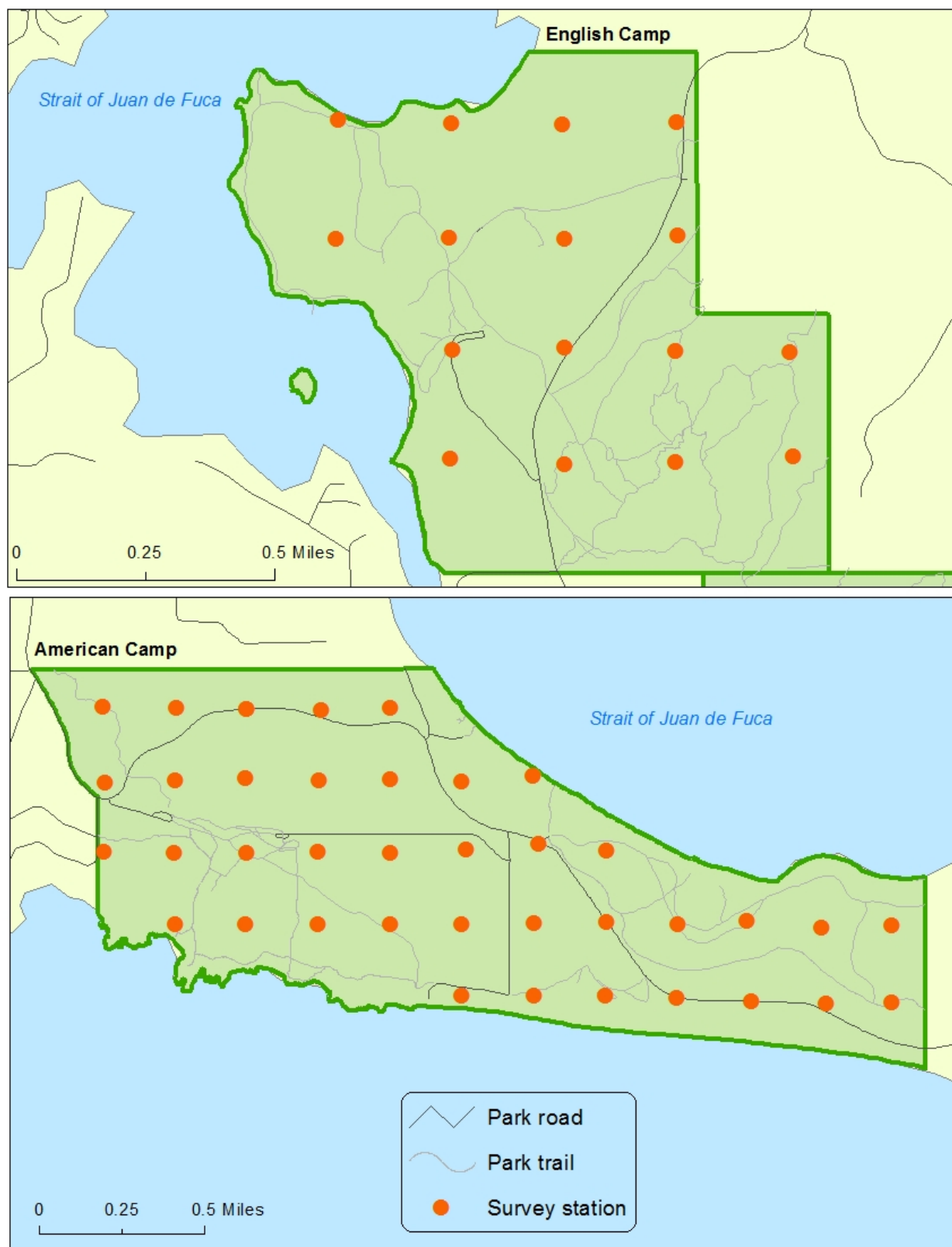


**Figure 3.** Approximate locations of transects conducted at North Cascades National Park Complex in 2013.





**Figure 4.** Approximate locations of transects conducted at Olympic National Park in 2013.



**Figure 5.** Locations of point count stations surveyed at San Juan Island National Historical Park in 2013; adjacent point count stations are 350 m apart.

**Table 1.** Observers who conducted point counts in the North Coast and Cascades Network in 2013.

Observer	Role
Wesley Bowens	Technician
Gavin Cotterill	Technician
Scott Gremel	NPS Biologist
Mandy Holmgren	Field Lead
Michael Krzywicki	Technician
Jay Love	Technician
Daniel Rousseau	Technician

## Data Collection

All point count data were collected between May 24 and May 29 at SAJH, between June 7 and July 29 at MORA, between June 3 and July 28 at NOCA, and between May 24 and July 28 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. Crew members were provided with maps and coordinates indicating the location of transect ‘starting points’ for those transects that had not yet been established (NOCA-1032, NOCA-1037, and NOCA-1057), the starting points lying directly on trails or roads. There were three transects that had not been established before 2013 due to snow and logistical issues in 2008. Crew members were also provided maps and coordinates of all point count station locations on the already-established transects, as well as narrative descriptions of point count stations and the travel routes between successive stations. 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.

When surveying already-established transects, crew members used the maps and narrative descriptions to locate the same point count stations that were established and surveyed in previous years. When surveying transects that had not yet been established, crew members began from the indicated starting points, and then established transect routes according to the guidelines in Siegel et al. (2007).

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.

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 will be assessed quantitatively, allowing for annual results to be adjusted to account for variable detectability (Buckland et al. 2001, Nichols et al. 2009). Until that analysis is completed, any results should be viewed as provisional only.

## Results

We surveyed all of the 2013 transects in the large parks, including 34 annual-panel and 34 second-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 306 individual point counts at MORA, 409 point counts at NOCA and 349 point counts at OLYM (Table 2). We also conducted 54 point counts at SAJH, including 38 at American Camp and 16 at English Camp. During the 1,064 point counts in the three large parks, we counted 8,948 individual birds. Across the three large parks, we documented the presence of 137 species (Table 4), 92 of which were detected during point counts; the remaining 45 species were recorded only as incidental detections or on “Rare Bird Report Forms”. At SAJH our field crew detected 84 species while in the park, 68 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, 67 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 1,010 individual bird detections (6.23 detections/point) at MORA, 2,173 detections (10.25 detections/point) at NOCA, and 1,298 detections (7.25 detections per point) at OLYM (Table 5). The five most frequently detected species on the annual-panel transects in 2013 were: pine siskin (403 detections), Pacific wren (330 detections), dark-eyed junco (323 detections), varied thrush (315 detections), and golden-crowned kinglet (250 detections).

Pooling data across the annual-panel transects as well as the transects in the second 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 52 bird species during point counts at MORA, 80 species during point counts at NOCA, and 60 species during point counts at OLYM (Table 6). Considering data from all 68 surveyed transects, the five most frequently detected species were: pine siskin (912 detections), dark-eyed junco (650 detections), Pacific wren (597 detections), varied thrush (590 detections), and Townsend’s warbler (481 detections).

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

For 57 species (all species for which we amassed at least 30 point count detections over the period between 2005 and 2013), we present the total number of detections of each species on each park’s annual panel transects during the 2005-2013 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 SAJH our 54 point counts yielded 1,272 detections of 68 species (Table 8), a detection rate of 23.56 birds per point. The most frequently detected species was red crossbill (148 detections), followed by American robin (100 detections), brown-headed cowbird (55 detections), white-crowned sparrow (also 55 detections), Swainson's thrush (54 detections), and pine siskin (also 54 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 2013.

Park	Panel	Elevation	Transect	No. of points surveyed
MORA	Ann1	Low	4001	16
MORA	Ann1	Low	4005	13
MORA	Ann1	Medium	4002	15
MORA	Ann1	Medium	4004	17
MORA	Ann1	Medium	4009	15
MORA	Ann1	Medium	4012	19
MORA	Ann1	High	4003	14
MORA	Ann1	High	4007	20
MORA	Ann1	High	4011	16
MORA	Ann1	High	4014	17
MORA	Alt3	Low	4010	14
MORA	Alt3	Low	4018	14
MORA	Alt3	Medium	4028	12
MORA	Alt3	Medium	4042	13
MORA	Alt3	Medium	4044	16
MORA	Alt3	Medium	4048	12
MORA	Alt3	High	4029	14
MORA	Alt3	High	4030	15
MORA	Alt3	High	4032	15
MORA	Alt3	High	4033	19
NOCA	Ann1	Low	1013	15
NOCA	Ann1	Low	1017	14
NOCA	Ann1	Low	1020	17
NOCA	Ann1	Low	1023	21
NOCA	Ann1	Medium	1015	17
NOCA	Ann1	Medium	1018	25
NOCA	Ann1	Medium	1022	15
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	Alt3	Low	1027	16
NOCA	Alt3	Low	1028	14
NOCA	Alt3	Low	1029	15
NOCA	Alt3	Low	1034	14
NOCA	Alt3	Medium	1025	15
NOCA	Alt3	Medium	1026	15
NOCA	Alt3	Medium	1057	16
NOCA	Alt3	Medium	1031	20

**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 2013 (continued).

<b>Park</b>	<b>Panel</b>	<b>Elevation</b>	<b>Transect</b>	<b>No. of points surveyed</b>
NOCA	Alt3	High	1032	13
NOCA	Alt3	High	1037	20
NOCA	Alt3	High	1039	20
NOCA	Alt3	High	1040	19
OLYM	Ann1	Low	3001	12
OLYM	Ann1	Low	3121	17
OLYM	Ann1	Low	3126	15
OLYM	Ann1	Low	3134	19
OLYM	Ann1	Medium	3122	17
OLYM	Ann1	Medium	3123	15
OLYM	Ann1	Medium	3130	10
OLYM	Ann1	Medium	3200	23
OLYM	Ann1	High	3124	12
OLYM	Ann1	High	3125	12
OLYM	Ann1	High	3127	15
OLYM	Ann1	High	3128	12
OLYM	Alt3	Low	3146	15
OLYM	Alt3	Low	3149	12
OLYM	Alt3	Low	3151	17
OLYM	Alt3	Low	3153	16
OLYM	Alt3	Medium	3143	11
OLYM	Alt3	Medium	3150	12
OLYM	Alt3	Medium	3152	13
OLYM	Alt3	Medium	3154	16
OLYM	Alt3	High	3147	19
OLYM	Alt3	High	3148	16
OLYM	Alt3	High	3156	11
OLYM	Alt3	High	3157	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 2013.

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

<sup>a</sup>Only the annual panel transects were surveyed in 2005 and 2006, during the protocol development phase of the project.

<sup>b</sup>The annual panel along with the first alternating panel were surveyed in 2007 and 2012.

<sup>c</sup>The annual panel along with the second alternating panel were surveyed in 2008 and 2013.

<sup>d</sup>The annual panel along with the third alternating panel were surveyed in 2009.

<sup>e</sup>The annual panel along with the fourth alternating panel were surveyed in 2010.

<sup>f</sup>The 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 2013 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
Canada Goose	<i>Branta canadensis</i>
Wood Duck*	<i>Aix sponsa</i>
Mallard*	<i>Anas platyrhynchos</i>
Green-winged Teal*	<i>Anas crecca</i>
Ring-necked Duck*	<i>Aythya collaris</i>
Lesser Scaup*	<i>Aythya affinis</i>
Harlequin Duck*	<i>Histrionicus histrionicus</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>
Ruffed Grouse*	<i>Bonasa umbellus</i>
White-tailed Ptarmigan*	<i>Lagopus leucura</i>
Sooty Grouse	<i>Dendragapus fuliginosus</i>
Red-throated Loon*	<i>Gavia stellata</i>
Common Loon	<i>Gavia immer</i>
Great Blue Heron	<i>Ardea herodias</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>
Killdeer*	<i>Charadrius vociferus</i>
Spotted Sandpiper	<i>Actitis macularius</i>
Marbled Murrelet*	<i>Brachyramphus marmoratus</i>
Rhinoceros Auklet*	<i>Cerorhinca monocerata</i>
Ring-billed Gull*	<i>Larus delawarensis</i>
Glaucous-winged Gull*	<i>Larus glaucescens</i>
Caspian Tern*	<i>Hydroprogne caspia</i>
Band-tailed Pigeon	<i>Patagioenas fasciata</i>
Eurasian Collared-dove*	<i>Streptopelia decaocto</i>
Mourning Dove	<i>Zenaida macroura</i>
Great Horned Owl*	<i>Bubo virginianus</i>
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>
Spotted Owl*	<i>Strix occidentalis</i>
Barred Owl	<i>Strix varia</i>
Boreal Owl*	<i>Aegolius funereus</i>
Common Nighthawk	<i>Chordeiles minor</i>
Black Swift	<i>Cypseloides niger</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>

**Table 4.** All species recorded in the three large North Coast and Cascades Network parks during the 2013 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
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>
Black-backed Woodpecker	<i>Picoides arcticus</i>
Northern Flicker	<i>Colaptes auratus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
American Kestrel*	<i>Falco sparverius</i>
Peregrine Falcon*	<i>Falco peregrinus</i>
Prairie Falcon*	<i>Falco mexicanus</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>
Western Kingbird*	<i>Tyrannus verticalis</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>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Brown Creeper	<i>Certhia americana</i>
Canyon Wren*	<i>Catherpes mexicanus</i>
House Wren	<i>Troglodytes aedon</i>
Pacific Wren	<i>Troglodytes pacificus</i>
Marsh Wren*	<i>Cistothorus palustris</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>

**Table 4.** All species recorded in the three large North Coast and Cascades Network parks during the 2013 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
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>
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>
Savannah Sparrow*	<i>Passerculus sandwichensis</i>
Fox Sparrow	<i>Passerella iliaca</i>
Song Sparrow	<i>Melospiza melodia</i>
Lincoln's Sparrow*	<i>Melospiza lincolni</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>
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>
American Goldfinch*	<i>Spinus tristis</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 2013.

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Canada Goose		1		1		3		3
Sooty Grouse	1	5	7	13	4	17	11	32
Great Blue Heron	1			1	1			1
Osprey		2		2		4		4
Red-tailed Hawk			1	1			1	1
Spotted Sandpiper	1	1	2	4	1	3	2	6
Band-tailed Pigeon			2	2			5	5
Mourning Dove			1	1			1	1
Common Nighthawk			1	1			2	2
Black Swift		2		2		9		9
Vaux's Swift	5	2	3	10	19	5	13	37
Rufous Hummingbird	6	10	8	24	19	21	13	53
Calliope Hummingbird		1		1		2		2
Belted Kingfisher			1	1			1	1
Red-breasted Sapsucker	1	4	2	7	1	18	2	21
Downy Woodpecker		1	1	2		1	1	2
Hairy Woodpecker	4	7	10	21	7	16	18	41
American Three-toed Woodpecker		1		1		4		4
Northern Flicker	2	4	5	11	2	7	13	22
Pileated Woodpecker	2	3	1	6	2	3	2	7
Olive-sided Flycatcher	3	5	5	13	4	10	12	26
Western Wood-Pewee		4		4		30		30
Willow Flycatcher		1		1		3		3
Hammond's Flycatcher	2	8	6	16	7	86	14	107
Dusky Flycatcher		1		1		5		5
Pacific-slope Flycatcher	6	5	9	20	38	24	122	184
Cassin's Vireo		5		5		19		19

**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 2013 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Hutton's Vireo			1	1			1	1
Warbling Vireo	2	7	4	13	4	59	27	90
Red-eyed Vireo		3		3		10		10
Gray Jay	6	3	3	12	13	8	6	27
Steller's Jay	3	2	5	10	6	6	14	26
Clark's Nutcracker		1		1		13		13
American Crow			1	1			3	3
Common Raven	2	3	2	7	8	4	2	14
Violet-green Swallow	1	1	1	3	3	4	1	8
Barn Swallow	1			1	11			11
Mountain Chickadee	1	3		4	2	14		16
Chestnut-backed Chickadee	7	10	11	28	50	91	83	224
Red-breasted Nuthatch	8	9	6	23	22	55	39	116
Brown Creeper	7	6	8	21	26	15	14	55
Pacific Wren	9	9	12	30	94	108	128	330
American Dipper	1	1	2	4	1	1	2	4
Golden-crowned Kinglet	9	10	12	31	81	64	105	250
Ruby-crowned Kinglet		1	1	2		1	3	4
Mountain Bluebird		1		1		1		1
Townsend's Solitaire		1	4	5		1	7	8
Veery		3		3		8		8
Swainson's Thrush	3	8	5	16	6	117	26	149
Hermit Thrush	7	7	6	20	35	75	57	167
American Robin	5	11	7	23	23	85	51	159
Varied Thrush	9	8	12	29	102	123	90	315
American Pipit	2		1	3	9		2	11
Cedar Waxwing		3	1	4		20	2	22

**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 2013 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Orange-crowned Warbler	1		1	2	1		2	3
Nashville Warbler		4		4		16		16
MacGillivray's Warbler		9		9		78		78
Common Yellowthroat		1		1		1		1
Yellow Warbler		5	1	6		72	5	77
Yellow-rumped Warbler	1	12	2	15	3	107	6	116
Black-throated Gray Warbler	1	3	2	6	1	10	3	14
Townsend's Warbler	7	7	5	19	45	109	35	189
Hermit Warbler	2			2	2			2
Wilson's Warbler	1	3	4	8	1	8	32	41
Spotted Towhee		1		1		1		1
Chipping Sparrow		7		7		40		40
Fox Sparrow		3		3		11		11
Song Sparrow	1	6	4	11	2	18	6	26
White-crowned Sparrow	1		1	2	1		1	2
Dark-eyed Junco	9	11	12	32	67	117	139	323
Western Tanager	4	10	3	17	8	85	7	100
Black-headed Grosbeak	1	7	1	9	1	15	1	17
Lazuli Bunting		1		1		1		1
Brown-headed Cowbird		2		2		8		8
Gray-crowned Rosy-Finch	2			2	12			12
Pine Grosbeak	1	2		3	1	5		6
Purple Finch		1		1		3		3
Cassin's Finch		4		4		21		21
Red Crossbill	4	3	6	13	35	28	44	107
Pine Siskin	10	8	8	26	162	137	104	403

**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 2013 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Evening Grosbeak	9	7	6	22	67	109	17	193
All species pooled					1,010	2,173	1,298	4,481
Detections per point (all species pooled)					6.23	10.25	7.25	8.1



**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 2013.

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Canada Goose		1		1		3		3
Sooty Grouse	1	12	15	28	4	39	29	72
Common Loon		1		1		1		1
Great Blue Heron	1			1	1			1
Osprey		3		3		5		5
Bald Eagle		1	1	2		1	1	2
Sharp-shinned Hawk		1		1		2		2
Northern Goshawk		2		2		2		2
Red-tailed Hawk			1	1			1	1
Spotted Sandpiper	2	4	2	8	3	6	2	11
Band-tailed Pigeon	1	1	4	6	4	2	7	13
Mourning Dove			1	1			1	1
Northern Pygmy-Owl			1	1			1	1
Barred Owl		1		1		2		2
Common Nighthawk			1	1			2	2
Black Swift		3		3		16		16
Vaux's Swift	10	5	6	21	45	12	20	77
Rufous Hummingbird	9	18	17	44	32	55	25	112
Calliope Hummingbird		2		2		4		4
Belted Kingfisher		1	1	2		1	1	2
Red-breasted Sapsucker	3	6	2	11	4	20	2	26
Downy Woodpecker		2	1	3		2	1	3
Hairy Woodpecker	5	14	18	37	9	25	36	70
American Three-toed Woodpecker		1		1		4		4
Black-backed Woodpecker		1		1		1		1
Northern Flicker	6	10	9	25	7	15	20	42
Pileated Woodpecker	5	4	2	11	7	4	3	14

**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 2013 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Olive-sided Flycatcher	6	12	10	28	10	21	28	59
Western Wood-Pewee	1	8	1	10	1	54	1	56
Willow Flycatcher		2	1	3		4	1	5
Hammond's Flycatcher	6	17	12	35	12	176	32	220
Dusky Flycatcher		3		3		7		7
Pacific-slope Flycatcher	14	8	20	42	80	29	245	354
Cassin's Vireo		11		11		43		43
Hutton's Vireo			1	1			1	1
Warbling Vireo	4	17	7	28	8	111	36	155
Red-eyed Vireo		6		6		17		17
Gray Jay	12	4	10	26	39	10	19	68
Steller's Jay	6	6	10	22	16	14	23	53
Clark's Nutcracker		4		4		26		26
American Crow		1	2	3		1	4	5
Common Raven	6	6	6	18	13	7	13	33
Violet-green Swallow	1	1	1	3	3	4	1	8
Northern Rough-winged Swallow			1	1			1	1
Barn Swallow	1			1	11			11
Mountain Chickadee	1	6		7	2	33		35
Chestnut-backed Chickadee	16	20	22	58	116	126	143	385
Red-breasted Nuthatch	18	20	15	53	62	95	68	225
Brown Creeper	15	13	13	41	47	32	35	114
House Wren		1		1		2		2
Pacific Wren	19	19	22	60	175	176	246	597
American Dipper	1	2	2	5	1	3	2	6
Golden-crowned Kinglet	18	21	23	62	147	125	205	477

**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 2013 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
Ruby-crowned Kinglet		2	5	7		4	21	25
Mountain Bluebird		2		2		7		7
Townsend's Solitaire	1	4	7	12	1	6	12	19
Veery		5		5		12		12
Swainson's Thrush	5	18	8	31	10	312	35	357
Hermit Thrush	15	16	14	45	80	171	104	355
American Robin	13	22	15	50	48	144	72	264
Varied Thrush	19	16	22	57	243	175	172	590
American Pipit	2		3	5	9		6	15
Cedar Waxwing	1	5	1	7	1	28	2	31
Orange-crowned Warbler	1		1	2	1		2	3
Nashville Warbler		8		8		37		37
MacGillivray's Warbler		17	3	20		126	16	142
Common Yellowthroat		2		2		5		5
American Redstart		1		1		1		1
Yellow Warbler	1	12	4	17	1	100	13	114
Yellow-rumped Warbler	4	24	4	32	10	271	13	294
Black-throated Gray Warbler	1	6	3	10	1	23	6	30
Townsend's Warbler	14	17	9	40	85	271	125	481
Townsend's x Hermit Warbler hybrid	1			1	1			1
Hermit Warbler	3		1	4	3		2	5
Wilson's Warbler	2	3	8	13	2	8	40	50
Spotted Towhee		1		1		1		1
Chipping Sparrow		14		14		89		89
Fox Sparrow		6		6		25		25
Song Sparrow	1	7	4	12	2	21	6	29

**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 2013 (continued).

Species	Number of transects with detections				Number of individual detections			
	MORA	NOCA	OLYM	ALL	MORA	NOCA	OLYM	ALL
White-crowned Sparrow	1	1	2	4	1	1	2	4
Dark-eyed Junco	18	23	22	63	151	242	257	650
Western Tanager	11	20	7	38	30	225	24	279
Black-headed Grosbeak	2	15	1	18	2	29	1	32
Lazuli Bunting		3		3		4		4
Brown-headed Cowbird		3		3		9		9
Gray-crowned Rosy-Finch	2	2		4	12	4		16
Pine Grosbeak	2	4	3	9	2	7	8	17
Purple Finch		3		3		6		6
Cassin's Finch		7		7		39		39
Red Crossbill	10	6	11	27	69	38	129	236
Pine Siskin	19	18	15	52	275	334	303	912
Evening Grosbeak	15	13	12	40	135	132	42	309
All species pooled					2,034	4,245	2,669	8,948
Detections per point (all species pooled)					6.65	10.38	7.65	8.41
Number of species detected during point counts					52	80	60	92

**Table 7.** Species listed under the Endangered Species Act recorded on “Rare Bird Detection Forms” in each park in 2013, excluding individuals that were also detected during point counts.

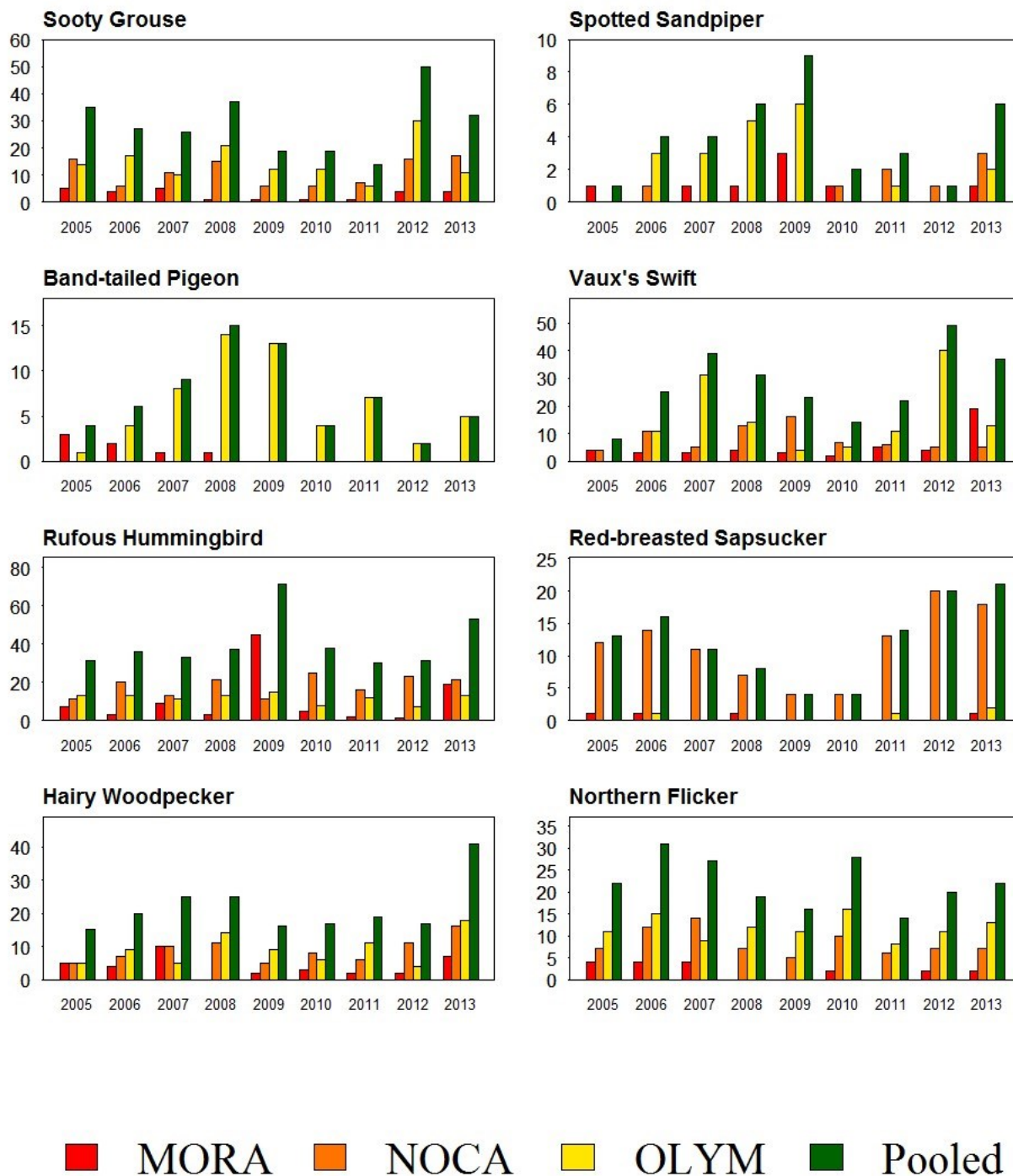
Species	Number of birds detected (excluding individuals also detected during point counts)		
	Mount Rainier	North Cascades	Olympic
Spotted Owl			1
Marbled Murrelet			2

**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 2013.

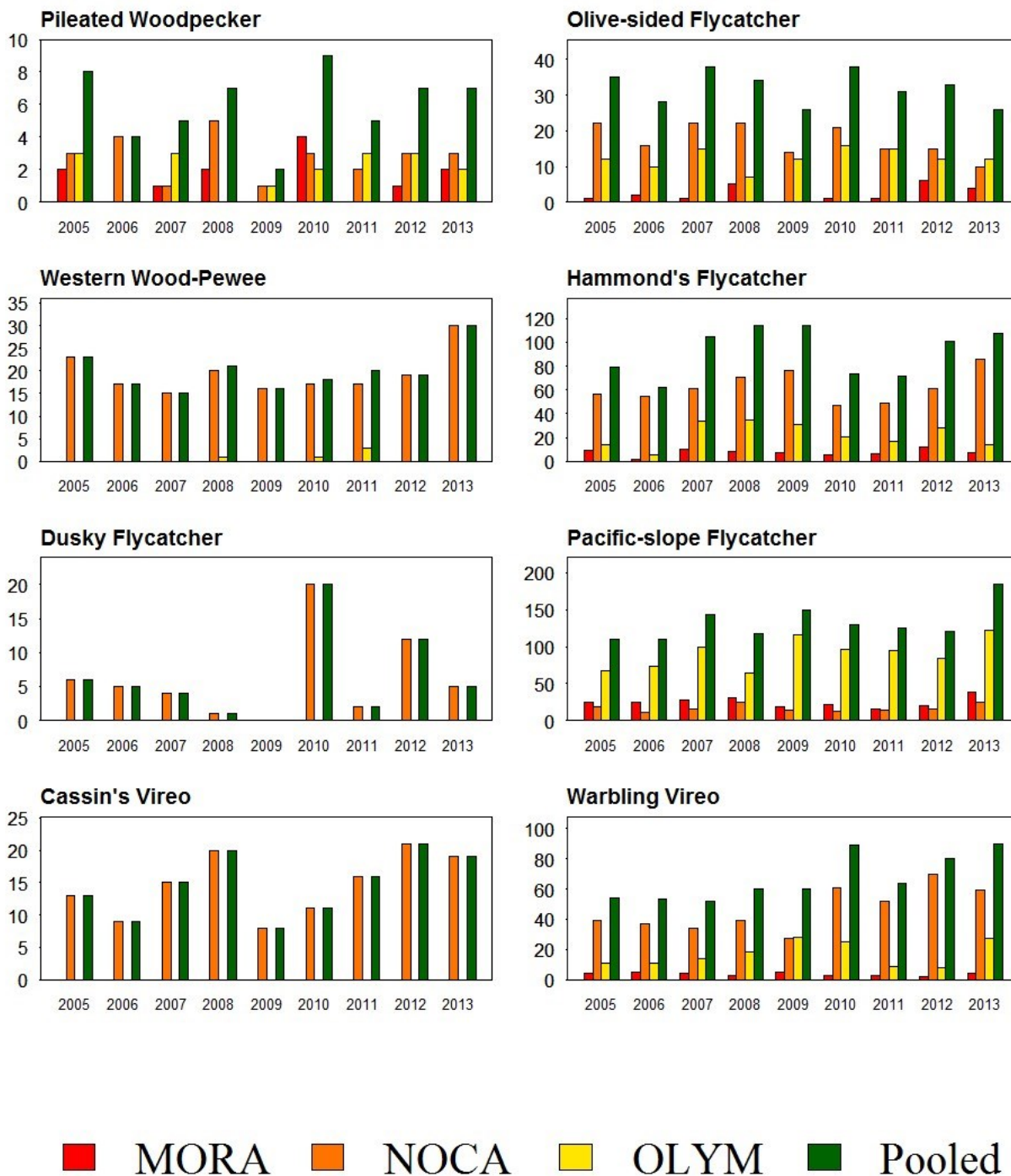
Species	Number of points with detections	Number of individual detections
Canada Goose	5	12
Surf Scoter	1	47
California Quail	7	9
Common Loon	1	1
Great Blue Heron	1	2
Turkey Vulture	1	1
Bald Eagle	8	10
Red-tailed Hawk	1	1
Killdeer	1	1
Common Murre	1	4
Rhinoceros Auklet	1	8
Glaucous-winged Gull	1	1
Eurasian Collared-dove	4	4
Mourning Dove	3	4
Vaux's Swift	3	4
Rufous Hummingbird	11	12
Belted Kingfisher	1	1
Hairy Woodpecker	2	2
Northern Flicker	3	3
Pileated Woodpecker	3	3
Olive-sided Flycatcher	8	8
Dusky Flycatcher	1	1
Pacific-slope Flycatcher	27	48
Cassin's Vireo	3	3
Hutton's Vireo	1	1
Warbling Vireo	13	14
American Crow	13	22
Common Raven	12	21
Tree Swallow	1	1

**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 2013 (continued).

<b>Species</b>	<b>Number of points with detections</b>	<b>Number of individual detections</b>
Violet-green Swallow	4	7
Northern Rough-winged Swallow	1	3
Cliff Swallow	1	2
Barn Swallow	4	9
Chestnut-backed Chickadee	24	35
Bushtit	2	11
Red-breasted Nuthatch	16	20
Brown Creeper	15	18
House Wren	26	39
Pacific Wren	5	7
Bewick's Wren	11	12
Golden-crowned Kinglet	10	11
Swainson's Thrush	35	54
American Robin	50	100
European Starling	2	2
Cedar Waxwing	3	6
Orange-crowned Warbler	27	40
Common Yellowthroat	9	11
Yellow Warbler	2	3
Yellow-rumped Warbler	9	9
Black-throated Gray Warbler	12	15
Townsend's Warbler	7	12
Wilson's Warbler	13	15
Spotted Towhee	29	40
Chipping Sparrow	5	6
Savannah Sparrow	20	52
Song Sparrow	27	34
White-crowned Sparrow	30	55
Dark-eyed Junco	15	20
Western Tanager	14	15
Black-headed Grosbeak	8	10
Red-winged Blackbird	9	18
Brown-headed Cowbird	29	55
House Finch	15	21
Purple Finch	10	11
Red Crossbill	22	148
Pine Siskin	23	54
American Goldfinch	24	42
Evening Grosbeak	1	1

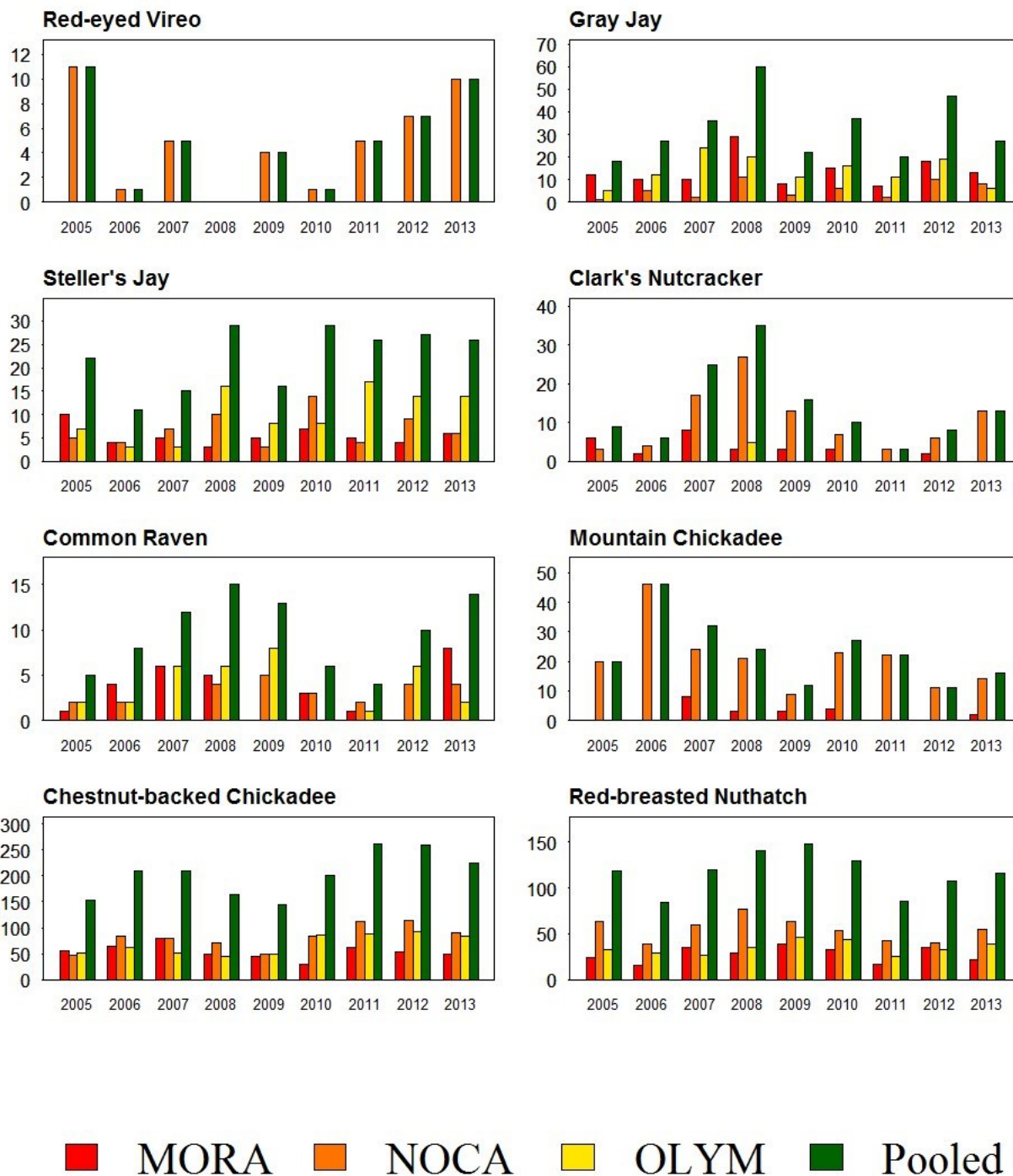


**Figure 6.** Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005-2013 field seasons. The figure includes all species for which we amassed at least 30 point count detections on annual-panel transects over the nine 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.

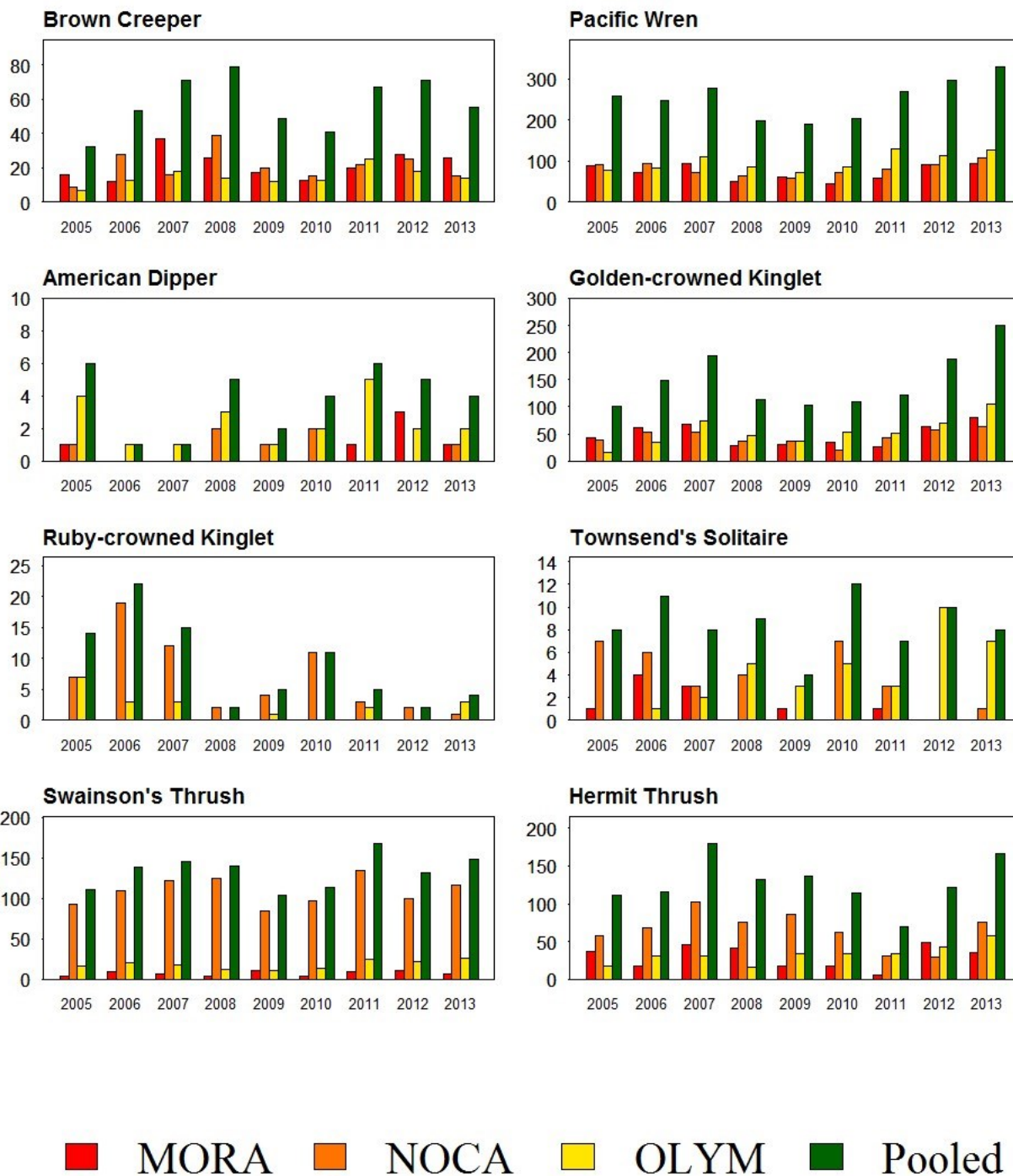


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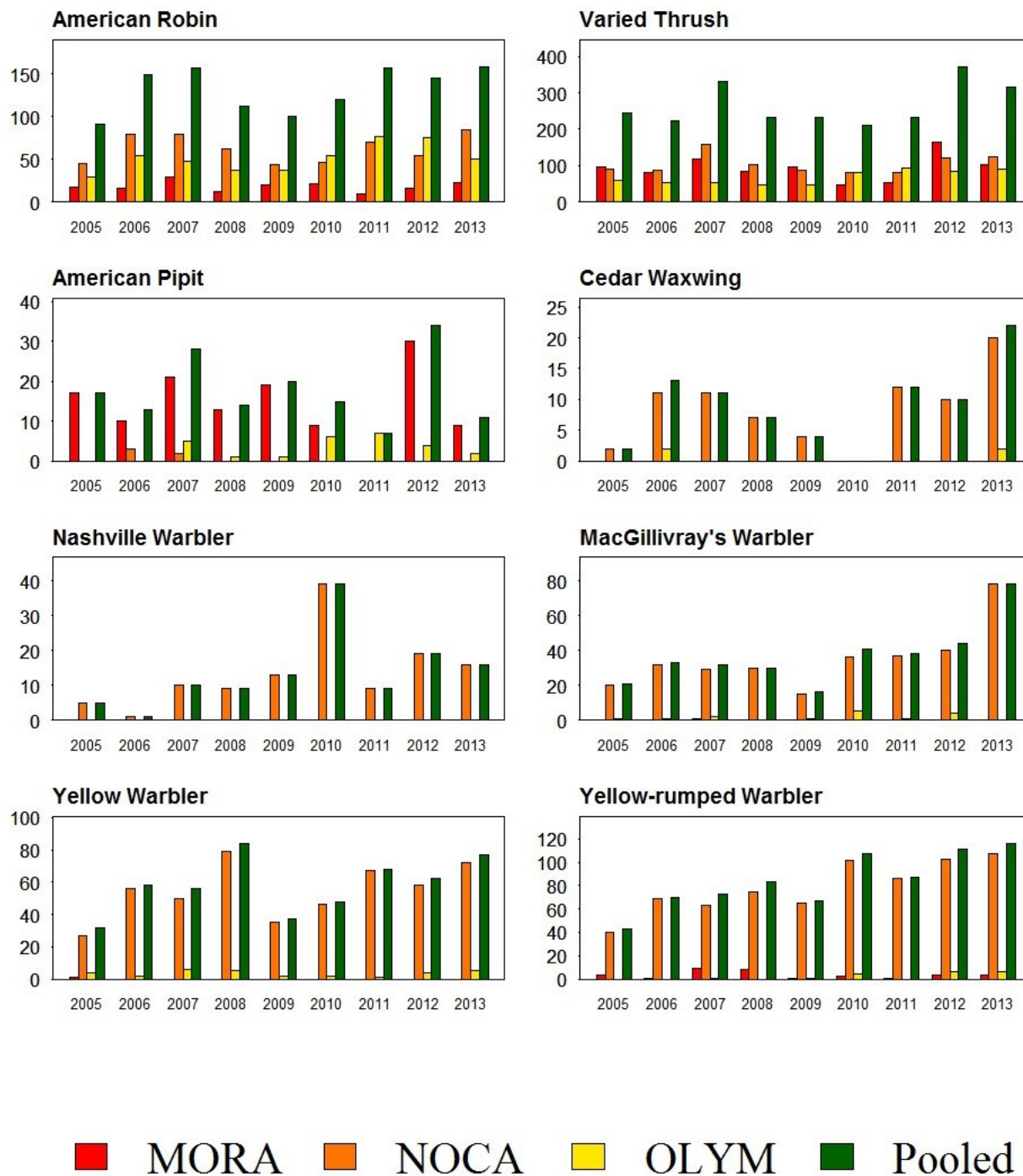




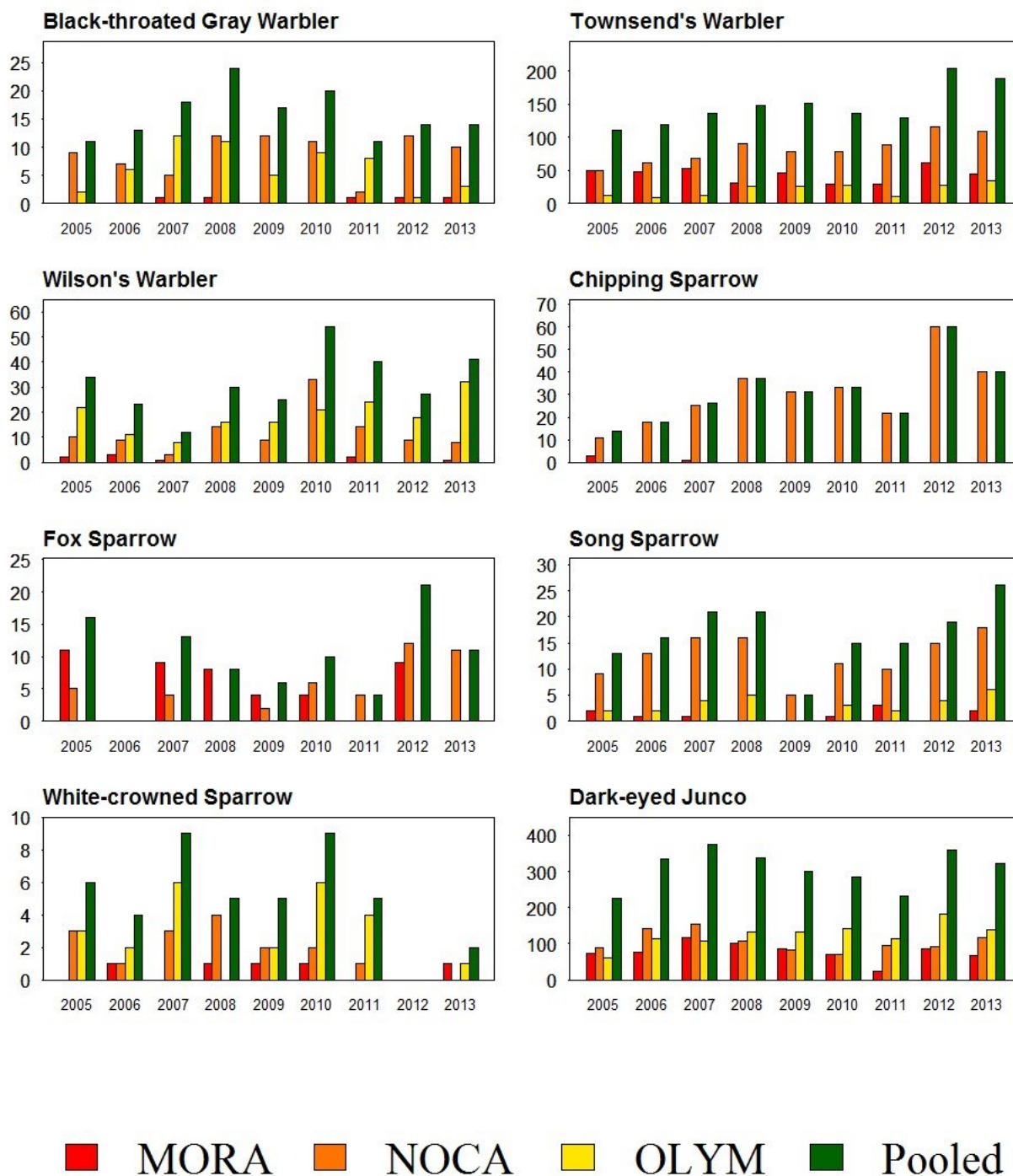
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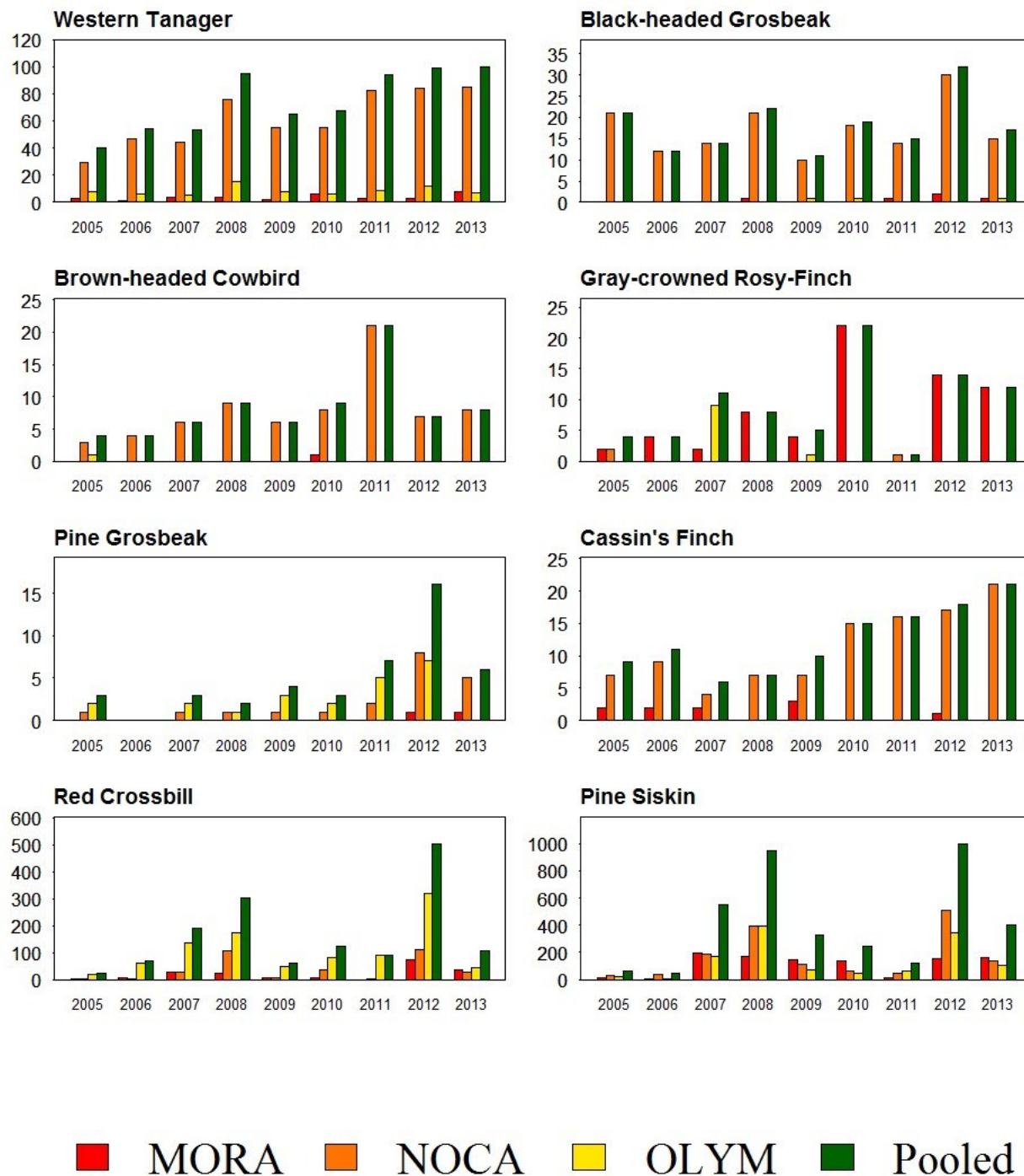


**Figure 6.** Number of times each species was detected on annual-panel transects at Mount Rainier (MORA), North Cascades (NOCA), and Olympic (OLYM) National Parks, and all three parks pooled (always presented in that order) during the 2005-2013 field seasons. The figure includes all species for which we amassed at least 30 point count detections on annual-panel transects over the nine 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).

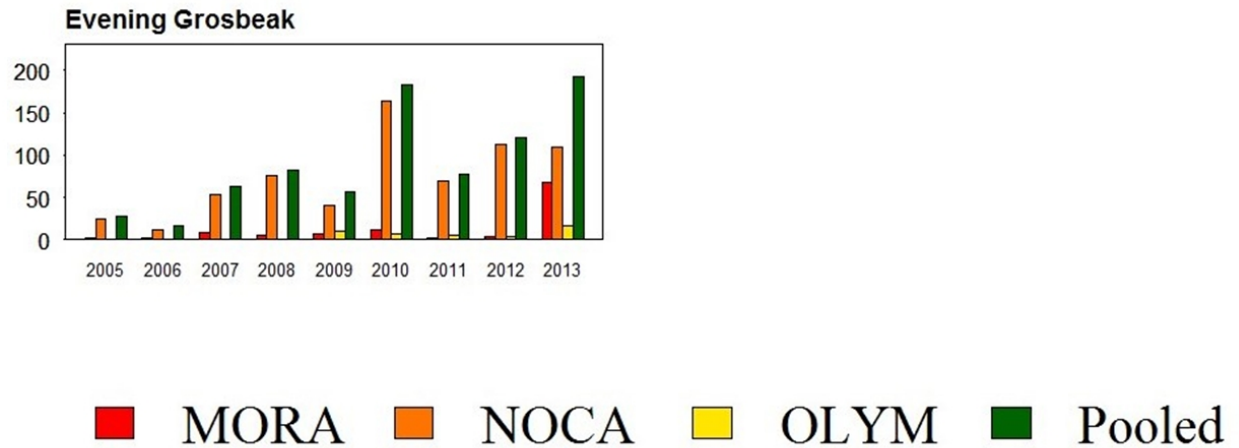


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## Discussion

With the experience gained from two pilot field seasons (2005 and 2006) and six previous years of full protocol implementation, our seventh 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. We were able to survey all 68 of the intended transects this year.

After 2012, which yielded the highest number of bird detections on annual-panel transects since the start of the monitoring project, detections were down slightly across all three parks in 2013. This was largely due to a substantial drop in pine siskin and red crossbill detections from 2012. While pine siskin detection numbers were still higher than in five of the eight years we have been monitoring, detections on annual-panel transects decreased from 999 in 2012 to 403 in 2013. Red crossbill numbers also substantially decreased, falling from 503 detections on annual-panel transects in 2012 to 107 in 2013 (Holmgren et al. 2013). Interestingly, red crossbill detections rose at SAJH, from 3 detections in 2011 (our most recent previous survey) to 148 detections in 2013.

Despite the decrease in overall number of birds detected, many species were detected in slightly or moderately greater numbers than in previous years. A few of these species include hairy woodpecker, Pacific-slope flycatcher, Pacific wren, and golden-crowned kinglet. Each of these species had more detections in 2013 than in any of the previous eight years. While many of these upticks in numbers of birds counted may reflect real population increases in 2013, 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.

There are several other interesting preliminary results, including a sharp increase in MacGillivray's warbler detections in 2013. In 2012, the year with the greatest number of MacGillivray's warbler detections prior to 2013, there were 44 detections on the annual panel, compared to 78 in 2013 (Holmgren et al. 2013). Pacific wren and golden-crowned kinglet detections both exceeded the previously highest detection totals seen in 2007 (when point counts were conducted for 5 rather than 7 minutes) (Siegel et al. 2008). Evening grosbeak detections also rose in 2013, surpassing the high detection totals of 2010 (Holmgren et al. 2011). Townsend's warbler detections remained high, after the increase in 2012. Brown-headed cowbird detections remained low, after the decrease in 2012 (Holmgren et al. 2013).

There were no Eurasian collared-doves detected during point counts in 2013, but they were detected at both OLYM and NOCA 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 SAJH, overall detections remained high in 2013, after having increased in 2011. There were notable increases in detections of a few species, including red crossbill, pine siskin, and Swainson's thrush. There were also decreases in detections of a few species, including American goldfinch and house wren. There was no substantial change in brown-headed cowbird detections, which decreased by four detections from 2011 numbers. Four Eurasian collared-doves were detected in 2013, the same number as in the 2011 surveys.

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, analyses which will take place in conjunction with our periodic trend analyses.



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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
MORA	Ann1	Low	4001	10	12	12	12	12	10	11	14	16
MORA	Ann1	Low	4005	11	11	11	11	12	9	10	13	13
MORA	Ann1	Medium	4002	11	11	11	12	11	13	13	15	15
MORA	Ann1	Medium	4004	18	17	18	18	13	15	10	17	17
MORA	Ann1	Medium	4009	14	14	15	15	11	13	10	15	15
MORA	Ann1	Medium	4012	16	16	14	19	19	13	0	17	19
MORA	Ann1	High	4003	12	12	12	12	12	10	12	13	14
MORA	Ann1	High	4007	20	20	20	20	20	20	0	20	20
MORA	Ann1	High	4011	13	11	14	17	17	15	0	16	16
MORA	Ann1	High	4014	10	16	14	16	16	15	0	17	17
MORA	Alt2	Low	4006	0	0	10	0	0	0	0	9	0
MORA	Alt2	Low	4008	0	0	9	0	0	0	0	12	0
MORA	Alt2	Medium	4015	0	0	11	0	0	0	0	12	0
MORA	Alt2	Medium	4017	0	0	12	0	0	0	0	13	0
MORA	Alt2	Medium	4020	0	0	9	0	0	0	0	8	0
MORA	Alt2	Medium	4026	0	0	10	0	0	0	0	11	0
MORA	Alt2	High	4016	0	0	19	0	0	0	0	20	0
MORA	Alt2	High	4019	0	0	20	0	0	0	0	20	0
MORA	Alt2	High	4027	0	0	13	0	0	0	0	14	0
MORA	Alt2	High	4075	0	0	14	0	0	0	0	11	0
MORA	Alt3	Low	4010	0	0	0	13	0	0	0	0	14
MORA	Alt3	Low	4018	0	0	0	12	0	0	0	0	14
MORA	Alt3	Medium	4028	0	0	0	11	0	0	0	0	12
MORA	Alt3	Medium	4042	0	0	0	12	0	0	0	0	13
MORA	Alt3	Medium	4044	0	0	0	15	0	0	0	0	16
MORA	Alt3	Medium	4048	0	0	0	13	0	0	0	0	12
MORA	Alt3	High	4029	0	0	0	14	0	0	0	0	14
MORA	Alt3	High	4030	0	0	0	12	0	0	0	0	15
MORA	Alt3	High	4032	0	0	0	15	0	0	0	0	15
MORA	Alt3	High	4033	0	0	0	18	0	0	0	0	19

## 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
MORA	Alt4	Low	4021	0	0	0	0	12	0	0	0	0
MORA	Alt4	Low	4022	0	0	0	0	17	0	0	0	0
MORA	Alt4	Medium	4057	0	0	0	0	10	0	0	0	0
MORA	Alt4	Medium	4060	0	0	0	0	24	0	0	0	0
MORA	Alt4	Medium	4061	0	0	0	0	15	0	0	0	0
MORA	Alt4	Medium	4065	0	0	0	0	13	0	0	0	0
MORA	Alt4	High	4035	0	0	0	0	12	0	0	0	0
MORA	Alt4	High	4036	0	0	0	0	14	0	0	0	0
MORA	Alt4	High	4039	0	0	0	0	11	0	0	0	0
MORA	Alt4	High	4043	0	0	0	0	18	0	0	0	0
MORA	Alt5	Low	4024	0	0	0	0	0	25	0	0	0
MORA	Alt5	Low	4025	0	0	0	0	0	9	0	0	0
MORA	Alt5	Medium	4068	0	0	0	0	0	9	0	0	0
MORA	Alt5	Medium	4073	0	0	0	0	0	13	0	0	0
MORA	Alt5	Medium	4074	0	0	0	0	0	13	0	0	0
MORA	Alt5	Medium	4076	0	0	0	0	0	15	0	0	0
MORA	Alt5	High	4045	0	0	0	0	0	12	0	0	0
MORA	Alt5	High	4046	0	0	0	0	0	10	0	0	0
MORA	Alt5	High	4052	0	0	0	0	0	12	0	0	0
MORA	Alt5	High	4055	0	0	0	0	0	0	0	0	0
MORA	Alt6	Low	4031	0	0	0	0	0	0	10	0	0
MORA	Alt6	Low	4034	0	0	0	0	0	0	10	0	0
MORA	Alt6	Medium	4077	0	0	0	0	0	0	12	0	0
MORA	Alt6	Medium	4078	0	0	0	0	0	0	9	0	0
MORA	Alt6	Medium	4081	0	0	0	0	0	0	10	0	0
MORA	Alt6	Medium	4084	0	0	0	0	0	0	0	0	0
MORA	Alt6	High	4058	0	0	0	0	0	0	0	0	0
MORA	Alt6	High	4062	0	0	0	0	0	0	0	0	0
MORA	Alt6	High	4064	0	0	0	0	0	0	10	0	0
MORA	Alt6	High	4067	0	0	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
NOCA	Ann1	Low	1013	12	11	14	12	11	9	13	15	15
NOCA	Ann1	Low	1017	13	12	9	12	12	12	13	14	14
NOCA	Ann1	Low	1020	15	12	13	15	16	12	16	17	17
NOCA	Ann1	Low	1023	18	19	19	20	21	20	21	21	21
NOCA	Ann1	Medium	1015	12	16	17	17	15	15	16	17	17
NOCA	Ann1	Medium	1018	16	21	21	23	22	25	25	23	25
NOCA	Ann1	Medium	1022	13	13	11	13	14	13	14	15	15
NOCA	Ann1	Medium	1024	9	10	11	12	10	11	10	13	13
NOCA	Ann1	High	1014	15	19	19	0	20	0	0	20	21
NOCA	Ann1	High	1016	14	15	14	16	15	14	15	17	17
NOCA	Ann1	High	1019	12	12	10	12	12	12	12	13	13
NOCA	Ann1	High	1021	18	21	22	23	22	19	17	24	24
NOCA	Alt2	Low	1001	0	0	11	0	0	0	0	13	0
NOCA	Alt2	Low	1005	0	0	13	0	0	0	0	15	0
NOCA	Alt2	Low	1006	0	0	10	0	0	0	0	12	0
NOCA	Alt2	Low	1010	0	0	12	0	0	0	0	16	0
NOCA	Alt2	Medium	1003	0	0	12	0	0	0	0	15	0
NOCA	Alt2	Medium	1004	0	0	13	0	0	0	0	14	0
NOCA	Alt2	Medium	1009	0	0	0	0	0	0	0	16	0
NOCA	Alt2	Medium	1011	0	0	19	0	0	0	0	19	0
NOCA	Alt2	High	1002	0	0	18	0	0	0	0	20	0
NOCA	Alt2	High	1007	0	0	13	0	0	0	0	14	0
NOCA	Alt2	High	1008	0	0	0	0	0	0	0	14	0
NOCA	Alt2	High	1012	0	0	15	0	0	0	0	19	0
NOCA	Alt3	Low	1027	0	0	0	13	0	0	0	0	16
NOCA	Alt3	Low	1028	0	0	0	13	0	0	0	0	14
NOCA	Alt3	Low	1029	0	0	0	13	0	0	0	0	15
NOCA	Alt3	Low	1034	0	0	0	13	0	0	0	0	14
NOCA	Alt3	Medium	1025	0	0	0	15	0	0	0	0	15
NOCA	Alt3	Medium	1026	0	0	0	14	0	0	0	0	15

## 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
NOCA	Alt3	Medium	1057	0	0	0	0	0	0	0	0	16
NOCA	Alt3	Medium	1031	0	0	0	19	0	0	0	0	20
NOCA	Alt3	High	1032	0	0	0	0	0	0	0	0	13
NOCA	Alt3	High	1037	0	0	0	0	0	0	0	0	20
NOCA	Alt3	High	1039	0	0	0	21	0	0	0	0	20
NOCA	Alt3	High	1040	0	0	0	21	0	0	0	0	19
NOCA	Alt4	Low	1036	0	0	0	0	20	0	0	0	0
NOCA	Alt4	Low	1046	0	0	0	0	0	0	0	0	0
NOCA	Alt4	Low	1054	0	0	0	0	11	0	0	0	0
NOCA	Alt4	Low	1061	0	0	0	0	10	0	0	0	0
NOCA	Alt4	Medium	1033	0	0	0	0	20	0	0	0	0
NOCA	Alt4	Medium	1035	0	0	0	0	16	0	0	0	0
NOCA	Alt4	Medium	1038	0	0	0	0	13	0	0	0	0
NOCA	Alt4	Medium	1041	0	0	0	0	14	0	0	0	0
NOCA	Alt4	High	1048	0	0	0	0	11	0	0	0	0
NOCA	Alt4	High	1049	0	0	0	0	12	0	0	0	0
NOCA	Alt4	High	1050	0	0	0	0	13	0	0	0	0
NOCA	Alt4	High	1052	0	0	0	0	11	0	0	0	0
NOCA	Alt5	Low	1062	0	0	0	0	0	8	0	0	0
NOCA	Alt5	Low	1063	0	0	0	0	0	9	0	0	0
NOCA	Alt5	Low	1065	0	0	0	0	0	11	0	0	0
NOCA	Alt5	Low	1067	0	0	0	0	0	8	0	0	0
NOCA	Alt5	Medium	1042	0	0	0	0	0	15	0	0	0
NOCA	Alt5	Medium	1043	0	0	0	0	0	9	0	0	0
NOCA	Alt5	Medium	1044	0	0	0	0	0	11	0	0	0
NOCA	Alt5	Medium	1045	0	0	0	0	0	10	0	0	0
NOCA	Alt5	High	1055	0	0	0	0	0	13	0	0	0
NOCA	Alt5	High	1058	0	0	0	0	0	0	0	0	0
NOCA	Alt5	High	1060	0	0	0	0	0	9	0	0	0
NOCA	Alt5	High	1064	0	0	0	0	0	10	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
NOCA	Alt6	Low	1068	0	0	0	0	0	0	13	0	0
NOCA	Alt6	Low	1070	0	0	0	0	0	0	12	0	0
NOCA	Alt6	Low	1074	0	0	0	0	0	0	14	0	0
NOCA	Alt6	Low	1075	0	0	0	0	0	0	11	0	0
NOCA	Alt6	Medium	1047	0	0	0	0	0	0	13	0	0
NOCA	Alt6	Medium	1051	0	0	0	0	0	0	11	0	0
NOCA	Alt6	Medium	1053	0	0	0	0	0	0	13	0	0
NOCA	Alt6	Medium	1056	0	0	0	0	0	0	13	0	0
NOCA	Alt6	High	1072	0	0	0	0	0	0	0	0	0
NOCA	Alt6	High	1088	0	0	0	0	0	0	12	0	0
NOCA	Alt6	High	1090	0	0	0	0	0	0	0	0	0
NOCA	Alt6	High	1092	0	0	0	0	0	0	14	0	0
OLYM	Ann1	Low	3001	11	10	8	10	11	12	12	13	12
OLYM	Ann1	Low	3121	11	15	17	17	17	14	17	15	17
OLYM	Ann1	Low	3126	9	10	11	13	13	13	15	15	15
OLYM	Ann1	Low	3134	16	16	18	18	18	18	19	19	19
OLYM	Ann1	Medium	3122	14	12	14	0	16	16	0	16	17
OLYM	Ann1	Medium	3123	10	10	12	14	14	15	15	15	15
OLYM	Ann1	Medium	3130	9	9	8	9	9	9	9	10	10
OLYM	Ann1	Medium	3200	0	0	22	23	21	23	22	23	23
OLYM	Ann1	High	3124	9	10	10	11	11	11	11	12	12
OLYM	Ann1	High	3125	9	11	13	13	14	15	11	14	12
OLYM	Ann1	High	3127	7	9	13	15	14	15	15	15	15
OLYM	Ann1	High	3128	10	11	11	11	10	11	12	13	12
OLYM	Alt2	Low	3138	0	0	10	0	0	0	0	12	0
OLYM	Alt2	Low	3142	0	0	14	0	0	0	0	14	0
OLYM	Alt2	Low	3144	0	0	13	0	0	0	0	13	0
OLYM	Alt2	Low	3145	0	0	13	0	0	0	0	14	0
OLYM	Alt2	Medium	3133	0	0	8	0	0	0	0	16	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
OLYM	Alt2	Medium	3135	0	0	11	0	0	0	0	13	0
OLYM	Alt2	Medium	3137	0	0	10	0	0	0	0	11	0
OLYM	Alt2	Medium	3141	0	0	14	0	0	0	0	15	0
OLYM	Alt2	High	3132	0	0	19	0	0	0	0	19	0
OLYM	Alt2	High	3136	0	0	11	0	0	0	0	11	0
OLYM	Alt2	High	3139	0	0	16	0	0	0	0	13	0
OLYM	Alt2	High	3140	0	0	0	0	0	0	0	12	0
OLYM	Alt3	Low	3146	0	0	0	15	0	0	0	0	15
OLYM	Alt3	Low	3149	0	0	0	10	0	0	0	0	12
OLYM	Alt3	Low	3151	0	0	0	12	0	0	0	0	17
OLYM	Alt3	Low	3153	0	0	0	11	0	0	0	0	16
OLYM	Alt3	Medium	3143	0	0	0	10	0	0	0	0	11
OLYM	Alt3	Medium	3150	0	0	0	11	0	0	0	0	12
OLYM	Alt3	Medium	3152	0	0	0	11	0	0	0	0	13
OLYM	Alt3	Medium	3154	0	0	0	15	0	0	0	0	16
OLYM	Alt3	High	3147	0	0	0	19	0	0	0	0	19
OLYM	Alt3	High	3148	0	0	0	14	0	0	0	0	16
OLYM	Alt3	High	3156	0	0	0	12	0	0	0	0	11
OLYM	Alt3	High	3157	0	0	0	11	0	0	0	0	12
OLYM	Alt4	Low	3155	0	0	0	0	10	0	0	0	0
OLYM	Alt4	Low	3159	0	0	0	0	11	0	0	0	0
OLYM	Alt4	Low	3161	0	0	0	0	11	0	0	0	0
OLYM	Alt4	Low	3163	0	0	0	0	15	0	0	0	0
OLYM	Alt4	Medium	3160	0	0	0	0	10	0	0	0	0
OLYM	Alt4	Medium	3167	0	0	0	0	11	0	0	0	0
OLYM	Alt4	Medium	3168	0	0	0	0	10	0	0	0	0
OLYM	Alt4	Medium	3174	0	0	0	0	14	0	0	0	0
OLYM	Alt4	High	3158	0	0	0	0	14	0	0	0	0
OLYM	Alt4	High	3164	0	0	0	0	14	0	0	0	0
OLYM	Alt4	High	3171	0	0	0	0	12	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
OLYM	Alt4	High	3173	0	0	0	0	10	0	0	0	0
OLYM	Alt5	Low	3165	0	0	0	0	0	10	0	0	0
OLYM	Alt5	Low	3166	0	0	0	0	0	12	0	0	0
OLYM	Alt5	Low	3169	0	0	0	0	0	8	0	0	0
OLYM	Alt5	Low	3170	0	0	0	0	0	11	0	0	0
OLYM	Alt5	Medium	3178	0	0	0	0	0	11	0	0	0
OLYM	Alt5	Medium	3183	0	0	0	0	0	13	0	0	0
OLYM	Alt5	Medium	3184	0	0	0	0	0	16	0	0	0
OLYM	Alt5	Medium	3185	0	0	0	0	0	9	0	0	0
OLYM	Alt5	High	3175	0	0	0	0	0	12	0	0	0
OLYM	Alt5	High	3179	0	0	0	0	0	16	0	0	0
OLYM	Alt5	High	3180	0	0	0	0	0	16	0	0	0
OLYM	Alt5	High	3188	0	0	0	0	0	12	0	0	0
OLYM	Alt6	Low	3172	0	0	0	0	0	0	14	0	0
OLYM	Alt6	Low	3177	0	0	0	0	0	0	10	0	0
OLYM	Alt6	Low	3181	0	0	0	0	0	0	16	0	0
OLYM	Alt6	Low	3182	0	0	0	0	0	0	16	0	0
OLYM	Alt6	Medium	3187	0	0	0	0	0	0	20	0	0
OLYM	Alt6	Medium	3190	0	0	0	0	0	0	14	0	0
OLYM	Alt6	Medium	3195	0	0	0	0	0	0	12	0	0
OLYM	Alt6	Medium	3198	0	0	0	0	0	0	11	0	0
OLYM	Alt6	High	3189	0	0	0	0	0	0	16	0	0
OLYM	Alt6	High	3191	0	0	0	0	0	0	15	0	0
OLYM	Alt6	High	3192	0	0	0	0	0	0	14	0	0
OLYM	Alt6	High	3196	0	0	0	0	0	0	15	0	0



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**National Park Service**  
**U.S. Department of the Interior**



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