

Monitoring Wyoming's Birds: 2008 Field Season Report



March 2009



Rocky Mountain Bird Observatory

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In Cooperation With:



ROCKY MOUNTAIN BIRD OBSERVATORY

Mission: *To conserve birds and their habitats*

Vision: *Native bird populations are sustained in healthy ecosystems*

Core Values: *(Our goals for achieving our mission)*

1. **Science** provides the foundation for effective bird conservation.
2. **Education** is critical to the success of bird conservation.
3. **Stewardship** of birds and their habitats is a shared responsibility.

RMBO accomplishes its mission by:

Partnering with state and federal natural resource agencies, private landowners, schools, and other nonprofits for conservation.

Studying bird responses to habitat conditions, ecological processes, and management actions to provide scientific information that guides bird conservation efforts.

Monitoring long-term trends in bird populations for our region.

Providing active, experiential, education programs that create an awareness and appreciation for birds.

Sharing the latest information in land management and bird conservation practices.

Developing voluntary, working partnerships with landowners to engage them in conservation.

Working across political and jurisdictional boundaries including, counties, states, regions, and national boundaries. Our conservation work emphasizes the Western United States, including the Great Plains, as well as Latin America.

Creating informed publics and building consensus for bird conservation needs.

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EXECUTIVE SUMMARY

In 2002, Rocky Mountain Bird Observatory (RMBO), in cooperation with the USDA Forest Service (USFS), USDI Bureau of Land Management (BLM), Wyoming Game and Fish Department (WGFD), and Wyoming Partners in Flight (WY-PIF) initiated a statewide program, Monitoring Wyoming's Birds (MWB), to monitor most breeding landbird populations. Bird population monitoring is utilized in MWB to fulfill legislative requirements, identify declining species, and measure environmental change and sustainability of human activities on Wyoming's ecosystems.

RMBO and partners selected six high-priority habitats for monitoring: Aspen, Grassland, Juniper Woodland, Mid-elevation Conifer, Montane Riparian, and Shrubsteppe. We randomly established 30 transects for point counts from habitat patches of at least 100 hectares and within one mile of a road. RMBO also established ten transects in each of three habitats in Shoshone National Forest (SNF): Montane Grassland, Montane Riparian and Mid-elevation Conifer. The ten Mid-elevation Conifer transects in SNF are part of the 30 MWB Mid-elevation Conifer transects and were used in both analyses. Point count transects consist of 15 points spaced 250 meters apart. Observers stop at each point, record vegetation information, and conduct a five-minute point count recording the distance to all detected birds and squirrels. Observers treated the 250-m sections between points as line transects. They recorded distances and bearings to low-density species detected while traveling between point-count stations.

RMBO conducted 2,334 point counts along 168 transects between 23 May and 21 July 2008. Observers detected 19,545 birds of 165 species on statewide point-count transects. Montane Riparian had the most birds detected per transect of all the habitats sampled. Observers in Shrubsteppe recorded the fewest birds per transect. Aspen had the greatest number of species detected per transect. Observers in Grassland and Shrubsteppe recorded the fewest species per transect.

RMBO used point count data and distance analysis software (Distance 5.0) to produce density estimates for species in a sampled habitat. We combined data from 2002-2008 to calculate our densities estimates for species by habitat. The pooled data yielded robust density estimates (CV < 50%) for 65 species and moderately robust estimates (CV = 50-75%) for four additional species.

In 2008, RMBO recorded 84 bird species that hold conservation and management designations in Wyoming. We recorded 35 species in sufficient numbers to calculate density estimates in at least one habitat.

In 2009, RMBO and its partners will implement a new sampling design in Wyoming. The study area will not be stratified by habitat, but by Bird Conservation Region (BCR) and management boundaries. Field methods will remain the same. Data from the previous, habitat-based sampling design can still be used to calculate and compare densities with the new, BCR-based design.

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INTRODUCTION

In 2002, Rocky Mountain Bird Observatory (RMBO), in cooperation with the USDA Forest Service (USFS), USDI Bureau of Land Management (BLM), Wyoming Game and Fish Department (WGFD), and Wyoming Partners in Flight (WY-PIF) initiated a statewide program, Monitoring Wyoming's Birds (MWB), to monitor most breeding landbird populations (Leukering et. al. 2001). Modeled after Colorado's bird monitoring program, MWB seeks to obtain count-based data for most diurnal, regularly breeding landbird species using a randomized, habitat-stratified design. This program is consistent with the goals emphasized in the Partners in Flight National Landbird Monitoring Strategy (Bart et. al. 2001). In addition to monitoring bird populations, the program also generates information useful in managing birds (e.g., habitat associations and spatial distribution).

Reasons for Monitoring

Birds are excellent indicators of biological integrity and ecosystem health (Morrison 1986, Bureau of Land Management 1998, Hutto 1998, O'Connell et al. 2000, Rich 2002, U.S. EPA 2002, Birdlife International 2003). Birds comprise a diverse group of niche specialists and generalists, occupy a broad range of habitats, are sensitive to both physical and chemical impacts on the environment, and often reflect the abundance and diversity of other organisms with which they coexist; they are useful for measuring the environmental change and sustainability of human activities on ecosystems.

Bird communities reflect an integration of a broad array of ecosystem conditions, including productivity, vegetation structure and composition; water quality; and landscape integrity (Adamus et al. 2001). The response of bird communities to changes in the environment can be examined at a variety of spatial scales making them a powerful and practical tool for evaluating the broader effects of resource management, conservation and restoration activities, or other environmental changes. Birds are generally abundant, conspicuous, and relatively easy to identify; monitoring their populations can be more efficient than monitoring other taxonomic groups.

Population monitoring forms the backbone of avian conservation. Without current monitoring data, conservation efforts may be misguided and inefficient. For these and other reasons, legislation such as the National Environmental Policy Act (1969), Endangered Species Act (ESA; 1973), and the Forest Management Act (1976), as well as various state laws, Forest plans, preserve management plans, and other long-range plans require population monitoring (Sauer 1993, Manley et al. 1993).

Given the declines of many bird species that breed in North America, there is an urgent need for monitoring programs that serve as an "early-warning" system to identify declining species and the causes of declines so that natural resource managers can proactively prevent further losses. RMBO's monitoring programs are comparable, repeatable, data rich, long-term, multi-scale, and accessible so that managers can make informed decisions to effectively conserve birds and their habitats.

Monitoring Objectives

RMBO's bird monitoring programs provide population trend or status data on regularly-occurring breeding species within the study areas. Initially, we expect to collect data to provide "early-warning" information for all species that can be monitored through a habitat-based approach. After establishing this monitoring phase, we anticipate collecting more demographic information and testing a priori hypotheses to determine the possible reasons for known declines and to better inform management decisions.

The specific objectives of MWB's "early warning" monitoring program are:

- 1.) to provide better information on distribution and abundance for most breeding landbirds, especially priority species;
- 2.) to provide basic habitat association data for most bird species;
- 3.) to provide long-term trend or status data on most regularly occurring breeding species in the region, while being able to detect population rises and declines of 3.0% per year or greater within a 30-year period;
- 4.) to maintain a high-quality database that is accessible to all of our collaborators, as well as the public, in the form of raw and summarized data; and
- 5.) to generate decision support tools such as population density models that help guide conservation efforts and provide a better measure of our conservation success.

METHODS

Site Selection

In 2002, RMBO and Wyoming Partners in Flight (WY-PIF) selected six high-priority habitats in which to place point-count transects. Using the Wyoming GAP Analysis Land Cover Layer, we randomly selected blocks of habitat large enough to support a 3.5 km transect. Nathan Nibbelink performed the GIS stand selection through a contract with the Bighorn National Forest. His final report describing the selection process and criteria is available upon request. For each habitat, we randomly selected 60 stands of at least 100 ha within one mile of a road. We chose 30 of these stands as study sites, and we held the remaining 30 stands as alternates in case any of the selected study sites were unsuitable (i.e., wrong habitat, not accessible, dangerous topography, etc.). In cases where an alternate was not available, we used the nearest suitable stand. In 2002, we also established 10 Montane Grassland transects, 10 Montane Riparian transects, and 10 of the statewide Mid-elevation Conifer transects within Shoshone National Forest.

Habitats

Aspen

Aspen (AS) consists of stands dominated by quaking aspen (*Populus tremuloides*). However, these stands are rarely homogeneous and are often intermixed with coniferous trees. This habitat is widespread in all of the major mountain ranges, with the most extensive tracts occurring in Medicine Bow National Forest along the Colorado border and the southern reaches of Bridger-Teton National Forest in western Wyoming. GAP code: 4100.

Grassland

Grassland (GR) can include shortgrass prairie, mixed-grass prairie, and Great Basin foothills grassland. This program uses Grassland for the habitat name instead of Shortgrass Prairie as specified in the Wyoming Partners in Flight Bird Conservation Plan (Nicholoff 2003). Random stand selection did not allocate any transects in stands of Great Basin Foothills grassland, which is primarily found in the southwest quadrant of the state. MWB does include the other two grassland types, which is primarily restricted to east of the continental divide. GAP codes: 31001, 31002.

Juniper Woodland

Juniper Woodland (JW) is dominated by juniper (*Juniperus* spp.), although there can be a strong shrubsteppe component in low-lying areas. This habitat's stronghold is in the southwest corner of the state, but large, isolated patches occur to the Montana border through the center of the state and along the western foothills of the Bighorn Mountains. GAP code: 42015.

Mid-elevation Conifer

Mid-elevation Conifer (MC) generally contains several conifer species in either pure or mixed stands. Tree species include Douglas-fir (*Pseudotsuga menziesii*), blue spruce (*Picea pungens*), lodgepole pine (*Pinus contorta*), limber pine (*Pinus flexilis*), ponderosa pine (*Pinus ponderosa*), and occasionally has an aspen component. This is the

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dominant forest habitat (6.38% of land area; Nicholoff 2003) in Wyoming and occurs in all major mountain ranges, except in the far northeast corner of the state. GAP codes: 42003, 42004, 42009, 42016, 42001 (between 7,000 and 8,500 feet).

Montane Riparian

Montane Riparian (MR) is associated with higher-elevation rivers and streams where willow (*Salix* spp.) is the dominant woody cover. Transects in this habitat focus on the suite of bird species dependent on willows as a nesting substrate (e.g., Veery, Wilson's Warbler, and Fox Sparrow). However, these areas tend to be linear and narrow in nature, so the surrounding forest type usually influences species recorded. GAP codes: 61001, 62001, 62003 (above 7,500 feet).

Shrubsteppe

Shrubsteppe (SS) is dominated by sagebrush (*Artemisia* spp.), greasewood (*Sarcobatus vermiculatus*), saltbush (*Altriplex* spp.), and rabbitbrush (*Chrysothamnus* spp.) and can include a grass component and extensive bare ground. This is the most extensive habitat in Wyoming (42.74% of land area; Nicholoff 2003) and is found in low-elevation settings throughout the state. GAP codes: 32002, 32006, 32007, 32008, 32009, 32010, 32011, 32012, 32013.

Field Personnel

RMBO staff, consisting of eight experienced biological technicians with excellent aural and visual bird-identification skills, conducted field work in 2008. Technicians completed a ten-day training program at the beginning of the field season to ensure full understanding of field protocols, practice bird identification, and calibrate distance estimation in a variety of habitats.

Point Transect Protocol

To sample bird populations in habitats selected for monitoring, RMBO staff conducted point transects (Buckland et al. 2001) following protocol established by Leukering (2000) and modified by Panjabi et. al. (2006). Observers conducted point transects in the morning, between ½-hour before sunrise and 11 AM. For new transects, observers established an access point and a randomly-selected bearing and distance within 400 m of the access point to place the first point count location. On the morning of the sample, the observer began the point transect at the first count station and then continued along the randomly-selected bearing for all remaining points if possible. In many cases, the pre-selected bearing led the observer out of the target habitat, or to some obstruction (e.g. cliff or private land). When this happened, the observer returned to the last point and randomly turned the transect right or left 90 degrees and then alternated right or left if additional turns were necessary.

Observers conducted as many as 15 five-minute point counts 250 meters apart along point transects. For every bird detected, we recorded species, sex, the distance from the observer, the minute we detected it, and the type of detection (e.g. call, song or visual sighting). Observers measured distances using Bushnell® Yardage Pro 500 laser rangefinders. When it was not possible to measure distance to a bird, observers

estimated distance by measuring to some nearby object. Observers treated the 250-m intervals between count stations as sections of a line transect, and recorded low-density species of birds and squirrels (all grouse, raptors, woodpeckers, and a few other rare or uncommon species). We measured the distance and bearing to an individual of these low-density species from where we detected it along the transect line. Observers did not include individuals in the line-transect data that were detected on a previous or subsequent point count. Observers also recorded birds flying over but not using the immediate surrounding landscape.

We considered all non-independent detections of birds, i.e., flocks or pairs of conspecific birds together in close proximity, as part of a 'cluster' rather than as separate independent observations. Observers recorded clusters as C , the number of birds detected within the cluster.

At the start and end of transects, observers recorded time and atmospheric data (i.e., temperature in degrees Fahrenheit, cloud cover, precipitation, and wind in Beaufort scale). We recorded locations of count stations using hand-held Garmin® E-trex™ Global Positioning System (GPS) units. Observers logged all GPS data in Universal Transverse Mercator (UTM) North American Datum 1927. Before beginning a point count, observers recorded vegetation data, including structural stage, forest canopy closure, mean canopy height, types and relative proportions of overstory trees, sub-canopy tree species composition, percent coverage and types of shrubs, and types and relative proportions of ground cover within a 50-m radius of the point. We recorded vegetation data quietly to allow birds, disturbed by our approach, time to return to their normal habits prior to the beginning of the point count.

Data Analyses

Understanding species' population trends requires 10 to 30 years of calculated density estimates (D). We used the analysis software Distance 5.0® to generate density estimates from our point count data (Thomas et al. 2006). Buckland et al. (2001) developed the concepts and methods of distance analysis. Distance analysis relies on three assumptions:

1. observers detect all birds directly at the point (i.e. distance to detection is 0);
2. observers measure distances of birds close to the point accurately; and
3. birds do not move in response to the observer's presence.

Distance 5.0® fits a unique detection function to the distribution of species in a sampled habitat. Because the detection function is unique to each species in each sampled habitat, Distance 5.0® is more suitable than other analytical programs for highly-varied sampling landscapes.

The number of detections used in analyses (n) may be fewer than the number of birds observed (M) because:

1. we recorded a cluster of birds as a single detection;
2. we excluded birds detected far from the observer; and
3. we removed birds detected flying over but not using the habitat.

The difference between (n) and (N) can be large for species that often occur in groups (e.g., swifts, swallows, and crossbills), at great distances from the observer (e.g. raptors and corvids), or flying over a sampled habitat (e.g. Pine Siskin and Evening Grosbeak).

We generated density estimates for species that had at least 60 utilizable detections (n) in a sampled habitat. We excluded flyover and line transect detections from analyses when calculating estimates. In future analyses, we will pool data across all years to obtain the 60 detections required to calculate density estimates.

RESULTS

Wyoming Statewide Monitoring

In 2008, our seventh year of statewide bird monitoring in Wyoming, we conducted 2,334 point counts along 168 point-count transects in six different habitats. Figure 1 displays all transects established in Wyoming. We sampled all transects between 23 May and 21 July 2008. Date ranges specific for each habitat sampled are included with the results for that habitat.

We detected 19,545 individual birds of 165 species on statewide point-count transects (Table 1). The number of birds and squirrels recorded (N) by habitat on MWB transects, including all species removed from analyses, is provided in Appendix B. Seventy-one species were detected in sufficient numbers to estimate density in at least one habitat.

The number of species detected in each habitat in 2008 ranged from 105 in Montane Riparian to 58 in Grassland (Table 1). Of the six habitats sampled in 2008, the average number of species detected per transect was highest in Aspen and lowest in Grassland and Shrubsteppe (Table 1). While these averages represent the richness of species that may be found in each habitat, note that some species were largely peripheral to the habitat in which they were detected. Thus, species numbers presented in this report do not necessarily indicate that all of the species or individuals were nesting in that habitat.

The pooled 2002-2008 data yielded robust density estimates ($CV < 50\%$) for 65 species and moderately robust estimates ($CV = 50-75\%$) for four additional species. We should be able to continue to monitor these 69 species, which represent 42% of all species detected on point-count transects and 92% of all individual birds observed in the MWB program during 2008.

Detailed species accounts including maps, links, density estimate graphs and tables are available at <http://rmbo.org/public/monitoring/speciesAccounts.aspx>

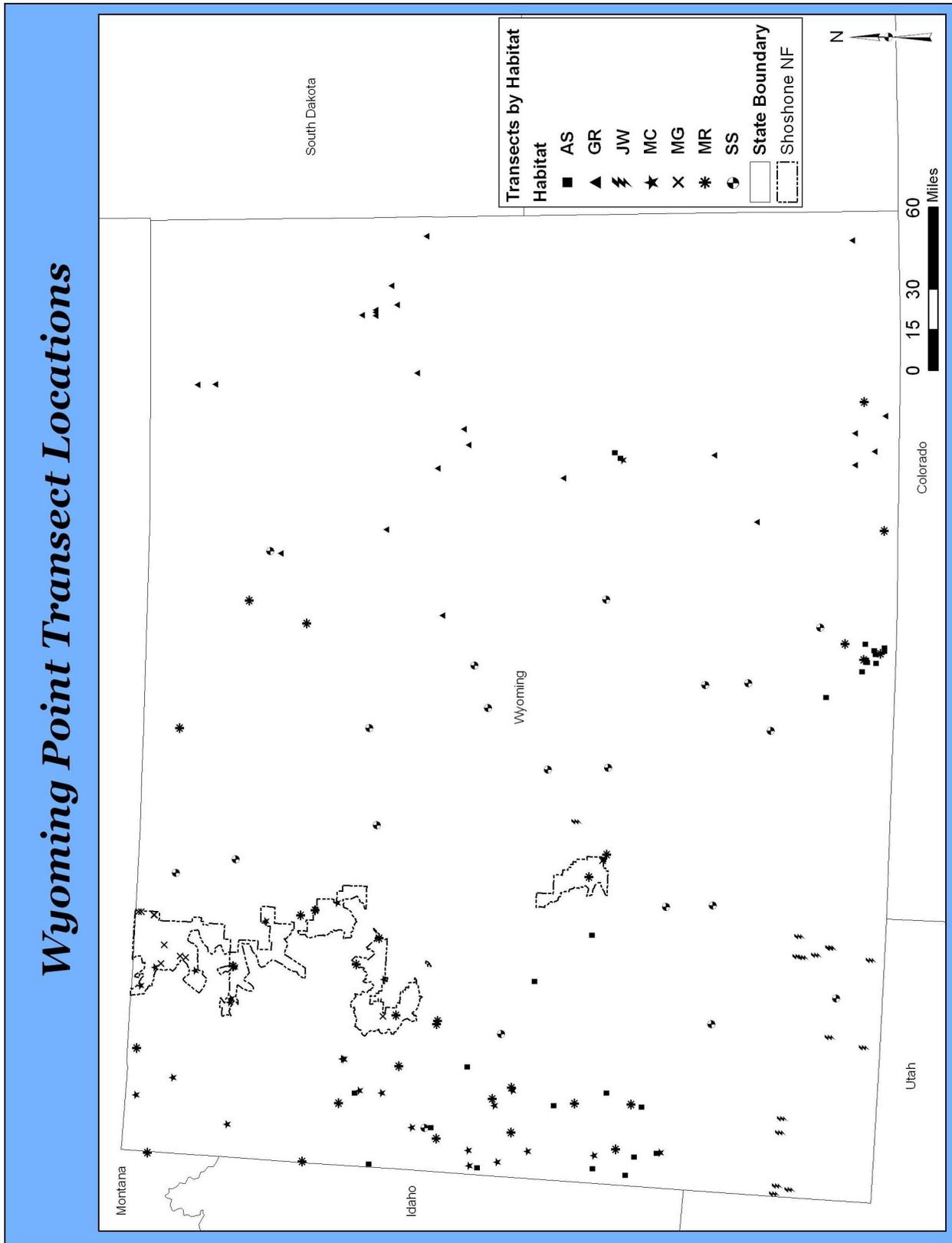


Figure 1. MWB and Shoshone NF transects by habitat for all years

Table 1. Counts of birds detected by habitat on Wyoming statewide transects, summer 2008.

Habitat	# birds detected	Avg. # birds per transect	# species detected	Avg. # species per transect
Aspen	3,550	122	98	28
Grassland	3,555	127	58	10
Juniper Woodland	3,513	117	88	21
Mid-elevation Conifer	2,785	107	82	23
Montane Riparian	3,418	131	105	27
Shrubsteppe	2,724	94	70	10
All Habitats	19,545	116	165	20

Aspen (AS)

We conducted 416 point counts along 29 transects in Aspen between 18 June and 16 July 2008. We detected 3,550 individual birds, with an average of 122 birds per transect (Table 1). We detected 98 species with an average of 28 species per transect (Table 1).

In 2008, observers detected seven species exclusively in Aspen:

- Swainson's Hawk,
- Common Poorwill,
- American Three-toed Woodpecker,
- Western Bluebird,
- Virginia's Warbler,
- American Redstart, and
- Blue Grosbeak.

Observers recorded 19 species more in Aspen than other habitats in 2008:

- Dusky Grouse,
- Red-tailed Hawk,
- Upland Sandpiper,
- Calliope Hummingbird,
- Red-naped Sapsucker,
- Downy Woodpecker,
- Hairy Woodpecker,
- Northern Flicker,
- Western Wood-pewee,
- Dusky Flycatcher,
- Warbling Vireo,
- Black-capped Chickadee,
- Brown Creeper,
- House Wren,
- Veery,
- Orange-crowned Warbler,
- Green-tailed Towhee,
- Brewer's Blackbird, and
- American Goldfinch.

The pooled 2002-2008 point-count transect data from Aspen yielded robust density estimates (CV < 50%) for 36 species and moderately robust estimates (CV = 50-75%)

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for three additional species (Table 2). We should be able to continue to monitor these 39 species in the future.

Warbling Vireo, Broad-tailed Hummingbird, House Wren, Dark-eyed Junco, and Pine Siskin had the highest estimated densities of all species detected in Aspen (listed in order of highest to lowest density). Sixteen species — Mourning Dove, Broad-tailed Hummingbird, Red-naped Sapsucker, Downy Woodpecker, Hairy Woodpecker, Northern Flicker, Western Wood-Pewee, Dusky Flycatcher, Warbling Vireo, American Crow, House Wren, Ruby-crowned Kinglet, Orange-crowned Warbler, Green-tailed Towhee, Dark-eyed Junco, and Brewer's Blackbird had higher estimated densities in Aspen than in the other five statewide habitats sampled.

Table 2. Estimated densities of breeding birds in Aspen habitat in Wyoming, 2002-2008¹.

Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	% <i>CV</i>	<i>n</i>
Mourning Dove	2002	1.0	0.5	1.9	40	13
	2003	0.8	0.5	1.5	34	12
	2004	5.1	2.7	9.8	40	52
	2005	2.2	1.2	4.1	38	30
	2006	4.5	3.1	6.6	22	66
	2007	4.3	2.9	6.4	24	61
	2008	2.9	1.7	5.0	33	46
Broad-tailed Hummingbird	2002	--	--	--	--	7
	2003	41.7	21.7	80.3	41	19
	2004	72.7	42.5	124.3	33	32
	2005	47.8	25.7	89.1	39	21
	2006	44.3	24.3	80.8	37	21
	2007	48.5	24.4	96.5	43	22
	2008	68.9	39.1	121.2	35	37
Red-naped Sapsucker	2002	9.6	5.0	18.3	39	13
	2003	15.2	8.8	26.3	33	22
	2004	45.4	32.9	62.5	19	61
	2005	17.2	11.3	26.1	25	24
	2006	27.9	17.1	45.5	30	42
	2007	14.6	8.7	24.6	32	21
	2008	10.0	5.9	16.9	32	17
Downy Woodpecker	2002	--	--	--	--	4
	2003	7.3	3.9	13.9	39	16
	2004	8.7	5.4	14.0	29	18
	2005	5.7	2.7	12.0	46	12
	2006	7.0	4.0	12.5	35	16
	2007	5.1	2.2	11.7	53	10
	2008	3.9	1.8	8.4	48	10
Hairy Woodpecker	2002	--	--	--	--	8
	2003	3.3	1.8	6.3	40	11
	2004	8.3	4.5	15.4	38	26
	2005	--	--	--	--	8
	2006	4.9	2.8	8.8	36	17
	2007	13.4	7.5	24.0	36	44
	2008	10.0	5.8	17.3	34	38

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Species	Year	D	LCL	UCL	%CV	n
Northern Flicker	2002	4.0	2.0	8.2	44	28
	2003	6.3	4.1	9.6	25	47
	2004	10.1	7.4	13.7	19	70
	2005	12.4	9.2	16.7	18	89
	2006	19.7	15.2	25.6	16	151
	2007	16.8	11.8	24.0	21	125
	2008	7.7	5.5	10.8	20	68
	Western Wood-Pewee	2002	8.7	5.6	13.8	27
2003		4.6	3.0	7.0	25	30
2004		12.9	9.1	18.3	21	80
2005		12.3	8.0	18.9	26	78
2006		15.0	10.5	21.5	21	102
2007		12.1	8.5	17.1	21	79
2008		6.4	3.8	11.0	32	50
Hammond's Flycatcher		2002	--	--	--	--
	2003	--	--	--	--	5
	2004	18.6	12.2	28.4	26	36
	2005	--	--	--	--	9
	2006	11.7	6.3	21.7	38	25
	2007	4.9	2.2	11.0	50	10
	2008	--	--	--	--	6
	Dusky Flycatcher	2002	23.5	14.8	37.4	28
2003		10.5	6.2	17.7	32	37
2004		24.9	16.5	37.5	25	83
2005		23.8	15.8	35.6	24	81
2006		26.6	18.9	37.6	21	97
2007		37.5	29.5	47.7	14	132
2008		31.7	22.8	44.0	20	132
Warbling Vireo		2002	58.8	38.7	89.5	25
	2003	59.7	45.9	77.6	16	173
	2004	127.9	111.3	147.1	8	343
	2005	105.3	90.9	121.8	9	294
	2006	89.2	71.1	112.0	13	268
	2007	131.8	112.7	154.0	9	380
	2008	104.5	87.6	124.5	10	354
	Clark's Nutcracker	2002	--	--	--	--
2003		0.7	0.3	1.6	52	14
2004		1.2	0.6	2.1	37	16
2005		1.5	0.7	3.1	47	25
2006		1.8	1.0	3.2	36	32
2007		1.8	1.1	3.0	31	34
2008		1.2	0.6	2.1	37	26
American Crow		2002	--	--	--	--
	2003	--	--	--	--	6
	2004	--	--	--	--	9
	2005	0.3	0.1	0.9	68	12
	2006	0.4	0.2	0.9	45	20
	2007	--	--	--	--	8
	2008	0.2	0.1	0.5	48	11

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Species	Year	D	LCL	UCL	%CV	n
Common Raven	2002	1.6	0.7	3.6	52	17
	2003	--	--	--	--	6
	2004	1.9	0.9	4.0	46	21
	2005	1.0	0.4	2.4	57	10
	2006	1.3	0.6	3.0	52	14
	2007	3.2	1.4	6.9	50	33
	2008	1.0	0.4	2.1	51	13
	Tree Swallow	2002	9.4	5.2	16.9	36
2003		20.8	14.2	30.6	23	45
2004		4.9	2.3	10.4	47	14
2005		8.2	4.3	15.5	39	16
2006		12.9	7.1	23.5	37	21
2007		14.4	8.4	24.7	33	25
2008		--	--	--	--	7
Violet-green Swallow		2002	--	--	--	--
	2003	--	--	--	--	3
	2004	8.8	4.6	16.9	41	26
	2005	8.3	4.4	16.0	41	28
	2006	3.6	1.6	8.0	51	12
	2007	4.6	1.7	12.5	65	11
	2008	6.8	3.3	14.0	46	18
	Black-capped Chickadee	2002	14.8	7.9	27.7	38
2003		--	--	--	--	3
2004		3.2	1.4	7.4	52	11
2005		4.5	2.0	9.8	49	17
2006		6.6	3.2	13.6	45	26
2007		8.1	4.1	16.1	42	31
2008		--	--	--	--	9
Mountain Chickadee		2002	21.1	12.8	34.6	30
	2003	54.4	37.2	79.7	23	90
	2004	66.6	46.2	95.9	22	100
	2005	34.5	22.8	52.2	25	84
	2006	30.0	18.8	47.7	28	86
	2007	26.5	18.1	38.9	23	84
	2008	27.6	18.2	41.9	26	114
	Red-breasted Nuthatch	2002	6.6	4.7	9.4	21
2003		9.2	7.0	12.3	17	64
2004		10.0	6.7	14.9	24	64
2005		6.8	4.4	10.3	25	45
2006		4.3	2.4	7.6	34	31
2007		5.5	3.4	8.9	29	38
2008		3.1	2.0	4.7	26	25
House Wren		2002	42.8	29.8	61.4	21
	2003	53.3	39.8	71.5	17	153
	2004	89.4	73.8	108.3	11	237
	2005	123.4	94.9	160.5	16	340
	2006	71.8	52.9	97.3	18	213
	2007	60.3	39.1	93.1	26	172
	2008	63.0	46.5	85.3	18	212

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Ruby-crowned Kinglet	2002	30.8	21.7	43.8	21	132
	2003	29.5	20.0	43.5	23	135
	2004	31.3	22.5	43.6	20	134
	2005	32.9	22.7	47.7	22	145
	2006	18.1	12.6	25.9	22	86
	2007	17.8	11.2	28.4	28	81
	2008	17.3	11.8	25.2	23	91
	Mountain Bluebird	2002	13.2	6.4	27.3	45
2003		12.0	7.7	18.6	27	29
2004		21.9	13.5	35.6	29	38
2005		10.7	6.2	18.6	33	23
2006		27.9	16.4	47.3	32	66
2007		9.2	4.9	17.0	38	22
2008		6.7	3.3	13.6	44	19
Townsend's Solitaire		2002	2.6	1.2	5.6	47
	2003	--	--	--	--	3
	2004	2.6	1.5	4.5	33	13
	2005	--	--	--	--	5
	2006	2.4	1.3	4.2	35	13
	2007	1.9	1.0	3.6	40	10
	2008	--	--	--	--	4
	Swainson's Thrush	2002	--	--	--	--
2003		2.1	0.8	5.3	58	17
2004		3.8	1.6	9.2	55	29
2005		1.3	0.6	3.0	53	10
2006		3.2	1.3	8.1	58	27
2007		3.3	1.1	9.4	69	26
2008		1.7	0.8	3.8	50	15
Hermit Thrush		2002	2.7	1.6	4.7	33
	2003	1.1	0.6	2.1	38	15
	2004	4.2	2.2	8.1	40	53
	2005	2.7	1.5	4.6	33	34
	2006	2.3	1.3	4.3	37	32
	2007	4.0	2.4	6.7	31	53
	2008	1.7	1.0	3.0	33	27
	American Robin	2002	36.4	24.9	53.2	23
2003		81.2	60.3	109.5	18	170
2004		113.3	87.5	146.7	16	227
2005		175.7	113.7	271.4	27	208
2006		92.1	71.2	119.2	16	377
2007		37.0	30.9	44.4	11	308
2008		17.7	14.2	21.9	13	198
Orange-crowned Warbler		2002	3.5	1.4	8.6	57
	2003	3.5	1.8	7.0	42	14
	2004	9.0	4.8	17.1	39	34
	2005	16.7	10.5	26.4	27	64
	2006	13.5	8.8	20.9	26	55
	2007	17.7	12.4	25.2	21	70
	2008	7.4	5.3	10.6	21	35

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Yellow Warbler	2002	11.5	4.7	28.5	57	27
	2003	13.6	5.5	33.5	57	34
	2004	13.2	8.1	21.3	29	31
	2005	12.6	7.8	20.2	29	30
	2006	15.4	8.3	28.5	38	40
	2007	29.0	19.3	43.5	25	71
	2008	8.8	5.3	14.8	31	25
	Yellow-rumped Warbler	2002	57.4	39.5	83.3	22
2003		23.7	16.6	33.9	21	82
2004		40.8	30.4	54.7	17	129
2005		46.9	36.4	60.3	15	153
2006		55.9	41.8	74.9	17	200
2007		48.0	36.4	63.4	16	163
2008		21.8	17.0	28.0	15	89
MacGillivray's Warbler		2002	11.7	6.7	20.5	34
	2003	13.9	9.7	20.0	21	33
	2004	17.9	12.2	26.3	23	40
	2005	23.2	13.8	39.0	31	53
	2006	24.8	16.9	36.4	23	61
	2007	16.1	9.0	29.1	36	38
	2008	19.0	12.3	29.2	26	53
	Western Tanager	2002	4.5	2.4	8.5	38
2003		4.7	2.5	9.1	40	28
2004		11.8	8.1	17.3	23	66
2005		8.1	5.5	12.0	23	46
2006		13.4	9.3	19.2	22	81
2007		10.6	7.3	15.3	22	62
2008		6.9	4.5	10.5	25	46
Green-tailed Towhee		2002	6.9	3.9	12.2	34
	2003	7.3	4.0	13.2	36	39
	2004	14.4	9.9	20.9	22	72
	2005	15.6	9.7	25.1	28	81
	2006	26.6	20.2	35.1	16	148
	2007	30.5	20.0	46.5	25	163
	2008	22.6	17.1	29.7	16	143
	Chipping Sparrow	2002	49.1	29.4	82.0	31
2003		38.2	24.6	59.5	26	49
2004		175.3	129.9	236.6	18	207
2005		97.2	59.2	159.7	30	120
2006		32.9	23.1	46.8	21	45
2007		59.6	38.1	93.5	27	75
2008		32.4	21.0	50.2	26	47
Brewer's Sparrow		2002	--	--	--	--
	2003	10.9	5.0	23.5	48	43
	2004	17.9	10.5	30.7	32	67
	2005	10.2	4.9	21.4	45	39
	2006	22.1	12.7	38.3	33	90
	2007	13.5	7.8	23.3	33	53
	2008	7.5	3.1	18.4	57	34

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Vesper Sparrow	2002	2.1	0.9	4.9	53	15
	2003	--	--	--	--	9
	2004	--	--	--	--	9
	2005	4.5	2.4	8.4	38	33
	2006	6.3	3.5	11.2	35	47
	2007	3.4	1.4	8.5	58	26
	2008	1.9	0.9	4.1	48	17
	Song Sparrow	2002	--	--	--	--
2003		6.9	1.6	29.1	103	24
2004		3.3	1.3	8.2	58	11
2005		4.2	2.0	8.6	45	14
2006		7.4	4.0	13.8	38	27
2007		3.7	1.7	8.1	48	13
2008		3.2	1.7	6.0	40	13
Lincoln's Sparrow		2002	--	--	--	--
	2003	7.5	4.1	13.4	36	18
	2004	14.5	8.4	25.0	34	31
	2005	24.9	13.7	45.5	37	58
	2006	18.3	9.9	33.9	38	46
	2007	32.9	19.9	54.3	31	79
	2008	17.2	9.2	32.4	39	49
	White-crowned Sparrow	2002	9.7	4.4	21.4	49
2003		13.5	7.2	25.4	39	37
2004		20.9	13.0	33.5	29	53
2005		11.7	6.1	22.6	40	31
2006		13.3	6.9	25.5	40	38
2007		13.6	7.1	25.9	40	37
2008		16.1	8.7	29.8	38	50
Dark-eyed Junco		2002	269.0	100.9	716.9	65
	2003	91.3	58.8	142.0	27	88
	2004	211.6	162.2	276.0	16	201
	2005	227.9	134.3	386.8	33	153
	2006	82.1	55.7	120.9	24	194
	2007	109.1	66.8	178.2	30	220
	2008	49.3	27.3	89.0	37	154
	Black-headed Grosbeak	2002	2.8	1.4	5.7	44
2003		--	--	--	--	7
2004		4.4	2.3	8.5	41	24
2005		2.4	1.2	4.9	44	14
2006		3.2	1.9	5.2	30	19
2007		2.0	0.8	5.0	58	12
2008		--	--	--	--	9
Western Meadowlark		2002	--	--	--	--
	2003	0.7	0.3	1.7	56	15
	2004	0.6	0.3	1.4	54	12
	2005	0.7	0.3	1.9	62	15
	2006	0.5	0.2	1.0	45	11
	2007	0.8	0.3	2.1	63	17
	2008	--	--	--	--	9

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Brewer's Blackbird	2002	--	--	--	--	5
	2003	--	--	--	--	9
	2004	19.5	9.7	39.5	44	17
	2005	13.4	5.4	33.1	58	21
	2006	15.3	7.0	33.1	48	24
	2007	3.5	1.2	10.6	72	11
	2008	10.6	5.3	21.2	43	28
	Brown-headed Cowbird	2002	5.3	2.3	12.0	51
2003		4.1	1.8	9.2	51	14
2004		9.6	5.4	17.1	35	30
2005		13.3	6.8	26.0	41	44
2006		6.2	3.1	12.2	42	22
2007		6.0	3.3	10.8	37	21
2008		6.2	3.5	11.0	35	25
Cassin's Finch		2002	5.8	3.3	10.0	33
	2003	4.6	2.2	9.7	47	11
	2004	9.3	5.5	15.6	32	18
	2005	11.2	6.6	19.1	32	22
	2006	4.8	2.6	9.0	38	11
	2007	--	--	--	--	7
	2008	4.2	2.4	7.5	35	12
	Red Crossbill	2002	--	--	--	--
2003		--	--	--	--	6
2004		2.0	0.7	5.7	67	13
2005		10.2	5.1	20.2	43	48
2006		1.3	0.7	2.7	43	16
2007		4.1	1.9	9.1	50	16
2008		--	--	--	--	8
Pine Siskin		2002	31.3	15.8	61.9	42
	2003	13.7	8.2	22.9	31	22
	2004	123.2	80.0	189.6	26	88
	2005	102.5	63.6	165.2	29	65
	2006	37.3	24.3	57.1	26	55
	2007	57.8	33.4	100.1	34	78
	2008	41.3	24.3	70.4	33	52
	Red Squirrel	2002	--	--	--	--
2003		--	--	--	--	2
2004		--	--	--	--	6
2005		19.6	12.0	31.9	29	45
2006		16.5	8.3	33.0	42	40
2007		20.7	11.3	37.6	36	48
2008		29.9	21.2	42.2	21	83

¹ *D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

MONITORING WYOMING'S BIRDS: 2008

Grassland (GR)

We conducted 361 point counts along 28 transects in Grassland between 23 May and 20 June 2008. We detected 3,555 birds, with an average of 127 birds per transect (Table 1). We detected 58 species with an average of 10 species per transect (Table 1).

In 2008, observers detected 4 species exclusively in Grassland:

- Mountain Plover,
- Long-billed Curlew
- McCown's Longspur, and
- Grasshopper Sparrow.

Observers recorded 14 species more in Grassland than other habitats in 2008:

- Canada Goose,
- Gadwall,
- American Kestrel,
- Killdeer,
- American Avocet,
- Willet,
- Wilson's Phalarope,
- Rock Pigeon,
- Western Kingbird,
- Eastern Kingbird,
- Lark Bunting,
- Chestnut-collared Longspur,
- Red-winged Blackbird, and
- Western Meadowlark.

The pooled 2002-2008 point-count transect data from Grassland yielded robust density estimates (CV < 50%) for 11 species and moderately robust estimates (CV = 50-75%) for four additional species (Table 3). We should be able to continue to monitor these 15 species in the future.

Lark Bunting, Horned Lark, Western Meadowlark, Brewer's Sparrow, and McCown's Longspur had the highest estimated densities of all species detected in Grassland (listed in order of highest to lowest density). Seven species — Killdeer, Lark Bunting, Grasshopper Sparrow, McCown's Longspur, Chestnut-collared Longspur, Red-winged Blackbird, and Western Meadowlark had higher estimated densities in Grassland than in the other five statewide habitats sampled.

Table 3. Estimated densities of breeding birds in Grassland habitat in Wyoming, 2002-2008¹.

Species	Year	D	LCL	UCL	%CV	n
Killdeer	2002	1.3	0.7	2.5	37	15
	2003	1.4	0.8	2.5	33	14
	2004	1.7	1.1	2.7	29	24
	2005	1.8	1.2	2.9	27	25
	2006	2.3	1.4	3.7	30	34
	2007	2.0	1.1	3.7	39	22
	2008	2.3	1.5	3.6	27	27

MONITORING WYOMING'S BIRDS: 2008

Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	<i>%CV</i>	<i>n</i>
Mourning Dove	2002	1.0	0.5	1.9	42	15
	2003	1.0	0.4	2.4	59	13
	2004	4.4	2.3	8.4	40	45
	2005	1.4	0.8	2.7	39	30
	2006	2.3	1.1	5.2	50	49
	2007	1.8	0.9	3.8	44	30
	2008	2.0	0.9	4.5	51	30
	Common Raven	2002	--	--	--	--
2003		--	--	--	--	2
2004		--	--	--	--	8
2005		0.2	0.1	0.4	45	16
2006		0.1	0.1	0.3	45	13
2007		0.2	0.1	0.4	46	17
2008		0.2	0.1	0.3	41	15
Horned Lark		2002	80.0	35.7	179.1	52
	2003	91.7	71.1	118.2	15	571
	2004	80.5	63.1	102.7	15	823
	2005	63.9	49.4	82.7	16	849
	2006	65.0	52.2	80.8	13	829
	2007	63.1	47.1	84.5	17	493
	2008	53.5	42.4	67.4	14	482
	Cliff Swallow	2002	--	--	--	--
2003		3.9	1.3	11.8	72	11
2004		4.0	2.0	8.0	43	14
2005		3.7	2.0	6.6	36	14
2006		5.0	2.5	10.0	42	19
2007		5.9	2.7	12.8	49	14
2008		--	--	--	--	8
Rock Wren		2002	--	--	--	--
	2003	--	--	--	--	9
	2004	0.5	0.2	1.1	48	17
	2005	0.9	0.6	1.5	28	31
	2006	0.5	0.3	1.0	36	17
	2007	0.4	0.2	1.1	55	11
	2008	--	--	--	--	2
	Sage Thrasher	2002	--	--	--	--
2003		0.6	0.2	2.2	82	10
2004		--	--	--	--	9
2005		0.9	0.4	2.2	54	24
2006		0.8	0.4	1.8	51	19
2007		--	--	--	--	8
2008		--	--	--	--	4
Brewer's Sparrow		2002	26.2	14.1	48.8	38
	2003	27.7	12.4	62.0	49	132
	2004	21.0	12.0	36.9	35	245
	2005	13.7	9.0	20.8	25	229
	2006	17.3	10.6	28.5	30	194
	2007	21.7	13.6	34.5	28	132
	2008	19.2	10.4	35.6	38	110

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Vesper Sparrow	2002	6.0	3.3	11.0	37	71
	2003	10.8	6.4	18.1	31	111
	2004	13.6	9.1	20.2	24	215
	2005	14.4	10.3	20.1	20	240
	2006	10.1	6.8	15.2	24	155
	2007	5.4	3.3	8.7	29	66
	2008	8.7	4.4	17.5	43	119
	Lark Sparrow	2002	4.3	1.4	12.9	71
2003		--	--	--	--	8
2004		--	--	--	--	8
2005		--	--	--	--	6
2006		--	--	--	--	8
2007		7.8	3.3	18.3	54	32
2008		--	--	--	--	8
Lark Bunting		2002	28.7	18.0	45.8	28
	2003	57.4	35.3	93.2	29	562
	2004	66.9	46.5	96.5	22	616
	2005	34.3	20.9	56.4	30	404
	2006	61.2	38.3	98.1	28	706
	2007	51.0	32.2	80.9	28	463
	2008	70.4	47.7	103.9	23	771
	Savannah Sparrow	2002	2.1	0.9	5.1	55
2003		--	--	--	--	5
2004		--	--	--	--	2
2005		4.0	1.8	9.2	52	37
2006		2.3	0.7	7.7	81	20
2007		--	--	--	--	2
2008		2.4	0.9	6.5	64	18
Grasshopper Sparrow		2002	--	--	--	--
	2003	4.3	2.1	8.5	42	20
	2004	3.6	1.4	9.5	61	27
	2005	4.1	1.1	15.6	93	31
	2006	9.4	4.0	22.5	55	67
	2007	9.5	4.4	20.2	47	53
	2008	10.0	4.6	21.6	48	62
	McCown's Longspur	2002	25.4	7.4	87.0	85
2003		10.4	4.8	22.7	48	68
2004		10.7	5.1	22.6	47	101
2005		19.5	11.3	33.5	33	183
2006		11.6	6.7	20.3	34	203
2007		13.3	7.1	25.1	38	102
2008		10.1	5.5	18.3	37	83
Chestnut-collared Longspur		2002	9.1	3.9	21.3	52
	2003	18.2	8.9	37.3	43	114
	2004	4.4	1.9	10.2	54	35
	2005	8.5	3.7	19.5	52	81
	2006	8.2	3.7	18.1	49	73
	2007	--	--	--	--	9
	2008	1.6	0.6	4.3	64	10

MONITORING WYOMING'S BIRDS: 2008

Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	% <i>CV</i>	<i>n</i>
Red-winged Blackbird	2002	1.5	0.6	3.6	54	21
	2003	2.1	0.7	6.0	68	25
	2004	0.9	0.4	2.0	47	17
	2005	4.8	2.0	11.7	57	56
	2006	4.1	1.9	8.5	46	61
	2007	1.3	0.6	2.9	50	14
	2008	4.1	1.6	10.2	58	52
	Western Meadowlark	2002	10.3	7.6	13.9	18
2003		22.7	16.4	31.6	19	404
2004		39.8	31.9	49.6	13	1083
2005		38.8	31.9	47.3	12	1103
2006		48.0	38.7	59.5	13	1281
2007		29.0	23.6	35.6	12	596
2008		28.2	21.6	36.7	16	640
Brewer's Blackbird		2002	0.9	0.4	1.9	46
	2003	--	--	--	--	6
	2004	2.2	1.2	4.1	38	28
	2005	1.5	0.6	3.7	56	15
	2006	3.8	1.6	9.0	55	45
	2007	2.0	0.9	4.4	49	16
	2008	2.7	1.7	4.4	29	32
	Brown-headed Cowbird	2002	1.2	0.6	2.5	45
2003		2.2	1.1	4.7	45	20
2004		2.9	1.7	4.9	33	37
2005		4.3	2.6	7.1	30	54
2006		1.8	1.0	3.0	31	23
2007		--	--	--	--	2
2008		3.7	1.8	7.5	45	33

[†] *D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

Juniper Woodland (JW)

We conducted 432 point counts along 30 transects in Juniper Woodland between 30 May and 20 June 2008. We detected 3,513 birds, with an average of 117 birds per transect (Table 1). We detected 88 species with an average of 21 species per transect (Table 1).

In 2008, observers recorded 11 species exclusively in Juniper Woodland:

- Northern Pintail,
- Chukar,
- Double-crested Cormorant,
- Ash-throated Flycatcher,
- Pinyon Jay,
- Juniper Titmouse,
- Bushtit,
- Blue-gray Gnatcatcher,
- Black-throated Gray Warbler,

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- Yellow-breasted Chat, and
- Black Rosy-Finch.

Observers recorded 25 species, more in Juniper Woodland than any other habitat in 2008:

- American White Pelican,
- Turkey Vulture,
- Cooper's Hawk,
- Mourning Dove,
- Great Horned Owl,
- Common Nighthawk,
- White-throated Swift,
- Gray Flycatcher,
- Say's Phoebe,
- Plumbeous Vireo,
- Black-billed Magpie,
- American Crow,
- Tree Swallow,
- Violet-green Swallow,
- Cliff Swallow,
- Rock Wren,
- Canyon Wren,
- Bewick's Wren,
- Mountain Bluebird,
- Spotted Towhee,
- Chipping Sparrow,
- Lark Sparrow,
- Lazuli Bunting,
- Brown-headed Cowbird, and
- House Finch.

The pooled 2002-2008 point-count transect data from Juniper Woodland yielded robust density estimates (CV < 50%) for 24 species and moderately robust estimates (CV = 50-75%) for one additional species (Table 4). We should be able to continue to monitor these 25 species in the future.

Chipping Sparrow, Gray Flycatcher, Blue-gray Gnatcatcher, Black-throated Gray Warbler, and Bewick's Wren had the highest estimated densities of all species detected in Juniper Woodland (listed in order of highest to lowest density). Thirteen species — Gray Flycatcher, Pinyon Jay, Black-billed Magpie, Common Raven, Cliff Swallow, Rock Wren, Bewick's Wren, Blue-gray Gnatcatcher, Mountain Bluebird, Black-throated Gray Warbler, Chipping Sparrow, Brown-headed Cowbird, and House Finch had higher estimated densities in Juniper Woodland than in the other five statewide habitats sampled.

Table 4. Estimated densities of breeding birds in Juniper Woodland habitat in Wyoming, 2002-2008¹.

Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	% <i>CV</i>	<i>n</i>
Mourning Dove	2002	4.6	3.1	6.8	23	74
	2003	9.6	6.5	14.2	24	94
	2004	5.7	4.3	7.6	17	118

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Species	Year	D	LCL	UCL	%CV	n
Mourning Dove (cont'd)	2005	8.8	6.5	11.8	18	133
	2006	16.6	12.4	22.3	18	230
	2007	3.0	1.4	6.2	47	60
	2008	2.5	1.8	3.5	20	116
Northern Flicker	2002	1.0	0.5	2.1	44	11
	2003	0.7	0.3	1.5	47	10
	2004	1.1	0.6	1.9	35	17
	2005	1.4	0.9	2.2	27	23
	2006	2.3	1.6	3.4	24	39
	2007	1.6	0.7	3.4	46	13
	2008	1.2	0.8	1.9	27	20
Gray Flycatcher	2002	48.7	33.0	71.7	23	131
	2003	38.7	28.0	53.3	19	134
	2004	29.7	19.0	46.4	27	116
	2005	37.9	28.4	50.5	17	155
	2006	63.3	51.3	78.2	13	266
	2007	--	--	--	--	6
	2008	48.0	37.1	62.3	16	196
Dusky Flycatcher	2002	--	--	--	--	4
	2003	--	--	--	--	8
	2004	17.0	8.6	33.5	42	58
	2005	10.9	5.2	22.8	47	39
	2006	4.3	2.1	8.9	46	16
	2007	7.8	4.2	14.4	38	14
	2008	4.2	1.9	9.6	52	15
Plumbeous Vireo	2002	--	--	--	--	0
	2003	--	--	--	--	6
	2004	--	--	--	--	5
	2005	70.6	32.7	152.4	48	36
	2006	--	--	--	--	9
	2007	--	--	--	--	0
	2008	--	--	--	--	6
Pinyon Jay	2002	1.8	0.7	4.4	58	20
	2003	2.2	1.2	4.0	36	32
	2004	7.1	2.7	18.3	62	27
	2005	4.1	2.3	7.6	38	27
	2006	4.2	2.0	8.7	46	50
	2007	1.9	0.9	4.0	44	13
	2008	3.4	1.7	6.6	42	40
Clark's Nutcracker	2002	--	--	--	--	4
	2003	--	--	--	--	9
	2004	--	--	--	--	8
	2005	1.2	0.5	2.9	59	20
	2006	0.9	0.5	1.9	44	24
	2007	--	--	--	--	0
	2008	0.5	0.1	2.1	95	12
Black-billed Magpie	2002	1.6	0.5	4.6	68	17
	2003	2.2	1.3	3.7	31	31
	2004	2.2	1.3	3.5	29	30

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Species	Year	D	LCL	UCL	%CV	n
Black-billed Magpie (cont'd)	2005	2.7	1.7	4.3	28	45
	2006	3.3	1.9	5.7	33	57
	2007	8.2	4.6	14.7	35	55
	2008	3.9	2.5	6.2	28	57
Common Raven	2002	--	--	--	--	8
	2003	0.8	0.5	1.2	29	22
	2004	0.5	0.2	0.8	38	15
	2005	0.7	0.4	1.1	28	24
	2006	0.7	0.4	1.1	32	24
	2007	--	--	--	--	9
	2008	2.3	1.4	3.9	32	72
Horned Lark	2002	--	--	--	--	9
	2003	6.5	2.1	20.8	76	24
	2004	20.0	9.1	44.3	49	65
	2005	8.7	4.5	16.7	40	24
	2006	8.4	4.3	16.6	42	36
	2007	21.5	12.6	37.0	32	47
	2008	4.9	2.6	9.2	39	21
	Violet-green Swallow	2002	2.5	0.9	7.0	66
2003		6.8	1.7	26.9	95	49
2004		4.6	2.0	10.4	52	24
2005		4.8	2.3	9.9	45	34
2006		10.4	5.4	20.1	40	74
2007		9.1	3.9	20.9	51	34
2008		9.0	5.1	15.8	35	44
Cliff Swallow		2002	--	--	--	--
	2003	--	--	--	--	0
	2004	--	--	--	--	8
	2005	--	--	--	--	9
	2006	4.9	1.5	16.2	83	22
	2007	--	--	--	--	7
	2008	5.7	1.7	18.9	83	18
	Mountain Chickadee	2002	5.9	2.4	14.7	56
2003		--	--	--	--	8
2004		--	--	--	--	9
2005		4.9	2.8	8.5	33	18
2006		4.3	2.3	7.9	38	17
2007		--	--	--	--	6
2008		--	--	--	--	6
Juniper Titmouse		2002	--	--	--	--
	2003	9.2	4.9	17.3	39	16
	2004	--	--	--	--	8
	2005	--	--	--	--	5
	2006	15.4	7.6	31.5	44	32
	2007	--	--	--	--	0
	2008	--	--	--	--	4
	Rock Wren	2002	3.7	2.4	5.6	25
2003		4.7	3.3	6.8	22	98
2004		6.3	4.5	8.8	20	144

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Species	Year	D	LCL	UCL	%CV	n
Rock Wren (cont'd)	2005	5.3	3.8	7.6	21	132
	2006	8.8	6.7	11.6	16	225
	2007	--	--	--	--	3
	2008	6.4	4.9	8.3	16	156
Bewick's Wren	2002	9.4	4.9	18.3	40	22
	2003	8.0	4.7	13.5	32	24
	2004	43.2	27.0	69.1	28	146
	2005	67.4	47.0	96.6	22	239
	2006	72.9	49.7	106.8	23	268
	2007	25.8	13.9	47.9	37	45
	2008	29.2	18.0	47.4	29	103
Blue-gray Gnatcatcher	2002	44.6	28.1	70.9	28	34
	2003	31.6	17.7	56.4	35	31
	2004	59.6	39.9	89.1	24	63
	2005	96.0	70.2	131.4	19	111
	2006	78.1	54.8	111.3	21	93
	2007	137.2	103.0	182.8	17	79
	2008	45.0	30.3	66.9	24	46
Mountain Bluebird	2002	13.9	7.1	27.3	42	46
	2003	33.7	20.1	56.4	32	97
	2004	46.9	29.3	75.1	29	151
	2005	144.3	96.0	216.7	25	163
	2006	27.8	21.4	36.1	16	220
	2007	17.4	11.9	25.6	23	86
	2008	10.9	7.2	16.5	25	97
American Robin	2002	5.9	3.5	9.9	31	24
	2003	8.0	4.7	13.7	33	42
	2004	14.0	9.4	20.8	24	82
	2005	9.8	6.8	14.1	22	59
	2006	10.5	7.1	15.7	24	68
	2007	5.4	2.5	11.7	46	16
	2008	8.2	5.4	12.6	26	51
Sage Thrasher	2002	--	--	--	--	4
	2003	3.3	1.6	6.9	46	28
	2004	2.1	1.2	3.7	34	20
	2005	3.4	2.0	5.8	33	34
	2006	1.4	0.7	3.0	46	14
	2007	3.0	1.4	6.2	44	15
	2008	1.3	0.7	2.5	41	13
Black-throated Gray Warbler	2002	60.0	27.9	129.2	49	31
	2003	24.1	10.1	57.1	56	16
	2004	54.7	25.6	116.7	48	39
	2005	115.2	56.9	233.4	45	88
	2006	77.3	36.5	163.5	48	63
	2007	--	--	--	--	7
	2008	39.6	18.7	84.0	48	31
Green-tailed Towhee	2002	20.7	12.5	34.3	31	107
	2003	15.9	8.3	30.6	41	82
	2004	12.0	6.5	22.1	38	135

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Species	Year	D	LCL	UCL	%CV	n
Green-tailed Towhee (cont'd)	2005	38.6	23.5	63.4	31	130
	2006	13.9	6.1	31.7	53	136
	2007	22.1	8.9	54.7	57	52
	2008	5.9	3.8	9.2	27	91
Chipping Sparrow	2002	101.2	76.7	133.5	16	101
	2003	171.2	124.0	236.5	19	220
	2004	211.8	160.4	279.6	17	284
	2005	276.5	214.1	357.0	15	416
	2006	118.1	92.7	150.4	14	184
	2007	158.5	107.2	234.4	23	116
	2008	146.8	116.3	185.2	14	203
Brewer's Sparrow	2002	15.1	9.2	25.0	30	77
	2003	29.9	15.3	58.7	42	72
	2004	114.5	77.4	169.3	24	205
	2005	109.5	71.5	167.8	26	157
	2006	34.7	20.6	58.3	32	257
	2007	15.5	9.3	25.8	31	76
	2008	12.8	7.3	22.4	35	77
Vesper Sparrow	2002	11.5	6.0	22.1	39	64
	2003	4.9	3.0	8.0	30	35
	2004	8.8	5.6	13.7	27	68
	2005	8.7	5.7	13.2	25	70
	2006	15.2	9.9	23.4	26	132
	2007	15.5	9.6	24.9	28	66
	2008	7.8	4.9	12.4	28	66
Lark Sparrow	2002	4.9	2.7	8.8	35	23
	2003	5.0	2.5	9.7	41	30
	2004	4.4	2.0	9.5	48	23
	2005	3.3	1.8	6.1	37	24
	2006	3.5	1.7	7.4	47	25
	2007	16.4	10.2	26.4	29	58
	2008	6.9	3.6	13.1	40	47
Sage Sparrow	2002	3.2	1.3	8.0	58	18
	2003	--	--	--	--	7
	2004	--	--	--	--	5
	2005	2.1	0.9	4.6	50	18
	2006	5.7	2.1	15.1	63	51
	2007	2.8	1.3	5.9	46	12
	2008	3.7	1.8	7.5	44	32
Western Meadowlark	2002	2.9	1.4	6.2	46	55
	2003	3.5	2.1	6.0	31	86
	2004	3.8	2.5	5.7	25	103
	2005	3.2	2.0	5.3	29	93
	2006	3.9	2.6	6.0	25	117
	2007	1.4	0.7	2.8	42	20
	2008	5.6	3.2	9.9	35	159
Brown-headed Cowbird	2002	8.4	5.0	14.3	32	36
	2003	6.7	3.2	14.0	45	37
	2004	5.8	3.3	10.3	35	34

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Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	% <i>CV</i>	<i>n</i>
Brown-headed Cowbird (cont'd)	2005	6.1	3.7	10.1	31	34
	2006	8.7	5.9	13.0	24	55
	2007	--	--	--	--	4
	2008	9.9	5.2	18.7	40	39
House Finch	2002	4.7	2.7	8.4	34	26
	2003	3.0	1.2	7.3	57	21
	2004	4.6	2.3	9.2	42	36
	2005	3.1	1.6	5.8	39	26
	2006	13.1	8.6	19.8	25	108
	2007	--	--	--	--	3
	2008	6.4	3.8	10.8	32	51
American Goldfinch	2002	--	--	--	--	3
	2003	--	--	--	--	0
	2004	--	--	--	--	9
	2005	1.0	0.4	2.3	54	16
	2006	1.8	0.9	3.6	43	23
	2007	--	--	--	--	0
	2008	--	--	--	--	9

¹ *D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

Mid-elevation Conifer (MC)

We conducted 358 point counts along 26 transects in Mid-elevation Conifer between 14 June and 21 July 2008. We detected 2,785 birds, with an average of 107 birds per transect (Table 1). We detected 82 species with an average of 23 species per transect (Table 1).

In 2008, we observers recorded four species exclusively in Mid-elevation Conifer:

- Northern Goshawk,
- Northern Saw-whet Owl,
- Golden-crowned Kinglet, and
- Pine Grosbeak.

We Observers recorded 21 species more in Mid-elevation Conifer than other habitats in 2008:

- Ruffed Grouse,
- Sharp-shinned Hawk,
- Olive-sided Flycatcher,
- Hammond's Flycatcher,
- Cordilleran Flycatcher,
- Gray Jay,
- Steller's Jay,
- Clark's Nutcracker,
- Mountain Chickadee,
- Red-breasted Nuthatch,
- White-breasted Nuthatch,
- Ruby-crowned Kinglet,

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- Townsend's Solitaire,
- Swainson's Thrush,
- Hermit Thrush,
- Yellow-rumped Warbler,
- Western Tanager,
- Dark-eyed Junco,
- Cassin's Finch,
- Red Crossbill, and
- Pine Siskin.

The pooled 2002-2008 point-count data from Mid-elevation Conifer yielded robust density estimates (CV < 50%) for 29 species and moderately robust estimates (CV = 50-75%) for two additional species (Table 5). We should be able to continue to monitor these 31 species in the future.

Pine Siskin, Dark-eyed Junco, Mountain Chickadee, Cassin's Finch, and Chipping Sparrow had the highest estimated densities of all species detected in Mid-elevation Conifer (listed in order of highest to lowest density). Twelve species — Olive-sided Flycatcher, Hammond's Flycatcher, Clark's Nutcracker, Mountain Chickadee, Red-breasted Nuthatch, Townsend's Solitaire, Swainson's Thrush, Hermit Thrush, Western Tanager, Cassin's Finch, Red Crossbill, and Pine Siskin had higher estimated densities in Mid-elevation Conifer than in the other statewide habitats sampled.

Table 5. Estimated densities of breeding birds in Mid-elevation Conifer habitat in Wyoming, 2002-2008¹.

Species	Year	D	LCL	UCL	%CV	n
Broad-tailed Hummingbird	2002	--	--	--	--	3
	2003	74.1	32.1	171.2	52	21
	2004	39.8	16.8	94.4	54	12
	2005	72.9	37.5	141.6	41	23
	2006	--	--	--	--	5
	2007	--	--	--	--	6
	2008	--	--	--	--	4
	Red-naped Sapsucker	2002	--	--	--	--
2003		--	--	--	--	8
2004		8.1	3.4	19.2	56	15
2005		7.2	3.0	17.2	56	15
2006		6.4	2.7	15.2	56	12
2007		7.9	2.9	21.5	66	15
2008		--	--	--	--	2
Hairy Woodpecker		2002	--	--	--	--
	2003	3.7	1.9	7.0	40	15
	2004	4.2	2.2	7.8	39	18
	2005	4.4	2.6	7.4	32	20
	2006	5.9	3.6	9.4	29	24
	2007	10.3	5.3	20.1	41	43
	2008	4.2	2.5	7.3	33	18
	Northern Flicker	2002	3.9	2.2	6.7	33
2003		4.2	2.5	7.3	33	17
2004		7.0	4.4	11.3	29	30
2005		12.3	7.9	19.0	27	55

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Species	Year	D	LCL	UCL	%CV	n
Northern Flicker (cont'd)	2006	13.8	9.3	20.6	24	55
	2007	13.6	7.7	24.0	35	56
	2008	6.4	3.4	12.0	38	27
Olive-sided Flycatcher	2002	--	--	--	--	5
	2003	--	--	--	--	7
	2004	0.9	0.5	1.7	38	17
	2005	1.4	0.7	2.7	41	27
	2006	1.3	0.8	2.1	30	22
	2007	--	--	--	--	2
	2008	1.3	0.7	2.2	34	23
Western Wood-Pewee	2002	--	--	--	--	6
	2003	--	--	--	--	2
	2004	--	--	--	--	6
	2005	--	--	--	--	6
	2006	2.2	1.0	4.7	46	21
	2007	1.2	0.5	3.1	58	12
	2008	1.7	1.0	3.0	34	17
	Hammond's Flycatcher	2002	--	--	--	--
2003		14.6	6.9	30.8	46	28
2004		6.9	3.5	13.6	42	14
2005		16.9	9.8	28.9	33	36
2006		9.9	5.2	18.7	39	19
2007		7.1	3.8	13.6	40	13
2008		11.0	5.6	21.4	41	22
Dusky Flycatcher	2002	7.6	4.6	12.6	30	24
	2003	8.3	4.3	15.8	39	29
	2004	13.9	9.1	21.4	26	52
	2005	8.5	4.4	16.1	39	33
	2006	15.9	10.0	25.2	28	56
	2007	11.4	7.4	17.7	26	41
	2008	14.2	9.6	21.1	24	52
	Warbling Vireo	2002	3.6	1.5	8.6	54
2003		13.5	7.7	23.5	33	58
2004		18.4	12.2	27.7	24	83
2005		11.5	7.5	17.7	26	54
2006		11.6	8.0	16.8	22	50
2007		21.2	14.1	31.7	24	93
2008		17.6	12.2	25.5	22	77
Gray Jay	2002	--	--	--	--	3
	2003	2.4	1.4	4.1	33	12
	2004	2.1	0.9	4.9	55	11
	2005	2.5	1.1	5.6	51	11
	2006	--	--	--	--	9
	2007	3.9	1.8	8.2	47	12
	2008	--	--	--	--	7
	Steller's Jay	2002	6.4	3.2	12.7	42
2003		3.5	2.0	6.3	35	16
2004		--	--	--	--	5
2005		--	--	--	--	4
2006		2.6	1.5	4.7	36	10
2007		3.9	1.8	8.2	47	17

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Species	Year	D	LCL	UCL	%CV	n
Steller's Jay (cont'd)	2008	--	--	--	--	4
Clark's Nutcracker	2002	1.9	1.1	3.3	34	19
	2003	1.7	1.0	2.8	31	18
	2004	5.1	3.2	8.2	28	54
	2005	3.2	2.1	5.1	28	38
	2006	6.0	4.2	8.5	21	58
	2007	3.4	2.3	5.1	24	37
	2008	4.4	2.5	7.6	33	46
Common Raven	2002	1.6	1.0	2.6	30	25
	2003	0.7	0.4	1.4	37	13
	2004	1.4	0.8	2.4	32	25
	2005	--	--	--	--	5
	2006	2.4	1.4	4.1	34	33
	2007	1.6	0.7	3.4	48	26
	2008	0.9	0.5	1.6	33	15
Mountain Chickadee	2002	69.4	46.5	103.5	25	186
	2003	38.1	23.2	62.6	31	136
	2004	42.7	32.5	56.0	16	132
	2005	168.5	122.9	231.0	19	190
	2006	39.6	24.5	64.2	30	131
	2007	38.7	28.3	52.9	19	182
	2008	37.8	19.1	74.8	43	155
Red-breasted Nuthatch	2002	16.8	10.6	26.7	28	92
	2003	12.0	8.2	17.6	23	73
	2004	20.0	13.9	28.8	22	124
	2005	10.8	7.3	15.9	24	73
	2006	6.9	4.6	10.2	24	42
	2007	10.3	6.4	16.5	29	61
	2008	10.1	6.2	16.5	30	64
Rock Wren	2002	--	--	--	--	0
	2003	--	--	--	--	3
	2004	--	--	--	--	8
	2005	--	--	--	--	9
	2006	1.6	0.8	3.0	39	31
	2007	--	--	--	--	6
	2008	--	--	--	--	3
House Wren	2002	--	--	--	--	4
	2003	3.5	1.8	7.0	42	14
	2004	2.6	1.4	4.8	38	11
	2005	3.6	2.1	6.1	32	15
	2006	6.0	2.9	12.2	43	24
	2007	4.2	2.4	7.2	33	17
	2008	5.3	3.4	8.3	27	22
Golden-crowned Kinglet	2002	--	--	--	--	8
	2003	11.5	5.5	24.0	46	17
	2004	11.3	4.1	31.6	66	18
	2005	--	--	--	--	4
	2006	--	--	--	--	8
	2007	8.4	3.7	19.1	51	15
	2008	--	--	--	--	6
Ruby-crowned Kinglet	2002	31.0	23.2	41.2	17	191

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Species	Year	D	LCL	UCL	%CV	n
Ruby-crowned Kinglet (cont'd)	2003	56.1	23.9	131.7	55	146
	2004	65.4	41.6	102.7	28	206
	2005	181.3	130.0	253.0	20	213
	2006	24.2	15.6	37.7	27	153
	2007	15.0	9.9	22.9	25	124
	2008	12.9	9.2	18.1	20	158
Mountain Bluebird	2002	--	--	--	--	3
	2003	3.4	1.8	6.5	39	16
	2004	4.2	2.4	7.4	34	18
	2005	4.6	2.6	8.1	34	24
	2006	4.2	2.3	8.0	38	20
	2007	3.8	1.8	7.7	45	17
	2008	3.7	2.1	6.6	35	17
Townsend's Solitaire	2002	2.7	1.7	4.2	27	17
	2003	--	--	--	--	2
	2004	4.4	2.7	7.1	29	30
	2005	1.8	0.9	3.6	44	14
	2006	3.5	2.1	5.9	31	25
	2007	1.9	1.0	3.5	37	14
	2008	2.7	1.7	4.4	29	20
Swainson's Thrush	2002	--	--	--	--	5
	2003	5.6	3.0	10.5	38	44
	2004	6.1	2.9	12.8	45	51
	2005	2.5	1.3	4.8	39	22
	2006	3.0	1.7	5.5	35	24
	2007	1.9	0.8	4.4	53	15
	2008	2.0	1.0	3.8	41	16
Hermit Thrush	2002	0.9	0.5	1.6	34	22
	2003	1.9	1.1	3.0	29	50
	2004	3.4	2.3	5.0	22	96
	2005	3.3	2.1	5.1	26	97
	2006	3.5	2.4	5.2	23	95
	2007	2.6	1.7	3.7	23	70
	2008	3.7	2.6	5.4	22	103
American Robin	2002	43.1	22.4	82.6	41	105
	2003	43.8	25.0	76.5	35	118
	2004	64.8	47.2	88.9	19	157
	2005	171.4	134.3	218.9	15	208
	2006	48.6	35.0	67.6	20	203
	2007	27.2	19.9	37.2	19	268
	2008	23.0	12.3	43.0	39	169
Orange-crowned Warbler	2002	2.3	1.0	5.1	51	12
	2003	--	--	--	--	8
	2004	--	--	--	--	9
	2005	--	--	--	--	1
	2006	--	--	--	--	8
	2007	3.3	1.4	7.6	52	20
	2008	--	--	--	--	3
Yellow Warbler	2002	--	--	--	--	2
	2003	--	--	--	--	3
	2004	--	--	--	--	3

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Yellow Warbler (cont'd)	2005	--	--	--	--	7
	2006	2.1	1.0	4.3	44	12
	2007	3.8	1.8	8.0	46	22
	2008	2.2	1.1	4.5	44	13
Yellow-rumped Warbler	2002	101.3	70.1	146.5	22	257
	2003	24.6	17.6	34.4	20	152
	2004	42.5	31.1	58.1	19	194
	2005	342.1	217.3	538.6	28	168
	2006	51.8	36.1	74.5	22	198
	2007	16.8	12.0	23.6	20	127
	2008	17.9	13.9	23.1	15	173
MacGillivray's Warbler	2002	--	--	--	--	7
	2003	19.0	9.7	37.0	41	52
	2004	11.7	6.0	22.7	41	33
	2005	8.5	5.1	14.1	31	26
	2006	8.7	4.4	17.2	42	24
	2007	5.7	2.4	13.5	54	16
	2008	7.3	3.9	13.8	39	21
	Western Tanager	2002	11.2	6.0	20.7	37
2003		18.2	11.8	27.8	25	81
2004		18.1	11.9	27.6	25	80
2005		5.6	3.6	8.9	27	26
2006		17.6	11.9	26.1	23	78
2007		23.4	15.2	36.2	26	107
2008		12.9	9.3	17.9	20	57
Green-tailed Towhee	2002	--	--	--	--	5
	2003	10.0	5.2	19.3	40	37
	2004	7.8	4.4	13.9	35	31
	2005	2.9	1.6	5.3	37	12
	2006	8.6	4.4	16.8	41	32
	2007	11.6	6.0	22.4	40	44
	2008	5.9	3.3	10.8	36	23
	Chipping Sparrow	2002	30.2	19.3	47.3	27
2003		20.1	11.9	33.9	32	39
2004		51.5	28.7	92.3	36	100
2005		393.1	256.2	603.2	26	174
2006		60.2	44.0	82.4	19	82
2007		19.6	15.5	24.9	14	74
2008		28.7	17.6	46.7	30	65
Brewer's Sparrow		2002	--	--	--	--
	2003	--	--	--	--	2
	2004	3.7	1.8	7.6	45	24
	2005	--	--	--	--	0
	2006	3.1	1.6	5.9	40	19
	2007	4.4	2.3	8.5	40	28
	2008	--	--	--	--	6
	Song Sparrow	2002	--	--	--	--
2003		--	--	--	--	4
2004		--	--	--	--	7
2005		6.3	2.2	18.2	69	18
2006		5.1	2.4	10.8	47	13

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Song Sparrow (cont'd)	2007	--	--	--	--	9
	2008	--	--	--	--	5
Lincoln's Sparrow	2002	--	--	--	--	3
	2003	5.7	3.3	9.7	32	31
	2004	5.5	2.7	11.4	45	32
	2005	3.4	2.0	5.9	33	21
	2006	8.0	5.5	11.7	23	43
	2007	4.8	2.4	9.7	43	26
	2008	6.0	3.7	9.7	29	34
White-crowned Sparrow	2002	--	--	--	--	1
	2003	8.4	3.8	18.3	49	43
	2004	7.1	3.3	15.2	47	40
	2005	4.1	2.4	6.9	32	24
	2006	5.9	3.2	10.6	36	31
	2007	6.7	3.7	12.2	37	35
	2008	5.1	2.1	12.3	55	28
Dark-eyed Junco	2002	359.7	155.8	830.2	54	190
	2003	92.3	53.1	160.5	34	186
	2004	113.3	83.4	154.0	19	250
	2005	386.3	248.8	599.8	27	223
	2006	124.8	88.5	176.0	21	296
	2007	86.2	67.4	110.1	15	349
	2008	41.3	22.1	77.0	39	179
Cassin's Finch	2002	43.0	21.5	85.8	43	14
	2003	47.0	19.0	116.4	58	17
	2004	44.2	15.6	125.1	68	11
	2005	213.5	112.2	406.2	40	55
	2006	--	--	--	--	9
	2007	--	--	--	--	4
	2008	29.1	14.6	58.3	43	10
Red Crossbill	2002	--	--	--	--	4
	2003	3.2	1.5	6.6	45	11
	2004	14.1	6.9	28.7	44	21
	2005	28.0	9.3	84.6	73	17
	2006	13.5	8.1	22.4	31	29
	2007	5.9	3.3	10.8	36	20
	2008	12.5	4.2	37.1	71	10
Pine Siskin	2002	48.7	30.2	78.7	28	89
	2003	33.5	23.4	48.1	21	66
	2004	114.9	81.7	161.6	21	104
	2005	159.4	120.5	210.9	17	154
	2006	73.1	52.9	100.9	19	132
	2007	136.4	106.1	175.3	15	229
	2008	86.9	61.7	122.6	20	167
Red Squirrel	2002	4.6	1.6	13.0	66	12
	2003	10.0	4.9	20.3	43	29
	2004	11.4	4.7	27.7	56	35
	2005	20.1	12.1	33.7	31	65
	2006	11.3	5.9	21.7	40	33
	2007	32.0	20.8	49.3	26	95
	2008	24.8	16.6	37.0	24	72

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¹ D = estimated density (birds/km²); LCL and UCL = lower and upper 90% confidence limits on D ; % CV = percent coefficient of variation of D ; n = number of independent detections used to estimate D . Note: we omitted the density estimates if $n < 10$.

Montane Riparian (MR)

We conducted 366 point counts along 26 transects in Montane Riparian between 4 June and 15 July, 2008. We detected 3,418 birds, with an average of 131 birds per transect (Table 1). We detected 105 species with an average of 27 species per transect (Table 1).

In 2008, we observers recorded seven species exclusively in Montane Riparian:

- Ring-necked Duck,
- Bufflehead,
- Merlin,
- Rufous Hummingbird,
- Willow Flycatcher,
- Bank Swallow, and
- Fox Sparrow.

Observers recorded 25 species more in Montane Riparian than other habitats in 2008:

- Mallard,
- Green-winged Teal,
- Barrow's Goldeneye,
- Common Merganser,
- Great Blue Heron,
- Osprey,
- Sandhill Crane,
- Spotted Sandpiper,
- Wilson's Snipe,
- Broad-tailed Hummingbird,
- Belted Kingfisher,
- American Dipper,
- Gray Catbird,
- Cedar Waxwing,
- Yellow Warbler,
- Ovenbird,
- MacGillivray's Warbler,
- Common Yellowthroat,
- Wilson's Warbler,
- Savannah Sparrow,
- Song Sparrow,
- Lincoln's Sparrow,
- White-crowned Sparrow, and
- Black-headed Grosbeak.

The pooled 2002-2008 point-count data from Montane Riparian yielded robust density estimates ($CV < 50\%$) for 33 species and moderately robust estimates ($CV = 50-75\%$) for eight additional species (Table 6). We should be able to continue to monitor these 41 species in the future.

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Pine Siskin, MacGillivray's Warbler, Broad-tailed Hummingbird, Yellow Warbler, and American Robin had the highest estimated densities of all species detected in Montane Riparian (listed in order of highest to lowest density). Seventeen species — Spotted Sandpiper, Wilson's Snipe, Willow Flycatcher, Tree Swallow, Violet-green Swallow, American Robin, Gray Catbird, Yellow Warbler, Yellow-rumped Warbler, MacGillivray's Warbler, Common Yellowthroat, Wilson's Warbler, Savannah Sparrow, Song Sparrow, Lincoln's Sparrow, White-crowned Sparrow, and Lazuli Bunting had higher estimated densities in Montane Riparian than in the other statewide habitats sampled.

Table 6. Estimated densities of breeding birds in Montane Riparian habitat in Wyoming, 2002-2008¹.

Species	Year	D	LCL	UCL	%CV	n
Spotted Sandpiper	2002	10.8	5.7	20.3	38	42
	2003	13.6	6.5	28.4	45	59
	2004	11.2	5.7	21.9	41	39
	2005	3.2	1.4	7.4	52	14
	2006	10.9	6.3	18.9	33	58
	2007	7.9	4.4	14.2	35	37
	2008	7.3	3.4	15.7	48	32
Wilson's Snipe	2002	--	--	--	--	5
	2003	1.0	0.5	2.3	48	19
	2004	1.2	0.6	2.5	45	20
	2005	2.0	1.0	3.9	42	37
	2006	0.9	0.5	1.7	37	20
	2007	0.5	0.3	1.1	43	11
	2008	1.6	0.9	3.0	37	32
Mourning Dove	2002	--	--	--	--	5
	2003	--	--	--	--	7
	2004	2.0	1.0	4.0	41	25
	2005	0.7	0.2	2.3	76	10
	2006	1.5	0.9	2.7	34	24
	2007	2.1	1.2	3.5	32	34
	2008	--	--	--	--	7
Broad-tailed Hummingbird	2002	43.6	19.0	100.0	51	24
	2003	73.6	43.4	124.8	32	45
	2004	77.4	44.7	133.9	33	43
	2005	99.6	59.8	165.8	31	62
	2006	66.4	37.8	116.6	34	49
	2007	92.9	49.6	173.8	38	63
	2008	60.1	34.5	104.5	34	39
Red-naped Sapsucker	2002	--	--	--	--	7
	2003	13.8	7.2	26.2	40	22
	2004	16.5	8.5	32.1	42	23
	2005	14.7	7.9	27.5	39	22
	2006	15.0	7.7	29.5	42	29
	2007	8.5	4.0	18.1	48	14
	2008	8.2	3.6	18.9	53	14
Northern Flicker	2002	3.0	1.8	4.9	31	26
	2003	3.6	2.3	5.6	27	35
	2004	4.4	2.8	6.9	27	37
	2005	3.5	2.3	5.4	26	34
	2006	5.8	4.0	8.4	23	67

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Species	Year	D	LCL	UCL	%CV	n
Northern Flicker (cont'd)	2007	5.4	3.7	7.7	22	58
	2008	2.7	1.7	4.2	27	30
Olive-sided Flycatcher	2002	--	--	--	--	4
	2003	--	--	--	--	5
	2004	1.3	0.7	2.3	36	14
	2005	1.0	0.5	1.9	43	12
	2006	0.7	0.4	1.3	35	11
	2007	--	--	--	--	6
	2008	0.9	0.4	2.0	47	13
Western Wood-Pewee	2002	--	--	--	--	5
	2003	0.9	0.4	1.9	48	10
	2004	--	--	--	--	8
	2005	3.0	1.6	5.6	38	36
	2006	2.1	1.3	3.6	32	30
	2007	2.3	1.2	4.4	39	30
	2008	1.3	0.7	2.4	40	17
	Willow Flycatcher	2002	3.4	1.4	8.4	57
2003		2.6	1.2	5.5	47	11
2004		4.6	2.4	8.7	39	18
2005		4.8	2.2	10.5	48	21
2006		5.6	2.2	14.0	58	29
2007		2.1	1.0	4.6	49	10
2008		2.2	1.1	4.5	43	11
Hammond's Flycatcher		2002	--	--	--	--
	2003	--	--	--	--	5
	2004	--	--	--	--	8
	2005	--	--	--	--	9
	2006	6.1	2.5	14.9	56	20
	2007	5.3	2.4	12.1	51	16
	2008	3.6	1.5	8.8	57	11
	Dusky Flycatcher	2002	9.3	4.8	17.9	39
2003		12.8	8.7	18.7	23	55
2004		25.6	17.4	37.6	23	100
2005		13.9	9.1	21.2	25	61
2006		11.0	7.1	17.0	26	57
2007		13.1	8.8	19.5	24	63
2008		13.0	8.9	18.9	22	64
Warbling Vireo		2002	10.0	5.7	17.7	34
	2003	12.7	6.8	23.6	38	45
	2004	31.0	19.6	49.1	28	97
	2005	24.9	16.5	37.6	25	90
	2006	19.8	12.0	32.9	31	84
	2007	21.6	13.9	33.5	27	85
	2008	30.8	17.7	53.6	34	122
	Clark's Nutcracker	2002	0.2	0.1	0.4	46
2003		--	--	--	--	6
2004		0.5	0.3	1.1	42	18
2005		0.3	0.1	0.5	35	12
2006		0.4	0.2	0.7	35	21
2007		0.5	0.2	0.8	36	27
2008		0.3	0.2	0.6	37	20

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Species	Year	D	LCL	UCL	%CV	n
Common Raven	2002	1.2	0.7	2.2	34	22
	2003	0.8	0.4	1.4	36	15
	2004	1.0	0.6	1.7	29	19
	2005	--	--	--	--	9
	2006	0.8	0.4	1.6	44	19
	2007	0.7	0.4	1.2	37	16
	2008	1.0	0.6	1.8	31	25
	Tree Swallow	2002	10.9	5.1	23.1	46
2003		7.4	3.5	15.5	46	18
2004		8.9	4.6	17.3	40	19
2005		8.8	4.3	18.2	45	14
2006		6.8	3.0	15.3	51	12
2007		11.8	6.2	22.5	40	29
2008		6.1	2.7	13.6	51	11
Violet-green Swallow		2002	32.1	13.9	74.1	52
	2003	--	--	--	--	2
	2004	48.7	24.6	96.3	42	13
	2005	37.8	18.2	78.4	46	12
	2006	27.1	12.6	58.3	48	11
	2007	22.6	9.6	53.5	55	14
	2008	21.9	9.9	48.1	50	11
	Mountain Chickadee	2002	6.0	3.4	10.8	36
2003		10.8	5.4	21.9	44	34
2004		16.5	10.2	26.7	30	46
2005		10.3	5.8	18.5	36	32
2006		10.8	6.6	17.7	30	39
2007		10.0	5.1	19.6	42	34
2008		16.4	8.7	31.2	40	57
House Wren		2002	6.9	2.7	17.5	59
	2003	20.8	9.3	46.6	51	47
	2004	11.7	4.9	27.6	54	24
	2005	20.4	10.7	38.9	40	47
	2006	11.0	5.1	23.8	49	30
	2007	8.4	3.7	19.2	53	21
	2008	11.6	6.5	20.5	36	30
	Ruby-crowned Kinglet	2002	10.6	5.3	21.3	44
2003		21.5	12.5	36.8	34	115
2004		30.4	17.3	53.2	35	146
2005		19.8	11.9	32.9	32	108
2006		11.0	6.2	19.6	36	71
2007		7.6	3.9	14.6	41	45
2008		17.1	9.6	30.4	36	102
Mountain Bluebird		2002	--	--	--	--
	2003	6.5	3.3	12.7	41	18
	2004	6.4	3.3	12.4	41	14
	2005	4.6	2.4	8.7	40	13
	2006	3.6	1.4	9.3	61	11
	2007	--	--	--	--	8
	2008	--	--	--	--	4
	Swainson's Thrush	2002	1.7	0.7	3.7	50
2003		--	--	--	--	8

MONITORING WYOMING'S BIRDS: 2008

Species	Year	D	LCL	UCL	%CV	n
Swainson's Thrush (cont'd)	2004	0.9	0.4	2.0	47	12
	2005	2.3	1.1	5.0	48	33
	2006	2.3	1.3	4.0	34	39
	2007	2.3	1.2	4.4	40	36
	2008	1.4	0.7	2.6	40	22
Hermit Thrush	2002	--	--	--	--	3
	2003	0.5	0.2	1.2	51	16
	2004	0.9	0.5	1.7	37	25
	2005	--	--	--	--	6
	2006	--	--	--	--	4
	2007	0.4	0.2	0.7	38	13
	2008	0.3	0.1	0.8	61	11
American Robin	2002	46.5	32.7	66.3	21	120
	2003	84.1	62.5	113.2	18	183
	2004	123.0	90.8	166.5	18	207
	2005	138.3	101.1	189.1	19	193
	2006	66.4	51.6	85.6	15	330
	2007	35.0	25.5	47.9	19	227
	2008	45.8	30.7	68.3	25	203
	Gray Catbird	2002	--	--	--	--
2003		--	--	--	--	3
2004		--	--	--	--	6
2005		6.6	2.2	19.4	70	16
2006		6.6	3.3	13.2	42	19
2007		4.2	1.7	10.3	57	11
2008		8.8	4.2	18.4	45	24
Yellow Warbler		2002	175.7	66.0	467.8	65
	2003	47.3	25.0	89.5	39	97
	2004	106.2	69.5	162.3	26	177
	2005	451.2	264.6	769.2	33	230
	2006	86.9	59.4	127.1	23	290
	2007	60.7	44.0	83.6	19	274
	2008	48.9	34.3	69.8	22	260
	Yellow-rumped Warbler	2002	10.8	4.2	27.8	59
2003		21.7	14.4	32.5	24	71
2004		30.2	19.4	47.0	26	86
2005		24.5	16.0	37.5	25	81
2006		21.7	13.3	35.6	30	85
2007		25.6	15.5	42.1	30	93
2008		23.2	13.0	41.5	35	85
MacGillivray's Warbler		2002	46.8	21.3	102.7	50
	2003	27.6	12.1	62.9	53	19
	2004	87.8	44.5	173.3	43	55
	2005	98.3	49.9	193.4	43	69
	2006	97.4	45.8	207.1	48	81
	2007	79.8	39.1	162.9	45	61
	2008	60.9	28.7	129.2	48	46
	Common Yellowthroat	2002	--	--	--	--
2003		--	--	--	--	2
2004		--	--	--	--	8
2005		1.9	0.8	4.5	52	10

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Species	Year	D	LCL	UCL	%CV	n
Common Yellowthroat (cont'd)	2006	2.0	0.9	4.2	47	12
	2007	2.9	1.4	5.6	42	16
	2008	4.2	2.1	8.3	43	23
Wilson's Warbler	2002	66.5	35.9	123.2	37	69
	2003	43.4	29.7	63.3	23	50
	2004	52.5	30.9	89.1	32	55
	2005	60.4	34.0	107.3	35	70
	2006	30.9	17.7	53.9	34	43
	2007	18.8	10.0	35.2	38	22
	2008	14.4	6.8	30.4	46	19
Western Tanager	2002	--	--	--	--	4
	2003	--	--	--	--	8
	2004	1.7	1.0	2.8	30	14
	2005	4.2	2.6	6.9	29	42
	2006	2.7	1.6	4.7	33	32
	2007	2.2	1.2	4.1	37	23
	2008	1.3	0.7	2.6	42	13
	Green-tailed Towhee	2002	3.8	1.4	10.7	65
2003		8.9	5.9	13.6	25	44
2004		9.6	5.9	15.5	29	41
2005		8.0	4.9	13.0	29	40
2006		9.2	5.8	14.7	28	55
2007		18.6	10.1	34.2	37	102
2008		8.7	5.6	13.5	26	48
Chipping Sparrow	2002	11.3	5.9	21.7	39	18
	2003	21.5	12.6	36.7	32	38
	2004	41.7	24.9	69.7	31	65
	2005	44.4	26.8	73.4	30	80
	2006	19.7	14.3	27.0	19	42
	2007	17.3	11.7	25.7	24	32
	2008	20.3	11.1	36.8	36	40
	Brewer's Sparrow	2002	--	--	--	--
2003		10.7	4.8	23.9	49	47
2004		13.6	7.2	25.6	38	54
2005		5.2	2.5	10.8	45	23
2006		19.1	9.2	39.9	45	96
2007		22.2	12.3	40.2	36	104
2008		10.4	4.9	21.9	46	52
Vesper Sparrow		2002	--	--	--	--
	2003	--	--	--	--	7
	2004	2.0	1.0	4.1	43	10
	2005	2.2	1.2	3.8	35	12
	2006	3.9	1.9	8.0	44	26
	2007	2.1	1.0	4.8	50	13
	2008	3.7	1.5	9.3	59	23
	Savannah Sparrow	2002	--	--	--	--
2003		7.4	3.0	18.6	58	47
2004		4.2	1.6	11.1	62	24
2005		6.4	1.9	20.9	79	41
2006		5.2	2.2	12.3	54	39
2007		6.5	2.7	15.9	56	45

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Species	Year	D	LCL	UCL	%CV	n
Savannah Sparrow (cont'd)	2008	5.1	2.3	11.0	48	37
Fox Sparrow	2002	--	--	--	--	7
	2003	--	--	--	--	8
	2004	--	--	--	--	8
	2005	6.0	1.7	21.6	88	15
	2006	7.5	2.8	20.1	65	22
	2007	--	--	--	--	6
	2008	--	--	--	--	4
Song Sparrow	2002	138.9	81.8	235.9	32	197
	2003	31.4	19.6	50.2	28	84
	2004	62.7	40.9	96.2	26	112
	2005	81.5	48.0	138.5	33	124
	2006	60.3	40.1	90.7	25	189
	2007	29.3	20.3	42.1	22	182
	2008	23.1	11.3	47.1	45	107
Lincoln's Sparrow	2002	57.9	30.4	110.2	39	114
	2003	48.9	27.6	86.6	35	93
	2004	93.5	58.8	148.8	28	151
	2005	18.5	9.4	36.3	41	99
	2006	39.8	27.8	57.0	21	182
	2007	29.1	20.2	41.8	22	171
	2008	21.2	13.7	32.7	26	140
White-crowned Sparrow	2002	124.8	66.3	234.9	38	133
	2003	60.5	35.8	102.3	32	102
	2004	42.1	25.8	68.7	29	110
	2005	83.2	52.4	132.2	28	90
	2006	35.2	20.6	60.4	33	137
	2007	45.4	25.9	79.4	34	123
	2008	24.6	13.8	44.1	35	158
Dark-eyed Junco	2002	21.5	11.8	39.0	37	27
	2003	35.8	17.6	72.5	44	50
	2004	64.5	36.5	114.1	35	76
	2005	47.7	26.2	86.8	37	66
	2006	68.1	38.7	120.1	35	105
	2007	56.7	32.5	98.9	34	82
	2008	34.4	18.1	65.1	40	49
Lazuli Bunting	2002	2.7	1.3	5.3	42	11
	2003	3.1	1.4	6.8	50	14
	2004	2.4	0.8	7.2	70	10
	2005	4.1	1.7	9.6	53	19
	2006	2.7	1.0	7.5	66	15
	2007	3.3	1.3	8.6	60	17
	2008	2.5	0.6	9.5	92	13
Brewer's Blackbird	2002	5.9	2.7	12.7	47	14
	2003	4.9	2.5	9.6	41	13
	2004	18.8	9.5	37.0	42	20
	2005	9.3	4.4	19.6	46	14
	2006	16.6	8.4	33.0	42	38
	2007	14.7	7.9	27.2	38	33
	2008	6.6	2.5	17.7	63	10
Brown-headed Cowbird	2002	2.0	0.8	4.8	55	12

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Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	% <i>CV</i>	<i>n</i>
Brown-headed Cowbird (cont'd)	2003	--	--	--	--	9
	2004	4.6	2.2	9.6	45	22
	2005	4.4	2.5	7.7	33	30
	2006	3.4	1.5	7.5	50	26
	2007	5.3	3.1	9.0	32	38
	2008	4.7	2.4	9.2	41	29
Red Crossbill	2002	--	--	--	--	6
	2003	--	--	--	--	6
	2004	--	--	--	--	3
	2005	2.4	0.7	8.2	83	31
	2006	0.5	0.3	1.2	49	10
	2007	--	--	--	--	4
	2008	--	--	--	--	4
Pine Siskin	2002	37.7	17.8	79.8	46	43
	2003	29.2	17.4	48.9	32	37
	2004	132.9	78.1	226.3	33	70
	2005	81.4	50.7	130.6	29	67
	2006	56.3	33.7	94.0	32	63
	2007	103.9	64.6	167.2	29	114
	2008	78.0	47.8	127.3	30	99
American Goldfinch	2002	--	--	--	--	1
	2003	--	--	--	--	1
	2004	3.0	1.1	8.2	64	12
	2005	3.3	1.3	8.8	62	15
	2006	5.3	2.5	11.1	47	24
	2007	2.5	0.7	8.0	79	12
	2008	--	--	--	--	3
Red Squirrel	2002	--	--	--	--	5
	2003	5.4	1.6	17.6	80	11
	2004	19.4	7.8	48.4	59	36
	2005	21.2	9.5	46.9	51	44
	2006	7.7	3.2	18.5	57	19
	2007	15.0	6.8	33.0	51	34
	2008	18.0	8.1	40.1	51	41

¹*D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

Shrubsteppe (SS)

We conducted 401 point counts along 29 transects in Shrubsteppe between 25 May and 15 June, 2008. We detected 2,724 birds, with an average of 94 birds per transect (Table 1). We detected 70 species with an average of 10 species per transect (Table 1).

In 2008, observers recorded five species exclusively in Shrubsteppe:

- Northern Shoveler,
- Western Grebe,
- Prairie Falcon, and
- European Starling.

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Observers recorded 12 species in Shrubsteppe more than other habitats in 2008:

- Ring-necked Pheasant,
- Greater Sage-Grouse,
- Ferruginous Hawk,
- California Gull,
- Loggerhead Shrike,
- Common Raven,
- Horned Lark,
- Barn Swallow,
- Sage Thrasher,
- Brewer's Sparrow,
- Vesper Sparrow, and
- Sage Sparrow.

The pooled 2002-2008 point-count data from Shrubsteppe yielded robust density estimates ($CV < 50\%$) for 9 species and a moderately robust estimate ($CV = 50-75\%$) for three additional species (Table 7). We should be able to continue to monitor these 12 species in the future.

Brewer's Sparrow, Horned Lark, Sage Thrasher, Sage Sparrow, and Vesper Sparrow had the highest estimated densities of all species detected in Shrubsteppe (listed in order of highest to lowest density). Six species — Horned Lark, Sage Thrasher, Brewer's Sparrow, Vesper Sparrow, Lark Sparrow, and Sage Sparrow had higher estimated densities in Shrubsteppe than in the other statewide habitats sampled.

Table 7. Estimated densities of breeding birds in Shrubsteppe habitat in Wyoming, 2002-2008¹.

Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	<i>%CV</i>	<i>n</i>
Mourning Dove	2002	--	--	--	--	2
	2003	0.6	0.3	1.2	40	18
	2004	1.0	0.5	2.0	41	26
	2005	1.2	0.6	2.1	38	26
	2006	0.9	0.5	1.6	39	23
	2007	1.8	1.0	3.4	38	33
	2008	0.9	0.5	1.7	42	22
Common Raven	2002	--	--	--	--	8
	2003	0.2	0.1	0.3	23	20
	2004	0.2	0.1	0.2	23	18
	2005	0.2	0.2	0.4	26	24
	2006	0.4	0.3	0.6	24	38
	2007	0.5	0.3	0.8	26	32
	2008	0.9	0.4	1.8	47	52
Horned Lark	2002	39.0	29.0	52.4	18	211
	2003	60.7	47.8	76.9	14	402
	2004	94.7	73.1	122.7	15	566
	2005	103.5	82.4	129.9	14	553
	2006	124.0	96.8	158.8	15	799
	2007	89.6	66.3	121.2	18	359
	2008	79.8	60.9	104.6	16	463
Rock Wren	2002	--	--	--	--	9
	2003	0.8	0.4	1.5	43	22

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Species	Year	D	LCL	UCL	%CV	n
Rock Wren (cont'd)	2004	0.7	0.4	1.2	38	19
	2005	1.2	0.6	2.4	42	33
	2006	1.6	0.9	2.9	37	47
	2007	0.9	0.5	1.6	36	15
	2008	1.3	0.5	3.6	64	34
American Robin	2002	0.3	0.1	1.0	69	10
	2003	0.5	0.2	1.2	64	17
	2004	0.7	0.3	1.6	54	25
	2005	0.3	0.1	0.8	70	10
	2006	0.3	0.1	0.8	74	10
	2007	0.6	0.2	1.8	76	13
2008	--	--	--	--	5	
Sage Thrasher	2002	3.2	2.2	4.6	21	42
	2003	11.4	8.3	15.7	19	183
	2004	10.7	7.7	14.9	20	160
	2005	13.2	9.4	18.6	20	205
	2006	21.0	15.6	28.1	18	342
	2007	17.0	11.6	24.7	22	164
	2008	17.3	12.5	24.1	20	254
	Green-tailed Towhee	2002	2.8	0.8	9.6	82
2003		6.3	3.1	12.6	43	63
2004		4.6	2.0	10.3	51	46
2005		5.1	2.2	11.9	54	49
2006		4.4	1.9	10.1	53	45
2007		3.8	1.6	8.9	53	23
2008		5.6	2.1	14.5	61	51
Brewer's Sparrow	2002	58.6	43.5	79.0	18	191
	2003	103.6	81.9	131.0	14	413
	2004	129.0	105.3	158.2	12	499
	2005	121.8	95.4	155.5	15	461
	2006	154.5	121.0	197.3	15	618
	2007	163.4	130.1	205.0	13	394
	2008	93.7	71.5	122.8	16	332
	Vesper Sparrow	2002	16.8	9.7	29.1	34
2003		9.9	6.4	15.5	27	147
2004		14.3	9.6	21.2	24	210
2005		29.5	10.6	82.3	69	165
2006		18.6	12.7	27.1	23	234
2007		5.2	3.0	9.1	33	65
2008		8.9	5.3	14.8	31	116
Lark Sparrow		2002	8.1	4.4	15.1	38
	2003	7.0	3.7	13.4	40	37
	2004	5.3	2.7	10.1	40	26
	2005	6.3	3.7	10.9	33	33
	2006	--	--	--	--	9
	2007	5.3	1.7	16.0	72	17
	2008	8.5	4.3	16.6	41	36
	Sage Sparrow	2002	7.6	3.6	16.1	46
2003		9.2	5.4	15.6	32	77
2004		11.4	6.7	19.2	32	95
2005		12.7	8.1	19.9	27	103

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Species	Year	<i>D</i>	<i>LCL</i>	<i>UCL</i>	% <i>CV</i>	<i>n</i>
Sage Sparrow (cont'd)	2006	18.3	11.9	28.2	26	158
	2007	19.6	10.1	37.9	40	100
	2008	16.9	9.5	30.0	35	128
Lark Bunting	2002	5.4	2.5	11.7	48	84
	2003	--	--	--	--	7
	2004	14.7	7.0	30.9	46	181
	2005	1.0	0.4	2.7	63	18
	2006	1.2	0.5	3.1	60	12
	2007	13.5	6.8	26.7	41	133
	2008	7.1	2.9	17.4	57	103
Savannah Sparrow	2002	--	--	--	--	6
	2003	1.6	0.4	6.5	99	10
	2004	3.0	0.7	12.5	101	19
	2005	--	--	--	--	5
	2006	2.2	0.6	7.5	85	12
	2007	--	--	--	--	6
	2008	--	--	--	--	3
Western Meadowlark	2002	7.1	1.5	34.2	119	37
	2003	9.4	5.7	15.6	30	226
	2004	14.9	8.4	26.5	35	200
	2005	11.2	7.2	17.5	27	314
	2006	8.4	5.2	13.7	29	305
	2007	17.6	10.7	28.8	30	238
	2008	8.8	4.9	15.6	35	211
Brown-headed Cowbird	2002	--	--	--	--	1
	2003	--	--	--	--	8
	2004	2.9	1.2	6.9	55	14
	2005	1.3	0.6	2.9	48	11
	2006	4.2	1.9	8.9	48	24
	2007	2.1	0.9	4.8	52	11
	2008	--	--	--	--	9

¹*D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

Shoshone National Forest

In 2008, our seventh year of bird monitoring in Shoshone National Forest (SNF), we conducted 339 point counts along 25 point-count transects in three different habitats. We conducted all transects between 17 June and 2 July. Date ranges specific for each habitat sampled are included with the results for that habitat.

We detected 2,618 individual birds of 87 species on SNF point-count transects. We detected 28 species in sufficient numbers to estimate density in at least one habitat, and we detected some of those species in sufficient numbers to estimate density in multiple habitats. All species, including those removed from analysis, are included in Appendix D. Species with conservation designations for SNF are included in Appendix C

Total number of species detected in each habitat in 2008 ranged from 68 in Montane Riparian to 56 in Mid-elevation Conifer (Table 9). Of the three habitats sampled in 2008, the average number of species detected per transect was highest in Mid-elevation

Conifer and lowest in Montane Grassland. While these averages represent the richness of species that may be found in each habitat, we would like to note that some species were adjacent to the habitat from which they were detected. Thus, species numbers presented in this report do not necessarily indicate that all of the species or individuals were actually nesting in the habitat from which they were detected.

The pooled 2002-2008 data yielded robust density estimates (CV < 50%) for 21 species and moderately robust estimates (CV = 50-75%) for six additional species. We should be able to effectively monitor these 27 species, which represent 31% of all species detected on point-count transects and 78% of all individual birds observed during 2002-2008 in SNF.

Table 8. Counts of birds detected, by habitat, in SNF, summer 2008.

Habitat	# birds detected	Avg. # birds per transect	# species detected	Avg. # species per transect
Mid-elevation Conifer	742	106	56	22
Montane Grassland	948	95	59	19
Montane Riparian	928	116	68	20
All Habitats	2,618	20	87	20

Mid-elevation Conifer (MC)

We conducted 97 point counts along seven transects in Mid-elevation Conifer between 22 June and 30 June 2008. We detected 742 individual birds, with an average of 106 birds per transect (Table 8). We detected 56 species with an average of 22 species per transect (Table 8).

In 2008, observers recorded eight species exclusively in SNF Mid-elevation Conifer:

- Least Flycatcher,
- Ovenbird,
- American Crow,
- Gadwall,
- Plumbeous Vireo,
- Red Crossbill,
- Spotted Towhee, and
- Williamson's Sapsucker.

Observers recorded 18 species more in Mid-elevation Conifer than other SNF habitats in 2008:

- American Kestrel,
- Downy Woodpecker,
- Hairy Woodpecker,
- Olive-sided Flycatcher,
- Gray Flycatcher,
- Clark's Nutcracker,
- Mountain Chickadee,
- Red-breasted Nuthatch,
- White-breasted Nuthatch,
- Ruby-crowned Kinglet,
- Townsend's Solitaire,
- Swainson's Thrush,

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- Hermit Thrush,
- Western Tanager,
- Chipping Sparrow,
- Dark-eyed Junco,
- Cassin's Finch, and
- Pine Siskin.

The pooled 2002-2008 point-count data from Mid-elevation Conifer yielded robust density estimates (CV < 50%) for 12 species and moderately robust estimates (CV = 50-75%) for three additional species (Table 9). We should be able to continue to monitor these 15 species in the future.

Dark-eyed Junco, Chipping Sparrow, Pine Siskin, Mountain Chickadee, and Yellow-rumped Warbler had the highest estimated densities of all species detected in Mid-elevation Conifer (listed in order of highest to lowest density). Twelve species — Northern Flicker, Dusky Flycatcher, Clark's Nutcracker, Mountain Chickadee, Red-breasted Nuthatch, Ruby-crowned Kinglet, Mountain Bluebird, Hermit Thrush, Western Tanager, Chipping Sparrow, Dark-eyed Junco, and Pine Siskin had higher estimated densities in Mid-elevation Conifer than in the other two habitats that we sampled in SNF.

Table 9. Estimated densities of breeding birds in Mid-elevation Conifer habitat in SNF, summer 2002-2008¹

Common Name	Year	D	LCL	UCL	%CV	n
Northern Flicker	2002	--	--	--	--	3
	2003	--	--	--	--	5
	2004	4.6	2.4	8.7	37	17
	2005	5.3	2.8	10.1	37	21
	2006	5.1	3.1	8.1	27	17
	2007	7.7	3.4	17.8	49	27
	2008	6.3	2.7	14.8	47	17
Hammond's Flycatcher	2002	--	--	--	--	2
	2003	27.4	13.1	57.4	40	25
	2004	--	--	--	--	6
	2005	--	--	--	--	7
	2006	--	--	--	--	7
	2007	--	--	--	--	4
	2008	--	--	--	--	3
Dusky Flycatcher	2002	--	--	--	--	0
	2003	--	--	--	--	5
	2004	16.4	8.9	30.0	36	23
	2005	22.8	12.5	41.7	36	34
	2006	21.9	10.1	47.8	45	26
	2007	12.9	6.2	26.8	44	17
	2008	23.6	12.7	43.8	36	24
Warbling Vireo	2002	--	--	--	--	2
	2003	--	--	--	--	9
	2004	11.8	5.1	27.5	50	26
	2005	14.6	7.8	27.2	37	34
	2006	7.5	4.1	13.9	36	14
	2007	9.7	5.5	17.1	34	20

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Common Name	Year	D	LCL	UCL	%CV	n
Warbling Vireo (cont'd)	2008	11.3	5.6	22.6	40	17
Clark's Nutcracker	2002	2.7	1.4	5.4	39	14
	2003	--	--	--	--	9
	2004	5.5	3.3	9.4	31	29
	2005	3.6	2.0	6.8	37	23
	2006	3.6	1.8	7.1	40	16
	2007	3.4	1.9	5.9	32	19
	2008	2.8	0.9	8.8	67	12
Mountain Chickadee	2002	62.5	34.5	113.3	33	56
	2003	39.6	17.1	92.1	47	29
	2004	26.1	15.6	43.6	30	25
	2005	43.8	27.1	70.8	28	45
	2006	27.5	14.8	51.0	35	23
	2007	53.4	28.6	99.9	36	52
	2008	45.2	15.8	129.3	59	34
Red-breasted Nuthatch	2002	--	--	--	--	8
	2003	15.4	9.6	24.8	25	25
	2004	20.3	11.4	36.3	33	41
	2005	17.9	12.8	25.0	19	42
	2006	6.4	3.2	12.9	38	12
	2007	11.0	4.5	27.1	52	22
	2008	19.3	8.7	43.1	43	31
Ruby-crowned Kinglet	2002	24.1	13.8	41.9	32	57
	2003	23.5	14.5	38.1	28	47
	2004	22.3	14.5	34.4	26	60
	2005	20.7	13.9	30.9	24	60
	2006	19.5	10.8	35.1	34	45
	2007	14.0	6.1	32.1	49	36
	2008	22.2	9.8	50.6	46	44
Mountain Bluebird	2002	--	--	--	--	2
	2003	--	--	--	--	7
	2004	13.0	6.2	27.2	45	13
	2005	13.1	5.9	29.2	49	16
	2006	--	--	--	--	8
	2007	--	--	--	--	8
	2008	13.2	5.9	29.2	47	11
Hermit Thrush	2002	--	--	--	--	1
	2003	--	--	--	--	8
	2004	4.5	2.7	7.5	29	39
	2005	3.7	2.1	6.6	33	34
	2006	2.1	1.3	3.5	28	16
	2007	3.2	2.0	5.2	27	27
	2008	4.4	1.9	10.2	47	28
American Robin	2002	10.2	6.9	15.2	21	25
	2003	14.5	9.5	22.2	22	30
	2004	15.2	10.4	22.2	21	40
	2005	20.4	15.2	27.4	17	59
	2006	18.9	12.3	28.9	23	44
	2007	26.3	17.1	40.5	24	68

MONITORING WYOMING'S BIRDS: 2008

Common Name	Year	D	LCL	UCL	%CV	n
American Robin (cont'd)	2008	22.5	15.4	32.8	20	46
Yellow-rumped Warbler	2002	28.6	18.9	43.1	22	47
	2003	43.9	25.9	74.4	28	61
	2004	22.6	14.0	36.5	27	42
	2005	19.9	12.4	31.8	27	40
	2006	21.2	13.5	33.3	25	34
	2007	11.2	6.1	20.7	35	20
	2008	24.7	16.1	37.9	23	34
Western Tanager	2002	--	--	--	--	1
	2003	--	--	--	--	6
	2004	8.8	4.2	18.6	47	14
	2005	--	--	--	--	6
	2006	11.7	5.5	25.0	47	18
	2007	8.2	3.9	17.0	46	14
	2008	9.9	4.1	23.9	55	12
Chipping Sparrow	2002	--	--	--	--	6
	2003	24.6	9.9	61.4	52	21
	2004	--	--	--	--	8
	2005	17.0	9.9	29.0	32	19
	2006	29.5	17.3	50.2	31	29
	2007	32.8	20.1	53.6	29	34
	2008	60.4	39.8	91.5	25	48
Dark-eyed Junco	2002	20.7	11.2	38.3	36	20
	2003	67.3	44.1	102.8	25	55
	2004	62.6	43.8	89.5	22	64
	2005	68.4	45.8	102.2	24	77
	2006	78.5	46.0	134.2	31	69
	2007	101.8	66.4	156.1	26	100
	2008	80.4	52.1	124.0	26	56
Pine Siskin	2002	--	--	--	--	4
	2003	16.7	9.2	30.4	32	15
	2004	75.9	46.2	124.9	30	37
	2005	56.2	29.4	107.7	40	35
	2006	34.9	15.9	76.5	44	32
	2007	72.9	53.6	99.2	18	74
	2008	47.4	20.6	109.2	46	35
Red Squirrel	2002	15.1	4.5	51.1	73	12
	2003	35.8	17.0	75.6	43	24
	2004	--	--	--	--	0
	2005	29.9	16.0	55.6	37	29
	2006	--	--	--	--	7
	2007	30.2	13.0	69.7	50	26
	2008	28.6	8.1	100.7	74	19

¹ *D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

Montane Grassland (MG)

We conducted 127 point counts along 10 transects in Montane Grassland between 17 June and 2 July 2008 (Table 8). We detected 948 individual birds, with an average of 95 birds per transect (Table 10). We detected 59 species with an average of 19 species per transect (Table 10).

In 2008, observers recorded six species exclusively in Montane Grassland:

- Northern Harrier,
- Prairie Falcon,
- American Three-toed Woodpecker,
- Horned Lark,
- Sage Thrasher, and
- Western Meadowlark.

Observers recorded 15 species more in Montane Grassland than other SNF habitats in 2008:

- Golden Eagle,
- Mourning Dove,
- Northern Flicker,
- Dusky Flycatcher,
- Black-billed Magpie,
- Common Raven,
- Rock Wren,
- Mountain Bluebird,
- Green-tailed Towhee,
- Brewer's Sparrow,
- Vesper Sparrow,
- Lark Sparrow,
- Brewer's Blackbird,
- Brown-headed Cowbird, and
- American Goldfinch.

The pooled 2002-2008 point-count data from Montane Grassland yielded robust density estimates (CV < 50%) for 13 species and moderately robust estimates (CV = 50-75%) for six additional species (Table 10). We should be able to continue to monitor these 19 species in the future.

Brewer's Sparrow, Western Meadowlark, Vesper Sparrow, Chipping Sparrow, and Dusky Flycatcher had the highest estimated densities of all species detected in Montane Grassland (listed in order of highest to lowest density). Seven species — Black-billed Magpie, Common Raven, Rock Wren, Brewer's Sparrow, Vesper Sparrow, Lark Sparrow, and Western Meadowlark had higher estimated densities in Montane Grassland than in the other two habitats that we sampled in SNF.

MONITORING WYOMING'S BIRDS: 2008

Table 10. Estimated densities of breeding birds in Montane Grassland habitat in the SNF, summer 2002-2008¹.

Common Name	Year	D	LCL	UCL	%CV	n
Northern Flicker	2002	--	--	--	--	5
	2003	1.3	0.6	3.1	48	11
	2004	0.2	0.1	0.4	51	19
	2005	1.3	0.7	2.4	36	11
	2006	2.0	1.2	3.5	32	18
	2007	3.4	2.1	5.4	28	23
	2008	2.7	1.3	5.7	43	20
	Dusky Flycatcher	2002	2.6	0.7	9.3	82
2003		3.9	1.1	13.2	74	12
2004		0.3	0.1	0.7	62	11
2005		4.4	1.3	14.1	70	14
2006		3.8	1.4	10.5	60	13
2007		8.5	3.6	19.8	49	22
2008		12.2	6.0	24.6	40	37
Warbling Vireo		2002	--	--	--	--
	2003	1.6	0.5	5.6	74	12
	2004	0.2	0.1	0.4	58	19
	2005	2.4	0.7	8.5	77	18
	2006	2.3	0.9	6.1	58	18
	2007	4.1	1.7	10.0	52	25
	2008	7.0	2.7	18.0	56	50
	Clark's Nutcracker	2002	--	--	--	--
2003		--	--	--	--	6
2004		0.1	0.0	0.2	61	12
2005		--	--	--	--	5
2006		1.6	0.8	3.3	43	21
2007		--	--	--	--	9
2008		1.1	0.3	3.4	73	13
Black-billed Magpie		2002	0.8	0.3	1.8	52
	2003	--	--	--	--	6
	2004	--	--	--	--	8
	2005	--	--	--	--	5
	2006	0.9	0.5	1.6	33	13
	2007	--	--	--	--	6
	2008	1.6	0.6	4.3	61	18
	Common Raven	2002	--	--	--	--
2003		--	--	--	--	4
2004		--	--	--	--	6
2005		0.4	0.2	0.6	31	11
2006		0.5	0.3	0.8	26	15
2007		0.4	0.3	0.8	32	10
2008		0.7	0.4	1.2	33	20
Horned Lark		2002	4.3	1.3	14.7	78
	2003	--	--	--	--	2
	2004	--	--	--	--	8
	2005	--	--	--	--	4
	2006	3.8	1.3	11.1	66	11

MONITORING WYOMING'S BIRDS: 2008

Common Name	Year	D	LCL	UCL	%CV	n
Horned Lark (cont'd)	2007	9.8	2.1	46.5	103	22
	2008	--	--	--	--	9
Mountain Chickadee	2002	4.3	1.9	9.4	47	13
	2003	--	--	--	--	2
	2004	--	--	--	--	9
	2005	6.2	2.9	13.4	44	15
	2006	--	--	--	--	7
	2007	--	--	--	--	7
	2008	6.0	3.0	11.8	39	12
	Rock Wren	2002	6.3	3.2	12.4	40
2003		6.7	3.3	13.5	40	37
2004		1.1	0.7	1.8	28	91
2005		7.9	4.2	14.6	35	45
2006		12.0	8.0	17.9	23	71
2007		3.7	2.2	6.1	29	17
2008		5.2	2.6	10.4	40	28
Ruby-crowned Kinglet		2002	2.2	0.8	6.4	64
	2003	--	--	--	--	3
	2004	0.2	0.1	0.5	55	13
	2005	2.5	0.9	7.1	61	11
	2006	2.4	1.0	5.7	50	11
	2007	4.3	1.5	12.0	62	15
	2008	4.3	1.5	12.3	63	14
	Mountain Bluebird	2002	--	--	--	--
2003		--	--	--	--	7
2004		0.5	0.2	1.1	52	16
2005		20.1	11.2	35.8	34	36
2006		5.4	2.3	13.1	51	16
2007		9.3	5.4	16.1	31	18
2008		4.5	2.1	9.6	44	10
American Robin		2002	3.2	1.6	6.7	43
	2003	2.5	1.1	6.0	50	16
	2004	0.2	0.1	0.5	57	18
	2005	4.5	2.2	8.9	39	28
	2006	4.2	1.8	9.9	50	27
	2007	8.4	5.0	14.1	30	44
	2008	6.2	3.1	12.4	40	38
	Yellow-rumped Warbler	2002	3.0	1.6	5.6	37
2003		--	--	--	--	5
2004		--	--	--	--	5
2005		--	--	--	--	9
2006		--	--	--	--	6
2007		--	--	--	--	5
2008		6.4	2.7	15.1	50	17
Green-tailed Towhee		2002	3.9	1.7	9.3	51
	2003	6.6	3.0	14.8	46	27
	2004	0.4	0.2	0.8	47	22
	2005	6.9	2.5	19.4	60	29
	2006	6.6	3.4	12.7	38	29

MONITORING WYOMING'S BIRDS: 2008

Common Name	Year	D	LCL	UCL	%CV	n
Green-tailed Towhee (cont'd)	2007	6.2	2.8	13.9	47	21
	2008	6.8	3.8	12.2	33	27
Chipping Sparrow	2002	6.5	3.3	12.7	40	20
	2003	--	--	--	--	4
	2004	0.3	0.1	0.6	45	10
	2005	6.5	2.0	21.4	72	14
	2006	9.0	3.9	21.0	50	21
	2007	5.9	2.3	14.8	54	11
	2008	12.3	5.4	28.1	48	25
Brewer's Sparrow	2002	15.3	7.2	32.5	45	53
	2003	15.5	7.6	31.7	41	39
	2004	1.5	0.7	3.0	46	54
	2005	6.2	2.5	15.0	52	16
	2006	31.1	18.2	53.0	31	85
	2007	30.5	17.4	53.6	33	63
	2008	35.3	18.0	69.3	39	86
Vesper Sparrow	2002	15.0	8.3	26.9	34	82
	2003	21.9	15.6	30.6	19	87
	2004	2.0	1.2	3.2	29	116
	2005	12.7	8.4	19.2	23	52
	2006	15.1	11.3	20.1	17	64
	2007	22.4	16.0	31.4	19	74
	2008	17.8	12.1	26.1	22	69
Lark Sparrow	2002	5.5	2.7	11.4	43	24
	2003	--	--	--	--	9
	2004	0.3	0.2	0.5	36	12
	2005	3.4	1.8	6.3	36	10
	2006	--	--	--	--	6
	2007	--	--	--	--	1
	2008	3.9	1.6	9.6	53	12
Dark-eyed Junco	2002	--	--	--	--	1
	2003	--	--	--	--	0
	2004	0.5	0.2	1.0	53	14
	2005	--	--	--	--	9
	2006	6.2	2.8	13.6	46	16
	2007	14.2	7.2	27.7	39	28
	2008	7.7	3.6	16.8	46	14
Western Meadowlark	2002	13.3	5.9	30.0	48	89
	2003	27.6	12.7	60.0	45	134
	2004	1.6	0.9	2.8	35	115
	2005	15.2	7.2	31.9	43	75
	2006	20.1	10.8	37.6	36	102
	2007	13.4	6.1	29.3	46	54
	2008	22.6	11.7	43.7	38	107

[†] *D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

MONITORING WYOMING'S BIRDS: 2008

Montane Riparian (MR)

We conducted 115 point counts along 8 transects in Montane Riparian between 18 June and 1 July 2008. We detected 928 birds, with an average of 116 birds per transect. We detected 68 species with an average of 20 species per transect (Table 8).

In 2008, observers recorded 13 species exclusively in SNF Montane Riparian:

- Turkey Vulture,
- Sandhill Crane,
- Spotted Sandpiper,
- Wilson's Snipe,
- Calliope Hummingbird,
- Broad-tailed Hummingbird,
- Belted Kingfisher,
- Gray Jay,
- Cedar Waxwing,
- Common Yellowthroat,
- Wilson's Warbler,
- Common Grackle, and
- House Finch.

We recorded 24 species more in Montane Riparian than other SNF habitats in 2008:

- Mallard,
- Common Merganser,
- Great Blue Heron,
- Sharp-shinned Hawk,
- Red-tailed Hawk,
- Red-naped Sapsucker,
- Western Wood-Pewee,
- Hammond's Flycatcher,
- Cordilleran Flycatcher,
- Warbling Vireo,
- Tree Swallow,
- Violet-green Swallow,
- House Wren,
- American Robin,
- Yellow Warbler,
- Yellow-rumped Warbler,
- MacGillivray's Warbler,
- Savannah Sparrow,
- Song Sparrow,
- Lincoln's Sparrow,
- White-crowned Sparrow,
- Black-headed Grosbeak,
- Lazuli Bunting, and
- Red-winged Blackbird.

The pooled 2002-2008 point-count data from Montane Riparian yielded robust density estimates (CV < 50%) for seven species and moderately robust estimates (CV = 50-75%) for seven additional species (Table 11). We should be able to continue to monitor these 14 species in the future.

MONITORING WYOMING'S BIRDS: 2008

Warbling Vireo, White-crowned Sparrow, American Robin, Yellow-rumped Warbler, and Chipping Sparrow had the highest estimated densities of all species detected in Montane Riparian (listed in order of highest to lowest density). Nine species — Warbling Vireo, American Robin, Yellow Warbler, Yellow-rumped Warbler, MacGillivray's Warbler, Green-tailed Towhee, Song Sparrow, Lincoln's Sparrow, and White-crowned Sparrow had higher estimated densities in Montane Riparian than in the other two habitats that we sampled in SNF.

Table 11. Estimated densities of breeding birds in Montane Riparian habitat in the SNF, summer 2002-2008¹.

Common Name	Year	D	LCL	UCL	%CV	n
Spotted Sandpiper	2002	15.8	8.0	31.2	39	27
	2003	29.4	11.1	77.4	56	39
	2004	11.3	3.8	33.6	61	13
	2005	--	--	--	--	7
	2006	13.8	4.6	42.0	63	16
	2007	--	--	--	--	6
	2008	--	--	--	--	8
	Northern Flicker	2002	--	--	--	--
2003		--	--	--	--	0
2004		--	--	--	--	4
2005		4.7	1.8	12.4	53	14
2006		4.1	1.8	9.3	46	14
2007		2.7	1.6	4.7	31	11
2008		3.6	1.1	11.8	70	14
Dusky Flycatcher		2002	--	--	--	--
	2003	17.7	8.8	35.5	40	23
	2004	25.0	11.9	52.2	40	28
	2005	28.4	13.8	58.4	38	28
	2006	23.8	9.4	60.5	52	26
	2007	--	--	--	--	8
	2008	16.3	6.8	38.7	49	21
	Warbling Vireo	2002	10.4	4.3	25.6	52
2003		21.9	10.2	47.0	43	31
2004		36.9	21.4	63.4	30	42
2005		47.5	32.3	69.8	21	50
2006		25.1	10.5	60.0	48	30
2007		29.4	15.9	54.3	34	43
2008		61.3	30.5	122.9	39	83
Mountain Chickadee		2002	11.4	5.8	22.3	39
	2003	9.1	3.8	22.0	51	10
	2004	25.4	15.1	42.8	29	21
	2005	--	--	--	--	7
	2006	12.6	6.8	23.4	34	12
	2007	24.7	11.7	52.0	42	27
	2008	--	--	--	--	8
	Ruby-crowned Kinglet	2002	18.5	9.1	37.8	41
2003		8.1	4.2	15.9	38	13

MONITORING WYOMING'S BIRDS: 2008

Common Name	Year	D	LCL	UCL	%CV	n
Ruby-crowned Kinglet (cont'd)	2004	24.0	10.0	57.4	48	32
	2005	12.4	7.3	20.9	28	15
	2006	10.8	3.5	33.2	64	15
	2007	9.1	3.4	24.0	55	15
	2008	10.1	3.2	31.8	67	16
American Robin	2002	22.1	12.9	37.9	31	30
	2003	29.3	12.1	70.9	52	31
	2004	54.7	28.6	104.9	37	48
	2005	41.2	27.2	62.4	24	32
	2006	57.6	25.0	132.6	47	48
	2007	59.5	32.0	110.6	35	64
	2008	44.9	24.5	82.3	35	43
Yellow Warbler	2002	8.0	3.9	16.1	40	16
	2003	19.9	4.8	81.6	89	31
	2004	8.9	3.1	25.6	59	12
	2005	13.5	4.1	44.0	65	15
	2006	19.1	7.1	51.4	54	26
	2007	26.6	9.9	71.5	56	43
	2008	32.9	15.5	70.2	42	51
Yellow-rumped Warbler	2002	30.1	18.1	50.1	29	42
	2003	46.0	29.7	71.4	24	50
	2004	38.4	23.3	63.4	27	31
	2005	36.4	16.2	81.9	43	30
	2006	23.3	10.7	50.4	42	22
	2007	44.5	25.6	77.4	30	49
	2008	39.0	20.2	75.2	36	39
MacGillivray's Warbler	2002	--	--	--	--	1
	2003	--	--	--	--	6
	2004	--	--	--	--	7
	2005	--	--	--	--	6
	2006	--	--	--	--	5
	2007	9.9	4.5	22.0	44	18
	2008	6.9	2.9	16.7	49	12
Green-tailed Towhee	2002	--	--	--	--	5
	2003	5.5	2.3	13.3	50	11
	2004	7.0	2.1	23.4	69	11
	2005	9.9	1.9	52.3	99	15
	2006	--	--	--	--	9
	2007	--	--	--	--	4
	2008	7.1	2.1	23.9	72	14
Chipping Sparrow	2002	--	--	--	--	8
	2003	14.9	6.0	36.7	53	17
	2004	27.5	10.2	74.2	57	23
	2005	24.3	11.7	50.5	41	20
	2006	25.4	14.7	44.0	32	25
	2007	11.9	5.8	24.2	42	13
	2008	37.1	18.5	74.6	41	36
Brewer's Sparrow	2002	--	--	--	--	3
	2003	--	--	--	--	2

MONITORING WYOMING'S BIRDS: 2008

Common Name	Year	D	LCL	UCL	%CV	n
Brewer's Sparrow (cont'd)	2004	--	--	--	--	2
	2005	--	--	--	--	0
	2006	--	--	--	--	1
	2007	14.4	4.2	49.3	73	42
	2008	4.9	1.0	23.1	98	14
Song Sparrow	2002	90.0	33.4	242.2	61	85
	2003	29.9	11.1	80.9	60	22
	2004	23.7	8.8	63.4	58	15
	2005	--	--	--	--	4
	2006	34.3	15.2	77.6	48	22
	2007	13.1	4.3	39.8	67	10
	2008	19.2	8.2	44.9	51	14
Lincoln's Sparrow	2002	--	--	--	--	0
	2003	34.5	14.8	80.9	49	39
	2004	19.5	6.1	62.3	66	19
	2005	--	--	--	--	4
	2006	13.2	3.7	47.1	74	13
	2007	49.7	25.9	95.1	36	58
	2008	26.8	8.7	82.7	66	29
White-crowned Sparrow	2002	39.0	13.3	114.8	66	45
	2003	11.1	2.4	51.4	100	10
	2004	--	--	--	--	6
	2005	--	--	--	--	3
	2006	24.3	10.3	57.7	50	19
	2007	30.2	9.3	98.2	71	26
	2008	46.1	10.4	205.1	95	41
Dark-eyed Junco	2002	16.4	6.6	41.0	54	14
	2003	24.1	11.3	51.4	44	16
	2004	73.3	37.2	144.6	38	40
	2005	45.6	17.0	122.4	54	23
	2006	--	--	--	--	8
	2007	69.8	34.1	142.9	41	47
	2008	22.8	8.0	64.9	61	13
Pine Siskin	2002	--	--	--	--	5
	2003	32.2	13.6	75.9	54	15
	2004	144.4	43.1	482.9	77	21
	2005	36.8	14.9	90.6	56	12
	2006	--	--	--	--	7
	2007	74.7	36.1	154.5	46	30
	2008	30.3	12.4	74.3	56	13

¹ *D* = estimated density (birds/km²); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; %*CV* = percent coefficient of variation of *D*; *n* = number of independent detections used to estimate *D*. Note: we omitted the density estimates if *n*<10.

DISCUSSION AND RECOMMENDATIONS

Unique Values of Each Habitat

While some bird species can inhabit many different habitat types, bird densities vary across habitats. Each habitat contains unique assemblages of birds and other attributes that contribute to the overall biological diversity of Wyoming. Highlights pertaining to each habitat sampled in 2008 follow, with an emphasis on species of management interest. Please note that this information pertains only to habitats sampled in the MWB program and does not take into account other habitats present in Wyoming.

Wyoming Statewide Transects

Aspen

Aspen stands are rarely monotypic; many other tree species generally occur within or adjacent to Aspen. These stands tend to be small and in close proximity to other forested habitats. We probably detected some of the species in other habitats within or near Aspen stands. Clark's Nutcracker, Ruby-crowned Kinglet, Cassin's Finch, and Red Crossbill prefer coniferous forests. Yellow Warbler, Song Sparrow, and Lincoln's Sparrow prefer wet, brushy areas. Brewer's Sparrow prefers sagebrush habitat. Vesper Sparrow, Western Meadowlark, and Brewer's Blackbird prefer open areas such as grassland.

We recorded one Virginia's Warbler this year in Aspen. Virginia's Warblers are known to nest in shrubby vegetation. Although most strongly associated with pinyon-juniper and oak woodlands, Virginia's Warblers can also breed in high-altitude coniferous forests with mixed deciduous trees (Olson and Martin 1999). This mixed habitat is common on Aspen transects.

We recorded one American Three-toed Woodpecker this year. Historically, we record this species in Mid-elevation Conifer as often as Aspen. American Three-toed Woodpeckers primarily feed on the larvae of bark beetles (Scolytidae). Bark beetle populations have increased tremendously in recent years. American Three-toed Woodpecker populations are, at least temporarily, thriving in habitats with beetle infestations (Leonard 2001).

Grassland

Canada Goose, Gadwall, American Avocet, Willet, and Wilson's Phalarope, are generally associated with wetland habitats such as lakes, ponds and marshes. These habitats overlap frequently with grassland habitat in eastern Wyoming and could explain why observers detected these species in Grassland. We recorded American Kestrel as often in Aspen as in Grassland over all years. We recorded more Northern Harriers, Northern Rough-winged Swallows, Lark Buntings, Chestnut-collared Longspurs, and Western Meadowlarks in Grassland than any other habitat since 2002. This year, we recorded the same number of Bullock's Orioles in Grassland and Juniper Woodland. Historically, we record more Bullock's Orioles in Grassland than any other habitat.

Juniper Woodland

In Wyoming, Juniper Woodland is present as a “mosaic of woodland patches within a sagebrush-grassland matrix” (Wyoming Partners in Flight 2003). We probably recorded some of the species with density estimates in Juniper Woodland in other habitats nearby. Horned Lark, Vesper Sparrow, and Western Meadowlark prefer open areas such as grasslands. Mountain Chickadee prefers coniferous forest. Sage Thrasher, Brewer's Sparrow, and Sage Sparrow prefer sagebrush habitat.

This year, an observer detected a flock of 29 Black Rosy-Finches in Juniper Woodland. This is the first year we recorded this species in Wyoming. Black Rosy-Finch breeds in alpine tundra habitat. These birds could have been migrating up to their breeding grounds when they were detected. The timing of Black Rosy-Finch migration partly depends on weather. Most birds probably arrive in April. Birds are occasionally driven down from their alpine breeding zone by storms in May (Johnson 2002). There was a large storm 3 days before the transect sample and over a foot of snow fell in the transect area in May (Weather Underground 2008).

Mid-elevation Conifer

Some of our Mid-elevation Conifer transects run along forest edges or border other habitats. We probably recorded some of the species with density estimates in Mid-elevation Conifer in other habitats nearby. Rock Wren prefers open, rocky areas found in many habitats in Wyoming. House Wren, Orange-crowned Warbler, Green-tailed Towhee, and Brewer's Sparrow prefers open, brushy patches. Mountain Bluebird prefers mountain meadows and open areas with scattered trees. Yellow Warbler, MacGillivray's Warbler, Song Sparrow, Lincoln's Sparrow, and White-crowned Sparrow prefer moist, shrubby areas.

We recorded one Northern Saw-whet Owl for the first time in Wyoming this summer, on transect WY-MC09. We have most likely not detected Northern Saw-whet Owls before because the frequency of vocalization is low at the time of day and year we conduct sampling (Rasmussen et. al. 2008).

Montane Riparian

It is important to note that Montane Riparian is associated with higher-elevation rivers and streams. This habitat is linear and narrow, following rivers and streams and closely borders other habitats. During point counts, observers frequently detect species that use habitats adjacent to Montane Riparian. We probably detected some of the species with density estimates in other habitats bordering Montane Riparian. Red-naped Sapsucker prefers mixed deciduous-coniferous forests. Dusky Flycatcher, Clark's Nutcracker, Mountain Chickadee, Ruby-crowned Kinglet, Yellow-rumped Warbler, Western Tanager, Dark-eyed Junco, Red Crossbill, and Pine Siskin prefer coniferous forests that do not necessarily require a riparian component. Mountain Bluebird, Chipping Sparrow, and Brown-headed Cowbird prefer open woodlands. Green-tailed Towhee and Brewer's Sparrow prefer arid, brushy areas. Vesper Sparrow prefers open areas such as grassland.

Shrubsteppe

Since MWB began, we recorded more Greater Sage-Grouse in Shrubsteppe than any other habitat. We recorded six Greater Sage-Grouse in Shrubsteppe this year. In 2007, we recorded 28 individuals. In past years, we recorded nearly as many Ferruginous Hawks in Grassland as in Shrubsteppe. Since MWB began, we recorded more Loggerhead Shrikes, Sage Thrashers, Brewer's Sparrows, and Sage Sparrows in Shrubsteppe than other habitats and nearly as many Vesper Sparrows in Grassland as in Shrubsteppe. This year, we recorded the same number of Golden Eagles in both Juniper Woodland and Shrubsteppe. Historically, we recorded more Golden Eagles in Shrubsteppe than other habitats.

Shoshone National Forest Transects

Mid-elevation Conifer

Some of our Mid-elevation Conifer transects run along forest edges or border other habitats. We probably detected some of the species with density estimates in Mid-elevation Conifer in other habitats nearby. Mountain Bluebird prefers open areas with scattered trees.

We recorded two Least Flycatchers in SNF this summer. We have recorded six Least Flycatchers since 2002. We recorded three in Mid-elevation Conifer and three in Montane Riparian. Least Flycatcher prefers deciduous forests, and the observer probably detected this species outside of Mid-elevation Conifer. We recorded two Ovenbirds this summer. This is the first time we recorded Ovenbird in SNF. We recorded one Plumbeous Vireo. This is the first time we recorded this species in SNF. We recorded one Spotted Towhee this summer. This species generally prefers brushy areas over coniferous forests. Most likely, the observer detected this species in a habitat bordering Mid-elevation Conifer. We recorded one Williamson's Sapsucker in SNF this summer. Since MWB began, we recorded this species more in Mid-elevation Conifer than any other habitat in SNF.

In past years, we recorded more Olive-sided Flycatchers, Clark's Nutcrackers, Townsend's Solitaires, and Cassin's Finches in Mid-elevation Conifer than in the other two habitats in SNF. Gray Flycatcher generally prefers sagebrush or other brushy areas. We recorded five Gray Flycatchers in SNF this summer on one transect, WY-MC75. This transect skirts the edge between Mid-elevation Conifer and shrubby habitat. The observer probably detected this species outside of Mid-elevation Conifer. This is the first year we recorded Gray Flycatcher on a Mid-elevation Conifer transect. We recorded two Northern Goshawks in SNF this summer, one each in Mid-elevation Conifer and Montane Riparian. Since MWB began, we recorded more Northern Goshawk in Mid-elevation Conifer than other habitats. We have recorded 8 Northern Goshawks since 2002.

Montane Grassland

In Wyoming, Montane Grassland is generally intermixed with mixed stands of coniferous forest. During point counts, observers frequently detect species that use these habitats adjacent to Montane Grassland. We probably detected some of the species with density estimates in habitats bordering Montane Grassland. Dusky Flycatcher, Clark's Nutcracker, Mountain Chickadee, Ruby-crowned Kinglet, Yellow-rumped Warbler, and

Dark-eyed Junco prefer coniferous forests. Warbling Vireo prefers open deciduous woods and riparian areas. Green-tailed Towhee prefers arid, brushy habitats.

Historically, we recorded more Spotted Sandpipers, Broad-tailed Hummingbirds and Cedar Waxwings in Montane Riparian than any other habitats in SNF. We have only ever recorded Wilson's Snipe, Common Yellowthroat, and Wilson's Warbler in Montane Riparian in SNF. We recorded one Calliope Hummingbird in SNF this summer. We have only recorded five Calliope Hummingbirds since 2002 in SNF. Historically, we recorded more Common Grackles in Montane Grassland than any other habitat in SNF. This is the first year we recorded House Finch in SNF.

Montane Riparian

Montane Riparian is associated with higher-elevation rivers and streams. This habitat is linear and narrow. Consequently, it closely borders other habitats. During point counts, observers frequently detect species that use habitats peripheral to Montane Riparian. We probably detected some of the species with density estimates in other habitats bordering Montane Riparian. Dusky Flycatcher, Mountain Chickadee, Ruby-crowned Kinglet, Dark-eyed Junco, and Pine Siskin prefer coniferous forests that do not necessarily require a riparian component. Green-tailed Towhee prefers arid, brushy habitat. Chipping Sparrow prefers open woodlands. Brewer's Sparrow prefers sagebrush habitat.

Historically, we recorded more Great Blue Herons, Cordilleran Flycatchers, MacGillivray's Warblers, and Lazuli Buntings in Montane Riparian than any other habitat in SNF. Historically, we recorded the same number of Red-naped Sapsuckers in Montane Grassland and Montane Riparian. This species is generally associated with mixed deciduous-coniferous forests.

Prospects for Population Monitoring

This year we combined point-count transect data from 2002 - 2008 in order to more accurately determine density estimates for each year. This allowed us to calculate density estimates for some species that would not have had large enough sample sizes if we had used only the 2008 data. As a result, we were able to calculate density estimates for 71 species in 2008. Had we only used the data collected during the 2008 field season, we would have only been able to calculate density estimates for 47 species.

This year on our statewide transects we detected 84 bird species that are of management interest, as designated by the Wyoming Game and Fish Department, U.S. Forest Service, U.S. Fish and Wildlife Service, Partners In Flight, or Wyoming Partners In Flight (Appendix A). We recorded 35 of these species in sufficient numbers to calculate density estimates in at least one habitat this year. The combined 2002-2007 data yielded excellent results with low coefficients of variation ($\leq 50\%$) for 32 of these species, and moderate results ($CV = 50-75\%$) for another two species in at least one habitat sampled statewide.

We were able to calculate density estimates for 43% of all species recorded statewide in 2008. The other 57% of species, which only comprise 7% of total detections in 2008, fall into one of the following categories:

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- 1) Low-density, highly localized species (e.g., Lewis's Woodpecker);
- 2) Low-density, widespread species (e.g., Northern Goshawk);
- 3) Species whose breeding ranges in Wyoming are peripheral to their continental distribution (e.g., Black-chinned Hummingbird);
- 4) Nocturnal species (e.g., Northern Saw-whet Owl);
- 5) Wetland-obligate species (e.g., Sora); and
- 6) Species most readily detectable prior to late May (e.g., Ruffed Grouse).

Species in the aforementioned groups could be monitored through additional effort using one or more of the following sample techniques:

- 1) Additional point transects in existing habitats;
- 2) Census of small, localized populations;
- 3) Census of birds at nesting sites (e.g., colonies, eyries, etc);
- 4) Species-specific call-response surveys;
- 5) Nocturnal surveys;
- 6) Wetland surveys; and
- 7) Early-season (i.e., winter/spring) surveys.

In 2009, RMBO and its partners will implement a new sampling design for MWB. The new design is based on spatially-balanced, random samples placed without regard to existing vegetation conditions. The primary stratification level of the new design is the Bird Conservation Region (BCR). The transects will no longer be linear but arranged in a four by four grid with points spaced 250 meters apart. Field methods will remain the same. Benefits of our new design include:

- Spatially-balanced designs are statistically more efficient than simple random samples;
- Strata based on fixed attributes allow for relating changes in bird population to changes on the landscape through time;
- Each BCR within a state can be stratified differently, depending upon local needs and areas to which one wants to make inferences;
- All vegetation types are available for sampling;
- The design can incorporate weighting by factors that influence species' distributions;
- Aggregation of strata-wide estimates to BCR- or state-wide estimates is built into the design;
- Because each stratum has its own spatially-balanced, ordered sample, sampling effort can vary among strata and among years and still provide statistically valid estimates;
- Local population trends can be directly compared to regional trends;
- Incorporating spatial information in data analysis can increase precision; and
- Data from the previous sampling design can be used to calculate and compare densities with the new, BCR-based data (Blakesley and Hanni 2009).

Meeting Our Goals in the Future

RMBO staff was not able to complete all scheduled point count transects for one of the following reasons:

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- 1) Transportation issues (WY-MC30, WY-MC62, WY-MC70, WY-MR15, WY-MR33, WY-MR47, WY-MR94);
- 2) Inaccessibility (WY-AS52, WY-GR39, WY-MC61);
- 3) Poor weather conditions (WY-SS21); or
- 4) Landowner issues (WY-GR14).

While there will always be unforeseeable events such as bad weather, RMBO staff will work towards eliminating other problems that are avoidable.

One field technician's car broke down and he was unable to fix it in time to finish the field season. We reassigned five of his transects to another field technician. The remaining crew did not have time to complete the other seven of his transects within the optimal sample dates. One solution in the future is to hire one additional field technician that can fill in as needed to insure that all transects are completed on time.

We did not complete two transects in 2008 because high water levels limited access. We could not access another transect this year, because the field technician assigned this transect did not have a high clearance vehicle and was unable to travel on the access road. In the future, we will assign transects to field technicians according to their ability to access the sample locations.

One transect was not conducted because of poor weather at the sample location, forcing the field technician to move on to other transects so as not to waste time. As a result, she was unable to return and conduct the transect within the optimal time frame. Hiring an additional field technician will help resolve this situation as well. Having more field technicians will allow more transects to be conducted in a shorter period of time, which should allow us to conduct all of our samples within the optimal time frame.

Because of the nature of the habitat, many of our Grassland transects fall on private property. We did not complete one transect this year because we could not get in touch with the landowner. In the future, we will try to reach landowners prior to the field season and give them a follow-up call closer to the actual date of the sample.

RMBO staff will take these issues into consideration when planning for the 2009 field season.

Data Dissemination Website

We are currently in the process of redesigning our web site so that data can be queried and results can be displayed on a variety of scales (i.e. management unit, county, state). Access to the raw data and habitat relationships will allow managers to apply the data to local management issues. There will be a species account section where you can access general information about a species and view maps and graphs of bird distributions according to our data (<http://rmbo.org/public/monitoring/speciesAccounts.aspx>). In addition, we are working with the Cornell Lab of Ornithology's Avian Knowledge Network and the U.S. Geological Survey to compile and merge results from a variety of sources. This effort will integrate information and allow partners to conduct analyses on regional datasets that can help inform management decisions.

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APPENDIX A.

APPENDIX A. List of bird species observed during point-count transects in Wyoming from 2002-2008 with management designation.

Common Name ¹	Species Management Designation											
	WGFD ²	USFS ³	USFWS ⁴					PIF ⁵				
		Region 2	BCR10	BCR16	BCR17	BCR18	Region 6	BCR10	BCR16	BCR17	BCR18	WY-PIF
Trumpeter Swan	SGCN	R2SS										WY-I
Northern Pintail	SGCN											
Canvasback	SGCN											
Redhead	SGCN											
Lesser Scaup	SGCN											
Harlequin Duck	SGCN	R2SS										WY-II
Barrow's Goldeneye	SGCN											
Ruffed Grouse								RS				
Greater Sage-Grouse	SGCN	R2SS						CC,RC,CS,RS	CC,RC	CC,RC,CS,RS		WY-I
Dusky Grouse								CC,RC	CC			WY-III
Sharp-tailed Grouse								RC		CS,RS	RC	
Common Loon	SGCN											WY-II
Western Grebe	SGCN											WY-III
Clark's Grebe	SGCN											WY-III
American White Pelican	SGCN											WY-II
Great Blue Heron	SGCN											
Black-crowned Night-Heron	SGCN											
Bald Eagle	SGCN, T											WY-I
Northern Harrier		R2SS		BCC		BCC	BCC	RC		RC	RC	WY-III
Northern Goshawk	SGCN	R2SS						RC,RS		RC		WY-I
Swainson's Hawk	SGCN		BCC	BCC			BCC	CC,RC	CC,RC	CC	CC,RS	WY-I
Ferruginous Hawk	SGCN	R2SS	BCC	BCC	BCC	BCC	BCC	RC	RC	RC,RS	RC,RS	WY-I
Golden Eagle			BCC	BCC	BCC		BCC		RC	RC		WY-III

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Common Name ¹	Species Management Designation											
	WGFD ²	USFS ³	USFWS ⁴					PIF ⁵				
		Region 2	BCR10	BCR16	BCR17	BCR18	Region 6	BCR10	BCR16	BCR17	BCR18	WY-PIF
Merlin	SGCN											WY-II
Peregrine Falcon	SGCN	R2SS	BCC	BCC	BCC	BCC	BCC					WY-I
Prairie Falcon			BCC	BCC	BCC	BCC	BCC		RC		RC	WY-III
Sandhill Crane	SGCN											
Mountain Plover	SGCN	R2SS	BCC	BCC	BCC	BCC	BCC					WY-I
American Avocet												WY-III
Willet												WY-III
Upland Sandpiper	SGCN		BCC		BCC		BCC					WY-I
Long-billed Curlew	SGCN		BCC		BCC	BCC	BCC					WY-I
Wilson's Phalarope			BCC	BCC	BCC		BCC					WY-I
Franklin's Gull	SGCN											WY-I
Forster's Tern	SGCN											WY-I
Northern Pygmy-Owl	SGCN											
Burrowing Owl	SGCN	R2SS		BCC	BCC	BCC	BCC			RC	RC,RS	WY-I
Great Gray Owl	SGCN											WY-II
Short-eared Owl	SGCN	R2SS		BCC	BCC		BCC	CC		CC,RC	CC	WY-I
Northern Saw-whet Owl								RS				
Common Nighthawk									RC		RC	
Common Poorwill												WY-III
White-throated Swift								CC	CC,RS	CC	CC	WY-II
Black-chinned Hummingbird												WY-II
Calliope Hummingbird								CC,CS,RS	CC			WY-II
Broad-tailed Hummingbird									RS			WY-II
Rufous Hummingbird								CC,CS,RS				WY-II
Lewis's Woodpecker	SGCN	R2SS	BCC	BCC	BCC	BCC	BCC	CC,RC	CC,RC,CS,RS	CC,RC	CC,RC	WY-II
Red-headed Woodpecker							BCC			CC,RC	CC,RC	WY-III
Williamson's Sapsucker			BCC	BCC			BCC	CS,RS	CS,RS			WY-II
Red-naped Sapsucker			BCC		BCC		BCC	CS,RS				WY-II
American Three-toed Woodpecker	SGCN	R2SS										WY-II

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Species Management Designation											
	WGFD ²	USFS ³	USFWS ⁴					PIF ⁵				
		Region 2	BCR10	BCR16	BCR17	BCR18	Region 6	BCR10	BCR16	BCR17	BCR18	WY-PIF
Black-backed Woodpecker	SGCN	R2SS								RC		WY-II
Olive-sided Flycatcher		R2SS						CC,RC	CC			WY-II
Willow Flycatcher	SGCN							CC,RS	CC,RC	CC		WY-II
Hammond's Flycatcher								RS				WY-II
Gray Flycatcher												WY-II
Dusky Flycatcher								CS,RS				WY-II
Cordilleran Flycatcher									RS			WY-II
Say's Phoebe									RS	RS	RS	WY-III
Ash-throated Flycatcher	SGCN											WY-II
Cassin's Kingbird												WY-II
Loggerhead Shrike		R2SS	BCC				BCC	RC	RC	RC	RC	WY-II
Gray Vireo				BCC			BCC		CC,RC,RS			
Plumbeous Vireo									RS			WY-II
Warbling Vireo									RS			
Western Scrub-Jay	SGCN											WY-II
Pinyon Jay				BCC				CC	CC,RC,CS,RS	CC,RC	CC	
Clark's Nutcracker								CS,RS	CS,RS			WY-III
Black-billed Magpie									RS	RC		
Purple Martin		R2SS										
Violet-green Swallow									RS			
Northern Rough-winged Swallow										RC		WY-III
Juniper Titmouse	SGCN								RC,RS			WY-II
Bushtit	SGCN											WY-II
Pygmy Nuthatch	SGCN		BCC						RC			WY-II
Brown Creeper												WY-II
Rock Wren									RS			WY-III
Canyon Wren									RC			WY-III
Bewick's Wren							BCC					WY-III
American Dipper								RS				WY-II

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Species Management Designation											
	WGFD ²	USFS ³	USFWS ⁴					PIF ⁵				
		Region 2	BCR10	BCR16	BCR17	BCR18	Region 6	BCR10	BCR16	BCR17	BCR18	WY-PIF
Golden-crowned Kinglet								RS				WY-II
Western Bluebird									RS			WY-II
Mountain Bluebird									RC,CS,RS	RC		
Townsend's Solitaire								RS				WY-II
Veery												WY-III
Sage Thrasher	SGCN									RC		WY-II
Virginia's Warbler			BCC	BCC		BCC			CC,RC,RS			WY-III
Yellow Warbler											RC	
Black-throated Gray Warbler				BCC					RC			WY-III
Ovenbird												WY-III
MacGillivray's Warbler												WY-II
Wilson's Warbler												WY-II
Green-tailed Towhee									CS,RS			
Cassin's Sparrow		R2SS				BCC	BCC				RC,RS	
Brewer's Sparrow	SGCN	R2SS	BCC		BCC		BCC	CC,RC	CC,RC	CC,RC	CC,RC	WY-I
Vesper Sparrow										RC		WY-II
Lark Sparrow											RC	WY-II
Black-throated Sparrow									RC			
Sage Sparrow	SGCN	R2SS		BCC					RC			WY-I
Lark Bunting	SGCN					BCC		RC		RC,CS,RS	RC,CS,RS	WY-II
Grasshopper Sparrow	SGCN	R2SS			BCC		BCC			RC,CS,RS	RC,CS,RS	WY-II
Baird's Sparrow					BCC		BCC			CC,RC		WY-I
McCown's Longspur	SGCN	R2SS	BCC			BCC	BCC	CC,RC		CC,RC,CS,RS	CC,CS,RS	WY-I
Chestnut-collared Longspur	SGCN	R2SS		BCC	BCC	BCC	BCC	RC		RC,CS,RS	RC	WY-II
Lazuli Bunting								RS				WY-III
Western Meadowlark										RS	RS	
Bullock's Oriole												WY-III
Scott's Oriole	SGCN											WY-II
Black Rosy-Finch	SGCN							CC,CS,RS	CC			WY-III

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Species Management Designation											
	WGFD ²	USFS ³	USFWS ⁴					PIF ⁵				
		Region 2	BCR10	BCR16	BCR17	BCR18	Region 6	BCR10	BCR16	BCR17	BCR18	WY-PIF
Cassin's Finch								RC,CS,RS	RC			
Red Crossbill								RS				
Pine Siskin									RC,RS			

¹ Common Names are from the A.O.U. Check-list of North American Birds, Seventh Edition (2003).

² WGFD=Wyoming Game and Fish Department, SGCN=Species of Greatest Conservation Need (Wyoming Comprehensive Wildlife Conservation Strategy 2005), T=Threatened Species.

³ USFS, Region 2=United States Forest Service, Region 2, R2SS=USFS Region 2 Sensitive Species.

⁴ USFWS=U.S. Fish and Wildlife Service, BCR=Bird Conservation Region, Region 6=USFWS Region 6 (Mountain-Prairie Region), BCC=Bird of Conservation Concern.

⁵ PIF=Partners in Flight, BCR=Bird Conservation Region, CC=Continental Concern Species, RC=Regional Concern Species, CS=Continental Stewardship Species, RS = Regional Stewardship Species, WY-PIF=Wyoming Partners in Flight (from the Wyoming Bird Conservation Plan, Version 2.0 2003), WY-I=WY-PIF Level I Priority (Conservation Action), WY-II=WY-PIF Level II Priority (Monitoring); WY-III=WY-PIF Level III Priority (Local Interest).

APPENDIX B.

List of all bird species observed during point-count transects in Wyoming, with species totals from 2001-2008 and species totals by habitat in 2008.

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
Canada Goose		53	35		3	1	10	1	25	73	127	151	92
Trumpeter Swan												6	
Gadwall		2		1			1	1	5	6	4	2	3
American Wigeon									13	1	11	3	
Mallard	4	8	1	2	17	6	12	2	29	34	29	17	38
Blue-winged Teal		1			1			1	6	2	4		2
Cinnamon Teal							1	2	7	2	4		
Northern Shoveler						2				2	2	1	2
Northern Pintail			2				2		6	4	3		2
Green-winged Teal					13	4			8	3	13	4	17
Canvasback										3	4		
Redhead										5			
Ring-necked Duck					2		1		8	8			2
Lesser Scaup							1		14	13	8	1	
Harlequin Duck											1		
Bufflehead					1				2	2	2	9	1
Barrow's Goldeneye				1	2			1	9	2	2	4	3
Common Merganser				1	8		3	8	18	32	28	20	9
Chukar			1				2	1	7	2	15	6	1
Ring-necked Pheasant			2			4	1	2	3	7	7		6
Ruffed Grouse	3			4	1		35	7	5	3	10	6	8
Greater Sage-Grouse		1				6	3		3	24	77	53	7
Dusky Grouse	6			1			15	23	31	7	13	34	7

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
Sharp-tailed Grouse										6		3	
Wild Turkey								7	1			1	
Common Loon											1	1	
Pied-billed Grebe										1	3		
Western Grebe						2				1	3		2
Clark's Grebe										2			
American White Pelican			19		4	2			2	2	16	8	25
Double-crested Cormorant			1								6		1
Great Blue Heron			1	1	6	1	5	3	10	9	11	3	9
Great Egret												4	
Black-crowned Night-Heron												3	
Turkey Vulture	2	1	9		1		7	16	19	14	17	11	13
Osprey			1		2		1	1	1	5	2	3	3
Bald Eagle	1				1			1	1	4	1	1	2
Northern Harrier		11				6	3	6	11	9	30	11	17
Sharp-shinned Hawk	1		3	4	3		3	3	7	5	5	1	11
Cooper's Hawk	2		3	1	1		1	6	3	5	10		7
Northern Goshawk				2			1		5	8	5	4	2
Broad-winged Hawk									1	1			
Swainson's Hawk	1						2	2	8	4	13	8	1
Red-tailed Hawk	11	6	9	9	10	2	28	33	51	57	79	68	47
Ferruginous Hawk		1				3	2	5	9	8	11	7	4
Golden Eagle	2	2	6	3	1	6	2	5	9	8	14	6	20
American Kestrel	10	11	9	9	4	7	11	10	32	40	38	35	50
Merlin					1		2		1				1
Peregrine Falcon											1	1	
Prairie Falcon						2	2	6	2	3	15	6	2
Sora								2	3		7	1	
American Coot									3	2			

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
Sandhill Crane	9	1	3	5	16		11	6	20	34	45	45	34
Killdeer	4	30	3		8	10	32	42	46	50	64	53	55
Mountain Plover		2					2	16	1	10	4	2	2
American Avocet		6				2			3	6	6	2	8
Spotted Sandpiper	2			6	47		55	69	56	41	75	83	55
Willet		13	1						2	8	11	7	14
Upland Sandpiper	4	1						2	10	7	6		5
Long-billed Curlew		3							1	1	4	4	3
Wilson's Snipe	5	8			39	1	13	20	42	56	49	35	53
Wilson's Phalarope		2			1				32	69	15		3
Franklin's Gull										1	2		
Ring-billed Gull									1		1		
California Gull		6	7			11			5	1	86	32	24
Forster's Tern											2		
Rock Pigeon		8				3			3	8		8	11
Mourning Dove	51	47	162	6	10	30	132	153	385	282	498	312	306
Great Horned Owl	1		2					2	1	3	3	6	3
Northern Pygmy-Owl								1		1	1		
Burrowing Owl									3		1		
Great Gray Owl										1	1	1	
Long-eared Owl											1		
Short-eared Owl									9		2		
Northern Saw-whet Owl				1									1
Common Nighthawk	1	1	18		3	1	7	10	8	14	20	35	24
Common Poorwill	1							1		1	1	2	1
White-throated Swift			32	1		1	7	2	14	17	16		34
Black-chinned Hummingbird									1	1	1	2	
Calliope Hummingbird	3				2		1	1	2	15	14	13	5
Broad-tailed Hummingbird	47			13	65		53	99	129	166	104	99	125

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
Rufous Hummingbird					1			3	1	16	1		1
Belted Kingfisher	1			1	3		5	1	6	9	10	3	5
Lewis's Woodpecker										1			
Red-headed Woodpecker											2		
Williamson's Sapsucker	2			2			10	14	10	6	7	10	4
Red-naped Sapsucker	38			4	24		34	76	152	125	148	109	66
Downy Woodpecker	15			3	1		9	30	38	30	39	30	19
Hairy Woodpecker	52			21	13		27	39	65	55	69	158	86
American Three-toed Woodpecker	1						2	6	13	18	12	3	1
Black-backed Woodpecker							1					1	
Northern Flicker	76	0	23	52	39	4	84	137	178	249	380	306	194
Olive-sided Flycatcher	3			28	15		17	20	56	53	46	22	46
Western Wood-Pewee	70		6	21	22	2	71	45	97	160	172	143	121
Willow Flycatcher					13		13	15	25	29	34	31	13
Least Flycatcher				2	2	1	2				10		5
Hammond's Flycatcher	6			26	13		11	50	74	92	74	50	45
Gray Flycatcher			234	5			175	145	154	164	311	7	239
Dusky Flycatcher	169		21	58	84	1	157	147	347	297	268	307	333
Cordilleran Flycatcher	1			4	1		7	24	34	51	38	26	6
Say's Phoebe			12		1	9	10	26	21	25	23	4	22
Ash-throated Flycatcher			7				10	8	7	16	14		7
Cassin's Kingbird									2				
Western Kingbird		5	3	1		1	12	6	19	5	7	2	10
Eastern Kingbird		2				1	2	2	29	10	6	4	3
Loggerhead Shrike		4	2			6	5	6	28	19	19	2	12
Gray Vireo										6			
Plumbeous Vireo	1		25	2	2		42	8	15	38	24	3	30
Warbling Vireo	436		1	101	145		208	292	566	644	499	632	683
Red-eyed Vireo									1				

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
Gray Jay	1			12	6		15	20	26	31	24	32	19
Steller's Jay	2			8	3		44	26	18	15	53	31	13
Western Scrub-Jay							9	5	5	10	2		
Pinyon Jay			183				34	59	120	97	90	19	183
Clark's Nutcracker	29		15	68	25		49	90	153	188	177	177	137
Black-billed Magpie	4		77		6	6	38	48	57	85	103	107	93
American Crow	12	3	23	3	6	10	3	14	29	79	67	65	57
Common Raven	14	16	82	21	32	113	86	84	150	134	203	169	278
Horned Lark	2	598	29			602	627	1074	1924	1943	2173	1092	1231
Purple Martin							2			6	2	1	
Tree Swallow	18	8	29	14	21		57	93	62	67	98	123	90
Violet-green Swallow	42	1	86	24	77	2	54	70	146	145	195	100	232
Northern Rough-winged Swallow		13	2		1	6	4	6	3	8	40	13	22
Bank Swallow					10		2	3	5	3	7	2	10
Cliff Swallow	30	26	80		17	27	16	13	97	57	93	135	180
Barn Swallow	1	8	2			21	4	3	32	16	12	25	32
Black-capped Chickadee	11		4		8		84	23	20	26	35	45	23
Mountain Chickadee	135		9	188	73	2	303	321	312	383	339	361	407
Juniper Titmouse			9				11	25	10	7	57		9
Bushtit			5					5	18	18	10		5
Red-breasted Nuthatch	36			83	9		146	166	210	174	87	119	128
White-breasted Nuthatch	8			10		1		7	9	64	9	22	19
Pygmy Nuthatch							9			2	6	3	
Brown Creeper	2			1			3	19	39	21	11	5	3
Rock Wren	19	2	176	3	7	40	92	141	213	255	387	80	247
Canyon Wren			3		1			1		3	2		4
Bewick's Wren	2		173			1	44	31	160	253	321	83	176
House Wren	229		10	29	40	1	135	226	299	483	325	219	309
Winter Wren										1			

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
American Dipper				1	7		12	19	10	7	11	6	8
Golden-crowned Kinglet				8			14	24	28	21	16	32	8
Ruby-crowned Kinglet	114			223	125		377	456	536	549	368	320	462
Blue-gray Gnatcatcher			85				46	42	82	123	137	108	85
Western Bluebird	2						2						2
Mountain Bluebird	29	1	165	20	6	6	94	186	293	322	398	171	227
Townsend's Solitaire	6			24	7		37	15	52	41	47	52	37
Veery	6				1		9	15	9	2	14	8	7
Swainson's Thrush	25			30	25		37	77	111	96	100	108	80
Hermit Thrush	53		8	107	13		62	111	203	183	153	155	181
American Robin	299	5	76	251	340	8	457	645	840	899	1211	1045	979
Gray Catbird			1	1	29		3	3	8	33	27	29	31
Northern Mockingbird		1					1		2		4		1
Sage Thrasher	3	6	18		3	292	79	232	258	326	490	208	322
Brown Thrasher							4				2		
European Starling						64	2	1	62	42	22	9	64
American Pipit									1	2	2		
Cedar Waxwing		2			3		14	3	38	38	38	49	5
Orange-crowned Warbler	42			3	7		27	33	50	79	77	98	52
Virginia's Warbler	1								2	4	6		1
Yellow Warbler	55		10	16	325	3	175	146	252	346	400	405	409
Yellow-rumped Warbler	96	0	13	218	98	3	480	335	489	484	540	421	428
Black-throated Gray Warbler			75				56	47	78	109	113	17	75
American Redstart	1									2		1	1
Ovenbird				2	5					2	1	2	7
Northern Waterthrush							5	2		3		1	
MacGillivray's Warbler	59			27	65		62	112	140	202	200	134	151
Common Yellowthroat	2		1		30		1	2	11	14	17	25	33
Wilson's Warbler	5		2	5	51		86	69	78	107	75	54	63

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
Yellow-breasted Chat			2				1			2	10	2	2
Western Tanager	54		9	81	23	5	78	135	174	151	224	251	172
Green-tailed Towhee	199	1	123	31	62	58	216	290	352	410	469	417	474
Spotted Towhee	3		7	3	3		6	21	23	23	62	13	16
Cassin's Sparrow											1		
Chipping Sparrow	97	13	411	151	53	4	306	463	811	966	530	512	729
Brewer's Sparrow	62	122	164	6	58	480	478	770	1262	1179	1527	974	892
Field Sparrow									2				5
Vesper Sparrow	19	128	88	7	23	131	329	339	601	666	724	267	396
Lark Sparrow		9	63	7		43	82	77	72	83	58	136	122
Black-throated Sparrow											1		
Sage Sparrow		3	49			161	86	107	110	128	232	127	213
Lark Bunting	1	1170				142	477	603	1592	743	1312	896	1313
Savannah Sparrow	1	19		1	39	4	35	64	49	93	93	57	64
Grasshopper Sparrow		74					20	42	35	37	87	57	74
Baird's Sparrow										1			
Fox Sparrow					5		8	11	16	21	24	10	5
Song Sparrow	17		3	9	168		224	124	140	192	291	249	197
Lincoln's Sparrow	55			40	172		129	167	243	254	309	322	267
White-crowned Sparrow	71	0	3	33	228	0	170	213	217	177	247	303	335
Dark-eyed Junco	214	0	5	263	78	5	390	394	624	578	771	809	565
McCown's Longspur		112					71	81	138	236	270	125	112
Chestnut-collared Longspur		25	2				74	132	48	97	112	17	27
Black-headed Grosbeak	12			9	26	4	30	18	33	34	64	41	51
Blue Grosbeak	1							1	8	1	2	2	1
Lazuli Bunting	2		21		19		27	23	33	59	45	45	42
Red-winged Blackbird	6	74	4	3	10	12	41	45	62	149	119	55	109
Western Meadowlark	9	700	179		7	226	402	769	1507	1833	1984	1024	1121
Yellow-headed Blackbird							4	5	8	3	2		

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008						Total # of individuals observed per year (in all habitats sampled ³)						
	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006	2007	2008
Brewer's Blackbird	60	56	16		41	12	59	54	173	160	254	117	185
Common Grackle	1	3	5		5	5	13	14	22	10	9	10	19
Brown-headed Cowbird	30	49	73	4	46	20	88	93	174	230	200	93	222
Orchard Oriole									1		1		
Bullock's Oriole		2	2			1		5	13	15	10	4	5
Baltimore Oriole											2		
Scott's Oriole								5	3	5	1		
Black Rosy-Finch			29										29
Pine Grosbeak				6			8	9	14	6	14	1	6
Cassin's Finch	16		14	38	5		52	57	89	192	73	40	73
House Finch	1		61		1		27	24	40	26	131	7	63
Red Crossbill	10			49	4		10	25	88	291	101	83	63
White-winged Crossbill							5	1		50	10	1	
Pine Siskin	133		12	220	157	2	197	146	615	894	342	614	524
Lesser Goldfinch												2	
American Goldfinch	15		14		8	2	7	14	45	77	84	38	39
Evening Grosbeak	2				2		4	1	1	15	17	5	4
House Sparrow										7	4	7	
Abert's Squirrel	3												3
Red Squirrel	113			88	52		22	47	86	200	103	222	253

¹ Common Names are from the A.O.U. Check-list of North American Birds, Seventh Edition (2003).

² Habitats: AS=aspen; GR=grassland; JW=juniper woodland; MC=mid-elevation conifer; MR=montane riparian; SS=shrubsteppe.

³ The number and types of habitats sampled each year may vary.

APPENDIX C

List of bird species observed during point-count transects in Shoshone NF from 2002-2008 with management designation.

Common Name ¹	Species Management Designation ²					
	WGFD	USFS	USFWS		PIF	
		Region 2	BCR10	Region 6	BCR10	WY-PIF
Ruffed Grouse					RS	
Greater Sage-Grouse	SGCN	R2SS			CC,RC,CS,RS	WY-I
Dusky Grouse					CC,RC	WY-III
American White Pelican	SGCN					WY-II
Great Blue Heron	SGCN					
Northern Harrier		R2SS		BCC	RC	WY-III
Northern Goshawk	SGCN	R2SS			RC,RS	WY-I
Ferruginous Hawk	SGCN	R2SS	BCC	BCC	RC	WY-I
Golden Eagle			BCC	BCC		WY-III
Merlin	SGCN					WY-II
Prairie Falcon			BCC	BCC		WY-III
Sandhill Crane	SGCN					
Long-billed Curlew	SGCN		BCC	BCC		WY-I
Northern Pygmy-Owl	SGCN					
White-throated Swift					CC	WY-II
Calliope Hummingbird					CC,CS,RS	WY-II
Broad-tailed Hummingbird						WY-II
Rufous Hummingbird					CC,CS,RS	WY-II
Williamson's Sapsucker			BCC	BCC	CS,RS	WY-II
Red-naped Sapsucker			BCC	BCC	CS,RS	WY-II
American Three-toed Woodpecker	SGCN	R2SS				WY-II
Black-backed Woodpecker	SGCN	R2SS				WY-II
Olive-sided Flycatcher		R2SS			CC,RC	WY-II
Willow Flycatcher	SGCN				CC,RS	WY-II
Hammond's Flycatcher					RS	WY-II
Dusky Flycatcher					CS,RS	WY-II
Cordilleran Flycatcher						WY-II
Say's Phoebe						WY-III
Plumbeous Vireo						WY-II
Clark's Nutcracker					CS,RS	WY-III
Northern Rough-winged Swallow						WY-III
Pygmy Nuthatch	SGCN		BCC			WY-II
Brown Creeper						WY-II
Rock Wren						WY-III
American Dipper					RS	WY-II
Golden-crowned Kinglet					RS	WY-II
Western Bluebird						WY-II
Townsend's Solitaire					RS	WY-II

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Species Management Designation ²					
	WGFD	USFS	USFWS		PIF	
		Region 2	BCR10	Region 6	BCR10	WY-PIF
Veery						WY-III
Sage Thrasher	SGCN					WY-II
Virginia's Warbler			BCC	BCC		WY-III
Ovenbird						WY-III
MacGillivray's Warbler						WY-II
Wilson's Warbler						WY-II
Brewer's Sparrow	SGCN	R2SS	BCC	BCC	CC,RC	WY-I
Vesper Sparrow						WY-II
Lark Sparrow						WY-II
Sage Sparrow	SGCN	R2SS				WY-I
Grasshopper Sparrow	SGCN	R2SS		BCC		WY-II
Lazuli Bunting					RS	WY-III
Bullock's Oriole						WY-III
Cassin's Finch					RC,CS,RS	
Red Crossbill					RS	

¹ Common Names are from the A.O.U. Check-list of North American Birds, Seventh Edition (2003).

² Special management designations: WGFD=Wyoming Game and Fish Department, SGCN=Species of Greatest Conservation Need (Wyoming Comprehensive Wildlife Conservation Strategy 2005); USFS, Region2=United States Forest Service, Region 2, R2SS=USFS Region 2 Sensitive Species; USFWS=U.S. Fish and Wildlife Service, BCR10=Bird Conservation Region 10, Region 6=USFWS Region 6 (Mountain-Prairie Region), BCC=Bird of Conservation Concern; PIF=Partners in Flight, BCR10=Bird Conservation Region 10, CC=Continental Concern Species, RC=Regional Concern Species, CS=Continental Stewardship Species, RS = Regional Stewardship Species, WY-PIF=Wyoming Partners in Flight (from the Wyoming Bird Conservation Plan, Version 2.0), WY-I=WY-PIF Level I Priority (Conservation Action), WY-II=WY-PIF Level II Priority (Monitoring); WY-III=WY-PIF Level III Priority (Local Interest).

APPENDIX D

List of all bird species observed during point-count transects in Shoshone NF, with species totals from 2001-2008 and species totals by habitat in 2008.

Common Name ¹	Total # of individuals observed per habitat ² , 2008			Total # of individuals observed per year (in all habitats sampled)						
	MC	MG	MR	2002	2003	2004	2005	2006	2007	2008
Canada Goose				6						
Gadwall	1									1
Mallard		1	4	4					7	5
Green-winged Teal				2					1	
Common Merganser	1	1	4	4						6
Chukar						4	2	6	1	
Ruffed Grouse				10	5		1	2		
Greater Sage-Grouse				3			2			
Dusky Grouse				4	2	1	1	3	3	
American White Pelican							1			
Great Blue Heron		1	2					5	1	3
Turkey Vulture			2						1	2
Osprey						1	2	1	1	
Northern Harrier		1						1	2	1
Sharp-shinned Hawk	1		2	1	1		1	2	1	3
Cooper's Hawk	1		1			2	2	3		2
Northern Goshawk	1		1			3	2		1	2
Red-tailed Hawk	3	3	4	4	10	7	10	15	11	10
Ferruginous Hawk									1	
Golden Eagle	1	2	1	2	2	3	1	1	2	4
American Kestrel	9	4		1		3	7	10	5	13
Merlin								1		
Prairie Falcon		2				1	1	1		2
Sora						1	1	1	1	
Sandhill Crane			4			1	5	3	4	4
Killdeer				2		1		4		
Spotted Sandpiper			13	40	50	15	14	20	21	13
Long-billed Curlew					1					
Wilson's Snipe			7	1		1	1	5	1	7
Mourning Dove	3	14	2	5	6	13	4	15	17	19
Great Horned Owl						2	1	2		
Northern Pygmy-Owl							1	1		
Common Nighthawk		1	1			1	4	1	4	2
White-throated Swift						31	4	6		
Calliope Hummingbird			1				4			1
Broad-tailed Hummingbird			1		3	5	1	1	1	1
Rufous Hummingbird					2	1	1			

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008			Total # of individuals observed per year (in all habitats sampled)						
	MC	MG	MR	2002	2003	2004	2005	2006	2007	2008
Belted Kingfisher			1	2	1	2	1		2	1
Williamson's Sapsucker	1			2	3	2		1	2	1
Red-naped Sapsucker		2	7	2	13	15	8	15	10	9
Downy Woodpecker	2		1	1	3			1		3
Hairy Woodpecker	6	2	2	4	7	9	16	10	29	10
American Three-toed Woodpecker		1			3	2	5	2		1
Black-backed Woodpecker									1	
Northern Flicker	20	23	17	11	22	42	50	58	75	60
Olive-sided Flycatcher	6	1		2	6	6	9	10	9	7
Western Wood-Pewee	6	1	14	1	5	7	15	7	20	21
Willow Flycatcher								2		
Least Flycatcher	2			2					2	2
Hammond's Flycatcher	4	1	16	3	39	6	14	13	29	21
Gray Flycatcher	5		3	1	2		1			8
Dusky Flycatcher	25	39	23	12	44	63	86	68	67	87
Cordilleran Flycatcher	1		4	8	10	2	3	1	2	5
Say's Phoebe								1		
Eastern Kingbird									1	
Plumbeous Vireo	1									1
Warbling Vireo	21	52	100	25	54	95	133	69	119	173
Gray Jay			2	4	3	7	6	3	10	2
Steller's Jay				2	3	2	1	2	5	
Clark's Nutcracker	22	15		34	19	57	42	54	73	37
Black-billed Magpie		22	4	13	6	11	11	21	20	26
American Crow	1			1	8		2	5	4	1
Common Raven	11	26	7	15	8	21	20	45	31	44
Horned Lark		10		17	2	8	7	12	24	10
Tree Swallow		3	22	1		1	3	8	1	25
Violet-green Swallow	13	1	68	3	5	29	40	30	17	82
Northern Rough-winged Swallow								4		
Cliff Swallow				12				4	10	
Barn Swallow									1	
Black-capped Chickadee				6	8	1	1			
Mountain Chickadee	41	19	10	87	60	61	81	47	111	70
Red-breasted Nuthatch	38	12	3	27	29	55	58	25	36	53
White-breasted Nuthatch	2	1			1		7	2	4	3
Pygmy Nuthatch									2	
Brown Creeper				2	3	2	1	2		
Rock Wren	2	32	1	48	40	101	62	104	49	35
House Wren	1	4	11	4	26	5	29	5	21	16
American Dipper				10	12	2				
Golden-crowned Kinglet					7	1		1	2	
Ruby-crowned Kinglet	55	23	27	112	70	114	100	85	103	105

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008			Total # of individuals observed per year (in all habitats sampled)						
	MC	MG	MR	2002	2003	2004	2005	2006	2007	2008
Western Bluebird				1						
Mountain Bluebird	12	17	7	10	17	40	90	28	43	36
Townsend's Solitaire	13	2	1	7	8	23	9	19	16	16
Veery				2		2		1	1	
Swainson's Thrush	4		2	3	19	6	3	4	6	6
Hermit Thrush	28	7	13	5	13	57	51	24	50	48
American Robin	53	51	80	88	84	122	150	144	254	184
Gray Catbird					2					
Sage Thrasher		5			9	5	1	14	9	5
American Pipit				1			37			
Cedar Waxwing			1						12	1
Orange-crowned Warbler					4	2	2	1	1	
Virginia's Warbler								1		
Yellow Warbler	4	4	63	18	33	16	24	33	45	71
Yellow-rumped Warbler	45	23	60	105	130	90	87	65	104	128
Ovenbird	2									2
MacGillivray's Warbler	5	2	13	1	7	9	17	9	27	20
Common Yellowthroat			11					3	3	11
Wilson's Warbler			2	33	1	1	1	7	22	2
Western Tanager	18	14	2	1	14	29	16	26	36	34
Green-tailed Towhee	1	32	14	29	38	43	53	40	40	47
Spotted Towhee	1						1	1	1	1
Chipping Sparrow	60	35	45	35	49	53	69	80	80	140
Brewer's Sparrow		105	14	56	49	79	19	98	136	119
Vesper Sparrow	1	93	6	94	91	137	64	88	102	100
Lark Sparrow	7	13		24	9	13	13	6	4	20
Sage Sparrow									1	
Savannah Sparrow		3	9	7	10	19	6	7	3	12
Grasshopper Sparrow								3		
Song Sparrow	3	2	19	93	24	19	15	30	19	24
Lincoln's Sparrow	4	6	31		56	19	13	20	87	41
White-crowned Sparrow	2	15	55	60	27	16	9	26	86	72
Dark-eyed Junco	79	20	19	39	82	132	136	113	227	118
Black-headed Grosbeak	1	1	5	1			5		2	7
Blue Grosbeak					1				2	
Lazuli Bunting		3	5	1	2	2	15	14	12	8
Red-winged Blackbird	3	2	5	1	4	5	4	3	3	10
Western Meadowlark		111		90	134	134	87	121	90	111
Brewer's Blackbird		21	1	1	4	23	18	17	13	22
Common Grackle			5	26			1		8	5
Brown-headed Cowbird		3	1	5	5	4	7		2	4
Bullock's Oriole									1	
Pine Grosbeak							1	2		

MONITORING WYOMING'S BIRDS: 2008

Common Name ¹	Total # of individuals observed per habitat ² , 2008			Total # of individuals observed per year (in all habitats sampled)						
	MC	MG	MR	2002	2003	2004	2005	2006	2007	2008
Cassin's Finch	11	2	1	15	7	14	9	2	14	14
House Finch			1							1
Red Crossbill	1					19		8	10	1
Pine Siskin	66	18	25	11	38	165	128	53	191	109
American Goldfinch		5	3		1		1		5	8
Evening Grosbeak					1					

¹ Common Names are from the A.O.U. Check-list of North American Birds, Seventh Edition (2003).

² Habitats: MC=mid-elevation conifer; MG=montane grassland, MR=montane riparian.