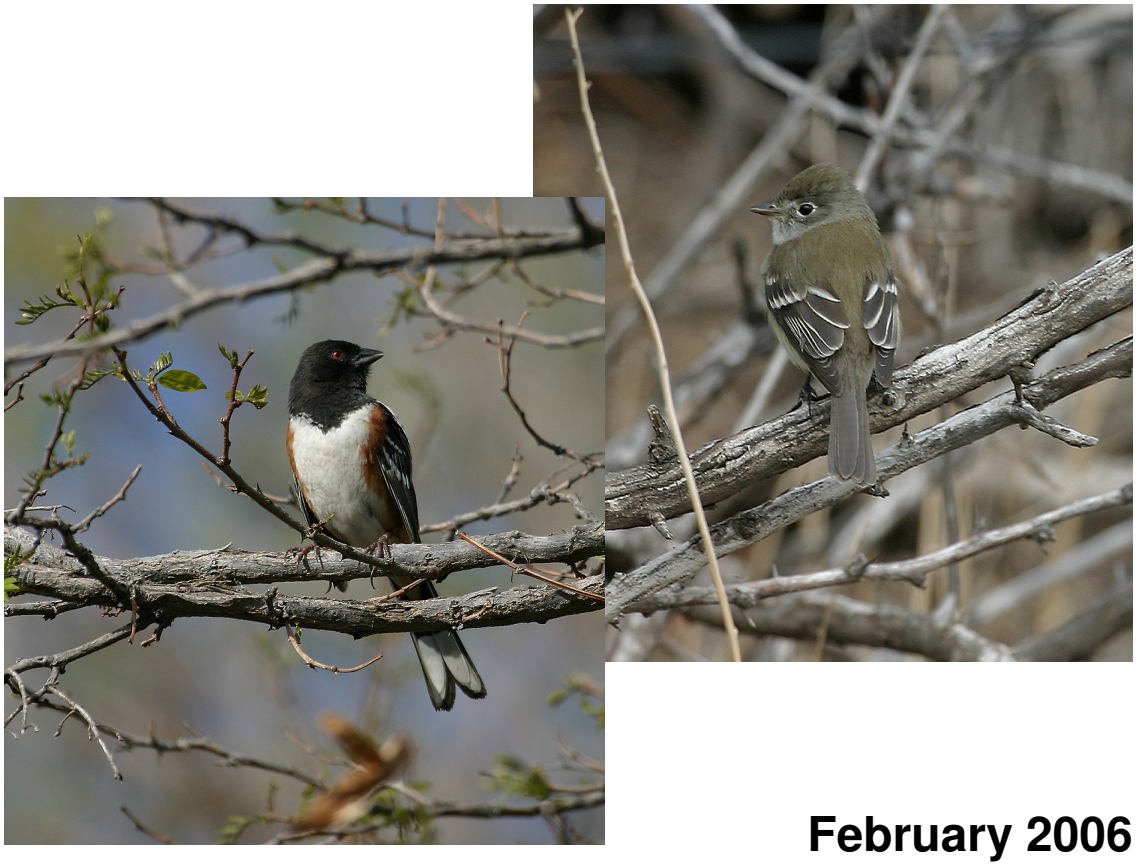
# Monitoring Wyoming's Birds: Year 4

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



**February 2006**

**Rocky Mountain Bird Observatory**
14500 Lark Bunting Lane
Brighton, CO 80603
303.659.4348
www.rmbo.org

Tech. Report # M-MWB05-01

**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.*

***Suggested Citation:***

**Hutton, K., D. Hanni, A. Panjabi, G. Giroir, and R. Sparks. 2005**. *Monitoring Wyoming's Birds: Year 4.* Tech. Rep. M-MWB05-01. Rocky Mountain Bird Observatory, Brighton, CO, XX pp.

***Cover Photos:***

Spotted Towhee and Hammond's Flycatcher, Tony Leukering, 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. Bird monitoring provides data needed not only to effectively manage bird populations, but also to understand the effects of human activities on the ecosystem and to gauge their sustainability. Because bird communities reflect an integration of a broad array of ecosystem conditions, monitoring entire bird communities at the habitat level offers a cost-effective means for monitoring biological integrity at a variety of scales.

In 2005, Rocky Mountain Bird Observatory (RMBO), in conjunction with its funding partners, the Bureau of Land Management, U.S. Forest Service (USFS), and the Wyoming Game and Fish Department (WGFD), implemented Year 4 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, including some USFS Region 2 Sensitive Species and WGFD Species of Greatest Conservation Need, as described in Wyoming's Comprehensive Wildlife Conservation Strategy. In the short term, this program provides information needed to effectively manage and conserve bird populations in Wyoming, including the spatial distribution, abundance, and habitat associations for each species. This cooperative project supports the USFS's efforts to comply with requirements set forth in the National Forest Management Act and other statutes and regulations. It also contributes to RMBO's broader landscape-scale breeding bird monitoring program, which currently includes 11 states in the Rocky Mountains and Great Plains regions.

In 2005, RMBO staff conducted 2,351 point counts along 166 transects in six different habitats (aspen, grassland, mid-elevation conifer, montane riparian, juniper woodland, and shrubsteppe) statewide. We also conducted 622 point counts along 42 transects in four habitats (high-elevation conifer, mid-elevation conifer, montane riparian and shrubsteppe) in the Bighorn National Forest. In addition, we conducted 365 point counts along 25 transects in 3 different habitats (mid-elevation conifer, montane grassland, montane riparian) in the Shoshone National Forest. New survey sites were added to certain habitats, while others were dropped or reestablished in more representative habitat. All of the grassland transects were reestablished in 2005 to randomly place them so that they are not along roads as in previous years, and were selected in a fashion similar to the other transects.

RMBO staff recorded a total of 187 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 (CV of ≤ 50% in at least one habitat) on 48 species which should be effectively monitored under MWB in at least one of the habitats surveyed this year, and we should be able to detect a population decline for these species of 3.0% per year within at least 12 years. We obtained sufficient data on several other species to monitor their populations across habitat types, although in some cases, these species may be better monitored with additional transects in certain habitats or with alternative techniques. Many of these species are listed as prioroity species by the USFS, Partners in Flight, the United States Fish and Wildlife Service, and the WGFD.

## ACKNOWLEDGEMENTS

This project was funded by the Wyoming Game and Fish Department, the U.S. Forest Service, and the Bureau of Land Management, through challenge cost-share agreements with the Rocky Mountain Bird Observatory.

We sincerely thank Andrea Cerovski of the Wyoming Game and Fish Department, Jon Warder of the U.S. Forest Service, and Mark Gorges of the Bureau of Land Management, for their support and involvement in the program, as well as for logistical assistance provided before the field season. We also thank Jeff Muehleck of the U.S. Forest Service for his help with GIS and transect mapping prior to the field season. We are especially grateful to the 2005 field crew leader, Ken Behrens, who helped prepare and implement a successful field season. We are also grateful to the 2005 field crew: Tim Avery, Joe Bends, Nick Block, Cameron Cox, Eva Crane, Coen Dexter, Pete Hosner, Kelly Idema, Pete Idema, and Tom McConnell, who spent many weeks in the field, sometimes under difficult conditions, conducting surveys and seeking out birds. We are especially appreciative to Michele Shimomura of RMBO for her efforts to integrate the data and improve the data quality and management; her efforts were essential to the successful completion of this report. Finally we thank Doug Faulkner and Emily Steel of RMBO for their careful review of this report.

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# INTRODUCTION

## *Program History*

In 1995, the Rocky Mountain Bird Observatory (RMBO), in conjunction with the Colorado Division of Wildlife (CDOW), United States Forest Service (USFS), Bureau of Land Management (BLM) and National Park Service (NPS), began efforts to create and conduct a Colorado-wide program to monitor breeding-bird populations, entitled *Monitoring Colorado's Birds* (MCB). This was one of the first attempts in the nation to develop and implement a statewide all-bird monitoring plan. In 1997, after review by statisticians and CDOW biologists, the program was structured so that count-based data was obtained for all breeding bird species in the state on a randomized and habitat-stratified basis. Using the Colorado GAP dataset, blocks of habitat (stands) large enough to support a 3.5 km MCB transect were randomly selected within the specified habitats. In 1998, we conducted a pilot year on three habitats: aspen, ponderosa pine and spruce-fir. In 1999, after a successful pilot year, the protocol was implemented in an additional 10 habitats.

Since 1999, RMBO has continually expanded its monitoring efforts to include neighboring states using a similar transect selection protocol and survey methodology. In 2001, in cooperation with its partner, the Black Hills National Forest (BHNF), RMBO implemented a habitat-based bird monitoring program designed to provide rigorous population trend data on most diurnal, regularly occurring breeding birds species in the Black Hills (Panjabi et al. 2001). Modeled after *Monitoring Colorado's Birds,* this program is entitled *Monitoring Birds of the Black Hills* (MBBH) with transects in 10 habitats. 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) and, in addition to monitoring bird populations, generates information useful in managing birds (e.g., habitat associations, spatial distribution).

In 2002, RMBO initiated a similar program in Wyoming entitled *Monitoring Wyoming's Birds* (MWB). In cooperation with the BLM, USFS, Wyoming Game and Fish Department (WGFD), and the Wyoming Partners in Flight group (WY-PIF), RMBO implemented a long-term, habitat-based bird monitoring program for six habitats state-wide. Also, we established additional transects in the Bighorn and Shoshone national forests.

In 2003, RMBO also began working with the Carson National Forest in New Mexico to increase the state of knowledge about the status and habitat requirements of avian species in this forest. Transects have been established in nine habitats, with an emphasis on pinyon-juniper that has undergone large die-offs in the Southwest from drought and Ips beetle outbreaks. In 2006, we will also establish new transects in the Valle Vidal also managed by the USFS in New Mexico.

The NPS expanded monitoring efforts with RMBO in 2005 to include 11 National Parks in three states (CO, WY, UT) in the Northern Colorado Plateau Inventory and Monitoring Network in order to monitor bird species in three habitats.

We plan to continue to build partnerships and to expand the level of effort so that bird population monitoring occurs across Bird Conservation Regions (BCR). BCRs were delineated by the North American Bird Conservation Initiative (NABCI) as ecologically based planning, implementation, and evaluation units for all birds. We hope to accomplish monitoring at the BCR level by increasing our own efforts and by coordinating with other organizations conducting similar work. BCRs are ideal management units for birds as they cover distinct ecoregions in North America that host similar bird communities (NABCI 2000).

## *Reasons for Monitoring*

Much like the canary in the coalmine, birds can be excellent indicators of biological integrity and ecosystem health. Because they 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, birds can be useful barometers of environmental change and for measuring 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).

Bird communities reflect an integration of a broad array of ecosystem conditions including vegetation structure and composition, water quality, and landscape integrity (Adamus et al. 2001). The response of bird communities to changes in the environment can be examined at a variety of spatial scales, making them a powerful and practical tool for evaluating the broader effects of resource management, conservation and restoration activities, or other environmental changes. And because birds are generally abundant, conspicuous, and relatively easy to identify, they offer tremendous logistical and economic advantages over other taxonomic groups for monitoring their populations. Also, birds are popular with the public, and there is a 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 also pollinate, disperse seeds, and consume pests of ecologically and economically important plants, thereby providing ecosystem services worth many billions of dollars. Thus, 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. 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).

Effective conservation depends on adequate monitoring information. To date, resource managers have relied on data derived from the Breeding Bird Surveys (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 (i.e., 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 are generally insufficient to guide local or regional management decisions.

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 and the causes of declines so that natural resource managers can proactively 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 bird monitoring programs are designed to provide population trend or status data on all regularly occurring breeding 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 more 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

hope to 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 monitoring program are:

1.) To integrate existing bird monitoring efforts in the region to provide better information on distribution and abundance of all breeding birds, and especially for priority species;
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 all 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 Web 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*

RMBO conducts monitoring in parts of five BCRs: BCR 10 – Northern Rockies, BCR 16 – Southern Rockies/Colorado Plateau, BCR 17 – Badlands and Prairies, and BCR 18 – Shortgrass Prairie (Figure 1). These BCR's cover a broad array of habitats and elevation gradients and have a correspondingly diverse suite of priority birds. For example, our work in BCR 10 is almost entirely within Wyoming's state boundary but the habitats range from shrubsteppe to montane riparian, with Brewer's Sparrow, Sage Thrasher, Lewis's Woodpecker, and Olive-sided Flycatcher being just a few of the priority species.

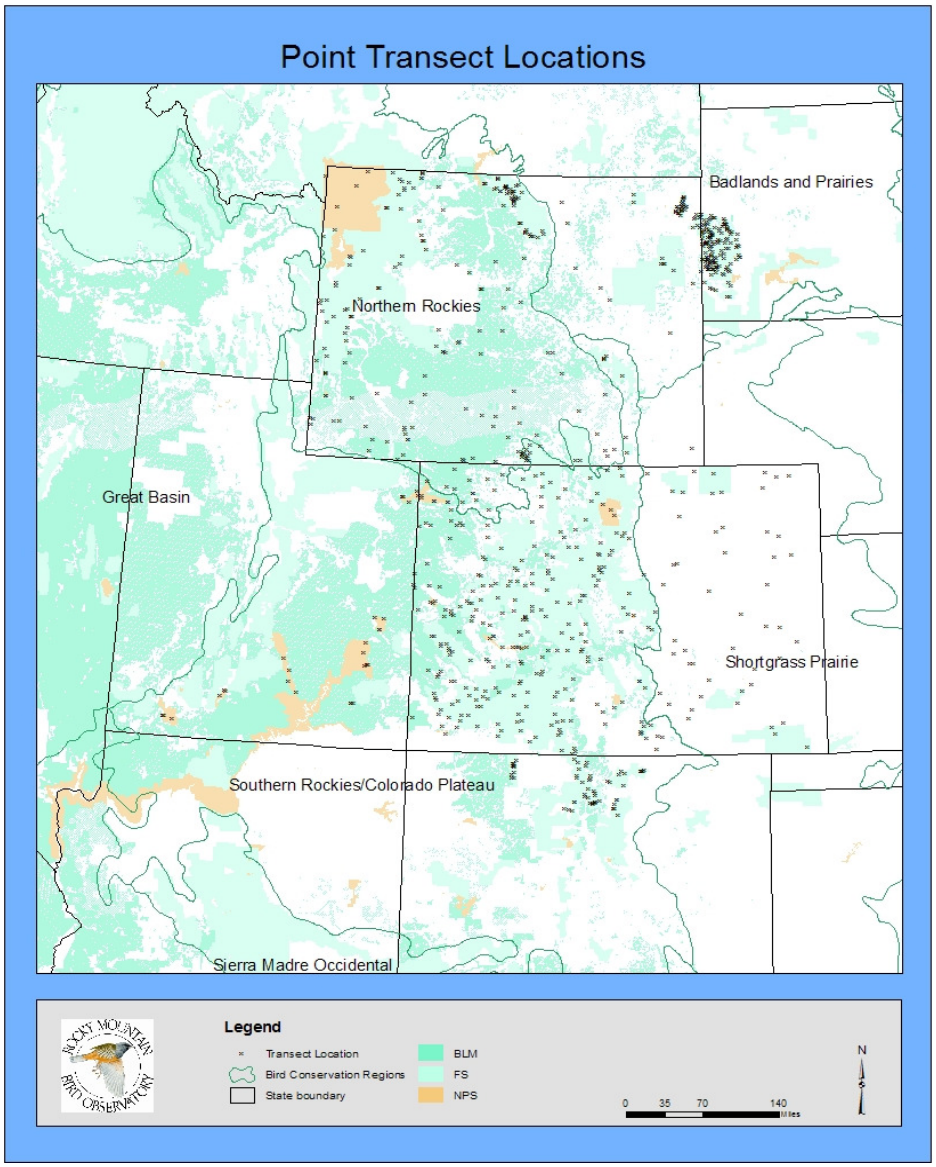


Figure 1. RMBO point-transect locations within state boundaries, BCR boundaries and land ownership.

Below is a breakdown of the habitats we surveyed in 2005 in Wyoming. For more detailed descriptions of these habitats or habitats within other monitoring programs, please see visit our web site at www.rmbo.org where reports from other projects are available for download.

*The Habitats*

In 2002, RMBO in coordination with the Wyoming Partners in Flight (WY-PIF) group, 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 extra statewide transects also fell within montane riparian habitat in the Bighorn National Forest and we include data from these two transects with the results for this habitat for the Bighorn National Forest. We also established ten grassland and montane riparian transects in the Shoshone National Forest. In addition, 10 of the randomly selected statewide mid-elevation conifer transects fell within the Shoshone National Forest and we analyze these transects separately in the results for the Shoshone National Forest.

Aspen

This habitat 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 (Shortgrass Prairie)

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

Mid-elevation Conifer

This habitat 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

This habitat 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

This habitat is dominated by sagebrush (*Artemisia* spp.), greasewood (*Sarcobatus vermiculatus*), saltbrush (*Altriplex* spp.), and rabbitbrush (*Chrysothamnus* spp.) and can include a grass component. 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 10 experienced biological technicians with excellent aural and visual bird-identification skills comprised the RMBO staff that executed the field component of MWB in 2005. All technicians completed a four-day training program at the beginning of the season to ensure full understanding of the field protocols and to practice distance estimation. All but two technicians also had at least one year of previous experience conducting bird monitoring for RMBO in Wyoming, bringing with them considerable experience with the protocol and knowledge of the local birds.

## *Site Selection*

Stand selection was done using GAP Analysis Land Cover data with secondary ground-truthing during the field season by the technician responsible for that transect. 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 transects 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 using the same protocol from the other habitats, and received permission from the landowners to survey these transects.

## *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 (2005). 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 and bearing from the access point (between 0-400 m and 0-360 degrees, respectively) 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 bearing for all 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 private land), forcing the observer to change the bearing of the transect. When this happened, the observer back-tracked to the last completed point count 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 transect, recording all detections of birds and red squirrels (*Tamiasciurus hudsonicus*) on standardized forms. Fly-overs (birds flying over, but not using the immediate surrounding landscape) were recorded, but excluded from analyses of density. For each bird detected, observers recorded to the best of their ability, the species, sex, how it was detected (e.g., call, song, drumming, etc.), and distance from the observation point. Whenever possible, they measured distances using Bushnell® Yardage Pro 500™ laser rangefinders. When it was not possible to measure the distance to a bird, staff used rangefinders to gauge distance estimates by measuring to some nearby 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. Individual birds initially detected on points that were again detected while moving between points were not included in the line-transect data. However, individuals 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.

A change in the bird data collection protocol from previous years was that since 2004, we treat 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 of those individuals. This means that if the detection of an individual bird is dependent upon the previous detection of another individual, the resulting observation is recorded as one independent detection with a cluster size of *C*, where *C* is the original individual detected plus the sum of any additional individuals whose detection was dependent upon the first individual revealing its presence. For example, a bird sings, and is thus detected independently. The observer then looks over to that bird, and as a result, detects a second individual. The resulting observation is recorded as one detection of a cluster of two birds. This practice ensures that we adhere more strictly to the assumption inherent in random sampling that all observations are independent of each other.

Observers 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 100m of a road, and vegetative 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 % 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 program DISTANCE (Thomas et al. 1998-99) 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.

Density estimates were generated only for species for which there was a minimum of 25 independently detected observations as recorded from count stations in a given habitat (not including fly-overs 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., sharp-tailed grouse, swifts, swallows, crossbills, etc.). Both numbers are 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.

# RESULTS

## *Wyoming Statewide Monitoring*

In 2005, our fourth year of statewide bird monitoring in Wyoming, we conducted a total of 2,351 point counts along 166 point-count transects in six different habitats (Figure 2). We surveyed all transects between 18 May and 13 July (Table 1).

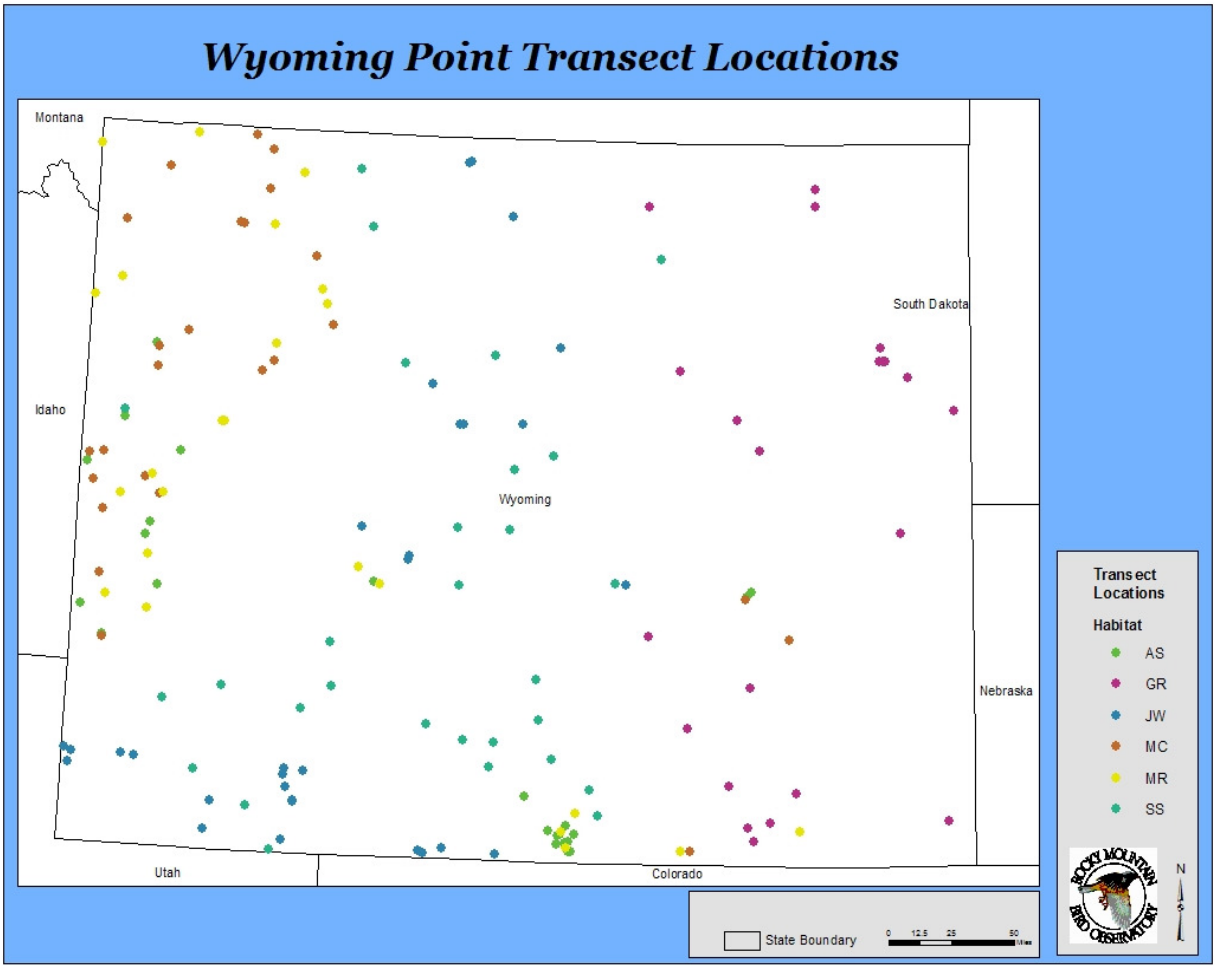


Figure 2. Map of statewide point-transects locations in Wyoming by habitat, summer 2005.

Table 1. Bird sampling periods and effort in each habitat in Wyoming, summer 2005.

| Habitat | Dates sampled | No. of Point Transects | No. of Point Counts |
|---|---|---|---|
| Aspen | 7 June – 13 July | 24 | 340 |
| Grassland | 21 May – 16 June | 29 | 428 |
| Juniper Woodland | 18 May – 18 June | 30 | 436 |
| Mid-elevation Conifer | 13 June – 13July | 28 | 395 |
| Montane Riparian | 5 June – 13 July | 22 | 326 |
| Shrubsteppe | 19 May – 10 June | 29 | 426 |
| **All Habitats** | **18 May – 13 July** | **166** | **2,351** |

We detected a total of 22,126 individual birds of 187 species on statewide point-count transects. Fifty-nine species were detected in sufficient numbers to estimate density in at least one habitat. Due to one observer's error in estimating distances, we were unable to calculate density for a few additional species even though there were sufficient independent detections.

The total number of species detected in each habitat in 2005 ranged from 112 in montane riparian to 73 in shrubsteppe (Table 2). While these totals represent the richness of species and individuals 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.

Of the six statewide habitats surveyed in 2005, the average species richness was greatest in aspen, and least in shrubsteppe (Table 2). We have provided estimates of avian species richness at both the count-level (sub-sample) and the transect (sample) level. The point-count level data are not influenced by stand size (the number of point counts per transect), and are therefore best for direct inter-habitat comparisons. The site-level data, which are influenced by stand size, provide a more complete picture of the bird community within a given stand of habitat.

Table 2. Bird totals and species richness in each habitat surveyed in Wyoming, summer 2005.

| Habitat | No. of Birds Detected | Avg. # of Birds/Point | No. of Species Detected | Avg. Species Richness/Point | Avg. Species Richness/Transect |
|---|---|---|---|---|---|
| Aspen | 4,472 | 13.2 | 102 | 9.0 | 32.2 |
| Grassland | 4,730 | 11.1 | 96 | 4.4 | 14.9 |
| Juniper Woodland | 3,258 | 7.5 | 86 | 5.5 | 21.7 |
| Mid-elevation Conifer | 3,103 | 7.9 | 80 | 5.5 | 21.9 |
| Montane Riparian | 3,539 | 10.9 | 112 | 7.5 | 30.9 |
| Shrubsteppe | 2,970 | 7.0 | 73 | 3.9 | 11.5 |
| **All Habitats** | **22,126** | **9.4** | **187** | **5.8** | **21.7** |

Aspen (AS)

We conducted 340 point counts along 24 transects in aspen between 7 June and 13 July 2005 (Table 1). We detected a total of 4,472 individual birds, with an average of 13.2 birds per point count (Table 2). We detected a total of 102 species with an average of 9.0 species per point count and 32.2 species per transect (Table 2).

The point-count transect data from aspen yielded robust density estimates (CV<50%) for 30 species and a moderately robust estimate (CV=50-100%) for three additional species (Table 3). We should be able to effectively monitor these 33 species, which represent 32% of all species detected in aspen.

House Wren, Warbling Vireo, Dark-eyed Junco, American Robin, and Yellow-rumped Warbler had the highest estimated densities of all species detected in Aspen. Nine species – Western Wood-Pewee, Warbling Vireo, House Wren, American Robin, Orange-crowned Warbler, Western Tanager, Black-headed Grosbeak, Brewer's Blackbird, and Red Crossbill – had higher estimated densities in Aspen relative to the other five statewide habitats surveyed.

Table 3. Estimated densities of breeding birds in Aspen in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Mourning Dove | 0.91 | 0.38 | 2.18 | 45.0% | 27 |
| Broad-tailed Hummingbird | 4.51 | 2.15 | 9.44 | 37.0% | 25 |
| Red-naped Sapsucker | 3.26 | 2.03 | 5.22 | 23.6% | 42 |
| Northern Flicker | 4.27 | 2.89 | 6.31 | 19.4% | 88 |
| Western Wood-Pewee | 6.04 | 3.94 | 9.27 | 21.1% | 112 |
| Dusky Flycatcher | 11.76 | 7.22 | 19.14 | 24.0% | 115 |
| Warbling Vireo | 38.15 | 25.87 | 56.27 | 19.9% | 374 |
| Clark's Nutcracker | 1.44 | 0.56 | 3.74 | 49.5% | 25 |
| Violet-green Swallow | 5.38 | 2.78 | 10.40 | 33.2% | 31 |
| Mountain Chickadee | 9.26 | 5.99 | 14.30 | 21.7% | 91 |
| Red-breasted Nuthatch | 2.95 | 1.73 | 5.04 | 26.2% | 68 |
| House Wren | 39.32 | 27.20 | 56.86 | 17.7% | 319 |
| Ruby-crowned Kinglet | 6.17 | 3.72 | 10.21 | 24.6% | 152 |
| Mountain Bluebird | 2.70 | 1.43 | 5.11 | 31.6% | 28 |
| House Wren | 39.32 | 27.20 | 56.86 | 17.7% | 319 |
| Ruby-crowned Kinglet | 6.17 | 3.72 | 10.21 | 24.6% | 152 |
| Mountain Bluebird | 2.70 | 1.43 | 5.11 | 31.6% | 28 |
| Hermit Thrush | 1.81 | 1.10 | 2.98 | 24.2% | 67 |
| American Robin | 20.52 | 15.46 | 27.23 | 14.0% | 215 |
| Orange-crowned Warbler | 3.56 | 2.13 | 5.95 | 25.1% | 65 |
| Yellow Warbler | 4.08 | 1.67 | 9.94 | 45.8% | 28 |
| Yellow-rumped Warbler | 14.00 | 8.92 | 21.96 | 22.4% | 132 |
| MacGillivray's Warbler | 6.96 | 3.80 | 12.74 | 29.5% | 62 |
| Western Tanager | 3.31 | 2.10 | 5.21 | 22.4% | 65 |
| Green-tailed Towhee | 6.78 | 3.70 | 12.41 | 29.6% | 111 |
| Chipping Sparrow | 7.68 | 4.99 | 11.83 | 21.5% | 83 |
| Brewer's Sparrow | 3.27 | 0.89 | 12.07 | 68.9% | 35 |
| Vesper Sparrow | 1.59 | 0.82 | 3.07 | 32.7% | 49 |

Table 3 cont. Estimated densities of breeding birds in Aspen in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Lincoln's Sparrow | 7.92 | 4.16 | 15.09 | 32.4% | 87 |
| White-crowned Sparrow | 3.10 | 0.95 | 10.09 | 63.6% | 25 |
| Dark-eyed Junco | 24.21 | 17.32 | 33.85 | 16.6% | 178 |
| Black-headed Grosbeak | 1.49 | 0.63 | 3.50 | 43.8% | 25 |
| Brewer's Blackbird | 4.76 | 1.65 | 13.72 | 55.0% | 25 |
| Brown-headed Cowbird | 5.73 | 2.80 | 11.70 | 35.7% | 59 |
| Red Crossbill | 9.29 | 4.78 | 18.06 | 34.2% | 39 |
| Pine Siskin | 7.97 | 5.58 | 11.38 | 17.6% | 130 |
| *Red Squirrel* | *11.48* | *6.82* | *19.32* | *25.8%* | *72* |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Grassland (GR)

We conducted 428 point counts along 29 transects in grassland between 21 May and 16 June 2005 (Table 1). We detected a total of 4,730 individual birds, with an average of 11.1 birds per point count (Table 2). We detected a total of 96 species with an average of 4.4 species per point count and 14.9 species per transect (Table 2).

The point-count transect data from grassland yielded robust density estimates (CV<50%) for 10 species and a moderately robust estimate (CV=50-100%) for five additional species (Table 4). We should be able to effectively monitor these 15 species, which represent 16% of all species detected in grassland.

Horned Lark, Western Meadowlark, Lark Bunting, McCown's Longspur, and Brewer's Sparrow had the highest estimated densities of all species detected in grassland. Nine species – Killdeer, Horned Lark, Lark Bunting, Savannah Sparrow, 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.

Table 4. Estimated densities of breeding birds in Grassland in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Killdeer | 0.53 | 0.33 | 0.86 | 24.2% | 30 |
| Mourning Dove | 0.84 | 0.38 | 1.84 | 40.5% | 31 |
| Horned Lark | 62.22 | 44.34 | 87.33 | 17.2% | 916 |
| Rock Wren | 0.86 | 0.45 | 1.63 | 32.9% | 34 |
| Sage Thrasher | 0.47 | 0.17 | 1.28 | 52.2% | 28 |
| Brewer's Sparrow | 15.38 | 9.43 | 25.06 | 24.4% | 235 |
| Vesper Sparrow | 8.05 | 5.32 | 12.18 | 21.0% | 296 |
| Lark Bunting | 18.85 | 10.87 | 32.67 | 27.4% | 476 |
| Savannah Sparrow | 6.9 | 1.73 | 27.58 | 78.4% | 36 |
| Grasshopper Sparrow | 2.28 | 0.49 | 10.57 | 87.0% | 36 |
| McCown's Longspur | 15.4 | 8.87 | 26.72 | 27.6% | 181 |
| Chestnut-collared Longspur | 5.6 | 1.69 | 18.62 | 64.1% | 57 |
| Red-winged Blackbird | 3.9 | 1.49 | 10.24 | 50.6% | 64 |

Table 4 cont. Estimated densities of breeding birds in Grassland in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Western Meadowlark | 21.44 | 16.82 | 27.32 | 12.0% | 1185 |
| Brown-headed Cowbird | 3.86 | 2.05 | 7.26 | 32.1% | 57 |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Juniper Woodland (JW)

We conducted 436 point counts along 30 transects in juniper woodland between 18 May and 18 June 2005 (Table 1). We detected a total of 3,258 individual birds, with an average of 7.5 birds per point count (Table 2). We detected a total of 86 species with an average of 5.5 species per point count and 21.7 species per transect (Table 2).

The point-count transect data from juniper woodland yielded robust density estimates (CV<50%) for 16 species and a moderately robust estimate (CV=50-100%) for three additional species (Table 5). We should be able to effectively monitor these 19 species, which represent 22% of all species detected in juniper woodland.

Chipping Sparrow, Gray Flycatcher, Blue-gray Gnatcatcher, Bewick's Wren, and Mountain Bluebird had the highest estimated densities of all species detected in Juniper Woodland. Fourteen species – Mourning Dove, Gray Flycatcher, Dusky Flycatcher, Pinyon Jay, Black-billed Magpie, Rock Wren, Bewick's Wren, Blue-gray Gnatcatcher, Mountain Bluebird, Black-throated Gray Warbler, Green-tailed Towhee, Chipping Sparrow, Brown-headed Cowbird, and House Finch – had higher estimated densities in juniper woodland relative to the other five statewide habitats surveyed.

Table 5. Estimated densities of breeding birds in Juniper Woodland in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Mourning Dove | 8.69 | 5.95 | 12.68 | 19.0% | 113 |
| Gray Flycatcher | 43.48 | 30.69 | 61.61 | 17.2% | 134 |
| Dusky Flycatcher | 15.21 | 4.86 | 47.62 | 60.5% | 31 |
| Pinyon Jay | 4.44 | 1.84 | 10.73 | 46.3% | 29 |
| Black-billed Magpie | 0.94 | 0.43 | 2.05 | 39.8% | 29 |
| Violet-green Swallow | 6.85 | 2.58 | 18.2 | 50.4% | 31 |
| Rock Wren | 5.82 | 4.1 | 8.25 | 17.2% | 144 |
| Bewick's Wren | 25.86 | 9.67 | 69.2 | 51.3% | 112 |
| Blue-gray Gnatcatcher | 37.59 | 18.82 | 75.07 | 35.0% | 25 |
| Mountain Bluebird | 25.13 | 15.36 | 41.13 | 24.2% | 104 |
| American Robin | 6.13 | 3.6 | 10.44 | 26.6% | 38 |
| Black-throated Gray Warbler | 17.84 | 8.7 | 36.56 | 36.8% | 49 |
| Green-tailed Towhee | 12.93 | 7.16 | 23.35 | 29.3% | 87 |
| Chipping Sparrow | 63.18 | 37.26 | 107.12 | 27.0% | 161 |
| Brewer's Sparrow | 9.02 | 4.71 | 17.27 | 32.6% | 72 |
| Vesper Sparrow | 5.55 | 3.17 | 9.75 | 28.1% | 66 |
| Western Meadowlark | 3.08 | 1.72 | 5.49 | 28.6% | 105 |
| Brown-headed Cowbird | 8.99 | 4.89 | 16.53 | 30.8% | 31 |

Table 5 cont. Estimated densities of breeding birds in Juniper Woodland in Wyoming, summer 2005

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| House Finch | 5.19 | 2.48 | 10.86 | 36.6% | 26 |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Mid-elevation Conifer (MC)

We conducted 395 point counts along 28 transects in mid-elevation conifer between 13 June and 13 July 2005 (Table 1). We detected a total of 3,103 individual birds, with an average of 7.9 birds per point count (Table 2). We detected a total of 80 species with an average of 5.5 species per point count and 21.9 species per transect (Table 2).

The point-count transect data from mid-elevation conifer yielded robust density estimates (CV<50%) for 13 species and a moderately robust estimate (CV=50-100%) for one additional species (Table 6). We should be able to effectively monitor these 14 species, which represent 18% of all species detected in mid-elevation conifer.

Pine Siskin, Mountain Chickadee, Dark-eyed Junco, Yellow-rumped Warbler, and Ruby-crowned Kinglet had the highest estimated densities of all species detected in mid-elevation conifer. Ten species – Northern Flicker, Hammond's Flycatcher, Clark's Nutcracker, Mountain Chickadee, Red-breasted Nuthatch, Ruby-crowned Kinglet, Hermit Thrush, Yellow-rumped Warbler, Dark-eyed Junco, and Pine Siskin – had higher estimated densities in mid-elevation conifer relative to the other five statewide habitats surveyed.

Table 6. Estimated densities of breeding birds in Mid-elevation Conifer in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Northern Flicker | 4.27 | 2.65 | 6.88 | 23.9% | 54 |
| Hammond's Flycatcher | 25.95 | 8.18 | 82.32 | 62.4% | 28 |
| Dusky Flycatcher | 9.3 | 4.27 | 20.25 | 39.8% | 37 |
| Warbling Vireo | 20.46 | 11.28 | 37.1 | 29.7% | 45 |
| Clark's Nutcracker | 3.62 | 1.88 | 6.99 | 33.8% | 45 |
| Mountain Chickadee | 57.76 | 33.52 | 99.52 | 28.0% | 127 |
| Red-breasted Nuthatch | 15.04 | 9.07 | 24.94 | 25.0% | 69 |
| Ruby-crowned Kinglet | 26.29 | 18.49 | 37.38 | 17.8% | 149 |
| Hermit Thrush | 6.13 | 3.76 | 9.99 | 24.5% | 99 |
| American Robin | 14.72 | 10.66 | 20.34 | 16.3% | 131 |
| Yellow-rumped Warbler | 28.21 | 19.86 | 40.07 | 17.5% | 110 |
| Chipping Sparrow | 8.1 | 4.67 | 14.04 | 28.0% | 55 |
| Dark-eyed Junco | 30.84 | 15.01 | 63.34 | 35.9% | 72 |
| Pine Siskin | 59.22 | 34.78 | 100.83 | 27.3% | 93 |
| *Red Squirel* | *18.47* | *9.78* | *34.9* | *32.3%* | *70* |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

Montane Riparian (MR)

We conducted 326 point counts along 22 transects in montane riparian between 5 June and 13 July 2005 (Table 1). We detected a total of 3,539 individual birds, with an average of 10.9 birds per point count (Table 2). We detected a total of 112 species with an average of 7.5 species per point count and 30.9 species per transect (Table 2).

The point-count transect data from montane riparian yielded robust density estimates (CV<50%) for 27 species and a moderately robust estimate (CV=50-100%) for seven additional species (Table 7). We should be able to effectively monitor these 30 species, which represent 27% of all species detected in montane riparian.

Yellow Warbler, American Robin, Lincoln's Sparrow, Song Sparrow, and Broad-tailed Hummingbird had the highest estimated densities of all species detected in montane riparian. Twelve species – Spotted Sandpiper, Wilson's Snipe, Broad-tailed hummingbird, Swainson's Thrush, Gray Catbird, Yellow Warbler, MacGillivray's Warbler, Wilson's Warbler, Song Sparrow, Lincoln's Sparrow, White-crowned Sparrow, and Lazuli Bunting – had higher estimated densities in montane riparian relative to the other five statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then montane riparian provides optimal habitat for these species in Wyoming.

Table 7. Estimated densities of breeding birds in Montane Riparian in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Spotted Sandpiper | 1.60 | 0.56 | 4.61 | 54.9% | 27 |
| Wilson's Snipe | 1.90 | 0.82 | 4.41 | 41.4% | 36 |
| Broad-tailed Hummingbird | 20.22 | 10.04 | 40.74 | 33.9% | 60 |
| Red-naped Sapsucker | 2.85 | 1.37 | 5.93 | 36.8% | 30 |
| Northern Flicker | 1.56 | 0.88 | 2.77 | 28.7% | 36 |
| Western Wood-Pewee | 2.63 | 0.74 | 9.39 | 70.2% | 34 |
| Dusky Flycatcher | 8.50 | 5.18 | 13.96 | 24.5% | 73 |
| Warbling Vireo | 6.82 | 4.37 | 10.64 | 21.6% | 115 |
| Violet-green Swallow | 3.12 | 1.42 | 6.86 | 39.9% | 24 |
| Mountain Chickadee | 2.76 | 1.45 | 5.24 | 32.1% | 42 |
| House Wren | 4.50 | 2.26 | 8.94 | 33.6% | 62 |
| Ruby-crowned Kinglet | 6.50 | 4.31 | 9.79 | 19.9% | 86 |
| Swainson's Thrush | 1.05 | 0.38 | 2.87 | 51.0% | 33 |
| American Robin | 19.64 | 14.70 | 26.24 | 14.3% | 117 |
| Gray Catbird | 4.28 | 1.18 | 15.54 | 67.3% | 26 |
| Yellow Warbler | 36.40 | 16.02 | 82.70 | 40.9% | 148 |
| Yellow-rumped Warbler | 7.14 | 4.00 | 12.74 | 28.3% | 85 |
| MacGillivray's Warbler | 7.75 | 4.15 | 14.48 | 30.4% | 71 |
| Wilson's Warbler | 6.71 | 1.77 | 25.44 | 69.7% | 44 |
| Western Tanager | 2.24 | 1.13 | 4.41 | 33.6% | 38 |
| Green-tailed Towhee | 2.38 | 1.13 | 5.04 | 36.8% | 49 |
| Chipping Sparrow | 6.97 | 2.96 | 16.40 | 42.7% | 47 |
| Savannah Sparrow | 2.81 | 0.66 | 11.92 | 76.7% | 44 |

Table 7 cont. Estimated densities of breeding birds in Montane Riparian in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Song Sparrow | 18.84 | 9.67 | 36.70 | 33.5% | 101 |
| Lincoln's Sparrow | 21.65 | 11.67 | 40.18 | 30.2% | 136 |
| White-crowned Sparrow | 10.87 | 4.63 | 25.51 | 42.3% | 71 |
| Dark-eyed Junco | 12.19 | 7.00 | 21.23 | 27.0% | 98 |
| Lazuli Bunting | 3.22 | 1.10 | 9.45 | 54.8% | 26 |
| Brown-headed Cowbird | 3.22 | 1.44 | 7.20 | 40.6% | 31 |
| Pine Siskin | 6.86 | 4.53 | 10.37 | 20.4% | 99 |
| *Red Squirrel* | *7.16* | *4.06* | *12.62* | *28.1%* | *44* |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Shrubsteppe (SS)

We conducted 426 point counts along 29 transects in shrubsteppe between 19 May and 10 June 2005 (Table 1). We detected a total of 2,970 individual birds, with an average of 7.0 birds per point count (Table 2). We detected a total of 73 species with an average of 3.9 species per point count and 11.5 species per transect (Table 2).

The point-count transect data from shrubsteppe yielded robust density estimates (CV<50%) for six species and a moderately robust estimate (CV=50-100%) for one additional species (Table 8). We should be able to effectively monitor these 7 species, which represent 10% of all species detected in shrubsteppe.

Horned Lark, Brewer's Sparrow, Vesper Sparrow, Western Meadowlark, and Sage Thrasher had the highest estimated densities of all species detected in shrubsteppe. Three species – Sage Thrasher, Brewer's Sparrow, Vesper Sparrow and Sage Sparrow – had higher estimated densities in shrubsteppe relative to the other five statewide habitats surveyed. If density is assumed to be positively correlated with habitat quality, then shrubsteppe provides optimal habitat for these species in Wyoming.

Table 8. Estimated densities of breeding birds in Shrubsteppe in Wyoming, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Horned Lark | 54.47 | 35.84 | 82.78 | 21.1% | 431 |
| Rock Wren | 1.02 | 0.42 | 2.49 | 45.6% | 35 |
| Sage Thrasher | 4.52 | 2.57 | 7.98 | 28.4% | 149 |
| Green-tailed Towhee | 4.51 | 1.26 | 16.14 | 67.8% | 49 |
| Brewer's Sparrow | 36.71 | 24.26 | 55.55 | 20.7% | 419 |
| Vesper Sparrow | 13.66 | 9.31 | 20.03 | 18.8% | 189 |
| Sage Sparrow | 1.81 | 0.52 | 6.25 | 68.0% | 34 |
| Western Meadowlark | 12.89 | 7.60 | 21.84 | 26.0% | 340 |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## *Bighorn National Forest*

In 2005, our fourth year of bird monitoring in Bighorn National Forest, we conducted a total of 622 point counts along 42 point-count transects in four habitats (Figure 3). We conducted all transects between 6 June and 5 July (Table 9).

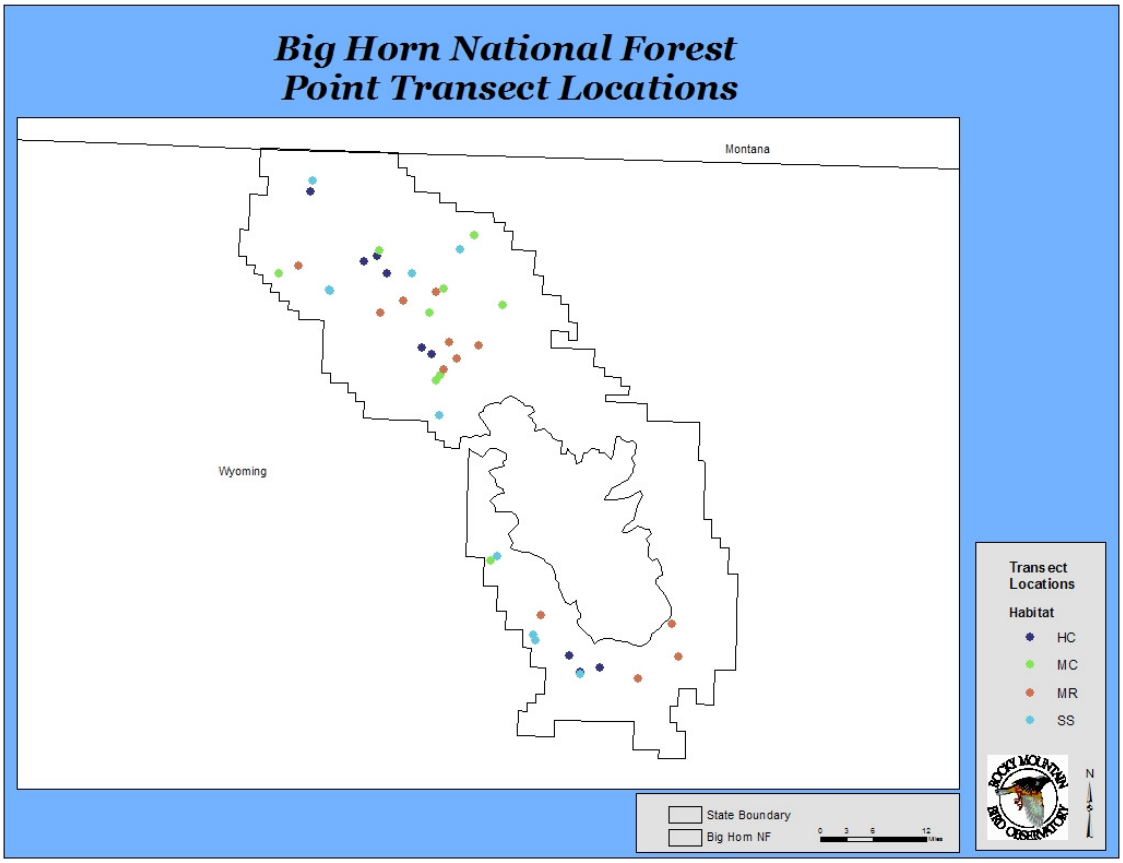


Figure 3. Map of Bighorn National Forest point-transects locations by habitat, summer 2005.

Table 9. Bird sampling periods and effort in each habitat, summer 2005.

| Habitat | Dates sampled | No. of Point Transects | No. of Point Counts |
|---|---|---|---|
| High-elevation Conifer | 7 June – 5 July | 10 | 145 |
| Mid-elevation Conifer | 9 June – 2 July | 10 | 147 |
| Montane Riparian | 6 June – 15 June | 12 | 180 |
| Shrubsteppe | 6 June – 4 July | 10 | 150 |
| **All Habitats** | **6 June – 5 July** | **42** | **622** |

We detected a total of 5,547 individual birds of 87 species on Bighorn National Forest point-count transects. Twenty 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 2005 ranged from 68 in montane riparian to 47 in high-elevation conifer (Table 10). While these totals represent the richness of species and individuals 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 associated with the habitat from which they were detected.

Of the four Bighorn National Forest habitats surveyed in 2005, the average species richness per point was greatest in high-elevation conifer, and least in montane riparian (Table 10). We have provided estimates of avian species richness at both the count-level (sub-sample) and the transect (sample) level. The point-count level data are not influenced by stand size (the number of point counts per transect), and are therefore best for direct inter-habitat comparisons. The site-level data, which are influenced by stand size, provide a more complete picture of the bird community within a given stand of habitat. Both estimates are useful from a management perspective.

Table 10. Bird totals and species richness in habitats surveyed in the Bighorn National Forest, summer 2005.

| Habitat | No. of birds detected | Avg. # birds/point | No. of species detected | Avg. species richness/point | Avg. species richness/transect |
|---|---|---|---|---|---|
| High-elevation Conifer | 1,383 | 9.5 | 47 | 6.6 | 21.7 |
| Mid-elevation Conifer | 1,269 | 8.6 | 52 | 6.0 | 22.7 |
| Montane Riparian | 1,439 | 8.0 | 68 | 5.6 | 21.8 |
| Shrubsteppe | 1,456 | 9.7 | 60 | 6.4 | 24.6 |
| **All Habitats** | **5,547** | **8.9** | **87** | **6.1** | **22.7** |

## High-Elevation Conifer (HC)

We conducted 145 point counts along 10 transects in high-elevation conifer between 7 June and 5 July 2005 (Table 9). We detected a total of 1,383 individual birds, with an average of 9.5 birds per point count (Table 10). We detected a total of 47 species with an average of 6.6 species per point count and 21.7 species per transect (Table 10).

The point-count transect data from high-elevation conifer yielded robust density estimates (CV<50%) for nine species and a moderately robust estimate (CV=50-100%) for one additional species (Table 11). We should be able to effectively monitor these 10 species, which represent 21% of all species detected in high-elevation conifer.

Dark-eyed Junco, Chipping Sparrow, Yellow-rumped Warbler, Ruby-crowned Kinglet, and Mountain Chickadee had the highest estimated densities of all species detected in high-elevation conifer. Four species – Ruby-crowned Kinglet, Hermit Thrush, 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.

Table 11. Estimated densities of breeding birds in High-Elevation Conifer in the Bighorn National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Mountain Chickadee | 19.05 | 11.19 | 32.44 | 25.8% | 88 |
| Ruby-crowned Kinglet | 25.86 | 18.02 | 37.13 | 16.3% | 205 |
| Mountain Bluebird | 4.22 | 2.25 | 7.92 | 30.7% | 35 |
| Hermit Thrush | 2.96 | 1.48 | 5.92 | 34.7% | 63 |
| American Robin | 8.50 | 6.11 | 11.83 | 16.0% | 112 |
| Yellow-rumped Warbler | 26.93 | 20.54 | 35.31 | 12.2% | 134 |
| Chipping Sparrow | 31.62 | 12.54 | 79.76 | 48.7% | 65 |
| White-crowned Sparrow | 2.11 | 0.73 | 6.13 | 52.7% | 28 |
| Dark-eyed Junco | 43.47 | 29.59 | 63.86 | 18.0% | 190 |
| Pine Siskin | 3.69 | 2.02 | 6.74 | 29.2% | 37 |
| *Red Squirel* | *51.36* | *32.11* | *82.15* | *21.7%* | *158* |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Mid-elevation Conifer (MC)

We conducted 147 point counts along 10 transects in mid-elevation conifer between 9 June and 2 July 2005 (Table 9). We detected a total of 1,269 individual birds, with an average of 8.6 birds per point count (Table 10). We detected a total of 52 species with an average of 6.0 species per point count and 22.7 species per transect (Table 10).

The point-count transect data from mid-elevation conifer yielded robust density estimates (CV<50%) for nine species and a moderately robust estimate (CV=50-100%) for one additional species (Table 12). We should be able to effectively monitor these 10 species, which represent 19% of all species detected in mid-elevation conifer.

Dark-eyed Junco, Yellow-rumped Warbler, Mountain Chickadee, Ruby-crowned Kinglet, and American Robin had the highest estimated densities of all species detected in mid-elevation conifer. Three species – Mountain Chickadee, 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.

Table 12. Estimated densities of breeding birds in Mid-elevation Conifer in the Bighorn National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Mountain Chickadee | 20.22 | 12.20 | 33.52 | 24.4% | 69 |
| Ruby-crowned Kinglet | 17.14 | 11.16 | 26.32 | 21.8% | 164 |
| Mountain Bluebird | 6.49 | 3.25 | 12.96 | 32.9% | 28 |
| Hermit Thrush | 1.48 | 0.48 | 4.57 | 61.0% | 54 |
| American Robin | 9.74 | 5.58 | 16.99 | 26.0% | 118 |
| Yellow-rumped Warbler | 26.93 | 20.59 | 35.22 | 12.3% | 106 |

Table 12 cont. Estimated densities of breeding birds in Mid-elevation Conifer in the Bighorn National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Chipping Sparrow | 8.46 | 4.79 | 14.93 | 27.1% | 46 |
| Dark-eyed Junco | 88.54 | 60.53 | 129.50 | 18.9% | 174 |
| Pine Siskin | 4.15 | 2.72 | 6.34 | 20.3% | 28 |
| *Red Squirel* | *39.42* | *23.97* | *64.82* | *23.4%* | *113* |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Montane Riparian (MR)

We conducted 180 point counts along 12 transects in montane riparian between 6 June and 15 June 2005 (Table 9). We detected a total of 1,439 individual birds, with an average of 8.0 birds per point count (Table 10). We detected a total of 68 species with an average of 5.6 species per point count and 21.8 species per transect (Table 10).

The point-count transect data from montane riparian yielded robust density estimates (CV<50%) for 11 species and a moderately robust estimate (CV=50-100%) for two additional species (Table 13). We should be able to effectively monitor these 13 species, which represent 19% of all species detected in montane riparian.

Lincoln's Sparrow, Wilson's Warbler, White-crowned Sparrow, Dark-eyed Junco, and American Robin had the highest estimated densities of all species detected in montane riparian. Seven species – Wilson's Snipe, Dusky Flycatcher, American Robin, Wilson's Warbler, Savannah Sparrow, Lincoln's Sparrow, White-crowned Sparrow, and Brown-headed Cowbird – had higher estimated densities in montane riparian relative to the other three habitats that we surveyed in Bighorn National Forest.

Table 13. Estimated densities of breeding birds in Montane Riparian in the Bighorn National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Wilson's Snipe | 3.02 | 1.57 | 5.81 | 32.4% | 25 |
| Dusky Flycatcher | 4.26 | 1.63 | 11.16 | 47.9% | 28 |
| Mountain Chickadee | 6.57 | 3.62 | 11.91 | 28.1% | 33 |
| Ruby-crowned Kinglet | 7.64 | 4.61 | 12.67 | 25.2% | 94 |
| American Robin | 20.15 | 14.37 | 28.25 | 16.7% | 199 |
| Yellow-rumped Warbler | 12.59 | 8.48 | 18.70 | 19.6% | 66 |
| Wilson's Warbler | 68.79 | 39.21 | 120.68 | 27.2 | 150 |
| Chipping Sparrow | 12.40 | 5.29 | 29.02 | 43.5% | 32 |
| Savannah Sparrow | 10.24 | 3.70 | 28.36 | 51.9% | 40 |
| Lincoln's Sparrow | 138.10 | 82.61 | 230.86 | 25.2% | 117 |
| White-crowned Sparrow | 53.27 | 12.98 | 218.64 | 80.5% | 56 |
| Dark-eyed Junco | 41.47 | 24.76 | 69.44 | 25.8% | 84 |
| Brown-headed Cowbird | 2.19 | 0.91 | 5.24 | 43.8% | 26 |
| *Red Squirel* | *4.43* | *2.04* | *9.63* | *39.8%* | *32* |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

Shrubsteppe (SS)

We conducted 150 point counts along 10 transects in shrubsteppe between 6 June and 4 July 2005 (Table 9). We detected a total of 1,456 individual birds, with an average of 9.7 birds per point count (Table 10). We detected a total of 60 species with an average of 6.4 species per point count and 24.6 species per transect (Table 10).

The point-count transect data from shrubsteppe yielded robust density estimates (CV<50%) for 13 species and a moderately robust estimate (CV=50-100%) for one additional species (Table 14). We should be able to effectively monitor these 14 species, which represent 23% of all species detected in shrubsteppe.

Dark-eyed Junco, White-crowned Sparrow, Vesper Sparrow, Green-tailed Towhee, and Chipping Sparrow had the highest estimated densities of all species detected in shrubsteppe. Five species – Warbling Vireo, Mountain Bluebird, Green-tailed Towhee, Brewer's Sparrow, and Vesper Sparrow – had higher estimated densities in shrubsteppe relative to the other three habitats that we surveyed in Bighorn National Forest.

Table 14. Estimated densities of breeding birds in Shrubsteppe in the Bighorn National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Warbling Vireo | 1.56 | 0.47 | 5.21 | 60.7% | 25 |
| Mountain Chickadee | 3.23 | 1.89 | 5.51 | 26.3% | 30 |
| Ruby-crowned Kinglet | 3.84 | 2.18 | 6.76 | 27.0% | 60 |
| Mountain Bluebird | 9.69 | 5.60 | 16.77 | 26.4% | 45 |
| American Robin | 10.48 | 7.07 | 15.53 | 17.9% | 123 |
| Yellow-rumped Warbler | 7.59 | 4.46 | 12.90 | 24.3% | 52 |
| Green-tailed Towhee | 12.42 | 7.49 | 20.59 | 22.9% | 77 |
| Chipping Sparrow | 12.11 | 7.30 | 20.08 | 22.8% | 86 |
| Brewer's Sparrow | 8.01 | 2.90 | 22.12 | 47.4% | 60 |
| Vesper Sparrow | 13.23 | 6.89 | 25.39 | 30.6% | 103 |
| Savannah Sparrow | 3.92 | 1.59 | 9.67 | 43.9% | 28 |
| White-crowned Sparrow | 17.44 | 9.44 | 32.22 | 28.9% | 98 |
| Dark-eyed Junco | 29.46 | 15.48 | 56.07 | 32.6% | 62 |
| Pine Siskin | 3.31 | 1.30 | 8.39 | 44.2% | 46 |
| *Red Squirel* | *7.20* | *3.63* | *14.27* | *32.7%* | *42* |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## *Shoshone National Forest*

In 2005, our fourth year of bird monitoring in Shoshone National Forest, we conducted a total of 365 point counts along 25 point-count transects in 3 different habitats (Figure 4). We conducted all transects between 1 June and 13 July (Table 15).

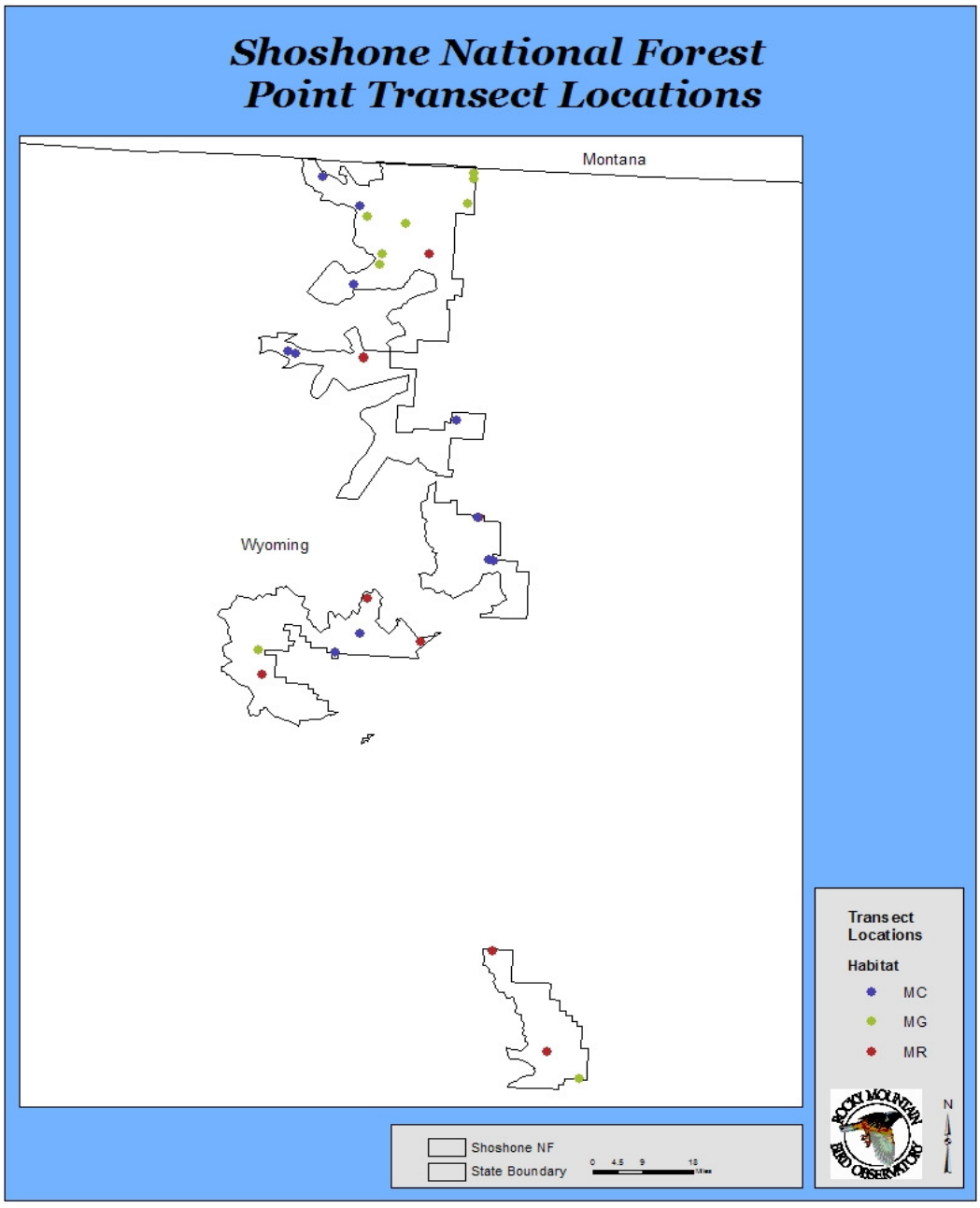


Figure 3. Map of Shoshone National Forest point-transects locations by habitat, summer 2005.

Table 15. Bird sampling periods and effort in each habitat in the Shoshone National Forest, summer 2005.

| Habitat | Dates sampled | # point transects | # point counts |
|---|---|---|---|
| Mid-elevation Conifer | 13 June – 1 July | 10 | 142 |
| Montane Grassland | 1 June – 21 June | 9 | 135 |
| Montane Riparian | 15 june – 13 July | 6 | 88 |
| **All Habitats** | **1 June – 13 July** | **25** | **365** |

We detected a total of 2,016 individual birds of 83 species on Shoshone National Forest point-count transects. Seventeen 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 2005 ranged from 56 in montane grassland to 51 in montane riparian (Table 16). While these totals represent the richness of species and individuals 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 associated with the habitat from which they were detected.

Of the three Shoshone habitats surveyed in 2005, the average species richness was greatest in montane riparian, and least in montane grassland (Table 16). We have provided estimates of avian species richness at both the count-level (sub-sample) and the transect (site) level. The point-count level data are not influenced by stand size (the number of point counts per transect), and are therefore best for direct inter-habitat comparisons. The site-level data, which are influenced by stand size, provide a more complete picture of the bird community within a given stand of habitat. Both estimates are useful from a management perspective.

Table 16. Bird totals and species richness in habitats surveyed in the Shoshone National Forest, summer 2005.

| Habitat | # birds detected | Avg. # birds/point | # species detected | Avg. species richness/point | Avg. species richness/transect |
|---|---|---|---|---|---|
| Mid-elevation Conifer | 782 | 5.5 | 52 | 4.6 | 20.9 |
| Montane Grassland | 677 | 5.0 | 56 | 3.5 | 18.0 |
| Montane Riparian | 557 | 6.3 | 51 | 4.8 | 19.8 |
| **All Habitats** | **2,016** | **5.5** | **83** | **4.2** | **19.6** |

## Mid-elevation Conifer (MC)

We conducted 142 point counts along 10 transects in mid-elevation conifer between 13 June and 1 July 2005 (Table 15). We detected a total of 782 individual birds, with an average of 5.5 birds per point count (Table 16). We detected a total of 52 species with an average of 4.6 species per point count and 20.9 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 22% of all species detected in mid-elevation conifer.

Pine Siskin, Dark-eyed Junco, Mountain Chickadee, Warbling Vireo, and Red-breasted Nuthatch had the highest estimated densities of all species detected in mid-elevation conifer. Nine species – Northern Flicker, Warbling Vireo, Clark's Nutcracker, Mountain Chickadee, Red-breasted Nuthatch, Ruby-crowned Kinglet, Hermit Thrush, Dark-eyed Junco, and Pine Siskin – had higher estimated densities in mid-elevation conifer relative to the other two habitats that we surveyed in Shoshone National Forest.

Table 17. Estimated densities of breeding birds in Mid-elevation Conifer in the Shoshone National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Northern Flicker | 9.47 | 4.14 | 21.63 | 40.8% | 24 |
| Dusky Flycatcher | 21.33 | 8.89 | 51.17 | 43.3% | 28 |
| Warbling Vireo | 39.96 | 17.96 | 88.93 | 38.2% | 32 |
| Clark's Nutcracker | 3.21 | 1.60 | 6.47 | 34.2% | 26 |
| Mountain Chickadee | 68.95 | 39.20 | 121.28 | 27.1% | 45 |
| Red-breasted Nuthatch | 24.15 | 13.61 | 42.85 | 27.4% | 54 |
| Ruby-crowned Kinglet | 18.99 | 12.06 | 29.90 | 22.5% | 65 |
| Hermit Thrush | 5.52 | 2.97 | 10.26 | 28.8% | 38 |
| American Robin | 14.82 | 9.17 | 23.96 | 23.7% | 58 |
| Dark-eyed Junco | 72.19 | 48.01 | 108.53 | 18.6% | 118 |
| Pine Siskin | 125.60 | 72.00 | 219.11 | 28.2% | 46 |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Montane Grassland (MG)

We conducted 135 point counts along 9 transects in montane grassland between 1 June and 21 June 2005 (Table 15). We detected a total of 677 individual birds, with an average of 5.0 birds per point count (Table 16). We detected a total of 56 species with an average of 3.5 species per point count and 18.0 species per transect (Table 16).

The point-count transect data from montane grassland yielded robust density estimates (CV<50%) for five species and a moderately robust estimate (CV=50-100%) for one additional species (Table 18). We should be able to effectively monitor these six species, which represent 11% of all species detected in montane grassland.

Mountain Bluebird, Western Meadowlark, Vesper Sparrow, Green-tailed Towhee, and Rock Wren had the highest estimated densities of all species detected in montane grassland. Five species – Rock Wren, Mountain Bluebird, Green-tailed Towhee, 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.

Table 18. Estimated densities of breeding birds in Montane Grassland in the Shoshone National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Rock Wren | 6.30 | 2.65 | 14.96 | 43.5% | 47 |
| Mountain Bluebird | 12.31 | 6.50 | 23.32 | 30.3% | 32 |
| American Robin | 3.35 | 1.52 | 7.37 | 35.8% | 34 |
| Green-tailed Towhee | 6.30 | 1.73 | 23.02 | 63.5% | 29 |
| Vesper Sparrow | 10.78 | 5.83 | 19.96 | 30.1% | 63 |
| Western Meadowlark | 11.15 | 4.51 | 27.56 | 41.2% | 83 |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = coefficient of variation of D; n = number of observations used to estimate D

## Montane Riparian (MR)

We conducted 88 point counts along six transects in montane riparian between 15 June and 13 July, 2005 (Table 15). We detected a total of 557 individual birds, with an average of 6.3 birds per point count (Table 16). We detected a total of 51 species with an average of 4.8 species per point count and 19.8 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=50-100%) for one additional species (Table 19). We should be able to effectively monitor these six species, which represent 12% of all species detected in montane riparian.

Dusky Flycatcher, Warbling Vireo, Yellow-rumped Warbler, American Robin, and Dark-eyed Junco had the highest estimated densities of all species detected in montane riparian. Four species – American Robin, Chipping Sparrow, Dusky Flycatcher, and Yellow-rumped Warbler – 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 montane riparian provides optimal habitat for these species in Shoshone National Forest.

Table 19. Estimated densities of breeding birds in Montane Riparian in the Shoshone National Forest, summer 2005.

| Species | D | LCL | UCL | CV | n |
|---|---|---|---|---|---|
| Dusky Flycatcher | 33.73 | 16.23 | 70.11 | 33.3% | 33 |
| Warbling Vireo | 28.49 | 13.02 | 62.35 | 34.3% | 73 |
| American Robin | 20.28 | 10.19 | 40.38 | 31.4% | 40 |
| Yellow-rumped Warbler | 23.96 | 8.89 | 64.54 | 44.1% | 34 |
| Dark-eyed Junco | 13.82 | 3.68 | 51.91 | 60.2% | 70 |
| Chipping Sparrow | 11.88 | 4.67 | 30.24 | 40.9% | 26 |

D = density estimate in birds/km$^2$; LCL and UCL = lower and upper 95% confidence limits on D; CV = 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 2005, we collected suffient data to monitor 15 of these species (Broad-tailed Hummingbird, Red-naped Sapsucker, Willow Flycatcher, Hammond's Flycatcher, Dusky Flycatcher, Plumbeous Vireo, Sage Thrasher, MacGillivray's Warbler, Wilson's Warbler, Brewer's Sparrow, Vesper Sparrow, Lark Sparrow, Lark Bunting, Grasshopper Sparrow and Chestnut-collared Longspur) in at least one habitat and, given interest, we can potentially monitor six more species (American Three-toed Woodpecker, Olive-sided Flycatcher, Cordilleran Flycatcher, Brown Creeper, and Townsend's Solitaire) by using data from the full range of habitats. For a few of the remaining species of diurnal landbirds, although we generally don't get enough detections annually to generate density estimates for these species (Calliope Hummingbird, Rufous Hummingbird, Williamson's Sapsucker, Ash-throated Flycatcher, Loggerhead Shrike, Western Scrub-Jay, Juniper Titmouse, Bushtit), with several years of data we should be able to pool data across years and habitats, and weight observations by habitat area to generate global detection functions for these species and thereby generate annual statewide density estimates for these species that may be robust enough for population trend monitoring. 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, Western Scrub-Jay, Juniper Titmouse, Bushtit and Virginia's Warbler 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 would be 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 of Level II species are waterbirds, which are not well suited for monitoring with point transects although we could improve our ability to monitor these species by adding wetland transects. In addition, a few are owls that are not usually active during our survey period but could be monitored with other techniques, such as early spring 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 project is providing valuable data on the distribution, abundance and habitat associations of most regularly occurring breeding landbirds in Wyoming that 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 47 bird species in at least one habitat surveyed statewide in 2005. 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 30 years and more likely within at least 12 years. Program MONITOR (Patuxent Wildlife Research Center 2000) indicates that for species with associated coefficients of variations of less than 0.50, we will be able to detect declines of 3.0% per year within 12 years (Leukering et. al. 2000).

We obtained sufficient data on at least 10 additional species to monitor their populations across habitat types, although in some cases, these 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 that breed mainly outside the Wyoming (e.g., Bobolink);
4) Nocturnal species (e.g., Great Gray Owl);
5) Wetland-obligate species (e.g., Common Loon); and
6) Species that are readily detectable primarily 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) Censusing small but localized populations;
3) Censusing 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.

Another effective way to monitor the health of bird populations, especially small ones, is to monitor reproductive output at nests. While this method can be more labor intensive than count-based monitoring, depending on the species in question and the detail of information needed, monitoring reproductive output does not necessarily imply high costs.

For species with small populations, such as Golden Eagle and Prairie Falcon, monitoring could be achieved by locating all active nests and visiting each during the breeding season as necessary to evaluate the outcome of each. Known nests would first be identified 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. Because relatively few nests exist for these species, this type of monitoring would probably require the equivalent effort of what is required for habitat-based monitoring (i.e., one additional person in the field during the spring and early summer).

For some low-density but widespread species, such as Northern Goshawk, a brief call-response survey could be conducted along each transect after its completion 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 highly portable playback system would be required for each observer, but other than this expense, relatively few additional expenses would be incurred. Such a program will be implanted in Colorado in 2006.

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 and a one-page map for each bird species detected in 2005 that is of management interest, as designated by either the USFS, Partners in Flight, USFWS and/or the Wyoming Comprehensive Wildlife Conservation Plan.

All species accounts follow the same format with an overview of our findings, a table of the density estimates by habitat, a comparison of density estimates by habitat and management unit (providing there were sufficient data) and a summary of the findings and prospective for monitoring. In the density estimate tables we present 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 of interest, especially for rare species, density estimates are derived using only independent observations. Also, in a few cases the *n* may be large enough to calculate a density but we were unable to do so due to one observer's error in estimating distances. The codes used to describe each project and the habitats where we conducted surveys are listed in Tables 9 and 10.

Table 9. List of projects and project codes used in the species accounts.

| Project | Project Code |
|---|---|
| Monitoring Colorado's Birds | MCB |
| Monitoring Birds of the Black Hills | MBBH |
| Monitoring Wyoming's Birds | MWB |
| Monitoring Wyoming's Birds – Bighorn National Forest | BI-MWB |
| Monitoring Wyoming's Birds – Shoshone National Forest | SH-MWB |
| Monitoring the Birds of the Carson National Forest | MBCNF |
| Monitoring Birds of the Northern Colorado Plateau Network | NCPN |

Table 10. List of habitat types by project used in the species accounts.

| Habitat Type | Code | Project |
|---|---|---|
| Aspen | AS | MCB, MWB, MBCNF |
| Alpine Tundra | AT | MCB |
| Burn Areas | BU | MBBH |
| Foothills Riparian | FR | MBBH |
| Grassland | GR | MCB, MWB, MBCNF |
| High-elevation Conifer | HC | BI-MWB |
| High-elevation Riparian | HR | MCB |
| Juniper Woodland | JW | MWB |
| Low-elevation Riparian | LR | NCPN |
| Mixed Conifer | MC | MCB, MBCNF |
| Mid-elevation Conifer | MC | MWB, BI-MWB, SH-MWB |
| Montane Grassland | MG | SH-MWB |
| Montane Riparian | MR | MWB, BI-MWB, SH-MWB, MBBH |
| Montane Shrubland | MS | MCB |
| Pinyon Juniper | PJ | MCB, MBCNF, MBBH, NCPN |

Table 10 cont. List of habitat types by project used in the species accounts.

| Habitat Type | Code | Project |
|---|---|---|
| Ponderosa Pine, northern hills | PN | MBBH |
| Ponderosa Pine | PP | MCB, MBCNF |
| Ponderosa Pine, southern hills | PS | MBBH |
| Sage Shrubland | SA | MCB, MBCNF, NCPN |
| Semi-desert Shrubland | SE | MCB |
| Spruce Fir | SF | MCB, MBCNF, NCPN |
| Shrubsteppe | SS | MWB, BI-MWB |
| Wetlands | WE | MCB |
| White Spruce | WS | MBBH |

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 2005. The relative abundance scale used in the maps is based on the average number of birds observed per point count *along each transect* where the species was detected, and the scale will vary by species depending on the number of detections of that species. Also, the location of each dot does not necessarily indicate the precise location of the point at which the species was observed, but rather the access point of that transect. 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. Finally, as a note of caution, species may seem more abundant in certain areas, especially the Black Hills, because the sampling effort is greater within a smaller area and not necessarily because it is in fact more abundant. Therefore, it is important to consider the level of sampling effort in conjunction with the index of abundance when comparing a species' occurrence across the region.

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, as these are the same birds detected on statewide transects, since these are the same transects.

In the summary, we tried to briefly describe the habitat associations and distribution of each species within Wyoming and evaluate our ability to monitor the species under MWB. If we had enough detections to calculate a density estimate for the species and the coefficient of variation was 0.50 or less, we assumed that we will be able to effectively monitor the species and detect a population trend (decline of 3.0% per year) in at least 12 years.

## Greater Sage-Grouse
## (*Centrocercus urophasianus*)

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

In 2005, we detected 27 individual Greater Sage-Grouse in one habitat on MWB. We also detected Greater Sage-Grouse on the MCB and NCPN projects. We did not detect Greater Sage-Grouse in sufficient numbers to calculate a density estimtate for this species in any habitat on any monitoring project.

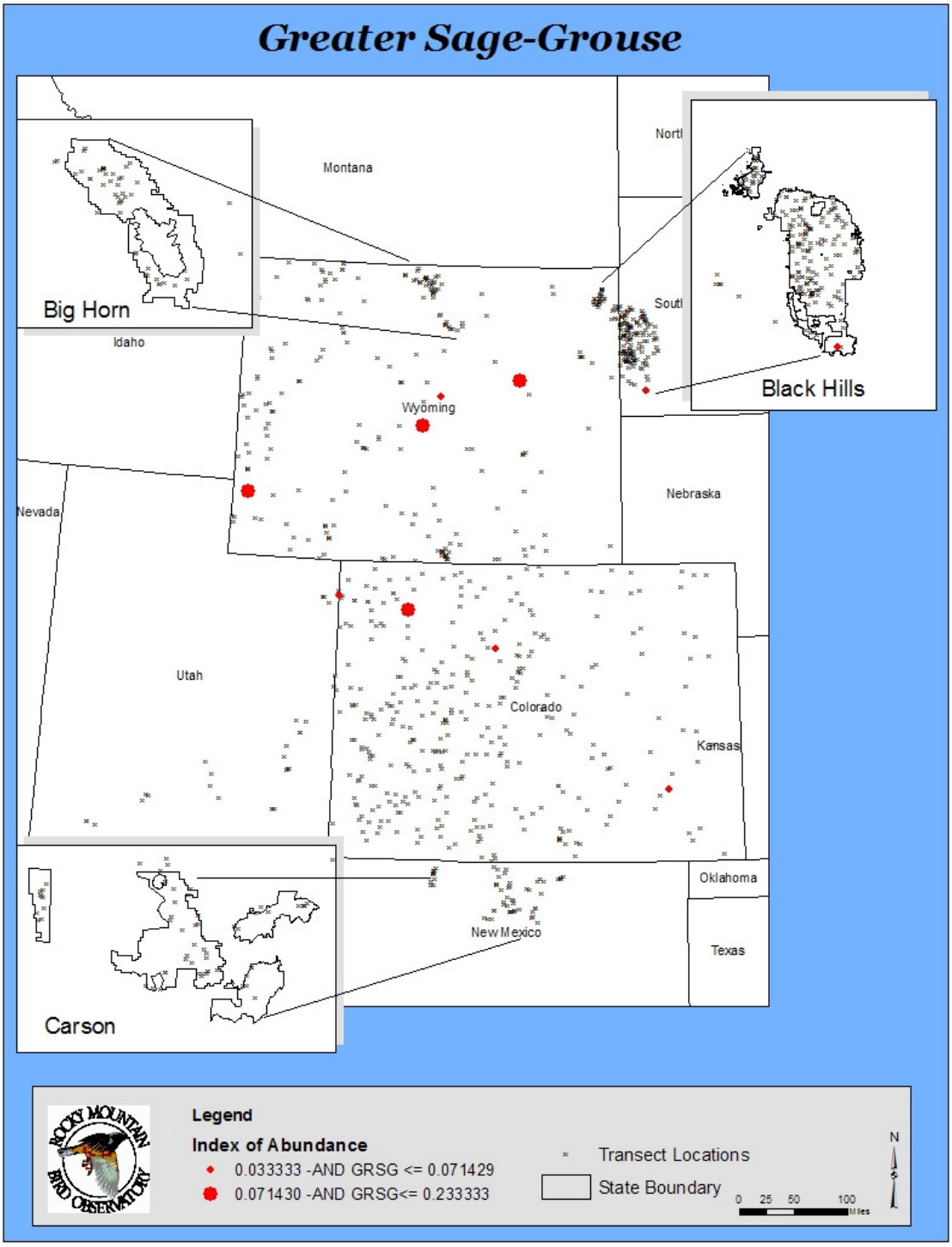
Total number of detections, number of individuals, and habitat-specific density estimates for Greater Sage-Grouse on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| SH-MG | ID | -- | -- | -- | -- | 2 |
| WY-GR | ID | -- | -- | -- | -- | 13 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Greater Sage-Grouse inhabits large, contiguous areas of sagebrush, and requires tall grass within the sagebrush for nesting. It is believed that fences, overgrazing, and the removal of sagebrush have greatly reduced the numbers of grouse inhabiting the region. The species was recently proposed for listing under the Endangered Species Act.

This monitoring project does not target Greater Sage-Grouse or any gallinaceous birds, all of which are game species in Wyoming, whose populations are monitored by the WGFD. We do, however, regularly detect this species on grassland transects and occasionally on shrubsteppe transect, and with the current number of detections, we may be able to monitor this species over time using data from the full range of habitats.


Greater Sage-Grouse
Montana
North
South
Big Horn
Idaho
Wyoming
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
0.033333 -AND GRSG <= 0.071429
0.071430 -AND GRSG<= 0.233333
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Blue Grouse
# (*Dendragapus obscurus*)

*WY-PIF Level I Priority Species

In 2005, we detected 11 individual Blue Grouse in five habitats on MWB. We also detected Blue Grouse on the MBCNF, MCB and NCPN projects. We did not detect Blue Grouse in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

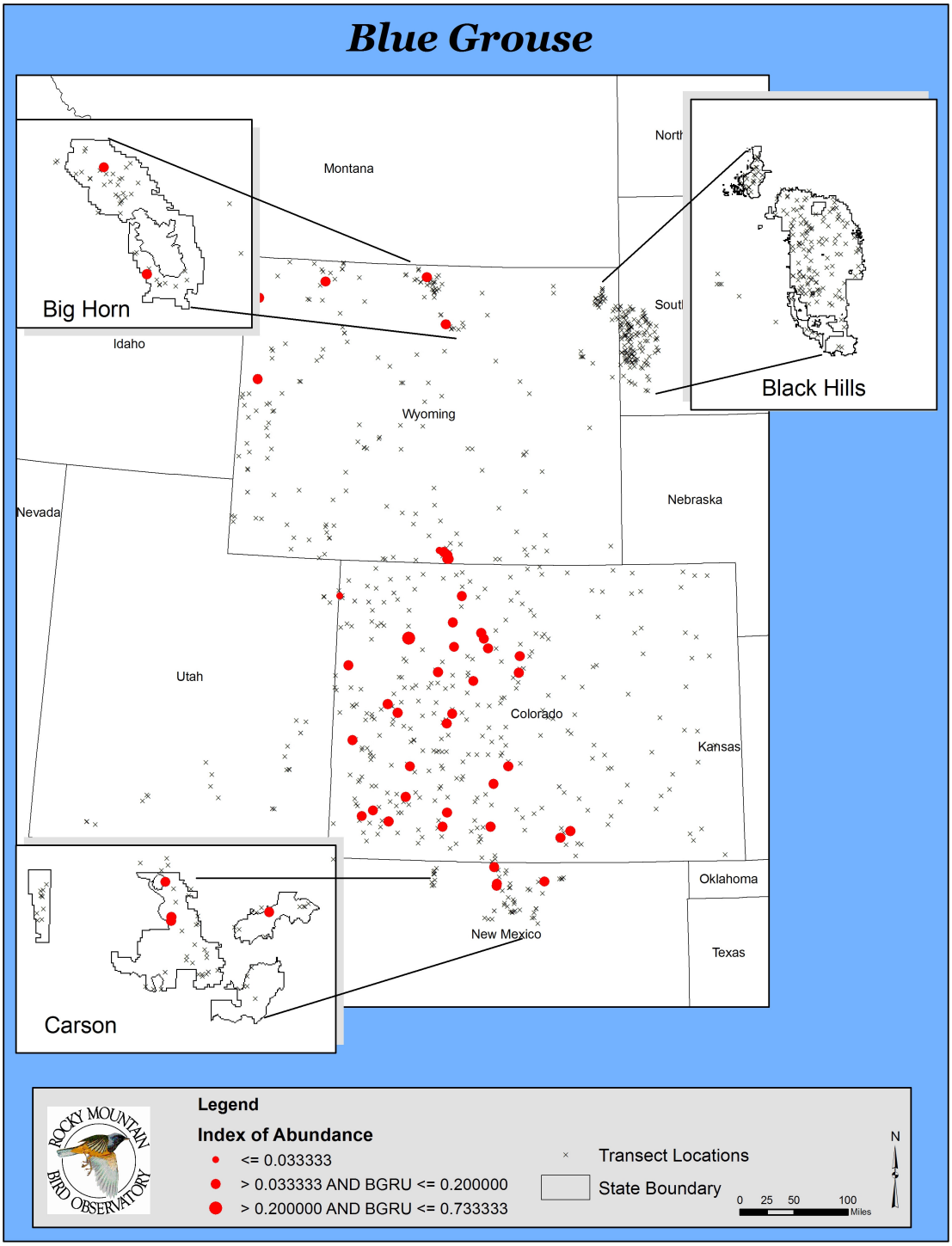
Total number of detections, number of individuals, and habitat-specific density estimates for Blue Grouse on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MC | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| SH-MG | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 6 |
| WY-MC | ID | -- | -- | -- | -- | 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.

***Summary*** – Blue Grouse can usually be found in coniferous forests or shrubby lowlands in summer, and in the fall this species usually moves to higher elevations. Blue Grouse are hunted in Wyoming and throughout much of their range.

We detect this species in low numbers every year especially in aspen and mid-elevation conifer habitats. Blue Grouse are often detected along transects and less frequently at point-count stations. The number of detections of Blue Grouse is too few to effectively monitor this species under MCB in any one habitat or across habitats. Given interest, however, with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a robust global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.


Blue Grouse
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.033333
> 0.033333 AND BGRU <= 0.200000
> 0.200000 AND BGRU <= 0.733333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Sharp-tailed Grouse
# (*Tympanuchus phasianellus*)

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

In 2005, we detected six individual Sharp-tailed Grouse in two habitats on MWB. We also detected one Sharp-tailed Grouse on the MBBH project. We did not detect Sharp-tailed Grouse in sufficient numbers to calculate a density estimate for this species in any habitat on any monitoring project.

Total number of detections, number of individuals, and habitat-specific density estimates for Sharp-tailed Grouse on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 2 |
| WY-GR | ID | -- | -- | -- | -- | 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.

***Summary –*** Sharp-tailed Grouse uses a wide range of open country from native prairie to aspen parkland. Habitat conversion and degredation, especially from agriculture, have caused this species to occur largely in scattered vestigial populations.

This was the first year we detected Sharp-tailed Grouse on point-transects in Wyoming. The timing of our surveys does not correspond well to the peak period of detectability of this spcies, which occurs earlier in spring. Thus the species probably goes undetected on many of our late-spring/early summer surveys. Since we detect Sharp-tailed Grouse so infrequently on transects, it is unlikely we will be able to effectively monitor this species in any individual habitat or across habitats under MWB. Effective monitoring would require a more intensive and focused effort. Additional surveys in aspen and grassland earlier in the spring would likely yield better information on Sharp-tailed Grouse, although because it is a game species, presumably it is already being monitored through other programs.

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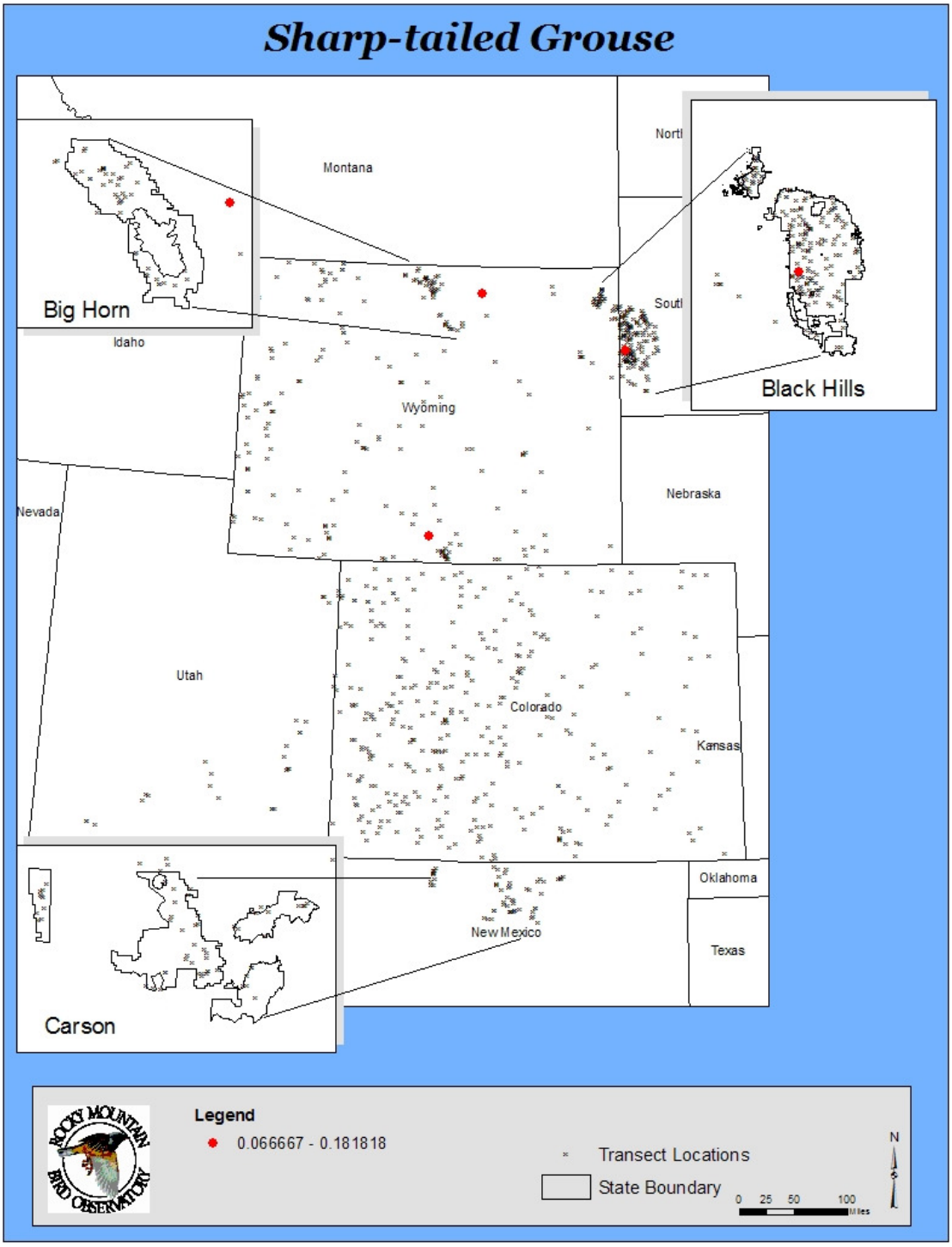

Sharp-tailed Grouse
Montana
North
South
Big Horn
Idaho
Wyoming
Black Hills
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
0.066667 - 0.181818
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Bald Eagle
## (*Haliaeetus leucocephalus*)

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

In 2005, we detected four individual Bald Eagles in three habitats on the MWB project. The only other RMBO point-transect monitoring projects where we detected Bald Eagle was the MBBH project. We did not detect Bald Eagle in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

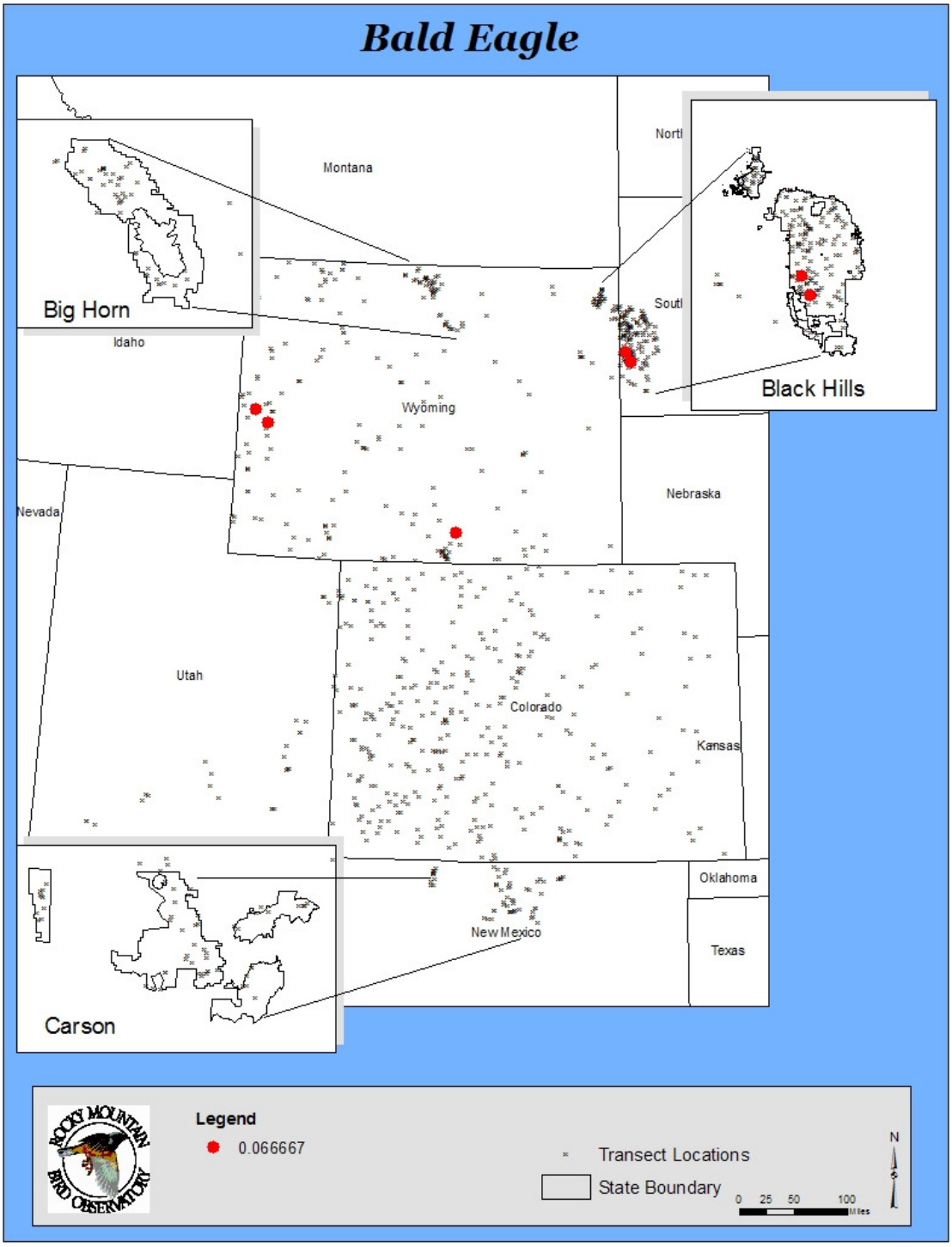
Total number of detections, number of individuals, and habitat-specific density estimates for Bald Eagle on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 1 |
| WY-MR | ID | -- | -- | -- | -- | 2 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Bald Eagles require large bodies of open water where there are plenty of fish to eat 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 1995, it graduated from Endangered to Threatened status, and in 1999 the U.S. Fish and Wildlife Service proposed to remove the Bald Eagle from the endangered and threatened species list due to its population rebound. In Wyoming, this species has been monitored by many organizations over the last 10 years including the BLM and the WGFD.

Bald Eagles, like other raptors, are difficult to monitor under MWB using the point-transect protocol because of their low densities and large territories, especially given the habitat requirements of this species. Therefore, it is unlikely we will be able to monitor Bald Eagles in any habitat or across habitats under MWB. Effective monitoring would require a more intensive and focused effort, possibly involving cataloguing nests and checking nest occupancy each year.


Bald Eagle
Montana
North
South
Big Horn
Idaho
Wyoming
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
0.066667
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Northern Harrier
## *(Circus cyaneus)*

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

In 2005, we detected 12 individual Northern Harriers in six habitats on the MWB project. MCB was the only other RMBO point-transect monitoring project where Northern Harrier was detected in 2005. We did not detect Northern Harrier in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

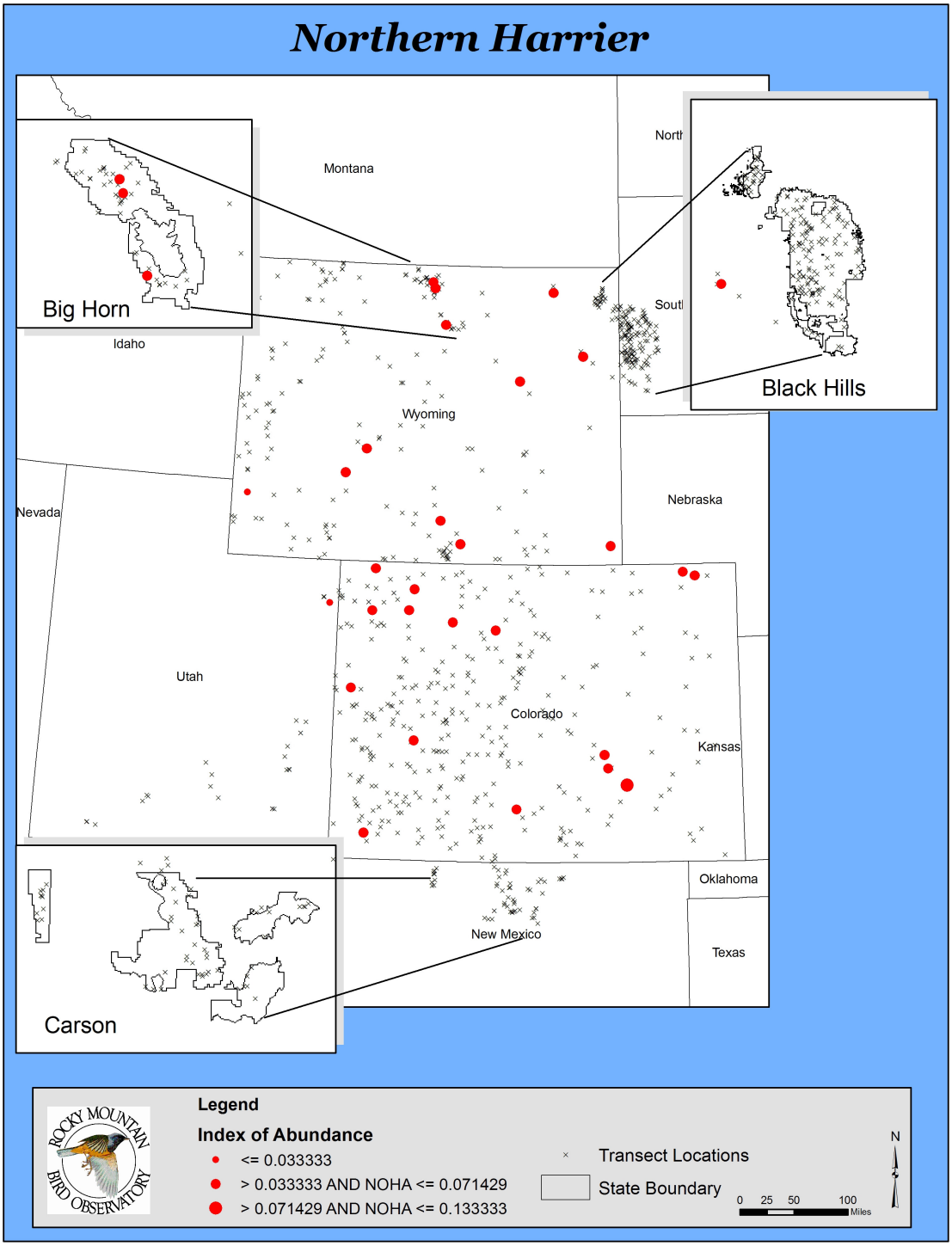
Total number of detections, number of individuals, and habitat-specific density estimates for Northern Harrier on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 2 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 1 |
| WY-GR | ID | -- | -- | -- | -- | 4 |
| WY-MR | ID | -- | -- | -- | -- | 1 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Historically, Northern Harrier was thought to be one of the most common hawks of the plains. Harriers declined in the 1970s, like many hawks, due to DDT poisoning. It appears that Harriers continue to decline due to habitat loss, particularly of wetlands.

Northern Harriers, like other raptors, are difficult to monitor under MWB using the point-transect protocol, because of their low densities and large territories. Therefore, it is unlikely we will be able to effectively monitor Northern Harrier in any individual habitat under MWB. Adding transects, especially in grassland and shrubsteppe habitat, may improve our ability to monitor this species. Given interest, however, with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a robust global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.


Northern Harrier
Big Horn
Black Hills
Carson
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Legend
Index of Abundance
<= 0.033333
> 0.033333 AND NOHA <= 0.071429
> 0.071429 AND NOHA <= 0.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Northern Goshawk
## (*Accipiter gentilis*)

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

In 2005, we detected 11 individual Northern Goshawks in six habitats on the MWB project. Northern Goshawk was also detected on the MBBH and MCB monitoring projects. We did not detect this species in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

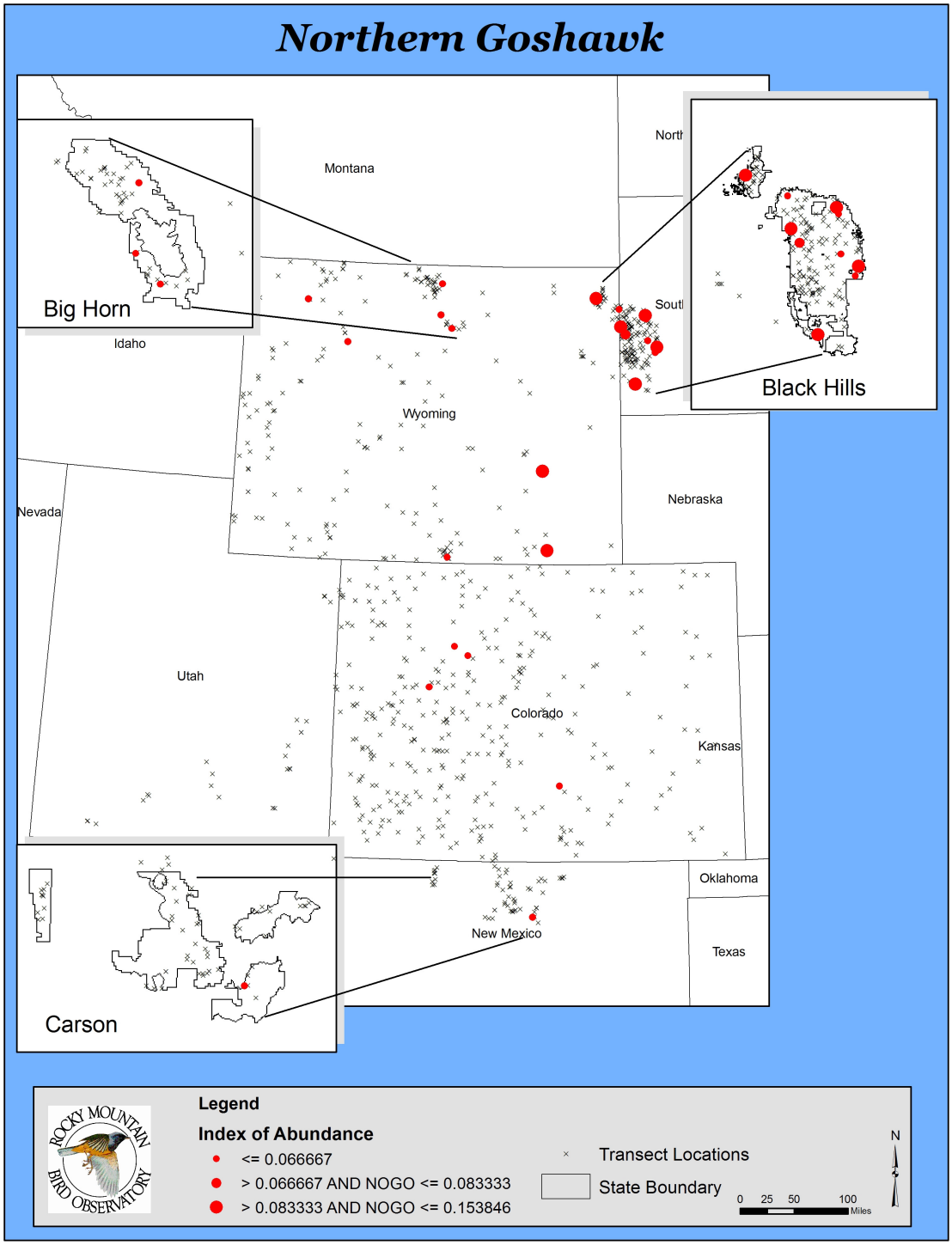
Total number of detections, number of individuals, and habitat-specific density estimates for Northern Goshawk on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 1 |
| BI-MC | ID | -- | -- | -- | -- | 2 |
| SH-MC | ID | -- | -- | -- | -- | *2* |
| WY-GR | ID | -- | -- | -- | -- | 1 |
| WY-MC | ID | -- | -- | -- | -- | 4 |
| WY-MR | ID | -- | -- | -- | -- | 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.

***Summary*** – Northern Goshawks are believed to inhabit only mature, old-growth forests and require large blocks of forest for nesting and foraging. It is believed that this species can be vulnerable to the effects of logging.

Data from all of the habitat-based point transects will likely not be sufficient to track population trends of Northern Goshawk over time. Effective monitoring would require a more intensive and focused effort, probably involving call-response surveys. Given interest, such a project could be implemented cost-effectively as part of MWB, with observers using playback to detect goshawks and other forest raptors. We will implement a project like this in Colorado in 2006.


Northern Goshawk
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.066667
> 0.066667 AND NOGO <= 0.083333
> 0.083333 AND NOGO <= 0.153846
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

## Swainson's Hawk
## (*Buteo swainsoni*)

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

In 2005, we detected five individual Swainson's Hawks in two habitats on the MWB project. The only other RMBO monitoring project where we detected Swainson's Hawks in 2005 was the MCB project. We did not detect Swainson's Hawk in sufficient numbers to calculate a density estimate for this species in any habitat on any monitoring project.

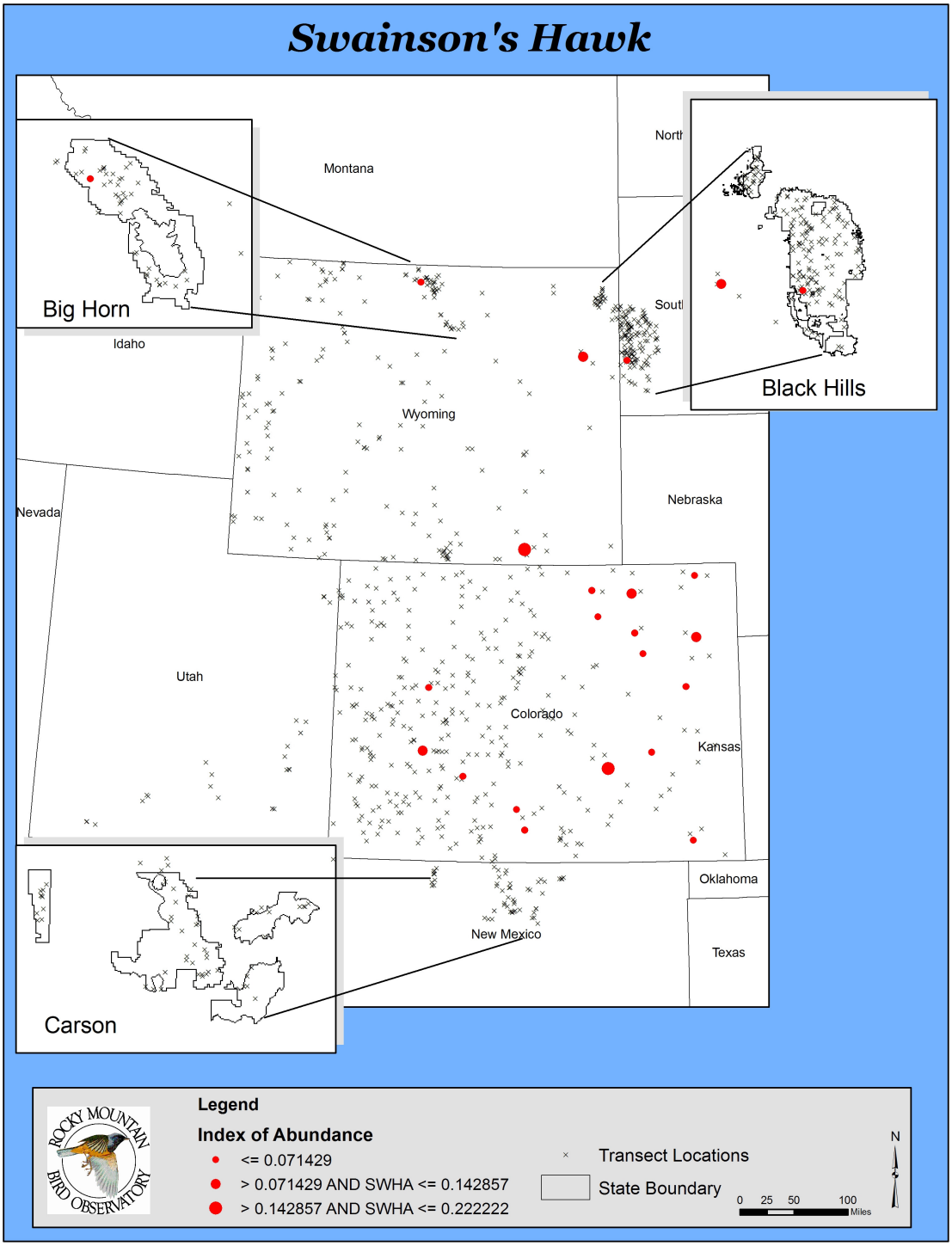
Total number of detections, number of individuals, and habitat-specific density estimates for Swainson's Hawk on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-SS | ID | -- | -- | -- | -- | 1 |
| WY-GR | ID | -- | -- | -- | -- | 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.

***Summary*** – Swainson's Hawks typically inhabit sites in arid grassland, desert, and agricultural areas with scattered trees and shrubs. This species winters in Argentina where, historically, the use of pesticides and insecticides on crops has killed thousands of birds (citation). Additional threats to its breeding grounds have placed this species on the National Audubon Society's national Watch List (citation).

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. Therefore, it is unlikely we will be able to effectively monitor Swainson's Hawk in any individual habitat or across habitats under MWB. Effective monitoring would require a more intensive and focused effort like cataloguing nests and checking nest occupancy each year through a special species program. Adding transects, especially in grassland habitat may also improve our ability to monitor this species.


Swainson's Hawk
Big Horn
Black Hills
Carson
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Legend
Index of Abundance
<= 0.071429
> 0.071429 AND SWHA <= 0.142857
> 0.142857 AND SWHA <= 0.222222
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Ferruginous Hawk
# (*Buteo regalis*)

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

In 2005, we detected eight individual Ferruginous Hawks in two habitats on the MWB project. The only other RMBO monitoring project where Ferruginous Hawk was detected in 2005 was MCB. We did not detect Ferruginous Hawk in sufficient numbers to calculate a density estimate for this species in any habitat on any monitoring project.

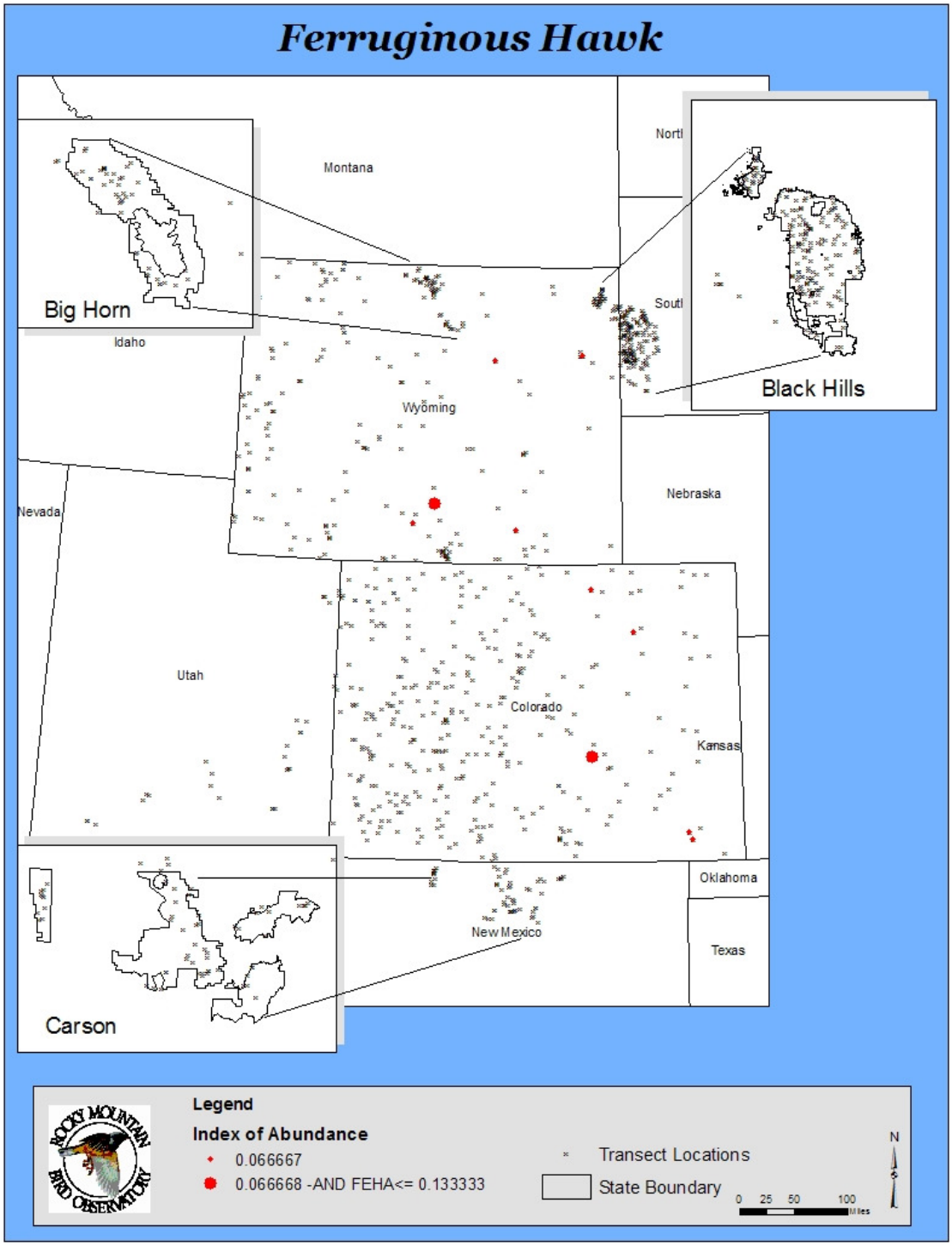
Total number of detections, number of individuals, and habitat-specific density estimates for Ferruginous Hawk on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-GR | ID | -- | -- | -- | -- | 5 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Ferruginous Hawks typically inhabit sites of expansive ungrazed or lightly grazed grassland or shrubland with varied topography, including hills, ridges, and valleys.

Ferruginous Hawks, like other raptors, are difficult to monitor under MWB using the point-transect protocol, because of their low densities and large territories. Therefore, it is unlikely we will be able to effectively monitor Ferruginous Hawk in any individual habitat or across habitats under MWB. Effective monitoring would require a more intensive and focused effort, and/or possibly adding transects in grassland and/or shrubsteppe habitats.


Ferruginous Hawk
Montana
Nortl
Big Horn
Idaho
Soutl
Black Hills
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
0.066667
0.066668 -AND FEHA<= 0.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Golden Eagle
## (*Aquila chrysaetos*)

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

In 2005, we detected 12 individual Golden Eagles in seven habitats on the MWB project. Golden Eagle was detected on all the RMBO point-transect monitoring project in 2005, except MBCNF. We did not detect Golden Eagle in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

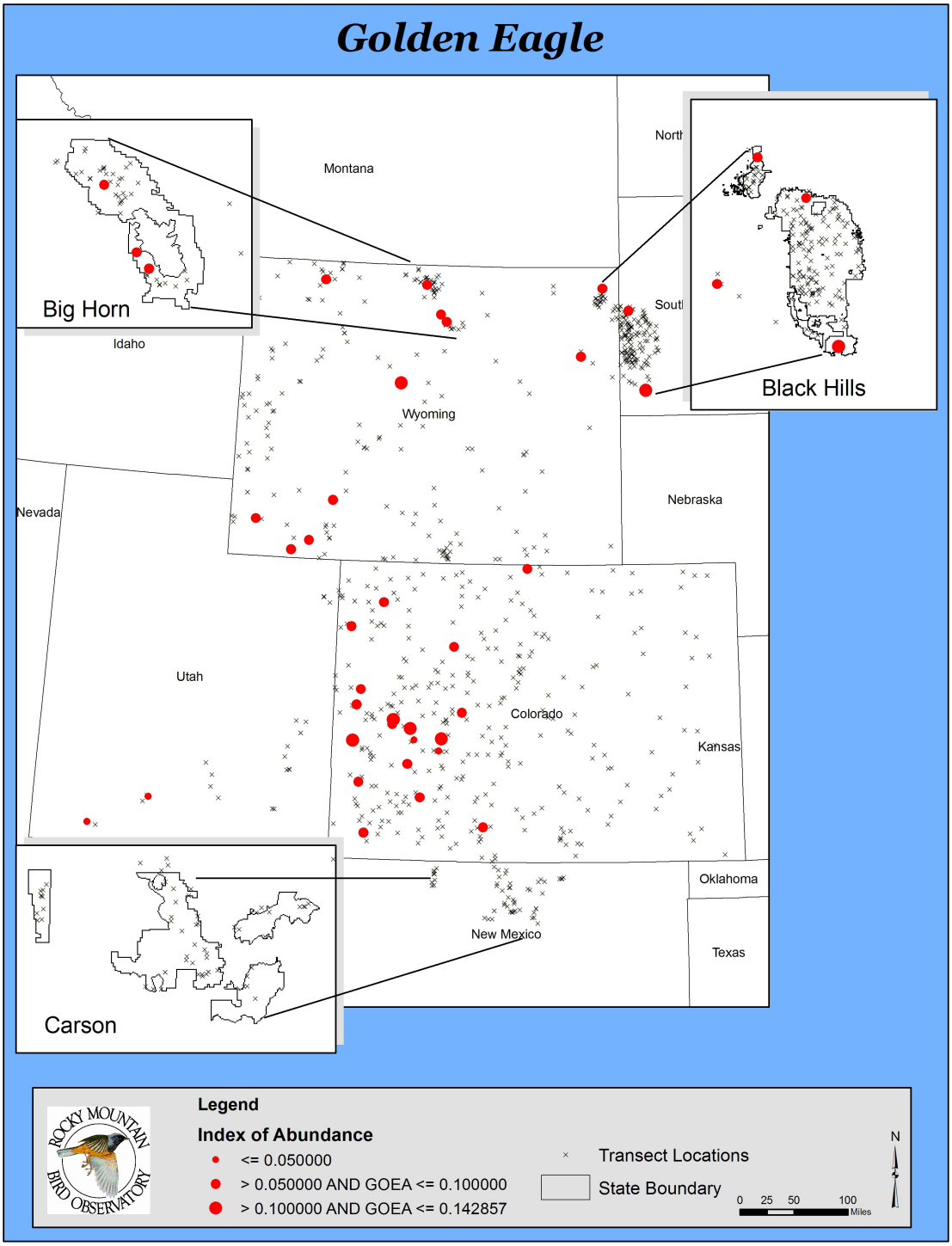
Total number of detections, number of individuals, and habitat-specific density estimates for Golden Eagle on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 2 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| SH-MG | ID | -- | -- | -- | -- | 1 |
| WY-GR | ID | -- | -- | -- | -- | 2 |
| WY-JW | ID | -- | -- | -- | -- | 3 |
| WY-MR | ID | -- | -- | -- | -- | 1 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Golden Eagles inhabit a wide variety of habitats. Most nest on cliffs; some nest in trees. Because of their size, Golden Eagles need vast expanses of hunting space, usually over open habitats including grassland, sagebrush, farmlands, and even tundra.

Golden Eagles, like other raptors, are difficult to monitor under MWB using the point-transect protocol, because of their low densities and large territories. Therefore, it is unlikely we will be able to effectively monitor Golden Eagles in any individual habitat or across habitats under MWB. Effective monitoring would require a more intensive and focused effort probably involving nest searches in potential habitat, cataloguing nests and checking nest occupancy each year. Adding transects in certain habitats may also improve our ability to monitor this species. Also, given interest, with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.


Golden Eagle
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.050000
> 0.050000 AND GOEA <= 0.100000
> 0.100000 AND GOEA <= 0.142857
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Prairie Falcon
## (*Falco mexicanus*)

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

In 2005, we detected four individual Prairie Falcons in three habitats on MWB. Prairie Falcon was detected on all RMBO point-transect monitoring projects in 2005, except MBCNF. We did not detect Prairie Falcon in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

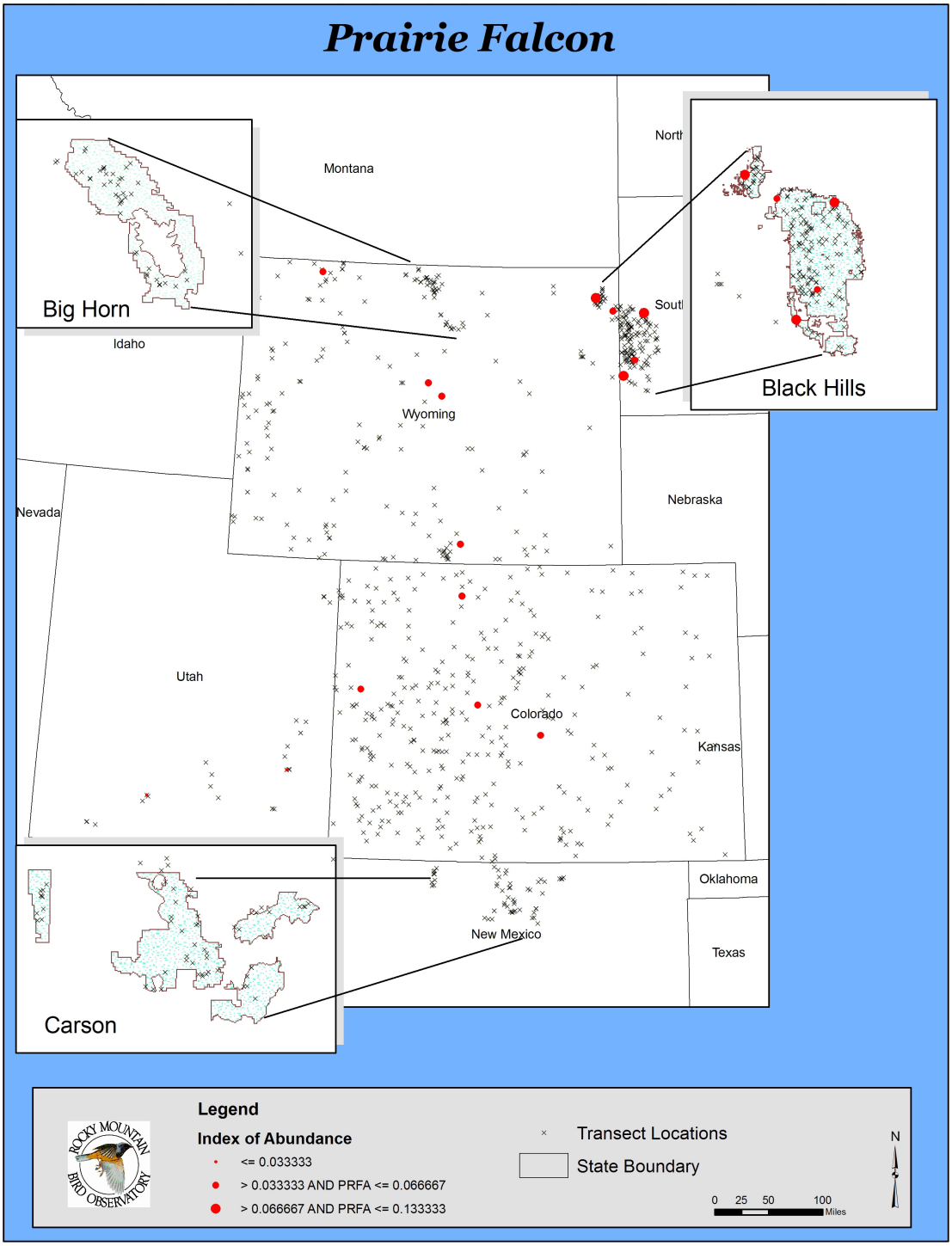
Total number of detections, number of individuals, and habitat-specific density estimates for Prairie Falcon on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| SH-MG | ID | -- | -- | -- | -- | 1 |
| WY-JW | ID | -- | -- | -- | -- | 1 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Prairie Falcons inhabit grasslands, shrubsteppe and other open country, including alpine tundra throughout Wyoming. This species will use a variety of landscapes provided suitable cliffs and rock outcrops are available for nesting, and open country is available for hunting.

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. Therefore, it is unlikely we will be able to effectively monitor Prairie Falcons in any individual habitat or across habitats under MWB. Effective monitoring would require a more intensive and focused effort, and given their nesting behavior Prairie Falcons would be better monitored by censusing birds at known nesting sites and searching for new nesting sites in potential habitat through a special species program.


Prairie Falcon
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.033333
> 0.033333 AND PRFA <= 0.066667
> 0.066667 AND PRFA <= 0.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Sandhill Crane
# (*Grus canadensis*)

*WGFD Species of Greatest Conservation Need

In 2005, we detected 42 individual Sandhill Cranes in eight habitats on MWB. We did not detect this species on any other RMBO point-transect monitoring project; however, this species does not normally breed in the rest of our survey area. We did not detect Sandhill Crane in sufficient numbers to calculate a density estimate in any habitat on the MWB project.

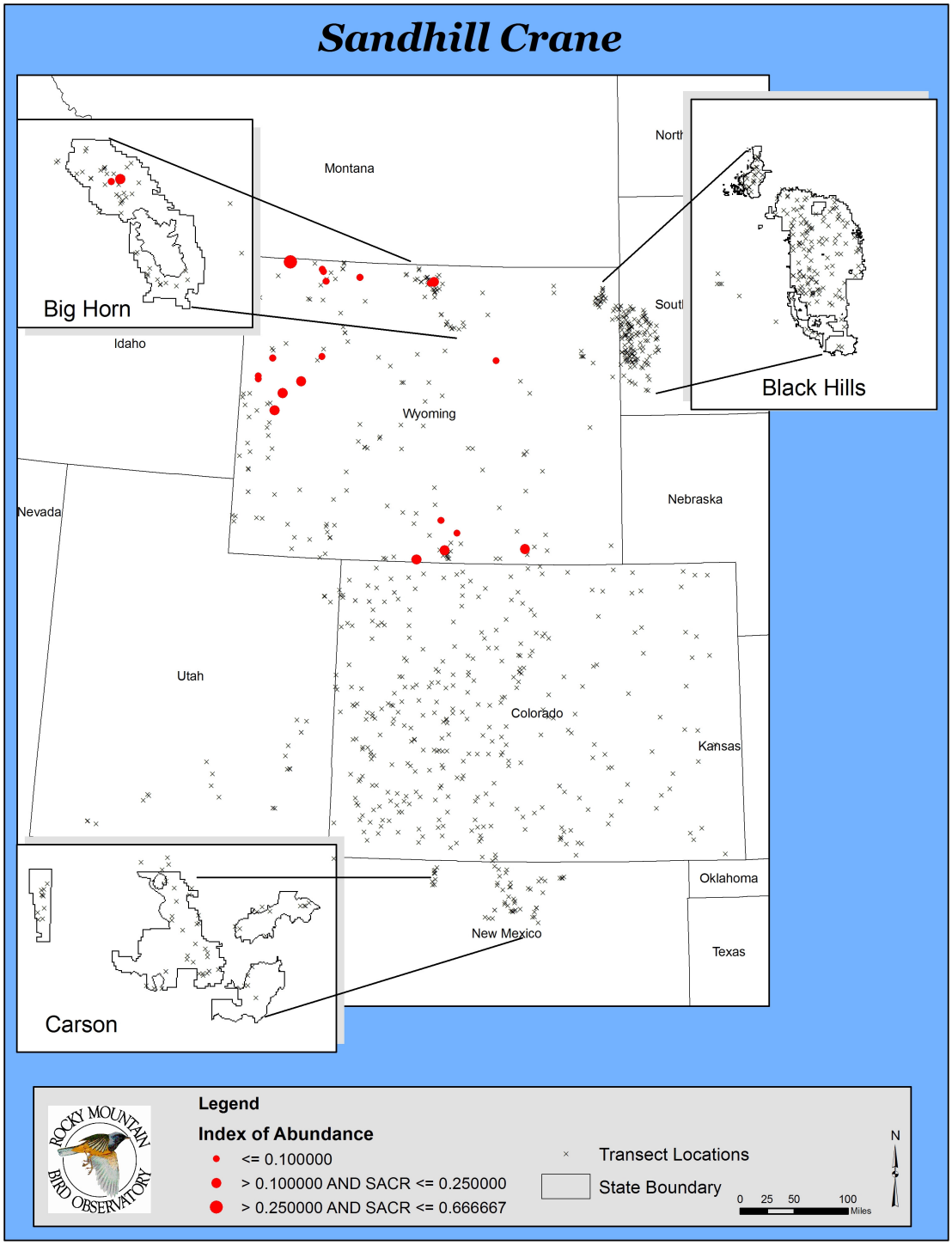
Total number of detections, number of individuals, and habitat-specific density estimates for Sandhill Crane on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 5 |
| SH-MC | ID | -- | -- | -- | -- | *2* |
| SH-MG | ID | -- | -- | -- | -- | 3 |
| WY-AS | ID | -- | -- | -- | -- | 5 |
| WY-GR | ID | -- | -- | -- | -- | 3 |
| WY-JW | ID | -- | -- | -- | -- | 2 |
| WY-MC | ID | -- | -- | -- | -- | 3 |
| WY-MR | ID | -- | -- | -- | -- | 16 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Sandhill Cranes inhabit a variety of freshwater wetlands and uplands, including agricultural and withing forested areas, but this species is typically restricted to open habitats. Sandhill Cranes primarily breed in western and southcentral Wyoming.

Sandhill Crane is not detected in sufficient numbers to effectively monitor this species in any habitat through point-transects under MWB, although we may be able to monitor this species by pooling data across habitats. Adding transects near wetlands or open water would most likely improve our ability to monitor this species.


Sandhill Crane
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.100000
> 0.100000 AND SACR <= 0.250000
> 0.250000 AND SACR <= 0.666667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Mountain Plover
## (*Charadrius montanus*)

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

In 2005, we detected 10 individual Mountain Plovers in one habitat on the MWB project. We did not detect the species on any other monitoring project, nor did we detect it in sufficient numbers to calculate a density estimate for this species in any habitat on the MWB project.

Total number of detections, number of individuals, and habitat-specific density estimates for Mountain Plover on the MWB monitoring project, 2005.

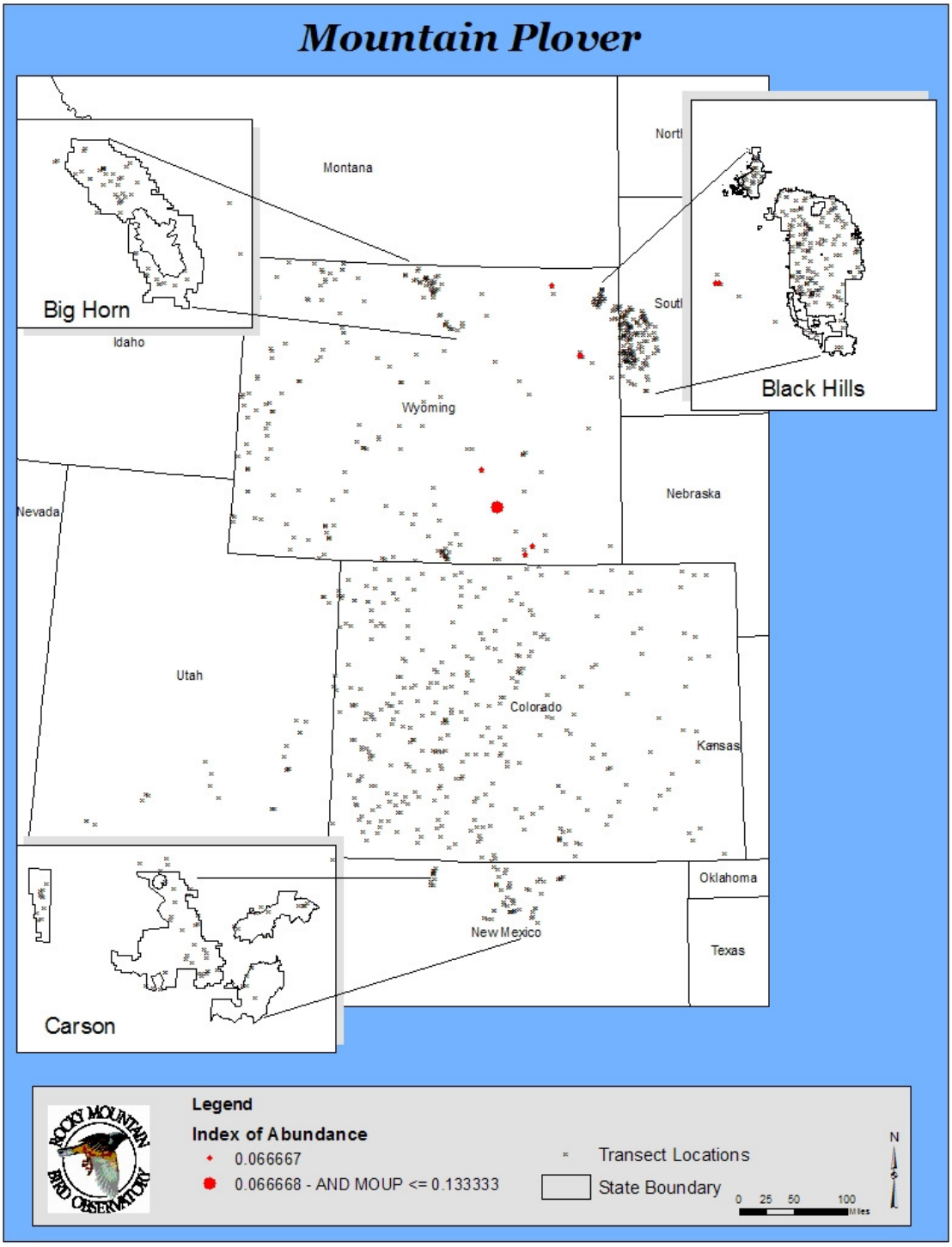
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-GR | ID | -- | -- | -- | -- | 10 |

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.

***Summary*** – Mountain Plovers primarily breed in arid shortgrass 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 conversion. In addition, oil and gas exploration, water well development, and other similar activities may negatively impact Mountain Plovers during the nesting season (citation).

Mountain Plover is not detected in sufficient numbers to effectively monitor its status through point-transects under the MWB project. Adding transects in grassland habitat may improve our ability to monitor this species. Each year we detect a few individuals on grassland transects and given interest with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.

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.


Mountain Plover
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
0.066667
0.066668 - AND MOUP <= 0.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Upland Sandpiper
# (*Bartramia longicauda*)

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

In 2005, we detected six individual Upland Sandpipers in grassland habitat on the MWB project. The only other RMBO monitoring project where we detected Upland Sandpiper in 2005 was MCB; however, in our survey area, the range of Upland Sandpiper extends just into eastern Wyoming and Colorado. We did not detect Upland Sandpiper in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

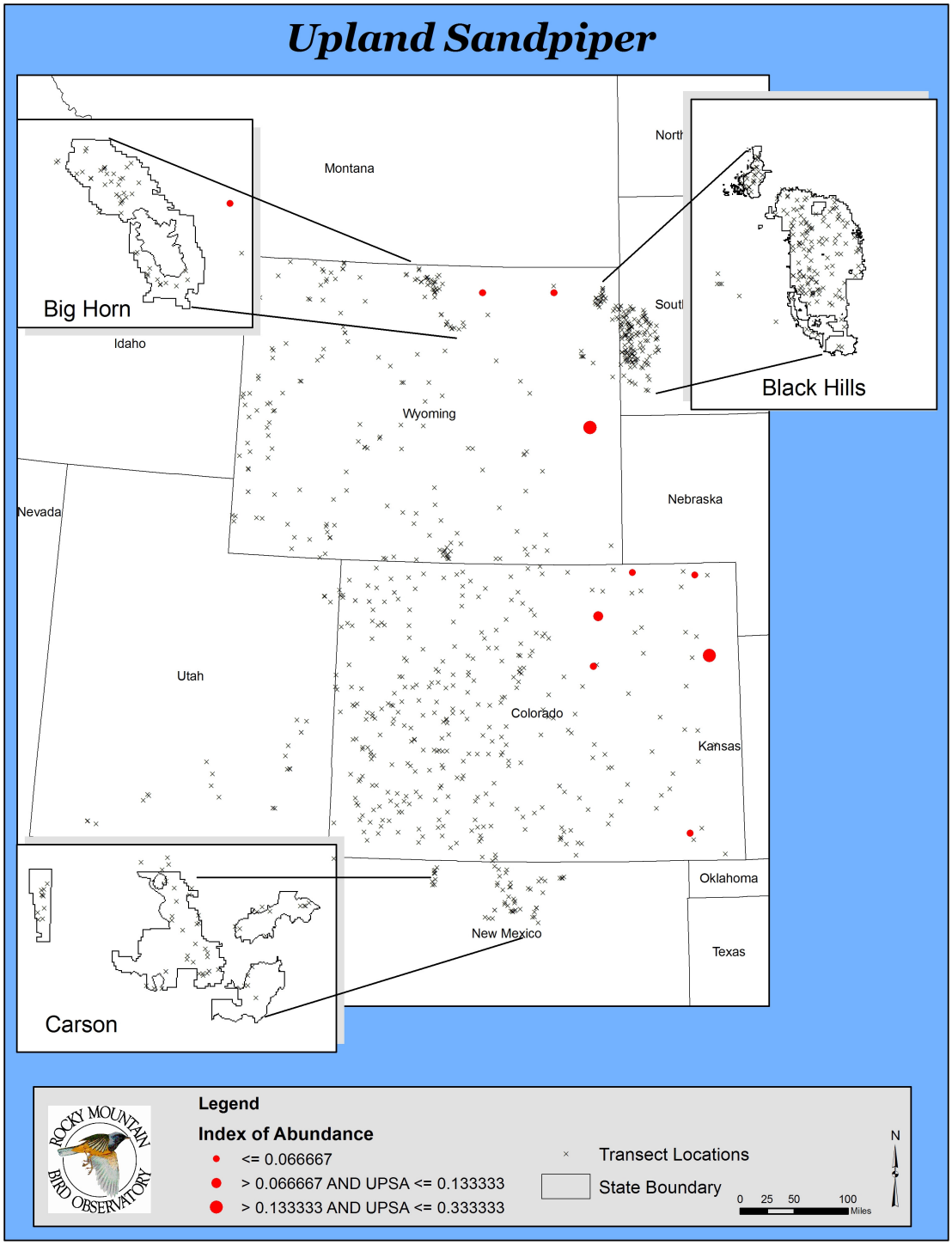
Total number of detections, number of individuals, and habitat-specific density estimates for Upland Sandpiper on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-GR | ID | -- | -- | -- | -- | 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.

***Summary*** – Upland Sandpiper prefers arid, open areas, including, meadows, cropland, and mixed and tall-grass prairies. This species appears to have suffered from the conversion of of native grasslands to agricultural fields and declines in native insect populations.

Most years we detect Upland Sandpiper on grassland transects in eastern Wyoming; however, the number of detections is always very low. Detections are too few to effectively monitor Upland Sandpiper through point-transects in any habitat under MWB. Adding grassland transects may improve our ability to monitor this species.


Upland Sandpiper
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.066667
> 0.066667 AND UPSA <= 0.133333
> 0.133333 AND UPSA <= 0.333333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Long-billed Curlew
# (*Numenius americanus*)

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

In 2005, we detected one individual Long-billed Curlew in shrubsteppe habitat on the MWB project. We also detected Long-billed Curlews on the MCB project. We did not detect Long-billed Curlew in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

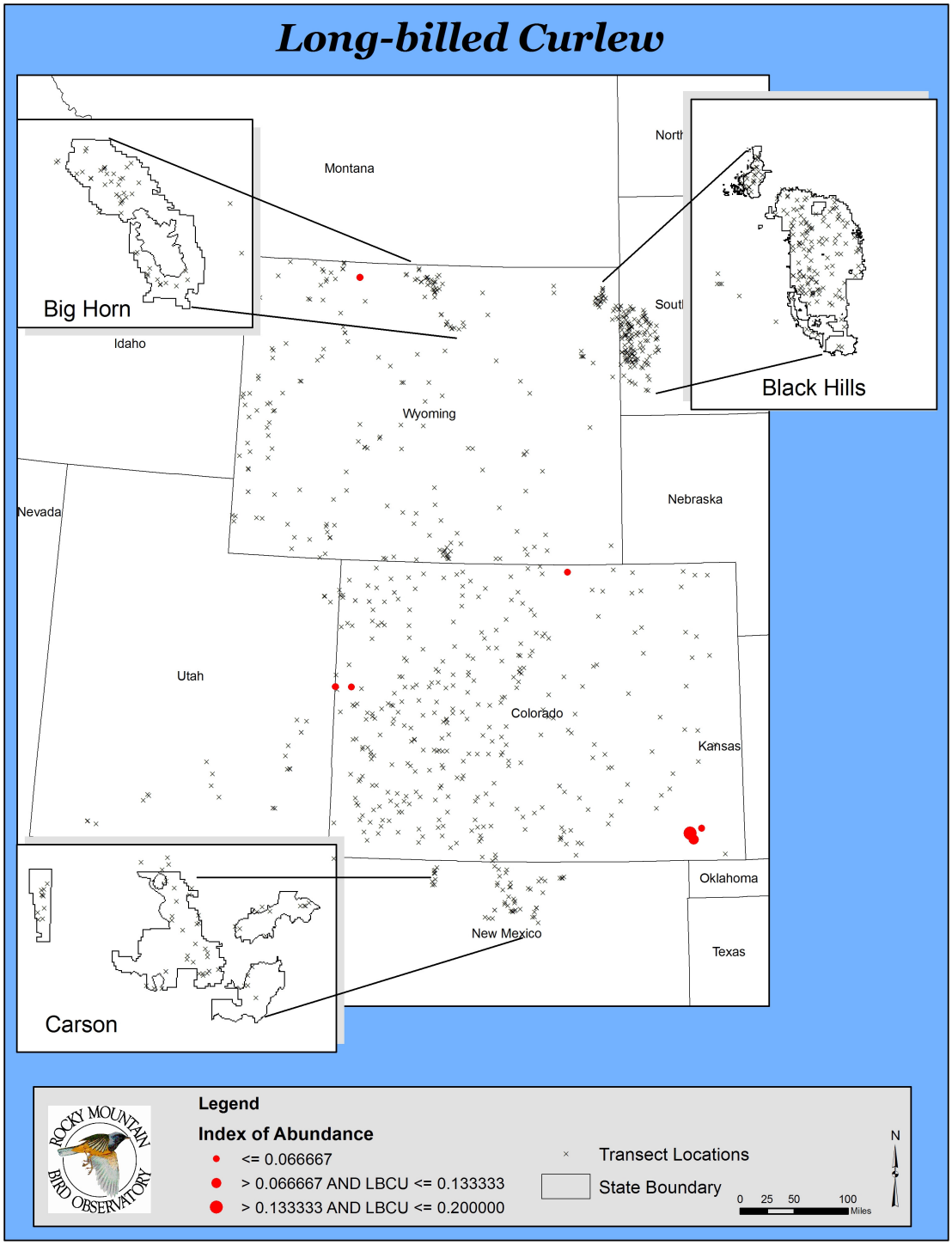
Total number of detections, number of individuals, and habitat-specific density estimates for Long-billed Curlew on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – 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. It is one of the most threatened shorebirds in the continent. The Long-billed Curlew's small population size and negative population trends, combined with threats of habitat degradation on both its breeding and wintering grounds, has placed this species on many high priority conservation lists, including the National Audubon Society's national Watch List (citation).

In 2004 and 2005, we detected one Long-billed Curlew in each year along point-transects in Wyoming. It is unlikely we will be able to effectively monitor or track the status of this species through point-transects under MWB. Additional grassland and shrupsteppe transects may would likely yield better information on Long-billed Curlew; however, given their low population density it will likely require a more intensive and focused effort.


Long-billed Curlew
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.066667
> 0.066667 AND LBCU <= 0.133333
> 0.133333 AND LBCU <= 0.200000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Great Gray Owl
# (*Strix nebulosa*)

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

In 2005, we detected one individual Great Gray Owl in mid-elevation conifer habitat on the MWB project. It was the only detection of the species on any of our monitoring projects; however, in our survey area the range of this species only extends into the northwestern edge of Wyoming.

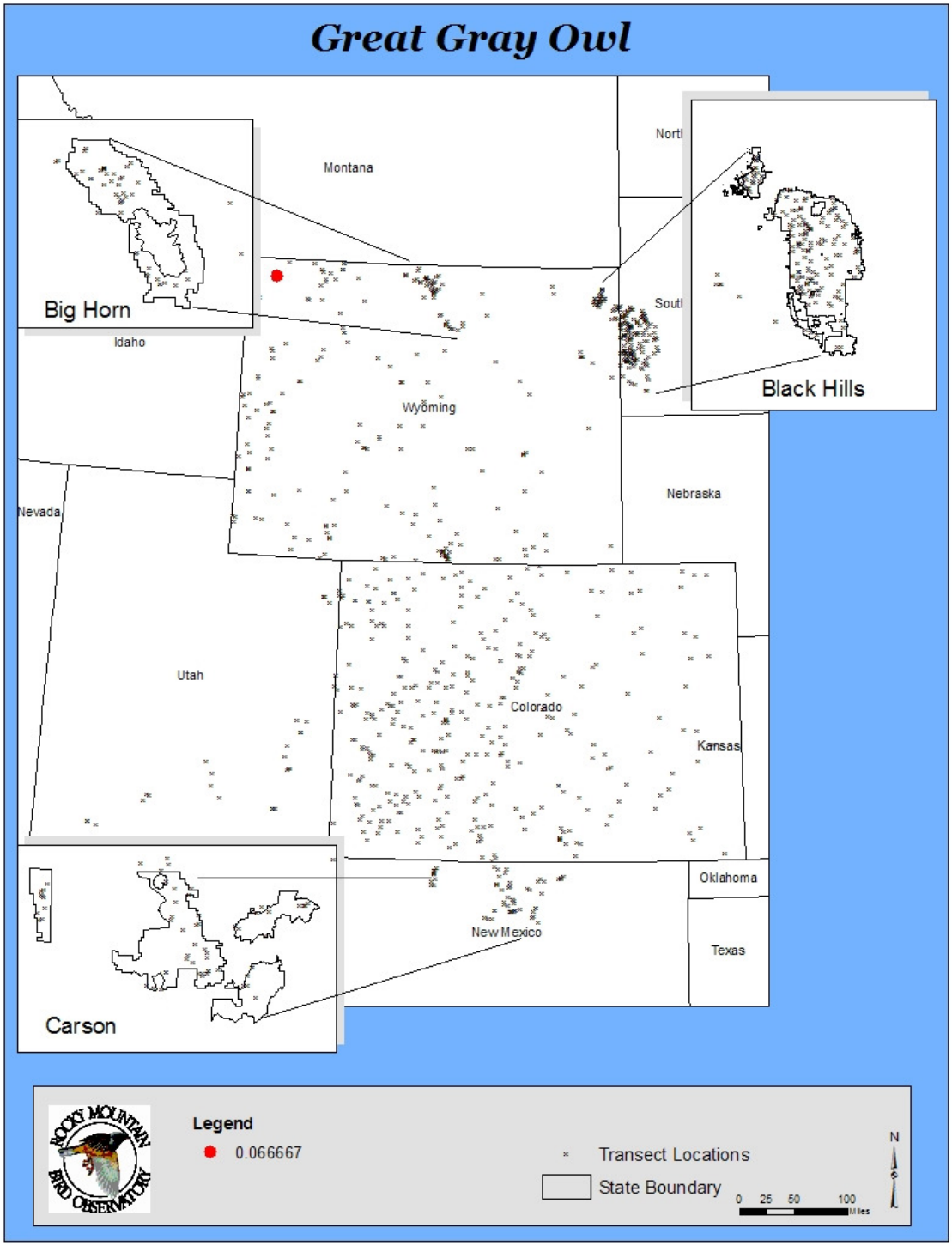
Total number of detections, number of individuals, and habitat-specific density estimates for Great Gray Owl on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-MC | ID | -- | -- | -- | -- | 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.

***Summary*** – Great Gray Owl, North America's longest owl, inhabits a variety of forest types but prefers dense coniferous forests near meadows and open fields.

This was the first year we detected Great Gray Owl along point-transects in Wyoming. The MWB project 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 (citation). 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. Given interest, such a program could be initiated in Wyoming.


Great Gray Owl
Montana
Nortl
Soutl
Big Horn
Idaho
Wyoming
Black Hills
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Carson
Legend
0.066667
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Northern Pygmy-Owl
# (*Glaucidium gnoma*)

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

In 2005, we detected one Northern Pygmy-Owl in mid-elevation conifer habitat on the MWB project. It was the only detection of the species on any of our monitoring projects in 2005.

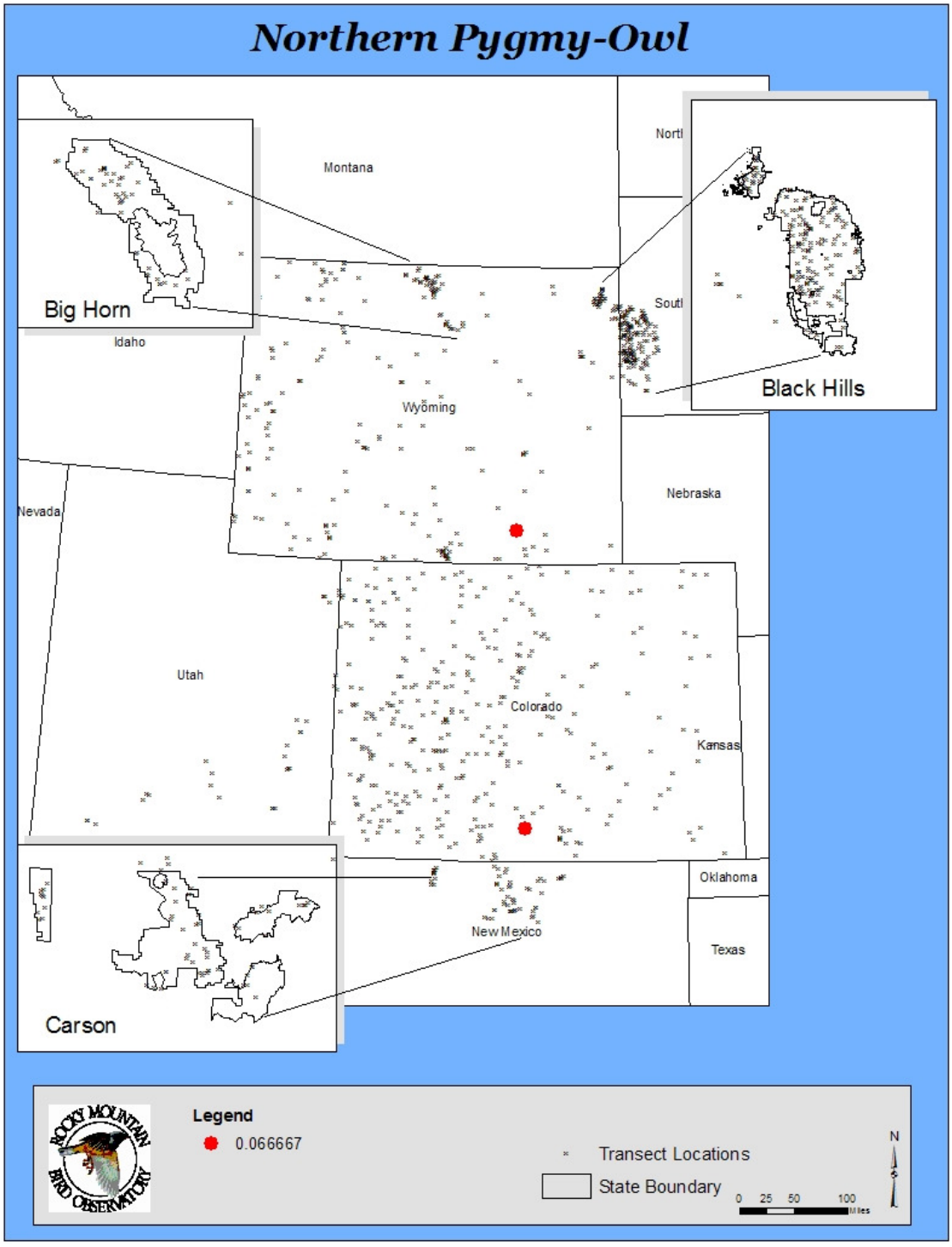
Total number of detections, number of individuals, and habitat-specific density estimates for Northern Pygmy-Owl on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-MC | ID | -- | -- | -- | -- | 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.

***Summary*** – Northern Pygmy-Owls inhabit dense montane coniferous forests and deciduous woodlands and nest in abandoned woodpecker cavities. Unlike other owls, pygmy owls are mostly diurnal and hunt primarily at dawn and dusk.

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 especially because of the pygmy-owl's cryptic nature. 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 implemented cost-effectively as part of MWB.


Northern Pygmy-Owl
Montana
Nortl
Soutl
Big Horn
Idaho
Wyoming
Black Hills
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Carson
Legend
0.066667
Transect Locations
State Boundary
0 25 50 100
Miles
N

## White-throated Swift
## (*Aeronautes saxatalis*)

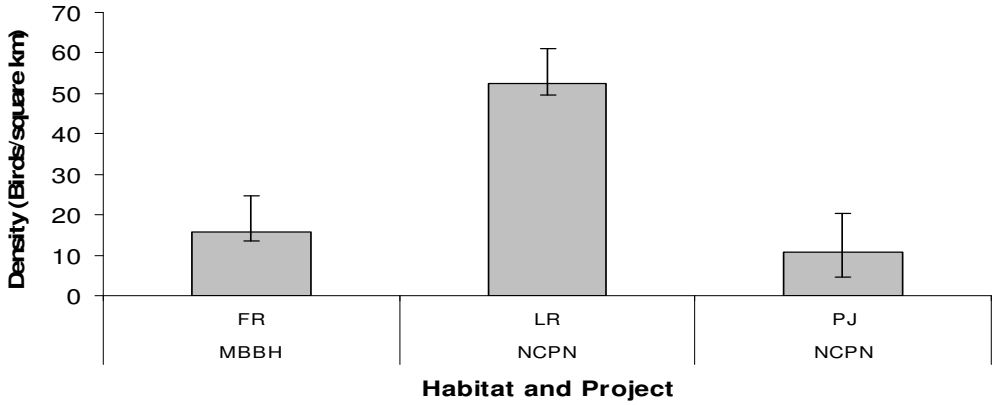
*WY-PIF Level II Priority Species

In 2005, we detected 22 individual White-throated Swifts in five habitats on the MWB project. Overall, we detected White-throated Swifts on all RMBO point-transect monitoring projects. We detected White-throated Swift in sufficient numbers to calculate a density estimate in at least one habitat on MBBH and NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for White-throated Swift on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 4 |
| WY-AS | ID | -- | -- | -- | -- | 1 |
| WY-JW | ID | -- | -- | -- | -- | 12 |
| WY-MC | ID | -- | -- | -- | -- | 4 |

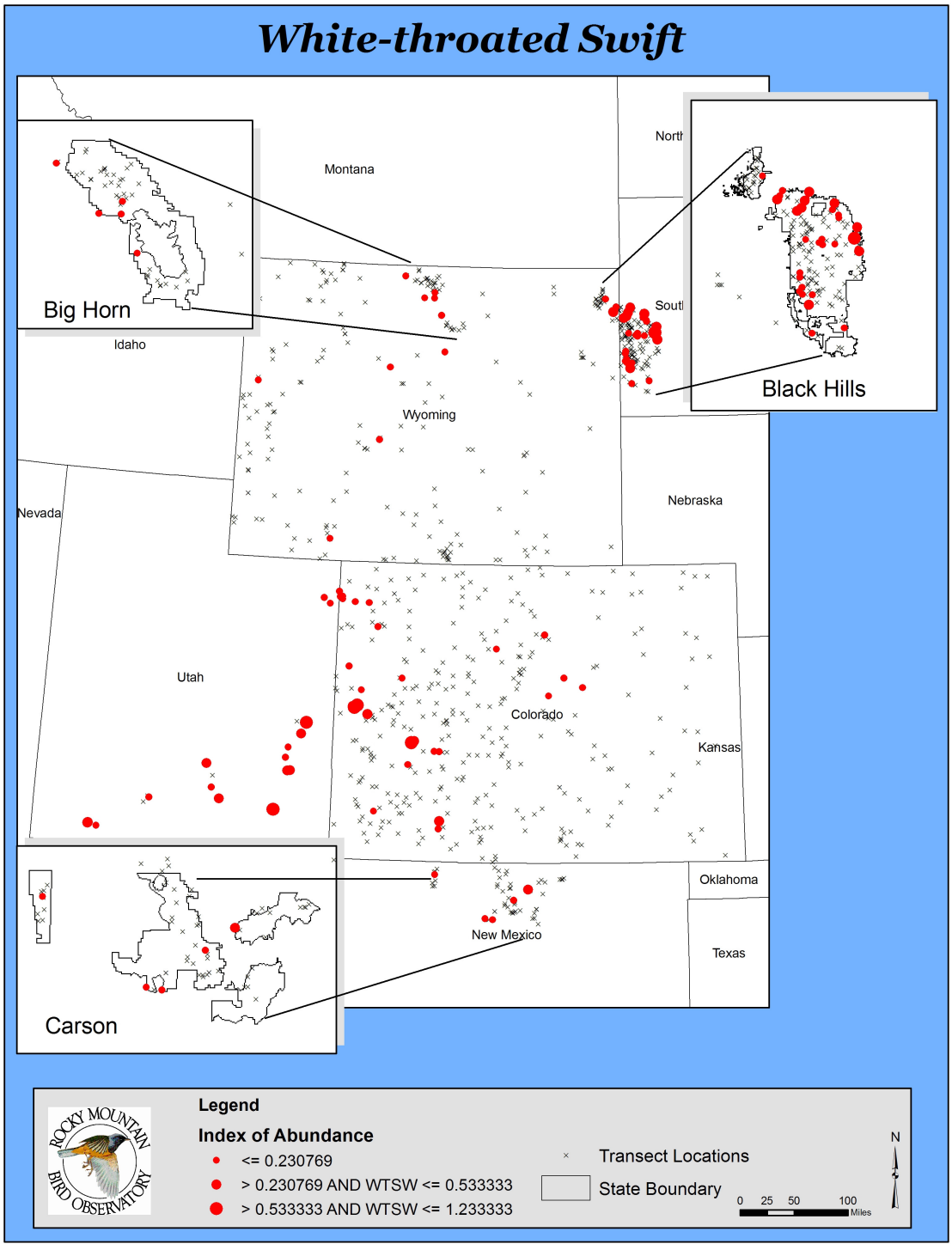
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of White-throated Swift among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – In this region White-throated Swifts typically nest in mountainous areas on cliffs in small colonies of up to a dozen.

We most commonly detect White-throated Swifts in juniper woodland habitat; however, because of its colonial nature and difficult-to-access cliff breeding sites, data from the Wyoming habitat-based point transects will likely not be sufficient to track population trends of White-throated Swift over time. Effective monitoring would require a more intensive and focused effort involving censusing birds at known nesting sites and searching for new nesting sites in potential habitat through a program for special species similar the one in Colorado under MCB.


White-throated Swift
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.230769
> 0.230769 AND WTSW <= 0.533333
> 0.533333 AND WTSW <= 1.233333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Black-chinned Hummingbird
# (*Archilochus alexandri*)

*WY-PIF Level II Priority Species

In 2005, we detected one Black-chinned Hummingbird in juniper woodland habitat on the MWB project. In total, we detected Black-chinned Hummingbird on all RMBO point-count transect monitoring projects except MBBH which is northeast of this species' normal breeding range. We were able to calculate a density estimate for this species only in low-elevation riparian habitat on the NCPN project.

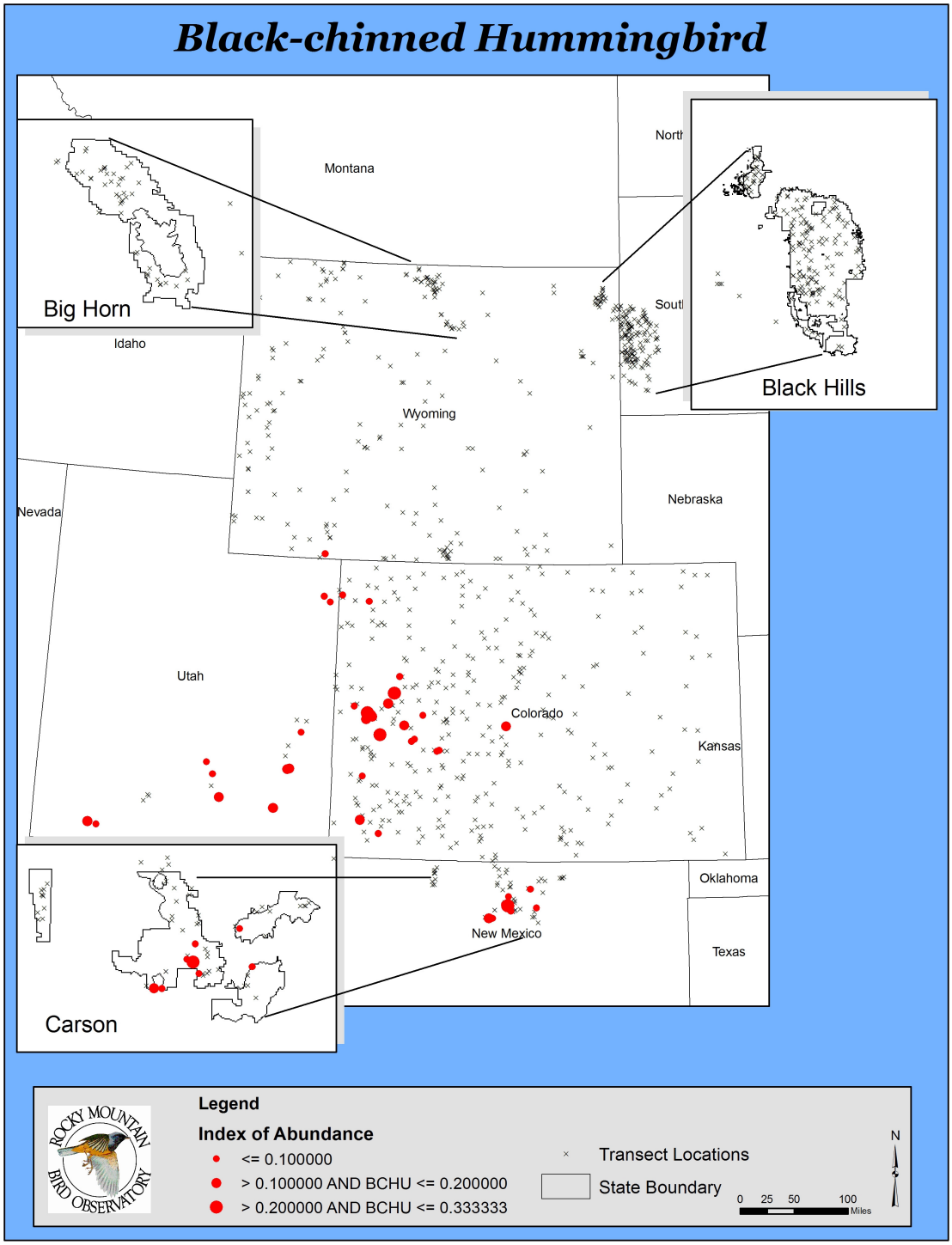
Total number of independent detections, number of individuals, and habitat-specific density estimates for Black-chinned Hummingbird for the MCB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | -- | -- | -- | -- | 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.

***SUMMARY*** – Black-chinned Hummingbird breeds most frequently in pinyon-juniper, but is also found in low- and mid-elevation riparian habitat, Gambel oak shrubland, and in urban areas. This species is currently documented as a peripheral breeder in Wyoming, primarily in the southwestern tip of the state.

This was only our second detection of Black-chinned Hummingbird in the history of the MWB project. Given their limited breeding range in Wyoming, it's unlikely we will be able to effectively monitor this species under the MWB project. Additional transects in juniper woodland habitat may improve our ability to monitor this species.


Black-chinned Hummingbird
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.100000
> 0.100000 AND BCHU <= 0.200000
> 0.200000 AND BCHU <= 0.333333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

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

In 2005, we detected 18 Calliope Hummingbird in two habitats on the MWB project. We did not detect Calliope Hummingbird on any of the other RMBO point-count transect monitoring projects; however, except for western Wyoming the normal breeding range of this species does not fall within our survey area.

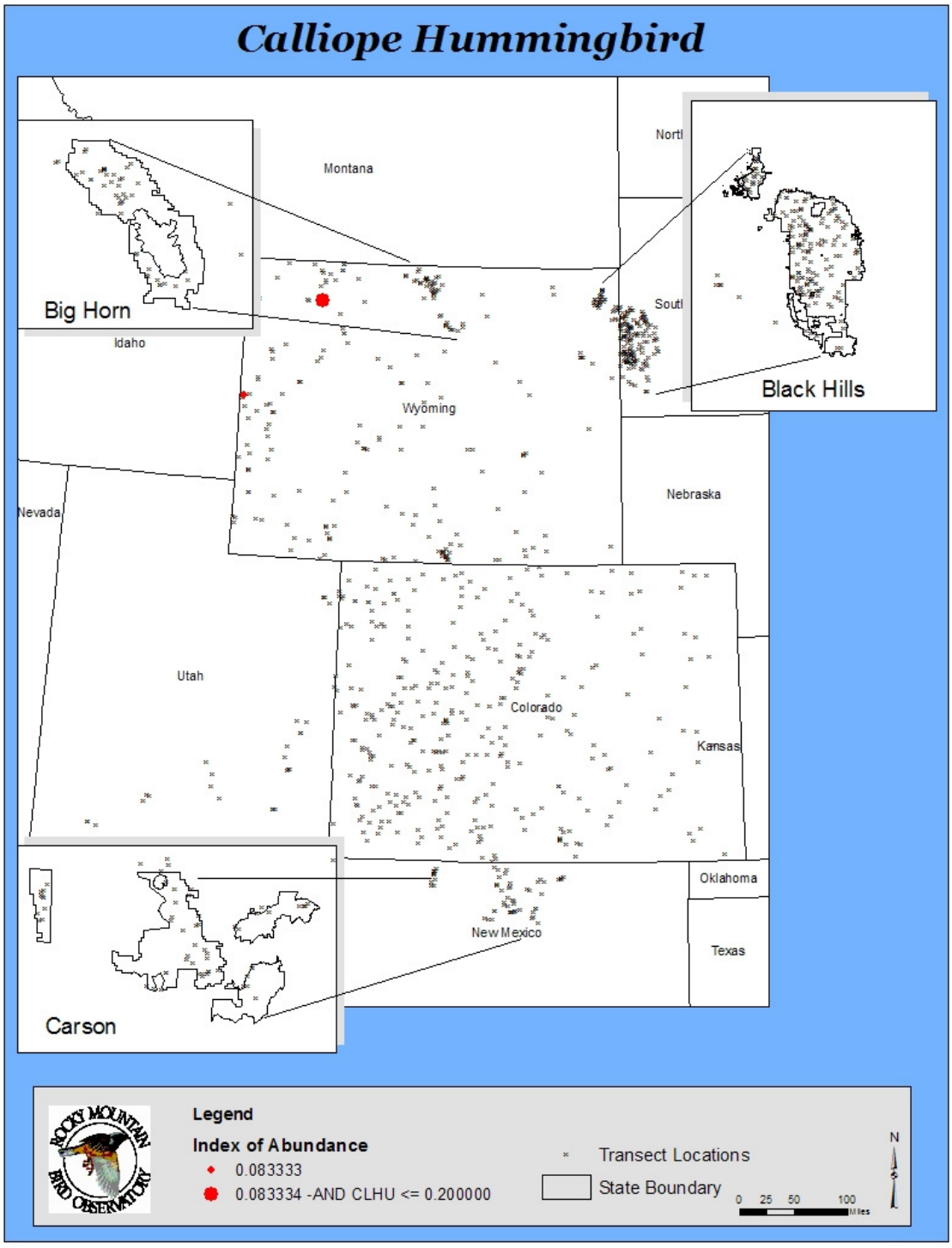
Total number of independent detections, number of individuals, and habitat-specific density estimates for Calliope Hummingbird for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| SH-MR | ID | -- | -- | -- | -- | 3 |
| WY-MC | ID | -- | -- | -- | -- | 2 |
| WY-MR | ID | -- | -- | -- | -- | 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.

***Summary-*** Calliope Hummingbird is found in the northern mountainous areas of Wyoming, although most records are from the western portion of the state. Calliope Hummingbird uses meadows, canyons, riparian aspen stands and willow thickets but prefers coniferous forests near water with a low to intermediate canopy cover.

We had the largest number of detections of Calliope Hummingbird in 2005 and more than any other year combined; however, the number of detections was still too low to effectively monitor this species in any one habitat or across habitats through point transects under MWB. Although, as we continue to add montane riparian transects to reach our target of 30, our ability to monitor this species should improve.


Calliope Hummingbird
Montana
Nortl
Soutl
Big Horn
Black Hills
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
0.083333
0.083334 -AND CLHU <= 0.200000
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Broad-tailed Hummingbird
# (*Selasphorus platycercus*)

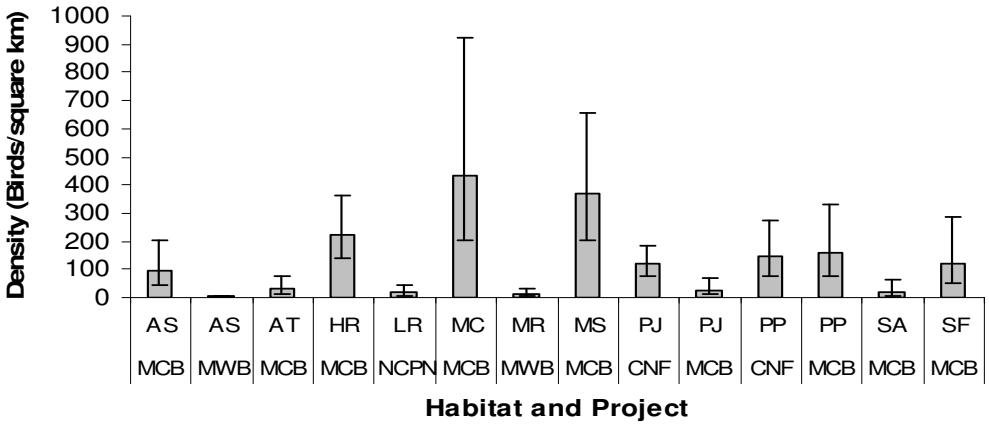
*WY-PIF Level II Priority Species

In 2005, we detected 167 individual Broad-tailed Hummingbirds in eight habitats on the MWB project and we detected this species in sufficient numbers to calculate a density estimate in aspen and montane riparian habitats. Overall, we detected Broad-tailed Hummingbirds on all five of the RMBO point-transect monitoring projects. We were able to calculate a density estimate for this species in at least one habitat on four of the monitoring projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Broad-tailed Hummingbird on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 2 |
| SH-MR | ID | -- | -- | -- | -- | 1 |
| WY-AS | 4.51 | 2.15 | 9.44 | 37% | 25 | 36 |
| WY-GR | ID | -- | -- | -- | -- | 2 |
| WY-JW | ID | -- | -- | -- | -- | 4 |
| WY-MC | ** | -- | -- | -- | 26 | 26 |
| WY-MR | 20.22 | 10.04 | 40.74 | 34% | 60 | 92 |
| WY-SS | ID | -- | -- | -- | -- | 4 |

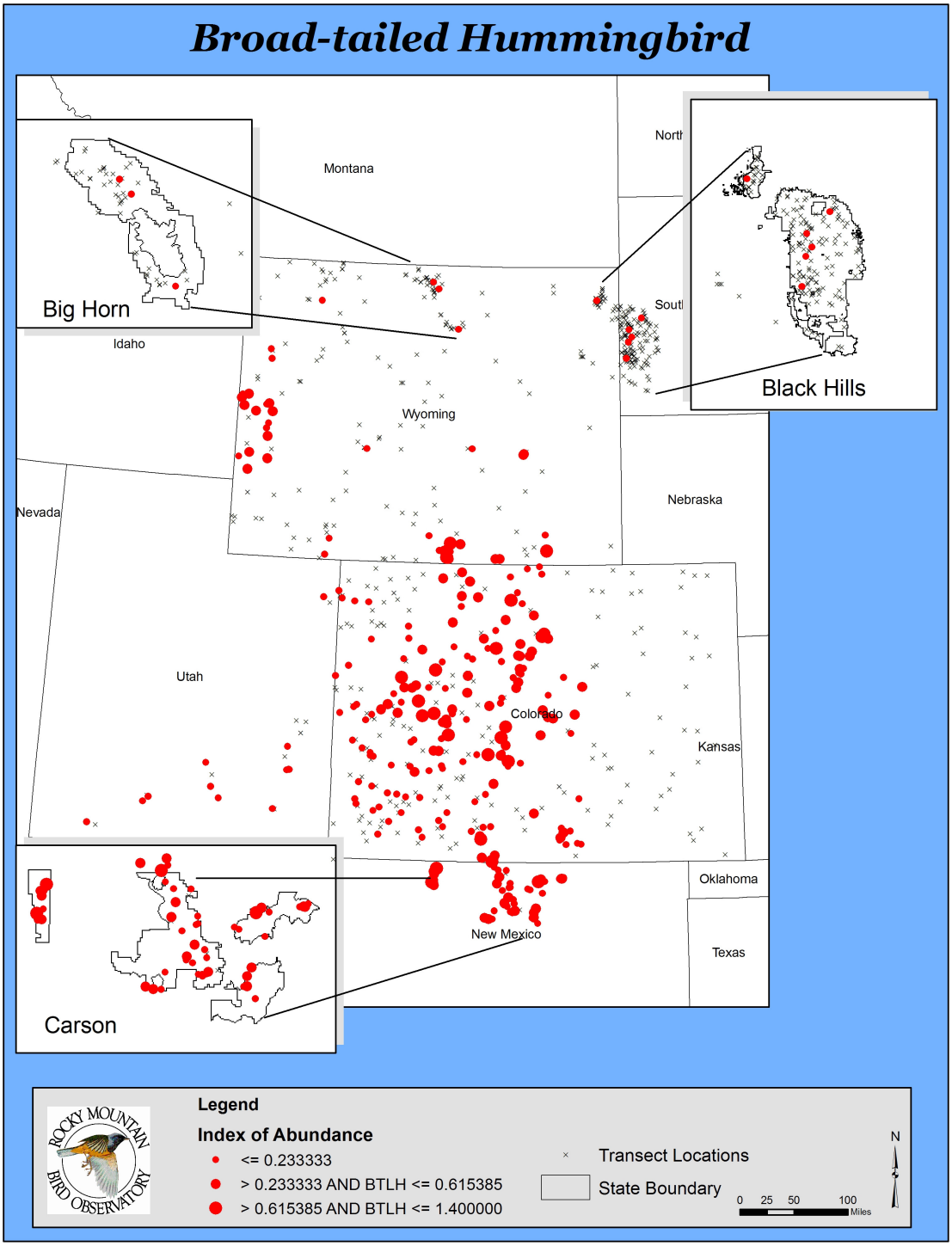
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** = unable to calculate density due to observer error in estimating distance.




Relative density of Broad-tailed Hummingbird among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Broad-tailed Hummingbirds inhabit a variety of forest types, near wet meadows and riparian features. They are found in most mountainous areas of Wyoming, although the state is on the northern limit of its breeding range.

We detected Broad-tailed Hummingbirds in sufficient numbers in aspen and montane riparian habitats to effectively monitor this species through point-transects under MWB.


Broad-tailed Hummingbird
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.233333
> 0.233333 AND BTLH <= 0.615385
> 0.615385 AND BTLH <= 1.400000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Rufous Hummingbird
## *(Selasphorus rufus)*

*WY-PIF Level II Priority Species

In 2005, we detected 16 Rufous Hummingbirds in three habitats on the MWB project. We also detected this species on the MCB and MBCNF forests in 2005; however, these were most likely migrating birds as the breeding range of this species is northwest of our survey area except for the northwestern corner of Wyoming. We did not detect Rufous Hummingbird in sufficient numbers to calculate a density estimate for this species on any project.

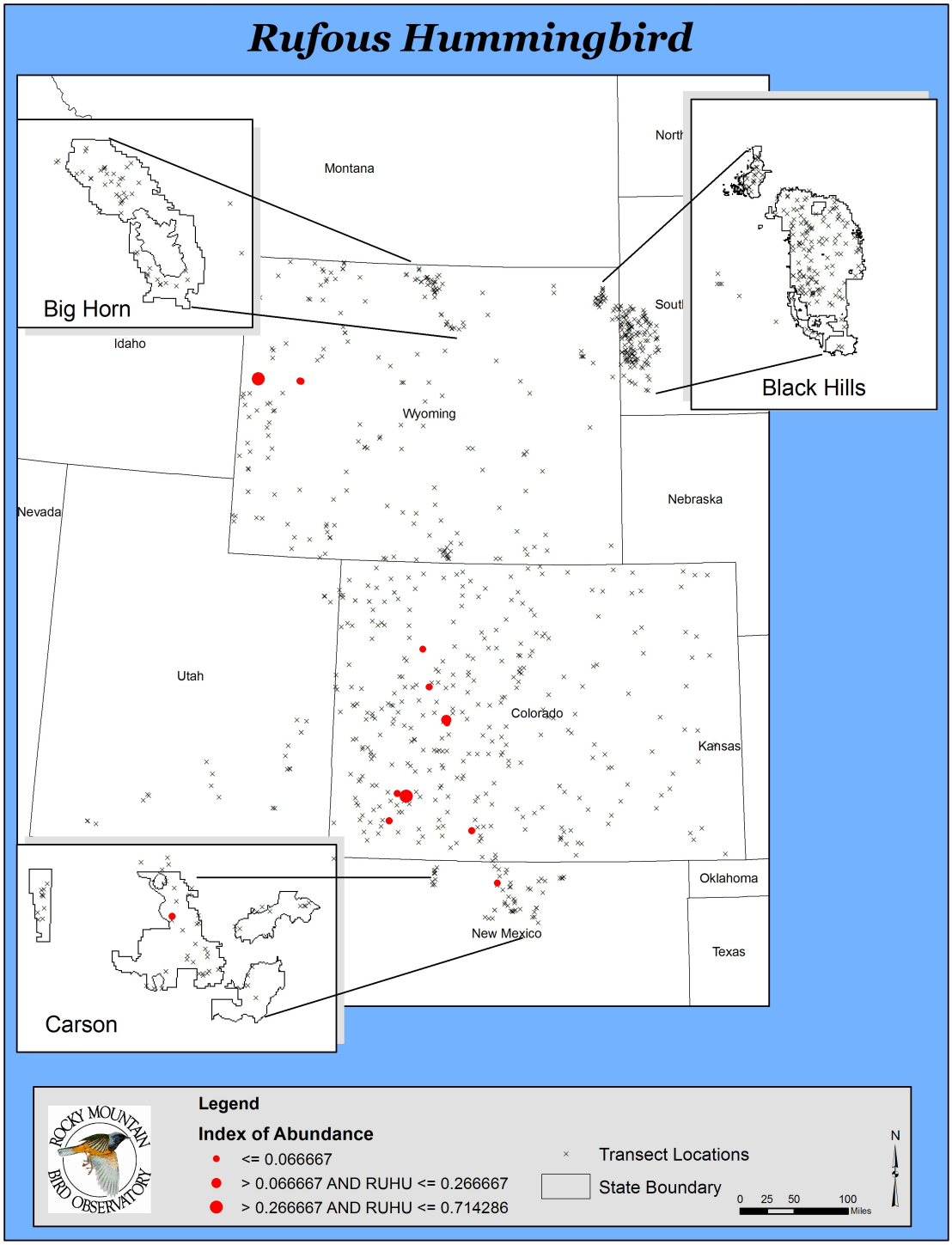
Total number of independent detections, number of individuals, and habitat-specific density estimates for Rufous Hummingbird for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 10 |
| WY-MC | ID | -- | -- | -- | -- | 1 |
| WY-MR | ID | -- | -- | -- | -- | 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.

**Summary-** Rufous Hummingbird breeds in mixed forests with lodgepole pine, Douglas-fir, blue spruce and aspen, and in riparian areas within the forest. It is known to breed only in the northwestern corner of Wyoming.

Due to its limited breeding range in Wyoming, it's unlikely we will be able to effectively monitor Rufous Hummingbird through point transects under MWB. In 2005, we did have our largest number of detections but it was still not sufficient to monitor this species in any one habitat or across habitats. Adding transects, especially in northwestern Wyoming, may improve our ability to monitor this species.


Rufous Hummingbird
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.066667
> 0.066667 AND RUHU <= 0.266667
> 0.266667 AND RUHU <= 0.714286
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Lewis's Woodpecker
## (*Melanerpes lewis*)

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

In 2005, we detected one individual Lewis's Woodpeckers on an Aspen transect on the MWB project. We also detected Lewis's Woodpeckers on the MBBH and MCB projects. We did not detect Woodpecker in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

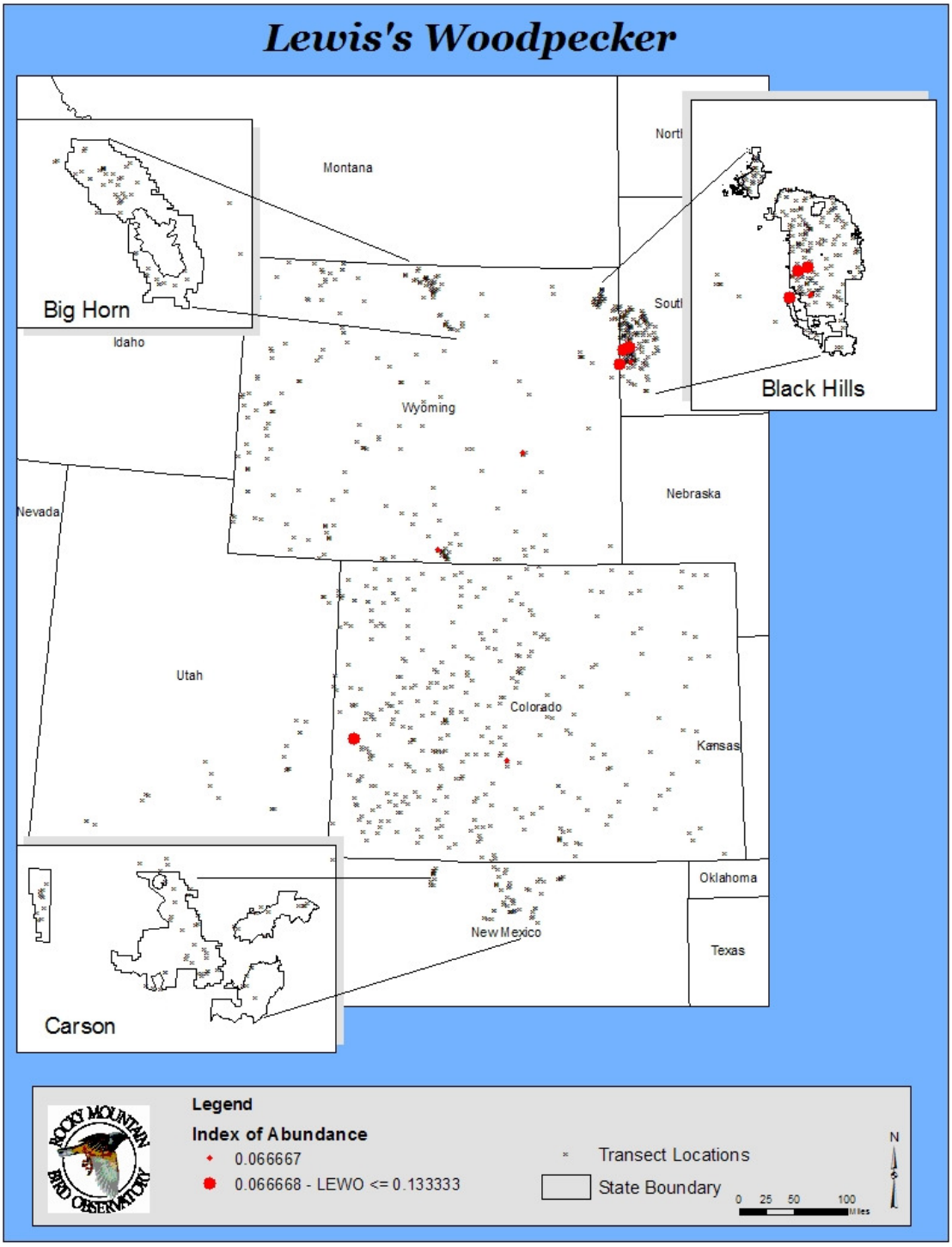
Total number of detections, number of individuals, and habitat-specific density estimates for Lewis's Woodpecker on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 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.

***Summary*** – Lewis's Woodpecker inhabits a variety of open country with scattered trees throughout Wyoming, including burned areas, but it appears to prefer open ponderosa pine forests for breeding.

This was the first year we detected Lewis's Woodpecker on point-transects in Wyoming. Due to its rare and localized nature, it is unlikely we will be able to adequately monitor this species with the current level of effort under MWB. Effective monitoring would require a more intensive and focused effort and possibly adding transects within areas of potential habitat, like including low-elevation conifer to the list of habitats surveyed.


Lewis's Woodpecker
Montana
Nortl
Big Horn
Idaho
Soutl
Black Hills
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
0.066667
0.066668 - LEWO <= 0.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N

# Red-headed Woodpecker
# (*Melanerpes erythrocephalus*)

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

In 2005, we detected six Red-headed Woodpeckers in aspen habitat on the MWB project. We also detected Red-headed Woodpeckers on the MBBH and MCB projects although in our survey area the normal breeding range of this species extends only into eastern Wyoming and Colorado. Detections of the species were sufficient to calculate density in burned areas on the MBBH project.

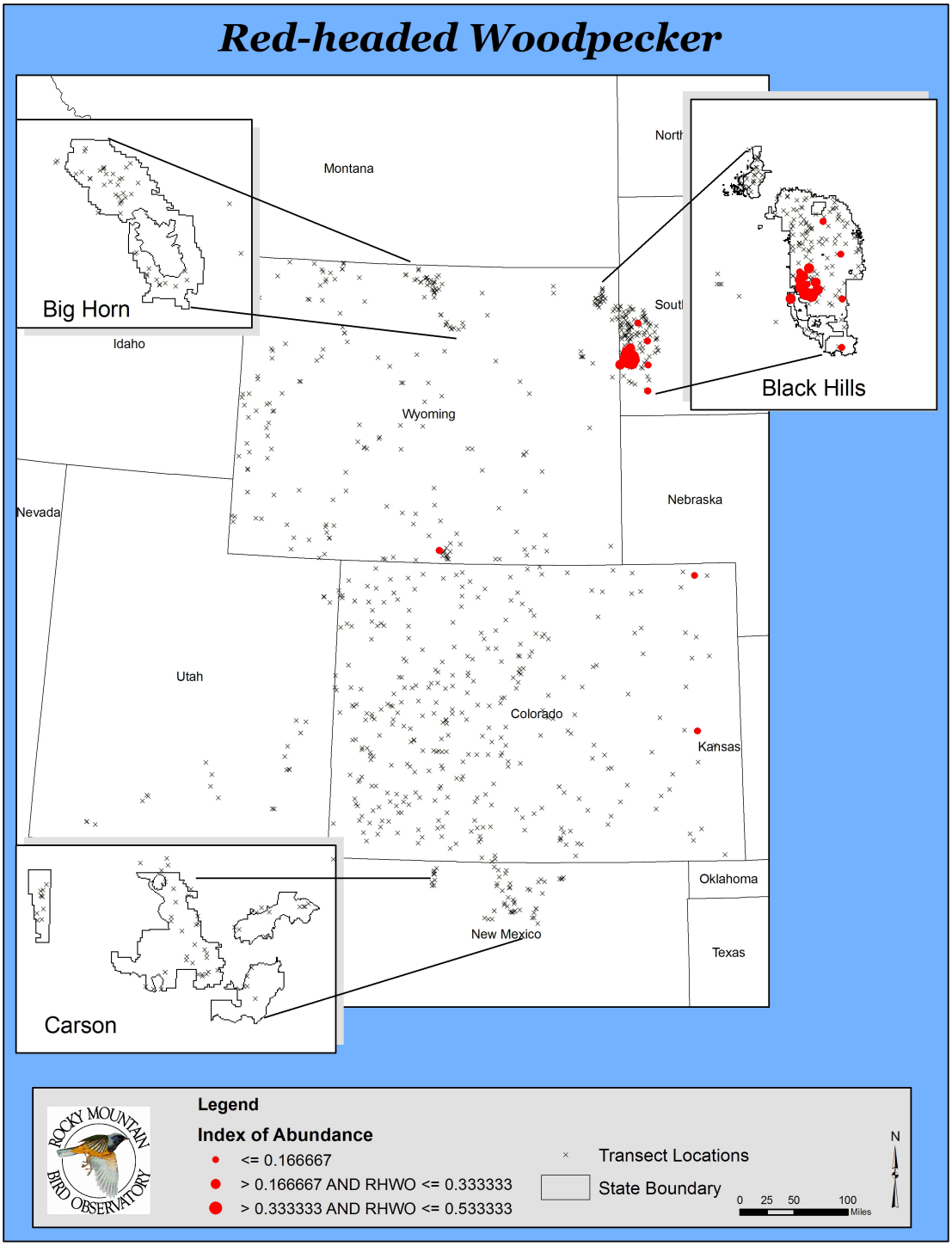
Total number of independent detections, number of individuals, and habitat-specific density estimates for Red-headed Woodpecker for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 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.

***Summary-*** Red-headed Woodpeckers prefer open, park-like woodlands, including open ponderosa pine savannah, but are most prevalent along major rivers within the forested areas. They are found throughout Wyoming but primarily breed in the eastern and north-central parts of the state.

This was the first year we detected Red-headed Woodpeckers on point transects uner the MWB project. Adding low-elevation riparian transects, especially along the eastern North Platte would likely yield better information on Red-headed Woodpeckers.


Red-headed Woodpecker
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.166667
> 0.166667 AND RHWO <= 0.333333
> 0.333333 AND RHWO <= 0.533333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Williamson's Sapsucker
# (*Sphyrapicus thyroideus*)

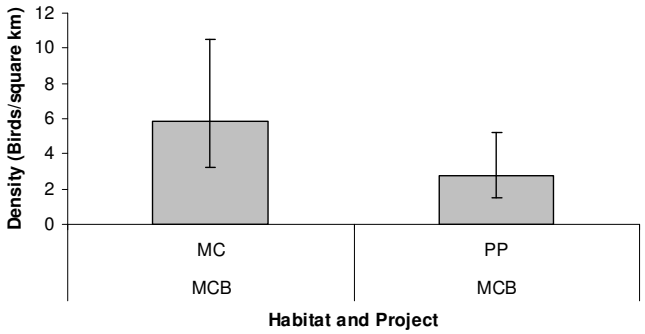
*WY-PIF Level II Priority Species
*USFWS Bird of Conservation Concern

In 2005, we detected 13 Williamson's Sapsuckers in five habitats on the MWB project. We detected Williamson's Sapsucker on all of the other RMBO point-transect projects except MBBH, which is west of its normal breeding range. We were able to calculate a density estimate for Williamson's Sapsucker in two habitats on the MCB project.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Williamson's Sapsucker for the MWB monitoring project, 2005.

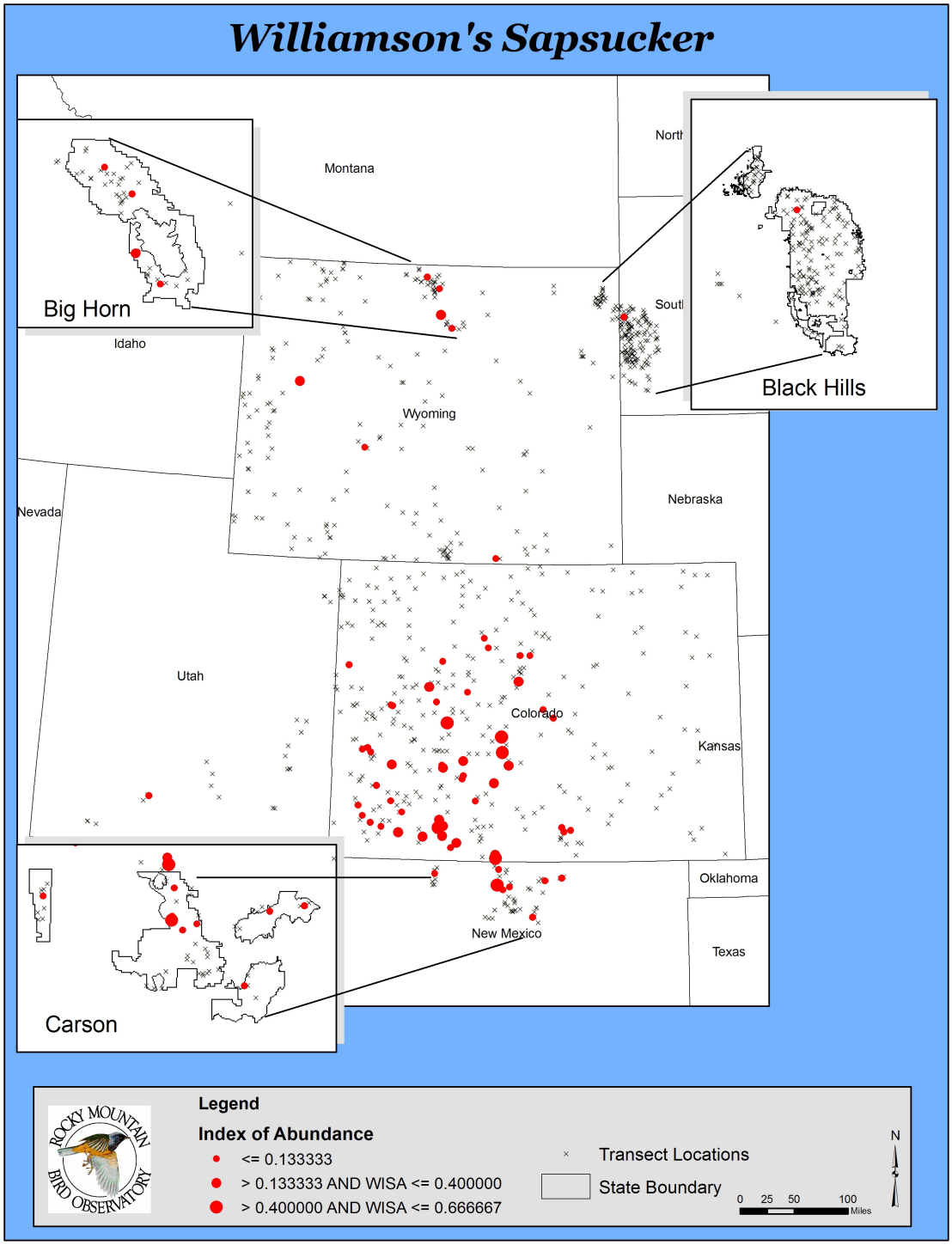
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 1 |
| BI-MC | ID | -- | -- | -- | -- | 4 |
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 1 |
| WY-MR | ID | -- | -- | -- | -- | 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.




Relative density of Williamson's Sapsucker between habitats on the MCB monitoring project, 2005.

***Summary-*** Williamson's Sapsucker prefers mixed coniferous forests and aspen stands, especially if they have burned recently, in mountainous areas of Wyoming. In 2005, we had more detections of Williamson's Sapsuckers in the Bighorn National Forest than on statewide transects. However, detections of Williamson's Sapsuckers have always been too low to effectively monitor this species through point-transects in one habitat or across habitats under MWB. Although given interest, with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.


Williamson's Sapsucker
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.133333
> 0.133333 AND WISA <= 0.400000
> 0.400000 AND WISA <= 0.666667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Red-naped Sapsucker
# (*Sphyrapicus nuchalis*)

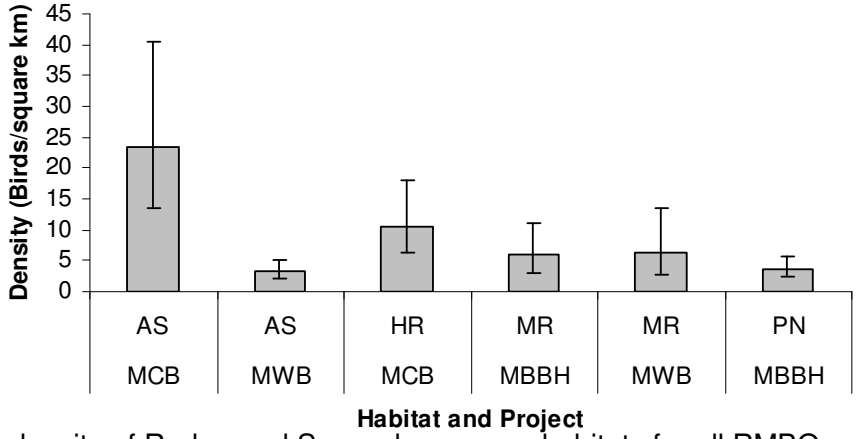
*WY-PIF Level II Priority Species
*USFWS Bird of Conservation Concern

In 2005, we detected 130 individual Red-naped Sapsuckers in nine habitats on MWB and we were able to calculate a density estimate for this species in aspen and montane riparian habitats. Overall, we detected Red-naped Sapsuckers on all of the RMBO point-transect monitoring projects except the NCPN project. We detected Red-naped Sapsucker in sufficient numbers to calculate a density estimate in at least one habitat on MBBH, MCB, and MWB.

Total number of detections, number of individuals, and habitat-specific density estimates for Red-naped Sapsucker on the MWB monitoring project, 2005.

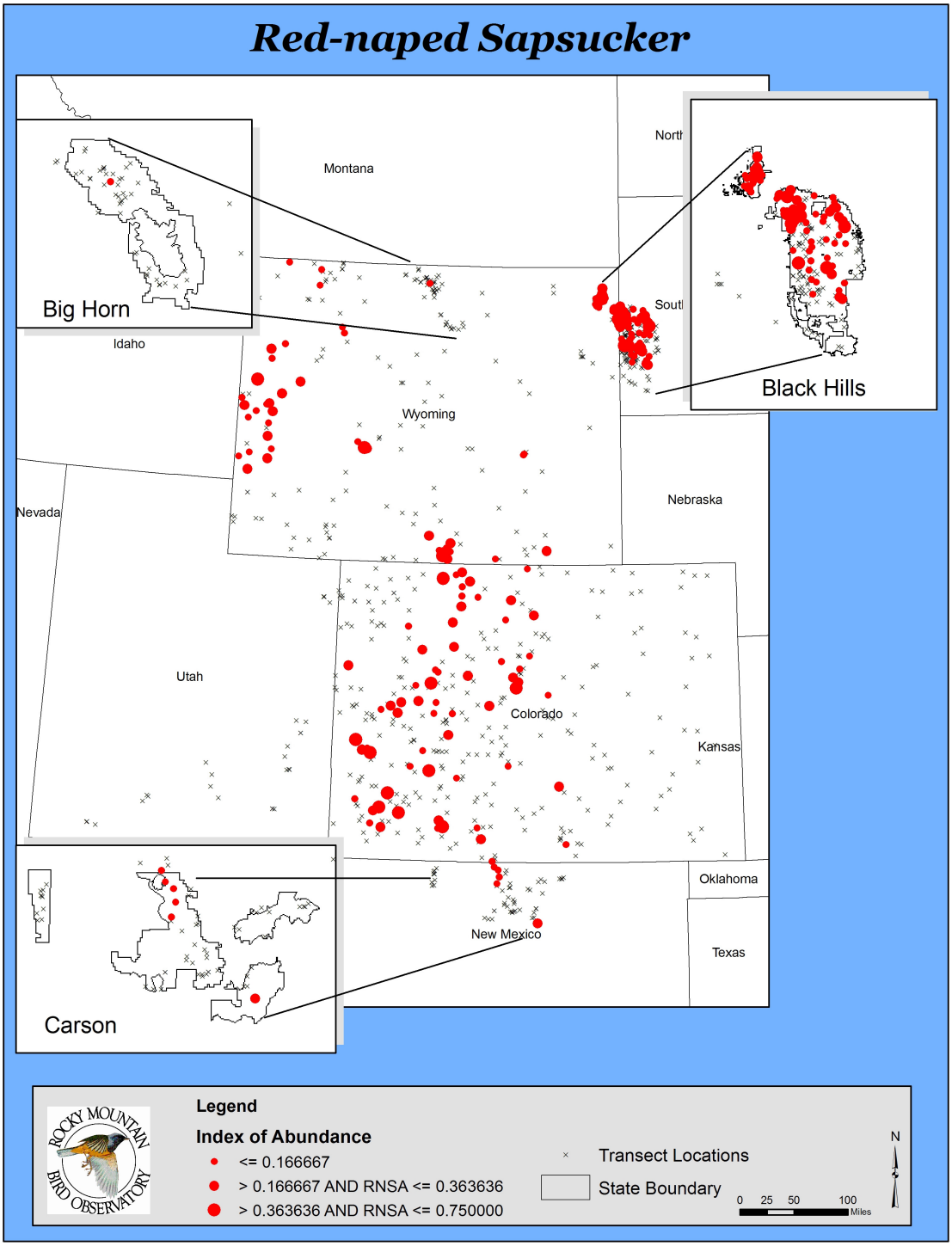
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 1 |
| SH-MC | ID | -- | -- | -- | -- | *4* |
| SH-MG | ID | -- | -- | -- | -- | 1 |
| SH-MR | ID | -- | -- | -- | -- | 3 |
| WY-AS | 3.26 | 2.03 | 5.22 | 24% | 42 | 57 |
| WY-GR | ID | -- | -- | -- | -- | 1 |
| WY-MC | ID | -- | -- | -- | -- | 18 |
| WY-MR | 2.85 | 1.37 | 5.93 | 37% | 30 | 48 |
| WY-SS | ID | -- | -- | -- | -- | 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.




Relative density of Red-naped Sapsucker among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Red-naped Sapsucker inhabits open and park-like woodlands, especially along major rivers. In our survey area, this species is most abundant in aspen and riparian habitat. Red-naped Sapsucker should be effectively monitored under MWB by point transects in a range of habitats, especially aspen and montane riparian.


Red-naped Sapsucker
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.166667
> 0.166667 AND RNSA <= 0.363636
> 0.363636 AND RNSA <= 0.750000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# American Three-toed Woodpecker
## *(Picoides tridactylus)*

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

In 2005, we detected 59 American Three-toad Woodpeckers in five habitats on the MWB project. Overall, we detected this species on all RMBO point-transect monitoring projects in 2005, except the NCPN project. Detections of American Three-toed Woodpeckers were sufficient only in white spruce habitat on the MBBH project to calculate a density estimate.

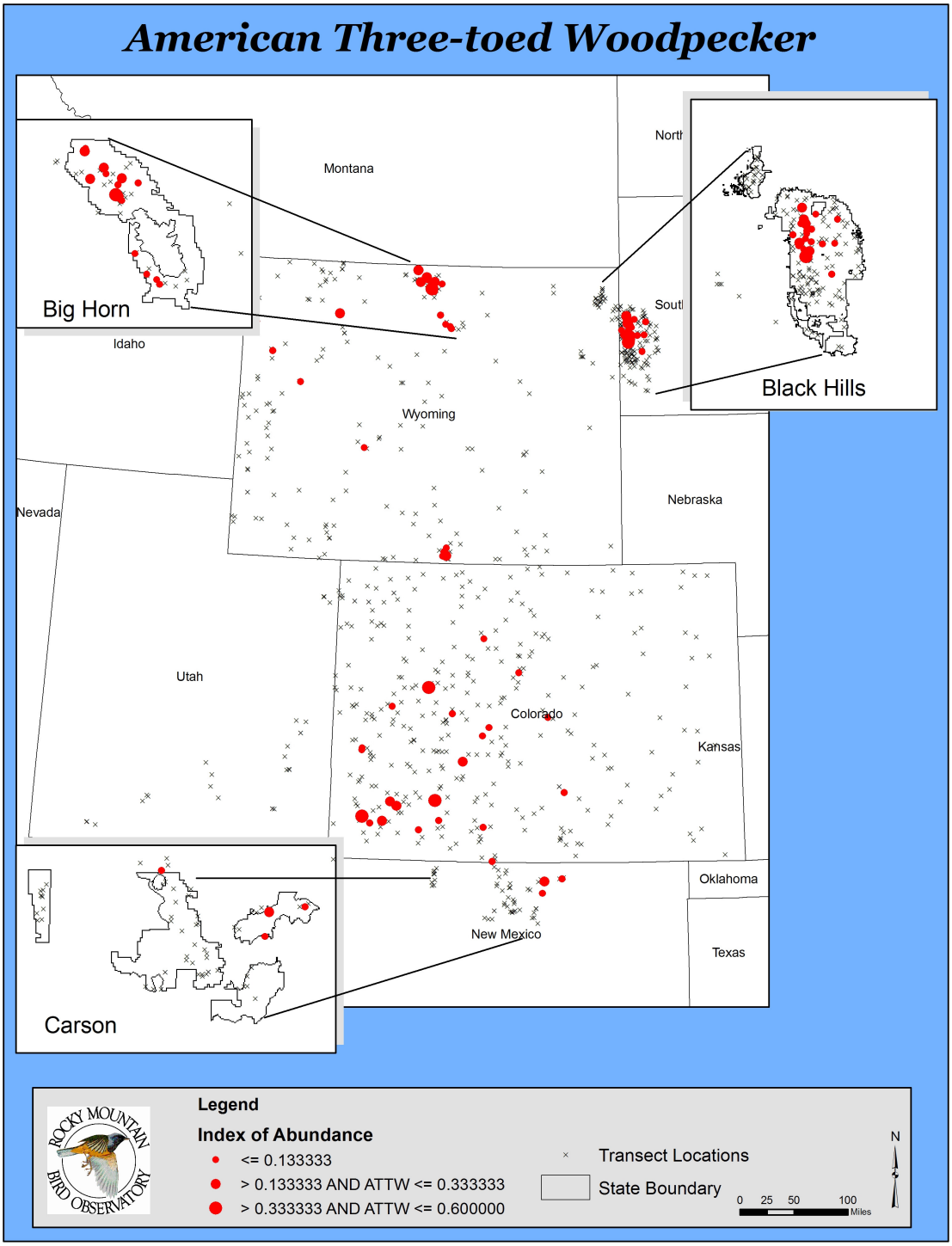
Total number of independent detections, number of individuals, and habitat-specific density estimates for American Three-toed Woodpecker for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 21 |
| BI-MC | ID | -- | -- | -- | -- | 12 |
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 7 |
| SH-MC | ID | -- | -- | -- | -- | *3* |
| WY-AS | ID | -- | -- | -- | -- | 9 |
| WY-MC | ID | -- | -- | -- | -- | 6 |
| WY-MR | ID | -- | -- | -- | -- | 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.

***Summary-*** American Three-toed Woodpecker prefers burned mixed conifer forests of lodgepole pine, Douglas-fir, blue spruce and Englemann spruce-subalpine fir.

For all habitats combined, we have consistently detected more American Three-toed Woodpeckers each year on the Bighorn National Forest transects than on the statewide transects. We detect this species too infrequently to effectively monitor this species in any one habitat under MWB; however, given interest we may be able to monitor their status in Wyoming using data from the full range of habitats in the MWB project.


American Three-toed Woodpecker
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.133333
> 0.133333 AND ATTW <= 0.333333
> 0.333333 AND ATTW <= 0.600000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Olive-sided Flycatcher
# (*Contopus cooperi*)

*WY-PIF Level II Priority Species

In 2005, we detected 55 Olive-sided Flycatchers in four habitats on the MWB project. Overall, we detected Olive-sided Flycatchers on all five RMBO point-count transect monitoring projects. We did not detect this species in sufficient numbers, however, to provide a density estimate for any habitat on any project.

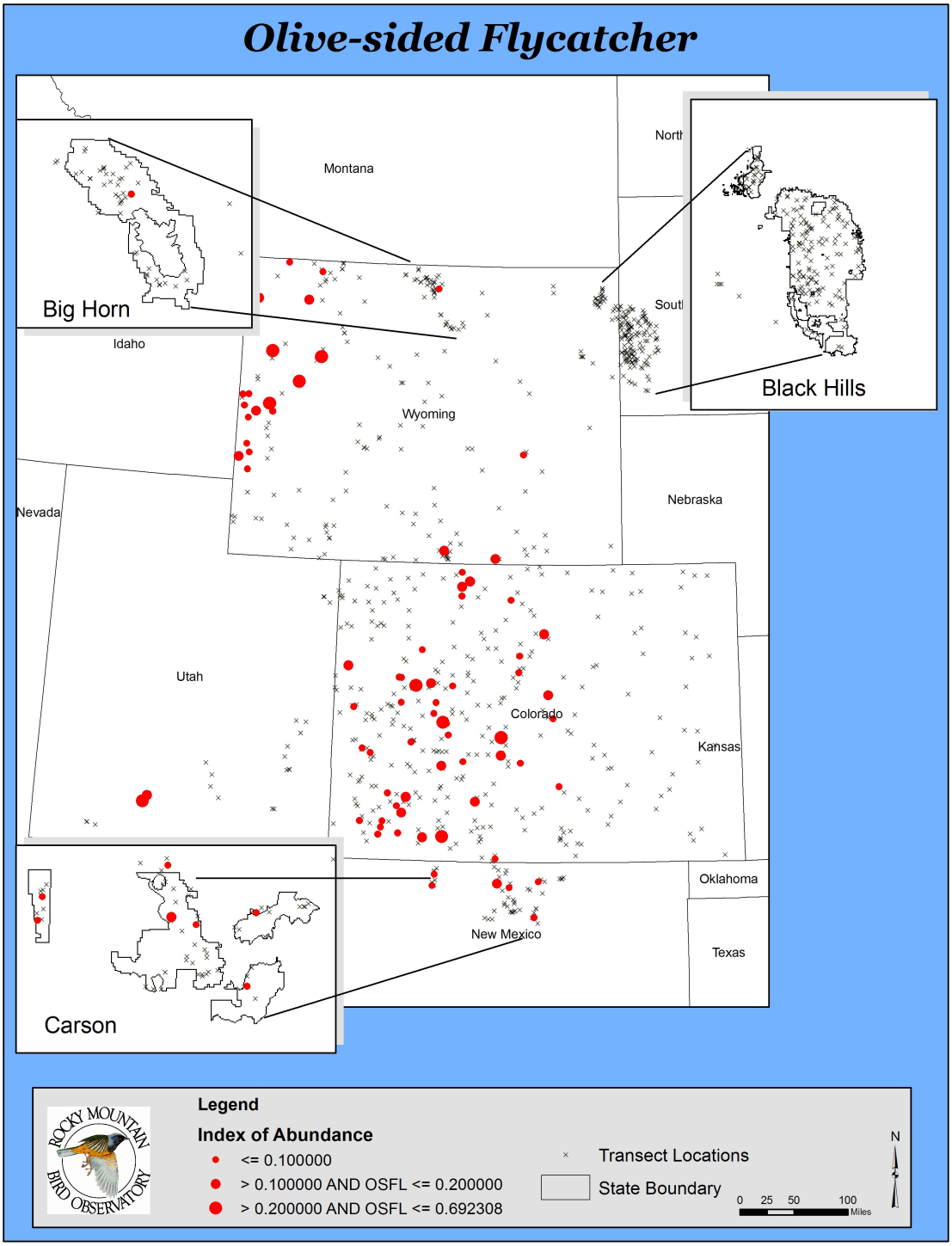
Total number of independent detections, number of individuals, and habitat-specific density estimates for Olive-sided Flycatcher for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 1 |
| SH-MC | ID | -- | -- | -- | -- | *8* |
| SH-MG | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 3 |
| WY-MC | ID | ** | -- | -- | 27 | 27 |
| WY-MR | ID | -- | -- | -- | -- | 23 |

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; ** - unable to calculate density due to observer error in estimating distance.

***Summary-*** Olive-sided Flycatcher is found in mature coniferous, riparian and aspen forests from 2,500 m to timberline throughout central and western Wyoming. It is dependent on burned areas and is often found near forest openings and edges near water.

Detections of Olive-sided Flycatchers are usually too few to monitor this species in any one habitat through point-transects under MWB except potentially mid-elevation conifer; however, we should be able to loosely track the status of this species over time using data from all habitats.


Olive-sided Flycatcher
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Legend
Index of Abundance
<= 0.100000
> 0.100000 AND OSFL <= 0.200000
> 0.200000 AND OSFL <= 0.692308
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Willow Flycatcher
# (*Empidonax traillii*)

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

In 2005, we detected 29 individual Willow Flycatchers in montane riparian habitat on MWB. We also detected Willow Flycatchers in 2005 on the MCB and NCPN projects. We did not detect Willow Flycatcher in sufficient numbers to calculate a density estimate for this species in any habitat on any monitoring project.

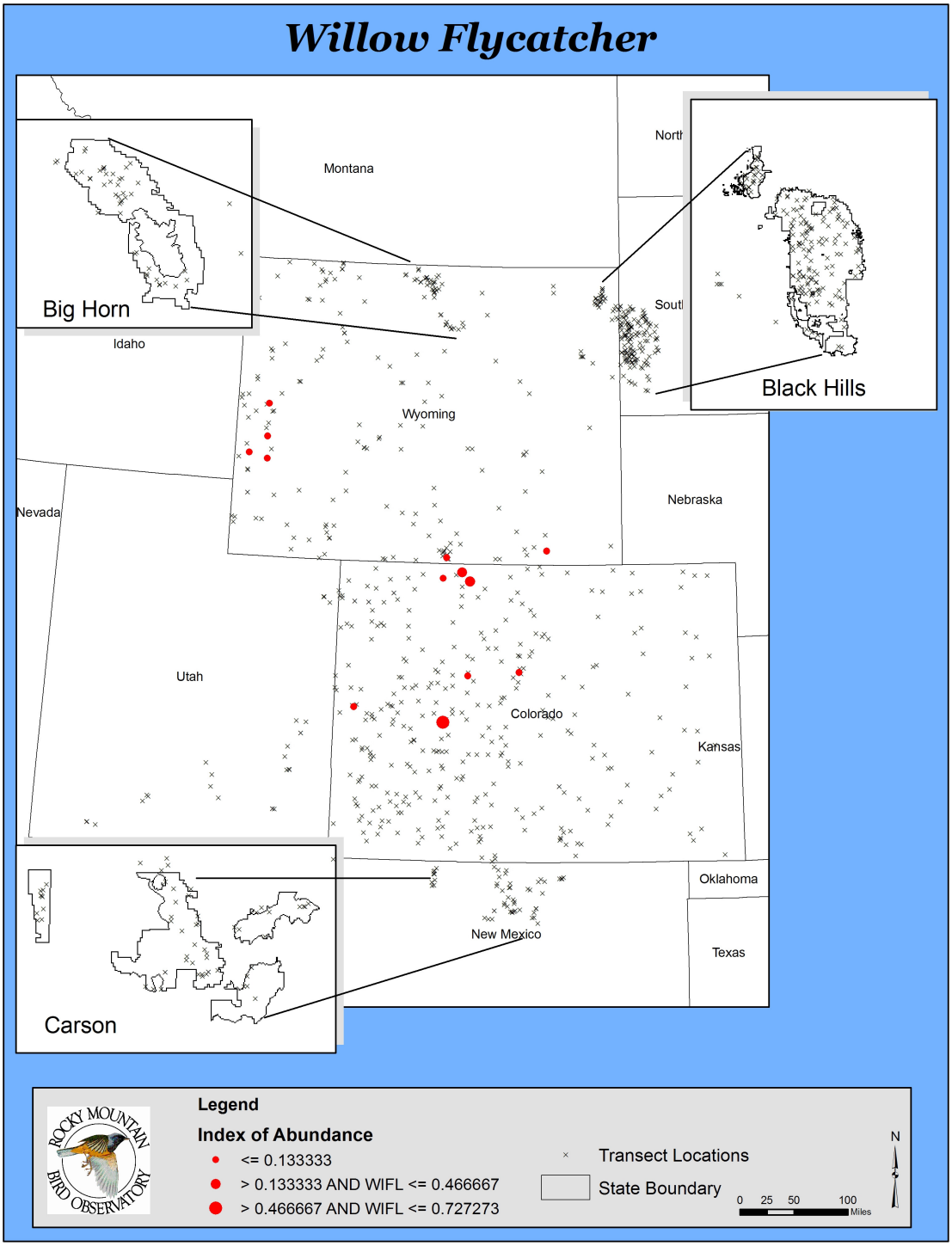
Total number of detections, number of individuals, and habitat-specific density estimates for Willow Flycatcher on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-MR | ** | -- | -- | -- | 27 | 29 |

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; ** - unable to calculate density due to observer error in estimating distance.

***Summary*** – Willow Flycatcher is a riparian obligate that uses willow or alder thickets along river bottoms, especially bordered by open stands of cottonwood. This species has been negatively impacted by degredation of riparian habitat for agricultural and other uses.

The number of detections of Willow Flycatcher has steadily increased each year since the inception of the MWB project as we have continued to establish and survey more transects in montane riparian habitat. This year due one observer's error estimating distances, we were unable to calculate a density estimate. In future years, especially if we are able to establish additional montane riparian transects, we should be able to detect this species in sufficient numbers to effectively monitor its population through point-transects under MWB in this habitat.


Willow Flycatcher
Montana
North
South
Wyoming
Idaho
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.133333
> 0.133333 AND WIFL <= 0.466667
> 0.466667 AND WIFL <= 0.727273
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Hammond's Flycatcher
# (*Empidonax hammondii*)

*WY-PIF Level II Priority Species

In 2005, we detected 100 individual Hammond's Flycatchers in eight habitats on MWB and we were able to calculate a density for this species in mid-elevation conifer habitat on statewide transects. We also detected Hammond's Flycatcher on the MBBH and MCB projects in 2005. Interestingly, Hammond's Flycatcher is not previously known to breed in the region of the MBBH project and in 2005 we recorded 6 individuals in riparian habitat. Detections of this species were too few to calculate a density estimate for this species in any habitat on any other project.

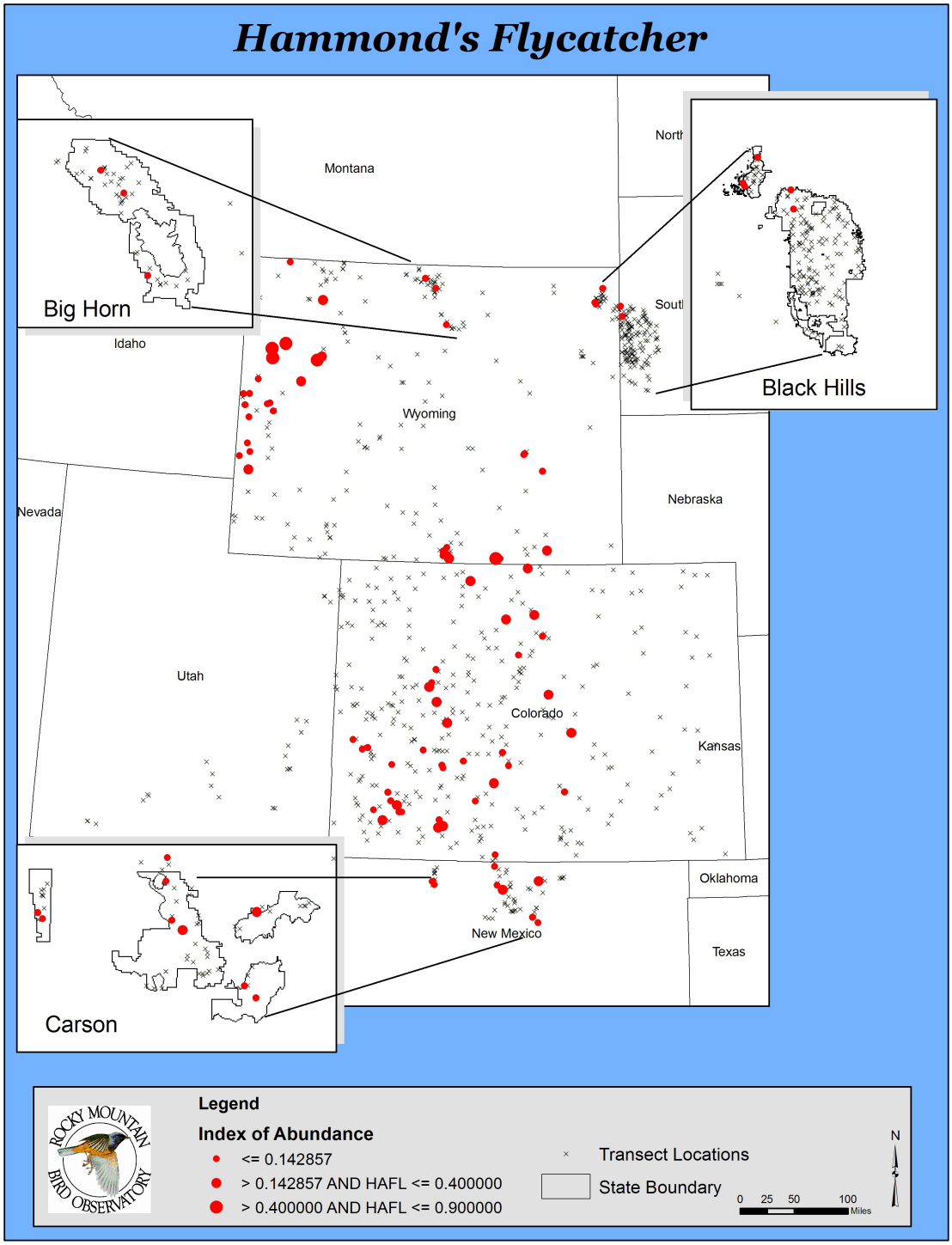
Total number of detections, number of individuals, and habitat-specific density estimates for Hammond's Flycatcher on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 1 |
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| SH-MC | ID | -- | -- | -- | -- | *6* |
| SH-MR | ID | -- | -- | -- | -- | 5 |
| WY-AS | ID | -- | -- | -- | -- | 23 |
| WY-MC | 25.95 | 8.18 | 82.32 | 62.4 | 28 | 47 |
| WY-MR | ID | -- | -- | -- | -- | 22 |

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.

***Summary*** – Hammond's Flycatchers typically nest in high-elevation, tall, moist, closed-canopy coniferous forests. Although superficially similar to Dusky Flycatcher, the two species differ in habitat, structure and voice. Because of the similarity of this species to the more common and widespread Dusky Flycatcher, RMBO will heavily emphasize identification of these two species in future training sessions.

In RMBO's entire point-transect survey area, Hammond's Flycatcher is most abundant in Wyoming. Hammond's Flycatcher should be effectively monitored through point-transects under MWB in a variety of habitats, especially mid-elevation conifer and aspen. This was the second year we have had enough detections to calculate a density estimate for this species in mid-elevation conifer habitat, and in 2004, we also had enough detections to calculate a density estimate for this species in aspen.


Hammond's Flycatcher
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.142857
> 0.142857 AND HAFL <= 0.400000
> 0.400000 AND HAFL <= 0.900000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Gray Flycatcher
## *(Empidonax wrightii)*

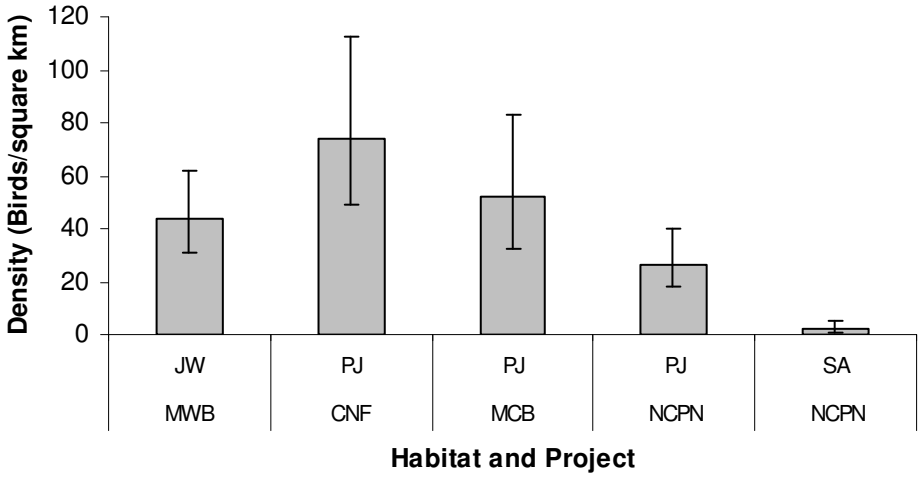
*WY-PIF Level II Priority Species

In 2005, we detected 165 Gray Flycatchers in two habitats on the MWB project. Overall, we detected Gray Flycatcher on all RMBO monitoring projects in 2005, except MBBH which is northeast of this species' normal breeding range. We detected this species in sufficient numbers to calculate a density estimate on four projects in pinyon-juniper (juniper woodland) habitat.

Total number of detections, number of individuals, and habitat-specific density estimates for Gray Flycatcher on the MWB monitoring project, 2005.

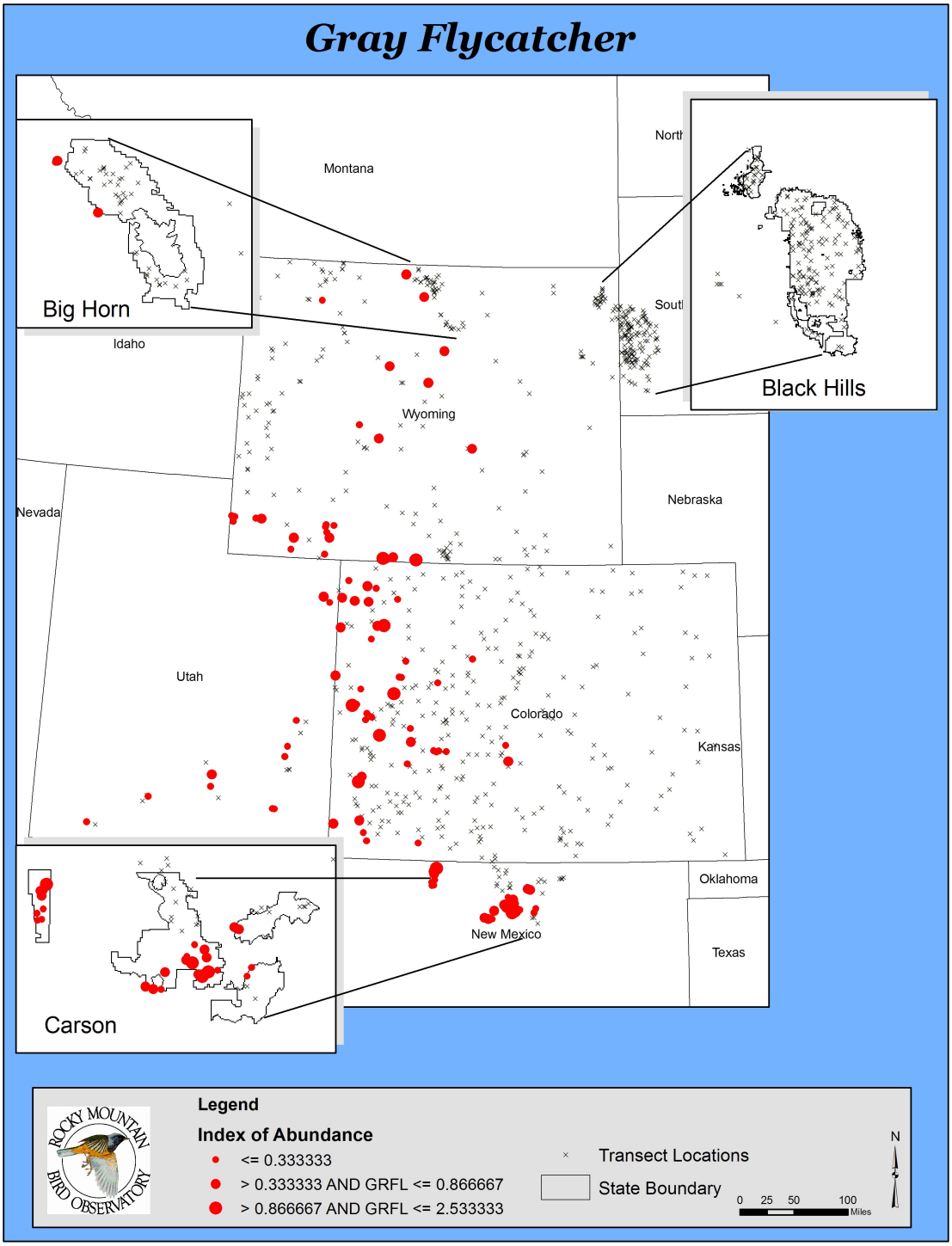
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| SH-MR | ID | -- | -- | -- | -- | 1 |
| WY-JW | 43.48 | 30.69 | 61.61 | 17.2% | 134 | 164 |

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.




Relative density of Gray Flycatcher among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary-*** Gray Flycatcher is found in juniper woodland and adjacent sagebrush habitat across central and southwestern Wyoming. Gray Flycatcher should be effectively monitored under MWB through point-transects in juniper woodland habitat.


Gray Flycatcher
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.333333
> 0.333333 AND GRFL <= 0.866667
> 0.866667 AND GRFL <= 2.533333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Dusky Flycatcher
# (*Empidonax oberholseri)*

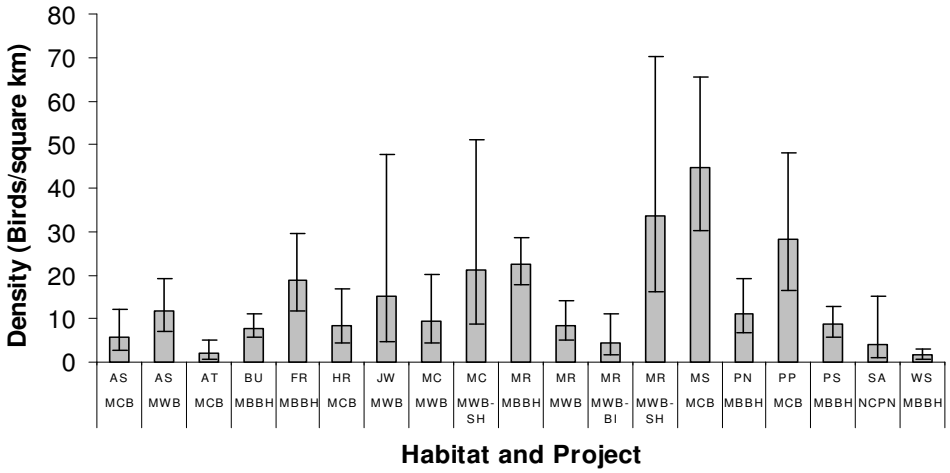
*WY-PIF Level II Priority Species

In 2005, we detected 380 Dusky Flycatchers in six habitats on the MWB project. Overall, we detected this species on all of the RMBO point-count transect monitoring projects this summer and calculated density estimates in at least one habitat for all projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Dusky Flycatcher on the MWB monitoring project, 2005.

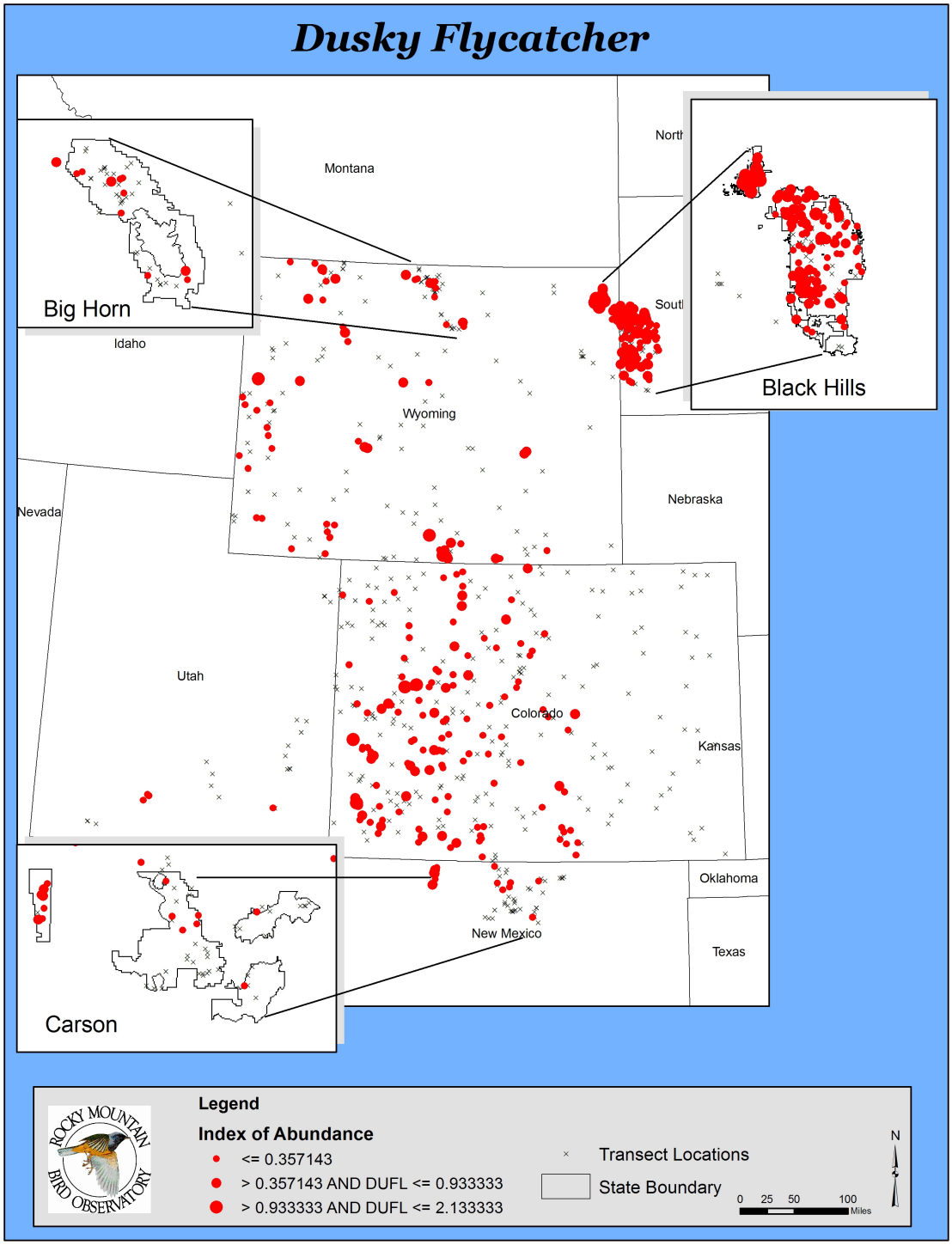
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MC | ID | -- | -- | -- | -- | 3 |
| BI-MR | 4.26 | 1.63 | 11.16 | 47.9% | 28 | 27 |
| BI-SS | ID | -- | -- | -- | -- | 4 |
| SH-MC | 21.33 | 8.89 | 51.17 | 43.3% | 28 | *30* |
| SH-MG | ID | -- | -- | -- | -- | 14 |
| SH-MR | 33.73 | 16.23 | 70.11 | 33.3% | 33 | 33 |
| WY-AS | 11.76 | 7.22 | 19.14 | 24.0% | 115 | 127 |
| WY-GR | ID | -- | -- | -- | -- | 3 |
| WY-JW | 15.21 | 4.86 | 47.62 | 60.5% | 31 | 43 |
| WY-MC | 9.3 | 4.27 | 20.25 | 39.8% | 37 | 41 |
| WY-MR | 8.50 | 5.18 | 13.96 | 24.5% | 73 | 79 |
| WY-SS | ID | -- | -- | -- | -- | 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.




Relative density of Dusky Flycatcher among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Dusky Flycatcher uses a wide range of open woodland and shrub habitat, including ponderosa pine savannah, pine-juniper, aspen, cottonwood-riparian, woodland chaparral, and riparian shrub throughout Wyoming. Dusky Flycatcher should be effectively monitored in a range of habitats through point-transects under the MWB project.


Dusky Flycatcher
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.357143
> 0.357143 AND DUFL <= 0.933333
> 0.933333 AND DUFL <= 2.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Cordilleran Flycatcher
# (*Empidonax occidentalis*)

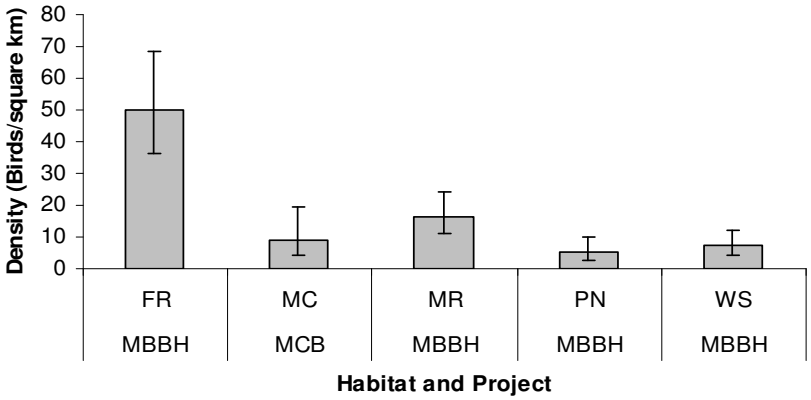
*WY-PIF Level II Priority Species

In 2005, we detected 102 individual Cordilleran Flycatchers in nine habitats on MWB. Overall, we detected Cordilleran Flycatchers on all five of the RMBO point-transect monitoring projects. We detected Cordilleran Flycatcher in sufficient numbers to calculate a density estimate for this species in at least one habitat on the MBBH and MCB projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Cordilleran Flycatcher on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 17 |
| BI-MC | ID | -- | -- | -- | -- | 17 |
| BI-MR | ID | -- | -- | -- | -- | 8 |
| BI-SS | ID | -- | -- | -- | -- | 7 |
| SH-MC | ID | -- | -- | -- | -- | *1* |
| SH-MR | ID | -- | -- | -- | -- | 2 |
| WY-AS | ID | -- | -- | -- | -- | 12 |
| WY-MC | ID | -- | -- | -- | -- | 15 |
| WY-MR | ID | -- | -- | -- | -- | 24 |

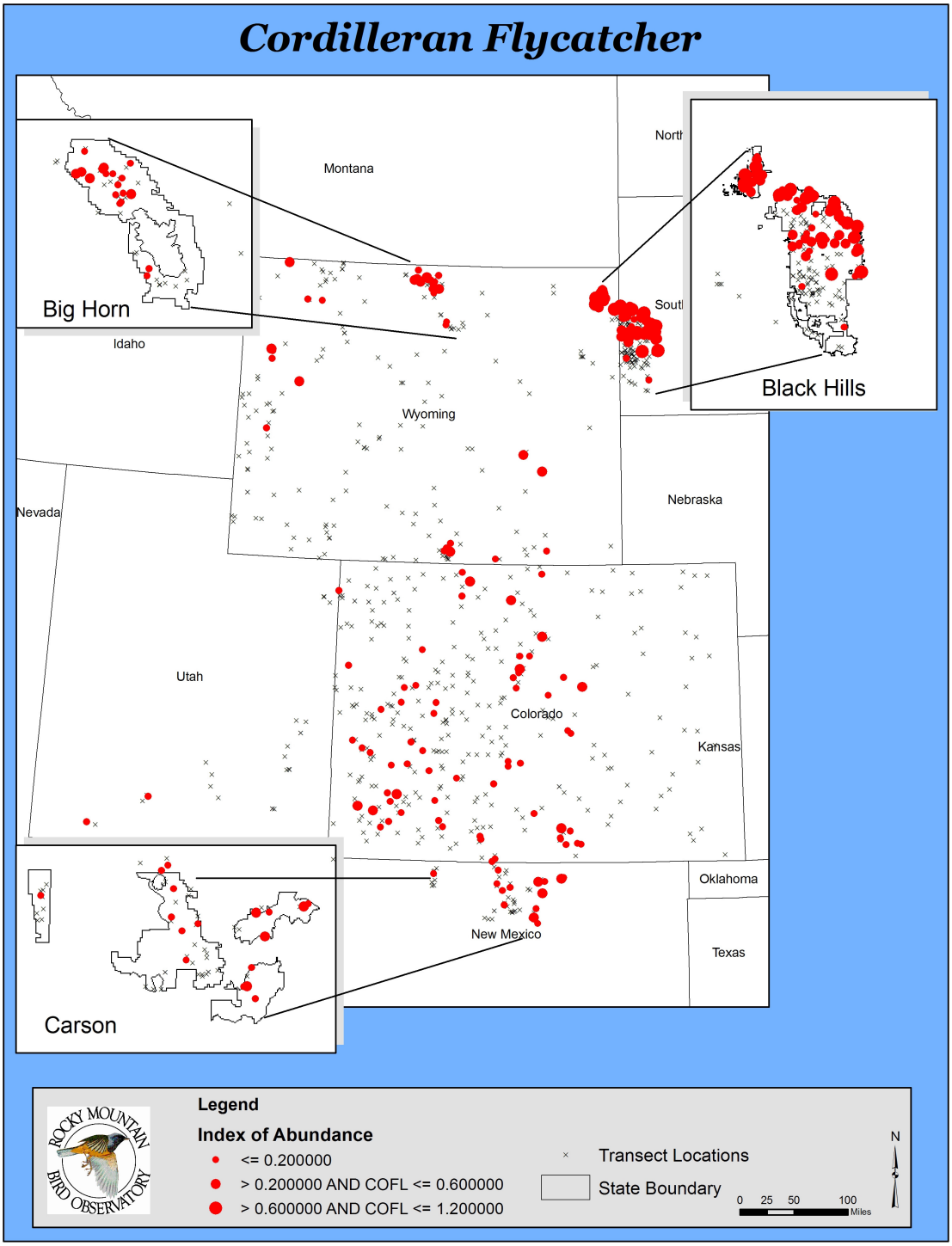
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Cordilleran Flycatcher among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Cordilleran Flycatchers nest in forested areas where cliffs or rocky ledges are present and is often found in riparian areas with many vertical surfaces. It is also occasionally found in pinyon-juniper stands that have some element of deciduous vegetation.

Cordilleran Flycatchers are detected too infrequently in most habitats to effectively monitor this species through point-transects under MWB; however, observations from the range of habitats should provide data to loosely track their status in Wyoming.


Cordilleran Flycatcher
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND COFL <= 0.600000
> 0.600000 AND COFL <= 1.200000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Say's Phoebe
# (*Sayornis saya*)

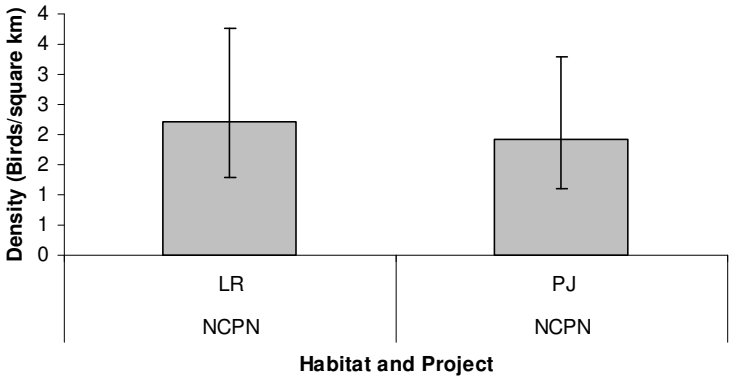
*WY-PIF Level III Priority Species

In 2005, we detected 25 Say's Phoebe in four habitats on the MWB project. We detected Say's Phoebe on all of the RMBO point-count transect monitoring projects in 2005, except MBBH where we did not survey the preferred habitat of this species. We were able to calculate a density estimate in two habitats for the NCPN project.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Say's Phoebe for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-GR | ID | -- | -- | -- | -- | 6 |
| WY-JW | ID | -- | -- | -- | -- | 13 |
| WY-MR | ID | -- | -- | -- | -- | 1 |
| WY-SS | ID | -- | -- | -- | -- | 5 |

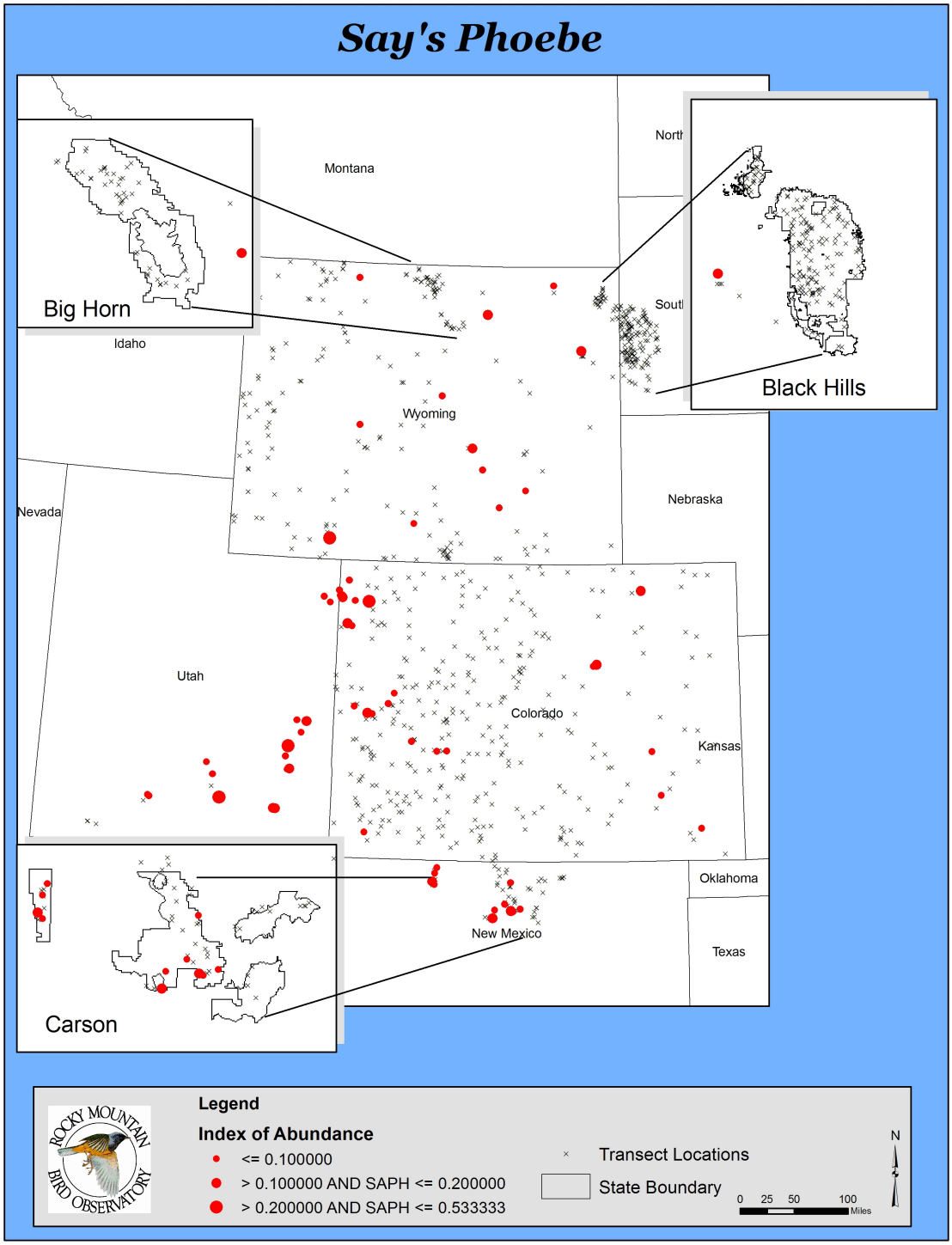
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Say's Phoebe between habitats for the NCPN point-count transect monitoring projects, 2005.

***Summary*** – Say's Phoebe inhabits arid, open country with sparse vegetation and nests on rocky ledges, as well as barns or 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.

We have not detected Say's Phoebes in sufficient numbers to provide a density estimate for any habitat on the MWB project; however, we may be able to loosely track its status over time using data from the full range of habitats.


Say's Phoebe
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.100000
> 0.100000 AND SAPH <= 0.200000
> 0.200000 AND SAPH <= 0.533333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Ash-throated Flycatcher (*Myiarchus cinerascens*)

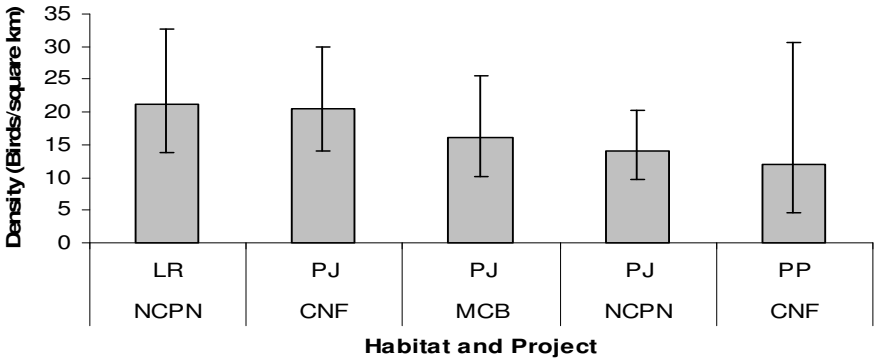
*WY-PIF Level II Priority Species
*WGFD Species of Greatest Conservation Need

In 2005, we detected 16 individual Ash-throated Flycatchers in juniper-woodland habitat on MWB. Overall, we detected Ash-throated Flycatchers on all RMBO point-transect monitoring projects except MBBH which is northeast of this species' regular breeding range. We detected Ash-throated Flycatcher in sufficient numbers to calculate a density estimate in at least one habitat on the MBCNF, MCB, and NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Ash-throated Flycatcher on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | -- | -- | -- | -- | 16 |

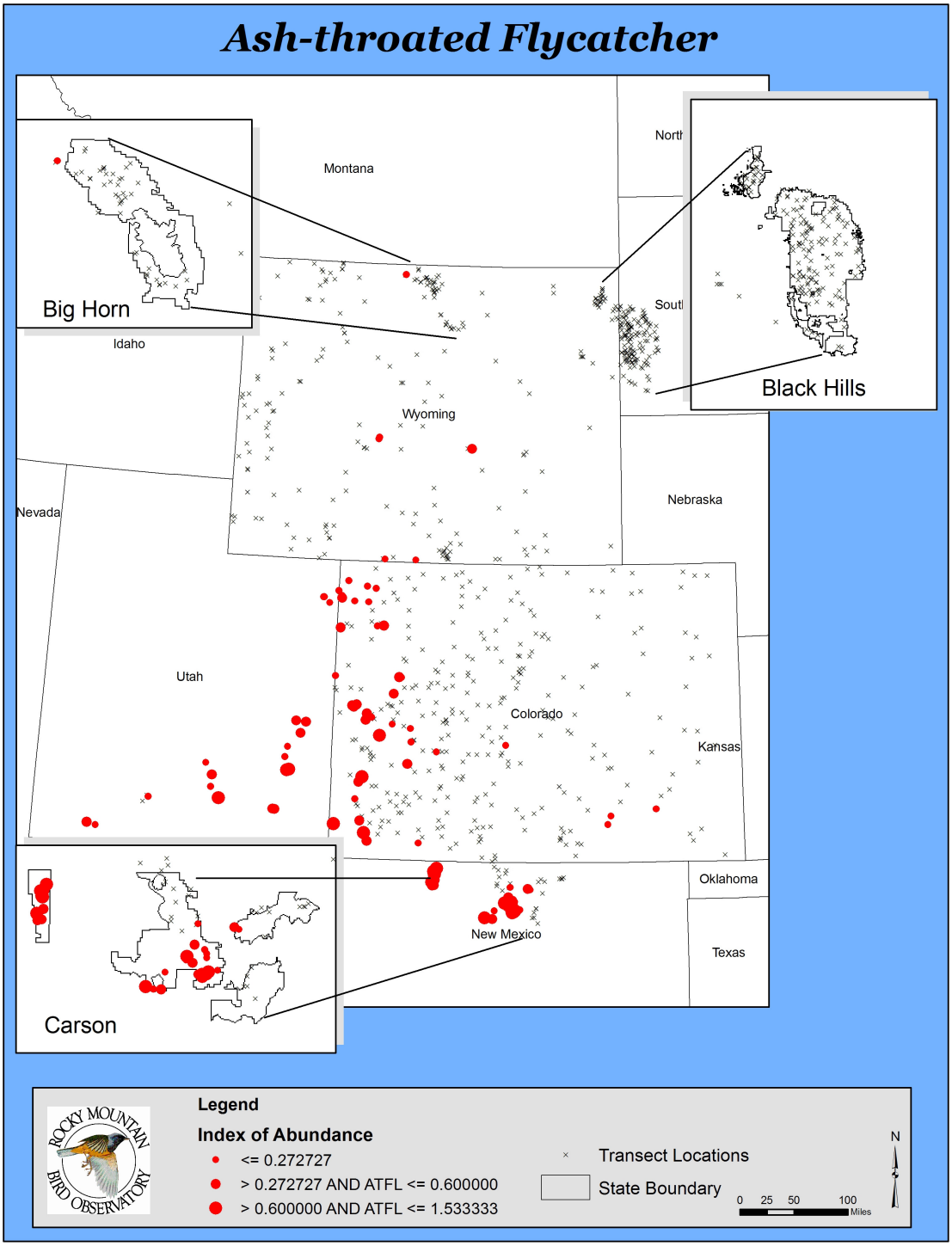
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Ash-throated Flycatcher among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – 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.

Ash-throated Flycatcher is currently only known to nest in the juniper woodlands of southwestern Wyoming, and individuals seen outside of this area are most likely migrating. In 2005, we detected Ash-throated Flycathcers on juniper woodland transects throughout the central part of Wyoming from the northern to the southern border. Detections of this species are usually too few, however, to effectively monitor its population with the current level of effort under MWB. Additional juniper woodland transects in the southwestern portion of the state may improve our ability to monitor this species. It would also be interesting to note the breeding behavior of birds in other areas of the state to confirm their breeding status outside of the known Wyoming breeding range.


Ash-throated Flycatcher
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.272727
> 0.272727 AND ATFL <= 0.600000
> 0.600000 AND ATFL <= 1.533333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Loggerhead Shrike
# (*Lanius ludovicianus*)

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

In 2005, we detected 19 individual Logerhead Shrikes in three habitats on MWB. We also detected Loggerhead Shrike on the MCB and NCPN projects in 2005; however, we did not detect this species in sufficient numbers to calculate density in any habitat on any monitoring project.

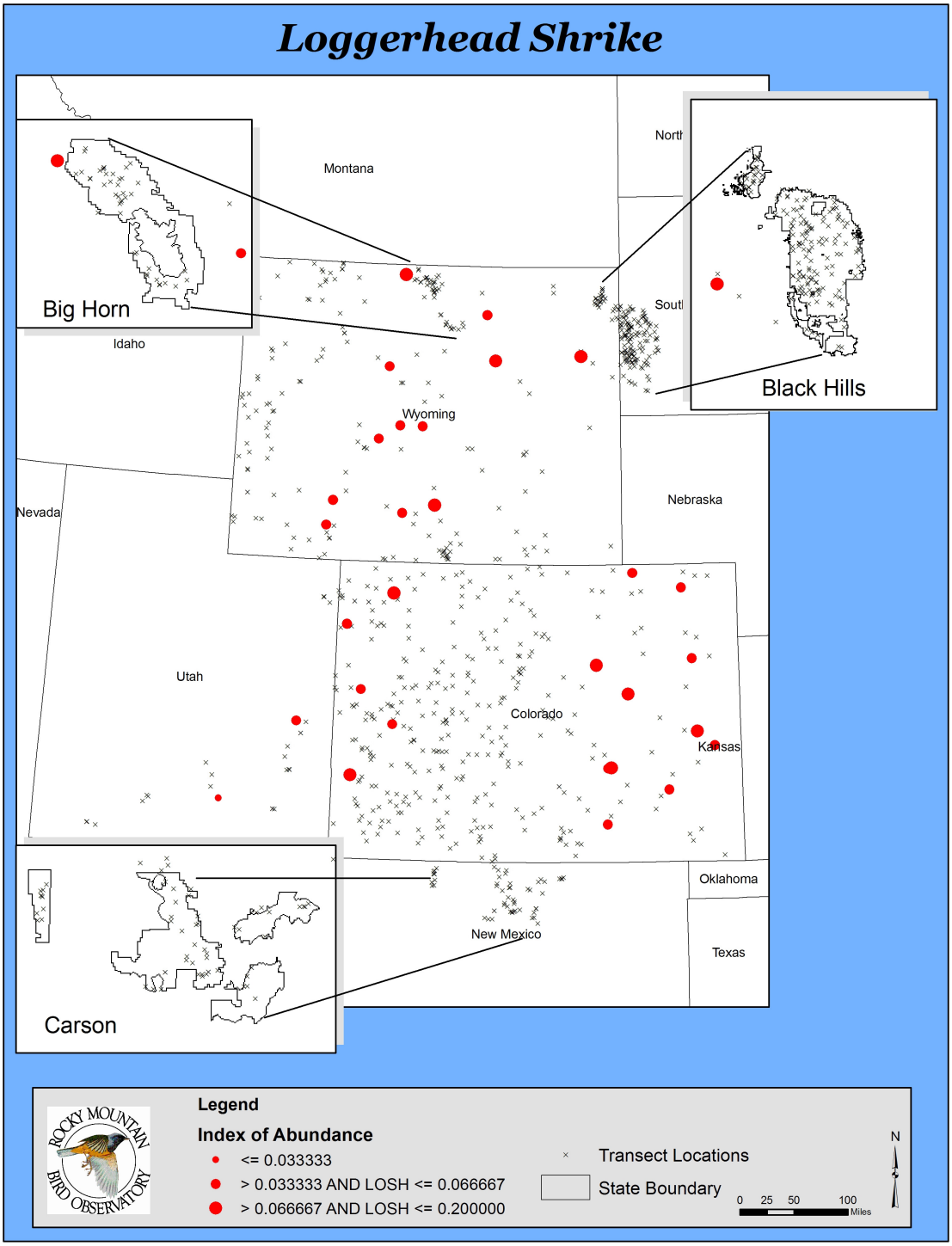
Total number of detections, number of individuals, and habitat-specific density estimates for Loggerhead Shrike on the MWB monitoring project, 2005.

| Project | Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|---|
| MWB | WY-GR | ID | -- | -- | -- | -- | 5 |
| MWB | WY-JW | ID | -- | -- | -- | -- | 6 |
| MWB | WY-SS | ID | -- | -- | -- | -- | 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.

***Summary –*** Loggerhead Shrike breeds across Wyoming in basin-prairie shrublands, sagebrush grasslands, mountain-foothills shrublands, pine-juniper woodlands and woodland-chaparral. Breeding Bird Survey data from 1966-2002 indicates that this species' population has undergone a large decrease of more than 50% in North America.

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. Although given interest, with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.


Loggerhead Shrike
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.033333
> 0.033333 AND LOSH <= 0.066667
> 0.066667 AND LOSH <= 0.200000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Gray Vireo
# (*Vireo vicinior*)

*USFWS Bird of Conservation Concern

In 2005, we detected 6 Gray Vireos in juniper woodland habitat on the MWB project. We detected Gray Vireo on all of the RMBO point-transect monitoring projects in 2005 except MBBH, which is north of the species' normal breeding range. We were able to calculate a density estimate for Gray Vireo in pinyon-juniper habitat on the NCPN project.

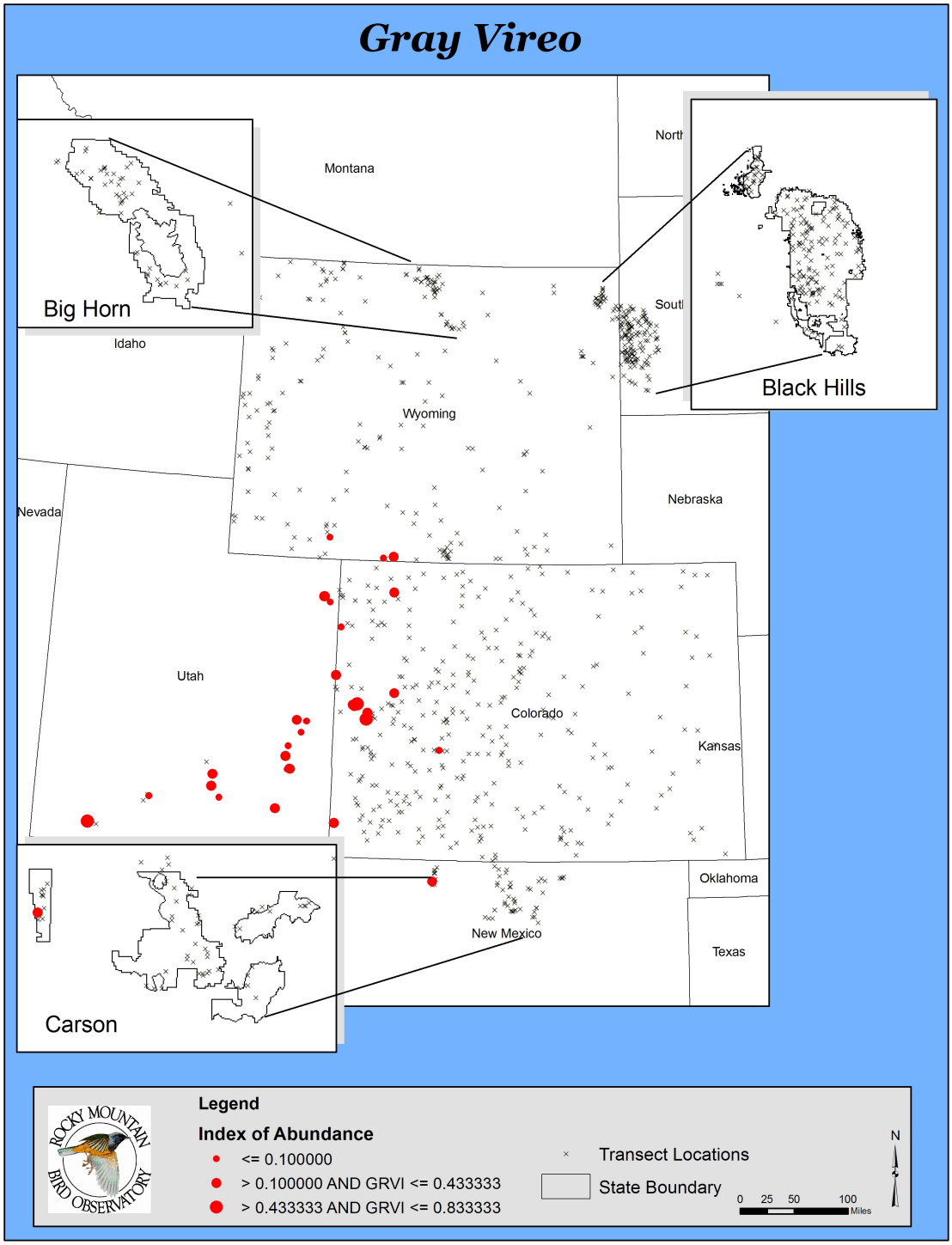
Total number of independent detections, number of individuals, and habitat-specific density estimates for Gray Vireo for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | -- | -- | -- | -- | 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.

***Summary*** – Gray Vireo nests exclusively on dry hillsides and in pinyon-juniper habitat with abundant shrubs, and is believed to nest primarily in low-elevation pinyon-juniper. The normal breeding range of Gray Vireo does not extend into Wyoming and observations of this species have come mainly from the southwestern corner of the state.

This was the first year we detected Gray Vireo on point transects under the MWB project. The species was recorded on three transects in the southwestern portion of the state in juniper woodland habitat. Given their scarcity in Wyoming, it is unlikely we will be able to monitor this species through point transects under MWB. Repeat visits and nest searches would also allow us to document this species' breeding status in Wyoming. Adding transects in juniper woodland habitat in southwestern Wyoming may also provide more information on the extent of its range in the state and improve our ability to monitor this species.


Gray Vireo
Montana
North
Big Horn
Idaho
South
Black Hills
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.100000
> 0.100000 AND GRVI <= 0.433333
> 0.433333 AND GRVI <= 0.833333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Plumbeous Vireo
## (*Vireo plumbeus*)

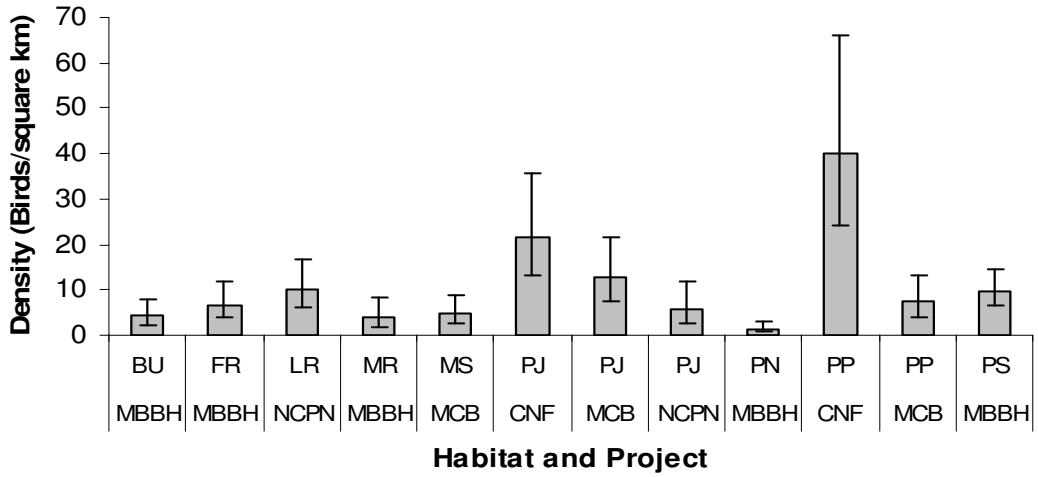
*WY-PIF Level II Priority Species

In 2005, we detected 38 individual Plumbeous Vireos in two habitats on MWB. Overall, we detected Plumbeous Vireos on all of our point-transect monitoring projects and we were able to calculate a density estimate for this species in at least one habitat on all of the projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Plumbeous Vireo on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 1 |
| WY-JW | ** | -- | -- | -- | 36 | 37 |

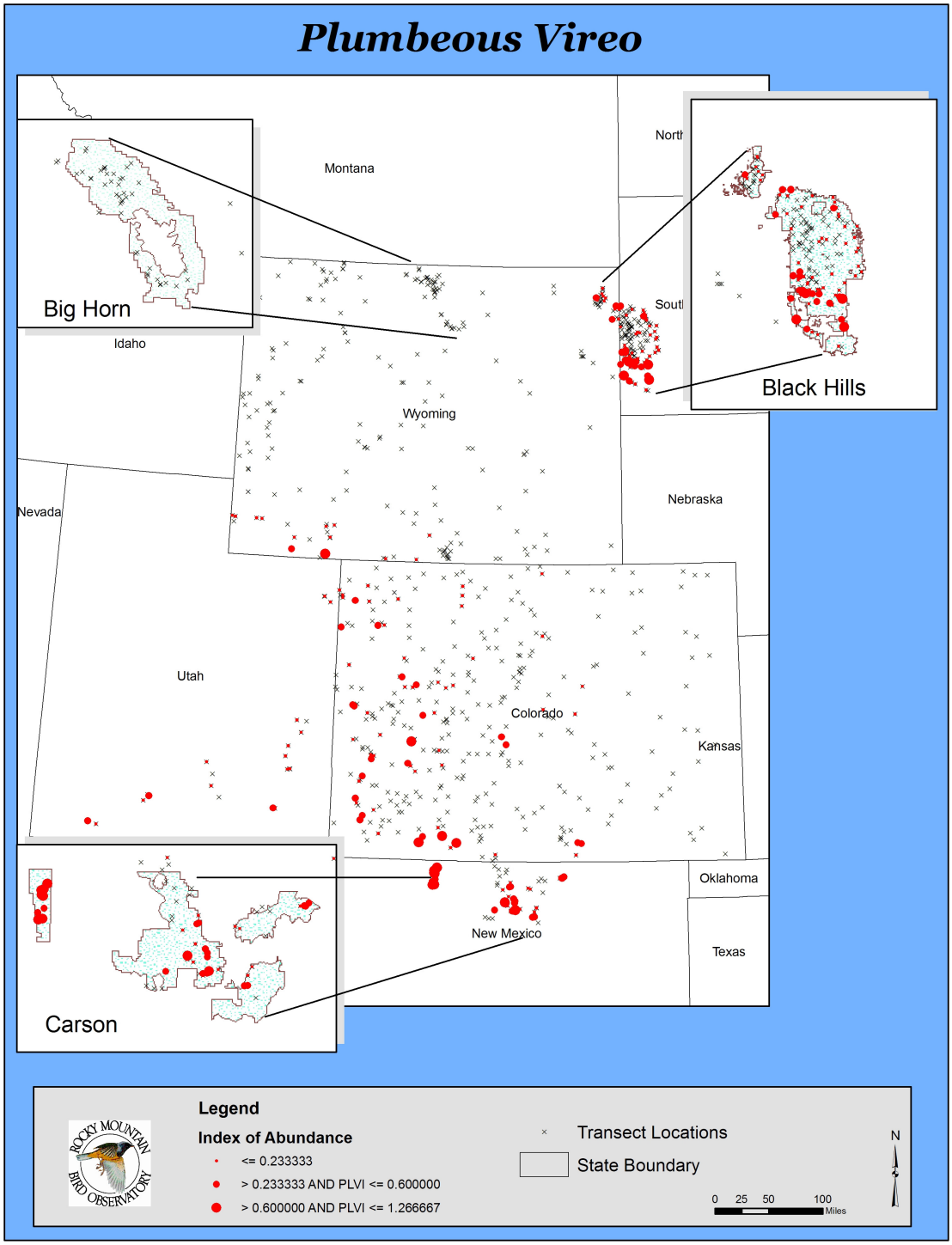
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data; ** - unable to calculate density due to observer error in estimating distance.




Relative density of Plumbeous Vireo among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Plumbeous Vireo has a wide habitat tolerance, including coniferous and mixed coniferous/decidous forests. It will also use openings caused by logging and fire, but it is apparently sensitive to forest fragmentation.

Plumbeous Vireo is found scattered throughout the mountain foothills of Wyoming; however, we primarily detect this species on juniper-woodland transects in the southwestern portion of the state. We may be able to monitor this species statewide in juniper woodland habitat if we continue to detect it in sufficient numbers in future years.


Plumbeous Vireo
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.233333
> 0.233333 AND PLVI <= 0.600000
> 0.600000 AND PLVI <= 1.266667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Western Scrub-Jay
# (*Aphelocoma californica*)

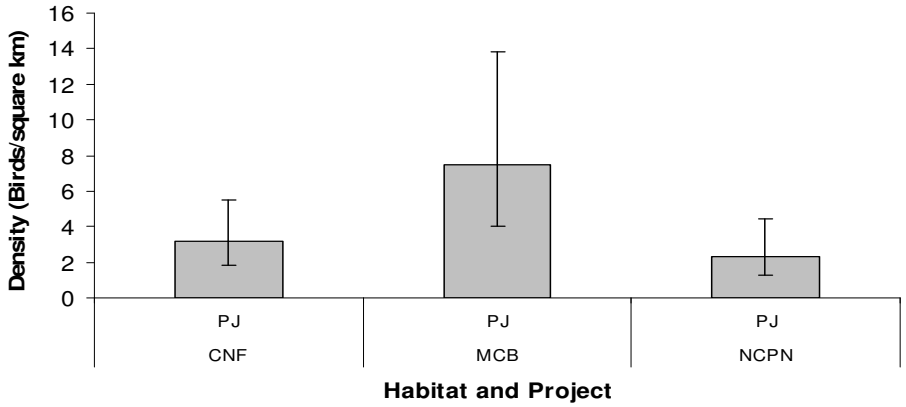
*WY-PIF Level II Priority Species
*WGFD Species of Greatest Conservation Need

In 2005, we detected 10 individual Western Scrub-Jays in juniper-woodland habitat on MWB. We detected Western Scrub-Jays on all RMBO point-transect monitoring projects in 2005 except the MBBH project which is beyond the normal range of this species. We were able to calculate a density estimate for this species in pinyon-juniper habitat on the MBCNF, MCB, and NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Western Scrub-Jay on the MWB monitoring project, 2005.

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

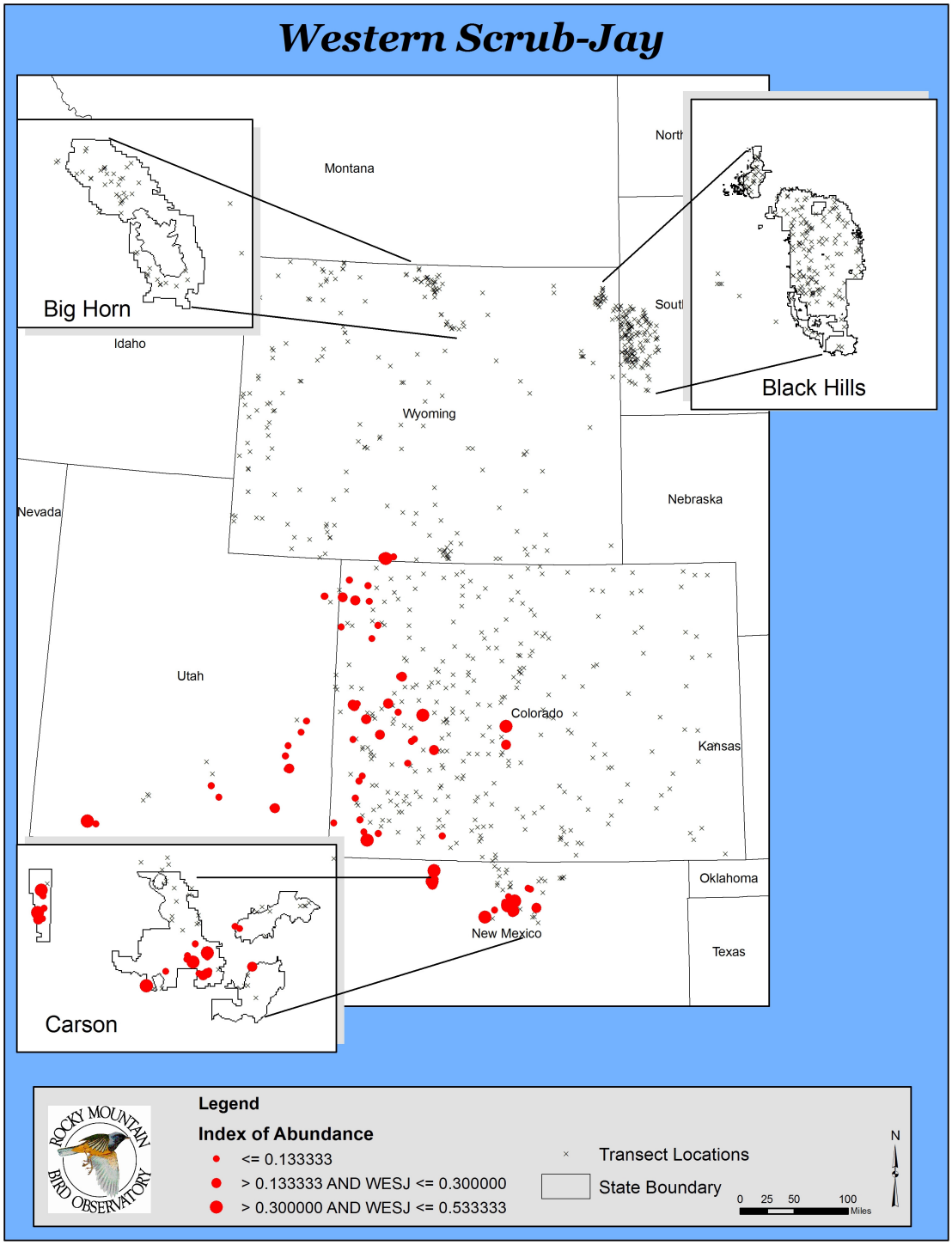
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Western Scrub-Jay among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – The Western Scrub-Jay is associated with mature juniper woodlands and is known to nest only in southwestern Wyoming.

We have detected Western Scrub-Jays in southwestern Wyoming on juniper woodland transects each year since the inception of MWB; however, detections are too few to effectively monitor this species. Adding juniper woodland transects in this area may improve our ability to monitor Western Scrub-Jay.


Western Scrub-Jay
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.133333
> 0.133333 AND WESJ <= 0.300000
> 0.300000 AND WESJ <= 0.533333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Clark's Nutcracker
# (*Nucifraga columbiana*)

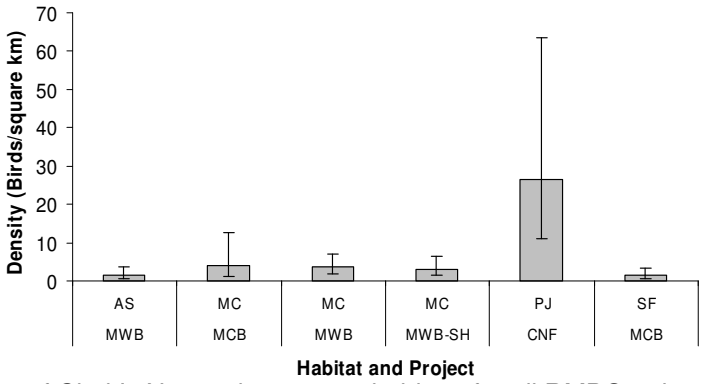
*WY-PIF Level III Priority Species

In 2005, we detected 254 Clark's Nutcrackers in seven habitats on the MWB project and calculated a density estimate in aspen and mid-elevation conifer habitats. Overall, we detected Clark's Nutcracker on all other RMBO point-count transect monitoring projects and calculated density estimates in at least one habitat on three projects.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Clark's Nutcracker for the MWB monitoring project, 2005.

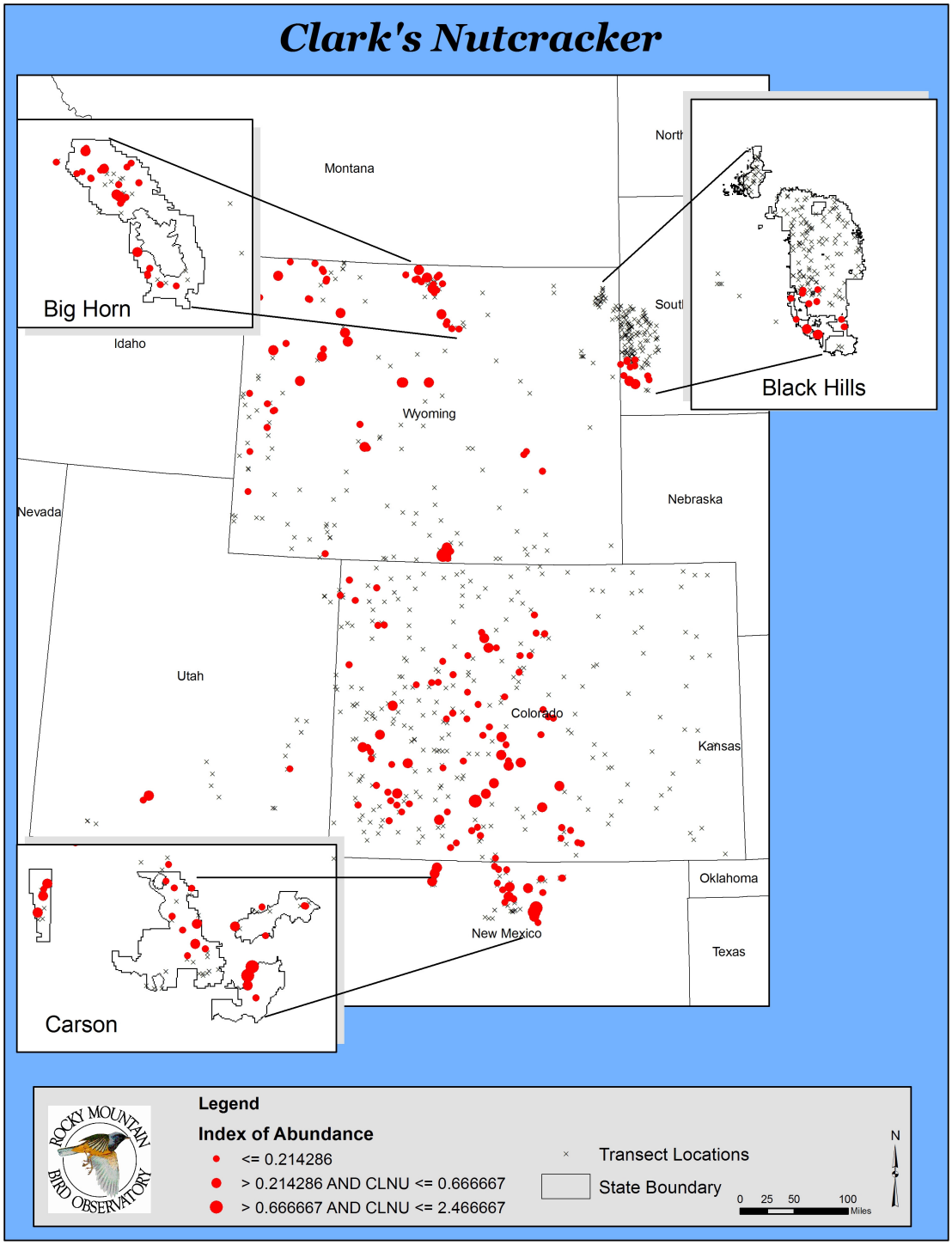
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | 21 | 27 |
| BI-MC | ID | -- | -- | -- | -- | 11 |
| BI-MR | ID | -- | -- | -- | -- | 3 |
| BI-SS | ID | -- | -- | -- | -- | 16 |
| SH-MC | 3.21 | 1.60 | 6.47 | 34.2% | 26 | *26* |
| SH-MG | ID | -- | -- | -- | -- | 7 |
| SH-MR | ID | -- | -- | -- | -- | 2 |
| WY-AS | 1.44 | 0.56 | 3.74 | 49.5% | 25 | 42 |
| WY-GR | ID | -- | -- | -- | -- | 1 |
| WY-JW | ID | -- | -- | -- | 22 | 63 |
| WY-MC | 3.62 | 1.88 | 6.99 | 33.8% | 45 | 54 |
| WY-MR | ID | -- | -- | -- | 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.




Relative density of Clark's Nutcracker among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Clark's Nutcracker nests in all coniferous habitats and travels widely in search of food when not nesting. It breeds infrequently in pinyon-juniper habitat; however we detected it frequently in this habitat on many projects in 2005. The increased number of detections in 2005 may be the result of sparse food resources at its normal higher-elevation breeding habitats. Clarks' Nutcracker should be effectively monitored through point transect under MWB in a range of habitats, especially aspen and mid-elevation conifer.


Clark's Nutcracker
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.214286
> 0.214286 AND CLNU <= 0.666667
> 0.666667 AND CLNU <= 2.466667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Northern Rough-winged Swallow
# (*Stelgidopteryx serripennis*)

*WY-PIF Level III Priority Species

In 2005, we detected 8 Northern Rough-winged Swallows in four habitats on MWB. Overall, we detected Northern Rough-winged Swallows on all RMBO point-transect monitoring projects; however, we did not detect this species in sufficient numbers to provide a density estimate for any habitat on any project.

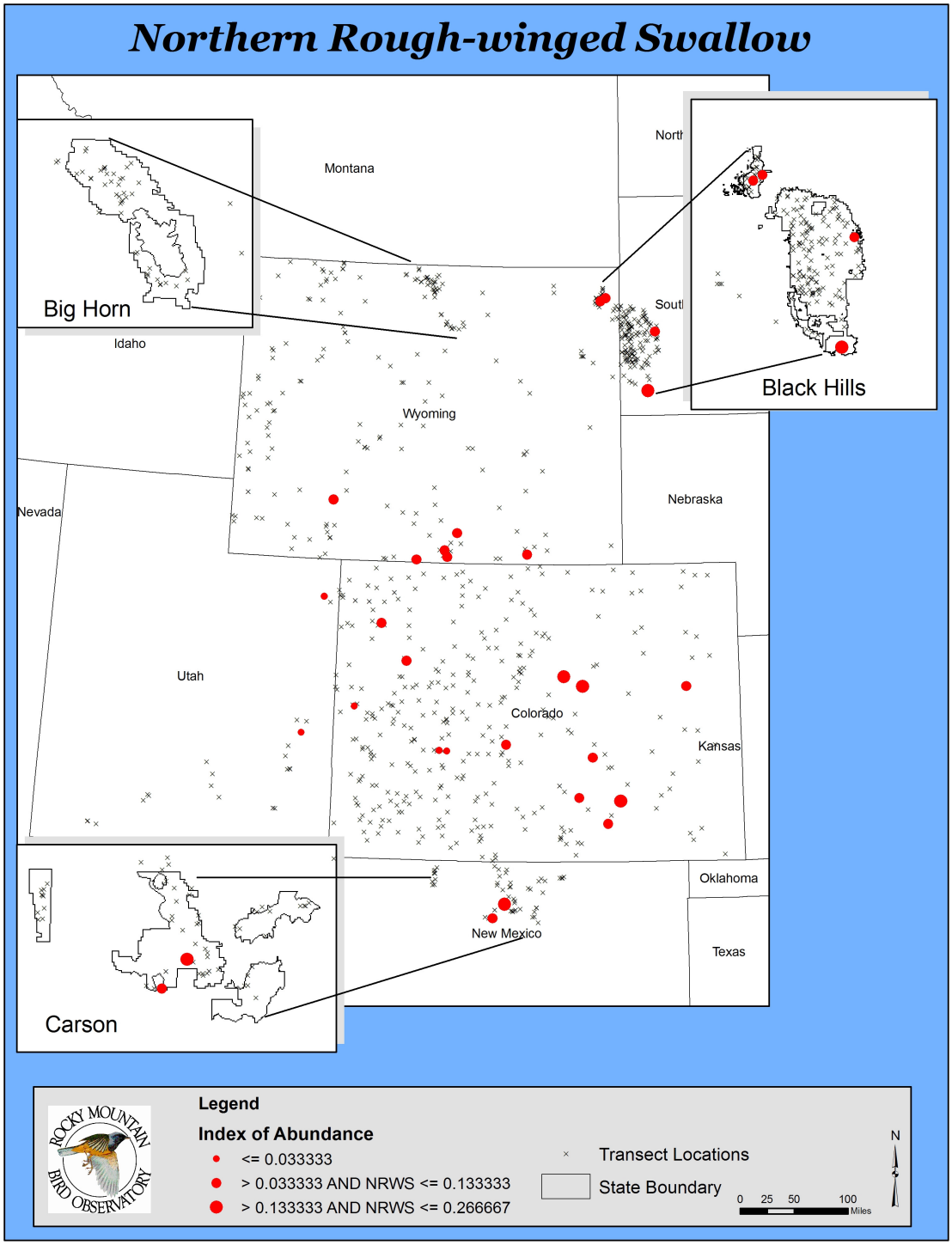
Total number of independent detections, number of individuals, and habitat-specific density estimates for Northern Rough-winged Swallow for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-GR | ID | -- | -- | -- | -- | 1 |
| WY-JW | ID | -- | -- | -- | -- | 1 |
| WY-MR | ID | -- | -- | -- | -- | 3 |
| WY-SS | ID | -- | -- | -- | -- | 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.

***Summary*** – Northern Rough-winged Swallow nests throughout Wyoming below 2,400m 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.

Due to its localized nature and specific nesting requirements, Northern Rough-winged Swallow is not well-monitored by any of the RMBO point-count transect projects. RBMO has developed a protocol (Bridge Surveys) to count birds that nest on or near bridges and this method can potentially be effective for monitoring all species of swallows.


Northern Rough-winged Swallow
Montana
North
Big Horn
Idaho
South
Black Hills
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.033333
> 0.033333 AND NRWS <= 0.133333
> 0.133333 AND NRWS <= 0.266667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Juniper Titmouse
# (*Baeolophus ridgwayi*)

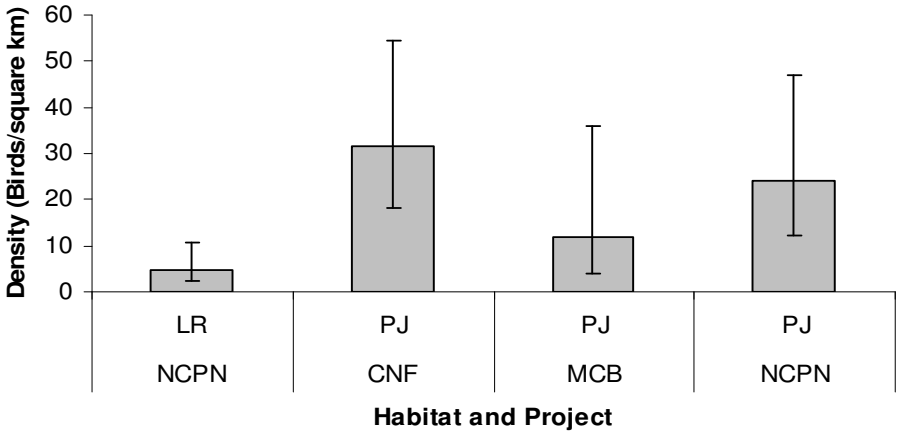
*WY-PIF Level II Priority Species

In 2005, we detected seven individual Juniper Titmice in juniper woodland habitat on MWB. Overall, we detected Juniper Titmouse on all of the RMBO point-transect monitoring projects except MBBH which is northeast of this species' regular range. We detected Juniper Titmouse in sufficient numbers to a calculate density estimtate in at least one habitat on the MBCNF, MCB, and NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Juniper Titmouse on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | -- | -- | -- | -- | 7 |

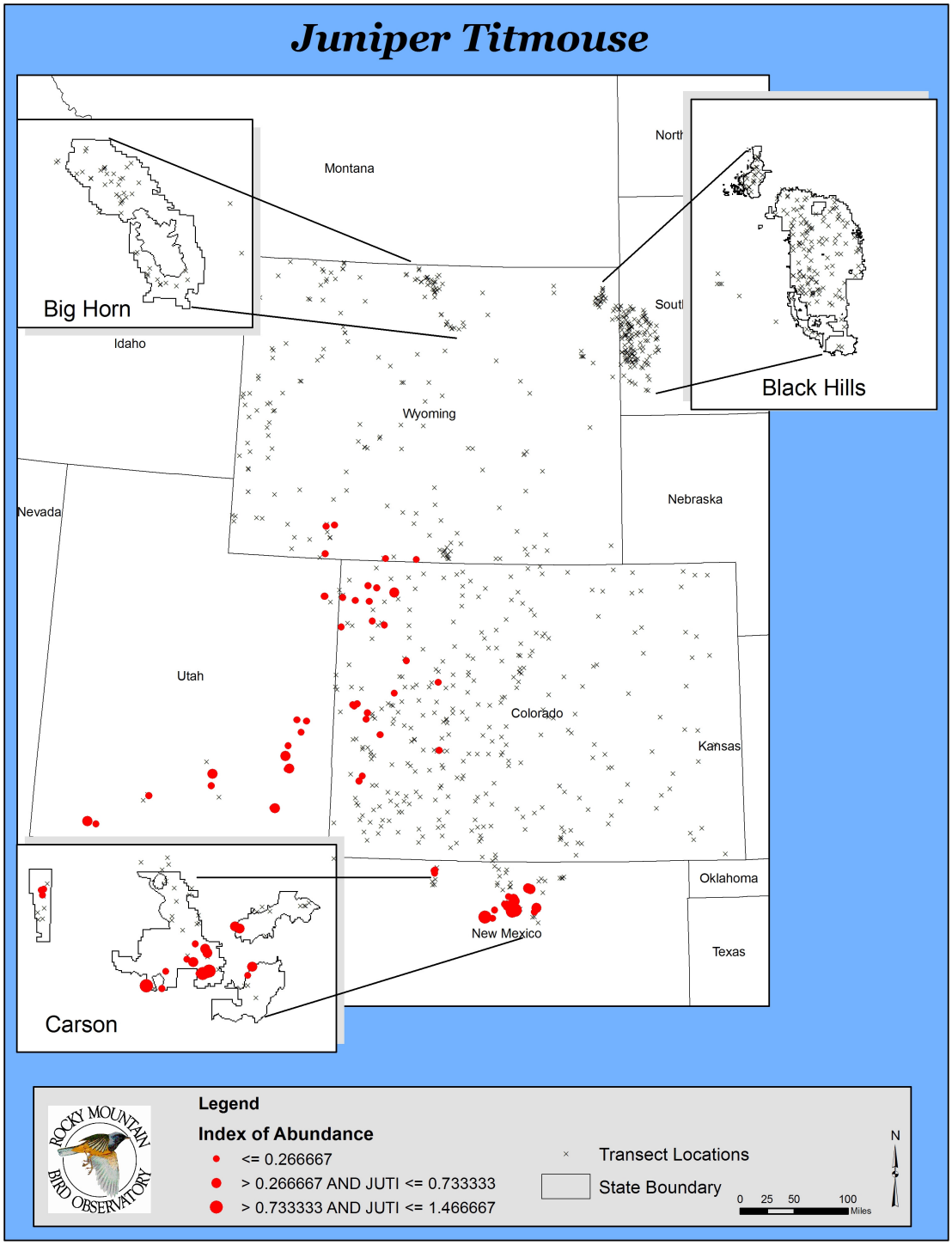
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Juniper Titmouse among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – 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.

We have detected Juniper Titmouse in southwestern Wyoming on juniper woodland transects each year since the inception of MWB; however, detections are too few to effectively monitor this species. Adding juniper woodland transects in this area may improve our ability to monitor this species.


Juniper Titmouse
Montana
North
South
Big Horn
Idaho
Wyoming
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.266667
> 0.266667 AND JUTI <= 0.733333
> 0.733333 AND JUTI <= 1.466667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Bushtit
## (*Psaltriparus minimus*)

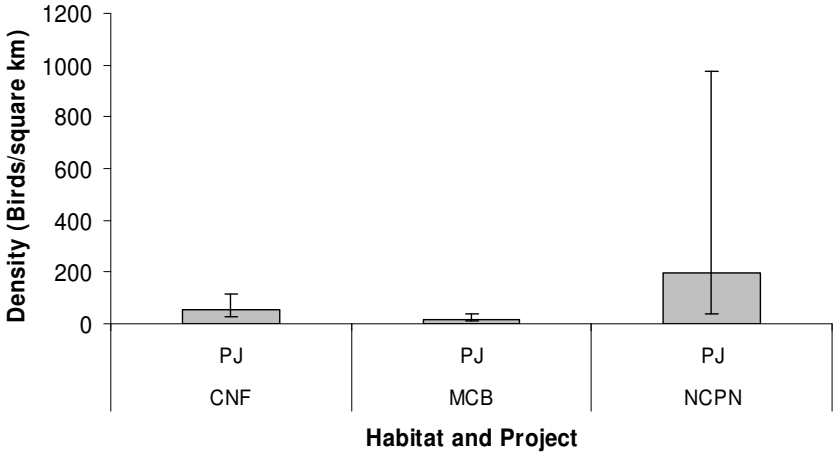
*WY-PIF Level II Priority Species
*WGFD Species of Greatest Conservation Need

In 2005, we detected 18 individual Bushtits in juniper-woodland habitat on MWB. Overall, we detected Bushtit on all of the RMBO point-transect monitoring projects except MBBH which is northeast of this species' regular breeding range. We detected Bushtit in sufficient numbers to calculate a density estimate in pinyon-juniper habitat on the MBCNF, MCB, and NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Bushtit on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | -- | -- | -- | -- | 18 |

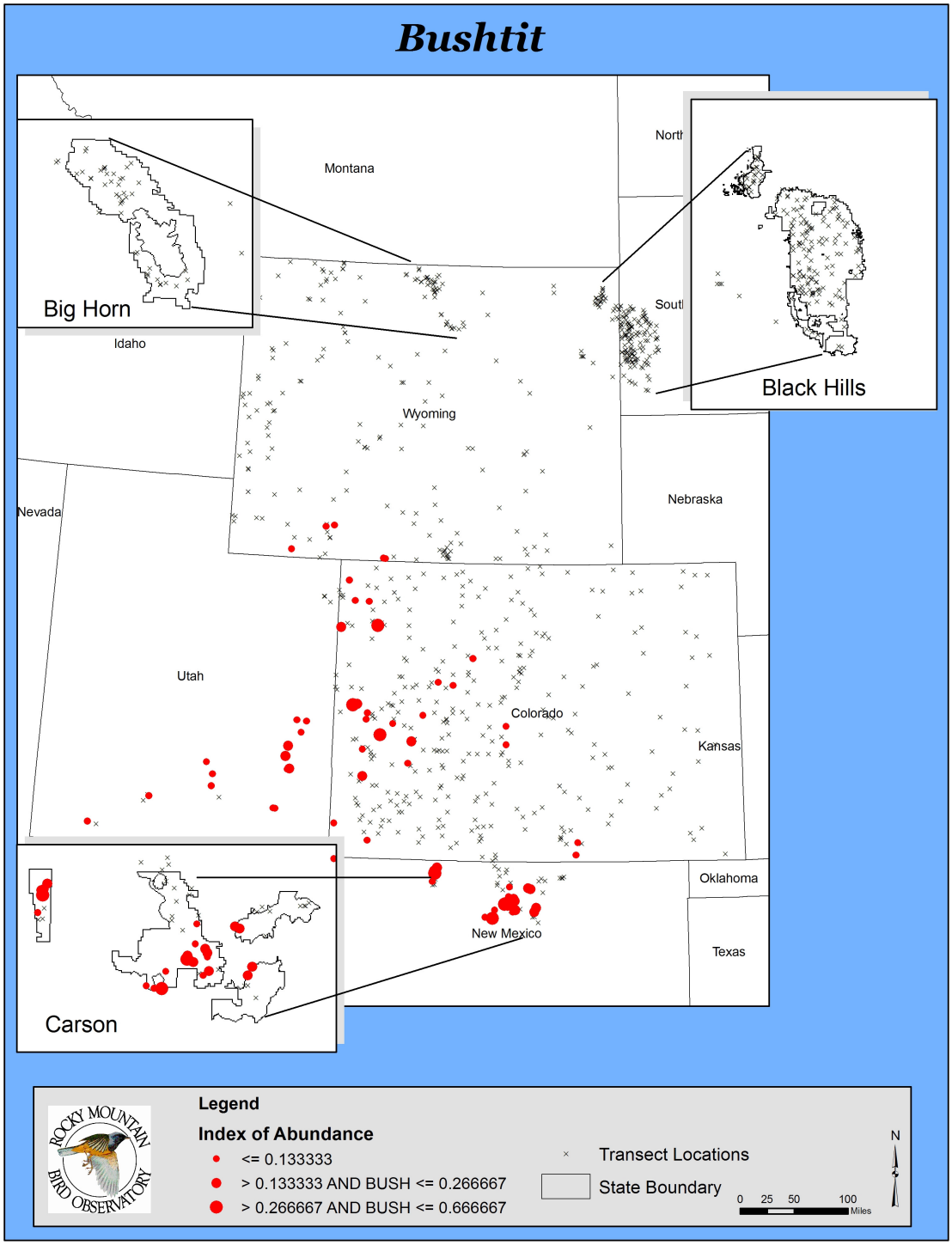
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Bushtit among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Bushtit is found in southwestern Wyoming in juniper woodlands, most often in younger junipers that have not yet developed cavities but are reproductively mature.

We have detected Bushtit in southwestern Wyoming on juniper woodland transects every year except 2002 under MWB; however, detections are too few to effectively monitor this species. Adding juniper woodland transects in this area may improve our ability to monitor this species. Given interest, with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.


Bushtit
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.133333
> 0.133333 AND BUSH <= 0.266667
> 0.266667 AND BUSH <= 0.666667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Pygmy Nuthatch
# (*Sitta pygmaea*)

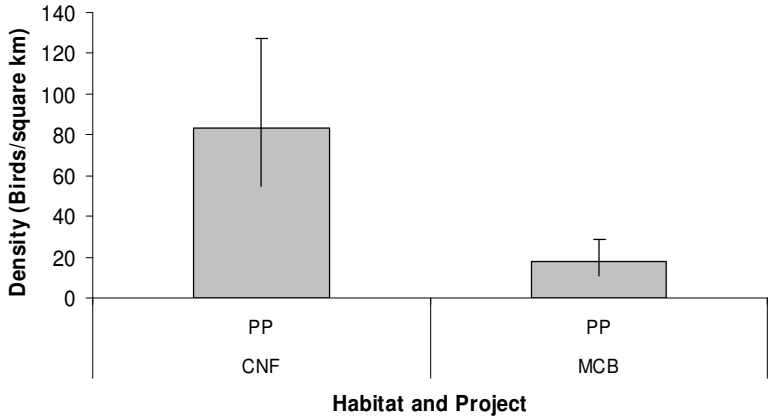
*WY-PIF Level II Priority Species
*WGFD Species of Greatest Conservation Need

In 2005, we detected two individual Pygmy Nuthatches in montane riparian habitat on MWB. We detected Pygmy Nuthatch on all RMBO point-transect monitoring projects in 2005, and we were able to calculate a density estimate for this species in ponderosa pine habitat on the MBCNF and MCB projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Pygmy Nuthatch on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-MR | ID | -- | -- | -- | -- | 2 |

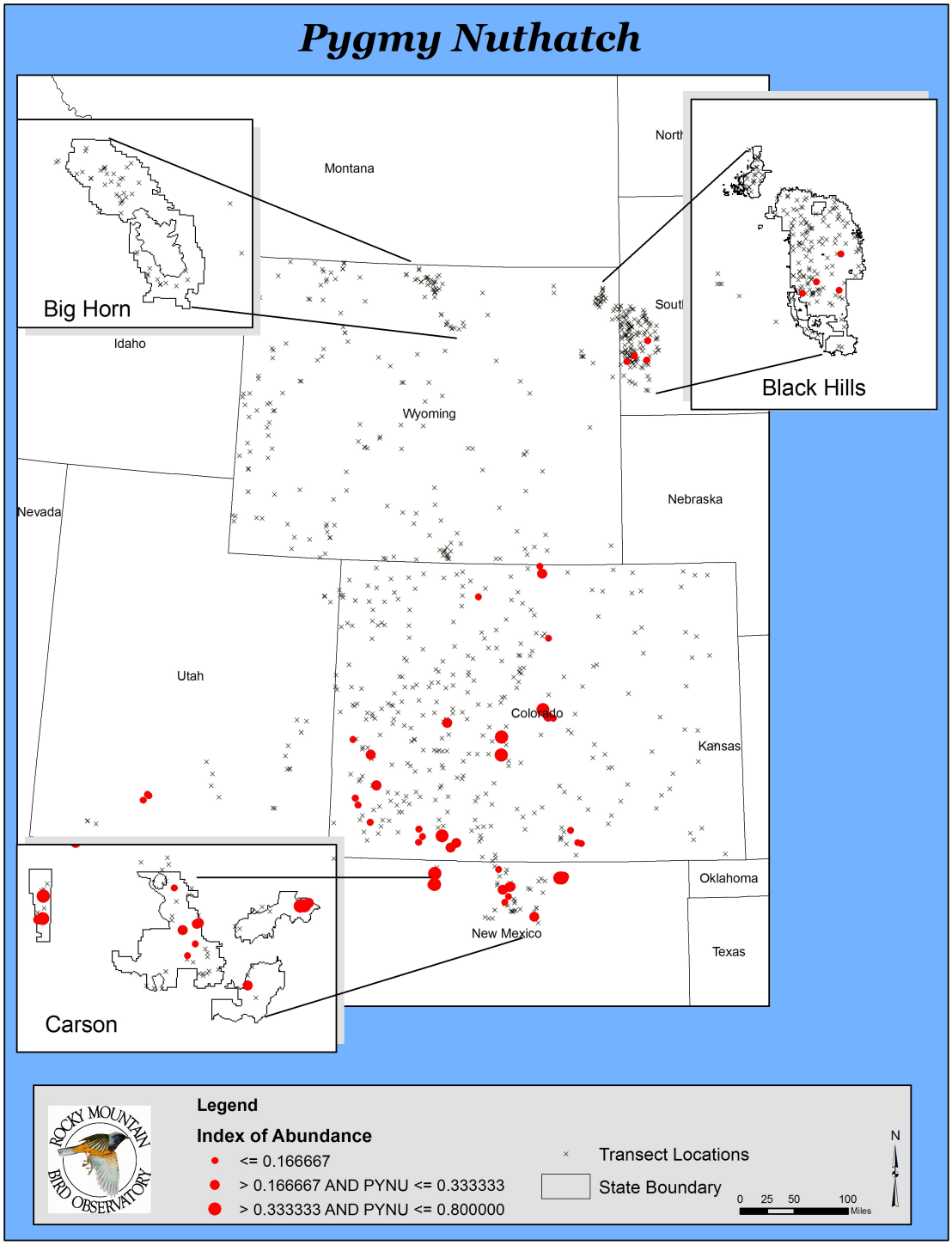
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Pygmy Nuthatch among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Pygmy Nuthatch is considered a ponderosa pine specialist and prefers mature old growth stands of ponderosa pine with less than 70% canopy cover. It is found scattered throughout Wyoming but breeds primarily in the ponderosa pine forests of eastern Wyoming.

Pygmy Nuthatch has only been detected in 2002 and in 2005 on point-transects under MWB. In 2002 it was detected in mid-elevation conifer and aspen. This year, we detected two individuals in montane riparian habitat. Given the specific habitat requirements of Pygmy Nuthatch, it is unlikely we will be able to monitor this species with the current level of effort under MWB. Adding ponderosa pine 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.


Pygmy Nuthatch
Montana
North
South
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.166667
> 0.166667 AND PYNU <= 0.333333
> 0.333333 AND PYNU <= 0.800000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Brown Creeper
# (*Certhia americana*)

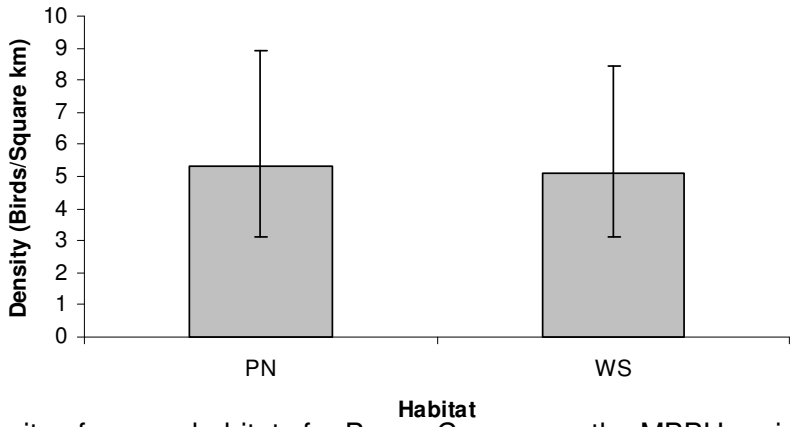
*WY-PIF Level II Priority Species

In 2005, we detected 55 individual Brown Creepers in eight habitats on MWB. Overall, we detected Brown Creeper on all RMBO point-transect monitoring projects except NCPN where we do not survey this species' preferred habitat. We detected Brown Creeper in sufficient numbers to calculate a density estimate in ponderosa pine and white spruce habitats on the MBBH project.

Total number of detections, number of individuals, and habitat-specific density estimates for Brown Creeper on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 13 |
| BI-MC | ID | -- | -- | -- | -- | 15 |
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 3 |
| SH-MR | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 11 |
| WY-MC | ID | -- | -- | -- | -- | 3 |
| WY-MR | ID | -- | -- | -- | -- | 8 |

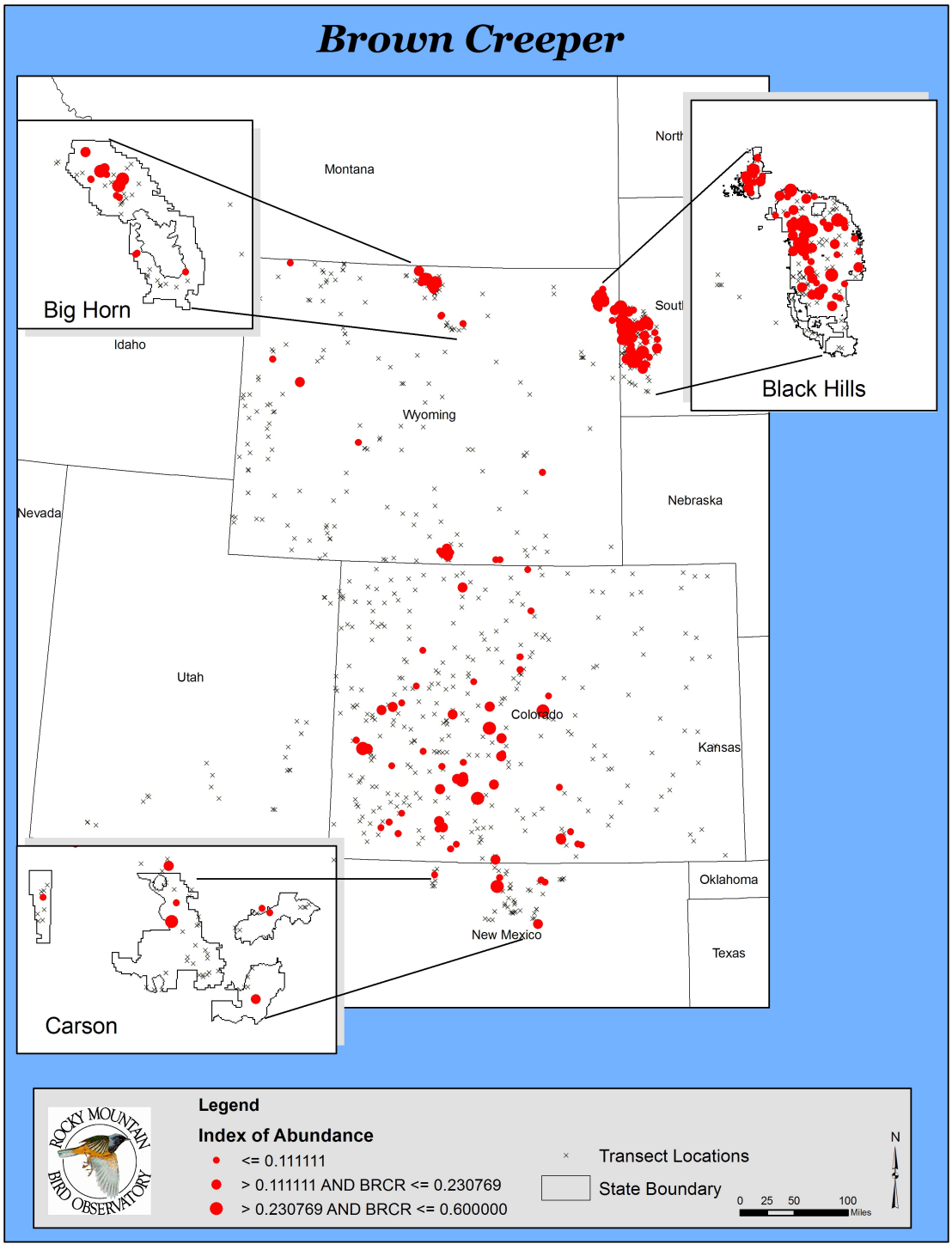
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of among habitats for Brown Creeper on the MBBH project, 2005.

***Summary*** – Brown Creeper is found throughout Wyoming during the breeding season in a variety of coniferous forests, including lodgepole pine, Douglas-fir and mixed coniferous forests. In the winter, this species moves to lower elevations.

We do not detect Brown Creeper in sufficient numbers to effectively monitor its population through point-transects under MWB; however, given interest, we may be able to loosely track its status over time using data from all habitats on the MWB project.


Brown Creeper
Montana
North
South
Wyoming
Idaho
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.111111
> 0.111111 AND BRCR <= 0.230769
> 0.230769 AND BRCR <= 0.600000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Rock Wren
## *(Salpinctes obsoletus)*

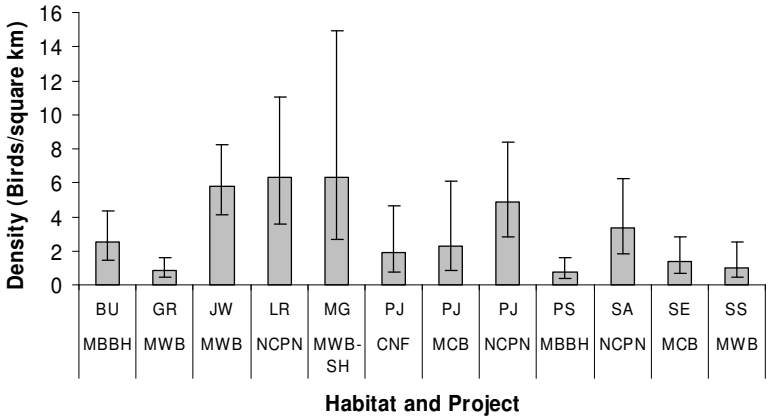
*WY-PIF Level III Priority Species

In 2005, we detected 331Rock Wrens in seven habitats on the MWB project and were able to calculate a density estimate in grassland, juniper woodland, and shrubsteppe habitats. Overall, we detected Rock Wren on all RMBO point-count monitoring projects in 2005, and we detected this species in sufficient numbers to calculate a density estimate in at least one habitat across five projects.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Rock Wren for the MWB monitoring project, 2005.

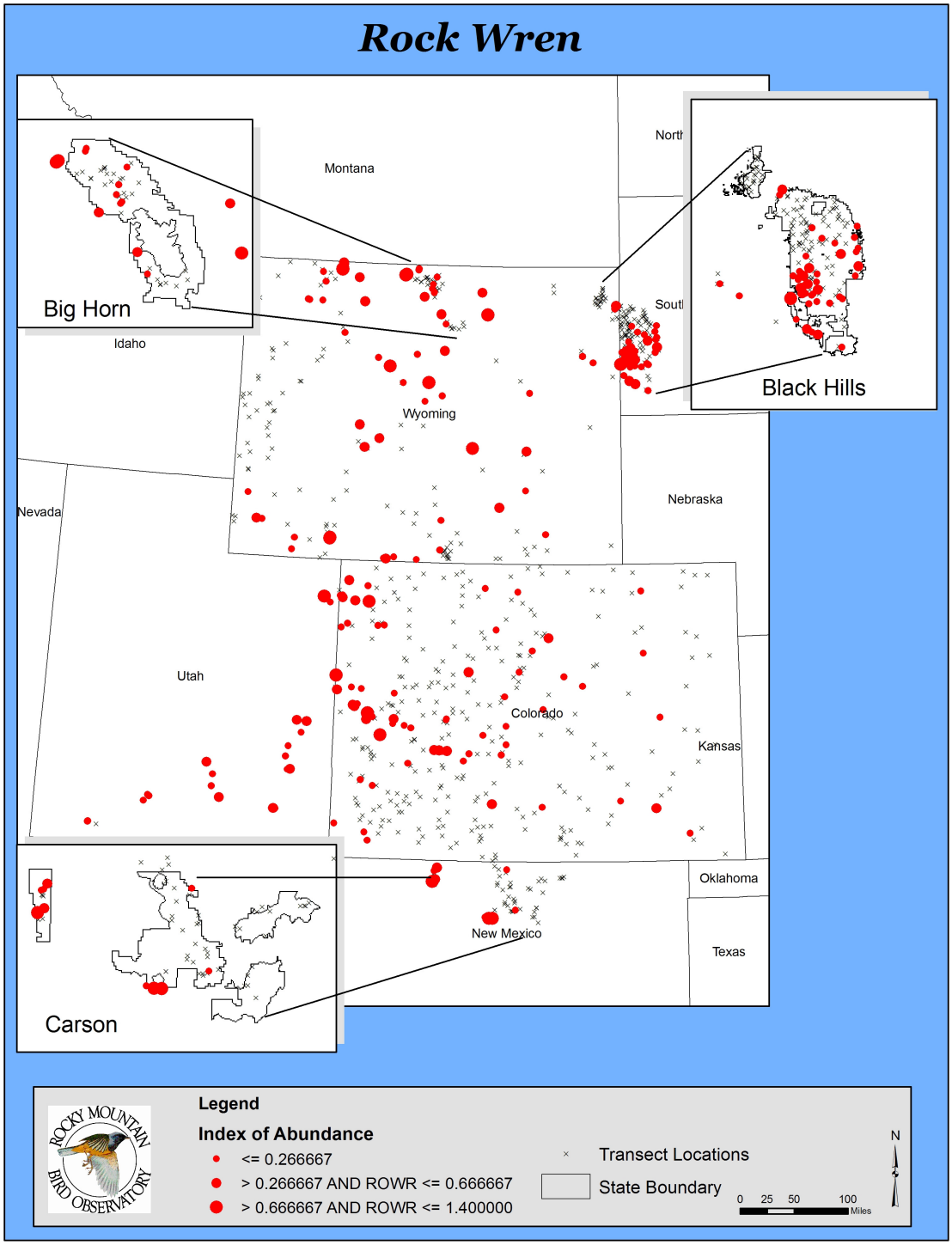
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 2 |
| BI-MC | ID | -- | -- | -- | -- | 3 |
| BI-SS | ID | -- | -- | -- | -- | 10 |
| SH-MC | ID | -- | -- | -- | -- | *2* |
| SH-MG | 6.30 | 2.65 | 14.96 | 43.5% | 47 | 51 |
| SH-MR | ID | -- | -- | -- | -- | 2 |
| WY-AS | ID | -- | -- | -- | -- | 16 |
| WY-GR | 0.86 | 0.45 | 1.63 | 32.9% | 34 | 37 |
| WY-JW | 5.82 | 4.1 | 8.25 | 17.2% | 144 | 158 |
| WY-MC | ID | -- | -- | -- | -- | 9 |
| WY-MR | ID | -- | -- | -- | -- | 4 |
| WY-SS | 1.02 | 0.42 | 2.49 | 45.6% | 35 | 39 |

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.




Relative density of Rock Wren among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Rock Wren is found throughout Wyoming in arid or semi-arid habitat. We detect this species in sufficient numbers to monitor it effectively through point transects under MWB in a range of habitats, especially grassland, juniper woodland and shrubsteppe.


Rock Wren
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.266667
> 0.266667 AND ROWR <= 0.666667
> 0.666667 AND ROWR <= 1.400000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Canyon Wren
# (*Catherpes mexicanus*)

*WY-PIF Level III Priority Species

In 2005, we detected 3 Canyon Wrens in juniper woodland habitat on the MWB project. Overall, we detected Canyon Wren on all five RMBO point-count transect monitoring projects in 2005. We calculated a density estimate for low-elevation riparian habitat on the NCPN project.

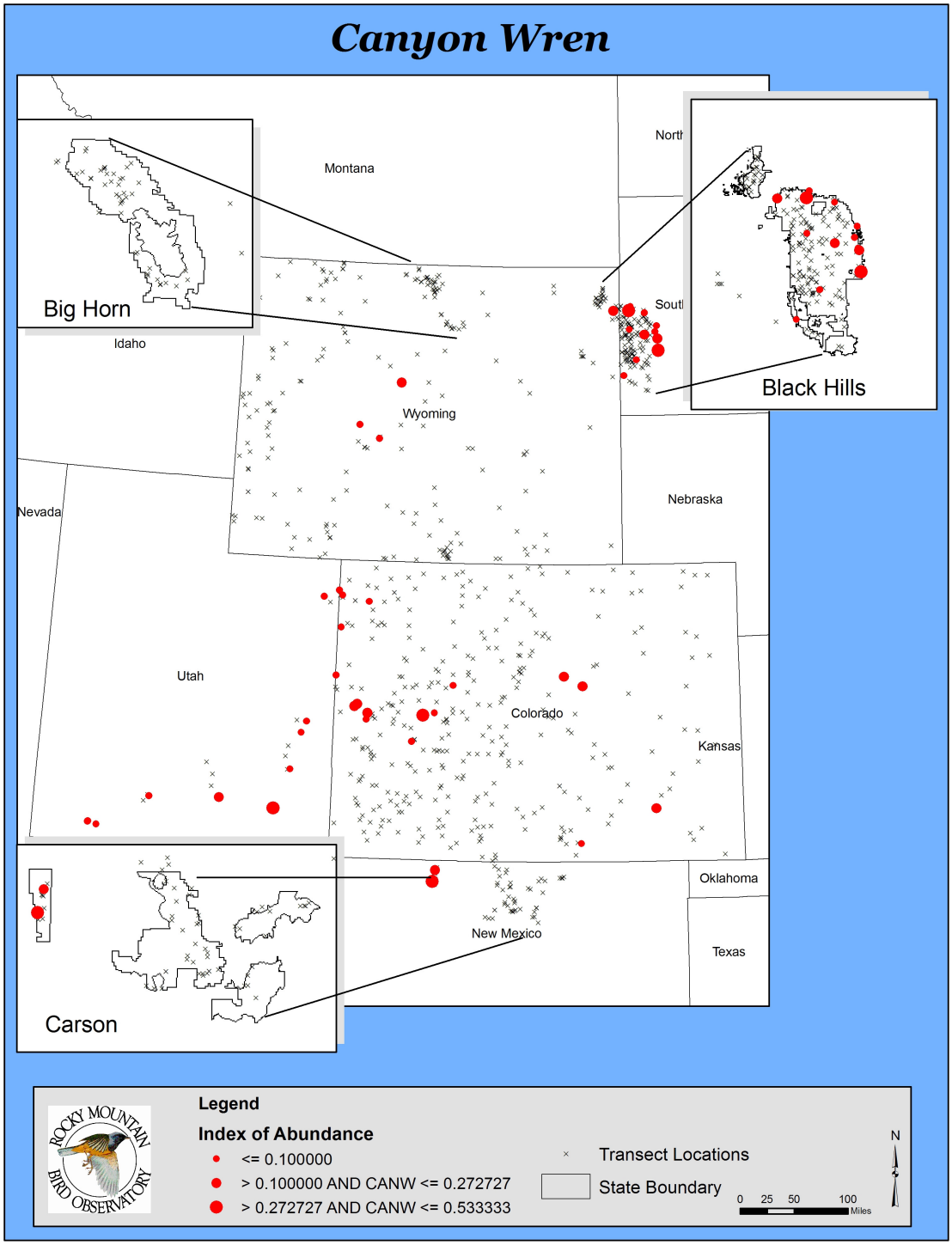
Total number of independent detections, number of individuals, and habitat-specific density estimates for Canyon Wren for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | -- | -- | -- | -- | 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.

***Summary*** – Canyon Wrens breed in rocky areas with plenty of vertical surfaces with crevices in which to nest and search for prey. The secluded habitat of Canyon Wrens generally protects them from most human activities, except recreational rock climbing which may disturb nesting grounds.

This was only the second year we detected Canyon Wrens on point transects under MWB. 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.


Canyon Wren
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.100000
> 0.100000 AND CANW <= 0.272727
> 0.272727 AND CANW <= 0.533333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Bewick's Wren
## *(Thryomanes bewickii)*

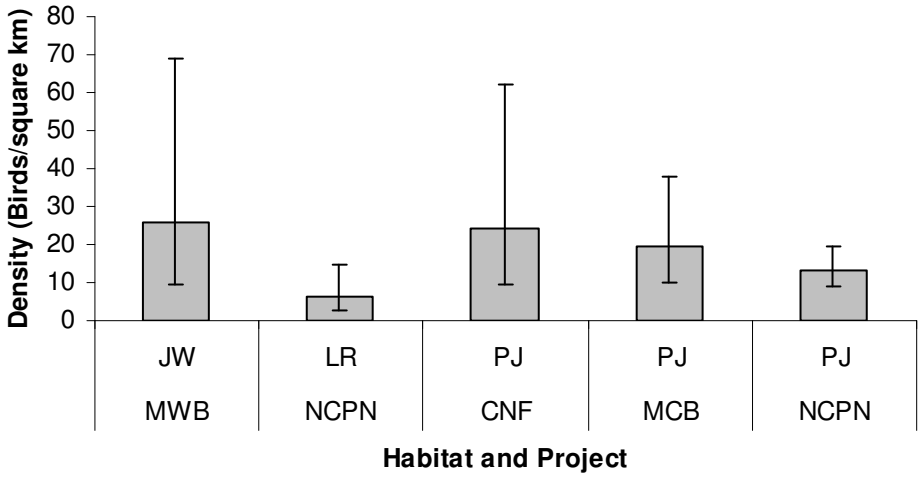
*WY-PIF Level III Priority Species
*USFWS Bird of Conservation Concern

In 2005, we detected 253 Bewick's Wrens in juniper woodland habitat on the MWB project and we were able to calculate a density estimate for this species in this habitat. Overall, we detected Bewick's Wren on all RMBO point-transect monitoring projects in 2005 except MBBH which is beyond the species' normal breeding range. We were able to calculate a density estimate for this species in at least on habitat on three other projects.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Canyon Wren for the MWB monitoring project, 2005.

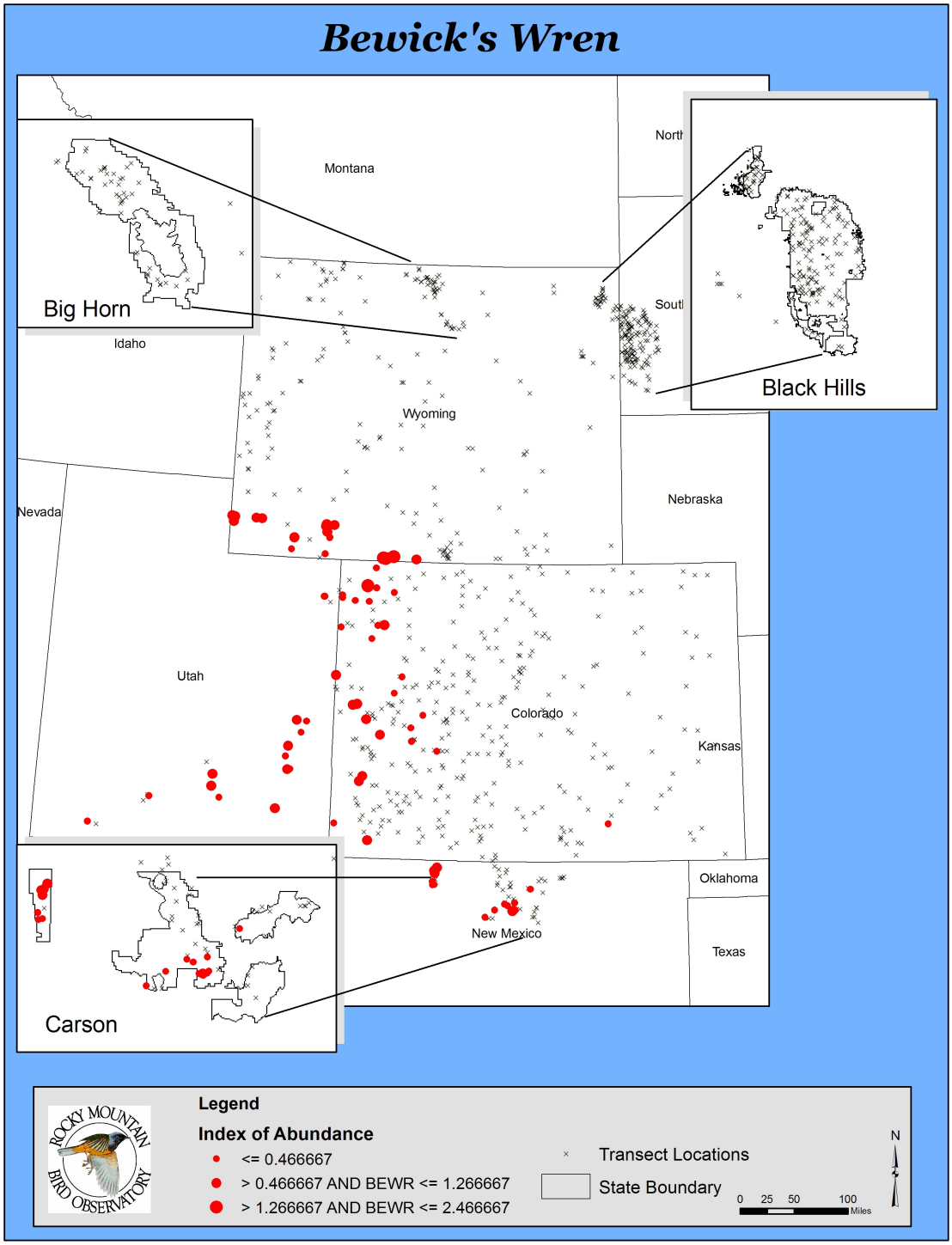
| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | 25.86 | 9.67 | 69.2 | 51.3% | 253 |

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.




***Summary-*** Bewick's Wren is found in pine-juniper, woodland-chaparral and mountain-foothills shrublands across southern and east-central Wyoming. Bewick's Wren is considered a specialist within the juniper woodland community in Wyoming.

Bewick's wren should be effectively monitored through point transects under MWB in juniper woodland habitat where it is consistently one of the most abundant species.


Bewick's Wren
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.466667
> 0.466667 AND BEWR <= 1.266667
> 1.266667 AND BEWR <= 2.466667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# American Dipper
# (*Cinclus mexicanus*)

*WY-PIF Level II Priority Species

In 2005, we detected seven individual American Dippers in two habitats on MWB. Overall, we detected American Dipper on all RMBO point-transect monitoring projects except MBCNF where we do not survey any of this species' prefered habitat. We did not detect American Dipper in sufficient numbers to calculate a density estimate in any habitat on any monitoring project.

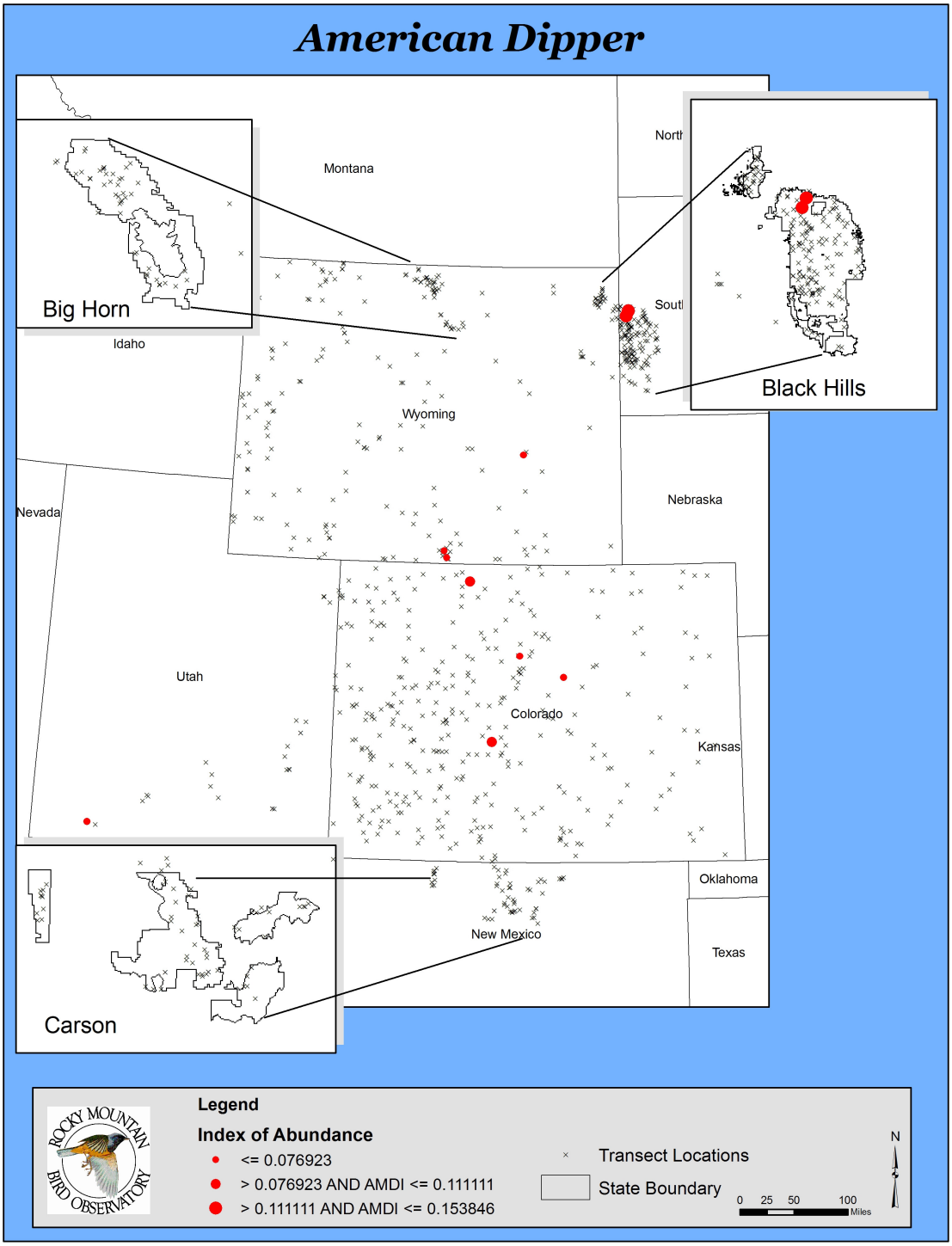
Total number of detections, number of individuals, and habitat-specific density estimates for American Dipper on the MWB monitoring project, 2005.

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

***Summary-*** 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.

American Dippers are not detected in sufficient numbers to effectively monitor or track the species through point-transect 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.


American Dipper
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.076923
> 0.076923 AND AMDI <= 0.111111
> 0.111111 AND AMDI <= 0.153846
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Golden-crowned Kinglet
# (*Regulus satrapa*)

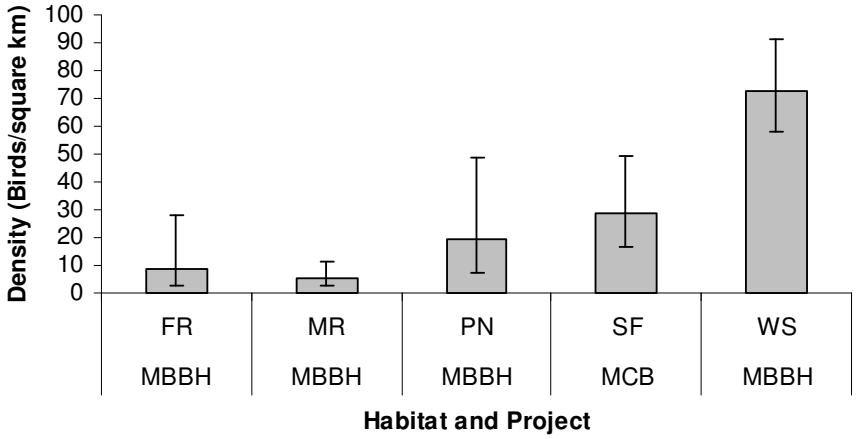
*WY-PIF Level II Priority Species

In 2005, we detected 25 individual Golden-crowned Kinglets in six habitats on MWB. Overall, we detected Golden-crowned Kinglet on all RMBO point-transect monitoring projects except NCPN where we do not survey the preferred habitat of this species. We detected Golden-crowned Kinglet in sufficient numbers to calculate a density estimate in at least one habitat on the MBBH and MCB projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Golden-crowned Kinglet on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 2 |
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 8 |
| WY-MC | ID | -- | -- | -- | -- | 5 |
| WY-MR | ID | -- | -- | -- | -- | 8 |

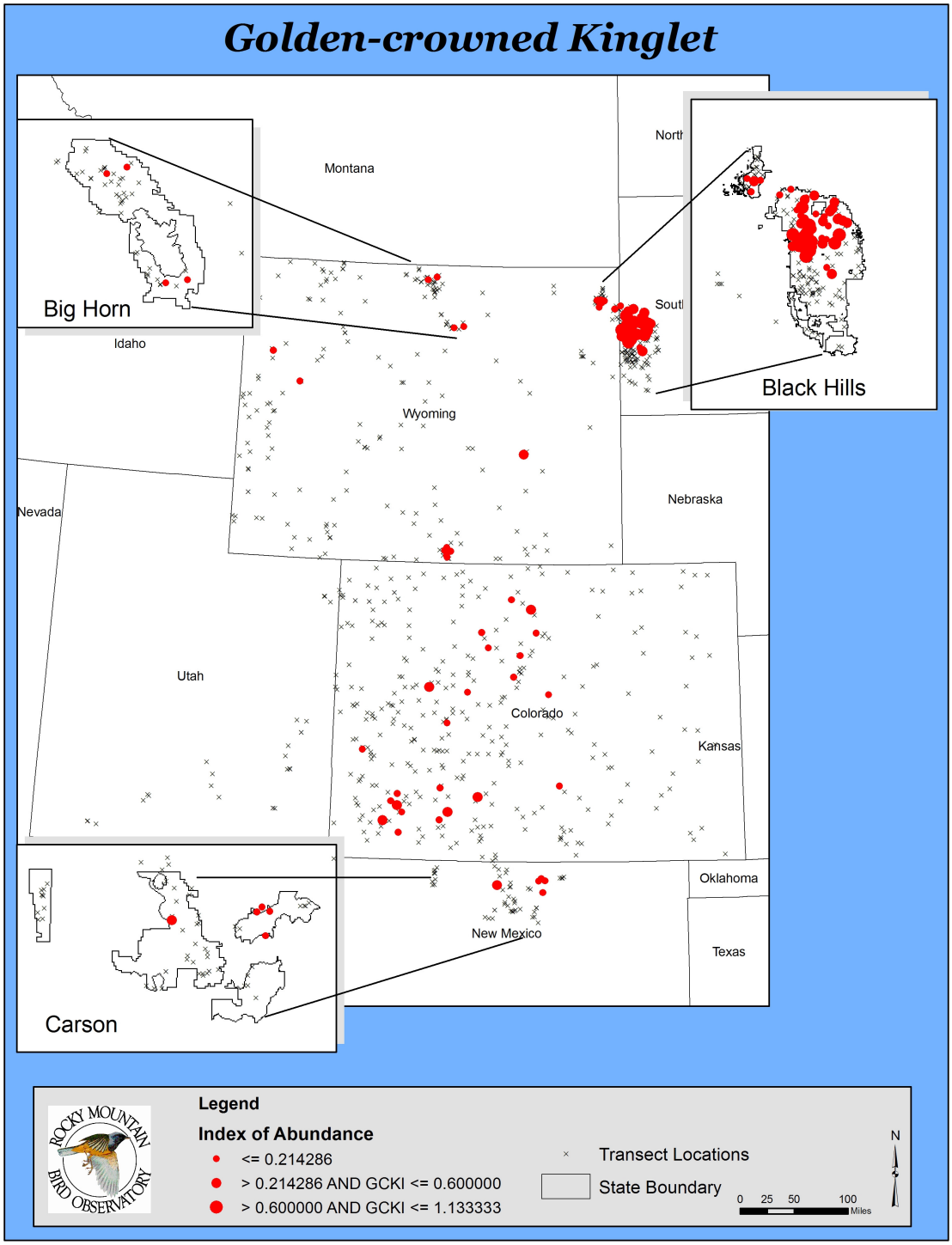
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Golden-crowned Kinglet among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Golden-crowned Kinglet prefers high-elevation coniferous forests that include spruce and is sensitive to habitat fragmentation.

In previous years, we primarily detected Golden-crowned Kinglets along mid-elevation conifer transects. Detections of Golden-crowned Kinglets are too few to effectively monitor this species under MWB; however, we may be able to loosely track its status over time using data from all habitats.


Golden-crowned Kinglet
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.214286
> 0.214286 AND GCKI <= 0.600000
> 0.600000 AND GCKI <= 1.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Townsend's Solitaire
# (*Myadestes townsendi*)

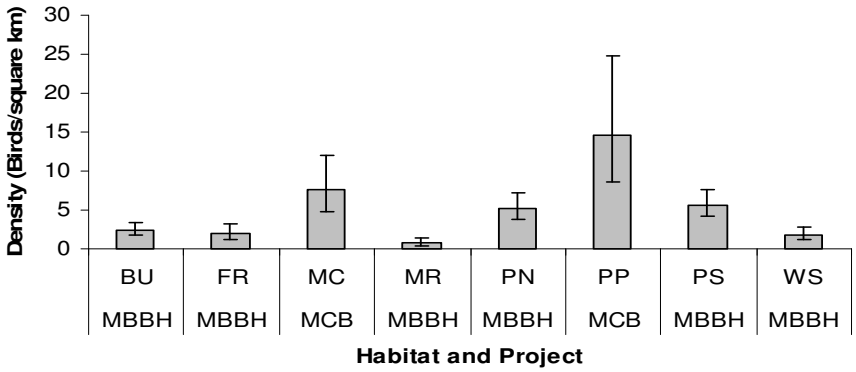
*WY-PIF Level II Priority Species

In 2005, we detected 100 individual Townsend's Solitaires in 12 habitats on MWB. Overall, we detected Townsend's Solitaire on all RMBO point-transect monitoring projects and we were able to calculate a density estimate for this species in at least one habitat on both the MBBH and MCB projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Townsend's Solitaire on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 12 |
| BI-MC | ID | -- | -- | -- | -- | 11 |
| BI-MR | ID | -- | -- | -- | -- | 13 |
| BI-SS | ID | -- | -- | -- | -- | 19 |
| SH-MC | ID | -- | -- | -- | -- | *5* |
| SH-MG | ID | -- | -- | -- | -- | 1 |
| SH-MR | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 8 |
| WY-JW | ID | -- | -- | -- | -- | 8 |
| WY-MC | ID | -- | -- | -- | -- | 16 |
| WY-MR | ID | -- | -- | -- | -- | 10 |
| WY-SS | ID | -- | -- | -- | -- | 1 |

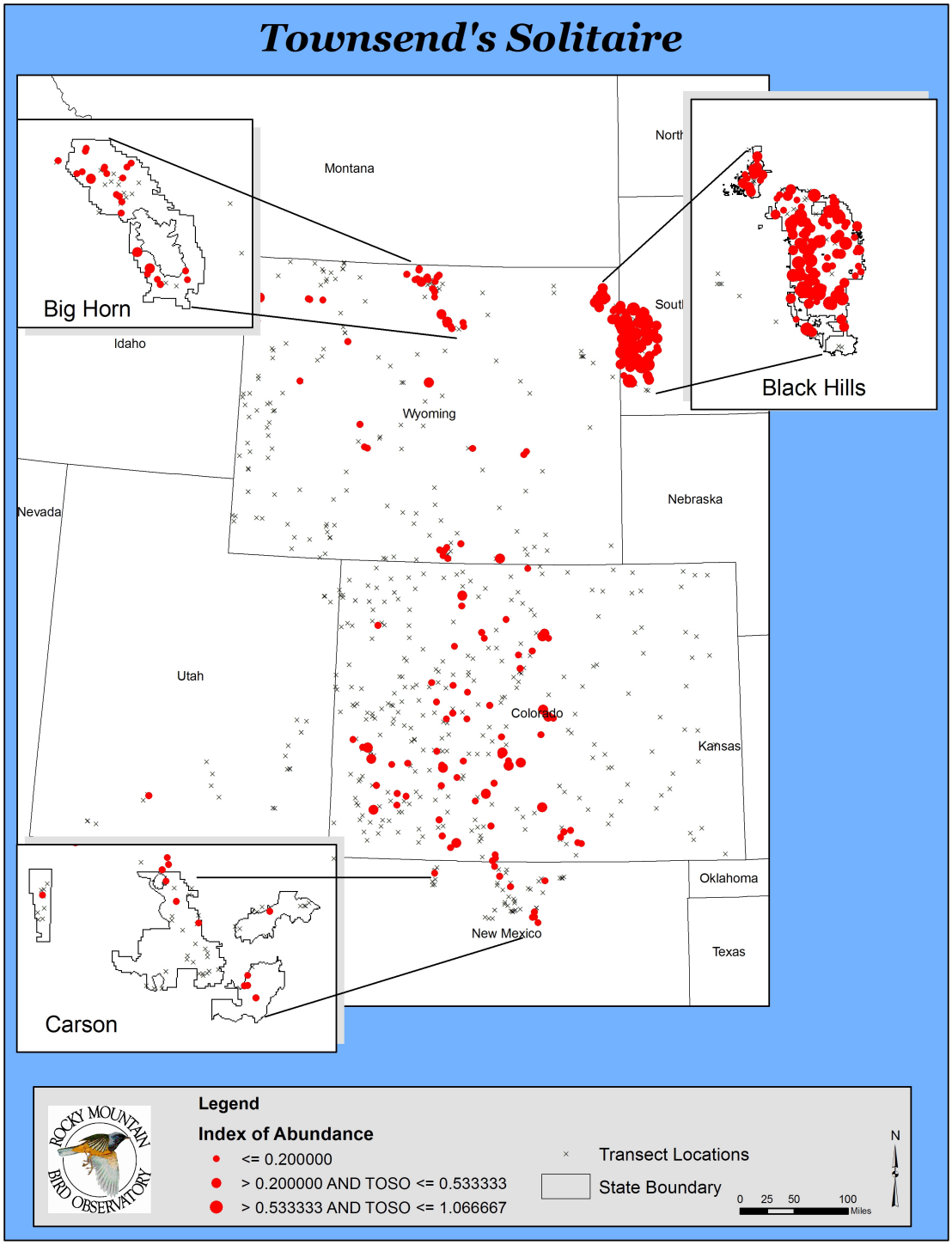
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Townsend's Solitaire among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Townsend's Solitaire nests in open coniferous forests throughout the state and usually places its nest on or near the ground.

Detections of Townsend's Solitaire are too few to monitor this species in any one habitat through point-transects under MWB except potentially mid-elevation conifer; however, we should be able to loosely track the status of Townsend's Solitaire over time using data from all habitats.


Townsend's Solitaire
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND TOSO <= 0.533333
> 0.533333 AND TOSO <= 1.066667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

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

In 2005, we had 2 detections of Veery in aspen habitat on the MWB project. We also detected this species on the MBBH and MCB projects but this species does not normally breed in the range of the MBCNF and NCPN projects. We were able to calculate a density estimate for this species in montane riparian habitat on the MBBH project.

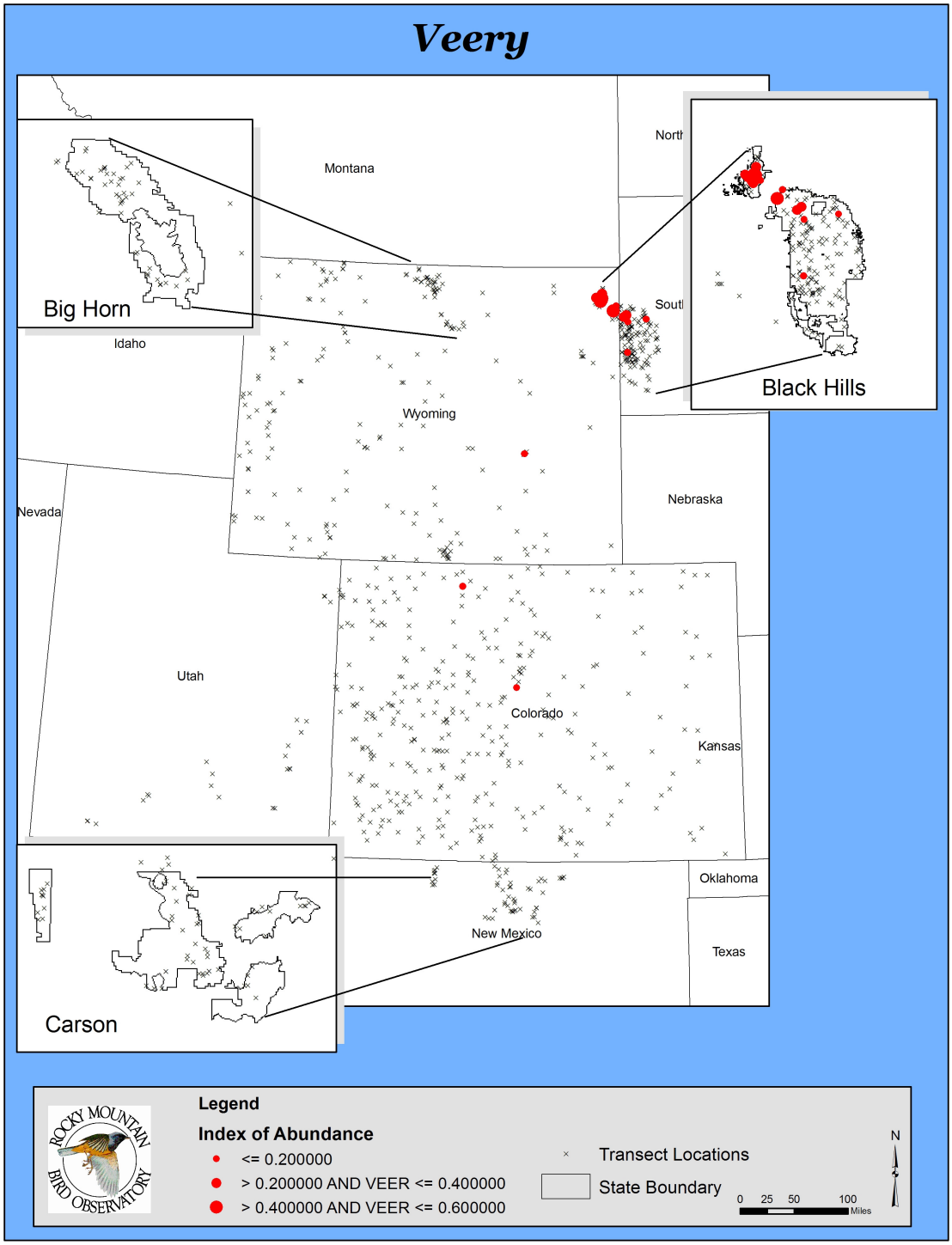
Total number of detections, number of individuals, and habitat-specific density estimates for Veery on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 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.

***Summary-*** Veery inhabits cottonwood and willow riparian areas, aspen woodlands, and conifer forests, usually near water, throughout most of Wyoming, but primarily the eastern half of the state.

In 2005, Veery was detected less frequently than in previous years. We do not detect Veery in sufficient numbers to monitor its status under MWB in any habitat or across habitats.


Veery
Montana
North
South
Big Horn
Idaho
Wyoming
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND VEER <= 0.400000
> 0.400000 AND VEER <= 0.600000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Sage Thrasher
# (*Oreoscoptes montanus*)

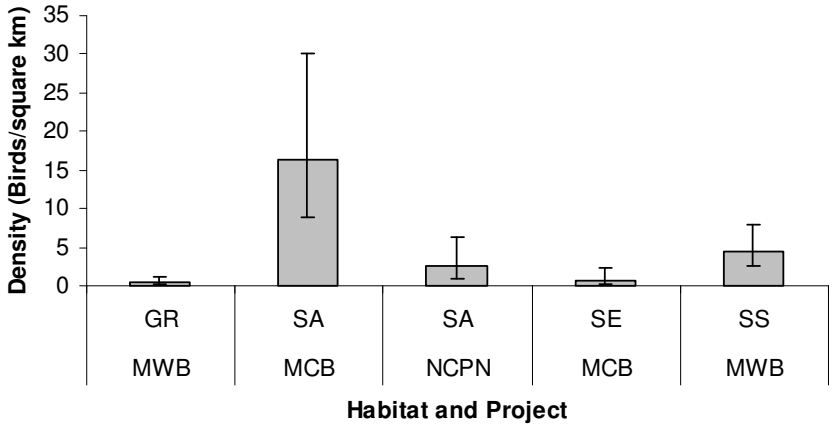
*WY-PIF Level II Priority Species
*WGFD Species of Greatest Conservation Need

In 2005, we detected 329 individual Sage Thrashers in four habitats on MWB and we were able to calculate a density estimate for this species in grassland and shrubsteppe habitats. Overall, we detected Sage Thrasher on all RMBO point-transect monitoring projects except MBBH where this species is rare and there is very little of the species' preferred habitat. We also detected Sage Thrasher in sufficient numbers to calculate a density estimate for this species in at least one habitat on the MCB and NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Sage Thrasher on the MWB monitoring project, 2005.

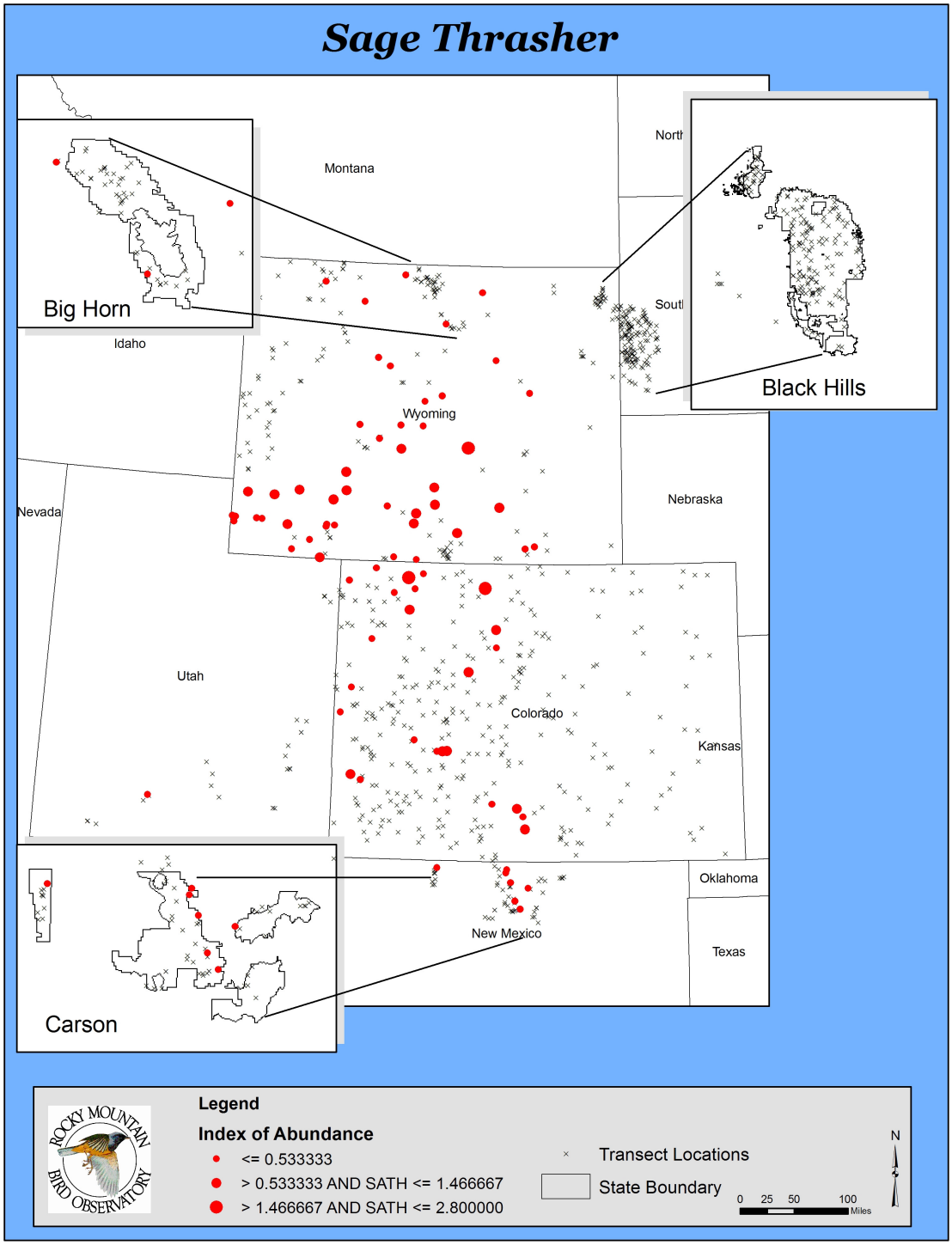
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-SS | ID | -- | -- | -- | -- | 2 |
| SH-MG | ID | -- | -- | -- | -- | 1 |
| WY-GR | 0.47 | 0.17 | 1.28 | 52% | 28 | 28 |
| WY-JW | ID | -- | -- | -- | -- | 37 |
| WY-SS | 4.52 | 2.57 | 7.98 | 28% | 149 | 261 |

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.




Relative density of Sage Thrasher among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Sage Thrasher is a sagebrush obligate that is found throughout Wyoming in prairie and foothills shrubland habitat where sagebrush is present, and appears to be sensitve to fragmentation of shrubsteppe habitat and removal of sagebrush. Sage Thrasher should be effectively monitored under MWB through point transects in shrubsteppe and grassland habitats.


Sage Thrasher
Montana
North
South
Big Horn
Idaho
Wyoming
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.533333
> 0.533333 AND SATH <= 1.466667
> 1.466667 AND SATH <= 2.800000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Virginia's Warbler
# (*Vermivora virginiae*)

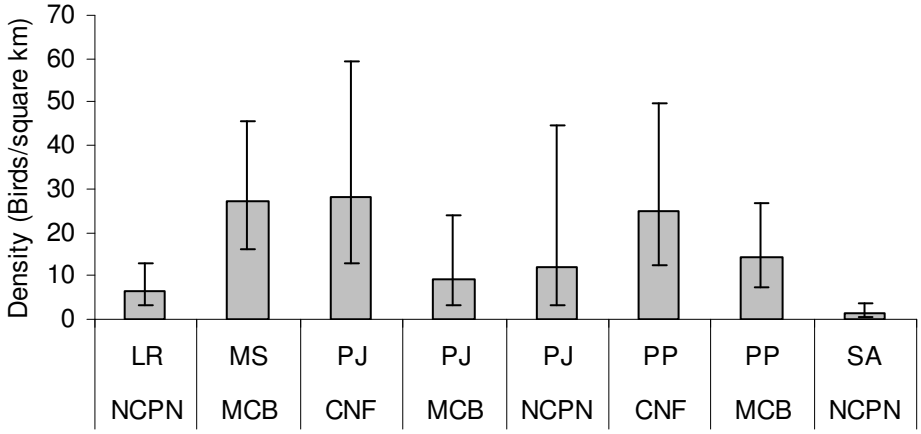
*WY-PIF Level III Priority Species
*USFWS Bird of Conservation Concern

In 2005, we detected 4 Virginia's Warbler in juniper woodland habitat on the MWB project. Overall, we detected Virginia's Warbler on all five RMBO point-count transect monitoring projects in 2005, and we were able to calculate a density estimate for this species in at least one habitat on the MCB and NCPN projects.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Virginia's Warbler for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| JW | ID | -- | -- | -- | -- | 4 |

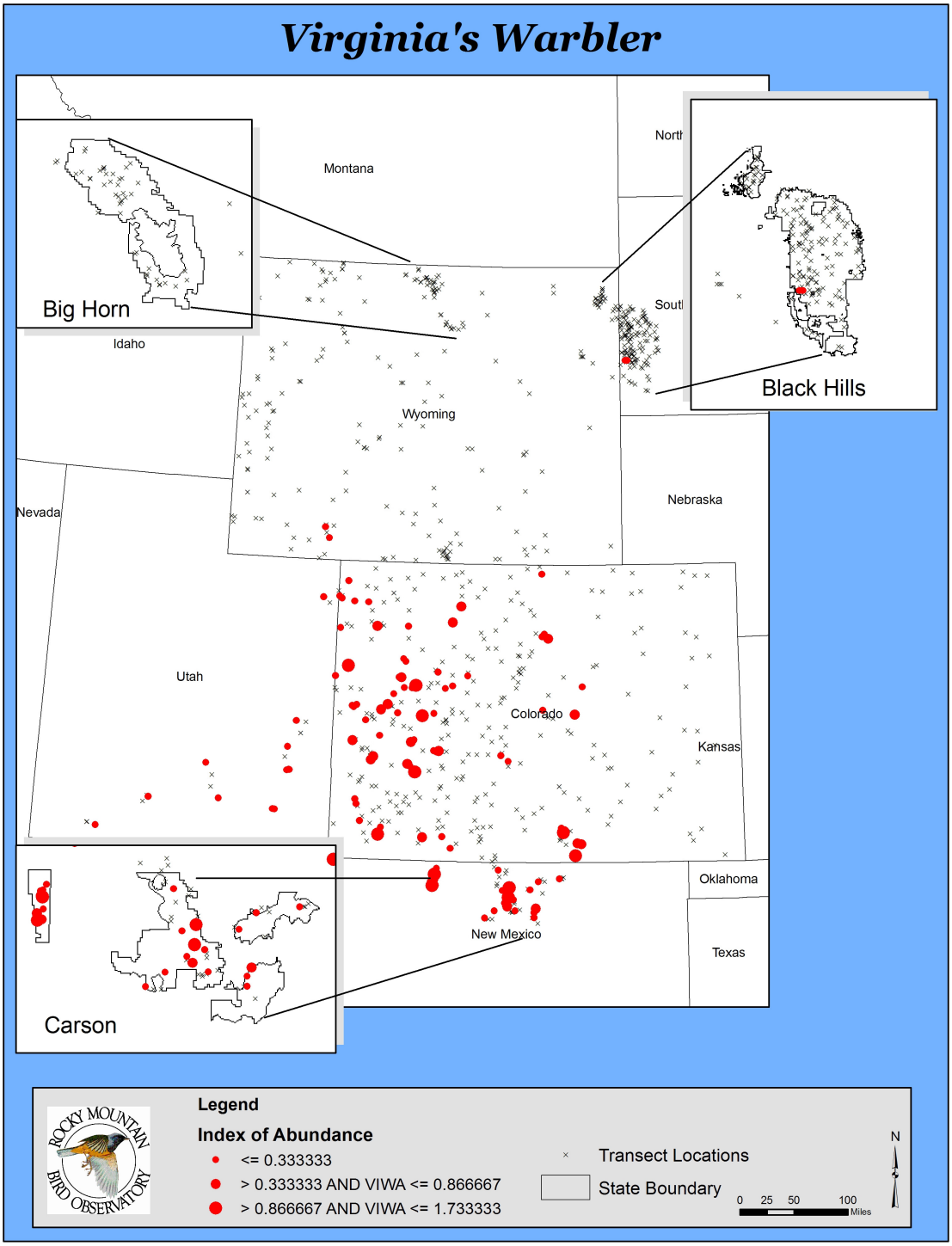
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Virginia's Warbler among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Virginia's Warbler is known to nest only in southern Wyoming, primarily in arid, brushy slopes and riparian habitat of juniper woodlands.

Virginia's Warblers are detected very rarely on juniper woodland point transects under MWB. 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 woodlands in southern Wyoming may improve our ability to monitor this species.


Virginia's Warbler
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.333333
> 0.333333 AND VIWA <= 0.866667
> 0.866667 AND VIWA <= 1.733333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Black-throated Gray Warbler
# (*Dendroica nigrescens*)

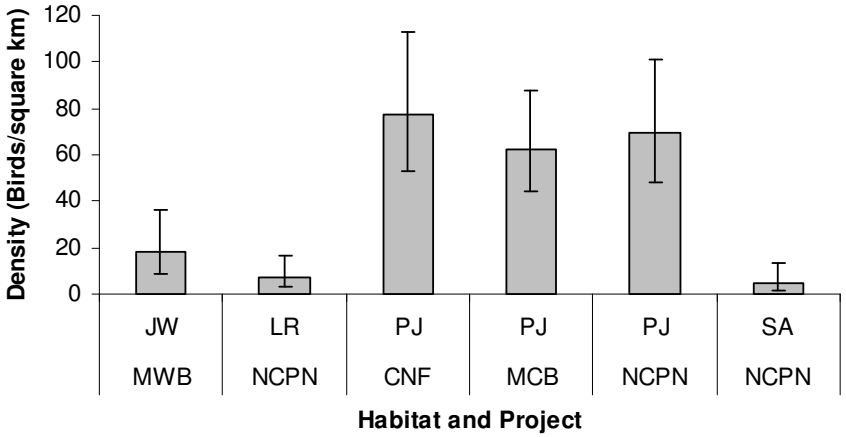
*WY-PIF Level III Priority Species

In 2005, we detected 109 Black-throated Gray Warbler in juniper woodland habitat on the MWB project and we were able to calculate a density estimate for this species in this habitat. Overall, we detected this species on all RMBO point-count transect monitoring projects in 2005 except MBBH, which is east of the species' normal breeding range. We calculated a density estimate in at least one habitat for four monitoring projects.

Total number of independent detections, number of individuals, and habitat-specific density estimates for Black-throated Gray Warbler for the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | 17.84 | 8.7 | 36.56 | 36.8% | 49 | 109 |

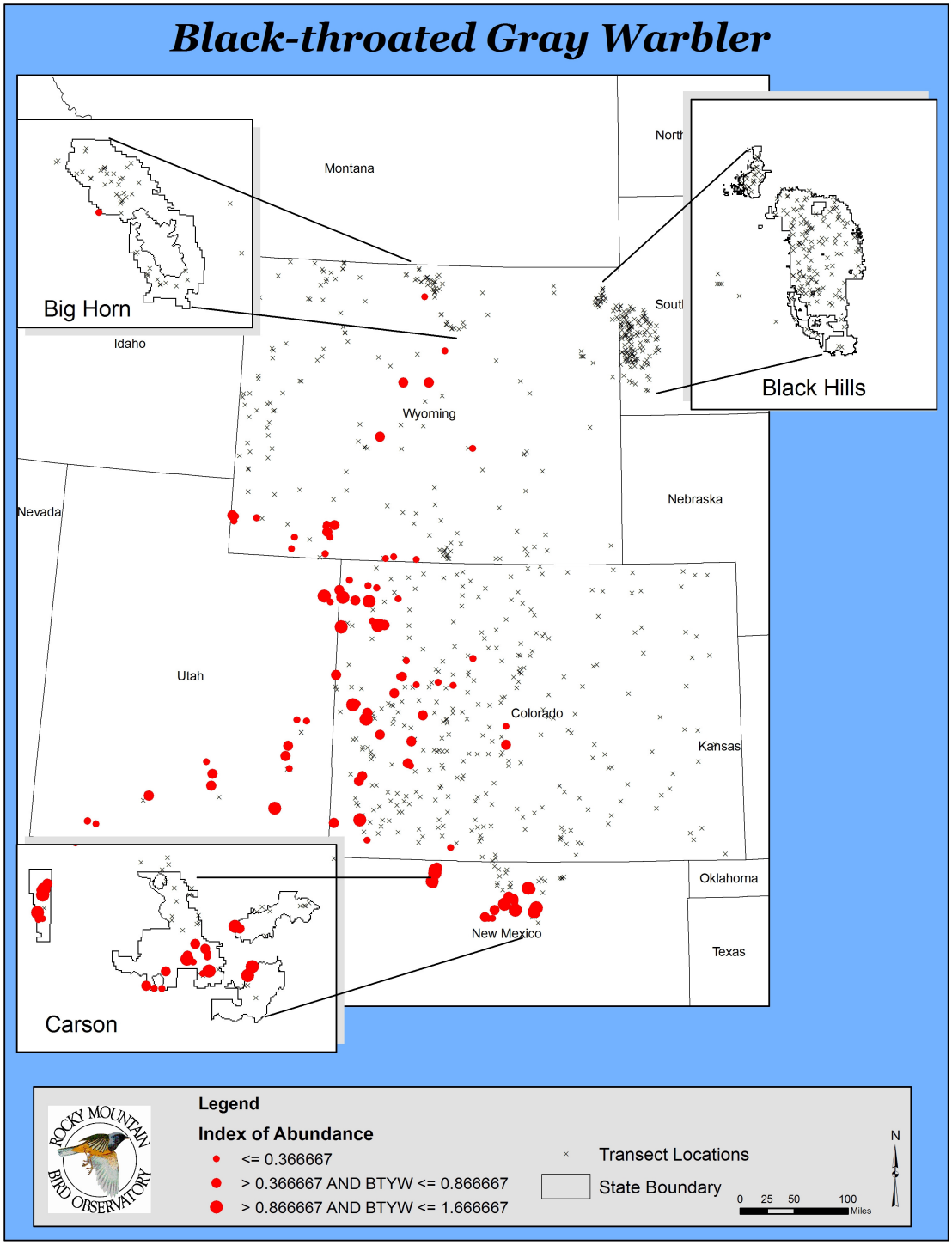
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Black-throated Gray Warbler among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Black-throated Gray Warbler prefers large stands of pinyon-dominated woodland. Very rarely is this species found outside of pinyon-juniper habitat in summer.

Black-throated Gray Warbler should be effectively monitored through point transects under MWB in juniper woodland habitat. In 2005, we had the highest number of detections for this species compared to previous years.


Black-throated Gray Warbler
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.366667
> 0.366667 AND BTYW <= 0.866667
> 0.866667 AND BTYW <= 1.666667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Ovenbird

***(Seiurus aurocapillus)***

*WY-PIF Level III Priority Species

In 2005, we detected 3 Ovenbirds in montane riparian habitat on the MWB project. We also detected Ovenbirds on the MBBH and MCB project. The MBCNF and NCPN projects are south of the normal breeding range for this species. We had sufficient detections of Ovenbirds to calculate a density for this species in four habitats on the MBBH project.

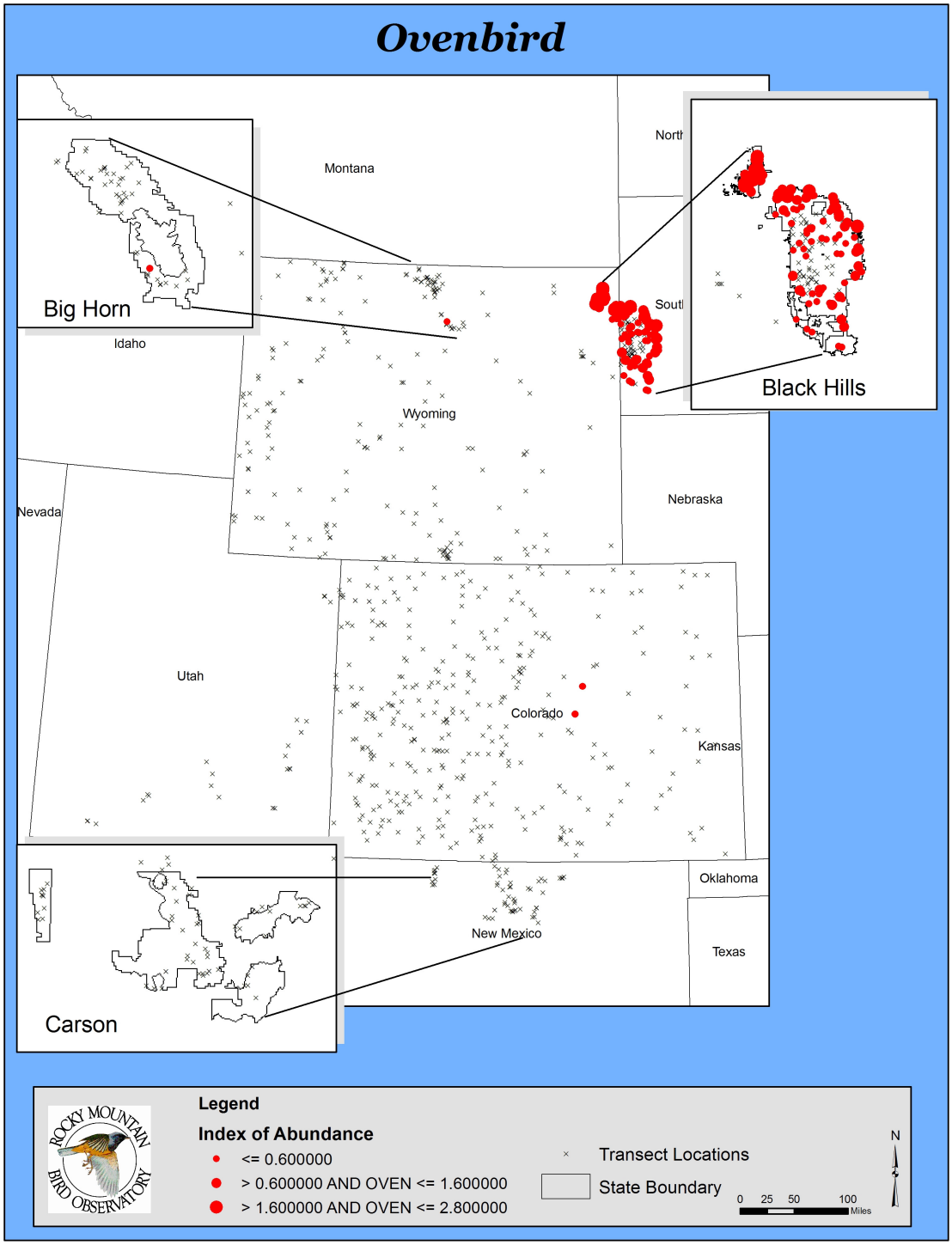
Total number of independent detections, number of individuals, and habitat-specific density estimates for Ovenbird for the MWB monitoring project, 2005.

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

***Summary-*** Ovenbird breeds in mature woodlands of many different plant community types with deciduous trees as a chief component. In Wyoming it breeds primarily in the Black Hills in the northwest corner of the state.

This was the first year we detected Ovenbird on a statewide transect and only the second year we detected this species in the Bighorn National Forest. Given its limited breeding range in the state and specific habitat requirements it is unlikely we will be able to monitor this species through point transects under MWB; however, adding transects in montane riparian habitat to meet our target goal of 30 may improve our abilitity to detect this species.


Ovenbird
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.600000
> 0.600000 AND OVEN <= 1.600000
> 1.600000 AND OVEN <= 2.800000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# MacGillivray's Warbler
# (*Oporornis tolmiei*)

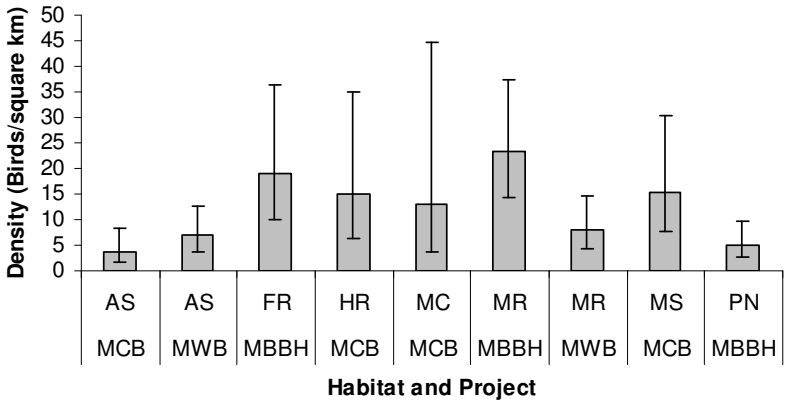
*WY-PIF Level II Priority Species

In 2005, we detected 175 individual MacGillivray's Warblers in eight habitats on MWB and we were able to calculate a density estimate for this species in aspen and montane riparian habitats. Overall, we detected MacGillivray's Warbler on all five RMBO point-transect monitoring projects and we were also able to calculate a density estimate in at least one habitat for the MBBH and MCB projects.

Total number of detections, number of individuals, and habitat-specific density estimates for MacGillivray's Warbler on the MWB monitoring project, 2005.

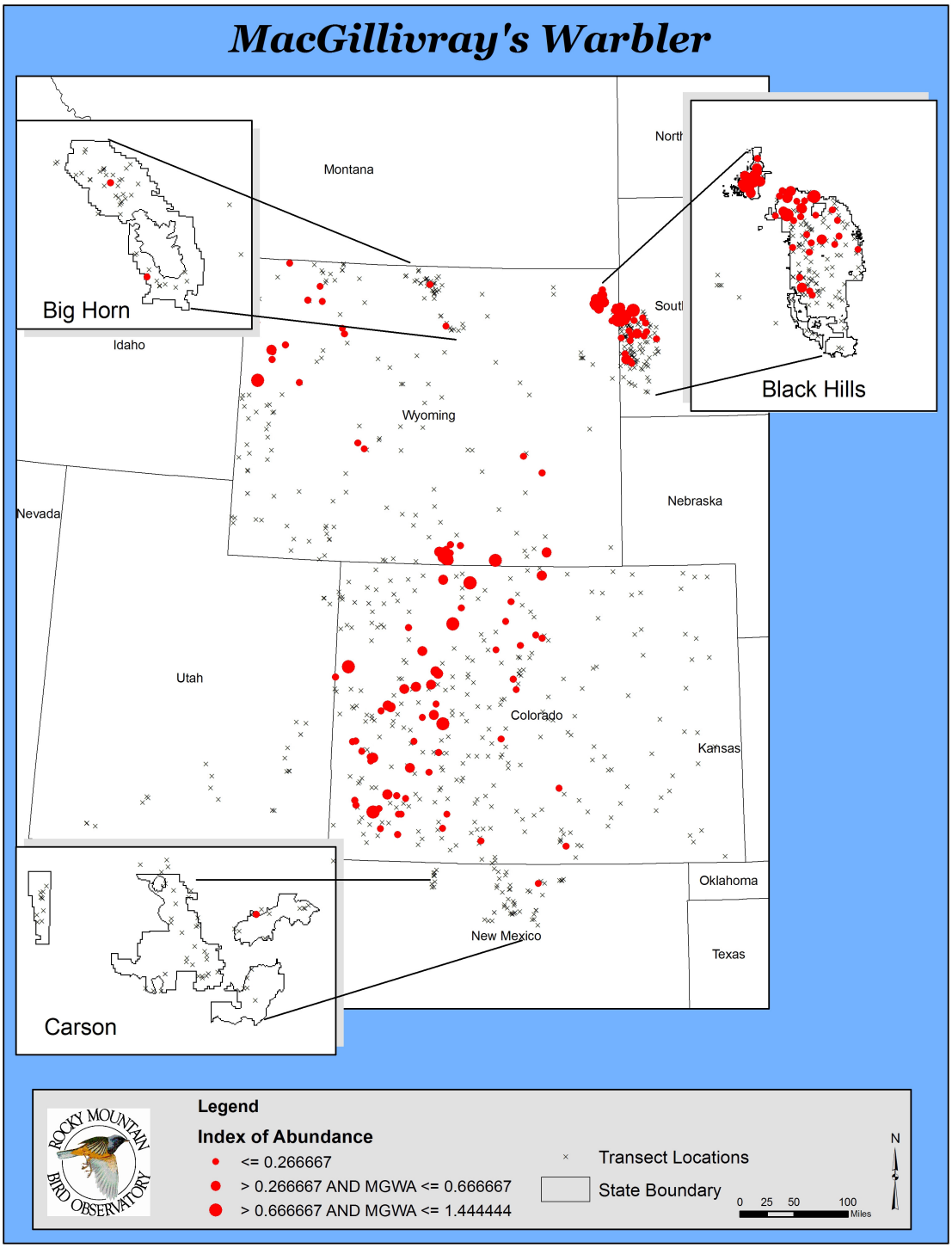
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 3 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| SH-MG | ID | -- | -- | -- | -- | 5 |
| SH-MR | ID | -- | -- | -- | -- | 9 |
| WY-AS | 6.96 | 3.80 | 12.74 | 30% | 62 | 64 |
| WY-MC | ID | -- | -- | -- | -- | 19 |
| WY-MR | 7.75 | 4.15 | 14.48 | 30% | 71 | 72 |
| WY-SS | ID | -- | -- | -- | -- | 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.




Relative density of MacGillivray's Warblers among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary-*** MacGillivray's Warbler prefers burned or cut areas in early successional stages but is found throughout most mountainous areas of Wyoming. MacGillivray's Warbler should be effectively monitored under MWB through point-transects in at least aspen and montane riparian habitats. In previous years, we have also detected this species in sufficient numbers to calculate a density estimate in mid-elevation conifer habitat.


MacGillivray's Warbler
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.266667
> 0.266667 AND MGWA <= 0.666667
> 0.666667 AND MGWA <= 1.444444
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Wilson's Warbler
## *(Wilsonia pusilla)*

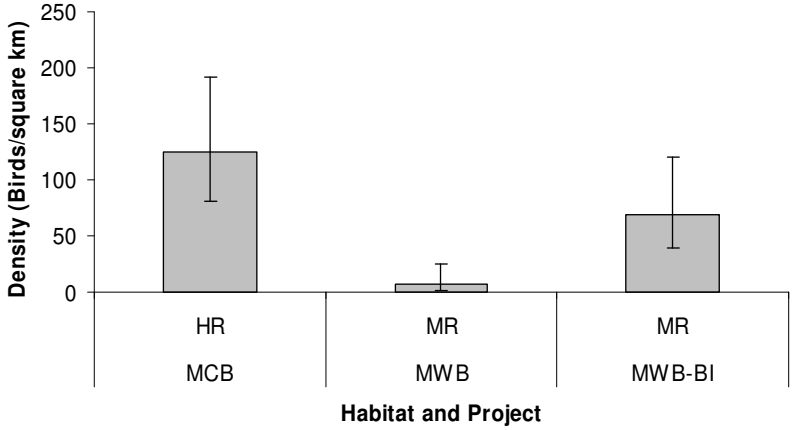
*WY-PIF Level II Priority Species

We detected Wilson's Warbler in five habitats on the MCB project in 2005 and we detected them in sufficient numbers to calculate a density estimates in high-elevation riparian. Overall, we detected this species on three RMBO point-count transect monitoring projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Wilson's Warbler on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MC | ID | -- | -- | -- | -- | 8 |
| BI-MR | 68.79 | 39.21 | 120.68 | 27.2% | 141 | 142 |
| SH-MR | ID | -- | -- | -- | -- | 1 |
| WY-AS | ID | -- | -- | -- | -- | 4 |
| WY-MC | ID | -- | -- | -- | -- | 4 |
| WY-MR | 6.71 | 1.77 | 25.44 | 69.7% | 44 | 99 |

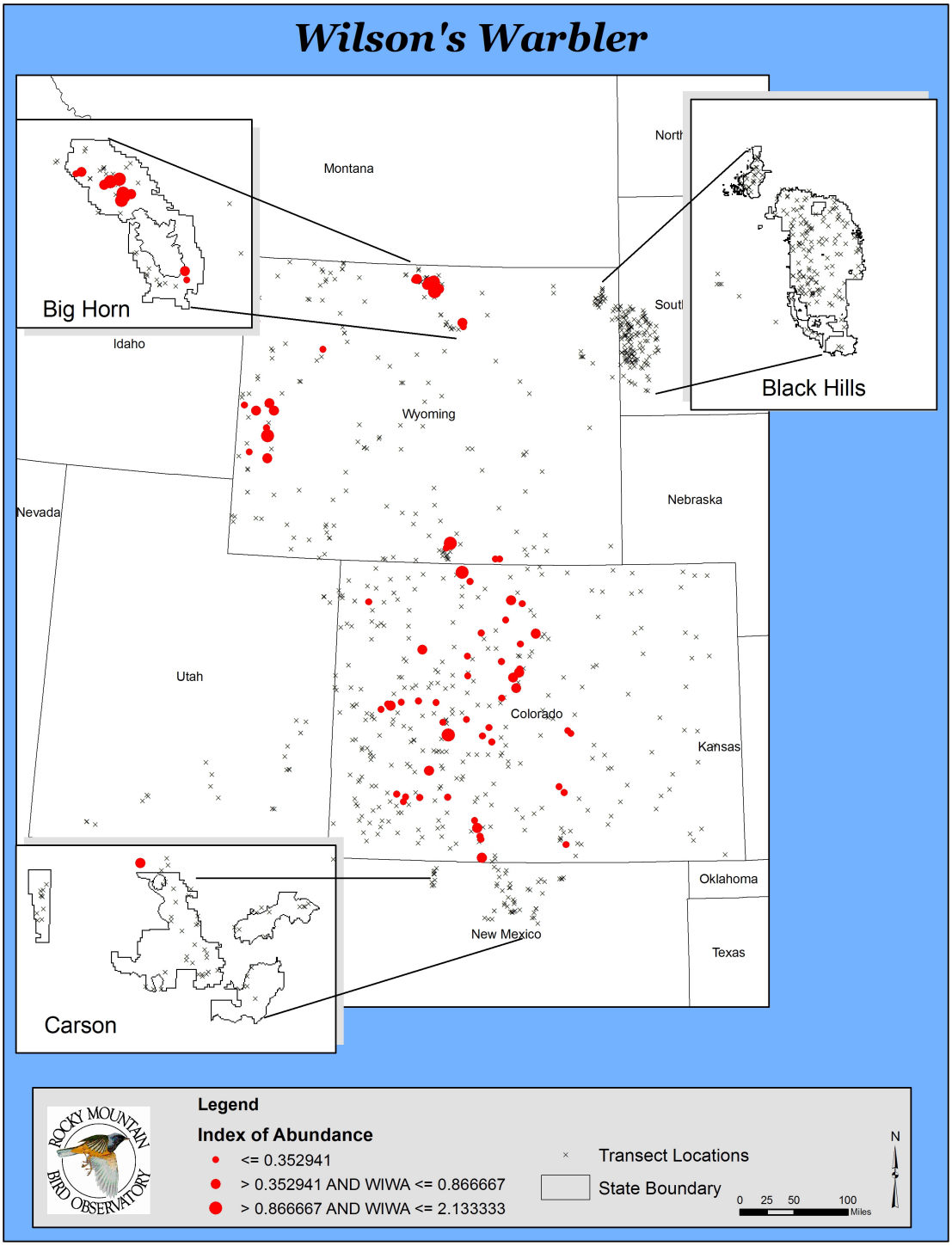
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Wilson's Warbler among habitats for all RMBO point-count transect monitoring projects, 2005.

***SUMMARY*** – Wilson's Warbler breeds in high-elevation areas that are dominated by willow shrubs, including alpine tundra.

Wilson's Warbler should be effectively monitored through point transects under MWB in montane riparian habitat, on both statewide and Bighorn National Forest transects. Interestingly, we had more detections of Wilson's Warbler on the 10 Bighorn montane riparian transects in 2005 than on the 22 statewide transects in this habitat.


Wilson's Warbler
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.352941
> 0.352941 AND WIWA <= 0.866667
> 0.866667 AND WIWA <= 2.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Brewer's Sparrow
## (*Spizella breweri)*

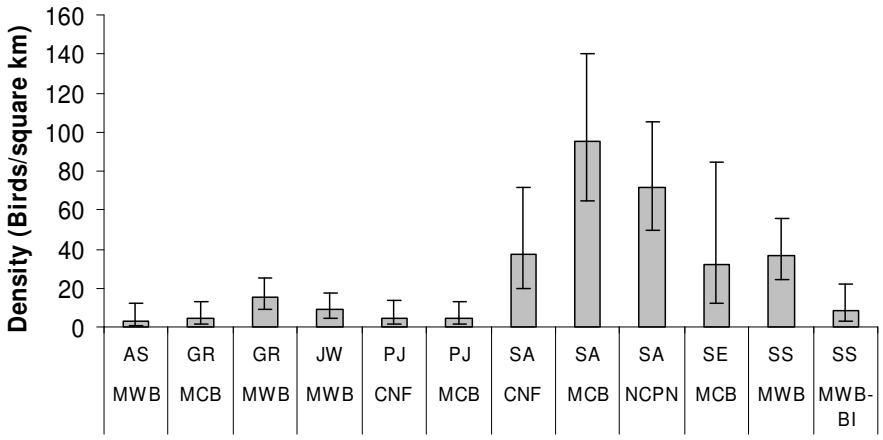
*WY-PIF Level I Priority Species
*USFWS Bird of Conservation Concern
*WGFD Species of Greatest Conservation Need

In 2005, we detected 1,277 Brewer's Sparrow in seven habitats on the MWB project and were able to calculate a density estimate in four habitats. Overall, we detected Brewer's Sparrow on RMBO point-count transect monitoring projects in 2005, and we were able to calculate a density estimate in at least one habitat for four of the RMBO monitoring projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Brewer's Sparrow on the MWB monitoring project, 2005.

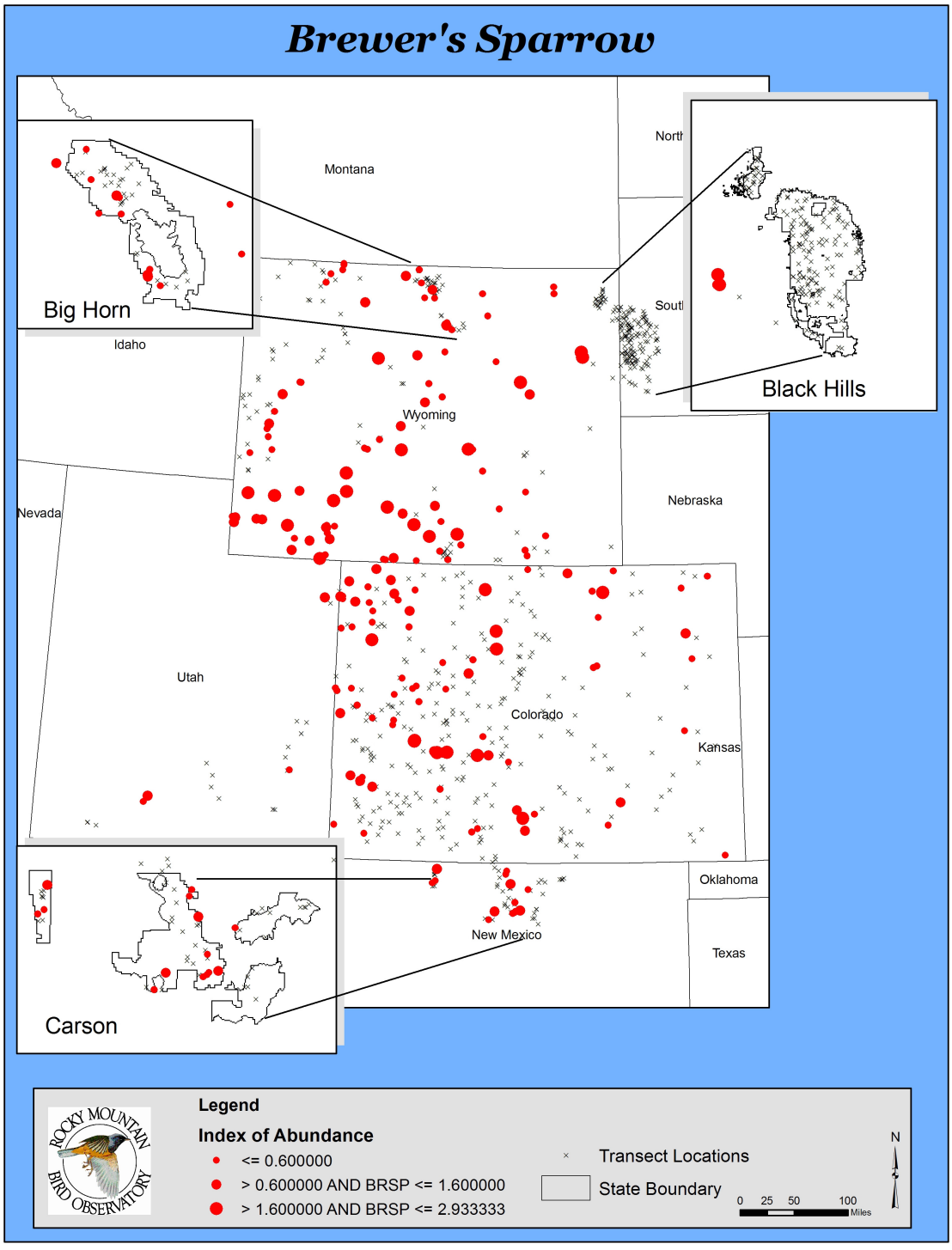
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 15 |
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | 8.01 | 2.90 | 22.12 | 47.4% | 60 | 62 |
| SH-MG | ID | -- | -- | -- | -- | 19 |
| WY-AS | 3.27 | 0.89 | 12.07 | 68.9% | 35 | 52 |
| WY-GR | 15.38 | 9.43 | 25.06 | 24.4% | 235 | 246 |
| WY-JW | 9.02 | 4.71 | 17.27 | 32.6% | 72 | 176 |
| WY-MC | ID | -- | -- | -- | -- | 2 |
| WY-MR | ** | -- | -- | -- | 25 | 25 |
| WY-SS | 36.71 | 24.26 | 55.55 | 20.7% | 419 | 679 |

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; ** - unable to calculate density due to observer error in estimating distance.




Relative density of Brewer's Sparrow among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary-*** Brewer's Sparrow prefers sagebrush habitat but may also breed in mountain mahogany and other shrubby habitat throughout the state. Brewer's Sparrow should be effectively monitored under MWB through point-transects in a variety of habitats including grassland, juniper woodland and shrubsteppe.


Brewer's Sparrow
Montana
North
South
Wyoming
Idaho
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.600000
> 0.600000 AND BRSP <= 1.600000
> 1.600000 AND BRSP <= 2.933333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Vesper Sparrow
# (*Pooecetes gramineus*)

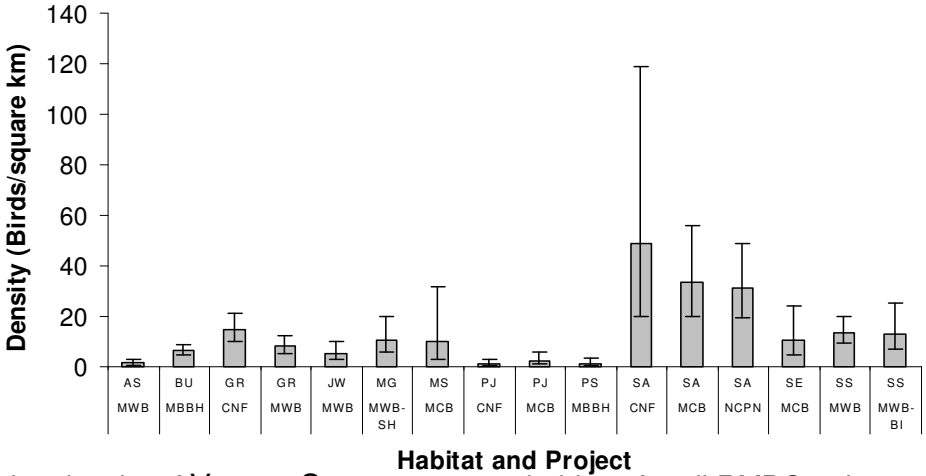
*WY-PIF Level II Priority Species

In 2005, we detected 883 individual Vesper Sparrows in 12 habitats on MWB and we were able to calculate a density estimate for this species in 6 habitats. Overall, we detected Vesper Sparrows on all RMBO monitoring projects and we were able to calculate a density estimate in at least one habitat on all projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Vesper Sparrow on the MWB monitoring project, 2005.

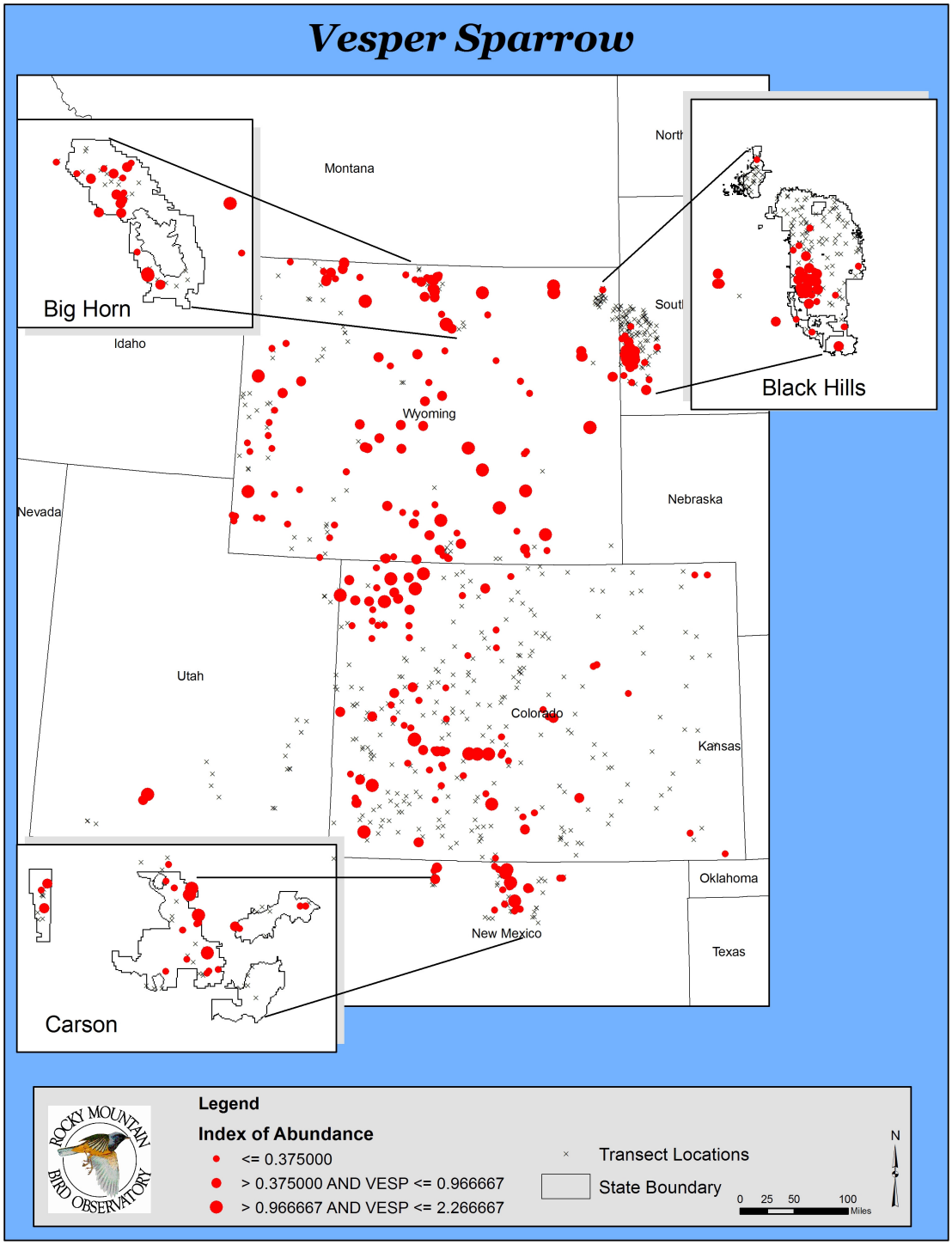
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-HC | ID | -- | -- | -- | -- | 15 |
| BI-MC | ID | -- | -- | -- | -- | 16 |
| BI-MR | ID | -- | -- | -- | -- | 8 |
| BI-SS | 13.23 | 6.89 | 25.39 | 31% | 103 | 104 |
| SH-MG | 10.78 | 5.83 | 19.96 | 30% | 63 | 63 |
| SH-MR | ID | -- | -- | -- | -- | 1 |
| WY-AS | 1.59 | 0.82 | 3.07 | 33% | 49 | 53 |
| WY-GR | 8.05 | 5.32 | 12.18 | 21% | 296 | 303 |
| WY-JW | 5.55 | 3.17 | 9.75 | 28% | 66 | 86 |
| WY-MC | ID | -- | -- | -- | -- | 2 |
| WY-MR | ** | -- | -- | -- | 25 | 25 |
| WY-SS | 13.66 | 9.31 | 20.03 | 19% | 189 | 207 |

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; ** - unable to calculate density due to observer error in estimating distance.




Relative density of Vesper Sparrow among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Vesper Sparrows occurs throughout the state in basin-prairie shrublands, mountain-foothills shrublands, grasslands, and agricultural areas. Vesper Sparrows should be effectively monitored through point-transects under MWB in a range of habitats, especially grassland, juniper woodland and shrubsteppe.


Vesper Sparrow
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.375000
> 0.375000 AND VESP <= 0.966667
> 0.966667 AND VESP <= 2.266667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Lark Sparrow
# (*Chondestes grammacus*)

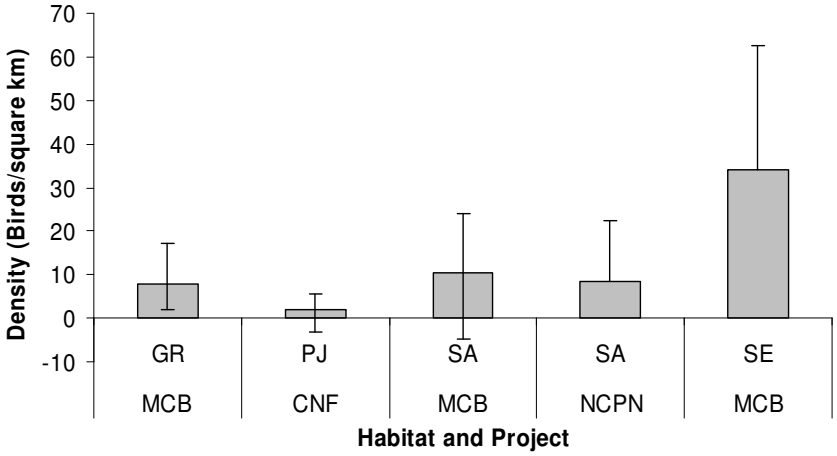
*WY-PIF Level II Priority Species

In 2005, we detected 96 individual Lark Sparrows in five habitats on MWB. Overall, we detected Lark Sparrow on all RMBO point-transect monitoring projects and we were able to calculate a density estimate for this species in at least one habitat on the MBCNF, MCB, and, NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Lark Sparrow on the MWB monitoring project, 2005.

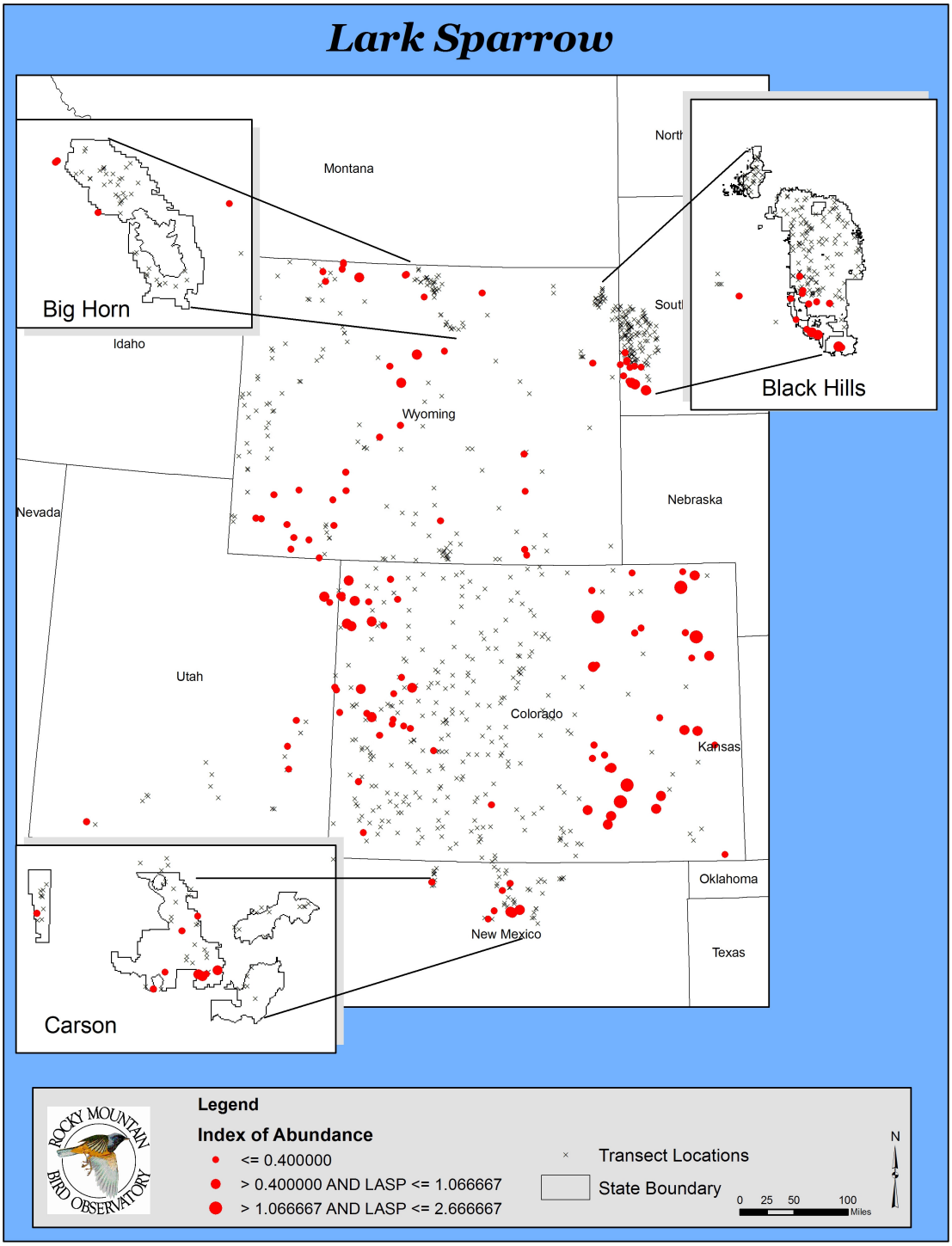
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| SH-MG | ID | -- | -- | -- | -- | 13 |
| WY-AS | ID | -- | -- | -- | -- | 1 |
| WY-GR | ID | -- | -- | -- | -- | 12 |
| WY-JW | ** | -- | -- | -- | 30 | 31 |
| WY-SS | ** | -- | -- | -- | 38 | 39 |

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; ** - unable to calculate density due to observer error in estimating distance.




Relative density of Lark Sparrow among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Lark Sparrows prefer arid, open areas with some shrub component and breed in a variety of locations including prairies, roadsides, farms, open woodlands, and mesas across Wyoming. We should be able to effectively monitor Lark Sparrow through point-transects under MWB in a variety of habitats, especially juniper woodland and shrubsteppe.


Lark Sparrow
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.400000
> 0.400000 AND LASP <= 1.066667
> 1.066667 AND LASP <= 2.666667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Sage Sparrow
# (*Amphispiza belli*)

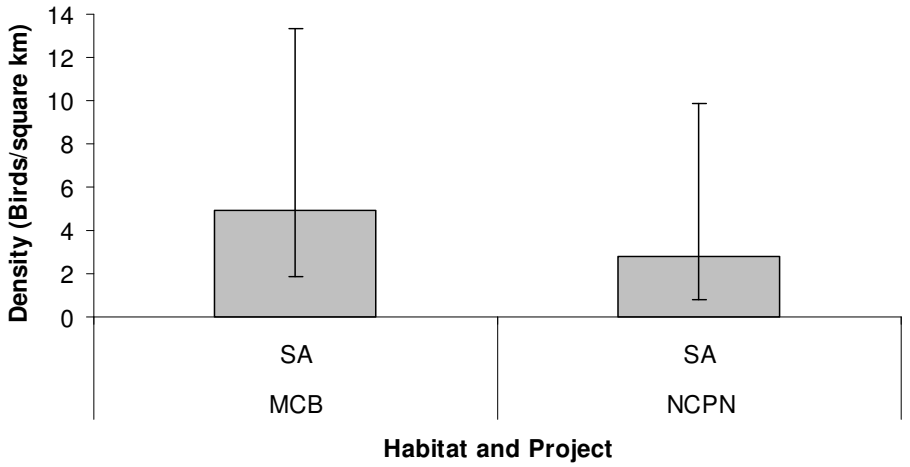
*WY-PIF Level I Priority Species
*WGFD Species of Greatest Conservation Need

In 2005, we detected 130 individual Sage Sparrows in five habitats on MWB. Overall, we detected Sage Sparrow on all RMBO point-transect projects except MBBH which is outside of this species' normal breeding range. We detected Sage Sparrow in sufficient numbers to calculate a density estimate in sage shrubland habitat on both the MCB and NCPN projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Sage Sparrow on the MWB monitoring project, 2005.

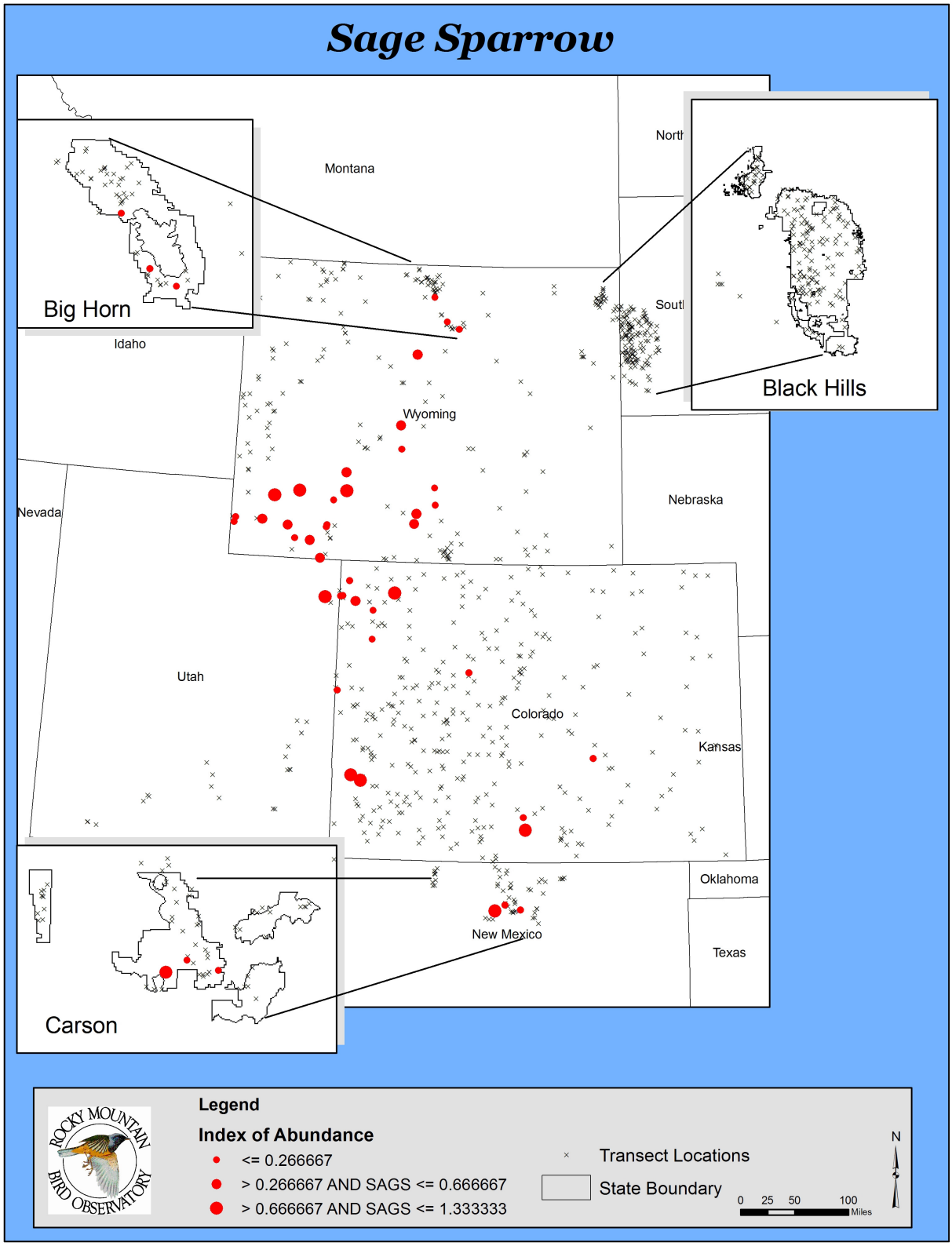
| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-MR | ID | -- | -- | -- | -- | 1 |
| BI-SS | ID | -- | -- | -- | -- | 1 |
| WY-JW | ID | -- | -- | -- | -- | 18 |
| WY-MR | ID | -- | -- | -- | -- | 1 |
| WY-SS | 1.81 | 0.52 | 6.25 | 68.0% | 34 | 109 |

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.




Relative density of Sage Sparrow among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Sage Sparrow is a sagebrush obligate that is sensitive to habitat fragmentation, and occurs throughout most of Wyoming where sagebrush is present. Sage Sparrow should be effectively monitored under MWB through point-transects in shrubsteppe habitat.


Sage Sparrow
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.266667
> 0.266667 AND SAGS <= 0.666667
> 0.666667 AND SAGS <= 1.333333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Lark Bunting
# (*Calamospiza melanocorys*)

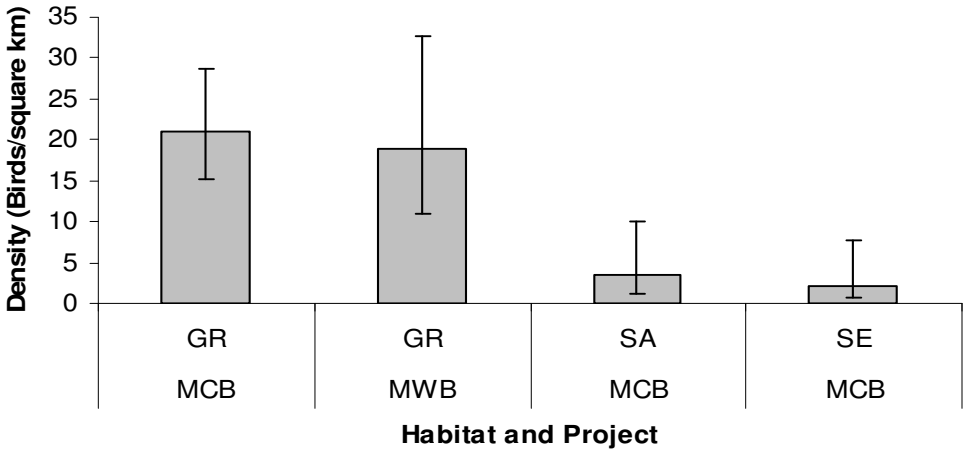
*WY-PIF Level II Priority Species
*WGFD Species of Greatest Conservation Need

In 2005, we detected 691 individual Lark Buntings in two habitats on MWB and were able to calculate a density estimate for this species in grassland habitat. Overall, we detected Lark Bunting on all point-transect monitoring projects except NCPN which is mostly outside of this species normal breeding range. We also detected Lark Bunting in sufficient numbers to calculate a density estimate in at least one habitat on the MCB and MWB projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Lark Bunting on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| WY-GR | 18.85 | 10.87 | 32.67 | 27% | 476 | 668 |
| WY-SS | ID | -- | -- | -- | -- | 23 |

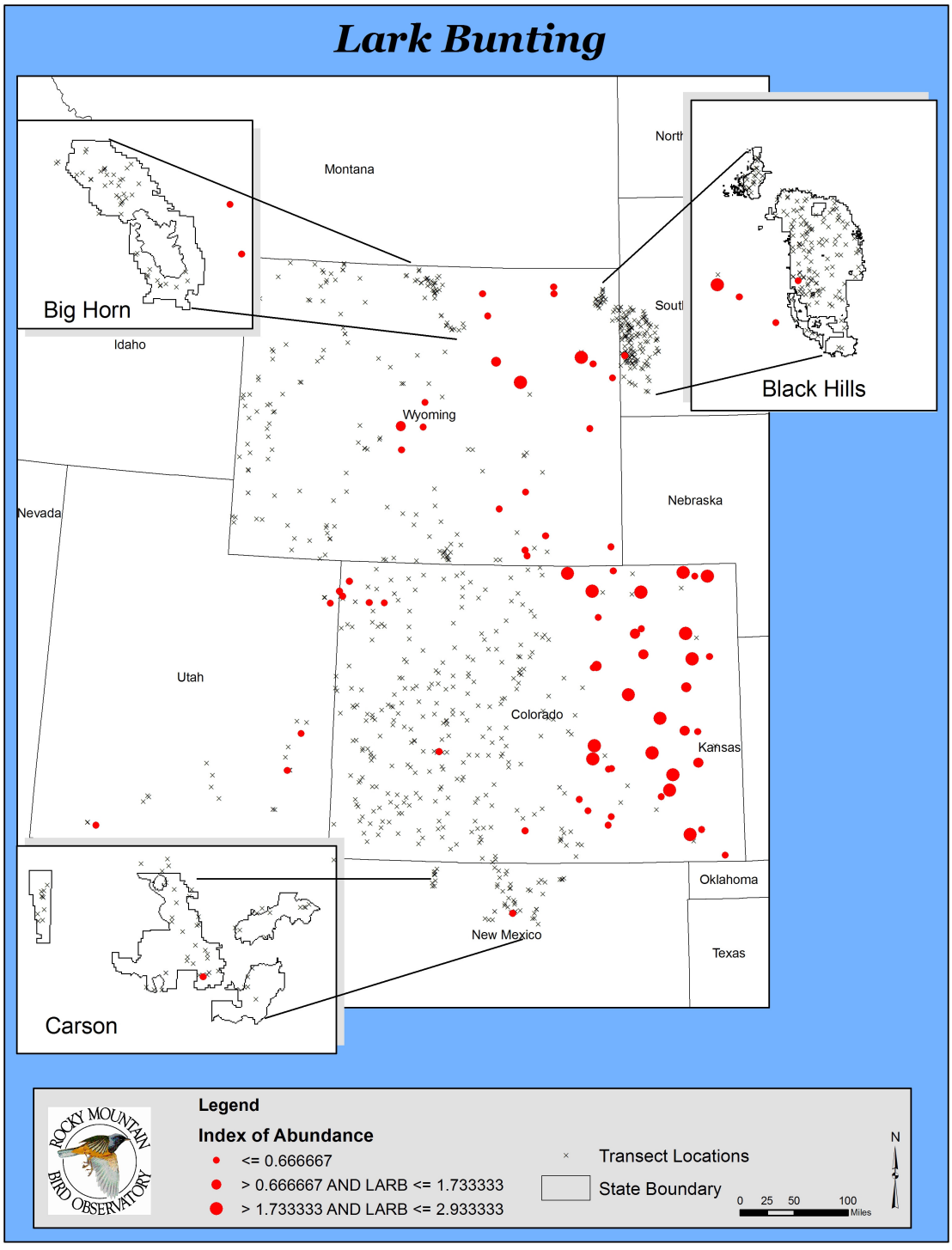
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Lark Bunting among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Lark Bunting is found throughout Wyoming primarily in open habitats such as native prairie, shrubsteppe and agricultural areas.

Lark Bunting should be effectively monitored under MWB through point-transects in grassland habitat. In previous years we have also had enough detections of this species in shrubsteppe habitat to calculate a density estimate.


Lark Bunting
Montana
North
South
Big Horn
Idaho
Wyoming
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Carson
Legend
Index of Abundance
<= 0.666667
> 0.666667 AND LARB <= 1.733333
> 1.733333 AND LARB <= 2.933333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Grasshopper Sparrow
# (*Ammodramus savannarum*)

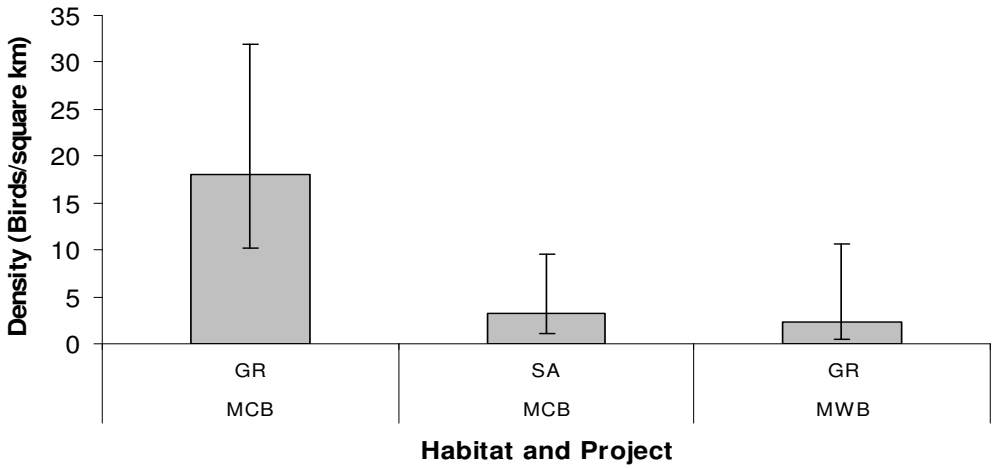
*USFS Region 2 Sensitive Species
*WY-PIF Level II Priority Species
*USFWS Bird of Conservation Concern
*WGFD Species of Greatest Conservation Need

In 2005, we detected 35 individual Grasshopper Sparrows in grassland habitat on MWB where we had enough detections to calculate a density estimate. The only other RMBO monitoring project this species was detected on in 2005 was MCB; however, the other projects are outside of this species' normal breeding range and we did not survey the appropriate habitat for Grasshopper Sparrow on the MBBH project in 2005. We detected Grasshopper Sparrow in sufficient numbers to also calculate a density in two habitats on the MCB project.

Total number of detections, number of individuals, and habitat-specific density estimates for Grasshopper Sparrow on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| WY-GR | 2.28 | 0.49 | 10.57 | 87% | 35 | 35 |

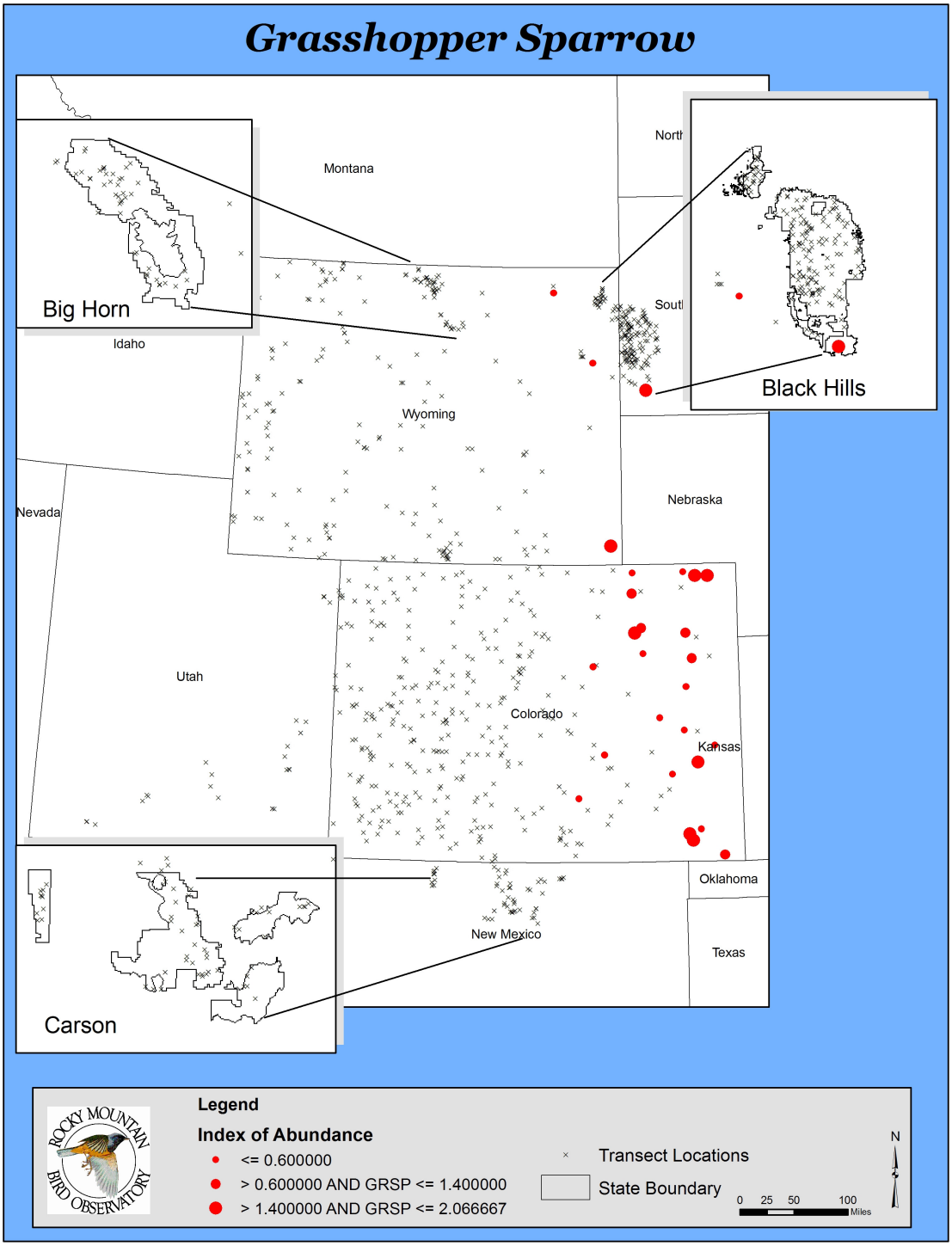
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Grasshopper Sparrow among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – Grasshopper Sparrows breed mostly in the eastern half of Wyoming in open habitats, including grasslands, open sagebrush grasslands, and agricultural areas.

We should be able to effectively monitor Grasshopper Sparrow through point transects under MWB in grassland habitat.


Grasshopper Sparrow
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.600000
> 0.600000 AND GRSP <= 1.400000
> 1.400000 AND GRSP <= 2.066667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Baird's Sparrow
## *(Ammodramus bairdii)*

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

In 2005, we detected one singing male Baird's Sparrow on one grassland transect in southeastern Wyoming. This was the only Baird's Sparrow recorded on any of the RMBO point-transect monitoring projects in 2005 or in the history of the program; however, Baird's Sparrow's normal breeding range extends only into the northern part of South Dakota, and barely into the northeast corner of Wyoming.

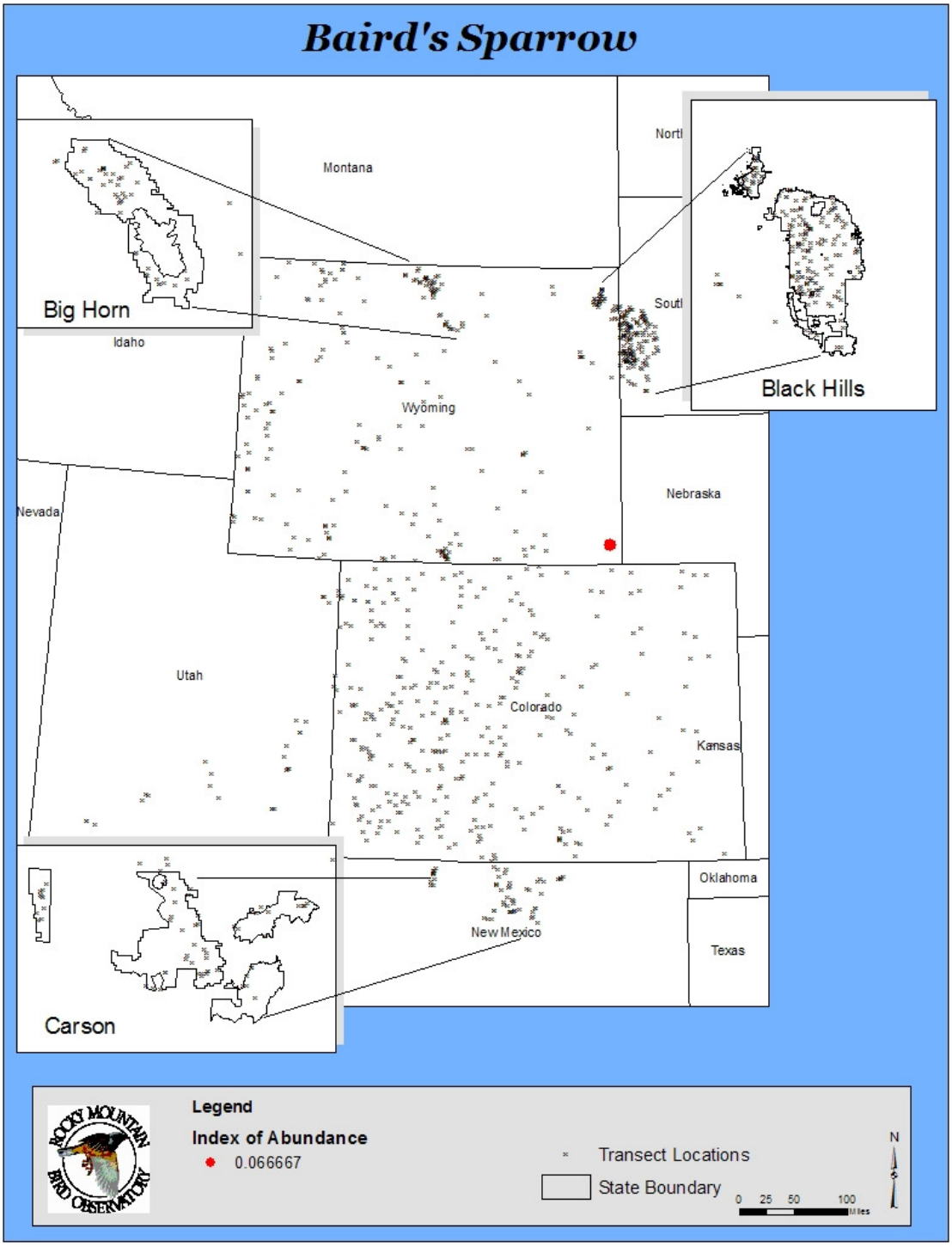
Total number of detections, number of individuals, and habitat-specific density estimates for Baird's Sparrow on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | N | N |
|---|---|---|---|---|---|---|
| WY-GR | ID | -- | -- | -- | -- | 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.

***Summary-*** Baird's Sparrow is a grassland species that seems to prefer slightly grazed or ungrazed prairie. This species' population is believed to be declining due to loss of habitat from the conversion of native grassland to cropland. There are no breeding records for Baird's Sparrow in Wyoming although its normal range extends into the southwest corner of Montana. Apparently territorial males are found singing in late May and early June, but disappear after a week or two (Scott 1993).

The singing male Baird's Sparrow detected by an RMBO technician in 2005 was not refound by birders a week later. It is possible that this species breeds in Wyoming, especially the northeast corner and adding grassland transects in this portion of the state may allow us to document the status of Baird's Sparrow in Wyoming.


Baird's Sparrow
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
0.066667
Transect Locations
State Boundary
0 25 50 100
Miles
N

# McCown's Longspur
# (*Calcarius mccownii*)

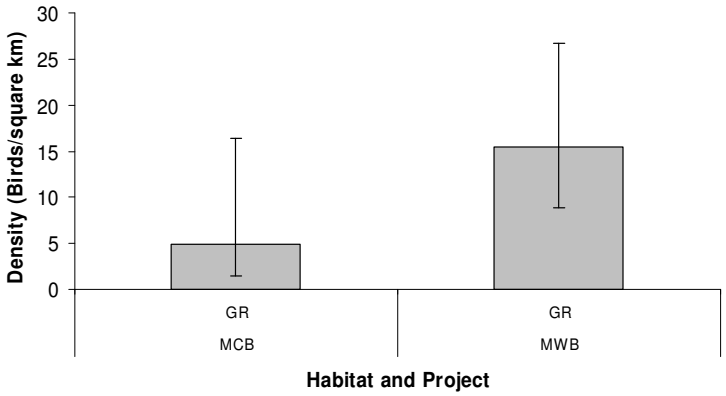
*WY-PIF Level I Priority Species
*USFWS Bird of Conservation Concern
*WGFD Species of Greatest Conservation Need

In 2005, we detected 201 individual McCown's Longspurs in two habitats on MWB and we were able to calculate a density estimate for this species in grassland habitat. MCB was the only other RMBO point-transect monitoring project where this species was detected in 2005, although the other projects are outside of the normal breeding range for McCown's Longspur. We detected McCown's Longspur in sufficient numbers to also calculate a density estimate on MCB project in grassland habitat.

Total number of detections, number of individuals, and habitat-specific density estimates for McCown's Longspur on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-GR | 15.4 | 8.87 | 26.72 | 28% | 181 | 200 |
| WY-SS | ID | -- | -- | -- | -- | 1 |

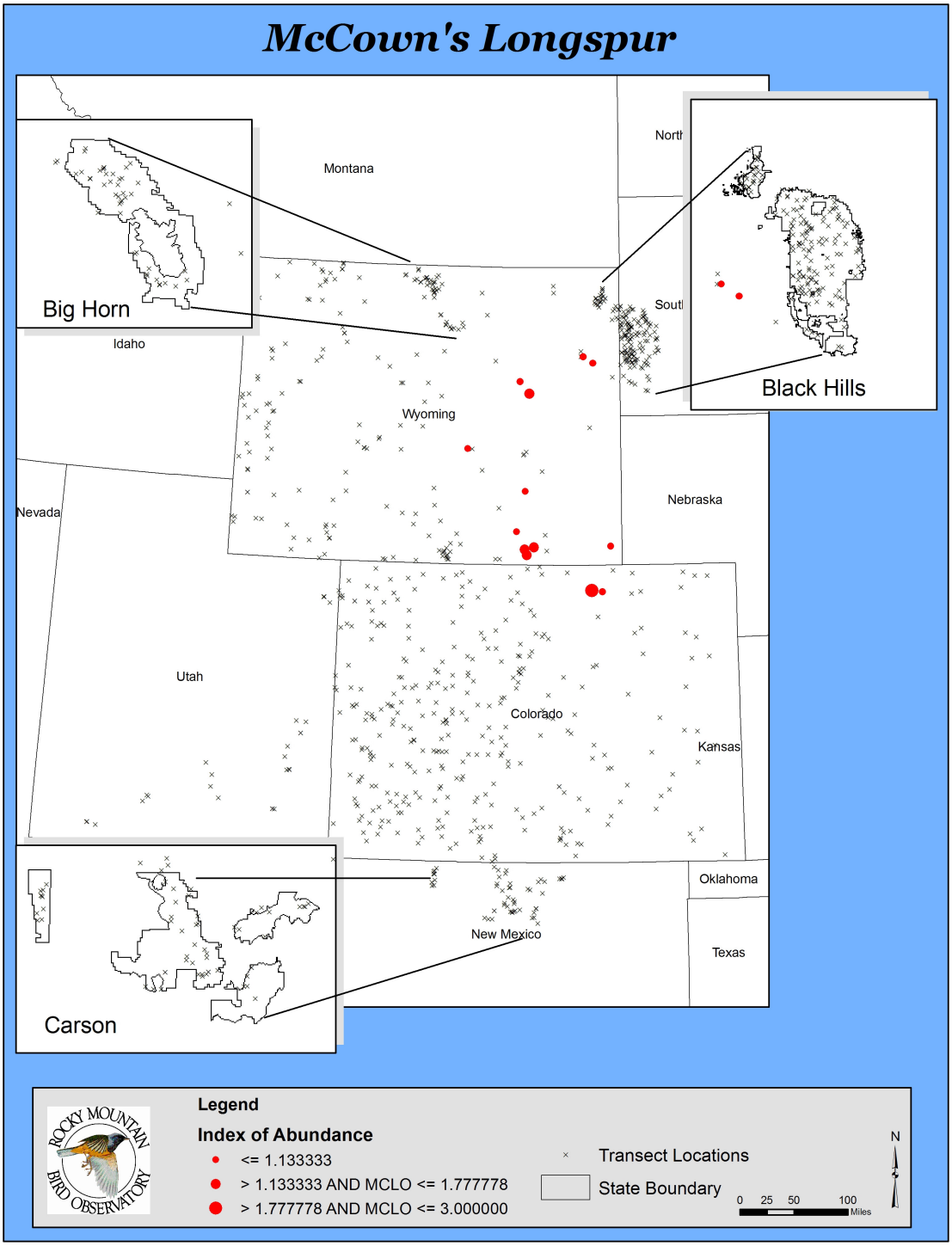
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of McCown's Longspur among habitats for all RMBO point-count transect monitoring projects, 2005.

***Summary*** – McCown's Longspur is found in open, arid, sparsely vegetated areas throughout most of Wyoming.

McCown's Longspur should be effectively monitored under MWB through point-transects in grassland habitat. In 2005, we detected nearly twice as many McCown's Longspurs on statewide transects than in any other year of the project.


McCown's Longspur
Big Horn
Black Hills
Carson
Montana
North
South
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Legend
Index of Abundance
<= 1.133333
> 1.133333 AND MCLO <= 1.777778
> 1.777778 AND MCLO <= 3.000000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Chestnut-collared Longspur
## (*Calcarius ornatus)*

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

In 2005, we detected 64 individual Chestnut-collared Longspurs in grassland habitat on MWB where we were able to calculate a density estimate for this species. The only other RMBO point-transect monitoring project where we detected Chestnut-collared Longspur in 2005 was MCB; however, the other projects are either outside of the normal breeding range for this species or we do not survey the appropriate habitat (MBBH). We did not detect this species in sufficient numbers to calculate a density estimate on any other project.

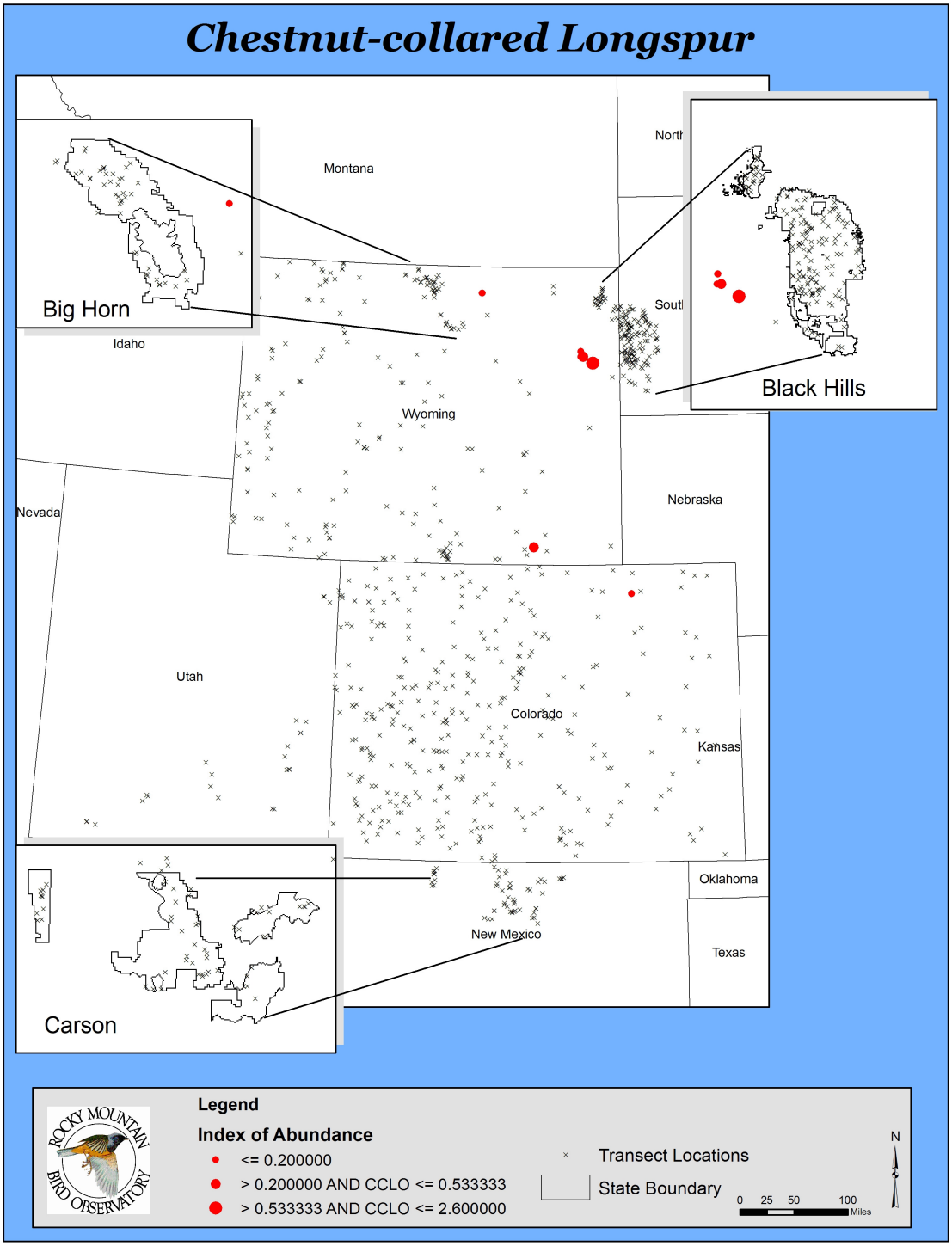
Total number of detections, number of individuals, and habitat-specific density estimates for Chestnut-collored Longspur on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-GR | 5.6 | 1.69 | 18.62 | 64% | 57 | 64 |

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.

***Summary*** – Chesnut-collared Longspur is found mainly in the eastern half of Wyoming in grassland habitats, including shortgrass and open mixed-grass prairies with scattered shrubs.

Chestnut-collared Longspur should be effectively monitored under MWB through statewide point-transects in grassland habitat.


Chestnut-collared Longspur
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND CCLO <= 0.533333
> 0.533333 AND CCLO <= 2.600000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Lazuli Bunting
## *(Passerina amoena)*

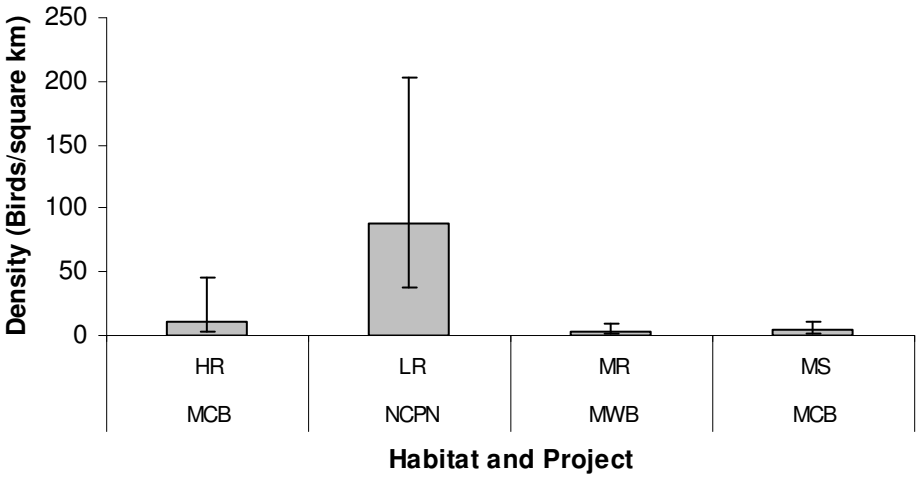
*WY-PIF Level III Priority Species

In 2005, we detected 76 Lazuli Buntings in six habitats on the MWB project and we were able to calculate a density estimate for this species in montane riparian habitat. Overall, we detected this species on all RMBO point-count transect monitoring projects and we were able to calculate a density estimate in at least one habitat on two other projects.

Total number of detections, number of individuals, and habitat-specific density estimates for Lazuli Bunting on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| BI-SS | ID | -- | -- | -- | -- | 4 |
| SH-MC | ID | -- | -- | -- | -- | *1* |
| SH-MG | ID | -- | -- | -- | -- | 2 |
| SH-MR | ID | -- | -- | -- | -- | 12 |
| WY-AS | ID | -- | -- | -- | -- | 11 |
| WY-GR | ID | -- | -- | -- | -- | 6 |
| WY-JW | ID | -- | -- | -- | -- | 14 |
| WY-MC | ID | -- | -- | -- | -- | 1 |
| WY-MR | 3.22 | 1.10 | 9.45 | 54.8% | 26 | 26 |

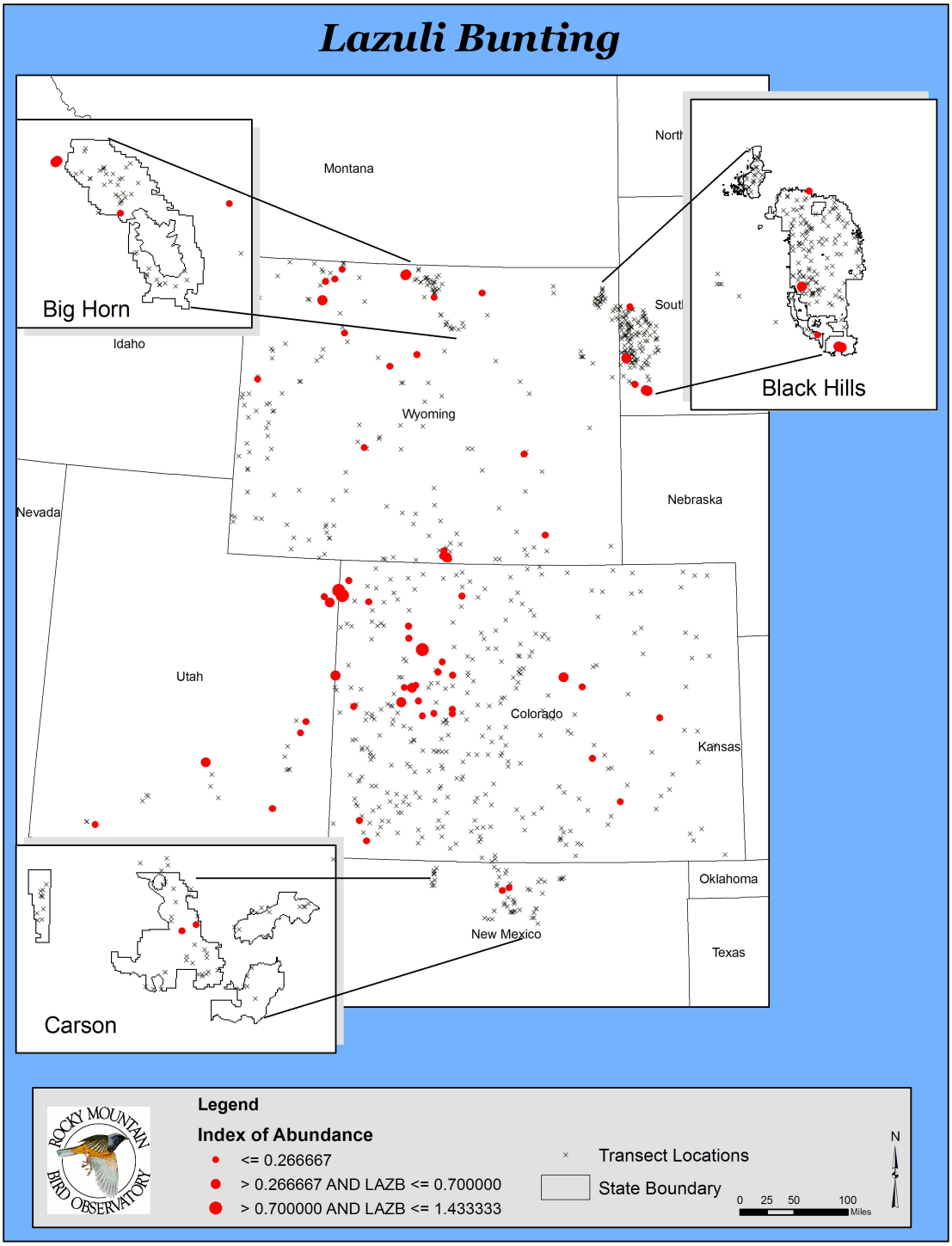
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.




Relative density of Lazuli Bunting among habitats for all RMBO point-count transect monitoring projects, 2005.

***SUMMARY*** – Lazuli Bunting is a widespread but never abundant species of areas that are dominated by deciduous shrubs and breeds throughout the state.

Lazuli Bunting should be effectively monitored through point transects under MWB in montane riparian habitat. We should also be able to loosely track the status of the species using data from the full range of habitats.


Lazuli Bunting
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.266667
> 0.266667 AND LAZB <= 0.700000
> 0.700000 AND LAZB <= 1.433333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Bullock's Oriole
## *(Icterus bullockii)*

*WY-PIF Level III Priority Species

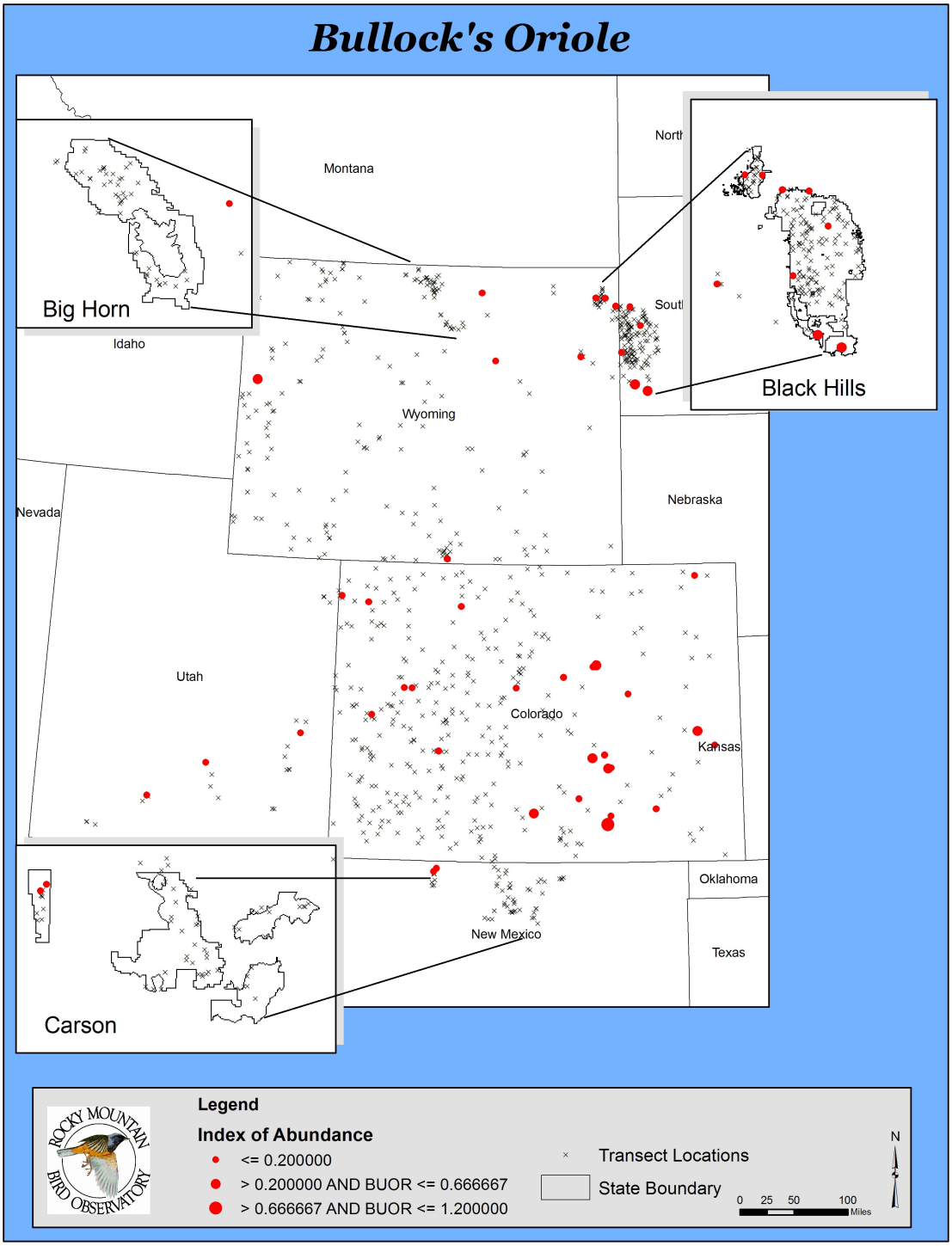
In 2005, we detected 15 Bullock's Orioles in three habitats on the MWB project. Overall, we detected Bullock's Oriole on all RMBO monitoring projects in 2005 and we were able to calculate a density estimate for this species in one habitat on one RMBO monitoring project.

Total number of detections, number of individuals, and habitat-specific density estimates for Bullock's Oriole on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-AS | ID | -- | -- | -- | -- | 7 |
| WY-GR | ID | -- | -- | -- | -- | 5 |
| WY-MR | ID | -- | -- | - | -- | 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.

***Summary-*** Bullock's Oriole can be found throughout Wyoming in open and riparian woodland, forest edges and around human habitation. We do not detect Bullock's Orioles in sufficient numbers along point transects to effectively monitor this species under MWB. Although given interest, with several years of data we may be able to pool data across years and habitats and weight observations by habitat area, to generate a global detection function for this species and thereby generate an annual statewide density estimate that may be robust enough for population trend monitoring.


Bullock's Oriole
Montana
North
South
Idaho
Wyoming
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND BUOR <= 0.666667
> 0.666667 AND BUOR <= 1.200000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

# Scott's Oriole
## (*Icterus parisorum)*

*WGFD Species of Greatest Conservation Need

In 2005, we detected five Scott's Orioles in juniper woodland habitat on the MWB project. The only other RMBO point-transects monitoring project that Scott's Oriole was detected on in 2005 was MBBH even though the regular breeding range for this species extends into the southwestern corner of Wyoming south to Arizona and New Mexico. We did not detect this species in sufficient numbers to calculate a density estimate in any habitat on any project.

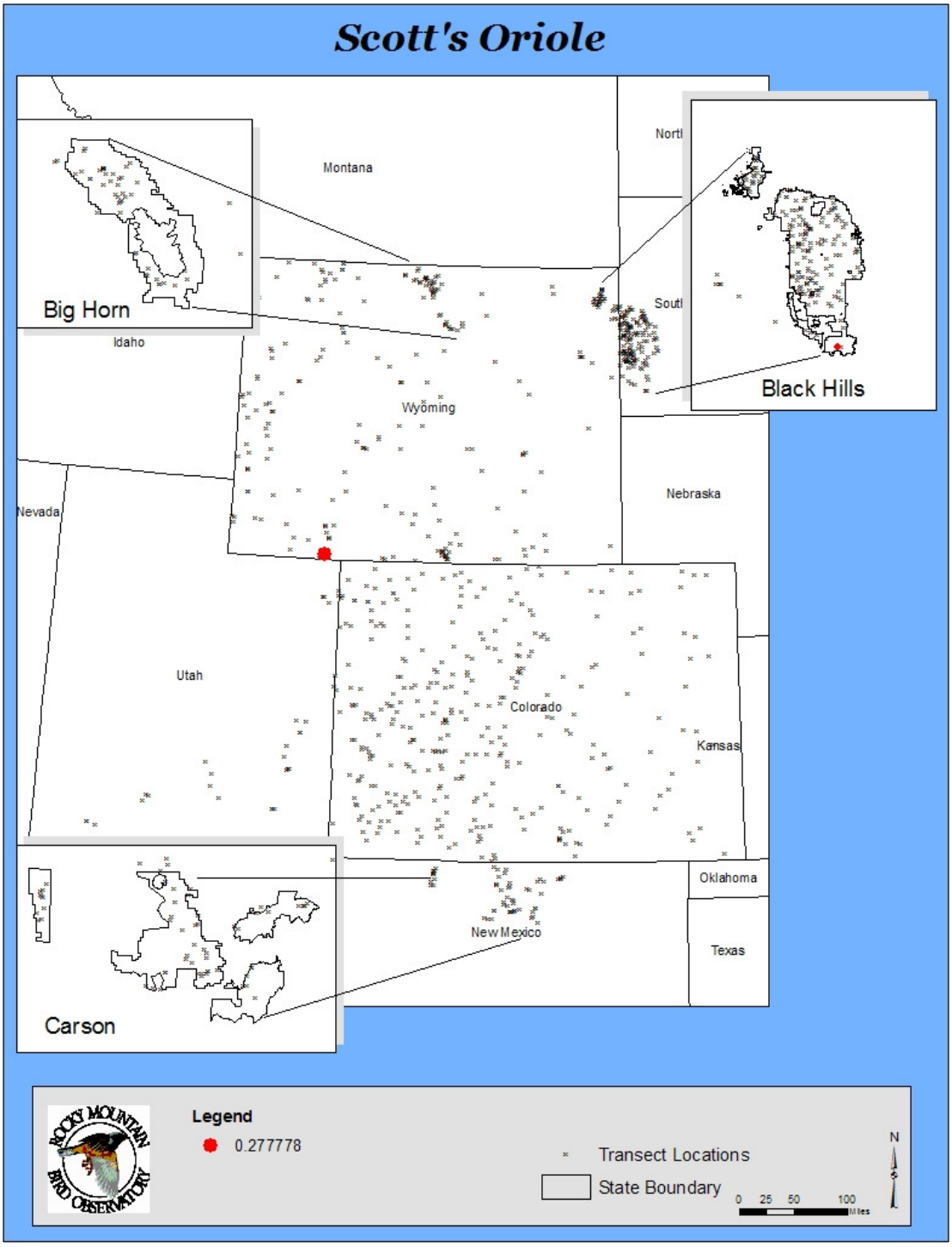
Total number of detections, number of individuals, and habitat-specific density estimates for Scott's Orioles on the MWB monitoring project, 2005.

| Habitat | D | LCL | UCL | CV | n | N |
|---|---|---|---|---|---|---|
| WY-JW | ID | -- | -- | -- | -- | 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.

***Summary-*** Scott's Oriole inhabits open, dry hillsides often where yucca and oaks meet and is found primarily in the southwestern corner of Wyoming.

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. Adding transects in juniper woodland and shrubsteppe habitats in the southwestern part of the state may yield better information for this species.


Scott's Oriole
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
0.277778
Transect Locations
State Boundary
0 25 50 100
Miles
N

# APPENDIX B. BIRDS DETECTED ON WYOMING STATEWIDE TRANSECTS

List of all bird species observed during point-count transects in Wyoming from 2002-2005, with management designation and species totals.

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | AS | GR | JW | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Canada Goose | | | | | 0 | 61 | 4 | 2 | 6 | 0 | 10 | 6 | 25 | 73 |
| Gadwall | | | | | 0 | 6 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 6 |
| American Wigeon | | | | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 1 |
| Mallard | | | | | 3 | 10 | 0 | 0 | 17 | 4 | 12 | 13 | 29 | 34 |
| Blue-winged Teal | | | | | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 2 |
| Cinnamon Teal | | | | | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 4 | 7 | 2 |
| Northern Shoveler | | | | | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Northern Pintail | | | | SGCN | 0 | 4 | 0 | 0 | 0 | 0 | 2 | 2 | 6 | 4 |
| Green-winged Teal | | | | | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 8 | 3 |
| Canvasback | | | | SGCN | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Redhead | | | | SGCN | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 |
| Ring-necked Duck | | | | | 0 | 1 | 0 | 0 | 7 | 0 | 1 | 0 | 8 | 8 |
| Lesser Scaup | | | | SGCN | 0 | 5 | 0 | 0 | 8 | 0 | 1 | 7 | 14 | 13 |
| Bufflehead | | | | | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 6 | 2 | 2 |
| Barrow's Goldeneye | | | | SGCN | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 9 | 2 |
| Common Merganser | | | | | 1 | 2 | 4 | 0 | 25 | 0 | 3 | 10 | 18 | 32 |
| Chukar | | | | | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 7 | 2 |
| Ring-necked Pheasant | | | | | 0 | 6 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 6 |
| Ruffed Grouse | | | | | 1 | 1 | 0 | 1 | 0 | 0 | 35 | 7 | 5 | 3 |
| Greater sage Grouse | | WY-I | | SGCN | 0 | 13 | 0 | 0 | 0 | 12 | 3 | 2 | 3 | 25 |
| Blue Grouse | | WY-I | | | 6 | 0 | 0 | 2 | 0 | 1 | 15 | 24 | 23 | 8 |
| Sharp-tailed Grouse | | WY-I | | SGCN | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Pied-billed Grebe | | | | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Western Grebe | | | | SGCN | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Clark's Grebe | | | | SGCN | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Wild Turkey | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | AS | GR | JW | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| American White Pelican | | WY-II | | SGCN | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Great Blue Heron | | | | SGCN | 1 | 1 | 0 | 1 | 6 | 0 | 5 | 3 | 10 | 9 |
| Turkey Vulture | | | | | 1 | 0 | 6 | 0 | 3 | 4 | 7 | 15 | 19 | 14 |
| Osprey | | | | | 0 | 0 | 0 | 1 | 3 | 1 | 1 | 1 | 1 | 5 |
| Bald Eagle | | WY-I | | SGCN | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 4 |
| Northern Harrier | R2SS | WY-III | BCC | | 1 | 4 | 0 | 0 | 1 | 3 | 3 | 6 | 11 | 9 |
| Sharp-shinned Hawk | | | | | 2 | 0 | 0 | 3 | 0 | 0 | 3 | 4 | 7 | 5 |
| Cooper's Hawk | | | | | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 6 | 4 | 5 |
| Northern Goshawk | R2SS | WY-I | | SGCN | 0 | 1 | 0 | 4 | 3 | 0 | 1 | 0 | 5 | 8 |
| Broad-winged Hawk | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| Swainson's Hawk | | WY-I | BCC | SGCN | 0 | 4 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 4 |
| Red-tailed Hawk | | | | | 10 | 3 | 14 | 13 | 12 | 5 | 25 | 34 | 50 | 57 |
| Ferruginous Hawk | | WY-I | BCC | SGCN | 0 | 5 | 0 | 0 | 0 | 3 | 2 | 4 | 9 | 8 |
| Golden Eagle | | WY-III | BCC | | 0 | 2 | 3 | 0 | 1 | 2 | 2 | 5 | 9 | 8 |
| American Kestrel | | | | | 12 | 7 | 10 | 2 | 3 | 6 | 11 | 10 | 33 | 40 |
| Merlin | | WY-II | | SGCN | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| Prairie Falcon | | WY-III | BCC | | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 6 | 2 | 3 |
| Sora | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 |
| American Coot | | | | | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 2 |
| Sandhill Crane | | | | SGCN | 5 | 3 | 2 | 3 | 16 | 5 | 11 | 8 | 20 | 34 |
| Killdeer | | | | | 1 | 35 | 1 | 1 | 4 | 8 | 32 | 43 | 45 | 50 |
| Mountain Plover | | WY-I | BCC | SGCN | 0 | 10 | 0 | 0 | 0 | 0 | 2 | 16 | 1 | 10 |
| American Avocet | | | | | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 6 |
| Willet | | | | | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 |
| Spotted Sandpiper | | | | | 6 | 0 | 0 | 4 | 30 | 1 | 55 | 88 | 56 | 41 |
| Upland Sandpiper | | WY-I | BCC | SGCN | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 2 | 10 | 6 |
| Long-billed Curlew | | WY-I | BCC | SGCN | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Wilson's Snipe | | | | | 4 | 11 | 0 | 2 | 39 | 0 | 14 | 26 | 42 | 56 |
| Wilson's Phalarope | | WY-I | BCC | | 0 | 64 | 0 | 0 | 0 | 5 | 0 | 0 | 32 | 69 |
| Ring-billed Gull | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Franklin's Gull | | WY-I | | SGCN | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| California Gull | | | | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | AS | GR | JW | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Rock Pigeon | | | | | 0 | 0 | 3 | 0 | 5 | 0 | 0 | 0 | 3 | 8 |
| Mourning Dove | | | | | 34 | 38 | 163 | 0 | 12 | 34 | 132 | 157 | 380 | 281 |
| Great Horned Owl | | | | | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 3 |
| Great Gray Owl | | WY-II | | SGCN | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Northern Pygmy-Owl | R2SS | WY-I | | SGCN | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Burrowing Owl | | WY-I | BCC | SGCN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Short-eared Owl | | WY-I | BCC | SGCN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 |
| Common Nighthawk | | | | | 3 | 0 | 7 | 2 | 2 | 0 | 7 | 10 | 8 | 14 |
| Common Poorwill | | | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| White-throated Swift | | WY-II | | | 1 | 0 | 12 | 4 | 0 | 0 | 4 | 6 | 14 | 17 |
| Black-chinned Hummingbird | | WY-II | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Calliope Hummingbird | | WY-II | | | 0 | 0 | 0 | 2 | 13 | 0 | 1 | 1 | 2 | 15 |
| Broad-tailed Hummingbird | | WY-II | | | 36 | 2 | 4 | 26 | 92 | 4 | 53 | 100 | 129 | 164 |
| Rufous Hummingbird | | WY-II | | | 10 | 0 | 0 | 1 | 5 | 0 | 0 | 5 | 1 | 16 |
| Belted Kingfisher | | | | | 2 | 0 | 0 | 0 | 7 | 0 | 5 | 2 | 6 | 9 |
| Lewis's Woodpecker | R2SS | WY-II | BCC | SGCN | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Red-headed Woodpecker | | WY-III | BCC | | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Williamson's Sapsucker | | WY-II | BCC | | 1 | 0 | 0 | 0 | 5 | 0 | 10 | 17 | 10 | 6 |
| Red-naped Sapsucker | | WY-II | BCC | | 57 | 1 | 0 | 18 | 48 | 1 | 33 | 78 | 152 | 125 |
| Downy Woodpecker | | | | | 29 | 0 | 0 | 0 | 1 | 0 | 8 | 31 | 36 | 30 |
| Hairy Woodpecker | | | | | 30 | 0 | 0 | 26 | 6 | 1 | 27 | 43 | 67 | 62 |
| American Three-toed Woodpecker | R2SS | WY-II | | SGCN | 9 | 0 | 0 | 6 | 3 | 0 | 2 | 6 | 12 | 18 |
| Northern Flicker | | | | | 107 | 10 | 27 | 68 | 45 | 3 | 83 | 150 | 178 | 260 |
| Olive-sided Flycatcher | | WY-II | | | 3 | 0 | 0 | 27 | 23 | 0 | 17 | 21 | 56 | 53 |
| Western Wood-Pewee | | | | | 114 | 0 | 3 | 7 | 42 | 0 | 71 | 45 | 97 | 166 |
| Willow Flycatcher | | WY-II | | SGCN | 0 | 0 | 0 | 0 | 29 | 0 | 13 | 15 | 25 | 29 |
| Least Flycatcher | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Hammond's Flycatcher | | WY-II | | | 23 | 0 | 0 | 47 | 22 | 0 | 11 | 78 | 74 | 92 |
| Gray Flycatcher | | WY-II | | | 0 | 0 | 164 | 0 | 0 | 0 | 173 | 145 | 154 | 164 |
| Dusky Flycatcher | | WY-II | | | 127 | 3 | 43 | 41 | 79 | 6 | 150 | 155 | 347 | 299 |
| Cordilleran Flycatcher | | WY-II | | | 12 | 0 | 0 | 15 | 24 | 0 | 4 | 27 | 34 | 51 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | AS | GR | JW | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Say's Phoebe | | WY-III | | | 0 | 6 | 13 | 0 | 1 | 5 | 9 | 16 | 21 | 25 |
| Ash-throated Flycatcher | | WY-II | | SGCN | 0 | 0 | 16 | 0 | 0 | 0 | 10 | 8 | 7 | 16 |
| Cassin's Kingbird | | WY-II | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Western Kingbird | | | | | 0 | 2 | 1 | 0 | 0 | 2 | 11 | 6 | 19 | 5 |
| Eastern Kingbird | | | | | 0 | 10 | 0 | 0 | 0 | 0 | 2 | 2 | 26 | 10 |
| Loggerhead Shrike | R2SS | WY-II | BCC | | 0 | 5 | 6 | 0 | 0 | 8 | 5 | 6 | 27 | 19 |
| Gray Vireo | | | BCC | | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Plumbeous Vireo | | WY-II | | | 1 | 0 | 37 | 0 | 0 | 0 | 42 | 8 | 13 | 38 |
| Warbling Vireo | | | | | 445 | 1 | 6 | 60 | 124 | 9 | 205 | 303 | 566 | 645 |
| Red-eyed Vireo | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Gray Jay | | | | | 11 | 0 | 0 | 17 | 2 | 1 | 15 | 29 | 26 | 31 |
| Stellar's Jay | | | | | 4 | 2 | 0 | 4 | 5 | 0 | 44 | 33 | 18 | 15 |
| Western Scrub-Jay | | WY-II | | SGCN | 0 | 0 | 10 | 0 | 0 | 0 | 9 | 5 | 5 | 10 |
| Pinyon Jay | | | | | 0 | 1 | 95 | 0 | 0 | 1 | 31 | 118 | 120 | 97 |
| Clark's Nutcracker | | WY-III | | | 42 | 1 | 63 | 54 | 28 | 0 | 49 | 104 | 153 | 188 |
| Black-billed Magpie | | | | | 4 | 6 | 52 | 0 | 13 | 10 | 38 | 51 | 57 | 85 |
| American Crow | | | | | 13 | 11 | 5 | 1 | 48 | 1 | 3 | 16 | 29 | 79 |
| Common Raven | | | | | 11 | 27 | 34 | 7 | 13 | 42 | 85 | 89 | 151 | 134 |
| Horned Lark | | | | | 1 | 1029 | 38 | 0 | 0 | 765 | 625 | 1062 | 1864 | 1833 |
| Purple Martin | | | | | 6 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 6 |
| Tree Swallow | | | | | 27 | 1 | 0 | 2 | 33 | 4 | 57 | 126 | 62 | 67 |
| Violet-green Swallow | | | | | 35 | 4 | 50 | 5 | 46 | 5 | 54 | 111 | 146 | 145 |
| Northern Rough-winged Swallow | | WY-III | | | 0 | 1 | 1 | 0 | 3 | 3 | 4 | 7 | 3 | 8 |
| Bank Swallow | | | | | 0 | 2 | 1 | 0 | 0 | 0 | 2 | 3 | 5 | 3 |
| Cliff Swallow | | | | | 12 | 20 | 11 | 0 | 3 | 6 | 16 | 95 | 97 | 52 |
| Barn Swallow | | | | | 0 | 8 | 0 | 0 | 2 | 1 | 4 | 3 | 32 | 11 |
| Black-capped Chickadee | | | | | 21 | 0 | 3 | 0 | 2 | 0 | 89 | 26 | 20 | 26 |
| Mountain Chickadee | | | | | 110 | 2 | 21 | 200 | 48 | 0 | 301 | 385 | 312 | 381 |
| Juniper Titmouse | | WY-II | | SGCN | 0 | 0 | 7 | 0 | 0 | 0 | 11 | 24 | 10 | 7 |
| Bushtit | | WY-II | | SGCN | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 5 | 18 | 18 |
| Red-breasted Nuthatch | | | | | 70 | 3 | 8 | 82 | 11 | 0 | 146 | 193 | 210 | 174 |
| White-breasted Nuthatch | | | | | 20 | 0 | 1 | 34 | 10 | 0 | 0 | 8 | 9 | 65 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | AS | GR | JW | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Pygmy Nuthatch | | WY-II | | SGCN | 0 | 0 | 0 | 0 | 2 | 0 | 9 | 0 | 0 | 2 |
| Brown Creeper | | WY-II | | | 11 | 0 | 0 | 3 | 8 | 0 | 3 | 22 | 38 | 22 |
| Rock Wren | | WY-III | | | 16 | 37 | 158 | 9 | 4 | 39 | 92 | 143 | 212 | 263 |
| Canyon Wren | | WY-III | | | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| Bewick's Wren | | WY-III | BCC | | 0 | 0 | 253 | 0 | 0 | 0 | 44 | 31 | 154 | 253 |
| House Wren | | | | | 374 | 3 | 18 | 16 | 67 | 6 | 135 | 231 | 299 | 484 |
| Winter Wren | | | | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| American Dipper | | WY-II | | | 0 | 0 | 0 | 1 | 6 | 0 | 12 | 26 | 10 | 7 |
| Golden-crowned Kinglet | | WY-II | | | 8 | 0 | 0 | 5 | 8 | 0 | 14 | 31 | 28 | 21 |
| Ruby-crowned Kinglet | | | | | 176 | 5 | 0 | 244 | 121 | 2 | 382 | 524 | 536 | 548 |
| Blue-gray Gnatcatcher | | | | | 0 | 0 | 123 | 0 | 0 | 0 | 46 | 42 | 82 | 123 |
| Western Bluebird | | WY-II | | | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Eastern Bluebird | | | | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Mountain Bluebird | | | | | 39 | 8 | 213 | 28 | 16 | 24 | 93 | 196 | 292 | 328 |
| Townsend's Solitaire | | WY-II | | | 8 | 0 | 8 | 16 | 10 | 1 | 37 | 18 | 52 | 43 |
| Veery | | WY-III | | | 2 | 0 | 0 | 0 | 0 | 0 | 9 | 15 | 9 | 2 |
| Swainson's Thrush | | | | | 24 | 0 | 0 | 30 | 42 | 0 | 39 | 96 | 112 | 96 |
| Hermit Thrush | | | | | 69 | 0 | 2 | 102 | 9 | 1 | 62 | 121 | 203 | 183 |
| American Robin | | | | | 285 | 21 | 68 | 250 | 278 | 10 | 459 | 714 | 838 | 912 |
| Gray Catbird | | | | | 2 | 4 | 0 | 0 | 27 | 0 | 3 | 3 | 8 | 33 |
| Northern Mockingbird | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| Sage Thrasher | | WY-II | | SGCN | 0 | 28 | 37 | 0 | 0 | 261 | 77 | 223 | 251 | 326 |
| Brown Thrasher | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| European Starling | | | | | 1 | 12 | 14 | 0 | 13 | 2 | 2 | 5 | 62 | 42 |
| American Pipit | | | | | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 2 |
| Cedar Waxwing | | | | | 8 | 0 | 0 | 7 | 23 | 0 | 13 | 7 | 38 | 38 |
| Orange-crowned Warbler | | | | | 69 | 0 | 0 | 1 | 7 | 2 | 27 | 33 | 50 | 79 |
| Virginia's Warbler | | WY-III | BCC | | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 4 |
| Yellow Warbler | | | | | 48 | 13 | 9 | 8 | 266 | 2 | 172 | 146 | 252 | 346 |
| Yellow-rumped Warbler | | | | | 182 | 0 | 12 | 186 | 100 | 4 | 482 | 409 | 489 | 484 |
| Black-throated Gray Warbler | | WY-III | | | 0 | 0 | 109 | 0 | 0 | 0 | 56 | 47 | 77 | 109 |
| American Redstart | | | | | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Ovenbird | | WY-III | | | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | AS | GR | JW | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Northern Waterthrush | | | | | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 2 | 0 | 3 |
| MacGillivray's Warbler | | WY-II | | | 64 | 0 | 0 | 19 | 72 | 2 | 62 | 113 | 140 | 157 |
| Common Yellowthroat | | | | | 0 | 0 | 0 | 0 | 14 | 0 | 1 | 2 | 11 | 14 |
| Wilson's Warbler | | WY-II | | | 4 | 0 | 0 | 4 | 99 | 0 | 89 | 69 | 78 | 107 |
| Yellow-breasted Chat | | | | | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Western Tanager | | | | | 70 | 0 | 1 | 31 | 46 | 2 | 76 | 141 | 174 | 150 |
| Green-tailed Towhee | | | | | 117 | 11 | 136 | 12 | 68 | 66 | 214 | 289 | 352 | 410 |
| Spotted Towhee | | | | | 2 | 8 | 4 | 2 | 1 | 6 | 6 | 21 | 25 | 23 |
| Cassin's Sparrow | | | BCC | | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 5 |
| Chipping Sparrow | | | | | 180 | 1 | 479 | 206 | 96 | 7 | 305 | 501 | 810 | 969 |
| Brewer's Sparrow | | WY-I | BCC | SGCN | 52 | 246 | 176 | 2 | 25 | 679 | 475 | 753 | 1213 | 1178 |
| Field Sparrow | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Vesper Sparrow | | WY-II | | | 53 | 303 | 86 | 2 | 25 | 207 | 338 | 339 | 581 | 676 |
| Lark Sparrow | | WY-II | | | 1 | 12 | 31 | 0 | 0 | 39 | 77 | 81 | 72 | 83 |
| Sage Sparrow | | WY-I | | SGCN | 0 | 0 | 18 | 0 | 1 | 109 | 86 | 110 | 109 | 128 |
| Lark Bunting | | WY-II | | SGCN | 0 | 668 | 0 | 0 | 0 | 23 | 477 | 635 | 1548 | 691 |
| Savannah Sparrow | | | | | 2 | 39 | 0 | 1 | 45 | 6 | 35 | 68 | 49 | 93 |
| Grasshopper Sparrow | R2SS | WY-II | BCC | SGCN | 0 | 35 | 0 | 0 | 0 | 0 | 20 | 41 | 35 | 35 |
| Baird's Sparrow | | WY-I | BCC | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Fox Sparrow | | | | | 3 | 0 | 0 | 0 | 18 | 0 | 8 | 11 | 16 | 21 |
| Song Sparrow | | | | | 18 | 2 | 0 | 16 | 153 | 0 | 232 | 126 | 140 | 189 |
| Lincoln's Sparrow | | | | | 88 | 2 | 0 | 23 | 141 | 0 | 129 | 196 | 243 | 254 |
| White-crowned Sparrow | | | | | 38 | 2 | 0 | 26 | 111 | 0 | 175 | 236 | 217 | 177 |
| Dark-eyed Junco | | | | | 236 | 0 | 0 | 248 | 111 | 0 | 391 | 498 | 624 | 595 |
| McCown's Longspur | | WY-I | BCC | SGCN | 0 | 200 | 0 | 0 | 0 | 1 | 71 | 83 | 138 | 201 |
| Chesnut-collared Longspur | | WY-II | BCC | SGCN | 0 | 64 | 0 | 0 | 0 | 0 | 74 | 147 | 48 | 64 |
| Black-headed Grosbeak | | | | | 25 | 0 | 2 | 0 | 6 | 1 | 30 | 18 | 33 | 34 |
| Blue Grosbeak | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| Lazuli Bunting | | WY-III | | | 11 | 6 | 14 | 1 | 26 | 1 | 25 | 23 | 32 | 59 |
| Red-winged Blackbird | | | | | 3 | 113 | 8 | 0 | 5 | 20 | 39 | 46 | 62 | 149 |
| Western Meadowlark | | | | | 19 | 1237 | 114 | 0 | 18 | 366 | 399 | 773 | 1495 | 1754 |
| Yellow-headed Blackbird | | | | | 0 | 3 | 0 | 0 | 0 | 0 | 4 | 5 | 8 | 3 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | AS | GR | JW | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Brewer's Blackbird | | | | | 35 | 38 | 31 | 0 | 41 | 15 | 56 | 81 | 173 | 160 |
| Common Grackle | | | | | 2 | 5 | 0 | 0 | 2 | 1 | 13 | 14 | 22 | 10 |
| Brown-headed Cowbird | | | | | 60 | 70 | 44 | 9 | 35 | 14 | 88 | 109 | 174 | 232 |
| Orchard Oriole | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Bullock's Oriole | | WY-III | | | 7 | 5 | 0 | 0 | 3 | 0 | 0 | 5 | 13 | 15 |
| Scott's Oriole | | | | SGCN | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 3 | 5 |
| Pine Grosbeak | | | | | 0 | 0 | 0 | 6 | 0 | 0 | 8 | 9 | 14 | 6 |
| Cassin's Finch | | | | | 32 | 1 | 17 | 101 | 41 | 0 | 51 | 61 | 89 | 192 |
| House Finch | | | | | 0 | 0 | 26 | 0 | 0 | 0 | 27 | 25 | 37 | 26 |
| Red Crossbill | | | | | 152 | 0 | 0 | 123 | 41 | 0 | 10 | 74 | 88 | 316 |
| White-winged Crossbill | | | | | 14 | 0 | 0 | 35 | 1 | 0 | 5 | 4 | 0 | 50 |
| Pine Siskin | | | | | 261 | 12 | 21 | 416 | 177 | 9 | 197 | 325 | 615 | 896 |
| American Goldfinch | | | | | 12 | 15 | 21 | 0 | 22 | 7 | 7 | 15 | 45 | 77 |
| Evening Grosbeak | | | | | 9 | 0 | 0 | 0 | 6 | 0 | 4 | 1 | 1 | 15 |
| House Sparrow | | | | | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 7 |
| *Red Squirrel* | | | | | *72* | *0* | *0* | *83* | *45* | *0* | *7* | *21* | *86* | *200* |

[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: 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, 2002-2005, with management designation and species totals.

| | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Name[1] | USFS | PIF | USFWS | WGFD | HC | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| American Wigeon | | | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Mallard | | | | | 3 | 0 | 9 | 0 | 4 | 4 | 0 | 12 |
| Green-winged Teal | | | | | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| Ring-necked Duck | | | | | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Barrow's Goldeneye | | | | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Gray Partridge | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Blue Grouse | | WY-1 | | | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 2 |
| Turkey Vulture | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Northern Harrier | R2SS | WY-III | BCC | | 0 | 0 | 2 | 1 | 0 | 1 | 4 | 3 |
| Sharp-shinned Hawk | | | | | 0 | 1 | 1 | 0 | 1 | 2 | 4 | 2 |
| Cooper's Hawk | | | | | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 3 |
| Northern Goshawk | R2SS | WY-I | | SGCN | 1 | 2 | 0 | 0 | 2 | 1 | 0 | 3 |
| Swainson's Hawk | | WY-I | BCC | SGCN | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Red-tailed Hawk | | | | | 1 | 1 | 2 | 3 | 5 | 4 | 6 | 7 |
| Golden Eagle | | WY-III | BCC | | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 3 |
| American Kestrel | | | | | 2 | 0 | 2 | 4 | 2 | 5 | 12 | 8 |
| Sandhill Crane | | | | | 0 | 0 | 5 | 0 | 4 | 0 | 1 | 5 |
| Killdeer | | | | | 0 | 0 | 2 | 2 | 1 | 4 | 2 | 4 |
| Spotted Sandpiper | | | | | 0 | 1 | 12 | 0 | 8 | 20 | 16 | 13 |
| Wilson's Snipe | | | | | 0 | 3 | 19 | 0 | 18 | 34 | 17 | 22 |
| Mourning Dove | | | | | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Great Horned Owl | | | | | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| Common Nighthawk | | | | | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| White-throated Swift | | WY-II | | | 0 | 0 | 1 | 4 | 0 | 13 | 8 | 5 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | HC | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Broad-tailed Hummingbird | | WY-II | | | 0 | 0 | 2 | 0 | 0 | 6 | 7 | 2 |
| Belted Kingfisher | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Williamson's Sapsucker | | WY-II | BCC | | 1 | 4 | 1 | 1 | 1 | 8 | 4 | 7 |
| Red-naped Sapsucker | | WY-II | BCC | | 0 | 0 | 1 | 0 | 2 | 6 | 7 | 1 |
| Downy Woodpecker | | | | | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 |
| Hairy Woodpecker | | | | | 10 | 11 | 2 | 7 | 19 | 55 | 36 | 30 |
| American Three-toed Woodpecker | R2SS | WY-II | | SGCN | 21 | 12 | 1 | 7 | 2 | 10 | 25 | 41 |
| Northern Flicker | | | | | 19 | 14 | 7 | 18 | 52 | 61 | 53 | 58 |
| Olive-sided Flycatcher | | WY-II | | | 0 | 0 | 1 | 0 | 2 | 7 | 4 | 1 |
| Western Wood-Pewee | | | | | 2 | 5 | 12 | 1 | 21 | 38 | 14 | 20 |
| Hammond's Flycatcher | | WY-II | | | 1 | 0 | 1 | 1 | 23 | 3 | 2 | 3 |
| Dusky Flycatcher | | WY-II | | | 0 | 3 | 27 | 4 | 16 | 70 | 31 | 34 |
| Cordilleran Flycatcher | | WY-II | | | 17 | 17 | 8 | 7 | 0 | 39 | 56 | 49 |
| Eastern Kingbird | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Warbling Vireo | | | | | 0 | 3 | 19 | 26 | 42 | 45 | 39 | 48 |
| Gray Jay | | | | | 14 | 5 | 0 | 1 | 17 | 41 | 40 | 20 |
| Stellar's Jay | | | | | 0 | 0 | 0 | 0 | 2 | 4 | 1 | 0 |
| Clark's Nutcracker | | WY-III | | | 27 | 11 | 3 | 16 | 29 | 85 | 69 | 57 |
| Black-billed Magpie | | | | | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 0 |
| American Crow | | | | | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 1 |
| Common Raven | | | | | 5 | 13 | 12 | 13 | 40 | 31 | 44 | 43 |
| Horned Lark | | | | | 14 | 2 | 1 | 4 | 8 | 28 | 19 | 21 |
| Tree Swallow | | | | | 0 | 2 | 5 | 0 | 0 | 1 | 1 | 7 |
| Violet-green Swallow | | | | | 4 | 1 | 18 | 2 | 5 | 23 | 22 | 25 |
| Cliff Swallow | | | | | 0 | 0 | 2 | 0 | 0 | 6 | 0 | 2 |
| Barn Swallow | | | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Black-capped Chickadee | | | | | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 |
| Mountain Chickadee | | | | | 81 | 75 | 35 | 31 | 211 | 407 | 303 | 222 |
| Red-breasted Nuthatch | | | | | 23 | 16 | 1 | 3 | 92 | 90 | 39 | 43 |
| White-breasted Nuthatch | | | | | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 2 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | HC | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Brown Creeper | | WY-II | | | 13 | 15 | 1 | 3 | 0 | 31 | 50 | 32 |
| Rock Wren | | WY-III | | | 2 | 3 | 0 | 10 | 6 | 28 | 60 | 15 |
| House Wren | | | | | 0 | 1 | 1 | 1 | 7 | 6 | 8 | 3 |
| Winter Wren | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| American Dipper | | WY-II | | | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| Golden-crowned Kinglet | | WY-II | | | 2 | 0 | 1 | 1 | 0 | 9 | 4 | 4 |
| Ruby-crowned Kinglet | | | | | 190 | 174 | 84 | 68 | 433 | 547 | 595 | 516 |
| Mountain Bluebird | | | | | 37 | 32 | 24 | 49 | 92 | 85 | 136 | 142 |
| Townsend's Solitaire | | WY-II | | | 12 | 11 | 13 | 19 | 0 | 18 | 35 | 55 |
| Swainson's Thrush | | | | | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 |
| Hermit Thrush | | | | | 65 | 62 | 4 | 15 | 114 | 249 | 203 | 146 |
| American Robin | | | | | 113 | 125 | 221 | 139 | 359 | 626 | 655 | 598 |
| Gray Catbird | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Sage Thrasher | | WY-II | | SGCN | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 2 |
| American Pipit | | | | | 3 | 1 | 2 | 149 | 12 | 12 | 21 | 155 |
| Cedar Waxwing | | | | | 0 | 0 | 0 | 0 | 3 | 1 | 4 | 0 |
| Orange-crowned Warbler | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| Yellow Warbler | | | | | 0 | 0 | 5 | 0 | 0 | 13 | 0 | 5 |
| Yellow-rumped Warbler | | | | | 138 | 106 | 59 | 53 | 168 | 276 | 326 | 356 |
| Ovenbird | | WY-III | | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| MacGillivray's Warbler | | WY-II | | | 0 | 0 | 3 | 1 | 0 | 1 | 7 | 4 |
| Common Yellowthroat | | | | | 0 | 0 | 6 | 0 | 2 | 7 | 13 | 6 |
| Wilson's Warbler | | WY-II | | | 0 | 8 | 142 | 0 | 177 | 132 | 120 | 150 |
| Yellow-breasted Chat | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Western Tanager | | | | | 0 | 2 | 1 | 7 | 1 | 19 | 10 | 10 |
| Green-tailed Towhee | | | | | 2 | 1 | 13 | 83 | 35 | 70 | 88 | 99 |
| Spotted Towhee | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Chipping Sparrow | | | | | 58 | 49 | 44 | 89 | 138 | 198 | 258 | 240 |
| Brewer's Sparrow | | WY-I | BCC | SGCN | 15 | 0 | 1 | 62 | 88 | 106 | 103 | 78 |
| Vesper Sparrow | | WY-II | | | 15 | 16 | 8 | 104 | 246 | 82 | 125 | 143 |
| Sage Sparrow | | WY-I | | SGCN | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 |
| Lark Bunting | | WY-II | | SGCN | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | HC | MC | MR | SS | 2002 | 2003 | 2004 | 2005 |
| Savannah Sparrow | | | | | 0 | 10 | 39 | 29 | 0 | 138 | 96 | 78 |
| Fox Sparrow | | | | | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 |
| Song Sparrow | | | | | 0 | 0 | 7 | 3 | 171 | 0 | 26 | 10 |
| Lincoln's Sparrow | | | | | 3 | 22 | 164 | 22 | 0 | 240 | 288 | 211 |
| White-crowned Sparrow | | | | | 34 | 28 | 66 | 107 | 121 | 279 | 205 | 235 |
| Dark-eyed Junco | | | | | 172 | 196 | 68 | 68 | 324 | 516 | 471 | 504 |
| Black-headed Grosbeak | | | | | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 |
| Lazuli Bunting | | WY-III | | | 0 | 0 | 0 | 4 | 10 | 28 | 7 | 4 |
| Red-winged Blackbird | | | | | 0 | 0 | 5 | 2 | 7 | 14 | 5 | 7 |
| Western Meadowlark | | | | | 2 | 1 | 8 | 14 | 37 | 25 | 61 | 25 |
| Brewer's Blackbird | | | | | 1 | 2 | 20 | 43 | 53 | 64 | 57 | 66 |
| Common Grackle | | | | | 0 | 0 | 0 | 0 | 5 | 25 | 0 | 0 |
| Brown-headed Cowbird | | | | | 1 | 3 | 28 | 1 | 1 | 13 | 21 | 33 |
| Black Rosy-Finch | | WY-III | | | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| Pine Grosbeak | | | | | 15 | 7 | 0 | 3 | 0 | 28 | 16 | 25 |
| Cassin's Finch | | | | | 14 | 7 | 5 | 23 | 6 | 4 | 25 | 49 |
| Red Crossbill | | | | | 21 | 26 | 4 | 13 | 3 | 90 | 75 | 64 |
| White-winged Crossbill | | | | | 15 | 6 | 0 | 0 | 0 | 4 | 22 | 21 |
| Pine Siskin | | | | | 41 | 33 | 14 | 58 | 67 | 171 | 268 | 146 |
| American Goldfinch | | | | | 1 | 1 | 0 | 0 | 0 | 2 | 4 | 2 |
| Evening Grosbeak | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| House Sparrow | | | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| *Red Squirrel* | | | | | *148* | *115* | *29* | *47* | *171* | *166* | *409* | *339* |

[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, 2002-2005, with management designation and species totals.

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | MC | MG | MR | 2002 | 2003 | 2004 | 2005 |
| Canada Goose | | | | | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Mallard | | | | | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Green-winged Teal | | | | | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Common Merganser | | | | | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Chukar | | | | | 0 | 2 | 0 | 0 | 0 | 4 | 2 |
| Ruffed Grouse | | | | | 1 | 0 | 0 | 10 | 5 | 0 | 1 |
| Greater Sage-Grouse | | WY-I | | SGCN | 0 | 2 | 0 | 3 | 0 | 0 | 2 |
| Blue Grouse | | WY-I | | | 0 | 1 | 0 | 4 | 3 | 1 | 1 |
| American White Pelican | | WY-II | | SGCN | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Osprey | | | | | 1 | 1 | 0 | 0 | 0 | 1 | 2 |
| Sharp-shinned Hawk | | | | | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| Cooper's Hawk | | | | | 1 | 0 | 1 | 0 | 0 | 2 | 2 |
| Northern Goshawk | R2SS | WY-I | | SGCN | 2 | 0 | 0 | 0 | 0 | 3 | 2 |
| Red-tailed Hawk | | | | | 7 | 2 | 1 | 6 | 11 | 7 | 10 |
| Golden Eagle | | WY-III | BCC | | 0 | 1 | 0 | 2 | 2 | 3 | 1 |
| American Kestrel | | | | | 1 | 4 | 2 | 1 | 0 | 2 | 7 |
| Prairie Falcon | | WY-III | BCC | | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| Sora | | | | | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| Sandhill Crane | | | | SGCN | 2 | 3 | 0 | 0 | 0 | 1 | 5 |
| Killdeer | | | | | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| Spotted Sandpiper | | | | | 2 | 1 | 11 | 40 | 67 | 15 | 14 |
| Long-billed Curlew | | WY-I | BCC | SGCN | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Wilson's Snipe | | | | | 1 | 0 | 0 | 0 | | 1 | 1 |
| Mourning Dove | | | | | 0 | 4 | 0 | 5 | 6 | 12 | 4 |
| Common Nighthawk | | | | | 1 | 2 | 1 | 0 | 0 | 1 | 4 |
| White-throated Swift | | WY-II | | | 0 | 0 | 0 | 0 | 0 | 31 | 0 |
| Calliope Hummingbird | | WY-II | | | 0 | 0 | 3 | 0 | 0 | 0 | 3 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | MC | MG | MR | 2002 | 2003 | 2004 | 2005 |
| Broad-tailed Hummingbird | | WY-II | | | 0 | 0 | 1 | 0 | 4 | 5 | 1 |
| Rufous Hummingbird | | WY-II | | | 0 | 0 | 0 | 0 | 4 | 1 | 0 |
| Belted Kingfisher | | | | | 0 | 0 | 1 | 2 | 2 | 2 | 1 |
| Williamson's Sapsucker | | WY-II | BCC | | 0 | 0 | 0 | 2 | 6 | 2 | 0 |
| Red-naped Sapsucker | | WY-II | BCC | | 4 | 1 | 3 | 3 | 15 | 15 | 8 |
| Downy Woodpecker | | | | | 0 | 0 | 0 | 1 | 4 | 0 | 0 |
| Hairy Woodpecker | | | | | 12 | 0 | 2 | 4 | 11 | 9 | 14 |
| American Three-toed Woodpecker | R2SS | WY-II | | SGCN | 3 | 0 | 0 | 0 | 3 | 2 | 3 |
| Northern Flicker | | | | | 23 | 11 | 14 | 11 | 32 | 42 | 48 |
| Olive-sided Flycatcher | | WY-II | | | 8 | 1 | 0 | 2 | 7 | 6 | 9 |
| Western Wood-Pewee | | | | | 2 | 0 | 13 | 1 | 5 | 7 | 15 |
| Least Flycatcher | | | | | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Hammond's Flycatcher | | WY-II | | | 6 | 0 | 5 | 3 | 67 | 6 | 11 |
| Gray Flycatcher | | WY-II | | | 0 | 0 | 1 | 1 | 2 | 0 | 1 |
| Dusky Flycatcher | | WY-II | | | 30 | 14 | 33 | 17 | 52 | 62 | 77 |
| Cordilleran Flycatcher | | WY-II | | | 1 | 0 | 2 | 11 | 13 | 2 | 3 |
| Warbling Vireo | | | | | 36 | 22 | 74 | 28 | 65 | 94 | 132 |
| Gray Jay | | | | | 6 | 0 | 0 | 4 | 6 | 7 | 6 |
| Steller's Jay | | | | | 1 | 0 | 0 | 2 | 6 | 2 | 1 |
| Clark's Nutcracker | | WY-III | | | 26 | 7 | 2 | 34 | 47 | 57 | 35 |
| Black-billed Magpie | | | | | 0 | 9 | 2 | 13 | 6 | 10 | 11 |
| American Crow | | | | | 0 | 2 | 0 | 1 | 15 | 0 | 2 |
| Common Raven | | | | | 5 | 15 | 0 | 14 | 8 | 21 | 20 |
| Horned Lark | | | | | 0 | 7 | 0 | 17 | 2 | 8 | 7 |
| Tree Swallow | | | | | 0 | 0 | 3 | 1 | 0 | 1 | 3 |
| Violet-green Swallow | | | | | 0 | 6 | 30 | 3 | 32 | 26 | 36 |
| Cliff Swallow | | | | | 0 | 0 | 0 | 12 | 0 | 0 | 0 |
| Black-capped Chickadee | | | | | 0 | 0 | 1 | 1 | 11 | 1 | 1 |
| Mountain Chickadee | | | | | 46 | 19 | 10 | 89 | 108 | 61 | 76 |
| Red-breasted Nuthatch | | | | | 44 | 5 | 3 | 27 | 56 | 55 | 52 |
| White-breasted Nuthatch | | | | | 1 | 2 | 3 | 0 | 2 | 0 | 6 |
| Brown Creeper | | WY-II | | | 0 | 0 | 1 | 2 | 5 | 2 | 1 |
| Rock Wren | | WY-III | | | 2 | 51 | 2 | 48 | 42 | 84 | 55 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | MC | MG | MR | 2002 | 2003 | 2004 | 2005 |
| House Wren | | | | | 5 | 10 | 14 | 4 | 29 | 5 | 29 |
| American Dipper | | WY-II | | | 0 | 0 | 0 | 9 | 19 | 2 | 0 |
| Golden-crowned Kinglet | | WY-II | | | 0 | 0 | 0 | 0 | 14 | 1 | 0 |
| Ruby-crowned Kinglet | | | | | 62 | 11 | 23 | 107 | 121 | 114 | 96 |
| Western Bluebird | | WY-II | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Mountain Bluebird | | | | | 18 | 66 | 4 | 10 | 36 | 40 | 88 |
| Townsend's Solitaire | | WY-II | | | 5 | 1 | 1 | 7 | 11 | 23 | 7 |
| Veery | | WY-III | | | 0 | 0 | 0 | 2 | 0 | 2 | 0 |
| Swainson's Thrush | | | | | 3 | 0 | 0 | 1 | 36 | 6 | 3 |
| Hermit Thrush | | | | | 34 | 6 | 10 | 5 | 21 | 57 | 50 |
| American Robin | | | | | 66 | 37 | 42 | 81 | 122 | 122 | 145 |
| Gray Catbird | | | | | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Sage Thrasher | | WY-II | | SGCN | 0 | 1 | 0 | 0 | 9 | 5 | 1 |
| American Pipit | | | | | 0 | 37 | 0 | 1 | 0 | 0 | 37 |
| Orange-crowned Warbler | | | | | 0 | 2 | 0 | 0 | 4 | 2 | 2 |
| Yellow Warbler | | | | | 1 | 1 | 20 | 19 | 33 | 15 | 22 |
| Yellow-rumped Warbler | | | | | 38 | 9 | 34 | 103 | 201 | 89 | 81 |
| MacGillivray's Warbler | | WY-II | | | 5 | 0 | 9 | 1 | 8 | 9 | 14 |
| Wilson's Warbler | | WY-II | | | 0 | 0 | 1 | 29 | 1 | 1 | 1 |
| Western Tanager | | | | | 7 | 4 | 5 | 1 | 20 | 28 | 16 |
| Green-tailed Towhee | | | | | 3 | 32 | 18 | 29 | 38 | 43 | 53 |
| Cassin's Sparrow | | | BCC | | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Chipping Sparrow | | | | | 19 | 17 | 27 | 35 | 75 | 52 | 63 |
| Brewer's Sparrow | | WY-I | BCC | SGCN | 0 | 19 | 0 | 56 | 52 | 78 | 19 |
| Vesper Sparrow | | WY-II | | | 0 | 63 | 1 | 85 | 91 | 127 | 64 |
| Lark Sparrow | | WY-II | | | 0 | 13 | 0 | 24 | 9 | 9 | 13 |
| Savannah Sparrow | | | | | 0 | 6 | 0 | 7 | 10 | 19 | 6 |
| Song Sparrow | | | | | 0 | 0 | 14 | 85 | 26 | 19 | 14 |
| Lincoln's Sparrow | | | | | 8 | 1 | 4 | 0 | 84 | 19 | 13 |
| White-crowned Sparrow | | | | | 4 | 2 | 3 | 55 | 46 | 16 | 9 |
| Dark-eyed Junco | | | | | 78 | 13 | 36 | 38 | 147 | 131 | 127 |
| Black-headed Grosbeak | | | | | 0 | 0 | 5 | 1 | 0 | 0 | 5 |
| Lazuli Bunting | | WY-III | | | 1 | 2 | 12 | 1 | 2 | 2 | 15 |
| Red-winged Blackbird | | | | | 0 | 4 | 0 | 1 | 4 | 5 | 4 |

| Common Name[1] | Special Management Designation[2] | | | | Total #individuals observed per habitat[3], 2005 | | | Total #individuals observed per year (in all habitats surveyed) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | USFS | PIF | USFWS | WGFD | MC | MG | MR | 2002 | 2003 | 2004 | 2005 |
| Western Meadowlark | | | | | 0 | 87 | 0 | 89 | 134 | 108 | 87 |
| Brewer's Blackbird | | | | | 0 | 16 | 2 | 1 | 7 | 23 | 18 |
| Common Grackle | | | | | 0 | 1 | 0 | 26 | 0 | 0 | 1 |
| Brown-headed Cowbird | | | | | 1 | 2 | 4 | 5 | 9 | 4 | 7 |
| Pine Grosbeak | | | | | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Cassin's Finch | | | | | 6 | 1 | 1 | 16 | 11 | 14 | 8 |
| Red Crossbill | | | | | 0 | 0 | 0 | 0 | 0 | 19 | 0 |
| Pine Siskin | | | | | 88 | 8 | 22 | 11 | 88 | 163 | 118 |
| American Goldfinch | | | | | 0 | 0 | 1 | 0 | 2 | 0 | 1 |
| Evening Grosbeak | | | | | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| *Red Squirrel* | | | | | *32* | *3* | *12* | *18* | *50* | *0* | *47* |

[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