Monitoring Colorado's Birds: The Year 2000 Final Report

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Abstract

In 2000, Rocky Mountain Bird Observatory (formerly Colorado Bird Observatory), in conjunction with its funding partners – Colorado Division of Wildlife, U.S.D.A. Forest Service, U.S. Bureau of Land Management, and National Park Service – conducted the *Monitoring Colorado's Birds* breeding-bird monitoring plan, as delineated in 1998 and recently updated (Leukering et al. 2000).

We conducted transects in 14 habitats this year, with Lodgepole Pine added to last year's 13 habitats. The habitat-stratified transects provided excellent data on 124 breeding species (coefficients of variation of ≤50%) in at least one habitat and solid data on an additional 39 breeding species (coefficients of variation between 50% and 100%) in at least one habitat. This total of 166 species suggests that data from these transects will enable us to monitor ~65% of all Colorado's annually-breeding species.

We conducted an extensive counting effort of breeding colonial waterbirds, visiting at least 439 sites and counting individuals of 16 species. We also counted territorial individuals of nine species with limited breeding ranges in Colorado. We continue to solicit locations of breeding sites for species in these two categories and have added a number of such sites to the list of locations to visit in 2001. Our counts in 2000 suggest that we will be able to monitor all of the colonial waterbirds and at least two of the limited-range species, raising the total monitored to ~72% of all Colorado's annually-breeding species.

Introduction

Rocky Mountain Bird Observatory (RMBO) initiated efforts to create and conduct a Colorado-wide effort to monitor breeding-bird populations in 1995 (see Leukering et al. 2000 for rationale for program). In 1997, after review by statisticians and Colorado Division of Wildlife (CDOW) biologists, we redesigned the program to focus on obtaining count-based data for all breeding-bird species in the state on a randomly-allocated and habitat-stratified basis and conducted a pilot effort in 1998 in three habitats (Leukering and Carter 1999). With the success of the 1998 effort, we expanded field work in 1999 to include all originally-allocated habitats and special-species efforts. We continued the project in 2000 and this report delineates the results of that effort.

Methods

We used three methods, transects, colony counts, and censussing, to obtain population data for Colorado's breeding-bird species. We would like to take this opportunity to point out that the utility of this program is entirely dependent upon the transects faithfully representing habitat and management. If land managers manage around these transects, the program becomes entirely useless.

Point transects–We established transects of 15 point counts in each of 30 randomly-selected stands in each of 12 habitats. Using the Colorado GAP data set, we numbered all publicly-owned stands of the habitats in Colorado and randomly selected 60 from each

habitat. We then randomly selected 30 of those in which to establish point transects. In a few instances, selected stands were not of the indicated habitat or access across private land was denied, so we discarded these and randomly selected a replacement from the original set of stands. We randomly selected Grassland transects from the landscape with only seven falling on public lands.

One observer conducted each transect using protocol established by Leukering (2000). The observer located the selected stand on the ground and ran the transect along a randomly-selected bearing. For many transects, observers found it impossible to run the entire transect along the random bearing, as stand boundaries, property boundaries, and physical obstructions forced turns in the transect direction. When this happened, the observer randomly turned right or left perpendicular to the random bearing, subsequently alternating perpendicular directions if additional turns were necessary. In some stands, the narrowness of the stands predicated the location and bearing of the transects.

Transects consisted of 15 five-minute point counts spaced at 250-m intervals along a line. We considered the intervals between points as legs of a line transect. At the individual points, we recorded the radial distance to each bird detected. Along the transect legs, we recorded individuals of a short list of the habitat's target species whose population densities are relatively low (thus, poorly-recorded on point counts) and estimated the perpendicular distance to each. We also recorded perpendicular distances for individuals of these target species detected on points in order to be able to pool birds on points with birds on transect legs. Individual birds initially detected on points were not recorded between points.

Observers recorded weather data (sky condition--cloud cover and precipitation, wind--Beaufort scale, and temperature) and the time at the start and end of each transect. At each point, the observer recorded whether or not the point was within 100m of a road. The observer recorded the specific habitat and seral stage (1-5 scale; Buttery and Gillam 1983) of each of the two predominant habitats around each point (often there was only one habitat present). He/she also recorded the two most common understory types and the percentage, rounded to the nearest 10%, that each occupied of a 50m-radius circle centered on the point. Upon arriving at a point, the observer recorded habitat data, then conducted the point count.

We used program DISTANCE (Thomas et al. 1998) to analyze distance-estimate data; in this report, all references to density estimates are values provided by DISTANCE from our data. The notation, concepts, and analysis methods of the program were developed in Buckland et al. (1993). The program can analyze several forms of distance sampling data, fitting a detection curve to the data set to be analyzed. The program limits some serious biases inherent in traditional analysis of point-count data (e.g. detectability among habitats or years), but comes with three assumptions: 1) all birds at distance 0 are detected; 2) distances of birds close to the point are measured accurately, and 3) birds do not move in response to the observer's presence. For those species for which the initial analysis provided relatively poor results, we truncated the longest 10% of the data and re-analyzed the data set.

Low-elevation Riparian and Wetland transects–We selected Low-elevation Riparian transects by determining the number of navigable (by canoe or raft) river miles below 5500' elevation in Colorado on 14 rivers and sorted them by river and distance. We then randomly selected 30 one-mile stretches of the river miles total and determined their locations. We conducted line transects by water craft (raft or canoe) of one river mile length in approximately 30 minutes, with one person conducting the transect and another operating the craft.

For Wetland transects, we randomly selected 60 wetland stands, regardless of ownership. We then randomly selected 30 of those and established a 300-meter line transect in each. Field workers conducting these transects started from the selected access point and ran the transect on a randomly-selected bearing.

Census of historical breeding sites of colonially-nesting waterbirds–We surveyed known nesting sites of the following species: Eared Grebe, Western Grebe, Clark's Grebe, American White Pelican, Double-crested Cormorant, Great Egret, Snowy Egret, Cattle Egret, Green Heron, Black-crowned Night-Heron, White-faced Ibis, Franklin's Gull, California Gull, Forster's Tern, and Black Tern. In addition, we also visited numerous lakes and ponds (see below) to determine the likelihood of future nesting of any of these species at those locations.

Direct nest counts – We counted from the perimeter of each colony of Double-crested Cormorant, Great Blue Heron, and Great Egret, and for the portion of the Black-crowned Night-Heron population that nests in riparian or shoreline trees. Under other circumstances, we attempted systematic ground surveys for ground-nesting species in colonies with fewer than 200-300 pairs. We based the decision to conduct systematic ground surveys or to use a sampling method upon the colony size, accessibility of the colony site, ability to find nests within the vegetation, and the number of people available to conduct the survey without causing unacceptable levels of disturbance to the nesting birds.

Flush counts – Colorado has a small number (<5 total) of small Franklin's Gull, Forster's Tern, and Black Tern colonies. These birds nest in emergent vegetation–cattails and bulrushes–which makes it impossible to directly count the nests from the perimeter. During the nesting period these birds react aggressively to near approach of the nests by potential predators (e.g., field biologists), circling overhead, calling loudly, and occasionally diving at the intruders. At small colonies, this behavior makes it relatively easy to count flying birds. The total number of adults in the colony is the parameter for this type of count. One observer approached the colony until adults congregated about the observer. A second observer stationed at a distance counted the flying adults. The total number of adults present in the colony was recorded. These counts were conducted in mid July, after the young had left the nest, but not capable of flight.

Perimeter counts – We conducted perimeter counts from boats or from pre-determined points around the perimeter of a colony. The number and location of survey points varied from colony to colony depending upon vegetation structure and density, colony size and shape, and types of species breeding in the colony. The points were located at sufficient intervals around the colony to allow for counting the maximum number of nests while minimizing the risk of double-counting nests. We located survey points that allowed us to count birds without disturbing them. These points provided a view of unique landmarks within the colony that we used to establish which nests to count from each point. We designated as active those nests at which adult birds were constructing, incubating, or brooding. At these colonies, we counted all juveniles that we could see.

Nocturnal Transects – We overlaid a Colorado map with a 5x5 grid to create 25 grid intersections within the boundaries of the state. From these intersections, we selected transects to follow the nearest road which would support 20 points spaced ½-mile apart and which would be passable by two-wheel drive vehicles in good weather. We selected the first road intersected by a three-mile-radius line swung around the point, beginning due north of the point. If no suitable road was intersected by this circle, we used a five-mile circle. Observers recorded the date, time, and weather conditions at the beginning of each transect, and the time, UTM, and wind conditions at each point. We conducted a three-minute point

count at each stop and counted all owls that were spontaneously vocalizing. When the observer detected an owl, he/she recorded the bearing from the point (A) to the owl and estimated the distance to the owl. If an owl called persistently, the observer took a bearing to it from a second pont (B) far enough away from the original point to change the bearing at least 20 degrees and took a bearing from that point (B). Observers recorded both bearings and the distance between points A and B. Observers also recorded the number of passing aircraft and highway vehicles. We ran evening transects starting ½-hour after local sunset and morning transects ended no later than ½-hour before sunrise.

Survey of ponds and lakes – We surveyed ponds and lakes across the state, mostly below 7500' elevation, to assay suitability of those sites for colonially-nesting water birds. We also recorded the presence of the following species: Pied-billed Grebes, Least and American bitterns, Green Herons, Yellow-crowned Night-Herons, Black Rails, Virginia Rails, Soras, Willets, and Franklin's Gulls. We determined the amount of open water present and the amount and species makeup of emergent vegetation. Evaluations used the following scale:

1 = Unsuitable; no emergent vegetation; fluctuating water levels
2 = Unlikely; little emergent vegetation; waterbirds seldom or never present
3 = Possible; some appropriate habitat, but no history of nesting; small numbers of non-colonial waterbirds (Pied-billed Grebes, Virginia Rails, Sora) may nest
4 = Minor site; intermittent site or recent site for small colonies
5 = Major site for colonially-nesting waterbirds and/or shorebirds

Other focused species surveys

Green Heron–We obtained data on year 2000 locations for this species from *North American Birds* regional editors and other contacts. We also surveyed sites of confirmed breeding as reported in Kingery (1998) and counted individuals detected through the survey of lakes and ponds.

Osprey–Volunteers and staff visited a majority of known breeding sites.

Willet–*MCB* conducted a census of all breeding sites located during the 1998 field season. Sites included Arapaho NWR, Hebron Waterfowl Area, Walden Reservoir, Lake John, Delaney Buttes, Cowdrey Reservoir, and Fruitgrowers Reservoir.

Black Swift–USFS personnel, RMBO staff, and volunteers conducted a census of all known and many suspected breeding sites.

Black Phoebe–We conducted a count of individuals on the San Miguel River between Piñon and the confluence of the San Miguel and Dolores rivers. We also recorded incidental observations at other locations

Scissor-tailed Flycatcher– We obtained data on year 2000 locations for this species from *North American Birds* regional editors and other contacts.

Bell's Vireo–Field workers counted all individuals at historical breeding areas along the South Platte River and in Yuma County.

Purple Martin–We visited as many sites with a history of occurrence by this species as possible and counted birds present.

Bobolink–We collected data from existing studies in Boulder County and the Yampa River Valley in Moffat and Routt counties, and also obtained incidental records from field work.

Scott's Oriole– We visited all known breeding sites and determined occupancy of each.

Results

Transects – We conducted 311 transects in 14 habitats (average of 22.2 per habitat; Table 1). We were hampered greatly by a shortage of field workers, due mostly to not being able to hire until April. Additionally, we added an additional habitat (Lodgepole Pine) to the 13 in which we worked in 1999, thus spreading the available help even more thinly. Finally, three field workers suffered season-ending injuries in late June that erased all possibilities of completing the late-season habitats.
We obtained data on 213 breeding-bird species via the transect program, and provide summary data in Appendix A for 166 of those. Appendix A lists data from all habitat-target species and a somewhat subjective sample of other species. Additionally, we provide the results of analysis for habitat target species within the target habitats in Table 2.

Nocturnal Transects. The transects conducted on the eastern plains produced very little data and were difficult to complete due to high winds during the spring. The montane transects produced some data on montane owls, but not enough for tracking trends in these populations. The results suggest that a fuller set of montane transects may produce adequate data to track the montane nocturnal birds. They further suggest that observer estimates of distance to spontaneously-calling owls may be accurate enough to make them useful in distance sampling. This pilot program will be modified for next year to include more transects in the montane regions of the state. Transects on the plains will be discontinued. We report here no data; we will conduct a full-scale effort in 2001.

Waterbirds. We visited and censussed a substantial number of historic sites (Appendix B) and added a number of new sites to the database; we summarize those data in Table 3. Individuals requiring specific site data should contact the authors.

Lakes survey. We surveyed and evaluated 251 lakes and ponds. Numbers of sites receiving each rating were: 1 -- 28; 2 -- 36; 3 -- 66; 4 -- 68; 5 -- 53. Because known sites were given a high priority for this field season, the ratings are skewed toward the top end. The vast majority of remaining sites have no history of nesting by colonial waterbirds, and very few are likely to be rated at 3 or higher. Individuals requiring specific site data should contact the authors.

Surveys of other localized species. We counted individuals of a number of limited-distribution and/or peripheral species (Table 3). Individuals requiring specific site data should contact the authors.

Discussion

As in 1999, we experienced some frustration with finding appropriate tracts in which to place transects due to the numerous errors in habitat identification in the Colorado GAP data set (the GIS information that we used to randomly-select transect locations). However, this problem was greatly reduced over that in 1999 and it should decrease further in the near future as we get all transects established.

Again in 2000, as in 1999, we were unable to obtain the services of enough qualified field workers to conduct all the work required. This was due to having to wait until contracts were in place before hiring, which didn't happen until late April, thus we lost a few of the qualified applicants to other positions before we were able to complete the hiring process. Because *MCB* is personnel-intensive, it is imperative that we be able to conduct hiring in January and February before a large number of qualified applicants have already signed on to other projects.
In general, despite an incomplete sample of transects in most habitats, sample sizes for many bird species were quite good. Even some low-density species were detected in reasonable numbers (e.g., Red-tailed Hawks on 36 transects with a total of 43 individuals). Some high-density species were detected in very large numbers (e.g., 1380 Dark-eyed Juncos on 133 transects in nine habitats). The fact that we obtained robust data despite completing only one habitat's transects (Piñon-Juniper) provides a large dose of optimism for the program.

Species that are considered well-sampled via transects are those with coefficients of variation of the density estimate (%CV in Table 2 and Appendix A; hereafter CV) of less than 50%, with two or fewer parameters (m) included in the detection-curve function, and with the two sources of variation (detection probability and sample size) reasonably balanced (~1:2 to ~2:1; thus with the percent of variation due to sample size (%var(n)) falling between 33.3 and 66.7). Species with CVs of >50% will simply require a longer period in which to detect trends with statistical significance. Thus, species with CVs between 50% and 100% will require us to conduct the transects for more than 12 years to detect population trends, but will still take less than 25 years.

We obtained CVs of ≤50% for 82 habitat target species and CVs between 50% and 100% for an additional 23 habitat target species (see Leukering et al. 2000 and Table 2). However, there were many instances when we obtained lower CVs and/or higher sample sizes for particular species in habitats in which we did not designate them as targets. The best example of this from the 2000 data would be White-crowned Sparrow in Alpine Tundra. We designated the species as a target in High-elevation Riparian (Leukering et al. 2000), yet obtained our lowest CV of all habitat-species interactions from White-crowned Sparrow in Alpine Tundra: 6.0% (Appendix A). After we get another couple years' data, we will re-analyze habitat designations using the densities we generate with *DISTANCE* from our transect data.

As all partners and funders are interested in management implications of the *MCB* data, we here provide brief synopses of 2000 results for those species deemed of most concern and/or interest in Colorado. Various bird species are listed by different agencies as being of concern, with some overlap among lists. Lists include the state list (CO ETSC)(CDOW 2001) and the USFS Region 2 List of Sensitive Species (FS-SS) (U.S.D.A. Forest Service 1994). These lists are intended to focus attention on potential effects of various management regimes on these species. Those species so listed are indicated below. However, there are a few species so listed that we do not treat as we obtained little or no data on them. These are Greater Prairie-Chicken, Lesser Prairie-Chicken, Sharp-tailed Grouse, Sandhill Crane, Flammulated Owl, and Boreal Owl. Since all federally-listed species (Bald Eagle, Piping Plover, Snowy Plover, Least Tern, and Spotted Owl) are monitored by

the U.S. Fish & Wildlife Service and by the state, we do not expend any effort monitoring them and also do not treat them here.

Pied-billed Grebe – No monitoring was planned for 2000, but field workers reported presence at 38 sites. These reports add to the developing database of potential nesting sites.

Eared Grebe – *MCB* staff surveyed 60 of 65 historical sites, including all major sites. Although the number of adults that we counted was very similar to the 1998 count (Giroir and Leukering 1999), the nest count was much lower. Production was down significantly at Walden Reservoir, which had much lower water levels than in 1999, and at La Jara Reservoir, which had been drained for dam repairs.

Western Grebe – We surveyed 41 sites, including all but one of those surveyed in 1998 (Giroir and Leukering 1999). Numbers for 2000 were very similar to the 1998 numbers.

Clark's Grebe – We surveyed 28 sites, including all but one of those surveyed in 1998 (Giroir and Leukering 1999), and 2000 numbers were very similar to the 1998 numbers.

American White Pelican (CO ETSC) – RMBO field workers censussed two of three historical nesting sites and counted adults and juvenile birds at McFarlane Reservoir; nesting also occurred at Riverside Reservoir, though we received no word as to numbers. Nesting attempts failed at Antero Reservoir, apparently due to excessive disturbance by recreationists. We notified the local Division of Wildlife office of this situation and that office will be taking steps to reduce disturbance in 2001.

Double-crested Cormorant – We visited 22 sites and found 11 active. The Antero Reservoir colony apparently failed due to excessive disturbance.

American Bittern (FS-SS). Although we did not attempt a state-wide survey of this species in 2000, we began compiling known nesting sites for surveying in the future. We conducted some preliminary counts incidental to visiting these sites for other species and gathered count data from agencies. The database contains 27 sites, and we conducted counts at nine, tallying 58 birds. We are cataloguing sites and devising protocols for counting this species.

Great Blue Heron – We surveyed 136 of 144 sites in the database. The unvisited sites include several that have not been active in the past few years. Empire Reservoir is the only site that we did not visit that had much likelihood of having more than ten nests. Of those visited, 64 sites had at least one active nest, and these sites contained a total of 1240 active nests. In surveys conducted in 1981-1983, Miller and Graul (1987) found 55 sites that were active for at least one of the three years. The sum-of-highest counts for these sites was 1439 nests, and the seven largest colonies accounted for more than 50% of the population. For the two years 1999-2000, we noted 77 sites to be active for at least one of the two years. The sum-of-highest counts for these sites was 1481 nests, and the nine largest colonies accounted for more than 50% of the population. Only the Chatfield colony was among the largest colonies in both time periods.

Great Egret – A cooperator surveyed the only previously-known active colony in the state and counted 19 active nests, the highest count yet at this site. One pair nested at a new location, and a volunteer observed another pair (not observed to be nesting) at another new location.

Snowy Egret – We found nests and/or juveniles at six sites and counted 509 adults at 18 of 19 historical and/or potential sites surveyed. Because several counts were conducted too late in the season, we are not satisfied that this year's counts will provide a solid index for tracking this species.

Little Blue Heron – RMBO field staff observed two adults and a second-year bird at Barr Lake. There is a reasonable chance that this species nests here and could explain juveniles present at Lochbuie (four miles from Barr Lake) each of the past two years in early August.

Cattle Egret – We counted 41 adult Egrets at eight sites (of nine in our database) and nests and/or juveniles at four. Because several counts were conducted too late in the season, we are not satisfied that this year's counts will provide a solid index for tracking this species.

Green Heron – We counted a total of 14 Green Herons at nine sites during the nesting season in Colorado. A RMBO field worker found a pair tending a nest in Yuma County and a volunteer reported a nest in Fort Collins. A juvenile bird was seen in Grand Junction where adults had been seen throughout the summer.

Black-crowned Night-Heron – We surveyed 28 of 37 historical and potential sites in the database and counted nests and/or juveniles at 18. Observers counted 406 adults, but we are not satisfied that these counts will provide an accurate index for tracking this species; we will conduct more intensive work on this species in 2001.

White-faced Ibis (FS-SS) – *MCB* staff and U.S. Fish & Wildlife Service employees visited 15 of 17 historical and potential sites and found nests and/or juveniles at four. The two sites not visited both have histories of small, sporadic, nesting populations (<25 nests). Despite the fact that 2000 was a very poor water year and several historic sites in the San Luis Valley were dry, observers counted 3438 adults at the nesting sites, by far the largest one-year total recorded in Colorado. Because the counts were conducted with significantly-different protocols, we are not satisfied that these counts will provide an accurate index for tracking this species. *MCB* and biologists from concerned agencies are cooperating to develop standardized protocols for 2001.

Osprey (FS-SS). Agency biologists, volunteers, and *MCB* field workers surveyed 56 sites with recent nesting history and located 42 active nests. We will attempt to attain full coverage in 2001.

Northern Goshawk (FS-SS). We recorded five individuals of this species on three transects in three habitats (Aspen, Lodgepole Pine, and Montane Shrubland). In 1999, we recorded the same number of Goshawks, but in different habitats. The spread of habitats in which we've recorded the species over the past two years points out the habitat-generalist nature of the species and the low density in which it occupies mountainous Colorado. We developed a CV of 54.3% by analyzing the perpendicular distance estimates on all point transects, however, these results are suspect due to very low sample size. We suggest that existing programs to monitor this species, particularly on USFS lands, continue and that additional and more thorough attempts to monitor the species statewide be made. We plan to gather data from all USFS districts in the future as one way to accomplish this.

Ferruginous Hawk (FS-SS; CO ETSC). We counted only two Ferruginous Hawks on two Grassland transects. In 2001, the Prairie Partners program at RMBO will be conducting a statewide survey for this species (focusing on finding active nests). In order to obtain better data on low-density grassland species in the future, we will be conducting special, early-season transects in 2001; so we should have much better data on this species in 2001, particularly from the eastern plains.

Snowy Plover (FS-SS). Although *MCB* did not plan any effort for this species in 2000, we incidentally gathered information on birds in the San Luis Valley; volunteers counted 26 birds at Blanca Wetlands. We did not find others in the San Luis Valley and did

not survey the southeast Colorado population. In cooperation with Prairie Partners Registry (*PPR*), we will begin to compile information on southeast playa lake sites in 2001.

Mountain Plover (Candidate-ESA; CO ETSC) We counted only four on Grassland transects in 2000. The special, early-season transects in eastern Colorado should result in much better data on this species in 2001. In addition, the *PPR* program at RMBO will be conducting a section-based survey of eastern plains grasslands in 2001 that should also obtain much better data on these species.

Willet – *MCB* staff surveyed all major historical locations in North Park and counted 83 birds (vs. 77 in 1999, 112 in 1998 (Giroir 1999). We also recorded small numbers of Willets at Fruitgrowers Reservoir, Delta Co. (2), and at Yampa River wetlands in Moffat and Routt cos. (2).

Upland Sandpiper (FS-SS). We counted 12 on two Grassland transects. The data produced a solid model with a CV of 52.0%, balanced sources of variance, and only two parameters involved. However, the low sample size is still of concern. Though we will be conducting special transects in 2001 for low-density grassland species, the vagaries of transect selection has produced only 3-5 transects running through Colorado's Upland Sandpiper breeding range. However, the Prairie Partners section-based efforts that will be instigated in 2001 have promise in monitoring this species.

Long-billed Curlew (FS-SS; CO ETSC). We recorded only two individuals on Grassland transects. As for Mountain Plover, the early-season transects in eastern Colorado should result in much better data on this species in 2001.

California Gull – RMBO field workers and volunteers visited seven of eight historical or potential sites and found three active, including a new site at Strauss Cabin Lake in Fort Collins. The colony at Antero Reservoir failed, probably due to excessive disturbance from recreationists. We did not survey Riverside Reservoir and none of the intermittent sites were active.

Franklin's Gull – In 1999 while surveying for Forster's Terns at Walden Reservoir, we documented the first breeding of this species in Colorado (Levad 2000). This remains the only documented colony, and the count grew exponentially from five adults in 1999 to 84 in 2000. Field workers also observed juvenile Franklin's Gulls at Island Lake in Russell Lakes SWA in late July, but the birds were fully capable of flight and conceivably could have been migrants. We intend to visit this site earlier in the season in 2001 to determine if nesting is taking place there.

Forster's Tern – We confirmed nesting at Walden Reservoir and at Lake John Annex, with 62 adults present at these sites. No nesting occurred in the San Luis Valley, probably due to the severe drought in that area, as many of the traditional nesting sites were completely dry.

Black Tern (FS-SS). For a second consecutive year, despite widespread efforts to locate pairs of this marsh-dependent species, we could confirm no nesting in the state and counted only 18 adults at six sites. In the first half of the 20th century, significant colonies of these terns nested in North Park, San Luis Valley, and the marshes of the South Platte and Arkansas rivers. This species is now on the verge of extirpation as a breeder in the state and requires **immediate attention** (cf. Kingery 1998 for data from the Breeding Bird Atlas period).

Yellow-billed Cuckoo - (FS-SS). *MCB* staff detected only three on three Low-elevation Riparian transects. However, since we conducted none of the transects on the South Platte River, which supports a significant percentage of Cuckoo habitat in the state, we believe that future years' data will be more robust. Additionally, the U.S. Fish & Wildlife

Service is conducting a status review for the western subspecies of Yellow-billed Cuckoo. This form occurs on the West Slope in Low-elevation Riparian and is nearing extirpation from that area (RMBO data, Kingery 1998, C. Dexter pers. comm.). We will be conducting extensive searches for Yellow-billed Cuckoos in appropriate western Colorado habitat in 2001, but similar work in 1998 failed to discover more than one pair of birds (C. Dexter pers. comm.).

Burrowing Owl (CO T&E; FS-SS). Unlike the 29 individuals we detected on Grassland transects in 1999, we found only one on Grassland transects in 2000. However, we conducted only 17 transects in the habitat in 2000, greatly reducing our chances of recording the species. In 2001, we will be coordinating with Prairie Partners to conduct a sampling scheme on prairie-dog towns, so should be able to report much better data next year. In addition, the early-season transects should provide data as should the Prairie Partners section-based efforts.

Black Swift (FS-SS). RMBO staff and volunteers visited 111 waterfalls this season, searching for evidence of nesting. They located 35 active nests and counted 92 adults at 26 active sites. Of the 47 sites with confirmed nesting by this species, *MCB* field workers discovered six this season. We have detected the species at an additional nine sites at which we have not confirmed nesting.

Lewis's Woodpecker (FS-SS). We detected only four individuals on a single High-elevation Riparian transect; none in either Ponderosa Pine or Low-elevation Riparian (the two primary habitats of this species in the state). This species occurs very locally in Ponderosa Pine forests, apparently requiring the more open structure of fire-created stands (Johnsgard 1986); a condition that is presently quite rare in Colorado. Transect selection apparently produced no Low-elevation Riparian transects in Lewis's-occupied areas on the Arkansas River. In 2001, we plan to begin recording all locations that field staff and volunteers find this species. Then, we will import all Breeding Bird Atlas locations and, in 2002, select some percentage of those locations for focused effort in that field season. Thus, we have just moved this species from transect-based efforts to special monitoring effort.

Three-toed Woodpecker (FS-SS). We detected 14 individuals, singles on each of two Lodgepole Pine transects, six on four Mixed-Conifer transects, and six on three Spruce-Fir transects. By combining all point transects across the state, we obtained very good results for this species – a CV of 43.6%, reasonably-balanced variance sources, and only one parameter included in the model. In the future, we are optimistic about USFS-funded possibilities to conduct state-wide transects in recently-burned areas, specifically targeted at Three-toeds and the following species.

Olive-sided Flycatcher (FS-SS). We counted 68 individuals on 50 transects in nine habitats. The perpendicular distance estimates from the point transects produced the best results of all analyses that we ran on this habitat-generalist, structure-specialist species. However, data from High-elevation Riparian, Ponderosa Pine, and Spruce-Fir all produced superb results. The data from the remaining forest habitats produced solid results. The two birds detected on Piñon-Juniper transects, which are run early in the season at about the time this species first arrives in the state, were probably migrants; the species is not known to breed in that habitat. Unlike the two previous seasons, we recorded highest densities of Olive-sideds in High-elevation Riparian in 2000. In previous years, our effort in that habitat was non-existent (1998; Leukering and Carter 1999) or sub-par (1999; Leukering and Levad 2000).

Willow Flycatcher (FS-SS). We did not record this species in the regular transects that we conducted in 2000. However, on the two pilot Mid-elevation Riparian transects (a

non-funded habitat) that we ran, we counted 14. We anticipate that the running of Mid-elevation Riparian transects would produce solid data on Willow Flycatcher (which would be a Mid-elevation Riparian target). We detected no individuals of the Southwestern race (*extimus*)(CO ETSC) on Low-elevation Riparian transects (typical habitat of this form), due both to the low incidence of occurrence of any Willow Flycatchers in this habitat in western Colorado and to the vagaries of random transect selection.

Black Phoebe – Surveys extended the known range on the San Miguel River several miles above and below what had been documented in previous years. The upper extent of this population reaches ~5 miles above Naturita (about three miles further than previously known). The lower extent reaches to the confluence with Roc Creek (about 7 miles further than previously known). We located 28 birds at 21 sites along the San Miguel and found a pair on the Dolores River at Slick Rock nearly 20 miles from the San Miguel. The territory on the Colorado River in Garfield County was occupied for the third consecutive year and field workers found one pair and another single bird (apparently mated with an Eastern Phoebe) on the St. Charles River in Pueblo County (Leukering and Wood 2001).

Bell's Vireo – In addition to the known populations along the South Platte River drainage and those along the South Fork of the Republican River and Arikaree rivers, *MCB* documented birds in Wray and elsewhere along the North Fork of the Republican River. Twenty nine singing male Bell's Vireos were located in a small area along Black Wolf Creek (*Yuma*). In most cases birds were found in areas of planted wild plum.

Loggerhead Shrike (FS-SS). We counted 24 Shrikes on 16 point transects in four habitats, with the majority being in Semi-desert Shrubland (18 birds on 11 transects). We also recorded one Shrike on a Low-elevation Riparian transect. Despite this fairly-low sample size, the analysis proved robust, with the coefficient of variation being lower than 50% (at 33.9%) and the two sources of variance being not quite balanced. Once we increase the number of transects in Semi-desert Shrubland (this habitat on the West Slope of Colorado is very different from the same habitat on the east side of the state), either through increasing the number or through separating the habitat into component east-side and west-side habitats, we anticipate that sample size of this species will increase. In 2001, we will be initiating special-effort transects focusing on grassland-dependent species which should increase our sample size for Shrikes. Interestingly, this species is apparently well-sampled on the eastern plains by the Breeding Bird Survey but not by our Grassland transects. This dichotomy is of concern and some attention should be focused on this species there.

Purple Martin (FS-SS). We visited 66 sites with a history of nesting by this species and found nesting activity at 40 of those and counted a total of 180 adults (60 were adult males).

Pygmy Nuthatch (FS-SS). For the second year in a row, the *MCB* field season produced solid data on this species. We counted 86 individuals on 20 Ponderosa Pine transects. This resulted in a very low CV. However, the sources of variance were not evenly balanced, thus suggesting some caution in interpreting the results. This likely is a result of one transect recording 23% of the total individuals. Should we continue to get results such as this, we will be able to obtain trend detection in <12 years.

Golden-crowned Kinglet (FS-SS). We recorded a total of 139 individuals on 38 transects in six habitats, with Spruce-Fir transects providing over half of the detections (the majority of the remaining detections were in High-elevation Riparian). Interestingly, in 1999, the habitat with the second highest detection for this species was Mixed Conifer. The addition of High-elevation Riparian transects, which primarily go through Spruce-Fir, will undoubtedly allow us to monitor this species. The data obtained in Spruce-Fir was quite

robust with only one parameter involved in the detection-curve function. The data suggest that Spruce-Fir transects alone will be able to effectively monitor the species in a fairly short time period (<12 years).

Ovenbird – We received reports of six singing males observed at three sites, including one along the Yampa River in Routt County. However, we did not receive any reports from Rye Mountain Park, which supports the densest breeding population in the state. Additionally, we suspect that this species is scattered up and down the Front Range in appropriate habitat (Gambel's Oak under Ponderosa Pine with a ground cover of ferns) and intend a more concerted effort on the species in 2001.

Grasshopper Sparrow (FS-SS). We detected 230 individual Grasshopper Sparrows on 17 transects in three habitats, including 183 birds on Grassland transects. The coefficient of variation was very low (18.3%) and it took only two parameters to fit the data to the detection-curve function. The sources of variation were only slightly further apart than we would like, suggesting that the data should be viewed with some caution. Despite this, the data suggest that this species' Colorado population can be effectively monitored by *MCB* in <12 years.

Fox Sparrow (FS-SS). As in 1999, the data that we obtained on Fox Sparrow in 2000 were surprisingly robust. We counted 40 birds in six habitats, with High-elevation Riparian accounting for 27 individuals on seven transects. The coefficient of variation was very low (28.5%), only one parameter was used, and the sources of variation were nearly equal. Thus, as predicted in the 1999 report (Leukering and Levad 2000), the separation of High-elevation (in 1999 this included all riparian areas greater than 5,500 ft. in elevation) into two habitat types, Mid-elevation Riparian (not prime Fox Sparrow habitat-5500-8500 ft. in elev.) and High-elevation Riparian (prime Fox Sparrow habitat-8500 ft. and higher) allowed us to obtain robust data allowing for trend-detection in this species in <12 years.

Bobolink – RMBO field staff and volunteers surveyed 41 of 51 sites in the database and counted 281 adults, 221 of those singing males. Coverage was nearly complete in the Yampa River and White River drainages, Boulder Open Space, and Castlewood SP populations. We received no reports of the species in the Gunnison Basin nor along the South Platte River.

Scott's Oriole – We surveyed all 18 sites of confirmed historical nesting and tallied ten adult males defending territories.

This year, in addition to various species of management concern, we wish to discuss a small number of species that are either habitat specialists (or mostly so) or forest generalists.

Habitat specialists are often more susceptible to management practices and stochastic events due to their reliance on one or a small number of habitats. Thus, it is particularly important to monitor these species' populations. We have selected a small number of species from all habitats to discuss in this vein.

Alpine Tundra: This habitat is the most inaccessible of all habitats in this program, mostly due to roadless conditions, and is the last habitat for which transects are run in the field season. As we cannot run transects in the habitat until the end of the season and since the beginning of the Alpine Tundra transect period overlaps that of a few montane forest habitats, Alpine Tundra transects tend to get short shrift when workers decide which transect to run on a given day in that overlap period. Regardless, we have firmly established 18 transects broadly scattered throughout the state. Sample sizes for tundra-specific species

have not been hampered by the low number of transects, except possibly for low-density species like White-tailed Ptarmigan and Brown-capped Rosy-Finch, for which we will likely not attain a statistically-robust sample.

American Pipit - We detected 474 on 18 transects. Originally, the data analysis resulted in four parameters needed to fit the data to a detection-curve function. Truncation of the highest 10% of distances (n=46), which are typically long-distance outliers, resulted in a better model. The CV was very low for this species (10.9%) and the sources of variation well-balanced. Thus, this species is well-monitored in Alpine Tundra and trend detection should take fewer than 10 years.

Brown-capped Rosy-Finch - We detected 26 individuals in Alpine Tundra and nowhere else. The CV was high (65.7%), although still below our 100% threshold for monitoring. Of concern is the unbalanced of sources of variance. This species nests on inaccessible, rocky cliffs which, obviously, our transects do not traverse; thus, allowing only for incidental observations of birds away from their primary nesting locations. For this reason, and because this species is a near Colorado endemic, we have developed a protocol for estimating population size through intensive banding at feeders during the winter (Leukering et al. 2000).

Aspen: A number of transects include points in recent clear cuts, and the transects traverse stands of a wide range of age-classes and seral stages. Aspen is seldom a climax vegetation, and many transects contain significant incursions of spruce-fir and other conifers. As a result, these transects provide detections of a number of species generally associated with conifers. These transects should do a good job of tracking changes due to manipulation–especially clear cut logging–and natural succession.

Red-naped Sapsucker - In Aspen, we detected 22 Red-napeds on nine transects. Analysis resulted in a rather high CV and unbalanced sources of variation with three parameters, but when truncated the data yield a respectable CV with balanced sources of variation. In all habitats, we had 114 detection of this species, one of the low-density species recorded on intervals between points as well as at points. Small patches of Aspen typically lie along the edges of streams flowing through coniferous forests, so this species appeared regularly on transects through these habitats. Red-napeds primary excavate cavities in aspens, but they forage heavily in willow carrs; thus, its highest concentrations are in Aspen close to riparian zones, and we can expect a significant increase in detections when we add Mid-elevation Riparian transects to the program.

Grassland: This habitat, which we have limited to that on the eastern plains of Colorado, is primarily in private ownership. Colorado contains a large portion of the shortgrass prairie region and many species reach high densities in Colorado. Colorado shortgrass prairie is also important for low-density species (Loggerhead Shrike and Long-billed Curlew), those which initiate nesting prior to us conducting transects (Mountain Plover), and colonial species (Burrowing Owl) which point transects do not obtain sufficient sample sizes to monitor. RMBO's Prairie Partners program is implementing shortgrass target-species transects in 2001 that should provide modest sample sizes for species not covered by point transects.

Cassin's Sparrow - In Grassland, we detected 181 individuals on 12 transects. We also detected this species in good numbers in Semi-desert Shrubland (110 individuals on eight transects) and in lesser numbers in Sage Shrubland (30 individuals on two transects), with detections only on eastern plains transects. Results from all three habitats were robust.

Cassin's Sparrow prefers open grassland with an admixture of shrubs, achieving its highest density in Grassland. It is less common in Semi-desert Shrubland which tends to have shrubs, but little grass tall enough for this species, and least abundant in Sage Shrubland in Colorado, as most of that habitat occurs outside of the Cassin's Sparrow breeding range. In the future, separation of either of the two shrub habitats into east-west components and the concomitant increase in number of transects on the eastern plains would increase sample size for Cassin's and other mainly-eastern species (e.g., Lark Bunting) in these habitats. The Grassland data suggest that *MCB* will enable trend detection in <12 years.

High-elevation Riparian: The 2000 field season was the first year that transects were run in truly high-elevation riparian stretches. In 1999, we considered High-elevation Riparian as any riparian habitat above 5,500 ft. elevation, which encompassed mid-elevation riparian areas that have a noticeably different avian composition from that at higher elevation. This re-definition allowed for larger sample sizes for species that primarily occur above 8,500 ft. (Wilson's Warbler, Lincoln's Sparrow, and White-crowned Sparrow), but reduced sample sizes, some drastically, for Mid-elevation Riparian species (Willow Flycatcher and Veery). High-elevation Riparian transects typically run through coniferous forests, thus incidentally increasing sample sizes for some forest bird species.

Wilson's Warbler - In 2000, we recorded 112 individuals on 35 transects in six habitats. High-elevation Riparian accounted for 73 of these detections (on 16 transects) and Alpine Tundra for 13 (on seven transects). The occurrence of this species on transects in other habitats is probably due to counting migrants on early-season, low-elevation transects and to transects traversing a High-elevation Riparian corridor. In High-elevation Riparian, the results are quite good and suggest that we will be able to detect a trend in less than 12 years.

Lincoln's Sparrow - We detected 555 individuals in eight habitats on 67 transects, with the vast majority detected in two habitats, High-elevation Riparian (222 individuals on 20 transects) and Aspen (199 individuals on 19 transects). Both habitats provided superb data on this species, however four or more parameters were needed to fit the data to detection-curve functions. After truncation, the data from both habitats provided very robust results.

Lodgepole Pine: This is a new habitat for the program in 2000. We expected very little in the way of species diversity or abundance in this habitat, except for Red Crossbill, of which one type is a Lodgepole Pine specialist (see that discussion, below). The data told us otherwise. Mountain Chickadee, Ruby-crowned Kinglet, Yellow-rumped Warbler, and Dark-eyed Junco, although abundant in other montane forest habitats, had large sample sizes in LP. This habitat is centered in the north-central part of the state west of Fort Collins and most of our transects are in this area.

Red Crossbill - We detected 104 individuals in seven habitats. Lodgepole Pine transects accounted for 24 individuals on six transects and provided the best data for monitoring this species. Other habitats that our data suggest are important to this species are Spruce-Fir, Mixed Conifer, and, to a lesser extent, Ponderosa Pine. We repeat last year's caution that two "types" of Red Crossbill breed regularly in Colorado, and these two forms act much like separate species. One is typical of high-elevation conifer forests (particularly Lodgepole Pine) and one specializes on Ponderosa Pine. It will be necessary for field workers to learn to differentiate these two forms in order to more accurately determine the trends of the two forms. William Maynard (pers. comm.) reported that there were essentially

no Red Crossbills in southeastern Colorado Ponderosa Pine forests in 2000, which may help to explain the low number of transects on which we recorded the species in that habitat. However, Panjabi noted large numbers of adults and juveniles in southwestern Colorado Ponderosa Pine forests in June. This juxtaposition of varying abundances illustrates one of the problems inherent in attempting to monitor highly-mobile and nomadic species such as Red Crossbill.

Low-elevation Riparian: This habitat is one of the more difficult in which to conduct transects. The transects require two personnel, are run mostly through private property, have high diversity and density of bird species, and are dependent on appropriate water levels to allow floating a canoe or raft. Thus, drought years, such as 2000, pose a problem. Additionally, we have various sampling and analysis concerns in this habitat that we will be investigating in 2001. Paramount of these concerns is the linear nature of the habitat and its effect on analysis (as it is for all riparian habitats).

Bank Swallow - *MCB* recorded this species primarily on Low-elevation Riparian transects, with 24 individuals on five transects. Although only one parameter was needed to fit the detection-curve function and the data produced a modest CV (65.2%), the sources of variance were strongly unbalanced. The high percentage of variance due to sample size is due to this species' colonial nature, as we recorded 87.5% of the birds on only two transects. We believe that line transects are not adequate to monitor this species and that we will probably have to conduct a focused effort.

Montane Shrubland: This habitat is found throughout the state in the foothills and lower montane elevations and, in most areas, is dominated by Gambel's oak. The two species represented below can be found anywhere that this habitat occurs, though the fact that Virginia's Warbler breeding range (Andrews and Righter 1992, Kingery 1998) coincides fairly strongly with the range of Gambel's oak (Kelly 1970) in Colorado might suggest that it may be more of an oak obligate. This habitat is the toughest in which to establish transects due to the high density in which oak tends to grow. Therefore, many transects are located on trails or roads.

Dusky Flycatcher - We detected 422 individuals in eight habitats. A significant portion of these was found in Montane Shrubland (166 individuals on 23 transects) and that habitat provided very solid results for obtaining trend data for this species in <12 years. Dusky Flycatchers occurs in other habitats where the species' structure requirements are met: open canopy and a strong understory layer.

Virginia's Warbler - We detected 248 individuals in six habitats with the largest portion observed in Montane Shrubland (81 individuals on 21 transects). Virginia's Warblers have a strong affinity for Gambel's Oak whether it is under a canopy or not, thus explaining its strong representation in Ponderosa Pine (which often has an oak understory).

Piñon-Juniper: Like Sage Shrubland, this habitat has two geographically-different avian components. The western portion contains most of the habitat obligates, e.g., Gray Flycatcher, Gray Vireo, and Black-throated Gray Warbler. The eastern portion contains relatively fewer individuals of these species, but includes one species found in West-Slope Piñon-Juniper only in the southwest: Cassin's Kingbird. West-Slope Piñon-Juniper begins to peter out north of Grand Junction, where it starts to become more juniper-dominated, eventually appearing only on hills in seas of Sage Shrubland in the northwest corner of the state. On the East Slope, Piñon-Juniper is rare north of Colorado Springs, with the largest

portion along the New Mexico border and north to Pueblo, mostly on private and Department of Defense lands. We are considering splitting this habitat into two in the future and allocating 30 transects in the eastern range (where we currently have none).

Gray Flycatcher - We detected 150 individuals on 26 transects in three habitats, with 142 on 23 Piñon-Juniper transects. DISTANCE required four parameters to fit the data to a detection-curve function, so we truncated the data set and reran the analysis. Truncation resulted in the sources of variance becoming unbalanced, though a more specific truncation could very well produce a robust model.

Gray Vireo - We detected three individuals on two transects. Although, the DISTANCE analysis provided a robust model, we feel that these results should be treated with extreme caution due to our extremely-low sample size. From RMBO's study of this species at the Colorado National Monument for a number of years, we believe that we understand the reason for such poor sample size on the transects in Piñon-Juniper, which is the only habitat in which Gray Vireos occur in Colorado. The species prefers particular aspects of that habitat that transect selection has mostly missed. We suggest that some focused effort will be required to monitor this species in Colorado.

Black-throated Gray Warbler - We detected 197 individuals on 32 transects in three habitats with the vast majority being in Piñon-Juniper (190 individuals on 28 transects). Truncation was necessary to produce a better model. However, this did not adversely affect the final results, which were quite robust.

Ponderosa Pine: Fire suppression in the past century may have significantly altered the structure of Ponderosa Pine stands in the state and consequently the relative abundance of a number of the bird species. Our transects should do a good job of tracking changes as efforts to manage stands with the goal of restoring them to a reasonable facsimile of historical conditions. Controlled burns have already been conducted on established transects.

Western Bluebird. Analysis of data for this species yielded a good CV at 36.3% even though we detected only 32 individuals on ten transects in Ponderosa Pine. The balance of variance was very slightly lower than what is preferred at 32.2% with two parameters involved in the function curve.

Grace's Warbler. Although we had a fairly-low detection rate, 29 individuals on six transects, for this Ponderosa Pine obligate, the CV was good and the sources of variance were balanced. If future results remain this robust, we will be able to obtain trend detection in <12 years.

Sage Shrubland: Data from this habitat may be affected by an avifauna that varies considerably between the big sagebrush transects of the Western Slope and the sand sagebrush transects on the eastern plains. Future years may require additional transects in one or both of these habitats in order to achieve adequate sample size for some species. Species makeup and population sizes also may be affected by large-scale changes that have occurred in this habitat; Piñon-Juniper has expanded into the pre-settlement range of sagebrush, bringing with it a new array of birds, and birds detected in smaller Sage Shrubland stands often reflect this incursion. It may be necessary to establish transects in larger stands to insure that we are detecting the proper array of species.

Brewer's Sparrow. This was the most frequently-detected species on Sage Shrubland transects, with 364 counted on 18 transects. The CV was a very low 7.3%; however, the sources of variance were not balanced, suggesting some caution in interpreting the results.

Brewer's Sparrow is relatively uncommon on the eastern plains transects, but separate analysis of the western transects (unpubl. analysis) does not significantly alter the results.

Sage Sparrow. We detected 46 individuals on six transects. Although the CV was quite good at 32.8%, the sources of variance were not balanced. This is probably because this species' peak song period occurs in April, considerably-earlier than the window in which transects are conducted. The results seem acceptable given this situation and additional focus on this species would be unlikely to justify the expense. Interestingly, analysis of 14 detections on five Semi-desert Shrubland transects produced a CV of 43.6% and a better balance of sources of variance.

Semi-desert Shrubland: This is another habitat for which there are major differences in the avian composition between east and west slopes. The east slope contains Scaled Quail, Curve-billed Thrasher, and Greater Roadrunner. The west slope completely lacks all three of these species. We should consider splitting this habitat into east and west slope types and establishing 30 transects in each.

Lark Sparrow - We detected 563 individuals in five habitats, with more than half observed on Semi-desert Shrubland transects (377 individuals on 20 transects). The reported CV is extremely low (8.0%), but the sources of variance were unbalanced. For this reason, the results should be viewed with some caution.

Spruce-Fir: This habitat shares virtually all of its species with other conifer forest types in Colorado. However, most species typical of Spruce-Fir achieve their highest densities in that habitat, though a few reach highest density in either Lodgepole Pine or Mixed Conifer.

Gray Jay - This is a high-elevation conifer specialist in the Rocky Mountains, generally being found above 8500' (Andrews and Righter 1992). The *MCB* project recorded Gray Jays in highest density in Spruce-Fir, with slightly lower numbers in Lodgepole Pine (the other major high-elevation coniferous habitat) and in very low density in Mixed Conifer (probably in areas with highest percentages of a Spruce or Fir component). However, the densities of this species reported here are suspect for two reasons. Gray Jays are exceedingly-early nesters, with successful breeders having nearly completed the breeding cycle and become very quiet. In addition, the species is very curious and usually investigates various disturbances. Thus, we believe that an unquantifiably high percentage of Gray Jays were attracted to the observers by the commotion caused by the observers moving across the landscape. This bias would obviously skew distance estimates to the short end, artificially-inflating densities. Whether these two seemingly-opposing biases would counteract each other is probably unknowable. However, there is a possibility that successful breeders with young in tow might also artificially increase sample size if observers unknowingly count juveniles (protocol requires not counting juveniles), thus both biases might act to inflate densities.

Wetlands: The two species discussed here illustrate the main problem with the Wetlands transects, the strong disparity in avifaunas in the two basic wetland types: meadows and tall emergent growth (e.g., cattail and bulrush) with open water. Because we currently consider these as one habitat, we have potential problems with obtaining sufficient sample size on most species. This may require us in the future to increase the number of transects that we conduct in Wetlands.

Savannah Sparrow - This species is an inhabitant of wet meadows, often without open water, and with only ankle-high vegetation. This wetland type is generally found at

middle elevations in Colorado, typically in the major parks, though where it occurs at other elevations, the Savannah Sparrow can usually be found. This species can achieve very high densities in appropriate habitat with this fact being responsible for the relatively-high density that we report in 2000, despite recording Savannahs on only five Wetlands transects.

Yellow-headed Blackbird - Yellow-heads prefer tall emergent vegetation, usually bulrushes, in relatively deep water and often with surrounding open water. Thus, this species is found on different transects than is Savannah Sparrow. Because this species is fairly colonial and individual pairs defend a small area in the immediate vicinity of the nest, it can be found in very dense concentrations. This is the reason for the very high density (1.26 birds/ha) reported on the Wetlands transects, despite being found on only ten transects.

Conifer forest generalists - The species discussed here are found in all conifer forests in Colorado in varying densities, though the reasons for such variance have been largely unstudied. All of these species are also recorded, often in large numbers, on Aspen transects. However, this seeming acceptance of Aspen is due mostly to the strong interdigitation of Aspen with all conifer forest types from Ponderosa Pine up to Spruce-Fir; these birds are undoubtedly utilizing the conifer aspects of these transects (with the possible exception of Hermit Thrush).

Hammond's Flycatcher - We counted 59 on 35 transects in eight habitats. As reported in 1998 (Leukering and Carter 1999), we had designated this a target species in Spruce-Fir. And, again in 2000 as in the previous year's of this program's operation, we detected more Hammond's Flycatchers in Aspen than in any other habitat. However, since this species is widely considered a Spruce-Fir inhabitant (e.g., Andrews and Righter 1992), we discuss it here. Hammond's Flycatcher is much more a structure specialist than a habitat specialist. We believe that the species has a preference for closed-canopy forests with little or no understory regardless of the vegetation community in which it breeds. This would explain why we have found it more commonly in Aspen as the cloning nature of that species produces such a habitat structure.

Steller's Jay - We counted 300 on 94 transects in nine habitats, from Piñon-Juniper up to Spruce-Fir. We have designated this bird a target in Mixed Conifer, but it truly is a conifer forest generalist. Our data produced densities of >0.04 individuals/ha in all six forested habitats and the species reached its highest abundance in Mixed Conifer (0.22/ha).

Mountain Chickadee - *MCB* staff detected 961 on 152 transects in ten habitats. Leukering et al. (2000) designated this species as a target of Spruce-Fir, though the transect data showed highest density in Mixed Conifer (with Spruce-Fir close behind). In 1999, Mountain Chickadee reached highest density in Spruce-Fir followed by Mixed Conifer. However, we believe that we did not run the DISTANCE analyses correctly that year which may have skewed the relative abundances and definitely provided outlandish densities, in many cases.

Ruby-crowned Kinglet - We tallied 614 individuals on 100 transects in nine habitats. The few birds that we recorded in Piñon-Juniper and Montane Shrubland were probably late migrants. This species is a target in Spruce-Fir and our data showed Ruby-crowns achieving their highest densities in that habitat, with lower, but similar, densities in Lodgepole Pine and Mixed Conifer.

Hermit Thrush - We counted 725 of these wonderful singers on 121 transects in nine habitats. More than most of the species presented here, Hermit Thrushes are accepting of some less-forested habitats and the individuals we detected in Piñon-Juniper and Montane

Shrubland could have been local breeders. We detected this species in highest density in Spruce-Fir, which is the habitat in which we assigned it as a target.

Yellow-rumped Warbler - *MCB* staff recorded 1018 birds on 127 transects in ten habitats. The individuals in Piñon-Juniper, Sage Shrubland, and Montane Shrubland were probably late migrants. This is a Mixed Conifer target species and we recorded highest density in Spruce-Fir, with the densities in Mixed Conifer and Lodgepole Pine being only slightly less. In future years, with additional habitat variables described at each point, we should be able to analyze abundances for varying canopy cover classes, thus possibly helping to explain the variation in abundance between habitats.

Dark-eyed Junco - This was the most common of the forest generalists, in fact of all species recorded by *MCB* transects. We counted 1380 on 133 transects in nine habitats. The species achieves highest density in Lodgepole Pine with an incredible 1.78 birds/ha (using the non-truncated data set). We believe that this high density is partly due to the species' overall abundance, but there are possibly some behavioral and ecological factors involved, too. Juncoes prefer closed canopy areas with little ground cover and they forage primarily on the ground. These conditions make it easy to detect non-singing, foraging birds, something that is not easy with shrub or canopy inhabitants. Thus, we believe that we detect a higher percentage of female Juncoes than we do for females of most other species in forested habitats.

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Table 1. Number of transects conducted in each habitat with totals of species and individuals detected (excluding flyovers) in *MCB* 2000 field season.

Habitat	# transects run	# species detected	# individuals
Alpine Tundra	20	36	1422
Aspen	24	72	3092
Grassland	18	52	2552
High-elevation Riparian	23	90	2719
Lodgepole Pine	17	58	1611
Low-elevation Riparian	21	84	1240
Mixed Conifer	17	79	2337
Montane Shrubland	25	97	3445
Piñon-Juniper	30	88	2813
Ponderosa Pine	25	78	3009
Sage Shrubland	21	77	2007
Semi-desert Shrubland	29	84	2621
Spruce-Fir	20	45	2045
Wetland	21	85	802
Totals (14 habitats)	311	213	31,715

Table 2. Habitat target species with coefficients of variation of less than 100% and with balanced sources of variance (see text). Habitat target species not in this table are those for which the results did not meet these criteria.

Species	Habitat	% CV	Species	Habitat	% CV
American Pipit	Alpine Tundra	9.9	Yellow-rumped Warbler	Mixed Conifer	20.7
Brown-capped Rosy-Finch	Alpine Tundra	49.7	Western Tanager	Mixed Conifer	10.3
Broad-tailed Hummingbird	Aspen	22.3	Dark-eyed Junco	Mixed Conifer	10.8
Red-naped Sapsucker	Aspen	59.5	Evening Grosbeak	Mixed Conifer	69.3
Olive-sided Flycatcher	Aspen	69.4	Dusky Flycatcher	Montane Shrubland	12.3
Western Wood-Pewee	Aspen	11.7	Western Scrub-Jay	Montane Shrubland	29.7
Hammond's Flycatcher	Aspen	40.0	Orange-crowned Warbler	Montane Shrubland	12.6
Warbling Vireo	Aspen	10.1	Virginia's Warbler	Montane Shrubland	14.8
Tree Swallow	Aspen	41.4	Green-tailed Towhee	Montane Shrubland	8.7
Violet-green Swallow	Aspen	18.5	Spotted Towhee	Montane Shrubland	7.4
Mountain Bluebird	Aspen	49.6	Lesser Goldfinch	Montane Shrubland	53.0
Swainson's Hawk	Grassland	61.1	Black-chinned Hummingbird	Piñon-Juniper	40.6
Upland Sandpiper	Grassland	51.9	Gray Flycatcher	Piñon-Juniper	10.7
Common Nighthawk	Grassland	46.5	Ash-throated Flycatcher	Piñon-Juniper	21.7
Cassin's Sparrow	Grassland	13.7	Plumbeous Vireo	Piñon-Juniper	24.6
Lark Bunting	Grassland	8.7	Pinyon Jay	Piñon-Juniper	23.2
Grasshopper Sparrow	Grassland	15.3	Juniper Titmouse	Piñon-Juniper	21.8
Western Meadowlark	Grassland	7.7	Bushtit	Piñon-Juniper	34.5
Cordilleran Flycatcher	High-elevation Riparian	25.1	Bewick's Wren	Piñon-Juniper	15.0
MacGillivray's Warbler	High-elevation Riparian	25.5	Blue-gray Gnatcatcher	Piñon-Juniper	13.3
Wilson's Warbler	High-elevation Riparian	18.4	Black-throated Gray Warbler	Piñon-Juniper	12.6
Fox Sparrow	High-elevation Riparian	28.5	Hairy Woodpecker	Ponderosa Pine	45.0
Lincoln's Sparrow	High-elevation Riparian	12.3	Pygmy Nuthatch	Ponderosa Pine	27.2
White-crowned Sparrow	High-elevation Riparian	15.6	Western Bluebird	Ponderosa Pine	36.3
Red Crossbill	Lodgepole Pine	41.7	Grace's Warbler	Ponderosa Pine	32.7
Wood Duck	Low-elevation Riparian	74.7	Chipping Sparrow	Ponderosa Pine	17.9
Mississippi Kite	Low-elevation Riparian	63.1	Sage Thrasher	Sage Shrubland	18.0
Yellow-billed Cuckoo	Low-elevation Riparian	73.0	Brewer's Sparrow	Sage Shrubland	7.3
Red-headed Woodpecker	Low-elevation Riparian	63.0	Vesper Sparrow	Sage Shrubland	22.0
Downy Woodpecker	Low-elevation Riparian	61.9	Sage Sparrow	Sage Shrubland	99.6
Northern Flicker	Low-elevation Riparian	36.3	Lark Sparrow	Semidesert Shrubland	8.0
Western Kingbird	Low-elevation Riparian	51.1	Black-throated Sparrow	Semidesert Shrubland	46.5
Eastern Kingbird	Low-elevation Riparian	40.7	Three-toed Woodpecker	Spruce-Fir	72.5
House Wren	Low-elevation Riparian	33.3	Gray Jay	Spruce-Fir	38.5
American Robin	Low-elevation Riparian	22.9	Clark's Nutcracker	Spruce-Fir	22.2
Gray Catbird	Low-elevation Riparian	85.0	Mountain Chickadee	Spruce-Fir	10.4
Brown Thrasher	Low-elevation Riparian	49.8	Red-breasted Nuthatch	Spruce-Fir	30.0
Yellow Warbler	Low-elevation Riparian	45.7	Golden-crowned Kinglet	Spruce-Fir	14.6
Yellow-breasted Chat	Low-elevation Riparian	31.3	Ruby-crowned Kinglet	Spruce-Fir	8.2
Song Sparrow	Low-elevation Riparian	45.3	Hermit Thrush	Spruce-Fir	9.7
Black-headed Grosbeak	Low-elevation Riparian	26.8	Pine Grosbeak	Spruce-Fir	28.5
Lazuli Bunting	Low-elevation Riparian	48.1	Cassin's Finch	Spruce-Fir	77.1
Common Grackle	Low-elevation Riparian	43.7	Pine Siskin	Spruce-Fir	11.8
Orchard Oriole	Low-elevation Riparian	80.5	Virginia Rail	Wetlands	82.2
Bullock's Oriole	Low-elevation Riparian	35.5	Sora	Wetlands	56.6
Baltimore Oriole	Low-elevation Riparian	84.6	American Coot	Wetlands	46.4
American Goldfinch	Low-elevation Riparian	42.0	Common Snipe	Wetlands	72.2
Williamson's Sapsucker	Mixed Conifer	28.4	Common Yellowthroat	Wetlands	34.1
Steller's Jay	Mixed Conifer	18.3	Savannah Sparrow	Wetlands	54.6
White-breasted Nuthatch	Mixed Conifer	23.3	Red-winged Blackbird	Wetlands	25.6
Brown Creeper	Mixed Conifer	44.2	Yellow-headed Blackbird	Wetlands	43.9

Table 3. Summary of special monitoring projects, summer 2000.

Species	Sites in Database	Sites Surveyed	Active Sites	Nest Structures	Occupied Nests	Adults	Juveniles
Eared Grebe	65	60	21	682	646	2496	134
Western Grebe	63	41	10	57	57	1018	30
Clark's Grebe	40	28	5	0	0	1836	79
American White Pelican	3	2	2	0	0	109	168
Double-crested Cormorant	30	22	11	814	710	794	24
Great Blue Heron	144	136	63	1646	1239	677	231
Great Egret	4	3	2	20	20	23	0
Snowy Egret	19	18	3	11	10	4950	4
Cattle Egret	9	8	4	0	0	41	4
Black-crowned Night-Heron	37	28	18	225	155	406	105
White-faced Ibis	17	15	4	0	0	3438	16
Franklin's Gull	4	4	1	0	0	88	12
California Gull	8	4	3	20	20	651	292
Forster's Tern	6	6	2	0	0	62	4
Black Tern	12	12	0	0	0	18	0
Colonial Waterbird Totals:	458	382	149	3478	2849	12098	1103
Green Heron	13	9	9	2	2	13	1
Osprey	80	56	42	43	42	85	40
Willet	18	18	10	0	0	86	0
Black Swift	301	111	26	58	35	92	27
Black Phoebe	32	32	24	21	6	32	0
Purple Martin	101	66	40	9	9	180	17
Ovenbird	3	3	2	0	0	6	0
Bobolink	51	41	35	0	0	281	0
Scott's Oriole	18	18	10	0	0	12	0
Special project totals:	617	354	191	132	93	787	85

Appendix A. Results obtained for 168 species from 2000 *MCB* transects.

Species	Habitat	n	k	D	CV(%)	m	%Var(n)	ESW(m)	Analysis[1]
Pied-billed Grebe	Wetlands	5	3	0.03	76.5	1	70.5	129	
Eared Grebe	Wetlands	9	1	0.13	104.9	1	90.9	57	
American Bittern	Wetlands	2	1	0.07	107.7	1	86.2	23	
Great Blue Heron	Low-elev. Riparian	12	9	0.06	43.2	2	43.6	28	
Great Blue Heron	Wetlands	17	7	0.07	54.1	1	83.6	193	
Snowy Egret	Wetlands	6	2	0.08	91.4	1	84.7	62	
Black-crowned Night-Heron	Wetlands	8	5	0.07	60.5	1	75.9	85	
White-faced Ibis	Wetlands	14	4	0.15	82.3	2	90.7	74	
Turkey Vulture	All habitats	17	8	0.00	53.4	1	94.8	431	Perpendicular
Turkey Vulture	All habitats	13	8	0.00	5720.0	2	59.6	158	Truncated
Turkey Vulture	All habitats	14	8	0.00	5390.0	4	59.6	199	
Canada Goose	Wetlands	10	3	0.07	82.9	1	93.6	112	
Wood Duck	Low-elev. Riparian	4	2	0.20	74.7	1	85.2	3	
Gadwall	Wetlands	15	4	0.12	72.1	2	66.8	98	
American Wigeon	Wetlands	9	2	0.09	72.9	1	90.6	80	
Mallard	Low-elev. Riparian	17	8	0.07	38.4	1	81.7	36	
Mallard	Wetlands	12	6	0.07	46.9	1	83.5	123	
Blue-winged Teal	Wetlands	8	1	0.04	105.8	1	89.4	162	
Cinnamon Teal	Wetlands	16	6	0.10	56.9	1	86.0	133	
Redhead	Wetlands	6	3	0.03	83.6	1	68.0	149	
Ring-necked Duck	Wetlands	9	1	0.11	103.4	1	93.5	63	
Ruddy Duck	Wetlands	17	3	0.10	59.0	1	91.1	129	
Mississippi Kite	Low-elev. Riparian	6	4	0.01	63.1	1	75.4	138	
Northern Harrier	All habitats	12	9	0.00	41.8	2	61.6	188	Perpendicular
Northern Harrier	All habitats	9	9	0.00	49.8	2	44.8	319	
Northern Harrier	Wetlands	2	2	0.01	80.5	1	73.4	189	
Sharp-shinned Hawk	All habitats	5	1	0.00	67.0	1	79.7	21	Perpendicular
Cooper's Hawk	All habitats	8	1	0.00	59.1	1	70.9	23	Perpendicular
Northern Goshawk	All habitats	5	3	0.00	77.2	1	46.9	116	
Northern Goshawk	All habitats	13	3	0.00	54.3	2	49.1	28	Perpendicular

Swainson's Hawk	All habitats	15	9	0.00	42.3	1	75.1	347	Perpendicular
Swainson's Hawk	All habitats	9	9	0.00	49.8	1	44.8	525	
Swainson's Hawk	Grassland	8	7	0.00	58.4	1	35.7	624	
Red-tailed Hawk	All habitats	55	36	0.00	21.6	2	78.4	86	Tr. perpendicular
Red-tailed Hawk	All habitats	43	36	0.00	20.1	2	67.5	178	
Red-tailed Hawk	All habitats	60	36	0.00	19.8	4	81.7	177	Perpendicular
Red-tailed Hawk	Low-elev. Riparian	10	8	0.01	43.5	1	51.2	149	
Red-tailed Hawk	Pinyon-Juniper	4	4	0.00	86.7	1	33.0	160	
Red-tailed Hawk	Sage Shrubland	5	5	0.00	56.3	1	62.3	381	
Red-tailed Hawk	Semi-desert Shrubland	4	4	0.00	103.2	2	23.3	205	
Golden Eagle	All habitats	16	9	0.00	36.3	2	62.6	816	Perpendicular
Golden Eagle	All habitats	9	9	0.00	41.6	2	64.1	971	
American Kestrel	All habitats	25	23	0.00	27.6	2	52.0	113	Truncated
American Kestrel	All habitats	26	23	0.00	31.7	2	64.4	174	Perpendicular
American Kestrel	All habitats	28	23	0.00	24.1	4	60.9	153	
American Kestrel	Low-elev. Riparian	9	6	0.01	54.8	1	48.1	162	
American Kestrel	Semi-desert Shrubland	12	9	0.00	46.4	2	37.7	173	
Prairie Falcon	All habitats	3	2	0.00	71.3	1	65.1	320	Perpendicular
White-tailed Ptarmigan	Alpine Tundra	6	1	0.04	90.3	1	86.7	12	Perpendicular
White-tailed Ptarmigan	Alpine Tundra	5	1	0.37	126.8	1	62.2	12	
Blue Grouse	All habitats	7	5	0.03	64.6	1	43.9	14	
Blue Grouse	All habitats	54	5	0.02	25.7	2	83.0	18	Perpendicular
Greater Prairie-Chicken	Grassland	10	2	0.00	77.2	1	90.2	373	Truncated
Greater Prairie-Chicken	Grassland	11	2	0.00	79.7	1	91.0	602	Perpendicular
Greater Prairie-Chicken	Grassland	11	2	0.00	405.1	3	3.0	312	
Scaled Quail	Semi-desert Shrubland	20	7	0.00	40.0	2	33.0	181	
Virginia Rail	Wetlands	2	2	0.01	82.2	1	70.4	178	
Sora	Wetlands	5	4	0.06	56.6	1	76.1	65	
American Coot	Wetlands	22	7	0.20	46.4	1	91.7	89	
Killdeer	All habitats	25	16	0.00	29.4	2	57.2	143	Truncated
Killdeer	All habitats	27	16	0.00	32.5	4	40.8	176	
Killdeer	Grassland	11	3	0.00	45.8	1	57.6	501	

Killdeer	Low-elev. Riparian	15	7	0.06	41.4	1	66.2	40	
Killdeer	Wetlands	21	12	0.29	36.0	2	58.8	58	
American Avocet	Wetlands	25	5	0.27	55.4	2	86.1	75	
Spotted Sandpiper	High-elev. Riparian	15	5	0.02	51.9	1	33.7	82	
Spotted Sandpiper	Low-elev. Riparian	44	12	0.20	27.9	1	78.1	33	
Spotted Sandpiper	Wetlands	9	5	0.10	57.4	1	67.4	73	
Upland Sandpiper	Grassland	12	2	0.00	52.0	2	60.5	212	
Upland Sandpiper	Grassland	12	2	0.00	96.7	2	89.6	264	Perpendicular
Common Snipe	Wetlands	3	3	0.07	72.2	1	57.6	33	
Band-tailed Pigeon	All habitats	7	2	0.01	61.1	1	82.0	29	
Mourning Dove	Grassland	62	16	0.08	24.8	2	35.5	96	Truncated
Mourning Dove	Grassland	69	16	0.04	20.3	4	47.3	151	
Mourning Dove	High-elev. Riparian	34	8	0.02	23.1	1	59.4	125	
Mourning Dove	Low-elev. Riparian	42	13	0.10	40.3	2	78.5	65	
Mourning Dove	Mixed Conifer	17	6	0.01	33.9	1	72.3	143	
Mourning Dove	Montane Shrubland	41	13	0.06	21.5	2	64.9	80	
Mourning Dove	Pinyon-Juniper	135	26	0.08	10.9	2	78.0	108	
Mourning Dove	Ponderosa Pine	96	18	0.09	15.7	2	52.8	96	
Mourning Dove	Sage Shrubland	33	11	0.02	25.5	1	64.5	129	
Mourning Dove	Semi-desert Shrubland	112	20	0.04	13.7	2	78.9	148	
Mourning Dove	Wetlands	11	8	0.07	35.4	1	78.0	120	
Yellow-billed Cuckoo	Low-elev. Riparian	3	3	0.01	73.0	1	56.2	83	
Burrowing Owl	Semi-desert Shrubland	3	3	0.00	98.7	1	34.1	110	
Common Nighthawk	All habitats	38	20	0.00	23.2	2	64.1	228	
Common Nighthawk	Grassland	13	7	0.00	46.5	2	39.5	293	
Common Nighthawk	Montane Shrubland	6	1	0.01	80.9	1	33.7	97	
Common Nighthawk	Ponderosa Pine	7	2	0.02	74.2	1	55.2	49	
Common Nighthawk	Sage Shrubland	5	3	0.01	67.3	1	61.3	88	
White-throated Swift	All habitats	45	15	0.00	24.2	2	82.8	151	
White-throated Swift	Montane Shrubland	19	4	0.02	45.2	2	57.2	101	
White-throated Swift	Pinyon-Juniper	11	5	0.00	53.0	2	49.4	165	
Black-chinned Hummingbird	Pinyon-Juniper	14	9	0.35	40.6	2	42.1	17	

Black-chinned Hummingbird	Pinyon-Juniper	18	9	0.05	43.2	2	46.5	18	Perpendicular
Broad-tailed Hummingbird	Alpine Tundra	19	7	0.50	34.8	2	68.5	20	
Broad-tailed Hummingbird	Aspen	63	21	0.69	19.7	1	44.3	29	Truncated
Broad-tailed Hummingbird	Aspen	70	21	0.64	22.3	3	29.8	31	
Broad-tailed Hummingbird	High-elev. Riparian	118	19	1.42	13.8	1	44.7	28	Truncated
Broad-tailed Hummingbird	High-elev. Riparian	130	19	1.66	19.4	4	20.7	27	
Broad-tailed Hummingbird	Lodgepole Pine	30	10	0.57	39.3	2	20.6	26	
Broad-tailed Hummingbird	Mixed Conifer	40	15	0.98	32.3	2	26.3	23	Truncated
Broad-tailed Hummingbird	Mixed Conifer	45	15	0.54	23.2	4	43.5	32	
Broad-tailed Hummingbird	Montane Shrubland	92	23	1.92	26.8	3	13.4	20	Truncated
Broad-tailed Hummingbird	Montane Shrubland	102	23	2.51	16.7	4	29.7	19	
Broad-tailed Hummingbird	Pinyon-Juniper	25	12	0.18	32.4	1	42.1	31	
Broad-tailed Hummingbird	Ponderosa Pine	48	19	0.27	17.8	1	62.7	39	
Broad-tailed Hummingbird	Sage Shrubland	18	5	0.16	42.6	1	46.1	34	
Broad-tailed Hummingbird	Spruce-Fir	18	10	0.23	34.6	1	48.9	29	
Belted Kingfisher	Low-elev. Riparian	7	5	0.09	69.4	2	38.5	11	
Belted Kingfisher	Wetlands	2	2	0.01	82.2	1	70.4	160	
Lewis's Woodpecker	All habitats	4	1	0.00	95.1	1	55.3	33	
Lewis's Woodpecker	All habitats	5	1	0.00	67.1	1	79.4	155	Perpendicular
Red-headed Woodpecker	Low-elev. Riparian	5	4	0.01	63.0	1	61.5	88	
Williamson's Sapsucker	All habitats	48	12	0.00	35.9	2	82.5	70	Perpendicular
Williamson's Sapsucker	All habitats	40	12	0.01	25.0	2	45.6	74	
Williamson's Sapsucker	Mixed Conifer	16	2	0.04	41.4	2	43.5	74	
Williamson's Sapsucker	Ponderosa Pine	23	9	0.02	28.4	1	55.5	99	
Red-naped Sapsucker	All habitats	114	34	0.02	20.5	2	86.7	29	Tr. perpendicular
Red-naped Sapsucker	All habitats	67	34	0.03	20.6	2	39.0	44	Truncated
Red-naped Sapsucker	All habitats	75	34	0.02	16.0	4	57.8	54	
Red-naped Sapsucker	All habitats	127	34	0.02	20.8	5	83.7	43	Perpendicular
Red-naped Sapsucker	Aspen	20	9	0.05	28.7	1	63.7	60	Truncated
Red-naped Sapsucker	Aspen	22	9	0.05	59.5	3	13.2	60	
Red-naped Sapsucker	High-elev. Riparian	27	10	0.04	25.8	2	59.8	80	
Red-naped Sapsucker	Lodgepole Pine	9	5	0.08	65.7	2	30.7	37	

Downy Woodpecker	All habitats	12	10	0.00	49.1	2	40.2	80	
Downy Woodpecker	Low-elev. Riparian	5	4	0.01	61.9	1	63.7	84	
Hairy Woodpecker	All habitats	141	62	0.01	15.3	1	90.2	55	Perpendicular
Hairy Woodpecker	All habitats	88	62	0.02	14.1	2	61.2	58	
Hairy Woodpecker	Aspen	20	13	0.08	31.6	1	47.4	47	
Hairy Woodpecker	High-elev. Riparian	12	7	0.02	39.8	1	51.0	80	
Hairy Woodpecker	Lodgepole Pine	9	8	0.02	56.0	2	34.4	85	
Hairy Woodpecker	Mixed Conifer	10	7	0.03	45.0	1	47.6	67	
Hairy Woodpecker	Montane Shrubland	7	6	0.02	49.9	1	72.9	51	
Hairy Woodpecker	Pinyon-Juniper	6	5	0.01	62.8	1	41.8	81	
Hairy Woodpecker	Ponderosa Pine	15	11	0.04	45.9	1	34.7	57	Truncated
Hairy Woodpecker	Ponderosa Pine	17	11	0.03	60.0	3	17.6	66	
Hairy Woodpecker	Spruce-Fir	7	5	0.02	62.1	1	57.6	65	
Three-toed Woodpecker	All habitats	26	9	0.00	44.0	1	77.9	71	Perpendicular
Three-toed Woodpecker	All habitats	14	9	0.00	43.6	1	37.5	73	
Three-toed Woodpecker	Mixed Conifer	6	4	0.01	82.0	1	24.3	112	
Three-toed Woodpecker	Spruce-Fir	6	3	0.01	72.5	1	31.2	70	
Northern Flicker	Aspen	94	23	0.13	15.9	1	41.9	81	Truncated
Northern Flicker	Aspen	105	23	0.14	14.5	4	44.0	83	
Northern Flicker	High-elev. Riparian	93	18	0.14	17.3	4	41.3	79	
Northern Flicker	High-elev. Riparian	84	18	0.14	46.2	5	6.4	74	Truncated
Northern Flicker	Lodgepole Pine	28	11	0.04	34.3	2	31.4	96	Truncated
Northern Flicker	Lodgepole Pine	31	11	0.03	33.4	3	29.2	107	
Northern Flicker	Low-elev. Riparian	13	10	0.02	36.3	1	51.6	89	
Northern Flicker	Mixed Conifer	65	16	0.08	15.9	2	62.2	102	
Northern Flicker	Montane Shrubland	74	24	0.15	17.8	2	45.7	66	Truncated
Northern Flicker	Montane Shrubland	81	24	0.09	13.6	5	68.8	88	
Northern Flicker	Pinyon-Juniper	19	15	0.01	40.0	2	31.5	98	Truncated
Northern Flicker	Pinyon-Juniper	21	15	0.01	35.3	5	36.5	105	
Northern Flicker	Ponderosa Pine	71	22	0.07	16.8	2	52.1	91	
Northern Flicker	Sage Shrubland	23	10	0.01	28.6	1	58.8	151	
Northern Flicker	Semi-desert Shrubland	15	5	0.00	111.6	1	40.1	182	

Northern Flicker	Spruce-Fir	27	10	0.04	29.3	2	52.4	86	
Olive-sided Flycatcher	All habitats	58	49	0.00	23.6	2	74.9	111	Perpendicular
Olive-sided Flycatcher	All habitats	61	49	0.01	32.8	3	15.0	90	Truncated
Olive-sided Flycatcher	All habitats	68	49	0.01	18.6	5	43.1	89	
Olive-sided Flycatcher	Aspen	8	6	0.01	69.4	1	25.5	75	
Olive-sided Flycatcher	High-elev. Riparian	14	7	0.02	38.4	2	46.5	85	
Olive-sided Flycatcher	Lodgepole Pine	6	5	0.01	64.1	2	53.3	108	
Olive-sided Flycatcher	Mixed Conifer	5	4	0.00	68.2	1	42.3	157	
Olive-sided Flycatcher	Montane Shrubland	8	6	0.00	50.5	1	48.1	169	
Olive-sided Flycatcher	Ponderosa Pine	11	8	0.01	40.9	1	52.9	120	
Olive-sided Flycatcher	Spruce-Fir	10	8	0.01	47.6	2	42.8	118	
Western Wood-Pewee	Aspen	137	15	0.22	11.7	2	64.6	74	
Western Wood-Pewee	High-elev. Riparian	34	11	0.03	26.8	1	51.4	108	
Western Wood-Pewee	Lodgepole Pine	28	8	0.08	33.8	2	32.4	65	
Western Wood-Pewee	Low-elev. Riparian	23	13	0.03	45.9	2	28.1	105	
Western Wood-Pewee	Mixed Conifer	30	8	0.03	24.6	1	56.3	118	
Western Wood-Pewee	Montane Shrubland	27	7	0.02	27.5	1	63.9	103	
Western Wood-Pewee	Ponderosa Pine	73	15	0.09	17.0	1	50.0	84	
Hammond's Flycatcher	All habitats	58	35	0.01	24.4	1	90.0	37	Perpendicular
Hammond's Flycatcher	All habitats	59	35	0.02	16.4	2	70.7	46	
Hammond's Flycatcher	Aspen	17	8	0.06	40.0	1	39.4	50	
Hammond's Flycatcher	Lodgepole Pine	5	4	0.01	82.5	2	28.9	72	
Hammond's Flycatcher	Mixed Conifer	9	5	0.05	67.5	1	23.7	47	
Hammond's Flycatcher	Ponderosa Pine	9	4	0.03	52.3	1	66.9	47	
Hammond's Flycatcher	Spruce-Fir	10	7	0.05	54.9	1	32.2	48	
Gray Flycatcher	Pinyon-Juniper	128	23	0.80	14.9	2	30.6	34	Truncated
Gray Flycatcher	Pinyon-Juniper	142	23	0.58	10.7	4	52.2	42	
Dusky Flycatcher	Aspen	28	9	0.05	31.0	1	37.1	74	
Dusky Flycatcher	High-elev. Riparian	46	15	0.25	22.5	1	41.1	41	Truncated
Dusky Flycatcher	High-elev. Riparian	51	15	0.22	39.6	3	11.7	46	
Dusky Flycatcher	Mixed Conifer	13	6	0.04	39.9	2	46.0	67	
Dusky Flycatcher	Montane Shrubland	166	23	0.95	12.3	2	51.5	39	

Dusky Flycatcher	Pinyon-Juniper	43	8	0.07	24.5	1	56.8	66	
Dusky Flycatcher	Ponderosa Pine	95	17	0.44	43.4	2	7.5	43	Truncated
Dusky Flycatcher	Ponderosa Pine	105	17	0.45	23.0	3	23.4	44	
Cordilleran Flycatcher	Aspen	20	9	0.05	28.0	2	60.3	61	
Cordilleran Flycatcher	High-elev. Riparian	40	13	0.20	25.1	2	41.3	43	
Cordilleran Flycatcher	Mixed Conifer	23	7	0.08	31.9	1	50.2	62	
Cordilleran Flycatcher	Spruce-Fir	8	4	0.02	69.8	1	25.0	64	
Say's Phoebe	All habitats	21	15	0.00	46.3	2	90.5	123	Perpendicular
Say's Phoebe	All habitats	22	15	0.00	36.3	2	40.6	147	
Say's Phoebe	Low-elev. Riparian	2	1	0.01	110.8	1	81.5	46	
Say's Phoebe	Pinyon-Juniper	4	3	0.01	88.4	2	47.8	45	
Say's Phoebe	Sage Shrubland	5	3	0.00	62.6	1	50.4	125	
Say's Phoebe	Semi-desert Shrubland	8	6	0.00	42.5	1	68.0	219	
Ash-throated Flycatcher	Pinyon-Juniper	32	17	0.01	21.7	1	61.5	136	
Cassin's Kingbird	Grassland	11	2	0.01	50.4	2	54.1	150	
Western Kingbird	Grassland	18	6	0.01	27.5	1	93.3	160	
Western Kingbird	Low-elev. Riparian	15	7	0.05	51.1	1	68.5	47	
Eastern Kingbird	Low-elev. Riparian	25	8	0.07	40.7	1	84.5	53	
Loggerhead Shrike	All habitats	24	16	0.00	33.9	2	45.2	63	
Loggerhead Shrike	Sage Shrubland	5	4	0.01	70.4	1	56.1	58	
Loggerhead Shrike	Semi-desert Shrubland	18	11	0.03	43.0	2	35.5	67	
Gray Vireo	Pinyon-Juniper	3	2	0.00	93.9	1	37.6	144	
Plumbeous Vireo	Mixed Conifer	11	2	0.03	44.6	1	60.7	72	
Plumbeous Vireo	Montane Shrubland	22	11	0.10	31.3	1	48.1	43	
Plumbeous Vireo	Pinyon-Juniper	60	20	0.15	24.6	2	31.3	53	
Plumbeous Vireo	Ponderosa Pine	64	12	0.17	16.6	1	63.3	57	
Warbling Vireo	Aspen	369	24	0.91	8.7	1	43.0	60	Truncated
Warbling Vireo	Aspen	410	24	0.89	10.1	5	26.6	64	
Warbling Vireo	High-elev. Riparian	149	20	0.44	12.8	3	49.0	56	
Warbling Vireo	High-elev. Riparian	134	20	0.46	32.0	5	9.1	52	Truncated
Warbling Vireo	Lodgepole Pine	52	9	0.17	23.1	2	45.7	62	
Warbling Vireo	Low-elev. Riparian	16	6	0.02	56.9	1	86.1	107	

Warbling Vireo	Mixed Conifer	152	17	0.52	12.0	2	60.5	60	
Warbling Vireo	Montane Shrubland	184	22	0.99	14.4	2	39.0	40	Truncated
Warbling Vireo	Montane Shrubland	205	22	0.54	12.1	5	52.4	57	
Warbling Vireo	Ponderosa Pine	140	19	0.24	12.4	2	48.2	71	
Warbling Vireo	Spruce-Fir	21	5	0.04	38.1	1	43.1	76	
Gray Jay	Lodgepole Pine	38	12	0.22	30.8	2	38.3	46	
Gray Jay	Mixed Conifer	10	4	0.01	45.5	1	46.7	98	
Gray Jay	Spruce-Fir	45	12	0.32	37.7	2	25.1	38	Truncated
Gray Jay	Spruce-Fir	50	12	0.23	38.5	4	21.0	48	
Steller's Jay	Aspen	38	14	0.06	23.2	2	69.9	75	
Steller's Jay	High-elev. Riparian	47	15	0.07	20.5	2	52.8	76	
Steller's Jay	Lodgepole Pine	24	10	0.04	29.8	2	46.5	89	
Steller's Jay	Mixed Conifer	68	16	0.22	18.3	2	49.2	62	
Steller's Jay	Ponderosa Pine	77	22	0.13	19.2	1	43.6	72	Truncated
Steller's Jay	Ponderosa Pine	86	22	0.11	26.4	3	19.8	82	
Steller's Jay	Spruce-Fir	14	5	0.11	51.4	2	45.2	36	Truncated
Steller's Jay	Spruce-Fir	16	5	0.04	47.5	4	43.6	65	
Blue Jay	Low-elev. Riparian	31	7	0.04	43.1	1	77.2	109	
Western Scrub-Jay	Montane Shrubland	19	7	0.03	29.7	2	62.9	74	
Western Scrub-Jay	Pinyon-Juniper	65	19	0.07	17.8	2	66.8	80	
Western Scrub-Jay	Ponderosa Pine	7	3	0.01	66.2	1	41.4	70	
Pinyon Jay	Pinyon-Juniper	44	17	0.04	24.1	2	49.8	91	Truncated
Pinyon Jay	Pinyon-Juniper	49	17	0.03	23.2	4	49.2	103	
Clark's Nutcracker	All habitats	113	47	0.01	16.7	2	45.1	85	Truncated
Clark's Nutcracker	All habitats	88	47	0.00	29.2	2	95.7	103	Perpendicular
Clark's Nutcracker	All habitats	124	47	0.01	14.4	4	53.7	97	
Clark's Nutcracker	High-elev. Riparian	23	6	0.02	33.9	2	58.4	102	
Clark's Nutcracker	Mixed Conifer	14	6	0.03	44.7	1	49.4	74	
Clark's Nutcracker	Ponderosa Pine	17	8	0.01	59.3	2	18.0	123	
Clark's Nutcracker	Spruce-Fir	42	10	0.03	22.2	2	60.3	113	
Black-billed Magpie	High-elev. Riparian	17	6	0.01	37.7	1	73.7	131	
Black-billed Magpie	Low-elev. Riparian	21	10	0.03	43.1	1	56.4	108	

Black-billed Magpie	Montane Shrubland	20	7	0.01	33.9	1	54.2	133	
Black-billed Magpie	Pinyon-Juniper	19	8	0.02	39.1	2	51.3	93	
Black-billed Magpie	Sage Shrubland	28	7	0.01	36.4	2	36.1	178	
Black-billed Magpie	Semi-desert Shrubland	44	12	0.02	24.0	2	62.6	140	
American Crow	All habitats	59	30	0.00	20.0	1	57.7	168	Truncated
American Crow	All habitats	66	30	0.00	17.0	4	69.4	187	
American Crow	High-elev. Riparian	11	5	0.01	65.4	2	29.4	133	
American Crow	Low-elev. Riparian	3	2	0.02	81.9	1	79.5	18	
American Crow	Montane Shrubland	18	8	0.00	36.0	2	50.5	182	
Common Raven	Aspen	15	7	0.00	45.4	2	39.8	207	
Common Raven	High-elev. Riparian	13	7	0.00	36.3	1	65.5	236	
Common Raven	Lodgepole Pine	13	4	0.01	49.9	2	43.8	108	
Common Raven	Mixed Conifer	17	9	0.02	38.9	2	45.5	118	
Common Raven	Montane Shrubland	12	9	0.00	39.7	1	60.2	300	
Common Raven	Pinyon-Juniper	41	19	0.01	21.6	2	68.0	175	
Common Raven	Ponderosa Pine	23	10	0.00	31.9	2	70.0	292	
Common Raven	Sage Shrubland	34	11	0.00	27.3	2	58.6	325	
Common Raven	Semi-desert Shrubland	15	10	0.00	43.2	2	34.6	301	
Common Raven	Spruce-Fir	8	5	0.00	58.8	2	44.4	208	
Horned Lark	Alpine Tundra	115	15	0.41	17.9	2	55.4	55	
Horned Lark	Grassland	415	18	0.72	8.5	4	52.0	84	
Horned Lark	Grassland	376	18	0.75	21.3	5	8.7	78	Truncated
Horned Lark	Sage Shrubland	114	10	0.32	15.7	2	66.8	60	
Horned Lark	Semi-desert Shrubland	354	24	0.39	8.1	2	69.7	82	
Tree Swallow	All habitats	62	25	0.02	23.9	2	60.6	51	
Tree Swallow	Aspen	21	7	0.02	41.4	1	60.6	93	
Tree Swallow	High-elev. Riparian	18	9	0.07	43.0	2	55.3	47	
Tree Swallow	Montane Shrubland	18	5	0.18	55.0	2	46.2	29	
Violet-green Swallow	All habitats	352	96	0.20	11.3	2	41.5	37	Truncated
Violet-green Swallow	All habitats	389	96	0.09	7.8	5	82.3	59	
Violet-green Swallow	Aspen	91	16	0.58	18.5	2	59.9	37	
Violet-green Swallow	High-elev. Riparian	63	12	0.36	22.7	2	58.7	40	

Violet-green Swallow	Mixed Conifer	33	10	0.16	26.1	2	60.5	51	
Violet-green Swallow	Montane Shrubland	57	15	0.15	21.7	2	76.5	57	Truncated
Violet-green Swallow	Montane Shrubland	62	15	0.09	22.0	4	70.2	76	
Violet-green Swallow	Pinyon-Juniper	27	14	0.24	32.3	3	49.3	28	Truncated
Violet-green Swallow	Pinyon-Juniper	30	14	0.06	24.7	5	76.6	61	
Violet-green Swallow	Ponderosa Pine	76	16	0.19	18.7	2	74.6	58	
Violet-green Swallow	Sage Shrubland	16	5	0.05	41.8	1	65.6	56	
N. Rough-winged Swallow	All habitats	7	5	0.00	60.6	1	50.0	76	
N. Rough-winged Swallow	Low-elev. Riparian	20	11	0.12	37.0	2	44.1	24	
Bank Swallow	Low-elev. Riparian	24	5	0.11	65.2	1	94.7	33	
Cliff Swallow	All habitats	50	17	0.03	28.8	4	49.7	40	Truncated
Cliff Swallow	All habitats	56	17	0.01	22.9	4	70.2	69	
Cliff Swallow	Low-elev. Riparian	24	9	0.07	37.4	1	87.0	48	Truncated
Cliff Swallow	Low-elev. Riparian	27	9	0.08	48.6	3	49.1	50	
Cliff Swallow	Pinyon-Juniper	6	1	0.03	74.9	1	29.4	40	
Cliff Swallow	Semi-desert Shrubland	36	7	0.09	30.3	2	71.7	55	
Cliff Swallow	Wetlands	18	4	0.10	64.0	1	87.4	143	
Barn Swallow	All habitats	54	24	0.00	20.7	1	90.5	142	
Barn Swallow	Grassland	18	8	0.01	36.9	2	56.4	145	
Barn Swallow	Low-elev. Riparian	31	11	0.16	29.8	1	77.8	29	
Barn Swallow	Semi-desert Shrubland	20	11	0.01	34.3	1	57.6	100	
Barn Swallow	Wetlands	11	7	0.03	51.5	1	82.5	326	
Black-capped Chickadee	Low-elev. Riparian	3	1	0.01	111.4	1	80.6	63	
Black-capped Chickadee	Mixed Conifer	23	2	0.08	38.6	2	80.3	61	
Black-capped Chickadee	Montane Shrubland	73	15	0.60	19.9	1	66.7	32	Truncated
Black-capped Chickadee	Montane Shrubland	81	15	0.56	17.6	4	71.4	35	
Mountain Chickadee	Aspen	111	23	0.60	15.1	2	55.3	41	
Mountain Chickadee	High-elev. Riparian	101	17	0.39	15.5	2	59.6	49	
Mountain Chickadee	Lodgepole Pine	152	17	0.76	10.8	2	61.6	50	
Mountain Chickadee	Mixed Conifer	111	16	1.04	14.9	1	43.9	37	Truncated
Mountain Chickadee	Mixed Conifer	123	16	0.96	12.3	3	56.3	40	
Mountain Chickadee	Montane Shrubland	54	12	0.21	21.5	1	62.9	47	

Mountain Chickadee	Pinyon-Juniper	71	20	0.17	16.6	1	60.1	55	
Mountain Chickadee	Ponderosa Pine	175	25	0.56	11.6	1	51.9	51	
Mountain Chickadee	Spruce-Fir	169	20	0.84	10.4	1	60.1	46	
Juniper Titmouse	Pinyon-Juniper	54	18	0.18	21.8	1	53.0	47	
Bushtit	All habitats	46	19	0.07	35.3	2	34.7	22	Truncated
Bushtit	All habitats	51	19	0.08	31.2	3	38.9	23	
Bushtit	Pinyon-Juniper	37	15	0.51	36.9	2	31.1	23	Truncated
Bushtit	Pinyon-Juniper	40	15	0.53	34.5	3	31.8	23	
Red-breasted Nuthatch	Aspen	27	10	0.05	28.3	1	60.1	68	
Red-breasted Nuthatch	High-elev. Riparian	17	5	0.01	45.9	1	39.9	108	
Red-breasted Nuthatch	Lodgepole Pine	59	12	0.21	20.2	2	46.2	59	
Red-breasted Nuthatch	Mixed Conifer	79	14	0.68	17.3	2	43.2	38	
Red-breasted Nuthatch	Ponderosa Pine	22	7	0.10	32.1	1	65.6	44	Truncated
Red-breasted Nuthatch	Ponderosa Pine	25	7	0.08	46.2	3	26.6	51	
Red-breasted Nuthatch	Spruce-Fir	40	12	0.15	25.6	1	38.8	54	Truncated
Red-breasted Nuthatch	Spruce-Fir	45	12	0.13	30.0	3	25.4	61	
White-breasted Nuthatch	Aspen	20	6	0.05	25.9	1	70.7	59	
White-breasted Nuthatch	High-elev. Riparian	13	5	0.04	44.4	1	49.7	57	
White-breasted Nuthatch	Mixed Conifer	30	8	0.13	23.3	1	66.7	54	
White-breasted Nuthatch	Montane Shrubland	15	10	0.03	39.0	1	48.2	69	
White-breasted Nuthatch	Pinyon-Juniper	33	17	0.10	25.3	1	46.9	50	Truncated
White-breasted Nuthatch	Pinyon-Juniper	37	17	0.09	45.9	3	13.2	56	
White-breasted Nuthatch	Ponderosa Pine	98	20	0.21	13.6	1	54.5	62	
Pygmy Nuthatch	Lodgepole Pine	6	2	0.02	89.6	1	62.0	61	
Pygmy Nuthatch	Ponderosa Pine	76	20	0.38	27.2	2	22.2	41	
Brown Creeper	All habitats	107	44	0.02	22.7	1	94.0	28	Perpendicular
Brown Creeper	Lodgepole Pine	7	5	0.10	64.1	1	34.0	29	
Brown Creeper	Mixed Conifer	16	11	0.17	44.2	1	34.1	34	
Brown Creeper	Ponderosa Pine	13	10	0.08	41.1	1	58.2	37	
Brown Creeper	Spruce-Fir	28	12	0.25	25.9	1	60.0	35	
Rock Wren	All habitats	105	40	0.01	22.5	2	22.6	91	Truncated
Rock Wren	All habitats	116	40	0.01	13.6	3	56.3	113	

Rock Wren	Alpine Tundra	8	3	0.00	60.2	1	33.7	172	
Rock Wren	Pinyon-Juniper	51	15	0.07	26.4	2	34.8	70	Truncated
Rock Wren	Pinyon-Juniper	57	15	0.07	23.7	4	38.4	75	
Rock Wren	Sage Shrubland	11	5	0.01	35.5	1	69.8	114	
Rock Wren	Semi-desert Shrubland	26	10	0.01	31.3	1	46.1	132	Truncated
Rock Wren	Semi-desert Shrubland	29	10	0.01	30.6	4	44.7	156	
Canyon Wren	All habitats	8	7	0.00	54.6	2	41.9	129	
Canyon Wren	Low-elev. Riparian	2	2	0.00	85.1	1	65.5	173	
Canyon Wren	Pinyon-Juniper	5	5	0.00	57.3	1	60.3	100	
Bewick's Wren	Pinyon-Juniper	148	20	0.67	17.4	2	31.9	40	Truncated
Bewick's Wren	Pinyon-Juniper	163	20	0.57	15.0	3	40.8	45	
Bewick's Wren	Sage Shrubland	14	4	0.04	43.8	1	57.0	61	
House Wren	Aspen	203	19	1.50	19.2	3	19.3	35	Truncated
House Wren	Aspen	226	19	1.85	11.7	5	43.7	33	
House Wren	High-elev. Riparian	59	14	0.24	22.0	2	48.0	48	
House Wren	Lodgepole Pine	22	8	0.05	32.3	1	51.8	78	
House Wren	Low-elev. Riparian	113	14	0.22	33.3	1	95.7	75	
House Wren	Mixed Conifer	57	12	0.10	16.8	1	81.7	84	
House Wren	Montane Shrubland	61	16	0.14	16.7	2	84.4	61	
House Wren	Ponderosa Pine	66	17	0.21	20.4	1	44.5	52	Truncated
House Wren	Ponderosa Pine	73	17	0.22	16.7	4	58.9	53	
House Wren	Wetlands	16	3	0.10	69.3	1	92.0	129	
Marsh Wren	Wetlands	39	9	0.59	35.1	2	87.8	52	
Golden-crowned Kinglet	High-elev. Riparian	21	5	0.26	33.9	1	50.9	27	
Golden-crowned Kinglet	Lodgepole Pine	14	6	0.32	40.1	2	55.0	23	
Golden-crowned Kinglet	Mixed Conifer	6	2	0.12	61.1	1	58.7	25	
Golden-crowned Kinglet	Spruce-Fir	88	17	0.95	14.6	1	57.2	31	
Ruby-crowned Kinglet	Aspen	71	20	0.15	18.0	1	43.3	66	Truncated
Ruby-crowned Kinglet	Aspen	79	20	0.11	13.1	3	72.1	82	
Ruby-crowned Kinglet	High-elev. Riparian	80	15	0.17	20.4	2	28.3	66	Truncated
Ruby-crowned Kinglet	High-elev. Riparian	89	15	0.15	15.6	4	42.8	75	
Ruby-crowned Kinglet	Lodgepole Pine	120	17	0.34	13.6	4	37.6	67	Truncated

Ruby-crowned Kinglet	Lodgepole Pine	133	17	0.14	10.4	5	53.9	110	
Ruby-crowned Kinglet	Mixed Conifer	70	11	0.32	18.9	1	48.7	53	Truncated
Ruby-crowned Kinglet	Mixed Conifer	78	11	0.31	34.4	3	12.3	57	
Ruby-crowned Kinglet	Ponderosa Pine	33	8	0.02	30.1	2	40.9	108	Truncated
Ruby-crowned Kinglet	Ponderosa Pine	37	8	0.02	28.1	4	42.0	122	
Ruby-crowned Kinglet	Spruce-Fir	170	19	0.31	28.1	2	6.3	76	Truncated
Ruby-crowned Kinglet	Spruce-Fir	187	19	0.38	8.2	3	63.0	72	
Blue-gray Gnatcatcher	Mixed Conifer	9	2	0.03	64.0	2	38.3	59	
Blue-gray Gnatcatcher	Montane Shrubland	57	14	0.72	17.7	1	69.1	26	
Blue-gray Gnatcatcher	Pinyon-Juniper	118	25	0.62	13.3	1	55.5	37	
Blue-gray Gnatcatcher	Ponderosa Pine	10	2	0.07	59.7	1	44.3	34	
Blue-gray Gnatcatcher	Sage Shrubland	17	4	0.06	48.4	1	23.8	52	
Western Bluebird	Ponderosa Pine	32	10	0.19	36.3	2	32.2	38	
Mountain Bluebird	Alpine Tundra	12	5	0.06	51.9	2	61.0	46	
Mountain Bluebird	Aspen	14	8	0.06	49.6	2	44.6	48	
Mountain Bluebird	Mixed Conifer	10	5	0.04	49.3	1	56.2	55	
Mountain Bluebird	Montane Shrubland	14	9	0.02	45.1	1	49.1	82	
Mountain Bluebird	Pinyon-Juniper	84	23	0.30	18.0	3	43.0	45	
Mountain Bluebird	Pinyon-Juniper	76	23	0.26	27.0	3	20.6	46	Truncated
Mountain Bluebird	Ponderosa Pine	14	5	0.03	45.0	1	49.1	65	
Mountain Bluebird	Sage Shrubland	26	10	0.06	29.7	2	56.9	68	
Townsend's Solitaire	All habitats	92	55	0.01	26.7	3	16.6	70	Truncated
Townsend's Solitaire	All habitats	101	55	0.01	13.4	4	61.8	85	
Townsend's Solitaire	Aspen	12	4	0.01	69.2	2	19.8	93	
Townsend's Solitaire	Lodgepole Pine	22	8	0.03	35.9	2	42.1	98	
Townsend's Solitaire	Mixed Conifer	12	8	0.04	53.5	2	32.7	59	
Townsend's Solitaire	Ponderosa Pine	27	14	0.07	28.9	2	47.9	55	
Townsend's Solitaire	Spruce-Fir	8	7	0.02	54.0	1	41.8	60	
Swainson's Thrush	Aspen	9	3	0.03	57.1	2	56.1	51	
Swainson's Thrush	High-elev. Riparian	16	8	0.02	36.4	2	51.1	80	
Hermit Thrush	Aspen	70	19	0.05	17.5	1	47.0	109	Truncated
Hermit Thrush	Aspen	78	19	0.05	15.3	4	57.0	114	

Hermit Thrush	High-elev. Riparian	51	13	0.03	19.1	1	63.0	121	
Hermit Thrush	Lodgepole Pine	91	17	0.11	15.0	1	54.2	100	Truncated
Hermit Thrush	Lodgepole Pine	101	17	0.09	11.9	5	72.7	120	
Hermit Thrush	Mixed Conifer	99	12	0.11	37.7	2	9.3	105	
Hermit Thrush	Montane Shrubland	31	12	0.02	25.6	1	58.2	114	
Hermit Thrush	Pinyon-Juniper	28	5	0.01	31.9	1	50.7	157	
Hermit Thrush	Ponderosa Pine	100	18	0.07	12.9	2	66.2	109	
Hermit Thrush	Spruce-Fir	205	19	0.19	38.6	3	3.2	106	Truncated
Hermit Thrush	Spruce-Fir	228	19	0.26	9.7	4	44.6	96	
American Robin	Alpine Tundra	51	13	0.14	26.8	2	46.2	61	
American Robin	Aspen	185	24	0.58	17.9	2	19.4	53	Truncated
American Robin	Aspen	206	24	0.46	9.8	4	56.5	64	
American Robin	High-elev. Riparian	199	23	0.36	9.1	2	71.1	72	
American Robin	Lodgepole Pine	86	16	0.54	30.5	3	13.6	45	Truncated
American Robin	Lodgepole Pine	96	16	0.52	13.2	5	63.7	48	
American Robin	Low-elev. Riparian	81	16	0.16	22.9	1	93.2	76	
American Robin	Mixed Conifer	119	16	0.33	14.5	1	57.4	67	Truncated
American Robin	Mixed Conifer	132	16	0.30	12.8	5	65.9	74	
American Robin	Montane Shrubland	186	24	0.53	14.9	2	27.2	55	Truncated
American Robin	Montane Shrubland	207	24	0.35	10.0	5	54.0	71	
American Robin	Pinyon-Juniper	27	13	0.05	24.7	1	66.3	65	
American Robin	Ponderosa Pine	208	25	0.38	9.1	2	62.8	68	
American Robin	Sage Shrubland	44	13	0.05	24.3	2	49.1	99	
American Robin	Spruce-Fir	107	19	0.57	14.9	1	48.0	45	Truncated
American Robin	Spruce-Fir	119	19	0.49	12.9	4	55.9	51	
Gray Catbird	Low-elev. Riparian	2	2	0.01	85.0	1	65.7	52	
Gray Catbird	Montane Shrubland	15	5	0.02	31.8	2	81.2	76	
Northern Mockingbird	Grassland	53	7	0.03	27.2	2	34.0	153	
Northern Mockingbird	Semi-desert Shrubland	105	19	0.03	14.2	1	61.7	173	
Sage Thrasher	Sage Shrubland	59	13	0.03	18.0	1	58.8	138	
Sage Thrasher	Semi-desert Shrubland	29	8	0.02	30.6	2	44.7	111	
Brown Thrasher	Low-elev. Riparian	5	5	0.01	49.8	1	64.5	89	

Curve-billed Thrasher	Semi-desert Shrubland	3	2	0.00	101.7	1	32.1	93	
European Starling	All habitats	12	5	0.00	41.8	1	63.4	155	
European Starling	Low-elev. Riparian	14	9	0.03	36.5	1	59.0	72	
American Pipit	Alpine Tundra	428	18	2.10	10.9	2	39.3	47	Truncated
American Pipit	Alpine Tundra	474	18	1.90	9.9	4	42.6	52	
Orange-crowned Warbler	Aspen	14	7	0.03	36.3	1	67.7	64	
Orange-crowned Warbler	High-elev. Riparian	17	4	0.07	34.2	1	53.8	48	
Orange-crowned Warbler	Mixed Conifer	19	5	0.13	30.9	1	62.7	43	
Orange-crowned Warbler	Montane Shrubland	112	20	0.47	12.6	2	77.0	45	
Orange-crowned Warbler	Pinyon-Juniper	14	5	0.02	42.5	1	61.1	73	
Orange-crowned Warbler	Ponderosa Pine	75	12	0.21	19.5	1	44.2	55	
Virginia's Warbler	Mixed Conifer	25	6	0.12	30.9	1	65.0	50	Truncated
Virginia's Warbler	Mixed Conifer	28	6	0.10	51.6	3	20.6	61	
Virginia's Warbler	Montane Shrubland	81	21	0.28	14.8	2	67.5	50	
Virginia's Warbler	Pinyon-Juniper	59	14	0.34	19.2	1	51.0	35	Truncated
Virginia's Warbler	Pinyon-Juniper	66	14	0.34	17.4	4	55.1	37	
Virginia's Warbler	Ponderosa Pine	58	12	0.19	27.4	1	26.6	50	Truncated
Virginia's Warbler	Ponderosa Pine	65	12	0.18	78.6	3	2.9	56	
Yellow Warbler	Aspen	20	6	0.03	32.8	1	76.5	84	
Yellow Warbler	High-elev. Riparian	43	7	0.25	27.3	2	49.3	40	
Yellow Warbler	Low-elev. Riparian	77	19	0.16	23.3	1	63.5	70	Truncated
Yellow Warbler	Low-elev. Riparian	86	19	0.17	45.7	4	16.5	74	
Yellow Warbler	Montane Shrubland	82	12	0.56	20.8	2	51.7	35	Truncated
Yellow Warbler	Montane Shrubland	91	12	0.45	18.8	5	60.4	42	
Yellow-rumped Warbler	Aspen	201	22	0.53	12.9	2	35.0	58	Truncated
Yellow-rumped Warbler	High-elev. Riparian	62	16	0.19	19.0	2	58.4	55	
Yellow-rumped Warbler	Lodgepole Pine	153	17	0.57	8.4	2	84.5	58	
Yellow-rumped Warbler	Mixed Conifer	147	15	0.63	12.6	1	39.4	54	Truncated
Yellow-rumped Warbler	Mixed Conifer	163	15	0.52	20.7	3	12.6	62	
Yellow-rumped Warbler	Montane Shrubland	17	4	0.06	35.3	1	56.3	51	
Yellow-rumped Warbler	Pinyon-Juniper	22	5	0.02	40.0	1	68.4	90	
Yellow-rumped Warbler	Ponderosa Pine	148	22	0.24	15.5	1	32.4	72	Truncated

Yellow-rumped Warbler	Ponderosa Pine	163	22	0.21	38.1	5	4.7	82	
Yellow-rumped Warbler	Spruce-Fir	227	20	0.73	8.4	1	47.4	58	
Black-throated Gray Warbler	Pinyon-Juniper	173	28	1.05	13.2	2	35.5	34	Truncated
Black-throated Gray Warbler	Pinyon-Juniper	190	28	1.00	12.6	4	35.0	37	
Grace's Warbler	Ponderosa Pine	29	6	0.08	32.7	1	43.1	55	
MacGillivray's Warbler	Aspen	58	14	0.15	19.2	1	56.9	58	
MacGillivray's Warbler	High-elev. Riparian	49	13	0.58	27.3	2	35.9	28	Truncated
MacGillivray's Warbler	High-elev. Riparian	55	13	0.59	25.5	4	34.7	29	
MacGillivray's Warbler	Mixed Conifer	16	5	0.08	40.7	1	59.0	51	
MacGillivray's Warbler	Montane Shrubland	123	23	1.09	17.0	2	33.8	31	Truncated
MacGillivray's Warbler	Montane Shrubland	137	23	0.86	13.1	5	51.0	37	
MacGillivray's Warbler	Ponderosa Pine	8	4	0.02	46.7	1	70.7	66	
Common Yellowthroat	Low-elev. Riparian	22	7	0.04	45.2	1	73.2	82	
Common Yellowthroat	Wetlands	38	13	0.23	34.1	1	89.4	131	
Wilson's Warbler	Alpine Tundra	14	7	0.22	43.8	2	57.1	26	
Wilson's Warbler	High-elev. Riparian	73	16	0.96	18.4	2	62.3	26	
Yellow-breasted Chat	Low-elev. Riparian	45	13	0.09	31.3	1	76.6	73	
Western Tanager	Aspen	40	15	0.08	21.9	2	56.7	68	
Western Tanager	High-elev. Riparian	36	10	0.06	24.6	1	53.8	76	
Western Tanager	Lodgepole Pine	39	7	0.06	26.0	1	41.9	92	Truncated
Western Tanager	Lodgepole Pine	43	7	0.05	33.6	3	23.9	108	
Western Tanager	Mixed Conifer	166	17	0.40	10.3	1	58.4	72	
Western Tanager	Montane Shrubland	48	13	0.11	18.2	1	78.9	61	
Western Tanager	Pinyon-Juniper	20	7	0.04	33.0	2	48.5	62	
Western Tanager	Ponderosa Pine	89	23	0.16	16.8	1	38.4	69	Truncated
Western Tanager	Ponderosa Pine	99	23	0.17	22.4	4	18.6	71	
Western Tanager	Spruce-Fir	19	4	0.02	32.6	1	51.9	96	
Green-tailed Towhee	Aspen	15	8	0.04	41.1	1	48.5	59	Truncated
Green-tailed Towhee	Aspen	17	8	0.03	53.6	3	24.4	71	
Green-tailed Towhee	High-elev. Riparian	68	8	0.25	20.0	1	63.5	50	
Green-tailed Towhee	Lodgepole Pine	14	5	0.02	48.3	1	42.2	107	Truncated
Green-tailed Towhee	Lodgepole Pine	16	5	0.01	65.4	3	21.1	122	

Green-tailed Towhee	Mixed Conifer	86	11	0.35	19.4	1	56.5	55	Truncated
Green-tailed Towhee	Mixed Conifer	96	11	0.42	24.7	4	31.7	54	
Green-tailed Towhee	Montane Shrubland	471	23	2.29	14.6	3	10.8	42	Truncated
Green-tailed Towhee	Montane Shrubland	523	23	2.65	8.7	4	29.1	41	
Green-tailed Towhee	Pinyon-Juniper	120	17	0.25	13.9	1	65.0	59	
Green-tailed Towhee	Ponderosa Pine	137	17	0.28	12.4	1	64.1	65	
Green-tailed Towhee	Sage Shrubland	211	13	0.38	39.8	3	4.6	75	Truncated
Green-tailed Towhee	Sage Shrubland	233	13	0.39	18.9	3	18.6	78	
Spotted Towhee	High-elev. Riparian	21	3	0.09	39.6	2	72.0	46	
Spotted Towhee	Low-elev. Riparian	16	7	0.03	47.7	1	71.7	83	
Spotted Towhee	Mixed Conifer	35	5	0.06	31.9	2	66.1	84	
Spotted Towhee	Montane Shrubland	391	20	2.63	11.8	2	27.5	36	Truncated
Spotted Towhee	Montane Shrubland	435	20	1.88	7.4	5	61.8	45	
Spotted Towhee	Pinyon-Juniper	213	20	0.56	11.3	2	60.1	53	
Spotted Towhee	Ponderosa Pine	95	12	0.32	17.9	1	52.1	50	
Spotted Towhee	Sage Shrubland	23	5	0.05	33.1	1	57.5	67	
Cassin's Sparrow	Grassland	181	12	0.10	13.2	2	64.5	146	
Cassin's Sparrow	Sage Shrubland	30	2	0.01	29.2	1	66.7	175	
Cassin's Sparrow	Semi-desert Shrubland	110	8	0.05	16.5	2	65.0	127	
Chipping Sparrow	Aspen	10	5	0.01	69.8	1	24.2	88	
Chipping Sparrow	High-elev. Riparian	25	9	0.09	33.9	1	60.3	51	
Chipping Sparrow	Lodgepole Pine	14	8	0.17	52.1	2	36.3	32	Truncated
Chipping Sparrow	Lodgepole Pine	16	8	0.15	46.2	4	38.5	36	
Chipping Sparrow	Mixed Conifer	116	16	0.46	16.2	2	47.1	56	
Chipping Sparrow	Montane Shrubland	89	18	0.40	19.0	2	39.9	44	
Chipping Sparrow	Pinyon-Juniper	239	28	1.70	13.3	2	25.5	32	Truncated
Chipping Sparrow	Pinyon-Juniper	266	28	1.35	9.4	3	44.7	38	
Chipping Sparrow	Ponderosa Pine	104	19	0.23	17.9	2	34.4	62	
Chipping Sparrow	Spruce-Fir	12	5	0.03	39.9	1	59.3	66	
Brewer's Sparrow	Grassland	56	7	0.07	28.7	2	65.2	100	
Brewer's Sparrow	High-elev. Riparian	16	3	0.02	51.9	1	39.6	93	
Brewer's Sparrow	Montane Shrubland	16	5	0.12	50.4	2	54.4	34	

Brewer's Sparrow	Pinyon-Juniper	19	7	0.02	36.5	1	46.1	85	
Brewer's Sparrow	Sage Shrubland	364	18	0.82	7.3	2	78.9	67	
Brewer's Sparrow	Semi-desert Shrubland	183	21	0.53	14.9	2	40.1	50	Truncated
Brewer's Sparrow	Semi-desert Shrubland	203	21	0.49	14.1	5	41.9	55	
Vesper Sparrow	Grassland	12	6	0.07	54.5	2	31.5	45	
Vesper Sparrow	Pinyon-Juniper	47	11	0.16	23.6	3	57.0	45	
Vesper Sparrow	Sage Shrubland	202	16	0.32	13.9	1	35.2	79	Truncated
Vesper Sparrow	Sage Shrubland	225	16	0.35	22.0	5	13.4	81	
Vesper Sparrow	Semi-desert Shrubland	47	7	0.06	21.9	2	64.4	78	
Lark Sparrow	Grassland	114	10	0.18	19.3	2	67.1	87	
Lark Sparrow	Pinyon-Juniper	18	10	0.04	46.4	2	33.5	57	
Lark Sparrow	Sage Shrubland	44	6	0.10	23.0	1	68.7	67	
Lark Sparrow	Semi-desert Shrubland	377	20	0.32	8.0	2	73.4	93	
Black-throated Sparrow	All habitats	10	3	0.00	59.4	1	84.2	62	Perpendicular
Black-throated Sparrow	All habitats	13	3	0.00	45.0	1	55.4	112	
Black-throated Sparrow	Semi-desert Shrubland	12	2	0.01	46.5	1	56.8	113	
Sage Sparrow	Sage Shrubland	54	6	0.05	51.5	1	90.6	71	Tr. perpendicular
Sage Sparrow	Sage Shrubland	46	6	0.07	32.8	1	29.7	84	Truncated
Sage Sparrow	Sage Shrubland	60	6	0.05	58.9	3	64.7	76	Perpendicular
Sage Sparrow	Sage Shrubland	51	6	0.08	99.6	5	2.8	81	
Sage Sparrow	Semi-desert Shrubland	14	5	0.02	43.6	2	63.3	69	
Lark Bunting	Grassland	508	16	0.60	10.6	2	53.8	102	Truncated
Lark Bunting	Grassland	563	16	0.34	8.5	5	89.5	141	
Lark Bunting	Sage Shrubland	80	3	0.04	26.0	1	76.3	138	Truncated
Lark Bunting	Sage Shrubland	88	3	0.04	24.4	4	90.7	158	
Lark Bunting	Semi-desert Shrubland	48	4	0.02	51.4	2	18.2	121	
Savannah Sparrow	High-elev. Riparian	15	1	0.07	50.5	2	63.5	46	
Savannah Sparrow	Wetlands	23	5	0.26	54.6	2	75.9	71	
Grasshopper Sparrow	Grassland	183	12	0.30	15.4	3	44.1	86	
Grasshopper Sparrow	Sage Shrubland	45	3	0.06	48.9	2	24.5	91	
Grasshopper Sparrow	Semi-desert Shrubland	2	2	0.00	110.2	1	41.1	107	
Fox Sparrow	High-elev. Riparian	27	7	0.06	28.5	1	52.4	66	

Song Sparrow	High-elev. Riparian	93	11	0.23	18.1	2	63.2	61	
Song Sparrow	Low-elev. Riparian	36	9	0.09	45.3	2	53.0	58	
Song Sparrow	Montane Shrubland	21	3	0.12	38.0	2	40.6	38	
Song Sparrow	Wetlands	22	7	0.37	43.1	1	85.0	47	
Lincoln's Sparrow	Alpine Tundra	37	13	0.05	24.0	1	59.3	91	
Lincoln's Sparrow	Aspen	179	19	0.718	12.8	1	51.7	47	Truncated
Lincoln's Sparrow	Aspen	199	19	0.76	14.8	4	35.5	48	
Lincoln's Sparrow	High-elev. Riparian	200	20	1.54	13.9	2	45.0	35	Truncated
Lincoln's Sparrow	High-elev. Riparian	222	20	1.25	12.3	5	51.8	41	
Lincoln's Sparrow	Lodgepole Pine	40	8	0.27	24.7	2	59.2	43	Truncated
Lincoln's Sparrow	Lodgepole Pine	44	8	0.20	23.0	5	61.2	53	
Lincoln's Sparrow	Spruce-Fir	40	10	0.06	22.4	1	88.4	85	
White-crowned Sparrow	Alpine Tundra	530	20	0.60	6.0	1	81.4	97	
White-crowned Sparrow	Aspen	81	13	0.45	21.6	4	43.5	40	Truncated
White-crowned Sparrow	Aspen	90	13	0.18	16.6	4	69.8	66	
White-crowned Sparrow	High-elev. Riparian	114	14	0.67	18.3	2	42.6	40	Truncated
White-crowned Sparrow	High-elev. Riparian	127	14	0.64	15.6	4	52.1	43	
White-crowned Sparrow	Lodgepole Pine	23	6	0.11	36.4	2	52.8	52	Truncated
White-crowned Sparrow	Lodgepole Pine	26	6	0.09	39.5	4	43.2	61	
White-crowned Sparrow	Spruce-Fir	24	9	0.03	36.1	2	51.0	89	
Dark-eyed Junco	Alpine Tundra	12	7	0.02	49.7	2	43.7	75	
Dark-eyed Junco	Aspen	339	24	0.87	6.7	2	73.9	59	
Dark-eyed Junco	High-elev. Riparian	104	19	0.24	14.0	2	57.7	63	
Dark-eyed Junco	Lodgepole Pine	211	16	2.86	18.8	4	14.1	30	Truncated
Dark-eyed Junco	Lodgepole Pine	235	16	1.78	8.6	5	56.9	41	
Dark-eyed Junco	Mixed Conifer	177	15	1.06	10.8	2	67.9	46	
Dark-eyed Junco	Montane Shrubland	19	5	0.07	41.2	1	42.6	48	
Dark-eyed Junco	Ponderosa Pine	204	24	0.55	14.0	2	28.9	56	
Dark-eyed Junco	Spruce-Fir	270	20	0.96	8.4	2	50.0	55	
Black-headed Grosbeak	Aspen	17	5	0.02	33.9	1	61.1	83	
Black-headed Grosbeak	Low-elev. Riparian	24	10	0.04	36.6	1	63.4	89	
Black-headed Grosbeak	Mixed Conifer	12	5	0.02	40.3	2	57.8	93	

Black-headed Grosbeak	Montane Shrubland	96	18	0.17	16.9	1	43.3	69	Truncated
Black-headed Grosbeak	Montane Shrubland	107	18	0.17	26.8	4	14.7	73	
Black-headed Grosbeak	Pinyon-Juniper	60	9	0.09	18.3	1	67.9	71	
Black-headed Grosbeak	Ponderosa Pine	13	7	0.01	62.5	1	22.1	87	
Blue Grosbeak	Low-elev. Riparian	22	13	0.03	31.9	1	44.6	99	
Lazuli Bunting	High-elev. Riparian	10	3	0.06	50.2	1	62.7	38	
Lazuli Bunting	Low-elev. Riparian	17	9	0.05	48.1	1	77.3	49	
Lazuli Bunting	Mixed Conifer	12	2	0.00	43.8	1	56.1	202	
Lazuli Bunting	Montane Shrubland	39	8	0.06	26.5	2	59.2	72	
Red-winged Blackbird	Grassland	15	5	0.01	48.9	1	60.0	148	
Red-winged Blackbird	High-elev. Riparian	14	3	0.01	49.8	1	48.4	101	
Red-winged Blackbird	Low-elev. Riparian	62	18	0.15	29.5	1	89.3	60	
Red-winged Blackbird	Wetlands	139	17	1.73	26.0	2	86.5	64	Truncated
Red-winged Blackbird	Wetlands	154	17	1.53	25.6	4	89.5	80	
Western Meadowlark	Grassland	677	18	0.55	7.4	5	30.8	123	
Western Meadowlark	Grassland	609	18	0.46	22.7	5	3.2	127	Truncated
Western Meadowlark	High-elev. Riparian	18	1	0.01	54.6	1	36.5	148	
Western Meadowlark	Pinyon-Juniper	40	17	0.03	43.5	3	12.7	93	Truncated
Western Meadowlark	Pinyon-Juniper	43	17	0.04	26.0	4	34.5	92	
Western Meadowlark	Sage Shrubland	184	16	0.14	26.8	2	10.2	114	Truncated
Western Meadowlark	Sage Shrubland	204	16	0.15	10.2	4	71.6	116	
Western Meadowlark	Semi-desert Shrubland	555	29	0.34	10.1	2	23.1	109	Truncated
Western Meadowlark	Semi-desert Shrubland	617	29	0.29	6.2	4	52.4	125	
Western Meadowlark	Wetlands	25	13	0.11	26.4	1	70.3	174	
Yellow-headed Blackbird	Wetlands	68	10	1.22	43.9	2	97.9	44	
Brewer's Blackbird	Sage Shrubland	8	2	0.03	73.2	1	57.9	51	
Brewer's Blackbird	Semi-desert Shrubland	32	4	0.11	42.1	2	69.4	46	
Common Grackle	Low-elev. Riparian	17	6	0.04	43.7	1	78.4	57	
Brown-headed Cowbird	Aspen	18	7	0.04	35.7	2	51.4	65	
Brown-headed Cowbird	Grassland	26	5	0.01	36.2	1	47.1	160	Truncated
Brown-headed Cowbird	Grassland	29	5	0.02	44.0	4	27.1	147	
Brown-headed Cowbird	High-elev. Riparian	12	6	0.02	47.8	1	47.5	68	

Brown-headed Cowbird	Low-elev. Riparian	48	15	0.10	29.5	1	70.4	72	
Brown-headed Cowbird	Mixed Conifer	11	3	0.01	43.0	1	74.0	97	
Brown-headed Cowbird	Montane Shrubland	112	21	0.68	14.8	2	63.7	38	
Brown-headed Cowbird	Pinyon-Juniper	42	18	0.09	22.9	2	56.6	57	
Brown-headed Cowbird	Ponderosa Pine	30	12	0.06	26.0	1	61.9	65	
Brown-headed Cowbird	Sage Shrubland	28	11	0.03	25.9	1	56.2	97	
Brown-headed Cowbird	Semi-desert Shrubland	33	7	0.02	27.2	1	55.2	111	
Brown-headed Cowbird	Wetlands	12	5	0.13	51.2	1	75.4	72	
Orchard Oriole	Low-elev. Riparian	18	5	0.03	80.5	1	92.3	84	
Bullock's Oriole	Low-elev. Riparian	32	12	0.05	35.5	1	62.8	94	
Baltimore Oriole	Low-elev. Riparian	3	2	0.00	84.6	1	74.5	126	
Brown-capped Rosy-Finch	Alpine Tundra	26	3	0.04	65.7	2	93.8	49	Perpendicular
Brown-capped Rosy-Finch	Alpine Tundra	15	3	0.05	49.7	2	69.1	57	
Pine Grosbeak	All habitats	45	25	0.00	30.0	1	87.8	50	Perpendicular
Pine Grosbeak	All habitats	54	25	0.01	19.2	2	62.4	67	
Pine Grosbeak	Aspen	9	4	0.01	61.3	2	42.1	101	
Pine Grosbeak	Lodgepole Pine	8	5	0.03	76.6	1	26.1	55	
Pine Grosbeak	Spruce-Fir	28	11	0.08	28.5	1	43.3	61	
Cassin's Finch	All habitats	45	35	0.00	31.2	1	90.5	53	Perpendicular
Cassin's Finch	All habitats	71	35	0.03	32.5	3	18.4	46	Truncated
Cassin's Finch	All habitats	78	35	0.03	17.3	5	60.0	45	
Cassin's Finch	Aspen	16	8	0.05	51.0	2	35.0	53	
Cassin's Finch	High-elev. Riparian	8	2	0.05	74.2	1	45.0	38	
Cassin's Finch	Lodgepole Pine	13	6	0.10	50.6	1	33.3	40	
Cassin's Finch	Mixed Conifer	9	5	0.08	52.3	2	48.4	38	
Cassin's Finch	Ponderosa Pine	18	7	0.04	37.2	1	60.7	63	
Cassin's Finch	Spruce-Fir	7	4	0.02	77.1	1	30.4	59	
House Finch	Low-elev. Riparian	12	7	0.02	45.4	1	67.6	81	
House Finch	Pinyon-Juniper	67	15	0.18	24.0	2	39.7	51	
Red Crossbill	All habitats	104	34	0.01	26.4	3	25.3	87	
Red Crossbill	High-elev. Riparian	8	3	0.01	63.9	1	60.6	83	
Red Crossbill	Lodgepole Pine	24	6	0.04	41.7	1	39.9	87	

Red Crossbill	Mixed Conifer	20	3	0.05	42.6	2	44.9	73	
Red Crossbill	Ponderosa Pine	16	8	0.03	40.9	1	59.2	70	
Red Crossbill	Spruce-Fir	20	8	0.03	34.8	1	76.1	87	
Pine Siskin	All habitats	560	116	0.24	17.7	4	9.6	43	Truncated
Pine Siskin	All habitats	622	116	0.18	6.6	4	64.0	52	
Pine Siskin	Alpine Tundra	21	5	0.28	43.1	2	55.9	28	
Pine Siskin	Aspen	94	20	0.29	14.9	2	81.9	54	
Pine Siskin	High-elev. Riparian	123	19	0.35	12.6	2	88.0	57	
Pine Siskin	Lodgepole Pine	80	16	0.56	18.2	2	52.4	42	
Pine Siskin	Mixed Conifer	68	14	0.34	17.4	1	57.4	50	
Pine Siskin	Ponderosa Pine	45	13	0.10	26.6	1	48.6	62	
Pine Siskin	Spruce-Fir	159	20	0.55	11.8	1	66.5	56	
Lesser Goldfinch	All habitats	18	5	0.00	45.7	2	47.2	107	
Lesser Goldfinch	Montane Shrubland	15	3	0.01	53.0	2	45.0	111	
American Goldfinch	Low-elev. Riparian	20	7	0.04	42.0	1	69.8	66	
American Goldfinch	Montane Shrubland	13	4	0.02	61.5	2	29.1	84	
Evening Grosbeak	All habitats	12	12	0.00	46.8	1	87.4	61	Perpendicular
Evening Grosbeak	All habitats	23	12	0.00	45.7	1	46.1	104	
Evening Grosbeak	Mixed Conifer	10	4	0.01	69.3	1	66.0	114	

[1] n=sample size in for species in that habitat
[2] k=number of transects on which species was detected in that habitat
[3] D=density estimate produced from data by program DISTANCE
[4] CV(%)=coefficient of variation, expressed as a percentage, of D
[5] m=number of parameters required to fit a detection-function curve to the best model
[6] %var(n)=the percentage of the variance due to sample size (the other source is detection probability)
[7] ESW=Effective strip width; that width beyond which data are less robust
[8] Perpendicular=only perpendicular distance data (rather than the radial data normal at points) were included in the analysis; Truncated=the upper 10% of distance estimates were truncated in order to smooth data sets; Tr. perpendicular=the perpendicular data were truncated as above.

Appendix B. Results of 2000 coverage of waterbird colonies by *MCB*. Species=number of species nesting at the site; size (# of nests): 1=1-10.; 2=11-25; 3=25-50; 4=51-100; 5=100+.

County	Site	Surveyed?	Active?	Species	Size
Adams	Barr Lake	yes	yes	5	5
Adams	Horse Creek Res.	no			2
Adams	Lake Sangraco	yes	yes	3	2
Alamosa	Adams Lake	yes	yes	3	5
Alamosa	Alamosa NWR	yes	yes	2	1
Alamosa	Blanca Wetlands	yes	yes	1	1
Alamosa	Cotton Lake	yes	no		0
Alamosa	Mishak Lakes	yes	no		0
Alamosa	San Luis Lakes SWA	yes	yes	2	4
Arapahoe	Cherry Creek Res	yes	no		0
Archuleta	Sullenberger Res.	yes	yes	1	2
Baca	Burchfield SWA	no			1
Baca	Two Buttes Res.	yes	no		0
Bent	John Martin Res.	yes	yes	2	5
Bent	Lake Hasty	yes	no		0
Bent	Lower Queens	yes	no		0
Boulder	Boulder Valley Farms	yes	yes	3	5
Boulder	Ish Lake	yes	yes	2	3
Boulder	Longmont	yes	yes	3	3
Boulder	Panama Lake	no			2
Conejos	24 Rd Pond	yes	yes	2	1
Conejos	Big Lake	yes	yes	1	2
Conejos	La Jara Res.	yes	no	1	5
Costilla	Eastdale Res #1	yes	no		0
Costilla	Smith Res.	yes	yes	2	5
Crowley	Holbrook Res.	yes	no		0
Crowley	Horse Cr. & Black Draw	no			2
Crowley	Lake Henry	yes	no		0
Crowley	Lake Meredith	yes	no		0
Crowley	Ordway Res.	no			2
Delta	Confluence Park	yes	yes	1	4
Delta	Crawford Res.	yes	yes	1	1
Delta	Dominguez Canyon	yes	no		0
Delta	Escalante Canyon	yes	no		0
Delta	Escalante SWA--east	yes	no		0
Delta	Fruitgrower's Res.	yes	yes	4	3
Delta	Hotchkiss	yes	no		0
Delta	LP Plant	yes	no		0
Delta	Sweitzer Lake	yes	no		0
Denver	Denver City Park	yes	yes	2	5
Denver	Marston Lake	no			2
Dolores	Glade Lake	yes	no		0
Douglas	Castlewood Cyn State Park	yes	no		0
Eagle	Burns	yes	no		0

Eagle	Consolidated Res.	no			1
Eagle	Dotsero	yes	no		0
Eagle	Gypsum	yes	yes	1	2
Eagle	Rock Bottom Ranch	yes	yes	1	2
Eagle	Spring Park Res.	yes	yes	1	1
El Paso	Chico Basin Ranch	yes	yes	1	1
El Paso	Colorado Springs	yes	yes	1	1
El Paso	Fountain Cr. Reg. Park	yes	yes	1	3
El Paso	Pinello Ranch	yes	yes	1	1
El Paso	Ramah Res.	yes	no		0
Garfield	Clough Island	yes	no		0
Garfield	Newcastle	yes	yes	1	1
Garfield	Parachute	yes	yes	1	2
Garfield	Ranch at Roaring Fork	yes	yes	1	1
Garfield	Rifle	yes	no		0
Garfield	Rose/Sanders Ranch	yes	yes	1	2
Garfield	Rulison	yes	no		0
Garfield	Silt	yes	yes	1	4
Garfield	Snyder Island	yes	no		0
Grand	Hinman Res.	yes	yes	2	1
Grand	Junction Butte	yes	no		0
Grand	Kremmling	yes	no		0
Grand	Lake Granby	yes	yes	1	2
Grand	Moore Res.	yes	yes	1	2
Grand	Windy Gap Res.	yes	no		0
Gunnison	Cimmaron	yes	yes	1	2
Gunnison	Gunnison	yes	yes	1	3
Gunnison	Jack's Cabin	yes	yes	1	2
Gunnison	Kenny Moore Res.	no			2
Gunnison	Roaring Judy SFU	yes	no		0
Gunnison	Tomichi Creek	yes	yes	1	1
Hinsdale	Browns Lakes SWA	yes	yes	2	2
Hinsdale	Road Canyon Res.	yes	yes	1	1
Huerfano	Maria Res.	yes	yes	2	2
Huerfano	Walsenburg Res.	no			2
Jackson	Arapaho NWR	yes	yes	2	4
Jackson	Boettcher Lakes	yes	yes	1	2
Jackson	Cowdry Lake	yes	no		0
Jackson	Hebron Slough	yes	yes	2	5
Jackson	Lake John Annex	yes	yes	2	2
Jackson	MacFarlane Res.	yes	yes	3	5
Jackson	Walden Res.	yes	yes	5	5
Jefferson	Standley Lake	yes	no		0
Jefferson	Swan Hereford Ranch	yes	no		0
Jefferson/Douglas	Chatfield Res.	yes	yes	2	5
Kiowa	Lower Queens	yes	yes	1	1
Kiowa	Mud Lake	yes	no		0
Kiowa	Neenoshe Res.	yes	no		0

Kiowa	Neeskah	yes	yes	1	2
Kiowa	Neesopah Res.	yes	yes	1	3
Kiowa	Thurston Res.	yes	no		0
Kiowa/Bent	Adobe Creek Res.	yes	no		0
Larimer	Berthod Res.	yes	yes	1	1
Larimer	Boedecker Lake	yes	yes	1	1
Larimer	Fossil Creek Res.	yes	no		0
Larimer	Lonetree Res.	yes	yes	1	2
Larimer	Strauss Cabin Lake	yes	yes	1	2
Larimer	Terry Lake	yes	yes	1	1
Larimer	Timnath Res.	yes	yes	2	2
Larimer	Wellington Res. #3	yes	yes	1	2
Logan	Jumbo Lake	yes	no		0
Logan	North Sterling Res	yes	yes	2	2
Mesa	20 Road Island	yes	no		0
Mesa	28 1/2 Road	yes	yes	1	3
Mesa	Casto Res.	yes	no		0
Mesa	Cheney Res.	yes	yes	1	1
Mesa	Clifton Water	yes	no		0
Mesa	Crow Bottom	yes	no		0
Mesa	Debeque	yes	yes	1	2
Mesa	East Salt Wash	yes	yes	1	1
Mesa	Orchard Mesa WA	yes	no		0
Mesa	Skippers Island	yes	yes	1	3
Mesa	Thompson Res. #2	yes	no		0
Mesa	Unaweep Divide lakes	yes	no		0
Mesa	Whitewater	yes	no		0
Moffat	Axial	yes	yes	1	1
Moffat	Browns Park NWR	yes	yes	1	2
Moffat	Craig	yes	yes	1	1
Moffat	Craig E	yes	yes	1	1
Moffat	Craig S	yes	yes	1	1
Moffat	Maybell	yes	yes	1	1
Moffat	Ralph White Lake	yes	yes	1	1
Moffat	Three Springs Ranch	yes	yes	1	2
Morgan	Jackson Res.	yes	no		0
Otero	Lake Cheraw	yes	no		0
Otero/Bent	Horse Creek Res.	yes	no		0
Park	Antero Res.	yes	no		0
Park	Como Lake	yes	yes	1	1
Park	Fairplay Pond	yes	yes	1	1
Park	Milligan Lakes	yes	yes	1	3
Park	Red Hill Pass Pond	yes	no		0
Pitkin	North Star Preserve	yes	yes	1	1
Prowers	Thurston Res.	yes	no		0
Pueblo	Huerfano Lake	no			2
Pueblo	Pueblo Nature Center	yes	no		0
Pueblo	Pueblo Res.	yes	yes	2	5

Pueblo	St. Charles Res. #1	no			2
Rio Blanco	Meeker	yes	yes	1	2
Rio Blanco	Powell Park	yes	yes	1	1
Rio Blanco	Rangely	yes	yes	1	2
Rio Blanco	Rio Blanco Lake	yes	yes	1	1
Rio Grande	Monte Visa NWR	yes	yes	6	5
Routt	Hayden	yes	yes	1	2
Routt	Milner	yes	yes	1	1
Routt	Morgen Bottom	yes	yes	1	1
Routt	Steamboat Springs	yes	no		0
Routt	Yampa	yes	yes	1	2
Saguache	Russell Lakes SWA	yes	yes	4	5
Saguache	Saguache Res.	yes	no		0
Washington	Prewitt Res.	yes	yes	1	2
Weld	Black Hollow Res.	yes	yes	1	1
Weld	Empire Res.	no			3
Weld	Glenmere Park Pond	yes	yes	1	1
Weld	Grover	yes	yes	1	1
Weld	Ireland Res. #5	yes	no		0
Weld	Johnstown	yes	yes	1	2
Weld	Lower Latham Res.	no			3
Weld	Milton Res.	yes	yes	2	5
Weld	Prospect Res.	no			2
Weld	Riverside Res.	no			5
Weld	Siebring Res.	yes	yes	1	2
Weld	Union Res.	yes	no		0
Weld	Windsor	yes	no		0
Yuma	Arickaree River	yes	no		0
Yuma	Beecher Island	yes	no		0
Yuma	North Fork Republican	yes	no		0

Summary: In 2000, *MCB* surveyed 155 of 170 sites known to have supported colonial waterbirds within the past three years and confirmed nesting by at least one species at 93 sites. Of these, 37 contained from 1 to 10 nests, 41 had 11-25, 11 had 26-50, four had 51-100, and 14 supported more than 100.