Monitoring Colorado's Birds:
The 2002 Field Season

Submitted by:

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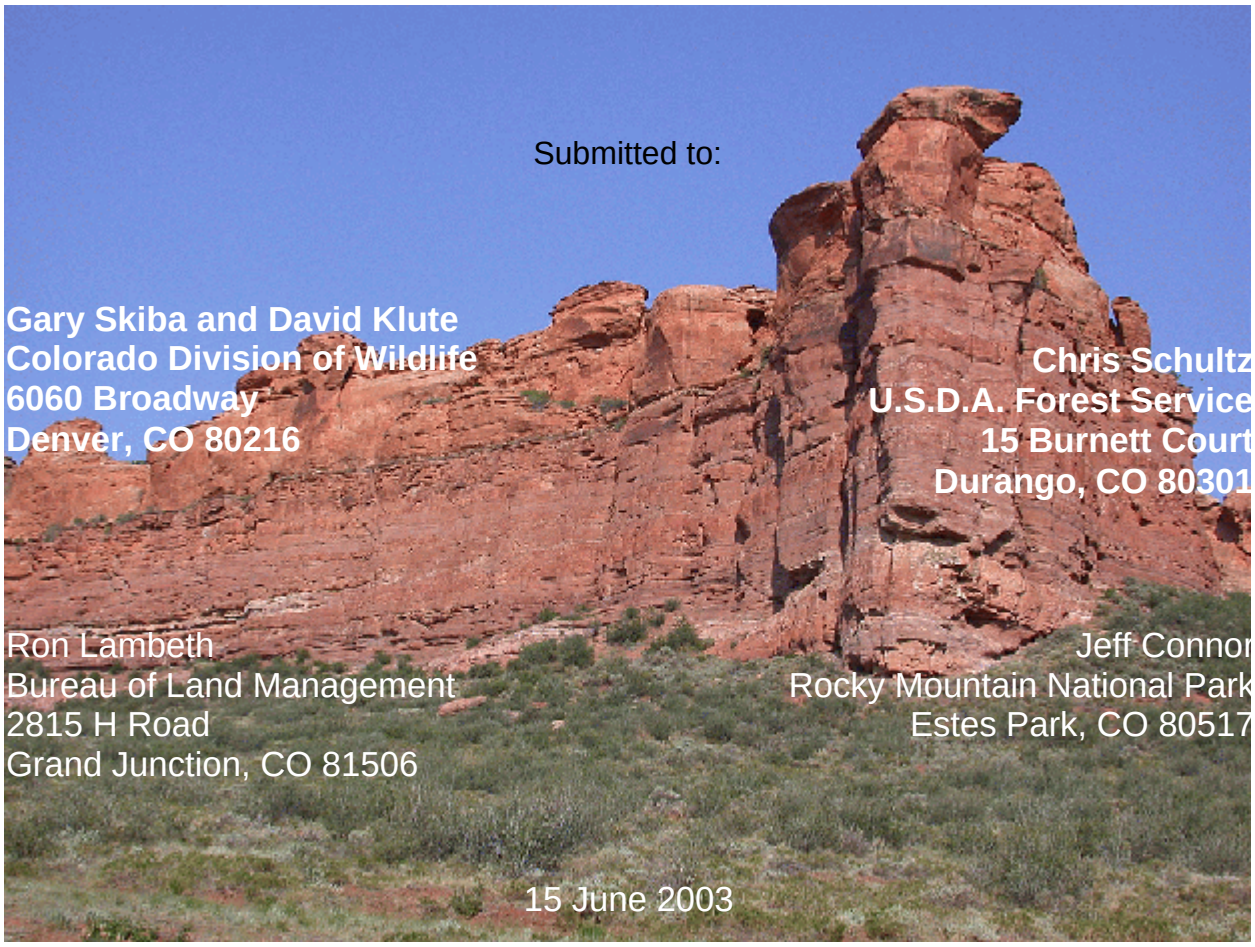
Abstract



In 2002, Rocky Mountain Bird Observatory, in conjunction with its funding partners, Colorado Division of Wildlife, U.S.D.A. Forest Service, and U.S. Bureau of Land Management, conducted the *Monitoring Colorado's Birds* breeding-bird monitoring plan, as updated in 2001 (Leukering et al. 2001a).

We conducted transects in 12 habitats this year, as we could not conduct Low-elevation Riparian transects due to the lack of water in the rivers (we conduct floating transects in this habitat). Additionally, we were unable to access a number of transects due to fire closures on a variety of state and federal lands. Despite the access issue of a very difficult field season, the habitat-stratified transects provided excellent data on 79 breeding species.

We conducted an extensive survey of breeding colonial waterbirds, counting individuals of 16 species at sites with a history of breeding by any of these species, as well as at a large number of sites deemed to have a high potential for breeding. These colony counts entailed 408 discrete monitoring tasks, with a count of one species at one site comprising each task. In addition we counted all waterbirds at 128 lakes, most of which do not have known nest colonies. We also documented breeding sites and counted individuals of 23 species with limited breeding ranges in Colorado. We conducted an early-winter count of waterfowl at 229 bodies of water, virtually all open water in the state. We continued to gather information on locations of breeding sites for species in these two categories and have added a number of such sites to the list of locations to survey in 2003. Our counts in 2002 suggest that we will be able to monitor all of the colonial waterbirds and at least six of the limited-range species (Snowy Plover, Willet, Osprey, Black Phoebe, Bobolink, and Scott's Oriole).

Introduction

Rocky Mountain Bird Observatory (RMBO) initiated efforts to create and conduct a Colorado-wide project to monitor breeding-bird populations in 1995 (see Leukering et al. 2001a). 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 fieldwork in 1999 to include all originally allocated habitats and special-species efforts. We continued the project in 2001 and this report presents the results of that effort. This report also constitutes partial fulfillment of the requirements in Item F in our contract with CDOW (PSC-1049-2003) and also for our contracts with U.S.D.A. Forest Service Region 2 (CCS-09-00-99-076) and U.S. Bureau of Land Management (CSP001043).

Methods

As in prior years, we used three methods (transects, colony counts, and censussing) to obtain population data on Colorado's breeding-bird species. We briefly outline these methods, below; please refer to Leukering et al. (2001b) for specifics on these methods.

Point transects–We established transects of 15 point counts in each of 30 randomly-selected stands in each of 11 habitats (Alpine Tundra, Aspen, Grassland, High-elevation Riparian, Mixed Conifer, Montane Shrubland, Piñon-Juniper, Ponderosa Pine, Sage Shrubland, Semi-desert Shrubland, and Spruce-Fir). We recorded all birds detected on the points and recorded an estimate of distance from the point to each bird. For species of low density, designated *a priori*, detected on points, we also recorded the distance to the individual perpendicular to the line of the transect. We also noted individuals of low-density species detected between points and recorded perpendicular distances for those individuals. See Leukering et al. (2001b) for more specifics of the various methodologies.

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) and Buckland et al. (2001). 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. We conducted an initial analysis of species for which we obtained sample sizes of >24 individuals. We did this to look at the data histograms and the detection-function curve fit and then truncated as needed to eliminate outliers. For species of low density and, thus, low detection rates, we pooled data across these 11 habitats and utilized the transect data (that is, the between-point detections).

Low-elevation Riparian and Wetland transects – For Wetland transects, we randomly selected 30 sites and established a 300-meter line transect at each. Transect survey duration was 30 minutes for both habitats. We analyzed these data as for the point transects, above. We did not conduct the floating, Low-elevation Riparian transects in 2002 due to very low water levels in the various rivers on which these transects are placed (Colorado law states that navigable waters are of open access, but we would not have been able to float most of the transects in 2002; walking them would have constituted trespassing).

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 Blue Heron, Great Egret, Snowy Egret, Cattle Egret, Black-crowned Night-Heron, White-faced Ibis, Franklin's Gull, California Gull, Forster's Tern, and Black Tern. We also visited

numerous lakes and ponds to determine the likelihood of future nesting of any of these species at those locations. See Leukering et al. (2001b) for more specifics on these methods.

Survey of ponds and lakes – We conducted counts of grebes, wading birds, waterfowl, gulls, and terns at lakes and ponds throughout the state, most below 7000' elevation. Observers noted numbers of adults, juveniles, and active nests. Counts were conducted from as many points as necessary to adequately count each site.

Other focused species surveys

Pied-billed Grebe–We collected incidental observations made by field staff at probable and confirmed nesting sites and entered sites that were previously unreported into the database.

American Bittern–We cataloged sites where breeding had been reported as confirmed in Kingery (1998). We obtained occurrence data on year 2002 from *North American Birds* (*NAB*) regional editors and other contacts. We surveyed a portion of the historical sites in association with conducting wetland transects and other monitoring tasks.

Green Heron–We obtained data on year 2002 locations from *NAB* regional editors and other contacts. We also surveyed selected sites of confirmed breeding as reported in Kingery (1998) and by local observers and counted individuals detected through the survey of lakes and ponds.

Osprey–We gathered data from established monitoring efforts and volunteers and staff visited a majority of the remaining known breeding sites.

Mississippi Kite–We cataloged sites where breeding was reported as confirmed in Kingery (1998) and sites reported by local experts. We obtained data on year 2002 from *NAB* regional editors and other contacts.

Ferruginous Hawk–We catalogued sites of recent nesting from the CDOW Northwest Region databases and surveyed those sites. We surveyed the northern half of the San Luis Valley for active nests and adventitiously noted active nests while conducting other efforts.

Snowy Plover–We collected data from BLM monitoring efforts at Blanca Wetlands and surveyed all reservoirs of Bent, Kiowa, and Prowers counties where nesting had previously been documented.

Black-necked Stilt–We collected observations from NWR personnel, surveyed all reservoirs of Bent, Kiowa, and Prowers counties, and collected observations from the *MCB* lake counts.

Willet–We conducted a census of breeding sites located during the 1998 field season: Arapaho NWR, Hebron Waterfowl Area, Walden Reservoir, Lake John, Delaney Buttes, Cowdry Reservoir, wetlands along the Yampa River, and Fruitgrowers Reservoir.

Upland Sandpiper– We obtained data on year 2002 occurrences from *NAB* regional editors and we began cataloging information on breeding locations in preparation for an extensive effort in the 2004 field season.

Black Rail–We began designing a protocol to monitor this species.

Eurasian Collared-Dove–We tracked the invasion of this species by cataloguing all observations reported on the listserve, COBIRDS, and by field workers. We recruited volunteers to check sites in the Arkansas Valley that had previous history of occupation.

Burrowing Owl–RMBO conducted an intensive inventory of this species on the Western Slope of Colorado in a project for the BLM's Grand Junction Field Office. The data collected have also been entered into *MCB* databases.

Black Swift–USFS personnel and RMBO staff and volunteers conducted a census of 17 of the 71 documented breeding sites. Additionally, we surveyed another 90 sites for evidence of breeding and suitability for occupation by Black Swifts. We evaluated each site using criteria developed by USFS Region 2.

Chimney Swift–We catalogued general sites reported in Kingery (1998) and by *MCB* field workers and recruited volunteers to find and monitor specific nest sites.

White-throated Swift–We began a catalogue of historical colony nest sites.

Lewis's Woodpecker–We began a catalogue of historical nest sites. We also recorded observations reported by field workers, by observers posting to the listserve COBIRDS, and those in Kingery (1998).

Eastern Phoebe--We began a catalogue of historical nest sites and ecorded observations reported by field workers, by observers posting to the listserve COBIRDS, and those in Kingery (1998).

Black Phoebe–We conducted a count of individuals on the San Miguel River where the river is accessible by road, and at all of the other known historical nesting sites. We also recorded incidental observations at other locations.

Scissor-tailed Flycatcher– We obtained data on year 2002 locations for this species from *NAB* regional editors and other contacts.

Bell's Vireo–Incidental to other surveys, field workers counted all individuals at two historical breeding areas along the South Platte River and in Yuma County. Other historical sites were not visited this year.

Purple Martin–We visited as many sites with a history of occurrence by this species as possible, counted birds present, and searched for active nest cavities. We visited most of the cavities identified in 2001 and determined whether they were active in 2002.

American Redstart–We obtained data on year 2002 locations for this species from *North American Birds* regional editors and other contacts.

Ovenbird–We began a catalogue of historical nest sites by recording observations reported by field workers and observers posting to the listserve COBIRDS, and those in the *Colorado Breeding Bird Atlas.* We obtained data on year 2002 locations for this species from *North American Birds* regional editors and other contacts.

Northern Waterthrush–We began a catalogue of historical nest sites. We recorded observations reported in the *Colorado Breeding Bird Atlas* and added specific information from the local expert.

Northern Cardinal–We began a catalogue of historical summer sites, recording observations reported in Kingery (1998) and added specific information from local experts. We obtained data on year 2002 locations for this species from *NAB* regional editors.

Bobolink–We surveyed all known sites and searched for previously undocumented sites along the Yampa River Valley in Routt and Moffat counties and in the White River Valley in Rio Blanco County. We collected data from existing studies in Boulder County, from surveys by volunteers in Larimer, Morgan, Douglas, and Elbert counties, and also obtained incidental records from field work.

Scott's Oriole– We visited all known breeding sites and determined occupancy of each. We also obtained incidental records from field work.

Results

Transects – We conducted 301 transects in 12 habitats (average of 25.1 per habitat; Table 1). This was the lowest number in four years of conducting these transects, except for 1998 when we conducted transects in only three habitats (Leukering and Carter 1999). We obtained data on 208 bird species via the transects and provide summary data in Appendix A for 100 of those. This appendix lists results from all habitat target species and all habitat-species associations and for low-density species across all habitats for which we obtained a sample size of detections of >24.

Table 1. Number of transects conducted in each habitat with totals of species and individuals detected (excluding flyovers) in *MCB* 2001 field season.

Habitat	# transects run	# species detected	# individuals
Alpine Tundra	21	66	1691
Aspen	25	78	2935
Grassland	24	59	2893
High-elevation Riparian	22	86	2707
Low-elevation Riparian[1]	0		
Mixed Conifer	22	78	2422
Montane Shrubland	25	93	2918
Piñon-Juniper	30	92	2345
Ponderosa Pine	24	85	2722
Sage Shrubland	29	94	2722
Semi-desert Shrubland	30	93	2518
Spruce-Fir	26	61	2379
Wetland	23	76	1352
Totals (13 habitats)	301	208	29,604

[1] We did not conduct transects in this habitat in 2002; see Methods.

Colonial waterbirds – With one exception, we visited and censussed all nesting sites that are known to have been occupied within the past three years (Table 2). Individuals requiring specific site data should contact the authors.

Table 2. Results of *MCB* colonial waterbird counts, summer 2002.

Species	# of sites in database	# of sites surveyed	# of active sites	# of confirmed sites[1]	# of nests occupied	# of adults	# of juveniles
Eared Grebe	61	54	20	10	493	2021	164
Western Grebe	59	44	19	3	42	1140	1
Clark's Grebe	36	24	10	3	0	90	11
American White Pelican	3	3	3	3	0	995	1350
Double-crested	33	30	16	16	893	2175	103
Great Blue Heron	171	133	77	78	1197	1414	237
Great Egret	5	5	4	2	15	34	0
Snowy Egret	21	20	7	5	116	111	137
Cattle Egret	12	12	3	2	34	27	44
Black-crowned Night-	41	39	17	12	336	603	175
White-faced Ibis	21	20	6	3	202	254	63
Franklin's Gull	9	9	5	5	0	1206	418
California Gull	2	2	2	0	0	10	20
Forster's Tern	6	5	1	1	0	32	11
Black Tern	14	14	1	1	2	8	0
Totals	??	408	??	??	??	??	??

[1] Confirmed sites are those in which we obtained proof (e.g., we found nests) of nesting

Surveys of other localized species – We collected counts of individuals of 29 additional species, most of which are of limited distribution in the state (Table 3). For some of these species, we simply catalogued sites in preparation for more extensive efforts in future years. Individuals requiring specific site data should contact the authors.

Lakes and ponds summer survey – We counted waterbirds at 128 bodies of water in 40 counties (Table 4). This is much less effort than we extended in 2001 (Leukering et al. 2002) as we are nearing completion of the aim of this effort - cataloguing waterbird sites. Individuals requiring data on specific sites should contact the authors.

Early-winter Barrow's Goldeneye and other waterfowl count – We counted water birds at 229 bodies of water in 35 counties (Table 5). More detailed data for Barrow's Goldeneyes are included the Discussion section that follows. Individuals requiring data on specific sites should contact the authors.

Table 3. Counts of species on which *MCB*'s special monitoring projects focused, summer 2002.

Species[1]	# of sites in database	# of sites surveyed	# of active sites	# of confirmed sites[2]	# of nests occupied	# of adults	# of juveniles
Pied-billed Grebe (i)	78	30	29	12	0	56	46
American Bittern (i)	32	12	6	0	0	14	0
Green Heron	23	2	2	0	0	2	0
Barrow's Goldeneye	260	229	11	na	na	146[3]	30
Osprey	97	76	48	48	48	96	42
Mississippi Kite (m)	18	6	6	2	2	13	0
Ferruginous Hawk (m)	12	12	10	9	9	15	10
Snowy Plover (i)	16	14	11	6	11	163	10
Black-necked Stilt (i)	30	17	12	5	17	65	0

Willet	24	15	5	1	0	28	6
Upland Sandpiper (m)	2	2	2	0	0	4	0
Black Rail (i)	22	0	0	0	0	0	0
Eurasian Collared-Dove	61	21	21	1	1	69	0
Burrowing Owl (West Slope)	83	83	15	7	8	41	35
Black Swift[4] (i)	220	107	25	36	63	91	37
Chimney Swift (i)	53	14	16	16	0	79	0
White-throated Swift (m)	87	4	3	3	0	23	0
Lewis's Woodpecker (m)	73	40	39	17	19	95	21
Eastern Phoebe (m)	30	7	7	5	5	11	3

Black Phoebe (i)	65	29	26	7	6	42	12
Scissors-tailed Flycatcher	2	1	1	1	0	2	2
Bell's Vireo (m)	13	2	2	0	0	2	0
Purple Martin	139	90	65	56	136	389	46
American Redstart (m)	4	1	1	0	0	2	0
Ovenbird (m)	26	6	6	1	1	21	0
Northern Waterthrush	1	0	0	0	0	0	0
Northern Cardinal (m)	2	1	1	0	0	2	0
Bobolink	70	17	15	0	0	67	0
Scott's Oriole	28	15	9	0	0	11	0

Totals	1571	853	394	233	326	2866	300

[1] Some efforts were minimal (m) and some were incomplete (i); those that were virtually complete have no code.

[2] Confirmed sites are those at which we obtained proof (e.g., we found nests) of nesting.

[3] The figure for Barrow's Goldeneye adults includes 48 birds whose ages could not be determined.

[4] The figure for Black Swift sites in database includes waterfalls that have not yet been surveyed for occupancy, as well as confirmed and possible nest sites.

Table 4. Results of the *MCB* survey of water bodies, summer 2002.

Species	# of sites	# of adults	# of juveniles	Total # of individuals
Pied-billed Grebe	11	53	33	86
Eared Grebe	20	1629	142	1771
Western Grebe	20	1087	1	1088
Clark's Grebe	11	122	12	134
American White Pelican	20	554	0	554
Double-crested Cormorant	17	881	90	971
Great Blue Heron	8	46	8	54
Great Egret	1	2	0	2
Snowy Egret	7	107	90	197
Cattle Egret	3	24	44	68
Black-crowned Night-Heron	10	72	94	166
White-faced Ibis	14	315	13	328
Canada Goose	20	129	39	168
Wood Duck	2	0	4	4
Gadwall	20	599	63	662
American Wigeon	5	87	10	97
Mallard	20	30	122	152
Blue-winged Teal	6	19	8	27
Cinnamon Teal	6	95	11	106
Northern Shoveler	1	0	0	0
Northern Pintail	4	2	8	10
Green-winged Teal	7	851	35	886
Canvasback	1	0	0	0
Redhead	3	4	14	18
Ring-necked Duck	3	50	14	64
Lesser Scaup	6	232	50	282
Common Merganser	6	12	20	32
Ruddy Duck	14	1203	142	1345
Virginia Rail	1	1	0	1
Sora	1	1	0	1
American Coot	20	536	33	569
Franklin's Gull	7	69	17	86
California Gull	13	1359	428	1787
Forster's Tern	7	59	11	70
Least Tern	2	4	0	4
Black Tern	6	134	0	134
Totals	36	10368	1556	11924

Table 5. Results of survey of early-winter waterbird count, 30 November-1 December 2002.

Species	# of sites	Total
Pacific Loon	1	2
Common Loon	12	16
Pied-billed Grebe	21	58
Eared Grebe	10	47
Western Grebe	14	117
Clark's Grebe	1	1
American White Pelican	3	3
Double-crested Cormorant	7	12

Greater White-fronted Goose	3	10
Snow Goose	12	571
Ross's Goose	8	48
Canada Goose	108	36922
Tundra Swan	2	5
Wood Duck	4	11
Gadwall	53	1535
American Wigeon	67	2197
Mallard	142	60919
Northern Shoveler	47	6531
Northern Pintail	29	2489
Green-winged Teal	39	1365
Canvasback	10	129
Redhead	24	246
Ring-necked Duck	62	1231
Greater Scaup	4	8
Lesser Scaup	51	681
White-winged Scoter	1	1
Black Scoter	1	1
Long-tailed Duck	3	9
Bufflehead	74	580
Common Goldeneye	121	3076
Barrow's Goldeneye	15	173
Hooded Merganser	32	207
Common Merganser	65	4330
Ruddy Duck	26	345
Bald Eagle	17	50
American Coot	31	608
Killdeer	4	8
Bonaparte's Gull	3	38
Mew Gull	1	1
Ring-billed Gull	75	6363
California Gull	14	97
Herring Gull	23	211
Lesser Black-backed Gull	2	2
Glaucous-winged Gull	1	1
Great Black-backed Gull	1	1
Black-legged Kittiwake	1	1
gull sp.	8	305
Totals	229	131562

Discussion

Though we really believed that we would come close to completing all transects in 2002 (due to a large and excellent field staff), this field season was the most difficult of the program's history. Though we typically conduct a higher percentage of the transects in early-season habitats (e.g., Piñon-Juniper and Sage Shrubland) than in later-season habitats (e.g., Spruce-Fir)(see previous program reports), in 2002 we did even better than usual by completing all but seven of the 120 early-season transects - we were having a good season. Then the Hayman Fire erupted.

Due to various drought effects, there was a sizable number of transects that we could not conduct. We decided early in the season that we would be unable to conduct the 30 Low-elevation Riparian transects due to very low water levels in the rivers on which we

conduct these floating transects. Fires and fire closures forced us to forego conducting at least 11 transects in seven counties on various state and federal properties. National security concerns caused us to not have access to a Montane Shrubland transect on the Air Force Academy in El Paso Co. Finally, due to these various problems, Leukering spent much more time in the RMBO office than is usual trying, and only rarely succeeding, to get access to transects behind closures, thus resulting in him conducting many fewer transects (~15) than he planned.

In general, despite an incomplete sample of transects in most habitats, sample sizes for many species were sufficient for analysis. Even some low-density species were detected in reasonable numbers (e.g., Williamson's Sapsuckers in sufficient sample size in both Mixed Conifer and Ponderosa Pine). The fact that we, again, obtained robust data despite completing only two habitat's transects (Piñon-Juniper and Semi-desert Shrubland) is further support for the usefulness and flexibility of the *MCB* program.

Species that are considered well-sampled via transects are those with coefficients of variation of the density estimates (D CV in Appendix A; hereafter CV) of less than 50% and with two or fewer parameters (m) included in the detection-curve function. 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 fewer than 25.

Analyzing just the point data on a by-habitat basis, we obtained CVs of $\leq$50% for 79 species and CVs of between 50% and 100% for and additional four species (Appendix A). For no other species did we obtain sufficient sample size on points. This compares favorably with the somewhat more extensive effort of 2001, when the respective numbers were 76 and zero (If we remove from the list those that were listed only in Low-elevation Riparian and the four species which only made the list by our analyzing all habitats together).

As all partners and funders are interested in management implications of the *MCB* data, we here provide brief synopses of 2002 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), the Colorado BLM list (BLM-SS; Morgan 2000), 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, U.S. Forest Service, and by the state, we do not attempt to monitor them and do not consider them here (except for Snowy Plover). Peregrine Falcon, though federally de-listed, is still within the five-year mandatory monitoring, thus the state and federal agencies still have this responsibility; we do not yet consider it part of our purview.

Pied-billed Grebe – Incidental reports were submitted by volunteers and field workers for 30 sites, including ten not previously documented. The developing atlas of confirmed and probable nesting sites now includes 78 locations.

Eared Grebe – *MCB* staff surveyed 54 of 61 sites with a history of confirmed or possible nesting, including all major sites. Nesting was confirmed at only10 sites as the drought conditions in the state deepened. Several of the historical sites were dry or had extremely low water levels. The total nest count of 493 was higher than the 403 in 2001 (682 in 2000), but many nests were in extremely shallow and receding water. It is likely that a high proportion of those nests were not successful. Production was down significantly at Walden Reservoir and other historical North Park sites, which had even lower water levels than in 2001; however, many birds apparently moved to Pole Mountain Reservoir which had a nesting colony (192 nests) for the first time since *MCB* began monitoring efforts.

Western Grebe – We surveyed 44 of 59 sites with a history of confirmed or possible nesting, including all major sites. All of the sites not visited were sites which have had only small numbers of nests recorded and no recent evidence of nesting. Nesting was confirmed at only three sites as low water levels eliminated nesting opportunities at many reservoirs. Forty-two active nests were counted. Adults were present at 19 sites; the total number of adults--mostly non-breeding birds--at these sites was 1140, up by more than 400 birds from 2001 surveys (666) covering most of the same sites.

Clark's Grebe – Our database contains 36 historical and possible nesting sites. We surveyed 24 sites of these sites and found 90 adults–primarily non-breeding birds--at 10 sites and 11 juveniles at three. Many of the Arkansas River Valley sites that have significant numbers of non-breeding birds most years were not surveyed. The extensive lakes survey counted an additional 106 non-breeding adult Clark's Grebes at 18 sites.

American White Pelican (CO ETSC) – RMBO field workers surveyed the three historical nesting sites. Successful nesting occurred at Antero Reservoir, Riverside Reservoir, and MacFarlane Reservoir. At Antero Reservoir, 180 juveniles were present on 16 July, the first young produced in three years. Low water levels apparently reduced disturbance by recreationists, which had led to nest failure in each of the previous two years. At Riverside Reservoir, the number of juveniles was up from a low count last year (approximately 200 juveniles), with an estimated 850 young present on 17 July. This number is still lower than numbers estimated in the mid 1990s. On 23 July, 320 juveniles were counted at MacFarlane, up from 278 on 13 July 2001 and 167 on 13 July 2000. The lakes survey tallied 473 non-breeding pelicans at 27 additional sites.

Double-crested Cormorant – We surveyed 30 of 33 sites with a history of confirmed or possible nesting, including all major sites. All of the sites not visited are low priority sites that have no recent evidence of nesting. Adults were present at 14 sites, and breeding was confirmed at 14 sites; 1920 adults and 893 active nests were counted. The total number of active nests was down slightly from the 2001 numbers (971) but still higher than the 814 in 2000. The only colony to clearly fail due to drought conditions was the one at Walden Reservoir in Jackson County. RMBO surveys of other lakes counted 201 non-breeding adults at an additional 15 sites.

American Bittern (FS-SS) - Although we did not attempt a state-wide survey of this species in 2002, we continued 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 32 sites. We visited or received reports on 12, six of which were occupied by at least one singing male (total = 14). We are cataloguing sites and for counting this species in the future and will experiment with protocols devised by the Marshbird Monitoring Committee for the North American Waterbird Conservation Plan.

Great Blue Heron – We surveyed 133 of 171 sites in the database. With one exception, the unvisited sites have not been active for more than three years. We were denied access to Empire Reservoir, the only unvisited site with any likelihood of having more than ten nests. Of those visited, adults were present at 77 sites, and 78 sites had at least one active nest; these sites contained a total of 1197 active nests. Drought conditions seemed to have little effect on this species; the number of nests counted in 2002 was virtually identical to the number in 2001.

Table 5. Comparison of GBHE counts 1999-2002.

	Counts				Averages[1]		
Year(s)	1999	2000	2001	2002	1999-2001	2000-2002	1999-2002
# of Active Sites	38	58	72	71	89	95	102
# of Active Nests	886	1250	1199	1197	1294	1265	1285

[1]Averages are computed by summing the average counts at each colony

Great Egret – The Boulder Creek colony, which has historically been the only significant colony in the state, completed its move to its new site near Longmont. All 14 nests in Boulder county were at the new site. The ColonyWatch volunteer at Milton Reservoir reported one active nest at that site, where no nesting had previously been documented. Four non-breeding individuals spent the summer at Russell Lakes and Monte Vista NWR in the San Luis Valley.

Snowy Egret – Twenty of the 21 historical and potential breeding sites in the database were surveyed. We found nests and/or juveniles at five sites and counted 259 adults at these sites. Based on flight-line and nest counts, we estimate that there were 116 active nests in 2002. The numbers were approximately half of those 2000 and 2001. The reduction in numbers is accounted for by the complete failure at Adams Lake and at Bowen Pond due to inadequate water supplies.. All but six nests were in the San Luis Valley; the small colony at Lake Sangraco in Adams county was again

active, and a single pair nested in the Great Blue Heron Colony at Milton Reservoir in Weld County.

Cattle Egret – We surveyed all 11 historical and/or potential breeding sites in the database and counted 82 adults. Based on flight-line counts and nest counts, we estimate that there were 34 active nests in 2002, half of the 2001 total of 67. The entire reduction can be attributed to the complete failure of nesting at Adams Lake due to lack of water.

Green Heron – We did not formally survey the 20 sites where nesting has been confirmed or suspected. We received reports of birds present at three locations during the nesting season, but no confirmations of breeding.

Black-crowned Night-Heron – We surveyed 39 of 41 historical and potential sites in the database and counted nests and/or juveniles at 17. All of the sites not visited are low priority sites that have no recent evidence of nesting. Based on nest counts and flight-line counts, we estimate approximately 336 active nests. In 2000 and 2001 we estimate 225 and 388 active nests respectively. Because this species is difficult to monitor without undue disturbance of nesting activities, these estimates have a fairly wide margin of error. Based on our experience in 2001 and 2002, we believe the earlier estimate to be low. The lower counts this year have reflect of drought conditions, especially in the San Luis Valley. Surveys during the past three seasons have increased understanding of the distribution and abundance of this species, and we have greater confidence in the counts and estimates for 2002 than in previous numbers.

White-faced Ibis (FS-SS) – *MCB* staff, volunteers, and U.S. Fish & Wildlife Service employees surveyed all of the 21 sites where nesting by this species has been previously confirmed or deemed probable. Breeding was confirmed three sites, all in the San Luis Valley. This species was dramatically affected by drought conditions. We estimate a total of 262 active nests for the season, less than 10% of the estimates of 3000 and 3525 for 2000 and 2001 respectively. The large colony of previous years at Adams Lake failed due to inadequate water, and nests at Bowen Pond were nearly all abandoned before hatching. Because this species is very difficult to monitor without undue disturbance of nesting activities, these estimates have a fairly wide margin of error; however, the decline in 2002 is clearly severe.

Barrow's Goldeneye – Volunteers surveyed 229 bodies of water on the weekend of Nov 30–Dec 1. They counted a total of 189 Barrow's Goldeneyes at 16 sites. Over four years of counts, this species has been counted at 33 sites, but 10 sites have accounted for a preponderance of the birds on each count; the major sites are Lake Avery, Rio Blanco County; Jerry Creek Reservoirs, Mesa County; Grand Lake, Grand County; Rifle Fish Hatchery Ponds, Garfield County; Blue Mesa Reservoir, Gunnison County; Blue Lake, Eagle County; Williams Fork Reservoir, Grand County; Rifle Gap Reservoir, Garfield County; Vega Reservoir, Mesa County; and Shadow Mountain Reservoir, Grand County. Each of these sites has had counts reaching 15 birds at least once. None of the minor sites has exceeded 8 birds on any count, and only two of the minor sites has had birds on more than one count.

Table 6. Summary of Barrow's Goldeneye counts, 1999-2002.

	1999	2000	2001	2002
Major sites occupied (of 10)	7	6[1]	9[2]	8
Total BAGO at major sites	226	88	184	168
Minor sites occupied	1	7	11	8
Total BAGO at minor sites	3	14	25	21
Total BAGO at all sites	229	112	209	189
Percent of total at major sites	98.7%	88.9%	88.0%	88.9%

[1]Three of the major sites (Grand Lake and Shadow Mountain Res in Grand County and Blue Mesa Reservoir in Gunnison County) were not surveyed in 2000.
[2]One major site (Blue Lake in Eagle County) was not surveyed in 2001.

Osprey (FS-SS) – We surveyed or solicited reports from volunteers and agency biologists on 76 of 97 nest sites in our database. Unvisited sites were primarily sites for which we had inadequate information to find and low priority sites that have not had recent use. Forty eight nests were found to be active, 31 of those in Grand County. These numbers are essentially similar to those of 2001 (53 and 34 respectively).

Mississippi Kite – Reports from local observers confirmed occupation of six of the 18 nesting territories in our database. We continued to catalog additional nesting locations.

Northern Goshawk (BLM-SS; FS-SS) - After tallying eight Northern Goshawks on transects in 2001, we recorded only a single individual this year (on a Spruce-Fir transect). We suggest that existing programs to monitor this species, particularly on USFS lands, continue and that additional and more thorough attempts be made to monitor the species statewide. We plan to gather data from all USFS districts in the future as one way to accomplish this.

Ferruginous Hawk – We surveyed historical nesting sites in western Colorado and found two active nests. We surveyed the northern half of the San Luis Valley and found four active nests. Three active nests were reported from the eastern plains from incidental observations by field workers.

Black Rail – Due to time and staffing restraints, we attempted no surveys.

Snowy Plover – The monitoring effort for this species covered many known and likely breeding sites in the state, most of which are on private lands. We found 163 birds on 14 playas and reservoirs. Year 2002 marked the first full effort at monitoring this species.

Mountain Plover (Candidate-ESA; CO ETSC; BLM-SS) - We counted only five birds, all on a single Grassland transect, an identical result to that of 2001. The Prairie Partners program at RMBO is developing an effective methodology to monitor this species through section-based surveys.

Willet – Nesting Willets in 2002 were severely affected by low water levels. *MCB* staff surveyed all major historical nesting locations in North Park and counted only 28 birds (see Table 5 for summary of previous counts). Willet nesting attempts at Fruitgrowers Reservoir, Delta Co, and at Yampa River wetlands in Moffat County were

apparently unsuccessful.

Table 6. Summary of Willet counts 1998-2002.

Year	1998	1999	2000	2001	2002
Active sites	10	8	12	12	5
Total birds	116	81	87	109	28

Upland Sandpiper (FS-SS) - We received only two incidental reports, having not yet initiated planned concerted efforts to count this species. However, the Prairie Partners section-based efforts initiated in 2001 show promise in monitoring this species.

Long-billed Curlew (CO ETSC; BLM-SS; FS-SS) - We recorded six individuals (three each on one Grassland transect and one Semi-desert Shrubland transect); we only noted two on transects in 2001. The Prairie Partners section-based efforts initiated in 2001 show promise in monitoring this species.

California Gull – RMBO field workers and volunteers visited all nine historical or potential sites and found adults present at all sites and confirmed breeding at four: MacFarlane and Walden reservoirs in North Park, Antero Reservoir in South Park, and Riverside Reservoir in Weld county. A total of 408 juveniles was counted at these sites. Production at the colony at Walden Reservoir was reduced, as the island became connected to the mainland before many of the young had fledged. The colony at Antero Reservoir produced young for the first time in three years. The birds were discouraged from nesting at the Arkansas Valley sites to protect nesting Least Terns and Piping Plovers from predation. 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, which grew from five adults in 1999 to 84 in 2000 to 102 in 2002. Extremely low water levels in 2002 led to the nest island being connected to the mainland, exposing the nests to land predators. We found no nests or flightless young in 2002, though 16 flighted juveniles were present 23 July. These may have been produced at Walden or may have been early migrants from more northerly breeding areas. On the same date at Lake John Annex, we noted four adults, two of which joined the breeding Forster's Terns in diving at the counter, and four juveniles. It seems likely that a small nesting colony has been established at this site.

Forster's Tern – We surveyed all six historical nesting sites and confirmed nesting only at Lake John Annex in Jackson County, where we counted 32 adults and 11 flightless young. The 2002 numbers are roughly half of the previous year's, as low water levels reduced available habitat. No nesting occurred at Walden Reservoir or in the San Luis Valley.

Black Tern (FS-SS) - Eight adults attended a single colony at Alamosa NWR, where we found two nests, though we assume that there were four nests present. Low water conditions made the marshes on South River Road in Alamosa County that supported last year's only colonies untenable for breeding Black Terns. In the first half of the 20th century, significant colonies of these terns nested in North Park, the San Luis Valley, and in the marshes of the South Platte and Arkansas rivers. This species is 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). In February of 2003, the Intermountain Waterbird Conservation Plan working group designated this species as one of the three highest priority species for conservation in BCR 16 (Southern Rocky Mountains/Colorado Plateau).

Eurasian Collared-Dove – Field workers and volunteers reported 69 adults at 21 sites. By the end of 2002, this invader, which was first reported in the state in 1986, had been recorded in at least 53 towns and cities, including six on the Western Slope.

Yellow-billed Cuckoo - (BLM-SS; FS-SS) - As we did not conduct the Low-elevation Riparian transects this year, we did not detect this species on transects.

Burrowing Owl (CO T&E; FS-SS) - We conducted an intensive search of all known historical West Slope nest sites and found only 41 owls at 15 locations. Of the 20 nest attempts, only eight were successful, producing 35 young. This species has declined sharply in the western half of the state during the past decade. The Boulder County Nature Association tracked this species in Boulder County, documenting two active nests, which produced six young, down from the five active nests in 2001 (Steve Jones pers. comm.).

Black Swift (FS-SS) - RMBO staff and volunteers visited 107 waterfalls this season, surveying 17 of the 71 previously known nest sites and searching for evidence of nesting at 90 others. We observed adults, active nests, and/or juveniles at 36 sites, 18 of which were previously unknown. We counted 91 adults, 63 nests that showed evidence of use in 2002, and 37 juvenile birds. The three-year total for this effort to visit all potential nesting sites stands at 265 waterfalls surveyed with the discovery of 54 previously unknown colonies.

Chimney Swift – We received reports of 79 adults from 16 of the 53 sites that we have in our location database.

White-throated Swift – We have now catalogued 87 breeding sites in anticipation of future tracking efforts.

Lewis's Woodpecker (FS-SS) - With information gathered in 2002, we increased the number of catalogued nesting sites to 73. Volunteers and field workers visited 40 sites, confirming breeding at 17 and counting 95 adults.

Three-toed Woodpecker (FS-SS). We detected 16 individuals, one bird each on single Aspen and Mixed-Conifer transects, and 14 on eight Spruce-Fir transects. The results are similar to 2000, in which 14 individuals were detected in three habitats (Lodgepole, Mixed Conifer, and Spruce-Fir). 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 Olive-sided Flycatcher.

Olive-sided Flycatcher (FS-SS) - We counted 62 individuals on 38 transects in seven habitats, down slightly from 68 on 50 transects in nine habitats in 2000. However, seven of those birds were recorded in Lodgepole Pine, a habitat in which we did not conduct transects in 2002. Last year, we recorded highest densities of Olive-sideds in High-elevation Riparian. This year, Ponderosa Pine accounted for the highest number of detections (n=16), with Mixed Conifer (n=12) and Spruce-Fir (n=10) being the only others in which we recorded 10 or more detections.

Willow Flycatcher (FS-SS) - We detected 11 individuals on four transects in three habitats (High-elevation Riparian, Low-elevation Riparian, and Montane Shrubland) in 2002. One High-elevation Riparian transect accounted for eight of these detections. Because this species is a Mid-elevation Riparian specialist (a non-funded habitat), we anticipate that the running of this habitat's transects would produce solid data on Willow Flycatcher.

Black Phoebe – Low water levels precluded surveying the San Miguel River by boat in 2002. However, by visiting those portions accessible by road, we located 26 birds at 16 sites. We also received reports of 14 at an additional ten sites, including newly discovered sites along the Piedra, Los Pinos, and Animas rivers in Archuleta and La Plata counties.

Bell's Vireo – Field staff reported two singing males, one each from Tamarack Ranch SWA and Red Lion SWA. We did not survey other sites in northeastern Colorado.

Loggerhead Shrike (FS-SS) - Using all detections, we counted 33 Shrikes on 17 transects in four habitats with the majority being in Semi-desert Shrubland (23 birds on nine transects). However, we conducted DISTANCE analysis on only 30 detections in three habitats (Appendix A), as field workers did not record bearings to three of the birds, so that we could not generate perpendicular distances, the critical value needed for analysis of line-transect data. If 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 overall number or through separating the habitat into component east-side and west-side habitats, we anticipate that sample size of this species will increase.

Purple Martin (FS-SS) - As recently as 25 years ago, Colorado ornithology considered Purple Martin a migrant or accidental straggler in the state (Kingery and Graul 1978). Observers discovered two colonies prior to the initiation of the Colorado Breeding Bird Atlas project (Svoboda et al 1980, Zerbi 1985), and when Atlas work began in 1987, Purple Martin was considered so rare in Colorado that it was not included on the field card. The Atlas project confirmed breeding at 22 sites and recorded probable breeding in another seven. Independent of the Atlas project, researchers located several nests in northeast Delta, northeast Mesa, and northwest Gunnison counties in 1987 and 1988 (Reynolds et al. 2002).

Since beginning surveys in 1999, RMBO has built a database of 136 sites where Purple Martins have nested or have been suspected to nest. In each of those years, we surveyed a number of sites to determine occupancy (Table). In 2001 we made a special effort to locate nests, and nest data were gathered for a study of habitat requirements conducted by RMBO's Forested Ecosystems Program. In 2002, with a somewhat less concerted, but more efficient, effort than in the previous year, we surveyed nearly as many sites and located even more nests and birds. We attribute this increased count to the benefits of the information and experience that we have accumulated; the increase should not be interpreted as suggesting a population increase.

Table 7. Summary of *MCB* Purple Martin surveys: 1999-2002.

Year	# of sites in database	# of sites visited	# of sites with adults	# of sites with breeding	# of active nests	# of total juveniles	Total # of adults	# of new colonies
1999		37	30	na	na	na	na	2
2000	101	66	40	?	9	17	180	4
2001	124	92	69	54	107	38	262	38
2002	136	88	63	56	136	42	366	19

In 2002, our surveys included 43 (of 54) colonies confirmed to be active in 2001; of these 35 were again active We checked 87 (of 107) nest holes that had been active in 2001 and found 57 (60.4%) of these again active. The other 30 were in trees that had fallen, were occupied by other species, or were apparently inactive. Future monitoring efforts will focus on re-occupation rates of colony sites and nest holes, as well as on the range and distribution of this species.

Various efforts have confirmed nesting at 84 sites in Colorado, 61 of those have been confirmed in the past four years by *MCB* field workers. The remaining 54 sites in our database–sites where Purple Martins have been observed, often multiple times–no doubt, represent many colonies where breeding occurs but has not yet been confirmed. Our surveys suggest that there are 100 to 200 Purple Martin colonies in Colorado, with colonies averaging about three nesting pairs and ranging in size from one to ten pairs.

Pygmy Nuthatch (FS-SS) - For the fourth year in a row, the *MCB* program produced good data on this species. We counted 78 individuals on 15 Ponderosa Pine transects (in 2000 we detected 86 birds on 20 Ponderosa Pine transects). This resulted in a very low CV, 15.9%. These results suggest that we will be able to detect a trend in <12 years.

Golden-crowned Kinglet (FS-SS) - For the third year in a row, the number of detections of this species declined, to only 29 on 11 Spruce-Fir transects. Though this value only fell from 31 in 2001, the 2000 count in Spruce-Fir was 88, with densities of 0.142/ha, 0.323/ha, and 0.950/ha in 2002, 2001, and 2002, respectively. Though Cvs are still, at 31.5%, more than adequate, we are beginning to be ***concerned*** about Golden-crowned Kinglet.

Ovenbird – With 2002 season reports, we expanded the size of the catalogue of historical nesting sites to 26. Volunteers and field staff detected 21 singing males at the six sites surveyed.

Northern Waterthrush – We conducted no effort focused on this species in 2003.

Grasshopper Sparrow (FS-SS) - We detected 156 individual Grasshopper Sparrows on 16 transects in two habitats, the precise figures that we obtained in 2001. That the figures were identical is particularly interesting, considering the extreme drought and lack of grass growth on the plains in 2002. Also, despite the similar numbers, there was a strong difference between 2002 and 2001. In 2001, 128 of the

156 individuals were detected on Grassland transects; in 2002 that figure was only 85, with the balance found on Sage Shrubland transects on the eastern plains. The CVs continue at low values, thus we should obtain trend detection in <12 years.

Fox Sparrow (FS-SS) - Unlike the past three years, we did not detect enough Fox Sparrows in 2002 to conduct analysis (n=23). Hopefully, with completion of all high-elevation habitats' transects, we will get sufficient sample size in future years to conduct density analysis.

Northern Cardinal – One pair spent the summer at Lamar Community College, though we did not find a nest. We received no other reports, though we did not survey the other recent sites, e.g. Wray.

Bobolink – RMBO field staff and volunteers surveyed 17 of the sites catalogued in our database and counted 67 adults, 65 of those singing males. Boulder Open Space did not report its counts as it has in previous years. We received no reports of the species from the South Platte River valley.

Scott's Oriole – We surveyed 15 of 28 historical territories and counted 11 adults, including nine males defending territories. Populations appear to be stable. We did not survey the Godiva Rim area in Moffat County, which had a territorial male in the early 1990's. The conductor of the Ninaview BBS route in Las Animas County recorded this species for the third successive year.

Conclusions and recommendations

Though this report is not the place that we intend analysis of the program as a whole, some conclusions from the operation of this program are warranted here, now that RMBO has nearly completed establishment of most aspects of *MCB*. We will treat most of these items in more depth in the subsequent, program-analysis report. Our transect methodology obtains large sample sizes for a sizable percentage of Colorado's avifauna. Completing every habitat's transects would provide for sufficient sample size for a few additional species that we do not currently monitor due to low sample sizes. In consultation with our funders, we should re-examine some of the habitat designations, specifically all of the Bureau of Land Management-funded habitats (Piñon-Juniper, Sage Shrubland, and Semi-desert Shrubland), as each of those habitats is quite different on opposite sides of the state. We are looking for ways to streamline the project to make it more efficient and cost-effective. However, the project is costing more and more as costs in all budget sectors are rising. RMBO has not passed along these rising costs since the project's inception, but we can ill afford to continue this. We will need to raise funding levels in the near future or consult with our funders to determine what aspects of the program can be dropped in order to save other aspects.

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Appendix A. *MCB* year 2001 results of DISTANCE analysis for species with sample sizes >24 in individual habitats or in all habitats combined (except for Sage Sparrow with sample of 24). *= target habitat for species indicated; m=number of parameters required to fit detection-curve function to data in selected model; ESW=Effective Strip Width (distance inside which at least 50% of birds present are detected); D=density estimate, individuals per hectare (from program DISTANCE); D LCL and D UCL=Lower and upper, respectively, 95% confidence intervals of density estimate; D CV=coefficient of variation of the density estimate; P=probability of detection; Total n=untruncated sample size; Model n=sample size used in selected model; Proportion of total n used=proportion of Total n used in the selected model.

Species	Habitat[1]	m	ESW	D	D LCL	D UCL	D CV	P	K	Total n	Sample n	% total n used
Turkey Vulture	All	2	251.9	0.000001	0.000000	0.000001	0.282	0.329	25	36	33	91.7%
Gadwall	WE	0	175.0	0.000	0.000	0.000	0.407	1.000	6	30	30	100.0%
Cinnamon Teal	WE	0	74.0	0.000	0.000	0.001	0.564	1.000	6	25	25	100.0%
Swainson's Hawk	All	2	549.2	0.000000	0.000000	0.000001	0.276	0.384	27	35	35	100.0%
Red-tailed Hawk	All	2	183.2	0.000002	0.000001	0.000002	0.233	0.184	47	61	61	100.0%
American Kestrel	All	2	170.5	0.000001	0.000001	0.000002	0.240	0.252	33	50	50	100.0%
Scaled Quail	All	1	214.5	0.000001	0.000000	0.000001	0.378	0.461	10	25	25	100.0%
Killdeer	WE	1	54.9	0.000	0.000	0.001	0.418	0.695	8	24	24	100.0%
Wilson's Phalarope	WE	1	64.0	0.001	0.000	0.002	0.548	0.711	4	53	48	90.6%
Mourning Dove	GR	2	163.0	0.034	0.023	0.049	0.194	0.127	21	101	101	100.0%
Mourning Dove	MS	1	101.9	0.037	0.023	0.059	0.247	0.149	14	45	44	97.8%
Mourning Dove	PJ	2	95.4	0.075	0.054	0.104	0.168	0.102	23	96	92	95.8%
Mourning Dove	PP	2	138.8	0.032	0.023	0.045	0.173	0.361	16	68	68	100.0%
Mourning Dove	SA	1	139.3	0.037	0.026	0.052	0.173	0.248	17	98	93	94.9%
Mourning Dove	SE	2	157.6	0.046	0.029	0.073	0.239	0.235	23	152	150	98.7%
Mourning Dove	WE	2	89.1	0.000	0.000	0.001	0.377	0.257	12	36	36	100.0%
Common Nighthawk	All	1	245.8	0.000001	0.000001	0.000002	0.225	0.461	30	56	56	100.0%
Broad-tailed Hummingbird	AS	2	23.0	0.881	0.287	2.700	0.606	0.067	18	54	54	100.0%
Broad-tailed Hummingbird	HR	2	18.1	2.490	0.989	6.270	0.491	0.036	16	84	83	98.8%
Broad-tailed Hummingbird	MC	2	21.6	0.867	0.312	2.413	0.543	0.060	13	41	40	97.6%
Broad-tailed Hummingbird	MS	2	20.5	1.367	0.794	2.355	0.279	0.076	22	68	66	97.1%
Broad-tailed Hummingbird	PP	2	28.3	0.637	0.287	1.417	0.417	0.087	13	56	56	100.0%
Williamson's Sapsucker	MC	1	94.6	0.033	0.019	0.057	0.280	0.484	11	29	29	100.0%
Williamson's Sapsucker	PP	2	58.0	0.078	0.031	0.196	0.482	0.117	11	31	29	93.5%
Red-naped Sapsucker	AS	2	48.1	0.123	0.065	0.229	0.322	0.153	14	35	33	94.3%
Red-naped Sapsucker	All	2	34.7	0.000017	0.000010	0.000026	0.238	0.077	46	121	121	100.0%
Downy Woodpecker	All	1	61.7	0.000003	0.000002	0.000005	0.248	0.617	26	39	39	100.0%
Hairy Woodpecker	All	2	61.9	0.000009	0.000006	0.000012	0.194	0.382	59	111	111	100.0%
Three-toed Woodpecker	All	2	49.7	0.000003	0.000002	0.000007	0.383	0.161	17	33	33	100.0%
Northern Flicker	AS	2	97.2	0.046	0.027	0.078	0.276	0.112	20	50	50	100.0%
Northern Flicker	HR	1	139.3	0.021	0.014	0.030	0.195	0.511	16	97	96	99.0%
Northern Flicker	MC	2	150.0	0.021	0.012	0.035	0.266	0.220	18	43	43	100.0%
Northern Flicker	MS	2	82.0	0.030	0.015	0.060	0.360	0.225	13	23	23	100.0%
Northern Flicker	PP	1	173.8	0.012	0.008	0.018	0.193	0.357	16	40	41	102.5%

Species	Habitat[1]	m	ESW	D	D LCL	D UCL	D CV	P	K	Total n	Sample n	% total n used
Northern Flicker	SF	1	117.5	0.015	0.009	0.027	0.299	0.268	14	25	25	100.0%
Olive-sided Flycatcher	All	2	75.9	0.000003	0.000002	0.000005	0.270	0.255	37	49	49	100.0%
Western Wood-Pewee	AS	1	87.2	0.131	0.099	0.173	0.142	0.198	18	116	116	100.0%
Western Wood-Pewee	MC	1	111.0	0.028	0.016	0.049	0.290	0.380	11	35	34	97.1%
Western Wood-Pewee	MS	2	79.5	0.056	0.029	0.109	0.341	0.177	14	41	41	100.0%
Western Wood-Pewee	PP	2	142.4	0.069	0.055	0.087	0.115	0.574	17	154	154	100.0%
Hammond’s Flycatcher	All	1	56.9	0.000005	0.000003	0.000007	0.241	0.625	29	60	56	93.3%
Gray Flycatcher	PJ	2	63.4	0.311	0.234	0.413	0.145	0.234	18	178	168	94.4%
Dusky Flycatcher	AS	2	87.0	0.038	0.023	0.062	0.261	0.370	10	33	33	100.0%
Dusky Flycatcher	HR	1	79.2	0.085	0.060	0.120	0.177	0.344	8	54	54	100.0%
Dusky Flycatcher	MC	1	84.8	0.039	0.023	0.068	0.284	0.268	10	28	28	100.0%
Dusky Flycatcher	MS	2	64.9	0.437	0.347	0.549	0.117	0.182	24	214	212	99.1%
Dusky Flycatcher	PJ	1	37.8	0.130	0.074	0.230	0.291	0.261	13	28	25	89.3%
Dusky Flycatcher	PP	2	88.3	0.095	0.069	0.130	0.165	0.476	14	82	81	98.8%
Dusky Flycatcher	SA	2	94.5	0.020	0.010	0.041	0.371	0.233	6	23	23	100.0%
Cordilleran Flycatcher	HR	2	94.2	0.048	0.033	0.068	0.185	0.293	13	43	43	100.0%
Cordilleran Flycatcher	All	2	68.9	0.000010	0.000006	0.000014	0.202	0.340	54	139	139	100.0%
Say’s Phoebe	All	2	113.8	0.000001	0.000001	0.000002	0.366	0.374	18	29	29	100.0%
Ash-throated Flycatcher	PJ	1	77.6	0.080	0.055	0.116	0.189	0.251	18	69	65	94.2%
Western Kingbird	GR	1	130.6	0.014	0.007	0.027	0.349	0.243	15	29	26	89.7%
Western Kingbird	SE	1	179.7	0.011	0.006	0.017	0.255	0.284	11	45	45	100.0%
Loggerhead Shrike	All	2	118.5	0.000001	0.000000	0.000003	0.493	0.347	16	30	30	100.0%
Plumbeous Vireo	MS	1	76.3	0.043	0.027	0.070	0.247	0.361	11	30	29	96.7%
Plumbeous Vireo	PJ	2	67.2	0.102	0.062	0.169	0.259	0.176	19	68	62	91.2%
Plumbeous Vireo	PP	2	92.0	0.089	0.065	0.122	0.160	0.458	15	83	83	100.0%
Warbling Vireo	AS	2	58.5	0.770	0.619	0.957	0.111	0.134	24	311	306	98.4%
Warbling Vireo	HR	1	80.0	0.148	0.109	0.201	0.156	0.216	16	96	96	100.0%
Warbling Vireo	MC	2	69.4	0.409	0.311	0.538	0.141	0.127	21	204	195	95.6%
Warbling Vireo	MS	2	62.5	0.462	0.345	0.620	0.150	0.142	23	211	208	98.6%
Warbling Vireo	PP	2	84.5	0.177	0.140	0.225	0.122	0.180	20	141	139	98.6%
Warbling Vireo	SA	2	117.2	0.014	0.008	0.024	0.275	0.181	6	25	25	100.0%
Warbling Vireo	SF	2	56.4	0.085	0.036	0.202	0.448	0.072	12	32	32	100.0%
Gray Jay	SF	1	45.7	0.199	0.121	0.330	0.259	0.231	19	60	49	81.7%
Steller's Jay	AS	2	50.0	0.155	0.046	0.522	0.665	0.128	18	48	45	93.8%
Steller's Jay	HR	1	87.7	0.045	0.025	0.080	0.298	0.243	13	37	36	97.3%
Steller's Jay	MC	2	149.8	0.032	0.022	0.048	0.203	0.235	17	72	72	100.0%
Steller's Jay	PP	2	116.9	0.042	0.028	0.063	0.209	0.235	21	63	63	100.0%
Steller's Jay	SF	1	65.0	0.078	0.048	0.129	0.255	0.146	15	40	39	97.5%
Western Scrub-Jay	MS	2	91.1	0.027	0.015	0.050	0.315	0.251	13	26	26	100.0%
Western Scrub-Jay	PJ	1	73.7	0.049	0.031	0.078	0.236	0.207	14	36	36	100.0%

Species	Habitat[1]	m	ESW	D	D LCL	D UCL	D CV	P	K	Total n	Sample n	% total n used
Clark's Nutcracker	AS	1	190.5	0.006	0.003	0.012	0.330	0.227	10	26	26	100.0%
Clark's Nutcracker	SF	2	121.2	0.024	0.013	0.045	0.323	0.175	12	45	42	93.3%
Clark's Nutcracker	All	2	95.4	0.000009	0.000006	0.000013	0.212	0.220	59	174	174	100.0%
Black-billed Magpie	SE	1	220.3	0.007	0.005	0.011	0.200	0.345	14	46	46	100.0%
American Crow	All	1	228.1	0.000001	0.000001	0.000002	0.267	0.570	21	67	62	92.5%
Common Raven	PJ	2	337.7	0.003	0.002	0.006	0.291	0.114	21	49	49	100.0%
Common Raven	PP	2	267.4	0.004	0.002	0.007	0.322	0.297	13	28	28	100.0%
Common Raven	SA	2	483.9	0.001	0.000	0.002	0.362	0.235	11	25	25	100.0%
Common Raven	SE	2	358.7	0.002	0.001	0.003	0.266	0.178	16	34	34	100.0%
Common Raven	All	2	258.4	0.000004	0.000003	0.000006	0.137	0.266	108	236	236	100.0%
Horned Lark	AT	1	62.5	0.189	0.122	0.292	0.224	0.221	13	70	69	98.6%
Horned Lark	GR	2	105.5	0.646	0.579	0.720	0.055	0.170	24	823	810	98.4%
Horned Lark	SA	2	116.3	0.098	0.074	0.129	0.140	0.285	15	172	172	100.0%
Horned Lark	SE	2	81.1	0.336	0.266	0.426	0.120	0.110	21	292	290	99.3%
Tree Swallow	HR	1	56.8	0.076	0.036	0.162	0.393	0.120	8	25	25	100.0%
Tree Swallow	All	2	48.7	0.000005	0.000002	0.000011	0.444	0.263	21	47	47	100.0%
Violet-green Swallow	AS	2	72.8	0.057	0.033	0.097	0.274	0.192	16	37	35	94.6%
Violet-green Swallow	HR	2	70.2	0.110	0.067	0.180	0.253	0.096	13	55	55	100.0%
Violet-green Swallow	MS	2	77.5	0.039	0.016	0.097	0.479	0.206	12	27	27	100.0%
Violet-green Swallow	PP	2	58.9	0.150	0.086	0.259	0.283	0.154	18	59	57	96.6%
Black-capped Chickadee	AS	1	80.8	0.042	0.023	0.076	0.304	0.386	12	33	32	97.0%
Black-capped Chickadee	MS	2	62.2	0.069	0.038	0.126	0.308	0.182	13	31	31	100.0%
Mountain Chickadee	AS	1	59.5	0.238	0.171	0.333	0.171	0.188	19	100	98	98.0%
Mountain Chickadee	HR	2	59.8	0.265	0.167	0.418	0.235	0.172	17	138	138	100.0%
Mountain Chickadee	MC	1	66.9	0.289	0.223	0.375	0.133	0.257	20	128	128	100.0%
Mountain Chickadee	PJ	2	49.6	0.094	0.050	0.174	0.318	0.177	14	31	31	100.0%
Mountain Chickadee	PP	1	89.1	0.102	0.074	0.141	0.165	0.259	18	89	89	100.0%
Mountain Chickadee	SF	2	43.8	0.960	0.713	1.293	0.152	0.184	24	236	217	91.9%
Juniper Titmouse	PJ	2	38.1	0.266	0.171	0.413	0.226	0.093	15	53	52	98.1%
Brown Creeper	All	2	50.5	0.000007	0.000004	0.000014	0.317	0.428	41	78	78	100.0%
Red-breasted Nuthatch	AS	1	88.3	0.045	0.031	0.065	0.188	0.361	17	41	41	100.0%
Red-breasted Nuthatch	MC	2	101.4	0.058	0.038	0.088	0.210	0.262	14	60	59	98.3%
Red-breasted Nuthatch	SF	2	88.4	0.041	0.026	0.066	0.239	0.435	16	38	38	100.0%
White-breasted Nuthatch	PP	1	87.9	0.065	0.048	0.088	0.156	0.321	18	56	55	98.2%
White-breasted Nuthatch	All	2	73.0	0.000008	0.000006	0.000012	0.190	0.285	51	125	125	100.0%
Pygmy Nuthatch	PP	2	99.4	0.071	0.052	0.097	0.159	0.576	15	78	77	98.7%
Rock Wren	PJ	2	77.6	0.033	0.013	0.087	0.501	0.150	11	29	27	93.1%
Rock Wren	SA	2	126.3	0.011	0.005	0.023	0.401	0.243	8	22	22	100.0%
Rock Wren	SE	2	114.5	0.023	0.013	0.039	0.281	0.246	12	39	39	100.0%
Rock Wren	All	2	88.4	0.000006	0.000004	0.000009	0.247	0.293	46	108	108	100.0%

Species	Habitat[1]	m	ESW	D	D LCL	D UCL	D CV	P	K	Total n	Sample n	% total n used
Bewick's Wren	PJ	2	61.1	0.162	0.097	0.268	0.260	0.193	14	89	81	91.0%
House Wren	AS	2	46.1	0.831	0.616	1.121	0.153	0.116	21	205	205	100.0%
House Wren	HR	2	35.4	0.228	0.084	0.618	0.525	0.085	8	30	28	93.3%
House Wren	MC	1	66.5	0.110	0.071	0.170	0.223	0.242	15	48	48	100.0%
House Wren	MS	2	53.8	0.276	0.176	0.434	0.233	0.222	18	94	92	97.9%
House Wren	PP	2	84.8	0.095	0.066	0.137	0.186	0.195	16	75	75	100.0%
Marsh Wren	WE	2	18.2	0.003	0.001	0.007	0.404	0.331	10	83	81	97.6%
Golden-crowned Kinglet	SF	2	40.2	0.142	0.077	0.261	0.315	0.219	11	29	27	93.1%
Ruby-crowned Kinglet	AS	3	63.2	0.189	0.135	0.265	0.171	0.166	20	89	88	98.9%
Ruby-crowned Kinglet	AT	2	134.4	0.019	0.011	0.033	0.280	0.219	11	32	32	100.0%
Ruby-crowned Kinglet	HR	2	72.9	0.256	0.191	0.344	0.151	0.119	19	138	138	100.0%
Ruby-crowned Kinglet	MC	1	78.0	0.174	0.136	0.223	0.126	0.324	17	110	105	95.5%
Ruby-crowned Kinglet	PP	1	72.7	0.050	0.028	0.088	0.289	0.328	7	33	29	87.9%
Ruby-crowned Kinglet	SF	2	63.4	0.589	0.461	0.754	0.126	0.176	26	293	279	95.2%
Blue-gray Gnatcatcher	MS	2	27.2	0.541	0.288	1.016	0.325	0.160	13	48	46	95.8%
Blue-gray Gnatcatcher	PJ	2	32.1	0.866	0.618	1.212	0.172	0.105	24	126	120	95.2%
Western Bluebird	All	1	51.9	0.000005	0.000002	0.000012	0.430	0.504	12	57	57	100.0%
Mountain Bluebird	MS	1	60.6	0.061	0.034	0.111	0.304	0.255	11	27	26	96.3%
Mountain Bluebird	PJ	2	53.1	0.272	0.190	0.390	0.184	0.124	21	106	103	97.2%
Townsend's Solitaire	MC	1	95.8	0.046	0.029	0.074	0.245	0.310	11	44	42	95.5%
Townsend's Solitaire	PP	1	100.5	0.049	0.033	0.071	0.194	0.191	16	54	54	100.0%
Swainson’s Thrush	All	1	92.9	0.000002	0.000001	0.000004	0.392	0.738	16	40	39	97.5%
Hermit Thrush	AS	2	152.5	0.050	0.039	0.063	0.125	0.277	20	134	134	100.0%
Hermit Thrush	HR	1	184.7	0.021	0.016	0.028	0.140	0.321	17	73	73	100.0%
Hermit Thrush	MC	2	154.4	0.035	0.026	0.047	0.158	0.352	16	86	82	95.3%
Hermit Thrush	PP	2	173.0	0.018	0.013	0.026	0.190	0.384	16	62	60	96.8%
Hermit Thrush	SF	2	121.8	0.168	0.146	0.194	0.074	0.176	24	295	294	99.7%
American Robin	AS	1	73.9	0.262	0.211	0.324	0.109	0.158	25	167	166	99.4%
American Robin	AT	2	88.8	0.099	0.056	0.175	0.296	0.143	16	388	378	97.4%
American Robin	HR	2	55.6	0.598	0.432	0.828	0.166	0.093	22	192	188	97.9%
American Robin	MC	2	93.4	0.117	0.090	0.152	0.135	0.187	21	106	101	95.3%
American Robin	MS	2	76.4	0.293	0.220	0.389	0.145	0.084	24	200	197	98.5%
American Robin	PJ	1	74.5	0.074	0.048	0.113	0.217	0.313	15	65	55	84.6%
American Robin	PP	1	90.2	0.169	0.134	0.213	0.118	0.194	23	159	151	95.0%
American Robin	SA	2	79.7	0.052	0.027	0.099	0.330	0.062	12	43	43	100.0%
American Robin	SF	2	66.7	0.237	0.178	0.315	0.147	0.087	23	124	124	100.0%
Northern Mockingbird	GR	2	238.8	0.006	0.003	0.010	0.284	0.313	8	36	36	100.0%
Northern Mockingbird	SE	1	198.6	0.026	0.021	0.032	0.107	0.308	20	135	135	100.0%
Sage Thrasher	SA	2	120.0	0.077	0.056	0.107	0.164	0.295	16	148	145	98.0%
Sage Thrasher	SE	1	141.6	0.021	0.014	0.032	0.222	0.226	6	55	55	100.0%

Species	Habitat[1]	m	ESW	D	D LCL	D UCL	D CV	P	K	Total n	Sample n	% total n used
American Pipit	AT	2	59.2	1.150	0.887	1.491	0.133	0.085	18	75	73	97.3%
Orange-crowned Warbler	MC	1	113.6	0.024	0.015	0.037	0.235	0.350	9	30	30	100.0%
Orange-crowned Warbler	MS	2	50.3	0.364	0.247	0.535	0.198	0.112	20	107	106	99.1%
Orange-crowned Warbler	PP	1	84.0	0.032	0.018	0.056	0.287	0.424	8	25	25	100.0%
Virginia's Warbler	MS	2	48.3	0.535	0.373	0.768	0.185	0.212	22	153	144	94.1%
Virginia's Warbler	PJ	2	31.8	0.309	0.202	0.473	0.218	0.073	13	44	42	95.5%
Yellow Warbler	HR	2	25.6	0.719	0.223	2.322	0.638	0.052	8	48	48	100.0%
Yellow Warbler	MS	2	32.3	0.440	0.187	1.036	0.450	0.226	10	53	53	100.0%
Yellow-rumped Warbler	AS	2	36.5	1.008	0.729	1.393	0.166	0.164	23	167	156	93.4%
Yellow-rumped Warbler	HR	2	53.1	0.385	0.272	0.543	0.177	0.110	16	110	110	100.0%
Yellow-rumped Warbler	MC	1	65.4	0.418	0.333	0.525	0.116	0.221	22	183	177	96.7%
Yellow-rumped Warbler	PP	1	65.7	0.236	0.179	0.312	0.143	0.192	21	113	112	99.1%
Yellow-rumped Warbler	SF	2	54.5	0.644	0.478	0.867	0.152	0.154	25	226	225	99.6%
Black-throated Gray Warbler	PJ	2	38.8	0.760	0.580	0.997	0.138	0.122	24	171	154	90.1%
Grace's Warbler	PP	2	108.2	0.038	0.025	0.058	0.217	0.632	8	50	49	98.0%
MacGillivray's Warbler	AS	1	66.4	0.109	0.069	0.173	0.236	0.261	12	56	56	100.0%
MacGillivray's Warbler	HR	2	56.7	0.141	0.077	0.259	0.314	0.149	11	46	46	100.0%
MacGillivray's Warbler	MC	1	94.0	0.029	0.016	0.050	0.285	0.382	7	25	25	100.0%
MacGillivray's Warbler	MS	2	51.1	0.173	0.097	0.309	0.299	0.113	12	54	52	96.3%
Common Yellowthroat	WE	2	28.5	0.002	0.001	0.003	0.317	0.396	15	73	68	93.2%
Wilson's Warbler	AT	2	28.1	0.324	0.136	0.775	0.454	0.112	8	26	24	92.3%
Wilson's Warbler	HR	2	25.8	1.817	1.222	2.700	0.203	0.065	16	124	123	99.2%
Western Tanager	AS	1	77.8	0.063	0.041	0.096	0.219	0.219	16	46	44	95.7%
Western Tanager	HR	2	79.8	0.053	0.030	0.094	0.295	0.226	9	34	34	100.0%
Western Tanager	MC	1	79.0	0.243	0.194	0.305	0.115	0.192	19	164	150	91.5%
Western Tanager	MS	2	78.1	0.048	0.029	0.080	0.260	0.186	8	34	34	100.0%
Western Tanager	PP	2	105.1	0.093	0.069	0.126	0.156	0.293	21	116	113	97.4%
Western Tanager	SF	1	52.0	0.141	0.090	0.221	0.230	0.276	10	47	45	95.7%
Green-tailed Towhee	AS	1	75.7	0.045	0.026	0.077	0.276	0.434	9	30	30	100.0%
Green-tailed Towhee	MC	2	63.6	0.123	0.078	0.193	0.232	0.198	14	55	49	89.1%
Green-tailed Towhee	MS	2	52.6	1.224	1.046	1.432	0.080	0.081	24	395	391	99.0%
Green-tailed Towhee	PJ	2	69.3	0.037	0.015	0.092	0.469	0.185	10	24	24	100.0%
Green-tailed Towhee	PP	2	80.7	0.162	0.125	0.209	0.131	0.175	17	116	116	100.0%
Green-tailed Towhee	SA	2	80.5	0.228	0.172	0.302	0.144	0.114	14	192	192	100.0%
Spotted Towhee	MS	2	50.3	0.803	0.623	1.036	0.130	0.139	21	237	234	98.7%
Spotted Towhee	PJ	2	42.4	0.533	0.322	0.884	0.260	0.121	24	143	129	90.2%
Spotted Towhee	PP	2	56.5	0.060	0.016	0.229	0.728	0.186	4	21	21	100.0%
Cassin's Sparrow	GR	1	209.7	0.024	0.019	0.032	0.136	0.489	9	122	121	99.2%
Cassin's Sparrow	SA	1	172.1	0.035	0.027	0.046	0.138	0.352	7	136	136	100.0%
Cassin's Sparrow	SE	1	187.7	0.005	0.002	0.011	0.408	0.521	2	23	23	100.0%

Species	Habitat[1]	m	ESW	D	D LCL	D UCL	D CV	P	K	Total n	Sample n	% total n used
Chipping Sparrow	AS	2	65.3	0.081	0.048	0.135	0.266	0.214	13	40	40	100.0%
Chipping Sparrow	HR	1	83.8	0.039	0.023	0.067	0.277	0.416	10	28	28	100.0%
Chipping Sparrow	MC	1	69.8	0.156	0.111	0.217	0.171	0.235	16	81	75	92.6%
Chipping Sparrow	MS	2	59.0	0.135	0.079	0.229	0.272	0.122	19	54	54	100.0%
Chipping Sparrow	PJ	2	51.5	0.421	0.299	0.593	0.175	0.063	26	153	150	98.0%
Chipping Sparrow	PP	1	85.1	0.084	0.059	0.120	0.181	0.223	18	67	67	100.0%
Chipping Sparrow	SF	2	53.2	0.114	0.058	0.224	0.350	0.197	12	39	38	97.4%
Brewer's Sparrow	GR	1	83.3	0.033	0.016	0.067	0.364	0.173	8	27	26	96.3%
Brewer's Sparrow	MS	1	52.4	0.117	0.065	0.210	0.305	0.215	7	38	37	97.4%
Brewer's Sparrow	PJ	1	78.2	0.032	0.016	0.061	0.341	0.239	10	29	26	89.7%
Brewer's Sparrow	SA	2	73.9	0.428	0.336	0.546	0.124	0.151	24	308	304	98.7%
Brewer's Sparrow	SE	2	76.1	0.272	0.194	0.380	0.172	0.185	12	209	206	98.6%
Vesper Sparrow	GR	1	145.6	0.010	0.006	0.019	0.306	0.368	3	26	25	96.2%
Vesper Sparrow	PJ	1	94.9	0.029	0.018	0.046	0.242	0.375	10	35	35	100.0%
Vesper Sparrow	SA	1	91.6	0.201	0.162	0.249	0.110	0.189	20	219	219	100.0%
Vesper Sparrow	SE	2	123.3	0.036	0.026	0.050	0.167	0.288	7	72	75	104.2%
Lark Sparrow	GR	1	104.2	0.072	0.049	0.105	0.194	0.197	9	88	88	100.0%
Lark Sparrow	PJ	1	115.6	0.016	0.009	0.028	0.286	0.344	6	29	29	100.0%
Lark Sparrow	SA	1	96.0	0.053	0.034	0.083	0.228	0.247	8	64	64	100.0%
Lark Sparrow	SE	1	87.6	0.202	0.160	0.255	0.120	0.188	21	213	203	95.3%
Sage Sparrow	SA	2	153.4	0.017	0.011	0.027	0.237	0.233	7	53	53	100.0%
Sage Sparrow	SE	1	120.2	0.012	0.006	0.022	0.335	0.446	4	22	22	100.0%
Lark Bunting	GR	2	127.5	0.127	0.098	0.165	0.135	0.113	13	233	233	100.0%
Lark Bunting	SA	1	122.1	0.085	0.061	0.118	0.168	0.231	7	169	164	97.0%
Lark Bunting	SE	1	138.0	0.008	0.004	0.016	0.349	0.360	2	20	20	100.0%
Savannah Sparrow	WE	1	51.3	0.000	0.000	0.001	0.313	0.684	11	28	28	100.0%
Grasshopper Sparrow	GR	2	108.7	0.064	0.044	0.093	0.193	0.281	10	85	85	100.0%
Grasshopper Sparrow	SA	2	80.5	0.084	0.058	0.123	0.193	0.395	4	71	71	100.0%
Song Sparrow	HR	2	26.3	0.957	0.545	1.679	0.290	0.091	9	69	67	97.1%
Song Sparrow	WE	1	45.7	0.000	0.000	0.001	0.417	0.508	8	28	27	96.4%
Lincoln's Sparrow	AS	1	80.0	0.174	0.132	0.228	0.139	0.130	18	129	129	100.0%
Lincoln's Sparrow	AT	2	57.1	0.197	0.116	0.333	0.270	0.137	15	63	60	95.2%
Lincoln's Sparrow	HR	2	40.8	1.943	1.401	2.695	0.168	0.116	21	342	329	96.2%
Lincoln's Sparrow	SF	1	78.8	0.055	0.037	0.081	0.205	0.326	14	40	40	100.0%
White-crowned Sparrow	AS	2	61.2	0.154	0.073	0.326	0.393	0.116	13	67	67	100.0%
White-crowned Sparrow	AT	2	56.5	1.382	0.963	1.984	0.186	0.093	21	456	413	90.6%
White-crowned Sparrow	HR	2	57.1	0.448	0.294	0.682	0.216	0.095	14	44	41	93.2%
White-crowned Sparrow	SF	2	74.1	0.062	0.033	0.118	0.333	0.222	11	41	41	100.0%
Dark-eyed Junco	AS	2	45.9	0.971	0.726	1.297	0.148	0.111	24	238	238	100.0%
Dark-eyed Junco	AT	2	49.0	0.125	0.048	0.321	0.497	0.087	9	28	28	100.0%

Species	Habitat[1]	m	ESW	D	D LCL	D UCL	D CV	P	K	Total n	Sample n	% total n used
Dark-eyed Junco	HR	1	70.4	0.147	0.102	0.212	0.188	0.204	17	75	74	98.7%
Dark-eyed Junco	MC	2	34.6	1.375	0.598	3.162	0.442	0.096	21	179	163	91.1%
Dark-eyed Junco	PP	2	70.8	0.283	0.223	0.359	0.121	0.180	22	157	156	99.4%
Dark-eyed Junco	SF	2	41.8	0.973	0.635	1.490	0.219	0.211	26	224	200	89.3%
McCown's Longspur	GR	2	84.7	0.077	0.042	0.139	0.310	0.148	3	64	62	96.9%
Black-headed Grosbeak	MS	2	59.6	0.188	0.116	0.305	0.248	0.081	17	77	77	100.0%
Blue Grosbeak	SE	2	125.8	0.012	0.006	0.023	0.333	0.333	5	25	25	100.0%
Red-winged Blackbird	SE	1	160.8	0.015	0.009	0.025	0.255	0.197	8	51	51	100.0%
Red-winged Blackbird	WE	2	57.0	0.005	0.003	0.007	0.190	0.325	18	368	357	97.0%
Western Meadowlark	GR	2	206.6	0.131	0.106	0.162	0.108	0.267	24	637	630	98.9%
Western Meadowlark	PJ	2	263.3	0.005	0.003	0.007	0.228	0.186	11	42	42	100.0%
Western Meadowlark	SA	2	147.1	0.121	0.098	0.149	0.107	0.132	22	342	341	99.7%
Western Meadowlark	SE	2	182.9	0.082	0.066	0.101	0.109	0.213	24	358	358	100.0%
Yellow-headed Blackbird	WE	2	57.6	0.002	0.001	0.005	0.530	0.677	11	154	139	90.3%
Brewer's Blackbird	SA	2	63.3	0.048	0.017	0.132	0.540	0.100	12	28	25	89.3%
Brown-headed Cowbird	GR	2	104.5	0.022	0.009	0.055	0.478	0.132	12	27	27	100.0%
Brown-headed Cowbird	HR	2	76.2	0.046	0.024	0.086	0.325	0.203	9	27	27	100.0%
Brown-headed Cowbird	MS	2	45.6	0.346	0.208	0.576	0.262	0.121	21	86	83	96.5%
Brown-headed Cowbird	PJ	1	73.1	0.057	0.035	0.093	0.251	0.254	15	45	41	91.1%
Brown-headed Cowbird	PP	1	85.6	0.041	0.027	0.063	0.218	0.493	12	33	33	100.0%
Brown-headed Cowbird	SA	2	37.5	0.246	0.086	0.707	0.565	0.042	17	49	45	91.8%
Brown-headed Cowbird	SE	2	120.7	0.016	0.007	0.037	0.450	0.167	10	30	30	100.0%
Brown-headed Cowbird	WE	1	43.9	0.001	0.000	0.001	0.316	0.601	14	34	34	100.0%
Bullock's Oriole	SE	1	114.8	0.026	0.016	0.043	0.262	0.305	6	49	45	91.8%
Pine Grosbeak	All	2	43.3	0.000004	0.000002	0.000010	0.423	0.233	21	40	40	100.0%
House Finch	PJ	1	61.4	0.093	0.058	0.148	0.241	0.311	12	50	47	94.0%
Pine Siskin	AS	2	56.8	0.205	0.123	0.342	0.263	0.164	14	80	77	96.3%
Pine Siskin	AT	1	72.1	0.158	0.109	0.229	0.190	0.277	13	80	77	96.3%
Pine Siskin	HR	1	80.9	0.168	0.122	0.232	0.164	0.280	17	112	112	100.0%
Pine Siskin	MC	2	51.2	0.305	0.189	0.492	0.246	0.165	18	81	79	97.5%
Pine Siskin	PP	2	55.2	0.128	0.082	0.200	0.228	0.189	14	45	43	95.6%
Pine Siskin	SF	2	40.2	0.442	0.236	0.826	0.324	0.144	21	88	84	95.5%
Evening Grosbeak	All	2	43.1	0.000004	0.000001	0.000010	0.567	0.375	19	35	33	94.3%

[1] Habitats: All = all individuals detected, with perpendicular distances provided, in all habitats; AS = Aspen; AT = Alpine Tundra; GR = Grassland; HR = High-elevation Riparian; MC = Mixed Conifer; MS = Montane Shrubland; PJ = Piñon-Juniper; PP = Ponderosa Pine; SA = Sage Shrubland; SE = Semi-desert Shrubland; SF = Spruce-Fir; WE = Wetland