

# **Landbird Inventory for Mount Rainier National Park (2003-2004)**

## **Final Report**

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## Summary

In 2003 The Institute for Bird Populations (IBP) collaborated with personnel at Mount Rainier National Park to initiate a two-year, park-wide, inventory of landbirds. The broad goals of the inventory were to elucidate spatial patterns of abundance across the park for a large suite of species, and to produce information that will assist park managers and cooperators in designing the park's long-term landbird monitoring program.

During our two field seasons (2003 and 2004), we counted 6,026 individual birds during 969 point counts conducted along 134 transects. Transects were well distributed across the park. We documented 95 bird species (including the Hermit-Townsend's Warbler hybrid) in the park during the field season. Seventy-eight of these species were detected during at least one point count, while the remaining 17 were recorded as incidental observations only at times other than during point counts. We also conducted detailed habitat assessments at each of the 969 survey points.

We present 'naïve' habitat-specific density estimates, unadjusted for differences in detectability, for all 78 species recorded during point counts. We also present habitat-specific density estimates, adjusted for species- and habitat-specific differences in detectability, for 45 species that were detected at least five times during point counts, as well as lists of all species detected in each of 17 habitats we sampled in the park. Although the results were rarely found to be statistically significant, we rank habitats with regard to a) the number of species detected in each (species richness) and b) the overall density of birds (all species pooled) estimated to occur in each, and find some substantial and perhaps surprising differences across park habitats. In particular, the two lowest elevation habitats harboring deciduous tree components (Conifer Deciduous Mix and Red Alder) ranked first (10.65 birds/ha—Conifer Deciduous Mix) and third (8.55 birds/ha—Red Alder) in overall density of birds. Also interesting was that the three major mid- and high-elevation forest types all ranked higher than the three major low- to mid-elevation forest types in overall density of birds. Mid- to high-elevation forest types include Pacific Silver Fir (7.82 birds/ha), Subalpine Fir (7.31 birds/ha), and Mountain Hemlock (7.00 birds/ha). Mid- to low-elevation forest types include Douglas-fir (6.53 birds/ha), Mixed Douglas-fir/Western Hemlock (6.48 birds/ha), and Western Hemlock (6.35 birds/ha). Surprisingly, the two shrub habitats were ranked among the lowest four habitats, with Mid-elevation Shrub at 4.88 birds/ha and High-elevation Shrub at 4.79 birds/ha. Park-wide bird density (all species pooled) was lower at Mount Rainier (6.2 birds per point) than both North Cascades (7.6 birds per point) and Olympic (6.6 birds per point). When pooled bird density is examined across shared habitats, Mount Rainier is lower across the board when compared to North Cascades, but interestingly, is slightly higher than at Olympic in 8 of 10 habitats. The difference between Mount Rainier and Olympic in pooled bird density is particularly noticeable in higher elevation habitats, with Mount Rainier having a density of 1.16 more individuals per hectare than Olympic (averaged values from all habitats including and above the Pacific Silver Fir zone).

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## Introduction

Reported declines of many birds breeding in North America have stimulated interest in avian population trends and mechanisms driving those trends (DeSante and George 1994). The North American Breeding Bird Survey suggests that landbird populations in Pacific Northwest late-seral forests appear to be in serious decline (Sauer et al. 2003), and data from the national parks are particularly important for teasing out possible causes. The avifauna of Mount Rainier National Park has historically received very little systematic study, with just a few published accounts (e.g. Taylor and Shaw 1927; Grater 1951; Manuwal 1991). Although simple presence/absence data for birds in the park already exist (Smith et al. 1997), extant data are insufficient for adequately describing species/habitat relationships, producing quantitative estimates of habitat-specific bird density, or reliably extrapolating those estimates across the park's 953 km<sup>2</sup>.

In September 2000, personnel from throughout the North Coast / Cascades Network met with landbird monitoring experts to produce recommendations for a long-term monitoring plan for landbirds (Siegel and Kuntz II, 2000). The panel recommended that each of the major parks in the network begin by initiating an inventory to elucidate spatial patterns of abundance for a large suite of species. Because birds are well-suited to serve as indicators of ecological change (Furness et al. 1993), these inventories could then serve as baselines for monitoring future ecological changes within the park, assessing the affects of future management actions on bird populations, and formulating efficient long-term bird monitoring strategies.

We designed this inventory project to determine habitat-specific density of landbirds during the breeding season at Mount Rainier National Park, using methods consistent with those employed in other parks across the North Coast / Cascades Network (Siegel et al 2002; Siegel et al. 2004a; Siegel et al. 2004b).



## Methods

### Sampling Strategy

Based on the recommendations of our September 2000 workshop (Siegel and Kuntz II 2000), as well as a follow-up meeting in 2002 that included many of the workshop participants as well as additional Olympic National Park personnel, we sought to design an inventory strategy that would provide a balance between sampling habitats in proportion to their spatial extent in the park, and ensuring that even relatively rare habitats would be sampled well enough for us to characterize their bird communities. Because we knew that many sampling occasions would be missed due to rain and other logistic constraints, we also sought to generate substantially more point count transects than we could actually use.

After extensive discussions about sampling design with NPS and USGS personnel, we selected our transect start points according to the procedures described below. All GIS work was conducted by Darin Swinney at Olympic National Park, and habitat delineations were based on parkwide vegetation maps produced by Pacific Meridian Resources (1996).

Systematic Points. A systematic, park-wide 2.5 km grid was generated. Points were created from the midpoint of grid polygons. All points on glaciers, in unvegetated high-elevation areas, and on slopes > 35 degrees were discarded. Points were then plotted on topographic maps and subjectively inspected for accessibility; those that were deemed inaccessible due to cliffs, dangerous river crossings, or other barriers, were discarded. Two Red Alder sample points were randomly selected as ‘supplemental’ start points to boost this habitat’s number of starting points, yielding 93 potential transect start points.

Trail Points. We expected that our crews would be able to complete approximately twice as many points per transect when working on trails versus working off-trail. We therefore decided to devote about a quarter of our sampling days to conducting transects along trails. Sixty-one trail transect start points were selected by a process that systematically selected segments of the park’s routed trail coverage. We discarded trail segments with obvious accessibility problems and/or sustained amounts of switchbacks.

In preparation for the second field season we re-evaluated all remaining trail segments in order to focus on those that ran through areas of under-sampled habitat for substantial portions of their length.

Supplemental Points. Following the 2003 field season (Siegel et. al. 2004c), eight vegetation types were found to have been poorly sampled. In the winter of 2003-2004 we selected additional transect start points within these habitats. To select these supplemental points we applied a three-by-three majority filter to the PMR vegetation map. All post-filtered polygons in each habitat greater than 0.5 acres in size and falling on slopes <35° were selected to be in the sample frame. A predetermined number of polygons from each habitat were selected randomly. Mid-points of each polygon were selected as the transect starting point. Points were over-sampled to provide for accessibility problems and a firing order was established to guide in the selection of replacement points.

## Data Collection

Conducting Point Counts. We conducted all fieldwork between May 23 and July 29 of 2003 and June 4 and July 30 of 2004. Crew members worked in pairs, and generally hiked into the backcountry for seven days at a time, during which they conducted transects on as many mornings as weather permitted. Prior to leaving for the field, crews were provided with coordinates and maps of at least six transect start points, selected such that each was generally no more than a one-day hike from another. Start points were assigned a randomly generated ‘firing order’ such that, logistic considerations aside, the decision of which points to complete when all points could not be completed was made randomly.

We used five-minute variable circular plot (VCP) point counts (Fancy and Sauer 2000, Siegel 2000) coupled with detailed habitat descriptions of each point count location as our primary means of surveying birds. VCP point counts entailed recording the horizontal distance, estimated to the nearest meter, to every bird seen or heard during the point count.

Each morning in the field, each two-person team conducted a transect of approximately 5-6 off-trail points or 10-12 on-trail points spaced 200 m apart. Transects began at pre-selected starting points which were located in the field with topographic maps and a hand-held GPS unit. Prior to starting the transect, one team member was designated the point count observer and the other was designated the vegetation observer. The point count observer flagged the trail from point to point as the transect was conducted; the vegetation observer then followed the trail of flagging, collecting vegetation data at the indicated point count locations. Vegetation observers were careful to remain at least 200 m behind the point count observer, to avoid influencing bird activity during the count. As a safety consideration, point count and vegetation observers remained in radio contact for the duration of the transect.

For on-trail transects, the observers completed their transect by collecting data at the starting point, and then proceeding along the trail in a pre-determined direction. For off-trail transects, observers chose the semi-cardinal direction (0°, 45°, 90°, etc.) that most closely approximated a perpendicular *toward* the nearest trail (on odd calendar days), or the semi-cardinal direction that most closely approximated a perpendicular *away* from the nearest trail (on even calendar days). Observers frequently encountered a river, cliff, or other barrier that prevented them from completing a transect along the intended compass bearing. In these cases they returned to the last successfully completed point, and then reoriented to the nearest semi-cardinal bearing that was not blocked by a barrier.

Point counts began within ten minutes of local sunrise, and continued until 3.5 hours after local sunrise. ‘Flyovers’— defined as birds that flew over the top of the vegetation canopy, never touched down in the observer’s field of view, and did not appear to be foraging, displaying, or behaving in any other way that might suggest a link to the habitat below— were tallied separately from other bird detections. Birds thought to have been recorded previously at another point were marked accordingly on the data forms. Geographical coordinates based on GPS readings and topographic maps were recorded at each sampling point, generally by the vegetation observer. We recorded whether each bird was initially detected during the first three minutes or last two minutes of the point count, in order to improve comparability with data from

the Breeding Bird Survey (BBS) which utilizes three-minute counts. We also recorded whether each bird was initially detected visually or aurally, and whether the bird sang at any time during the count.

Additionally, whenever crew members detected species thought to be rare or difficult to sample in the park, they completed “Rare Bird Report Forms”, including descriptions of the birds’ appearance and behavior and geographical coordinates. 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. Although our project focused explicitly on diurnal passerine and near-passerine birds, we frequently used these rare bird report forms to record owls, raptors, and other species which were poorly sampled by our point count protocol, regardless of their actual rarity.

Sampling Vegetation at Bird Survey Points. Vegetation descriptions at each point entailed assigning a primary habitat classification to a circular 50-m radius plot centered on the point count station, and also collecting more detailed data on vegetation structure and composition within two 20 m x 40 m subplots within that 50-m radius circle. Vegetation plots occasionally straddled more than one distinct habitat type; in these cases observers classified the point as being dominated by the habitat that covered the larger portion of the plot, and then additionally recorded the ‘secondary’ habitat present in the plot. Habitat classifications were based on the habitat categories described in the park’s current GIS habitat coverage (Pacific Meridian Resources 1996), except that we added three categories that Pacific Meridian Resources did not use: Conifer Deciduous Mix (areas where the canopy was >20% conifer species and >20% deciduous species), Engelmann Spruce, and Grand Fir. Subsequent to data collection, however, we made some minor changes to the habitat classification system, in order to better delineate meaningful bird habitats:

- 1) We combined points that were classified in the field as ‘Herbaceous Sedge Meadow’ with points classified as ‘Heather’ to form a new category which we called ‘Heather/Herbaceous Sedge Meadow’. We combined these two habitats into a single classification unit because a) we often encountered a mixture of heather and meadow plants on our plots, b) the documentation in Pacific Meridian Resources (1996) provides little guidance for how to classify such areas, and c) we saw no obvious differences in the bird communities inhabiting these plant communities.

- 2) We split points that were classified in the field as ‘Shrub’ into two distinct habitat categories, ‘Mid-elevation Shrub’ (<1280 m and/or comprising a generally mid-elevation plant community) and ‘High-elevation Shrub’ (>1280 m and/or comprising a generally high-elevation plant community). This was necessary because the avifauna within shrub-dominated areas of these two elevation zones differed markedly, even though Pacific Meridian Resources (1996) mapped them as belong to the same plant community.

During the 2003 field season we also classified vegetation plots according to the “Franklin Key” (Franklin et al. 1988), but our crews were often unable to confidently age the forest stands (a necessary step in using the key), so we did not use them in the data analysis, and we stopped recording them after the 2003 field season.

We also collected more detailed information describing habitat structure and composition within each of two 20 m x 40 m subplots adjacent to the point count station. The first subplot straddled the line of travel walked by the vegetation observer as (s)he approached the point count station, beginning 50 m from the station and ending 10 m from the station. The second subplot straddled the line of travel walked as the observer left the point count station, beginning 10 m from the station and ending 50 m from the station.

Within each plot we assessed the composition and structure of both the canopy and the understory. For the canopy, we estimated the average canopy height and subcanopy height, if a subcanopy was present. We tallied all trees by size class and species, and also counted snags and downed logs. For the understory we estimated the percent cover contributed by each constituent species of woody plant, and also estimated the percent cover of each component of groundcover, including living as well as non-living elements. More detail about the habitat parameters we measured is provided in Appendix C.

### Crew Training and Testing

At the beginning of each field season, we provided our field crew with an intensive two-week training program at Olympic and North Cascades National Parks, where the low-elevation habitats allowed better birding earlier in the season than was available at Mount Rainier. We trained our crew members, who generally had prior experience birding and conducting biological fieldwork, in visual and aural bird identification, distance estimation, plant identification, orienteering, backcountry safety, and project protocols. Crew members honed their bird identification skills by spending days in the field birding and practicing point counts with experienced trainers, and then reviewing at night with the aid of field guides, taped songs and calls, and an instructional CD-ROM. At the end of the two-week training period, we gave all crew members a rigorous exam involving the identification of approximately 100 taped songs and calls (some of them grouped together in rapid succession to produce ‘simulated point counts’) as well as 30-40 photographic images (generally of rarer species or less obvious female plumages). Crew members were not permitted to conduct point counts (they worked solely as vegetation observers instead) until they passed the exam, which was altered for each administration. Passing the exam, which required a near-perfect score, ensured that observers could competently identify by sight and sound all species expected to occur in the park.

### Data Analysis

All data were entered into DBASE databases, which we then checked for errors using an array of automated and manual data verification routines. Copies of these databases are being submitted along with this report.

Within each habitat, each species’ apparent density, uncorrected for detectability, was calculated as

$$\frac{d_{50}/p_{hab}}{0.7854},$$

where  $d_{50}$  is the total number of 50-m radius detections tallied at all points in that habitat,  $p_{hab}$  is the total number of points sampled within that habitat type, and 0.7854 is the portion of a hectare covered by a 50-m radius circle

The effective detection radius for birds during point counts has been shown to vary across habitats and between species (Burnham 1981; Barker and Sauer 1995). Because vegetative structure differs dramatically across park habitats, it is necessary to correct for inter-habitat variability in detectability before densities can be compared across habitats (Buckland et al. 2001). Additionally, some species vocalize much more loudly than others, so detectability corrections must be performed on a species by species basis. We used the computer program DISTANCE 4.0 Release 2 (Thomas et al. 2002) to correct for inter-habitat differences in detectability and to produce estimates of absolute density for all species detected at least ten times during point counts.

Distance-sampling experts generally advise that at least 60-80 detections are necessary for reliably modeling the relationship between detection probability and distance from the observer (Buckland et al. 2001). We amassed 60 or more detections in a single habitat type for just a small suite of species, so for the purpose of modeling detection probability, we pooled habitats into two general habitat groups, based on vegetation structure and, presumably, likelihood of detecting birds at moderate or large distances:

Habitat Group 1--densely vegetated habitats: Red Alder, Conifer Deciduous Mix, Western Redcedar, Douglas-fir, Douglas-fir/Western Hemlock, Western Hemlock, Engelmann Spruce, Grand Fir, Noble Fir, Pacific Silver Fir.

Habitat Group 2--sparsely vegetated habitats: Mid-elevation Shrub, High-elevation Shrub, Alaska Yellow Cedar, Mountain Hemlock, Subalpine Fir, Heather/Herbaceous Sedge Meadow, Rock or Sparsely Vegetated.

Within each habitat group, we used DISTANCE to fit detection functions for each species detected at least 60 times in the pooled habitats that constituted that group. We set the data filter to truncate the largest 10% of observations (Buckland et al. 2001), and then fit models using the half-normal key function and both the cosine and polynomial series expansions. We used the Akaike Information Criterion (AIC) to select among models with different forms and numbers of expansion terms (Akaike 1973; Burnham and Anderson 1998). We then applied the habitat group detection function separately to the data in each of the constituent habitats within that group, to produce habitat-specific estimates of absolute abundance, taking into account species- and habitat-specific variation in detectability.

For species that were detected at least five times in the park, but fewer than 60 times in one or both habitat groups, we used detectability functions generated from observations of the same species at Olympic National Parks (Siegel et al. 2004a) or North Cascades (Siegel et al. 2004b) to adjust our density estimates at Mount Rainier National Park. We did this by fitting the uniform key function with no adjustment terms, and using 'borrowed' estimates of detection probability and detection probability variance from the North Cascades analyses as multipliers (Thomas et al. 2002). However, many species that were relatively rare at Mount Rainier National Park were also relatively rare at North Cascades and Olympic National Parks, and

consequently we were unable to model detectability functions for them at either park. For such species that were detected at least five times at Mount Rainier National Park, we matched them with ‘surrogate species’—species with similar song volume, song pitch, and/or singing location (e.g. high in the canopy) that were detected at least 60 times within a habitat group. We then used the detection probability and detection probability variance of the ‘surrogate’ species in the same way described above. For a small number of species in which there was no suitable species match to use for a surrogate from another park, but there were more than 60 detections across the three large North Coast Cascades Network parks, we pooled detections across the three parks to establish network-wide parameters for modeling detectability. Those parameters were then applied to the Mount Rainier National Park data in the same way as described above in the case of surrogate species.

To compare the overall density of birds (all species pooled) across habitats, we summed the adjusted density estimates for all species within each habitat. This method likely underestimates the true density slightly, since we produced adjusted density estimates for just 45 of the 78 species detected during point counts. The bias should be minimal however, as all but a few of the species for which we did not produce adjusted density estimates were quite rare in the park, and consequently have little effect on overall bird density.

## Results and Discussion

### Scope of Work Accomplished

We recorded 6,026 individual birds during 969 point counts conducted along 134 transects (Fig. 1). During our 94 off-trail transects, we completed an average of 5.5 points per transect, similar to the average of 5.3 points per transect we obtained in North Cascades National Park (Siegel et al. 2004a) and slightly lower than the average of 6.0 points per transect we obtained in Olympic National Park (Siegel et al. 2004b). As we expected, we were able to complete substantially more points per transect when we conducted on-trail transects. During our 27 on-trail transects, we averaged 11.3 points per transect.

Although most of the habitats at Mount Rainier are relatively restricted, with just a few covering broad sections of the park, the final point totals in each habitat show at least minimally adequate (greater than 20 points sampled) sampling in 12 of 17 habitats (Table 1). In fact, 10 of the 17 habitats have at least 30 points sampled. We consider this a success given the decision that point totals were so low following the first year of data collection (just seven habitats with greater than 20 points sampled) that we decided to focus almost exclusively on under-sampled habitats in the second year. Locations of our completed sampling points in each habitat are presented in Figures 2 – 17.

### Bird Species Detected in the Park

We documented 95 species (including the Townsend’s-Hermit Warbler hybrid) in the park (Table 2). Seventeen of the species we detected were never actually recorded during point counts, but instead were observed incidentally at other times by our crew members while they were hiking or camping.

## Density Estimates

Seventy-eight of the 95 species we recorded in the park were detected during at least one point count. We estimated habitat-specific density, accounting for species- and habitat-specific variability in detectability, for 45 of them (Table 3). Although we detected several additional species at least five times during point counts, we elected not to estimate their density because some aspect of their behavior or distribution makes density estimation using our methods questionable. These included Vaux's Swift, and Violet-green Swallow because they typically range over large distances within a short time period, and Rufous Hummingbird because the species was clearly attracted to our flagging.

Tables 4-20 provide lists of each species detected during point counts in each habitat. The tables also provide:

- 1) the number of points with detections (including flyovers) of each species within each habitat,
- 2) the number of detections (excluding flyovers) of each species within each habitat,
- 3) the number of non-flyover detections within 50 m of the observer of each species in each habitat (used to calculate the unadjusted density),
- 4) the 'unadjusted density' of each species (based only on the number of detections within 50 m of the observer, and incorporating no correction for species- or habitat-specific variation in detectability),
- 5) the adjusted density estimate, which takes into account habitat- and species-specific variation in detectability, for each species recorded at least five times park-wide during point counts, and
- 6) the coefficient of variation, degrees of freedom, and 95% confidence interval associated with each adjusted density estimate.

To provide an easy way to compare species-specific densities across habitats, Tables 21-64 present nearly the same data as described above for all 45 species for which we produced adjusted density estimates, organized by species rather than habitat and with the percent of points with detections rather than the number of points with detections.

The overall density of birds (all species pooled) varied greatly across park habitats (Table 65). In particular, the two lowest elevation habitats harboring deciduous tree components (Conifer Deciduous Mix and Red Alder) ranked first (9.19 birds/ha—Conifer Deciduous Mix) and third (8.04 birds/ha—Red Alder) overall. Also interesting was that the three major mid- and high-elevation forest types all ranked higher than the three major low- to mid-elevation forest types. Mid- to high-elevation forest types include Pacific Silver Fir (7.75 birds/ha), Subalpine Fir (7.61 birds/ha), and Mountain Hemlock (7.38 birds/ha). Mid- to low- elevation forest types include

Douglas-fir (6.61 birds/ha), Mixed Douglas-fir/Western Hemlock (6.54 birds/ha), and Western Hemlock (6.13 birds/ha). Surprisingly, the two shrub habitats were ranked among the lowest four habitats overall, with High-elevation Shrub at 6.28 birds/ha and Mid-elevation Shrub at 5.08 birds/ha.

The number of species detected in each habitat also varied greatly (Table 66), though we caution that these results are not straightforward to interpret, as they are heavily confounded by variable survey effort across habitats, an issue which has much less bearing on the relative density estimates described above. While there is no reason to expect density estimates to increase with the number of points sampled, we would indeed expect to see such a relationship between the number of species detected and the number of points sampled. Table 66 is, thus, best interpreted by looking at the obvious exceptions to this general pattern. The highest species total was Douglas-fir with 42 species; an interesting result given that Douglas-fir was sampled with 78 fewer points than Western Hemlock, the habitat with the highest number of points sampled. The lowest species total was for Noble Fir (17 species), a habitat that was sampled with just 15 points. The largest exception to the general trend of detecting more species in better sampled habitats occurs in the Rock or Sparsely Vegetated habitat category. With only 52 points sampled, this habitat has the third highest species total (39 species). This is most likely explained by the broad elevation zone covered by the habitat, from low elevation rocky river washes to high rocky ridge lines and outcroppings. All other habitats are restricted to a well defined elevation zone.

Overall density of birds was substantially lower at Mount Rainier National Park than at North Cascades National Park (Siegel et al. 2004b), and slightly lower than at Olympic National Park (Siegel et al. 2004a). Across the entire park, we detected an average of 7.6 birds per point at North Cascades, 6.6 birds per point at Olympic, and 6.2 birds per point at Mount Rainier. This amounts to an 18% difference when compared to North Cascades and a 6% difference when compared to Olympic. When pooled densities are compared just between shared habitats across parks, Mount Rainier does not rank higher in any habitat when compared to North Cascades (the closest being Pacific Silver Fir with 8.54 birds per point at North Cascades and 7.75 birds per point at Mount Rainier). When compared with Olympic, most habitats in Mount Rainier have a slightly higher density, particularly at higher elevations. Pooled species density is most similar in Heather/Herbaceous Sedge Meadow habitat (6.63 birds per point at Mount Rainier compared to 6.05 birds per point in Olympic) and most different in Mountain Hemlock and High Elevation Shrub (a 1.38 birds per point difference in each). At lower elevations, densities appear very similar between Mount Rainier and Olympic, but are difficult to compare directly due to the lack of lower elevation (< 600 m) habitat at Mount Rainier.

Comparison of habitat-specific densities of selected species across parks reveals some interesting differences between Mount Rainier, North Cascades, and Olympic. Species in Mount Rainier lack the strong preference for Douglas-fir forest that is found in North Cascades, where eight species occur in significantly higher densities when compared with Western Hemlock forests (Siegel et al. 2004b). In Mount Rainier only Townsend's Warbler exhibits a preference for Douglas-fir habitat over Western Hemlock. Also interesting is that habitat preferences between Douglas-fir and Western Hemlock habitats for Hammond's and Pacific-slope Flycatcher differed in Mount Rainier. Of the three parks, Hammond's Flycatcher is found in higher densities than



Pacific-slope Flycatcher in both habitats in North Cascades; Pacific-slope is found in higher densities than Hammond's Flycatcher in both habitats in Olympic; however, in Mount Rainier Hammond's Flycatcher is found in higher densities in Douglas-fir while Pacific-slope Flycatcher is found in higher densities in Western Hemlock. Examining these habitat relationships both within and between parks is worthy of further investigation. Indeed, the vegetation data we collected at each sampling point provide a wealth of opportunity for further analyses of species-habitat relationships at Mount Rainier, and across the North Coast Cascades Network.

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Table 1. Number of off-trail, on-trail, and total points counts conducted in each major habitat at Mount Rainier National Park.

| Habitat                           | Off-trail | On-trail | Total |
|-----------------------------------|-----------|----------|-------|
| Western Hemlock                   | 88        | 102      | 190   |
| Pacific Silver Fir                | 72        | 64       | 136   |
| Douglas-fir                       | 72        | 40       | 112   |
| Mixed Douglas-fir/Western Hemlock | 70        | 41       | 111   |
| Heather/Herbaceous Sedge Meadow   | 26        | 78       | 104   |
| Subalpine fir                     | 36        | 40       | 76    |
| Rock or Sparsely Vegetated        | 21        | 31       | 52    |
| Mid-elevation Shrub               | 37        | 5        | 42    |
| High-elevation Shrub              | 9         | 21       | 30    |
| Mountain Hemlock                  | 18        | 12       | 30    |
| Conifer Deciduous Mix             | 22        | 3        | 25    |
| Red Alder                         | 19        | 2        | 21    |
| Noble Fir                         | 14        | 1        | 15    |
| Western Redcedar                  | 6         | 1        | 7     |
| Engelmann Spruce                  | 0         | 7        | 7     |
| Alaska Yellow Cedar               | 3         | 3        | 6     |
| Grand Fir                         | 5         | 0        | 5     |
| Total                             | 518       | 451      | 969   |

Table 2. All bird species detected by IBP staff at Mount Rainier National Park during the 2003 and 2004 field seasons. Asterisks indicate species that were documented by our crew members but were never detected during point counts.

|                            |                               |                                       |
|----------------------------|-------------------------------|---------------------------------------|
| 1. Great Blue Heron*       | 33. Northern Flicker          | 65. Varied Thrush                     |
| 2. Turkey Vulture*         | 34. Pileated Woodpecker       | 66. American Pipit                    |
| 3. Canada Goose            | 35. Olive-sided Flycatcher    | 67. Cedar Waxwing                     |
| 4. Mallard*                | 36. Western Wood-Pewee        | 68. Orange-crowned Warbler            |
| 5. Harlequin Duck*         | 37. Hammond's Flycatcher      | 69. Yellow Warbler                    |
| 6. Osprey                  | 38. Dusky Flycatcher          | 70. Yellow-rumped Warbler             |
| 7. Northern Harrier*       | 39. Pacific-slope Flycatcher  | 71. Black-throated Gray Warbler       |
| 8. Sharp-shinned Hawk      | 40. Hutton's Vireo*           | 72. Townsend's Warbler                |
| 9. Northern Goshawk*       | 41. Warbling Vireo            | 73. Townsend's x Hermit Wrblr. Hybrid |
| 10. Red-tailed Hawk        | 42. Gray Jay                  | 74. Hermit Warbler                    |
| 11. Rough-legged Hawk*     | 43. Steller's Jay             | 75. MacGillivray's Warbler            |
| 12. Golden Eagle*          | 44. Clark's Nutcracker        | 76. Common Yellowthroat               |
| 13. American Kestrel       | 45. American Crow             | 77. Wilson's Warbler                  |
| 14. Merlin*                | 46. Common Raven              | 78. Western Tanager                   |
| 15. White-tailed Ptarmigan | 47. Tree Swallow              | 79. Spotted Towhee                    |
| 16. Blue Grouse            | 48. Violet-green Swallow      | 80. Chipping Sparrow                  |
| 17. Spotted Sandpiper      | 49. Barn Swallow              | 81. Fox Sparrow                       |
| 18. Marbled Murrelet       | 50. Mountain Chickadee        | 82. Song Sparrow                      |
| 19. Band-tailed Pigeon     | 51. Chestnut-backed Chickadee | 83. Lincoln's Sparrow                 |
| 20. Western Screech-Owl*   | 52. Bushtit*                  | 84. White-crowned Sparrow             |
| 21. Great Horned Owl*      | 53. Red-breasted Nuthatch     | 85. Dark-eyed Junco                   |
| 22. Northern Pygmy-Owl     | 54. Brown Creeper             | 86. Black-headed Grosbeak             |
| 23. Barred Owl             | 55. Canyon Wren               | 87. Red-winged Blackbird              |
| 24. Common Nighthawk*      | 56. Winter Wren               | 88. Brown-headed Cowbird              |
| 25. Black Swift*           | 57. American Dipper           | 89. Gray-crowned Rosy-Finch           |
| 26. Vaux's Swift           | 58. Golden-crowned Kinglet    | 90. Pine Grosbeak                     |
| 27. Rufous Hummingbird     | 59. Ruby-crowned Kinglet      | 91. Cassin's Finch                    |
| 28. Belted Kingfisher      | 60. Mountain Bluebird         | 92. Red Crossbill                     |
| 29. Red-breasted Sapsucker | 61. Townsend's Solitaire      | 93. Pine Siskin                       |
| 30. Downy Woodpecker       | 62. Swainson's Thrush         | 94. American Goldfinch*               |
| 31. Hairy Woodpecker       | 63. Hermit Thrush             | 95. Evening Grosbeak                  |
| 32. Three-toed Woodpecker* | 64. American Robin            |                                       |

Table 3. Species for which we estimated habitat-specific density in densely vegetated and/or sparsely vegetated habitats. ‘Self’ indicates species for which we amassed at least 60 detections within a habitat group (densely vegetated habitats or sparsely vegetated habitats) and were able to model detectability without using data from ‘surrogate’ species or data from other parks. For species that were detected less frequently (but at least five times) at Mount Rainier National Park, we modeled detectability using data from the same species or a more frequently encountered species at either North Cascades NP, Olympic NP, Mount Rainier NP, or pooled data from all three North Coast/Cascades Network National Parks.

| Species                   | Source of Parameter Values for Detectability Adjustments <sup>1</sup> |           |                       |        |                                       |           |                       |        |
|---------------------------|---|-----------|-----------------------|--------|---------------------------------------|-----------|-----------------------|--------|
|                           | Densely Vegetated Habitats  |           |                       |        | Sparsely Vegetated Habitats           |           |                       |        |
|                           | Species   | Sample    | Detection Probability |        | Species                               | Sample    | Detection Probability |        |
|                           |   | Width (m) | Estimate              | SE     |                                       | Width (m) | Estimate              | SE     |
| Blue Grouse               | Blue Grouse <sup>2</sup>  | 210       | 0.1957                | 0.0280 | Blue Grouse <sup>3</sup>              | 151       | 0.2213                | 0.0272 |
| Spotted Sandpiper         | Dark-eyed Junco <sup>4</sup>  | 80        | 0.4106                | 0.0376 | Dark-eyed Junco <sup>4</sup>          | 88        | 0.1903                | 0.0175 |
| Marbled Murrelet          | Olive-sided Flycatcher <sup>2</sup>                                   | 143       | 0.2951                | 0.1038 | not detected                          |           |                       |        |
| Band-tailed Pigeon        | Blue Grouse <sup>2</sup>  | 210       | 0.1957                | 0.0280 | not detected                          |           |                       |        |
| Hairy Woodpecker          | Hairy Woodpecker <sup>3</sup>   | 95        | 0.2632                | 0.0295 | American Robin <sup>4</sup>           | 125       | 0.3432                | 0.0537 |
| Northern Flicker          | Northern Flicker <sup>3</sup>   | 150       | 0.3603                | 0.1419 | Northern Flicker <sup>3</sup>         | 162       | 0.4015                | 0.1404 |
| Pileated Woodpecker       | Pileated Woodpecker <sup>3</sup>                                      | 227       | 0.2059                | 0.0227 | Northern Flicker <sup>3</sup>         | 162       | 0.4015                | 0.1404 |
| Olive-sided Flycatcher    | Olive-sided Flycatcher <sup>2</sup>                                   | 143       | 0.2951                | 0.1038 | Olive-sided Flycatcher <sup>3</sup>   | 220       | 0.2529                | 0.2574 |
| Hammond's Flycatcher      | self  | 55        | 0.5065                | 0.0769 | Pacific-slope Flycatcher <sup>3</sup> | 75        | 0.5543                | 0.1212 |
| Pacific-slope Flycatcher  | self  | 74        | 0.3811                | 0.0366 | Pacific-slope Flycatcher <sup>3</sup> | 75        | 0.5543                | 0.1212 |
| Warbling Vireo            | Warbling Vireo <sup>2</sup>   | 99        | 0.3458                | 0.3187 | American Robin <sup>4</sup>           | 125       | 0.3432                | 0.0537 |
| Gray Jay                  | self  | 80        | 0.2893                | 0.0654 | Townsend's Warbler <sup>2</sup>       | 100       | 0.3460                | 0.0505 |
| Steller's Jay             | Steller's Jay <sup>2</sup>  | 180       | 0.2008                | 0.0242 | Hermit Thrush <sup>4</sup>            | 175       | 0.5415                | 0.2470 |
| Clark's Nutcracker        | American Robin <sup>4</sup>   | 102       | 0.4859                | 0.0901 | Clark's Nutcracker <sup>3</sup>       | 333       | 0.1007                | 0.0143 |
| Common Raven              | Common Raven <sup>3</sup>   | 229       | 0.3541                | 0.0449 | Hermit Thrush <sup>4</sup>            | 175       | 0.5415                | 0.2470 |
| Mountain Chickadee        | American Robin <sup>4</sup>   | 102       | 0.4859                | 0.0901 | Hermit Thrush <sup>4</sup>            | 175       | 0.5415                | 0.2470 |
| Chestnut-backed Chickadee | self  | 48        | 0.4608                | 0.0766 | self                                  | 50        | 0.4024                | 0.0611 |
| Red-breasted Nuthatch     | self  | 120       | 0.5503                | 0.3115 | self                                  | 110       | 0.4609                | 0.1758 |
| Brown Creeper             | self  | 52        | 0.5061                | 0.0829 | Golden-crowned Kinglet <sup>4</sup>   | 39        | 0.3712                | 0.0603 |
| Winter Wren               | self  | 100       | 0.3947                | 0.0222 | self                                  | 87        | 0.3522                | 0.0993 |
| Golden-crowned Kinglet    | self  | 40        | 0.5224                | 0.0345 | self                                  | 39        | 0.3712                | 0.0603 |
| Ruby-crowned Kinglet      | Townsend's Warbler <sup>4</sup>                                       | 89        | 0.6137                | 0.0682 | Townsend's Warbler <sup>2</sup>       | 100       | 0.3460                | 0.0505 |
| Mountain Bluebird         | not detected  |           |                       |        | Pine Siskin <sup>4</sup>              | 100       | 0.4953                | 0.1488 |
| Swainson's Thrush         | self  | 120       | 0.4813                | 0.1040 | Hermit Thrush <sup>4</sup>            | 175       | 0.5415                | 0.2470 |
| Hermit Thrush             | self  | 130       | 0.5734                | 0.2394 | self                                  | 175       | 0.5415                | 0.2470 |
| American Robin            | self  | 102       | 0.4859                | 0.0901 | self                                  | 125       | 0.3432                | 0.0537 |

Table 3, continued

| Species                   | Source of Parameter Values for Detectability Adjustments <sup>1</sup> |                  |                       |        |                                    |                  |                       |        |
|---------------------------|---|------------------|-----------------------|--------|------------------------------------|------------------|-----------------------|--------|
|                           | Densely Vegetated Habitats  |                  |                       |        | Sparsely Vegetated Habitats        |                  |                       |        |
|                           | Species   | Sample Width (m) | Detection Probability |        | Species                            | Sample Width (m) | Detection Probability |        |
|                           |   |                  | Estimate              | SE     |                                    |                  | Estimate              | SE     |
| Varied Thrush             | self  | 150              | 0.5770                | 0.0426 | self                               | 160              | 0.4656                | 0.0227 |
| American Pipit            | American Pipit <sup>5</sup>   | 90               | 0.3799                | 0.0629 | not detected                       |                  |                       |        |
| Yellow Warbler            | Yellow Warbler <sup>2</sup>   | 76               | 0.3521                | 0.0348 | Yellow-rumped Warbler <sup>2</sup> | 119              | 0.2391                | 0.0355 |
| Yellow-rumped Warbler     | Yellow-rumped Warbler <sup>2</sup>                                    | 95               | 0.4093                | 0.0735 | Yellow-rumped Warbler <sup>2</sup> | 119              | 0.2391                | 0.0355 |
| Black-thrtd. Gray Warbler | Black-thrtd. Gray Warbler <sup>2</sup>                                | 87               | 0.3810                | 0.0373 | Townsend's Warbler <sup>2</sup>    | 100              | 0.3460                | 0.0505 |
| Townsend's Warbler        | self  | 89               | 0.6137                | 0.0682 | Townsend's Warbler <sup>2</sup>    | 100              | 0.3460                | 0.0505 |
| MacGillivray's Warbler    | MacGillivray's Warbler <sup>2</sup>                                   | 81               | 0.4027                | 0.1192 | Townsend's Warbler <sup>2</sup>    | 100              | 0.3460                | 0.0505 |
| Wilson's Warbler          | Wilson's Warbler <sup>5</sup>   | 75               | 0.4330                | 0.0473 | Yellow-rumped Warbler <sup>2</sup> | 119              | 0.2391                | 0.0355 |
| Western Tanager           | Western Tanager <sup>2</sup>  | 105              | 0.3540                | 0.0543 | American Robin <sup>4</sup>        | 125              | 0.3432                | 0.0537 |
| Chipping Sparrow          | Chipping Sparrow <sup>2</sup>   | 93               | 0.2502                | 0.0298 | Chipping Sparrow <sup>2</sup>      | 80               | 0.5869                | 0.1316 |
| Fox Sparrow               | Song Sparrow <sup>2</sup>   | 125              | 0.1682                | 0.0389 | Fox Sparrow <sup>2</sup>           | 195              | 0.1566                | 0.0400 |
| Song Sparrow              | Song Sparrow <sup>2</sup>   | 125              | 0.1682                | 0.0389 | Fox Sparrow <sup>2</sup>           | 195              | 0.1566                | 0.0400 |
| Lincoln's Sparrow         | not detected  |                  |                       |        | Dark-eyed Junco <sup>4</sup>       | 88               | 0.1903                | 0.0175 |
| Dark-eyed Junco           | self  | 80               | 0.4106                | 0.0376 | self                               | 88               | 0.1903                | 0.0175 |
| Red-winged Blackbird      | Song Sparrow <sup>2</sup>   | 125              | 0.1682                | 0.0389 | not detected                       |                  |                       |        |
| Gray-crowned Rosy-Finch   | not detected  |                  |                       |        | Pine Siskin <sup>4</sup>           | 100              | 0.4953                | 0.1488 |
| Red Crossbill             | Red Crossbill <sup>2</sup>  | 90               | 0.2165                | 0.3192 | Red Crossbill <sup>5</sup>         | 89               | 0.4217                | 0.0652 |
| Pine Siskin               | self  | 84               | 0.4909                | 0.0618 | self                               | 100              | 0.4953                | 0.1488 |
| Evening Grosbeak          | Evening Grosbeak <sup>2</sup>   | 115              | 0.2381                | 0.0362 | Yellow-rumped Warbler <sup>2</sup> | 119              | 0.2391                | 0.0355 |

<sup>1</sup>Parameter values calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

<sup>2</sup>Indicates detectability was modeled using data from North Cascades National Park.

<sup>3</sup>Indicates detectability was modeled using pooled data from all three North Coast/Cascades Network National Parks.

<sup>4</sup>Indicates detectability was modeled using data from Mount Rainier National Park.

<sup>5</sup>Indicates detectability was modeled using data from Olympic National Park.



Table 4. Results from 21 point counts at locations classified as Red Alder. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>        | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |    |                   |                   |
|-----------------------------|--|--|---|--|-------------------------------|-------|----|-------------------|-------------------|
|                             |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Spotted Sandpiper           | 1                                      | 1  | 0   | 0.00   | <b>0.06</b>                   | 100.4 | 20 | 0.01              | 0.33              |
| Rufous Hummingbird          | 1                                      | 1  | 1   | 0.06   | --                            |       |    |                   |                   |
| Hairy Woodpecker            | 1                                      | 1  | 1   | 0.06   | <b>0.06</b>                   | 100.6 | 20 | 0.01              | 0.37              |
| Hammond's Flycatcher        | 9                                      | 12   | 11  | 0.67   | <b>1.09</b>                   | 32.1  | 33 | 0.58              | 2.06              |
| Pacific-slope Flycatcher    | 5                                      | 6  | 4   | 0.24   | <b>0.44</b>                   | 43.9  | 22 | 0.18              | 1.04              |
| Warbling Vireo              | 7                                      | 9  | 3   | 0.18   | <b>0.36</b>                   | 35.0  | 20 | 0.18              | 0.73              |
| Steller's Jay               | 3                                      | 3  | 1   | 0.06   | <b>0.07</b>                   | 56.1  | 20 | 0.02              | 0.21              |
| Common Raven                | 3                                      | 3  | 0   | 0.00   | <b>0.02</b>                   | 70.1  | 20 | <0.01             | 0.06              |
| Chestnut-backed Chickadee   | 10                                     | 15   | 15  | 0.91   | <b>2.14</b>                   | 30.7  | 40 | 1.17              | 3.93              |
| Brown Creeper               | 3                                      | 4  | 4   | 0.24   | <b>0.44</b>                   | 60.9  | 23 | 0.14              | 1.42              |
| Winter Wren                 | 9                                      | 12   | 2   | 0.12   | <b>0.46</b>                   | 31.5  | 21 | 0.24              | 0.87              |
| Golden-crowned Kinglet      | 5                                      | 5  | 5   | 0.30   | <b>0.91</b>                   | 40.5  | 21 | 0.40              | 2.04              |
| Swainson's Thrush           | 8                                      | 9  | 5   | 0.30   | <b>0.20</b>                   | 37.3  | 41 | 0.10              | 0.41              |
| American Robin              | 1                                      | 2  | 1   | 0.06   | <b>0.06</b>                   | 101.7 | 21 | 0.01              | 0.35              |
| Varied Thrush               | 5                                      | 7  | 1   | 0.06   | <b>0.08</b>                   | 43.7  | 21 | 0.03              | 0.20              |
| Yellow Warbler              | 1                                      | 1  | 1   | 0.06   | <b>0.07</b>                   | 100.5 | 20 | 0.01              | 0.43              |
| Black-throated Gray Warbler | 2                                      | 2  | 2   | 0.12   | <b>0.11</b>                   | 69.6  | 20 | 0.03              | 0.39              |
| Townsend's Warbler          | 6                                      | 12   | 5   | 0.30   | <b>0.37</b>                   | 39.0  | 24 | 0.17              | 0.81              |
| Wilson's Warbler            | 4                                      | 5  | 3   | 0.18   | <b>0.31</b>                   | 50.6  | 20 | 0.11              | 0.84              |
| Western Tanager             | 1                                      | 1  | 1   | 0.06   | <b>0.04</b>                   | 101.2 | 20 | 0.01              | 0.22              |
| Song Sparrow                | 2                                      | 3  | 3   | 0.18   | <b>0.17</b>                   | 76.6  | 20 | 0.04              | 0.71              |
| Dark-eyed Junco             | 8                                      | 10   | 7   | 0.42   | <b>0.58</b>                   | 32.5  | 24 | 0.30              | 1.11              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 5. Results from 25 point counts at locations classified as Conifer Deciduous Mix. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>        | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|-----------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                             |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Canada Goose                | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Vaux's Swift                | 2                                      | 2  | 1   | 0.05   | --                            |       |     |                   |                   |
| Rufous Hummingbird          | 3                                      | 3  | 3   | 0.15   | --                            |       |     |                   |                   |
| Pileated Woodpecker         | 2                                      | 2  | 0   | 0.00   | <b>0.02</b>                   | 70.1  | 24  | 0.01              | 0.09              |
| Hammond's Flycatcher        | 8                                      | 10   | 9   | 0.46   | <b>0.75</b>                   | 38.5  | 33  | 0.35              | 1.59              |
| Pacific-slope Flycatcher    | 15                                     | 22   | 19  | 0.97   | <b>1.34</b>                   | 22.2  | 36  | 0.86              | 2.10              |
| Warbling Vireo              | 8                                      | 10   | 4   | 0.20   | <b>0.38</b>                   | 33.6  | 24  | 0.19              | 0.74              |
| Steller's Jay               | 6                                      | 6  | 2   | 0.10   | <b>0.12</b>                   | 38.3  | 24  | 0.05              | 0.25              |
| Common Raven                | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 70.4  | 24  | 0.00              | 0.05              |
| Tree Swallow                | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Chestnut-backed Chickadee   | 16                                     | 31   | 30  | 1.53   | <b>3.60</b>                   | 25.9  | 68  | 2.17              | 5.98              |
| Red-breasted Nuthatch       | 5                                      | 6  | 0   | 0.00   | <b>0.08</b>                   | 75.5  | 100 | 0.02              | 0.31              |
| Brown Creeper               | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Winter Wren                 | 14                                     | 20   | 11  | 0.56   | <b>0.58</b>                   | 22.7  | 27  | 0.37              | 0.92              |
| American Dipper             | 1                                      | 1  | 1   | 0.05   | --                            |       |     |                   |                   |
| Golden-crowned Kinglet      | 4                                      | 4  | 2   | 0.10   | <b>0.15</b>                   | 100.2 | 24  | 0.03              | 0.85              |
| Swainson's Thrush           | 9                                      | 13   | 6   | 0.31   | <b>0.20</b>                   | 38.9  | 46  | 0.10              | 0.43              |
| Hermit Thrush               | 3                                      | 4  | 2   | 0.10   | <b>0.05</b>                   | 72.3  | 52  | 0.01              | 0.19              |
| American Robin              | 4                                      | 5  | 2   | 0.10   | <b>0.13</b>                   | 53.3  | 31  | 0.05              | 0.35              |
| Varied Thrush               | 7                                      | 7  | 1   | 0.05   | <b>0.06</b>                   | 37.1  | 26  | 0.03              | 0.12              |
| Black-throated Gray Warbler | 2                                      | 2  | 2   | 0.10   | <b>0.09</b>                   | 69.9  | 24  | 0.02              | 0.32              |
| Townsend's Warbler          | 7                                      | 10   | 6   | 0.31   | <b>0.26</b>                   | 37.1  | 29  | 0.13              | 0.55              |
| MacGillivray's Warbler      | 1                                      | 1  | 1   | 0.05   | <b>0.05</b>                   | 104.3 | 24  | 0.01              | 0.28              |
| Wilson's Warbler            | 2                                      | 2  | 1   | 0.05   | <b>0.10</b>                   | 70.1  | 24  | 0.03              | 0.39              |
| Song Sparrow                | 6                                      | 8  | 4   | 0.20   | <b>0.39</b>                   | 45.5  | 24  | 0.16              | 0.95              |
| Dark-eyed Junco             | 9                                      | 13   | 11  | 0.56   | <b>0.63</b>                   | 32.9  | 28  | 0.33              | 1.22              |

Table 5, continued

| Species <sup>1</sup> | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup>  |       |    |                   |                   |
|----------------------|--|--|---|--|--------------------------------|-------|----|-------------------|-------------------|
|                      |  |  |   |  | <b>Estimate<br/>(birds/ha)</b> | CV    | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Red-winged Blackbird | 1                                      | 1  | 0   | 0.00   | <b>0.05</b>                    | 102.6 | 24 | 0.01              | 0.28              |
| Red Crossbill        | 3                                      | 4  | 1   | 0.05   | <b>0.15</b>                    | 70.8  | 24 | 0.04              | 0.54              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 6. Results from 5 point counts at locations classified as Grand Fir.

| Species <sup>1</sup>        | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |    |                   |                   |
|-----------------------------|--|--|---|--|-------------------------------|-------|----|-------------------|-------------------|
|                             |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Hammond's Flycatcher        | 1                                      | 2  | 0   | 0.00   | <b>0.42</b>                   | 101.2 | 4  | 0.04              | 4.10              |
| Pacific-slope Flycatcher    | 2                                      | 5  | 3   | 0.76   | <b>1.22</b>                   | 62.0  | 4  | 0.26              | 5.77              |
| Warbling Vireo              | 2                                      | 2  | 0   | 0.00   | <b>0.38</b>                   | 61.9  | 4  | 0.08              | 1.83              |
| Gray Jay                    | 1                                      | 1  | 1   | 0.25   | <b>0.34</b>                   | 102.5 | 4  | 0.04              | 3.32              |
| Steller's Jay               | 1                                      | 1  | 1   | 0.25   | <b>0.10</b>                   | 100.7 | 4  | 0.01              | 1.00              |
| Common Raven                | 1                                      | 1  | 0   | 0.00   | <b>0.03</b>                   | 100.8 | 4  | <0.01             | 0.35              |
| Chestnut-backed Chickadee   | 4                                      | 5  | 3   | 0.76   | <b>1.80</b>                   | 68.7  | 5  | 0.35              | 9.38              |
| Red-breasted Nuthatch       | 1                                      | 1  | 0   | 0.00   | <b>0.08</b>                   | 114.9 | 7  | 0.01              | 0.71              |
| Winter Wren                 | 1                                      | 1  | 0   | 0.00   | <b>0.16</b>                   | 100.2 | 4  | 0.02              | 1.62              |
| Swainson's Thrush           | 1                                      | 1  | 0   | 0.00   | <b>0.09</b>                   | 102.3 | 4  | 0.01              | 0.89              |
| Hermit Thrush               | 1                                      | 2  | 0   | 0.00   | <b>0.13</b>                   | 108.4 | 6  | 0.02              | 1.19              |
| American Robin              | 1                                      | 1  | 0   | 0.00   | <b>0.13</b>                   | 101.7 | 4  | 0.01              | 1.23              |
| Black-throated Gray Warbler | 1                                      | 2  | 0   | 0.00   | <b>0.22</b>                   | 100.5 | 4  | 0.02              | 2.25              |
| Townsend's Warbler          | 4                                      | 9  | 1   | 0.25   | <b>1.05</b>                   | 33.8  | 5  | 0.45              | 2.43              |
| Fox Sparrow                 | 1                                      | 1  | 1   | 0.25   | <b>0.24</b>                   | 102.6 | 4  | 0.02              | 2.55              |
| Dark-eyed Junco             | 1                                      | 2  | 1   | 0.25   | <b>0.49</b>                   | 100.4 | 4  | 0.05              | 4.85              |
| Pine Siskin                 | 1                                      | 2  | 1   | 0.25   | <b>0.37</b>                   | 100.8 | 4  | 0.04              | 3.65              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details.

Table 7. Results from 190 point counts at locations classified as Western Hemlock. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Osprey                    | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Blue Grouse               | 1                                      | 1  | 0   | 0.00   | <b>&lt;0.01</b>               | 101.0 | 189 | <0.01             | 0.01              |
| Marbled Murrelet          | 4                                      | 5  | 0   | 0.00   | <b>0.01</b>                   | 70.4  | 189 | <0.01             | 0.04              |
| Band-tailed Pigeon        | 3                                      | 4  | 2   | 0.01   | <b>0.01</b>                   | 75.7  | 189 | <0.01             | 0.02              |
| Vaux's Swift              | 5                                      | 8  | 6   | 0.04   | --                            |       |     |                   |                   |
| Rufous Hummingbird        | 4                                      | 4  | 4   | 0.03   | --                            |       |     |                   |                   |
| Red-breasted Sapsucker    | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Downy Woodpecker          | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Hairy Woodpecker          | 4                                      | 4  | 3   | 0.02   | <b>0.03</b>                   | 50.9  | 189 | 0.01              | 0.07              |
| Northern Flicker          | 4                                      | 4  | 1   | 0.01   | <b>0.01</b>                   | 63.3  | 189 | <0.01             | 0.03              |
| Pileated Woodpecker       | 5                                      | 5  | 2   | 0.01   | <b>0.01</b>                   | 45.6  | 189 | <0.01             | 0.02              |
| Hammond's Flycatcher      | 20                                     | 22   | 19  | 0.13   | <b>0.22</b>                   | 28.8  | 279 | 0.13              | 0.38              |
| Pacific-slope Flycatcher  | 48                                     | 69   | 43  | 0.29   | <b>0.47</b>                   | 17.9  | 315 | 0.33              | 0.66              |
| Warbling Vireo            | 4                                      | 5  | 1   | 0.01   | <b>0.02</b>                   | 61.7  | 189 | 0.01              | 0.06              |
| Gray Jay                  | 12                                     | 16   | 8   | 0.05   | <b>0.12</b>                   | 41.3  | 235 | 0.05              | 0.26              |
| Steller's Jay             | 10                                     | 10   | 1   | 0.01   | <b>0.03</b>                   | 33.1  | 189 | 0.01              | 0.05              |
| Common Raven              | 7                                      | 10   | 3   | 0.02   | <b>0.01</b>                   | 48.0  | 189 | <0.01             | 0.02              |
| Violet-green Swallow      | 1                                      | 1  | 1   | 0.01   | --                            |       |     |                   |                   |
| Chestnut-backed Chickadee | 110                                    | 168  | 145   | 0.97   | <b>2.27</b>                   | 18.8  | 671 | 1.58              | 3.28              |
| Red-breasted Nuthatch     | 30                                     | 36   | 8   | 0.05   | <b>0.07</b>                   | 59.8  | 194 | 0.03              | 0.22              |
| Brown Creeper             | 18                                     | 19   | 17  | 0.11   | <b>0.22</b>                   | 28.9  | 248 | 0.13              | 0.39              |
| Winter Wren               | 131                                    | 197  | 90  | 0.60   | <b>0.74</b>                   | 8.5   | 479 | 0.63              | 0.87              |
| Golden-crowned Kinglet    | 44                                     | 51   | 50  | 0.34   | <b>0.94</b>                   | 17.7  | 248 | 0.67              | 1.33              |
| Ruby-crowned Kinglet      | 1                                      | 1  | 1   | 0.01   | <b>&lt;0.01</b>               | 100.6 | 189 | <0.01             | 0.02              |
| Swainson's Thrush         | 9                                      | 12   | 1   | 0.01   | <b>0.03</b>                   | 42.5  | 236 | 0.01              | 0.07              |
| Hermit Thrush             | 28                                     | 38   | 7   | 0.05   | <b>0.06</b>                   | 46.3  | 242 | 0.03              | 0.14              |
| American Robin            | 9                                      | 9  | 2   | 0.01   | <b>0.03</b>                   | 37.5  | 230 | 0.02              | 0.06              |
| Varied Thrush             | 95                                     | 156  | 16  | 0.11   | <b>0.19</b>                   | 11.7  | 440 | 0.15              | 0.24              |
| Townsend's Warbler        | 24                                     | 37   | 13  | 0.09   | <b>0.12</b>                   | 24.3  | 285 | 0.07              | 0.19              |
| Western Tanager           | 4                                      | 5  | 1   | 0.01   | <b>0.02</b>                   | 51.9  | 189 | 0.01              | 0.05              |

Table 7, continued

| Species <sup>1</sup> | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|----------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                      |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Song Sparrow         | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 102.6 | 189 | <0.01             | 0.03              |
| Dark-eyed Junco      | 41                                     | 52   | 28  | 0.19   | <b>0.27</b>                   | 19.3  | 291 | 0.19              | 0.40              |
| Red-winged Blackbird | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 102.6 | 189 | <0.01             | 0.03              |
| Red Crossbill        | 11                                     | 13   | 5   | 0.03   | <b>0.11</b>                   | 37.6  | 189 | 0.05              | 0.22              |
| Pine Siskin          | 18                                     | 22   | 9   | 0.06   | <b>0.07</b>                   | 33.7  | 245 | 0.04              | 0.14              |
| Evening Grosbeak     | 4                                      | 7  | 2   | 0.01   | <b>0.03</b>                   | 63.9  | 189 | 0.01              | 0.10              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 8. Results from 7 point counts at locations classified as Western Redcedar.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |    |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Hammond's Flycatcher      | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |    |                   |                   |
| Pacific-slope Flycatcher  | 5                                      | 6  | 3   | 0.55   | <b>1.09</b>                   | 41.1  | 7  | 0.42              | 2.80              |
| Warbling Vireo            | 2                                      | 2  | 1   | 0.18   | <b>0.27</b>                   | 65.2  | 6  | 0.06              | 1.15              |
| Gray Jay                  | 1                                      | 1  | 0   | 0.00   | <b>0.25</b>                   | 102.5 | 7  | 0.03              | 1.87              |
| Steller's Jay             | 2                                      | 3  | 2   | 0.36   | <b>0.21</b>                   | 70.4  | 6  | 0.04              | 0.99              |
| Chestnut-backed Chickadee | 4                                      | 6  | 5   | 0.91   | <b>2.14</b>                   | 53.0  | 7  | 0.67              | 6.86              |
| Winter Wren               | 3                                      | 4  | 0   | 0.00   | <b>0.23</b>                   | 64.8  | 6  | 0.05              | 0.98              |
| Golden-crowned Kinglet    | 1                                      | 1  | 1   | 0.18   | <b>0.54</b>                   | 100.2 | 6  | 0.07              | 4.17              |
| Swainson's Thrush         | 1                                      | 1  | 1   | 0.18   | <b>0.07</b>                   | 102.3 | 7  | 0.01              | 0.50              |
| Hermit Thrush             | 1                                      | 1  | 1   | 0.18   | <b>0.05</b>                   | 108.4 | 8  | 0.01              | 0.35              |
| American Robin            | 2                                      | 2  | 0   | 0.00   | <b>0.18</b>                   | 67.2  | 7  | 0.04              | 0.76              |
| Varied Thrush             | 4                                      | 7  | 1   | 0.18   | <b>0.18</b>                   | 40.7  | 6  | 0.07              | 0.45              |
| Townsend's Warbler        | 2                                      | 2  | 1   | 0.18   | <b>0.19</b>                   | 65.5  | 6  | 0.04              | 0.79              |
| Song Sparrow              | 1                                      | 1  | 0   | 0.00   | <b>0.17</b>                   | 102.6 | 6  | 0.02              | 1.38              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details.

Table 9. Results from 111 point counts at locations classified as Mixed Douglas-fir/Western Hemlock. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>        | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|-----------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                             |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Canada Goose                | 0                                      | 0  | 0   | 0.00   | --                            |       |     |                   |                   |
| Blue Grouse                 | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Band-tailed Pigeon          | 3                                      | 8  | 4   | 0.05   | <b>0.03</b>                   | 69.6  | 110 | 0.01              | 0.09              |
| Northern Pygmy-Owl          | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Vaux's Swift                | 4                                      | 5  | 2   | 0.02   | --                            |       |     |                   |                   |
| Hairy Woodpecker            | 4                                      | 4  | 4   | 0.05   | <b>0.05</b>                   | 50.6  | 110 | 0.02              | 0.12              |
| Northern Flicker            | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 80.7  | 110 | <0.01             | 0.03              |
| Pileated Woodpecker         | 1                                      | 1  | 0   | 0.00   | <b>&lt;0.01</b>               | 100.6 | 110 | <0.01             | 0.01              |
| Olive-sided Flycatcher      | 1                                      | 1  | 0   | 0.00   | <b>&lt;0.01</b>               | 106.0 | 110 | <0.01             | 0.03              |
| Hammond's Flycatcher        | 10                                     | 13   | 9   | 0.10   | <b>0.19</b>                   | 41.9  | 142 | 0.09              | 0.41              |
| Pacific-slope Flycatcher    | 19                                     | 27   | 17  | 0.20   | <b>0.36</b>                   | 26.2  | 144 | 0.22              | 0.60              |
| Warbling Vireo              | 2                                      | 2  | 0   | 0.00   | <b>0.02</b>                   | 71.0  | 110 | <0.01             | 0.06              |
| Gray Jay                    | 5                                      | 5  | 3   | 0.03   | <b>0.08</b>                   | 49.4  | 154 | 0.03              | 0.20              |
| Steller's Jay               | 3                                      | 3  | 1   | 0.01   | <b>0.01</b>                   | 58.5  | 110 | <0.01             | 0.04              |
| Common Raven                | 2                                      | 2  | 0   | 0.00   | <b>&lt;0.01</b>               | 71.5  | 110 | <0.01             | 0.01              |
| Chestnut-backed Chickadee   | 64                                     | 110  | 94  | 1.08   | <b>2.54</b>                   | 20.1  | 542 | 1.72              | 3.75              |
| Red-breasted Nuthatch       | 34                                     | 38   | 6   | 0.07   | <b>0.12</b>                   | 58.8  | 182 | 0.04              | 0.35              |
| Brown Creeper               | 14                                     | 16   | 14  | 0.16   | <b>0.31</b>                   | 30.7  | 170 | 0.17              | 0.57              |
| Winter Wren                 | 61                                     | 94   | 42  | 0.48   | <b>0.60</b>                   | 12.2  | 175 | 0.47              | 0.76              |
| Golden-crowned Kinglet      | 21                                     | 25   | 24  | 0.28   | <b>0.76</b>                   | 24.9  | 127 | 0.47              | 1.23              |
| Swainson's Thrush           | 4                                      | 6  | 0   | 0.00   | <b>0.03</b>                   | 56.4  | 142 | 0.01              | 0.07              |
| Hermit Thrush               | 24                                     | 33   | 6   | 0.07   | <b>0.09</b>                   | 46.1  | 233 | 0.04              | 0.22              |
| American Robin              | 8                                      | 13   | 5   | 0.06   | <b>0.07</b>                   | 48.5  | 141 | 0.03              | 0.17              |
| Varied Thrush               | 54                                     | 85   | 7   | 0.08   | <b>0.16</b>                   | 14.3  | 199 | 0.12              | 0.22              |
| Black-throated Gray Warbler | 1                                      | 3  | 3   | 0.03   | <b>0.03</b>                   | 100.5 | 110 | 0.01              | 0.16              |
| Townsend's Warbler          | 41                                     | 66   | 26  | 0.30   | <b>0.32</b>                   | 19.0  | 224 | 0.22              | 0.47              |
| Wilson's Warbler            | 2                                      | 2  | 1   | 0.01   | <b>0.02</b>                   | 71.2  | 110 | 0.01              | 0.08              |
| Western Tanager             | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 101.2 | 110 | <0.01             | 0.04              |
| Spotted Towhee              | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Song Sparrow                | 1                                      | 1  | 1   | 0.01   | <b>0.01</b>                   | 102.6 | 110 | <0.01             | 0.06              |



Table 9, continued

| Species <sup>1</sup> | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|----------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                      |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Dark-eyed Junco      | 19                                     | 26   | 13  | 0.15   | <b>0.25</b>                   | 25    | 145 | 0.15              | 0.41              |
| Red-winged Blackbird | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 102.6 | 110 | <0.01             | 0.06              |
| Red Crossbill        | 9                                      | 15   | 10  | 0.11   | <b>0.25</b>                   | 41.2  | 110 | 0.11              | 0.54              |
| Pine Siskin          | 12                                     | 18   | 12  | 0.14   | <b>0.15</b>                   | 37.1  | 138 | 0.07              | 0.30              |
| Evening Grosbeak     | 3                                      | 7  | 1   | 0.01   | <b>0.06</b>                   | 63.7  | 110 | 0.02              | 0.20              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 10. Results from 112 point counts at locations classified as Douglas-fir. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>        | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|-----------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                             |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Canada Goose                | 0                                      | 0  | 0   | 0.00   | --                            |       |     |                   |                   |
| Blue Grouse                 | 1                                      | 1  | 0   | 0.00   | <b>&lt;0.01</b>               | 101.0 | 111 | <0.01             | 0.02              |
| Band-tailed Pigeon          | 1                                      | 1  | 0   | 0.00   | <b>&lt;0.01</b>               | 101.0 | 111 | <0.01             | 0.02              |
| Vaux's Swift                | 3                                      | 3  | 1   | 0.01   | --                            |       |     |                   |                   |
| Rufous Hummingbird          | 1                                      | 1  | 1   | 0.01   | <b>0.11</b>                   | 102.3 | 111 | 0.02              | 0.59              |
| Red-breasted Sapsucker      | 1                                      | 1  | 1   | 0.01   | --                            |       |     |                   |                   |
| Hairy Woodpecker            | 5                                      | 5  | 5   | 0.06   | <b>0.06</b>                   | 45.3  | 111 | 0.03              | 0.14              |
| Northern Flicker            | 4                                      | 4  | 0   | 0.00   | <b>0.01</b>                   | 63.1  | 111 | <0.01             | 0.04              |
| Pileated Woodpecker         | 4                                      | 4  | 1   | 0.01   | <b>0.01</b>                   | 50.5  | 111 | <0.01             | 0.03              |
| Hammond's Flycatcher        | 26                                     | 32   | 27  | 0.31   | <b>0.56</b>                   | 25.6  | 196 | 0.34              | 0.92              |
| Pacific-slope Flycatcher    | 23                                     | 27   | 16  | 0.18   | <b>0.31</b>                   | 22.7  | 159 | <0.01             | 0.49              |
| Warbling Vireo              | 8                                      | 8  | 3   | 0.03   | <b>0.03</b>                   | 50.2  | 111 | 0.01              | 0.09              |
| Gray Jay                    | 3                                      | 4  | 2   | 0.02   | <b>0.06</b>                   | 64.8  | 138 | 0.02              | 0.20              |
| Steller's Jay               | 5                                      | 5  | 0   | 0.00   | <b>0.02</b>                   | 45.5  | 111 | 0.01              | 0.05              |
| American Crow               | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Common Raven                | 6                                      | 7  | 0   | 0.00   | <b>0.01</b>                   | 48.1  | 111 | 0.00              | 0.02              |
| Barn Swallow                | 1                                      | 4  | 4   | 0.05   | --                            |       |     |                   |                   |
| Chestnut-backed Chickadee   | 55                                     | 85   | 82  | 0.93   | <b>2.17</b>                   | 20.5  | 520 | 1.46              | 3.23              |
| Red-breasted Nuthatch       | 18                                     | 19   | 3   | 0.03   | <b>0.07</b>                   | 61.1  | 207 | 0.02              | 0.2               |
| Brown Creeper               | 13                                     | 13   | 11  | 0.13   | <b>0.23</b>                   | 33.1  | 165 | 0.12              | 0.43              |
| Canyon Wren                 | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Winter Wren                 | 60                                     | 77   | 28  | 0.32   | <b>0.50</b>                   | 12.6  | 170 | 0.39              | 0.64              |
| Golden-crowned Kinglet      | 25                                     | 28   | 26  | 0.30   | <b>0.82</b>                   | 21.9  | 134 | 0.53              | 1.25              |
| Swainson's Thrush           | 10                                     | 11   | 1   | 0.01   | <b>0.03</b>                   | 40.5  | 161 | 0.02              | 0.07              |
| Hermit Thrush               | 33                                     | 43   | 15  | 0.17   | <b>0.12</b>                   | 44.9  | 217 | 0.05              | 0.27              |
| American Robin              | 9                                      | 9  | 4   | 0.05   | <b>0.03</b>                   | 44    | 147 | 0.02              | 0.08              |
| Varied Thrush               | 41                                     | 53   | 10  | 0.11   | <b>0.11</b>                   | 16.2  | 174 | 0.08              | 0.14              |
| Yellow-rumped Warbler       | 1                                      | 1  | 1   | 0.01   | <b>0.01</b>                   | 101.6 | 111 | <0.01             | 0.04              |
| Black-throated Gray Warbler | 5                                      | 7  | 3   | 0.03   | <b>0.06</b>                   | 47.4  | 111 | 0.02              | 0.14              |
| Townsend's Warbler          | 64                                     | 105  | 52  | 0.59   | <b>0.56</b>                   | 15.2  | 314 | 0.42              | 0.76              |

Table 10, continued

| Species <sup>1</sup>   | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                        |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| MacGillivray's Warbler | 1                                      | 1  | 1   | 0.01   | <b>0.01</b>                   | 104.3 | 111 | <0.01             | 0.06              |
| Common Yellowthroat    | 1                                      | 1  | 1   | 0.01   | --                            |       |     |                   |                   |
| Wilson's Warbler       | 2                                      | 2  | 0   | 0.00   | <b>0.02</b>                   | 71.2  | 111 | 0.01              | 0.08              |
| Western Tanager        | 4                                      | 6  | 0   | 0.00   | <b>0.04</b>                   | 54.3  | 111 | 0.02              | 0.12              |
| Song Sparrow           | 3                                      | 5  | 2   | 0.02   | <b>0.05</b>                   | 63.9  | 111 | 0.02              | 0.17              |
| White-crowned Sparrow  | 2                                      | 2  | 1   | 0.01   | --                            |       |     |                   |                   |
| Dark-eyed Junco        | 29                                     | 43   | 27  | 0.31   | <b>0.43</b>                   | 21.8  | 160 | 0.28              | 0.66              |
| Red-winged Blackbird   | 2                                      | 4  | 1   | 0.01   | <b>0.04</b>                   | 82.2  | 111 | 0.01              | 0.18              |
| Brown-headed Cowbird   | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Red Crossbill          | 3                                      | 3  | 3   | 0.03   | <b>0.05</b>                   | 59.1  | 111 | 0.02              | 0.14              |
| Pine Siskin            | 7                                      | 11   | 8   | 0.09   | <b>0.07</b>                   | 46.8  | 128 | 0.03              | 0.18              |
| Evening Grosbeak       | 1                                      | 1  | 1   | 0.01   | <b>0.01</b>                   | 101.2 | 111 | <0.01             | 0.05              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 11. Results from 42 point counts at locations classified as Mid-elevation Shrub. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>        | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|-----------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                             |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Blue Grouse                 | 1                                      | 1  | 0   | 0.00   | <b>0.02</b>                   | 100.8 | 41  | <0.01             | 0.08              |
| Vaux's Swift                | 4                                      | 11   | 5   | 0.15   | --                            |       |     |                   |                   |
| Rufous Hummingbird          | 11                                     | 16   | 16  | 0.49   | --                            |       |     |                   |                   |
| Northern Flicker            | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 105.9 | 41  | <0.01             | 0.04              |
| Olive-sided Flycatcher      | 3                                      | 3  | 1   | 0.03   | <b>0.02</b>                   | 57.2  | 41  | 0.01              | 0.05              |
| Western Wood-Pewee          | 1                                      | 1  | 1   | 0.03   | --                            |       |     |                   |                   |
| Hammond's Flycatcher        | 4                                      | 5  | 3   | 0.09   | <b>0.10</b>                   | 52.9  | 41  | 0.04              | 0.26              |
| Pacific-slope Flycatcher    | 18                                     | 23   | 16  | 0.49   | <b>0.53</b>                   | 29.5  | 41  | 0.30              | 0.96              |
| Warbling Vireo              | 13                                     | 18   | 13  | 0.39   | <b>0.24</b>                   | 29.8  | 41  | 0.13              | 0.43              |
| Steller's Jay               | 7                                      | 8  | 4   | 0.12   | <b>0.04</b>                   | 58.6  | 41  | 0.01              | 0.11              |
| Common Raven                | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Tree Swallow                | 1                                      | 1  | 1   | 0.03   | --                            |       |     |                   |                   |
| Chestnut-backed Chickadee   | 11                                     | 15   | 13  | 0.39   | <b>0.98</b>                   | 33.7  | 62  | 0.51              | 1.89              |
| Red-breasted Nuthatch       | 4                                      | 4  | 0   | 0.00   | <b>0.05</b>                   | 61.4  | 100 | 0.02              | 0.17              |
| Brown Creeper               | 5                                      | 5  | 4   | 0.12   | <b>0.13</b>                   | 101.3 | 41  | 0.03              | 0.73              |
| Winter Wren                 | 15                                     | 20   | 9   | 0.27   | <b>0.48</b>                   | 37.0  | 123 | 0.24              | 0.98              |
| Golden-crowned Kinglet      | 4                                      | 4  | 3   | 0.09   | <b>0.40</b>                   | 58.6  | 48  | 0.14              | 1.20              |
| Ruby-crowned Kinglet        | 1                                      | 1  | 1   | 0.03   | <b>0.02</b>                   | 101.1 | 41  | <0.01             | 0.12              |
| Swainson's Thrush           | 11                                     | 15   | 4   | 0.12   | <b>0.07</b>                   | 53.6  | 41  | 0.02              | 0.19              |
| Hermit Thrush               | 6                                      | 7  | 2   | 0.06   | <b>0.03</b>                   | 61.0  | 131 | 0.01              | 0.10              |
| American Robin              | 4                                      | 5  | 3   | 0.09   | <b>0.07</b>                   | 53.6  | 49  | 0.03              | 0.19              |
| Varied Thrush               | 25                                     | 34   | 5   | 0.15   | <b>0.21</b>                   | 17.8  | 48  | 0.15              | 0.30              |
| Yellow Warbler              | 4                                      | 5  | 5   | 0.15   | <b>0.11</b>                   | 53.3  | 41  | 0.04              | 0.31              |
| Black-throated Gray Warbler | 1                                      | 2  | 1   | 0.03   | <b>0.02</b>                   | 101.1 | 41  | <0.01             | 0.12              |
| Townsend's Warbler          | 14                                     | 17   | 6   | 0.18   | <b>0.35</b>                   | 29.2  | 41  | 0.20              | 0.62              |
| MacGillivray's Warbler      | 7                                      | 7  | 7   | 0.21   | <b>0.15</b>                   | 37.9  | 41  | 0.07              | 0.32              |
| Wilson's Warbler            | 10                                     | 10   | 6   | 0.18   | <b>0.22</b>                   | 31.6  | 41  | 0.12              | 0.42              |
| Western Tanager             | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 101.2 | 41  | <0.01             | 0.08              |
| Spotted Towhee              | 1                                      | 1  | 1   | 0.03   | --                            |       |     |                   |                   |
| Chipping Sparrow            | 1                                      | 1  | 1   | 0.03   | <b>0.02</b>                   | 102.5 | 41  | <0.01             | 0.11              |

Table 11, continued

| Species <sup>1</sup>  | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |    |                   |                   |
|-----------------------|--|--|---|--|-------------------------------|-------|----|-------------------|-------------------|
|                       |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Song Sparrow          | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 103.2 | 41 | <0.01             | 0.07              |
| Dark-eyed Junco       | 14                                     | 15   | 10  | 0.30   | <b>0.67</b>                   | 27.4  | 52 | 0.39              | 1.15              |
| Black-headed Grosbeak | 2                                      | 2  | 2   | 0.06   | --                            |       |    |                   |                   |
| Red Crossbill         | 3                                      | 3  | 2   | 0.06   | <b>0.07</b>                   | 58.4  | 41 | 0.02              | 0.20              |
| Pine Siskin           | 3                                      | 3  | 1   | 0.03   | <b>0.05</b>                   | 63.8  | 66 | 0.01              | 0.15              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 12. Results from 15 point counts at locations classified as Noble Fir.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Hairy Woodpecker          | 1                                      | 1  | 1   | 0.08   | <b>0.09</b>                   | 100.6 | 14  | 0.01              | 0.54              |
| Pileated Woodpecker       | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Pacific-slope Flycatcher  | 1                                      | 1  | 1   | 0.08   | <b>0.10</b>                   | 100.5 | 14  | 0.02              | 0.61              |
| Gray Jay                  | 6                                      | 6  | 3   | 0.25   | <b>0.46</b>                   | 49.8  | 22  | 0.17              | 1.22              |
| Steller's Jay             | 1                                      | 1  | 0   | 0.00   | <b>0.03</b>                   | 100.7 | 14  | 0.01              | 0.20              |
| Common Raven              | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 100.8 | 14  | <0.01             | 0.07              |
| Chestnut-backed Chickadee | 9                                      | 15   | 15  | 1.27   | <b>3.00</b>                   | 30.7  | 28  | 1.62              | 5.55              |
| Red-breasted Nuthatch     | 7                                      | 7  | 1   | 0.08   | <b>0.19</b>                   | 63.4  | 144 | 0.06              | 0.59              |
| Brown Creeper             | 3                                      | 3  | 3   | 0.25   | <b>0.47</b>                   | 55.9  | 17  | 0.16              | 1.40              |
| Winter Wren               | 11                                     | 16   | 8   | 0.68   | <b>0.81</b>                   | 22.5  | 16  | 0.50              | 1.29              |
| Golden-crowned Kinglet    | 4                                      | 7  | 7   | 0.59   | <b>1.78</b>                   | 46.6  | 15  | 0.69              | 4.58              |
| Hermit Thrush             | 2                                      | 4  | 2   | 0.17   | <b>0.07</b>                   | 83.6  | 25  | 0.02              | 0.29              |
| Varied Thrush             | 12                                     | 20   | 5   | 0.42   | <b>0.33</b>                   | 20.3  | 19  | 0.22              | 0.50              |
| Townsend's Warbler        | 2                                      | 3  | 0   | 0.00   | <b>0.13</b>                   | 73.2  | 15  | 0.03              | 0.53              |
| Dark-eyed Junco           | 7                                      | 8  | 4   | 0.34   | <b>0.65</b>                   | 32.3  | 17  | 0.33              | 1.26              |
| Red Crossbill             | 3                                      | 3  | 1   | 0.08   | <b>0.24</b>                   | 69.7  | 14  | 0.06              | 0.93              |
| Pine Siskin               | 7                                      | 10   | 2   | 0.17   | <b>0.61</b>                   | 37.0  | 18  | 0.29              | 1.30              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details.

Table 13. Results from 136 point counts at locations classified as Pacific Silver Fir. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Canada Goose              | 0                                      | 0  | 0   | 0.00   | --                            |       |     |                   |                   |
| Blue Grouse               | 3                                      | 3  | 0   | 0.00   | <b>0.01</b>                   | 59.1  | 135 | <0.01             | 0.02              |
| Band-tailed Pigeon        | 3                                      | 3  | 2   | 0.02   | <b>0.01</b>                   | 59.1  | 135 | <0.01             | 0.02              |
| Barred Owl                | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Vaux's Swift              | 8                                      | 13   | 11  | 0.10   | --                            |       |     |                   |                   |
| Rufous Hummingbird        | 2                                      | 2  | 2   | 0.02   | --                            |       |     |                   |                   |
| Belted Kingfisher         | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Hairy Woodpecker          | 10                                     | 11   | 8   | 0.07   | <b>0.10</b>                   | 35.5  | 135 | 0.05              | 0.19              |
| Northern Flicker          | 6                                      | 6  | 3   | 0.03   | <b>0.01</b>                   | 59.1  | 135 | <0.01             | 0.04              |
| Pileated Woodpecker       | 2                                      | 2  | 0   | 0.00   | <b>&lt;0.01</b>               | 100.6 | 135 | <0.01             | 0.01              |
| Hammond's Flycatcher      | 13                                     | 14   | 14  | 0.13   | <b>0.21</b>                   | 31.3  | 203 | 0.12              | 0.39              |
| Pacific-slope Flycatcher  | 18                                     | 23   | 18  | 0.17   | <b>0.26</b>                   | 25.4  | 180 | 0.16              | 0.42              |
| Gray Jay                  | 20                                     | 29   | 21  | 0.20   | <b>0.37</b>                   | 33.1  | 163 | 0.19              | 0.69              |
| Steller's Jay             | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 71.5  | 135 | <0.01             | 0.03              |
| Clark's Nutcracker        | 1                                      | 1  | 0   | 0.00   | <b>&lt;0.01</b>               | 101.7 | 135 | <0.01             | 0.02              |
| Common Raven              | 5                                      | 5  | 0   | 0.00   | <b>0.01</b>                   | 51.0  | 135 | <0.01             | 0.01              |
| Mountain Chickadee        | 1                                      | 2  | 2   | 0.02   | <b>0.01</b>                   | 101.7 | 135 | <0.01             | 0.05              |
| Chestnut-backed Chickadee | 68                                     | 110  | 105   | 0.98   | <b>2.32</b>                   | 19.8  | 606 | 1.58              | 3.40              |
| Red-breasted Nuthatch     | 49                                     | 67   | 27  | 0.25   | <b>0.17</b>                   | 58.4  | 178 | 0.06              | 0.50              |
| Brown Creeper             | 15                                     | 17   | 15  | 0.14   | <b>0.26</b>                   | 32.3  | 196 | 0.14              | 0.48              |
| Winter Wren               | 82                                     | 114  | 62  | 0.58   | <b>0.65</b>                   | 10.0  | 271 | 0.53              | 0.79              |
| Golden-crowned Kinglet    | 48                                     | 67   | 65  | 0.61   | <b>1.74</b>                   | 16.5  | 186 | 1.26              | 2.40              |
| Swainson's Thrush         | 3                                      | 4  | 0   | 0.00   | <b>0.01</b>                   | 77.4  | 156 | <0.01             | 0.04              |
| Hermit Thrush             | 42                                     | 57   | 9   | 0.08   | <b>0.12</b>                   | 44.2  | 207 | 0.05              | 0.28              |
| American Robin            | 10                                     | 10   | 7   | 0.07   | <b>0.04</b>                   | 37.3  | 180 | 0.02              | 0.09              |
| Varied Thrush             | 82                                     | 140  | 18  | 0.17   | <b>0.24</b>                   | 11.7  | 327 | 0.19              | 0.30              |
| Yellow-rumped Warbler     | 3                                      | 3  | 1   | 0.01   | <b>0.02</b>                   | 60.1  | 135 | 0.01              | 0.06              |
| Townsend's Warbler        | 14                                     | 15   | 8   | 0.07   | <b>0.06</b>                   | 30.7  | 176 | 0.04              | 0.11              |
| Wilson's Warbler          | 1                                      | 1  | 1   | 0.01   | <b>0.01</b>                   | 100.6 | 135 | <0.01             | 0.05              |
| Western Tanager           | 1                                      | 1  | 1   | 0.01   | <b>0.01</b>                   | 101.2 | 135 | <0.01             | 0.03              |

Table 13, continued

| Species <sup>1</sup> | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|----------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                      |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Chipping Sparrow     | 1                                      | 2  | 1   | 0.01   | <b>0.01</b>                   | 100.7 | 135 | <0.01             | 0.06              |
| Song Sparrow         | 1                                      | 2  | 2   | 0.02   | <b>0.02</b>                   | 102.6 | 135 | <0.01             | 0.10              |
| Dark-eyed Junco      | 48                                     | 64   | 34  | 0.32   | <b>0.51</b>                   | 16.7  | 245 | 0.37              | 0.70              |
| Pine Grosbeak        | 2                                      | 2  | 1   | 0.01   | --                            |       |     |                   |                   |
| Red Crossbill        | 8                                      | 10   | 4   | 0.04   | <b>0.11</b>                   | 41.4  | 135 | 0.05              | 0.23              |
| Pine Siskin          | 41                                     | 60   | 33  | 0.31   | <b>0.38</b>                   | 20.1  | 244 | 0.26              | 0.56              |
| Evening Grosbeak     | 8                                      | 9  | 5   | 0.05   | <b>0.07</b>                   | 39.1  | 135 | 0.03              | 0.14              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details



Table 14. Results from 7 point counts at locations classified as Engelmann Spruce. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |    |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Rufous Hummingbird        | 1                                      | 1  | 1   | 0.18   | --                            |       |    |                   |                   |
| Chestnut-backed Chickadee | 3                                      | 4  | 4   | 0.73   | <b>1.71</b>                   | 54.6  | 7  | 0.52              | 5.68              |
| Red-breasted Nuthatch     | 4                                      | 4  | 1   | 0.18   | <b>0.23</b>                   | 66.7  | 61 | 0.07              | 0.77              |
| Winter Wren               | 3                                      | 3  | 3   | 0.55   | <b>0.35</b>                   | 47.5  | 6  | 0.12              | 1.03              |
| American Dipper           | 1                                      | 1  | 1   | 0.18   | --                            |       |    |                   |                   |
| Golden-crowned Kinglet    | 3                                      | 3  | 3   | 0.55   | <b>1.63</b>                   | 47.6  | 6  | 0.55              | 4.88              |
| Hermit Thrush             | 6                                      | 8  | 2   | 0.36   | <b>0.24</b>                   | 49.1  | 63 | 0.09              | 0.59              |
| Varied Thrush             | 3                                      | 6  | 2   | 0.36   | <b>0.18</b>                   | 66.7  | 6  | 0.04              | 0.77              |
| Wilson's Warbler          | 1                                      | 1  | 1   | 0.18   | <b>0.19</b>                   | 100.6 | 6  | 0.02              | 1.44              |
| Dark-eyed Junco           | 2                                      | 5  | 3   | 0.55   | <b>0.87</b>                   | 67.0  | 6  | 0.20              | 3.79              |
| Pine Siskin               | 3                                      | 4  | 2   | 0.36   | <b>0.53</b>                   | 53.5  | 7  | 0.16              | 1.74              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details.

Table 15. Results from 6 point counts at locations classified as Alaska Yellow Cedar.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |    |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Chestnut-backed Chickadee | 1                                      | 1  | 1   | 0.21   | <b>0.53</b>                   | 101.2 | 5  | 0.06              | 4.43              |
| Golden-crowned Kinglet    | 2                                      | 4  | 3   | 0.64   | <b>2.82</b>                   | 101.3 | 5  | 0.34              | 23.67             |
| Ruby-crowned Kinglet      | 1                                      | 1  | 2   | 0.00   | <b>0.15</b>                   | 101.1 | 5  | 0.02              | 1.32              |
| Hermit Thrush             | 2                                      | 2  | 0   | 0.00   | <b>0.06</b>                   | 78.0  | 11 | 0.01              | 0.29              |
| Varied Thrush             | 2                                      | 2  | 0   | 0.00   | <b>0.09</b>                   | 63.4  | 5  | 0.02              | 0.39              |
| Dark-eyed Junco           | 2                                      | 4  | 2   | 0.42   | <b>1.44</b>                   | 63.9  | 5  | 0.33              | 6.36              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details.

Table 16. Results from 30 point counts at locations classified as High-elevation Shrub. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Blue Grouse               | 1                                      | 1  | 0   | 0.00   | <b>0.02</b>                   | 100.8 | 29  | <0.01             | 0.12              |
| Spotted Sandpiper         | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Rufous Hummingbird        | 1                                      | 1  | 1   | 0.04   | --                            |       |     |                   |                   |
| Northern Flicker          | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 105.9 | 29  | <0.01             | 0.06              |
| Olive-sided Flycatcher    | 2                                      | 4  | 0   | 0.00   | <b>0.03</b>                   | 78.9  | 29  | 0.01              | 0.14              |
| Pacific-slope Flycatcher  | 2                                      | 2  | 1   | 0.04   | <b>0.07</b>                   | 72.8  | 29  | 0.02              | 0.26              |
| Warbling Vireo            | 2                                      | 2  | 1   | 0.04   | <b>0.04</b>                   | 71.2  | 29  | 0.01              | 0.15              |
| Gray Jay                  | 4                                      | 4  | 1   | 0.04   | <b>0.10</b>                   | 49.7  | 29  | 0.04              | 0.25              |
| Steller's Jay             | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 83.1  | 29  | <0.01             | 0.06              |
| Common Raven              | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 83.1  | 29  | <0.01             | 0.06              |
| Chestnut-backed Chickadee | 10                                     | 14   | 14  | 0.59   | <b>1.48</b>                   | 33.9  | 44  | 0.76              | 2.87              |
| Red-breasted Nuthatch     | 8                                      | 15   | 10  | 0.42   | <b>0.29</b>                   | 66.1  | 63  | 0.09              | 0.95              |
| Winter Wren               | 12                                     | 14   | 10  | 0.42   | <b>0.56</b>                   | 37.4  | 99  | 0.27              | 1.14              |
| Golden-crowned Kinglet    | 3                                      | 3  | 3   | 0.13   | <b>0.56</b>                   | 58.0  | 34  | 0.19              | 1.69              |
| Ruby-crowned Kinglet      | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Swainson's Thrush         | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 109.9 | 29  | <0.01             | 0.04              |
| Hermit Thrush             | 17                                     | 23   | 2   | 0.08   | <b>0.15</b>                   | 49.6  | 134 | 0.06              | 0.37              |
| American Robin            | 3                                      | 3  | 0   | 0.00   | <b>0.04</b>                   | 71.2  | 32  | 0.01              | 0.15              |
| Varied Thrush             | 12                                     | 21   | 5   | 0.21   | <b>0.18</b>                   | 27.7  | 31  | 0.10              | 0.31              |
| Yellow Warbler            | 2                                      | 2  | 1   | 0.04   | <b>0.06</b>                   | 71.1  | 29  | 0.02              | 0.23              |
| Townsend's Warbler        | 1                                      | 4  | 1   | 0.04   | <b>0.12</b>                   | 101.1 | 29  | 0.02              | 0.68              |
| Wilson's Warbler          | 7                                      | 8  | 7   | 0.30   | <b>0.25</b>                   | 38.6  | 29  | 0.12              | 0.54              |
| Western Tanager           | 1                                      | 1  | 0   | 0.00   | <b>0.02</b>                   | 101.2 | 29  | <0.01             | 0.11              |
| Fox Sparrow               | 4                                      | 4  | 1   | 0.04   | <b>0.07</b>                   | 53.8  | 29  | 0.03              | 0.20              |
| Dark-eyed Junco           | 14                                     | 26   | 18  | 0.76   | <b>1.73</b>                   | 26.6  | 37  | 1.02              | 2.94              |
| Cassin's Finch            | 1                                      | 1  | 1   | 0.04   | --                            |       |     |                   |                   |

Table 16, continued

| Species <sup>1</sup> | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup>  |      |    |                   |                   |
|----------------------|--|--|---|--|--------------------------------|------|----|-------------------|-------------------|
|                      |  |  |   |  | <b>Estimate<br/>(birds/ha)</b> | CV   | df | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Pine Siskin          | 10                                     | 20   | 10  | 0.42   | <b>0.41</b>                    | 44.3 | 89 | 0.18              | 0.94              |
| Evening Grosbeak     | 2                                      | 2  | 0   | 0.00   | <b>0.06</b>                    | 71.1 | 29 | 0.02              | 0.23              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 17. Results from 30 point counts at locations classified as Mountain Hemlock. An entry of ‘--’ for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Vaux's Swift              | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Rufous Hummingbird        | 1                                      | 1  | 1   | 0.04   | --                            |       |     |                   |                   |
| Pileated Woodpecker       | 2                                      | 2  | 0   | 0.00   | <b>0.02</b>                   | 77.8  | 29  | <0.01             | 0.08              |
| Pacific-slope Flycatcher  | 1                                      | 1  | 1   | 0.04   | <b>0.03</b>                   | 102.4 | 29  | 0.01              | 0.19              |
| Gray Jay                  | 3                                      | 3  | 1   | 0.04   | <b>0.07</b>                   | 57.8  | 29  | 0.02              | 0.22              |
| Common Raven              | 2                                      | 2  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Mountain Chickadee        | 2                                      | 4  | 2   | 0.08   | <b>0.12</b>                   | 74.6  | 29  | 0.03              | 0.48              |
| Chestnut-backed Chickadee | 15                                     | 19   | 15  | 0.64   | <b>1.58</b>                   | 29.2  | 52  | 0.89              | 2.81              |
| Red-breasted Nuthatch     | 16                                     | 25   | 8   | 0.34   | <b>0.44</b>                   | 45.0  | 177 | 0.19              | 1.02              |
| Brown Creeper             | 2                                      | 2  | 2   | 0.08   | <b>0.38</b>                   | 71.3  | 29  | 0.10              | 1.40              |
| Winter Wren               | 8                                      | 8  | 1   | 0.04   | <b>0.24</b>                   | 46.6  | 65  | 0.10              | 0.58              |
| Golden-crowned Kinglet    | 8                                      | 10   | 9   | 0.38   | <b>1.69</b>                   | 39.7  | 41  | 0.78              | 3.67              |
| Hermit Thrush             | 12                                     | 19   | 2   | 0.08   | <b>0.10</b>                   | 52.0  | 137 | 0.04              | 0.27              |
| American Robin            | 2                                      | 2  | 1   | 0.04   | <b>0.04</b>                   | 71.2  | 32  | 0.01              | 0.15              |
| Varied Thrush             | 20                                     | 27   | 5   | 0.21   | <b>0.19</b>                   | 22.4  | 32  | 0.12              | 0.29              |
| Townsend's Warbler        | 1                                      | 1  | 0   | 0.00   | <b>0.03</b>                   | 101.1 | 29  | 0.01              | 0.17              |
| Spotted Towhee            | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Chipping Sparrow          | 1                                      | 1  | 1   | 0.04   | <b>0.03</b>                   | 102.5 | 29  | <0.01             | 0.16              |
| Dark-eyed Junco           | 17                                     | 27   | 23  | 0.98   | <b>1.87</b>                   | 21.1  | 44  | 1.23              | 2.85              |
| Pine Grosbeak             | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Red Crossbill             | 3                                      | 4  | 2   | 0.08   | <b>0.13</b>                   | 61.4  | 29  | 0.04              | 0.40              |
| Pine Siskin               | 14                                     | 18   | 12  | 0.51   | <b>0.39</b>                   | 39.8  | 123 | 0.18              | 0.82              |
| Evening Grosbeak          | 4                                      | 4  | 0   | 0.00   | <b>0.03</b>                   | 101.1 | 29  | 0.01              | 0.17              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details.

Table 18. Results from 76 point counts at locations classified as Subalpine Fir. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Sharp-shinned Hawk        | 0                                      | 0  | 0   | 0.00   | --                            |       |     |                   |                   |
| Red-tailed Hawk           | 1                                      | 1  | 1   | 0.02   | --                            |       |     |                   |                   |
| Blue Grouse               | 3                                      | 3  | 0   | 0.00   | <b>0.02</b>                   | 71.3  | 75  | <0.01             | 0.06              |
| Spotted Sandpiper         | 1                                      | 1  | 0   | 0.00   | <b>0.03</b>                   | 100.4 | 75  | 0.01              | 0.15              |
| Rufous Hummingbird        | 4                                      | 4  | 4   | 0.07   | --                            |       |     |                   |                   |
| Hairy Woodpecker          | 3                                      | 4  | 0   | 0.00   | <b>0.02</b>                   | 72.0  | 75  | <0.01             | 0.06              |
| Northern Flicker          | 3                                      | 3  | 1   | 0.02   | <b>0.01</b>                   | 66.8  | 75  | <0.01             | 0.04              |
| Olive-sided Flycatcher    | 2                                      | 3  | 0   | 0.00   | <b>0.01</b>                   | 74.8  | 75  | <0.01             | 0.04              |
| Dusky Flycatcher          | 1                                      | 1  | 1   | 0.02   | --                            |       |     |                   |                   |
| Warbling Vireo            | 1                                      | 1  | 1   | 0.02   | <b>0.01</b>                   | 101.2 | 75  | <0.01             | 0.04              |
| Gray Jay                  | 13                                     | 13   | 6   | 0.10   | <b>0.11</b>                   | 31.9  | 75  | 0.06              | 0.20              |
| Steller's Jay             | 1                                      | 1  | 1   | 0.02   | <b>&lt;0.01</b>               | 109.9 | 75  | <0.01             | 0.01              |
| Clark's Nutcracker        | 3                                      | 4  | 2   | 0.03   | <b>0.01</b>                   | 62.2  | 75  | <0.01             | 0.05              |
| Common Raven              | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Mountain Chickadee        | 12                                     | 16   | 11  | 0.18   | <b>0.23</b>                   | 35.6  | 75  | 0.11              | 0.45              |
| Chestnut-backed Chickadee | 17                                     | 25   | 25  | 0.42   | <b>1.04</b>                   | 28.8  | 124 | 0.60              | 1.82              |
| Red-breasted Nuthatch     | 44                                     | 74   | 34  | 0.57   | <b>0.53</b>                   | 40.1  | 214 | 0.25              | 1.13              |
| Brown Creeper             | 4                                      | 4  | 4   | 0.07   | <b>0.30</b>                   | 51.6  | 75  | 0.11              | 0.78              |
| Winter Wren               | 18                                     | 26   | 11  | 0.18   | <b>0.39</b>                   | 36.4  | 161 | 0.20              | 0.79              |
| Golden-crowned Kinglet    | 12                                     | 24   | 24  | 0.40   | <b>1.78</b>                   | 33.9  | 112 | 0.93              | 3.42              |
| Hermit Thrush             | 24                                     | 37   | 6   | 0.10   | <b>0.09</b>                   | 49.9  | 147 | 0.03              | 0.22              |
| American Robin            | 5                                      | 5  | 3   | 0.05   | <b>0.04</b>                   | 46.2  | 93  | 0.02              | 0.09              |
| Varied Thrush             | 30                                     | 55   | 7   | 0.12   | <b>0.18</b>                   | 18.4  | 86  | 0.13              | 0.26              |
| Yellow-rumped Warbler     | 6                                      | 7  | 5   | 0.08   | <b>0.09</b>                   | 44.1  | 75  | 0.04              | 0.20              |
| Townsend's Warbler        | 10                                     | 14   | 11  | 0.18   | <b>0.17</b>                   | 34.9  | 75  | 0.09              | 0.33              |
| Townsend's-Hermit Warbler | 1                                      | 2  | 2   | 0.03   | --                            |       |     |                   |                   |
| Hermit Warbler            | 1                                      | 1  | 1   | 0.02   | --                            |       |     |                   |                   |
| Chipping Sparrow          | 7                                      | 9  | 8   | 0.13   | <b>0.10</b>                   | 44.7  | 75  | 0.04              | 0.23              |
| Fox Sparrow               | 5                                      | 5  | 2   | 0.03   | <b>0.03</b>                   | 55.3  | 75  | 0.01              | 0.08              |
| Lincoln's Sparrow         | 1                                      | 1  | 1   | 0.02   | <b>0.03</b>                   | 100.4 | 75  | 0.01              | 0.15              |

Table 18, continued

| Species <sup>1</sup> | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |      |     |                   |                   |
|----------------------|--|--|---|--|-------------------------------|------|-----|-------------------|-------------------|
|                      |  |  |   |  | Estimate<br>(birds/ha)        | CV   | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Dark-eyed Junco      | 43                                     | 72   | 52  | 0.87   | <b>1.96</b>                   | 16.5 | 149 | 1.42              | 2.71              |
| Red Crossbill        | 4                                      | 4  | 2   | 0.03   | <b>0.05</b>                   | 51.4 | 75  | 0.02              | 0.13              |
| Pine Siskin          | 28                                     | 41   | 23  | 0.39   | <b>0.33</b>                   | 35.1 | 257 | 0.17              | 0.64              |
| Evening Grosbeak     | 4                                      | 4  | 1   | 0.02   | <b>0.05</b>                   | 51.2 | 75  | 0.02              | 0.13              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 19. Results from 104 point counts at locations classified as Heather/Herbaceous Sedge Meadow. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| American Kestrel          | 1                                      | 1  | 1   | 0.01   | --                            |       |     |                   |                   |
| Blue Grouse               | 5                                      | 5  | 2   | 0.02   | <b>0.02</b>                   | 50.8  | 103 | 0.01              | 0.06              |
| Spotted Sandpiper         | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Rufous Hummingbird        | 7                                      | 7  | 7   | 0.09   | --                            |       |     |                   |                   |
| Hairy Woodpecker          | 4                                      | 4  | 0   | 0.00   | <b>0.02</b>                   | 59.3  | 103 | 0.01              | 0.05              |
| Northern Flicker          | 10                                     | 10   | 0   | 0.00   | <b>0.03</b>                   | 46.2  | 103 | 0.01              | 0.07              |
| Olive-sided Flycatcher    | 8                                      | 10   | 0   | 0.00   | <b>0.03</b>                   | 37.7  | 103 | 0.01              | 0.05              |
| Pacific-slope Flycatcher  | 1                                      | 1  | 1   | 0.01   | <b>0.01</b>                   | 102.4 | 103 | <0.01             | 0.05              |
| Gray Jay                  | 19                                     | 24   | 6   | 0.07   | <b>0.15</b>                   | 29.1  | 103 | 0.09              | 0.27              |
| Steller's Jay             | 2                                      | 2  | 1   | 0.01   | <b>&lt;0.01</b>               | 83.9  | 103 | <0.01             | 0.02              |
| Clark's Nutcracker        | 10                                     | 14   | 1   | 0.01   | <b>0.04</b>                   | 36.6  | 103 | 0.02              | 0.08              |
| Common Raven              | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Violet-green Swallow      | 1                                      | 4  | 4   | 0.05   | --                            |       |     |                   |                   |
| Mountain Chickadee        | 21                                     | 25   | 7   | 0.09   | <b>0.26</b>                   | 26.3  | 103 | 0.16              | 0.44              |
| Chestnut-backed Chickadee | 3                                      | 3  | 1   | 0.01   | <b>0.03</b>                   | 101.1 | 108 | 0.01              | 0.16              |
| Red-breasted Nuthatch     | 46                                     | 77   | 27  | 0.33   | <b>0.37</b>                   | 41.4  | 235 | 0.17              | 0.80              |
| Brown Creeper             | 2                                      | 2  | 2   | 0.02   | <b>0.11</b>                   | 72.2  | 103 | 0.03              | 0.39              |
| Winter Wren               | 20                                     | 24   | 8   | 0.10   | <b>0.26</b>                   | 36.5  | 177 | 0.13              | 0.53              |
| American Dipper           | 1                                      | 1  | 1   | 0.01   | --                            |       |     |                   |                   |
| Golden-crowned Kinglet    | 9                                      | 13   | 12  | 0.15   | <b>0.60</b>                   | 45.7  | 130 | 0.25              | 1.41              |
| Ruby-crowned Kinglet      | 2                                      | 2  | 1   | 0.01   | <b>0.02</b>                   | 71.9  | 103 | <0.01             | 0.06              |
| Mountain Bluebird         | 6                                      | 15   | 10  | 0.12   | <b>0.07</b>                   | 81.8  | 103 | 0.02              | 0.31              |
| Townsend's Solitaire      | 2                                      | 3  | 1   | 0.01   | --                            |       |     |                   |                   |
| Hermit Thrush             | 20                                     | 28   | 2   | 0.02   | <b>0.04</b>                   | 52.8  | 173 | 0.02              | 0.12              |
| American Robin            | 29                                     | 36   | 10  | 0.12   | <b>0.18</b>                   | 24.9  | 149 | 0.11              | 0.30              |
| Varied Thrush             | 29                                     | 44   | 8   | 0.10   | <b>0.10</b>                   | 20.6  | 115 | 0.07              | 0.15              |
| American Pipit            | 3                                      | 6  | 4   | 0.05   | <b>0.06</b>                   | 64.1  | 103 | 0.02              | 0.19              |
| Cedar Waxwing             | 1                                      | 1  | 1   | 0.01   | --                            |       |     |                   |                   |
| Orange-crowned Warbler    | 1                                      | 1  | 1   | 0.01   | --                            |       |     |                   |                   |
| Yellow-rumped Warbler     | 15                                     | 20   | 9   | 0.11   | <b>0.18</b>                   | 30.5  | 103 | 0.10              | 0.33              |



Table 19, continued

| Species <sup>1</sup>    | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |      |     |                   |                   |
|-------------------------|--|--|---|--|-------------------------------|------|-----|-------------------|-------------------|
|                         |  |  |   |  | Estimate<br>(birds/ha)        | CV   | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Western Tanager         | 2                                      | 2  | 1   | 0.01   | <b>0.01</b>                   | 72.1 | 103 | <0.01             | 0.04              |
| Chipping Sparrow        | 19                                     | 25   | 17  | 0.21   | <b>0.20</b>                   | 33.8 | 103 | 0.10              | 0.38              |
| Fox Sparrow             | 14                                     | 17   | 1   | 0.01   | <b>0.09</b>                   | 36.9 | 103 | 0.04              | 0.18              |
| Lincoln's Sparrow       | 4                                      | 4  | 2   | 0.02   | <b>0.06</b>                   | 57.9 | 103 | 0.02              | 0.18              |
| Dark-eyed Junco         | 71                                     | 153  | 94  | 1.15   | <b>2.76</b>                   | 14.8 | 239 | 2.07              | 3.69              |
| Black-headed Grosbeak   | 1                                      | 1  | 1   | 0.01   | --                            |      |     |                   |                   |
| Gray-crowned Rosy-Finch | 2                                      | 3  | 2   | 0.02   | <b>0.13</b>                   | 90.8 | 27  | 0.03              | 0.64              |
| Cassin's Finch          | 2                                      | 2  | 1   | 0.01   | --                            |      |     |                   |                   |
| Red Crossbill           | 5                                      | 6  | 1   | 0.01   | <b>0.05</b>                   | 54.5 | 103 | 0.02              | 0.13              |
| Pine Siskin             | 58                                     | 101  | 43  | 0.53   | <b>0.72</b>                   | 37.7 | 334 | 0.35              | 1.47              |
| Evening Grosbeak        | 2                                      | 3  | 0   | 0.00   | <b>0.03</b>                   | 75.7 | 103 | 0.01              | 0.10              |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for details

Table 20. Results from 52 point counts at locations classified as Rock or Sparsely Vegetated. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Species <sup>1</sup>      | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|---------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                           |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Red-tailed Hawk           | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| White-tailed Ptarmigan    | 1                                      | 1  | 1   | 0.02   | --                            |       |     |                   |                   |
| Spotted Sandpiper         | 3                                      | 3  | 1   | 0.02   | <b>0.12</b>                   | 57.3  | 51  | 0.04              | 0.36              |
| Vaux's Swift              | 1                                      | 1  | 1   | 0.02   | --                            |       |     |                   |                   |
| Rufous Hummingbird        | 4                                      | 4  | 4   | 0.10   | --                            |       |     |                   |                   |
| Hairy Woodpecker          | 2                                      | 2  | 0   | 0.00   | <b>0.02</b>                   | 71.7  | 51  | 0.01              | 0.08              |
| Northern Flicker          | 2                                      | 3  | 1   | 0.02   | <b>0.02</b>                   | 81.8  | 51  | <0.01             | 0.07              |
| Pileated Woodpecker       | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Hammond's Flycatcher      | 1                                      | 1  | 1   | 0.02   | <b>0.02</b>                   | 102.4 | 51  | <0.01             | 0.11              |
| Pacific-slope Flycatcher  | 2                                      | 3  | 2   | 0.05   | <b>0.06</b>                   | 77.1  | 51  | 0.01              | 0.23              |
| Warbling Vireo            | 4                                      | 6  | 2   | 0.05   | <b>0.07</b>                   | 53.7  | 51  | 0.02              | 0.19              |
| Gray Jay                  | 1                                      | 1  | 1   | 0.02   | <b>0.01</b>                   | 101.2 | 51  | <0.01             | 0.08              |
| Steller's Jay             | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 83.6  | 51  | <0.01             | 0.03              |
| Clark's Nutcracker        | 6                                      | 9  | 0   | 0.00   | <b>0.02</b>                   | 61.9  | 51  | 0.01              | 0.07              |
| Common Raven              | 1                                      | 1  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |
| Violet-green Swallow      | 1                                      | 4  | 4   | 0.10   | --                            |       |     |                   |                   |
| Mountain Chickadee        | 2                                      | 4  | 1   | 0.02   | <b>0.02</b>                   | 100.8 | 51  | <0.01             | 0.13              |
| Chestnut-backed Chickadee | 3                                      | 3  | 3   | 0.07   | <b>0.18</b>                   | 58.6  | 58  | 0.06              | 0.54              |
| Red-breasted Nuthatch     | 4                                      | 6  | 0   | 0.00   | <b>0.03</b>                   | 68.2  | 102 | 0.01              | 0.11              |
| Canyon Wren               | 1                                      | 1  | 0   | 0.00   | --                            |       |     |                   |                   |
| Winter Wren               | 8                                      | 8  | 2   | 0.05   | <b>0.11</b>                   | 51.4  | 94  | 0.04              | 0.30              |
| American Dipper           | 1                                      | 2  | 2   | 0.05   | --                            |       |     |                   |                   |
| Golden-crowned Kinglet    | 1                                      | 1  | 1   | 0.02   | <b>0.11</b>                   | 101.3 | 54  | 0.02              | 0.58              |
| Mountain Bluebird         | 6                                      | 6  | 1   | 0.02   | <b>0.11</b>                   | 108.9 | 3   | 0.01              | 1.66              |
| Swainson's Thrush         | 2                                      | 2  | 0   | 0.00   | <b>0.01</b>                   | 83.6  | 51  | <0.01             | 0.03              |
| Hermit Thrush             | 4                                      | 7  | 1   | 0.02   | <b>0.02</b>                   | 84.8  | 94  | <0.01             | 0.08              |
| American Robin            | 3                                      | 5  | 3   | 0.07   | <b>0.05</b>                   | 80.1  | 55  | 0.01              | 0.19              |
| Varied Thrush             | 4                                      | 6  | 0   | 0.00   | <b>0.02</b>                   | 56.8  | 52  | 0.01              | 0.04              |
| American Pipit            | 9                                      | 10   | 3   | 0.07   | <b>0.14</b>                   | 39.2  | 51  | 0.07              | 0.28              |
| Yellow-rumped Warbler     | 2                                      | 3  | 0   | 0.00   | <b>0.05</b>                   | 75.4  | 51  | 0.01              | 0.21              |

Table 20, continued

| Species <sup>1</sup>    | Points with<br>Detections <sup>2</sup> | Non-<br>flyover<br>Detections <sup>3</sup> | Non-flyover<br>Detections<br>within 50 m <sup>4</sup> | Unadjusted<br>Density<br>(birds/ha) <sup>5</sup> | Adjusted Density <sup>6</sup> |       |     |                   |                   |
|-------------------------|--|--|---|--|-------------------------------|-------|-----|-------------------|-------------------|
|                         |  |  |   |  | Estimate<br>(birds/ha)        | CV    | df  | Lower<br>95% C.I. | Upper<br>95% C.I. |
| Townsend's Warbler      | 2                                      | 3  | 0   | 0.00   | <b>0.05</b>                   | 75.4  | 51  | 0.01              | 0.20              |
| Wilson's Warbler        | 2                                      | 2  | 2   | 0.05   | <b>0.04</b>                   | 71.6  | 51  | 0.01              | 0.13              |
| Chipping Sparrow        | 2                                      | 2  | 1   | 0.02   | <b>0.02</b>                   | 102.5 | 51  | <0.01             | 0.09              |
| Song Sparrow            | 1                                      | 1  | 0   | 0.00   | <b>0.01</b>                   | 103.2 | 51  | <0.01             | 0.06              |
| Dark-eyed Junco         | 16                                     | 20   | 12  | 0.29   | <b>0.66</b>                   | 29.1  | 63  | 0.38              | 1.17              |
| Gray-crowned Rosy-Finch | 7                                      | 8  | 2   | 0.05   | <b>0.05</b>                   | 57.1  | 51  | 0.02              | 0.14              |
| Red Crossbill           | 1                                      | 2  | 0   | 0.00   | <b>0.04</b>                   | 101.2 | 51  | 0.01              | 0.20              |
| Pine Siskin             | 15                                     | 20   | 3   | 0.07   | <b>0.20</b>                   | 41.7  | 166 | 0.09              | 0.44              |
| Evening Grosbeak        | 0                                      | 0  | 0   | 0.00   | <b>0.00</b>                   |       |     |                   |                   |

<sup>1</sup>Includes all species detected during point counts in the habitat.

<sup>2</sup>Number of points where the species was detected, including flyovers.

<sup>3</sup>Number of individual birds detected at any distance during point counts, excluding flyovers.

<sup>4</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers.

<sup>5</sup>Based on number of detections within 50 m of the observer, with no adjustment for detectability.

<sup>6</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Thomas et al. 2003). See Methods for detail

Table 21. Habitat-specific density estimates of Blue Grouse at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.5  | 1                                   | 0   | 0.00                                       | <b>&lt;0.01</b>               | 101.0 | 189 | <0.01          | 0.01           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.9  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 0.9  | 1                                   | 0   | 0.00                                       | <b>&lt;0.01</b>               | 101.0 | 111 | <0.01          | 0.02           |
| Mid-elevation Shrub               | 2.4  | 1                                   | 0   | 0.00                                       | <b>0.02</b>                   | 100.8 | 41  | <0.01          | 0.08           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 2.2  | 3                                   | 0   | 0.00                                       | <b>0.01</b>                   | 59.1  | 135 | <0.01          | 0.02           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 3.3  | 1                                   | 0   | 0.00                                       | <b>0.02</b>                   | 100.8 | 29  | <0.01          | 0.12           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 3.9  | 3                                   | 0   | 0.00                                       | <b>0.02</b>                   | 71.3  | 75  | <0.01          | 0.06           |
| Heather/Herbaceous Sedge Meadow   | 4.8  | 5                                   | 2   | 0.02                                       | <b>0.02</b>                   | 50.8  | 103 | 0.01           | 0.06           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 22. Habitat-specific density estimates of Spotted Sandpiper at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |    |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 4.8  | 1                                   | 0   | 0.00                                       | <b>0.06</b>                   | 100.4 | 20 | 0.01           | 0.33           |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| High-elevation Shrub              | 3.3  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Subalpine Fir                     | 1.3  | 1                                   | 0   | 0.00                                       | <b>0.03</b>                   | 100.4 | 75 | 0.01           | 0.15           |
| Heather/Herbaceous Sedge Meadow   | 1.0  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Rock or Sparsely Vegetated        | 5.8  | 3                                   | 1   | 0.02                                       | <b>0.12</b>                   | 57.3  | 51 | 0.04           | 0.36           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 23. Habitat-specific density estimates of Marbled Murrelet at Mount Rainier National Park. An entry of '--' for the Adjusted Density Estimate indicates a habitat for which we did not model detectability.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |      |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV   | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Western Hemlock                   | 2.1  | 5                                   | 0   | 0.00                                       | <b>0.01</b>                   | 70.4 | 189 | <0.01          | 0.04           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |     |                |                |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 24. Habitat-specific density estimates of Band-tailed Pigeon at Mount Rainier National Park. An entry of '--' for the Adjusted Density Estimate indicates a habitat for which we did not model detectability.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 1.6  | 4                                   | 2   | 0.01                                       | <b>0.01</b>                   | 75.7  | 189 | <0.01          | 0.02           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 2.7  | 8                                   | 4   | 0.05                                       | <b>0.03</b>                   | 69.6  | 110 | 0.01           | 0.09           |
| Douglas-fir                       | 0.9  | 1                                   | 0   | 0.00                                       | <b>&lt;0.01</b>               | 101.0 | 111 | <0.01          | 0.02           |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 2.2  | 3                                   | 2   | 0.02                                       | <b>0.01</b>                   | 59.1  | 135 | <0.01          | 0.02           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 25. Habitat-specific density estimates of Hairy Woodpecker at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 4.8  | 1                                   | 1   | 0.06                                       | <b>0.06</b>                   | 100.6 | 20  | 0.01           | 0.37           |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 2.1  | 4                                   | 3   | 0.02                                       | <b>0.03</b>                   | 50.9  | 189 | 0.01           | 0.07           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 3.6  | 4                                   | 4   | 0.05                                       | <b>0.05</b>                   | 50.6  | 110 | 0.02           | 0.12           |
| Douglas-fir                       | 4.5  | 5                                   | 5   | 0.06                                       | <b>0.06</b>                   | 45.3  | 111 | 0.03           | 0.14           |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 6.7  | 1                                   | 1   | 0.08                                       | <b>0.09</b>                   | 100.6 | 14  | 0.01           | 0.54           |
| Pacific Silver Fir                | 7.4  | 11                                  | 8   | 0.07                                       | <b>0.10</b>                   | 35.5  | 135 | 0.05           | 0.19           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 3.9  | 4                                   | 0   | 0.00                                       | <b>0.02</b>                   | 72.0  | 75  | <0.01          | 0.06           |
| Heather/Herbaceous Sedge Meadow   | 3.8  | 4                                   | 0   | 0.00                                       | <b>0.02</b>                   | 59.3  | 103 | 0.01           | 0.05           |
| Rock or Sparsely Vegetated        | 3.8  | 2                                   | 0   | 0.00                                       | <b>0.02</b>                   | 71.7  | 51  | 0.01           | 0.08           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.



Table 26. Habitat-specific density estimates of Northern Flicker at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 2.1  | 4                                   | 1   | 0.01                                       | <b>0.01</b>                   | 63.3  | 189 | <0.01          | 0.03           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 1.8  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 80.7  | 110 | <0.01          | 0.03           |
| Douglas-fir                       | 3.6  | 4                                   | 0   | 0.00                                       | <b>0.01</b>                   | 63.1  | 111 | <0.01          | 0.04           |
| Mid-elevation Shrub               | 2.4  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 105.9 | 41  | <0.01          | 0.04           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 4.4  | 6                                   | 3   | 0.03                                       | <b>0.01</b>                   | 59.1  | 135 | <0.01          | 0.04           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 3.3  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 105.9 | 29  | <0.01          | 0.06           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 3.9  | 3                                   | 1   | 0.02                                       | <b>0.01</b>                   | 66.8  | 75  | <0.01          | 0.04           |
| Heather/Herbaceous Sedge Meadow   | 9.6  | 10                                  | 0   | 0.00                                       | <b>0.03</b>                   | 46.2  | 103 | 0.01           | 0.07           |
| Rock or Sparsely Vegetated        | 3.8  | 3                                   | 1   | 0.02                                       | <b>0.02</b>                   | 81.8  | 51  | <0.01          | 0.07           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 27. Habitat-specific density estimates of Pileated Woodpecker at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 8.0  | 2                                   | 0   | 0.00                                       | <b>0.02</b>                   | 70.1  | 24  | 0.01           | 0.09           |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 2.6  | 5                                   | 2   | 0.01                                       | <b>0.01</b>                   | 45.6  | 189 | <0.01          | 0.02           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.9  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 3.6  | 4                                   | 1   | 0.01                                       | <b>0.01</b>                   | 50.5  | 111 | <0.01          | 0.03           |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 6.7  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 1.5  | 2                                   | 0   | 0.00                                       | <b>&lt;0.01</b>               | 100.6 | 135 | <0.01          | 0.01           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 6.7  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 1.9  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 28. Habitat-specific density estimates of Olive-sided Flycatcher at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.9  | 1                                   | 0   | 0.00                                       | <b>&lt;0.01</b>               | 106.0 | 110 | <0.01          | 0.03           |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mid-elevation Shrub               | 7.1  | 3                                   | 1   | 0.03                                       | <b>0.02</b>                   | 57.2  | 41  | 0.01           | 0.05           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 6.7  | 4                                   | 0   | 0.00                                       | <b>0.03</b>                   | 78.9  | 29  | 0.01           | 0.14           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 2.6  | 3                                   | 0   | 0.00                                       | <b>0.01</b>                   | 74.8  | 75  | <0.01          | 0.04           |
| Heather/Herbaceous Sedge Meadow   | 7.7  | 10                                  | 0   | 0.00                                       | <b>0.03</b>                   | 37.7  | 103 | 0.01           | 0.05           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 29. Habitat-specific density estimates of Hammond's Flycatcher at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 42.9   | 12                                  | 11  | 0.67                                       | <b>1.09</b>                   | 32.1  | 33  | 0.58           | 2.06           |
| Conifer Deciduous Mix             | 32.0   | 10                                  | 9   | 0.46                                       | <b>0.75</b>                   | 38.5  | 33  | 0.35           | 1.59           |
| Grand Fir                         | 20.0   | 2                                   | 0   | 0.00                                       | <b>0.42</b>                   | 101.2 | 4   | 0.04           | 4.10           |
| Western Hemlock                   | 10.5   | 22                                  | 19  | 0.13                                       | <b>0.22</b>                   | 28.8  | 279 | 0.13           | 0.38           |
| Western Redcedar                  | 14.3   | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 9.0  | 13                                  | 9   | 0.10                                       | <b>0.19</b>                   | 41.9  | 142 | 0.09           | 0.41           |
| Douglas-fir                       | 23.2   | 32                                  | 27  | 0.31                                       | <b>0.56</b>                   | 25.6  | 196 | 0.34           | 0.92           |
| Mid-elevation Shrub               | 9.5  | 5                                   | 3   | 0.09                                       | <b>0.10</b>                   | 52.9  | 41  | 0.04           | 0.26           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 9.6  | 14                                  | 14  | 0.13                                       | <b>0.21</b>                   | 31.3  | 203 | 0.12           | 0.39           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 1.9  | 1                                   | 1   | 0.02                                       | <b>0.02</b>                   | 102.4 | 51  | <0.01          | 0.11           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 30. Habitat-specific density estimates of Pacific-slope Flycatcher at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 23.8   | 6                                   | 4   | 0.24                                       | <b>0.44</b>                   | 43.9  | 22  | 0.18           | 1.04           |
| Conifer Deciduous Mix             | 60.0   | 22                                  | 19  | 0.97                                       | <b>1.34</b>                   | 22.2  | 36  | 0.86           | 2.10           |
| Grand Fir                         | 40.0   | 5                                   | 3   | 0.76                                       | <b>1.22</b>                   | 62    | 4   | 0.26           | 5.77           |
| Western Hemlock                   | 25.3   | 69                                  | 43  | 0.29                                       | <b>0.47</b>                   | 17.9  | 315 | 0.33           | 0.66           |
| Western Redcedar                  | 71.4   | 6                                   | 3   | 0.55                                       | <b>1.09</b>                   | 41.1  | 7   | 0.42           | 2.80           |
| Mixed Douglas-fir/Western Hemlock | 17.1   | 27                                  | 17  | 0.20                                       | <b>0.36</b>                   | 26.2  | 144 | 0.22           | 0.60           |
| Douglas-fir                       | 20.5   | 27                                  | 16  | 0.18                                       | <b>0.31</b>                   | 22.7  | 159 | 0.20           | 0.49           |
| Mid-elevation Shrub               | 42.9   | 23                                  | 16  | 0.49                                       | <b>0.53</b>                   | 29.5  | 41  | 0.30           | 0.96           |
| Noble Fir                         | 6.7  | 1                                   | 1   | 0.08                                       | <b>0.10</b>                   | 100.5 | 14  | 0.02           | 0.61           |
| Pacific Silver Fir                | 13.2   | 23                                  | 18  | 0.17                                       | <b>0.26</b>                   | 25.4  | 180 | 0.16           | 0.42           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 6.7  | 2                                   | 1   | 0.04                                       | <b>0.07</b>                   | 72.8  | 29  | 0.02           | 0.26           |
| Mountain Hemlock                  | 3.3  | 1                                   | 1   | 0.04                                       | <b>0.03</b>                   | 102.4 | 29  | 0.01           | 0.19           |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 1.0  | 1                                   | 1   | 0.01                                       | <b>0.01</b>                   | 102.4 | 103 | <0.01          | 0.05           |
| Rock or Sparsely Vegetated        | 3.8  | 3                                   | 2   | 0.05                                       | <b>0.06</b>                   | 77.1  | 51  | 0.01           | 0.23           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 31. Habitat-specific density estimates of Warbling Vireo at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 33.3   | 9                                   | 3   | 0.18                                       | <b>0.36</b>                   | 35.0  | 20  | 0.18           | 0.73           |
| Conifer Deciduous Mix             | 32.0   | 10                                  | 4   | 0.20                                       | <b>0.38</b>                   | 33.6  | 24  | 0.19           | 0.74           |
| Grand Fir                         | 40.0   | 2                                   | 0   | 0.00                                       | <b>0.38</b>                   | 61.9  | 4   | 0.08           | 1.83           |
| Western Hemlock                   | 2.1  | 5                                   | 1   | 0.01                                       | <b>0.02</b>                   | 61.7  | 189 | 0.01           | 0.06           |
| Western Redcedar                  | 28.6   | 2                                   | 1   | 0.18                                       | <b>0.27</b>                   | 65.2  | 6   | 0.06           | 1.15           |
| Mixed Douglas-fir/Western Hemlock | 1.8  | 2                                   | 0   | 0.00                                       | <b>0.02</b>                   | 71.0  | 110 | <0.01          | 0.06           |
| Douglas-fir                       | 7.1  | 8                                   | 3   | 0.03                                       | <b>0.03</b>                   | 50.2  | 111 | 0.01           | 0.09           |
| Mid-elevation Shrub               | 31.0   | 18                                  | 13  | 0.39                                       | <b>0.24</b>                   | 29.8  | 41  | 0.13           | 0.43           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 6.7  | 2                                   | 1   | 0.04                                       | <b>0.04</b>                   | 71.2  | 29  | 0.01           | 0.15           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 1.3  | 1                                   | 1   | 0.02                                       | <b>0.01</b>                   | 101.2 | 75  | <0.01          | 0.04           |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 7.7  | 6                                   | 2   | 0.05                                       | <b>0.07</b>                   | 53.7  | 51  | 0.02           | 0.19           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 32. Habitat-specific density estimates of Gray Jay at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 20.0   | 1                                   | 1   | 0.25                                       | <b>0.34</b>                   | 102.5 | 4   | 0.04           | 3.32           |
| Western Hemlock                   | 6.3  | 16                                  | 8   | 0.05                                       | <b>0.12</b>                   | 41.3  | 235 | 0.05           | 0.26           |
| Western Redcedar                  | 14.3   | 1                                   | 0   | 0.00                                       | <b>0.25</b>                   | 102.5 | 7   | 0.03           | 1.87           |
| Mixed Douglas-fir/Western Hemlock | 4.5  | 5                                   | 3   | 0.03                                       | <b>0.08</b>                   | 49.4  | 154 | 0.03           | 0.2            |
| Douglas-fir                       | 2.7  | 4                                   | 2   | 0.02                                       | <b>0.06</b>                   | 64.8  | 138 | 0.02           | 0.2            |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 40.0   | 6                                   | 3   | 0.25                                       | <b>0.46</b>                   | 49.8  | 22  | 0.17           | 1.22           |
| Pacific Silver Fir                | 14.7   | 29                                  | 21  | 0.20                                       | <b>0.37</b>                   | 33.1  | 163 | 0.19           | 0.69           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 13.3   | 4                                   | 1   | 0.04                                       | <b>0.10</b>                   | 49.7  | 29  | 0.04           | 0.25           |
| Mountain Hemlock                  | 10.0   | 3                                   | 1   | 0.04                                       | <b>0.07</b>                   | 57.8  | 29  | 0.02           | 0.22           |
| Subalpine Fir                     | 17.1   | 13                                  | 6   | 0.10                                       | <b>0.11</b>                   | 31.9  | 75  | 0.06           | 0.20           |
| Heather/Herbaceous Sedge Meadow   | 18.3   | 24                                  | 6   | 0.07                                       | <b>0.15</b>                   | 29.1  | 103 | 0.09           | 0.27           |
| Rock or Sparsely Vegetated        | 1.9  | 1                                   | 1   | 0.02                                       | <b>0.01</b>                   | 101.2 | 51  | <0.01          | 0.08           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 33. Habitat-specific density estimates of Steller's Jay at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 14.3   | 3                                   | 1   | 0.06                                       | <b>0.07</b>                   | 56.1  | 20  | 0.02           | 0.21           |
| Conifer Deciduous Mix             | 24.0   | 6                                   | 2   | 0.10                                       | <b>0.12</b>                   | 38.3  | 24  | 0.05           | 0.25           |
| Grand Fir                         | 20.0   | 1                                   | 1   | 0.25                                       | <b>0.10</b>                   | 100.7 | 4   | 0.01           | 1.00           |
| Western Hemlock                   | 5.3  | 10                                  | 1   | 0.01                                       | <b>0.03</b>                   | 33.1  | 189 | 0.01           | 0.05           |
| Western Redcedar                  | 28.6   | 3                                   | 2   | 0.36                                       | <b>0.21</b>                   | 70.4  | 6   | 0.04           | 0.99           |
| Mixed Douglas-fir/Western Hemlock | 2.7  | 3                                   | 1   | 0.01                                       | <b>0.01</b>                   | 58.5  | 110 | <0.01          | 0.04           |
| Douglas-fir                       | 4.5  | 5                                   | 0   | 0.00                                       | <b>0.02</b>                   | 45.5  | 111 | 0.01           | 0.05           |
| Mid-elevation Shrub               | 16.7   | 8                                   | 4   | 0.12                                       | <b>0.04</b>                   | 58.6  | 41  | 0.01           | 0.11           |
| Noble Fir                         | 6.7  | 1                                   | 0   | 0.00                                       | <b>0.03</b>                   | 100.7 | 14  | 0.01           | 0.20           |
| Pacific Silver Fir                | 1.5  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 71.5  | 135 | <0.01          | 0.03           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 6.7  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 83.1  | 29  | <0.01          | 0.06           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 1.3  | 1                                   | 1   | 0.02                                       | <b>&lt;0.01</b>               | 109.9 | 75  | <0.01          | 0.01           |
| Heather/Herbaceous Sedge Meadow   | 1.9  | 2                                   | 1   | 0.01                                       | <b>&lt;0.01</b>               | 83.9  | 103 | <0.01          | 0.02           |
| Rock or Sparsely Vegetated        | 3.8  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 83.6  | 51  | <0.01          | 0.03           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.



Table 34. Habitat-specific density estimates of Clark's Nutcracker at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.7  | 1                                   | 0   | 0.00                                       | <b>&lt;0.01</b>               | 101.7 | 135 | <0.01          | 0.02           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 3.9  | 4                                   | 2   | 0.03                                       | <b>0.01</b>                   | 62.2  | 75  | <0.01          | 0.05           |
| Heather/Herbaceous Sedge Meadow   | 9.6  | 14                                  | 1   | 0.01                                       | <b>0.04</b>                   | 36.6  | 103 | 0.02           | 0.08           |
| Rock or Sparsely Vegetated        | 11.5   | 9                                   | 0   | 0.00                                       | <b>0.02</b>                   | 61.9  | 51  | 0.01           | 0.07           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 35. Habitat-specific density estimates of Common Raven at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 14.3   | 3                                   | 0   | 0.00                                       | <b>0.02</b>                   | 70.1  | 20  | <0.01          | 0.06           |
| Conifer Deciduous Mix             | 8.0  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 70.4  | 24  | <0.01          | 0.05           |
| Grand Fir                         | 20.0   | 1                                   | 0   | 0.00                                       | <b>0.03</b>                   | 100.8 | 4   | <0.01          | 0.35           |
| Western Hemlock                   | 3.7  | 10                                  | 3   | 0.02                                       | <b>0.01</b>                   | 48.0  | 189 | <0.01          | 0.02           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 1.8  | 2                                   | 0   | 0.00                                       | <b>&lt;0.01</b>               | 71.5  | 110 | <0.01          | 0.01           |
| Douglas-fir                       | 5.4  | 7                                   | 0   | 0.00                                       | <b>0.01</b>                   | 48.1  | 111 | <0.01          | 0.02           |
| Mid-elevation Shrub               | 2.4  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 6.7  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 100.8 | 14  | <0.01          | 0.07           |
| Pacific Silver Fir                | 3.7  | 5                                   | 0   | 0.00                                       | <b>0.01</b>                   | 51.0  | 135 | <0.01          | 0.01           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 6.7  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 83.1  | 29  | <0.01          | 0.06           |
| Mountain Hemlock                  | 6.7  | 2                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 1.3  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 1.0  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 1.9  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 36. Habitat-specific density estimates of Mountain Chickadee at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.7  | 2                                   | 2   | 0.02                                       | <b>0.01</b>                   | 101.7 | 135 | <0.01          | 0.05           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 6.7  | 4                                   | 2   | 0.08                                       | <b>0.12</b>                   | 74.6  | 29  | 0.03           | 0.48           |
| Subalpine Fir                     | 15.8   | 16                                  | 11  | 0.18                                       | <b>0.23</b>                   | 35.6  | 75  | 0.11           | 0.45           |
| Heather/Herbaceous Sedge Meadow   | 20.2   | 25                                  | 7   | 0.09                                       | <b>0.26</b>                   | 26.3  | 103 | 0.16           | 0.44           |
| Rock or Sparsely Vegetated        | 3.8  | 4                                   | 1   | 0.02                                       | <b>0.02</b>                   | 100.8 | 51  | <0.01          | 0.13           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 37. Habitat-specific density estimates of Chestnut-backed Chickadee at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 47.6   | 15                                  | 15  | 0.91                                       | <b>2.14</b>                   | 30.7  | 40  | 1.17           | 3.93           |
| Conifer Deciduous Mix             | 64.0   | 31                                  | 30  | 1.53                                       | <b>3.60</b>                   | 25.9  | 68  | 2.17           | 5.98           |
| Grand Fir                         | 80.0   | 5                                   | 3   | 0.76                                       | <b>1.80</b>                   | 68.7  | 5   | 0.35           | 9.38           |
| Western Hemlock                   | 57.9   | 168                                 | 145   | 0.97                                       | <b>2.27</b>                   | 18.8  | 671 | 1.58           | 3.28           |
| Western Redcedar                  | 57.1   | 6                                   | 5   | 0.91                                       | <b>2.14</b>                   | 53.0  | 7   | 0.67           | 6.86           |
| Mixed Douglas-fir/Western Hemlock | 57.7   | 110                                 | 94  | 1.08                                       | <b>2.54</b>                   | 20.1  | 542 | 1.72           | 3.75           |
| Douglas-fir                       | 49.1   | 85                                  | 82  | 0.93                                       | <b>2.17</b>                   | 20.5  | 520 | 1.46           | 3.23           |
| Mid-elevation Shrub               | 26.2   | 15                                  | 13  | 0.39                                       | <b>0.98</b>                   | 33.7  | 62  | 0.51           | 1.89           |
| Noble Fir                         | 60.0   | 15                                  | 15  | 1.27                                       | <b>3.00</b>                   | 30.7  | 28  | 1.62           | 5.55           |
| Pacific Silver Fir                | 50.0   | 110                                 | 105   | 0.98                                       | <b>2.32</b>                   | 19.8  | 606 | 1.58           | 3.40           |
| Engelmann Spruce                  | 42.9   | 4                                   | 4   | 0.73                                       | <b>1.71</b>                   | 54.6  | 7   | 0.52           | 5.68           |
| Alaska Yellow Cedar               | 16.7   | 1                                   | 1   | 0.21                                       | <b>0.53</b>                   | 101.1 | 5   | 0.06           | 4.43           |
| High-elevation Shrub              | 33.3   | 14                                  | 14  | 0.59                                       | <b>1.48</b>                   | 33.9  | 44  | 0.76           | 2.87           |
| Mountain Hemlock                  | 50.0   | 19                                  | 15  | 0.64                                       | <b>1.58</b>                   | 29.2  | 52  | 0.89           | 2.81           |
| Subalpine Fir                     | 22.4   | 25                                  | 25  | 0.42                                       | <b>1.04</b>                   | 28.8  | 125 | 0.60           | 1.82           |
| Heather/Herbaceous Sedge Meadow   | 2.9  | 3                                   | 1   | 0.01                                       | <b>0.03</b>                   | 101.1 | 108 | 0.01           | 0.16           |
| Rock or Sparsely Vegetated        | 5.8  | 3                                   | 3   | 0.07                                       | <b>0.18</b>                   | 58.6  | 58  | 0.06           | 0.54           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 38. Habitat-specific density estimates of Red-breasted Nuthatch at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 20.0   | 6                                   | 0   | 0.00                                       | <b>0.08</b>                   | 75.5  | 100 | 0.02           | 0.31           |
| Grand Fir                         | 20.0   | 1                                   | 0   | 0.00                                       | <b>0.08</b>                   | 114.9 | 7   | 0.01           | 0.71           |
| Western Hemlock                   | 15.8   | 36                                  | 8   | 0.05                                       | <b>0.07</b>                   | 59.8  | 194 | 0.03           | 0.22           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 30.6   | 38                                  | 6   | 0.07                                       | <b>0.12</b>                   | 58.8  | 182 | 0.04           | 0.35           |
| Douglas-fir                       | 16.1   | 19                                  | 3   | 0.03                                       | <b>0.07</b>                   | 61.1  | 207 | 0.02           | 0.20           |
| Mid-elevation Shrub               | 9.5  | 4                                   | 0   | 0.00                                       | <b>0.05</b>                   | 61.4  | 100 | 0.02           | 0.17           |
| Noble Fir                         | 46.7   | 7                                   | 1   | 0.08                                       | <b>0.19</b>                   | 63.4  | 144 | 0.06           | 0.59           |
| Pacific Silver Fir                | 36.0   | 67                                  | 27  | 0.25                                       | <b>0.17</b>                   | 58.4  | 178 | 0.06           | 0.50           |
| Engelmann Spruce                  | 57.1   | 4                                   | 1   | 0.18                                       | <b>0.23</b>                   | 66.7  | 61  | 0.07           | 0.77           |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 26.7   | 15                                  | 10  | 0.42                                       | <b>0.29</b>                   | 66.1  | 63  | 0.09           | 0.95           |
| Mountain Hemlock                  | 53.3   | 25                                  | 8   | 0.34                                       | <b>0.44</b>                   | 45.0  | 177 | 0.19           | 1.02           |
| Subalpine Fir                     | 57.9   | 74                                  | 34  | 0.57                                       | <b>0.53</b>                   | 40.1  | 214 | 0.25           | 1.13           |
| Heather/Herbaceous Sedge Meadow   | 44.2   | 77                                  | 27  | 0.33                                       | <b>0.37</b>                   | 41.4  | 235 | 0.17           | 0.80           |
| Rock or Sparsely Vegetated        | 7.7  | 6                                   | 0   | 0.00                                       | <b>0.03</b>                   | 68.2  | 102 | 0.01           | 0.11           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 39. Habitat-specific density estimates of Brown Creeper at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 14.3   | 4                                   | 4   | 0.24                                       | <b>0.44</b>                   | 60.9  | 23  | 0.14           | 1.42           |
| Conifer Deciduous Mix             | 4.0  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 9.5  | 19                                  | 17  | 0.11                                       | <b>0.22</b>                   | 28.9  | 248 | 0.13           | 0.39           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 12.6   | 16                                  | 14  | 0.16                                       | <b>0.31</b>                   | 30.7  | 170 | 0.17           | 0.57           |
| Douglas-fir                       | 11.6   | 13                                  | 11  | 0.13                                       | <b>0.23</b>                   | 33.1  | 165 | 0.12           | 0.43           |
| Mid-elevation Shrub               | 11.9   | 5                                   | 4   | 0.12                                       | <b>0.13</b>                   | 101.3 | 41  | 0.02           | 0.73           |
| Noble Fir                         | 20.0   | 3                                   | 3   | 0.25                                       | <b>0.47</b>                   | 55.9  | 17  | 0.16           | 1.40           |
| Pacific Silver Fir                | 11.0   | 17                                  | 15  | 0.14                                       | <b>0.26</b>                   | 32.3  | 196 | 0.14           | 0.48           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 6.7  | 2                                   | 2   | 0.08                                       | <b>0.38</b>                   | 71.3  | 29  | 0.10           | 1.40           |
| Subalpine Fir                     | 5.3  | 4                                   | 4   | 0.07                                       | <b>0.30</b>                   | 51.6  | 75  | 0.11           | 0.78           |
| Heather/Herbaceous Sedge Meadow   | 1.9  | 2                                   | 2   | 0.02                                       | <b>0.11</b>                   | 72.2  | 103 | 0.03           | 0.39           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 40. Habitat-specific density estimates of Winter Wren at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 42.9   | 12                                  | 2   | 0.12                                       | <b>0.46</b>                   | 31.5  | 21  | 0.24           | 0.87           |
| Conifer Deciduous Mix             | 56.0   | 20                                  | 11  | 0.56                                       | <b>0.58</b>                   | 22.7  | 27  | 0.37           | 0.92           |
| Grand Fir                         | 20.0   | 1                                   | 0   | 0.00                                       | <b>0.16</b>                   | 100.2 | 4   | 0.02           | 1.62           |
| Western Hemlock                   | 68.9   | 197                                 | 90  | 0.60                                       | <b>0.74</b>                   | 8.5   | 479 | 0.63           | 0.87           |
| Western Redcedar                  | 42.9   | 4                                   | 0   | 0.00                                       | <b>0.23</b>                   | 64.8  | 6   | 0.05           | 0.98           |
| Mixed Douglas-fir/Western Hemlock | 55.0   | 94                                  | 42  | 0.48                                       | <b>0.60</b>                   | 12.2  | 175 | 0.47           | 0.76           |
| Douglas-fir                       | 53.6   | 77                                  | 28  | 0.32                                       | <b>0.50</b>                   | 12.6  | 170 | 0.39           | 0.64           |
| Mid-elevation Shrub               | 35.7   | 20                                  | 9   | 0.27                                       | <b>0.48</b>                   | 37.0  | 123 | 0.24           | 0.98           |
| Noble Fir                         | 73.3   | 16                                  | 8   | 0.68                                       | <b>0.81</b>                   | 22.5  | 16  | 0.50           | 1.29           |
| Pacific Silver Fir                | 60.3   | 114                                 | 62  | 0.58                                       | <b>0.65</b>                   | 10.0  | 271 | 0.53           | 0.79           |
| Engelmann Spruce                  | 42.9   | 3                                   | 3   | 0.55                                       | <b>0.35</b>                   | 47.5  | 6   | 0.12           | 1.03           |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 40.0   | 14                                  | 10  | 0.42                                       | <b>0.56</b>                   | 37.4  | 99  | 0.27           | 1.14           |
| Mountain Hemlock                  | 26.7   | 8                                   | 1   | 0.04                                       | <b>0.24</b>                   | 46.6  | 65  | 0.10           | 0.58           |
| Subalpine Fir                     | 23.7   | 26                                  | 11  | 0.18                                       | <b>0.39</b>                   | 36.4  | 161 | 0.20           | 0.79           |
| Heather/Herbaceous Sedge Meadow   | 19.2   | 24                                  | 8   | 0.10                                       | <b>0.26</b>                   | 36.5  | 177 | 0.13           | 0.53           |
| Rock or Sparsely Vegetated        | 15.4   | 8                                   | 2   | 0.05                                       | <b>0.11</b>                   | 51.4  | 94  | 0.04           | 0.30           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 41. Habitat-specific density estimates of Golden-crowned Kinglet at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 23.8   | 5                                   | 5   | 0.30                                       | <b>0.91</b>                   | 40.5  | 21  | 0.4            | 2.04           |
| Conifer Deciduous Mix             | 16.0   | 4                                   | 2   | 0.10                                       | <b>0.15</b>                   | 100.2 | 24  | 0.03           | 0.85           |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 23.2   | 51                                  | 50  | 0.34                                       | <b>0.94</b>                   | 17.7  | 248 | 0.67           | 1.33           |
| Western Redcedar                  | 14.3   | 1                                   | 1   | 0.18                                       | <b>0.54</b>                   | 100.2 | 6   | 0.07           | 4.17           |
| Mixed Douglas-fir/Western Hemlock | 18.9   | 25                                  | 24  | 0.28                                       | <b>0.76</b>                   | 24.9  | 127 | 0.47           | 1.23           |
| Douglas-fir                       | 22.3   | 28                                  | 26  | 0.30                                       | <b>0.82</b>                   | 21.9  | 134 | 0.53           | 1.25           |
| Mid-elevation Shrub               | 9.5  | 4                                   | 3   | 0.09                                       | <b>0.40</b>                   | 58.6  | 48  | 0.14           | 1.20           |
| Noble Fir                         | 26.7   | 7                                   | 7   | 0.59                                       | <b>1.78</b>                   | 46.6  | 15  | 0.69           | 4.58           |
| Pacific Silver Fir                | 35.3   | 67                                  | 65  | 0.61                                       | <b>1.74</b>                   | 16.5  | 186 | 1.26           | 2.40           |
| Engelmann Spruce                  | 42.9   | 3                                   | 3   | 0.55                                       | <b>1.63</b>                   | 47.6  | 6   | 0.55           | 4.88           |
| Alaska Yellow Cedar               | 33.3   | 4                                   | 3   | 0.64                                       | <b>2.82</b>                   | 101.3 | 5   | 0.34           | 23.67          |
| High-elevation Shrub              | 10.0   | 3                                   | 3   | 0.13                                       | <b>0.56</b>                   | 58.0  | 34  | 0.19           | 1.69           |
| Mountain Hemlock                  | 26.7   | 10                                  | 9   | 0.38                                       | <b>1.69</b>                   | 39.7  | 41  | 0.78           | 3.67           |
| Subalpine Fir                     | 15.8   | 24                                  | 24  | 0.40                                       | <b>1.78</b>                   | 33.9  | 112 | 0.93           | 3.42           |
| Heather/Herbaceous Sedge Meadow   | 8.7  | 13                                  | 12  | 0.15                                       | <b>0.60</b>                   | 45.7  | 130 | 0.25           | 1.41           |
| Rock or Sparsely Vegetated        | 1.9  | 1                                   | 1   | 0.02                                       | <b>0.11</b>                   | 101.3 | 54  | 0.02           | 0.58           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.



Table 42. Habitat-specific density estimates of Ruby-crowned Kinglet at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.5  | 1                                   | 1   | 0.01                                       | <b>&lt;0.01</b>               | 100.6 | 189 | <0.01          | 0.02           |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mid-elevation Shrub               | 2.4  | 1                                   | 1   | 0.03                                       | <b>0.02</b>                   | 101.1 | 41  | <0.01          | 0.12           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 16.7   | 1                                   | 0   | 0.00                                       | <b>0.15</b>                   | 101.1 | 5   | 0.02           | 1.32           |
| High-elevation Shrub              | 3.3  | 1                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 1.9  | 2                                   | 1   | 0.01                                       | <b>0.02</b>                   | 71.9  | 103 | <0.01          | 0.06           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 43. Habitat-specific density estimates of Mountain Bluebird at Mount Rainier National Park. An entry of '--' for the Adjusted Density Estimate indicates a habitat for which we did not model detectability.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 5.8  | 15                                  | 10  | 0.12                                       | <b>0.07</b>                   | 81.8  | 103 | 0.02           | 0.31           |
| Heather/Herbaceous Sedge Meadow   | 11.5   | 6                                   | 1   | 0.02                                       | <b>0.11</b>                   | 108.9 | 3   | 0.01           | 1.66           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 44. Habitat-specific density estimates of Swainson's Thrush at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 38.1   | 9                                   | 5   | 0.30                                       | <b>0.20</b>                   | 37.3  | 41  | 0.1            | 0.41           |
| Conifer Deciduous Mix             | 36.0   | 13                                  | 6   | 0.31                                       | <b>0.20</b>                   | 38.9  | 46  | 0.1            | 0.43           |
| Grand Fir                         | 20.0   | 1                                   | 0   | 0.00                                       | <b>0.09</b>                   | 102.3 | 4   | 0.01           | 0.89           |
| Western Hemlock                   | 4.7  | 12                                  | 1   | 0.01                                       | <b>0.03</b>                   | 42.5  | 236 | 0.01           | 0.07           |
| Western Redcedar                  | 14.3   | 1                                   | 1   | 0.18                                       | <b>0.07</b>                   | 102.3 | 7   | 0.01           | 0.50           |
| Mixed Douglas-fir/Western Hemlock | 3.6  | 6                                   | 0   | 0.00                                       | <b>0.03</b>                   | 56.4  | 142 | 0.01           | 0.07           |
| Douglas-fir                       | 8.9  | 11                                  | 1   | 0.01                                       | <b>0.03</b>                   | 40.5  | 161 | 0.02           | 0.07           |
| Mid-elevation Shrub               | 26.2   | 15                                  | 4   | 0.12                                       | <b>0.07</b>                   | 53.7  | 41  | 0.02           | 0.19           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 2.2  | 4                                   | 0   | 0.00                                       | <b>0.01</b>                   | 77.4  | 156 | 0.00           | 0.04           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 3.3  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 109.9 | 29  | <0.01          | 0.04           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 3.8  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 83.6  | 51  | <0.01          | 0.03           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 45. Habitat-specific density estimates of Hermit Thrush at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 12.0   | 4                                   | 2   | 0.10                                       | <b>0.05</b>                   | 72.3  | 52  | 0.01           | 0.19           |
| Grand Fir                         | 20.0   | 2                                   | 0   | 0.00                                       | <b>0.13</b>                   | 108.4 | 6   | 0.02           | 1.19           |
| Western Hemlock                   | 14.7   | 38                                  | 7   | 0.05                                       | <b>0.06</b>                   | 46.3  | 242 | 0.03           | 0.14           |
| Western Redcedar                  | 14.3   | 1                                   | 1   | 0.18                                       | <b>0.05</b>                   | 108.4 | 8   | 0.01           | 0.35           |
| Mixed Douglas-fir/Western Hemlock | 21.6   | 33                                  | 6   | 0.07                                       | <b>0.09</b>                   | 46.1  | 233 | 0.04           | 0.22           |
| Douglas-fir                       | 29.5   | 43                                  | 15  | 0.17                                       | <b>0.12</b>                   | 44.9  | 217 | 0.05           | 0.27           |
| Mid-elevation Shrub               | 14.3   | 7                                   | 2   | 0.06                                       | <b>0.03</b>                   | 61.0  | 131 | 0.01           | 0.10           |
| Noble Fir                         | 13.3   | 4                                   | 2   | 0.17                                       | <b>0.07</b>                   | 83.6  | 25  | 0.02           | 0.29           |
| Pacific Silver Fir                | 30.9   | 57                                  | 9   | 0.08                                       | <b>0.12</b>                   | 44.2  | 207 | 0.05           | 0.28           |
| Engelmann Spruce                  | 85.7   | 8                                   | 2   | 0.36                                       | <b>0.24</b>                   | 49.1  | 63  | 0.09           | 0.59           |
| Alaska Yellow Cedar               | 33.3   | 2                                   | 0   | 0.00                                       | <b>0.06</b>                   | 78.0  | 11  | 0.01           | 0.29           |
| High-elevation Shrub              | 56.7   | 23                                  | 2   | 0.08                                       | <b>0.15</b>                   | 49.6  | 134 | 0.06           | 0.37           |
| Mountain Hemlock                  | 40.0   | 19                                  | 2   | 0.08                                       | <b>0.10</b>                   | 52.0  | 137 | 0.04           | 0.27           |
| Subalpine Fir                     | 31.6   | 37                                  | 6   | 0.10                                       | <b>0.09</b>                   | 49.9  | 147 | 0.03           | 0.22           |
| Heather/Herbaceous Sedge Meadow   | 19.2   | 28                                  | 2   | 0.02                                       | <b>0.04</b>                   | 52.8  | 173 | 0.02           | 0.12           |
| Rock or Sparsely Vegetated        | 7.7  | 7                                   | 1   | 0.02                                       | <b>0.02</b>                   | 84.8  | 94  | <0.01          | 0.08           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 46. Habitat-specific density estimates of American Robin at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 4.8  | 2                                   | 1   | 0.06                                       | <b>0.06</b>                   | 101.7 | 21  | 0.01           | 0.35           |
| Conifer Deciduous Mix             | 16.0   | 5                                   | 2   | 0.10                                       | <b>0.13</b>                   | 53.3  | 31  | 0.05           | 0.35           |
| Grand Fir                         | 20.0   | 1                                   | 0   | 0.00                                       | <b>0.13</b>                   | 101.7 | 4   | 0.01           | 1.23           |
| Western Hemlock                   | 4.7  | 9                                   | 2   | 0.01                                       | <b>0.03</b>                   | 37.5  | 230 | 0.02           | 0.06           |
| Western Redcedar                  | 28.6   | 2                                   | 0   | 0.00                                       | <b>0.18</b>                   | 67.2  | 7   | 0.04           | 0.76           |
| Mixed Douglas-fir/Western Hemlock | 7.2  | 13                                  | 5   | 0.06                                       | <b>0.07</b>                   | 48.5  | 141 | 0.03           | 0.17           |
| Douglas-fir                       | 8.0  | 9                                   | 4   | 0.05                                       | <b>0.03</b>                   | 44    | 147 | 0.02           | 0.08           |
| Mid-elevation Shrub               | 9.5  | 5                                   | 3   | 0.09                                       | <b>0.07</b>                   | 53.6  | 49  | 0.03           | 0.19           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 7.4  | 10                                  | 7   | 0.07                                       | <b>0.04</b>                   | 37.3  | 180 | 0.02           | 0.09           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 10.0   | 3                                   | 0   | 0.00                                       | <b>0.04</b>                   | 71.2  | 32  | 0.01           | 0.15           |
| High-elevation Shrub              | 6.7  | 2                                   | 1   | 0.04                                       | <b>0.04</b>                   | 71.2  | 32  | 0.01           | 0.15           |
| Mountain Hemlock                  | 6.6  | 5                                   | 3   | 0.05                                       | <b>0.04</b>                   | 46.2  | 93  | 0.02           | 0.09           |
| Subalpine Fir                     | 27.9   | 36                                  | 10  | 0.12                                       | <b>0.18</b>                   | 24.9  | 149 | 0.11           | 0.30           |
| Heather/Herbaceous Sedge Meadow   | 5.8  | 5                                   | 3   | 0.07                                       | <b>0.05</b>                   | 80.1  | 55  | 0.01           | 0.19           |
| Rock or Sparsely Vegetated        | 10.0   | 3                                   | 0   | 0.00                                       | <b>0.04</b>                   | 71.2  | 32  | 0.01           | 0.15           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 47. Habitat-specific density estimates of Varied Thrush at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |      |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV   | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 23.8   | 7                                   | 1   | 0.06                                       | <b>0.08</b>                   | 43.7 | 21  | 0.03           | 0.20           |
| Conifer Deciduous Mix             | 28.0   | 7                                   | 1   | 0.05                                       | <b>0.06</b>                   | 37.1 | 26  | 0.03           | 0.12           |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |     |                |                |
| Western Hemlock                   | 50.0   | 156                                 | 16  | 0.11                                       | <b>0.19</b>                   | 11.7 | 440 | 0.15           | 0.24           |
| Western Redcedar                  | 57.1   | 7                                   | 1   | 0.18                                       | <b>0.18</b>                   | 40.7 | 6   | 0.07           | 0.45           |
| Mixed Douglas-fir/Western Hemlock | 48.6   | 85                                  | 7   | 0.08                                       | <b>0.16</b>                   | 14.3 | 199 | 0.12           | 0.22           |
| Douglas-fir                       | 36.6   | 53                                  | 10  | 0.11                                       | <b>0.11</b>                   | 16.2 | 174 | 0.08           | 0.14           |
| Mid-elevation Shrub               | 59.5   | 34                                  | 5   | 0.15                                       | <b>0.21</b>                   | 17.8 | 48  | 0.15           | 0.30           |
| Noble Fir                         | 80.0   | 20                                  | 5   | 0.42                                       | <b>0.33</b>                   | 20.3 | 19  | 0.22           | 0.50           |
| Pacific Silver Fir                | 60.3   | 140                                 | 18  | 0.17                                       | <b>0.24</b>                   | 11.7 | 327 | 0.19           | 0.30           |
| Engelmann Spruce                  | 42.9   | 6                                   | 2   | 0.36                                       | <b>0.18</b>                   | 66.7 | 6   | 0.04           | 0.77           |
| Alaska Yellow Cedar               | 33.3   | 2                                   | 0   | 0.00                                       | <b>0.09</b>                   | 63.4 | 5   | 0.02           | 0.39           |
| High-elevation Shrub              | 40.0   | 21                                  | 5   | 0.21                                       | <b>0.18</b>                   | 27.7 | 31  | 0.10           | 0.31           |
| Mountain Hemlock                  | 66.7   | 27                                  | 5   | 0.21                                       | <b>0.19</b>                   | 22.4 | 32  | 0.12           | 0.29           |
| Subalpine Fir                     | 39.5   | 55                                  | 7   | 0.12                                       | <b>0.18</b>                   | 18.4 | 86  | 0.13           | 0.26           |
| Heather/Herbaceous Sedge Meadow   | 27.9   | 44                                  | 8   | 0.10                                       | <b>0.10</b>                   | 20.6 | 115 | 0.07           | 0.15           |
| Rock or Sparsely Vegetated        | 7.7  | 6                                   | 0   | 0.00                                       | <b>0.02</b>                   | 56.8 | 52  | 0.01           | 0.04           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 48. Habitat-specific density estimates of Yellow Warbler at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |    |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 4.8  | 1                                   | 1   | 0.06                                       | <b>0.07</b>                   | 100.5 | 20 | 0.01           | 0.43           |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Mid-elevation Shrub               | 9.5  | 5                                   | 5   | 0.15                                       | <b>0.11</b>                   | 53.3  | 41 | 0.04           | 0.31           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| High-elevation Shrub              | 6.7  | 2                                   | 1   | 0.04                                       | <b>0.06</b>                   | 71.1  | 29 | 0.02           | 0.23           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 49. Habitat-specific density estimates of Yellow-rumped Warbler at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 0.9  | 1                                   | 1   | 0.01                                       | <b>0.01</b>                   | 101.6 | 111 | <0.01          | 0.04           |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 2.2  | 3                                   | 1   | 0.01                                       | <b>0.02</b>                   | 60.1  | 135 | 0.01           | 0.06           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 7.9  | 7                                   | 5   | 0.08                                       | <b>0.09</b>                   | 44.1  | 75  | 0.04           | 0.20           |
| Heather/Herbaceous Sedge Meadow   | 14.4   | 20                                  | 9   | 0.11                                       | <b>0.18</b>                   | 30.5  | 103 | 0.10           | 0.33           |
| Rock or Sparsely Vegetated        | 3.8  | 3                                   | 0   | 0.00                                       | <b>0.05</b>                   | 75.4  | 51  | 0.01           | 0.21           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.



Table 50. Habitat-specific density estimates of Black-throated Gray Warbler at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |    |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 9.5  | 2                                   | 2   | 0.12                                       | <b>0.11</b>                   | 69.6  | 20 | 0.03           | 0.39           |
| Conifer Deciduous Mix             | 8.0  | 2                                   | 2   | 0.10                                       | <b>0.09</b>                   | 69.9  | 24 | 0.02           | 0.32           |
| Grand Fir                         | 20.0   | 2                                   | 0   | 0.00                                       | <b>0.22</b>                   | 100.5 | 4  | 0.02           | 2.25           |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Mixed Douglas-fir/Western Hemlock | 9.5  | 2                                   | 2   | 0.12                                       | <b>0.11</b>                   | 69.6  | 20 | 0.03           | 0.39           |
| Douglas-fir                       | 8.0  | 2                                   | 2   | 0.10                                       | <b>0.09</b>                   | 69.9  | 24 | 0.02           | 0.32           |
| Mid-elevation Shrub               | 20.0   | 2                                   | 0   | 0.00                                       | <b>0.22</b>                   | 100.5 | 4  | 0.02           | 2.25           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |    |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 51. Habitat-specific density estimates of Townsend's Warbler at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 28.6   | 12                                  | 5   | 0.30                                       | <b>0.37</b>                   | 39.0  | 24  | 0.17           | 0.81           |
| Conifer Deciduous Mix             | 28.0   | 10                                  | 6   | 0.31                                       | <b>0.26</b>                   | 37.1  | 29  | 0.13           | 0.55           |
| Grand Fir                         | 80.0   | 9                                   | 1   | 0.25                                       | <b>1.05</b>                   | 33.8  | 5   | 0.45           | 2.43           |
| Western Hemlock                   | 12.6   | 37                                  | 13  | 0.09                                       | <b>0.12</b>                   | 24.3  | 285 | 0.07           | 0.19           |
| Western Redcedar                  | 28.6   | 2                                   | 1   | 0.18                                       | <b>0.19</b>                   | 65.5  | 6   | 0.04           | 0.79           |
| Mixed Douglas-fir/Western Hemlock | 36.9   | 66                                  | 26  | 0.30                                       | <b>0.32</b>                   | 19.0  | 224 | 0.22           | 0.47           |
| Douglas-fir                       | 57.1   | 105                                 | 52  | 0.59                                       | <b>0.56</b>                   | 15.2  | 314 | 0.42           | 0.76           |
| Mid-elevation Shrub               | 33.3   | 17                                  | 6   | 0.18                                       | <b>0.35</b>                   | 29.2  | 41  | 0.20           | 0.62           |
| Noble Fir                         | 13.3   | 3                                   | 0   | 0.00                                       | <b>0.13</b>                   | 73.2  | 15  | 0.03           | 0.53           |
| Pacific Silver Fir                | 10.3   | 15                                  | 8   | 0.07                                       | <b>0.06</b>                   | 30.7  | 176 | 0.04           | 0.11           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 3.3  | 4                                   | 1   | 0.04                                       | <b>0.12</b>                   | 101.1 | 29  | 0.02           | 0.68           |
| Mountain Hemlock                  | 3.3  | 1                                   | 0   | 0.00                                       | <b>0.03</b>                   | 101.1 | 29  | 0.01           | 0.17           |
| Subalpine Fir                     | 13.2   | 14                                  | 11  | 0.18                                       | <b>0.17</b>                   | 34.9  | 75  | 0.09           | 0.33           |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 3.8  | 3                                   | 0   | 0.00                                       | <b>0.05</b>                   | 75.4  | 51  | 0.01           | 0.20           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 52. Habitat-specific density estimates of MacGillivray's Warbler at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   | 104.3 | 24  | 0.01           | 0.28           |
| Conifer Deciduous Mix             | 4.0  | 1                                   | 1   | 0.05                                       | <b>0.05</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   | 104.3 | 111 | <0.01          | 0.06           |
| Douglas-fir                       | 0.9  | 1                                   | 1   | 0.01                                       | <b>0.01</b>                   |       |     |                |                |
| Mid-elevation Shrub               | 16.7   | 7                                   | 7   | 0.21                                       | <b>0.15</b>                   |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   | 37.9  | 41  | 0.07           | 0.32           |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   | 37.9  | 41  | 0.07           | 0.32           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 53. Habitat-specific density estimates of Wilson's Warbler at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 19.0   | 5                                   | 3   | 0.18                                       | <b>0.31</b>                   | 50.6  | 20  | 0.11           | 0.84           |
| Conifer Deciduous Mix             | 8.0  | 2                                   | 1   | 0.05                                       | <b>0.10</b>                   | 70.1  | 24  | 0.03           | 0.39           |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 1.8  | 2                                   | 1   | 0.01                                       | <b>0.02</b>                   | 71.2  | 110 | 0.01           | 0.08           |
| Douglas-fir                       | 1.8  | 2                                   | 0   | 0.00                                       | <b>0.02</b>                   | 71.2  | 111 | 0.01           | 0.08           |
| Mid-elevation Shrub               | 23.8   | 10                                  | 6   | 0.18                                       | <b>0.22</b>                   | 31.6  | 41  | 0.12           | 0.42           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.7  | 1                                   | 1   | 0.01                                       | <b>0.01</b>                   | 100.6 | 135 | <0.01          | 0.05           |
| Engelmann Spruce                  | 14.3   | 1                                   | 1   | 0.18                                       | <b>0.19</b>                   | 100.6 | 6   | 0.02           | 1.44           |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 23.3   | 8                                   | 7   | 0.30                                       | <b>0.25</b>                   | 38.6  | 29  | 0.12           | 0.54           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 3.8  | 2                                   | 2   | 0.05                                       | <b>0.04</b>                   | 71.6  | 51  | 0.01           | 0.13           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 54. Habitat-specific density estimates of Western Tanager at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 4.8  | 1                                   | 1   | 0.06                                       | <b>0.04</b>                   | 101.2 | 20  | 0.01           | 0.22           |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 2.1  | 5                                   | 1   | 0.01                                       | <b>0.02</b>                   | 51.9  | 189 | 0.01           | 0.05           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.9  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 101.2 | 110 | <0.01          | 0.04           |
| Douglas-fir                       | 3.6  | 6                                   | 0   | 0.00                                       | <b>0.04</b>                   | 54.3  | 111 | 0.02           | 0.12           |
| Mid-elevation Shrub               | 2.4  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 101.2 | 41  | <0.01          | 0.08           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.7  | 1                                   | 1   | 0.01                                       | <b>0.01</b>                   | 101.2 | 135 | <0.01          | 0.03           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 3.3  | 1                                   | 0   | 0.00                                       | <b>0.02</b>                   | 101.2 | 29  | <0.01          | 0.11           |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 1.9  | 2                                   | 1   | 0.01                                       | <b>0.01</b>                   | 72.1  | 103 | <0.01          | 0.04           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 55. Habitat-specific density estimates of Chipping Sparrow at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mid-elevation Shrub               | 2.4  | 1                                   | 1   | 0.03                                       | <b>0.02</b>                   | 102.5 | 41  | <0.01          | 0.11           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.7  | 2                                   | 1   | 0.01                                       | <b>0.01</b>                   | 100.7 | 135 | <0.01          | 0.06           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 3.3  | 1                                   | 1   | 0.04                                       | <b>0.03</b>                   | 102.5 | 29  | <0.01          | 0.16           |
| Subalpine Fir                     | 9.2  | 9                                   | 8   | 0.13                                       | <b>0.10</b>                   | 44.7  | 75  | 0.04           | 0.23           |
| Heather/Herbaceous Sedge Meadow   | 18.3   | 25                                  | 17  | 0.21                                       | <b>0.20</b>                   | 33.8  | 103 | 0.10           | 0.38           |
| Rock or Sparsely Vegetated        | 3.8  | 2                                   | 1   | 0.02                                       | <b>0.02</b>                   | 102.5 | 51  | <0.01          | 0.09           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 56. Habitat-specific density estimates of Fox Sparrow at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   | 102.6 | 4   | 0.02           | 2.55           |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 20.0   | 1                                   | 1   | 0.25                                       | <b>0.24</b>                   |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   | 53.8  | 29  | 0.03           | 0.20           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 13.3   | 4                                   | 1   | 0.04                                       | <b>0.07</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 6.6  | 5                                   | 2   | 0.03                                       | <b>0.03</b>                   | 55.3  | 75  | 0.01           | 0.08           |
| Heather/Herbaceous Sedge Meadow   | 13.5   | 17                                  | 1   | 0.01                                       | <b>0.09</b>                   | 36.9  | 103 | 0.04           | 0.18           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 57. Habitat-specific density estimates of Song Sparrow at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 9.5  | 3                                   | 3   | 0.18                                       | <b>0.17</b>                   | 76.6  | 20  | 0.04           | 0.71           |
| Conifer Deciduous Mix             | 24.0   | 8                                   | 4   | 0.20                                       | <b>0.39</b>                   | 45.5  | 24  | 0.16           | 0.95           |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 1.1  | 2                                   | 0   | 0.00                                       | <b>0.01</b>                   | 102.6 | 189 | <0.01          | 0.03           |
| Western Redcedar                  | 14.3   | 1                                   | 0   | 0.00                                       | <b>0.17</b>                   | 102.6 | 6   | 0.02           | 1.38           |
| Mixed Douglas-fir/Western Hemlock | 0.9  | 1                                   | 1   | 0.01                                       | <b>0.01</b>                   | 102.6 | 110 | <0.01          | 0.06           |
| Douglas-fir                       | 2.7  | 5                                   | 2   | 0.02                                       | <b>0.05</b>                   | 63.9  | 111 | 0.02           | 0.17           |
| Mid-elevation Shrub               | 2.4  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 103.2 | 41  | <0.01          | 0.07           |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.7  | 2                                   | 2   | 0.02                                       | <b>0.02</b>                   | 102.6 | 135 | <0.01          | 0.10           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Rock or Sparsely Vegetated        | 1.9  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 103.2 | 51  | <0.01          | 0.06           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.



Table 58. Habitat-specific density estimates of Lincoln Sparrow at Mount Rainier National Park. An entry of '--' for the Adjusted Density Estimate indicates a habitat for which we did not model detectability.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Subalpine Fir                     | 1.3  | 1                                   | 1   | 0.02                                       | <b>0.03</b>                   | 100.4 | 75  | 0.01           | 0.15           |
| Heather/Herbaceous Sedge Meadow   | 3.8  | 4                                   | 2   | 0.02                                       | <b>0.06</b>                   | 57.9  | 103 | 0.02           | 0.18           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 59. Habitat-specific density estimates of Dark-eyed Junco at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 38.1   | 10                                  | 7   | 0.42                                       | <b>0.58</b>                   | 32.5  | 24  | 0.30           | 1.11           |
| Conifer Deciduous Mix             | 36.0   | 13                                  | 11  | 0.56                                       | <b>0.63</b>                   | 32.9  | 28  | 0.33           | 1.22           |
| Grand Fir                         | 20.0   | 2                                   | 1   | 0.25                                       | <b>0.49</b>                   | 100.4 | 4   | 0.05           | 4.85           |
| Western Hemlock                   | 21.6   | 52                                  | 28  | 0.19                                       | <b>0.27</b>                   | 19.3  | 291 | 0.19           | 0.40           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 17.1   | 26                                  | 13  | 0.15                                       | <b>0.25</b>                   | 25    | 145 | 0.15           | 0.41           |
| Douglas-fir                       | 25.9   | 43                                  | 27  | 0.31                                       | <b>0.43</b>                   | 21.8  | 160 | 0.28           | 0.66           |
| Mid-elevation Shrub               | 33.3   | 15                                  | 10  | 0.30                                       | <b>0.67</b>                   | 27.4  | 52  | 0.39           | 1.15           |
| Noble Fir                         | 46.7   | 8                                   | 4   | 0.34                                       | <b>0.65</b>                   | 32.3  | 17  | 0.33           | 1.26           |
| Pacific Silver Fir                | 35.3   | 64                                  | 34  | 0.32                                       | <b>0.51</b>                   | 16.7  | 245 | 0.37           | 0.7            |
| Engelmann Spruce                  | 28.6   | 5                                   | 3   | 0.55                                       | <b>0.87</b>                   | 67.0  | 6   | 0.2            | 3.79           |
| Alaska Yellow Cedar               | 33.3   | 4                                   | 2   | 0.42                                       | <b>1.44</b>                   | 63.9  | 5   | 0.33           | 6.36           |
| High-elevation Shrub              | 46.7   | 26                                  | 18  | 0.76                                       | <b>1.73</b>                   | 26.6  | 37  | 1.02           | 2.94           |
| Mountain Hemlock                  | 56.7   | 27                                  | 23  | 0.98                                       | <b>1.87</b>                   | 21.1  | 44  | 1.23           | 2.85           |
| Subalpine Fir                     | 56.6   | 72                                  | 52  | 0.87                                       | <b>1.96</b>                   | 16.5  | 149 | 1.42           | 2.71           |
| Heather/Herbaceous Sedge Meadow   | 68.3   | 153                                 | 94  | 1.15                                       | <b>2.76</b>                   | 14.8  | 239 | 2.07           | 3.69           |
| Rock or Sparsely Vegetated        | 30.8   | 20                                  | 12  | 0.29                                       | <b>0.66</b>                   | 29.1  | 63  | 0.38           | 1.17           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 60. Habitat-specific density estimates of Red-winged Blackbird at Mount Rainier National Park. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 4.0  | 1                                   | 0   | 0.00                                       | <b>0.05</b>                   | 102.6 | 24  | 0.01           | 0.28           |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 0.5  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 102.6 | 189 | <0.01          | 0.03           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.9  | 1                                   | 0   | 0.00                                       | <b>0.01</b>                   | 102.6 | 110 | <0.01          | 0.06           |
| Douglas-fir                       | 1.8  | 4                                   | 1   | 0.01                                       | <b>0.04</b>                   | 82.2  | 111 | 0.01           | 0.18           |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Heather/Herbaceous Sedge Meadow   | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | --                            |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 61. Habitat-specific density estimates of Gray-crowned Rosy-Finch at Mount Rainier National Park. An entry of '--' for the Adjusted Density Estimate indicates a species for which we did not model detectability.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |      |    |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|------|----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV   | df | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Western Hemlock                   | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Mixed Douglas-fir/Western Hemlock | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Douglas-fir                       | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |    |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Pacific Silver Fir                | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | --                            |      |    |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |    |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |    |                |                |
| Mountain Hemlock                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |    |                |                |
| Subalpine Fir                     | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |      |    |                |                |
| Heather/Herbaceous Sedge Meadow   | 1.9  | 3                                   | 2   | 0.02                                       | <b>0.13</b>                   | 90.8 | 27 | 0.03           | 0.64           |
| Rock or Sparsely Vegetated        | 13.5   | 8                                   | 2   | 0.05                                       | <b>0.05</b>                   | 57.1 | 51 | 0.02           | 0.14           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 62. Habitat-specific density estimates of Red Crossbill at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 12.0   | 4                                   | 1   | 0.05                                       | <b>0.15</b>                   | 70.8  | 24  | 0.04           | 0.54           |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 5.8  | 13                                  | 5   | 0.03                                       | <b>0.11</b>                   | 37.6  | 189 | 0.05           | 0.22           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 8.1  | 15                                  | 10  | 0.11                                       | <b>0.25</b>                   | 41.2  | 110 | 0.11           | 0.54           |
| Douglas-fir                       | 2.7  | 3                                   | 3   | 0.03                                       | <b>0.05</b>                   | 59.1  | 111 | 0.02           | 0.14           |
| Mid-elevation Shrub               | 7.1  | 3                                   | 2   | 0.06                                       | <b>0.07</b>                   | 58.4  | 41  | 0.02           | 0.20           |
| Noble Fir                         | 20.0   | 3                                   | 1   | 0.08                                       | <b>0.24</b>                   | 69.7  | 14  | 0.06           | 0.93           |
| Pacific Silver Fir                | 5.9  | 10                                  | 4   | 0.04                                       | <b>0.11</b>                   | 41.4  | 135 | 0.05           | 0.23           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mountain Hemlock                  | 10.0   | 4                                   | 2   | 0.08                                       | <b>0.13</b>                   | 61.4  | 29  | 0.04           | 0.40           |
| Subalpine Fir                     | 5.3  | 4                                   | 2   | 0.03                                       | <b>0.05</b>                   | 51.4  | 75  | 0.02           | 0.13           |
| Heather/Herbaceous Sedge Meadow   | 4.8  | 6                                   | 1   | 0.01                                       | <b>0.05</b>                   | 54.5  | 103 | 0.02           | 0.13           |
| Rock or Sparsely Vegetated        | 1.9  | 2                                   | 0   | 0.00                                       | <b>0.04</b>                   | 101.2 | 51  | 0.01           | 0.20           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 63. Habitat-specific density estimates of Pine Siskin at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 20.0   | 2                                   | 1   | 0.25                                       | 0.37                          | 100.8 | 4   | 0.04           | 3.65           |
| Western Hemlock                   | 9.5  | 22                                  | 9   | 0.06                                       | 0.07                          | 33.7  | 245 | 0.04           | 0.14           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 10.8   | 18                                  | 12  | 0.14                                       | 0.15                          | 37.1  | 138 | 0.07           | 0.30           |
| Douglas-fir                       | 6.3  | 11                                  | 8   | 0.09                                       | 0.07                          | 46.8  | 128 | 0.03           | 0.18           |
| Mid-elevation Shrub               | 7.1  | 3                                   | 1   | 0.03                                       | 0.05                          | 63.8  | 66  | 0.01           | 0.15           |
| Noble Fir                         | 46.7   | 10                                  | 2   | 0.17                                       | 0.61                          | 37.0  | 18  | 0.29           | 1.30           |
| Pacific Silver Fir                | 30.1   | 60                                  | 33  | 0.31                                       | 0.38                          | 20.1  | 244 | 0.26           | 0.56           |
| Engelmann Spruce                  | 42.9   | 4                                   | 2   | 0.36                                       | 0.53                          | 53.5  | 7   | 0.16           | 1.74           |
| Alaska Yellow Cedar               | 16.7   | 1                                   | 0   | 0.00                                       | 0.11                          | 104.4 | 6   | 0.01           | 0.88           |
| High-elevation Shrub              | 33.3   | 20                                  | 10  | 0.42                                       | 0.41                          | 44.3  | 89  | 0.18           | 0.94           |
| Mountain Hemlock                  | 46.7   | 18                                  | 12  | 0.51                                       | 0.39                          | 39.8  | 123 | 0.18           | 0.82           |
| Subalpine Fir                     | 36.8   | 41                                  | 23  | 0.39                                       | 0.33                          | 35.1  | 257 | 0.17           | 0.64           |
| Heather/Herbaceous Sedge Meadow   | 55.8   | 101                                 | 43  | 0.53                                       | 0.72                          | 37.7  | 334 | 0.35           | 1.47           |
| Rock or Sparsely Vegetated        | 28.8   | 20                                  | 3   | 0.07                                       | 0.20                          | 41.7  | 166 | 0.09           | 0.44           |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 64. Habitat-specific density estimates of Evening Grosbeak at Mount Rainier National Park.

| Habitat                           | Percent of Points with Detections <sup>1</sup> | Non-flyover Detections <sup>2</sup> | Non-flyover Detections within 50 m <sup>3</sup> | Unadjusted Density (birds/ha) <sup>4</sup> | Adjusted Density <sup>5</sup> |       |     |                |                |
|-----------------------------------|--|-------------------------------------|---|--|-------------------------------|-------|-----|----------------|----------------|
|                                   |  |                                     |   |  | Estimate (birds/ha)           | CV    | df  | Lower 95% C.I. | Upper 95% C.I. |
| Red Alder                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Conifer Deciduous Mix             | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Grand Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Western Hemlock                   | 2.1  | 7                                   | 2   | 0.01                                       | <b>0.03</b>                   | 63.9  | 189 | 0.01           | 0.10           |
| Western Redcedar                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Mixed Douglas-fir/Western Hemlock | 2.7  | 7                                   | 1   | 0.01                                       | <b>0.06</b>                   | 63.7  | 110 | 0.02           | 0.20           |
| Douglas-fir                       | 0.9  | 1                                   | 1   | 0.01                                       | <b>0.01</b>                   | 101.2 | 111 | <0.01          | 0.05           |
| Mid-elevation Shrub               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Noble Fir                         | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Pacific Silver Fir                | 5.9  | 9                                   | 5   | 0.05                                       | <b>0.07</b>                   | 39.1  | 135 | 0.03           | 0.14           |
| Engelmann Spruce                  | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| Alaska Yellow Cedar               | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |
| High-elevation Shrub              | 6.7  | 2                                   | 0   | 0.00                                       | <b>0.06</b>                   | 71.1  | 29  | 0.02           | 0.23           |
| Mountain Hemlock                  | 13.3   | 4                                   | 0   | 0.00                                       | <b>0.03</b>                   | 101.1 | 29  | 0.01           | 0.17           |
| Subalpine Fir                     | 5.3  | 4                                   | 1   | 0.02                                       | <b>0.05</b>                   | 51.2  | 75  | 0.02           | 0.13           |
| Heather/Herbaceous Sedge Meadow   | 1.9  | 3                                   | 0   | 0.00                                       | <b>0.03</b>                   | 75.7  | 103 | 0.01           | 0.10           |
| Rock or Sparsely Vegetated        | 0.0  | 0                                   | 0   | 0.00                                       | <b>0.00</b>                   |       |     |                |                |

<sup>1</sup>Percent of points where the species was detected, including flyovers.

<sup>2</sup>Number of individual detections at any distance during point counts, excluding flyovers.

<sup>3</sup>Number of individual birds detected within 50 m of the observer during point counts, excluding flyovers, with no adjustment for detectability.

<sup>4</sup>Based on number of detections within 50 m of the observer excluding flyovers, with no adjustment for detectability.

<sup>5</sup>Estimates and statistics calculated using the software Distance 4.0 Release 2 (Buckland et al. 2003). See Methods for details.

Table 65. Estimates of total bird density (all species pooled) for each major habitat in which we completed at least ten point counts (excludes Western Redcedar, Grand Fir, Engelmann Spruce, and Alaska Yellow Cedar).

| Habitat                           | No. of Point Counts Completed | Density of All Species Pooled (birds/ha) |
|-----------------------------------|-------------------------------|--|
| Conifer Deciduous Mix             | 25                            | 9.19                                     |
| Noble Fir                         | 15                            | 8.87                                     |
| Red Alder                         | 21                            | 8.04                                     |
| Pacific Silver Fir                | 136                           | 7.75                                     |
| Subalpine Fir                     | 76                            | 7.61                                     |
| Mountain Hemlock                  | 30                            | 7.38                                     |
| Heather/Herbaceous Sedge Meadow   | 104                           | 6.63                                     |
| Douglas-fir                       | 112                           | 6.61                                     |
| Mixed Douglas-fir/Western Hemlock | 111                           | 6.54                                     |
| High-elevation Shrub              | 30                            | 6.28                                     |
| Western Hemlock                   | 190                           | 6.13                                     |
| Mid-elevation Shrub               | 42                            | 5.08                                     |
| Rock or Sparsely Vegetated        | 52                            | 2.27                                     |



Table 66. Number of species detected in each major habitat in which we completed at least ten point counts (excludes Western Redcedar, Grand Fir, Engelmann Spruce, and Alaska Yellow Cedar). Note that effort (number of points completed) varies greatly across habitats.

| Habitat                           | No. of Point Counts Completed | No. of Species Detected<br>During Point Counts |
|-----------------------------------|-------------------------------|--|
| Douglas-fir                       | 112                           | 42   |
| Heather/Herbaceous Sedge Meadow   | 104                           | 41   |
| Rock or Sparsely Vegetated        | 52                            | 39   |
| Pacific Silver Fir                | 136                           | 37   |
| Western Hemlock                   | 190                           | 36   |
| Mixed Douglas-fir/Western Hemlock | 111                           | 35   |
| Mid-elevation Shrub               | 42                            | 35   |
| Subalpine Fir                     | 76                            | 34   |
| Conifer Deciduous Mix             | 25                            | 29   |
| High-elevation Shrub              | 30                            | 28   |
| Mountain Hemlock                  | 30                            | 23   |
| Red Alder                         | 21                            | 22   |
| Noble Fir                         | 15                            | 17   |

# Transect Start Points

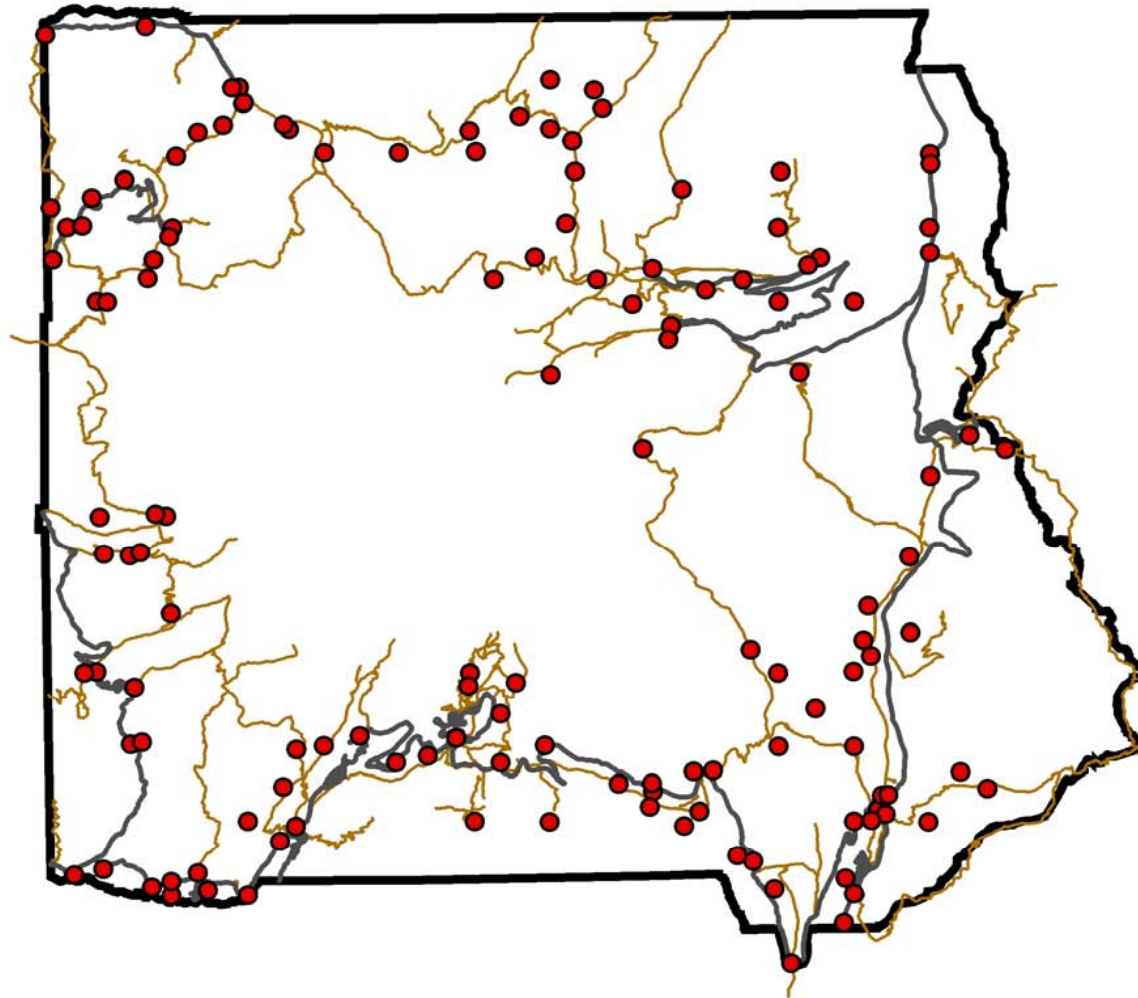


Figure 1. Location of start points for all 134 point count transects conducted at Mount Rainier National Park. Gray lines indicate roads. Gold lines indicate trails.

# Red Alder Sample Points

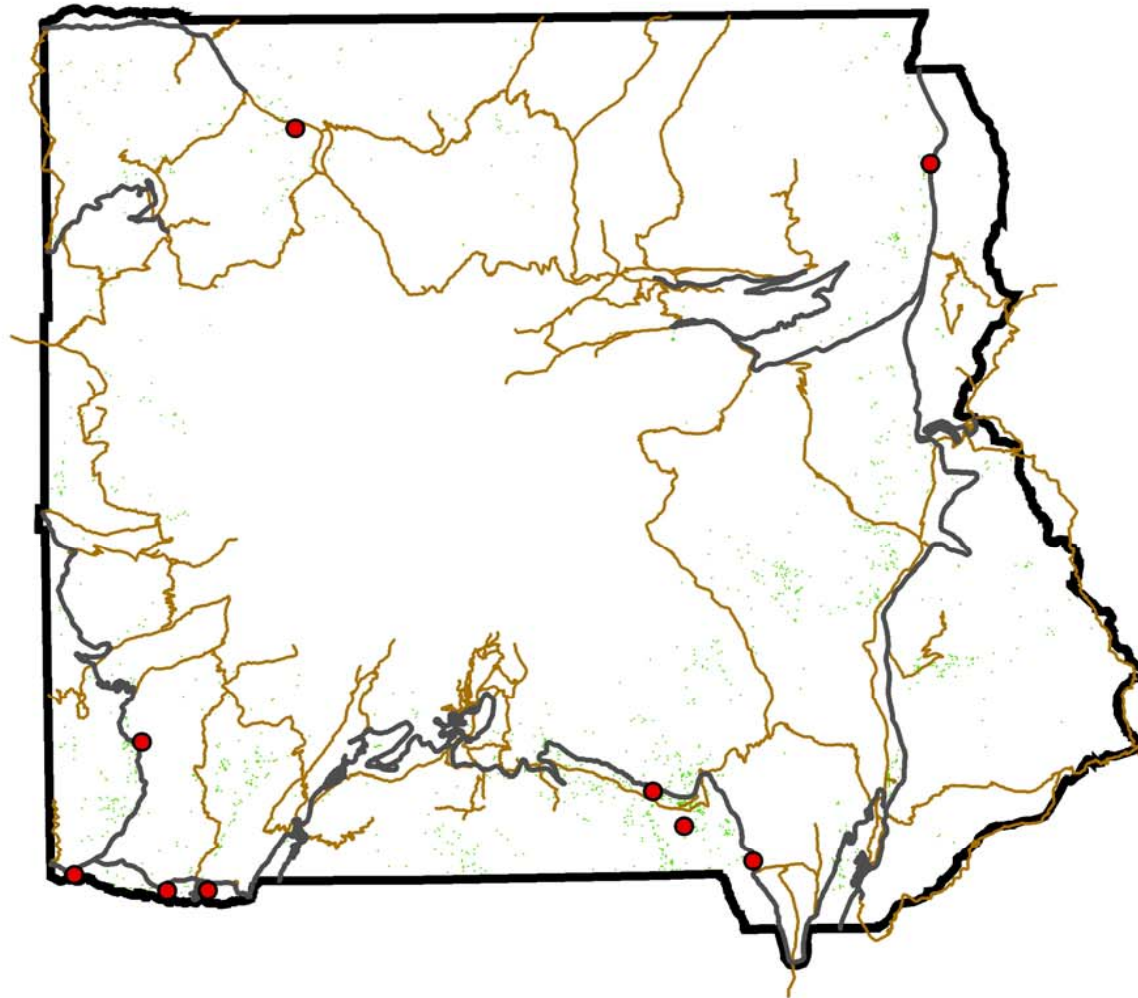


Figure 2. Green shading indicates areas mapped as Red Alder in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the nine transects that included at least one of the 21 points classified as Red Alder.

# Conifer Deciduous Mix Sample Points

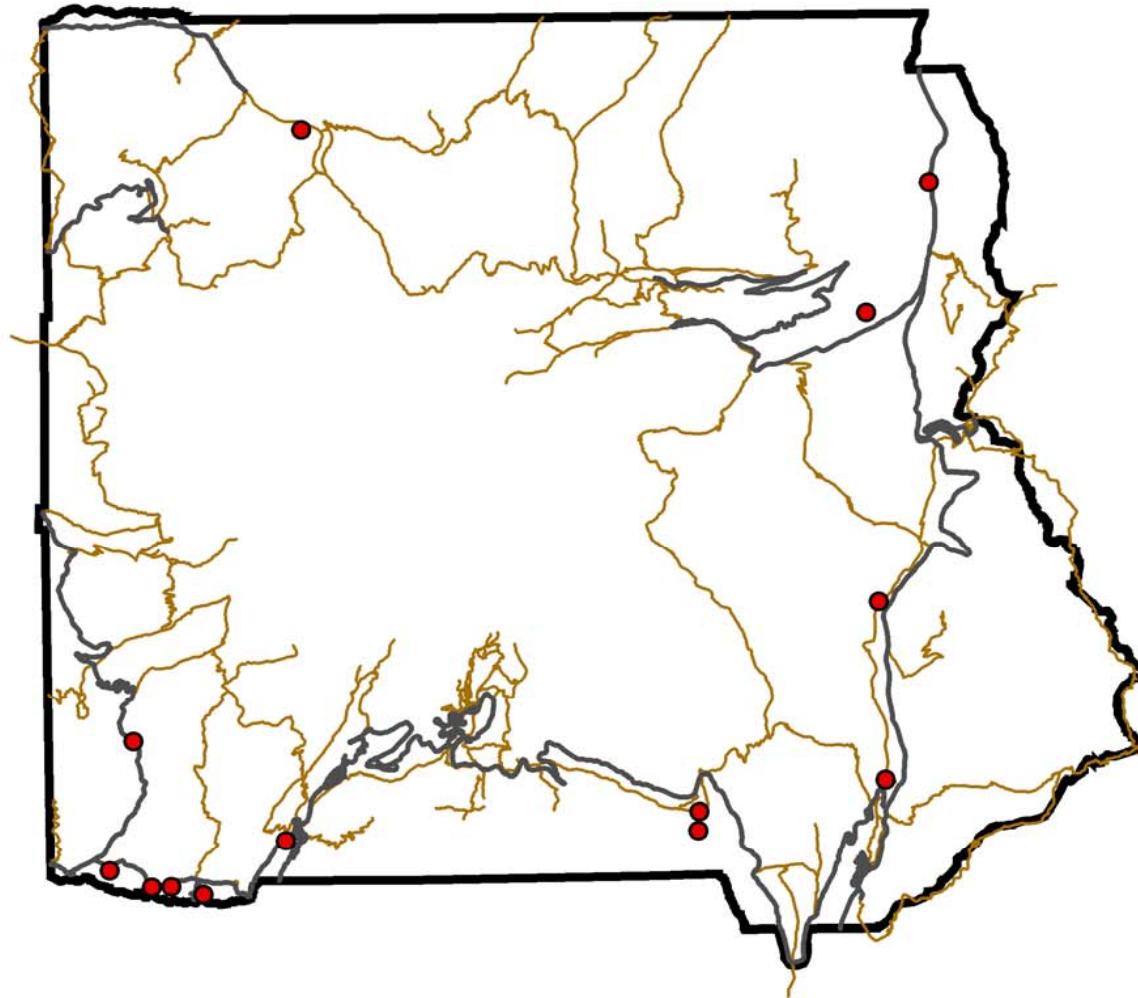


Figure 3. Red dots indicate the 13 transects that included at least one of the 25 points classified as Conifer Deciduous Mix.

# Grand Fir Sample Points

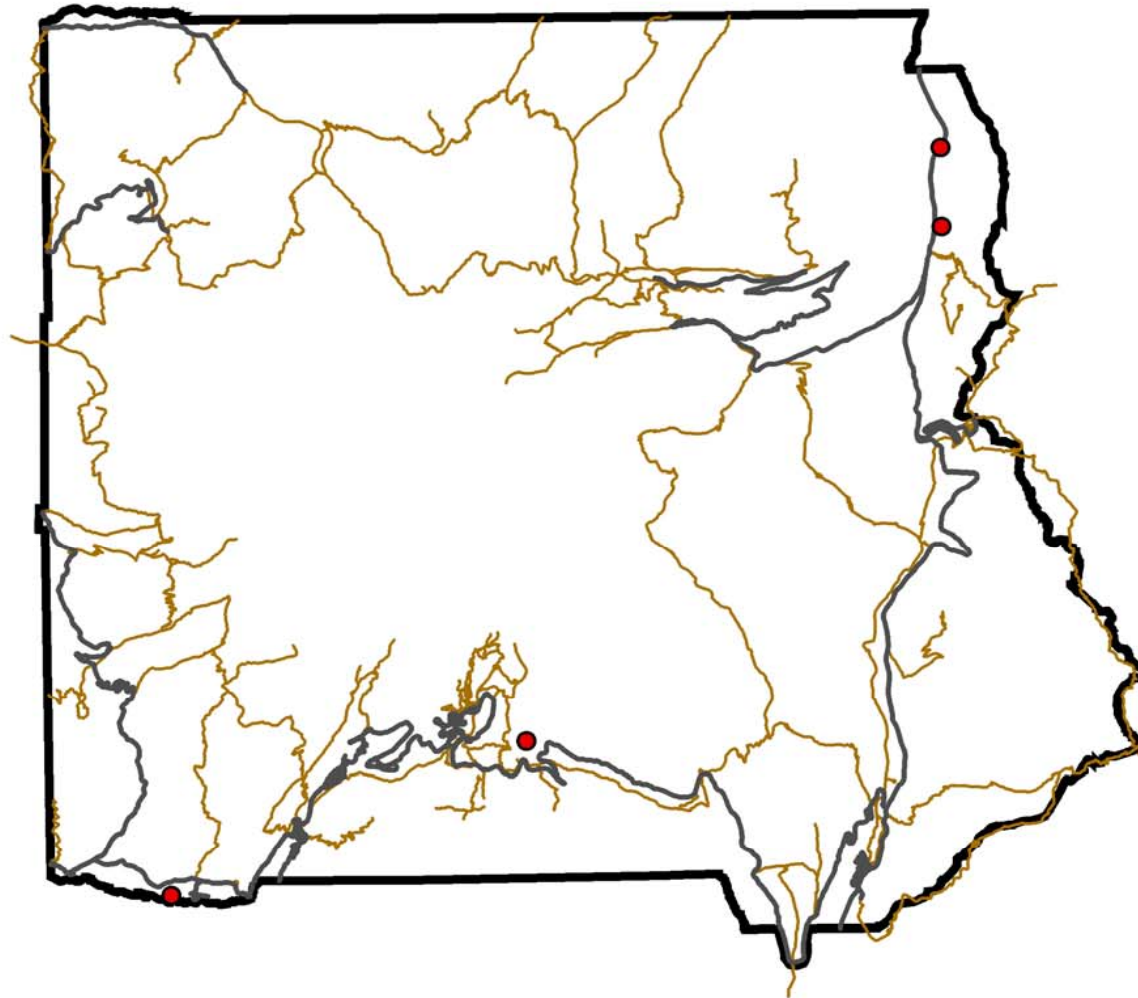


Figure 4. Red dots indicate the four transects that included at least one of the five points classified as Grand Fir.



# Western Hemlock Sample Points

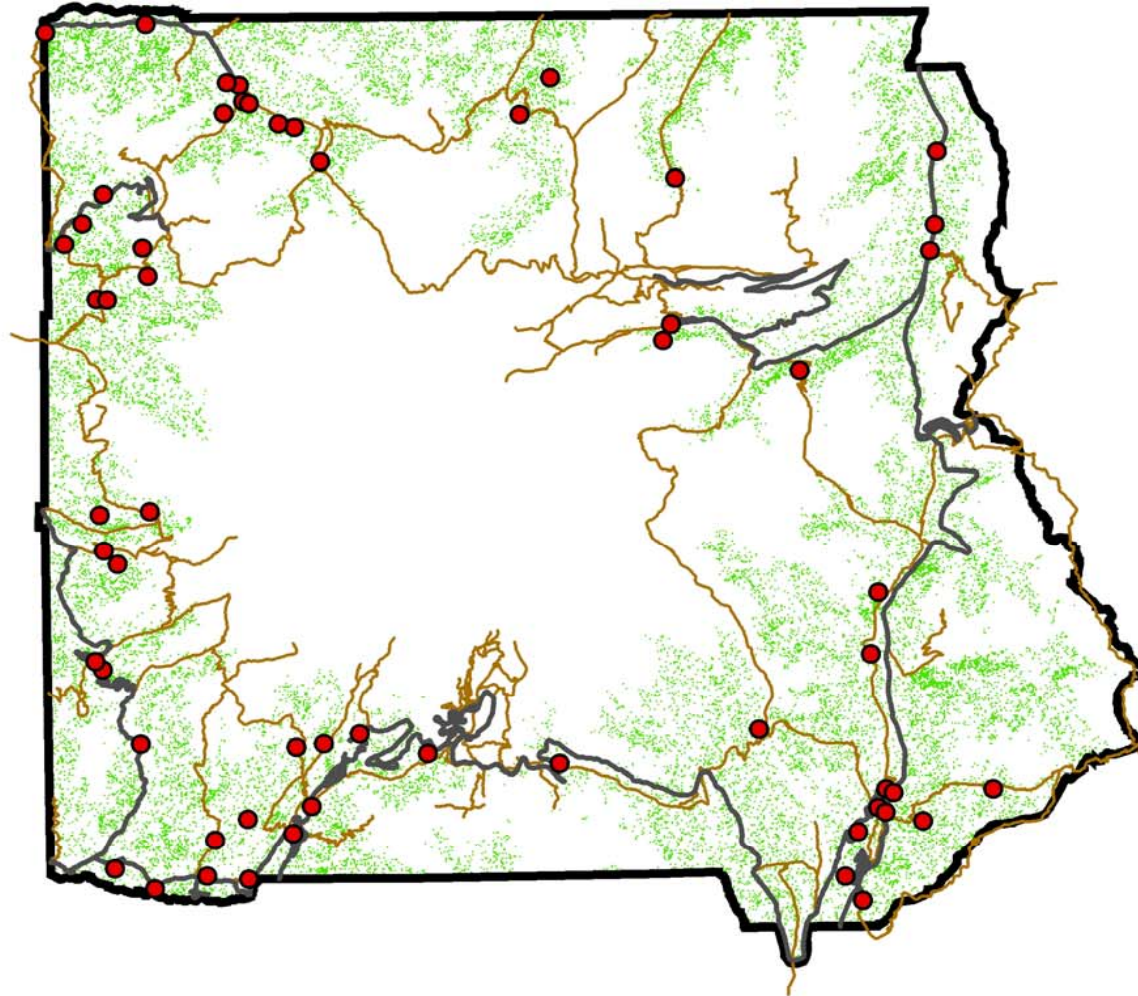


Figure 5. Green shading indicates areas mapped as Western Hemlock in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 58 transects that included at least one of the 190 points classified as Western Hemlock.

# Western Redcedar Sample Points

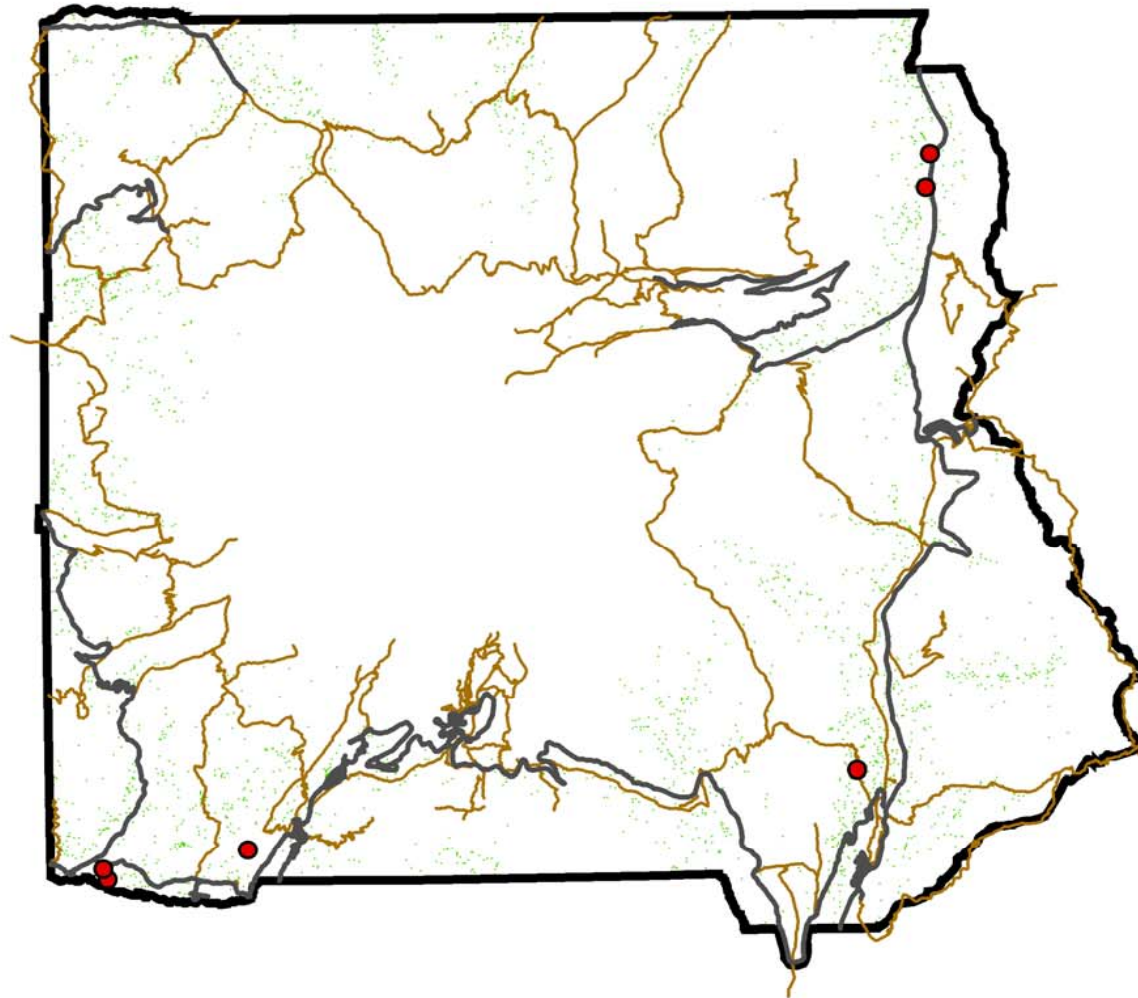


Figure 6. Green shading indicates areas mapped as Western Redcedar in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 6 transects that included at least one of the seven points classified as Western Redcedar.

# Mixed Douglas-fir/Western Hemlock Sample Points

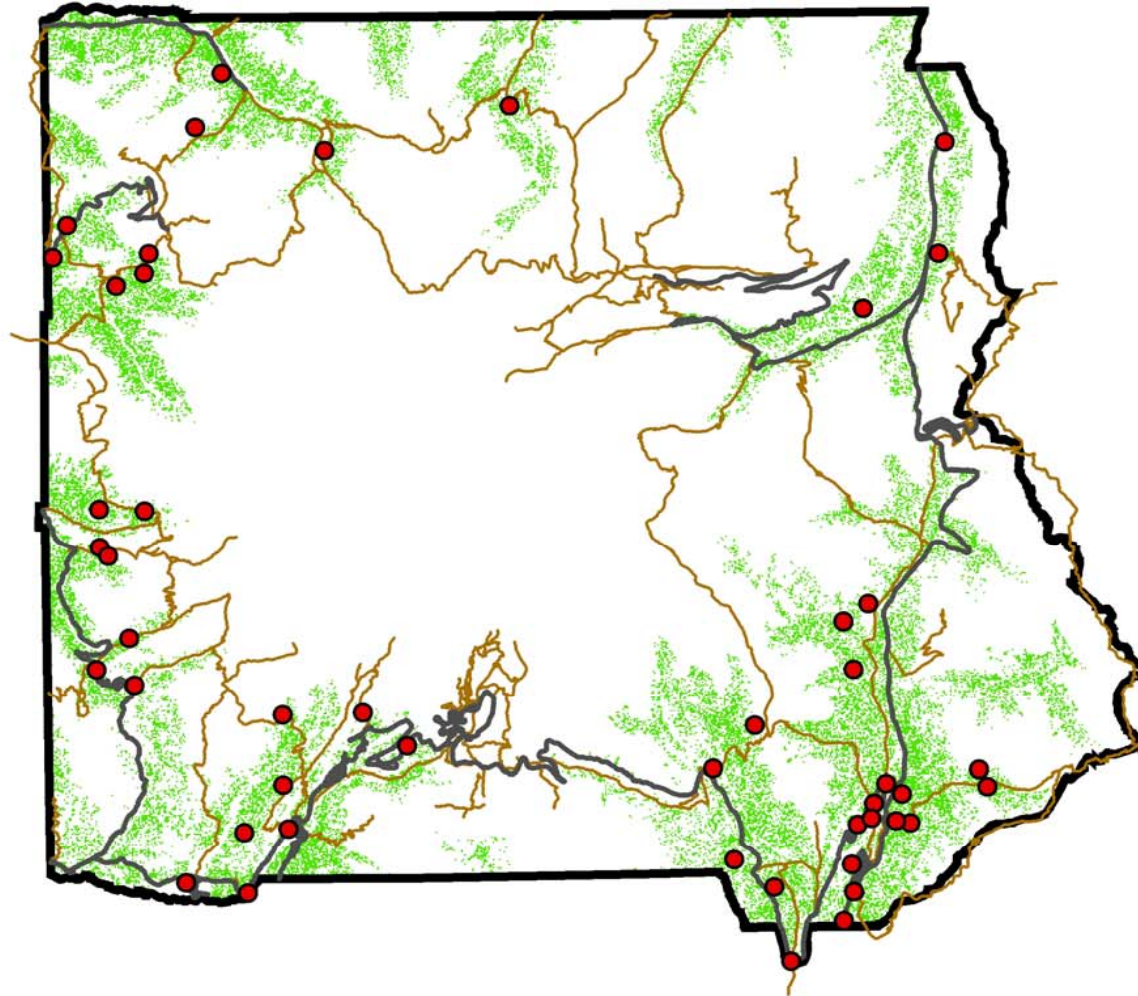


Figure 7. Green shading indicates areas mapped as Mixed Douglas-fir/Western Hemlock in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 47 transects that included at least one of the 111 points classified as Mixed Douglas-fir/Western Hemlock.



# Douglas-fir Sample Points

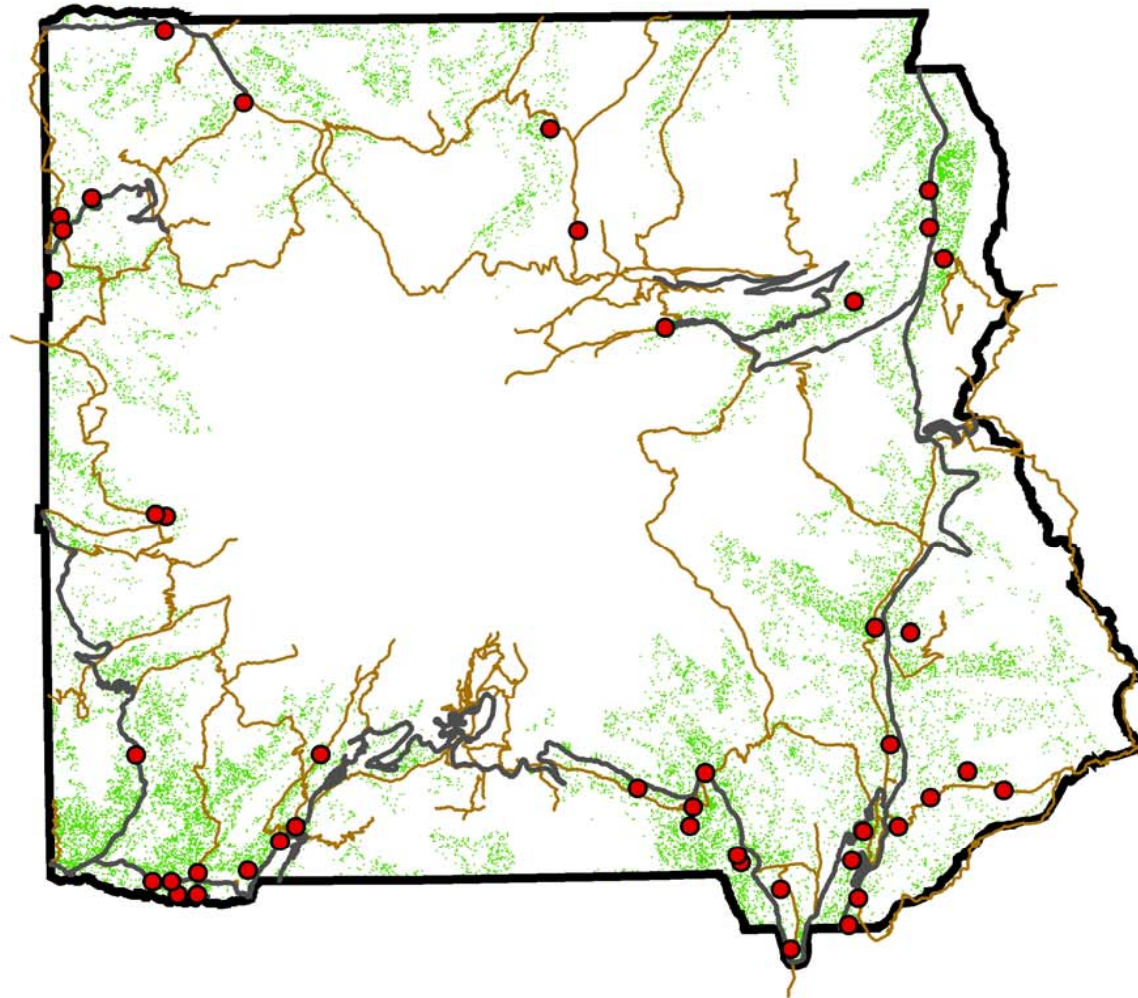


Figure 8. Green shading indicates areas mapped as Douglas-fir in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 44 transects that included at least one of the 112 points classified as Douglas-fir.

# Shrub Sample Points

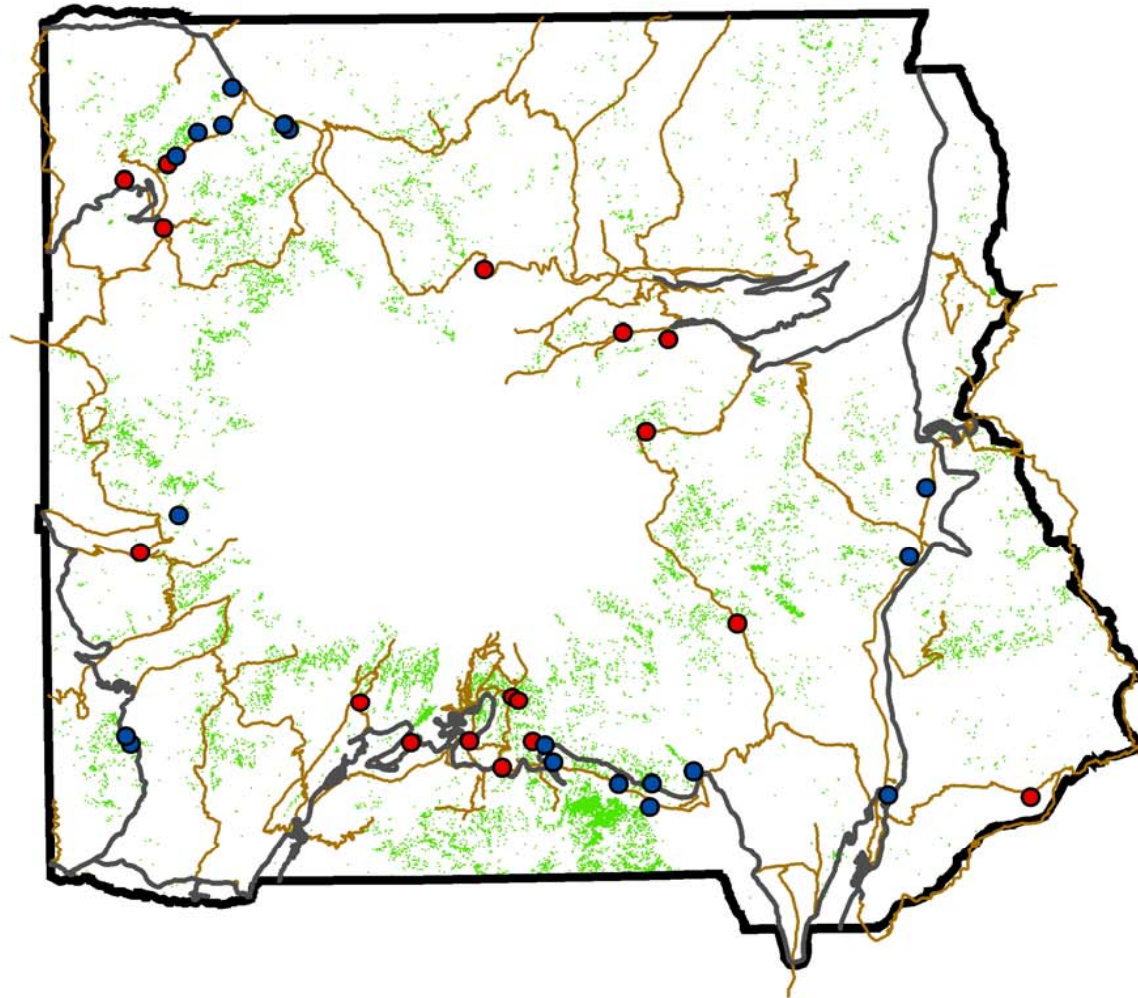


Figure 9. Green shading indicates areas mapped as Shrub in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 17 transects that included at least one of the 30 points classified as High-elevation Shrub. Blue dots indicate the 19 transects that included at least one of the 42 points classified as Mid-elevation Shrub.

# Noble Fir Sample Points

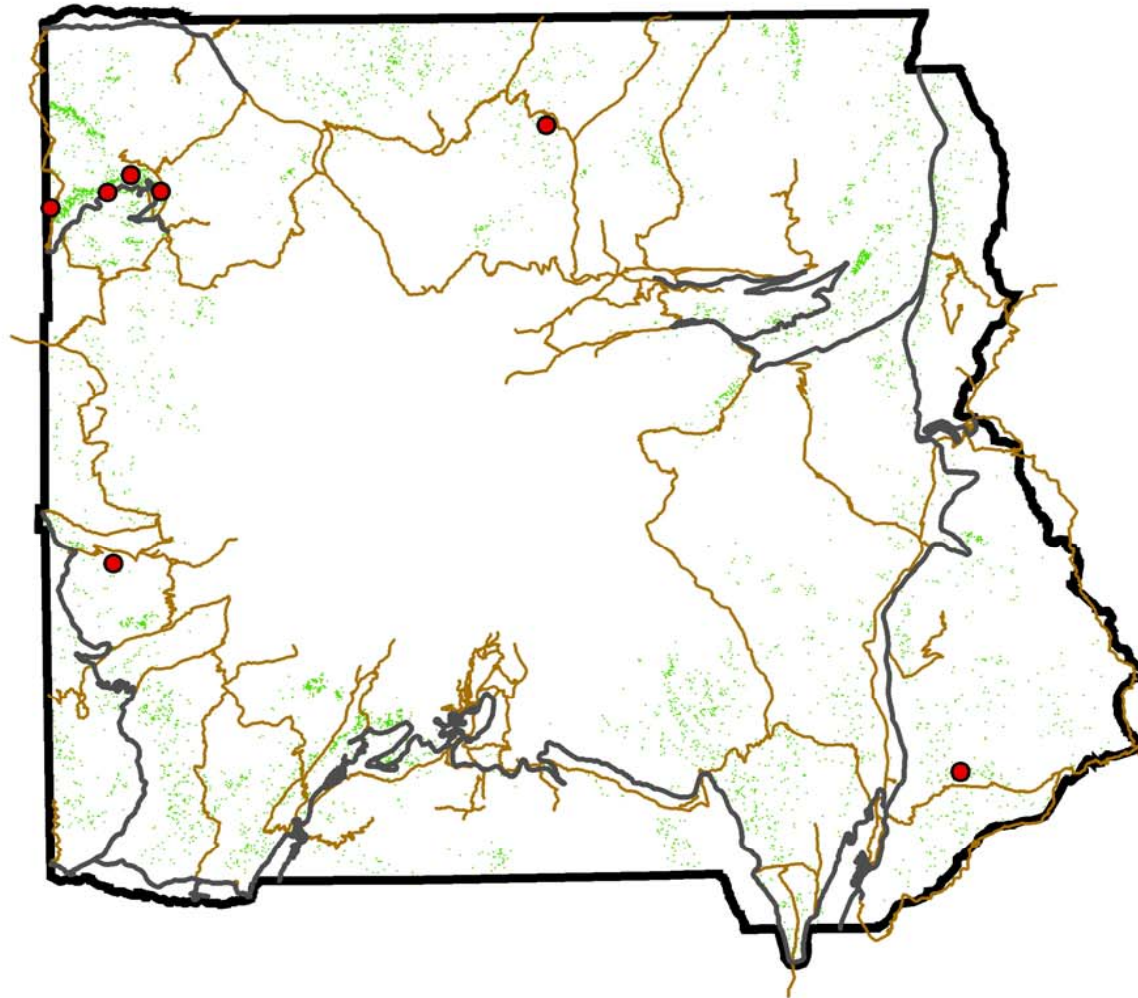


Figure 10. Green shading indicates areas mapped as Noble Fir in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the seven transects that included at least one of the 15 points classified as Noble Fir.



# Pacific Silver Fir Sample Points

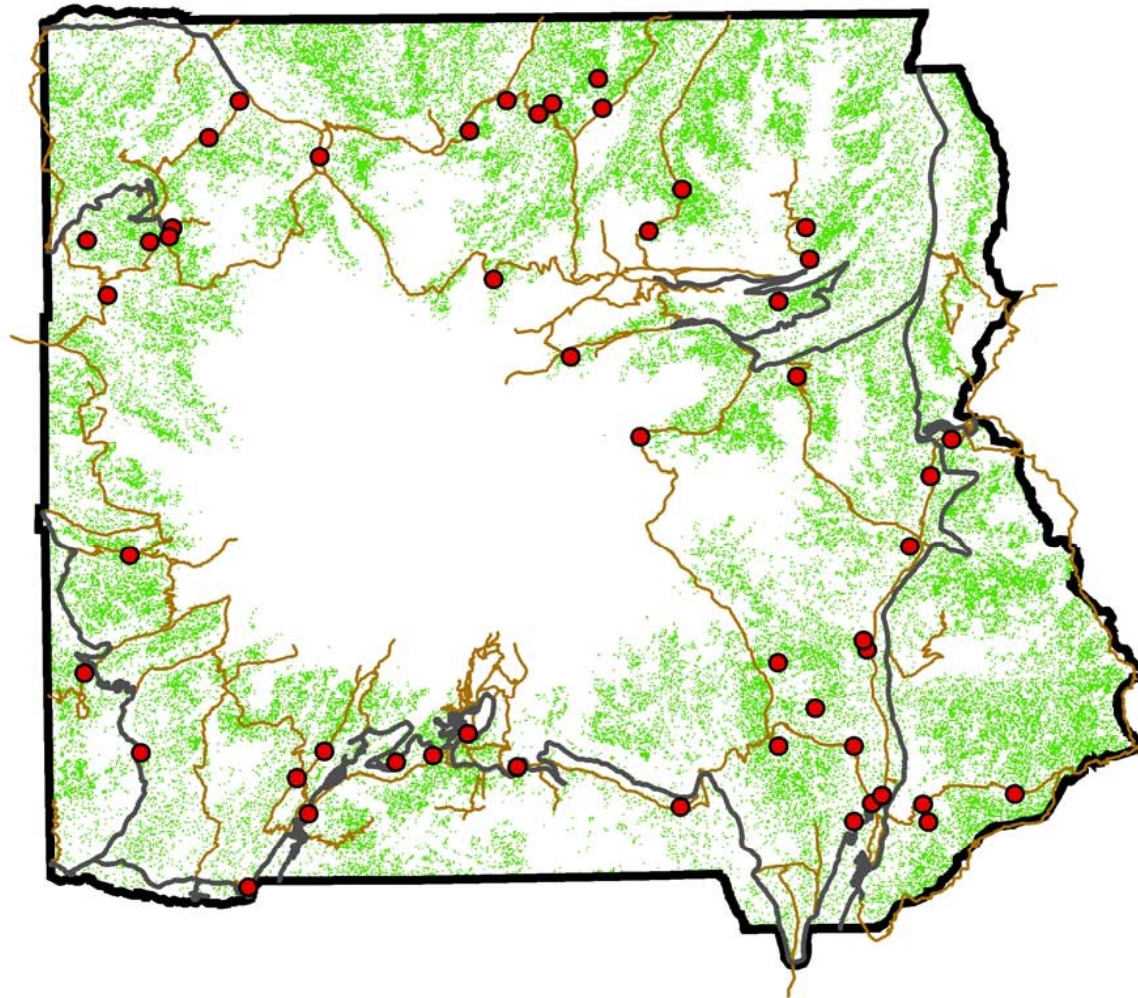


Figure 11. Green shading indicates areas mapped as Pacific Silver Fir in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 50 transects that included at least one of the 136 points classified as Pacific Silver Fir.

# Engelmann Spruce Sample Points

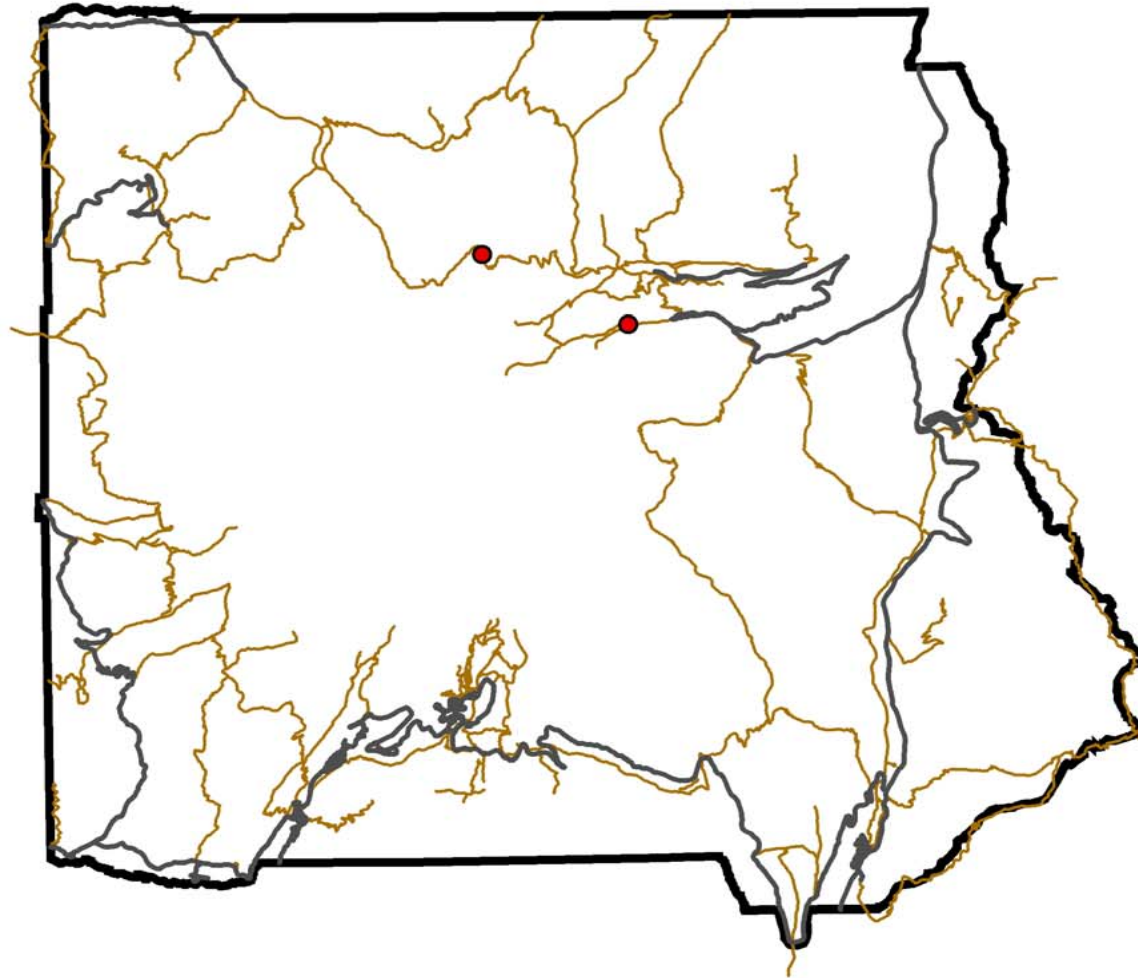


Figure 12. Red dots indicate the two transects that included at least one of the seven points classified as Engelmann Spruce.

# Alaska Yellow Cedar Sample Points

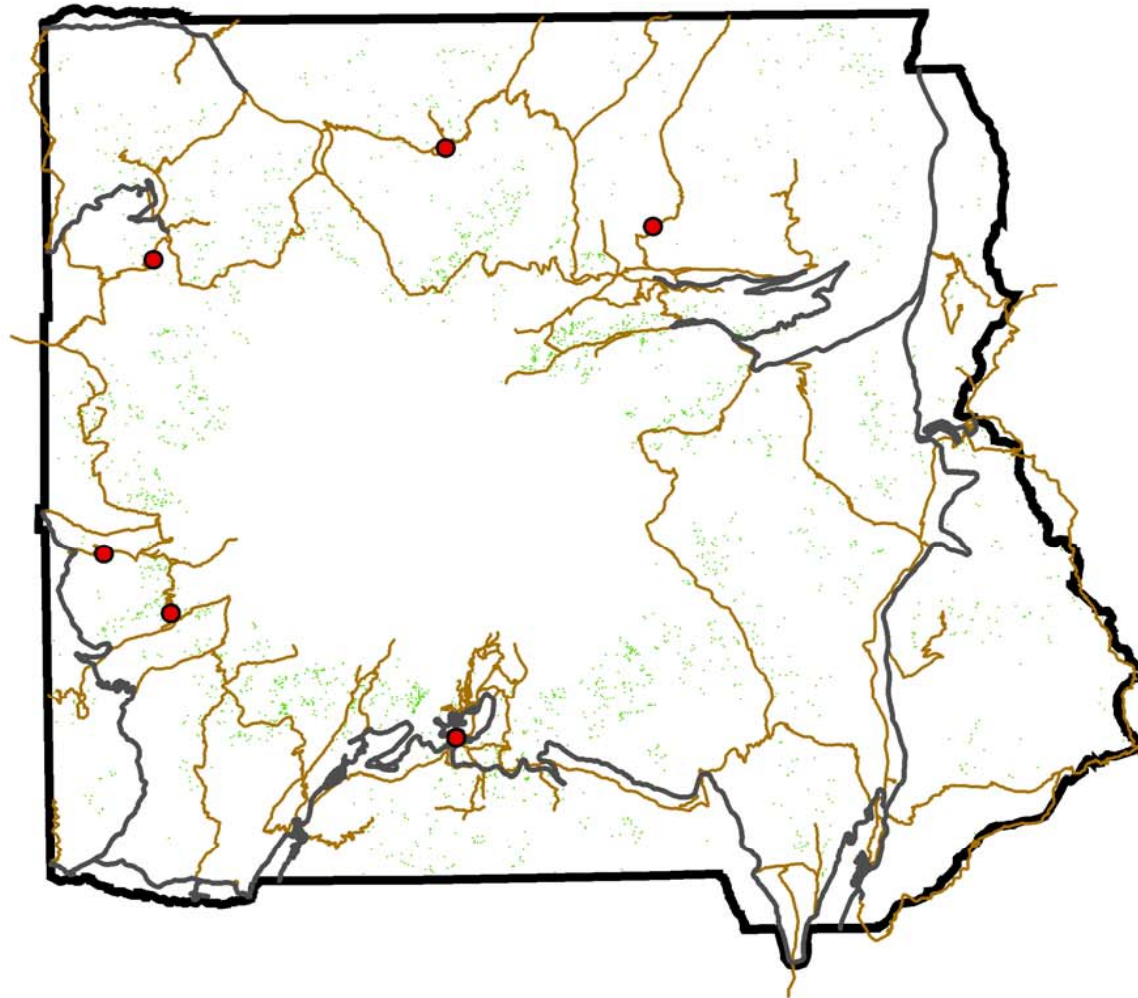


Figure 13. Green shading indicates areas mapped as Alaska Yellow Cedar in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the six transects that included at least one of the six points classified as Alaska Yellow Cedar.



# Mountain Hemlock Sample Points

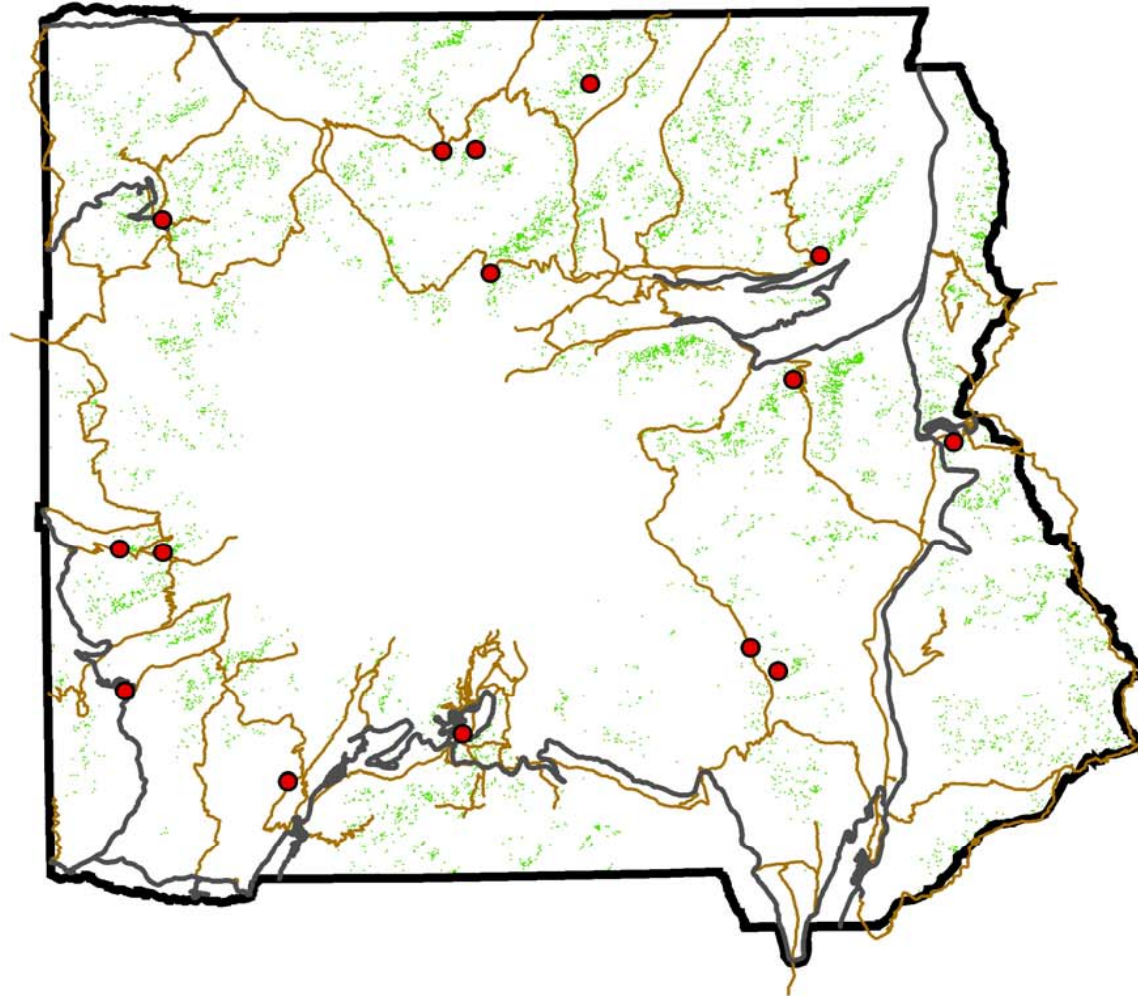


Figure 14. Green shading indicates areas mapped as Mountain Hemlock in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 15 transects that included at least one of the 30 points classified as Mountain Hemlock.

# Subalpine Fir Sample Points

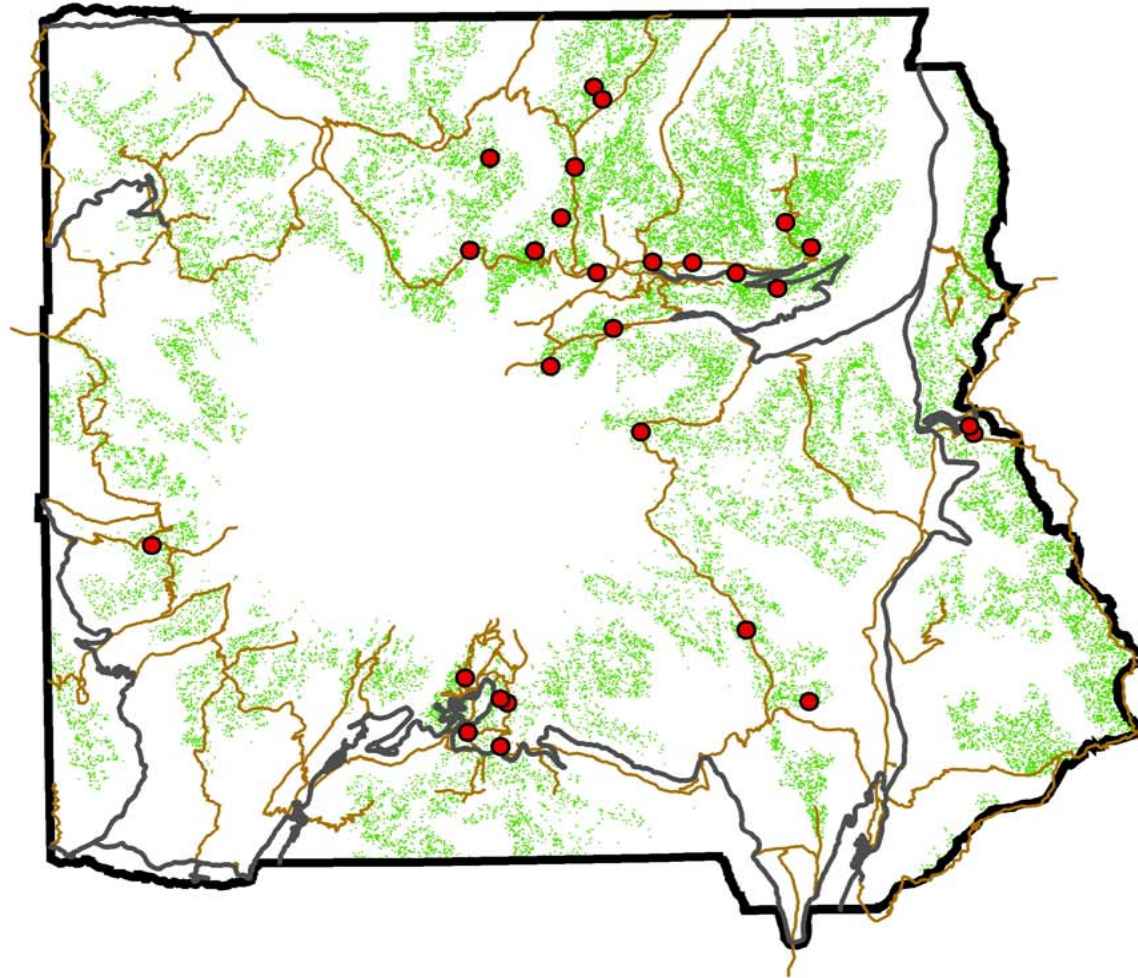


Figure 15. Green shading indicates areas mapped as Subalpine Fir in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 27 transects that included at least one of the 76 points classified as Subalpine Fir.



# Heather/Herbaceous Sedge Meadow Sample Points

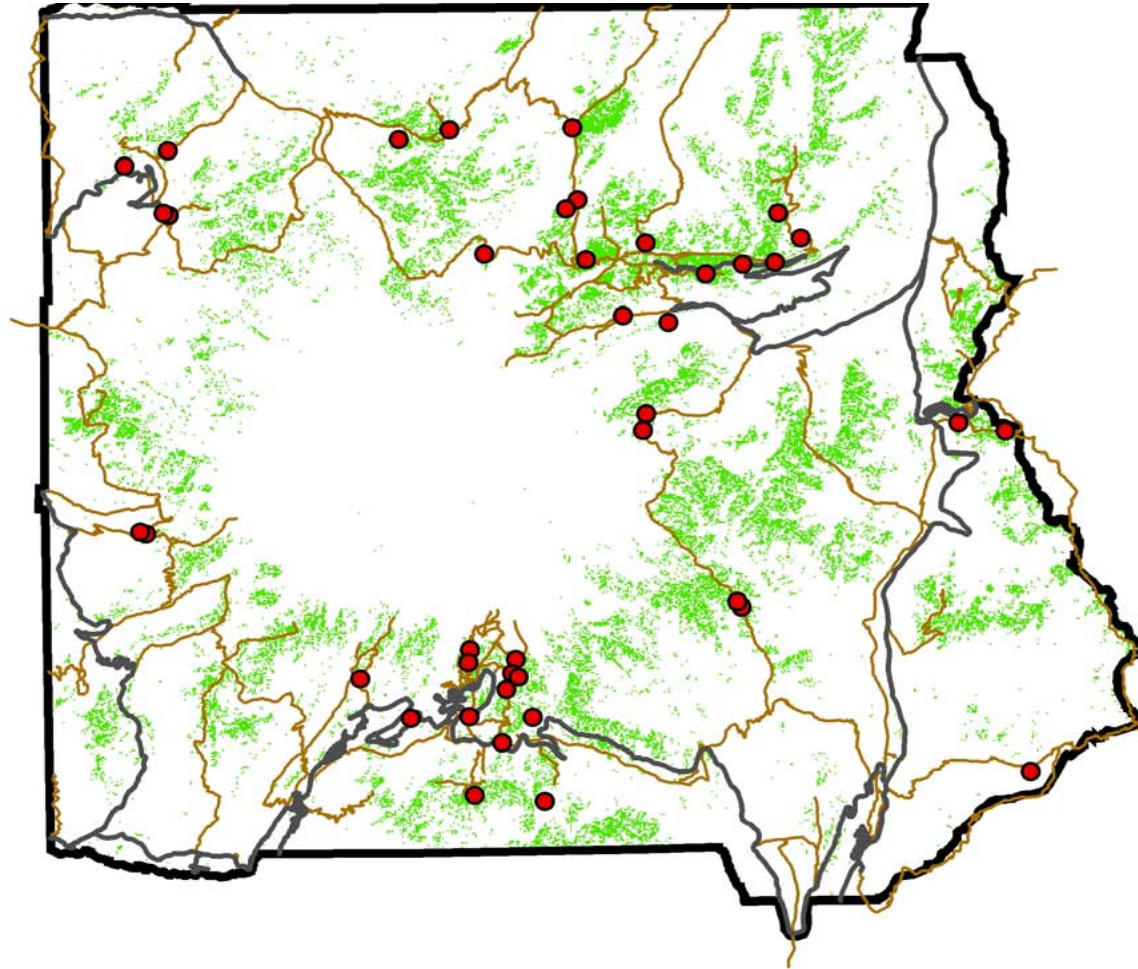


Figure 16. Green shading indicates areas mapped as either Heather or Herbaceous Sedge Meadow in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 24 transects that included at least one of the 104 points classified as Heather/Herbaceous Sedge Meadow.

# Rock or Sparsely Vegetated Sample Points

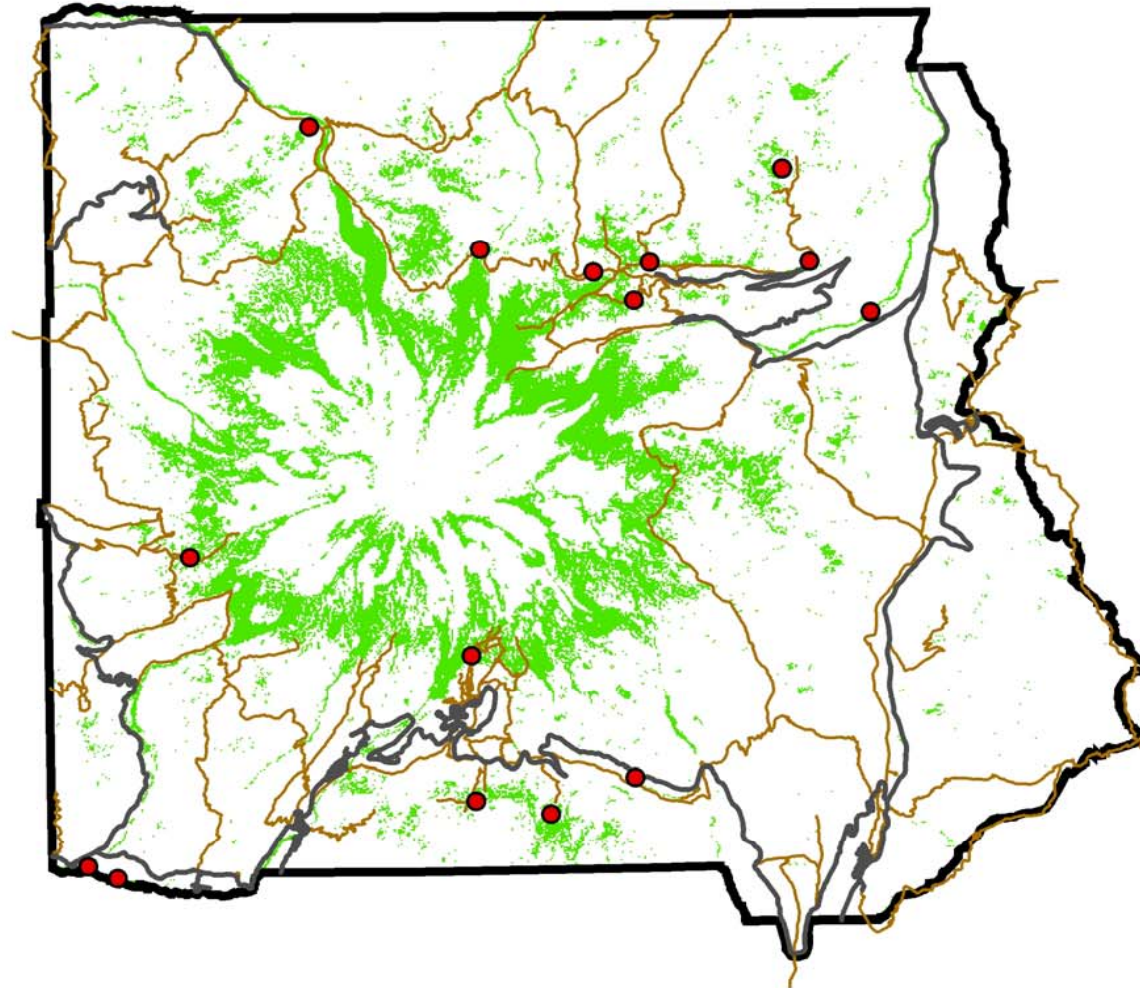


Figure 17. Green shading indicates areas mapped as Rock or Sparsely Vegetated in the Pacific Meridian Resources (1996) GIS coverage. Red dots indicate the 15 transects that included at least one of the 52 points classified as Rock or Sparsely Vegetated.

# Appendix A. Scientific Names of All Bird Species Listed in this Report

| Common Name              | Scientific Name <sup>1</sup>     |
|--------------------------|----------------------------------|
| Great Blue Heron         | <i>Ardea herodias</i>            |
| Turkey Vulture           | <i>Cathartes aura</i>            |
| Canada Goose             | <i>Branta canadensis</i>         |
| Mallard                  | <i>Anas platyrhynchos</i>        |
| Harlequin Duck           | <i>Histrionicus histrionicus</i> |
| Osprey                   | <i>Pandion haliaetus</i>         |
| Northern Harrier         | <i>Circus cyaneus</i>            |
| Sharp-shinned Hawk       | <i>Accipiter striatus</i>        |
| Northern Goshawk         | <i>Accipiter gentilis</i>        |
| Red-tailed Hawk          | <i>Buteo jamaicensis</i>         |
| Rough-legged Hawk        | <i>Buteo lagopus</i>             |
| Golden Eagle             | <i>Aquila chrysaetos</i>         |
| American Kestrel         | <i>Falco sparverius</i>          |
| Merlin                   | <i>Falco columbarius</i>         |
| White-tailed Ptarmigan   | <i>Lagopus leucurus</i>          |
| Blue Grouse              | <i>Dendragapus obscurus</i>      |
| Spotted Sandpiper        | <i>Actitis macularia</i>         |
| Marbled Murrelet         | <i>Brachyramphus marmoratus</i>  |
| Band-tailed Pigeon       | <i>Columba fasciata</i>          |
| Western Screech-Owl      | <i>Otus kennicottii</i>          |
| Great Horned Owl         | <i>Bubo virginianus</i>          |
| Northern Pygmy-Owl       | <i>Glaucidium gnoma</i>          |
| Barred Owl               | <i>Strix varia</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>         |
| Belted Kingfisher        | <i>Ceryle alcyon</i>             |
| Red-breasted Sapsucker   | <i>Sphyrapicus ruber</i>         |
| Downy Woodpecker         | <i>Picoides pubescens</i>        |
| Hairy Woodpecker         | <i>Picoides villosus</i>         |
| Three-toed Woodpecker    | <i>Picoides tridactylus</i>      |
| Northern Flicker         | <i>Colaptes auratus</i>          |
| Pileated Woodpecker      | <i>Dryocopus pileatus</i>        |
| Olive-sided Flycatcher   | <i>Contopus cooperi</i>          |
| Western Wood-Pewee       | <i>Contopus sordidulus</i>       |
| Hammond's Flycatcher     | <i>Empidonax hammondii</i>       |
| Dusky Flycatcher         | <i>Empidonax oberholseri</i>     |
| Pacific-slope Flycatcher | <i>Empidonax difficilis</i>      |
| Hutton's Vireo           | <i>Vireo huttoni</i>             |
| Warbling Vireo           | <i>Vireo gilvus</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>     |

Appendix A, continued

| Common Name                        | Scientific Name                           |
|------------------------------------|---|
| Common Raven                       | <i>Corvus corax</i>                       |
| Tree Swallow                       | <i>Tachycineta bicolor</i>                |
| Violet-green Swallow               | <i>Tachycineta thalassina</i>             |
| Barn Swallow                       | <i>Hirundo rustica</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>                  |
| Canyon Wren                        | <i>Catherpes mexicanus</i>                |
| Winter Wren                        | <i>Troglodytes troglodytes</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>                |
| 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>                    |
| American Pipit                     | <i>Anthus rubescens</i>                   |
| Cedar Waxwing                      | <i>Bombycilla cedrorum</i>                |
| Orange-crowned Warbler             | <i>Vermivora celata</i>                   |
| Yellow Warbler                     | <i>Dendroica petechia</i>                 |
| Yellow-rumped Warbler              | <i>Dendroica coronata</i>                 |
| Black-throated Gray Warbler        | <i>Dendroica nigrescens</i>               |
| Townsend's Warbler                 | <i>Dendroica townsendi</i>                |
| Townsend's x Hermit Warbler Hybrid | <i>Dendroica townsendi x occidentalis</i> |
| Hermit Warbler                     | <i>Dendroica occidentalis</i>             |
| MacGillivray's Warbler             | <i>Oporornis tolmiei</i>                  |
| Common Yellowthroat                | <i>Geothlypis trichas</i>                 |
| Wilson's Warbler                   | <i>Wilsonia pusilla</i>                   |
| Western Tanager                    | <i>Piranga ludoviciana</i>                |
| Spotted Towhee                     | <i>Pipilo maculatus</i>                   |
| Chipping Sparrow                   | <i>Spizella passerina</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>             |
| Dark-eyed Junco                    | <i>Junco hyemalis</i>                     |
| Black-headed Grosbeak              | <i>Pheucticus melanocephalus</i>          |
| Red-winged Blackbird               | <i>Agelaius phoeniceus</i>                |
| Brown-headed Cowbird               | <i>Molothrus ater</i>                     |
| Gray-crowned Rosy-Finch            | <i>Leucosticte tephrocotis</i>            |
| Pine Grosbeak                      | <i>Pinicola enucleator</i>                |
| Cassin's Finch                     | <i>Carpodacus cassinii</i>                |
| Red Crossbill                      | <i>Loxia curvirostra</i>                  |

Appendix A, continued

| Common Name        | Scientific Name                   |
|--------------------|-----------------------------------|
| Pine Siskin        | <i>Carduelis pinus</i>            |
| American Goldfinch | <i>Carduelis tristis</i>          |
| Evening Grosbeak   | <i>Coccothraustes vespertinus</i> |

<sup>1</sup>Names follow American Ornithologists' Union (1998).

## Appendix B: Scientific Names of All Plant Species Listed in this Report

| Common Name         | Scientific Name <sup>1</sup>      |
|---------------------|-----------------------------------|
| Pacific Silver Fir  | <i>Abies amabilis</i>             |
| Grand Fir           | <i>Abies grandis</i>              |
| Subalpine Fir       | <i>Abies lasiocarpa</i>           |
| Noble Fir           | <i>Abies procera</i>              |
| Red Alder           | <i>Alnus rubra</i>                |
| Alaska Yellow Cedar | <i>Chamaecyparis nootkatensis</i> |
| Engelmann Spruce    | <i>Picea engelmannii</i>          |
| Douglas Fir         | <i>Pseudotsuga menzeisii</i>      |
| Western Redcedar    | <i>Thuja plicata</i>              |
| Western Hemlock     | <i>Tsuga heterophylla</i>         |
| Mountain Hemlock    | <i>Tsuga mertensiana</i>          |

<sup>1</sup>Names follow Pojar and Mackinnon (1994).

## Appendix C: Metadata for the Avian Inventory of Mount Rainier National Park

The accompanying CD contains the MS Access file IBP\_DATA containing five access tables: ibp\_pct, ibp\_vega, ibp\_vegb, ibp\_rare, and ibp\_density. This appendix serves as metadata for these files. Note that tables referred to in the field descriptions below are presented at the end of the appendix.

### **1. Point count data: ibp\_pct**

This file contains all point count data from both the 2003 and 2004 field seasons.

Field: LOC

Description: Identifies the park, MORA = Mount Rainier National Park.

Field: DATE

Description: The date the point count was conducted (mm/dd/yyyy).

Field: TRANSECT

Description: Identifies transect on which the point was conducted.

Field: POINT

Description: Identifies the point number along the transect.

Field: UNIQPT

Description: Combines transect and 2-digit point number along the transect for each point conducted, providing a unique code for each point. For example, the second point on Transect 2051 would be 205102. **This field may be used to link data in each of the databases on this disk.**

Field: HAB

Description: Signifies the bird classification habitat type. See Table A1 for a list of habitats and their codes.

Field: HABGROUP

Description: Signifies the habitat group the point was placed in for fitting the species-specific detectability functions in Distance. 'Dense' signifies low- and mid-elevation forest; 'sparse' signifies open habitats as well as high-elevation forest.

Field: BIRDOBS

Description: Initials of the point count observer. See Table A5 for full list of observer names.

Field: NOISE

Description: Noise interference, scored from 1 to 5, where 1 = no noise, 2=*gentle babbling brook noise*, probably not missing birds; 3=*babbling creek noise*, might be missing some high-pitched songs/calls of distant birds; 4=*rushing creek noise*, detection radius is probably substantially reduced; 5=*roaring creek/river noise*, probably detecting only the closest/loudest birds.

Field: TIME

Description: 4-character field indicating the time of day the point count began.

Field: SPEC

Description: 4-character bird species code. See Table A2 for bird species codes.

Field: COMMONNAME

Description: Common name of species coded in SPEC field.

Field: DIST

Description: Horizontal distance in meters to a bird when it was first detected.

Field: PREV

Description: An 'X' indicates that the same individual was recorded on at least two consecutive points counts. The record with the 'X' indicates the point at which the detected individual was at a greater distance from the observer.

Field: FLY

Description: Indicates the number of birds detected as flyovers.

Field: SEENFIRST

Description: 'Y' indicates the distance to the bird was estimated *after* visually locating the bird. 'N' indicates the distance to the bird was estimated without the use of visual cues.

Field: EVERSANG

Description: 'Y' indicates the bird sang at least once during the five-minute point count. 'N' indicates the bird did not sing during the five-minute point count.

Field: Interval

Description: '3' indicates the bird was first detected in the first three minutes of the five-minute point count period. '2' indicates the bird was first detected in the last two minutes of the five-minute point count period.

Field: Flock

Description: Indicates multiple birds in a flock. A blank field indicates a single individual.

## **2. Habitat Data I: ibp\_vega**

This is one of two files containing habitat data from each of the point count stations visited during the 2003 and 2004 field seasons. Ibp\_vega.xls contains data that pertain to the entire vegetation plot, as well as to one of the two intensively sampled subplots (subplot 'A'). Note that some of the *Vaccinium* species can be difficult to identify to species, especially in the late spring/early summer. Data fields indicate our crew members' best attempt to identify the correct species, but some errors may have occurred.

Field: TRANSECT

Description: Identifies transect on which the point was conducted.

Field: POINT

Description: Identifies the point number along the transect.

Field: UNIQPT

Description: Combines transect and the point for each point conducted, providing a unique code for each point. **This field may be used to link data in each of the databases on this disk.**



Field: TRAIL

Description: Identifies the sample point as either on trail or off trail. 'ON' indicates a point sampled on-trail. 'OFF' indicates a point samples off trail.

Field: HAB

Description: 4-character code identifying the dominant habitat type (for the most part PMR-based) within a 50-m radius of the survey point. See Table A1 for list of habitat codes.

Field: HABNAME

Description: Complete name of each habitat type. See Table A1 for the complete list of habitat names and codes.

Field: HAB2

Description: 4-character code identifying a secondary habitat type (if present) within a 50-m radius of the survey point. See Table A1 for list of habitat codes.

Field: HAB2NAME

Description: Complete name of habitat indicated in HAB2.

Field: DATE

Description: The date the vegetation was sampled (mm/dd/yyyy).

Field: BIRDOBS

Description: Initials of the point count observer. See Table A5 for full list of observer names.

Field: VEGOBS

Description: Initials of the vegetation observer. See Table A5 for full list of observer names.

Field: ASPECT

Description: Compass degrees indicating the dominant aspect of the 50-m radius point count circle.

Field: ELEV\_FT

Description: Elevation in feet, as determined by observers from topographic maps in the field.

Field: SLOPE

Description: Average slope (degrees) of the 50-m radius point count circle, measured with a clinometer. **'99' indicates no data were collected in the field.**

Field: ROCKPRES

Description: Y=exposed rock is a substantial enough feature of the habitat to affect bird usage of the area, N=little or no exposed rock.

Field: MOIST

Description: Soil moisture in the 50-m radius circle. 1=dry, 2=moist, 3=wet.

Field: STANDH2O

Description: Area (square meters) of the 50-m radius circle covered in standing water.

Field: RUNH2O

Description: Index describing running water in the 50-m radius circle. 1=none, 2=trickle, 3=small stream, 4=large stream, 5=river.

Field: LOCSOURCE

Description: Indicates the primary method used to obtain the GPS coordinates in the field: G = GPS unit and map (low-cost Garmin GPS models used), M = MAP only, GPS Unit and map.

Field: NORTHING

Description: UTM northing (NAD27) of the survey point.

Field: EASTING

Description: UTM easting (NAD27) of the survey point.

Field: GPSError

Description: Error in meters of GPS reading, as provided by hand-held GPS unit.

Field: FRANKKEY

Description: 1-letter code indicating the letter of the Franklin Key used in classifying the Franklin Key species.

Field: DOMTREE

Description: 6-letter code (first 3 letters of genus followed by first 3 letters of species) of the dominant tree species present in plot. See Table A3 for complete tree species list.

Field: DOMSHRUB1

Description: 6-letter code (first 3 letters of genus followed by first 3 letters of species) of the dominant shrub species present in plot. See Table A4 for complete shrub species list.

Field: DOMSHRUB2

Description: 6-letter code (first 3 letters of genus followed by first 3 letters of species) of the second most dominant shrub species present in plot. See Table A4 for complete shrub species list.

Field: OTHERHAB1

Description: 4-character code indicating the presence of other habitat types outside of the 50-m radius circle but within 100 m of the center of the vegetation plot. See Table A1 for list of habitat names.

Field: OTHERHAB2

Description: 4-character code entered indicating the presence of other habitat types outside of the 50-m radius circle but within 100 m of the center of the vegetation plot. See Table A1 for list of habitat names.

**The following fields, all of which begin with ‘A’ describe conditions in the first of two 20m x 40m subplots adjacent to the point count station.**

Field: APLOTHAB

Description: 4-character code identifying the dominant habitat type within the subplot. See Table A1 for list of habitat codes.

Field: AHABNAME

Description: Complete name of each habitat type. See Table A1 for the complete list of habitat names and codes.

Field: AHERBCAN

Description: Average height (cm) of the herbaceous canopy, if present.

Field: ATREECAN

Description: Average height (m) of the tree canopy, if present.

Field: ATREESCAN

Description: Average height (m) of the tree subcanopy, if present.

Field: ASHRUBCAN

Description: Average height (m) of the shrub canopy, if present.

Field: ASHRUBSCAN

Description: Average height (m) of the shrub subcanopy, if present.

Field: ATREE1ID

Description: 6-letter code (first 3 letters of genus followed by first 3 letters of species) of a plant species covering at least 1% of the subplot, at least 5m above ground. See Table A3 for list of tree codes.

Field: AT1NAME

Description: Indicates the common name of the code entered in ATREE1ID. See Table A3 for list of tree common names.

Field: ATREE123

Description: Count of stems 1-23cm dbh of the species indicated in Atree1id.

Field: ATREE153

Description: Count of stems 24-53cm dbh of the species indicated in Atree1id.

Field: ATREE181

Description: Count of stems 54-81cm dbh of the species indicated in Atree1id.

Field: ATREE1122

Description: Count of stems 82-122cm dbh of the species indicated in Atree1id.

Field: ATREE1123

Description: Count of stems >122cm dbh of the species listed in Atree1id.

Field: ATREE1HCOV

Description: Percent cover of the species indicated in Atree1id, considering only vegetation greater than 20 m above ground.

Field: ATREE1MCOV

Description: Percent cover of the species indicated in Atree1id, considering only vegetation between 5 and 20 m above ground.

Field: ATREE2ID

Description: 6-letter code (first 3 letters of genus followed by first 3 letters of species) of another plant species covering at least 1% of the subplot, at least 5m above ground. See Table A3 for list of tree codes.

Field: AT2NAME

Description: Indicates the common name of the code entered in ATREE2ID. See Table 3 for list of tree common names.

Fields: ATREE223... ATREE2MCOV

Description: Fields follow the same conventions as above, but applied to the species indicated in Atree2id, rather than Atree1id.

**Fields following the same conventions are provided for four additional plant species (Atree3id...Atree6id).**

Field: ASHRUBHCOV

Description: Percent cover of the all shrub species (undifferentiated) in the vegetation layer greater than 20 m above ground.

Field: ASHRUBMCOV

Description: Percent cover of the all shrub species (undifferentiated) in the vegetation layer between 5-20 m above ground.

Field: ASNAG23

Description: Number of snags (dead tree, any species, >1.5 m tall) 1-23 cm dbh.

Field: ASNAG53

Description: Number of snags 24-53 cm dbh.

Field: ASNAG81

Description: Number of snags 54-81 cm dbh.

Field: ASNAG122

Description: Number of snags 82-122 cm dbh.

Field: ASNAG123

Description: Number of snags >122 cm dbh.

Field: ADECAY1

Description: Number of logs (>20 cm diameter) crossing the center of the plot, perpendicular to its long axis (such that the observer had to step or climb over them) of decay class 1. Decay classes were defined as follows:

| Characteristic           | Decay Class 1         | Decay Class 2             | Decay Class 3         |
|--------------------------|-----------------------|---------------------------|-----------------------|
| Bark                     | Mostly intact         | Mostly sloughed/sloughing | Absent                |
| 3 cm twigs               | Present to absent     | Absent                    | Absent                |
| Exposed wood texture     | Intact, hard          | Large pieces, partly soft | Small pieces, soft    |
| Portion of log on ground | Log supporting itself | Log sagging on ground     | Log entirely grounded |
| Exposed wood color       | Original              | Original to reddish       | Reddish to brown      |
| Epiphytes                | None                  | Conifer seedlings         | Moss and conif. sdng  |
| Invading roots           | None                  | Shallow seedlings         | Roots penetrating     |
| Log x-sectional shape    | Round                 | Round                     | Oval or collapsed     |

Field: ADECAY2

Description: Number of logs (>20 cm diameter) crossing the center of the plot, perpendicular to its long axis (such that the observer had to step or climb over them) of decay class 2.

Field: ADECAY3

Description: Number of logs (>20 cm diameter) crossing the center of the plot, perpendicular to its long axis (such that the observer had to step or climb over them) of decay class 3.

Field: ATOTCOVH

Description: Percent cover of all contributing species, considering only vegetation greater than 20 m above ground.

Field: ATOTCOVM

Description: Percent cover of all contributing species, considering only vegetation between 5 and 20 m above ground.

Field: AWVTOTCOV

Description: Percent cover of all contributing species (tree or shrub), considering only vegetation between 1 and 5 m above ground.

Field: ASHRUBONLY

Description: Percent cover of all shrub species, considering only vegetation between 1 and 5 m above ground.

Field: AWW1ID

Description: 6-letter code (first 3 letters of genus followed by first 3 letters of species) of a plant species covering at least 1% of the subplot, considering only vegetation between 1 and 5 m above ground. See Table A4 for shrub species list.

Field: AWW1NAME

Description: Indicates the common name of the species entered in AWW1ID. See Table A4 for list of shrub common names and codes.

Field: AWW1COV

Description: Considering only vegetation between 1 and 5 m above ground, percent cover of species indicated in Aww1id.

Field: AWW1HT

Description: Avg. ht (m) of species indicated in Awv1id.

**Fields following the same conventions are provided for 6 more plant species (AWV2ID-AWV2HT; AWV3ID-AWV3HT;...AWV7ID-AWV7HT).**

Field: AWVTREESCO

Description: Considering only vegetation between 1 and 5 m above ground, percent cover of all tree species (undifferentiated) present.

**The following fields all refer to ground cover below 0.1 m above ground.**

Field: ASNOW

Description: Percent of ground covered by snow.

Field: AWATER

Description: Percent of ground covered by standing or running water.

Field: AROCK

Description: Percent of ground comprised of exposed rock.

Field: ABARE

Description: Percent of ground comprised of bare soil.

Field: ALITTER

Description: Percent of ground covered by organic litter.

Field: ADW

Description: Percent of ground covered by downed wood.

Field: AGRASS

Description: Percent of ground covered by grass.

Field: ASEDGE

Description: Percent of ground covered by sedge.

Field: AFORB

Description: Percent of ground covered by forbs.

Field: AFERN

Description: Percent of ground covered by ferns.

Field: ASHRUB

Description: Percent of ground covered by shrubs.

Field: ATREE

Description: Percent of ground covered by tree foliage.

Field: AMOSS

Description: Percent of ground covered by moss.

Field: AOTHER1ID

Description: One-word description of any additional ground cover item.

Field: AOTHER1COV

Description: Percent of ground covered by item indicated in Aother1id.

Field: AOTHER2ID

Description: One-word description of any additional ground cover item.

Field: AOTHER2COV

Description: Percent of ground covered by item indicated in Aother1id

Field: ACOMPLETE

Description: 'Y' indicates all data for the subplot were collected. 'N' indicates some data for the subplot were missing.

Field: ADESCRIBE

Description: Describes data missing in subplot for records with an 'N' in Acomplete.

Field: DENNORTH

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing north. **999 signifies no data were collected.**

Field: DENEAST

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing east. **999 signifies no data were collected.**

Field: DENSOUTH

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing south. **999 signifies no data were collected.**

Field: DENWEST

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing west. **999 signifies no data were collected.**

### **3. Habitat Data II: ibp\_vegb**

The file ibp\_vegb.xls contains data pertaining to the second of the two vegetation subplots (subplot 'B') associated with each point count station. The first field, 'UNIQPT' serves as a link to each of the other databases. The remaining fields are identical to their counterparts in ibp\_vega.xls, except they all begin with 'B'.

### **4. Rare Bird Data: ibp\_rare**

This file contains documentation of notable, unexpected, or otherwise poorly documented species that our crews detected in the park at times other than during point counts.

Field: SPEC

Description: 4-character bird species code. See Table A2 for key to bird species codes.

Field: COMMONNAME

Description: Common name of species coded in SPEC field.

Field: OBSERVER

Description: Initials of the rare bird observer. MOB = Many Observers; see Table A6 for all other observer names.

Field: DATE

Description: The date the bird was observed (mm/dd/yyyy).

Field: QUANTITY

Description: The number of birds detected of the indicated species.

Field: NORTHING

Description: UTM northing (NAD27) of the detection.

Field: EASTING

Description: UTM easting (NAD27) of the detection.

Field: DETAILS

Description: Details regarding encounter and identification of species.

#### **4. Species- and habitat-specific density estimates: ibp density**

This file contains habitat-specific density estimates and associated information for all species detected during point counts.

Field: HAB

Description: 4-letter habitat code. See Table A1 for a list of habitats and their codes.

Field: HABNAME

Description: Complete name of each habitat type. See Table A1 for the complete list of habitat names and codes.

Field: SPEC

Description: 4-character bird species code. See Table A2 for bird species codes.

Field: COMMONNAME

Description: Common name of species coded in SPEC field.

Field: PRCNTWUNLD

Description: Percent of points in the indicated habitat at which the species was detected.

Field: PTSWUNLDET

Description: Number of points at which the species was detected (includes flyovers).

Field: ALLDETS:

Description: Number of individual detections of indicated species in indicated habitat, excluding flyovers.

Field: L50DETS:



Description: Number of less than 50-m radius individual detections of indicated species in indicated habitat, excluding flyovers.

Field: UNADJDENS

Description: Unadjusted density, based on the number of detections within 50 m of the observer, **with no adjustment for detectability**.

Field: ADJDENS

Description: Adjusted density, calculated using Distance 4.0 Release 2.

Field: PERCENTCV

Description: Coefficient of variation of the density estimate, expressed as a percentage.

Field: DF

Description: Degrees of freedom of the density estimate.

Field: LOW95CI

Description: Lower bound of the 95% confidence interval of the density estimate.

Field: HIGH95CI

Description: Upper bound of the 95% confidence interval of the density estimate.

Table A1. Habitats and codes in the databases. Asterisks indicate habitats used for which we estimated bird density.

| Habitat                            | Code |
|------------------------------------|------|
| Alaska Yellow Cedar*               | ALYC |
| Big Leaf Maple                     | BIGM |
| Conifer Deciduous Mix*             | CODM |
| Developed                          | DEVO |
| Douglas-fir*                       | DOFI |
| Engelmann Spruce*                  | ENGS |
| Grand Fir*                         | GRAF |
| Heather                            | HEAT |
| Heather/Herbaceous Sedge Meadow*   | HHSM |
| Herbaceous Sedge                   | HESE |
| High-elevation Shrub*              | HSHR |
| Meadow                             | MEAD |
| Mid-elevation Shrub*               | MSHR |
| Mixed Conifer                      | MICO |
| Mixed Douglas-fir/Western Hemlock* | DFWH |
| Mountain Hemlock*                  | MOHE |
| Noble Fir*                         | NOBF |
| Pacific Silver Fir*                | PASF |
| Red Alder*                         | REAL |
| Road                               | ROAD |
| Rock or Sparsely Vegetated*        | ROSV |
| Shrub                              | SHRU |
| Sitka Spruce                       | SISP |
| Snow                               | SNOW |
| Subalpine fir*                     | SUBF |
| Water                              | WATE |
| Western Hemlock*                   | WEHE |
| Western Redcedar*                  | WERC |

Table A2. Bird species codes used in the databases.

| Common Name                 | Code | Common Name                        | Code |
|-----------------------------|------|------------------------------------|------|
| American Crow               | AMCR | Lincoln's Sparrow                  | LISP |
| American Dipper             | AMDI | MacGillivray's Warbler             | MGWA |
| American Goldfinch          | AMGO | Mallard                            | MALL |
| American Kestrel            | MAKE | Marbled Murrelet                   | MAMU |
| American Pipit              | AMPI | Merlin                             | MERL |
| American Robin              | AMRO | Mountain Bluebird                  | MOBL |
| Band-tailed Pigeon          | BTPI | Mountain Chickadee                 | MOCH |
| Barn Swallow                | BARS | Northern Flicker                   | NOFL |
| Barred Owl                  | BDOW | Northern Goshawk                   | NOGO |
| Belted Kingfisher           | BEKI | Northern Harrier                   | NOHA |
| Black Swift                 | BLSW | Northern Pygmy-Owl                 | NOPO |
| Black-headed Grosbeak       | BHGR | Olive-sided Flycatcher             | OSFL |
| Black-throated Gray Warbler | BTYW | Orange-crowned Warbler             | OCWA |
| Blue Grouse                 | BLUG | Osprey                             | OSPR |
| Brown Creeper               | BRCR | Pacific-slope Flycatcher           | PSFL |
| Brown-headed Cowbird        | BHCO | Pileated Woodpecker                | PIWO |
| Bushtit                     | BUSH | Pine Grosbeak                      | PIGR |
| Canada Goose                | CAGO | Pine Siskin                        | PISI |
| Canyon Wren                 | CANW | Red Crossbill                      | RECR |
| Cassin's Finch              | CAFI | Red-breasted Nuthatch              | RBNU |
| Cedar Waxwing               | CEDW | Red-breasted Sapsucker             | RBSA |
| Chestnut-backed Chickadee   | CBCH | Red-tailed Hawk                    | RTHA |
| Chipping Sparrow            | CHSP | Red-winged Blackbird               | RWBL |
| Clark's Nutcracker          | CLNU | Rough-legged Hawk                  | RLHA |
| Common Nighthawk            | CONI | Ruby-crowned Kinglet               | RCKI |
| Common Raven                | CORA | Rufous Hummingbird                 | RUHU |
| Common Yellowthroat         | COYE | Sharp-shinned Hawk                 | SSHA |
| Dark-eyed Junco             | DEJU | Song Sparrow                       | SOSP |
| Downy Woodpecker            | DOWO | Spotted Sandpiper                  | SPSA |
| Dusky Flycatcher            | DUFL | Spotted Towhee                     | SPTO |
| Evening Grosbeak            | EVGR | Steller's Jay                      | STJA |
| Fox Sparrow                 | FOSP | Swainson's Thrush                  | SWTH |
| Golden Eagle                | GOEA | Three-toed Woodpecker              | TTWO |
| Golden-crowned Kinglet      | GCKI | Townsend's Solitaire               | TOSO |
| Gray Jay                    | GRAJ | Townsend's Warbler                 | TOWA |
| Gray-crowned Rosy-Finch     | GCRF | Townsend's x Hermit Warbler Hybrid | THWH |
| Great Blue Heron            | GBHE | Tree Swallow                       | TRES |
| Great Horned Owl            | GHOW | Turkey Vulture                     | TUVU |
| Hairy Woodpecker            | HAWO | Unidentified Empidonax             | UNEM |
| Hammond's Flycatcher        | HAFL | Unidentified Flycatcher            | UNFL |
| Harlequin Duck              | HARD | Unidentified Hummingbird           | UNHU |
| Hermit Thrush               | HETH | Unidentified Sapsucker             | UNSA |
| Hermit Warbler              | HEWA | Unidentified Swallow               | UNSW |
| Hutton's Vireo              | HUVI | Unidentified Warbler               | UNWA |

Table A2, continued

| Common Name             | Code |
|-------------------------|------|
| Unidentified Woodpecker | UNWO |
| Varied Thrush           | VATH |
| Vaux's Swift            | VASW |
| Violet-green Swallow    | VGSW |
| Warbling Vireo          | WAVI |
| Western Screech-Owl     | WESO |
| Western Tanager         | WETA |
| Western Wood-Pewee      | WEWP |
| White-crowned Sparrow   | WCSP |
| White-tailed Ptarmigan  | WTPT |
| Wilson's Warbler        | WIWA |
| Winter Wren             | WIWR |
| Yellow Warbler          | YWAR |
| Yellow-rumped Warbler   | YRWA |

Table A3. Tree species codes used in the databases.

| Common Name         | Scientific Name <sup>1</sup>      | Code   |
|---------------------|-----------------------------------|--------|
| Pacific Silver Fir  | <i>Abies amabilis</i>             | ABIAMA |
| Grand Fir           | <i>Abies grandis</i>              | ABIGRA |
| Subalpine Fir       | <i>Abies lasiocarpa</i>           | ABILAS |
| Noble Fir           | <i>Abies procera</i>              | ABIPRO |
| Unknown Fir         | <i>Abies sp.</i>                  | ABISP  |
| Vine Maple          | <i>Acer circinatum</i>            | ACECIR |
| Mountain Maple      | <i>Acer glabrum</i>               | ACEGLA |
| Big-leaf Maple      | <i>Acer macro</i>                 | ACEMAC |
| Red Alder           | <i>Alnus rubra</i>                | ALNRUB |
| Sitka Alder         | <i>Alnus sinuata</i>              | ALNSIN |
| Bog Birch           | <i>Betula glandulosa</i>          | BETGLA |
| Paper Birch         | <i>Betula papyifera</i>           | BETPAP |
| Alaska Yellow Cedar | <i>Chamaecyparis nootkatensis</i> | CHANOO |
| Pacific Dogwood     | <i>Cornus nuttallii</i>           | CORNUT |
| Common Juniper      | <i>Juniperus communis</i>         | JUNCOM |
| Engelmann Spruce    | <i>Picea engelmannii</i>          | PICENG |
| Sitka Spruce        | <i>Picea sitchensis</i>           | PICSIT |
| Whitebark Pine      | <i>Pinus albicaulis</i>           | PINALB |
| Lodgepole Pine      | <i>Pinus contorta</i>             | PINCON |
| Western White Pine  | <i>Pinus monticola</i>            | PINMON |
| Ponderosa Pine      | <i>Pinus ponderosa</i>            | PINPON |
| Black Cottonwood    | <i>Populus balsamifera</i>        | POPBAL |
| Quaking Aspen       | <i>Populus trichocarpa</i>        | POPTRE |
| Douglas Fir         | <i>Pseudotsuga menzeisii</i>      | PSEMEN |
| Western Yew         | <i>Taxus brevifolia</i>           | TAXBRE |
| Western Redcedar    | <i>Thuja plicata</i>              | THUPLI |
| Western Hemlock     | <i>Tsuga heterophylla</i>         | TSUHET |
| Mountain Hemlock    | <i>Tsuga mertensiana</i>          | TSUMER |

<sup>1</sup>Scientific names follow Pojar and Mackinnon (1994) and/or Biek (2000).

Table A4. Plant species codes used in the databases.

| Common Name              | Scientific Name <sup>1</sup>    | Code   |
|--------------------------|---------------------------------|--------|
| Vine Maple               | <i>Acer circinatum</i>          | ACECIR |
| Dwarf Maple              | <i>Acer glabrum</i>             | ACEGLA |
| Mountain Maple           | <i>Acer glabrum</i>             | ACEGLA |
| Big Leaf Maple           | <i>Acer macrophyllum</i>        | ACEMAC |
| Red Alder                | <i>Alnus rubra</i>              | ALNRUB |
| Slide Alder              | <i>Alnus viridis</i>            | ALNVIR |
| Serviceberry             | <i>Amelanchier alnifolia</i>    | AMEALN |
| Unknown Anemone          | <i>Anemone sp.</i>              | ANESP  |
| Kinnikinnick             | <i>Arctostaphylos uva-ursi</i>  | ARCUVA |
| Tall Oregon Grape        | <i>Berberis aquifolium</i>      | BERAQU |
| Cascade Oregon Grape     | <i>Berberis nervosa</i>         | BERNER |
| Creeping Oregon Grape    | <i>Berberis ripens</i>          | BERRIP |
| Unknown Oregon Grape     | <i>Berberis sp.</i>             | BERSP  |
| Deer Fern                | <i>Blechnum spicant</i>         | BLESPI |
| White Mountain Heather   | <i>Cassiope mertensiana</i>     | CASMER |
| Alaskan Mountain Heather | <i>Cassiope stelleriana</i>     | CASSTE |
| Mountain Balm            | <i>Ceanothus velutinus</i>      | CEAVEL |
| Pipsissewa               | <i>Chimaphila umbellata</i>     | CHIUMB |
| Bunchberry               | <i>Cornus Canadensis</i>        | CORCAN |
| Red-Osier Dogwood        | <i>Cornus sericea</i>           | CORSER |
| Unknown Dogwood          | <i>Cornus sp.</i>               | CORSP  |
| Hazelnut                 | <i>Corylus cornuta</i>          | CORCOR |
| Slender Wintergreen      | <i>Gaultheria ovatifolia</i>    | GAUOVA |
| Salal                    | <i>Gaultheria shallon</i>       | GAUSHA |
| Ocean Spray              | <i>Holodiscus discolor</i>      | HOLDIS |
| Juniper                  | <i>Juniperus communis</i>       | JUNCOM |
| Bog Laurel               | <i>Kalmia microphylla</i>       | KALMIC |
| Trapper's Tea            | <i>Ledum glandulosum</i>        | LEDGLA |
| Labrador Tea             | <i>Ledum groenlandicum</i>      | LEDGRO |
| Twinflower               | <i>Linnaea borealis</i>         | LINBOR |
| Twinberry                | <i>Lonicera involucrate</i>     | LONINV |
| Unknown Lupine           | <i>Lupinus s.</i>               | LUPSP  |
| False Solomon's Seal     | <i>Maianthemum racemosum</i>    | MAIRAC |
| False Azalea             | <i>Menziesia ferruginea</i>     | MENFER |
| Sweet Gale               | <i>Myrica gale</i>              | MYRGAL |
| Indian Plum              | <i>Oemleria cerasiformis</i>    | OEMCER |
| Devil's Club             | <i>Oplopanax horridum</i>       | OPLHOR |
| Mountain Box             | <i>Pachistima myrsinites</i>    | PACMYR |
| Pink Mountain Heather    | <i>Phyllodoce empetriformis</i> | PHYEMP |
| Yellow Mountain Heather  | <i>Phyllodoce glanduliflora</i> | PHYGLA |
| Unknown Heather          | <i>Phyllodoce sp.</i>           | PHYSP  |
| Western Sword Fern       | <i>Polystichium munitum</i>     | POLMUN |
| Bitter Cherry            | <i>Prunus emarginata</i>        | PRUEMA |
| Cascara                  | <i>Rhamnus purshiana</i>        | RHAPUR |
| White Rhododendron       | <i>Rhododendron albiflorum</i>  | RHOALB |

Table A4, continued

| Common Name             | Scientific Name <sup>1</sup>     | Code   |
|-------------------------|----------------------------------|--------|
| Pacific Rhododendron    | <i>Rhododendron macrophyllum</i> | RHOMAC |
| Stink Currant           | <i>Ribes bracteosum</i>          | RIBBRA |
| Swamp Gooseberry        | <i>Ribes lacustre</i>            | RIBLAC |
| Trailing Black Currant  | <i>Ribes laxiflorum</i>          | RIBLAX |
| Red-flowering Current   | <i>Ribes sanguineum</i>          | RIBSAN |
| Unknown Ribes           | <i>Ribes sp.</i>                 | RIBSP  |
| > 1 Unknown Ribes       | <i>Ribes spp.</i>                | RIBSPP |
| Sticky Currant          | <i>Ribes viscosissimum</i>       | RIBVIS |
| Wood Rose               | <i>Rosa gymnocarpa</i>           | ROSGYM |
| Unknown Rose            | <i>Rose sp.</i>                  | ROSSP  |
| Dwarf Blackberry        | <i>Rubus lasiococcus</i>         | RUBLAS |
| Western Thimbleberry    | <i>Rubus parviflorus</i>         | RUBPAR |
| Five-leaved Blackberry  | <i>Rubus pedatus</i>             | RUBPED |
| Unknown Rubus           | <i>Rubus sp.</i>                 | RUBSP  |
| Salmonberry             | <i>Rubus spectabilis</i>         | RUBSPE |
| > 1 Unknown Rubus       | <i>Rubus spp.</i>                | RUBSPP |
| Pacific Blackberry      | <i>Rubus ursinus</i>             | RUBURS |
| Shining Willow          | <i>Salix lucida</i>              | SALLUC |
| Sitka Willow            | <i>Salix sitchensis</i>          | SALSIT |
| Unknown Willow          | <i>Salix sp.</i>                 | SALSP  |
| > 1 Unknown Willow      | <i>Salix spp.</i>                | SALSPP |
| Blue Elderberry         | <i>Sambucus cerulea</i>          | SAMCER |
| Red Elderberry          | <i>Sambucus racemosa</i>         | SAMRAC |
| Cascade Mountain Ash    | <i>Sorbus scopulina</i>          | SORSCO |
| Sitka Mountain Ash      | <i>Sorbus sitchensis</i>         | SORSIT |
| Birch-leaved Spirea     | <i>Spirea betulifolia</i>        | SPIBET |
| Subalpine Spirea        | <i>Spirea densiflora</i>         | SPIDEN |
| Douglass's Spirea       | <i>Spirea douglasii</i>          | SPIDOU |
| Unknown Spirea          | <i>Spirea sp.</i>                | SPISP  |
| Common Snowberry        | <i>Symphoricarpos albus</i>      | SYMALB |
| Unknown Snowberry       | <i>Symphoricarpos sp.</i>        | SYMSP. |
| Western Yew             | <i>Taxus brevifolia</i>          | TAXBRE |
| Alaska Huckleberry      | <i>Vaccinium alaskense</i>       | VACALA |
| Blue-leaf Huckleberry   | <i>Vaccinium deliciosum</i>      | VACDEL |
| Thin-leaved Huckleberry | <i>Vaccinium membranaceum</i>    | VACMEM |
| Oval-leaf Huckleberry   | <i>Vaccinium ovalifolium</i>     | VACOVA |
| Red Huckleberry         | <i>Vaccinium parvifolium</i>     | VACPAR |
| Grouseberry             | <i>Vaccinium scoparium</i>       | VACSCO |
| Blueberry/Huckleberry   | <i>Vaccinium sp.</i>             | VACSP  |
| Unknown Huckleberry     | <i>Vaccinium sp.</i>             | VACSP  |
| >1 Unknown Huckleberry  | <i>Vaccinium spp.</i>            | VACSPP |
| Bear Grass              | <i>Xerophyllum tenax</i>         | XERTEN |
| Unknown Forb            |                                  | FORB   |
| Unknown Plant           |                                  | UNKNOW |
| Unknown Fern            |                                  | FERN   |

<sup>1</sup>Scientific names follow Pojar and Mackinnon (1994) and/or Biek (2000).

Table A5. Field observers' names and initials.

| Name             | Initials |
|------------------|----------|
| Amy Brown        | AB       |
| Angie Kociolek   | AK       |
| Bob Wilkerson    | BW       |
| Eric Michelson   | EM       |
| Heidi Pedersen   | HP       |
| Katie Stassen    | KS       |
| Mandy Holmgren   | MH       |
| Roberto Quintero | RQ       |
| Rodney Siegel    | RS       |
| Ryan Kepler      | RK       |



## Appendix D: Field Forms

page\_\_\_\_\_of\_\_\_\_\_

|  |  |
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|  |  |
|  |  |

[illegible][illegible]

<sup>1</sup>Noise: 1=no noise; 2=gentle babbling brook noise, probably not missing birds; 3=babbling creek noise, might be missing some high-pitched songs/calls of distant birds; 4=rushing creek noise, detection radius is probably substantially reduced; 5=roaring creek/river noise, probably detecting only the closest/loudest birds.

<sup>2</sup>Interval: 3=first detected during first three minutes of point count; 2=first detected during last two minutes of point count.

Point: \_\_\_\_\_ Hab: \_\_\_\_\_ Hab2 (optional): \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Bird Obs: \_\_\_\_\_ Veg Obs: \_\_\_\_\_ Aspect (°): \_\_\_\_\_  
Slope(°): \_\_\_\_\_ Rock (y or n): \_\_\_\_\_ Moisture (1-3): \_\_\_\_\_ Std H<sub>2</sub>O (sq.-m): \_\_\_\_\_ Run H<sub>2</sub>O (1-5): \_\_\_\_\_ Elev: \_\_\_\_\_ (\_\_\_\_ft \_\_\_\_m)  
Location Source: \_\_\_\_\_ (G, M) Northing: \_\_\_\_\_ Easting: \_\_\_\_\_ GPS error: \_\_\_\_\_ (m) **NAD 27 DATUM**  
**Franklin** Key Used: \_\_\_\_\_ Dom Tree: \_\_\_\_\_ Dom Shrub: \_\_\_\_\_ Other Habs W/in. 100 m: \_\_\_\_\_, \_\_\_\_\_

| <b>Plot 1</b>                                   | Habitat:                | Avg. tree canopy ht.:m     | Avg. shrub canopy ht.:m     |                                     |          |            |            |
|---|-------------------------|----------------------------|-----------------------------|-------------------------------------|----------|------------|------------|
|   | Avg. herb canopy ht.:cm | Avg. tree sub-canopy ht.:m | Avg. shrub sub-canopy ht.:m |                                     |          |            |            |
| Tree Species                                    | 0-23 cm                 | 24-53 cm                   | 54-81 cm                    | 82-122 cm                           | >122 cm  | Cov > 20 m | Cov 5-20 m |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
| SHRUBS  |                         |                            |                             |                                     |          | %          | %          |
| Snags (>1.5m tall)                              |                         |                            |                             |                                     |          |            |            |
| Logs > 20cm DBH                                 | Decay =1                | Decay=2                    | Decay=3                     | Total Cover                         |          | %          | %          |
| <b>Woody Vegetation between 0.1 m and 5.0 m</b> |                         |                            |                             | <b>Ground cover (0.1 m or less)</b> |          |            |            |
| Total Cover:% Shrub Cover Only:%                |                         |                            |                             | Type                                | Cover    | Type       | Cover      |
| Species   | Cover                   | Avg. Ht. (m)               | snow                        | %                                   | fern     | %          |            |
|   | %                       |                            | water                       | %                                   | shrub    | %          |            |
|   | %                       |                            | rock                        | %                                   | tree     | %          |            |
|   | %                       |                            | bare dirt/mud               | %                                   | moss     | %          |            |
|   | %                       |                            | litter                      | %                                   | Other 1: | %          |            |
|   | %                       |                            | downed wood                 | %                                   | Other 2: | %          |            |
|   | %                       |                            | grass                       | %                                   | Other 3: | %          |            |
|   | %                       |                            | sedge                       | %                                   | Other 4: | %          |            |
| TREES   | %                       |                            | forb                        | %                                   |          |            |            |
| <b>Plot 2</b>                                   | Habitat:                | Avg. tree canopy ht.:m     | Avg. shrub canopy ht.:m     |                                     |          |            |            |
|   | Avg. herb canopy ht.:cm | Avg. tree sub-canopy ht.:m | Avg. shrub sub-canopy ht.:m |                                     |          |            |            |
| Tree Species                                    | 0-23 cm                 | 24-53 cm                   | 54-81 cm                    | 82-122 cm                           | >122 cm  | Cov > 20 m | Cov 5-20 m |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
|   |                         |                            |                             |                                     |          | %          | %          |
| SHRUBS  |                         |                            |                             |                                     |          | %          | %          |
| Snags (>1.5m tall)                              |                         |                            |                             |                                     |          |            |            |
| Logs > 20cm DBH                                 | Decay =1                | Decay=2                    | Decay=3                     | Total Cover                         |          | %          | %          |
| <b>Woody Vegetation between 0.1 m and 5.0 m</b> |                         |                            |                             | <b>Ground cover (0.1 m or less)</b> |          |            |            |
| Total Cover:% Shrub Cover Only:%                |                         |                            |                             | Type                                | Cover    | Type       | Cover      |
| Species   | Cover                   | Avg. Ht. (m)               | snow                        | %                                   | fern     | %          |            |
|   | %                       |                            | water                       | %                                   | shrub    | %          |            |
|   | %                       |                            | rock                        | %                                   | tree     | %          |            |
|   | %                       |                            | bare dirt/mud               | %                                   | moss     | %          |            |
|   | %                       |                            | litter                      | %                                   | Other 1: | %          |            |
|   | %                       |                            | downed wood                 | %                                   | Other 2: | %          |            |
|   | %                       |                            | grass                       | %                                   | Other 3: | %          |            |
|   | %                       |                            | sedge                       | %                                   | Other 4: | %          |            |
| TREES   | %                       |                            | forb                        | %                                   |          |            |            |

### Mount Rainier National Park Point Count Densiometer Readings

Transect: \_\_\_\_\_ Date: \_\_\_\_\_ Observer: \_\_\_\_\_

**Note: Please record the number of OPEN quarter-squares!!!**

|  |
|--|
| <b>Point 1</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 2</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 3</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 4</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 5</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 6</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 7</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 8</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|  |
|--|
| <b>Point 9</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|--|

|   |
|---|
| <b>Point 10</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|---|

|   |
|---|
| <b>Point 11</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|---|

|   |
|---|
| <b>Point 12</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|---|

|   |
|---|
| <b>Point 13</b><br>North: _____/96      East: _____/96      South: _____/96      West: _____/96 |
|---|

## Mt. Rainier National Park Inventory Rare Bird Report Form

|  |          |                  |      |                    |                   |       |
|--|----------|------------------|------|--------------------|-------------------|-------|
| Obs.:  | Species: | Date:<br>/ /2004 | Qty: | Northing:<br>_____ | Easting:<br>_____ | Time: |
| Transect and point, if detected during a point count:  |          |                  |      |                    |                   |       |
| Description (include diagnostic plumage and vocalization details used to identify the individual, sex, #'s, and any nest sightings or behavior indicative of nesting): |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |

|  |          |                  |      |                    |                   |       |
|--|----------|------------------|------|--------------------|-------------------|-------|
| Obs.:  | Species: | Date:<br>/ /2004 | Qty: | Northing:<br>_____ | Easting:<br>_____ | Time: |
| Transect and point, if detected during a point count:  |          |                  |      |                    |                   |       |
| Description (include diagnostic plumage and vocalization details used to identify the individual, sex, #'s, and any nest or behavior indicative of nesting): |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |
|  |          |                  |      |                    |                   |       |

Hitlist:  
 COLO  
 All Grebe spp.  
 All Waterfowl  
 Scoter spp.  
 Merganser spp.  
 MAMU  
 TUVU  
 OSPR  
 BAEA  
 NOHA  
 SSHA, COHA  
 NOGO, RTHA  
 GOEA  
 MAKE, MERL  
 PEFA  
 RNPH  
 SPGR  
 WTPT  
 All Quail Spp.  
 VIRA  
 Shorebird spp.  
 All Gull spp.  
 MAMU  
 BTPI, MODU  
 All Owl spp.  
 CONI, ANHU  
 All Swift Spp.  
 BEKI  
 LEWO, WISA  
 RNSA, TTWO  
 BBWO  
 WIFL, DUFL  
 WEWP, WEKI  
 WESJ, CLNU  
 HOLA  
 All Swallows  
 REVI  
 WBNU  
 CANW, ROWR  
 HOWR, MAWR  
 RCKI  
 WEBL, MOBL  
 TOSO, NOMO  
 AMPI, EUST  
 CEDW, GRCA  
 NAWA, HEWA  
 AMRE, COYE  
 VESP, SAVS  
 FOSP, LISP  
 GCSP, LAZB  
 WEME, YHBL  
 BUOR, RWBL  
 BRBL, BHCO  
 GCRF, PIGR  
 PUF1, CAFI  
 WWCR, AMGO  
 ---  
 Or anything you  
 even suspect  
 may be unusual  
 or outside its

**MOUNT RAINIER NATIONAL PARK BIRD INVENTORY DAILY JOURNAL**

Transect: \_\_\_\_\_ Quad: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Bird Obs.: \_\_\_\_\_ Veg. Obs.: \_\_\_\_\_

**Transect Turning Points**

|                     |                      |
|---------------------|----------------------|
| Point number: _____ | New direction: _____ |
| Explanation: _____  |                      |
| _____               |                      |
| Point number: _____ | New direction: _____ |
| Explanation: _____  |                      |
| _____               |                      |
| Point number: _____ | New direction: _____ |
| Explanation: _____  |                      |
| _____               |                      |
| Point number: _____ | New direction: _____ |
| Explanation: _____  |                      |
| _____               |                      |

Transect notes (describe transect route including crossing creeks/rivers and vegetation types encountered):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Weather: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Vegetation phenology and natural history observations (include interesting avian encounters/observations; please record unusual bird sightings here and on the Rare Bird Report Form):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Other: \_\_\_\_\_

\_\_\_\_\_