Monitoring Wyoming's Birds: 2006 Field Season Report

Kelly Hutton, Jason Beason, Glenn Giroir, Rob Sparks,
Arvind Panjabi, and David Hanni

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Rocky Mountain Bird Observatory
14500 Lark Bunting Lane
Brighton, CO 80603
303.659.4348
www.rmbo.org
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In Cooperation With:

ROCKY MOUNTAIN BIRD OBSERVATORY

The mission of the Rocky Mountain Bird Observatory (RMBO) is the conservation of birds of the Rocky Mountains, Great Plains, and Intermountain West, and the habitats on which they depend. *RMBO practices a multi-faceted approach to bird conservation that integrates scientific research and monitoring studies with education and outreach programs to bring bird conservation issues to the public and other conservation partners. RMBO works closely with state and federal natural resource agencies, private landowners, schools, and other nonprofit organizations. RMBO accomplishes its mission by working in four areas:*

Research*: RMBO studies avian responses to habitat conditions, ecological processes, and management actions to provide scientific information that guides bird conservation efforts.*

Monitoring*: RMBO monitors the distribution and abundance of birds through long-term, broad-scale monitoring programs designed to track population trends for birds of the region.*

Education*: RMBO provides active, experiential, education programs for K-12 students in order to create an awareness and appreciation for birds, with a goal of their understanding of the need for bird conservation.*

Outreach*: RMBO shares the latest information in land management and bird conservation practices with private landowners, land managers, and resource professionals at natural resource agencies. RMBO develops voluntary, working partnerships with these individuals and groups for habitat conservation throughout the Great Plains and Rocky Mountains.*

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Cover Photos:
Common Nighthawk, Eva Crane, evacrane@wyoming.com, RMBO.

Contact Information:
Kelly Hutton kelly.hutton@rmbo.org
David Hanni david.hanni@rmbo.org
RMBO
14500 Lark Bunting Lane
Brighton, CO 80603
303.659.4348

EXECUTIVE SUMMARY

Birds are excellent indicators of environmental quality and change. In addition, they are one of the most highly visible and valued components of our native wildlife. Monitoring birds provides data needed not only to effectively manage bird populations, but also to understand the effects of human activities on ecosystem and to gauge their sustainability. Because bird communities reflect a broad array of ecosystem conditions, monitoring bird communities at the habitat level offers a cost-effective means for monitoring biological integrity at a variety of scales.

In 2006, Rocky Mountain Bird Observatory (RMBO), in conjunction with its funding partners, the Bureau of Land Management, U.S.D.A. Forest Service (USFS), and the Wyoming Game and Fish Department (WGFD), implemented Year 5 of *Monitoring* Wyoming's Birds (MWB), using a protocol similar to other RMBO monitoring programs as delineated by Panjabi et al. (2001). RMBO designed this program to provide statistically rigorous, long-term trend data for populations of most diurnal, regularly breeding bird species in Wyoming. In the short term, this program provides information needed to effectively manage and conserve bird populations in Wyoming, including the spatial distribution, abundance, and relationship to important habitat characteristics for each species. It also contributes to RMBO's broader landscape-scale breeding-bird monitoring program.

In 2006, RMBO staff conducted 2,453 point counts along 164 transects in six different habitats statewide. We also conducted 488 point counts along 30 transects in four habitats in the Bighorn National Forest, and 357 point counts along 25 transects in 3 habitats in the Shoshone National Forest. New survey sites were added to certain habitats in order to bring the total number of transects in each habitat to initially planned levels, while others were reestablished in more representative habitat.

RMBO staff recorded a total of 192 bird species on statewide transects in the six habitats, many of which were observed on only a few occasions. The habitat-stratified point-transect data provided robust results on 66 species that should be effectively monitored under MWB in at least one of the habitats surveyed this year. We obtained sufficient data on several other species to monitor their populations across habitat types or using the line transect data, although in some cases, these species may be better monitored with additional transects in certain habitats or with alternative techniques. The USFS, Partners in Flight, the United States Fish and Wildlife Service, and the WGFD list many of these as priority species.

We are also 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. 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 identify monitoring programs, integrate information, and conduct analyses on regional datasets that can help inform management decisions.

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INTRODUCTION

Program History

In 2002, the Rocky Mountain Bird Observatory (RMBO), in cooperation with the U.S.D.A. Forest Service (USFS), Bureau of Land Management (BLM), Wyoming Game and Fish Department (WGFD), and the Wyoming Partners in Flight Group (WY-PIF) initiated a statewide program to monitor most breeding landbird populations, entitled Monitoring Wyoming's Birds (MWB). Modeled after Colorado's bird-monitoring program, MWB is structured to obtain count-based data for most diurnal, regularly breeding bird species in the state on a randomized and habitat-stratified basis. Using the Wyoming GAP Analysis Land Cover GIS layer, blocks of habitat (stands) large enough to support a 3.5 km MWB transect were randomly selected within six habitats throughout the state. We also established additional transects in the Bighorn and Shoshone national forests by habitat.

This program, as well as other RMBO monitoring programs, 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, spatial distribution).

Reasons for Monitoring

Much like the canary in the coal mine, birds can be excellent indicators of biological integrity and ecosystem health. Birds comprise a diverse group of niche specialists, 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. Therefore, birds can be useful barometers of environmental change and the sustainability of human activities on ecosystems (Morrison 1986, Croonquist and Brooks 1991, Bureau of Land Management 1998, Hutto 1998, O'Connell et al. 2000, Rich 2002, U.S. EPA 2002, Birdlife International 2003).

The response of bird communities to changes in the environment can be examined at a variety of spatial scales, making bird monitoring a powerful and practical tool for evaluating the broader effects of resource management, conservation and restoration activities, or other environmental changes. Because birds are generally abundant, conspicuous, and relatively easy to identify, their monitoring offers tremendous logistical and economic advantages over that of other taxonomic groups. Also, birds are popular with the public, and there is strong and growing interest, both nationally and internationally, to manage and conserve bird populations, many of which are exhibiting long-term population declines (Sauer et al. 2003).

Aside from serving as indicators, birds are a tremendous economic resource in and of themselves. A recent federal economic report found that 46 million birdwatchers across America spent $32 billion in 2001 on bird watching and related activities (USFWS 2003). This spending generated $85 billion in overall economic output and $13 billion in federal and state income taxes, and supported more than 863,000 jobs. In addition to being an economic attraction, birds pollinate flowers, disperse seeds, and consume pests of ecologically and economically important plants, thereby providing ecosystem services worth many billions of dollars. Declines in bird populations diminish a valuable economic resource that could have profound negative implications for regional and local economies, both directly and indirectly.

In order for birds to be conserved on a global scale, people in all areas must assume responsibility to conserve the species and habitats for which they are stewards, and population monitoring forms the backbone of avian conservation. To date, resource managers have relied on data derived from the Breeding Bird Survey (BBS) for bird-population information. The BBS, however, is a road-based, volunteer-dependent survey that does not effectively sample many species or habitats (Robbins et al. 1993, Sauer 1993) and does not reliably decipher population trends at small geographic scales (e.g., statewide; Sauer 2000). Furthermore, the design and implementation of the BBS are such that results generated from these efforts are often inconclusive due to the difficulty associated with interpreting index counts (Sauer 2000) and numerous confounding variables (e.g., observer bias) (Robbins et al. 1986, Bohning-Gaese et al. 1993, Sauer et al. 1994, James et al. 1996, Thomas 1996). For these reasons, BBS data generally are insufficient to guide local or regional management decisions.

Without current monitoring data, conservation efforts are likely to be misguided and inefficient. For these and other reasons, monitoring is mandated by legislation such as the National Environmental Policy Act (1969), Endangered Species Act (ESA; 1973), and the Forest Management Act (1976), as well as by various state laws, Forest plans, preserve-management plans, and other long-range plans (Sauer 1993, Manley et al. 1993).

Given the well-publicized declines of many species of North American breeding birds, there is an urgent need for monitoring programs that serve as an “early-warning” system to identify declining species so that natural resource managers can attempt to prevent further declines. RMBO’s monitoring programs are designed to be comparable, repeatable, data rich, long-term, multi-scale, and efficient, so that managers can make informed decisions to effectively conserve birds and their habitats.

Monitoring Objectives

RMBO's Habitat-based Bird Monitoring Program is designed to provide population trend or status data on most regularly occurring breeding landbird species within each program area. 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 framework, we anticipate collecting demographic information and testing *a priori* hypotheses to determine the possible reasons for known declines and to better inform management decisions. Herein we discuss the initial surveillance monitoring framework, the monitoring goals, and progress to date. In the future, with the initial trend information, we will develop and establish the second phase of the program to gather demographic and other information to address specific management issues.

The specific objectives of RMBO's Habitat-based Bird Monitoring Program are:

1.) To integrate existing bird-monitoring efforts in the region to provide better information on distribution and abundance of all breeding-bird species, and especially for species of concern;
2.) to provide basic habitat-association data for most bird species to address habitat-management issues;
3.) to provide long-term trend or status data on most regularly occurring breeding species in the region, with a target of detecting a minimum rate of population change of ±3.0% per year over a maximum time period of 30 years with a statistical significance of p=0.1 and power of 0.8;
4.) to maintain a high-quality database that is accessible to all of our collaborators as well as the public on the Internet in the form of raw and summarized data; and,
5.) to generate decision-support tools, such as population-estimate models, that help guide conservation efforts and provide a better measure of our conservation success.

METHODS

Study Area

Habitats

In 2002, RMBO in coordination with Wyoming Partners in Flight (WY-PIF), selected six high-priority habitats in which to place point-count transects with additional habitats to be added in future years as funding became available. The goal was to place 30 transects in each of the six habitats: aspen, grassland, juniper woodland, mid-elevation conifer, montane riparian, and shrubsteppe. In addition, we established ten transects in each of four habitats (high-elevation conifer, mid-elevation conifer, montane riparian and shrubsteppe) on the Bighorn National Forest. Two statewide transects also fell within montane riparian habitat in the Bighorn National Forest and data from these two transects are included with the results from this habitat for the Bighorn National Forest. We also established ten grassland transects and ten montane riparian transects in the Shoshone National Forest. In addition, ten of the randomly selected statewide mid-elevation conifer transects fell within the Shoshone National Forest and we analyze these transects in the results for the Shoshone National Forest.

Aspen

Aspen habitat (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 the Medicine Bow National Forest along the Colorado border and the southern reaches of the Bridger-Teton National Forest in western Wyoming. GAP code: 4100

Grassland

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

Juniper Woodland

Juniper Woodland habitat (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, along the western foothills of the Bighorn Mountains. GAP code: 42015

Mid-elevation Conifer

Mid-elevation Conifer habitat (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 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 habitat (MR) is associated with higher-elevation (i.e., montane) rivers and streams where willow (*Salix* spp.) is the dominant woody cover. This habitat's transects 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) habitat is dominated by sagebrush (*Artemisia* spp.), greasewood (*Sarcobatus vermiculatus*), saltbrush (*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

One field crew leader and 17 experienced biological technicians with excellent aural and visual bird-identification skills comprised the RMBO staff that executed the field component of MWB in 2006. Each technician also completed a four-day training program at the beginning of the field season to ensure full understanding of the field protocols and to practice bird identification and distance estimation in a variety of habitats. Ten of the technicians also had at least one year of previous experience conducting bird monitoring for RMBO, bringing with them considerable experience with the protocol and knowledge of the local birds.

Site Selection

Stand selection took place using GAP Analysis Land Cover data with secondary ground-truthing during the field season by the technicians. Nathan Nibbelink performed the GIS stand selection through a contract with the Bighorn National Forest. His final report to the Bighorn NF describing the selection process and criteria is available upon request.

For each habitat, we randomly selected 60 stands of at least 100 ha and within one mile of a road. We randomly chose 30 of these stands as study sites, and the remaining 30 stands were held as alternates in case any of the 30 selected stands were unsuitable (i.e., wrong habitat, not accessible, dangerous topography, etc.). In cases where an alternate was not available, the nearest suitable stand was used.

In 2004, because of difficulties locating transects on publicly managed Grassland stands, we opted to place transects along public right-of-ways (i.e., secondary or tertiary roads) regardless of land ownership. This situation also occurred in the Colorado program, an apparently universal dilemma inherent to performing transects in a predominantly privately owned habitat. In 2005, however, we relocated these transects off roads, often on private property, according to the same protocol used for the other habitats.

Point Transect Protocol

RMBO staff conducted point transects (Buckland et al. 1993) in order to sample bird populations in each habitat selected for monitoring. Each transect was surveyed by one observer following protocol established by Leukering (2000) and modified by Panjabi (2006). RMBO technicians conducted all transect surveys in the morning, between ½-hour before sunrise and 11 AM; most surveys were completed before 10 AM. To maximize efficiency, observers located the selected stand on the ground prior to the morning of the survey. For new transects, observers used this pre-survey visit to establish an access point for each stand, and a random distance (between 0-400 m) and bearing from the access point at which the first point count station would be located. On the morning of the survey, the observer began the point transect at the first count station and then continued along the pre-selected bearing for the fourteen remaining points, if possible. In many cases, the pre-selected bearing eventually would lead the transect out of the target habitat, or to some obstruction (e.g., cliff or edge of habitat), forcing the observer to change the bearing of the transect. When this happened, the observer back-tracked to the last point and randomly turned the transect right or left, at an angle perpendicular to the original bearing, and then alternated right or left if additional turns were necessary. In some small or linear stands (e.g., riparian sites), the size and shape of the stand determined the location and course of the transect.

Observers conducted up to 15 five-minute point counts at stations located at 250-m intervals along each point transect, recording all bird detections on standardized forms. Each one-minute interval of every point count was noted on the datasheet so that bird detections were recorded as part of a specific one-minute interval. Flyovers, birds flying over but not using the immediate surrounding landscape, were recorded but excluded from analyses of density. For each bird detected, observers recorded the species, sex, how it was detected (e.g., call, song, drumming, etc.), and distance from the observation point. Whenever possible, observers measured distances using Bushnell® Yardage Pro

500™ laser rangefinders. When it was not possible to measure the distance to a bird, observers used rangefinders to gauge distance estimates by measuring to some closer object. Observers treated the 250-m intervals between count stations as parts of a line transect, and recorded individuals of a short list of low-density species (all grouse, raptors, woodpeckers, and a few other rare or uncommon species) and measured the distance and bearing to each from where it was detected along the transect line. They also recorded bearings and distances to individuals of the same low-density species when they were detected at count stations. Birds initially detected on points that were again detected while moving between points were not included in the line-transect data. However, birds detected between points, but then again during the subsequent point count, were removed from the line-transect data, and included only on the point count.

Beginning in 2004, we considered all non-independent detections of individual birds as part of a 'cluster' together with the first independently observed bird, rather than as separate independent observations. This means that if the detection of an individual bird is dependent upon the previous detection of another individual, both observations are recorded as one detection. We then record a cluster size of *C*, where *C* is the original individual detected plus the sum of any additional individuals detected as a result of the first individual.

Biologists recorded atmospheric data (i.e., temperature in degrees Fahrenheit, cloud cover, precipitation, and wind--Beaufort scale) and the time at the start and end of each transect. They measured distances between count stations using hand-held Garmin® E-trex™ Global Positioning System units. All GPS data were logged in Universal Transverse Mercator (UTM) North American Datum 1927. At each count station, observers recorded UTM coordinates, whether or not the station was within 100 m of a road, and vegetation data, including the structural stage and canopy closure of the forest, mean canopy height, the types and relative proportions of overstory trees, the sub-canopy volume and tree species composition, and the percent coverage and types of shrubs within a 50-m radius of the point. Observers recorded these data prior to beginning each bird count.

Data Analysis

We used DISTANCE (Thomas et al. 2006) to generate density estimates (*D*) using only data collected at point count stations. The notation, concepts, and analysis methods of DISTANCE were developed by Buckland et al. (1993). In DISTANCE analysis, a unique detection function is fit to each distribution of distances associated with a species in a given habitat. Because the detection function is unique to each species in each habitat, DISTANCE analysis avoids some serious problems inherent in traditional analyses of point count data (e.g., unquantifiable differences in detectability among habitats, species, and years). DISTANCE analysis relies on three assumptions, all of which are reasonably well met by MWB: 1) all birds at distance=0 are detected, 2) distances of birds close

to the point are measured accurately, and 3) birds do not move in response to the observer's presence.

In 2006, density estimates were generated only for species for which there was a minimum of 100 detections for all five years of the MWB project (an average of 20 per season) as recorded from count stations in a given habitat (not including flyovers or between-point observations, and prior to truncation or removal of outliers). Because we considered only independent detections in our analyses of density, the number of *observations* (*n*) reported for each species may be lower than the number of *individuals* (*N*) observed. This is especially true for species that tend to associate in groups (e.g., swifts, swallows, crossbills, etc.) Both numbers may be useful, especially for low-density species, and thus both are reported in the "Species Accounts" section. Note however, that in the habitat accounts in the "Results" section, the number of observations reported (*n*) reflects only the number of independent detections *used to estimate density* (i.e., after any truncation or removal of outliers), and may be less than the total number of independent detections or the total number of individuals observed. The total number of individuals recorded in each habitat for each project, including between point detections of low-density species, is provided in Appendix B and Appendix C.

RESULTS

Wyoming Statewide Monitoring

In 2006, our fifth year of statewide bird monitoring in Wyoming, we conducted a total of 2,453 point counts along 164 point-count transects in 6 different habitats (Figure 1). We conducted all transects between 15 May and 20 July (Table 1).

Table 1. Bird sampling periods and effort in Wyoming statewide habitats, summer 2006.

Habitat	Dates sampled	# point-count transects	# point counts
Aspen	11 June – 8 July	25	368
Grassland	25 May – 23 June	28	420
Juniper Woodland	19 May – 12 June	30	450
Mid-elevation Conifer	12 June – 12 July	24	347
Montane Riparian	10 June – 20 July	27	418
Shrubsteppe	15 May – 10 June	30	450
All Habitats	**15 May – 20July**	**164**	**2,453**

We detected a total of 23,748 individual birds of 193 species on statewide point-count transects (Table 2). Sixty-three species were detected in sufficient numbers to estimate density in at least one habitat.

The total number of species detected in each habitat in 2006 ranged from 117 in Montane Riparian to 80 in Shrubsteppe (Table 2). Of the six statewide habitats surveyed in 2006, the species richness (average number of species detected per point-count and per transect) was greatest in Aspen, and least in Shrubsteppe and Grassland (Table 2). While these numbers represent the richness of species that may be found in each habitat, we would like to note that some species were largely peripheral to the habitat from which they were detected. Thus, species richness as we present it in this report does not necessarily indicate that all of the species or individuals were actually using the habitat from which they were detected.

Table 2. Bird totals and species richness in habitats surveyed on Wyoming statewide transects, summer 2006.

Habitat	# birds detected	Avg. # birds per point	# species detected	Avg. # species per point	Avg. # species per transect
Aspen	3,947	11	105	8.3	32
Grassland	5,515	13	86	4.1	14
Juniper Woodland	4,016	8.9	104	6.1	23
Mid-elevation Conifer	2,829	8.1	90	6.1	26
Montane Riparian	3,733	8.9	117	6.9	29
Shrubsteppe	3,708	8.2	80	4.0	14
All Habitats	**23,748**	**9.7**	**193**	**5.9**	**22**

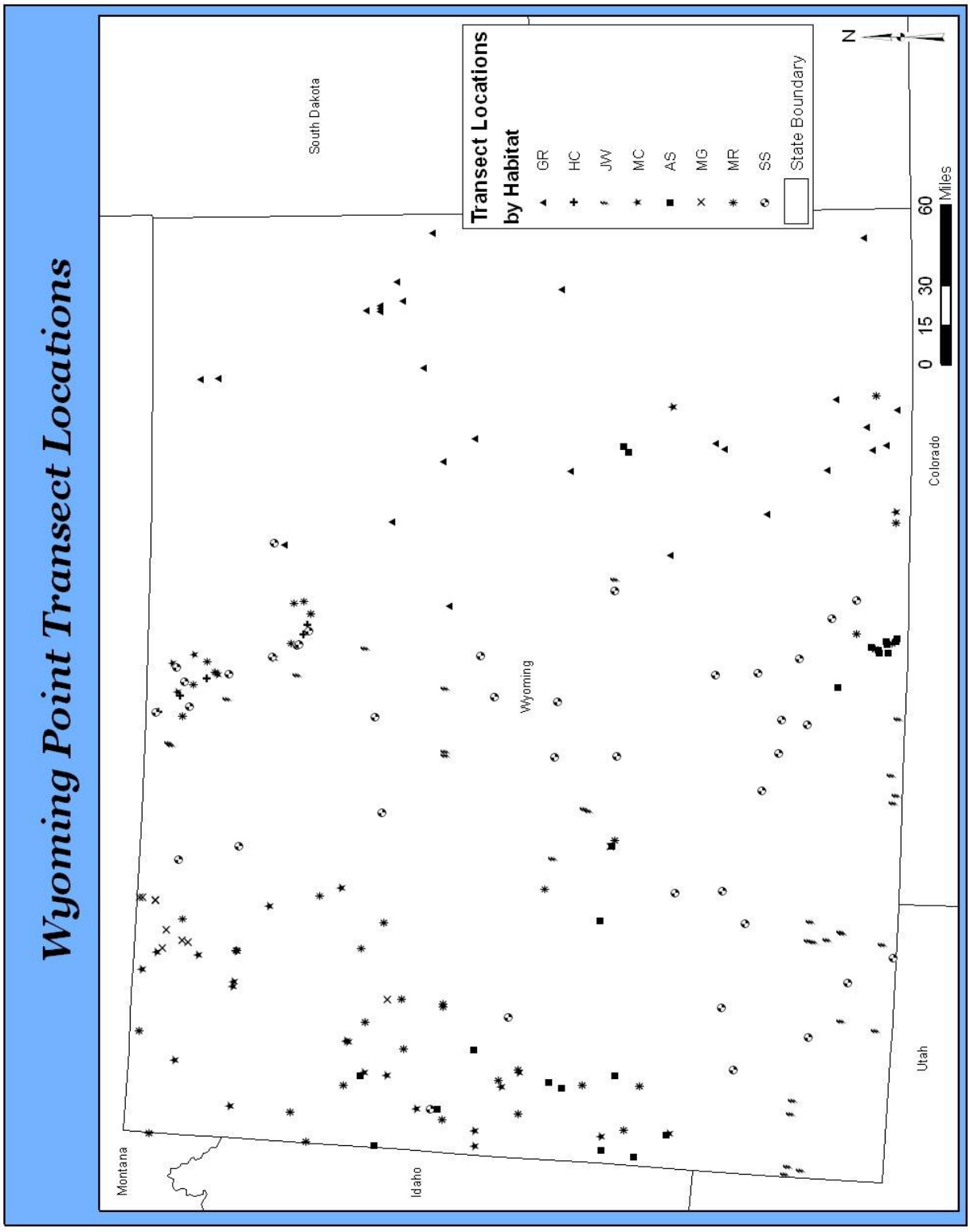

Figure 1. RMBO point-transect locations in Wyoming, 2006.

Aspen (AS)

We conducted 368 point counts along 25 transects in Aspen between 11 June and 08 July 2006 (Table 1). We detected a total of 3,947 individual birds, with an average of 11 birds per point count (Table 2). We detected a total of 105 species with an average of 8.3 species per point count and 32 species per transect (Table 2).

The point-count transect data from Aspen yielded robust density estimates (CV<50%) for 27 species and a moderately robust estimate (CV=50-75%) for one additional species (Table 3). We should be able to effectively monitor these 28 species, which represent 27% of all species detected in Aspen.

Dark-eyed Junco, American Robin, Warbling Vireo, House Wren, and Pine Siskin had the highest estimated densities of all species detected in Aspen (listed in order of highest to lowest density). Fourteen species – Red-naped Sapsucker, Northern Flicker, Western Wood-Pewee, Dusky Flycatcher, Warbling Vireo, Tree Swallow, Black-capped Chickadee, Mountain Chickadee, Red-breasted Nuthatch, House Wren, American Robin, Orange-crowned Warbler, Green-tailed Towhee, and Brown-headed Cowbird – had higher estimated densities in Aspen relative to the other five statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed Aspen provides optimal habitat for these species in Wyoming.

Table 3. Estimated densities of breeding birds in Aspen habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Mourning Dove	2002	1.1	0.6	2.3	44	12
	2003	1.1	0.6	1.9	36	12
	2004	6.4	3.3	13	41	51
	2005	2.2	1.2	4.3	40	24
	2006	5.7	3.7	9.0	27	58
Broad-tailed Hummingbird	2002	26	14	49	38	10
	2003	47	25	89	39	19
	2004	83	50	138	31	32
	2005	69	39	123	35	27
	2006	65	37	113	34	24
Red-naped Sapsucker	2002	11	5.3	22	44	15
	2003	16	8.5	28	37	23
	2004	47	31	70	25	65
	2005	27	17	43	28	39
	2006	39	23	65	31	53
Northern Flicker	2002	4.7	2.2	9.9	46	27
	2003	7.5	4.8	12	27	46
	2004	12	8.7	17	21	71
	2005	14	9.5	19	21	80
	2006	23	17	31	19	126

Table 3 cont. Estimated densities of breeding birds in Aspen habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Western Wood-Pewee	2002	8.2	5.3	13	26	56
	2003	4.3	2.8	6.5	25	31
	2004	12	8.1	17	21	80
	2005	12	7.7	19	26	84
	2006	16	11	23	22	104
Dusky Flycatcher	2002	29	18	46	28	78
	2003	13	7.7	23	33	38
	2004	32	21	48	25	86
	2005	38	25	58	25	105
	2006	39	27	55	21	101
Warbling Vireo	2002	74	48	113	25	161
	2003	75	57	99	16	175
	2004	161	137	188	10	345
	2005	154	129	183	10	344
	2006	141	114	175	13	299
Tree Swallow	2002	11	5.9	22	41	23
	2003	22	12	38	34	46
	2004	3.6	1.5	8.5	54	14
	2005	12	6.2	24	42	23
	2006	22	10	46	47	32
Black-capped Chickadee	2002	17	8.7	34	42	55
	2003	1.2	0.3	4.6	95	4
	2004	3.7	1.6	8.9	55	11
	2005	6.1	2.7	14	52	20
	2006	7.3	3.1	17	54	22
Mountain Chickadee	2002	33	21	54	29	79
	2003	35	25	50	21	89
	2004	42	29	61	22	100
	2005	34	25	45	17	82
	2006	40	28	59	22	84
Red-breasted Nuthatch	2002	8.9	6.2	13	22	44
	2003	13	9.4	17	18	67
	2004	14	8.8	21	26	66
	2005	13	8.3	21	27	66
	2006	6.7	3.7	12	35	32
House Wren	2002	53	36	77	22	109
	2003	69	51	94	18	153
	2004	115	93	141	12	234
	2005	141	107	187	17	299
	2006	101	75	135	18	201
Ruby-crowned Kinglet	2002	33	24	45	19	132
	2003	31	22	45	22	134
	2004	33	24	45	18	134
	2005	34	24	48	20	141
	2006	21	15	29	19	83
Mountain Bluebird	2002	14	6.9	30	45	30
	2003	14	8.5	21	28	30

Table 3 cont. Estimated densities of breeding birds in Aspen habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Mountain Bluebird cont.	2004	24	15	39	30	46
	2005	12	7.0	21	34	26
	2006	28	16	50	35	54
Hermit Thrush	2002	2.2	1.3	3.9	34	34
	2003	1.0	0.5	1.8	39	16
	2004	3.6	1.9	6.8	39	56
	2005	4.2	2.6	6.7	29	66
	2006	3.1	1.8	5.4	33	47
American Robin	2002	63	48	82	16	149
	2003	69	57	84	12	175
	2004	98	80	119	12	230
	2005	91	75	111	12	223
	2006	164	135	199	12	365
Orange-crowned Warbler	2002	3.9	1.6	9.7	57	13
	2003	3.9	2.0	7.9	43	14
	2004	10	5.3	19	40	34
	2005	18	11	29	28	63
	2006	17	11	26	26	55
Yellow Warbler	2002	16	6.5	41	58	27
	2003	20	8.1	49	57	35
	2004	19	11	31	31	31
	2005	23	14	38	30	38
	2006	27	14	51	39	44
MacGillivray's Warbler	2002	13	7.1	22	34	26
	2003	15	10	22	22	33
	2004	19	13	29	24	40
	2005	25	15	43	31	54
	2006	31	20	46	24	62
Western Tanager	2002	4.8	2.5	9.3	40	25
	2003	5.2	2.7	10	41	29
	2004	13	8.3	19	26	66
	2005	9.8	6.3	15	26	52
	2006	15	10	24	25	78
Green-tailed Towhee	2002	8.7	4.8	16	36	36
	2003	9.2	5.1	17	36	41
	2004	18	12	26	24	73
	2005	25	15	41	31	106
	2006	32	23	45	20	129
Chipping Sparrow	2002	62	39	98	27	76
	2003	40	26	60	25	52
	2004	179	135	237	17	216
	2005	108	71	165	25	135
	2006	44	31	62	20	50
Brewer's Sparrow	2002	2.8	1.0	8.2	69	9
	2003	13	5.8	28	48	43
	2004	21	12	36	33	67
	2005	11	5.3	24	47	37

Table 3 cont. Estimated densities of breeding birds in Aspen habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Brewer's Sparrow cont.	2006	29	16	50	34	88
Vesper Sparrow	2002	2.4	1.0	5.7	55	15
	2003	1.3	0.5	3.9	70	9
	2004	1.4	0.5	4.3	74	9
	2005	5.1	2.6	9.9	41	33
	2006	7.5	3.8	15	42	43
Lincoln's Sparrow	2002	2.9	0.8	10	86	5
	2003	10	5.3	21	43	19
	2004	19	10	37	40	31
	2005	41	20	81	43	71
	2006	32	16	65	43	54
Dark-eyed Junco	2002	125	87	180	22	153
	2003	71	54	93	16	93
	2004	178	141	224	14	202
	2005	134	104	172	15	168
	2006	179	130	246	19	207
Brown-headed Cowbird	2002	4.7	2.0	11	53	17
	2003	3.6	1.6	8.4	53	14
	2004	9.6	5.2	18	39	32
	2005	14	6.9	28	44	51
	2006	7.9	3.8	16	45	28
Pine Siskin	2002	56	30	106	39	55
	2003	21	12	36	33	22
	2004	199	127	312	28	93
	2005	226	152	338	25	130
	2006	73	47	114	27	63

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Grassland (GR)

We conducted 420 point counts along 28 transects in Grassland between 25 May and 23 June 2006 (Table 1). We detected a total of 5,515 birds, with an average of 13 birds per point count (Table 2). We detected a total of 86 species with an average of 4.1 species per point count and 14 species per transect (Table 2).

The point-count transect data from Grassland yielded robust density estimates (CV<50%) for nine species and a moderately robust estimate (CV=50-75%) for four additional species (Table 4). We should be able to effectively monitor these 12 species, which represent 14% of all species detected in Grassland.

Horned Lark, Lark Bunting, 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 relative to the other five statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Grassland provides optimal habitat for these species in Wyoming.

Table 4. Estimated densities of breeding birds in Grassland habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Killdeer	2002	1.2	0.6	2.4	37	15
	2003	1.3	0.8	2.4	33	14
	2004	1.6	1.0	2.6	29	25
	2005	1.8	1.1	2.9	27	26
	2006	2.3	1.4	3.7	29	36
Mourning Dove	2002	0.7	0.3	1.5	43	15
	2003	0.7	0.3	2.0	59	13
	2004	3.5	1.8	6.8	40	46
	2005	1.2	0.6	2.3	39	31
	2006	2.1	0.9	4.7	50	51
Horned Lark	2002	74	36	155	46	304
	2003	92	73	117	13	595
	2004	78	60	102	15	952
	2005	69	48	99	22	995
	2006	63	51	77	12	960
Brewer's Sparrow	2002	26	14	48	37	70
	2003	27	12	62	49	132
	2004	20	11	36	35	245
	2005	13	9.0	20	25	229
	2006	17	10	28	30	194
Vesper Sparrow	2002	4.2	2.2	7.8	38	71
	2003	14	8.8	24	30	115
	2004	9.7	6.5	14	23	229
	2005	7.4	5.5	10	17	263
	2006	8.2	4.7	14	34	171
Lark Bunting	2002	36	22	57	27	345
	2003	52	33	83	26	586
	2004	80	52	124	26	693
	2005	22	13	35	28	459
	2006	52	32	82	27	786
Grasshopper Sparrow	2002	1.8	0.7	4.3	54	14
	2003	3.1	1.6	6.0	39	21
	2004	3.0	1.2	7.3	55	33
	2005	3.4	0.9	11	83	37
	2006	8.2	3.5	19	53	84
McCown's Longspur	2002	9.4	4.6	18	42	71
	2003	11	5.9	23	41	80
	2004	12	6.0	24	43	113
	2005	18	12	28	25	216
	2006	14	7.5	26	38	234

Table 4 cont. Estimated densities of breeding birds in Grassland habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Chestnut-colored Longspur	2002	13	5.8	30	50	74
	2003	17	8.8	35	41	132
	2004	5.7	2.4	13	52	40
	2005	11	4.9	27	54	91
	2006	6.2	2.8	14	50	104
Red-winged Blackbird	2002	1.4	0.6	3.5	55	21
	2003	2.0	0.6	5.9	68	25
	2004	1.0	0.4	2.3	50	22
	2005	5.1	2.2	11	53	63
	2006	4.1	1.9	8.7	46	70
Western Meadowlark	2002	9.5	6.9	13	18	225
	2003	24	17	34	19	406
	2004	36	27	49	18	1097
	2005	22	18	27	11	1180
	2006	51	41	63	12	1323
Brewer's Blackbird	2002	0.8	0.4	1.8	46	11
	2003	0.5	0.2	1.3	59	6
	2004	2.1	1.1	4.2	41	33
	2005	1.5	0.6	3.5	52	17
	2006	4.4	1.9	9.9	50	54
Brown-headed Cowbird	2002	0.9	0.3	2.3	59	12
	2003	5.7	2.4	13	53	20
	2004	4.5	2.4	8.3	37	39
	2005	3.4	1.9	5.9	34	56
	2006	1.5	0.8	2.8	38	24

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Juniper Woodland (JW)

We conducted 450 point counts along 30 transects in Juniper Woodland between 19 May and 12 June 2006 (Table 1). We detected a total of 4,016 birds, with an average of 8.9 birds per point count (Table 2). We detected a total of 104 species with an average of 6.1 species per point count and 23 species per transect (Table 2).

The point-count transect data from Juniper Woodland yielded robust density estimates (CV<50%) for 22 species and a moderately robust estimate (CV=50-75%) for three additional species (Table 5). We should be able to effectively monitor these 25 species, which represent 24% of all species detected in Juniper Woodland.

Chipping Sparrow, Blue-gray Gnatcatcher, Bewick's Wren, Mountain Bluebird, and Black-throated Gray Warbler had the highest estimated densities of all species detected in Juniper Woodland (listed in order of highest to lowest

density). Thirteen species – Mourning Dove, Gray Flycatcher, Pinyon Jay, Black-billed Magpie, Rock Wren, Bewick's Wren, Blue-gray Gnatcatcher, Mountain Bluebird, Black-throated Gray Warbler, Chipping Sparrow, Vesper Sparrow, Lark Sparrow, and House Finch – had higher estimated densities in Juniper Woodland relative to the other five statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Juniper Woodland provides optimal habitat for these species in Wyoming.

Table 5. Estimated densities of breeding birds in Juniper Woodland habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Mourning Dove	2002	4.5	3.1	6.7	23	74
	2003	9.6	6.5	14	24	94
	2004	5.6	4.2	7.5	17	118
	2005	8.7	6.5	11	17	133
	2006	16	12	22	17	230
Northern Flicker	2002	0.7	0.3	1.4	43	12
	2003	0.5	0.2	1.1	41	12
	2004	0.7	0.4	1.3	36	18
	2005	0.9	0.6	1.5	28	25
	2006	1.8	1.2	2.7	24	48
Gray Flycatcher	2002	63	42	94	24	156
	2003	29	21	41	20	142
	2004	35	21	59	30	139
	2005	65	46	92	20	162
	2006	63	46	86	19	288
Dusky Flycatcher	2002	1.6	0.5	4.9	70	4
	2003	2.9	0.9	8.5	70	9
	2004	17	9.6	31	36	61
	2005	10	5.5	21	42	40
	2006	4.2	2.1	8.1	40	16
Pinyon Jay	2002	1.4	0.5	3.4	56	22
	2003	1.6	0.9	3.0	36	33
	2004	5.2	2.1	13	59	30
	2005	3.7	2.0	6.8	37	30
	2006	3.1	1.5	6.4	45	52
Black-billed Magpie	2002	0.8	0.2	2.4	70	17
	2003	8.5	4.7	15	36	31
	2004	3.1	1.7	5.9	38	29
	2005	5.7	3.6	8.8	26	42
	2006	2.2	1.3	3.7	32	56
Common Raven	2002	0.1	0.1	0.4	47	9
	2003	1.2	0.5	2.6	45	22
	2004	0.4	0.2	0.8	38	15
	2005	1.5	0.8	2.7	36	28
	2006	0.2	0.1	0.3	33	26
Horned Lark	2002	2.0	0.7	5.4	61	9
	2003	4.6	1.3	15	81	26
	2004	25	11	57	50	73

Table 5 cont. Estimated densities of breeding birds in Juniper Woodland habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Horned Lark cont.	2005	40	18	85	48	24
	2006	5.3	2.6	10	43	39
Violet-green Swallow	2002	1.9	0.7	5.0	60	17
	2003	4.2	1.0	16	95	49
	2004	3.0	1.4	6.6	48	27
	2005	3.0	1.5	6.2	43	35
	2006	6.7	3.5	12	39	77
Rock Wren	2002	3.6	2.0	6.6	36	58
	2003	4.3	2.9	6.4	24	98
	2004	6.8	3.9	11	34	143
	2005	10	3.8	30	69	132
	2006	7.3	5.4	9.9	18	225
Bewick's Wren	2002	13	7.0	25	38	26
	2003	9.6	5.7	16	31	24
	2004	53	34	84	27	151
	2005	82	58	118	21	245
	2006	91	63	133	22	281
Blue-gray Gnatcatcher	2002	45	28	72	27	38
	2003	38	22	64	31	41
	2004	62	43	89	21	74
	2005	93	71	121	15	118
	2006	94	68	130	19	125
Mountain Bluebird	2002	22	13	36	28	46
	2003	37	27	50	17	98
	2004	58	46	73	14	167
	2005	61	48	78	14	190
	2006	73	60	89	11	227
American Robin	2002	5.1	2.5	10	44	24
	2003	5.0	2.9	8.6	33	42
	2004	28	18	43	26	84
	2005	13	9.1	19	23	60
	2006	5.9	4.0	8.8	23	69
Sage Thrasher	2002	0.8	0.3	1.9	50	5
	2003	3.9	1.8	8.1	44	29
	2004	2.8	1.7	4.7	30	24
	2005	4.2	2.6	6.6	27	37
	2006	1.9	0.8	4.4	51	17
Black-throated Gray Warbler	2002	51	32	82	28	52
	2003	29	17	49	32	38
	2004	45	29	71	26	66
	2005	67	48	94	20	104
	2006	63	41	96	25	101
Green-tailed Towhee	2002	21	13	36	31	111
	2003	15	8.3	29	39	82
	2004	8.6	5.4	14	29	139
	2005	38	23	62	29	131
	2006	13	8.5	22	29	137

Table 5 cont. Estimated densities of breeding birds in Juniper Woodland habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Chipping Sparrow	2002	110	85	143	15	115
	2003	179	137	236	16	241
	2004	224	173	290	15	323
	2005	277	221	346	13	437
	2006	132	106	163	12	215
Brewer's Sparrow	2002	15	9.4	25	30	80
	2003	29	15	58	41	75
	2004	109	74	161	23	216
	2005	125	87	180	21	160
	2006	32	19	53	30	270
Vesper Sparrow	2002	10	5.3	20	40	66
	2003	2.1	1.1	4.0	38	38
	2004	6.7	4.1	10	29	69
	2005	17	9.0	33	40	75
	2006	19	12	28	24	138
Lark Sparrow	2002	7.7	4.0	14	40	23
	2003	7.9	3.8	16	45	30
	2004	7.0	3.1	15	51	24
	2005	4.4	2.2	8.7	42	20
	2006	5.3	2.4	11	49	24
Sage Sparrow	2002	4.6	1.5	13	70	17
	2003	2.0	0.7	6.0	69	7
	2004	2.1	0.8	5.3	55	5
	2005	13	6.0	31	51	18
	2006	4.4	1.5	12	68	47
Western Meadowlark	2002	11	4.7	28	58	60
	2003	2.7	1.6	4.6	31	90
	2004	4.6	2.9	7.4	27	108
	2005	1.8	1.0	3.0	32	101
	2006	3.6	2.2	5.8	29	132
Brown-headed Cowbird	2002	5.4	3.1	9.4	33	39
	2003	12	6.1	27	46	37
	2004	5.5	3.0	10	37	35
	2005	9.5	5.3	17	36	38
	2006	5.9	3.9	8.9	24	61
House Finch	2002	3.1	1.6	6.1	41	25
	2003	3.6	1.4	9.6	61	20
	2004	4.1	1.9	8.5	45	35
	2005	3.7	1.8	7.6	43	26
	2006	21	13	36	30	110

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Mid-elevation Conifer (MC)

We conducted 347 point counts along 24 transects in Mid-elevation Conifer between 12 June and 12 July 2006 (Table 1). We detected a total of 2,829 birds, with an average of 8.1 birds per point count (Table 2). We detected 90 species with an average of 6.1 species per point count and 26 species per transect (Table 2).

The point-count transect data from Mid-elevation Conifer yielded robust density estimates (CV<50%) for 22 species and a moderately robust estimate (CV=50-75%) for one additional species (Table 6). We should be able to effectively monitor these 23 species, which represent 25% of all species detected in Mid-elevation Conifer.

Dark-eyed Junco, Pine Siskin, Chipping Sparrow, American Robin, 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). Thirteen species – Hammond's Flycatcher, Clark's Nutcracker, Common Raven, Ruby-crowned Kinglet, Swainson's Thrush, Hermit Thrush, Yellow-rumped Warbler, Western Tanager, White-crowned Sparrow, Dark-eyed Junco, Cassin's Finch, Red Crossbill, and Pine Siskin – had higher estimated densities in Mid-elevation Conifer relative to the other statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Mid-elevation Conifer provides optimal habitat for these species in Wyoming.

Table 6. Estimated densities of breeding birds in Mid-elevation Conifer habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Northern Flicker	2002	4.8	2.8	8.3	32	15
	2003	5.5	3.2	9.4	32	19
	2004	10	6.7	16	27	38
	2005	16	11	24	23	64
	2006	19	12	29	24	66
Hammond's Flycatcher	2002	4.3	2.1	8.6	42	7
	2003	15	7.2	33	47	28
	2004	7.8	4.0	15	40	15
	2005	17	10	31	34	36
	2006	10	5.4	20	40	19
Dusky Flycatcher	2002	18	8.8	39	47	24
	2003	4.3	2.1	8.4	42	35
	2004	18	11	30	28	54
	2005	12	2.5	56	115	36
	2006	18	11	31	32	61
Warbling Vireo	2002	5.5	2.1	14	60	14
	2003	10	5.8	19	37	58
	2004	17	8.2	34	45	85
	2005	20	13	33	28	54

Table 6 cont. Estimated densities of breeding birds in Mid-elevation Conifer habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Warbling Vireo cont.	2006	13	8.5	20	27	50
Clark's Nutcracker	2002	1.9	1.0	3.5	37	20
	2003	1.1	0.6	2.1	39	19
	2004	3.7	2.3	5.9	28	60
	2005	2.4	1.5	3.8	28	42
	2006	9.5	6.2	14	26	62
Common Raven	2002	1.5	0.8	2.8	37	23
	2003	0.7	0.3	1.5	43	13
	2004	1.4	0.7	2.7	39	25
	2005	0.2	0.1	0.5	48	5
	2006	2.4	1.2	4.7	41	32
Mountain Chickadee	2002	80	60	107	16	187
	2003	39	26	58	23	146
	2004	49	33	73	24	137
	2005	141	111	178	13	192
	2006	30	23	40	16	141
Red-breasted Nuthatch	2002	11	7.6	17	24	92
	2003	7.9	4.8	13	30	78
	2004	26	19	37	20	124
	2005	55	18	163	72	73
	2006	3.1	2.2	4.4	19	43
Ruby-crowned Kinglet	2002	95	70	130	18	191
	2003	66	48	91	19	147
	2004	88	66	116	17	206
	2005	86	68	111	14	215
	2006	68	46	101	23	154
Swainson's Thrush	2002	0.7	0.1	3.2	99	5
	2003	6.1	3.2	11	38	44
	2004	6.5	3.1	13	45	50
	2005	2.7	1.4	5.2	40	22
	2006	3.3	1.8	6.0	36	24
Hermit Thrush	2002	1.9	1.0	3.7	39	22
	2003	1.9	1.1	3.3	32	50
	2004	3.1	2.1	4.6	23	96
	2005	3.1	1.9	4.9	28	95
	2006	4.0	2.6	6.2	26	90
American Robin	2002	55	36	83	24	111
	2003	55	44	70	13	125
	2004	72	55	94	15	170
	2005	86	70	106	12	216
	2006	98	75	128	15	219
Yellow-rumped Warbler	2002	107	78	146	18	258
	2003	58	43	78	17	156
	2004	72	55	94	15	205
	2005	58	47	71	12	175
	2006	75	58	97	15	203
MacGillivray's Warbler	2002	3.4	1.6	7.1	44	7

Table 6 cont. Estimated densities of breeding birds in Mid-elevation Conifer habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
MacGillivray's Warbler cont.	2003	23	12	46	41	53
	2004	14	7.3	27	40	34
	2005	11	6.7	18	30	28
	2006	13	7.2	25	39	31
Western Tanager	2002	19	10	36	38	45
	2003	31	19	49	27	81
	2004	30	19	47	27	82
	2005	9.6	5.9	15	29	28
	2006	29	19	45	25	79
Green-tailed Towhee	2002	1.2	0.5	2.8	52	5
	2003	8.0	4.0	16	42	36
	2004	6.5	3.6	11	35	31
	2005	2.4	1.2	4.4	37	12
	2006	6.6	3.3	13	41	30
Chipping Sparrow	2002	60	41	88	22	57
	2003	50	33	77	25	53
	2004	114	73	177	26	121
	2005	162	109	240	23	187
	2006	105	78	140	17	105
Lincoln's Sparrow	2002	1.4	0.2	8.7	122	3
	2003	8.2	4.0	17	45	31
	2004	14	5.9	35	56	32
	2005	3.5	1.5	8.0	51	22
	2006	6.5	3.7	11	33	44
White-crowned Sparrow	2002	--	--	--	--	0
	2003	23	8.8	61	63	45
	2004	--	--	--	--	0
	2005	10	4.7	24	53	24
	2006	14	5.7	34	58	28
Dark-eyed Junco	2002	124	87	177	20	193
	2003	111	92	135	11	192
	2004	145	111	188	15	253
	2005	119	100	142	10	226
	2006	186	151	228	12	311
Cassin's Finch	2002	59	29	119	43	21
	2003	53	24	114	47	21
	2004	52	21	126	56	17
	2005	199	108	366	37	57
	2006	50	24	103	45	17
Red Crossbill	2002	2.1	0.6	7.0	79	4
	2003	5.7	2.7	12	45	12
	2004	27	13	54	44	24
	2005	47	16	141	71	20
	2006	26	14	46	36	33
Pine Siskin	2002	70	44	113	28	85
	2003	48	33	70	22	63
	2004	174	122	247	21	103

Table 6 cont. Estimated densities of breeding birds in Mid-elevation Conifer habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Pine Siskin cont.	2005	234	173	316	18	143
	2006	106	75	149	20	126
Red Squirrel	2002	10	3.3	36	79	14
	2003	13	6.4	28	46	30
	2004	8.8	3.5	22	59	37
	2005	17	9.9	29	32	69
	2006	7.6	3.6	15	45	34

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Montane Riparian (MR)

We conducted 418 point counts along 27 transects in Montane Riparian between 10 June and 20 July, 2006 (Table 1). We detected a total of 3,733 birds, with an average of 8.9 birds per point count (Table 2). We detected 117 species with an average of 6.9 species per point count and 29 species per transect (Table 2).

The point-count transect data from Montane Riparian yielded robust density estimates (CV<50%) for 25 species and a moderately robust estimate (CV=50-75%) for five additional species (Table 7). We should be able to effectively monitor these 30 species, which represent 26% of all species detected in Montane Riparian.

Yellow warbler, MacGillivray's Warbler, American Robin, Broad-tailed Hummingbird, and Dark-eyed Junco had the highest estimated densities of all species detected in Montane Riparian (listed in order of highest to lowest density). Twelve species – Spotted Sandpiper, Wilson's Snipe, Broad-tailed hummingbird, Willow Flycatcher, Violet-green Swallow, Yellow Warbler, MacGillivray's Warbler, Wilson's Warbler, Savannah Sparrow, Song Sparrow, Lincoln's Sparrow, and Brewer's Sparrow – had higher estimated densities in Montane Riparian relative to the other statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Montane Riparian provides optimal habitat for these species in Wyoming.

Table 7. Estimated densities of breeding birds in Montane Riparian habitat in Wyoming, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Spotted Sandpiper	2002	13	7.0	25	38	42
	2003	17	7.9	35	45	59
	2004	14	6.9	27	41	39
	2005	3.9	1.7	9.0	52	14
	2006	15	8.7	26	33	58

Table 7 cont. Estimated densities of breeding birds in Montane Riparian habitat in Wyoming, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Wilson's Snipe	2002	0.3	0.1	0.8	68	4
	2003	1.2	0.5	2.6	49	19
	2004	1.3	0.6	2.8	48	19
	2005	2.2	1.1	4.5	45	36
	2006	1.2	0.6	2.2	38	20
Broad-tailed Hummingbird	2002	50	23	109	48	27
	2003	76	45	131	33	46
	2004	95	56	162	32	52
	2005	129	81	206	28	79
	2006	84	45	157	38	54
Red-naped Sapsucker	2002	5.8	2.7	13	49	9
	2003	14	7.7	25	37	24
	2004	20	11	37	37	32
	2005	19	10	35	39	33
	2006	19	9.9	37	41	35
Northern Flicker	2002	4.2	2.6	6.8	28	27
	2003	4.9	3.2	7.5	26	35
	2004	6.0	3.9	9.3	26	37
	2005	5.0	3.3	7.4	24	36
	2006	7.6	5.2	11	23	57
Western Wood-Pewee	2002	0.5	0.2	1.3	57	5
	2003	0.9	0.4	2.1	48	10
	2004	0.9	0.4	2.2	53	9
	2005	3.7	2.0	6.8	37	40
	2006	2.0	1.1	3.6	35	23
Willow Flycatcher	2002	4.3	1.7	11	56	13
	2003	3.3	1.5	6.9	46	11
	2004	5.9	3.2	11	37	18
	2005	6.1	2.8	13	47	21
	2006	8.0	3.2	20	59	28
Dusky Flycatcher	2002	11	5.8	22	40	38
	2003	15	10	22	22	57
	2004	31	21	46	23	108
	2005	17	12	26	24	67
	2006	13	8.4	21	28	54
Warbling Vireo	2002	21	11	37	36	33
	2003	24	13	46	39	46
	2004	36	22	59	29	100
	2005	9.1	5.1	16	36	100
	2006	13	7.6	22	32	80
Tree Swallow	2002	14	6.2	33	53	25
	2003	9.3	4.0	22	54	18
	2004	12	5.6	26	49	20
	2005	13	5.7	29	51	17
	2006	9.2	4.1	21	52	14
Violet-green Swallow	2002	9.5	4.4	21	47	18
	2003	4.7	1.8	12	60	10

Table 7 cont. Estimated densities of breeding birds in Montane Riparian habitat in Wyoming, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Violet-green Swallow cont.	2004	21	12	38	36	28
	2005	19	11	31	30	29
	2006	14	8.1	25	35	19
Mountain Chickadee	2002	8.5	4.1	18	47	18
	2003	16	6.9	36	52	37
	2004	25	13	49	43	52
	2005	17	8.4	35	45	40
	2006	18	8.9	35	43	42
House Wren	2002	7.1	2.8	18	60	14
	2003	22	9.8	49	51	48
	2004	13	5.4	29	54	25
	2005	27	13	53	43	59
	2006	11	4.4	26	56	25
Ruby-crowned Kinglet	2002	7.6	4.1	14	38	51
	2003	20	12	32	29	119
	2004	31	20	49	28	150
	2005	23	16	33	21	109
	2006	7.1	4.5	11	27	69
Swainson's Thrush	2002	1.7	0.7	3.8	52	21
	2003	0.6	0.2	1.6	68	8
	2004	0.9	0.4	2.1	49	12
	2005	2.5	1.1	5.5	49	36
	2006	2.5	1.3	4.8	39	38
American Robin	2002	57	41	79	20	135
	2003	82	63	106	16	215
	2004	104	81	132	15	238
	2005	88	68	114	15	234
	2006	129	99	168	16	350
Yellow Warbler	2002	105	63	176	31	141
	2003	65	37	115	34	97
	2004	133	89	197	24	179
	2005	147	94	231	27	223
	2006	179	127	253	21	283
MacGillivray's Warbler	2002	58	29	119	45	29
	2003	38	19	78	45	21
	2004	114	64	202	36	56
	2005	134	75	237	36	75
	2006	158	81	309	42	93
Wilson's Warbler	2002	75	41	138	37	85
	2003	48	33	71	23	61
	2004	58	36	92	28	66
	2005	64	36	114	35	82
	2006	42	25	69	31	56
Western Tanager	2002	22	6.8	68	75	6
	2003	1.2	0.5	2.7	52	8
	2004	3.3	1.8	6.1	38	15
	2005	2.3	1.2	4.3	38	38

Table 7 cont. Estimated densities of breeding birds in Montane Riparian habitat in Wyoming, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Western Tanager cont.	2006	1.6	0.7	3.6	49	19
Green-tailed Towhee	2002	5.5	1.9	16	67	17
	2003	13	8.0	21	28	44
	2004	14	8.8	24	30	43
	2005	17	11	29	31	61
	2006	11	6.5	20	35	42
Chipping Sparrow	2002	13	6.8	25	40	23
	2003	25	15	43	33	49
	2004	43	26	72	31	73
	2005	46	28	75	31	89
	2006	17	12	24	22	35
Brewer's Sparrow	2002	3.4	1.1	10	71	8
	2003	17	7.3	39	52	44
	2004	23	12	44	41	54
	2005	6.4	3.0	13	46	17
	2006	34	15	75	49	90
Savannah Sparrow	2002	1.2	0.4	3.7	76	7
	2003	7.0	2.8	18	59	47
	2004	4.1	1.5	11	65	25
	2005	6.0	1.8	20	80	41
	2006	5.6	2.4	13	55	39
Song Sparrow	2002	157	96	256	29	197
	2003	46	29	73	28	84
	2004	79	51	123	27	113
	2005	92	61	138	25	125
	2006	72	43	119	31	180
Lincoln's Sparrow	2002	38	21	70	37	116
	2003	32	20	50	27	108
	2004	54	36	83	25	160
	2005	36	20	64	35	123
	2006	52	36	74	21	187
Dark-eyed Junco	2002	25	14	43	35	31
	2003	41	21	80	42	57
	2004	75	44	128	33	89
	2005	68	38	120	35	95
	2006	79	44	140	35	108
Brewer's Blackbird	2002	9.6	4.6	20	45	16
	2003	8.1	4.3	15	39	15
	2004	27	13	53	43	25
	2005	16	8.8	31	38	23
	2006	27	13	54	43	38
Brown-headed Cowbird	2002	2.1	0.8	5.4	59	12
	2003	1.4	0.7	2.9	43	9
	2004	4.9	2.2	11	52	23
	2005	4.4	2.2	8.5	41	28
	2006	4.0	1.7	9.6	55	26
Pine Siskin	2002	37	19	72	40	47

Table 7 cont. Estimated densities of breeding birds in Montane Riparian habitat in Wyoming, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Pine Siskin cont.	2003	16	9.5	28	33	47
	2004	125	81	192	26	80
	2005	63	42	97	26	106
	2006	29	17	48	32	65

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Shrubsteppe (SS)

We conducted 450 point counts along 30 transects in Shrubsteppe between 15 May and 10 June, 2006 (Table 1). We detected a total of 3,708 birds, with an average of 8.2 birds per point count (Table 2). We detected 80 species with an average of 4.0 species per point count and 14 species per transect (Table 2).

The point-count transect data from Shrubsteppe yielded robust density estimates (CV<50%) for nine species and a moderately robust estimate (CV=50-75%) for three additional species (Table 8). We should be able to effectively monitor these 12 species, which represent 15% of all species detected in Shrubsteppe.

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). Four species – Horned Lark, Sage Thrasher, Brewer's Sparrow, and Sage Sparrow – had higher estimated densities in Shrubsteppe relative to the other statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Shrubsteppe provides optimal habitat for these species in Wyoming.

Table 8. Estimated densities of breeding birds in Shrubsteppe habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Mourning Dove	2002	0.1	0.1	0.3	60	4
	2003	0.5	0.3	0.8	37	18
	2004	0.9	0.5	1.7	35	32
	2005	0.9	0.5	1.5	34	27
	2006	1.1	0.6	1.8	33	32
Common Raven	2002	0.4	0.1	1.0	63	10
	2003	0.6	0.3	1.3	45	20
	2004	0.7	0.4	1.5	45	22
	2005	1.3	0.5	3.0	57	36
	2006	1.8	0.9	3.6	44	48
Horned Lark	2002	51	38	68	17	236
	2003	74	59	92	13	418

Table 8 cont. Estimated densities of breeding birds in Shrubsteppe habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Horned Lark cont.	2004	112	89	142	14	587
	2005	125	101	155	13	571
	2006	154	122	193	13	845
Rock Wren	2002	0.5	0.2	1.0	43	12
	2003	0.8	0.4	1.6	44	23
	2004	0.6	0.3	1.2	39	19
	2005	1.2	0.6	2.3	43	34
	2006	1.6	0.9	3.0	37	50
Sage Thrasher	2002	5.2	3.8	7.2	19	61
	2003	13	9.6	18	18	186
	2004	13	9.8	17	17	186
	2005	17	13	23	18	238
	2006	27	20	35	16	387
Green-tailed Towhee	2002	3.1	1.0	9.9	77	25
	2003	7.2	3.8	14	39	71
	2004	5.0	2.3	11	49	50
	2005	6.2	2.7	14	52	60
	2006	4.8	2.1	11	50	49
Brewer's Sparrow	2002	87	66	113	16	248
	2003	127	100	161	14	446
	2004	161	131	197	12	550
	2005	163	130	205	14	545
	2006	199	159	251	14	701
Vesper Sparrow	2002	11	7.7	17	23	136
	2003	10	6.6	16	26	151
	2004	14	9.7	20	21	205
	2005	12	8.8	17	19	174
	2006	17	12	24	20	253
Lark Sparrow	2002	8.8	4.6	17	41	34
	2003	7.9	3.9	16	43	37
	2004	5.9	3.0	12	43	26
	2005	7.2	4.0	13	36	33
	2006	1.9	0.6	5.6	73	9
Sage Sparrow	2002	10	4.6	22	48	47
	2003	13	7.4	23	34	75
	2004	17	9.7	28	33	95
	2005	18	11	29	28	102
	2006	26	16	40	27	153
Lark Bunting	2002	5.6	2.5	13	51	87
	2003	0.4	0.1	1.0	66	7
	2004	13	6.0	28	49	183
	2005	1.1	0.4	3.2	67	19
	2006	1.2	0.5	3.1	60	13
Western Meadowlark	2002	2.3	1.1	4.7	45	56
	2003	7.6	4.6	12	30	226
	2004	7.4	4.6	12	29	220
	2005	12	8.0	19	25	354

Table 8 cont. Estimated densities of breeding birds in Shrubsteppe habitat in Wyoming, 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Western Meadowlark cont.	2006	12	7.5	19	28	361

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Bighorn National Forest

In 2006, our fifth year of bird monitoring in Bighorn National Forest, we conducted a total of 448 point counts along 30 point-count transects in 4 different habitats. We conducted all transects between 14 June and 24 July (Table 9).

Table 9. Bird sampling periods and effort in Bighorn National Forest habitats, summer 2006.

Habitat	Dates sampled	# point transects	# point counts
High-elevation Conifer	29 June – 24 July	7	104
Mid-elevation Conifer	1 July – 21 July	6	89
Montane Riparian	26 June – 22 July	8	120
Shrubsteppe	14 June – 13 July	9	135
All Habitats	**14 June – 24 July**	**30**	**448**

We detected a total of 3887 individual birds of 81 species on Bighorn National Forest point-count transects. Twenty-two species were detected in sufficient numbers to estimate density in at least one habitat, and many of those species were detected in sufficient numbers to estimate density in multiple habitats.

The total number of species detected in each habitat in 2006 ranged from 42 in Mid-elevation Conifer to 55 in Montane Riparian (Table 10). Of the four Bighorn habitats surveyed in 2006, the species richness (average number of species detected per point-count and per transect) was greatest in High-elevation Conifer, and least in Montane Riparian (Table 10).While these numbers represent the richness of species that may be found in each habitat, we would like to note that some species were largely peripheral to the habitat from which they were detected. Thus, species richness as we present it in this report does not necessarily indicate that all of the species or individuals were actually using the habitat from which they were detected.

Table 10. Bird totals and species richness in habitats surveyed in Bighorn National Forest, summer 2006.

Habitat	# birds detected	Avg. # birds/point	# species detected	Avg. species per point	Avg. species per transect
High-elevation Conifer	914	8.8	45	5.8	21
Mid-elevation Conifer	747	8.4	42	5.5	20
Montane Riparian	967	8.1	55	5.1	20
Shrubsteppe	1259	9.3	52	5.7	20
All Habitats	**3887**	**8.8**	**81**	**5.5**	**20**

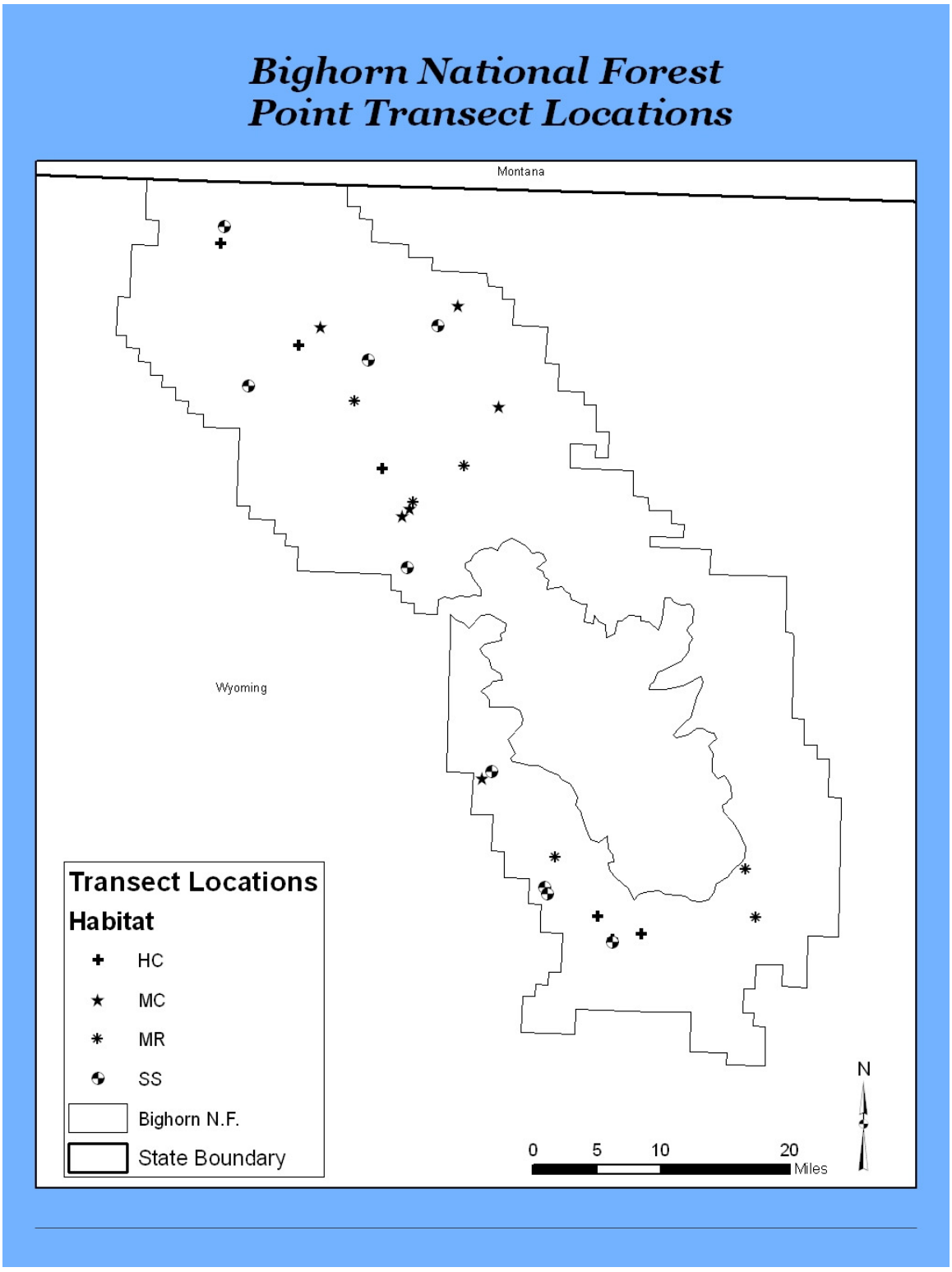

Figure 2. Map of transect locations in the Bighorn National Forest, Wyoming, 2006.

High-Elevation Conifer (HC)

We conducted 104 point counts along 7 transects in High-Elevation Conifer between 29 June and 25 July 2006 (Table 9). We detected a total of 914 birds, with an average of 8.8 birds per point count (Table 10). We detected 45 species with an average of 5.8 species per point count and 21 species per transect (Table 10).

The point-count transect data from High-Elevation Conifer yielded robust density estimates (CV<50%) for 10 species and a moderately robust estimate (CV=50-75%) for one additional species (Table 11). We should be able to effectively monitor these 11 species, which represent 24% of all species detected in High-Elevation Conifer.

Chipping Sparrow, Dark-eyed Junco, American Robin, Yellow-rumped Warbler, and Mountain Chickadee had the highest estimated densities of all species detected in High-Elevation Conifer (listed in order of highest to lowest density). Five species – Ruby-crowned Kinglet, Hermit Thrush, American Robin, Yellow-rumped Warbler, and Chipping Sparrow – had higher estimated densities in High-Elevation Conifer relative to the other three habitats that we surveyed in Bighorn National Forest. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, High-Elevation Conifer provides optimal habitat for these species in Bighorn National Forest.

Table 11. Estimated densities of breeding birds in High-Elevation Conifer habitat in Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Mountain Chickadee	2002	39	29	54	18	74
	2003	72	51	102	20	141
	2004	56	40	77	19	96
	2005	34	24	49	21	62
	2006	33	22	49	22	45
Red-breasted Nuthatch	2002	8.8	4.8	16	35	31
	2003	8.3	4.4	15	37	30
	2004	2.8	1.6	4.6	31	10
	2005	6.0	3.5	10	32	21
	2006	4.8	2.6	8.7	34	12
Ruby-crowned Kinglet	2002	28	21	38	17	104
	2003	37	27	51	18	140
	2004	55	42	72	16	206
	2005	46	35	60	17	167
	2006	23	12	43	34	58
Mountain Bluebird	2002	2.6	1.4	5.0	37	15
	2003	0.7	0.3	1.8	57	4
	2004	7.4	4.2	13	33	39
	2005	5.9	3.2	11	36	31
	2006	4.1	2.1	7.9	36	17

Table 11 cont. Estimated densities of breeding birds in High-Elevation Conifer habitat in Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Hermit Thrush	2002	8.2	5.2	13	25	62
	2003	12	7.2	20	28	93
	2004	11	8.0	16	19	88
	2005	6.7	4.2	11	27	51
	2006	7.0	3.5	14	37	38
American Robin	2002	25	16	37	24	76
	2003	32	25	41	15	102
	2004	47	32	68	21	144
	2005	31	24	42	16	97
	2006	47	30	75	28	82
Yellow-rumped Warbler	2002	27	18	39	22	63
	2003	40	30	55	18	99
	2004	51	39	65	15	124
	2005	52	40	68	15	124
	2006	34	19	58	30	51
Chipping Sparrow	2002	9.9	5.0	20	41	17
	2003	17	9.3	31	35	30
	2004	45	28	72	28	77
	2005	30	17	51	32	51
	2006	56	33	94	31	67
White-crowned Sparrow	2002	2.7	0.7	10	86	16
	2003	3.4	1.8	6.5	38	21
	2004	5.6	2.6	12	44	35
	2005	4.3	1.7	11	54	26
	2006	7.9	2.3	27	72	34
Dark-eyed Junco	2002	43	31	59	18	104
	2003	56	40	79	20	141
	2004	57	44	74	15	137
	2005	57	44	75	16	139
	2006	56	40	79	19	95
Pine Siskin	2002	8.1	4.7	14	33	25
	2003	6.9	2.5	19	61	22
	2004	14	9.0	23	29	42
	2005	12	6.7	21	34	32
	2006	18	10	32	34	34

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Mid-elevation Conifer (MC)

We conducted 89 point counts along 6 transects in Mid-elevation Conifer between 1 July and 21 July 2006 (Table 9). We detected a total of 747 birds, with an average of 8.4 birds per point count (Table 10). We detected a total of 42 species with an average of 5.5 species per point count and 20 species per transect (Table 10).

The point-count transect data from Mid-elevation Conifer yielded robust density estimates (CV<50%) for 10 species and a moderately robust estimate (CV=50-75%) for one additional species (Table 12). We should be able to effectively monitor these 11 species, which represent 26% of all species detected in Mid-elevation Conifer.

Dark-eyed Junco, Mountain Chickadee, Chipping Sparrow, Pine Siskin, 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). Five species – Mountain Chickadee, Red-breasted Nuthatch, Mountain Bluebird, Dark-eyed Junco, and Pine Siskin – had higher estimated densities in Mid-elevation Conifer relative to the other three habitats that we surveyed in Bighorn National Forest. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Mid-elevation Conifer provides optimal habitat for these species in Bighorn National Forest.

Table 12. Estimated densities of breeding birds in Mid-elevation Conifer habitat in the Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Mountain Chickadee	2002	48	30	75	26	84
	2003	68	47	98	21	117
	2004	58	40	84	22	79
	2005	36	21	60	29	55
	2006	54	28	105	36	58
Red-breasted Nuthatch	2002	9.7	6.2	15	26	35
	2003	9.6	7.2	13	17	34
	2004	3.6	2.1	6.1	30	13
	2005	4.3	2.6	6.9	28	15
	2006	6.5	2.9	15	44	14
Ruby-crowned Kinglet	2002	31	23	42	17	147
	2003	37	29	47	15	168
	2004	38	28	51	18	177
	2005	35	27	45	15	159
	2006	16	6.8	39	47	46
Mountain Bluebird	2002	6.3	3.4	12	35	24
	2003	6.4	3.5	12	35	24
	2004	9.5	5.7	16	29	37
	2005	7.0	3.9	13	34	26
	2006	8.8	4.2	18	41	16
Hermit Thrush	2002	7.2	4.2	12	32	36
	2003	7.3	5.3	10	18	102
	2004	3.5	2.0	6.2	32	70
	2005	2.0	1.1	3.5	33	53
	2006	2.2	0.9	5.1	47	35
American Robin	2002	12	7.5	20	28	58
	2003	25	16	38	24	116
	2004	24	15	39	28	115

Table 12 cont. Estimated densities of breeding birds in Mid-elevation Conifer habitat in the Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
American Robin cont.	2005	24	16	37	25	112
	2006	19	13	27	19	53
Yellow-rumped Warbler	2002	23	15	35	25	58
	2003	31	23	42	17	78
	2004	34	25	46	18	87
	2005	41	31	54	16	102
	2006	22	9.1	54	48	34
Chipping Sparrow	2002	10	5.0	20	42	17
	2003	27	11	64	52	45
	2004	33	18	62	37	56
	2005	25	14	44	34	42
	2006	35	16	76	44	33
White-crowned Sparrow	2002	3.6	1.3	9.7	62	10
	2003	11	4.5	24	52	29
	2004	7.8	2.6	24	70	22
	2005	8.4	4.0	18	46	23
	2006	11	4.2	27	55	17
Dark-eyed Junco	2002	67	47	95	21	121
	2003	86	62	120	20	153
	2004	79	54	116	23	141
	2005	96	69	132	19	164
	2006	133	96	185	19	142
Pine Siskin	2002	14	7.7	26	36	34
	2003	11	5.5	21	39	25
	2004	25	11	56	49	47
	2005	11	6.4	19	33	24
	2006	35	20	61	32	42

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Montane Riparian (MR)

We conducted 120 point counts along 8 transects in Montane Riparian between 26 June and 22 July 2006 (Table 9). We detected a total of 967 birds, with an average of 8.1 birds per point count (Table 10). We detected a total of 55 species with an average of 5.1 species per point count and 20 species per transect (Table 10).

The point-count transect data from Montane Riparian yielded robust density estimates (CV<50%) for eight species and a moderately robust estimate (CV=50-75%) for five additional species (Table 13). We should be able to effectively monitor these 13 species, which represent 24% of all species detected in Montane Riparian.

Lincoln's Sparrow, Dark-eyed Junco, Song Sparrow, American Robin, and Chipping Sparrow had the highest estimated densities of all species detected in Montane Riparian (listed in order of highest to lowest density). Six species – Dusky Flycatcher, Warbling Vireo, Wilson's Warbler, Savannah Sparrow, Song Sparrow, and Lincoln's Sparrow – had higher estimated densities in Montane Riparian relative to the other three habitats that we surveyed in Bighorn National Forest. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Montane Riparian provides optimal habitat for these species in Bighorn National Forest.

Table 13. Estimated densities of breeding birds in Montane Riparian habitat in the Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Dusky Flycatcher	2002	--	--	--	--	0
	2003	6.5	3.6	12	34	30
	2004	4.2	2.1	8.7	42	20
	2005	5.3	2.5	11	45	25
	2006	5.4	2.4	12	45	17
Warbling Vireo	2002	20	9.2	41	45	39
	2003	7.5	2.7	21	63	16
	2004	9.2	3.3	25	62	20
	2005	7.8	2.5	25	73	17
	2006	12	4.5	34	59	18
Mountain Chickadee	2002	8.6	4.9	15	33	26
	2003	20	13	31	27	63
	2004	12	6.6	24	38	40
	2005	10	6.0	17	31	32
	2006	22	11	42	37	44
Ruby-crowned Kinglet	2002	21	12	35	32	123
	2003	19	11	33	33	122
	2004	20	13	32	29	131
	2005	12	7.5	20	30	79
	2006	17	8.6	32	39	72
American Robin	2002	32	25	40	13	131
	2003	52	40	69	17	230
	2004	55	41	74	17	233
	2005	40	30	53	17	171
	2006	30	21	44	21	86
Yellow-rumped Warbler	2002	20	8.6	48	53	11
	2003	22	13	37	33	50
	2004	15	8.6	25	31	63
	2005	13	9.1	19	22	58
	2006	24	10	55	51	20
Wilson's Warbler	2002	154	105	226	22	170
	2003	100	71	142	20	118
	2004	87	59	130	23	105
	2005	114	74	174	24	135
	2006	16	7.4	36	44	13
Chipping Sparrow	2002	122	68	219	36	75

Table 13 cont. Estimated densities of breeding birds in Montane Riparian habitat in the Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Chipping Sparrow cont.	2003	76	43	133	34	50
	2004	56	27	118	45	38
	2005	48	25	92	41	31
	2006	27	14	52	41	12
Savannah Sparrow	2002	--	--	--	--	0
	2003	22	11	42	40	78
	2004	15	7.7	29	39	55
	2005	9.5	4.3	21	48	35
	2006	17	6.7	46	56	43
Song Sparrow	2002	123	68	220	35	103
	2003	--	--	--	--	0
	2004	24	7.1	81	77	22
	2005	4.4	2.0	9.5	46	4
	2006	36	9.6	135	81	20
Lincoln's Sparrow	2002	--	--	--	--	0
	2003	153	91	257	31	160
	2004	178	118	269	25	187
	2005	135	86	213	27	139
	2006	167	73	382	48	118
White-crowned Sparrow	2002	14	6.5	28	43	38
	2003	37	21	67	35	111
	2004	18	8.9	36	41	52
	2005	22	13	37	30	66
	2006	22	8.3	57	55	43
Dark-eyed Junco	2002	82	49	136	30	65
	2003	28	18	43	26	125
	2004	29	17	50	33	94
	2005	36	22	60	30	85
	2006	74	31	176	56	136
Pine Siskin	2002	1.9	0.7	5.3	64	7
	2003	8.3	4.1	17	42	33
	2004	21	11	39	39	60
	2005	3.0	1.9	4.8	29	12
	2006	12	5.9	24	40	31

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Shrubsteppe (SS)

We conducted 135 point counts along 9 transects in Shrubsteppe between 14 June and 13 July 2006 (Table 9). We detected a total of 1,259 birds, with an average of 9.3 birds per point count (Table 10). We detected a total of 52 species with an average of 5.7 species per point count and 20 species per transect (Table 10).

The point-count transect data from Shrubsteppe yielded robust density estimates (CV<50%) for 12 species and a moderately robust estimate (CV=50-75%) for four additional species (Table 14). We should be able to effectively monitor these 16 species, which represent 31% of all species detected in Shrubsteppe.

Brewer's Sparrow, White-crowned Sparrow, Vesper Sparrow, Chipping Sparrow, and Dark-eyed Junco had the highest estimated densities of all species detected in Shrubsteppe (listed in order of highest to lowest density). Six species – Northern Flicker, Mountain Chickadee, Green-tailed Towhee, Brewer's Sparrow, Vesper Sparrow, and White-crowned Sparrow – had higher estimated densities in Shrubsteppe relative to the other three habitats that we surveyed in Bighorn National Forest. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Shrubsteppe provides optimal habitat for these species in Bighorn National Forest.

Table 14. Estimated densities of breeding birds in Shrubsteppe habitat in the Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Northern Flicker	2002	1.1	0.6	2.2	40	22
	2003	0.7	0.3	1.3	38	13
	2004	0.9	0.5	1.7	38	17
	2005	0.8	0.4	1.5	40	15
	2006	1.5	0.9	2.8	35	27
Mountain Chickadee	2002	2.3	0.8	6.9	67	22
	2003	2.8	1.4	5.6	41	27
	2004	3.2	2.0	5.1	28	28
	2005	3.2	2.1	4.9	25	30
	2006	1.8	1.1	2.9	27	16
Ruby-crowned Kinglet	2002	2.4	1.2	4.9	41	44
	2003	3.7	2.2	6.3	30	69
	2004	3.7	2.2	6.3	30	69
	2005	3.5	2.3	5.2	23	65
	2006	2.6	1.4	4.6	33	43
Mountain Bluebird	2002	4.4	3.0	6.6	23	23
	2003	6.3	3.5	11	33	33
	2004	4.9	2.8	8.5	32	29
	2005	8.8	5.4	14	28	45
	2006	4.3	2.1	8.4	39	20
American Robin	2002	8.3	5.5	13	23	82
	2003	11	8.1	14	15	105
	2004	10	7.6	13	16	92
	2005	12	9.1	17	18	122
	2006	12	8.9	16	16	105
Yellow-rumped Warbler	2002	8.2	2.7	26	71	32
	2003	6.7	3.5	13	40	26
	2004	5.6	2.8	11	43	22
	2005	13	6.8	24	39	49
	2006	4.0	1.6	10	57	14
Green-tailed Towhee	2002	7.0	3.6	14	39	34

Table 14 cont. Estimated densities of breeding birds in Shrubsteppe habitat in the Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Green-tailed Towhee cont.	2003	12	6.4	24	38	60
	2004	15	9.0	26	30	74
	2005	16	10	24	23	76
	2006	11	5.2	24	43	49
Chipping Sparrow	2002	34	13	92	60	24
	2003	8.3	4.5	15	36	54
	2004	13	6.8	24	37	69
	2005	27	14	51	39	79
	2006	19	8.7	41	47	40
Brewer's Sparrow	2002	21	12	39	35	77
	2003	23	10	52	47	84
	2004	21	13	35	28	78
	2005	15	6.4	37	51	56
	2006	57	37	87	24	187
Vesper Sparrow	2002	74	42	131	33	208
	2003	22	13	36	29	62
	2004	33	21	54	28	92
	2005	31	17	57	35	89
	2006	47	29	76	28	118
Savannah Sparrow	2002	--	--	--	--	0
	2003	5.1	2.6	10	40	34
	2004	3.7	1.3	11	64	24
	2005	4.0	2.0	8.4	43	27
	2006	4.8	2.1	11	50	29
Lincoln's Sparrow	2002	--	--	--	--	0
	2003	2.8	1.4	5.8	42	29
	2004	5.4	3.5	8.3	25	55
	2005	2.0	1.0	3.7	37	20
	2006	3.2	1.3	7.9	53	29
White-crowned Sparrow	2002	27	10	72	62	48
	2003	52	25	109	46	93
	2004	51	24	107	47	90
	2005	53	27	106	43	95
	2006	54	21	139	59	86
Dark-eyed Junco	2002	6.9	2.4	20	65	26
	2003	16	8.4	32	38	62
	2004	16	8.6	28	34	58
	2005	17	11	25	25	63
	2006	17	9.4	32	35	59
Western Meadowlark	2002	3.1	1.3	7.2	51	23
	2003	2.3	1.1	4.5	41	17
	2004	5.8	2.9	12	42	44
	2005	0.9	0.4	2.1	48	7
	2006	7.5	3.3	17	48	51
Pine Siskin	2002	--	--	--	--	0
	2003	1.7	1.0	3.1	33	17
	2004	6.9	3.6	13	38	48

Table 14 cont. Estimated densities of breeding birds in Shrubsteppe habitat in the Bighorn National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Pine Siskin cont.	2005	5.0	2.4	11	44	46
	2006	5.0	2.4	11	43	41

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Shoshone National Forest

In 2006, our fifth year of bird monitoring in Shoshone National Forest, we conducted a total of 357 point counts along 25 point-count transects in 3 different habitats. We conducted all transects between 3 June and 9 July (Table 15).

Table 15. Bird sampling periods and effort in Shoshone National Forest habitats, summer 2006.

Habitat	Dates sampled	# point transects	# point counts
Mid-elevation Conifer	12 June – 9 July	8	114
Montane Grassland	3 June – 29 June	10	141
Montane Riparian	9 June – 6 July	7	102
All Habitats	**3 June – 9 July**	**25**	**357**

We detected a total of 1,921 individual birds of 91 species on Shoshone National Forest point-count transects. Twenty-one species were detected in sufficient numbers to estimate density in at least one habitat, and some of those species were detected in sufficient numbers to estimate density in multiple habitats.

The total number of species detected in each habitat in 2006 ranged from 58 in Montane Riparian to 56 in Montane Grassland (Table 16). Of the three Shoshone habitats surveyed in 2006, the species richness (average number of species detected per point-count and per transect) was greatest in Mid-elevation Conifer and least in Montane Grassland (Table 16).While these numbers represent the richness of species that may be found in each habitat, we would like to note that some species were largely peripheral to the habitat from which they were detected. Thus, species richness as we present it in this report does not necessarily indicate that all of the species or individuals were actually using the habitat from which they were detected.

Table 16. Bird totals and species richness in habitats surveyed in Shoshone National Forest, summer 2006.

Habitat	# birds detected	Avg. # birds/point	# species detected	Avg. species /point	Avg. species /transect
Mid-elevation Conifer	630	5.5	57	4.5	22
Montane Grassland	785	5.6	56	4.1	17
Montane Riparian	528	5.2	58	4.1	19
All Habitats	**1,921**	**5.4**	**91**	**4.2**	**20**

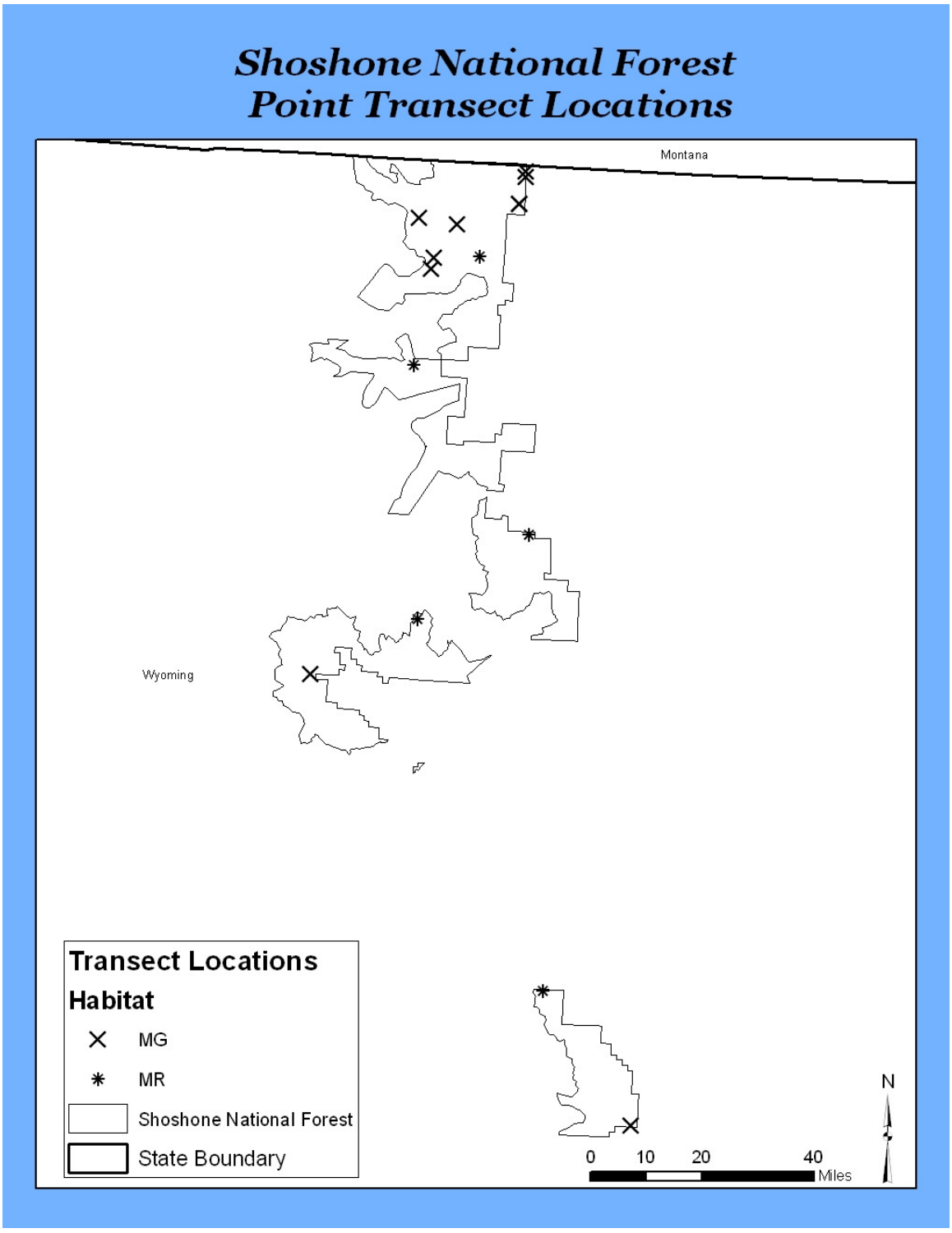

Figure 3. Map of transect locations in the Shoshone National Forest, Wyoming, 2006.

Mid-elevation Conifer (MC)

We conducted 114 point counts along eight transects in Mid-elevation Conifer between 12 June and 9 July 2006 (Table 15). We detected 630 birds, with an average of 5.5 birds per point count (Table 16). We detected 56 species with an average of 4.1 species per point count and 17 species per transect (Table 16).

The point-count transect data from Mid-elevation Conifer yielded robust density estimates (CV<50%) for 11 species (Table 17). We should be able to effectively monitor these species, which represent 19% of all species detected in Mid-elevation Conifer.

American Robin, Hermit Thrush, Yellow-rumped Warbler, Chipping Sparrow, and Ruby-crowned Kinglet had the highest estimated densities of all species detected in Mid-elevation Conifer (listed in order of highest to lowest density). Eight species – Dusky Flycatcher, Clark's Nutcracker, Mountain Chickadee, Red-breasted Nuthatch, Ruby-crowned Kinglet, Hermit Thrush, American Robin, and Pine Siskin – had higher estimated densities in Mid-elevation Conifer relative to the other two habitats that we surveyed in Shoshone National Forest. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Mid-elevation Conifer provides optimal habitat for these species in Shoshone National Forest.

Table 17. Estimated densities of breeding birds in Mid-elevation Conifer habitat in Shoshone National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Dusky Flycatcher	2002	--	--	--	--	0
	2003	2.1	0.5	7.9	85	8
	2004	49	26	91	37	23
	2005	18	9.6	34	38	35
	2006	25	11	55	45	26
Clark's Nutcracker	2002	2.4	1.3	4.7	37	15
	2003	1.7	1.0	3.0	30	9
	2004	4.9	3.0	8.0	28	31
	2005	3.3	1.8	5.8	34	27
	2006	3.3	1.7	6.5	39	17
Mountain Chickadee	2002	7.1	1.5	33	98	56
	2003	1.7	0.3	8.7	106	39
	2004	8.4	4.8	14	34	25
	2005	3.9	2.0	7.6	40	47
	2006	3.4	1.7	6.8	42	24
Red-breasted Nuthatch	2002	11	7.8	17	23	8
	2003	16	10	26	23	25
	2004	17	11	26	23	41
	2005	20	14	29	20	45
	2006	21	13	33	24	12
Ruby-crowned Kinglet	2002	43	26	69	28	57

Table 17 cont. Estimated densities of breeding birds in Mid-elevation Conifer habitat in Shoshone National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Ruby-crowned Kinglet cont.	2003	27	15	50	35	44
	2004	28	16	50	34	59
	2005	19	10	34	36	58
	2006	25	15	44	32	44
Hermit Thrush	2002	4.2	0.9	19	98	1
	2003	12	4.8	31	55	7
	2004	19	6.3	58	71	34
	2005	8.8	4.5	17	40	32
	2006	91	47	174	39	14
American Robin	2002	25	13	49	38	25
	2003	83	51	134	29	30
	2004	77	50	119	26	39
	2005	76	46	125	30	57
	2006	96	53	172	34	44
Yellow-rumped Warbler	2002	4.9	1.0	23	98	46
	2003	21	11	39	32	59
	2004	98	59	163	30	42
	2005	65	32	130	43	39
	2006	44	20	96	43	33
Chipping Sparrow	2002	89	48	165	35	6
	2003	26	11	58	46	23
	2004	47	25	88	37	8
	2005	79	49	128	28	19
	2006	36	18	72	41	30
Dark-eyed Junco	2002	4.1	2.1	8.3	39	20
	2003	15	9.3	25	28	55
	2004	20	11	37	35	64
	2005	17	11	25	24	77
	2006	6.3	3.1	12	40	69
Pine Siskin	2002	36	17	76	46	4
	2003	20	11	34	31	15
	2004	29	14	57	42	37
	2005	21	13	33	26	34
	2006	20	11	37	35	32

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Montane Grassland (MG)

We conducted 141 point counts along 10 transects in Montane Grassland between 3 June and 29 June 2006 (Table 15). We detected 785 birds, with an average of 5.6 birds per point count (Table 16). We detected a total of 56 species with an average of 4.1 species per point count and 19 species per transect (Table 16).

The point-count transect data from Montane Grassland yielded robust density estimates (CV<50%) for eight species (Table 18). We should be able to effectively monitor these species, which represent 14% of all species detected in Montane Grassland.

Brewer's Sparrow, Western Meadowlark, Vesper Sparrow, Rock Wren, and Green-tailed Towhee had the highest estimated densities of all species detected in Montane Grassland (listed in order of highest to lowest density). Six species – Rock Wren, Mountain Bluebird, Green-tailed Towhee, Brewer's Sparrow, Vesper Sparrow, and Western Meadowlark – had higher estimated densities in Montane Grassland relative to the other two habitats that we surveyed in Shoshone National Forest. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Montane Grassland provides optimal habitat for these species in Shoshone National Forest.

Table 18. Estimated densities of breeding birds in Montane Grassland habitat in the Shoshone National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Rock Wren	2002	8.8	4.6	16	36	48
	2003	7.8	3.9	15	39	37
	2004	17	9.2	32	35	91
	2005	9.1	4.9	16	34	45
	2006	14	9.5	20	21	71
Mountain Bluebird	2002	2.4	0.9	6.2	56	8
	2003	2.7	0.9	8.0	63	8
	2004	6.0	2.7	13	46	16
	2005	18	10	32	34	37
	2006	5.7	2.5	12	47	18
American Robin	2002	4.5	2.1	9.9	45	28
	2003	3.0	1.3	7.1	49	16
	2004	3.1	1.3	7.1	48	19
	2005	5.8	2.9	11	38	31
	2006	5.0	2.2	11	49	27
Green-tailed Towhee	2002	7.0	3.0	16	50	22
	2003	10	4.4	22	46	27
	2004	7.0	3.6	13	38	22
	2005	8.9	2.7	28	70	25
	2006	9.5	4.7	19	40	28
Brewer's Sparrow	2002	21	10	45	42	53
	2003	19	9.7	38	39	41
	2004	22	11	43	37	55
	2005	7.2	3.0	17	51	16
	2006	37	21	63	30	86
Vesper Sparrow	2002	30	17	52	31	84
	2003	19	13	27	20	91
	2004	32	24	42	17	122
	2005	10	6.7	17	28	57
	2006	18	12	26	22	71

Table 18 cont. Estimated densities of breeding birds in Montane Grassland habitat in the Shoshone National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Western Meadowlark	2002	17	7.6	38	47	89
	2003	29	13	65	45	134
	2004	21	9.5	49	48	112
	2005	15	7.2	32	43	70
	2006	20	10	39	37	97

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

Montane Riparian (MR)

We conducted 102 point counts along seven transects in Montane Riparian between 3 June and 9 July 2006 (Table 15). We detected 528 birds, with an average of 5.2 birds per point count (Table 16). We detected 58 species with an average of 4.1 species per point count and 19 species per transect (Table 16).

The point-count transect data from Montane Riparian yielded robust density estimates (CV<50%) for five species and a moderately robust estimate (CV=50-75%) for three additional species (Table 19). We should be able to effectively monitor these eight species, which represent 14% of all species detected in Montane Riparian.

American Robin, Song Sparrow, Yellow Warbler, Yellow-rumped Warbler, and Warbling Vireo had the highest estimated densities of all species detected in Montane Riparian. Five species – Spotted Sandpiper, Warbling Vireo, Yellow Warbler, Song Sparrow, and Dark-eyed Junco – had higher estimated densities in Montane Riparian relative to the other two habitats that we surveyed in Shoshone National Forest. If density is assumed to be positively correlated with habitat quality, then of the habitats we surveyed, Montane Riparian provides optimal habitat for these species in Shoshone National Forest.

Table 19. Estimated densities of breeding birds in Montane Riparian habitat in the Shoshone National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Spotted Sandpiper	2002	12	6.4	25	39	27
	2003	23	8.9	62	56	39
	2004	8.4	2.7	26	64	12
	2005	5.6	2.3	13	48	7
	2006	11	3.6	33	63	16
Dusky Flycatcher	2002	13	2.8	59	99	1
	2003	24	11	50	43	23
	2004	36	17	77	42	28
	2005	29	12	69	52	28

Table 19. Estimated densities of breeding birds in Montane Riparian habitat in the Shoshone National Forest, summer 2002-2006[1].

Species	Year	*D*	*LCL*	*UCL*	*%CV*	*n*
Dusky Flycatcher cont.	2006	20	7.6	52	57	26
Warbling Vireo	2002	18	7.4	45	54	19
	2003	59	25	136	50	31
	2004	32	18	57	30	43
	2005	27	14	50	37	57
	2006	27	11	65	50	31
Ruby-crowned Kinglet	2002	22	11	47	42	41
	2003	7.8	3.0	20	59	13
	2004	60	24	150	53	32
	2005	10	5.3	21	41	17
	2006	5.0	1.5	17	79	16
American Robin	2002	24	14	41	31	32
	2003	31	13	73	48	33
	2004	52	27	101	36	49
	2005	47	30	72	23	36
	2006	63	28	143	45	53
Yellow Warbler	2002	33	19	55	30	16
	2003	52	32	83	26	31
	2004	42	24	72	30	12
	2005	41	17	95	45	18
	2006	28	12	65	46	26
Yellow-rumped Warbler	2002	32	19	55	30	42
	2003	52	32	83	26	52
	2004	42	24	72	30	33
	2005	41	17	95	45	31
	2006	28	12	65	46	25
Chipping Sparrow	2002	5.2	2.2	12	51	8
	2003	14	5.8	35	52	17
	2004	26	9.7	70	56	23
	2005	23	11	48	40	20
	2006	24	14	41	31	25
Song Sparrow	2002	98	37	257	57	85
	2003	32	12	86	57	22
	2004	27	10	73	56	16
	2005	9.8	3.0	31	66	5
	2006	37	16	81	44	22
Dark-eyed Junco	2002	12	4	32	58	14
	2003	33	14	74	50	17
	2004	77	39	152	37	40
	2005	12	4.4	33	58	29
	2006	5.6	1.5	21	88	8

[1] *D* = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*.

DISCUSSION AND RECOMMENDATIONS

Prospects for Monitoring Priority Species

The Wyoming Partners in Flight Plan identifies 53 Level II priority bird species for which monitoring is the proposed action (Wyoming Partners in Flight 2003). In 2006, we collected sufficient data to monitor 15 of these species effectively (Broad-tailed Hummingbird, Red-naped Sapsucker, Willow Flycatcher, Hammond's Flycatcher, Gray Flycatcher, Dusky Flycatcher, Rock Wren, Sage Thrasher, MacGillivray's Warbler, Wilson's Warbler, Vesper Sparrow, Lark Sparrow, Lark Bunting, Grasshopper Sparrow, Chesnut-collared Longspur) in at least one habitat. For another 14 species (White-throated Swift, Calliope Hummingbird, Williamson's Sapsucker, American Three-toed Woodpecker, Olive-sided Flycatcher, Cordilleran Flycatcher, Ash-throated Flycatcher, Loggerhead Shrike, Plumbeous Vireo, Juniper Titmouse, Bushtit, Brown Creeper, Golden-crowned Kinglet, and Townsend's Solitaire), using data from all years or the line transect, we anticipate being able to monitor them effectively with a few more years of data. A few of these species, however, would be more effectively monitored by adding transects in certain habitats, especially juniper woodland. Many priority species, including Ash-throated Flycatcher and Western Scrub-Jay would probably be detected in sufficient numbers each year to calculate a density estimate in juniper woodland if transects were added in this habitat. In doing so, we anticipate being able to detect trends for these species in a shorter period of time.

Overall, we are able to monitor the majority of Level II priority bird species that are regularly occurring, diurnal breeding landbirds in the state of Wyoming. A few Level II species are waterbirds, which are not well suited for monitoring with point transects. We could improve our ability to monitor these species by adding wetland transects. In addition, a few Level II species are owls that are not usually active during our survey period, but could be monitored with other techniques, such as nocturnal transects.

Through MWB we also detect several Level I (Conservation Action) and Level III (Local Interest) priority species, as well as many species listed in the Wyoming Comprehensive Wildlife Conservation Strategy, USFS Region 2 Sensitive Species, and USFWS Birds of Conservation Concern. This monitoring program is providing valuable data on the distribution, abundance and habitat association of most regularly-occurring, breeding landbird species in Wyoming, and can be used over time not only to monitor population trends but also to guide management actions and aid conservation efforts.

Overall Prospects for Population Monitoring

The habitat-stratified point transects produced excellent results with low coefficients of variation (≤ 50%) on 66 bird species in at least one habitat surveyed statewide in 2006. We estimated similar results for about half of these same species for each of the National Forest transects. Thus, we should be able to detect habitat-specific population trends for these species within our maximum target of at least 30 years and more likely within 15 years.

We anticipate being able to estimate densities in at least one habitat for at least an additional 20 species, using data from all years or the line transect data with a few more years of data. However, in some cases a species may be better monitored with additional transects in certain habitats. The remaining species, which were detected too infrequently to monitor their populations, fall into one of the following categories:

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 that are 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 survey 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.

For species with large home ranges and high nest-site fidelity, such as Golden Eagle and Prairie Falcon, monitoring could be achieved by locating active nests and visiting a subset during the spring and summer as necessary to evaluate the outcome of each. Nests would first be located by consulting with local biologists, birders, and other experts, and then as part of the field effort, additional suitable habitat could be searched to locate previously unrecorded nests. Ultimately, the majority of active nests would be included in the monitoring scheme and a random subset would be visited each year to check for occupancy and outcome.

For some low-density but widespread species, such as Northern Goshawk, a brief call-response survey could be used to detect the presence of this or other similar species across the areas already covered by the habitat-stratified point transects. A high-powered, yet easily portable playback system would be required for each observer, but otherwise, relatively few additional expenses would be incurred. RMBO successfully implemented such a study in 2006 for the USFS in several National Forests throughout Colorado, Wyoming, and the Black Hills.

Because of the already extensive point-transect effort undertaken each year, implementing additional field techniques to target other high-priority species can be done cost-effectively. Rocky Mountain Bird Observatory is open to discussing these options with our Wyoming partners.

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APPENDIX A. SPECIES ACCOUNTS

In this section we present one-page accounts for each bird species detected in 2006 that is of management interest, as designated by either the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Wyoming Game and Fish Department, or Partners In Flight. Each of these organizations has a stake in maintaining healthy populations of birds in Wyoming. For the U.S. Forest Service, we include designations for Region 2 Sensitive Species (R2SS). For the U.S. Fish and Wildlife Service, we include designations for Birds of Conservation Concern for Bird Conservation Region 17 (BCR17; USFWS 2002). For the Wyoming Game and Fish Department, we include designations for State Threatened or Endangered Species and Species of Greatest Conservation Need. For Partners In Flight we include designations from the Partners In Flight Species Assessment Database for Bird Conservation Region 17, (PIF Species Assessment Database 2005), and the Wyoming Partners In Flight Bird Conservation Plan (2003; this designation included only for Level I and II priority species).

The geographic distribution maps in the following accounts depict the locations and relative abundance of species of management interest that were detected on point transects in 2006. The relative abundance scale used in the maps is based on the number of points *along each transect* where the species was detected. It should also be noted that the location of the dots do not indicate the precise location of the point at which the species was observed, but rather the access point of the transect on which the species was observed. It is important to keep in mind that the maps only reflect the abundance and distribution of the species across the sites we surveyed, and should not necessarily be construed to suggest anything about the areas in between.

In each table we provide two numbers pertaining to the number of observations for each species: *N, the number of individuals observed,* and *n, the number of independent observations for each species*. These numbers may be different as often several individuals are detected in a single observation, as when birds are in a flock. While the number of individuals observed is often of interest, especially for rare species, density estimates are derived using only independent observations. It should also be noted that the number of individuals observed (N) includes flyovers and between point detections. This explains why the total number of birds in Appendix A is greater than the totals in Table 2.

In order to calculate the total number of birds detected for each species, we did not include the two transects on the Bighorn National Forest in montane riparian habitat that are part of the statewide transects in the *N* for this habitat. Also, we report the N for Shoshone National Forest mid-elevation conifer transects but these are not added into the total detections for that species, since these are the same transects as the statewide transects and thus the same birds.

In the summary, we included a brief description of the breeding habitat, other pertinent information, and an evaluation of our ability to monitor the species under MWB. Unless otherwise noted, the breeding information for each species was obtained from the WY-PIF Wyoming Bird Conservation Plan (Nicholoff 2003). If we had enough detections to calculate a density estimate for the species and the coefficient of variation (*CV*) was 0.50 or less, we assumed that we will be able to effectively monitor the species and detect a population trend (a change of 3.0% per year) in at least 30 years. We are also currently exploring the nine years of data we have for Colorado. Our preliminary findings indicate that the power to detect a trend for many species increases by using the line transect data. Therefore, we recommend continuing to record low-density species along transects between points because of the improved precision of density estimates at essentially no additional cost to monitoring programs.

Greater Sage-Grouse
(*Centrocercus urophasianus*)

USFS Region 2 Sensitive Species
WY-PIF Level I Priority Species
WGFD Species of Greatest Conservation Need

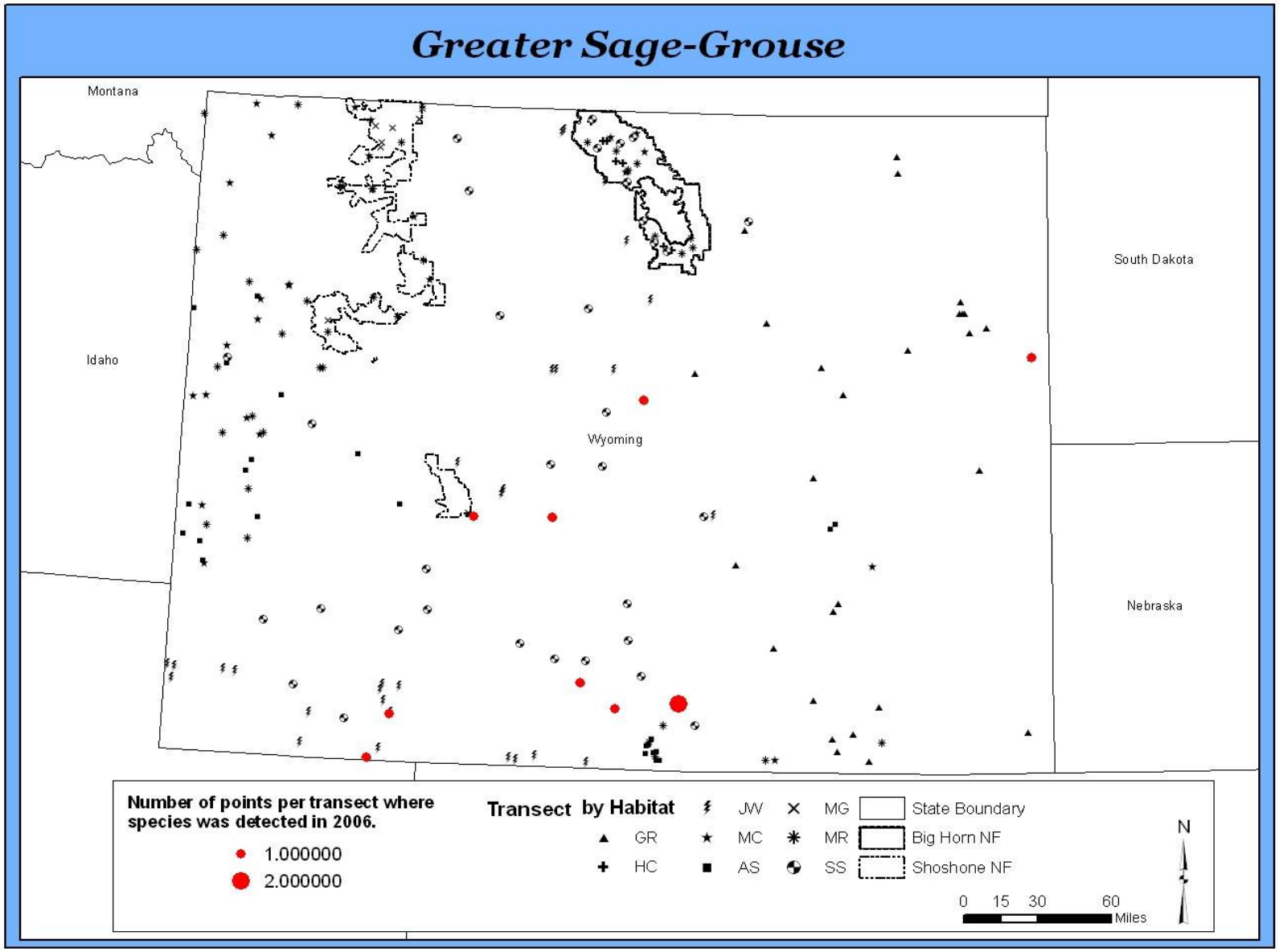
The Greater Sage-Grouse inhabits large, contiguous areas of sagebrush, often where tall grass is present within the sagebrush for nesting. In 2006, we detected 77 Greater Sage-Grouse in five habitats on MWB. Sixty-two detections were from shrubsteppe transects: SS12, SS32, SS34, SS44 and SS56. Thirty-two of these detections were on SS12 and 27 detections were on SS34. Of note, we also detected this species on SS44 in 2005.

This monitoring project does not target the Greater Sage-Grouse or any gallinaceous birds, all of which are game species in Wyoming and whose populations are monitored by the WGFD. Although we do regularly detect this species on point transects, it is usually between point counts during the line transect portion of the survey. Using the line transect data though or conducting separate surveys earlier in the spring, we may be able to improve our power to detect a trend for this species in at least shrubsteppe and grassland habitats.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Greater Sage-Grouse on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	2	8
WY-GR	ID	--	--	--	2	3
WY-JW	ID	--	--	--	1	1
WY-MR	ID	--	--	--	1	3
WY-SS	ID	--	--	--	8	62

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Greater Sage Grouse on transects in Wyoming, 2006.

Dusky Grouse
(Dendragapus obscurus)

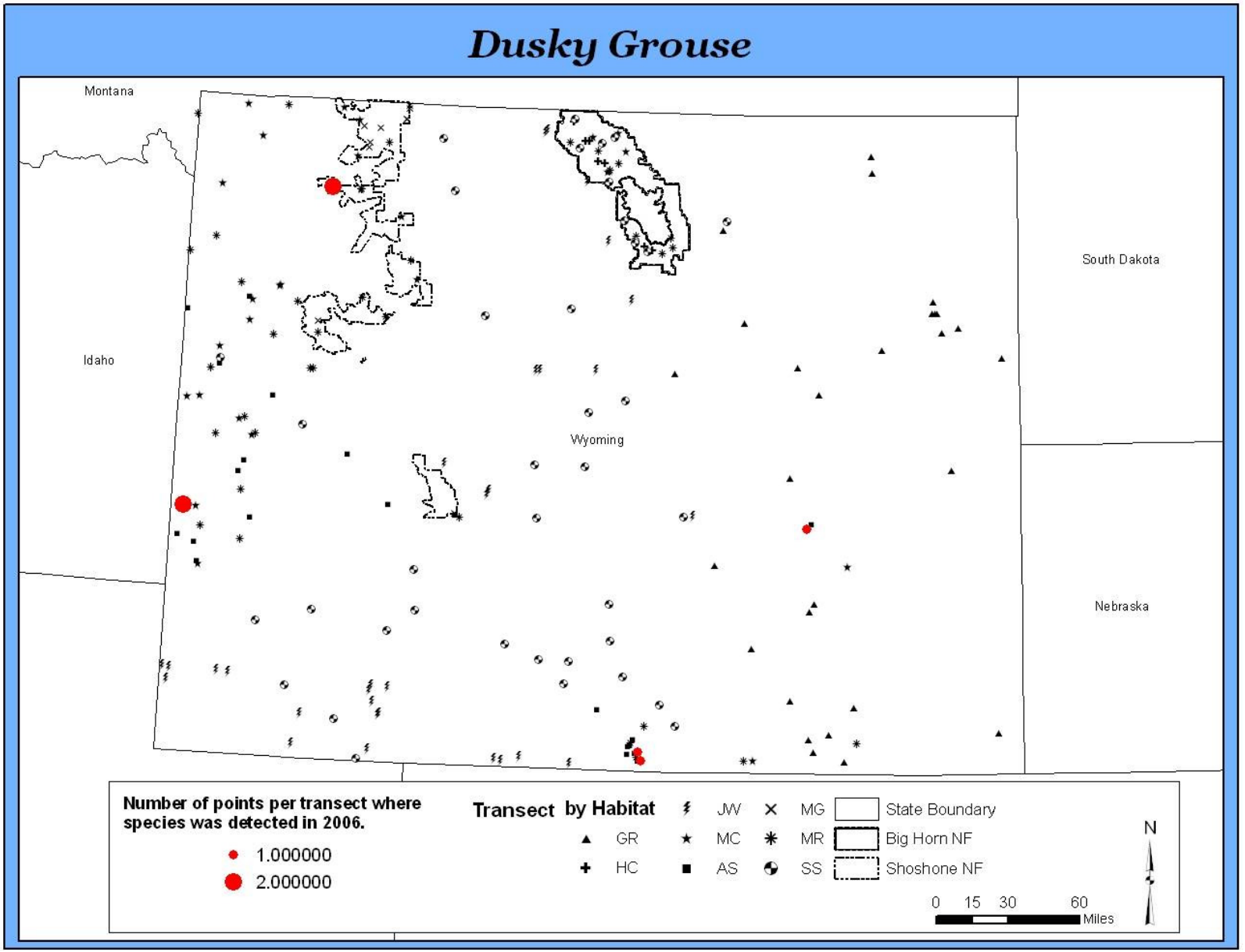
WY-PIF Level III Priority Species

The Dusky Grouse can be found in coniferous forests and shrublands at middle elevations in summer. In fall, this species usually moves to higher elevations (Righter et al. 1992). In 2006, we detected six Dusky Grouse in two habitats, aspen and mid-elevation conifer, on MWB. We detect this species in low numbers every year, especially in aspen and mid-elevation conifer habitats. The species is often detected along transects and less frequently at point-count stations. The number of detections of Dusky Grouse is too few to effectively monitor this species under MWB in any one habitat or across habitats. Using the line transect data though, or all of the detections across years, we may be able to improve our power to detect a trend for this species in at least aspen habitat.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Dusky Grouse on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MC**	ID	--	--	--	1	3
WY-AS	ID	--	--	--	3	3
WY-MC	ID	--	--	--	1	3

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = The ten SH-MC transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Dusky Grouse on transects in Wyoming, 2006.

Bald Eagle
(*Haliaeetus leucocephalus*)

WY-PIF Level I Priority Species
WGFD Species of Greatest Conservation Need

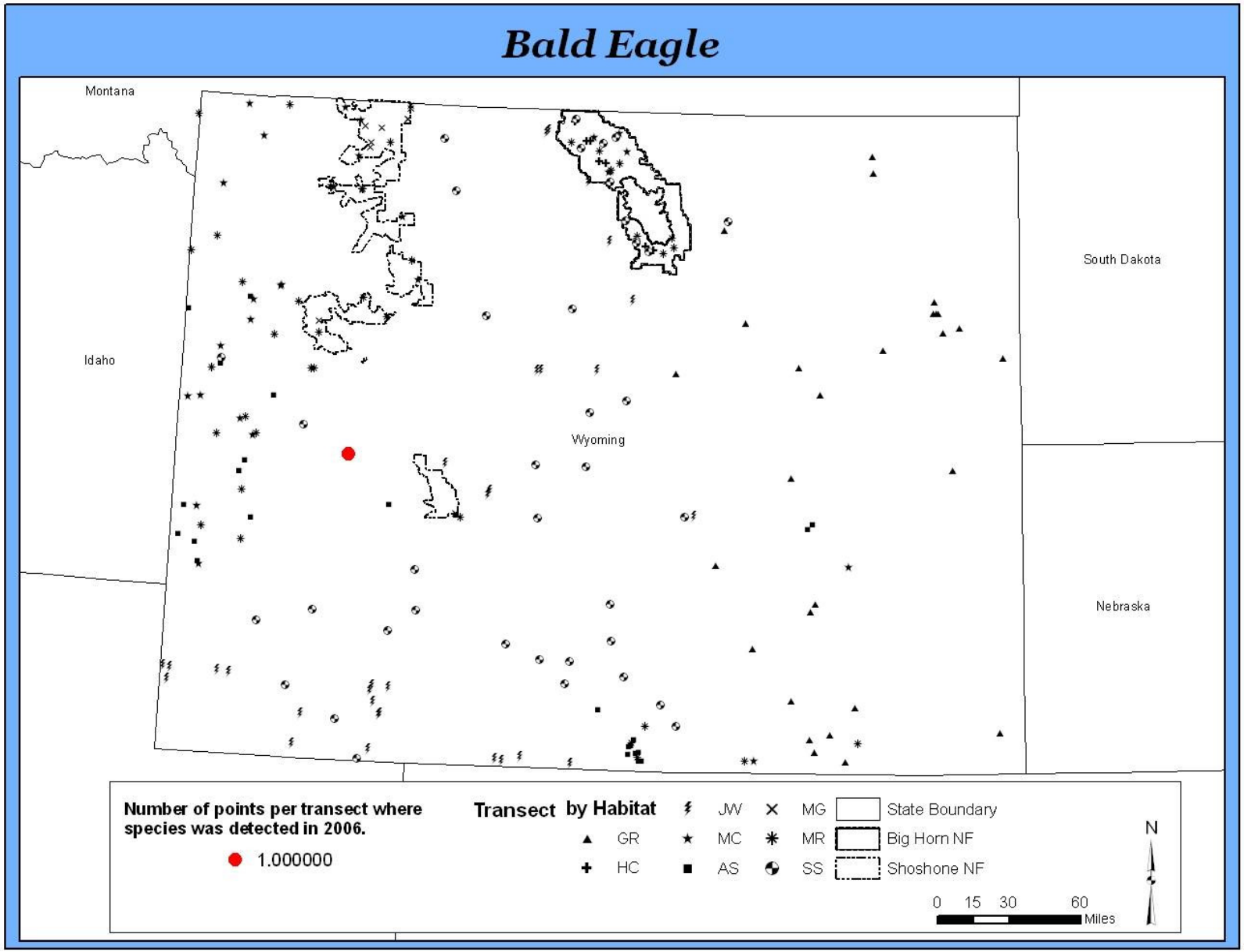
Bald Eagles require large bodies of open water with plentiful fish and tall trees for nesting and roosting. Although this species was once threatened with extinction in the lower 48 states, under the protection of the Endangered Species Act (ESA), it has made a remarkable recovery. In Wyoming, this species has been monitored by many organizations over the last 10 years, including the BLM and the WGFD.

In 2006, we detected one Bald Eagle on an aspen transect. The Bald Eagle, like other raptors, is difficult to monitor under MWB using the point-transect protocol because of its low density and large territory size. Therefore, it is unlikely we will be able to monitor the Bald Eagle in any habitat or across habitats under MWB. Adding wetland transects may improve our ability to monitor this species; however, effective monitoring would likely require a more intensive and focused effort, possibly involving cataloguing nests and checking nest occupancy each year.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Bald Eagle on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Bald Eagle on transects in Wyoming, 2006.

Northern Harrier
(Circus cyaneus)

USFS Region 2 Sensitive Species
WY-PIF Level III Priority Species
USFWS Bird of Conservation Concern

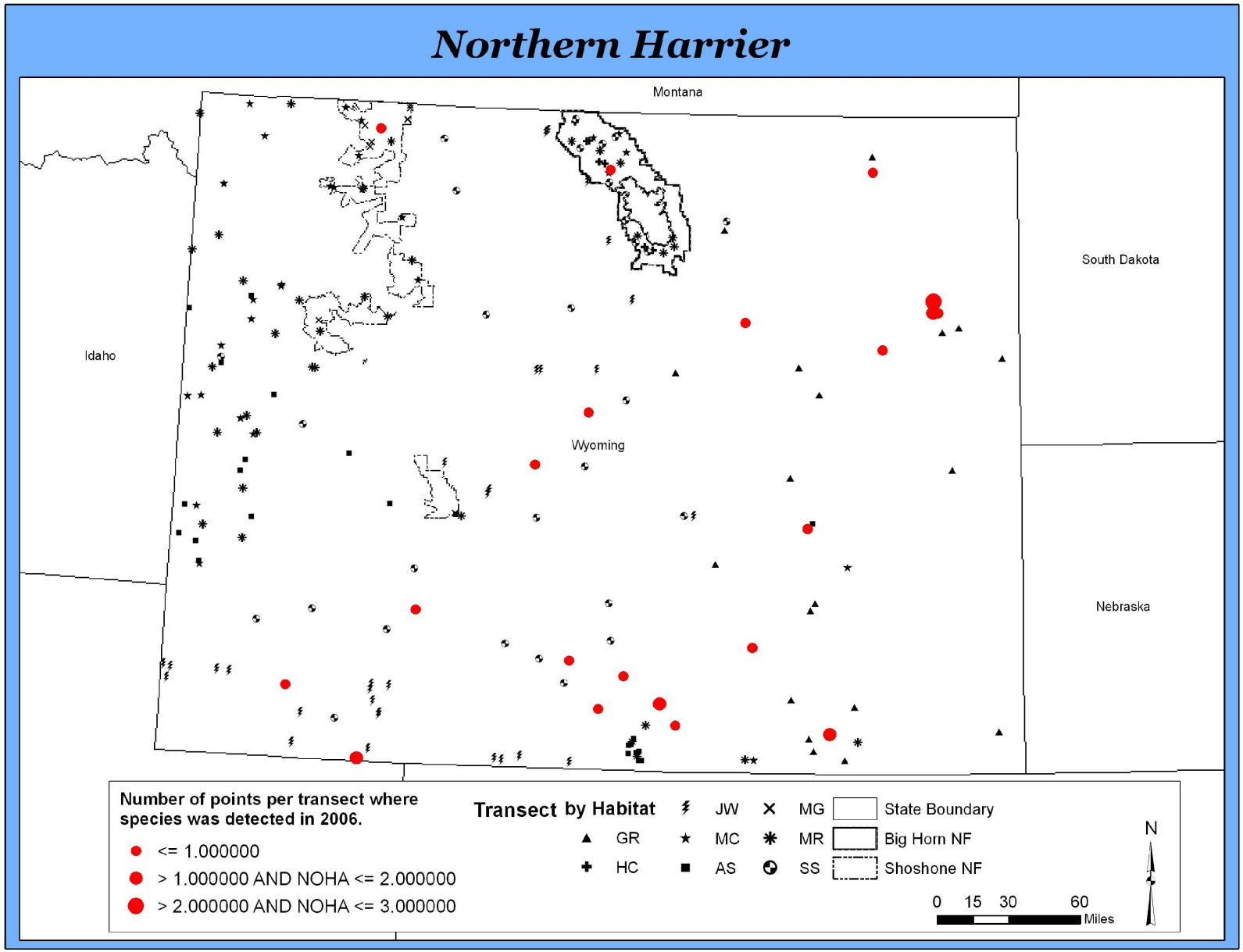
Historically, the Northern Harrier was thought to be one of the most common raptor on the plains. Like many raptor species, harriers declined in the 1970s due to DDT poisoning, and it appears that Northern Harriers continue to decline due to habitat loss, particularly of wetlands (Cornell 2003). In 2006, we detected 32 Northern Harriers in five habitats on MWB.

Like other raptor species, the Northern Harrier is difficult to monitor under MWB using point-transect protocol, because of its low density and large territory size. Using data from all years though, we may be able to calculate a global detection function for this species and thereby generate an annual statewide density estimate that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Northern Harrier on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-MR	ID	--	--	--	1	1
SH-MG	ID	--	--	--	1	1
WY-AS	ID	--	--	--	2	2
WY-GR	ID	--	--	--	13	17
WY-SS	ID	--	--	--	8	11

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Northern Harriers on transects in Wyoming, 2006.

Northern Goshawk
(*Accipiter gentilis*)

USFS Region 2 Sensitive Species
WY-PIF Level I Priority Species
WGFD Species of Greatest Conservation Need

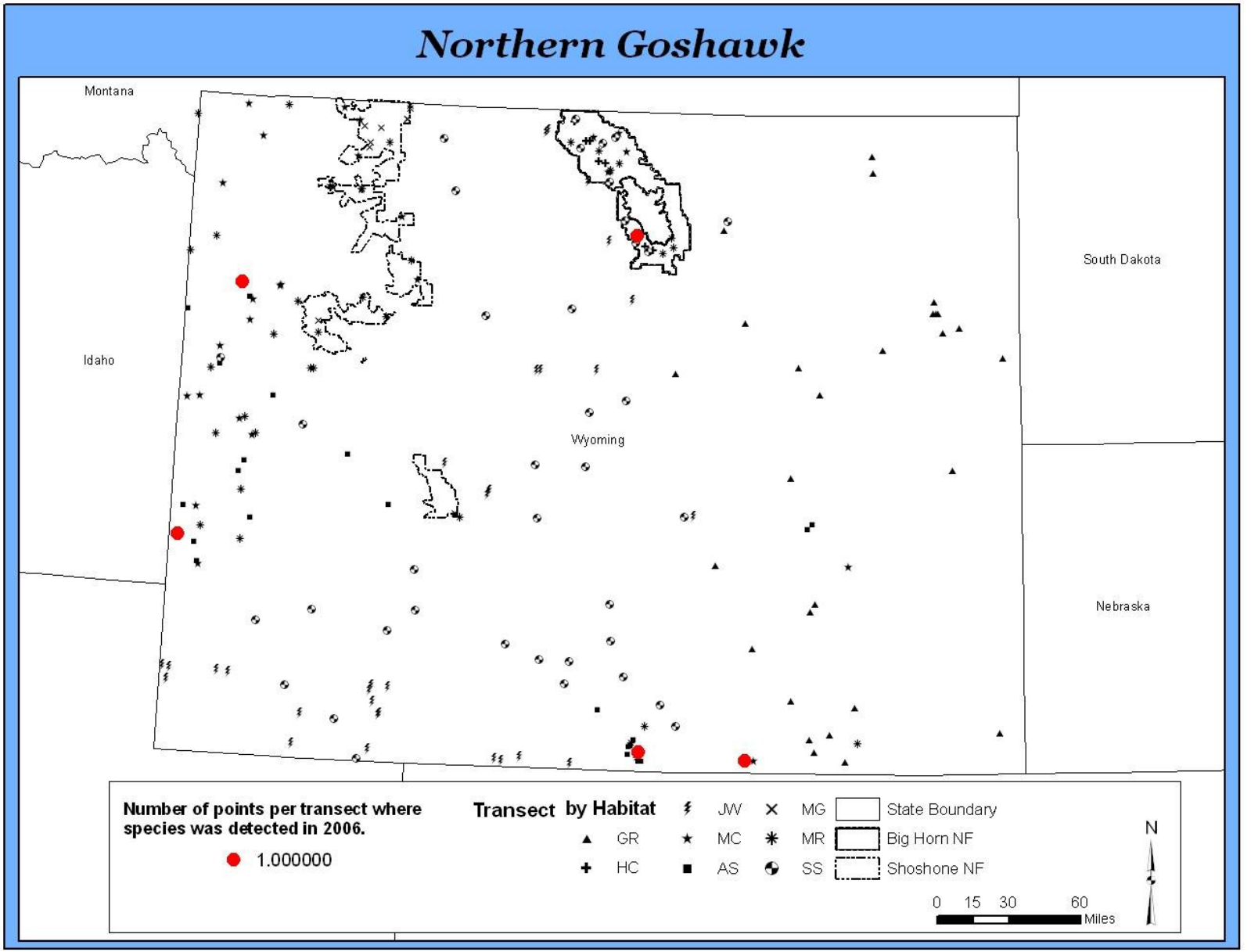
Northern Goshawks inhabit mature forests, and require large tracts of undisturbed habitat for nesting and foraging. In 2006, we detected five Northern Goshawks in two habitats, aspen and mid-elevation riparian, on MWB.

Data from all of the habitat-based point transects will likely not be sufficient to track population trends of the Northern Goshawk over time. However, RMBO implemented a pilot study in 2006 that used a call-playback technique developed by the USFS to monitor the Northern Goshawk. This study was conducted in several National Forests throughout Colorado, Wyoming, and the Black Hills. Effective monitoring will likely require such intensive and focused efforts, implemented region-wide.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Northern Goshawk on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	1	3
WY-MR	ID	--	--	--	1	2

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Northern Goshawks on transects in Wyoming, 2006.

Swainson's Hawk
(*Buteo swainsoni*)

WY-PIF Level I Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

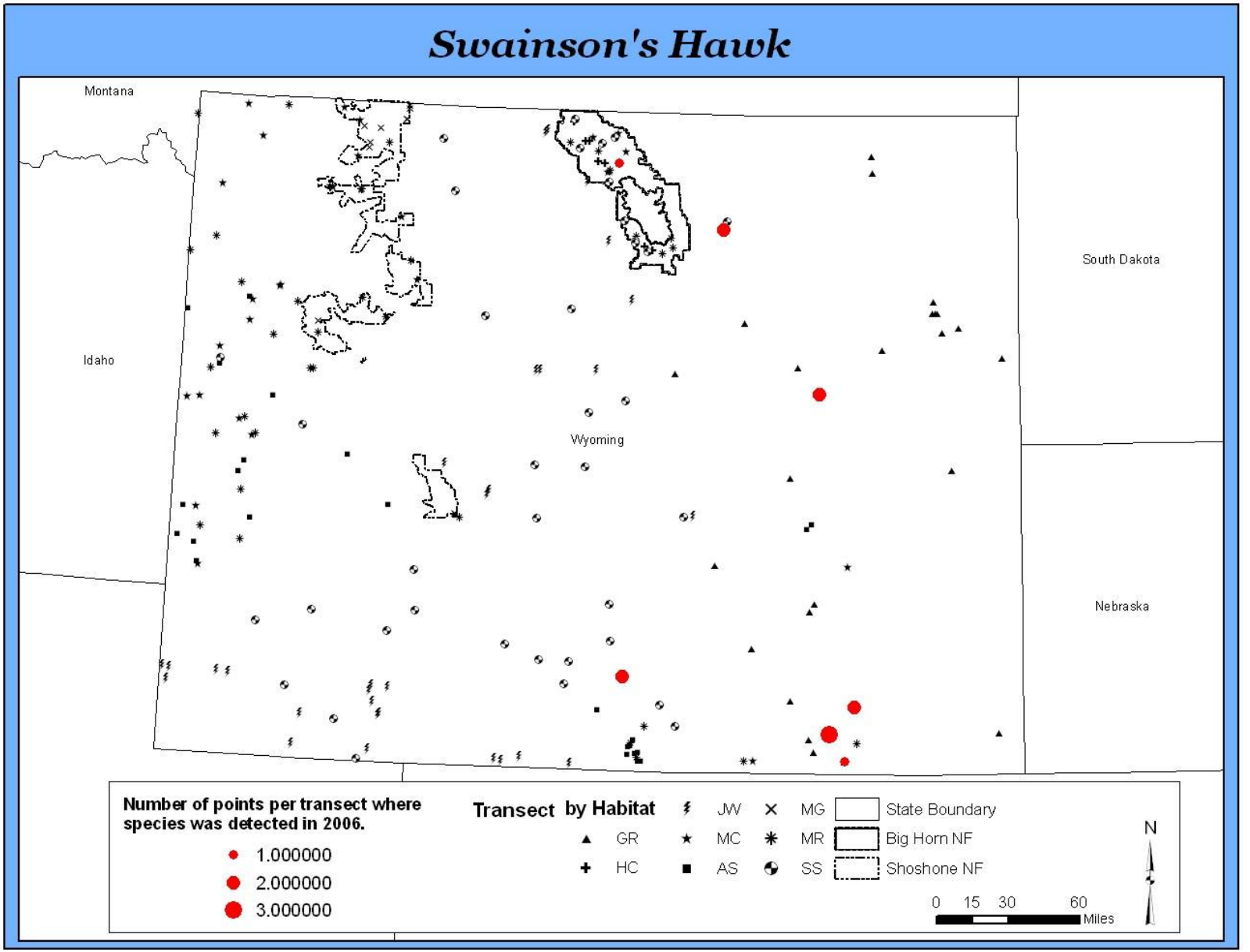
Swainson's Hawks typically inhabit sites in grassland, desert, and agricultural areas with scattered trees and shrubs. In 2006, we detected 14 Swainson's Hawks in three habitats on MWB.

The Swainson's Hawk, like other raptor species, is difficult to monitor under MWB using the point-transect protocol, because of its low density and large territory size. However, using data from all years, especially in grassland habitat, we may be able to calculate a global detection function for this species and thereby generate an annual density estimate that can be used for population-trend monitoring. To detect trends sooner though, we recommend adding grassland transects.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Swainson's Hawk on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-MR	ID	--	--	--	1	1
WY-GR	ID	--	--	--	8	11
WY-SS	ID	--	--	--	2	2

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Swainson's Hawks on transects in Wyoming, 2006.

Ferruginous Hawk
(*Buteo regalis*)

USFS Region 2 Sensitive Species
WY-PIF Level I Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

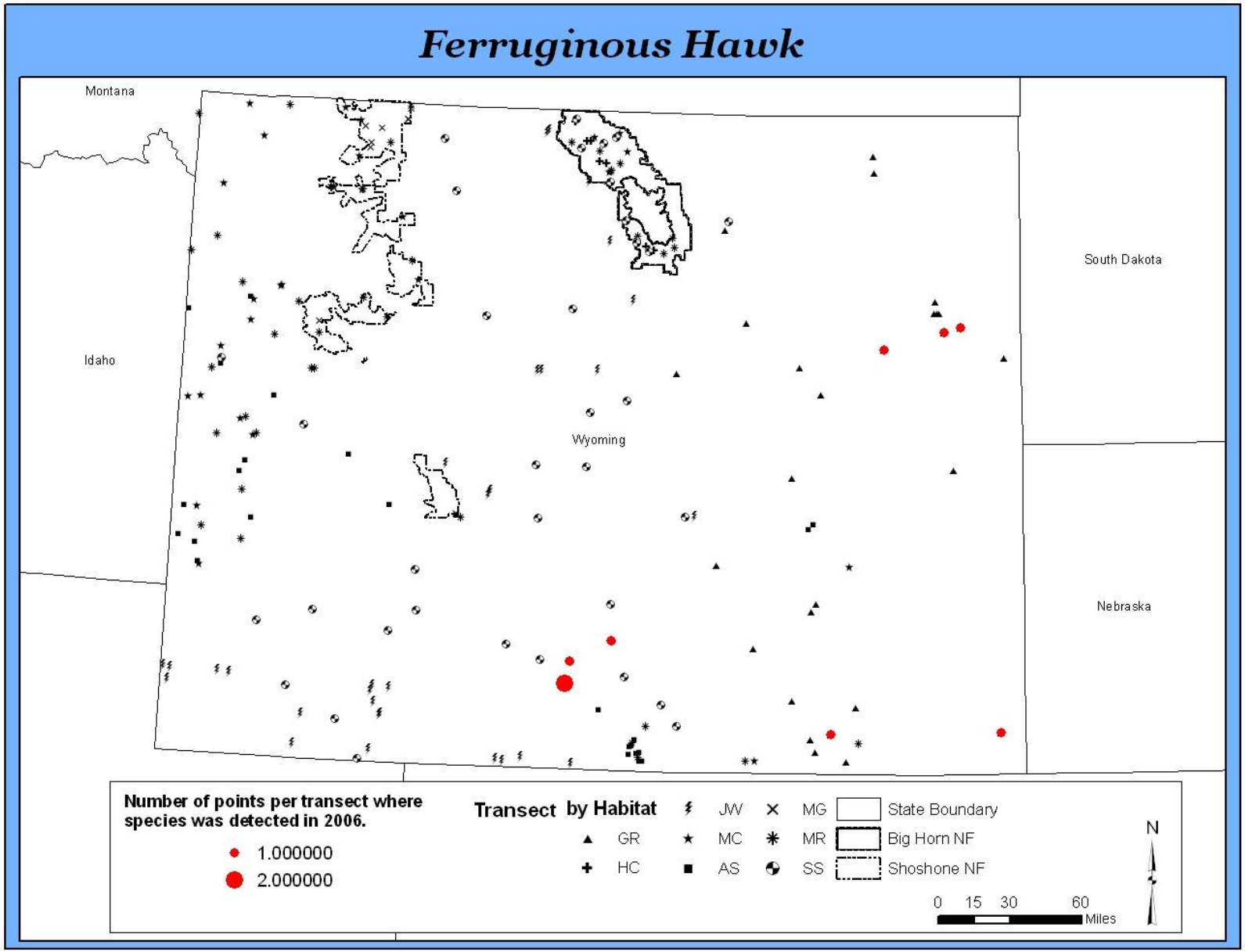
Ferruginous Hawks typically inhabit expansive ungrazed or lightly grazed grassland or shrubland with varied topography, including hills, ridges, and valleys. In 2006, we detected 11 Ferruginous Hawks in two habitats, grassland and shrubsteppe. We detected Ferruginous Hawks on two grassland transects in 2006, GR08 and GR37, where we also detected the species in previous years. Similarly, we detected Ferruginous Hawks on three shrubsteppe transects in 2006, SS01, SS15 and SS34, where we also detected the species in previous years. Furthermore, we have detected Ferruginous Hawks on transect SS15 the last four consecutive years.

The Ferruginous Hawk, like other raptor species, is difficult to monitor under MWB using the point-transect protocol, because of its low density and large territory size. However, using data from all years, we may be able to calculate a global detection function for this species and thereby generate annual density estimates in grassland and shrubsteppe habitats that can be used for population-trend monitoring. Adding transects, especially in grassland and shrubsteppe habitat, may also yield better information for the Ferruginous Hawk and allow us to detect trends sooner.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Ferruginous Hawk on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-GR	ID	--	--	--	3	5
WY-SS	ID	--	--	--	5	6

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Ferruginous Hawks on transects in Wyoming, 2006.

Golden Eagle
(*Aquila chrysaetos*)

WY-PIF Level III Priority Species
USFWS Bird of Conservation Concern

The Golden Eagle occupies a wide variety of habitats but because of its size, the species requires vast open habitats for hunting, including grassland, sagesteppe, farmlands, and even tundra. In 2006, we detected 14 Golden Eagles in five habitats on MWB. Two transects on which we detected Golden Eagles in 2006 - SS20 and JW43 - we also detected the species on in previous years.

The Golden Eagle, like other raptor species, is difficult to monitor under MWB using the point-transect protocol, because of its low density and large territory size. However, using data from all years, we may be able to calculate a global detection function for this species and thereby generate an annual density estimates in several habitats that can be used for population-trend monitoring. Adding transects, especially in grassland and shrubsteppe habitat, may also yield better information for the Golden Eagle and allow us to detect trends sooner.

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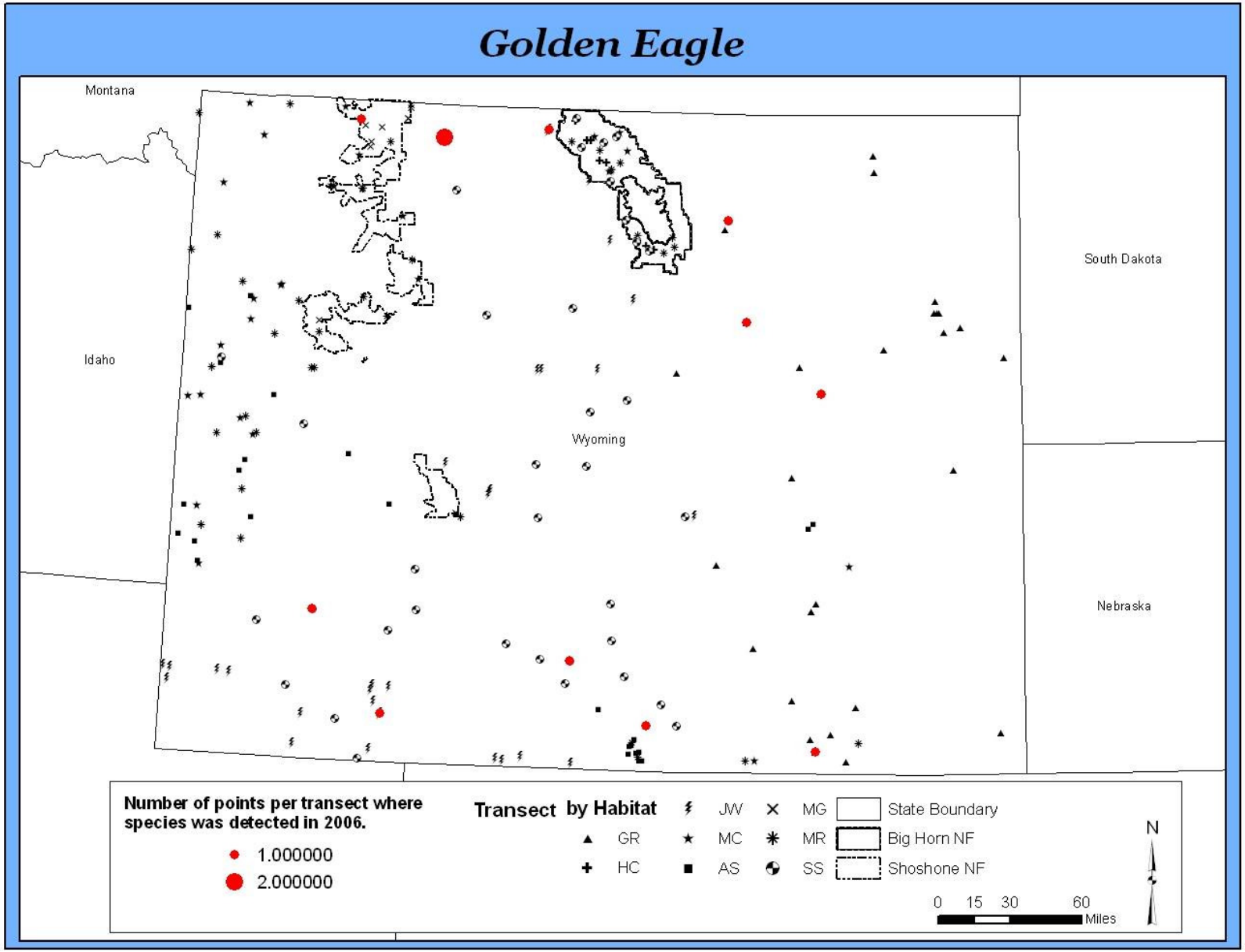
Total number of independent detections, number of individuals, and habitat-specific density estimates for the Golden Eagle on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MC**	ID	--	--	--	1	1
WY-GR	ID	--	--	--	4	4
WY-JW	ID	--	--	--	2	2
WY-MC	ID	--	--	--	1	1
WY-MR	ID	--	--	--	1	1
WY-SS	ID	--	--	--	5	6

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = The ten SH-MC transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Golden Eagle on transects in Wyoming, 2006.

Prairie Falcon
(*Falco mexicanus*)

WY-PIF Level III Priority Species
USFWS Bird of Conservation Concern

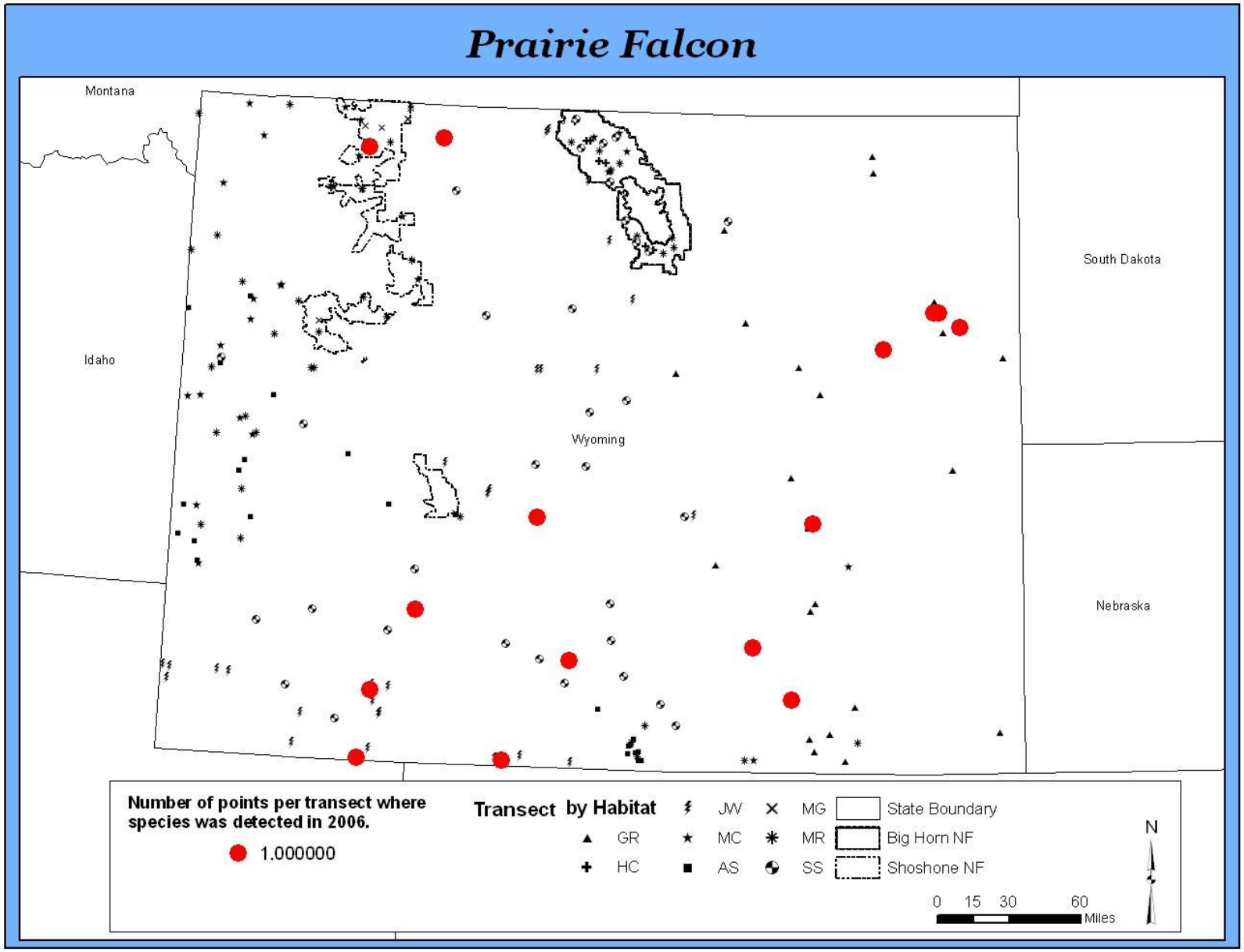
The Prairie Falcon inhabits open habitat throughout Wyoming, including grassland, shrubsteppe and alpine tundra. In 2006, we detected 16 Prairie Falcons in five habitats on MWB. We detected Prairie Falcons on four transects in 2006 where we also detected the species in previous years: AS44, GR01, GR13, and SS23.

Prairie Falcon, like other raptor species, is difficult to monitor under MWB using the point-transect protocol, because of its low density and large territory size. However, using data from all years, we may be able to calculate a global detection function for this species and thereby generate annual density estimates in several habitats that can be used for population-trend monitoring. Adding transects, especially in grassland and shrubsteppe habitat, may also yield better information for the Prairie Falcon and allow us to detect trends sooner.
In addition, locating and monitoring Prairie Falcon nests could be incorporated into a special species program in a cost-effective manner, especially if combined with similar efforts for other cliff-nesting species (e.g., Peregrine Falcon).

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Prairie Falcon on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MG	ID	--	--	--	1	1
WY-AS	ID	--	--	--	1	1
WY-GR	ID	--	--	--	3	6
WY-JW	ID	--	--	--	3	3
WY-SS	ID	--	--	--	4	5

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Prairie Falcons on transects in Wyoming, 2006.

Sandhill Crane
(*Grus canadensis*)

WGFD Species of Greatest Conservation Need

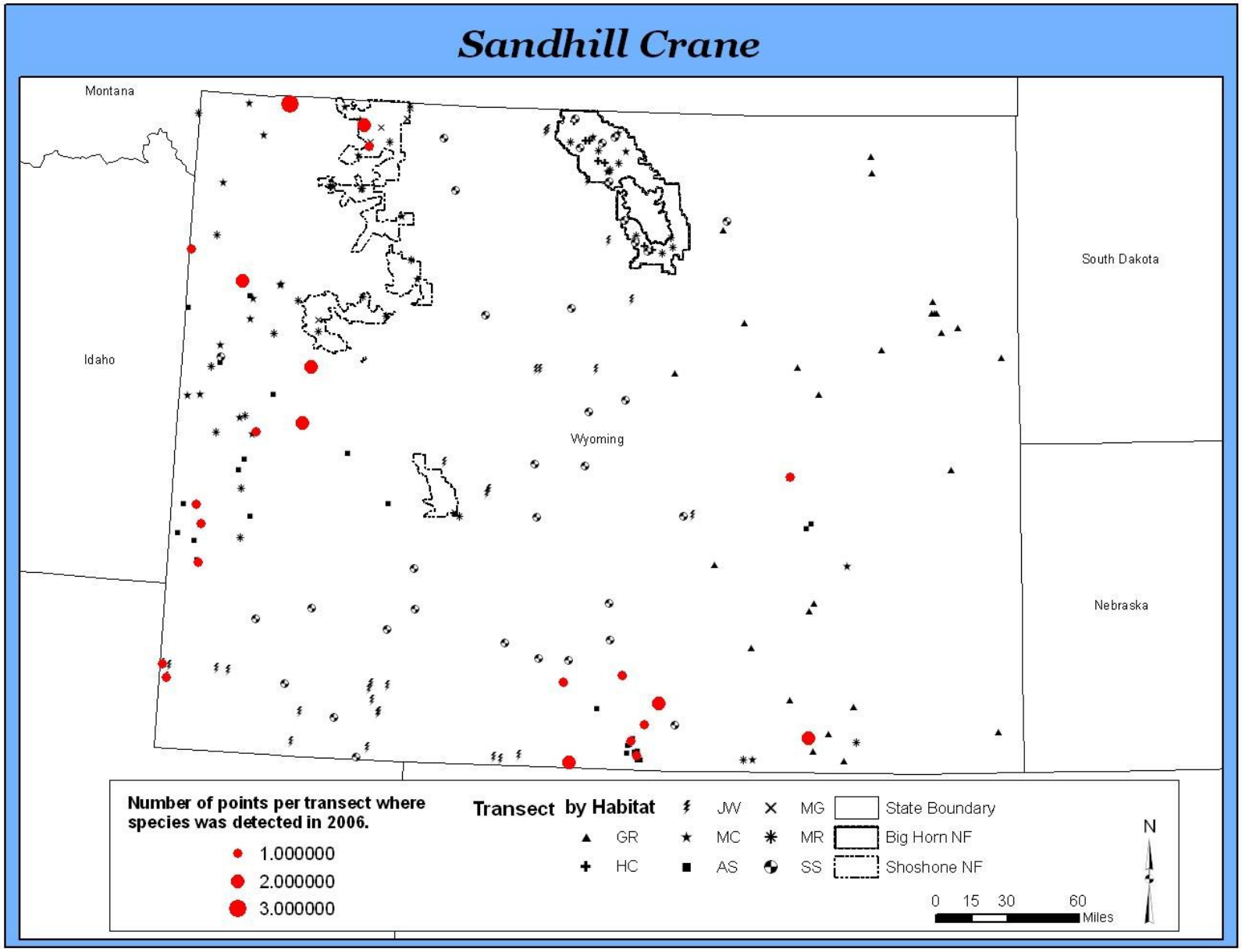
Sandhill Cranes inhabit a variety of open habitats, including wetlands and uplands, particularly in agricultural areas. The species breeds throughout Wyoming, with the exception of the northeast corner of the state. In 2006, we detected 48 Sandhill Cranes in six habitats on MWB. Eight of the Sandhill Crane detections in mid-elevation riparian habitat were from transect MR22. We have detected Sandhill Cranes on this transect for the last four consecutive years.

Using data from all years, especially in mid-elevation riparian habitat, we may be able to calculate a global detection function by habitat for the Sandhill Crane and thereby generate annual density estimates that can be used for population-trend monitoring. Adding transects near wetlands or open water would most likely improve our ability to monitor this species.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Sandhill Crane on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MG	ID	--	--	--	2	3
WY-GR	ID	--	--	--	3	4
WY-JW	ID	--	--	--	4	5
WY-MC	ID	--	--	--	1	3
WY-MR	ID	--	--	--	6	23
WY-SS	ID	--	--	--	5	10

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Sandhill Cranes on transects in Wyoming, 2006.

Mountain Plover
(*Charadrius montanus*)

*WY-PIF Level I Priority Species
*USFWS Bird of Conservation Concern
*WGFD Species of Greatest Conservation Need

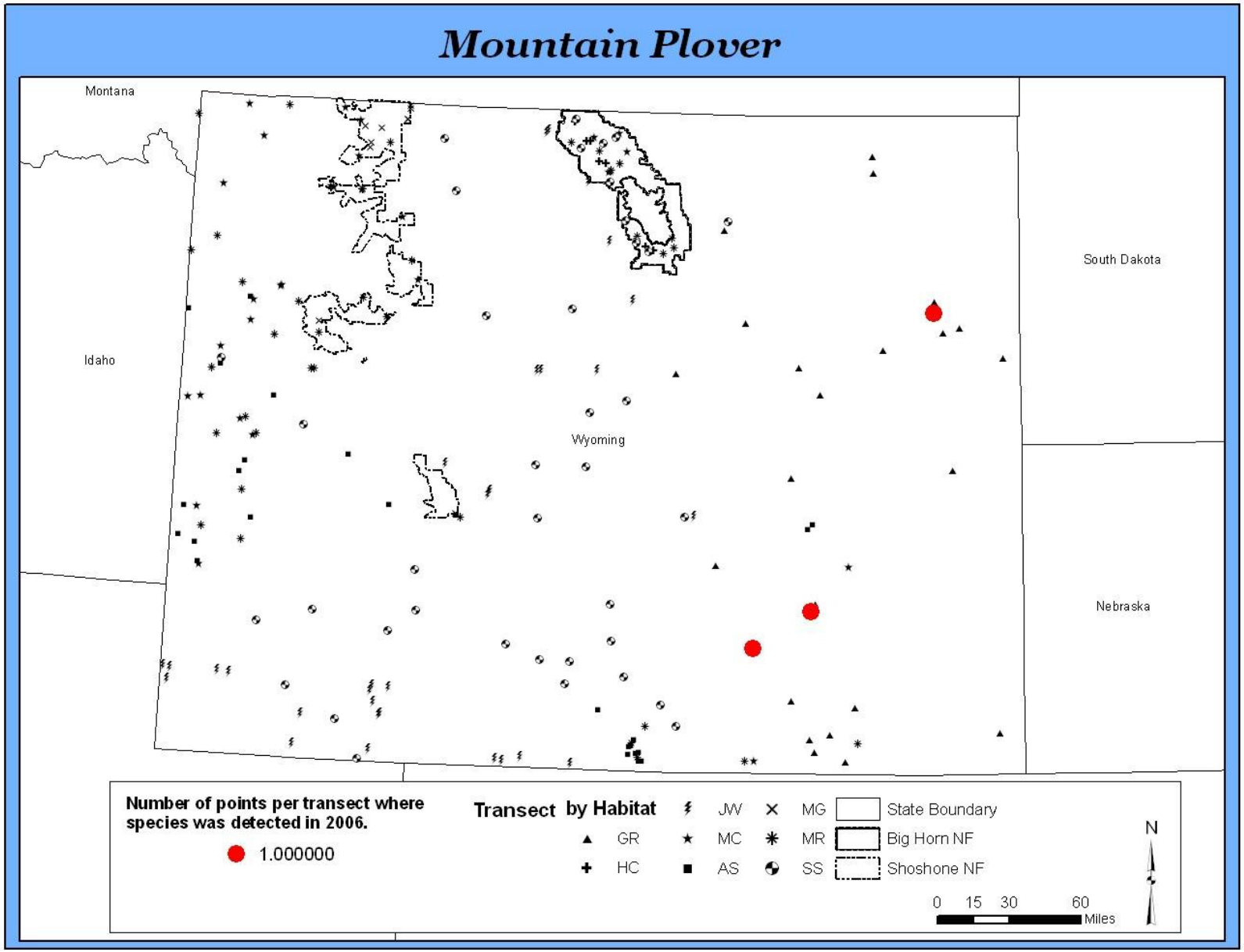
Mountain Plovers primarily breed in arid prairie, agricultural fields, and grazed rangelands. A petition has been filed to list Mountain Plovers for protection under the Endangered Species Act, as the species' population is believed to have declined due to habitat loss and degradation. In 2006, we detected four Mountain Plovers in grassland habitat on MWB. The four detections were from three grassland transects: GR04, GR43 and GR44. On two of these transects, GR04 and GR44, we have detected Mountain Plovers in previous years.

Using data from all years in grassland habitat, we may be able to calculate a global detection function and thereby generate an annual density estimate that can be used for population-trend monitoring. Adding transects in grassland habitat may improve our ability to monitor this species. Furthermore, in Colorado and Nebraska, through RMBO's Prairie Partners program, we track and monitor nests on agricultural fields through partnerships with private landowners. Nests are flagged and avoided during harvest. Given interest, such a program could be implemented in Wyoming, along with more targeted Mountain Plover surveys.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Mountain Plover on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-GR	ID	--	--	--	4	4

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Mountain Plovers on transects in Wyoming, 2006.

Upland Sandpiper
(*Bartramia longicauda*)

WY-PIF Level I Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

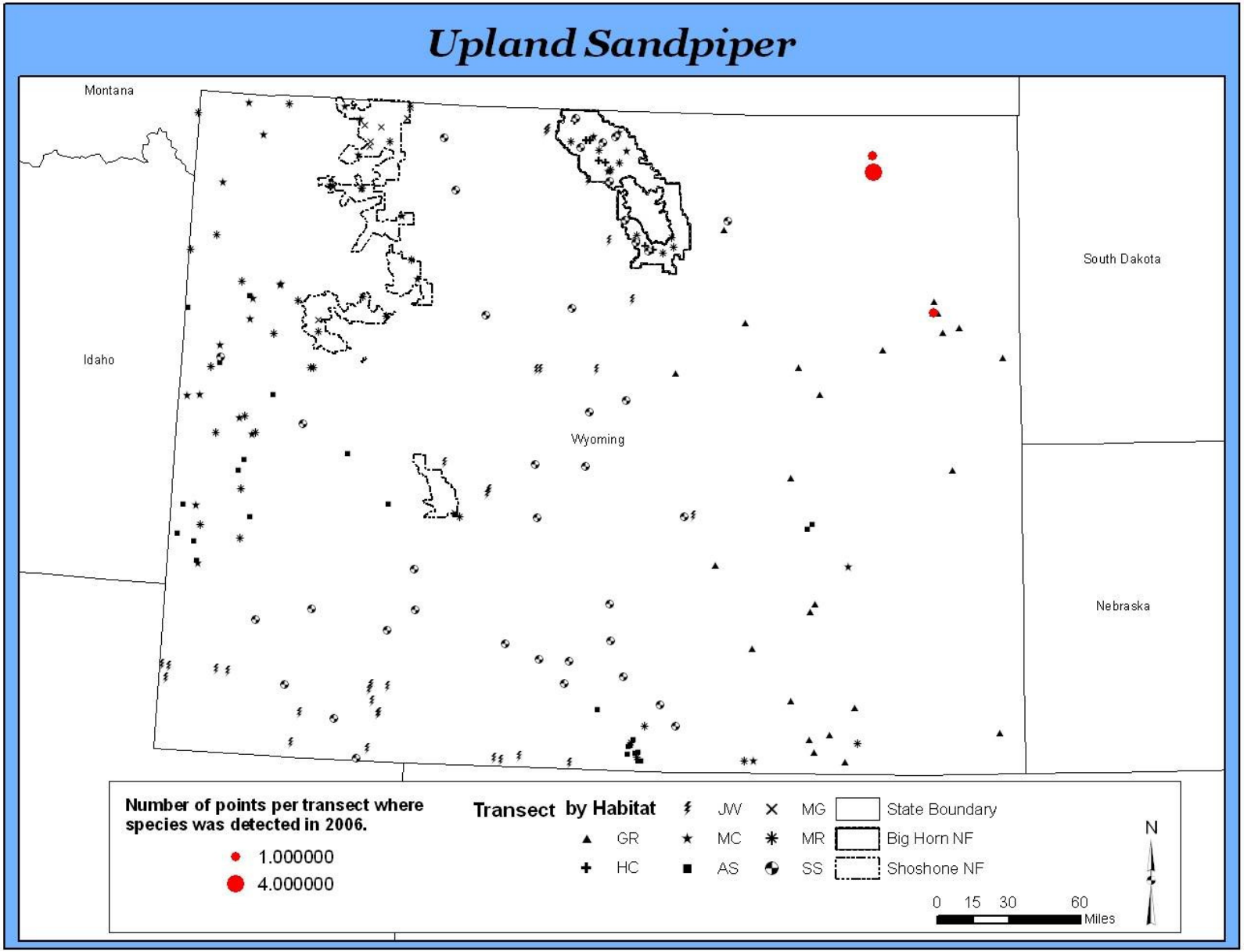
The Upland Sandpiper prefers open areas, including, meadows, cropland, and mixed and tall-grass prairies. This species appears to have suffered from the conversion of native grasslands to agricultural fields and declines in native insect populations. In 2006, we detected six Upland Sandpipers on three grassland transects on MWB. We have detected Upland Sandpipers on all three of these transects – GR04, GR75, and GR76 – in previous years.

We detect Upland Sandpipers on grassland transects in northeastern Wyoming most years; however, the number of detections is always very low. Using data from all years in grassland habitat, we may be able to calculate a global detection function and thereby generate an annual density estimate for Upland Sandpiper that can be used for population-trend monitoring. Adding grassland transects may improve our ability to monitor this species.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Upland Sandpiper on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-GR	ID	--	--	--	6	6

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Upland Sandpipers on transects in Wyoming, 2006.

Long-billed Curlew
(*Numenius americanus*)

WY-PIF Level I Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

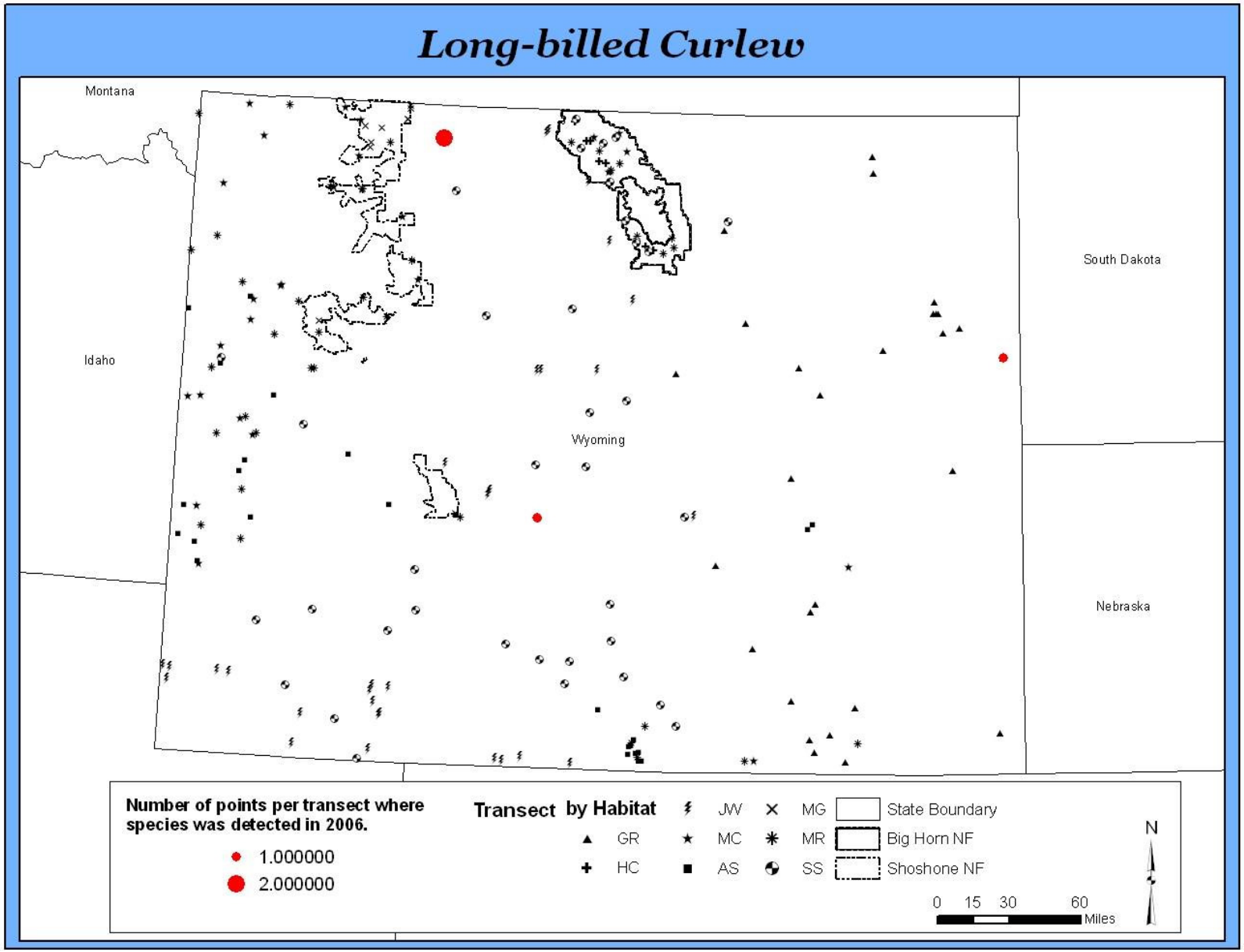
The Long-billed Curlew, the largest shorebird in North America, is found in fields and dry prairie as well as mudflats, and prefers short vegetation near water (Cornell 2003). In 2006, we detected four Long-billed Curlews in two habitats on MWB. Two of the detections from shrubsteppe habitat were from transect SS20, where we also detected this species in 2005.

We detect Long-billed Curlews too infrequently on point transects to effectively monitor this species under MWB. Additional grassland and shrubsteppe transects would likely yield better information for the Long-billed Curlew; however, given the species low population density, effective monitoring will likely require a more intensive and focused effort.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Long-billed Curlew on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-GR	ID	--	--	--	1	1
WY-SS	ID	--	--	--	3	3

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Long-billed Curlews on transects in Wyoming, 2006.

Great Gray Owl
(*Strix nebulosa*)

WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

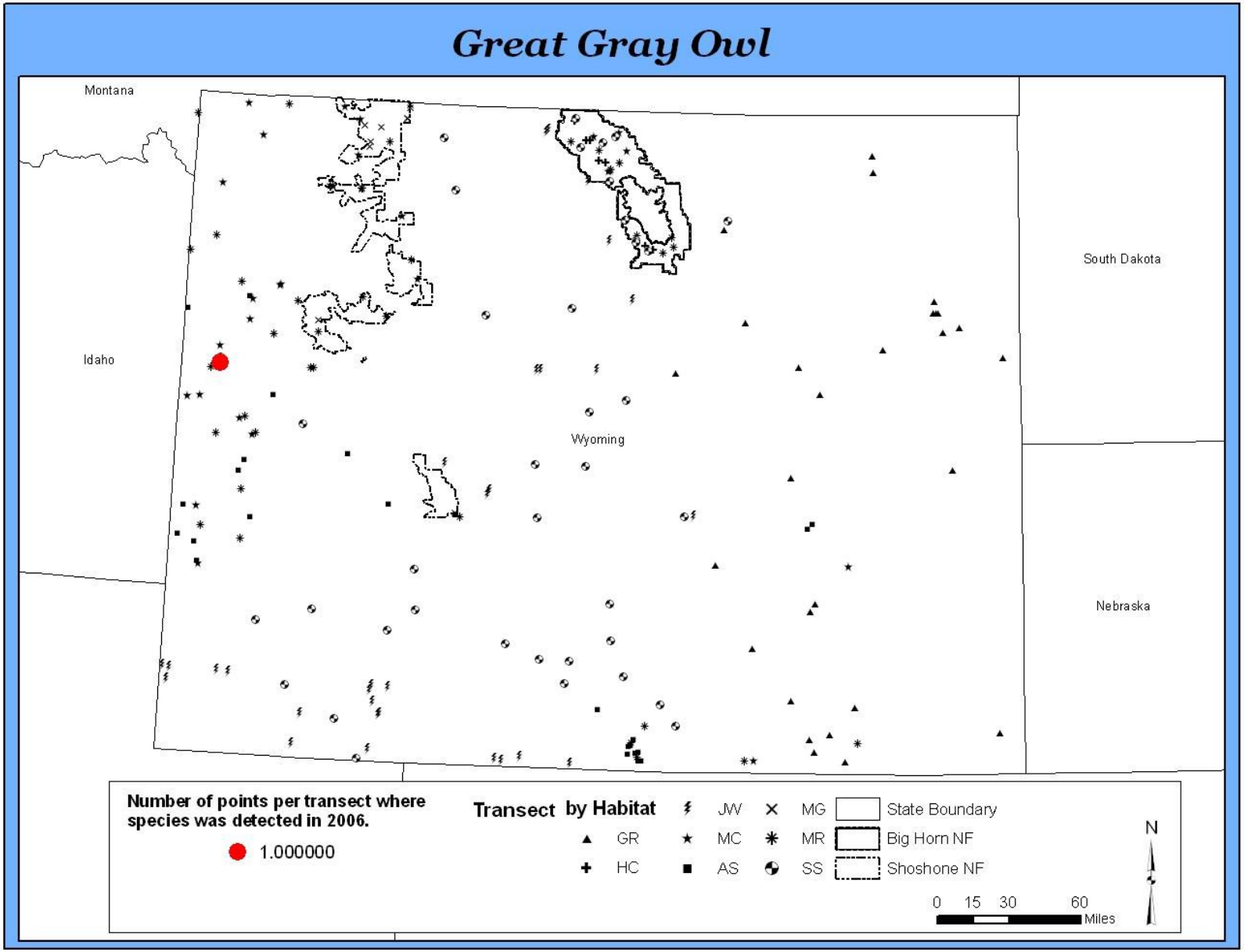
The Great Gray Owl inhabits a variety of forest types but prefers dense coniferous forests near meadows and open fields. In 2006, we detected one Great Gray Owl on an aspen transect, AS90, on MWB. This was our first detection of a Great Gray Owl in aspen habitat in Wyoming. Last year was the first year we detected a Great Gray Owl along point-transects in Wyoming.

MWB was not designed to monitor nocturnal species. This is a very difficult suite of species to monitor, especially on a statewide basis. Nocturnal monitoring programs have been implemented in Canada and the northeastern United States primarily using volunteers in a fashion similar to the Breeding Bird Surveys. In Wyoming, an effective monitoring program for owls and goatsuckers would likely involve nocturnal playback surveys for a group of targeted species with similar timing of breeding and habitat requirements. Such a program would be best implemented through volunteer efforts similar to the special species program that is part of the MCB project.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Great Gray Owl on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Great Gray Owls on transects in Wyoming, 2006.

Northern Pygmy-Owl
(*Glaucidium gnoma*)

WGFD Species of Greatest Conservation Need

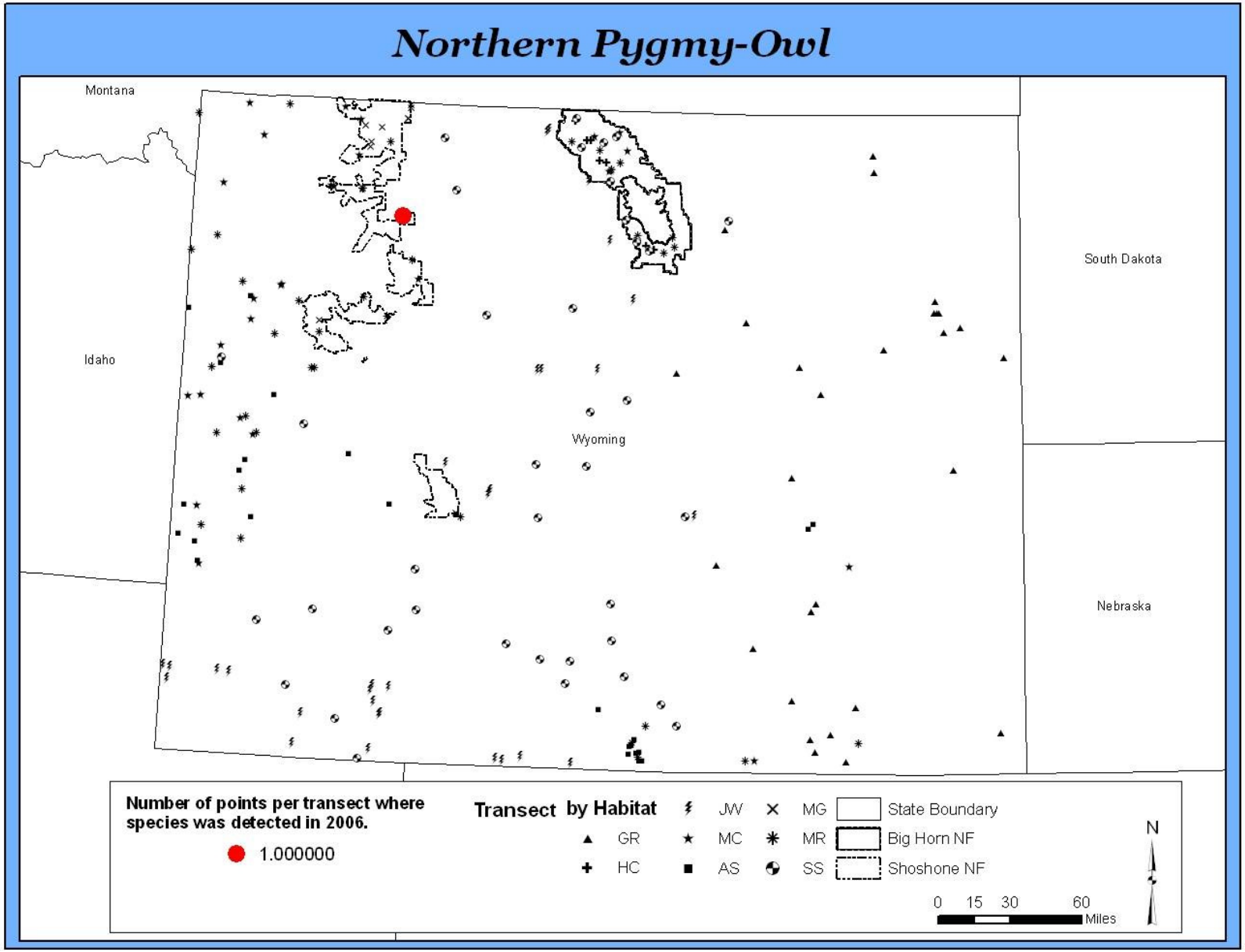
The Northern Pygmy-Owl inhabits both coniferous and deciduous montane forests, and nests in abandoned woodpecker cavities. Unlike most other owls, pygmy owls are primarily diurnal and hunt at dawn and dusk. In 2006, we detected one Northern Pygmy-Owl on a mid-elevation conifer transect, MC70, on MWB.

The Northern Pygmy-Owl, like other raptor species, is difficult to monitor under MWB using the point-transect protocol, because of its low population density and also because of the pygmy-owl's secretive habits. Therefore, it is unlikely we will be able to effectively monitor Northern Pygmy-Owls in any individual habitat or across habitats under MWB. Effective monitoring would require a more intensive and focused effort, probably involving call-response surveys. Given interest, such a program could be incorporated into a special species program for MWB.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Northern Pygmy-Owl on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MC**	ID	--	--	--	1	1
WY-MC	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = The ten SH-MC transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Northern Pygmy-Owls on transects in Wyoming, 2006.

White-throated Swift
(*Aeronautes saxatalis*)

*WY-PIF Level II Priority Species

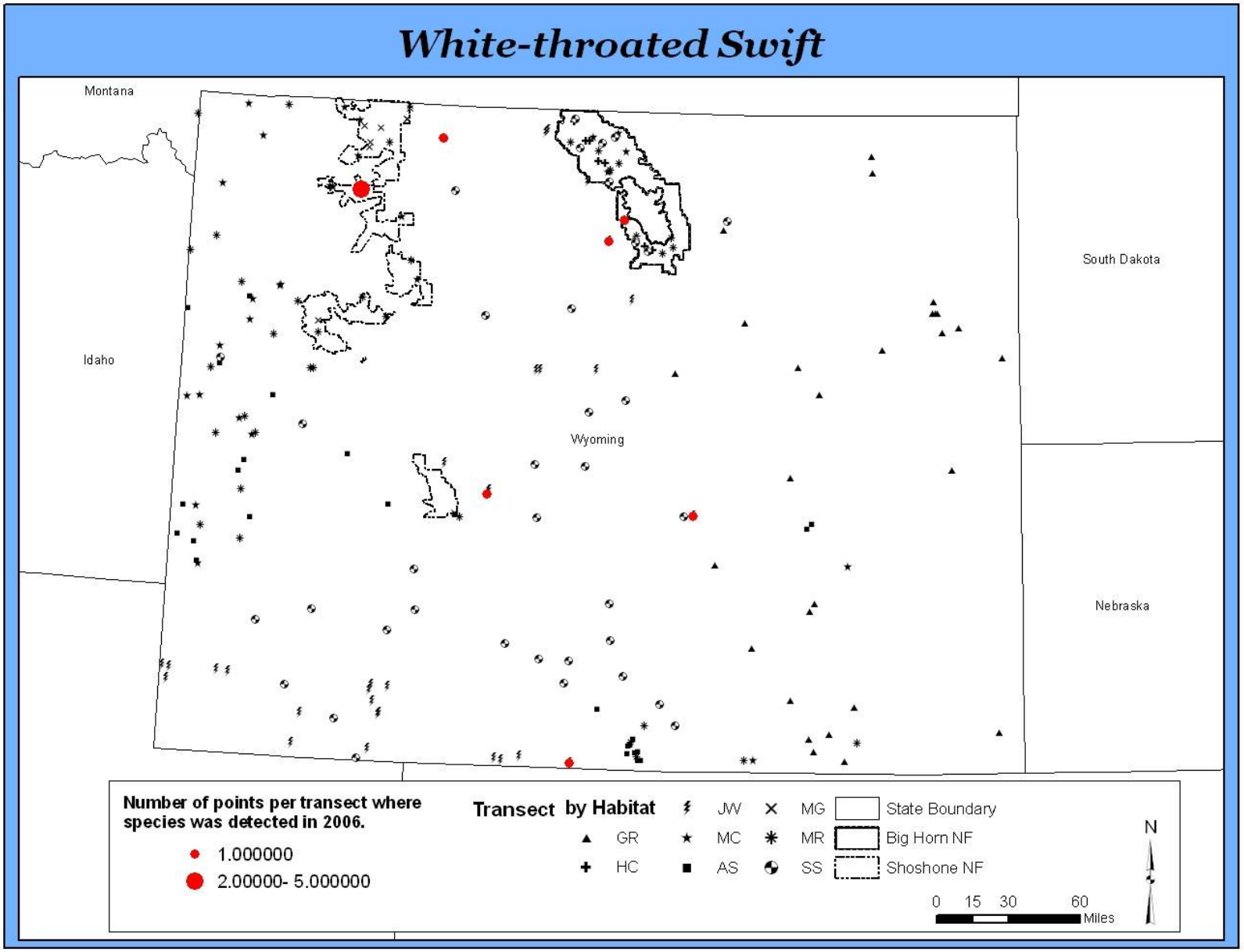
White-throated Swifts typically nest on cliffs in mountainous areas, sometimes in small colonies of up to a dozen. They wander widely while foraging, and can be encountered in almost any habitat. In 2006, we detected 17 White-throated Swifts in three habitats on MWB.

Although we detect White-throated Swifts every year, its colonial nature and difficult-to-access cliff breeding sites makes it difficult to monitor effectively. Using data from all years, we may be able to calculate a global detection function and thereby generate annual density estimates in several habitats that can be used for population-trend monitoring. However, censusing birds at known nest sites and searching for new nest sites in potential habitat would provide better information for this species in Wyoming. A similar program has been implemented successfully in Colorado through the Monitoring Colorado Birds program.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the White-throated Swift on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-SS	ID	--	--	--	1	1
SH-MC**	ID	--	--	--	1	6
WY-JW	ID	--	--	--	4	5
WY-MC	ID	--	--	--	5	6
WY-SS	ID	--	--	--	1	5

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = The ten SH-MC transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of White-throated Swifts on transects in Wyoming, 2006.

Black-chinned Hummingbird
(*Archilochus alexandri*)

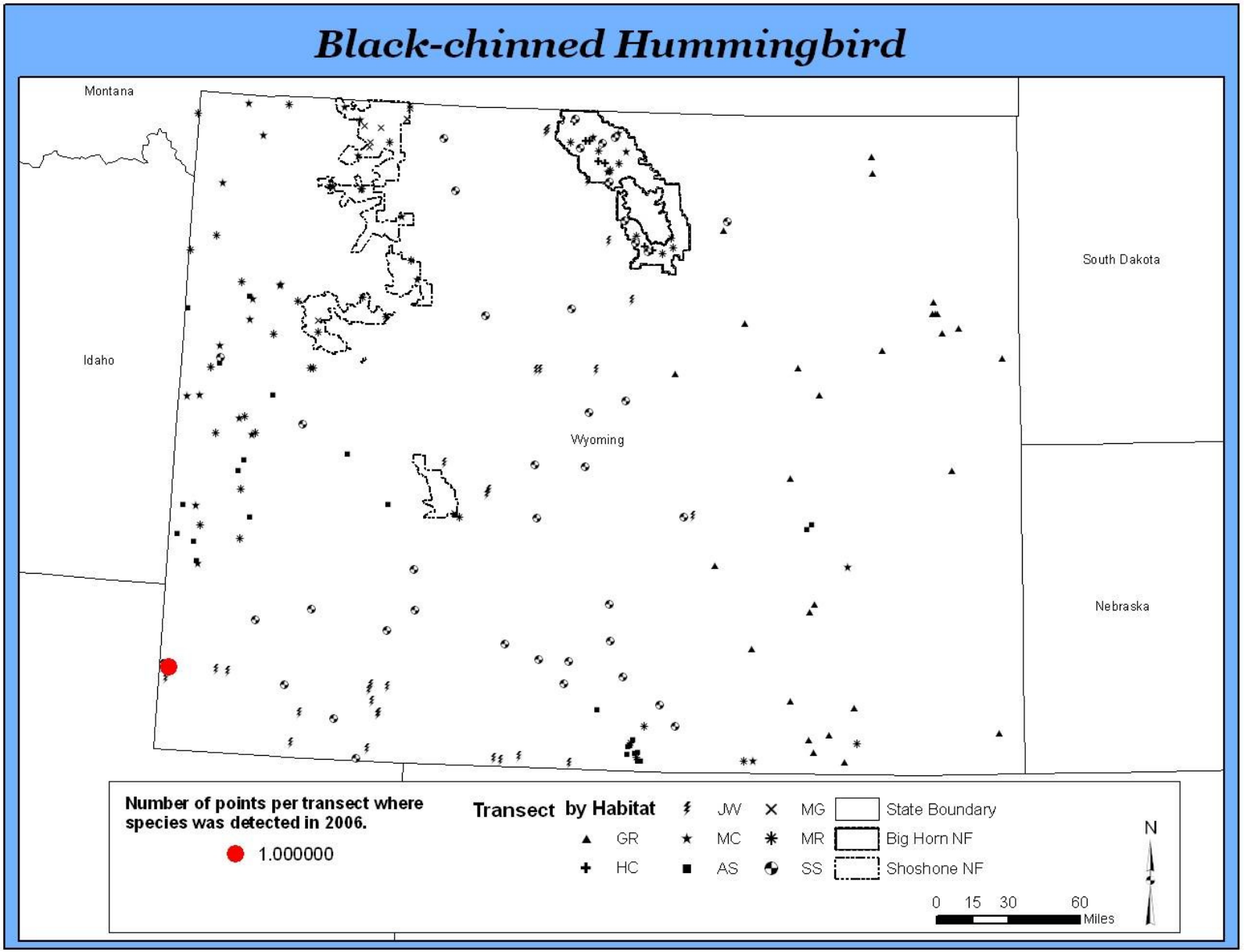
WY-PIF Level II Priority Species

The Black-chinned Hummingbird breeds most frequently in pinyon-juniper, but is also found in low- and mid-elevation riparian habitat, Gambel oak shrubland, and urban areas. This species is currently documented as a peripheral breeder in Wyoming, primarily in the southwestern corner of the state. In 2006, we detected one Black-chinned Hummingbird on a juniper woodland transect, JW67, on MWB. This was only the third detection of Black-chinned Hummingbird in the history of the MWB program. Given their limited breeding range in Wyoming, it's unlikely we will be able to effectively monitor this species under MWB. Additional transects in juniper woodland habitat in the southwest portion of the state may yield better information for this species.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Black-chinned Hummingbird for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Black-chinned Hummingbirds on transects in Wyoming, 2006.

Calliope Hummingbird
(***Stellula calliope***)
WY-PIF Level II Priority Species

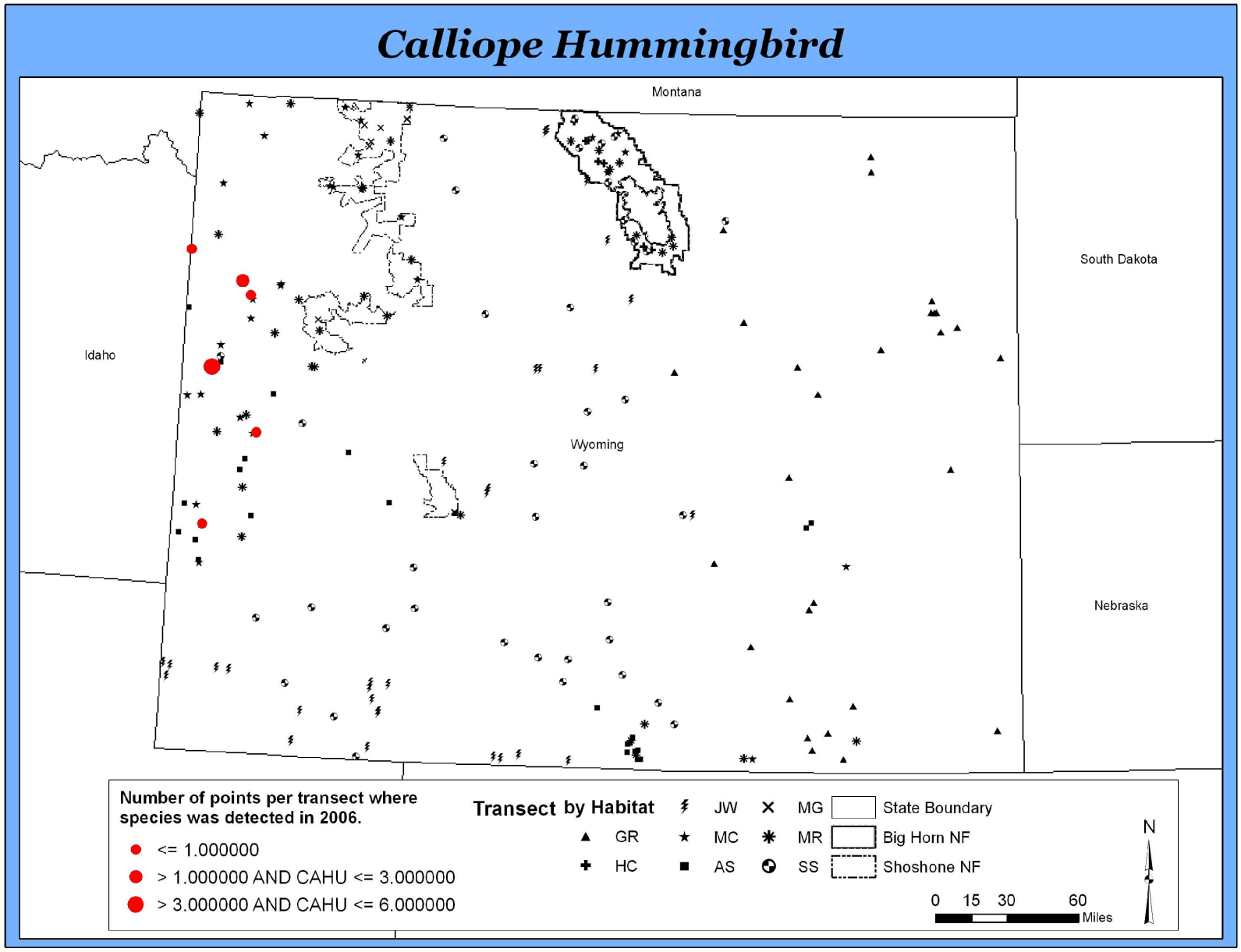
The Calliope Hummingbird is found in mid-elevation areas of northern and western Wyoming. The species uses meadows, canyons, riparian areas, aspen stands, and willow thickets, but prefers coniferous forests near water with a low to intermediate canopy cover. In 2006, we detected 14 Calliope Hummingbirds in two habitats on MWB.

Using data from all years, we may be able to calculate a global detection function and thereby generate an annual density estimate for Calliope Hummingbird, at least in montane riparian habitat, that can be used for population-trend monitoring. Also, as we continue to add montane riparian transects to reach our target of 30, our ability to monitor this species may improve.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Calliope Hummingbird for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	1	1
WY-MR	ID	--	--	--	9	13

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Calliope Hummingbirds on transects in Wyoming, 2006.

Broad-tailed Hummingbird
(*Selasphorus platycercus*)

WY-PIF Level II Priority Species

Broad-tailed Hummingbirds inhabit a variety of forest types near wet meadows and riparian features, although Wyoming is at the eastern limit of the species' breeding range. In 2006, we detected 108 Broad-tailed Hummingbirds in seven habitats in Wyoming. We were able to calculate a density estimate in aspen and montane riparian habitats. We should be able to effectively monitor this species at least in aspen and montane riparian habitats under MWB.

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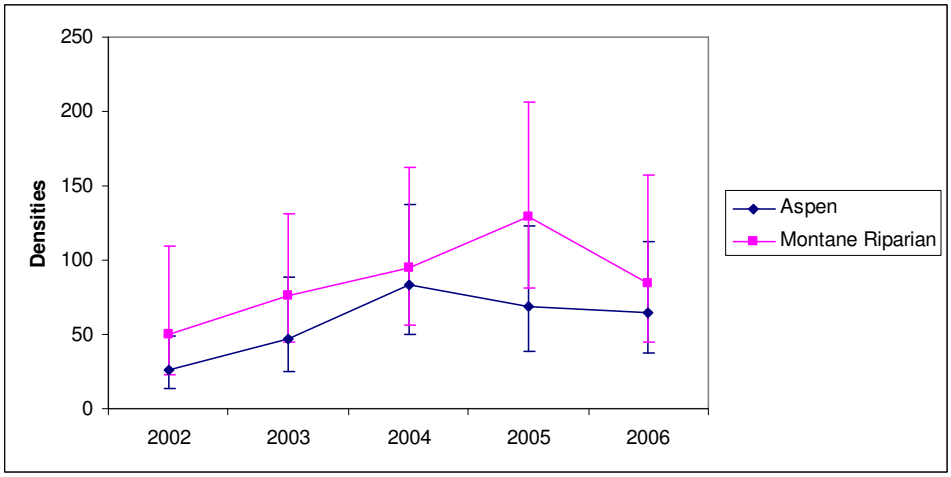
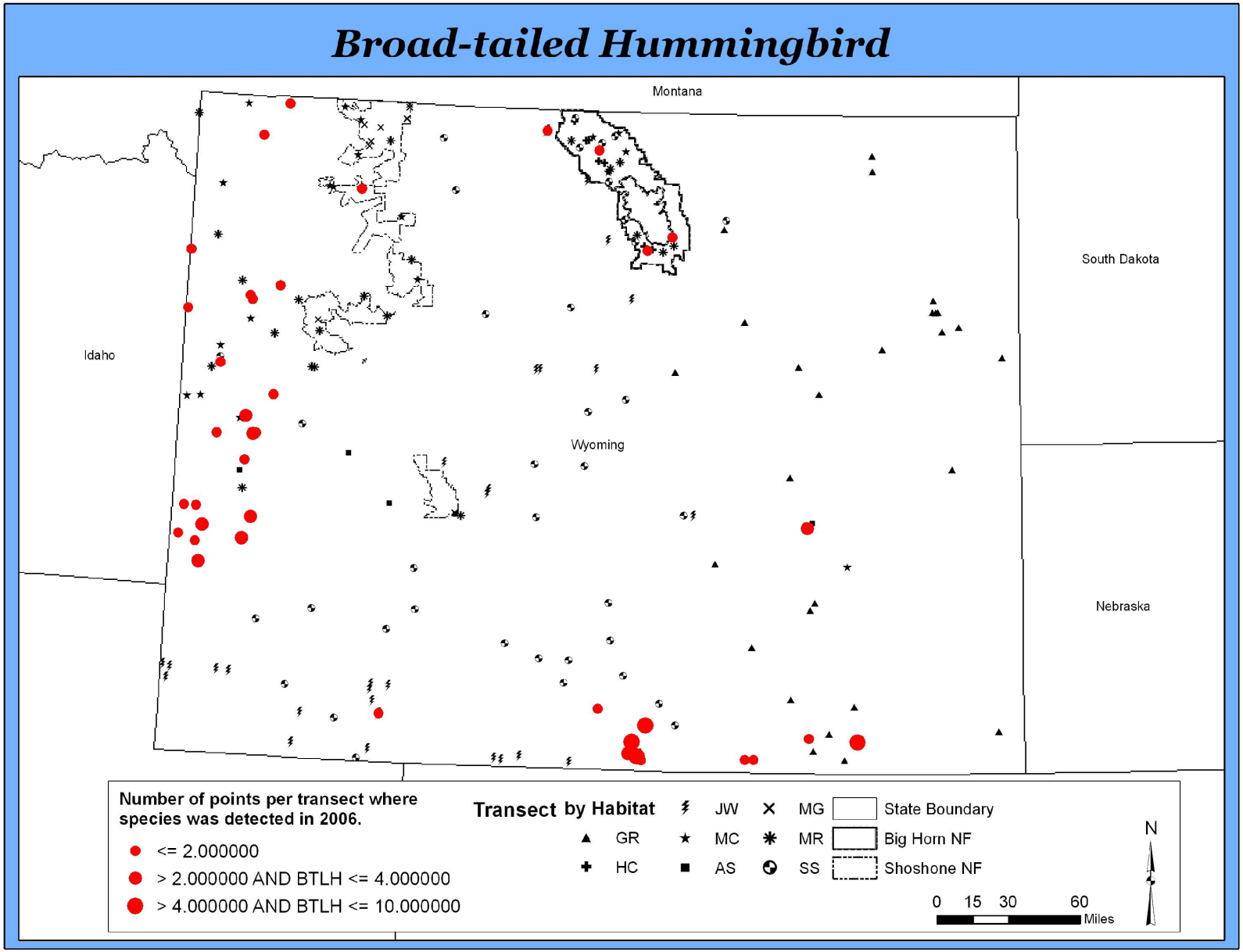


Estimated density (birds/km2) of the Broad-tailed Hummingbird (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Broad-tailed Hummingbird on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	1	1
BI-MR*	ID	--	--	--	*3*	*3*
SH-MC**	ID	--	--	--	1	1
WY-AS	65	37	113	34	24	27
WY-GR	ID	--	--	--	1	1
WY-JW	ID	--	--	--	3	3
WY-MC	ID	--	--	--	9	9
WY-MR	84	45	157	38	54	67

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Broad-tailed Hummingbirds on transects in Wyoming, 2006.

Rufous Hummingbird
(Selasphorus rufus)

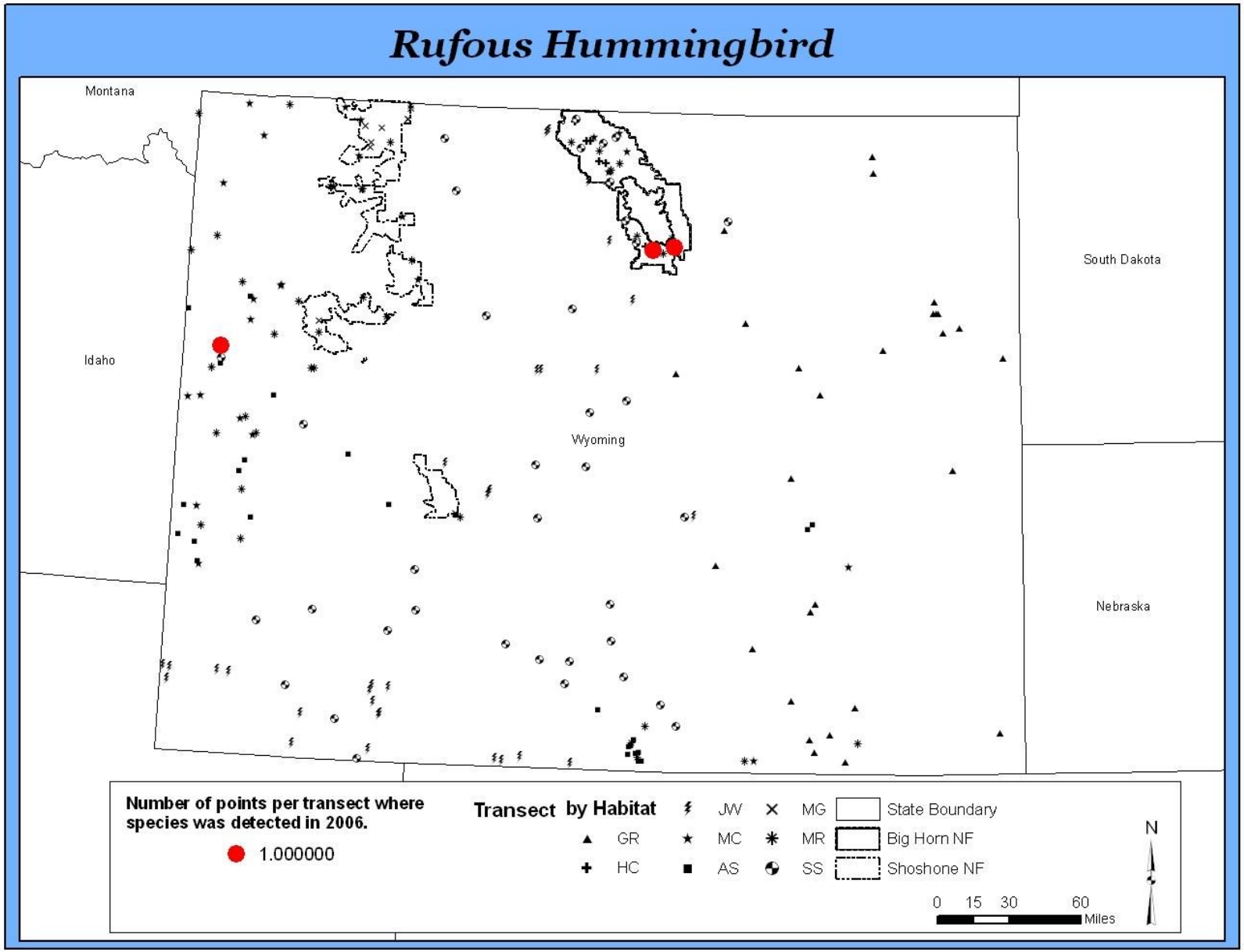
WY-PIF Level II Priority Species

The Rufous Hummingbird prefers riparian areas in mixed forests that include lodgepole pine, Douglas-fir, blue spruce and aspen. The species is known to breed only in the northwestern corner of Wyoming. Detections of this species in the Bighorn NF are most likely migrants. In 2006, we detected three Rufous Hummingbirds in three habitats on MWB. Due to its limited breeding range in Wyoming, it's unlikely we will be able to effectively monitor the Rufous Hummingbird under MWB. Adding transects, especially in northwestern Wyoming, may improve our ability to monitor this species.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Rufous Hummingbird for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	1	1
BI-MR*	ID	--	--	--	1	1
WY-MC	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects.



RMBO point-transect locations and detections of Rufous Hummingbirds on transects in Wyoming, 2006.

Williamson's Sapsucker
(Sphyrapicus thyroideus)

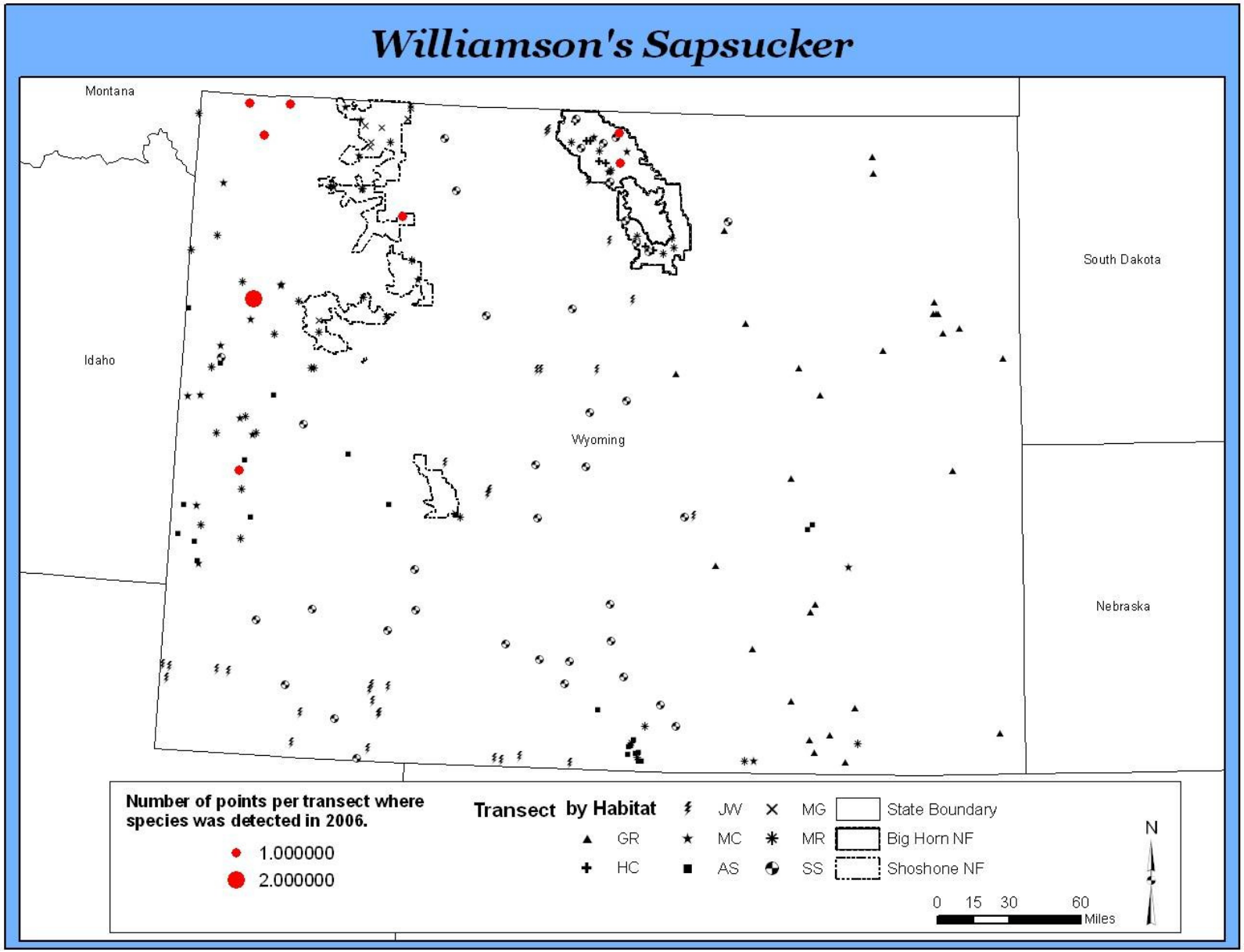
WY-PIF Level II Priority Species
USFWS Bird of Conservation Concern

The Williamson's Sapsucker prefers mixed coniferous forests and aspen stands, especially if they have burned recently. In 2006, we detected nine Williamson's Sapsuckers in three habitats on the MWB project. Using data from all years, we may be able to calculate a global detection function and thereby generate density estimates for Williamson's Sapsucker, at least in mid-elevation conifer habitat, that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Williamson's Sapsucker for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-MC	ID	--	--	--	1	1
BI-MR*	ID	--	--	--	1	1
SH-MC**	ID	--	--	--	1	1
WY-AS	ID	--	--	--	1	1
WY-MC	ID	--	--	--	4	6
WY-MR	ID	--	--	--	2	2

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.

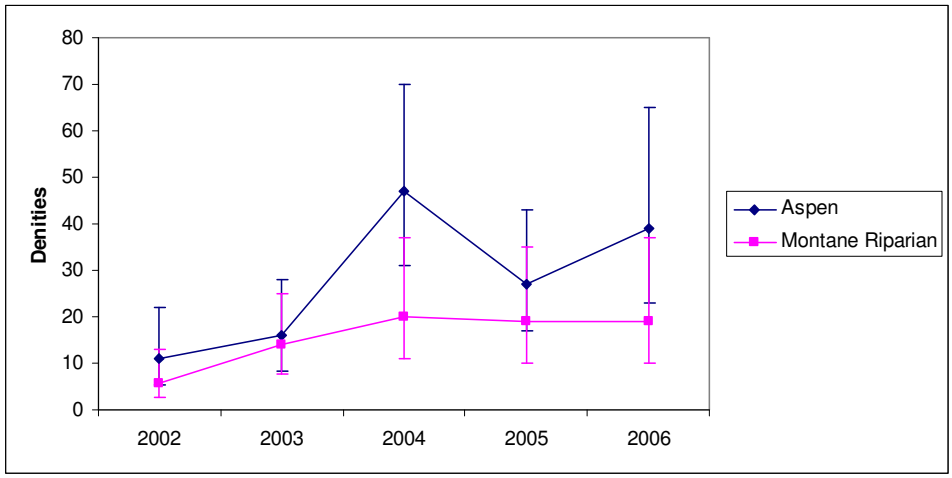


RMBO point-transect locations and detections of Williamson's Sapsuckers on transects in Wyoming, 2006.

Red-naped Sapsucker
(*Sphyrapicus nuchalis*)

WY-PIF Level II Priority Species
USFWS Bird of Conservation Concern

The Red-naped Sapsucker inhabits open woodlands, especially along major rivers. In 2006, we detected 158 Red-naped Sapsuckers in five habitats on MWB and we were able to calculate a density estimate for this species in aspen and montane riparian habitats. This species should be effectively monitored under MWB in at least aspen and montane riparian habitats.

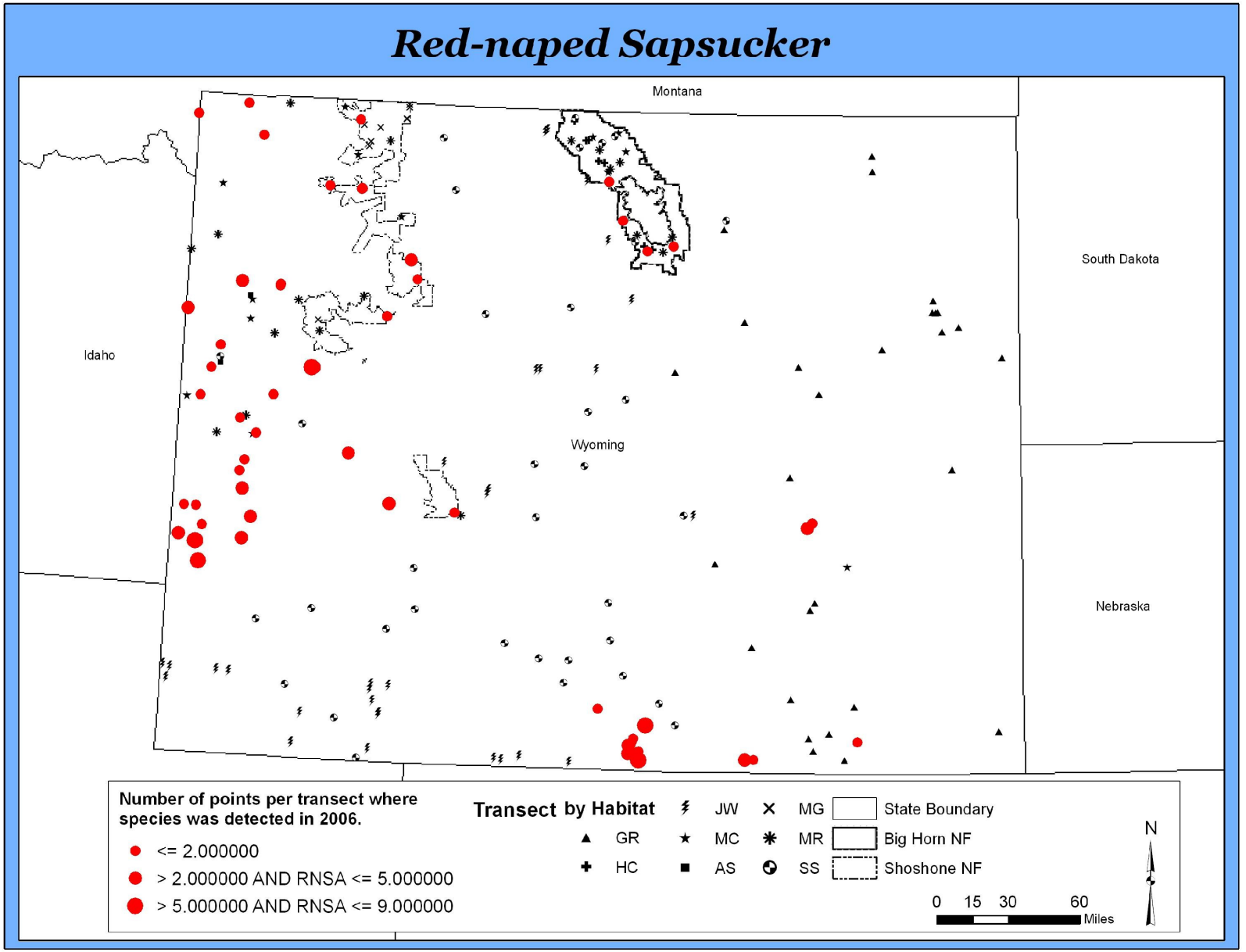


Estimated density (birds/km2) of the Red-naped Sapsucker (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Red-naped Sapsucker on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-MC	ID	--	--	--	1	1
BI-MR*	ID	--	--	--	1	1
BI-SS	ID	--	--	--	2	*2*
SH-MC**	ID	--	--	--	6	6
SH-MG	ID	--	--	--	2	2
SH-MR	ID	--	--	--	7	7
WY-AS	39	23	65	31	53	76
WY-MC	ID	--	--	--	17	19
WY-MG	ID	--	--	--	1	2
WY-MR	19	9.9	37	41	35	53

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Red-naped Sapsuckers on transects in Wyoming, 2006.

American Three-toed Woodpecker
(Picoides tridactylus)

USFS Region 2 Sensitive Species
WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The American Three-toed Woodpecker prefers conifer forests of lodgepole pine, Douglas-fir, blue spruce, Engelmann spruce, and subalpine fir. The species is also frequently present in recently burned forest. In 2006, we detected American Three-toed Woodpeckers in three habitats on the MWB project. For all habitats combined, we have consistently detected more American Three-toed Woodpeckers each year on the Bighorn National Forest transects than on statewide transects, especially Bighorn high-elevation conifer transects. Using data from all years, we may be able to calculate a global detection function and thereby generate an annual density estimate for American Three-toed Woodpecker, at least in high-elevation conifer habitat, that can be used for population-trend monitoring.

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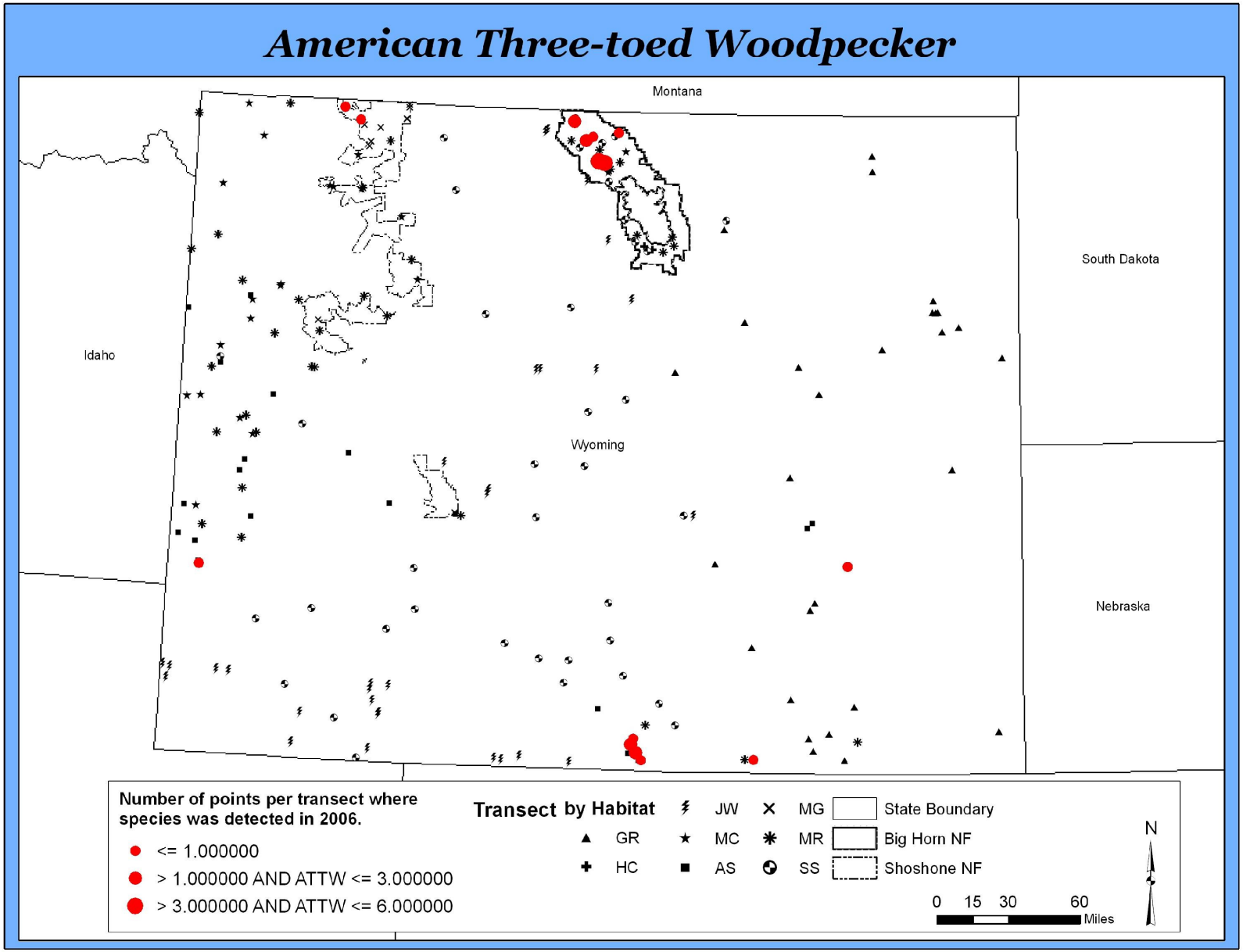
Total number of independent detections, number of individuals, and habitat-specific density estimates for the American Three-toed Woodpecker for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	15	17
BI-MC	ID	--	--	--	2	2
SH-MC**	ID	--	--	--	1	2
WY-AS	ID	--	--	--	5	7
WY-MC	ID	--	--	--	3	5

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of American Three-toed Woodpeckers on transects in Wyoming, 2006.

Olive-sided Flycatcher
(*Contopus cooperi*)

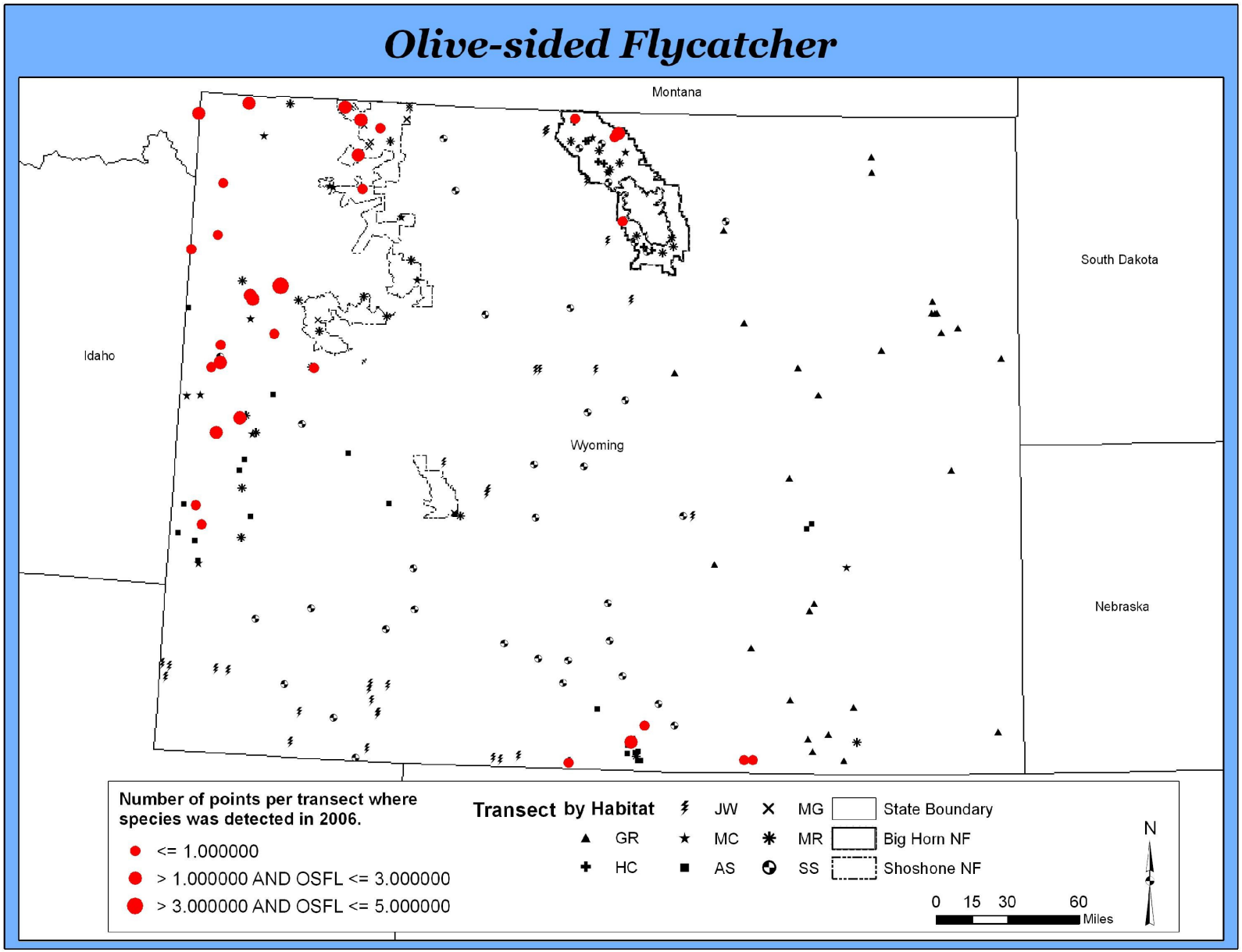
USFS Region 2 Sensitive Species
WY-PIF Level II Priority Species

The Olive-sided Flycatcher is found in mature coniferous and aspen forests throughout central and western Wyoming. It is dependent on burned areas and is often found near forest openings and edges near water. In 2006, we detected 53 Olive-sided Flycatchers in six habitats on the MWB project. After next season, we anticipate having enough observations to calculate a global detection function for this species at least in mid-elevation conifer using data from all years. With this function we will be able to generate annual density estimates that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Olive-sided Flycatcher for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-MC	ID	--	--	--	3	4
BI-SS	ID	--	--	--	1	2
SH-MC**	ID	--	--	--	8	8
SH-MG	ID	--	--	--	1	1
SH-MR	ID	--	--	--	1	1
WY-AS	ID	--	--	--	4	4
WY-JW	ID	--	--	--	1	1
WY-MC	ID	--	--	--	26	26
WY-MR	ID	--	--	--	13	15

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Olive-sided Flycatchers on transects in Wyoming, 2006.

Willow Flycatcher
(*Empidonax traillii*)

WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Willow Flycatcher is a riparian obligate that uses willow or alder thickets along river bottoms, especially those bordered by open stands of cottonwood. In 2006, we detected 36 Willow Flycatchers in montane riparian habitat on MWB. The number of detections of Willow Flycatcher has steadily increased each year since the inception of MWB as we have continued to establish and survey more transects in montane riparian habitat. The Willow Flycatcher should be effectively monitored under MWB in at least montane riparian habitat.

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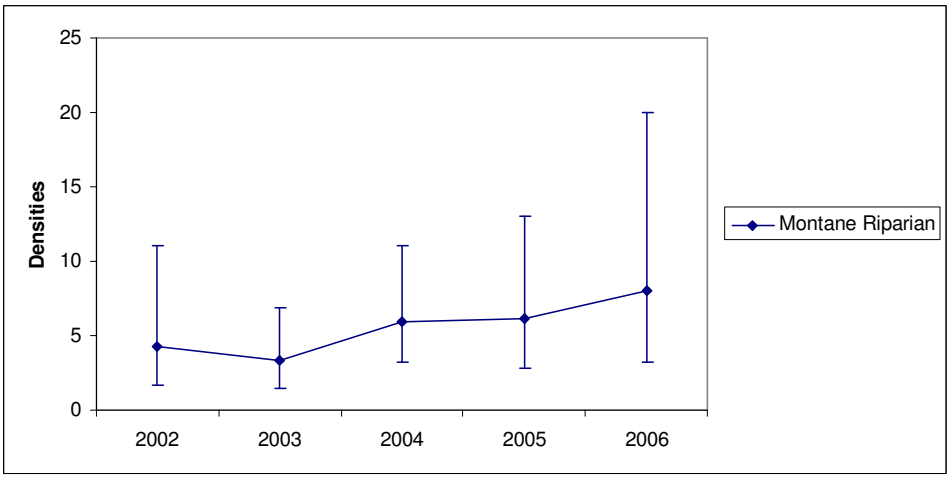
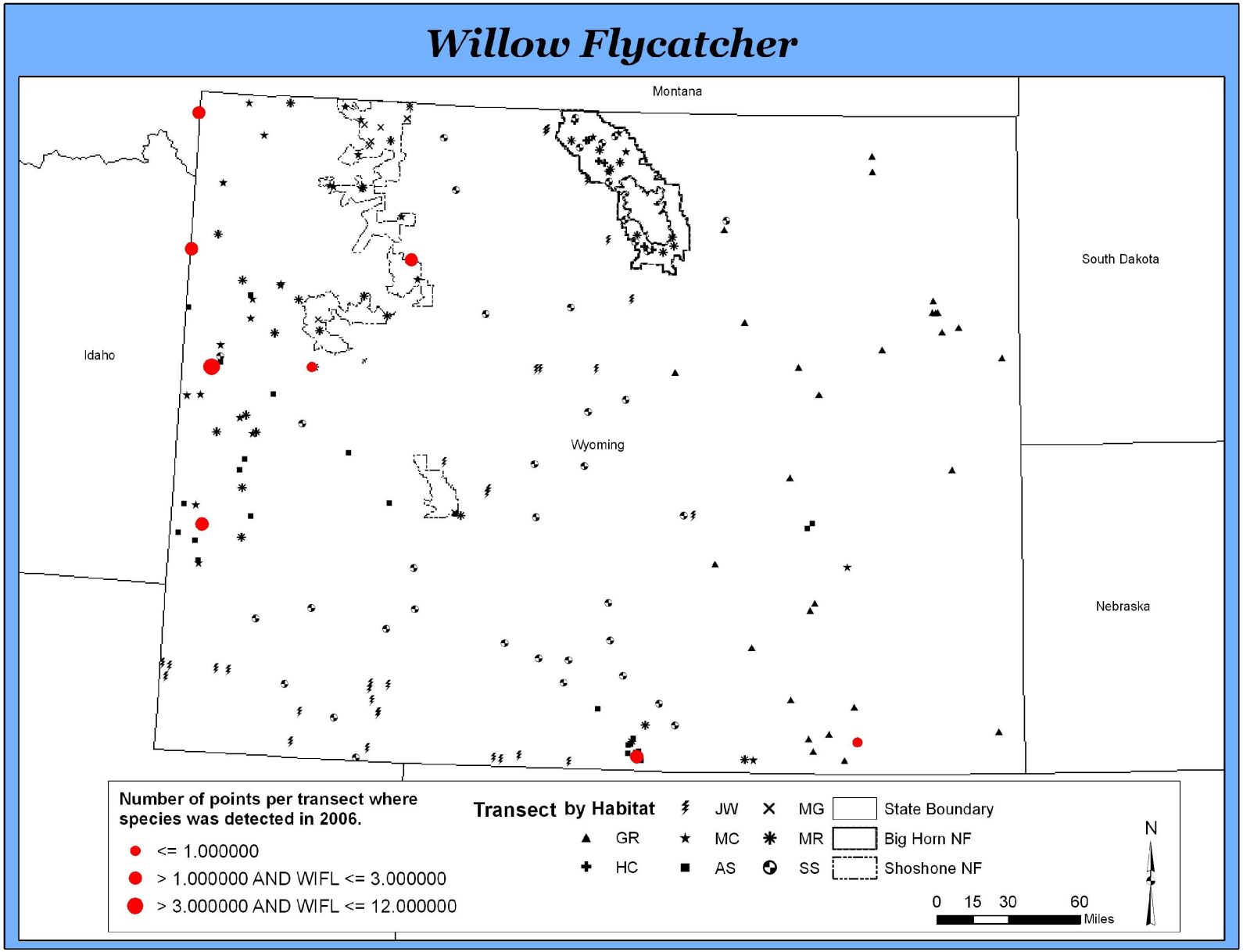


Estimated density (birds/km2) of the Willow Flycatcher (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Willow Flycatcher on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MR	ID	--	--	--	2	2
WY-MR	8.0	3.2	20	59	28	34

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

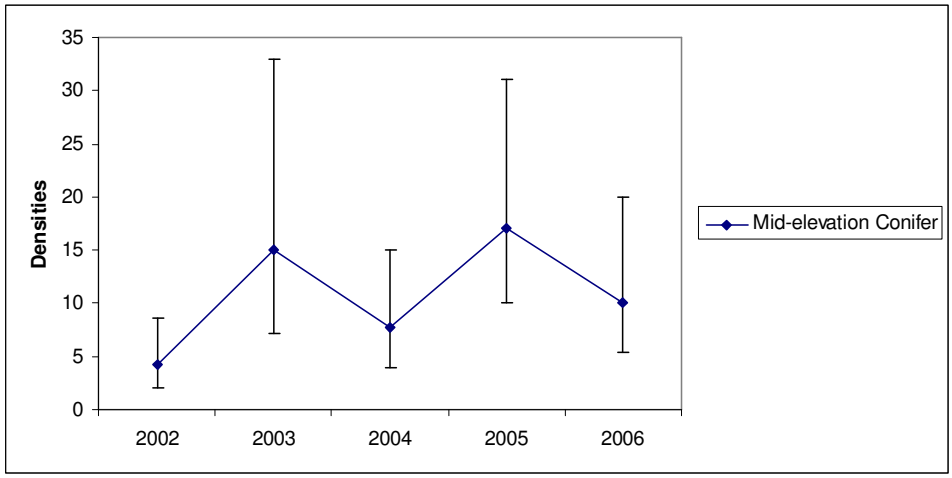


RMBO point-transect locations and detections of Willow Flycatchers on transects in Wyoming, 2006.

Hammond's Flycatcher
(*Empidonax hammondii*)

WY-PIF Level II Priority Species

Hammond's Flycatchers typically nest in moist, closed-canopy coniferous forests. In 2006, we detected 80 Hammond's Flycatchers in four habitats on MWB transects. The Hammond's Flycatcher should be effectively monitored through point-transects under MWB in a variety of habitats, especially mid-elevation conifer. After next season, we anticipate having enough observations to calculate a global detection function for this species at least in aspen habitat using data from all years. With this function we will be able to generate annual density estimates that can be used for population-trend monitoring.

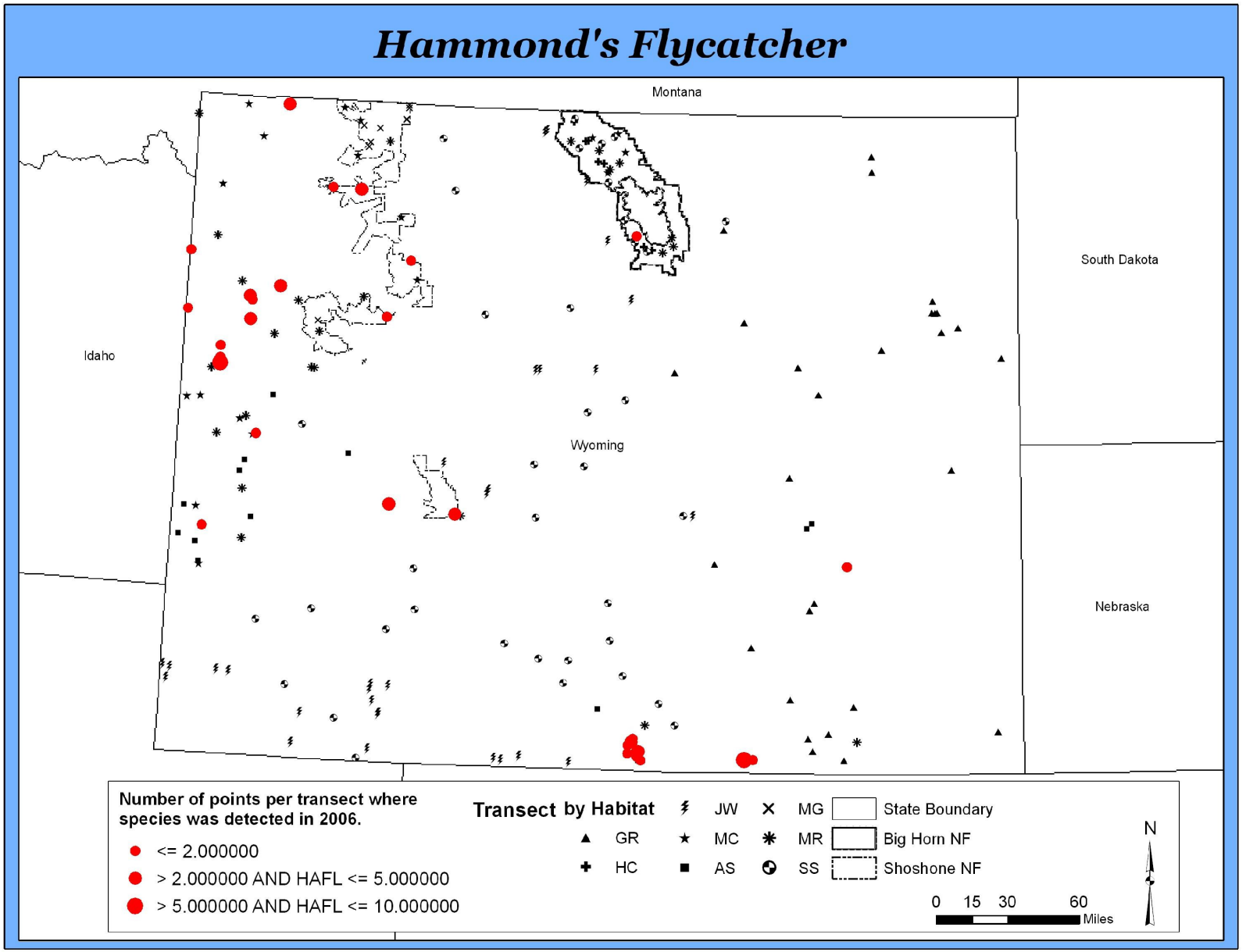


Estimated density (birds/km2) of the Hammond's Flycatcher (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Hammond's Flycatcher on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-MR*	ID	--	--	--	1	1
SH-MC**	ID	--	--	--	7	7
SH-MR	ID	--	--	--	6	6
WY-AS	ID	--	--	--	29	30
WY-MC	10	5.4	20	40	19	19
WY-MR	ID	--	--	--	21	23
WY-SS	ID	--	--	--	2	2

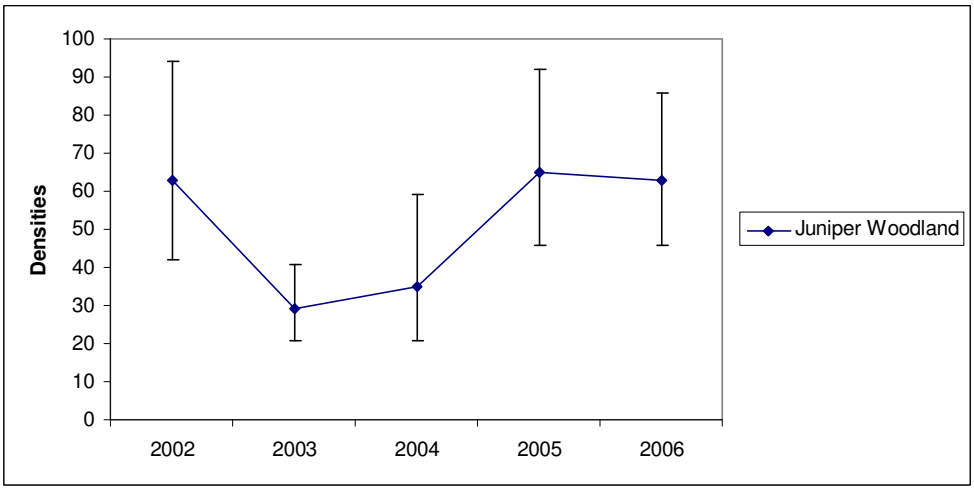
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Hammond's Flycatchers on transects in Wyoming, 2006.

Gray Flycatcher
(Empidonax wrightii)
WY-PIF Level II Priority Species

The Gray Flycatcher is found in juniper woodland across central and southwestern Wyoming. In 2006, we detected 311 Gray Flycatchers in two habitats on MWB. The Gray Flycatcher should be effectively monitored under MWB in juniper woodland habitat.

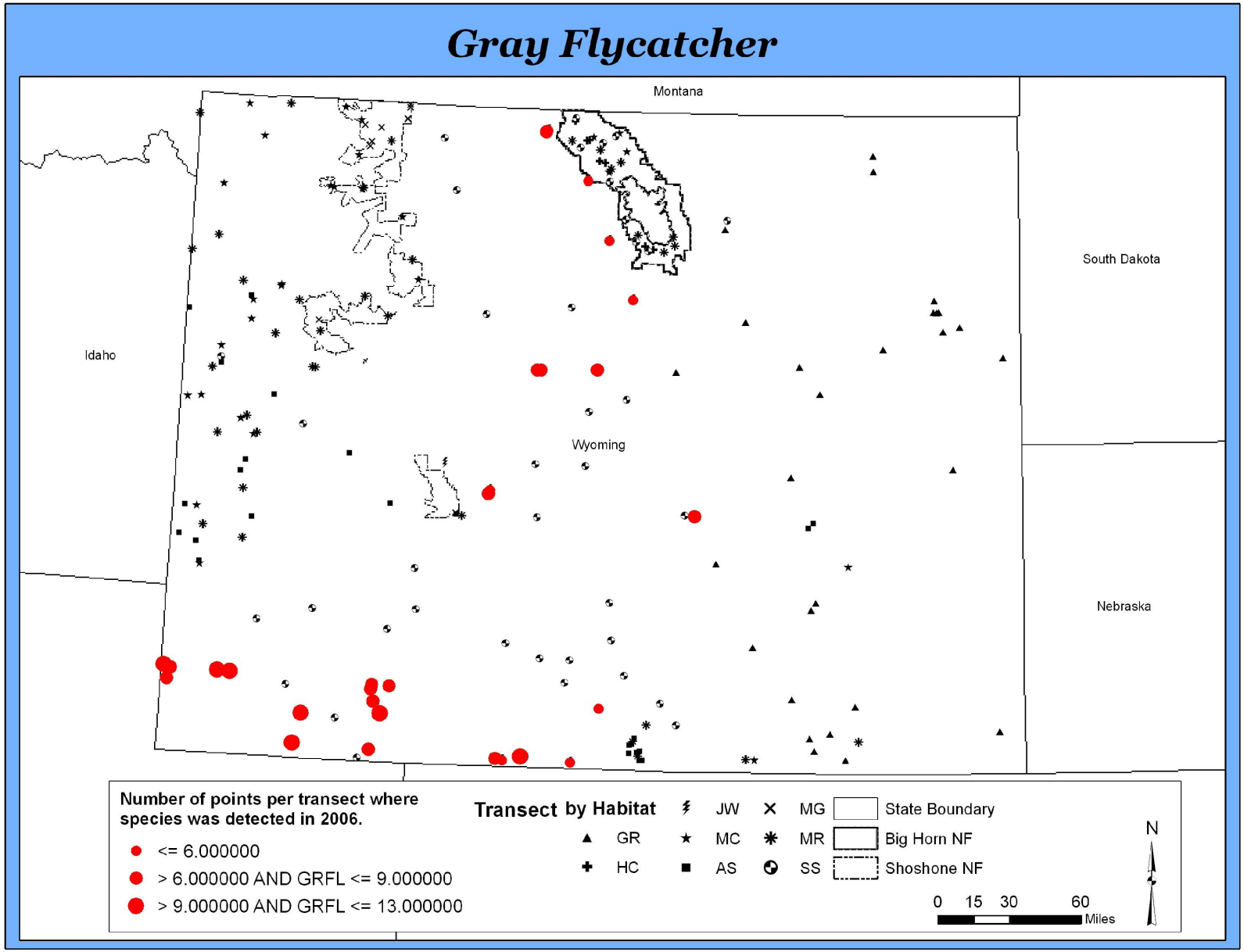


Estimated density (birds/km2) of the Gray Flycatcher (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of detections, number of individuals, and habitat-specific density estimates for Gray Flycatcher on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	--	4
WY-JW	63	46	86	19	288	307

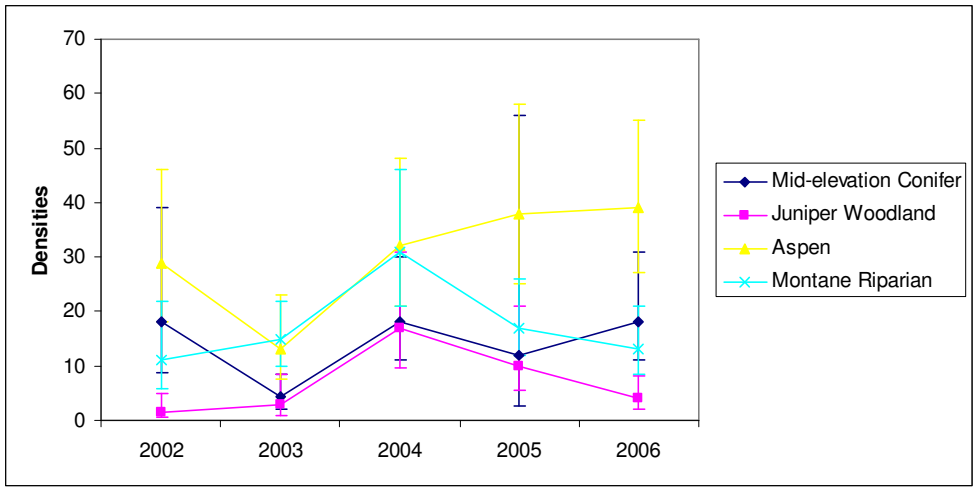
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Gray Flycatchers on transects in Wyoming, 2006.

Dusky Flycatcher
(*Empidonax oberholseri)*
WY-PIF Level II Priority Species

The Dusky Flycatcher uses a wide range of open woodland and shrub habitat, including ponderosa pine savannah, juniper, aspen, cottonwood-riparian, Gambel oak, and riparian shrub throughout Wyoming. In 2006, we detected 324 Dusky Flycatchers in seven habitats on MWB. It reached its highest density in aspen habitat, followed by mid-elevation conifer habitat in the Shoshone National Forest in 2006. The Dusky Flycatcher should be effectively monitored in a range of habitats under MWB.

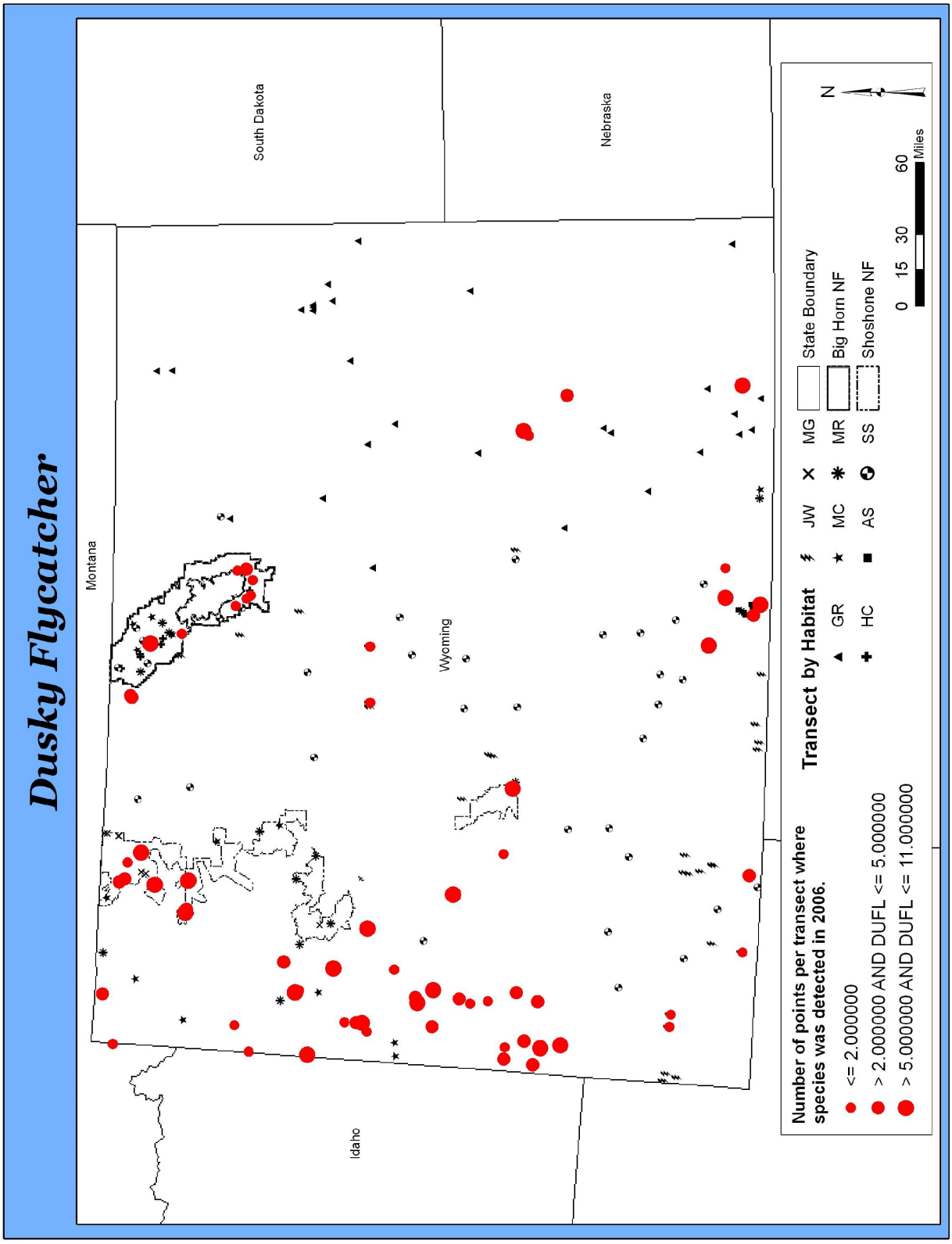


Estimated density (birds/km2) of the Dusky Flycatcher (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Dusky Flycatcher on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	4	4
BI-MR*	5.4	2.4	12	45	17	17
BI-SS	ID	--	--	--	1	1
SH-MC**	25	11	55	45	26	27
SH-MG	ID	--	--	--	14	14
SH-MR	20	7.6	52	57	26	27
WY-AS	39	27	55	21	101	115
WY-JW	4.2	2.1	8.1	40	16	22
WY-MC	18	11	31	32	61	63
WY-MR	13	8.4	21	28	54	62
WY-SS	ID	--	--	--	6	6

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Dusky Flycatchers on transects in Wyoming, 2006.

Cordilleran Flycatcher
(*Empidonax occidentalis*)

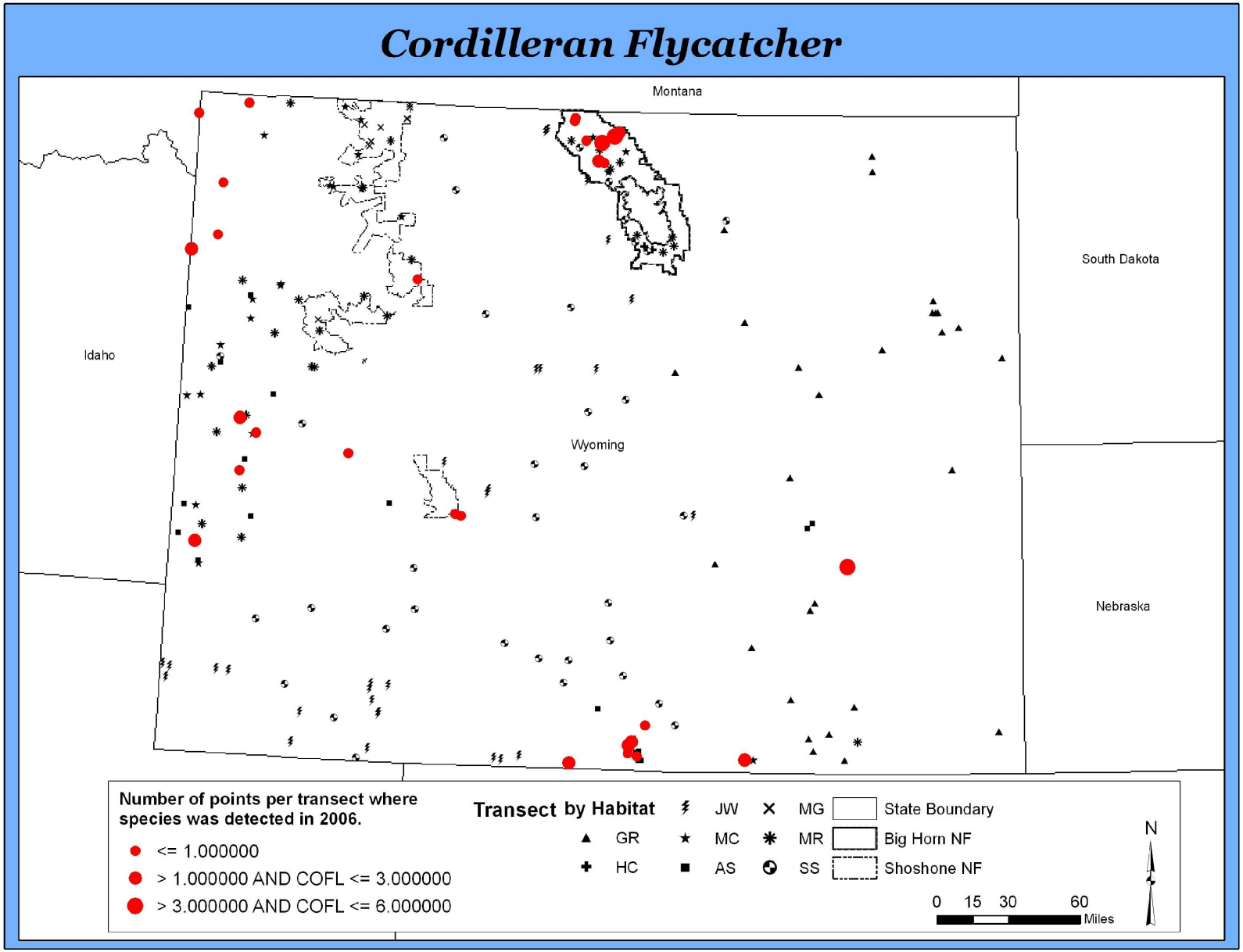
WY-PIF Level II Priority Species

The Cordilleran Flycatcher nests in forested areas where cliffs or rocky ledges are present, and is often found in riparian areas. It is also occasionally found in pinyon-juniper stands that have a deciduous component. In 2006, we detected 54 Cordilleran Flycatchers in six habitats on MWB. Cordilleran Flycatchers are detected infrequently in most habitats. However, in a few years, using data from all years, we may be able to calculate a global detection function and thereby generate an annual density estimate for Cordilleran Flycatcher that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Cordilleran Flycatcher on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	4	5
BI-MC	ID	--	--	--	2	2
BI-SS	ID	--	--	--	9	9
SH-MC**	ID	--	--	--	1	1
WY-AS	ID	--	--	--	7	8
WY-JW	ID	--	--	--	2	3
WY-MC	ID	--	--	--	11	11
WY-MR	ID	--	--	--	10	16

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Cordilleran Flycatchers on transects in Wyoming, 2006.

Say's Phoebe
(*Sayornis saya*)

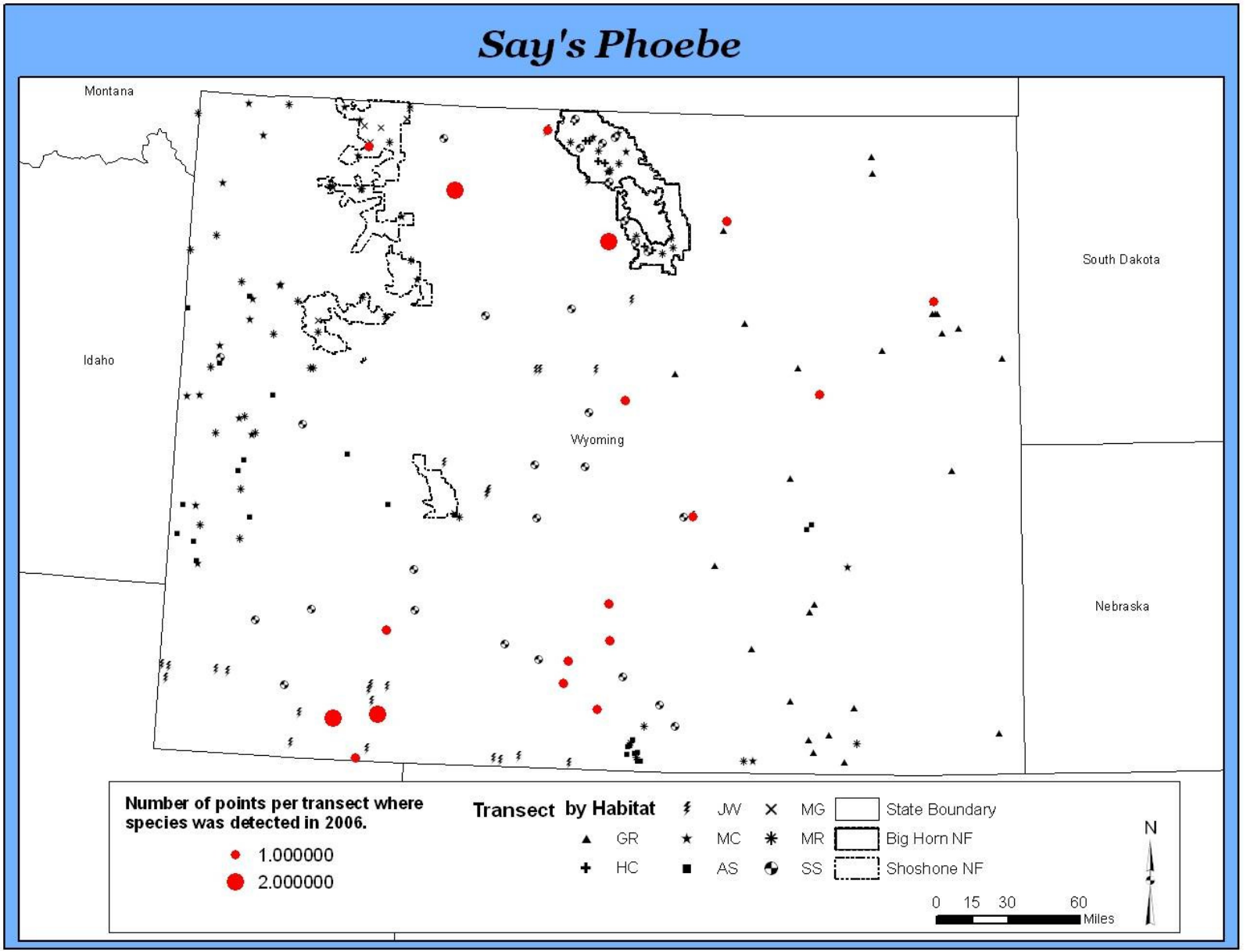
WY-PIF Level III Priority Species

The Say's Phoebe inhabits arid, open country with sparse vegetation and nests on rocky ledges, as well as barns and other human structures. This species arrives on its breeding grounds earlier than most other migrants, and as a result we may miss the period when it is most actively singing, since we begin surveys in mid-May at the earliest. In 2006, we detected 24 Say's Phoebes in five habitats under MWB. We have not detected Say's Phoebes in sufficient numbers to provide a density estimate for any habitat on the MWB program. However, in a few years, using data from all years we may be able to calculate a global detection function and thereby generate an annual density estimate for Say's Pheobe that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Say's Phoebe for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MG	ID	--	--	--	1	1
WY-AS	ID	--	--	--	1	1
WY-GR	ID	--	--	--	2	2
WY-JW	ID	--	--	--	7	7
WY-SS	ID	_--_	--	--	12	13

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Say's Phoebes on transects in Wyoming, 2006.

Ash-throated Flycatcher
(*Myiarchus cinerascens*)

WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Ash-throated Flycatcher is most often found in succesional scrub and juniper woodlands. It nests in cavities excavated by other species but will use man-made boxes if they are present. In 2006, we detected 14 Ash-throated Flycatchers in juniper-woodland habitat on MWB. The Ash-throated Flycatcher has been confirmed as a breeder only in the juniper woodlands of southwestern Wyoming. In 2006, we detected Ash-throated Flycathcers on juniper woodland transects throughout the central part of Wyoming from the central to the southern border. In the last five years, we have detected a total of 55 Ash-throated Flycatchers in juniper-woodland habitat in Wyoming. At this rate, in another five years, using data from all years we may be able to calculate a global detection function and thereby generate an annual density estimate for Ash-throated Flycatcher that can be used for population-trend monitoring.
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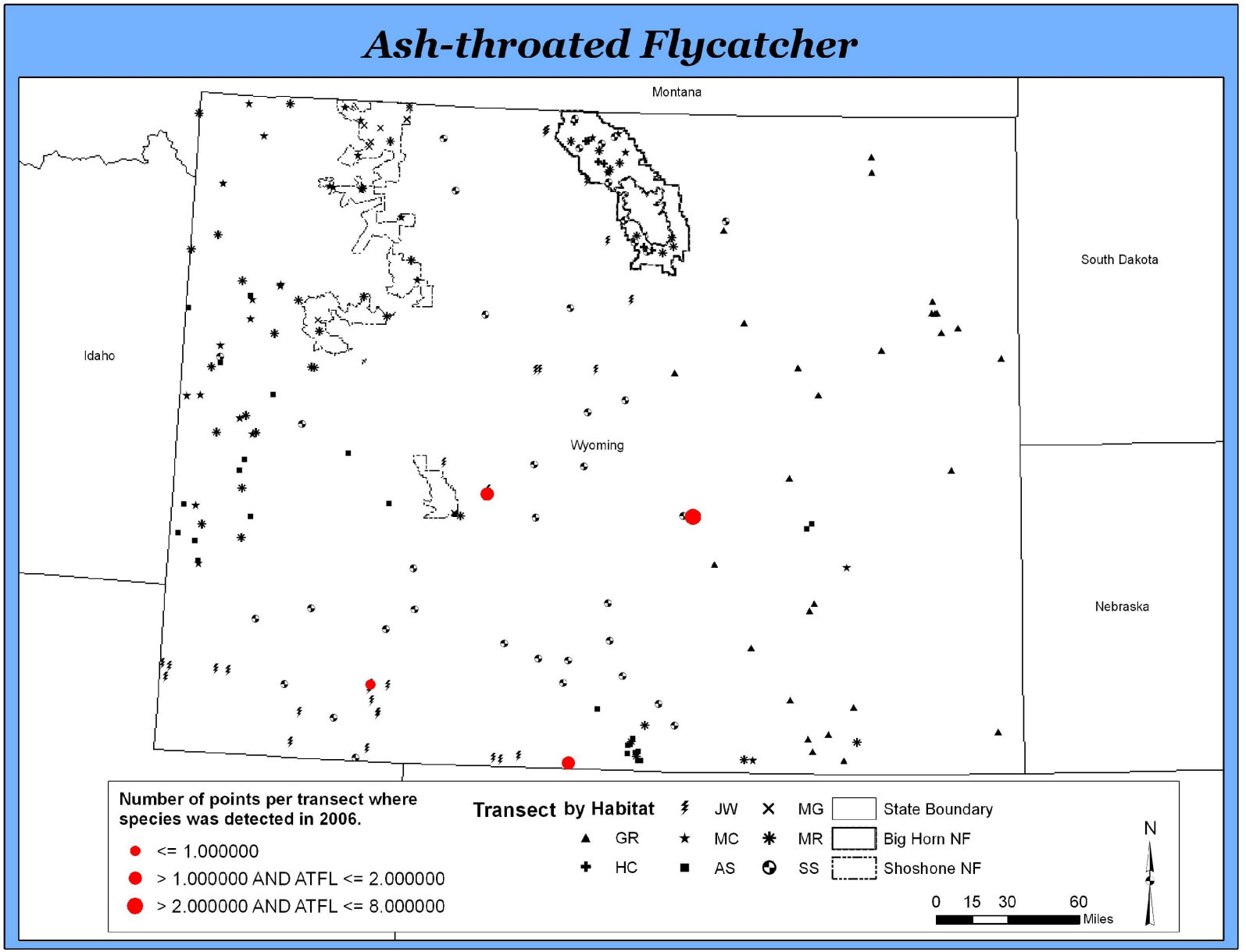
Total number of independent detections, number of individuals, and habitat-specific density estimates for the Ash-throated Flycatcher on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	ID	--	--	--	13	14

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Ash-throated Flycatchers on transects in Wyoming, 2006.

Loggerhead Shrike
(*Lanius ludovicianus*)

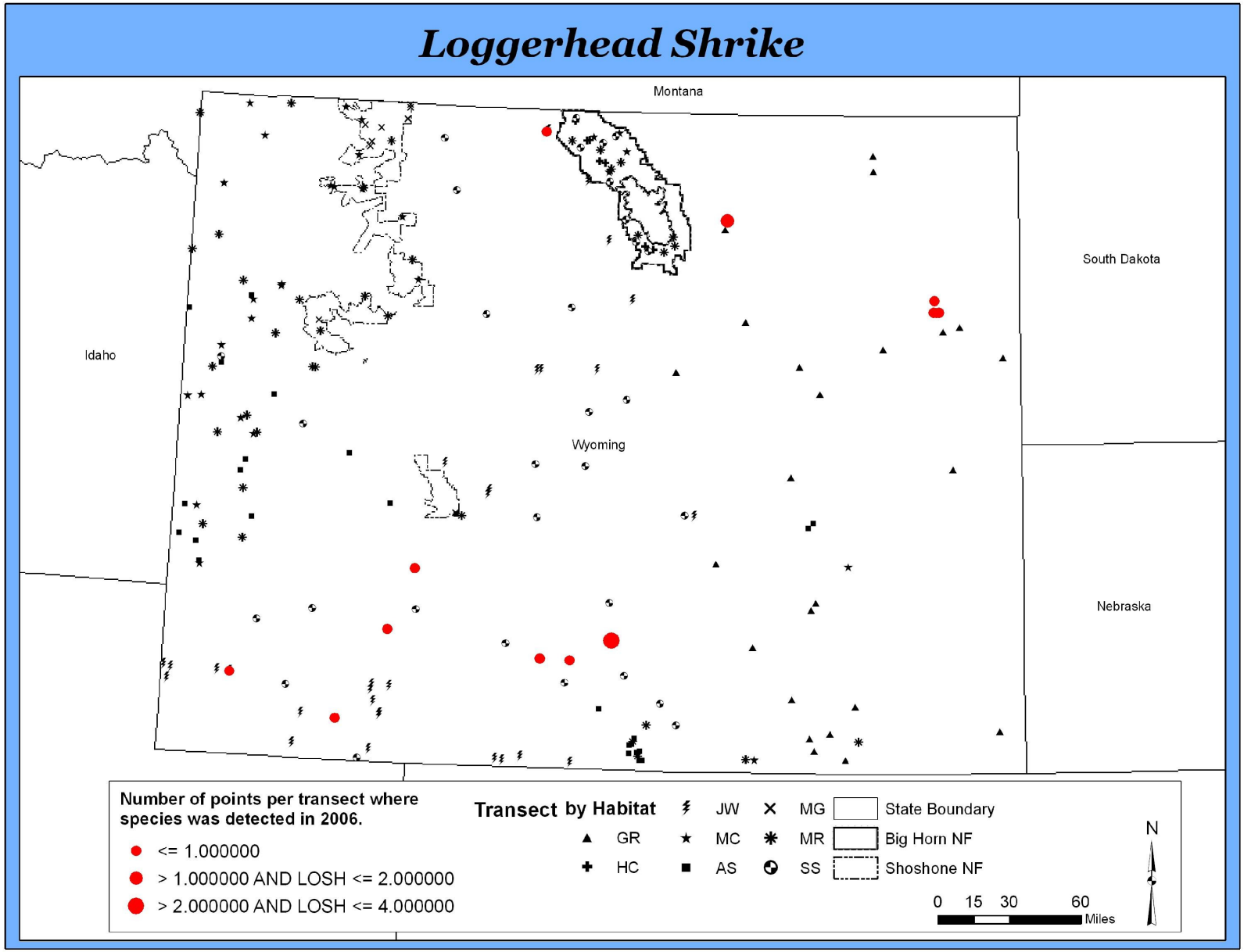
USFS Region 2 Sensitive Species
WY-PIF Level II Priority Species
USFWS Bird of Conservation Concern

The Loggerhead Shrike breeds across Wyoming in prairie, sagebrush shrublands, mountain-foothills shrublands, and pine-juniper woodlands. In 2006, we detected 19 Loggerhead Shrikes in three habitats on MWB. We do not detect this species in sufficient numbers to effectively monitor its population through point-transects in any one habitat or across habitats under MWB. Using the line transect data or data across years, we may be able to obtain a better estimate of density that we can use for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Loggerhead Shrike on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-GR	ID	--	--	--	4	5
WY-JW	ID	--	--	--	1	2
WY-SS	ID	--	--	--	10	12

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Loggerhead Shrike on transects in Wyoming, 2006.

Plumbeous Vireo
(*Vireo plumbeus*)

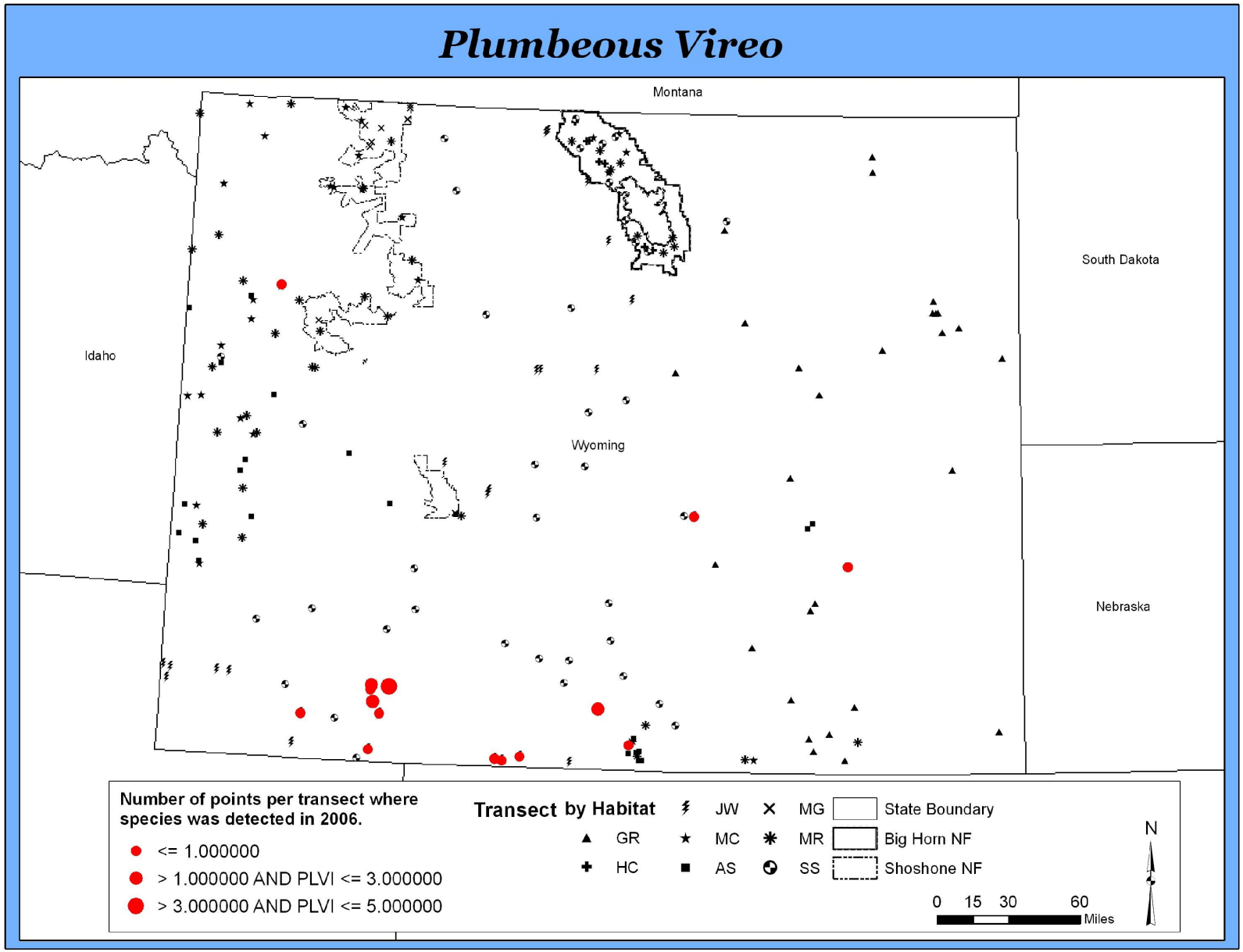
WY-PIF Level II Priority Species

The Plumbeous Vireo has a wide habitat tolerance, including coniferous and mixed forests. It will use openings caused by logging and fire, but is apparently sensitive to forest fragmentation. In 2006, we detected 24 Plumbeous Vireos in three habitats on MWB. Plumbeous Vireo is found throughout the foothills of Wyoming; however, we primarily detect this species on juniper-woodland transects in the southwestern portion of the state. In the last five years, we have detected a total of 127 Plumbeous Vireos in juniper-woodland habitat in Wyoming, with 90 of these being independent detections. After next season, we anticipate having enough observations to calculate a global detection function for the Plumbeous Vireo at least in juniper-woodland habitat using data from all years. With this function we will be able to generate annual density estimates that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Plumbeous Vireo on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	4	4
WY-JW	ID	--	--	--	18	18
WY-MC	ID	--	--	--	2	2

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Plumbeous Vireos on transects in Wyoming, 2006.

Western Scrub-Jay
(*Aphelocoma californica*)

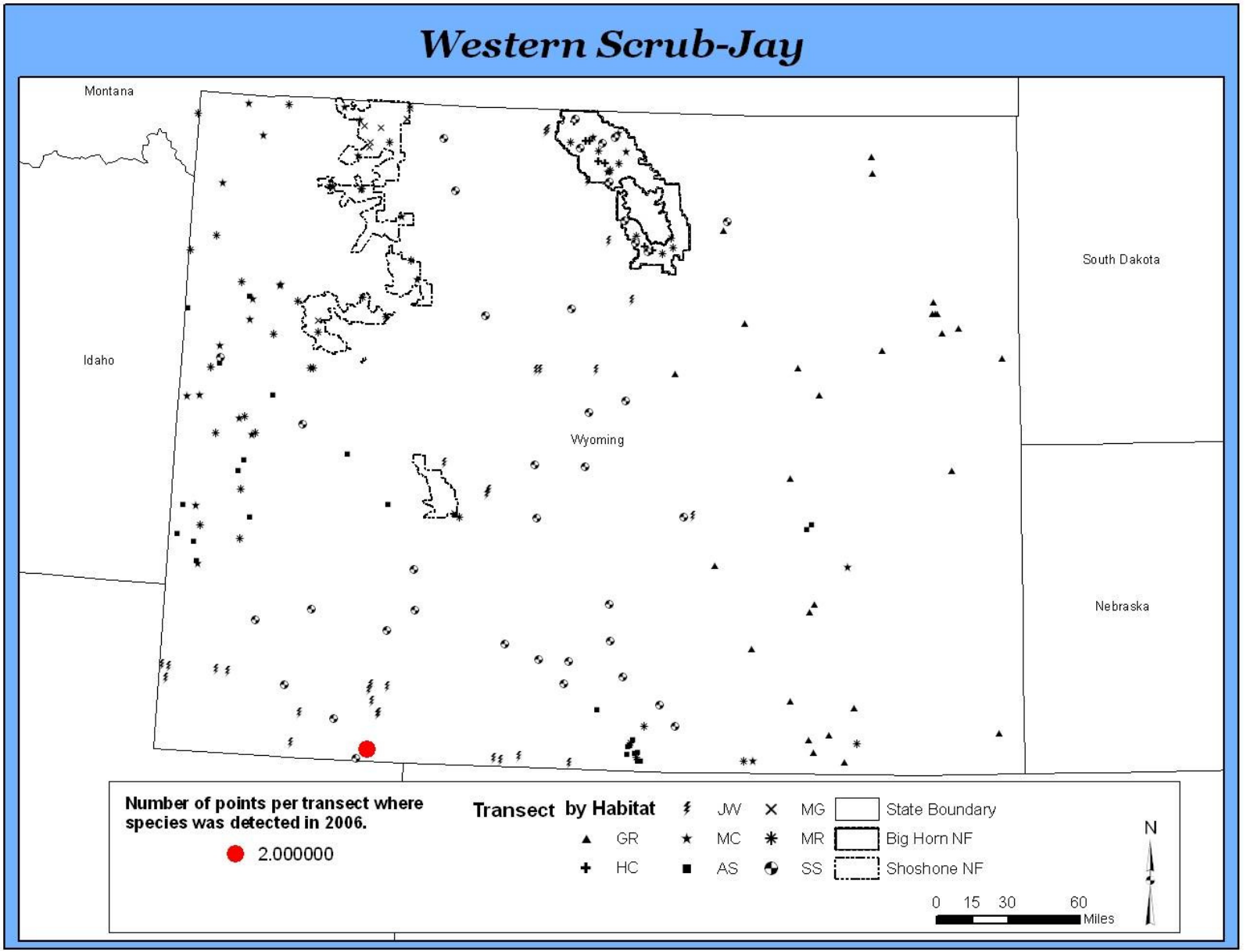
WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Western Scrub-Jay is associated with mature juniper woodlands and is known to nest only in southwestern Wyoming. In 2006, we detected two Western Scrub-Jays in juniper-woodland habitat on MWB. Both detections of this species in 2006 were along transect JW52. We also detected Western Scrub-Jays on this transect in 2002 and 2004. The number of detections of this species though is generally too few to effectively monitor this species under MWB. However, using the line transect data for all of the detections across years, we may be able to improve our power to detect a trend for this species in at least juniper-woodland habitat. Also, adding juniper woodland transects in the southwest portions of the state may improve our ability to monitor Western Scrub-Jay.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Western Scrub-Jay on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	ID	--	--	--	2	2

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

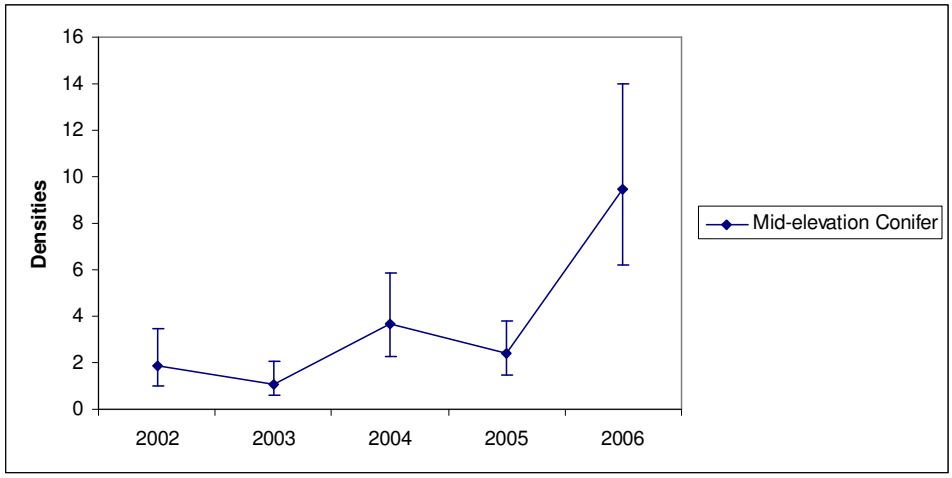


RMBO point-transect locations and detections of Western Scrub-Jays on transects in Wyoming, 2006.

Clark's Nutcracker
(*Nucifraga columbiana*)

WY-PIF Level III Priority Species

The Clark's Nutcracker nests in most coniferous habitats; however, Clark's Nutcrackers breed in February and detections in summer include that year's young. In 2006, we detected 276 Clark's Nutcrackers in eight habitats on MWB and calculated a density estimate in mid-elevation conifer habitats in Wyoming and the Shoshone National Forest. This program is not appropriate for monitoring the Clark's Nutcracker because the species' breeding date violates the assumption that all detections are of adults.

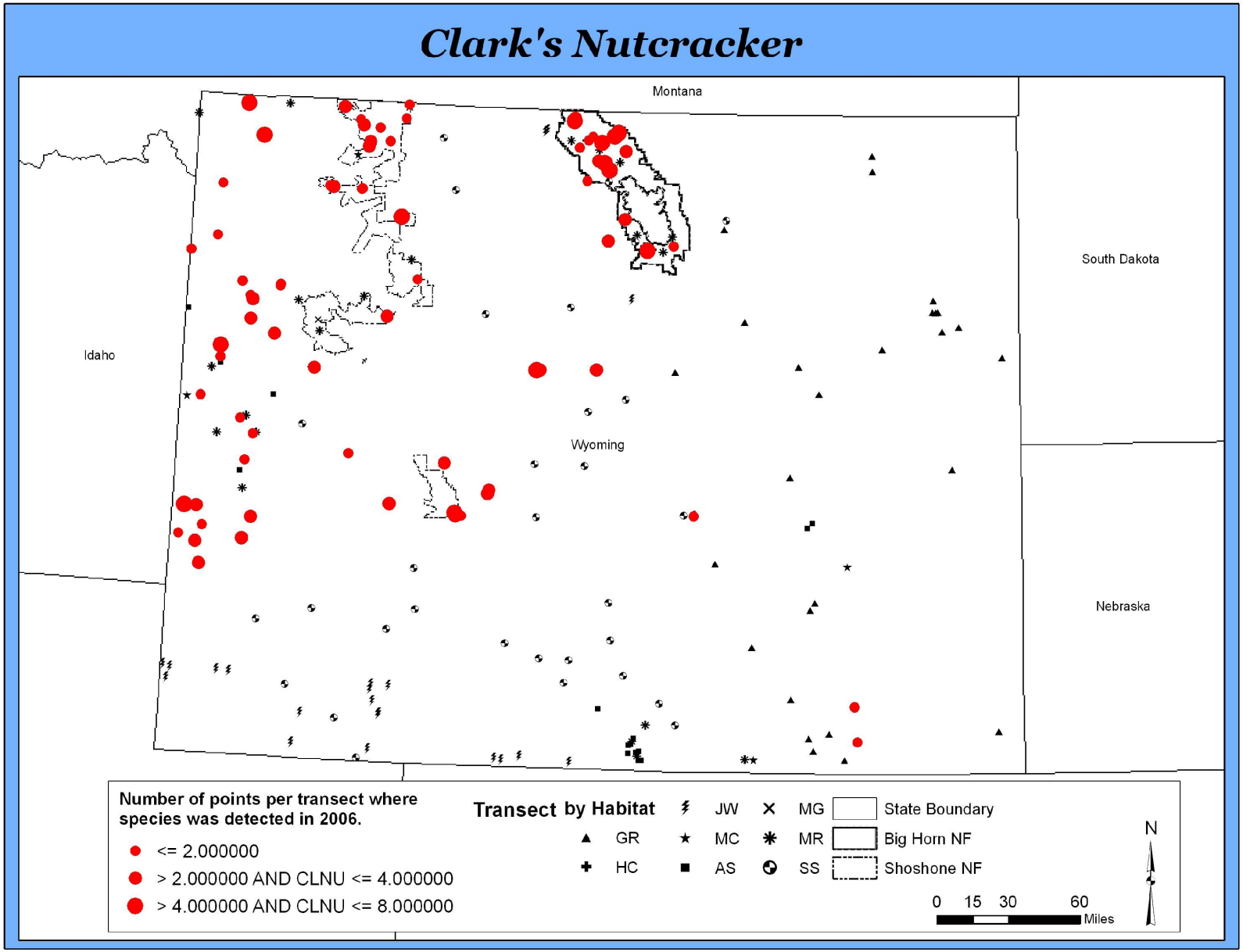


Estimated density (birds/km2) of the Clark's Nutcracker (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Clark's Nutcracker for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	26	26
BI-MC	ID	--	--	--	23	25
BI-MR*	ID	--	--	--	3	3
BI-SS	ID	--	--	--	20	21
SH-MC**	3.3	1.7	6.5	39	17	23
SH-MG	ID	--	--	--	21	22
SH-MR	ID	--	--	--	7	8
WY-AS	ID	--	--	--	31	38
WY-GR	ID	--	--	--	1	1
WY-JW	ID	--	--	--	29	29
WY-MC	9.5	6.2	14	26	62	77
WY-MR	ID	--	--	--	23	29
WY-SS	ID	--	--	--	2	3

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Clark's Nutcrackers on transects in Wyoming, 2006.

Northern Rough-winged Swallow
(*Stelgidopteryx serripennis*)

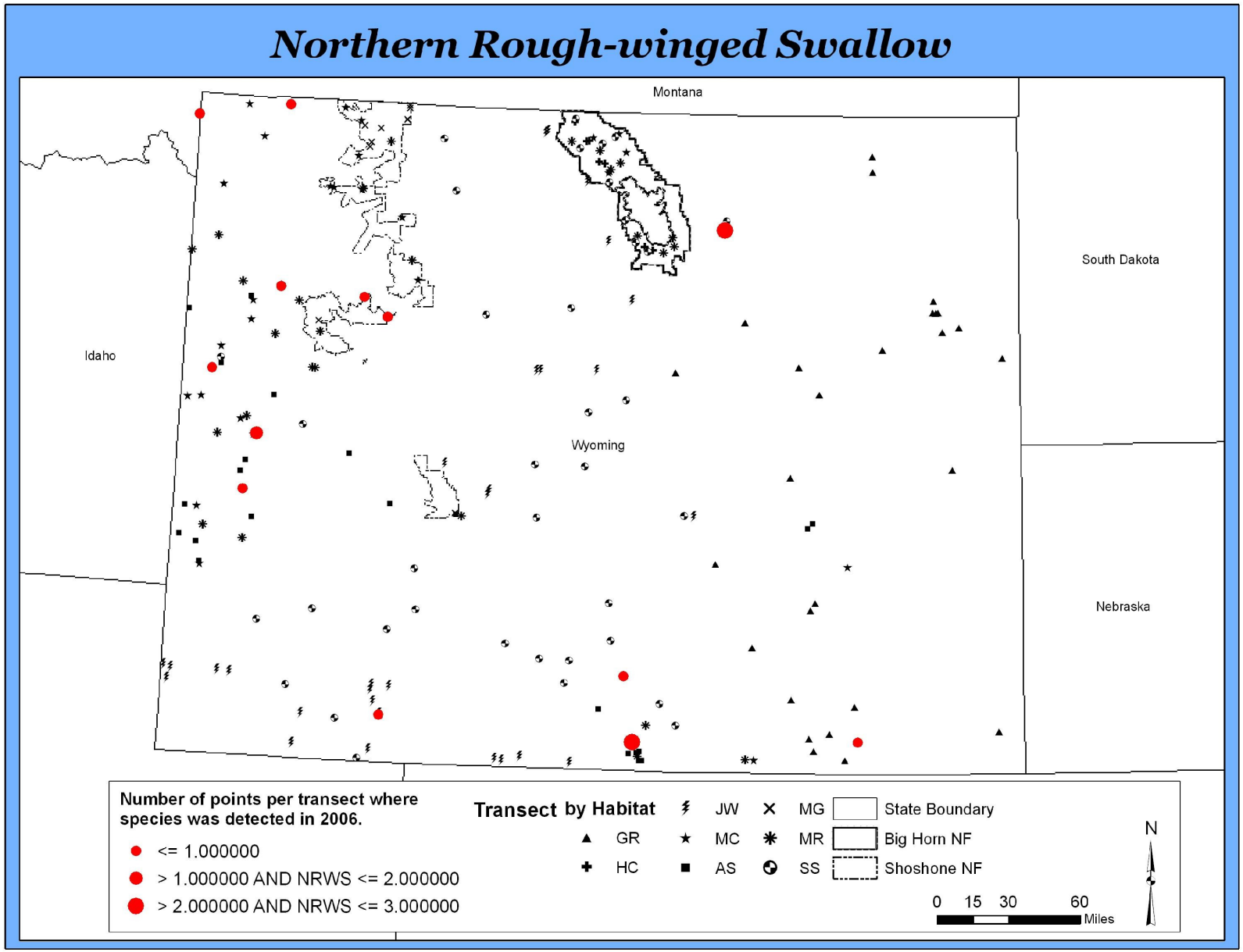
WY-PIF Level III Priority Species

The Northern Rough-winged Swallow nests throughout Wyoming below 2,400m elevation in a variety of open areas near water, including woodlands. Typically this species excavates burrows in stream banks for nesting, but it will also use rock crevices, culverts, bridges, buildings and other human structures. In 2006, we detected 43 Northern Rough-winged Swallows in five habitats on MWB. Due to its localized nature and specific nesting requirements, the Northern Rough-winged Swallow is not well-monitored by point transects. RBMO has developed a protocol (Bridge Surveys) to count birds that nest on or near bridges and this method may potentially be effective for monitoring most species of swallows.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Northern Rough-winged Swallow for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MR	ID	--	--	--	4	4
WY-GR	ID	--	--	--	4	15
WY-JW	ID	--	--	--	2	2
WY-MC	ID	--	--	--	1	4
WY-MR	ID	--	--	--	9	18
WY-SS	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Northern Rough-winged Swallows on transects in Wyoming, 2006.

Juniper Titmouse
(*Baeolophus ridgwayi*)

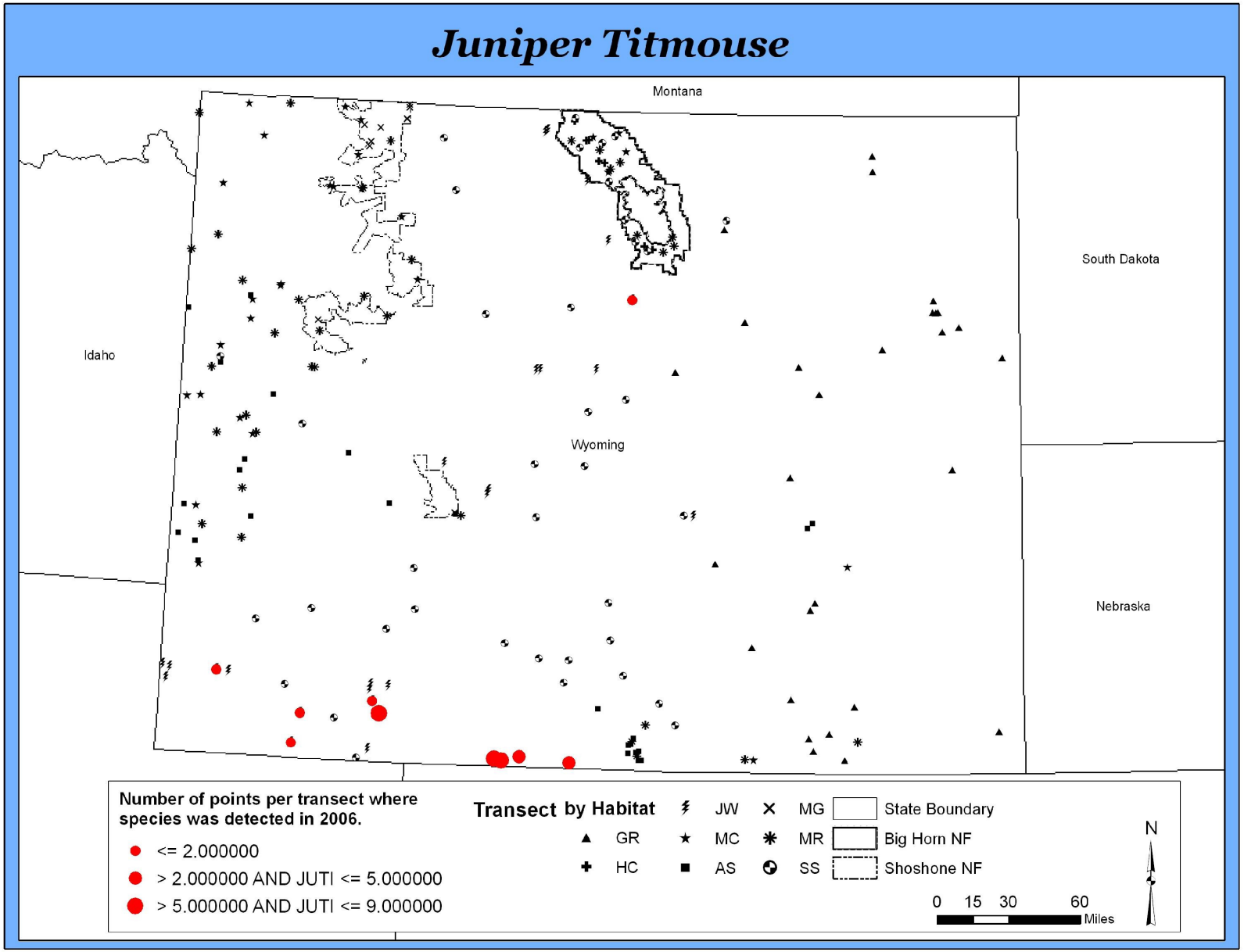
WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Juniper Titmouse is found in southwestern Wyoming in juniper woodlands and is rarely found in other habitats. This species nests in tree cavities excavated by other species. In 2006, we detected 57 Juniper Titmice in juniper woodland habitat on MWB. We have detected the Juniper Titmouse in southwestern Wyoming each year since the inception of MWB. In 2006, we had more than double the usual number of detections per year from this area. This brought the total number of independent detections for this species in juniper-woodland habitat across the five years to 89. After next season, we anticipate having enough observations to calculate a global detection function for the Juniper Titmouse at least in juniper-woodland habitat using data from all years. With this function we will be able to generate annual density estimates that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Juniper Titmouse on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	ID	--	--	--	45	57

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Juniper Titmice on transects in Wyoming, 2006.

Bushtit
(*Psaltriparus minimus*)

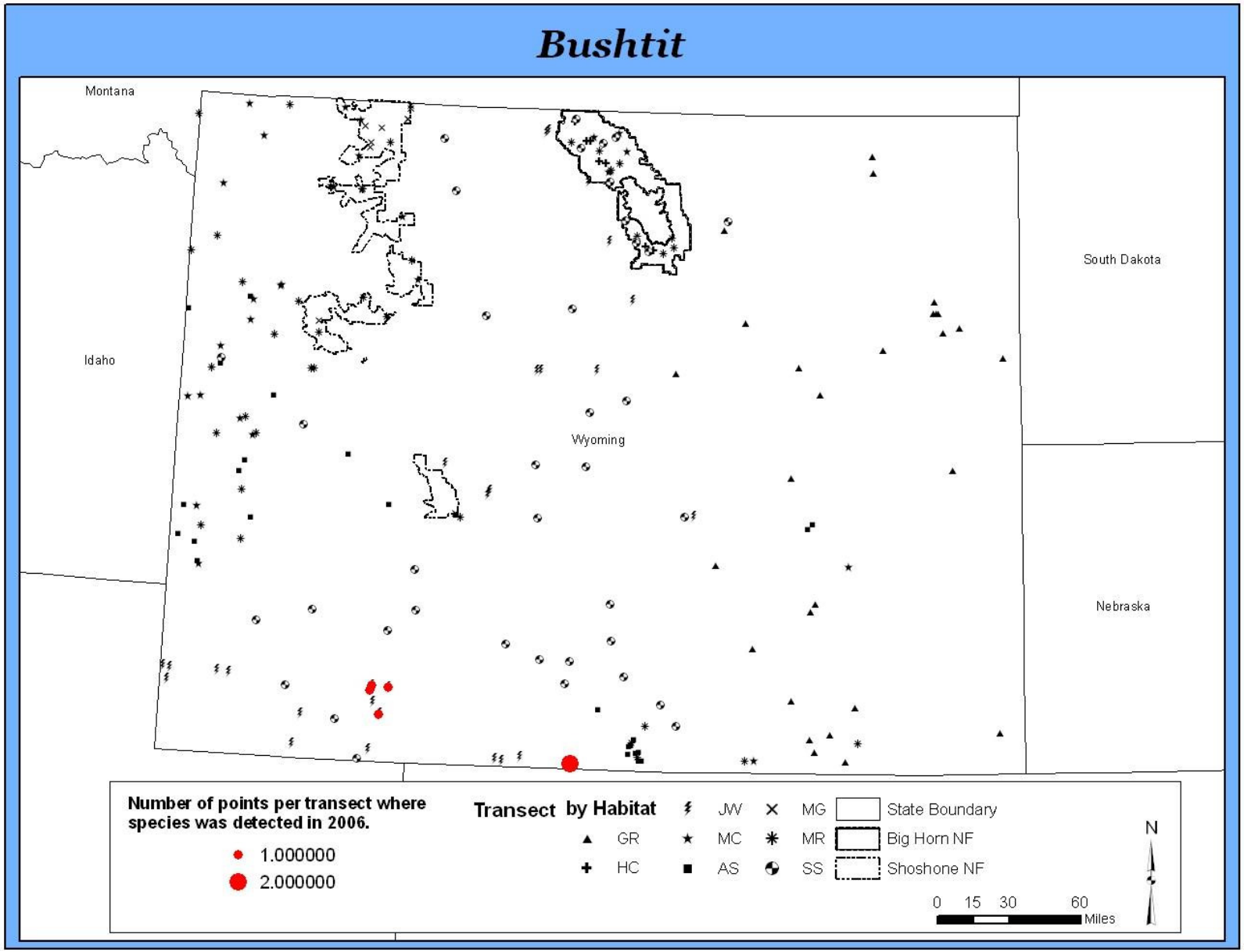
WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Bushtit is found in southwestern Wyoming in juniper woodlands. In 2006, we detected 10 Bushtits in juniper-woodland habitat on MWB. We have detected Bushtits in southwestern Wyoming on juniper woodland transects every year except 2002 under MWB. The number of Bushtit detections each year is too few though to calculate a density. However, using the line transect data or all of the detections across years, we may be able to improve our power to detect a trend for this species in at least juniper-woodland habitat. Also, adding juniper woodland transects in the southwest portions of the state may improve our ability to monitor the Bushtit.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Bushtit on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	ID	--	--	--	8	10

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Bushtit on transects in Wyoming, 2006.

Pygmy Nuthatch
(*Sitta pygmaea*)

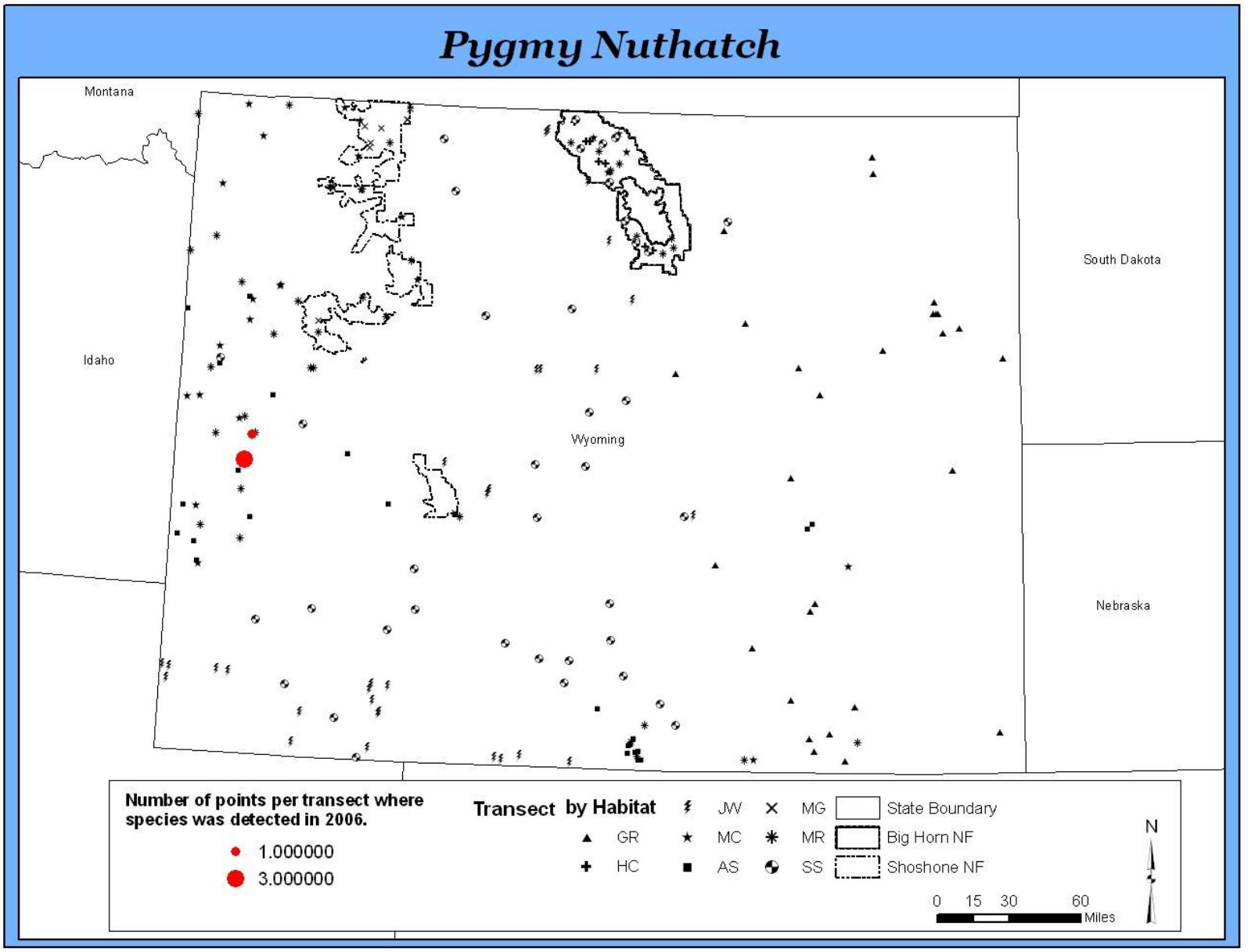
WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Pygmy Nuthatch is considered a ponderosa pine specialist and prefers mature old growth stands of ponderosa pine with less than 70% canopy cover. This species is found scattered throughout Wyoming, but breeds primarily in the ponderosa pine forests of eastern Wyoming. In 2006, we detected six Pygmy Nuthatches in two habitats on MWB. We detected Pygmy Nuthatches on one mid-elevation conifer transect, MC19; we also detected this species on this transect in 2002. Given the specific habitat requirements of the Pygmy Nuthatch, it is unlikely we will be able to monitor this species with the current level of effort under MWB. Adding low-elevation conifer to the list of statewide habitats that we survey would improve our ability to monitor this species. On other RMBO monitoring projects, where we target ponderosa pine habitat, we are usually able to detect this species in sufficient numbers to calculate a density estimate and monitor its status over time.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Pygmy Nuthatch on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	1	4
WY-MC	ID	--	--	--	2	2

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Pygmy Nuthatches on transects in Wyoming, 2006.

Brown Creeper
(*Certhia americana*)

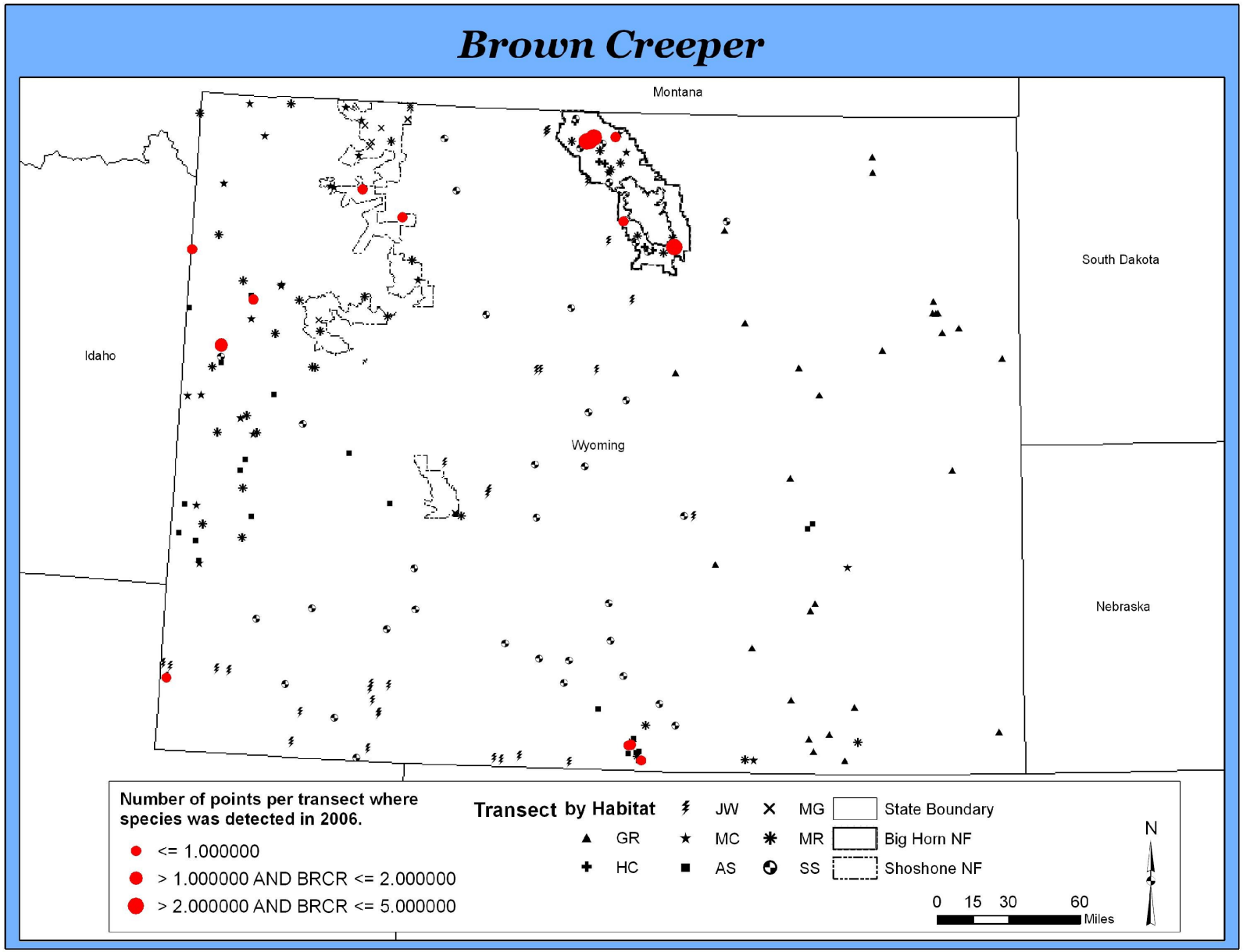
WY-PIF Level II Priority Species

The Brown Creeper is found throughout Wyoming during the breeding season in a variety of coniferous forests, including lodgepole pine, Douglas-fir, Engelmann spruce, and subalpine fur. In 2006, we detected 30 Brown Creepers in six habitats on MWB. The number of Brown Creeper detections each year though is too low to calculate a density in any habitat. However, using the line transect data or all of the detections across years, we may be able to improve our power to detect a trend for this species.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Brown Creeper on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	3	8
BI-MC	ID	--	--	--	4	6
BI-MR*	ID	--	--	--	4	4
BI-SS	ID	--	--	--	1	1
SH-MC**	ID	--	--	--	2	2
WY-AS	ID	--	--	--	1	4
WY-JW	ID	--	--	--	1	1
WY-MC	ID	--	--	--	5	5
WY-MR	ID	--	--	--	1	1

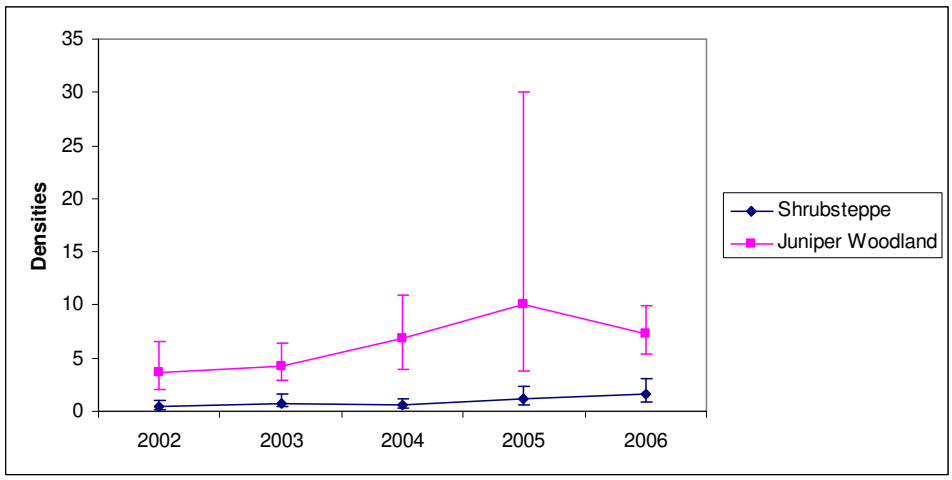
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Brown Creepers on transects in Wyoming, 2006.

Rock Wren
(Salpinctes obsoletus)
WY-PIF Level III Priority Species

The Rock Wren is found throughout Wyoming wherever there are landscape features such as rock outcroppings, canyons, and cliffs. In 2006, we detected 532 Rock Wrens in eight habitats on the MWB project, and we were able to calculate a density estimate in montane grassland, juniper woodland, and shrubsteppe habitats. We detect this species in sufficient numbers to monitor it effectively under MWB in a range of habitats, especially montane grassland, juniper woodland, and shrubsteppe.

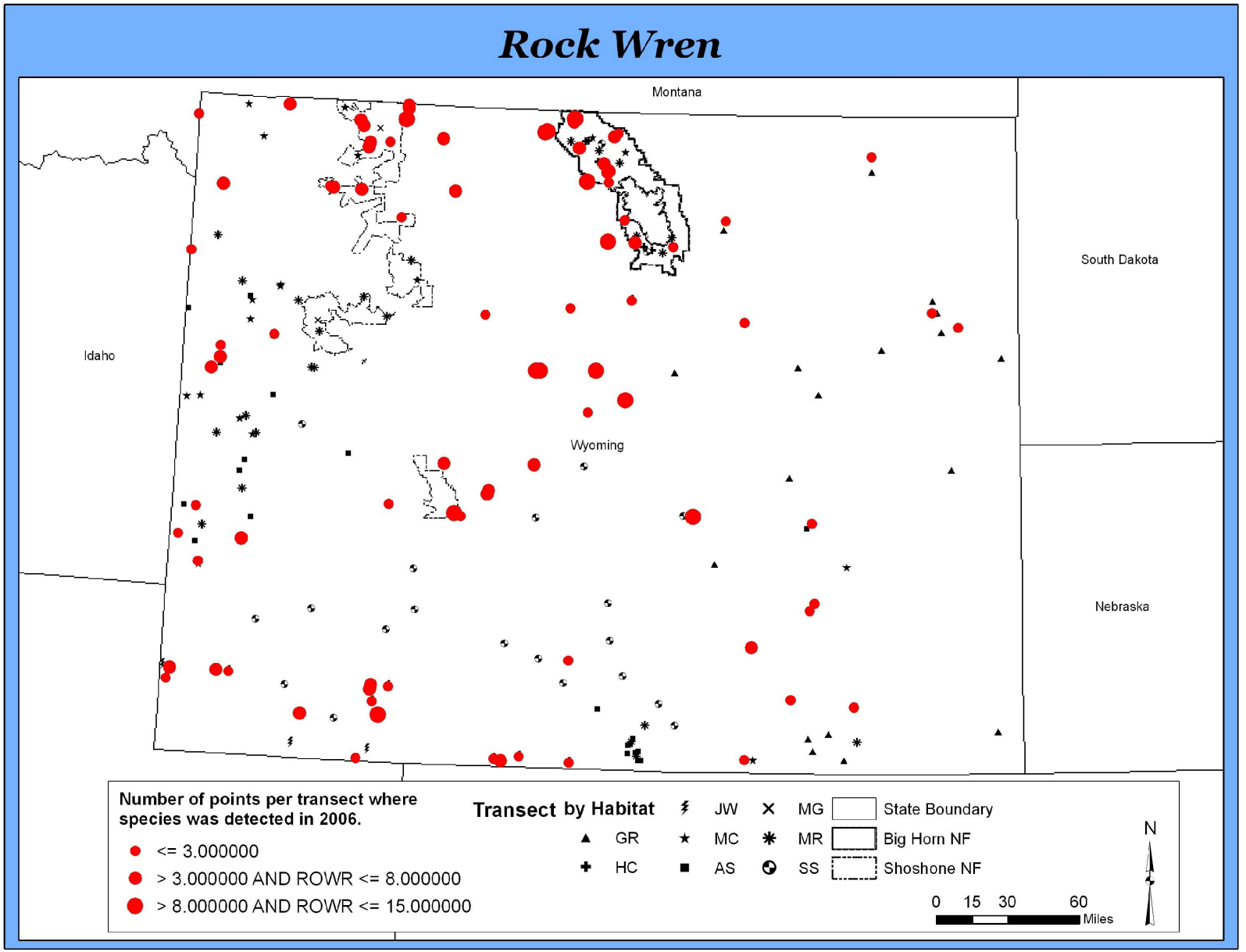


Estimated density (birds/km2) of the Rock Wren (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Rock Wren for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	15	15
BI-MC	ID	--	--	--	17	17
BI-MR*	ID	--	--	--	1	1
BI-SS	ID	--	--	--	33	33
SH-MC**	ID	--	--	--	24	24
SH-MG	14	9.5	20	21	71	75
SH-MR	ID	--	--	--	5	5
WY-AS	ID	--	--	--	10	10
WY-GR	ID	--	--	--	19	19
WY-JW	7.3	5.4	9.9	18	225	250
WY-MC	ID	--	--	--	33	33
WY-MR	ID	--	--	--	22	22
WY-SS	1.6	0.9	3.0	37	50	53

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Rock Wrens on transects in Wyoming, 2006.

Canyon Wren
(*Catherpes mexicanus*)

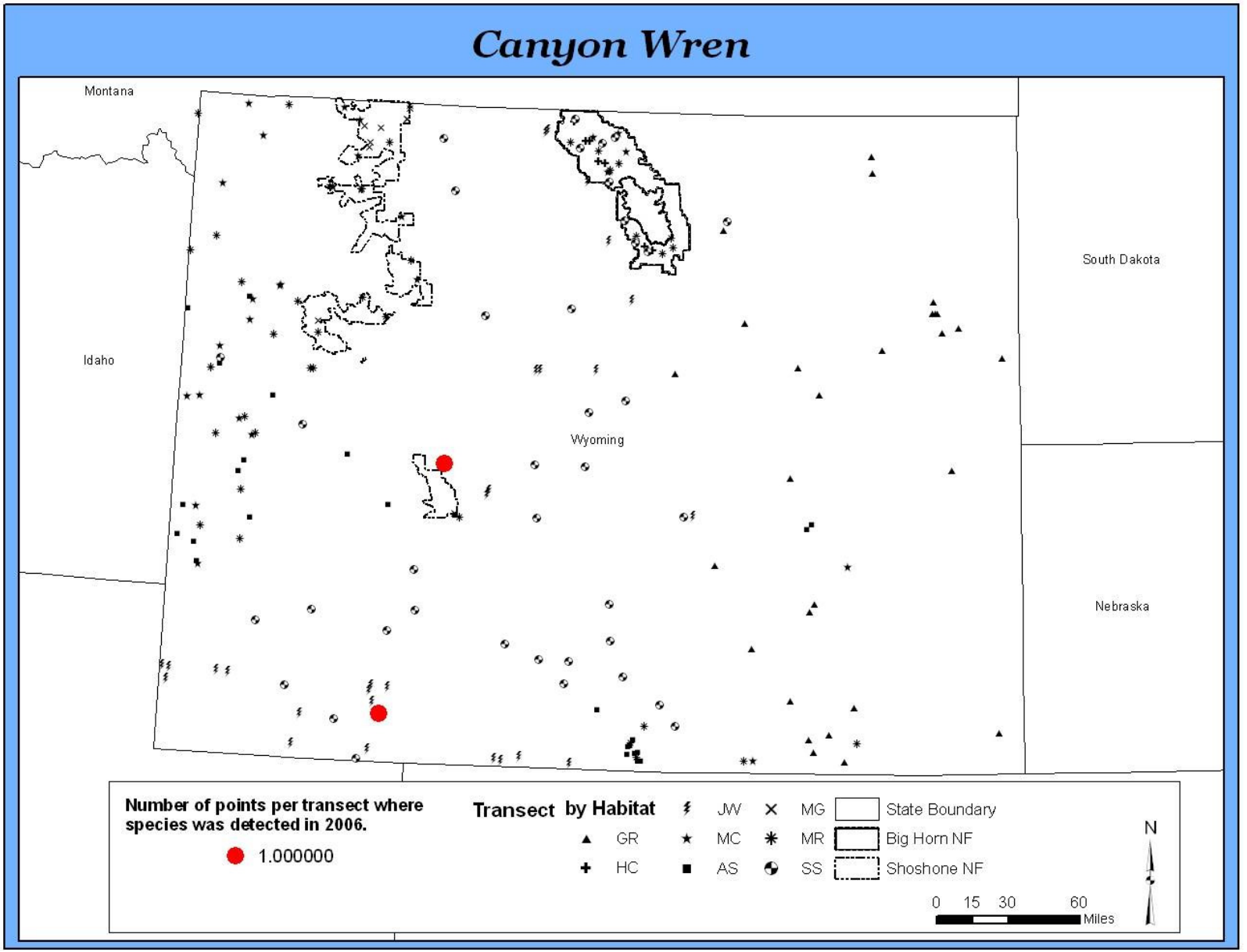
WY-PIF Level III Priority Species

Canyon Wrens breed in rocky areas with plenty of vertical surfaces with crevices in which to nest and search for prey. In 2006, we detected two Canyon Wrens on two juniper woodland transects, JW13 and JW43, on MWB. We also detected the Canyon Wren on transect JW13 in 2005. This was only the third year we detected Canyon Wrens on point transects under MWB. In five years we have only detected six Canyon Wrens, all in juniper-woodland habitat. Canyon Wrens are too localized to be adequately monitored by point transects under MWB. Effective monitoring of this species would require more intensive and focused efforts, involving surveying locations with rocky areas and vertical surfaces.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Canyon Wren for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	ID	--	--	--	2	2

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

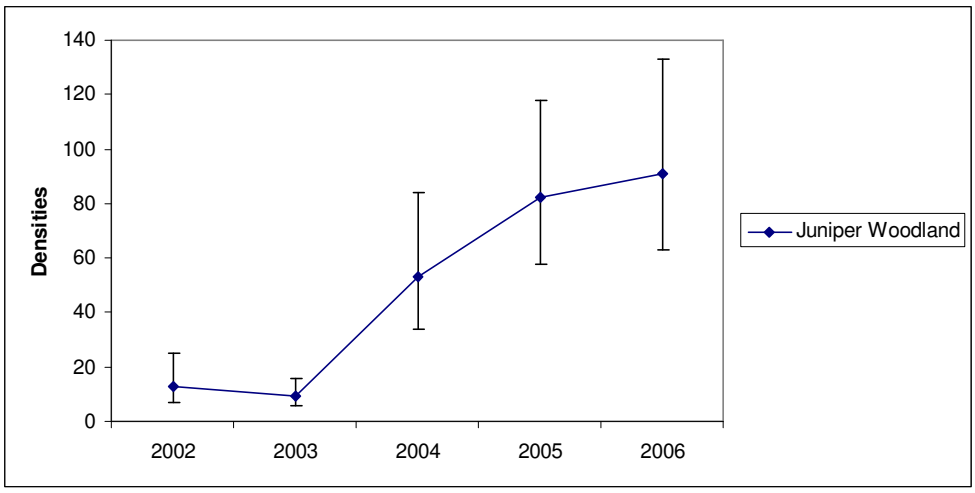


RMBO point-transect locations and detections of Canyon Wrens on transects in Wyoming, 2006.

Bewick's Wren
(Thryomanes bewickii)

WY-PIF Level III Priority Species
USFWS Bird of Conservation Concern

The Bewick's Wren is found in pine-juniper, woodland-chaparral and mountain-foothills shrublands in southwestern Wyoming. The species is a specialist of the juniper woodland community in Wyoming. In 2006, we detected 321 Bewick's Wrens in juniper woodland habitat on MWB. The Bewick's Wren should be effectively monitored under MWB in juniper-woodland habitat where it is consistently one of the most abundant species.

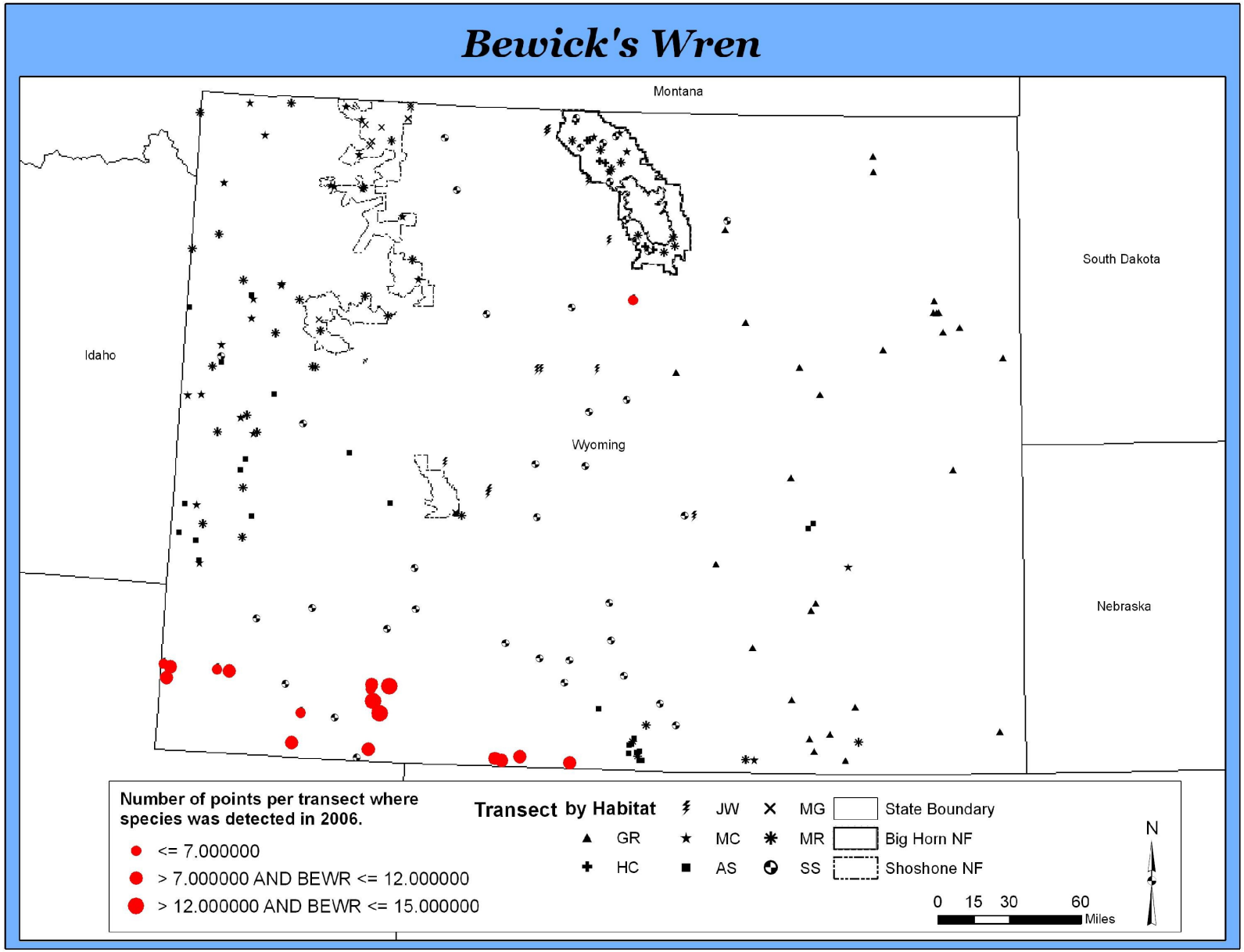


Estimated density (birds/km2) of the Bewick's Wren (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Bewick's Wren for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	91	63	133	22	281	321

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Bewick's Wrens on transects in Wyoming, 2006.

American Dipper
(*Cinclus mexicanus*)

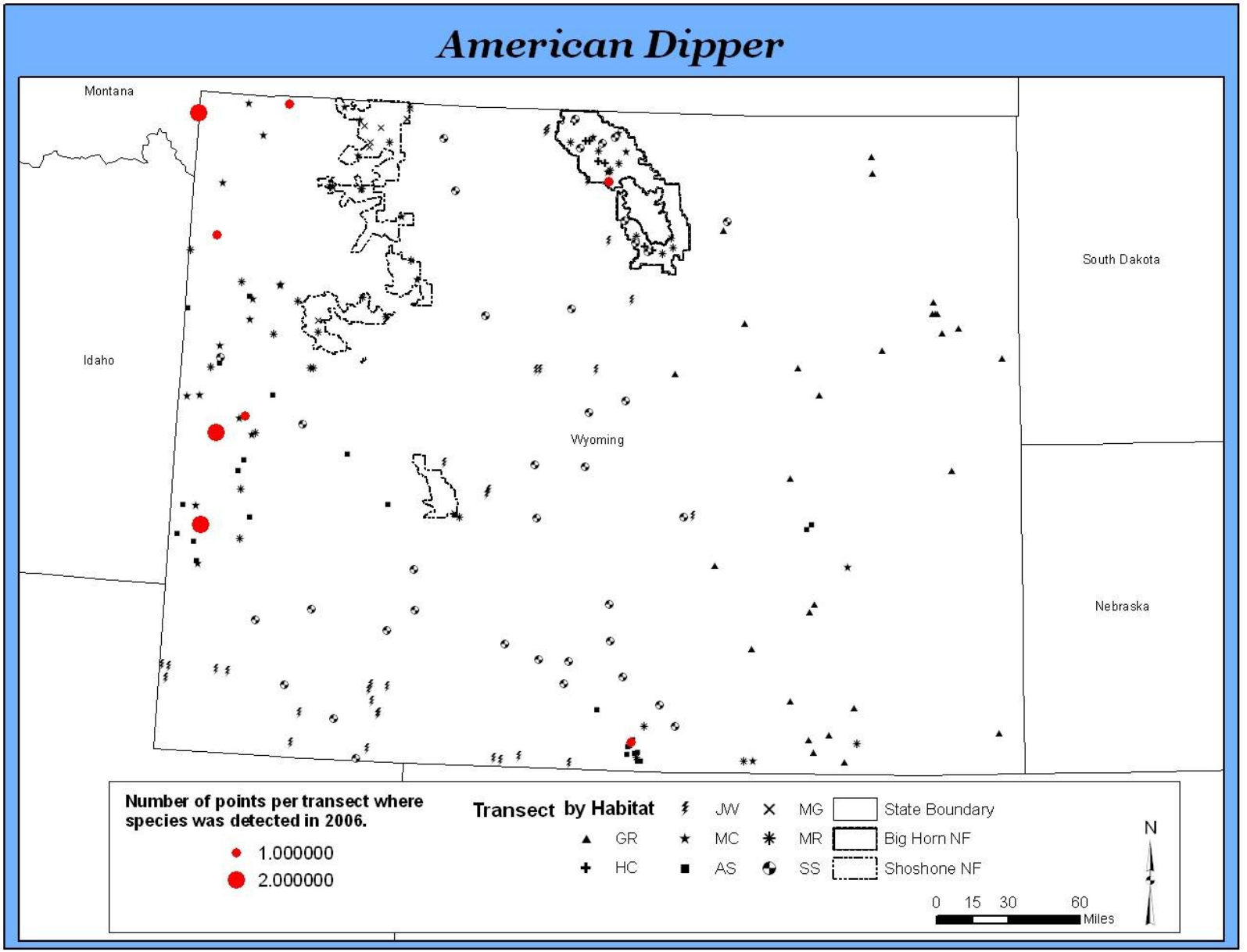
WY-PIF Level II Priority Species

The American Dipper inhabits clear, rapidly flowing mountain streams in coniferous forests and is found throughout the state, except in the Wyoming portion of the Black Hills. In 2006, we detected 12 American Dippers in two habitats on MWB. American Dippers are not detected in sufficient numbers to effectively monitor through point transects under MWB. Additional transects in montane riparian habitat may improve our ability to monitor this species. RBMO has also developed a protocol to count birds that nest on or near bridges that could be a useful tool for monitoring this species statewide.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the American Dipper on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-SS	ID	--	--	--	1	1
WY-MR	ID	--	--	--	8	11

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of American Dippers on transects in Wyoming, 2006.

Golden-crowned Kinglet
(*Regulus satrapa*)

WY-PIF Level II Priority Species

The Golden-crowned Kinglet prefers high-elevation coniferous forests that include spruce. In 2006, we detected 16 Golden-crowned Kinglets in three habitats on MWB. We primarily detected Golden-crowned Kinglets along mid-elevation conifer transects. The number of Golden-crowned Kinglet detections each year though is too low to calculate a density in any habitat. However, using the line transect data or all of the detections across years, we may be able to improve our power to detect a trend for this species.

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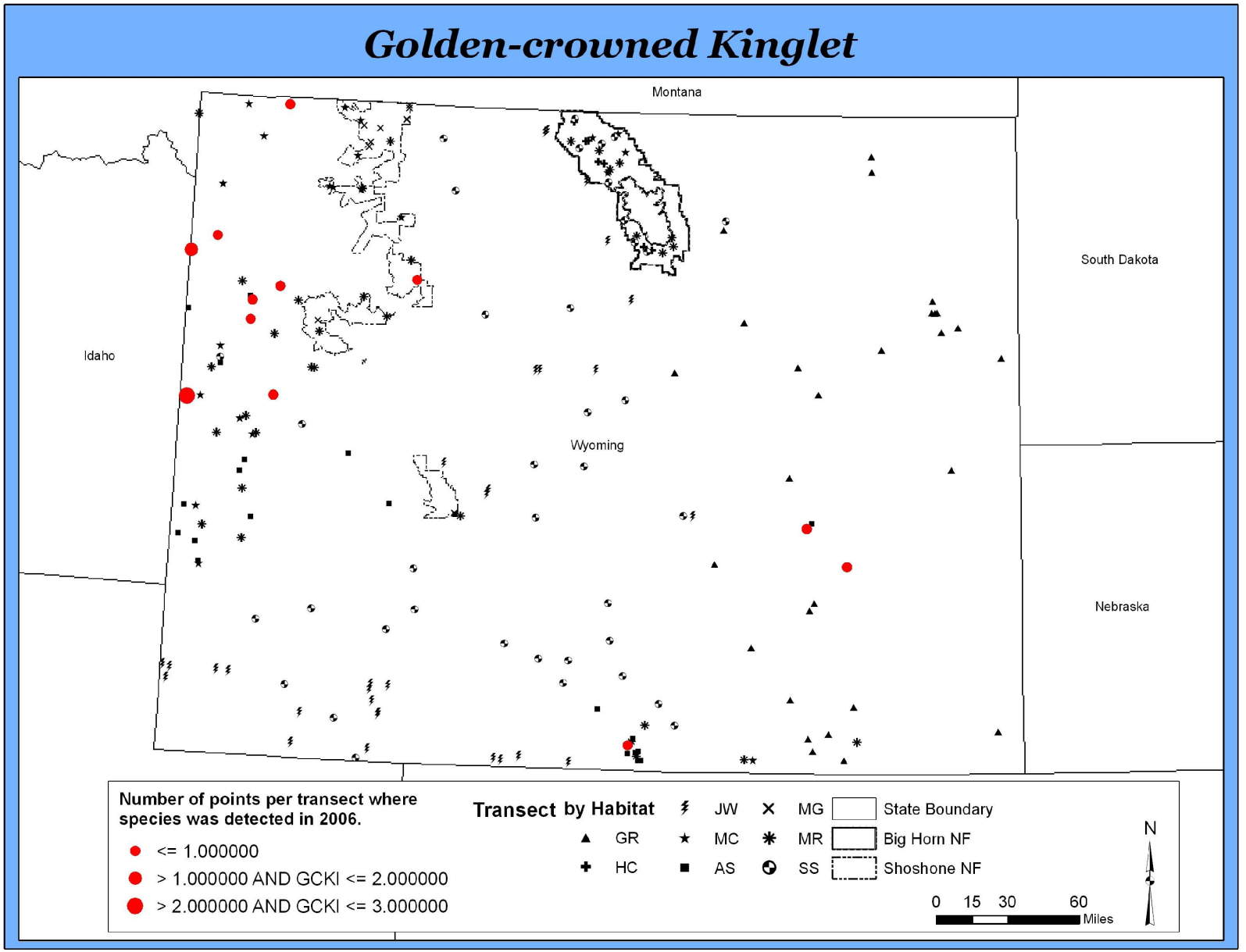
Total number of independent detections, number of individuals, and habitat-specific density estimates for the Golden-crowned Kinglet on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MC**	ID	--	--	--	1	1
WY-AS	ID	--	--	--	1	3
WY-MC	ID	--	--	--	8	8
WY-MR	ID	--	--	--	4	5

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Golden-crowned Kinglets on transects in Wyoming, 2006.

Townsend's Solitaire
(*Myadestes townsendi*)

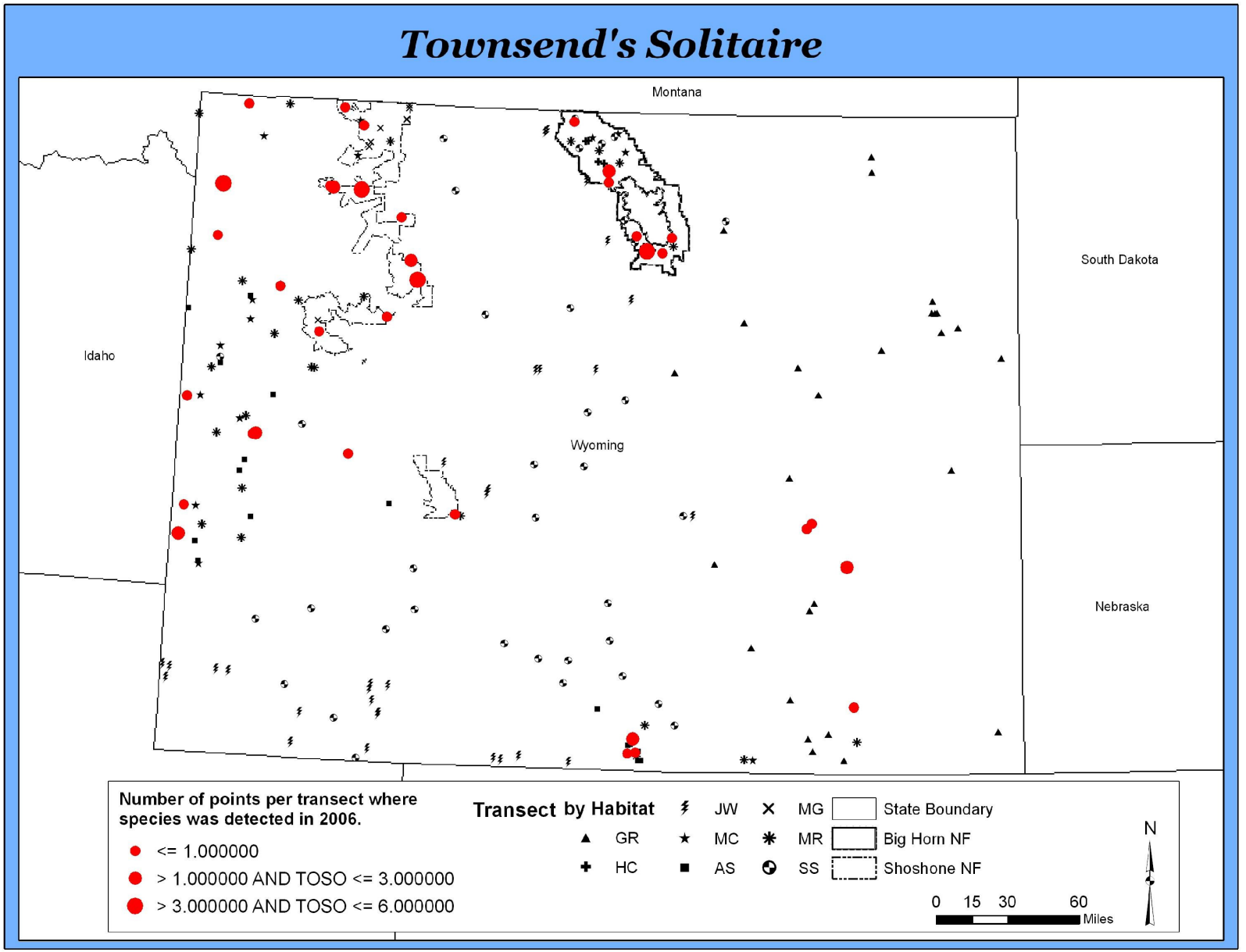
WY-PIF Level II Priority Species

The Townsend's Solitaire nests in open coniferous forests throughout the state and usually places its nest on or near the ground. In 2006, we detected 64 Townsend's Solitaires in seven habitats on MWB. After next season, we anticipate having enough observations using the data from all years to calculate a global detection function for this species in at least mid-elevation conifer habitat. With this function we will be able to generate annual density estimates that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Townsend's Solitaire on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	7	8
BI-MC	ID	--	--	--	2	3
BI-MR*	ID	--	--	--	2	2
BI-SS	ID	--	--	--	1	1
SH-MC**	ID	--	--	--	14	14
SH-MG	ID	--	--	--	1	1
SH-MR	ID	--	--	--	4	4
WY-AS	ID	--	--	--	13	13
WY-GR	ID	--	--	--	1	1
WY-MC	ID	--	--	--	25	25
WY-MR	ID	--	--	--	4	8

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Townsend's Solitaires on transects in Wyoming, 2006.

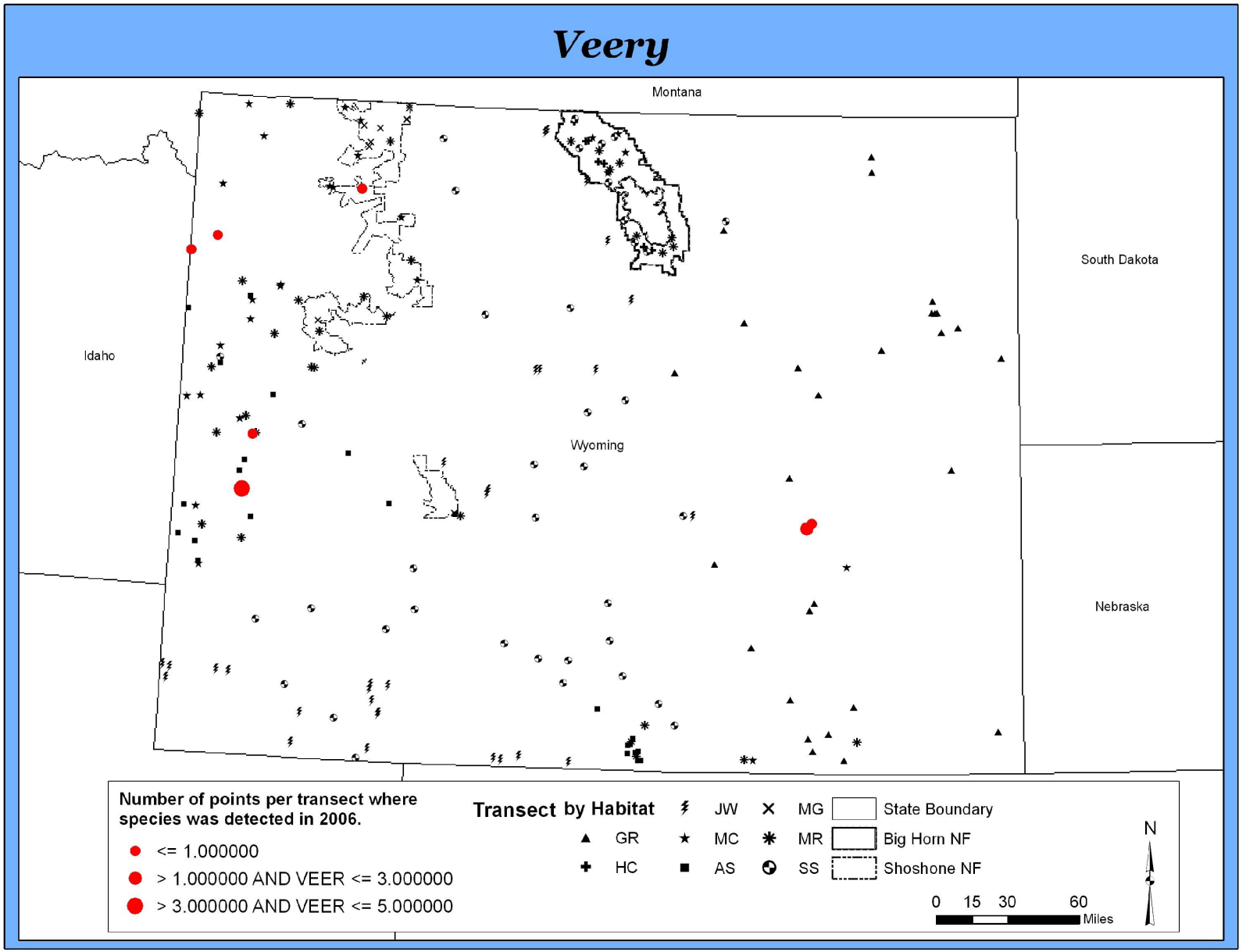
Veery
(Catharus fuscescens)
WY-PIF Level III Priority Species

The Veery inhabits cottonwood and willow riparian areas, aspen woodlands, and coniferous forests, usually near water, primarily in the eastern half of the state. In 2006, we had 15 detections of Veeries in three habitats under MWB. We do not detect Veeries in sufficient numbers to monitor its status under MWB in any habitat; however, pooling data across years and habitats may improve our power to detect a statewide trend. We also may want to consider collecting line transect data for this species to increase our total number of detections and thereby improve our estimates.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Veery on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	N	N
SH-MR	ID	--	--	--	1	1
WY-AS	ID	--	--	--	4	6
WY-MC	ID	--	--	--	1	1
WY-MR	ID	--	--	--	7	7

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

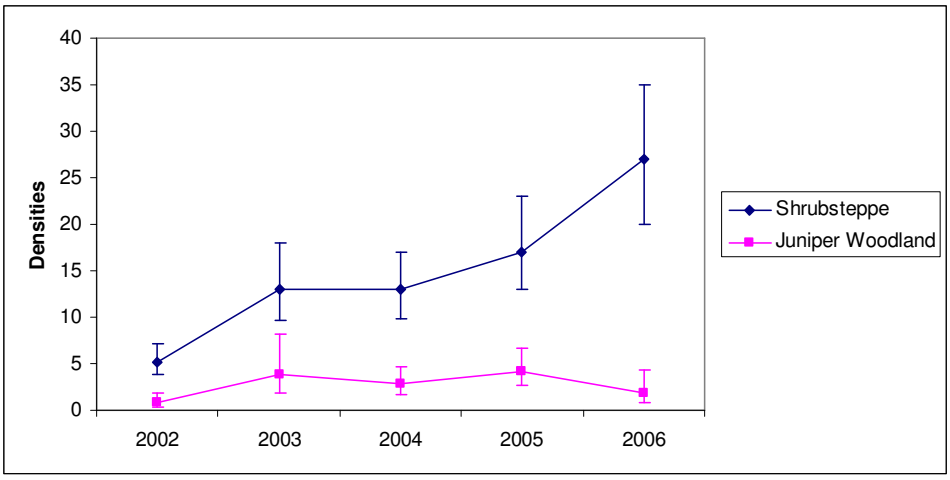


RMBO point-transect locations and detections of Veeries on transects in Wyoming, 2006.

Sage Thrasher
(*Oreoscoptes montanus*)

WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Sage Thrasher is a sagebrush obligate that is found throughout Wyoming in prairie and foothills shrubland habitat where sagebrush is present. In 2006, we detected 501 Sage Thrashers in seven habitats on MWB and we were able to calculate a density estimate for this species in juniper woodland and shrubsteppe habitats. The Sage Thrasher should be effectively monitored under MWB in at least juniper woodland and shrubsteppe habitats.

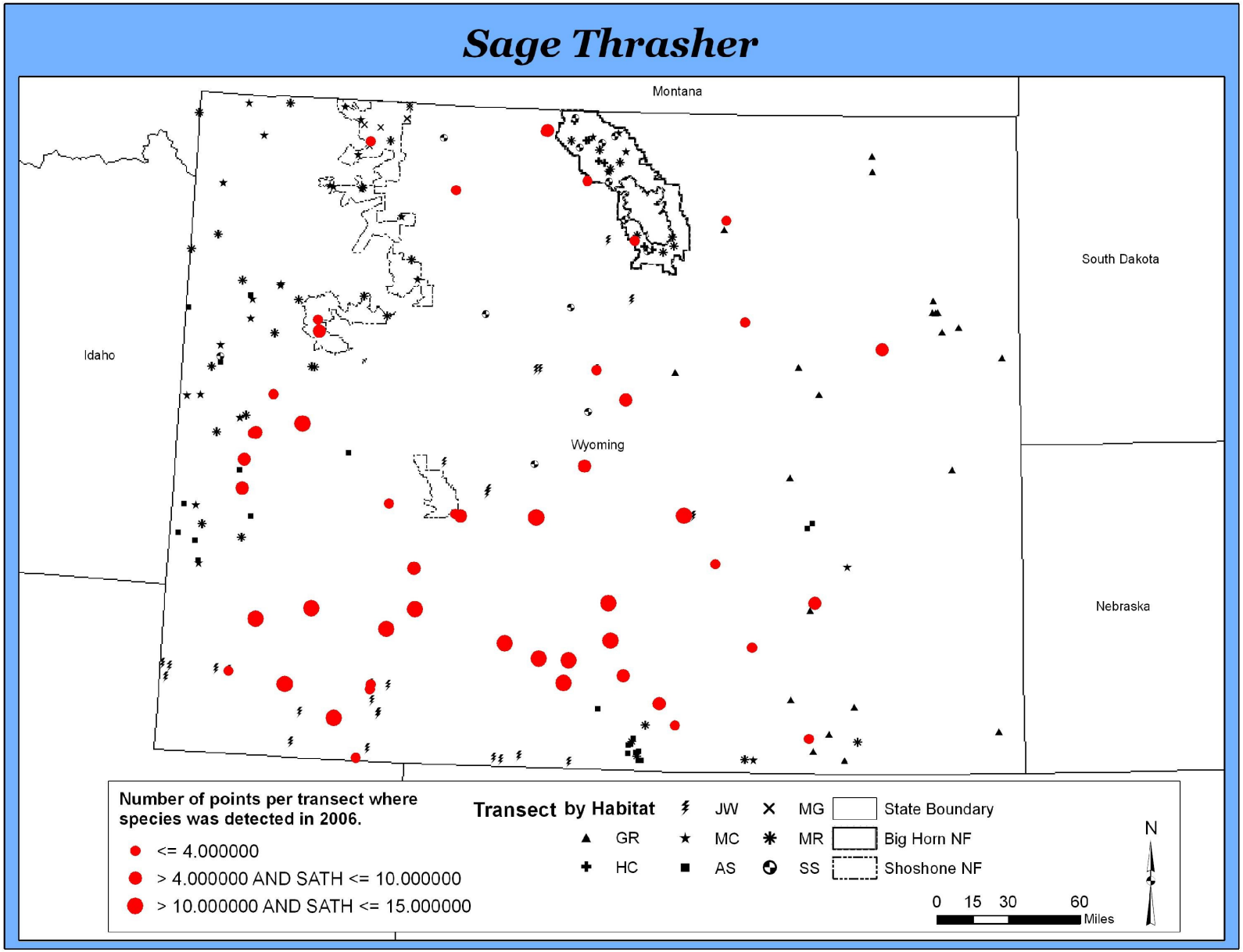


Estimated density (birds/km2) of the Sage Thrasher (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Sage Thrasher on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-SS	ID	--	--	--	3	3
SH-MG	ID	--	--	--	8	8
SH-MR	ID	--	--	--	6	6
WY-AS	ID	--	--	--	10	21
WY-GR	ID	--	--	--	19	19
WY-JW	1.9	0.8	4.4	51	17	19
WY-MC	ID	--	--	--	3	3
WY-MR	ID	--	--	--	27	33
WY-SS	27	20	35	16	387	395

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Sage Thrashers on transects in Wyoming, 2006.

Virginia's Warbler
(*Vermivora virginiae*)

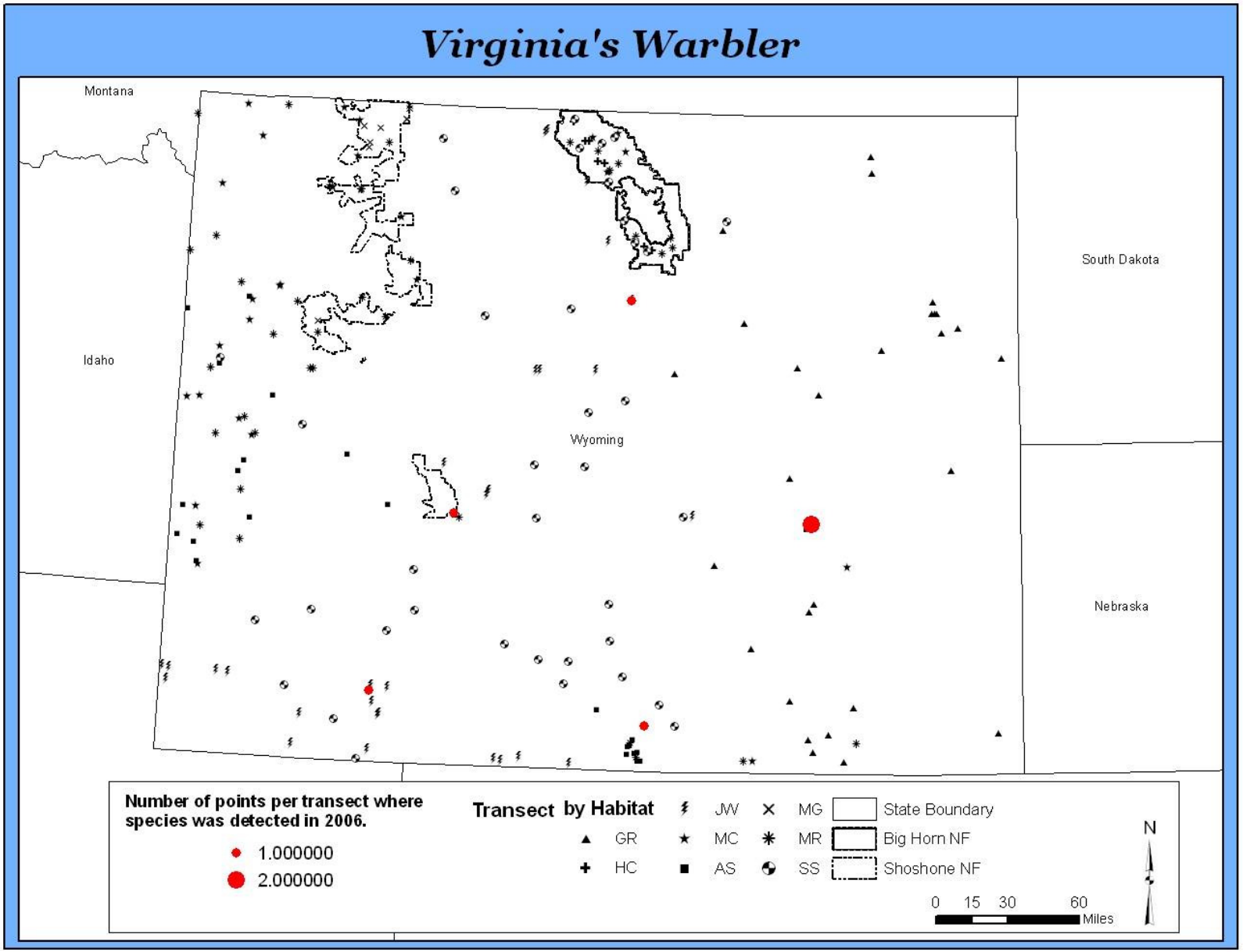
WY-PIF Level III Priority Species
USFWS Bird of Conservation Concern

The Virginia's Warbler is known to nest in the southwest corner of Wyoming, primarily on arid, brushy slopes and in riparian habitat within juniper woodlands. It also occurs in the Laramie Mountains of eastern Wyoming. In 2006, we detected seven Virginia's Warblers in four habitats on MWB. Virginia's Warblers are detected very rarely in Wyoming. Due to its rarity and localized nature, it is unlikely we will be able to monitor this species with our current level of effort under MWB. Adding transects in juniper woodland habitat in southern Wyoming may improve our ability to monitor this species.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Virginia's Warbler for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MG	ID	--	--	--	1	1
WY-AS	ID	--	--	--	3	3
WY-JW	ID	--	--	--	2	2
WY-MR	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

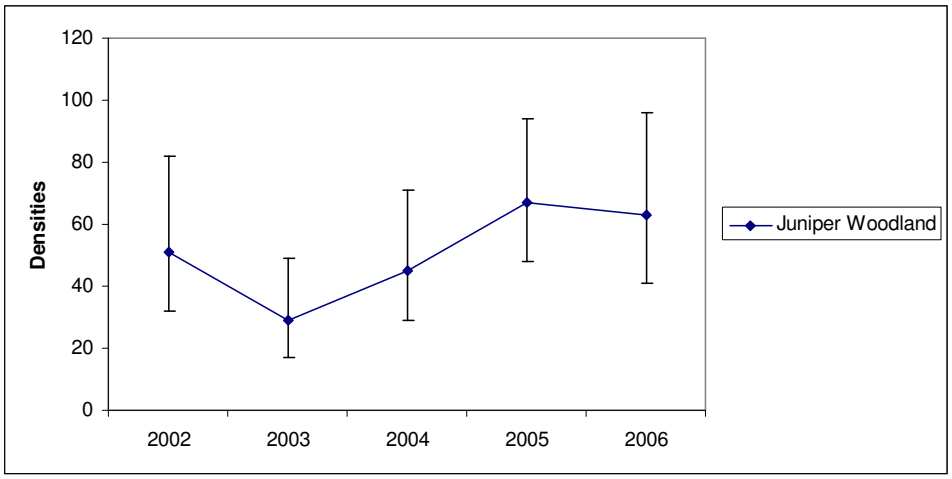


RMBO point-transect locations and detections of Virginia's Warblers on transects in Wyoming, 2006.

Black-throated Gray Warbler
(*Dendroica nigrescens*)

WY-PIF Level III Priority Species

The Black-throated Gray Warbler prefers large stands of juniper-dominated woodland. Very rarely is this species found outside of juniper habitat in the summer. In 2006, we detected 113 Black-throated Gray Warblers in juniper woodland habitat on MWB and we were able to calculate a density estimate for this species in this habitat. The Black-throated Gray Warbler should be effectively monitored through point transects under MWB in juniper woodland habitat.

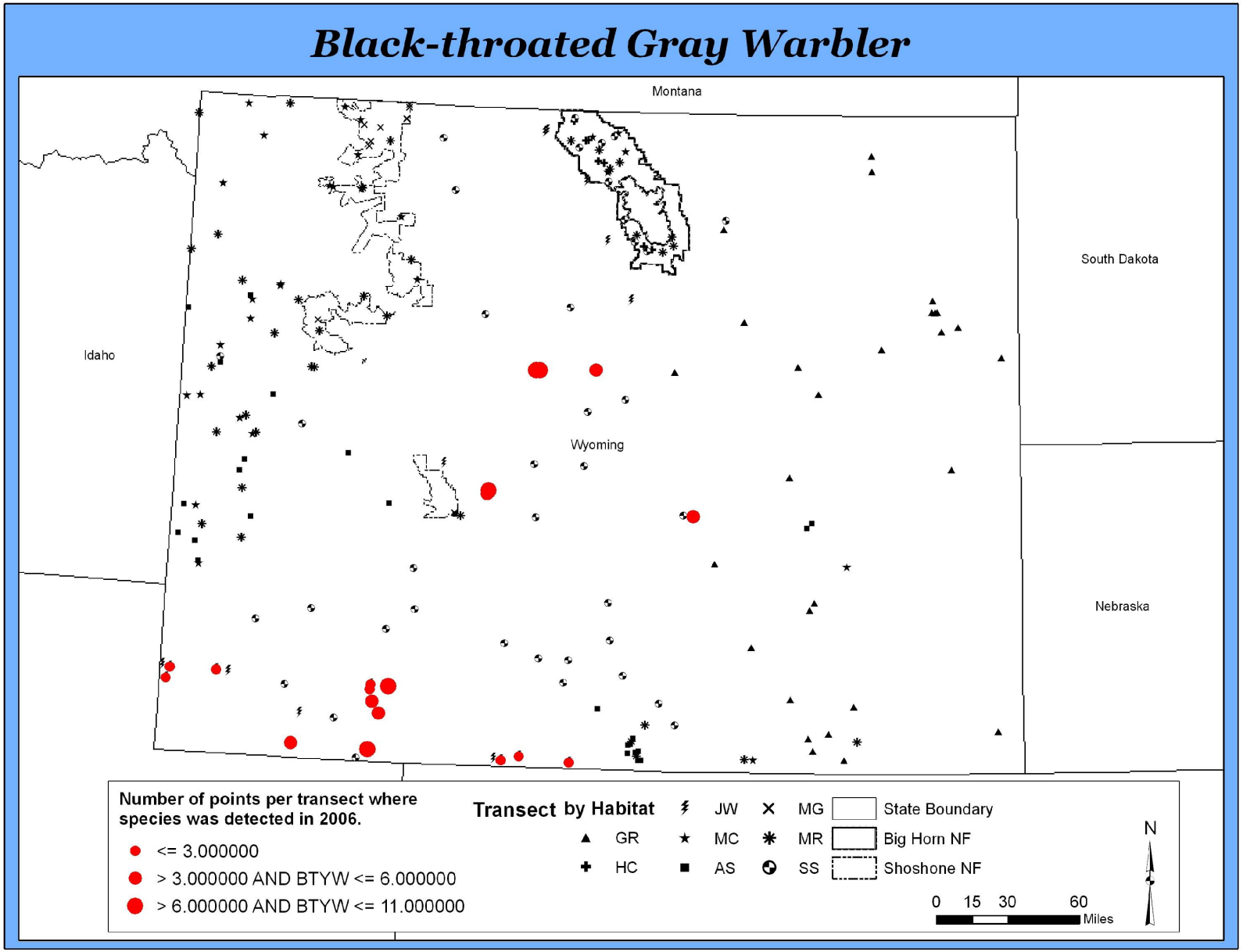


Estimated density (birds/km2) of the Black-throated Gray Warbler (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Black-throated Gray Warbler for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	63	41	96	25	101	113

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Black-throated Gray Warblers on transects in Wyoming, 2006.

Ovenbird

(Seiurus aurocapillus)

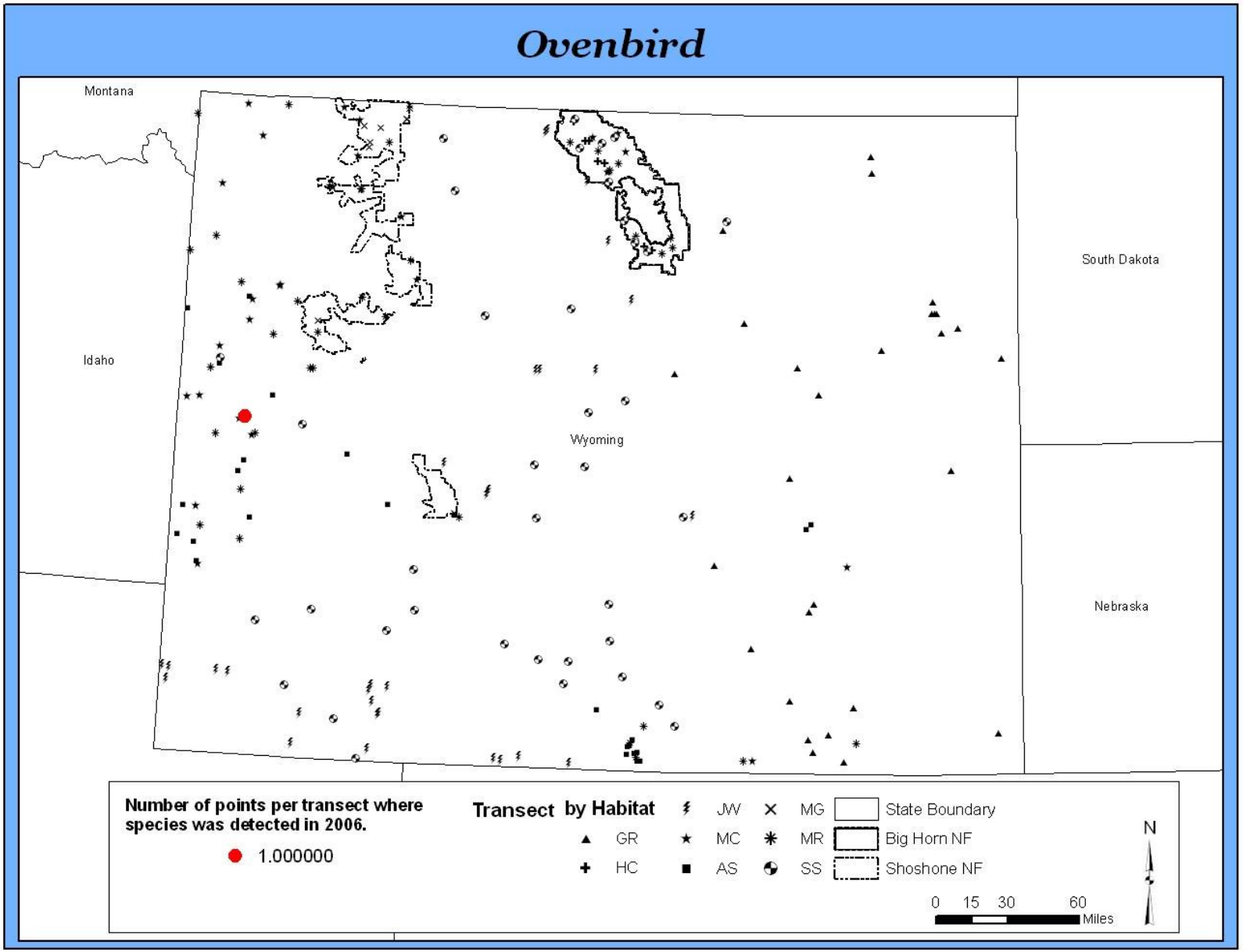
WY-PIF Level III Priority Species

The Ovenbird breeds in mid- to high-elevation mature woodlands that have a significant deciduous component. In Wyoming it is most common in the Black Hills, in the northeast corner of the state. In 2006, we detected one Ovenbird on a montane riparian transect, MR57, under MWB. This was the second year we detected Ovenbird on a statewide transect. Given its limited breeding range in the state and specific habitat requirements, it is unlikely we will be able to monitor this species under MWB; however, adding transects in montane riparian habitat to meet our target goal of 30 may improve our ability to detect this species.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Ovenbird for the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-MR	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

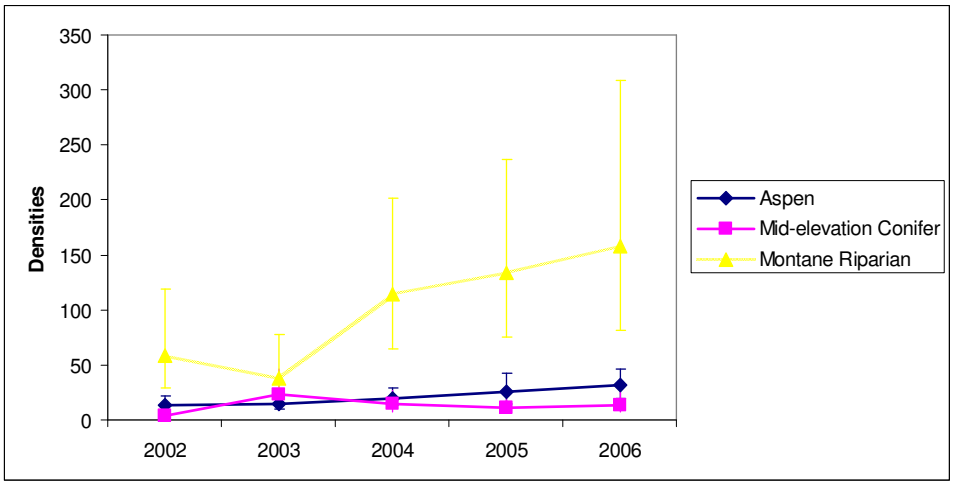


RMBO point-transect locations and detections of Ovenbirds on transects in Wyoming, 2006.

MacGillivray's Warbler
(*Oporornis tolmiei*)

WY-PIF Level II Priority Species

The MacGillivray's Warbler prefers a variety of shrub-dominated habitat, including burned or cut areas in early successional stages, and montane riparian. In 2006, we detected 203 MacGillivray's Warblers in six habitats on MWB and we were able to calculate a density estimate for this species in aspen, mid-elevation conifer and montane riparian habitats. MacGillivray's Warbler should be effectively monitored under MWB through point-transects in at least aspen, mid-elevation conifer, and montane riparian habitats.

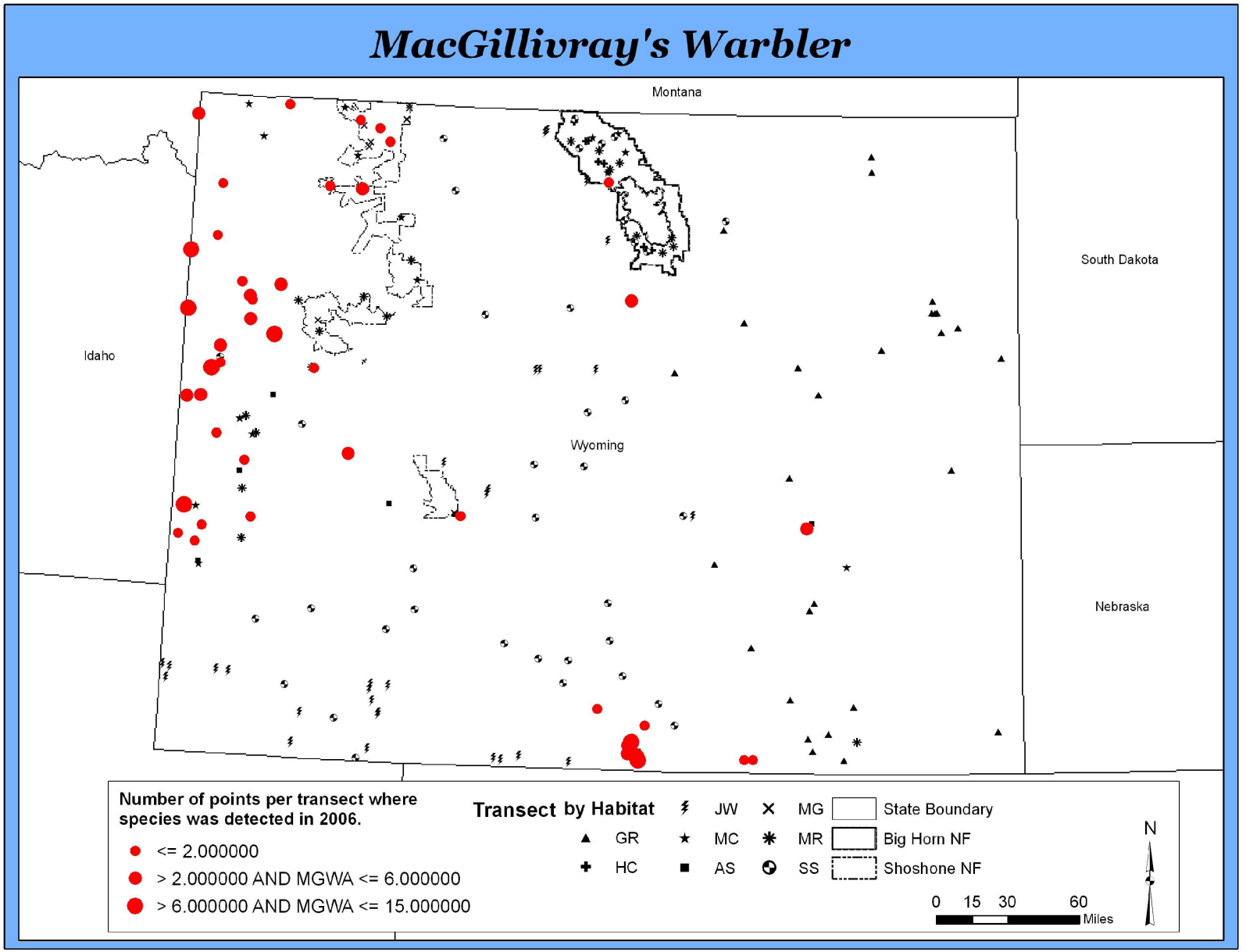


Estimated density (birds/km2) of the MacGillivray's Warbler (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the MacGillivray's Warbler on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-SS	ID	--	--	--	1	1
SH-MC**	ID	--	--	--	3	3
SH-MG	ID	--	--	--	1	1
SH-MR	ID	--	--	--	5	5
WY-AS	31	20	46	24	62	65
WY-JW	ID	--	--	--	3	3
WY-MC	13	7.2	25	39	31	35
WY-MR	158	81	309	42	93	96
WY-SS	ID	--	--	--	2	2

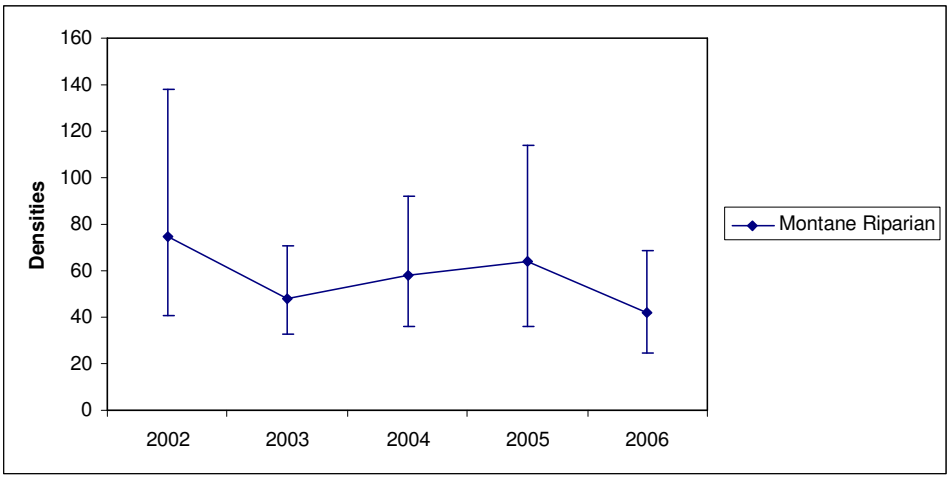
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of MacGillivray's Warblers on transects in Wyoming, 2006.

Wilson's Warbler
(Wilsonia pusilla)
WY-PIF Level II Priority Species

The Wilson's Warbler breeds in high-elevation areas that are dominated by willow shrubs, including alpine tundra. In 2006, we detected 89 Wilson's Warbler in four habitats on MWB and we were able to calculate a density estimate for this species in statewide and Bighorn National Forest montane riparian habitats. The Wilson's Warbler should be effectively monitored through point transects under MWB in montane riparian habitat, both statewide and on the Bighorn National Forest.

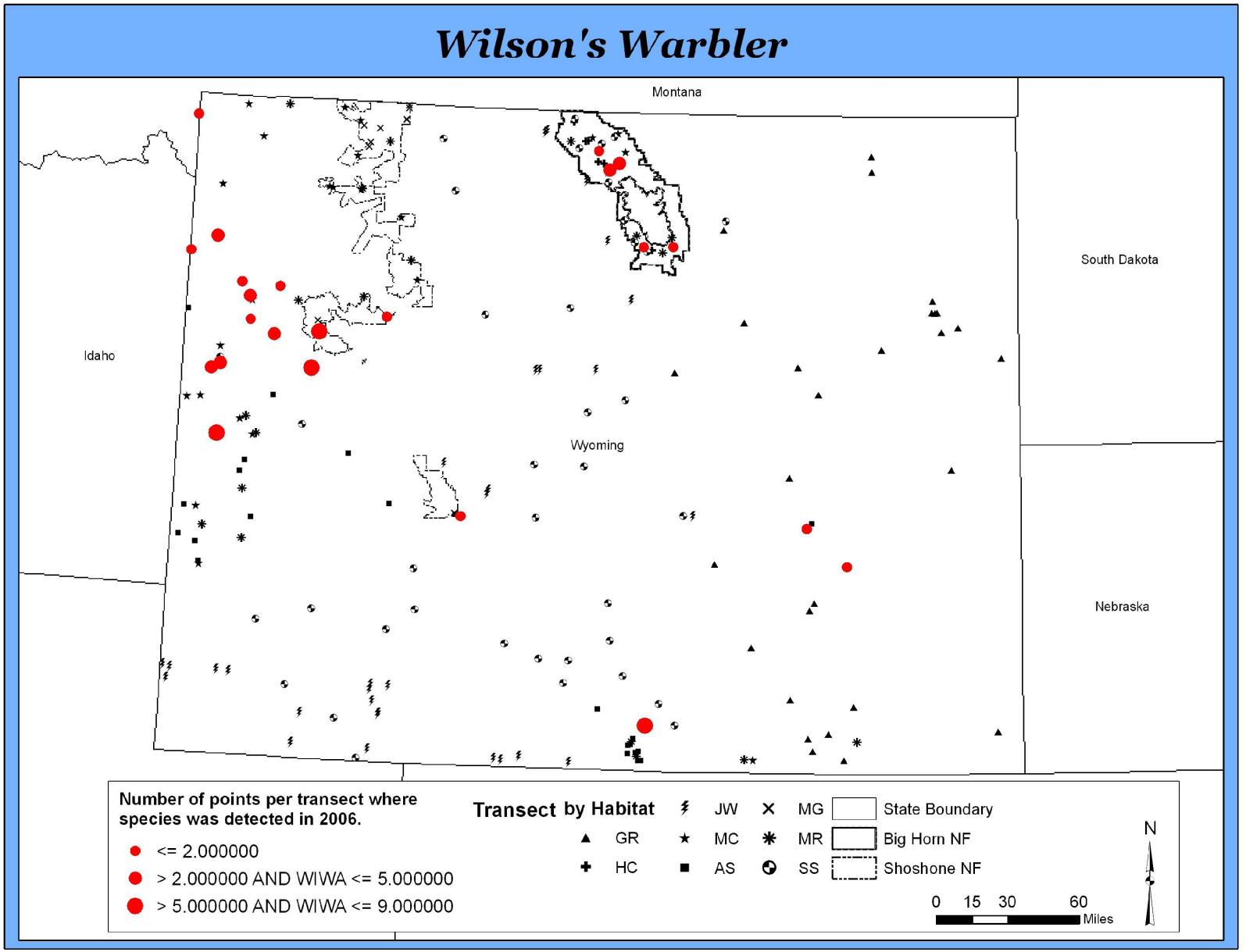


Estimated density (birds/km2) of the Wilson's Warbler (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Wilson's Warbler on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	N	N
BI-HC	ID	--	--	--	1	1
BI-MR*	16	7.4	36	44	13	13
SH-MR	ID	--	--	--	7	7
WY-AS	ID	--	--	--	9	9
WY-MC	ID	--	--	--	5	5
WY-MR	42	25	69	31	56	61

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects.

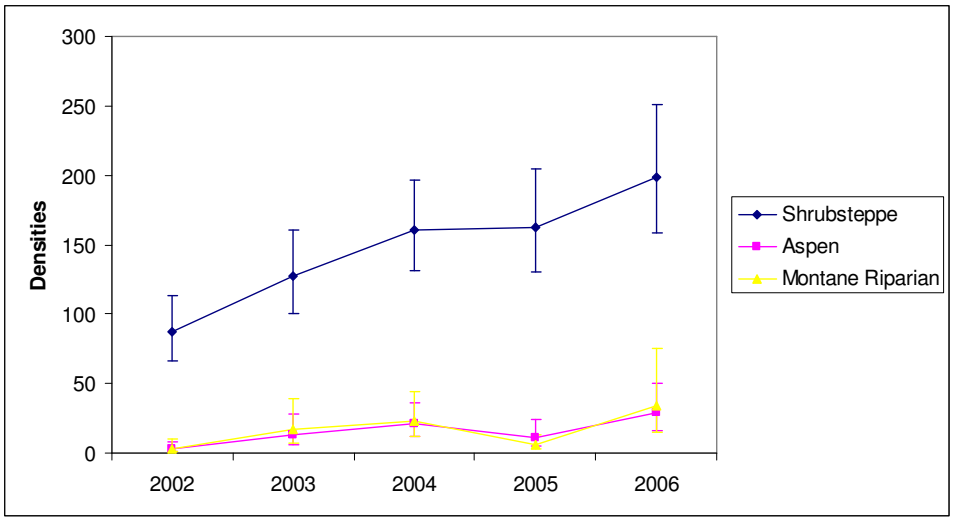


RMBO point-transect locations and detections of Wilson's Warblers on transects in Wyoming, 2006.

Brewer's Sparrow
(*Spizella breweri)*

USFS Region 2 Sensitive Species
WY-PIF Level I Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

The Brewer's Sparrow prefers sagebrush habitat but also occasionally breeds in mountain mahogany and other shrubby habitat. In 2006, we detected 1,895 Brewer's Sparrows in eight habitats on MWB. The Brewer's Sparrow should be effectively monitored under MWB in a variety of habitats.

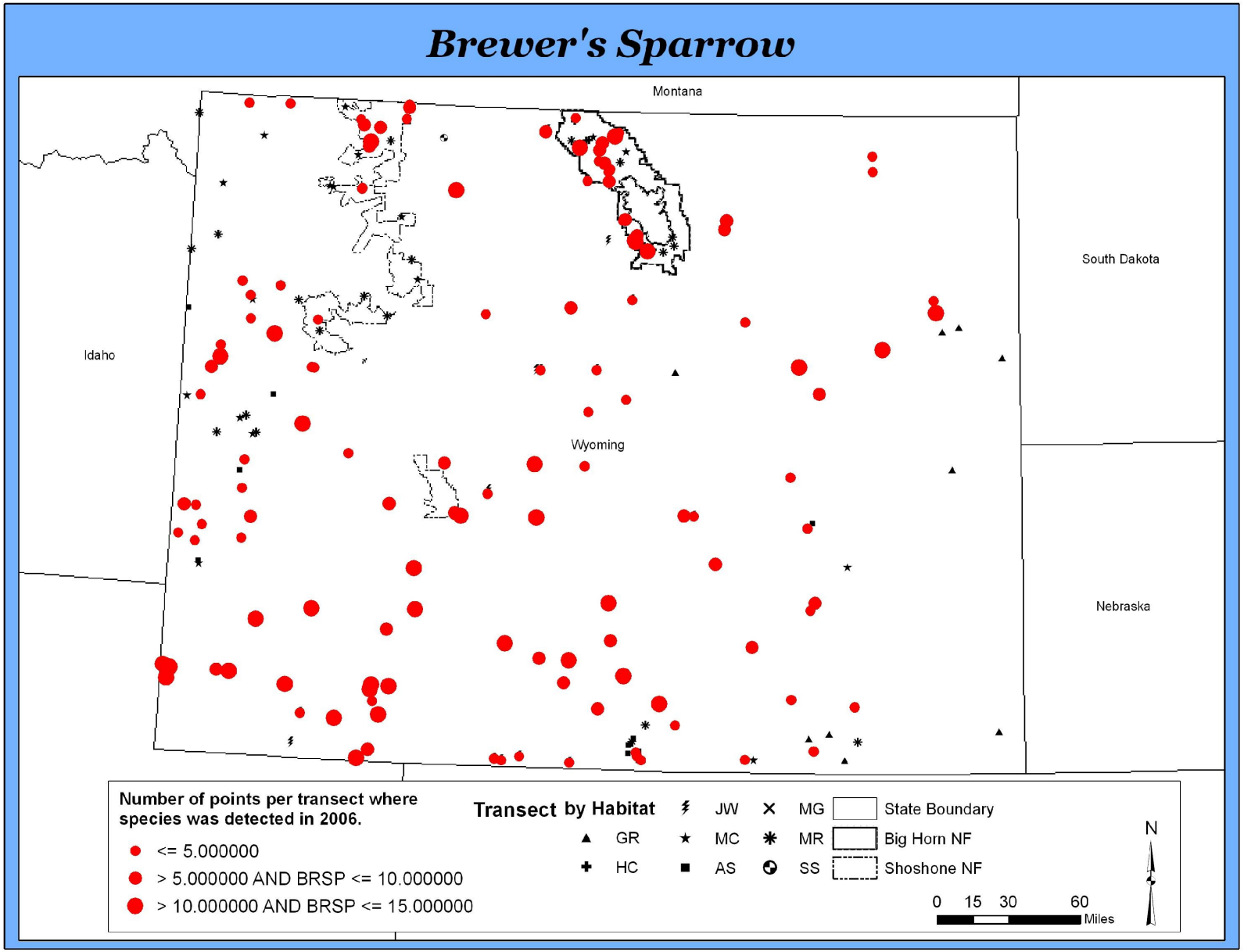


Estimated density (birds/km2) of the Brewer's Sparrow (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Brewer's Sparrow on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	19	19
BI-MC	ID	--	--	--	9	11
BI-MR*	ID	--	--	--	27	27
BI-SS	57	37	87	24	187	215
SH-MC**	ID	--	--	--	2	2
SH-MG	37	21	63	30	86	95
SH-MR	ID	--	--	--	1	1
WY-AS	29	16	50	34	88	94
WY-GR	17	10	28	30	194	220
WY-JW	32	19	53	30	270	300
WY-MC	ID	--	--	--	20	20
WY-MR	34	15	75	49	90	106
WY-SS	199	159	251	14	701	787

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.

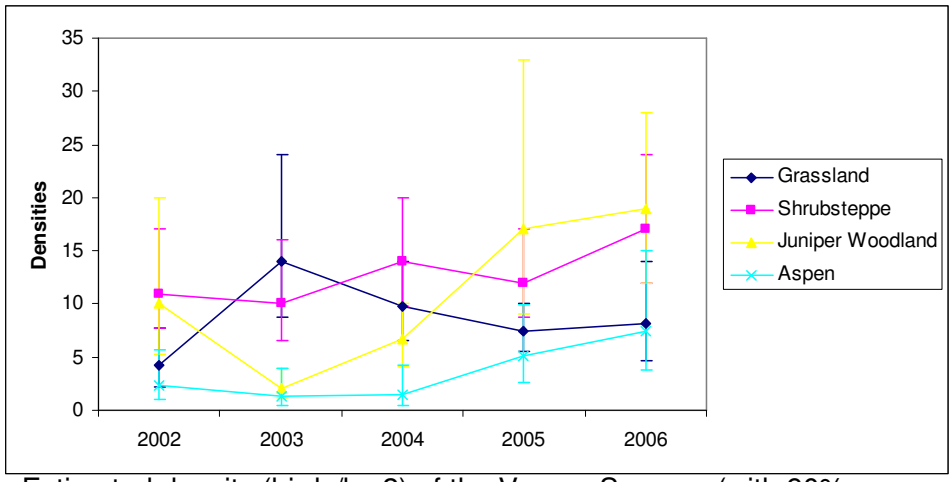


RMBO point-transect locations and detections of Brewer's Sparrows on transects in Wyoming, 2006.

Vesper Sparrow
(*Pooecetes gramineus*)

WY-PIF Level II Priority Species

Vesper Sparrows occur throughout the state in basin-prairie shrublands, mountain-foothills shrublands, grasslands, and agricultural areas. In 2006, we detected 981 Vesper Sparrows in eight habitats on MWB and we were able to calculate a density estimate for this species in several habitats. Vesper Sparrows should be effectively monitored through point-transects under MWB in a range of habitats, especially grassland, juniper woodland, and shrubsteppe.

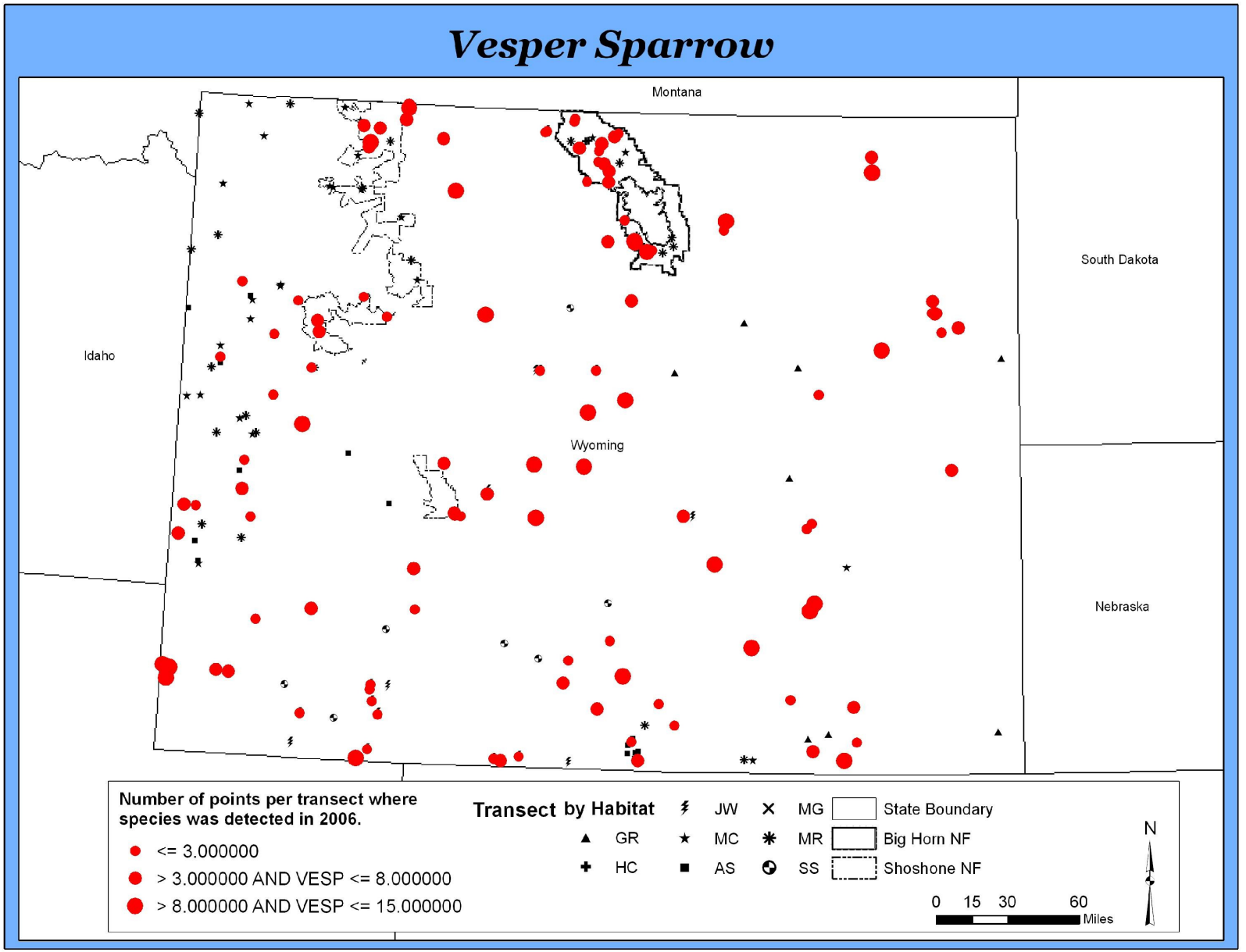


Estimated density (birds/km2) of the Vesper Sparrow (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Vesper Sparrow on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	16	16
BI-MC	ID	--	--	--	13	13
BI-MR*	ID	--	--	--	4	4
BI-SS	47	29	76	28	118	143
SH-MG	18	12	26	22	71	80
SH-MR	ID	--	--	--	8	8
WY-AS	7.5	3.8	15	42	43	56
WY-GR	8.2	4.7	14	34	171	207
WY-JW	19	12	28	24	138	153
WY-MC	ID	--	--	--	1	1
WY-MR	ID	--	--	--	28	28
WY-SS	17	12	24	20	253	279

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects.

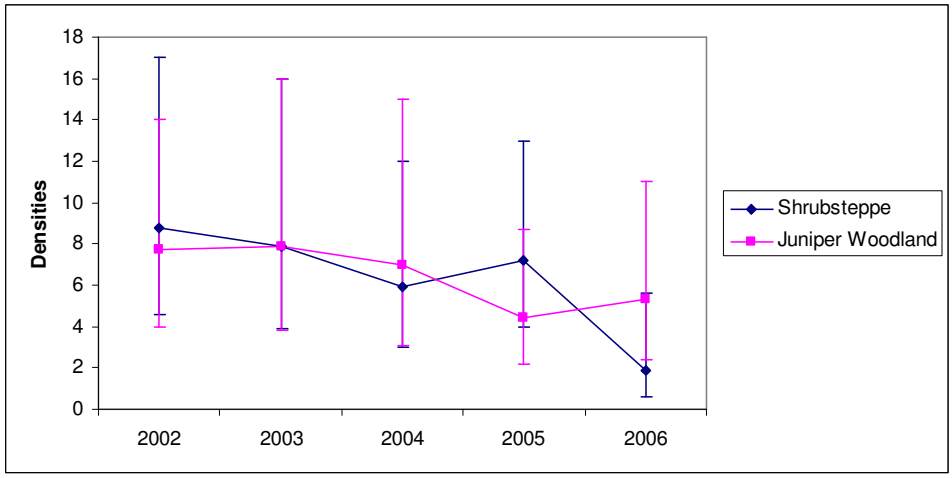


RMBO point-transect locations and detections of Vesper Sparrows on transects in Wyoming, 2006.

Lark Sparrow
(*Chondestes grammacus*)

WY-PIF Level II Priority Species

Lark Sparrows breed in a variety of locations including prairies, roadsides, farms, open woodlands, and mesas across Wyoming. In 2006, we detected 64 Lark Sparrows in five habitats on MWB. We should be able to effectively monitor Lark Sparrows through point-transects under MWB in at least juniper woodland and shrubsteppe habitats.

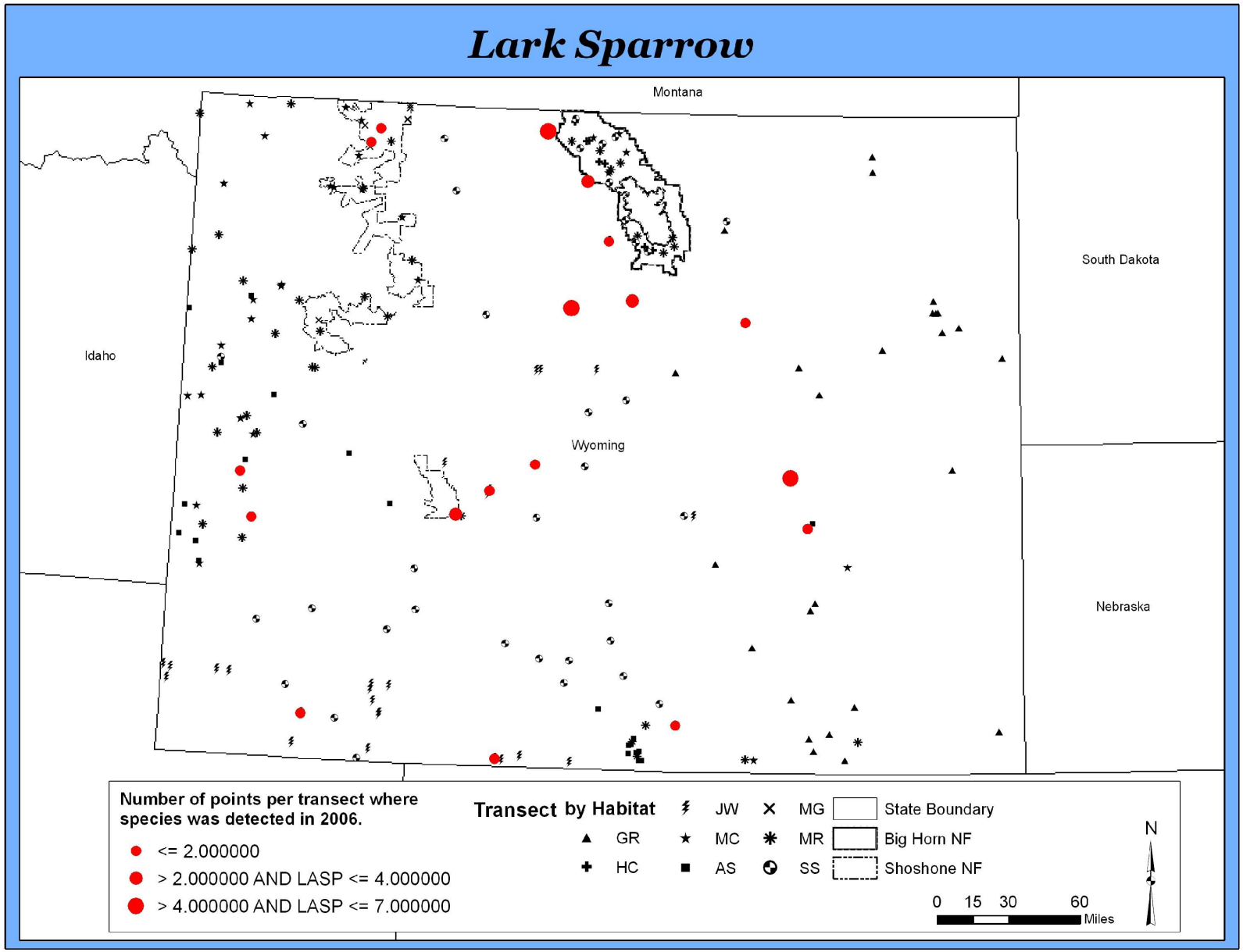


Estimated density (birds/km2) of the Lark Sparrow (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of detections, number of individuals, and habitat-specific density estimates for the Lark Sparrow on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
SH-MG	ID	--	--	--	6	6
WY-AS	ID	--	--	--	9	10
WY-GR	ID	--	--	--	10	10
WY-JW	5.3	2.4	11	49	24	26
WY-SS	1.9	0.6	5.6	73	9	12

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

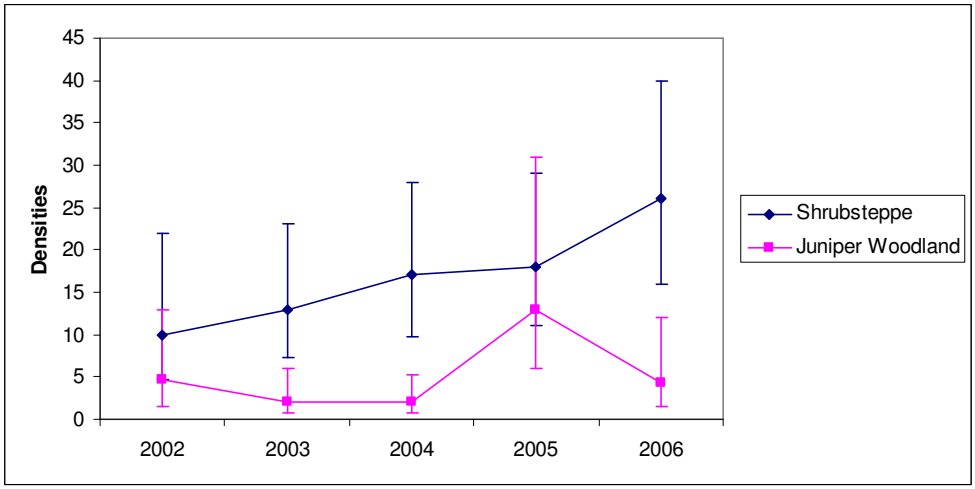


RMBO point-transect locations and detections of Lark Sparrows on transects in Wyoming, 2006.

Sage Sparrow
(*Amphispiza belli*)

USFS Region 2 Sensitive Species
WY-PIF Level I Priority Species
WGFD Species of Greatest Conservation Need

The Sage Sparrow is a sagebrush obligate that occurs throughout western and central Wyoming. In 2006, we detected 238 Sage Sparrows in three habitats on MWB. The Sage Sparrow should be effectively monitored under MWB in at least shrubsteppe habitat.

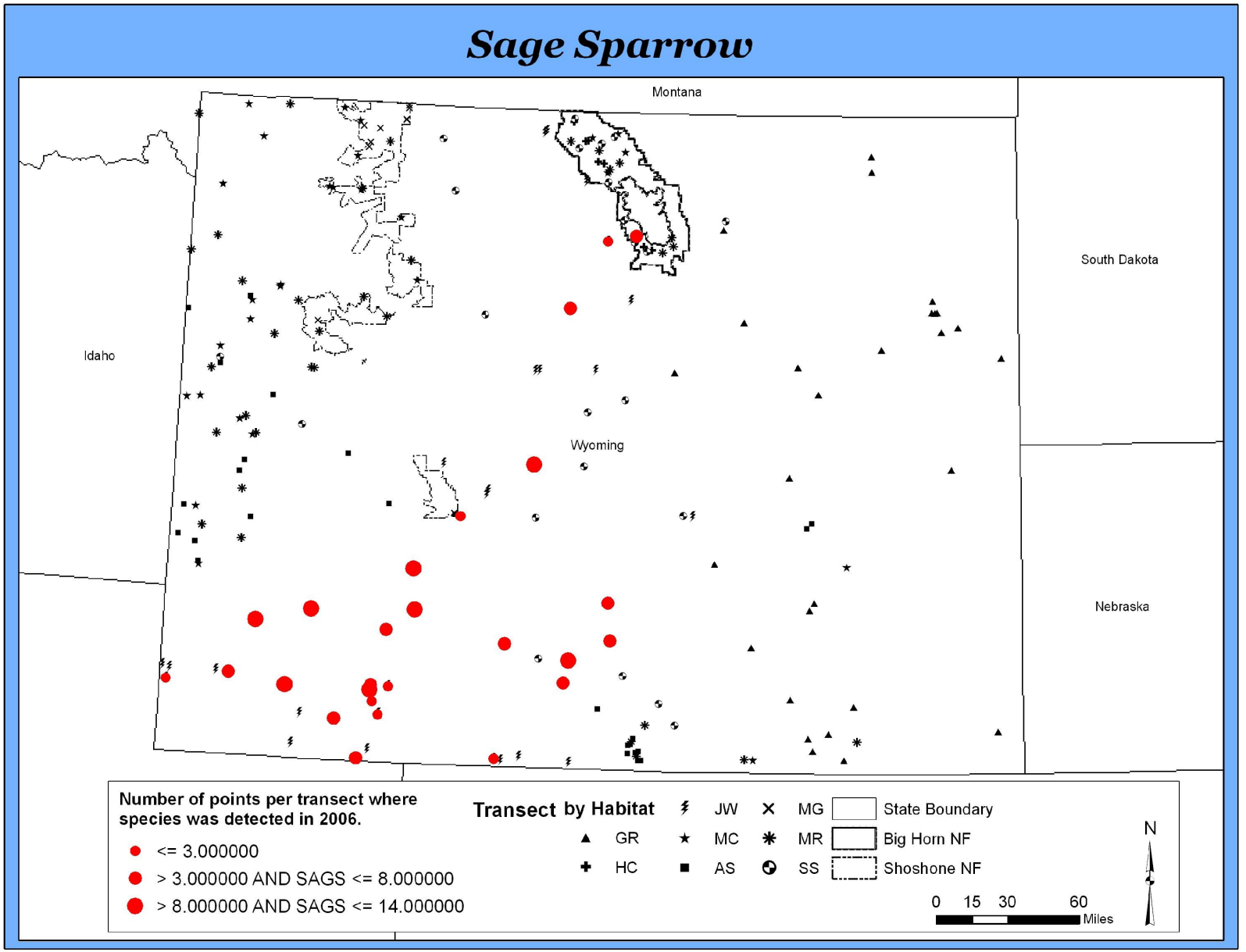


Estimated density (birds/km2) of the Sage Sparrow (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Sage Sparrow on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-MR*	ID	--	--	--	6	6
WY-JW	4.4	1.5	12	68	47	54
WY-MR	ID	--	--	--	1	1
WY-SS	26	16	40	27	153	177

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects.

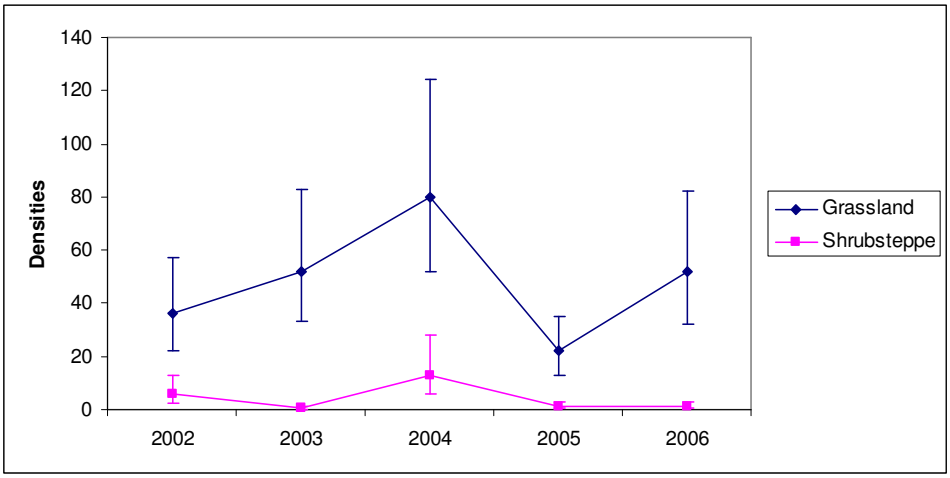


RMBO point-transect locations and detections of Sage Sparrows on transects in Wyoming, 2006.

Lark Bunting
(*Calamospiza melanocorys*)

WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Lark Bunting is found throughout Wyoming primarily in open habitats such as native prairie, shrubsteppe and agricultural areas. It is most common in the eastern third of the state. In 2006, we detected 1,312 Lark Buntings in five habitats on MWB, and were able to calculate a density estimate for this species in grassland habitat. The Lark Bunting should be effectively monitored under MWB in grassland and shrubsteppe habitats.

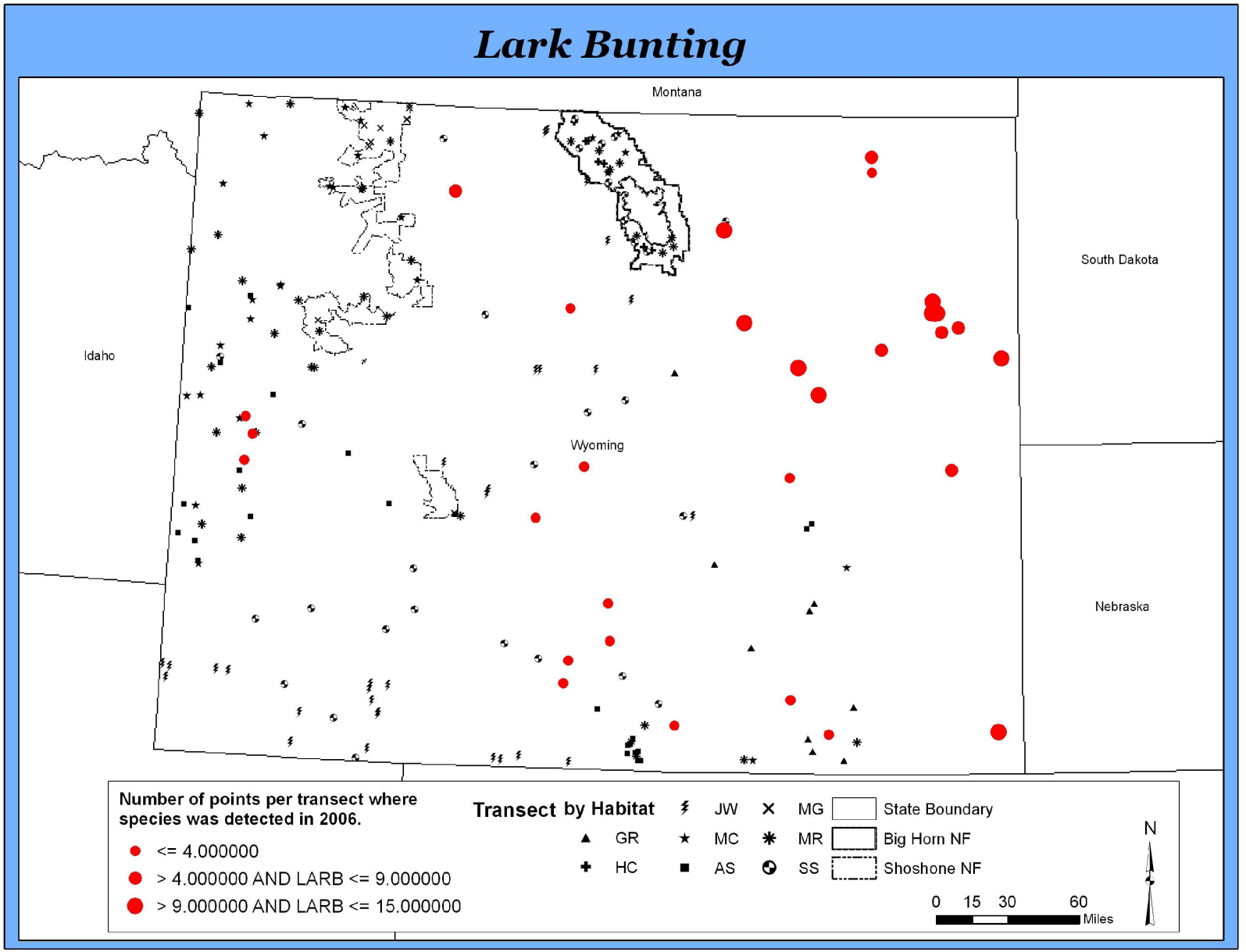


Estimated density (birds/km2) of the Lark Bunting (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Lark Bunting on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	N	N
WY-AS	ID	--	--	--	2	2
WY-GR	52	32	82	27	786	1278
WY-MC	ID	--	--	--	3	3
WY-MR	ID	--	--	--	1	1
WY-SS	1.2	0.5	3.1	60	13	28

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

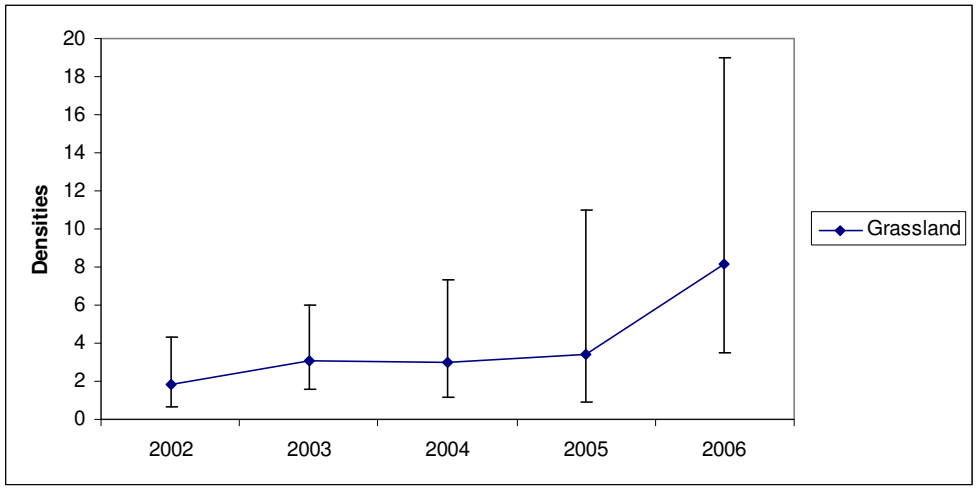


RMBO point-transect locations and detections of Lark Buntings on transects in Wyoming, 2006.

Grasshopper Sparrow
(*Ammodramus savannarum*)

USFS Region 2 Sensitive Species
WY-PIF Level II Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

Grasshopper Sparrows breed mostly in the eastern half of Wyoming in open habitats including grasslands, open grassy sagesteppe, and agricultural areas. In 200, we detected 89 Grasshopper Sparrows in four habitats on MWB. The Grasshopper Sparrow should be effectively monitored in grassland habitat under MWB.

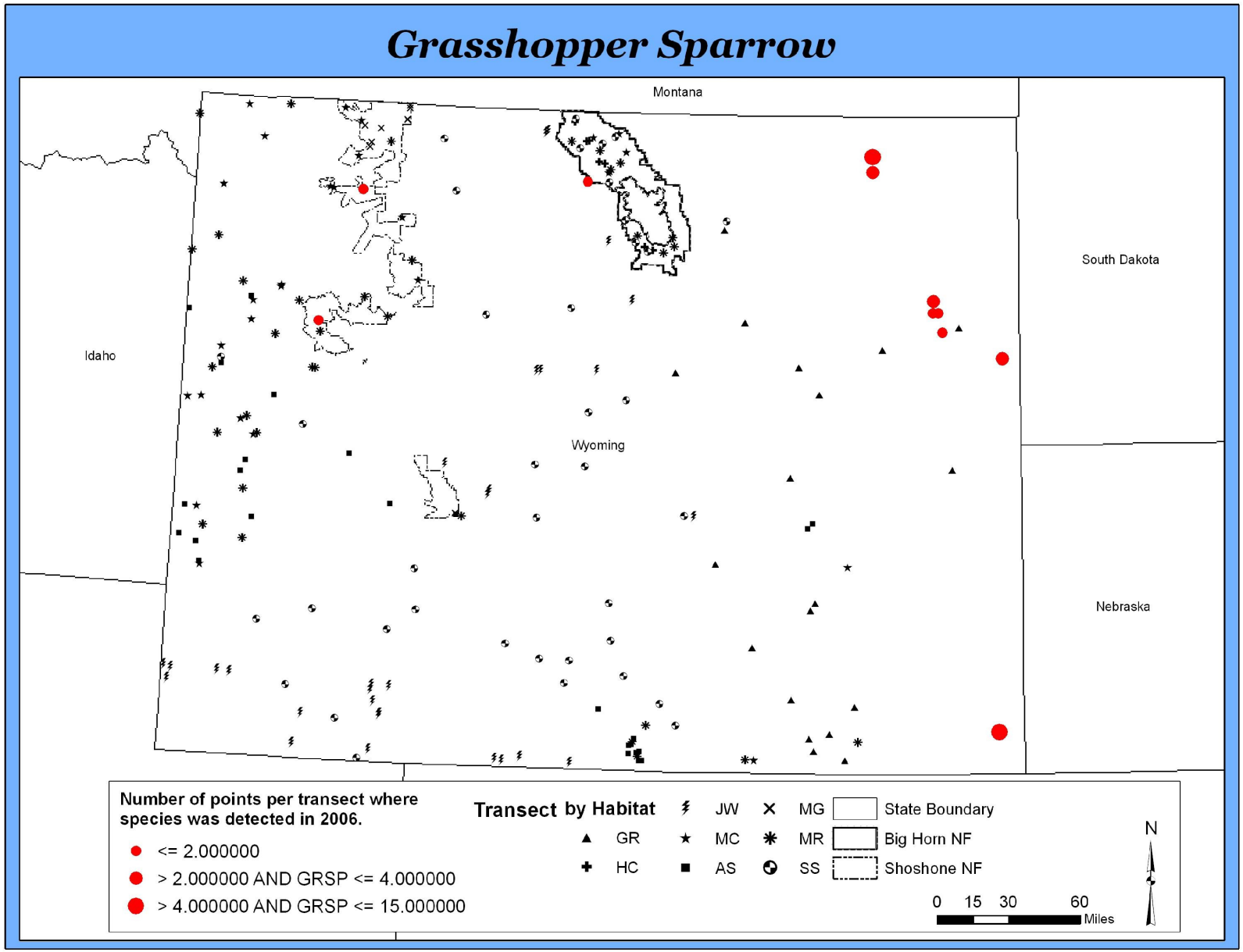


Estimated density (birds/km2) of the Grasshopper Sparrow (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Grasshopper Sparrow on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	N	N
SH-MG	ID	--	--	--	2	2
SH-MR	ID	--	--	--	1	1
WY-GR	8.2	3.5	19	53	84	85
WY-JW	ID	--	--	--	1	1
WY-MR	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

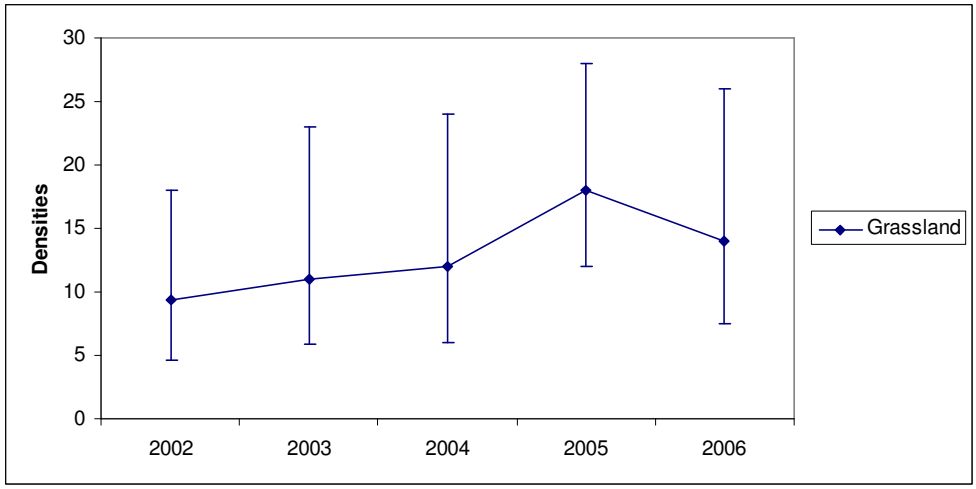


RMBO point-transect locations and detections of Grasshopper Sparrows on transects in Wyoming, 2006.

McCown's Longspur
(Calcarius mccownii)

WY-PIF Level I Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

The McCown's Longspur is found in prairie habitat throughout eastern Wyoming. In 2006, we detected 270 McCown's Longspurs in grassland habitat on MWB. The McCown's Longspur should be effectively monitored under MWB in grassland habitat. In 2006, we had the most detections of McCown's Longspurs in a single year in grassland habitat, but the density was still higher in 2005.

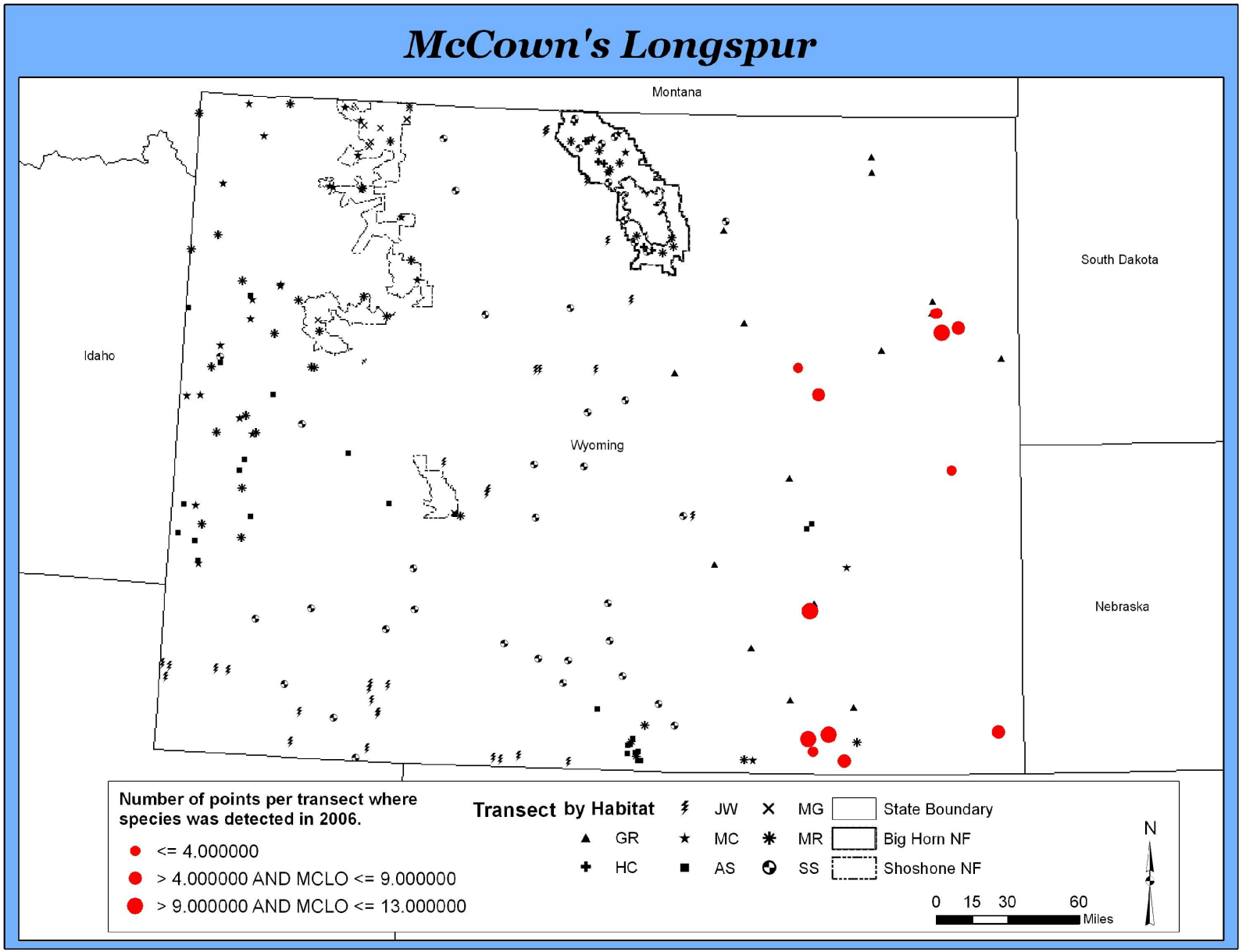


Estimated density (birds/km2) of the McCown's Longspur (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the McCown's Longspur on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-GR	14	7.5	26	38	234	270

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.

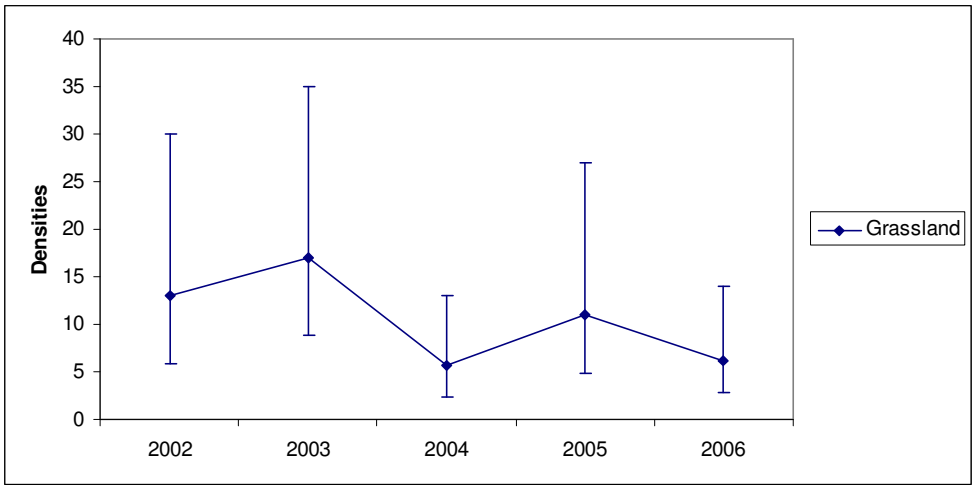


RMBO point-transect locations and detections of McCown's Longspurs on transects in Wyoming, 2006.

Chestnut-collared Longspur
(*Calcarius ornatus)*

USFS Region 2 Sensitive Species
WY-PIF Level II Priority Species
USFWS Bird of Conservation Concern
WGFD Species of Greatest Conservation Need

The Chesnut-collared Longspur is found mainly in the eastern half of Wyoming, in shortgrass and mixed-grass prairies that sometimes have a shrub component. In 2006, we detected 112 Chestnut-collared Longspurs in two habitats on MWB. This species was detected on eight grassland transects with the majority of detections from three transects: GR01, GR37 and GR62. The Chestnut-collared Longspur should be effectively monitored under MWB in grassland habitat.

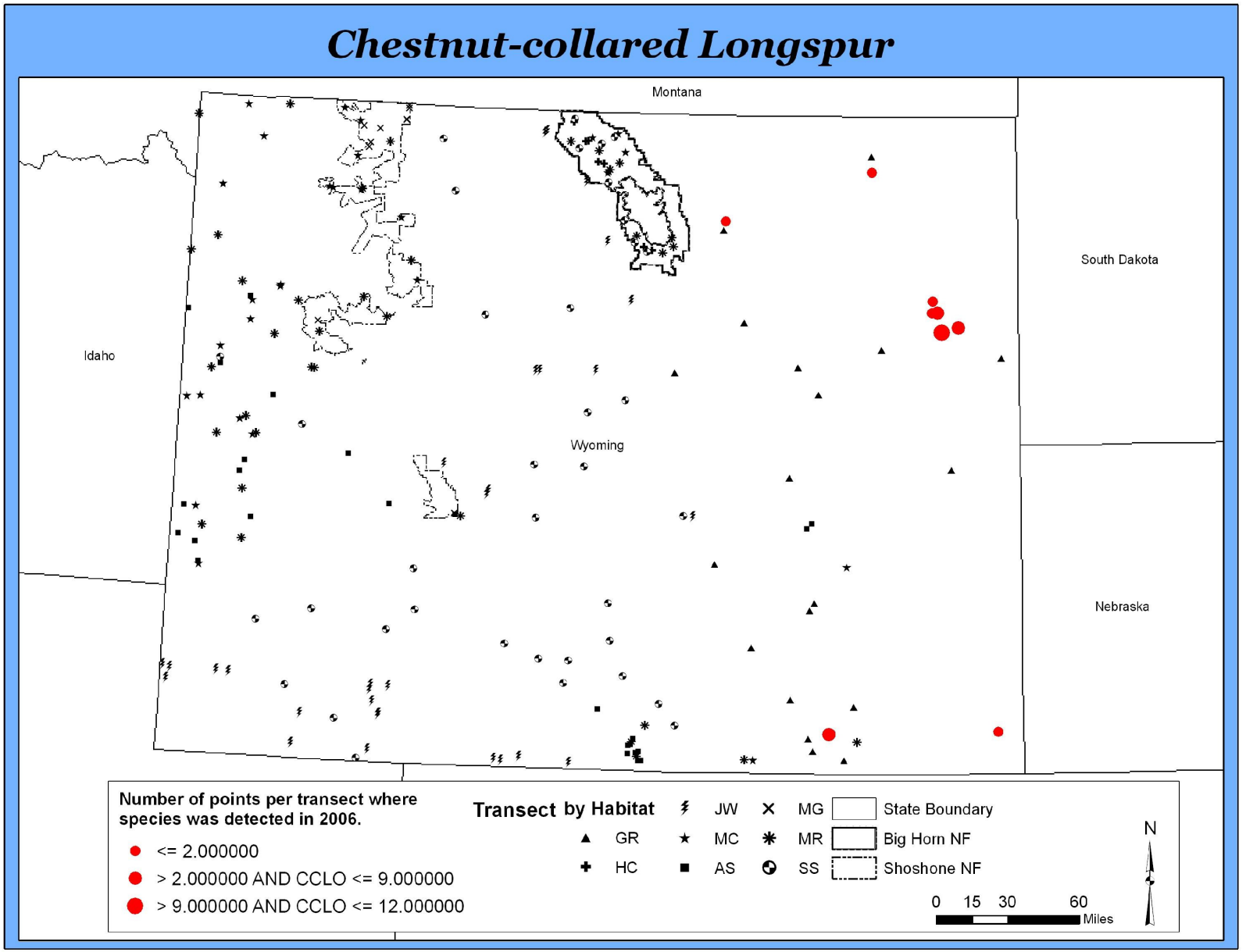


Estimated density (birds/km2) of the Chesnut-collared Longspur (with 90% confidence intervals) on MWB transects 2002-2006.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Chestnut-collared Longspur on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-GR	6.2	2.8	14	50	104	109
WY-SS	ID	--	--	--	3	3

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Chesnut-collared Longspurs on transects in Wyoming, 2006.

Lazuli Bunting
(Passerina amoena)

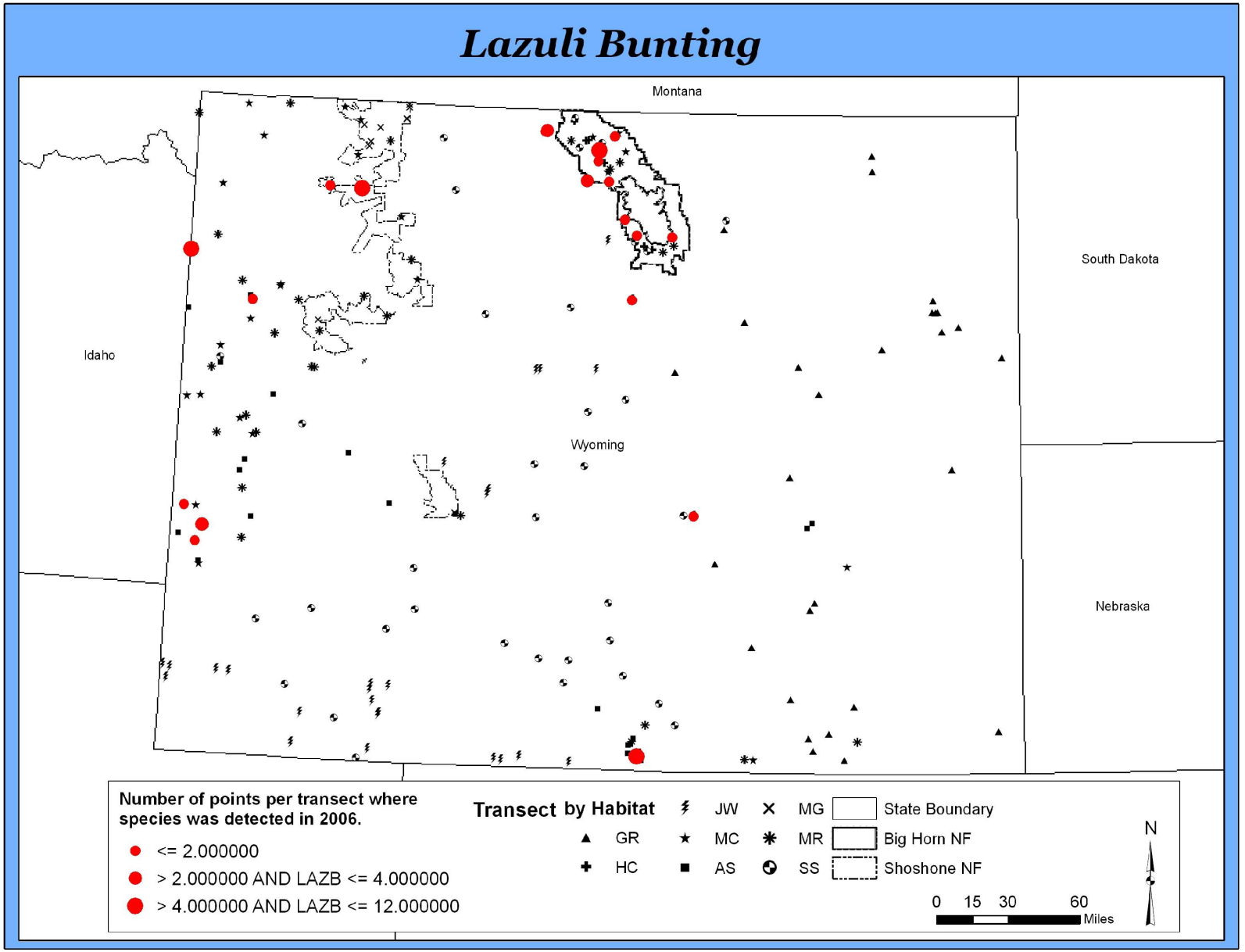
WY-PIF Level III Priority Species

The Lazuli Bunting is widespread in Wyoming and is found in areas that are dominated by deciduous shrubs. In 2006, we detected 82 Lazuli Buntings in six habitats on MWB and were able to calculate a density estimate for this species in montane riparian habitat. After next season, we anticipate having enough observations using the data from all years to calculate a global detection function for this species in at least montane riparian habitat. With this function we will be able to generate annual density estimates that can be used for population-trend monitoring.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Lazuli Bunting on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
BI-HC	ID	--	--	--	1	1
BI-MR*	ID	--	--	--	16	17
BI-SS	ID	--	--	--	6	6
SH-MC**	ID	--	--	--	1	1
SH-MR	ID	--	--	--	13	13
WY-AS	ID	--	--	--	2	2
WY-JW	ID	--	--	--	20	21
WY-MC	ID	--	--	--	2	2
WY-MR	ID	--	--	--	17	20

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; * = Two of these transects are part of the 30 WY-MR transects; ** = All ten of these transects are part of the 30 WY-MC transects.



RMBO point-transect locations and detections of Lazuli Buntings on transects in Wyoming, 2006.

Bullock's Oriole
(Icterus bullockii)

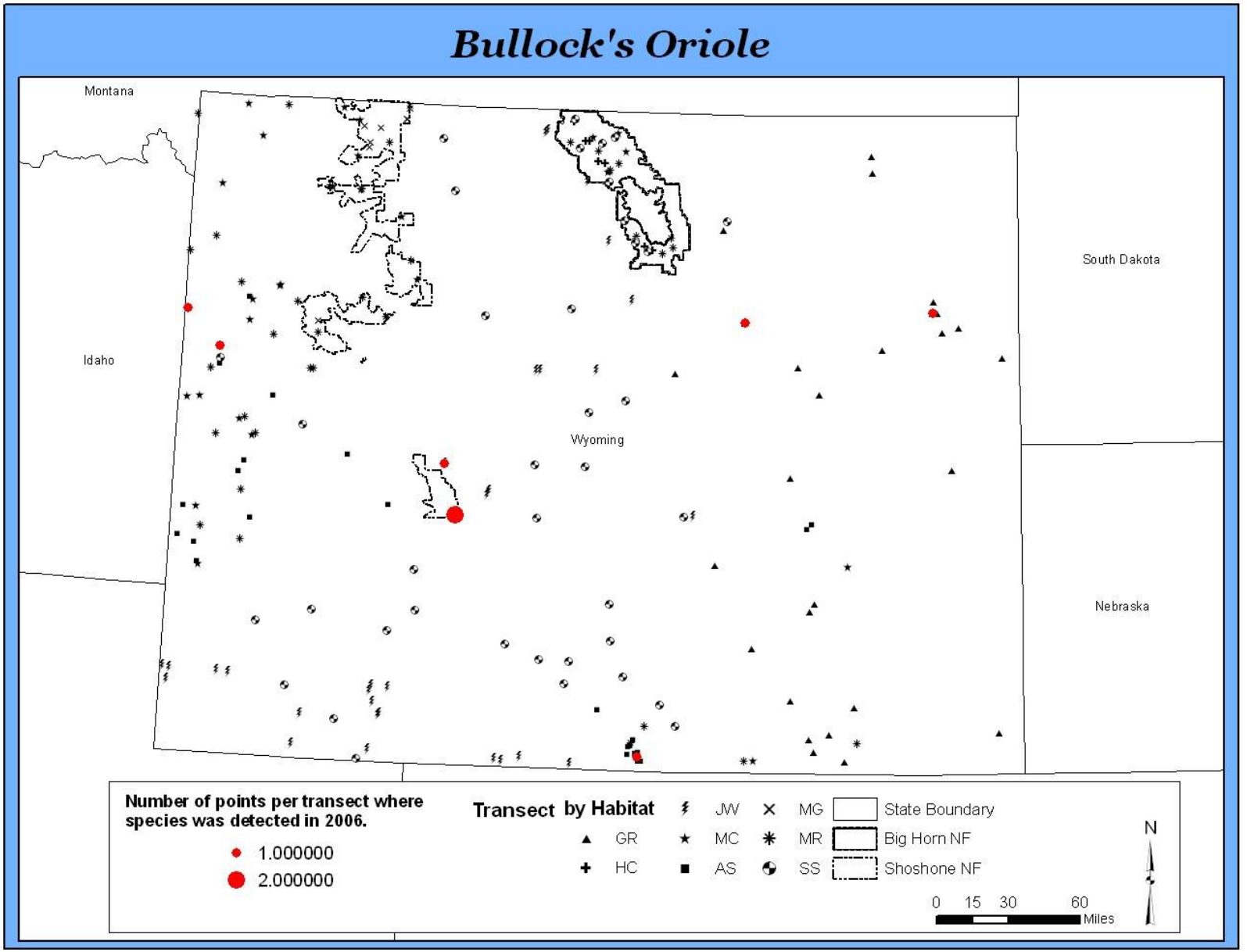
WY-PIF Level III Priority Species

The Bullock's Oriole can be found throughout Wyoming in riparian woodland, along forest edges, and around human habitation. In 2006, we detected 10 Bullock's Orioles in five habitats on MWB. We detected this species on two grassland transects, GR04 and GR74, in 2006. We also detected Bullock's Orioles on these transects in 2005. Overall, we detect the Bullock's Oriole too infrequently on point transects to effectively monitor this species under MWB. Additional grassland transects would likely yield better information for Long-billed Curlew; however, given the species' low population density, effective monitoring will likely require a more intensive and focused effort.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Bullock's Oriole on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-AS	ID	--	--	--	2	3
WY-GR	ID	--	--	--	4	4
WY-JW	ID	--	--	--	1	1
WY-MC	ID	--	--	--	1	1
WY-MR	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Bullock's Orioles on transects in Wyoming, 2006.

Scott's Oriole
(*Icterus parisorum)*

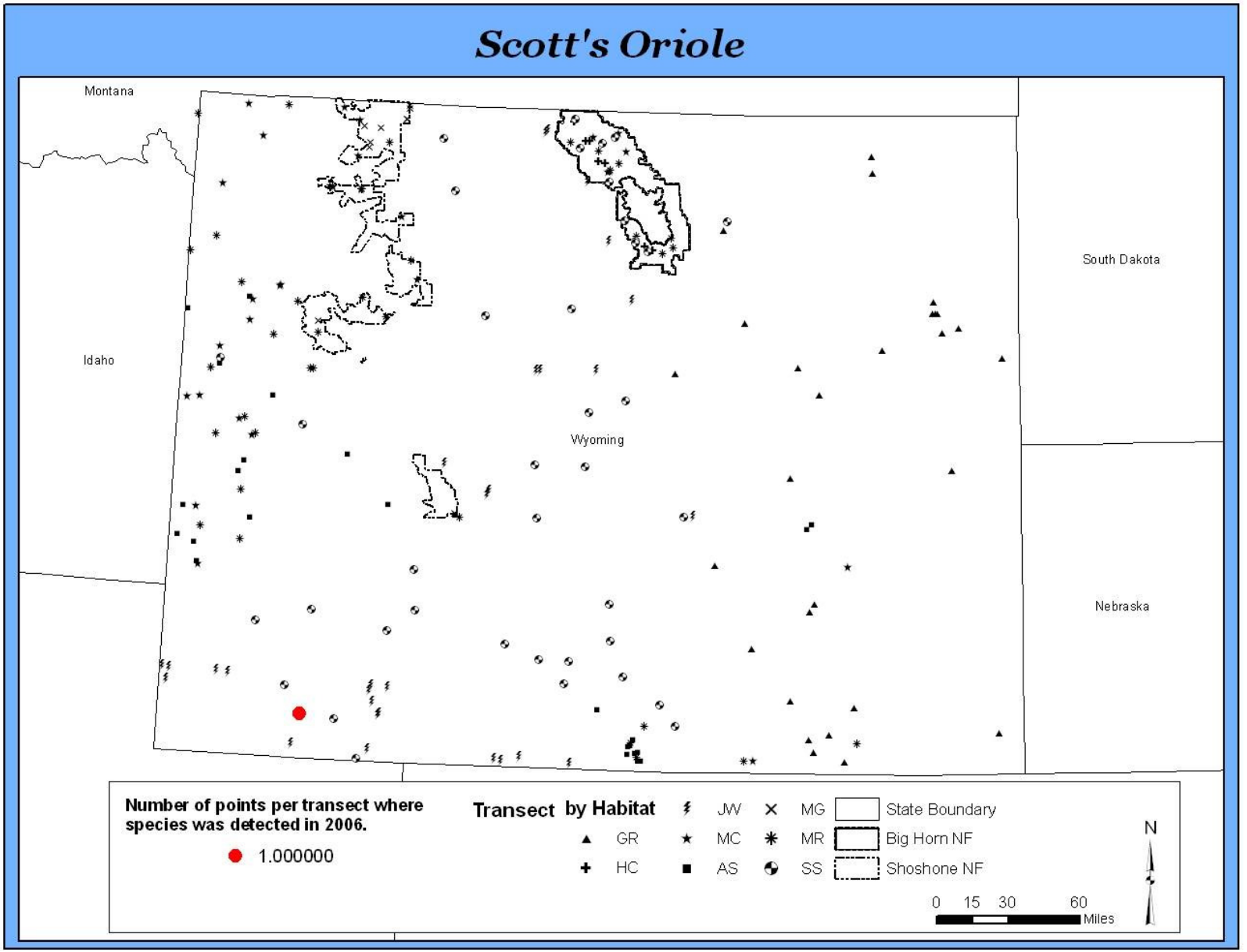
WY-PIF Level II Priority Species
WGFD Species of Greatest Conservation Need

The Scott's Oriole is found exclusively in the southwestern corner of Wyoming in juniper woodland habitat, typically on open, dry hillsides. In 2006, we detected one Scott's Orioles on a juniper woodland transect, JW08, on MWB. We also detected this species on this transect in 2003 and 2004. The population of Scott's Oriole in Wyoming is probably very small, and effective monitoring would most likely require more intense surveys, and potentially a census of nests. We do not detect this species in sufficient numbers to effectively monitor its status through point transects under MWB in any habitat or across the range of habitats.

Total number of independent detections, number of individuals, and habitat-specific density estimates for the Scott's Orioles on the MWB monitoring project, 2006.

Habitat	D	LCL	UCL	CV	n	N
WY-JW	ID	--	--	--	1	1

D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



RMBO point-transect locations and detections of Scott's Orioles on transects in Wyoming, 2006.

APPENDIX B. BIRDS DETECTED ON WYOMING STATEWIDE TRANSECTS

List of all bird species observed during point-count transects in Wyoming from 2002-2006, with management designation and species totals.

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
American Avocet		WY-III				1				5			3	6	6
American Coot													3	2	
American Crow					20	4	13	9	18	3	3	14	29	79	67
American Dipper		WY-II							11		12	19	10	7	11
American Goldfinch					11	2	32	1	36	2	7	14	45	77	84
American Kestrel					12	9	8	2	3	4	11	10	32	40	38
American Pipit					2								1	2	2
American Redstart														2	
American Robin					431	2	83	248	437	10	457	645	840	899	1211
American Three-toed Woodpecker	R2SS	WY-II		SGCN	7			5			2	6	13	18	12
American White Pelican		WY-II		SGCN		6	2		8				2	2	16
American Wigeon						4			5	2			13	1	11
Ash-throated Flycatcher		WY-II		SGCN			14				10	8	7	16	14
Audubon's Warbler					207		8	223	89	5	480	335	11	481	532
Baird's Sparrow		WY-I	BCC											1	
Bald Eagle		WY-I		SGCN	1							1	1	4	1
Baltimore Oriole									2						2
Bank Swallow						3	1	3			2	3	5	3	7
Barn Swallow						3			4	5	4	3	32	16	12
Barrow's Goldeneye				SGCN					2			1	9	2	2
Belted Kingfisher					1		1	2	6		5	1	6	9	10
Bewick's Wren		WY-III	BCC				321				44	31	160	253	321

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
Black-billed Magpie					4	8	65		15	11	38	48	57	85	103
Black-capped Chickadee					27		2		6		84	23	20	26	35
Black-chinned Hummingbird		WY-II					1						1	1	1
Black-headed Grosbeak					29		2	17	16		30	18	33	34	64
Black-throated Gray Warbler		WY-III					113				56	47	78	109	113
Black-throated Sparrow							1								1
Blue Grosbeak					2							1	8	1	2
Blue Grouse		WY-III			3			3		1					7
Blue-gray Gnatcatcher							135		1	1	46	42	82	123	137
Blue-winged Teal									4			1	6	2	4
Brewer's Blackbird					41	85	6	6	56	60	59	54	173	160	254
Brewer's Sparrow	R2SS	WY-I	BCC	SGCN	94	220	300	20	106	787	478	770	1262	1179	1527
Broad-tailed Hummingbird		WY-II			27	1	3	9	64		53	99	129	166	104
Broad-winged Hawk													1	1	
Brown Creeper		WY-II			4		1	5	1		3	19	39	21	11
Brown Thrasher						2					4				2
Brown-headed Cowbird					30	31	66	1	29	43	88	93	174	230	200
Bufflehead									2				2	2	2
Bullock's Oriole		WY-III			3	4	1	1	1			5	13	15	10
Burrowing Owl	R2SS	WY-I	BCC	SGCN		1							3		1
Bushtit		WY-II		SGCN			10					5	17	18	10
California Gull					1	81	3			1			5	1	86
Calliope Hummingbird		WY-II			1				13		1	1	2	15	14
Canada Goose										12					12
Canada Goose						58	26		10	21	10	1	25	73	115
Canvasback				SGCN		4								3	4
Canyon Wren		WY-III					2					1		3	2
Cassin's Finch					12		18	26	12	5	52	57	89	192	73
Cassin's Kingbird		WY-II											5		

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
Cassin's Sparrow	R2SS		BCC			1			1					5	2
Cedar Waxwing					3			1	34		14	3	38	38	38
Chestnut-collared Longspur	R2SS	WY-II	BCC	SGCN		109				3	74	132	48	97	112
Chipping Sparrow					73	1	268	135	47	5	306	463	811	961	529
Chukar							14			1	2	1	7	2	15
Cinnamon Teal						4					1	2	7	2	4
Clark's Grebe		WY-III		SGCN										2	
Clark's Nutcracker		WY-III			38	1	29	77	29	3	49	90	153	188	177
Cliff Swallow					7	36	38		6	6	16	13	97	57	93
Common Grackle						8	1				13	14	22	10	9
Common Loon		WY-II		SGCN					1						1
Common Merganser							1		27		3	8	18	32	28
Common Nighthawk					2	3	3		11	1	7	10	8	14	20
Common Poorwill		WY-III			1							1		1	1
Common Raven					18	24	32	47	19	63	86	84	150	134	203
Common Snipe						1			2	1	13				4
Common Yellowthroat					2			2	13		1	2	11	14	17
Cooper's Hawk					1		2	4	3		1	6	3	5	10
Cordilleran Flycatcher		WY-II			8		3	11	16		7	24	34	51	38
Dark-eyed Junco					76			61	41		390	369	624	147	178
Double-crested Cormorant						5	1								6
Downy Woodpecker					29		1	1	8		9	30	38	30	39
Dusky Flycatcher		WY-II			115		22	63	62	6	157	147	347	297	268
Dusky Grouse					3			3			15	23	31	7	6
Eastern Kingbird						5				1	2	2	26	10	6
European Starling						12	7			3	2	1	62	42	22
Evening Grosbeak					10				7		4	1	1	15	17
Ferruginous Hawk	R2SS	WY-I	BCC	SGCN		5				6	2	5	9	8	11
Field Sparrow													2		

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
Forster's Tern		WY-I		SGCN		1	1								2
Fox Sparrow									22	2	8	11	16	21	24
Franklin's Gull		WY-I		SGCN						2				1	2
Gadwall						4					1	1	5	6	4
Golden Eagle		WY-III	BCC			4	2	1	1	6	2	5	9	8	14
Golden-crowned Kinglet		WY-II			3			8	5		14	24	28	21	16
Grasshopper Sparrow	R2SS	WY-II	BCC	SGCN		85	1		1		20	42	35	37	87
Gray Catbird					2	1			24		3	3	8	33	27
Gray Flycatcher		WY-II			4		307				175	145	154	164	311
Gray Jay					9			14	1		15	20	26	31	24
Gray Vireo			BCC											6	
Gray-headed Junco					140		1	27	5					357	173
Great Blue Heron				SGCN	1	1			9		5	3	10	9	11
Great Gray Owl		WY-II		SGCN	1									1	1
Great Horned Owl							1	1	1			2	1	3	3
Greater Sage-Grouse	R2SS	WY-I		SGCN	8	3	1		3	62			2	24	77
Green-tailed Towhee					160	12	145	36	66	50	216	290	352	410	469
Green-winged Teal									6	7			8	3	13
Hairy Woodpecker					27			34	8		27	39	65	55	69
Hammond's Flycatcher		WY-II			30			19	23	2	11	50	74	92	74
Hermit Thrush					47		4	97	5		62	111	203	183	153
Horned Lark					4	1141	43		1	984	627	1074	1924	1943	2173
House Finch					1		127		3		27	24	40	26	131
House Sparrow						1	3							7	4
House Wren					234		23	27	38	3	135	226	299	483	325
Juniper Titmouse		WY-II		SGCN			57				11	25	10	7	57
Killdeer						42	2		12	8	32	42	46	50	64
Lark Bunting		WY-II		SGCN	2	1278		3	1	28	477	603	1592	743	1312
Lark Sparrow		WY-II			10	10	26			12	82	77	72	83	58

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
Lazuli Bunting		WY-III			2		21	2	20		27	23	33	59	45
Least Flycatcher					8			1	1		2				10
Lesser Scaup				SGCN					8		1		14	13	8
Lewis's Woodpecker	R2SS	WY-II	BCC	SGCN										1	
Lincoln's Sparrow					56	2		49	199	3	129	167	243	254	309
Loggerhead Shrike	R2SS	WY-II	BCC			5	2			12	5	6	28	19	19
Long-billed Curlew		WY-I	BCC	SGCN		1				3			1	1	4
Long-eared Owl								1							1
MacGillivray's Warbler		WY-II			65		3	35	96		62	112	140	202	199
Mallard					3	6	3		12	5	12	2	29	34	29
McCown's Longspur	R2SS	WY-I	BCC	SGCN		270					71	81	138	236	270
Merlin		WY-II		SGCN							2		1		
Morning Warbler								1							1
Mountain Bluebird					75	12	272	21	12	6	94	186	293	322	398
Mountain Chickadee					105		26	156	52		303	321	312	383	339
Mountain Plover	R2SS	WY-I	BCC	SGCN		4					2	16	1	10	4
Mourning Dove					69	67	274	14	27	47	132	153	385	282	498
Northern Flicker					100	3	43	54	58	10	83	132	178	11	268
Northern Goshawk	R2SS	WY-I		SGCN	3				2		1		5	8	5
Northern Harrier	R2SS	WY-III	BCC		2	17				11	3	6	11	9	30
Northern Mockingbird						1	3				1		2		4
Northern Pintail				SGCN			2			1	2		6	4	3
Northern Pygmy-Owl				SGCN				1				1		1	1
Northern Rough-winged Swallow		WY-III				15	2	4	18	1	4	6	3	8	40
Northern Shoveler										2				2	2
Northern Waterthrush											5	2		3	
Olive-sided Flycatcher	R2SS	WY-II			4		1	26	15		17	20	56	53	46
Orange-crowned Warbler					56			9	11	1	27	33	50	79	77
Orchard Oriole						1							1		1

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
Osprey									2		1	1	1	5	2
Ovenbird		WY-III							1					2	1
Peregrine Falcon	R2SS	WY-I	BCC	SGCN				1							1
Pied-billed Grebe						2			1					1	3
Pileated Woodpecker								3							3
Pine Grosbeak								11	3		8	9	14	6	14
Pine Siskin					92		1	154	95		197	146	615	894	342
Pink-sided junco					30			296	93	1		25		74	420
Pinyon Jay							89			1	34	59	120	97	90
Plumbeous Vireo		WY-II			4		18	2			42	8	15	38	24
Prairie Falcon		WY-III	BCC		1	6	3			5	2	6	2	3	15
Purple Martin	R2SS				2						2			6	2
Pygmy Nuthatch		WY-II		SGCN	4			2			9			2	6
Red Crossbill					33			57	11		10	25	88	291	101
Red Squirrel					44			36	23		22	47	86	200	103
Red-breasted Nuthatch					38			47	2		146	166	210	174	87
Red-eyed Vireo													1		
Redhead				SGCN										5	
Red-headed Woodpecker		WY-III	BCC				1		1						2
Red-naped Sapsucker		WY-II	BCC		76			19	53		34	76	152	125	148
Red-shafted Flicker					59	3	6	22	22		1	5		237	112
Red-tailed Hawk					20	6	17	12	19	5	28	33	51	57	79
Red-winged Blackbird					13	79	13	1	3	9	41	45	62	149	118
Ring-billed Gull						1							1		1
Ring-necked Duck											1		8	8	
Ring-necked Pheasant						2	2			3	1	2	3	7	7
Rock Pigeon													3	8	
Rock Wren		WY-III			10	19	250	33	22	53	92	141	213	255	387
Ruby-crowned Kinglet					91			174	102		377	456	536	549	367

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
Ruffed Grouse					5			2	3		35	7	5	3	10
Rufous Hummingbird		WY-II						1				3	1	16	1
Rusty Blackbird						1									1
Sage Grouse											3		1		
Sage Sparrow	R2SS	WY-I		SGCN			54		1	177	86	107	110	128	232
Sage Thrasher		WY-II		SGCN	21	19	19	3	33	395	79	232	258	326	490
Sandhill Crane				SGCN		4	5	3	23	10	11	6	20	34	45
Savannah Sparrow					1	31		2	41	18	35	64	49	93	93
Say's Phoebe		WY-III			1	2	7			13	10	26	21	25	23
Scott's Oriole		WY-II		SGCN			1					5	3	5	1
Sharp-shinned Hawk							2	1	2		3	3	7	5	5
Sharp-tailed Grouse	R2SS	WY-I	BCC	SGCN										6	
Short-eared Owl	R2SS	WY-I	BCC	SGCN		2							9		2
Song Sparrow					28	4	8	19	226	6	224	124	140	192	291
Sora					3				3	1		2	3		7
Spotted Sandpiper					3		1	6	63	2	55	69	56	41	75
Spotted Towhee					22		32		2	6	6	21	23	23	62
Steller's Jay					11			20	22		44	26	18	15	53
Swainson's Hawk		WY-I	BCC	SGCN		11				2	2	2	8	4	13
Swainson's Thrush					27			27	46		37	77	111	96	100
Townsend's Solitaire		WY-II			13	1		25	8		37	15	52	41	47
Tree Swallow					53	1		14	25	5	57	93	62	67	98
Turkey Vulture					5	1	7	1		3	7	16	19	14	17
Upland Sandpiper		WY-I	BCC	SGCN		6						2	10	7	6
Veery		WY-III			6			1	7		9	15	9	2	14
Vesper Sparrow		WY-II			56	207	153	1	28	279	329	339	601	666	724
Violet-green Swallow					14		122	14	36	9	54	70	146	145	195
Virginia's Warbler		WY-III	BCC		3		2		1				2	4	6
Warbling Vireo					341		6	56	96		208	292	566	644	499

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006						Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	AS	GR	JW	MC	MR	SS	2002	2003	2004	2005	2006
Western Grebe		WY-III		SGCN			3							1	3
Western Kingbird					1	2	1			3	12	6	19	5	7
Western Meadowlark					11	1416	153	1	6	395	402	769	1507	1832	1982
Western Scrub-Jay		WY-II		SGCN			2				9	5	5	10	2
Western Tanager					89		1	98	34	2	78	135	174	151	224
Western Wood-Pewee					115	1	1	21	34		71	45	97	160	172
White-breasted Nuthatch					4			5				7	9	64	9
White-crowned Sparrow					14		1	4	74		170		217	3	93
White-crowned Sparrow					36			33	84	1		213		174	154
White-throated Swift		WY-II					5	6		5	7	2	14	17	16
White-winged Crossbill								10			5	1		50	10
Wild Turkey												7	1		
Willet		WY-III				11							2	8	11
Williamson's Sapsucker		WY-II	BCC		1			5	1		10	14	10	6	7
Willow Flycatcher		WY-II		SGCN					34		13	15	25	29	34
Wilson's Phalarope		WY-I	BCC			15							32	69	15
Wilson's Snipe					5	7	1	3	23	6		20	42	56	45
Wilson's Warbler		WY-II			9			5	61		86	69	78	107	75
Winter Wren														1	
Yellow Warbler					51	3	6	12	319	9	175	146	252	346	400
Yellow-breasted Chat					1		5		4		1			2	10
Yellow-headed Blackbird						1	1				4	5	8	3	2
Yellow-rumped Warbler					7				1				478	3	8
Yellow-shafted Flicker														1	
Yellow-throated Warbler														1	

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

[2] Special management designations: R2SS=US Forest Service Region 2 Sensitive Species; WY-I= Wyoming Partners In Flight Level I Priority (Conservation Action), WY-II= Wyoming Partners In Flight Level II Priority (Monitoring); WY-III=Wyoming Partners in Flight Level III Priority (Local Interest); BCC= USFWS Bird of Conservation Concern for Region 6 (Mountain-Prairie Region); SGCN=Species of Greatest Conservation Need (Wyoming Comprehensive Wildlife Conservation Plan 2005).

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

APPENDIX C. BIRDS DETECTED ON BIGHORN NATIONAL FOREST TRANSECTS

List of all bird species observed during point-count transects in Bighorn National Forest, 2002-2006, with management designation and species totals.

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006				Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	HC	MC	MR	SS	2002	2003	2004	2005	2006
Green-winged Teal											2	1	
American Crow						1			2	2	1	1	1
American Dipper		WY-II						1		2	2		1
American Goldfinch								1		2	4	2	1
American Kestrel								2	2	5	12	8	2
American Pipit					14			2	12	12	21	157	16
American Robin					129	55	98	115	351	592	656	598	397
American Wigeon												1	
American Three-toed Woodpecker	R2SS	WY-II		SGCN	17	2			2	10	26	41	19
Audubon's Warbler					77	41	22	18	165	273		364	158
Barrow's Goldeneye				SGCN								1	
Barn Swallow												1	
Black-billed Magpie									1	1	3		
Belted Kingfisher											1		
Blue Grouse		WY-III				1							1
Brown-headed Cowbird							3	13	1	11	21	33	16
Black-headed Grosbeak					1		1		2	2			2
Black Rosy-Finch		WY-III		SGCN								2	
Brewer's Blackbird					2		1	16	53	26	57	66	19
Brown Creeper		WY-II			8	6	4	1		30	52	32	19

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006				Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	HC	MC	MR	SS	2002	2003	2004	2005	2006
Brewer's Sparrow	R2SS	WY-I	BCC	SGCN	19	11	27	215	88	106	103	78	272
Broad-tailed Hummingbird		WY-II			1		3			6	7	3	4
Cassin's Finch					16	2		2	6	4	25	51	20
Cassin's Sparrow	R2SS		BCC		1								1
Clay-colored Sparrow								1					1
Cedar Waxwing						1		2	3	1	4		3
Chipping Sparrow					85	43	16	48	138	191	259	242	192
Clark's Nutcracker		WY-III			26	25	3	21	29	59	70	59	75
Cliff Swallow							2			1		2	2
Cordilleran Flycatcher		WY-II			5	2		9		39	56	54	16
Common Grackle									5	3			
Cooper's Hawk											3	3	
Common Nighthawk							2			2	1	1	2
Common Raven					13	10	7	38	39	29	44	44	68
Common Snipe							2		17				2
Common Yellowthroat							11		2	7	13	6	11
Dark-eyed Junco						63	11	3	3	501	471	114	77
Downy Woodpecker									2	1	1		
Dusky Flycatcher		WY-II			4		18	1	16	70	31	35	23
Dusky Grouse									2	1		2	
Eastern Kingbird										1			
Eastern Wood-Pewee						1							1
Evening Grosbeak											1		
Field Sparrow								1					1
Fox Sparrow							2			2	1	1	2
Golden-crowned Kinglet		WY-II								9	4	4	
Gray-headed Junco					1				320			3	1
Great Horned Owl					2				1		3		2

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006				Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	HC	MC	MR	SS	2002	2003	2004	2005	2006
Golden Eagle		WY-III	BCC							2	1	3	
Gray Jay					24	1		1	17	35	40	20	26
Gray Catbird										1			
Gray Partridge											2		
Green-tailed Towhee						1	1	52	35	68	88	99	54
Hammond's Flycatcher		WY-II					1		23	3	2	3	1
Hairy Woodpecker					6	8	6	1	19	53	36	30	21
Hermit Thrush					54	36	4	17	114	247	203	146	111
House Finch						6	3						9
Horned Lark					4				8	28	19	21	4
House Sparrow										1			
House Wren							1	1	7	6	8	3	2
Killdeer									1	3	2	4	
Lark Bunting		WY-II		SGCN							16		
Lazuli Bunting		WY-III			1		17	6	10	28	7	4	24
Lincoln's Sparrow					5	7	132	33		235	289	224	177
Mallard							1		4	4		12	1
MacGillivray's Warbler		WY-II						1		1	7	4	1
Mountain Bluebird					22	23	5	28	92	74	137	144	78
Mountain Chickadee					72	66	53	19	211	372	303	227	210
Mourning Dove					2	1		6	2				9
White-crowned Sparrow					40	13	39	93		279		243	185
Northern Flicker					14	11	26	24	52	57	53	1	75
Northern Goshawk	R2SS	WY-I		SGCN			0		2	1		3	0
Northern Harrier	R2SS	WY-III	BCC				1			1	4	3	1
Orange-crowned Warbler							2	1		1	2		3
Oregon Junco							1						1
Olive-sided Flycatcher	R2SS	WY-II				4		2	2	7	4	1	6

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006				Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	HC	MC	MR	SS	2002	2003	2004	2005	2006
Ovenbird		WY-III									1	1	
Pine Grosbeak					12	7		4		28	16	25	23
Pine Siskin					60	53	38	48	67	99	271	149	199
Prairie Falcon		WY-III	BCC									1	
Pink-sided junco					146	105	136	62		1	1	416	449
Red-breasted Nuthatch					14	17	10	4	91	86	39	44	45
Ruby-crowned Kinglet					81	55	93	44	425	530	595	531	273
Red Crossbill					20	8	6	14	3	40	75	66	48
Red Squirrel					117	89	62	44	182	284	409	342	312
Ring-necked Duck												2	
Red-naped Sapsucker		WY-II	BCC			1	1	2	2	5	7	1	4
Rock Wren		WY-III			15	17	1	33	6	28	60	15	66
Red-shafted Flicker					6	7	1	7		1		57	21
Red-tailed Hawk					1		1	3	5	4	6	7	5
Rufous Hummingbird		WY-II			1		1						2
Red-winged Blackbird					12				7	14	5	7	12
Sandhill Crane				SGCN					4		1	5	
Sage Sparrow	R2SS	WY-I		SGCN			6					3	6
Sage Thrasher		WY-II		SGCN				3		1		2	3
Savannah Sparrow					1	5	46	29		134	96	79	81
Song Sparrow							23		162		26	10	23
Spotted Sandpiper							5		8	20	16	13	5
Spotted Towhee										2			
Sharp-shinned Hawk						1			1	1	4	2	1
Steller's Jay									2	4	1		
Swainson's Hawk		WY-I	BCC	SGCN			1				1	1	1
Swainson's Thrush						1			3	1			1
Townsend's Solitaire		WY-II			8	3	3	1		18	35	56	15

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006				Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	HC	MC	MR	SS	2002	2003	2004	2005	2006
Tree Swallow						2	5	5		1	1	7	12
Turkey Vulture					1					1			1
Vesper Sparrow		WY-II			16	13	4	143	237	83	126	143	176
Violet-green Swallow							1		5	16	22	25	1
Warbling Vireo					3	1	23	7	41	45	39	48	34
White-breasted Nuthatch										1		2	
White-crowned Sparrow						9	12		116		205		21
Western Bluebird		WY-II				1							1
Western Meadowlark							3	57	36	25	62	26	60
Western Tanager						1	1		1	19	10	10	2
Western Wood-Pewee					5	1	12	3	21	38	14	20	21
Williamson's Sapsucker		WY-II	BCC			1	1		1	8	4	7	2
Wilson's Snipe					1		3	1		28	17	28	5
Wilson's Warbler		WY-II			1		13		173	132	120	159	14
Winter Wren											1		
White-throated Swift		WY-II						1		5	8	5	1
White-winged Crossbill					10	10		1		2	25	21	21
White-winged Junco						1							1
Yellow-breasted Chat											1		
Yellow-rumped Warbler											326		
Yellow-shafted Flicker						1							1
Yellow Warbler							1			13		5	1

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

[2] Special management designations: USFS=United States Forest Service, R2SS=US Forest Service Region 2 Sensitive Species; PIF=Partners in Flight, WY-I= Wyoming Partners In Flight Level I Priority (Conservation Action), WY-II= Wyoming Partners In Flight Level II Priority (Monitoring); WY-III=Wyoming Partners in Flight Level III Priority (Local Interest); USFWS=U.S. Fish and Wildlife Service, BCC= Bird of Conservation Concern for Region 6 (Mountain-Prairie Region); WGFD=Wyoming Game and Fish Department, SGCN=Species of Greatest Conservation Need (Wyoming Comprehensive Wildlife Conservation Plan 2005).

[3] Habitats: HC=high-elevation conifer; MC=mid-elevation conifer; MR=montane riparian; SS=shrubsteppe

APPENDIX D. BIRDS DETECTED ON SHOSHONE NATIONAL FOREST TRANSECTS

List of all bird species observed during point-count transects in Shoshone National Forest, 2002-2006, with management designation and species totals.

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006			Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	MC	MG	MR	2002	2003	2004	2005	2006
American Crow					2	3		1	8		2	5
American Dipper		WY-II						10	12	2		
American Goldfinch									1		1	
American Kestrel					2	7	1	1		3	7	10
American Pipit								1			37	
American Robin					48	34	62	88	84	122	150	144
American Three-toed Woodpecker	R2SS	WY-II		SGCN	2				3	2	5	2
Audubon's Warbler					34	6	25	105	130	2	87	65
American White Pelican		WY-II		SGCN							1	
Black-billed Magpie						17	4	13	6	11	11	21
Black-capped Chickadee								6	8	1	1	
Belted Kingfisher								2	1	2	1	
Brown-headed Cowbird								5	5	4	7	
Black-headed Grosbeak								1			5	
Blue Grosbeak									1			
Brewer's Blackbird						16	1	1	4	23	18	17
Brown Creeper		WY-II			2			2	3	2	1	2
Brewer's Sparrow	R2SS	WY-I	BCC	SGCN	2	95	1	56	49	79	19	98
Broad-tailed Hummingbird		WY-II			1				3	5	1	1
Cassin's Finch					2			15	7	14	9	2
Calliope Hummingbird		WY-II									4	
Cassin's Sparrow	R2SS		BCC								1	
Chipping Sparrow					30	22	28	35	49	53	68	80

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006			Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	MC	MG	MR	2002	2003	2004	2005	2006
Chukar						6				4	2	6
Clark's Grebe		WY-III		SGCN		1						1
Clark's Nutcracker		WY-III			23	22	8	34	19	57	42	53
Cliff Swallow							4	12				4
Cordilleran Flycatcher		WY-II			1			8	10	2	3	1
Common Grackle								26			1	
Cooper's Hawk					3					2	2	3
Common Nighthawk						1				1	4	1
Common Raven					6	24	15	15	8	21	20	45
Common Snipe						1		1				1
Common Yellowthroat							3					3
Dark-eyed Junco					6	11		29	57	131	44	17
Downy Woodpecker						1		1	3			1
Dusky Flycatcher		WY-II			27	14	27	12	44	63	86	68
Dusky Grouse					3			4	2	1	1	3
Evening Grosbeak									1			
Great Blue Heron				SGCN			5					5
Golden-crowned Kinglet		WY-II			1				7	1		1
Gray-headed Junco					1					1	82	1
Great Horned Owl							2			2	1	2
Golden Eagle		WY-III	BCC		1			2	2	3	1	1
Gray Jay					3			4	3	7	6	3
Gray Catbird									2			
Gray Flycatcher		WY-II						1	2		1	
Grasshopper Sparrow	R2SS	WY-II	BCC	SGCN		2	1					3
Green-tailed Towhee					1	29	10	29	38	43	53	40
Hammond's Flycatcher		WY-II			7		6	3	39	6	14	13
Hairy Woodpecker					6	1	3	4	7	9	16	10
Hermit Thrush					16	5	3	5	13	57	51	24

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006			Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	MC	MG	MR	2002	2003	2004	2005	2006
Horned Lark						12		17	2	8	7	12
House Wren					2	2	1	4	26	5	29	5
Killdeer						2	2	2		1		4
Lark Sparrow		WY-II				6		24	9	13	13	6
Lazuli Bunting		WY-III			1		13	1	2	2	15	14
Long-billed Curlew		WY-I	BCC	SGCN					1			
Lincoln's Sparrow					7		13		56	19	13	20
Merlin		WY-II		SGCN		1						1
MacGillivray's Warbler		WY-II			3	1	5	1	7	9	17	9
Mountain Bluebird					9	18	1	10	17	40	90	28
Mountain Chickadee					26	8	13	87	60	61	81	47
Mourning Dove						10	5	5	6	13	4	15
White-crowned Sparrow					7		19	1	27		8	26
no birds					0	0	0	0	0	0	0	0
Northern Flicker					5	5	13	11	17	42	3	23
Northern Goshawk	R2SS	WY-I		SGCN						3	2	
Northern Harrier	R2SS	WY-III	BCC			1						1
Northern Pygmy-Owl				SGCN	1						1	1
Northern Rough-winged Swallow		WY-III					4					4
Orange-crowned Warbler						1			4	2	2	1
Olive-sided Flycatcher	R2SS	WY-II			8	1	1	2	6	6	9	10
Osprey						1				1	2	1
Pine Grosbeak					2						1	2
Pine Siskin					36	5	12	11	38	165	128	53
Prairie Falcon		WY-III	BCC			1				1	1	1
Pink-sided junco					78	7	10	10	25		10	95
Red-breasted Nuthatch					15	9	1	27	29	55	58	25
Ruby-crowned Kinglet					53	12	19	112	70	114	100	84
Red Crossbill					8					19		8

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006			Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	MC	MG	MR	2002	2003	2004	2005	2006
Red Squirrel					8	10	4	18	33		50	22
Red-naped Sapsucker		WY-II	BCC		6	2	7	2	13	15	8	15
Rock Wren		WY-III			24	75	5	48	40	101	62	104
Red-shafted Flicker					19	14	2		5		47	35
Red-tailed Hawk					4	7	4	4	10	7	10	15
Ruffed Grouse					1		1	10	5		1	2
Rufous Hummingbird		WY-II							2	1	1	
Red-winged Blackbird						2	1	1	4	5	4	3
Sandhill Crane				SGCN		3				1	5	3
Sage Grouse											2	
Say's Phoebe		WY-III				1						1
Sage Thrasher		WY-II		SGCN		8	6		9	5	1	14
Savannah Sparrow						7		7	10	19	6	7
Sora						1				1	1	1
Song Sparrow					4		25	93	24	19	15	29
Spotted Sandpiper					1		19	40	50	15	14	20
Spotted Towhee							1				1	1
Sharp-shinned Hawk							2	1	1		1	2
Steller's Jay					2			2	3	2	1	2
Swainson's Thrush					2		2	3	19	6	3	4
Townsend's Solitaire		WY-II			14	1	4	7	8	23	9	19
Tree Swallow					1	5	2	1		1	3	8
Veery		WY-III					1	2		2		1
Vesper Sparrow		WY-II				80	8	94	91	137	64	88
Violet-green Swallow					8	3	19	3	5	29	40	30
Virginia's Warbler		WY-III	BCC			1						1
Warbling Vireo					16	20	33	25	54	95	133	69
White-breasted Nuthatch					2				1		7	2
White-crowned Sparrow								59		16	1	

Common Name[1]	Special Management Designation[2]				Total Number of Individuals Observed per Habitat[3], 2006			Total Number of Individuals Observed per Year (all habitats)				
	USFS	PIF-WY	USFWS	WGFD	MC	MG	MR	2002	2003	2004	2005	2006
Western Meadowlark						120	1	90	134	134	87	121
Western Tanager					20	6		1	14	29	16	26
Western Wood-Pewee					3	2	2	1	5	7	15	7
Willow Flycatcher		WY-II		SGCN			2					2
Williamson's Sapsucker		WY-II	BCC		1			2	3	2		1
Wilson's Snipe						1	3			1	1	4
Wilson's Warbler		WY-II					7	33	1	1	1	7
White-throated Swift		WY-II			6					31	4	6
Yellow-rumped Warbler										88		
Yellow Warbler					2	3	28	18	33	16	24	33

[1] Common names are from the A.O.U. Check-list of North American Birds, Seventh Edition (2003).
[2] Special management designations: USFS=United States Forest Service, R2SS=US Forest Service Region 2 Sensitive Species; PIF=Partners in Flight, WY-I= Wyoming Partners In Flight Level I Priority (Conservation Action), WY-II= Wyoming Partners In Flight Level II Priority (Monitoring); WY-III=Wyoming Partners in Flight Level III Priority (Local Interest); USFWS=U.S. Fish and Wildlife Service, BCC= Bird of Conservation Concern for Region 6 (Mountain-Prairie Region); WGFD=Wyoming Game and Fish Department, SGCN=Species of Greatest Conservation Need (Wyoming Comprehensive Wildlife Conservation Plan 2005).
[3] Habitats: MC=mid-elevation conifer; MG=montane grassland; MR=montane riparian