Bird Monitoring in the National Park Service, Northern Colorado Plateau Network: 2005 Field Season Report

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In Cooperation With:

ROCKY MOUNTAIN BIRD OBSERVATORY

The mission of the Rocky Mountain Bird Observatory (RMBO) is to conserve birds of the Rocky Mountains, Great Plains, and Intermountain West and the habitats on which they depend through research, monitoring, education, and outreach. *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 the goal of understanding the need for bird conservation.*

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EXECUTIVE SUMMARY

Birds are excellent indicators of environmental quality and change. In addition, they are one of the most highly visible and valued components of our native wildlife. Monitoring birds provides data needed not only to effectively manage bird populations, but also to understand the effects of human activities on ecosystems 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 partner, the National Park Service (NPS), implemented Year 1 of a bird monitoring program in the NPS Northern Colorado Plateau Network (NCPN), using a protocol similar to other RMBO monitoring programs as delineated by Panjabi et al. (2001). RMBO has designed this program to provide statistically rigorous long-term trend data for populations of most diurnal, regularly breeding bird species in the NCPN. In the short term, the program will provide information needed to effectively manage and conserve bird populations in the NCPN, including the spatial distribution, abundance, and relationships to important habitat characteristics for each species. In the long term, it will support the NCPN's efforts to develop natural resource monitoring plans for its park units and contribute to RMBO's broader landscape-scale breeding bird monitoring program, which currently includes 11 states in the Rocky Mountains and Great Plains regions.

The objective of the NCPN program was to establish 45 point-count transects (15 transects each in low-elevation riparian, pinyon-juniper, and sage shrubland habitats) and to conduct those transects two times every year. Initially, 2005 was intended as a pilot season in which we were to scout transect locations and establish as many of the transects as possible. We were, however, able to establish all 45 point-count transects and conduct all of them two times (for a total of 1333 point counts) in 2005. RMBO staff recorded a total of 119 breeding bird species on point-count transects in the three habitats, many of which were observed on only a few occasions. The habitat-stratified point-count transect data provided robust results (CV of < 50% in at least one habitat) for 36 bird species, and moderately robust results (CV of 50% - 75% in at least one habitat) for 9 additional species. The 45 species should be effectively monitored under the current program in at least one of the three habitats surveyed this year. We obtained sufficient data on seven other species to possibly monitor their populations across habitat types, although in some cases, these species may be better monitored with additional transects in certain habitats. The total number of species that should be monitored represents approximately 44% of the total number of species detected in the NCPN in 2005.

We are also in the process of redesigning our web site so that data can be queried and results can be displayed on a variety of scales (i.e. management unit, county, state). This effort will make the data much more useful and dynamic to land managers. Real-time access to the raw data and habitat relationships will allow managers to apply the data to local management issues. In addition, we are working with the Cornell Lab of Ornithology's Avian Knowledge Network and the U.S. Geological Survey to compile and merge results from a variety of sources. This long-needed effort will identify monitoring programs, integrate information, and conduct analyses on regional datasets that can help inform management decisions.

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INTRODUCTION

Program History

In 1995, the Rocky Mountain Bird Observatory (RMBO), in conjunction with the Colorado Division of Wildlife (CDOW), U.S.D.A. 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 were obtained for most diurnal, regularly 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 our 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). In addition to monitoring bird populations, the program also 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 statewide. We also established additional transects in the Bighorn and Shoshone national forests at that time.

In 2003, RMBO 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 that 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 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 (NCPN) in order to monitor bird species in three habitats.

We will 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 will 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 coal mine, 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 monitoring populations of other taxonomic groups. 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 flowers, 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. To date, resource managers have relied on data derived from the Breeding Bird Survey (BBS) for bird-population information. The BBS, however, is a road-based, volunteer-dependent survey that does not effectively sample many species or habitats (Robbins et al. 1993, Sauer 1993) and does not reliably decipher population trends at small geographic scales (e.g., statewide; Sauer 2000). Furthermore, the design and implementation of the BBS are such that results generated from these efforts are often inconclusive due to the difficulty associated with interpreting index counts (Sauer 2000) and numerous confounding variables (e.g., observer bias) (Robbins et al. 1986, Bohning-Gaese et al. 1993, Sauer et al. 1994, James et al. 1996, Thomas 1996). For these reasons, BBS data generally are insufficient to guide local or regional management decisions.

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

Given the well-publicized declines of many species of North American breeding birds, there is an urgent need for monitoring programs that serve as an "early-warning" system to identify declining species so that natural resource managers can 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

will develop and establish the second phase of the program to gather demographic and other information to address specific management issues.

The specific objectives of RMBO's monitoring program are:

1.) To integrate existing bird-monitoring efforts in the region to provide better information on distribution and abundance of all breeding-bird species, and especially for 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 all or parts of four BCRs: BCR 10 – Northern Rockies, BCR 16 – Southern Rockies/Colorado Plateau, BCR 17 – Badlands and Prairies, and BCR 18 – Shortgrass Prairie (Figure 1). These BCRs cover a broad array of habitats and elevation gradients and have a correspondingly diverse suite of priority birds. All but one of the parks we survey lie within BCR16.

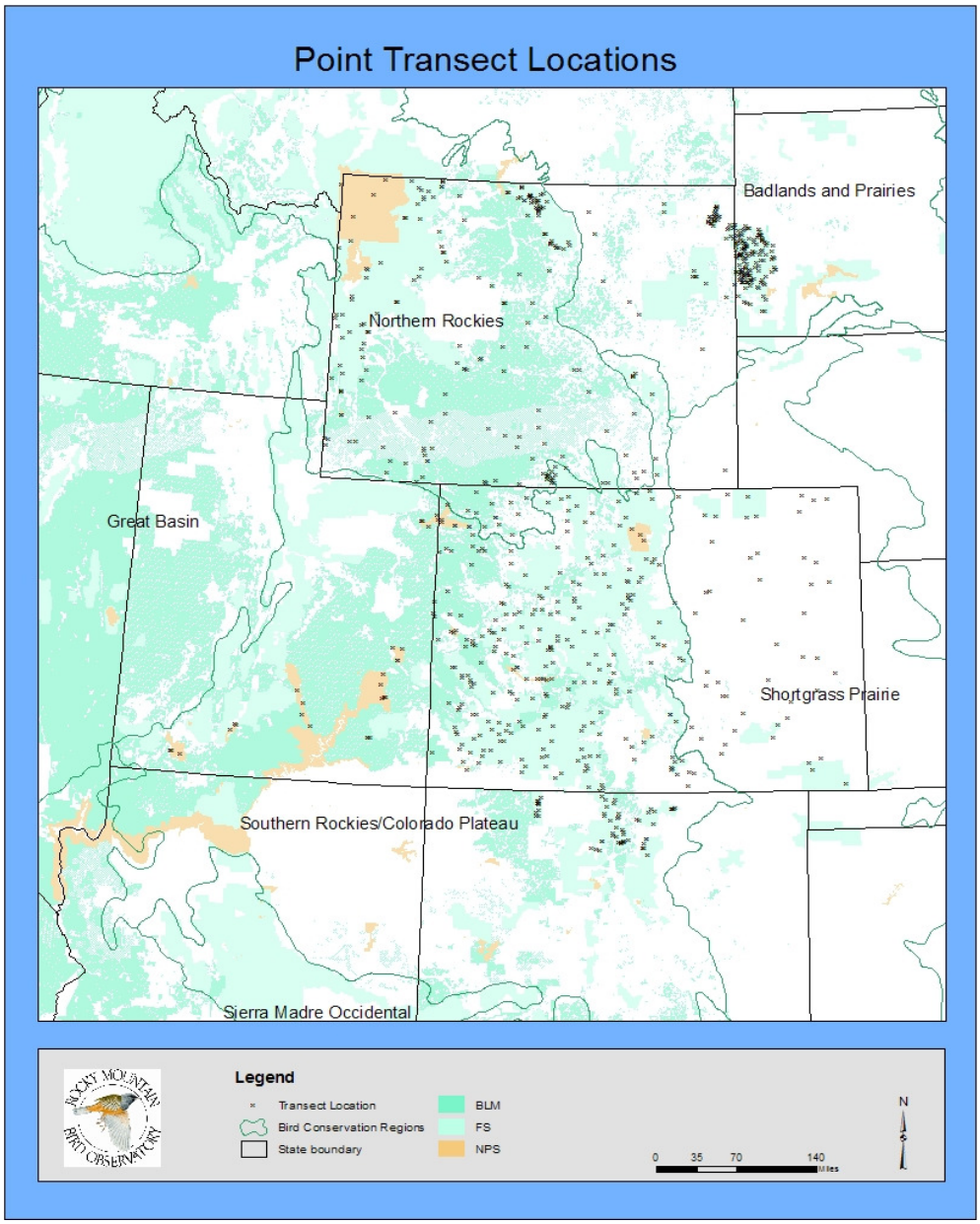


Figure 1. RMBO point-count transect locations within state boundaries, BCR boundaries and land ownership.

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

The Habitats

Low-elevation Riparian

This habitat is comprised mostly of scattered stands of Fremont cottonwood (*Populus fremontii*) and boxelder (*Acre negundo*) along perennial streams, sometimes within deeply-cut canyons.

Pinyon-Juniper

Pinyon-juniper typically lies just above semidesert shrubland. It covers most of the ridges and mesas in the NCPN and is the most extensive habitat. Pinyon-juniper varies in composition with various ratios of its two main components – pinyon pine (*Pinus edulis*) and juniper (*Juniperus* sp.).

Sage Shrubland

The sagebrush shrubland community occurs extensively on the Colorado Plateau. The stands of sage that we survey in the NCPN are generally narrow "fingers" of pure sage, and our point-count stations are often near forests. The most common species of sagebrush in the NCPN are big sagebrush (*Artemisia tridentata*) and mountain sagebrush (*Artemisia frigida*).

Field Personnel

Six experienced biologists with excellent aural and visual bird-identification skills comprised the RMBO staff that executed the field component in the NCPN in 2005. All technicians brought with them considerable experience conducting bird surveys across the United States and excellent bird-identification skills. Each technician also 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.

Site Selection

Survey sites were selected by NPS and RMBO during the winter of 2005. The sites were randomly selected from a pool of habitat "stands" that were large enough to accommodate transects of 15 point counts. Areas with >50% slope were not included in the selection pool, thus, stands selected for consideration could be reached by hiking and could be traversed safely. RMBO staff "ground-proofed" the selected stands during the early spring, and established the transects during the field season. In the few cases where the originally-selected stands would not work out, replacement stands were chosen in the same manner as the original stands.

Point-count transect Protocol

RMBO staff conducted point transects (Buckland et al. 1993) 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). In order to increase our sample size, we conducted all NCPN transects two times, with each visit on a separate day. 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 compass bearing from the access point (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 count station 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 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.

In 2004, we incorporated a change in the bird-data collection protocol relative to previous years in that 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™ or other similar 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 vegetation data, including the structural stage and canopy closure of the forest, mean canopy height, the types and relative proportions of overstory trees, the sub-canopy volume and tree species composition, and the % 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 the NCPN project: 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., swifts, swallows, crossbills, etc.). Both numbers are useful, especially for low-density species, and thus both are reported in the "Species Accounts" section for species with at least 25 detections. 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

RMBO staff conducted a total of 1333 point counts along 45 point-count transects (conducted twice) in three habitats (Figure 2) between 22 May and 9 July 2005.

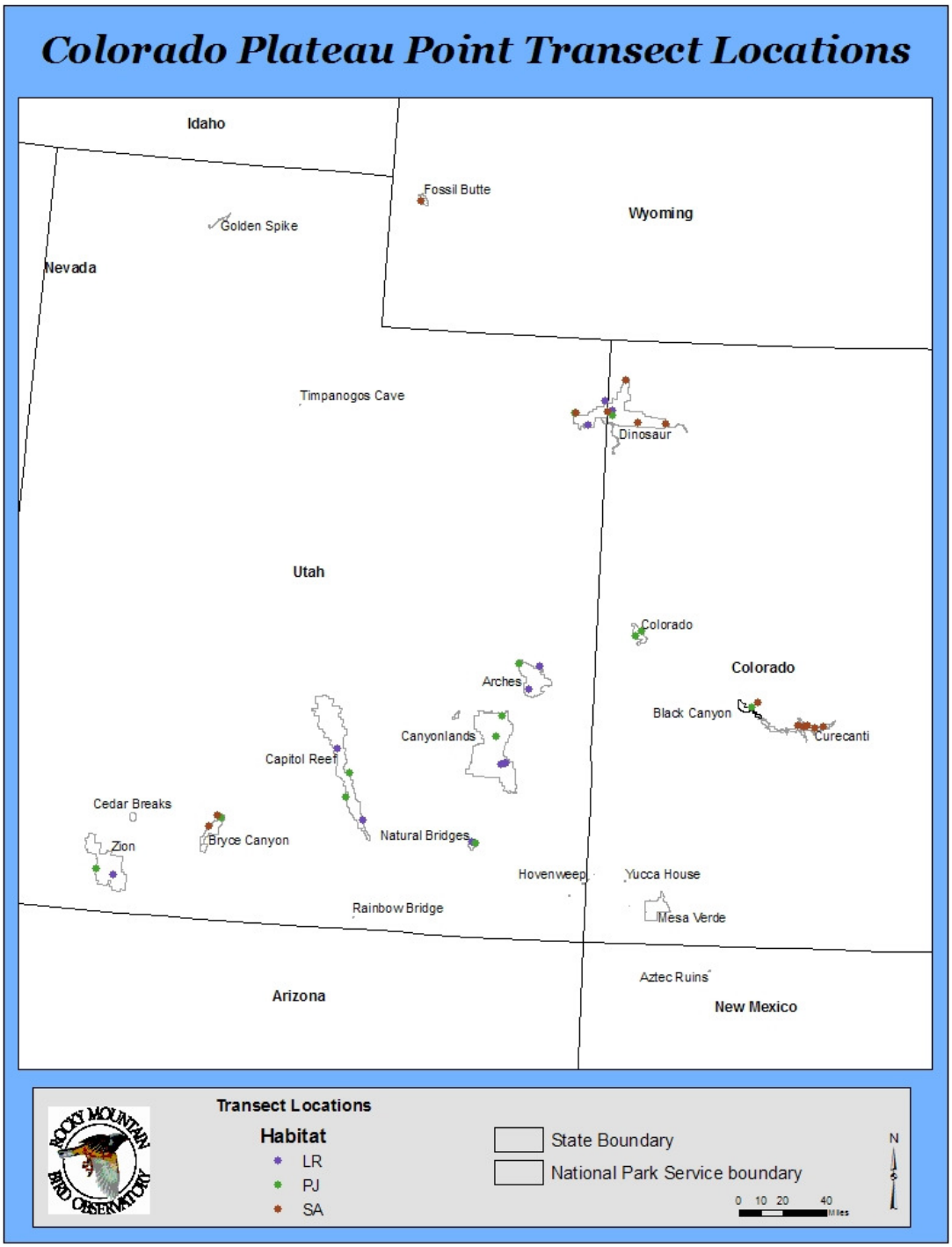


Figure 2. Location of point-count transects on the NCPN by habitat, summer 2005.

Table 1. Bird sampling periods and effort in each habitat, in the Northern Colorado Plateau Network, summer 2005.

Habitat	Dates Sampled	# point-count transects	# point counts
Low-Elevation Riparian	15 May – 3 July	15*	440
Pinyon-Juniper	14 May – 1 July	15*	450
Sage Shrubland	14 May – 2 July	15*	443
All habitats	**14 May – 3 July**	**45***	**1333**

*All transects were conducted twice.

We detected a total of 9,435 individual birds of 119 species on point-count transects. We detected forty-six species in sufficient numbers (n > 25) to estimate density in at least one habitat.

We detected 3,064 individual birds of 81 species in low-elevation riparian habitat, 3,118 individual birds of 85 species in pinyon-juniper habitat, and 3,253 individual birds of 92 species in sage shrubland habitat (Table 2). We record these detections while surveying but they are not useful for estimating densities. 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 three habitats surveyed, the average species richness was greatest in pinyon-juniper habitat and least in sage-shrubland habitat (Table 2). We have provided estimates of species richness at both the point-count (sub-sample) level 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.

Table 2. Bird totals and species richness in habitats surveyed in the Northern Colorado Plateau Network, summer 2005.

Habitat	# birds detected	Avg. # birds/point	# species detected	Avg. # species /point	Avg. # species /transect
Low-Elevation Riparian	3064	6.96	81	4.76	21.27
Pinyon-Juniper	3118	6.92	85	5.24	23.03
Sage Shrubland	3253	7.34	92	4.70	19.77
All habitats	**9435**	**7.08**	**118**	**4.90**	**21.36**

It should be noted that the number of birds in Table 2 differs from Appendix B. Table 2 includes only detections at point count stations, while Appendix B includes between point detections of low-density species and flyovers of species that are not believed to be utilizing the habitat in which they are detected.

Low-Elevation Riparian (LR)

We conducted 440 point counts along 15 transects (conducted twice) in low-elevation riparian habitat between 15 May and 3 July 2005 (Table 1). We detected a total of 3,064 individual birds in this habitat, with an average of 6.96 birds per point count (Table 2). We detected 81 species in total and, on average, 4.76 species per point count and 21.27 species per transect in this habitat (Table 2).

The point-count transect data from low-elevation riparian habitat yielded robust density estimates (CV<50%) for 21 species and moderately robust estimates (CV=50-75%) for five additional species (Table 3). We should be able to effectively monitor these 26 species, which represent 32% of all species detected in low-elevation riparian habitat.

Black-chinned Hummingbird, Lazuli Bunting, Blue-gray Gnatcatcher, Yellow Warbler, and White-throated Swift had the highest estimated densities of all species detected in low-elevation riparian habitat (Table 3). Twenty-one species – White-throated Swift, Black-chinned Hummingbird, Broad-tailed Hummingbird, Western Wood-Pewee, Ash-throated Flycatcher, Plumbeous Vireo, Common Raven, Mourning Dove, Rock Wren, Canyon Wren, House Wren, Song Sparrow, Yellow Warbler, Yelow-breasted Chat, Spotted Towhee, Violet-green Swallow, Black-throated Sparrow, Say's Phoebe, Lazuli Bunting, House Finch, and Lesser Goldfinch – had higher estimated densities in low-elevation riparian habitat relative to the other habitats surveyed.

Table 3. Estimated densities of breeding birds in low-elevation riparian habitat in the Northern Colorado Plateau Network, summer 2005.

Species	D	LCL	UCL	CV	n
Mourning Dove	26.86	8.38	86.13	64.3%	114
White-throated Swift	52.46	24.07	114.32	40.9%	138
Black-chinned Hummingbird	95.80	58.28	157.45	24.8%	30
Broad-tailed Hummingbird	18.72	8.38	41.84	40.9%	25
Western Wood-Pewee	4.07	1.81	9.15	40.5%	27
Say's Phoebe	2.20	1.28	3.77	26.5%	41
Ash-throated Flycatcher	21.29	13.88	32.66	20.8%	152
Plumbeous Vireo	10.19	6.17	16.81	24.8%	60
Common Raven	1.12	0.59	2.14	32.9%	28
Violet-green Swallow	48.21	31.88	72.92	20.7%	103
Juniper Titmouse	4.79	2.19	10.48	38.9%	27
Rock Wren	6.32	3.61	11.07	27.5%	91
Canyon Wren	1.47	0.64	3.37	41.6%	28
Bewick's Wren	6.30	2.67	14.84	42.6%	51
House Wren	20.30	7.55	54.59	49.9%	37
Blue-gray Gnatcatcher	70.71	40.75	122.71	28.2%	130
Virginia's Warbler	6.29	3.11	12.71	35.1%	35
Yellow Warbler	68.62	29.60	159.09	41.1%	138
Black-throated Gray Warbler	7.11	3.02	16.76	42.7%	38
Yellow-breasted Chat	25.34	6.28	102.30	73.8%	33
Spotted Towhee	43.57	30.53	62.19	17.1%	246
Black-throated Sparrow	3.47	1.21	9.99	53.0%	52
Song Sparrow	27.82	9.61	80.56	53.6%	45

Table 3 cont. Estimated densities of breeding birds in low-elevation riparian habitat in the Northern Colorado Plateau Network, summer 2005.

Species	D	LCL	UCL	CV	n
Lazuli Bunting	87.89	37.95	203.53	41.6%	163
House Finch	24.57	13.49	44.77	30.7%	113
Lesser Goldfinch	13.59	5.58	33.11	44.9%	24

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

Pinyon-Juniper (PJ)

We conducted 450 point counts along 15 transects (conducted twice) in pinyon-juniper habitat between 14 May and 1 July 2005 (Table 1). We detected a total of 3,118 individual birds in this habitat, with an average of 6.92 birds per point count (Table 2). We detected a total of 85 species in this habitat with an average of 5.24 species per point count and 23.03 species per transect (Table 2).

The point-count transect data from pinyon-juniper habitat yielded robust density estimates (CV<50%) for 19 species and moderately robust estimates (CV=50-75%) for six additional species (Table 4). We should be able to effectively monitor these 25 species, which represent 31% of all species detected in pinyon-juniper habitat.

Bushtit, Blue-gray Gnatcatcher, Black-throated Warbler, Gray Flycatcher, and Juniper Titmouse had the highest estimated densities of all species detected in pinyon-juniper habitat (Table 4). Twelve species – Gray Flycatcher, Western Scrub-Jay, Pinyon Jay, Mountain Chickadee, Juniper Titmouse, Bushtit, Bewick's Wren, Blue-gray Gnatcatcher, Mountain Bluebird, Virginia's Warbler, Black-throated Gray Warbler, and Chipping Sparrow – had higher estimated densities in pinyon-juniper habitat relative to the other habitats surveyed.

Table 4. Estimated densities of breeding birds in pinyon-juniper habitat in the Northern Colorado Plateau Network, summer 2005.

Species	D	LCL	UCL	CV	n
Mourning Dove	17.44	10.80	28.14	23.2%	183
White-throated Swift	10.67	5.00	22.79	37.3%	97
Gray Flycatcher	26.69	17.91	39.78	19.6%	120
Say's Phoebe	1.91	1.10	3.30	26.7%	30
Ash-throated Flycatcher	14.05	9.68	20.37	18.5%	125
Gray Vireo	6.85	3.78	12.43	29.2%	101
Plumbeous Vireo	5.81	2.80	12.09	35.8%	67
Western Scrub-Jay	2.36	1.24	4.46	31.7%	47
Pinyon Jay	1.73	0.65	4.59	50.6%	47
Common Raven	0.47	0.29	0.76	24.1%	33
Violet-green Swallow	17.90	5.62	57.06	62.9%	39
Mountain Chickadee	3.59	1.10	11.65	60.9%	22
Juniper Titmouse	24.14	12.35	47.17	34.7%	84
Bushtit	197.62	40.10	973.88	93.0%	37
Rock Wren	4.86	2.82	8.37	26.6%	83
Bewick's Wren	13.14	8.96	19.26	18.7%	164

Table 4 cont. Estimated densities of breeding birds in pinyon-juniper habitat in the Northern Colorado Plateau Network, summer 2005.

Species	D	LCL	UCL	CV	n
Blue-gray Gnatcatcher	73.84	49.41	110.35	20.1%	160
Mountain Bluebird	8.91	2.85	27.89	57.8%	66
American Robin	1.38	0.58	3.31	44.2%	31
Virginia's Warbler	11.94	3.19	44.70	73.7%	53
Black-throated Gray Warbler	69.70	48.12	100.96	18.1%	311
Spotted Towhee	10.77	5.75	20.18	30.6%	104
Chipping Sparrow	14.57	8.41	25.23	26.7%	94
Black-throated Sparrow	3.40	1.57	7.38	38.0%	45
Western Meadowlark	2.64	0.66	10.52	72.4%	48
House Finch	17.70	10.64	29.45	24.9%	102

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

Sage Shrubland (SA)

We conducted 443 point counts along 15 transects (conducted twice) in sage shrubland habitat between 14 May and 2 July 2005 (Table 1). We detected a total of 3,253 individual birds in this habitat, with an average of 7.34 birds per point count (Table 2). We detected 92 species in total and, on average, 4.90 species per point count and 21.36 species per transect in this habitat (Table 2).

The point-count transect data from sage shrubland habitat yielded robust density estimates (CV<50%) for 16 species and moderately robust estimates (CV=50-75%) for six additional species (Table 5). We should be able to effectively monitor these 22 species, which represent 24% of all species detected in sage shrubland habitat.

Brewer's Sparrow, Green-tailed Towhee, Vesper Sparrow, Cliff Swallow, and Chipping Sparrow had the highest estimated densities of all species detected in sage shrubland habitat (Table 5). Twelve species – Dusky Flycatcher, Black-billed Magpie, Horned Lark, Cliff Swallow, American Robin, Sage Thrasher, Green-tailed Towhee, Brewer's Sparrow, Vesper Sparrow, Lark Sparrow, Sage Sparrow, and Western Meadowlark – had higher estimated densities in sage shrubland habitat relative to the other habitats surveyed.

Table 5. Estimated densities of breeding birds in sage shrubland habitat in the Northern Colorado Plateau Network, summer 2005.

Species	D	LCL	UCL	CV	n
Mourning Dove	2.34	0.91	5.99	48.7%	88
Gray Flycatcher	2.13	0.90	5.07	44.4%	25
Dusky Flycatcher	4.07	1.10	15.13	68.9%	33
Black-billed Magpie	3.10	1.45	6.63	37.9%	63
Common Raven	0.06	0.03	0.12	30.9%	30
Horned Lark	2.74	1.00	7.57	50.3%	28
Cliff Swallow	24.47	7.31	81.97	63.8%	16
Rock Wren	3.39	1.84	6.25	30.6%	99
Blue-gray Gnatcatcher	7.42	3.18	17.30	42.1%	35
Mountain Bluebird	6.36	3.45	11.70	30.7%	72

Table 5 cont. Estimated densities of breeding birds in sage shrubland habitat in the Northern Colorado Plateau Network, summer 2005.

Species	D	LCL	UCL	CV	n
American Robin	3.20	1.62	6.30	34.3%	46
Sage Thrasher	2.52	1.01	6.29	45.3%	90
Virginia's Warbler	1.24	0.44	3.46	51.4%	26
Black-throated Gray Warbler	4.82	1.76	13.22	50.7%	28
Green-tailed Towhee	31.37	17.13	57.44	29.7%	320
Spotted Towhee	3.62	1.61	8.15	40.0%	64
Chipping Sparrow	9.51	4.70	19.25	35.4%	35
Brewer's Sparrow	71.88	49.18	105.07	18.2%	567
Vesper Sparrow	30.98	19.57	49.05	22.9%	334
Lark Sparrow	8.57	3.27	22.42	47.7%	94
Sage Sparrow	2.79	0.79	9.88	64.8%	38
Western Meadowlark	5.22	2.21	12.33	43.8%	165

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 Population Monitoring

The habitat-stratified point-count transects produced excellent results with low coefficients of variation (≤ 50%) for 36 bird species in at least one habitat surveyed in 2005, and moderately robust results (CV of 50% - 75% in at least one habitat) for 9 additional species. Thus we should be able to detect habitat-specific population trends for these 45 species within our maximum target of 30 years.

We obtained sufficient data on an additional seven species to monitor their populations across habitat types, although in some cases, these species may be better monitored with additional transects in a certain habitat. For several more species, we did not record enough detections either within one habitat or across habitats to generate density estimates. Given interest, however, with several years' data we may 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 density estimates that may be robust enough for population trend monitoring.

The 52 species for which we have enough data to monitor either within or across habitats represent about 44% of *all species* observed in the three habitats surveyed in 2005, but they represent almost 96% of all *individual birds* observed. The other 66% of species (~4% of birds observed) fall into one of the following categories below:

1) Low-density, highly localized species (e.g., Black Phoebe);
2) Low-density, widespread species (e.g., Peregrine Falcon);
3) Irregular species (e.g., Black-chinned Sparrow);
4) Vagrant species (e.g. Lucy's warbler);
5) Species that occur mainly outside of NCPN in other habitats (e.g., Grace's Warbler);
6) Nocturnal species (e.g., Great-horned Owl);
7) Wetland-obligate species (e.g. Blue-winged Teal); and
8) Species that are most readily detectable prior to late May (e.g. Greater Sage-Grouse).

Species in the aforementioned groups, except vagrant species, could be monitored through additional effort using one or more of the following survey techniques:

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

One 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 Eagles and Prairie Falcons, monitoring could be achieved by locating active nests and visiting a subset during the spring and summer as necessary to evaluate the outcome of each. Nests would first be located by consulting with local biologists, birders, and other experts, and then as part of the field effort, additional suitable habitat could be searched to locate previously unrecorded nests. Ultimately, the majority of active nests would be included in the monitoring scheme and a random subset would be visited each year to check for occupancy and outcome.

RMBO has been implementing some of these techniques through the special-species program under MCB with great success. Details of these findings are available in the 2005 MCB special species report, which will be available for download on our website. RMBO is open to discussing implementing additional techniques for targeted species with the NCPN.

Coordinated Bird Monitoring

Coordinated Bird Monitoring (CBM) is an ongoing effort that began with the Western Working Group of Partners in Flight in 1999, to integrate existing monitoring data to estimate trends in population size, describe changes in abundance, and monitor several fitness indicators. CBM focuses on management issues and, ideally, the integration will be useful at many spatial and administrative levels.

RMBO has been working with the Western Working Group of PIF over the last few years to implement CBM, especially in the Intermountain West. We are in the process of redesigning our web site to enable web-based queries of our data and the display of results by habitat, management unit, ecoregion, and other scales. Some of these data will be available via web crawlers to a larger network of monitoring programs so that data can be queried at a regional level in collaboration with CBM. Currently, several partners are involved in this effort, including the Avian Science Center at the University of Montana, Cornell Lab of Ornithology's Avian Knowledge Network, and the US Geological Survey. Within the next few years, we plan to merge results, broaden our scale of comparison, and provide our collaborators with an easily accessible and more dynamic dataset.

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APPENDIX A. SPECIES ACCOUNTS

In this section we present a one-page account and a one-page map for each bird species detected in 2005 that is of management interest, as designated by the Partners in Flight (PIF) and the U.S. Fish and Wildlife Service.

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 prospect for monitoring. In the density estimate tables we present *N, the number of individuals observed*, and if we were able to calculate a density estimate, we also present *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. The codes used to describe each project and the habitats in which we conducted surveys for all of RMBO's projects are listed in Tables 6 and 7.

Table 6. 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	MWB-BI
Monitoring Wyoming's Birds – Shoshone National Forest	MWB-SH
Monitoring the Birds of the Carson National Forest	MBCNF
Monitoring Birds of the Northern Colorado Plateau Network	NCPN

Table 7. 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	MWB-BI
High-elevation Riparian	HR	MCB
Juniper Woodland	JW	MWB
Low-elevation Riparian	LR	NCPN
Mid-elevation Conifer	MC	MWB, MWB-BI, MWB-SH
Mixed Conifer	MC	MCB, MWB, MBCNF
Montane Grassland	MG	MWB-SH
Montane Riparian	MR	MWB, MWB-BI, MWB-SH, MBBH
Montane Shrubland	MS	MCB
Pinyon Juniper	PJ	MCB, MBCNF, MBBH, NCPN
Ponderosa Pine, northern hills	PN	MBBH

Table 7 cont. List of Habitat types by project used in the species accounts.

Habitat Type	Code	Project
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, NCPN
Shrubsteppe	SS	MWB, MWB-BI
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. Wetland transects, (MCB only) since they are line transects are not depicted in the maps. For more information on wetland species please see the 2005 MCB special species report. 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 the summary, we briefly describe the breeding habitat for each species, other pertinent information, and evaluate our ability to monitor the species in the NCPN. 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 30 years. Although there is yearly variation in the coefficient of variation for each species, typically it does not fluctuate beyond our ability to calculate a density estimate.

Greater Sage-Grouse
(*Centrocercus urophasianus*)

*PIF Species of Regional Importance

In 2005, we detected 19 individual Greater Sage Grouse in sage habitat on NCPN transects. Elsewhere within our sampling area, we detected Greater Sage Grouse on our Colorado Monitoring Project (MCB), the Monitoring Birds of the Black Hills (MBBH) project, and our Wyoming Monitoring Project (MWB). We did not detect Greater Sage Grouse in sufficient numbers (n > 24 birds in an individual habitat) to calculate density on any monitoring project

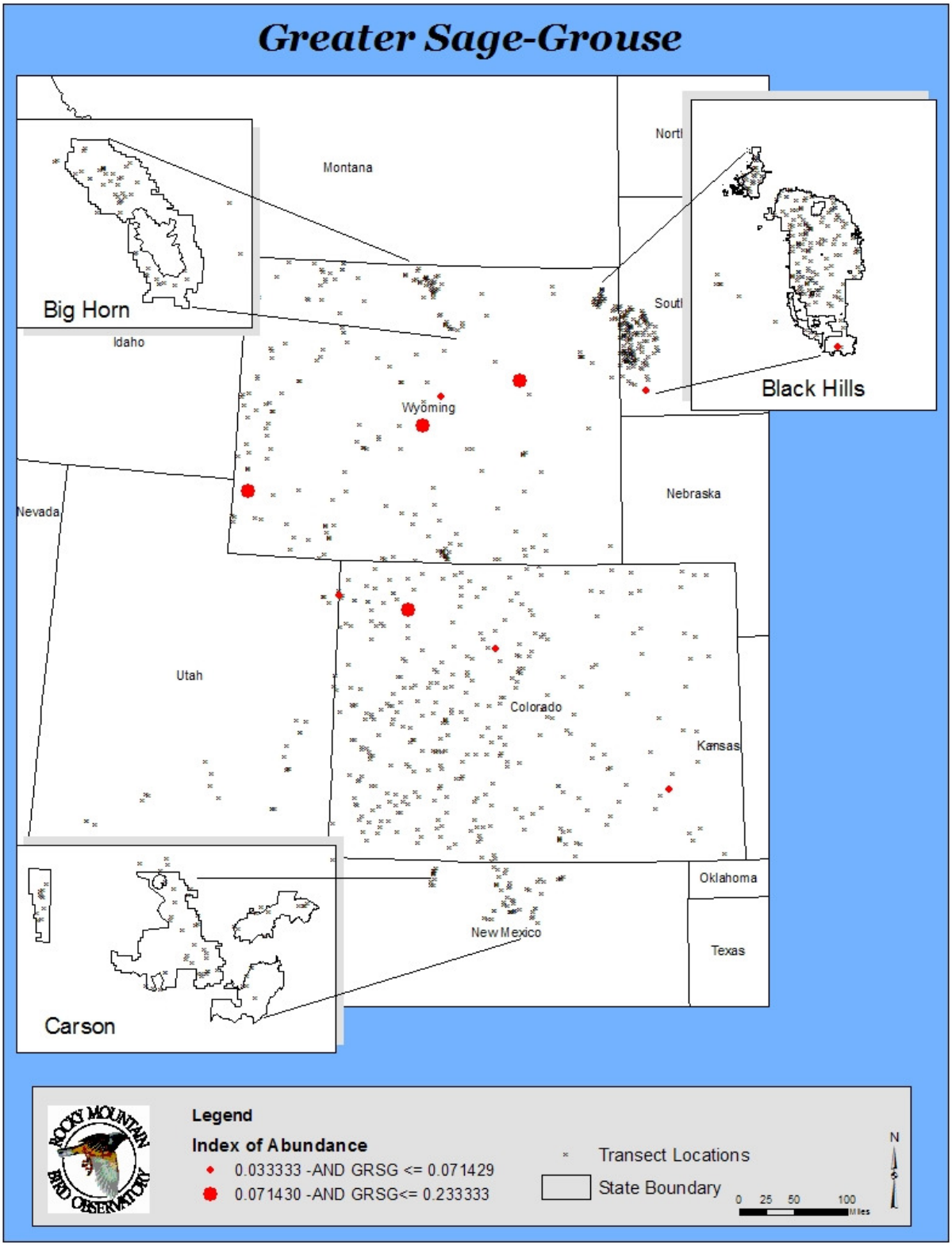
Total number of detections, number of individuals, and habitat-specific density estimates for Greater Sage-Grouse on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
SA	ID	--	--	--	--	19

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 Sage Grouse across its range. The species was recently proposed for listing under the Endangered Species Act (Righter et al. 2004).

This monitoring project does not target Greater Sage-Grouse or any gallinaceous birds, most of which are game species whose populations are monitored by state wildlife agencies. We did, however, detect the species on sage shrubland transects, and if our first year of surveys is an indication of the species' distribution and abundance, we may be able to loosely track the presence of Greater Sage Grouse in sage shrubland habitat in the NCPN.


Greater Sage-Grouse
Montana
Nortl
Soutl
Big Horn
Idaho
Wyoming
Black Hills
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Texas
New Mexico
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*)

*PIF Species of Regional Importance

In 2005, we detected only one Blue Grouse on NCPN transects. We detected Blue Grouse on all of our RMBO point-transect monitoring projects except MBBH, however, we did not detect the species in sufficient numbers to calculate density on any monitoring project

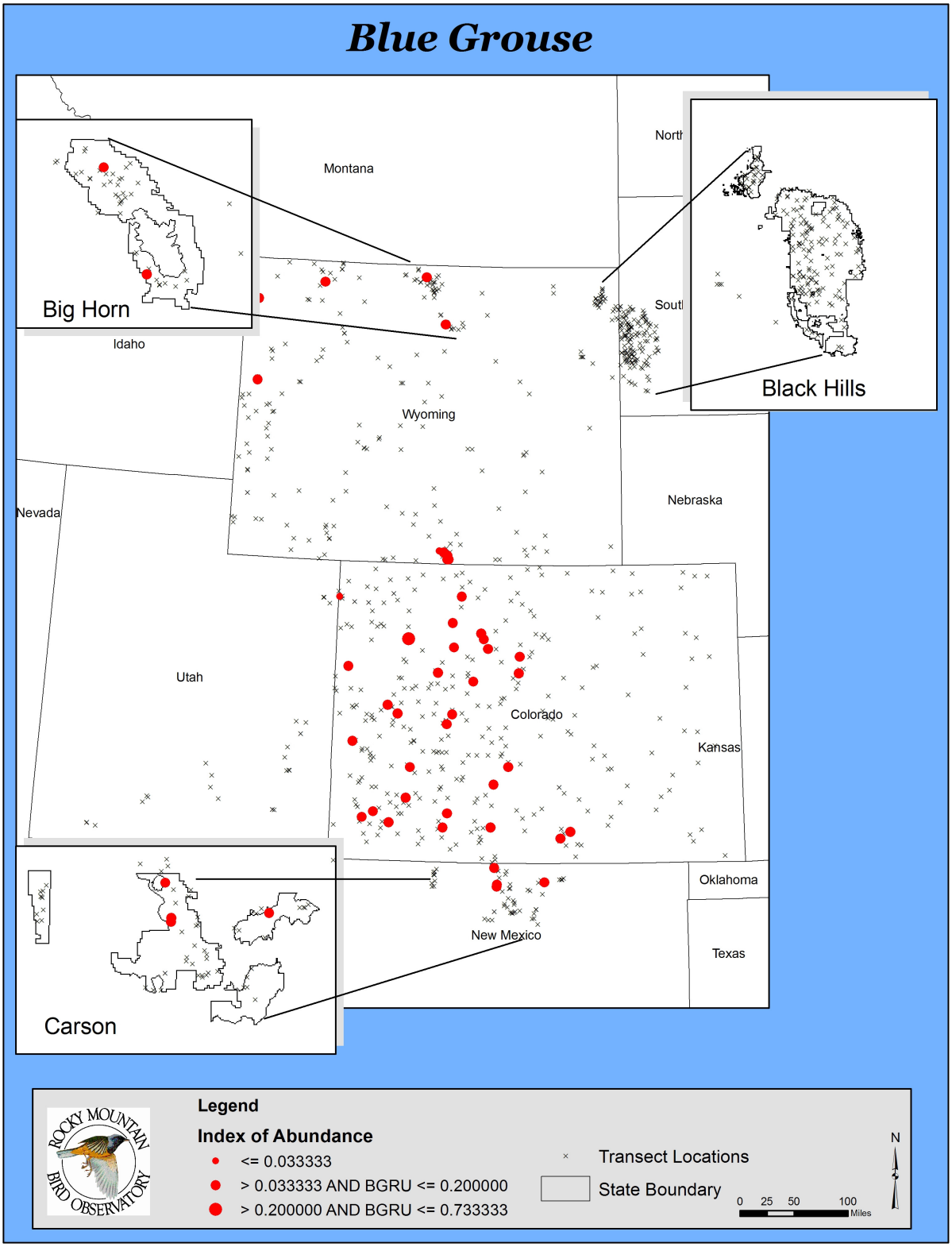
Total number of detections, number of individuals, and habitat-specific density estimates for Blue Grouse on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
SA	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 – On the Colorado Plateau, Blue Grouse typically nest in brushlands and forested habitats on plateaus and mountains above 7,000 feet (Righter et al. 2004). The species is considered a game species throughout most of its range, and is typically monitored by state wildlife agencies.

We detect Blue Grouse on our monitoring projects in low numbers every year. Because the species is secretive and does not make its presence known unless closely approached, it is more often detected as field workers walk between points and less frequently at the point count stations. If our first year of surveys is an indication of the species' distribution and abundance, we will not be able to monitor Blue Grouse through point transects in the NCPN.


Blue Grouse
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
North
South
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

Golden Eagle
(*Aquila chrysaetos*)

*PIF Species of Regional Importance

In 2005, we detected seven individual Golden Eagles in two habitats on NCPN transects. We detected Golden Eagle on all of our RMBO point-transect monitoring projects except MBCNF. We did not detect Golden Eagle in sufficient numbers to calculate density on any monitoring project.

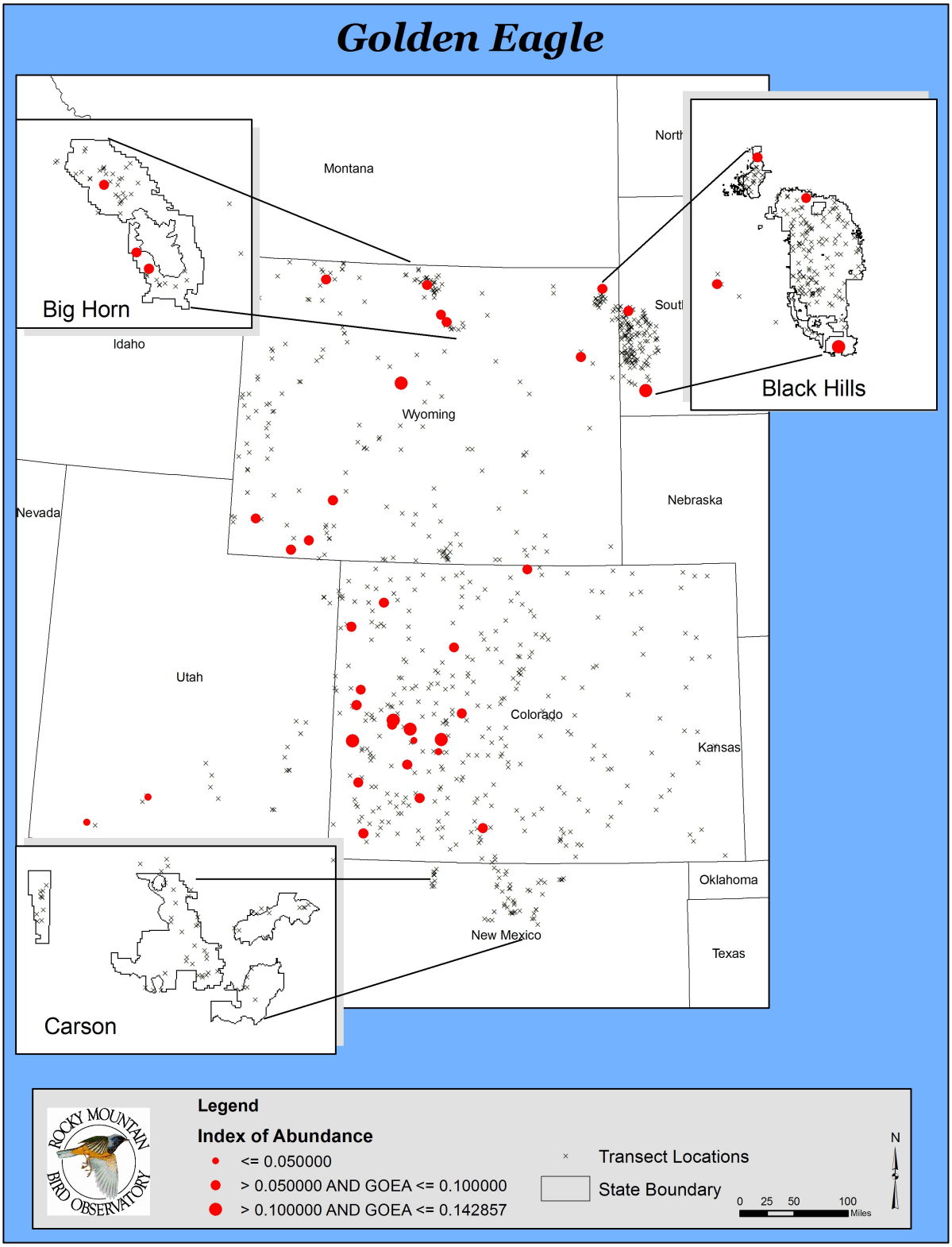
Total number of detections, number of individuals, and habitat-specific density estimates for Golden Eagle on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
PJ	ID	--	--	--	--	5
SA	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 nest throughout the Colorado Plateau region in cliff country, from desert canyons to high mesas (Righter et al. 2004).

Golden Eagle, like other raptor species, is difficult to monitor under the NCPN project using the point-transect protocol, because of its low density and large territory size. Therefore, it is unlikely that we will be able to effectively monitor Golden Eagle in any individual habitat or across habitats under this project. Adding transects in certain habitats may improve our ability to monitor this species; however, effective monitoring will likely best be accomplished through locating and monitoring nests of this species in each park. Such an effort could be incorporated into a special-species program like the one under MCB, in a cost-effective manner, especially if combined with similar efforts for other raptor species (e.g., Prairie Falcon). Also, given interest, with several years' 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, thereby generating an annual statewide density estimate that may be robust enough for population-trend monitoring.


Golden Eagle
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Peregrine Falcon
(*Falco peregrinus*)

*PIF Species of Regional Importance

In 2005, we detected three individual Peregrine Falcons in pinyon-juniper habitat on NCPN transects. The only other RMBO monitoring project on which we detected the species was MCB. We did not detect Peregrine Falcon in sufficient numbers to calculate density on any monitoring project.

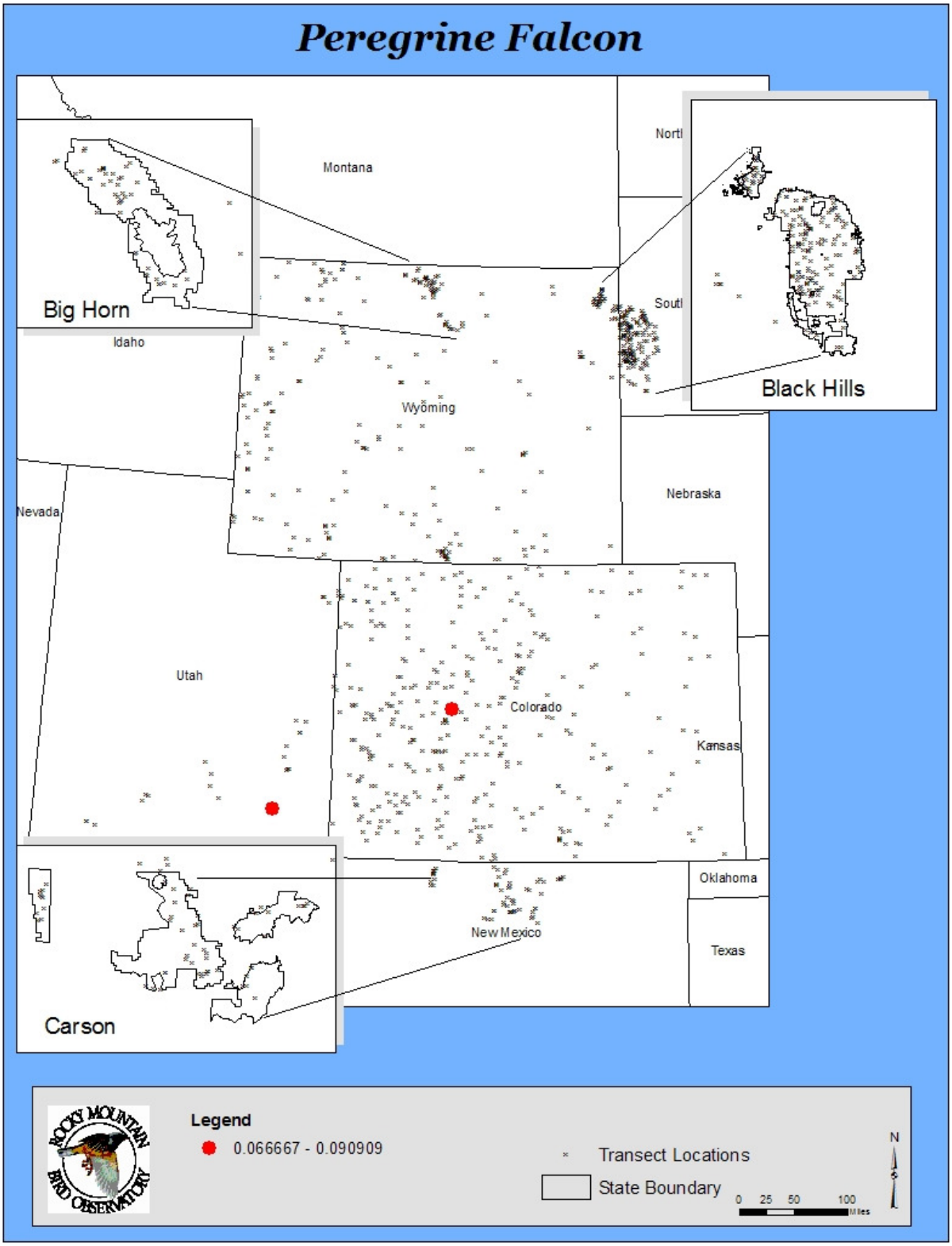
Total number of detections, number of individuals, and habitat-specific density estimates for Peregrine Falcon on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	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 – Peregrine Falcons nest throughout the Colorado Plateau region where towering cliffs, usually near water, are available. Once near extinction, its population in the region has recovered well (Righter et al. 2004).

Peregrine Falcons, like other raptors, are difficult to monitor using our point-transect protocol, because of their low densities and large territories. Therefore, it is unlikely we will be able to effectively monitor Peregrine Falcons in the NCPN. Effective monitoring would require a more intensive and focused effort, such as the ongoing monitoring projects in Dinosaur National Monument and other NCPN park units. We will, however, be able to track the status of this species on specific transects over time and provide supplemental information on potential nest locations.


Peregrine Falcon
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
0.066667 - 0.090909
Transect Locations
State Boundary
0 25 50 100
Miles
N

Prairie Falcon
(*Falco mexicanus*)

*PIF Species of Regional Importance

In 2005, we detected one individual Prairie Falcon on NCPN transects. We detected Prairie Falcon on all of our RMBO monitoring projects, except MBCNF, but we did not detect Prairie Falcon in sufficient numbers (n > 24 birds in an individual habitat) to calculate density on any monitoring project.

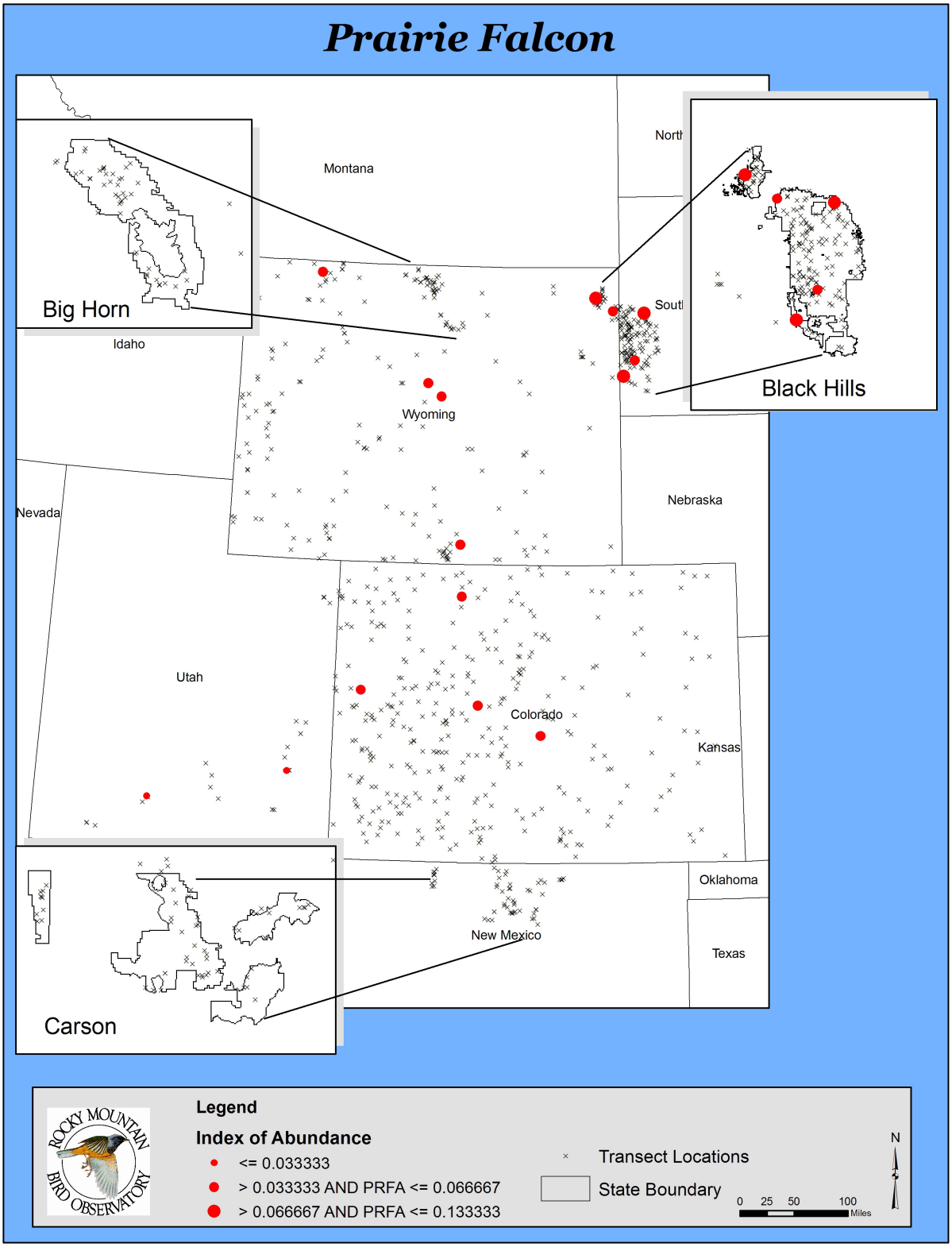
Total number of detections, number of individuals, and habitat-specific density estimates for Prairie Falcon on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
SA	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 – In the Colorado Plateau region, Prairie Falcons inhabit areas with available cliff faces for nesting and open country for foraging, typically below 10,000 feet (Righter et al. 2004).

Prairie Falcon, like other raptor species, is difficult to monitor using our point-transect protocol, because of its low density and large territory size. Therefore, it is unlikely we will be able to effectively monitor Prairie Falcon in the NCPN. Effective monitoring would require a more intensive and focused effort, such as the ongoing Peregrine Falcon monitoring projects in Dinosaur National Monument and other NCPN park units. We may, however, be able to track the status of this species on specific transects over time and provide supplemental information on potential nest locations.


Prairie Falcon
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
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

Common Nighthawk
(*Chordeiles minor*)

*PIF Species of Regional Importance

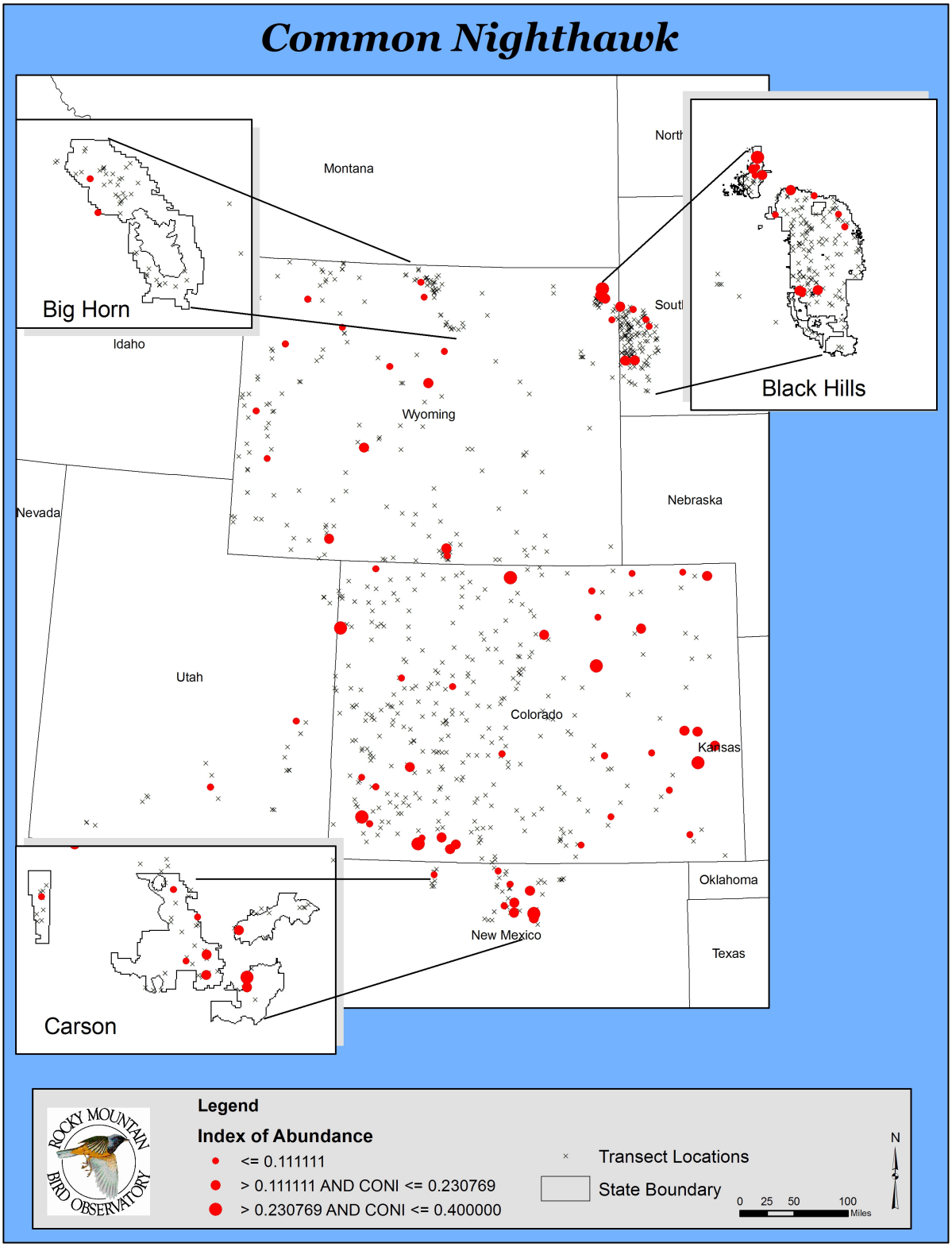
In 2005, we detected only one common Nighthawk on NCPN transects. We detected Common Nighthawk on all of our RMBO point-transect monitoring projects, but detections on all projects were insufficient to calculate density in any habitat.

Total number of detections, number of individuals, and habitat-specific density estimates for Common Nighthawk on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
PJ	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 – Due to Common Nighthawk's nocturnal behavior, it is unlikely that a point-transect program would sufficiently monitor or track the species' population trends. Evening or nighttime surveys may provide a means by which to track the species' population in the NCPN.


Common Nighthawk
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.111111
> 0.111111 AND CONI <= 0.230769
> 0.230769 AND CONI <= 0.400000
Transect Locations
State Boundary
0 25 50 100
Miles
N

White-throated Swift
(*Aeronautes saxatalis)*

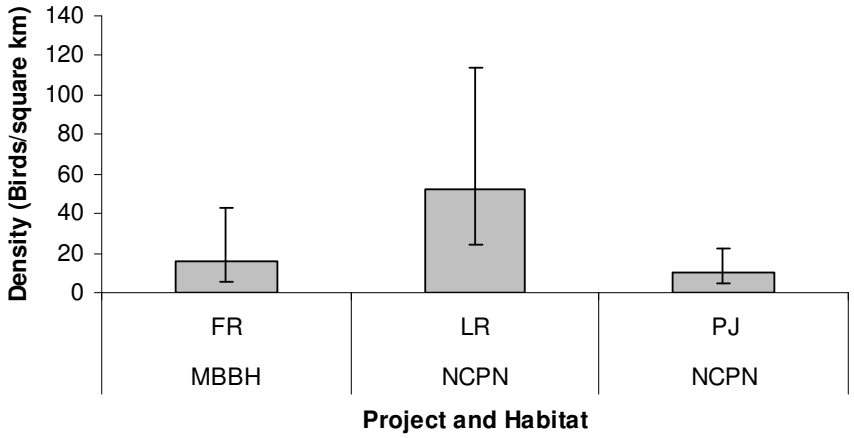
*PIF Species of Regional Importance

In 2005, we detected 550 individual White-throated Swifts in three habitats on NCPN transects. We detected White-throated Swift on all of our RMBO point-transect monitoring projects, but were able to calculate a density estimate in at least one habitat on only MBBH and NCPN.

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

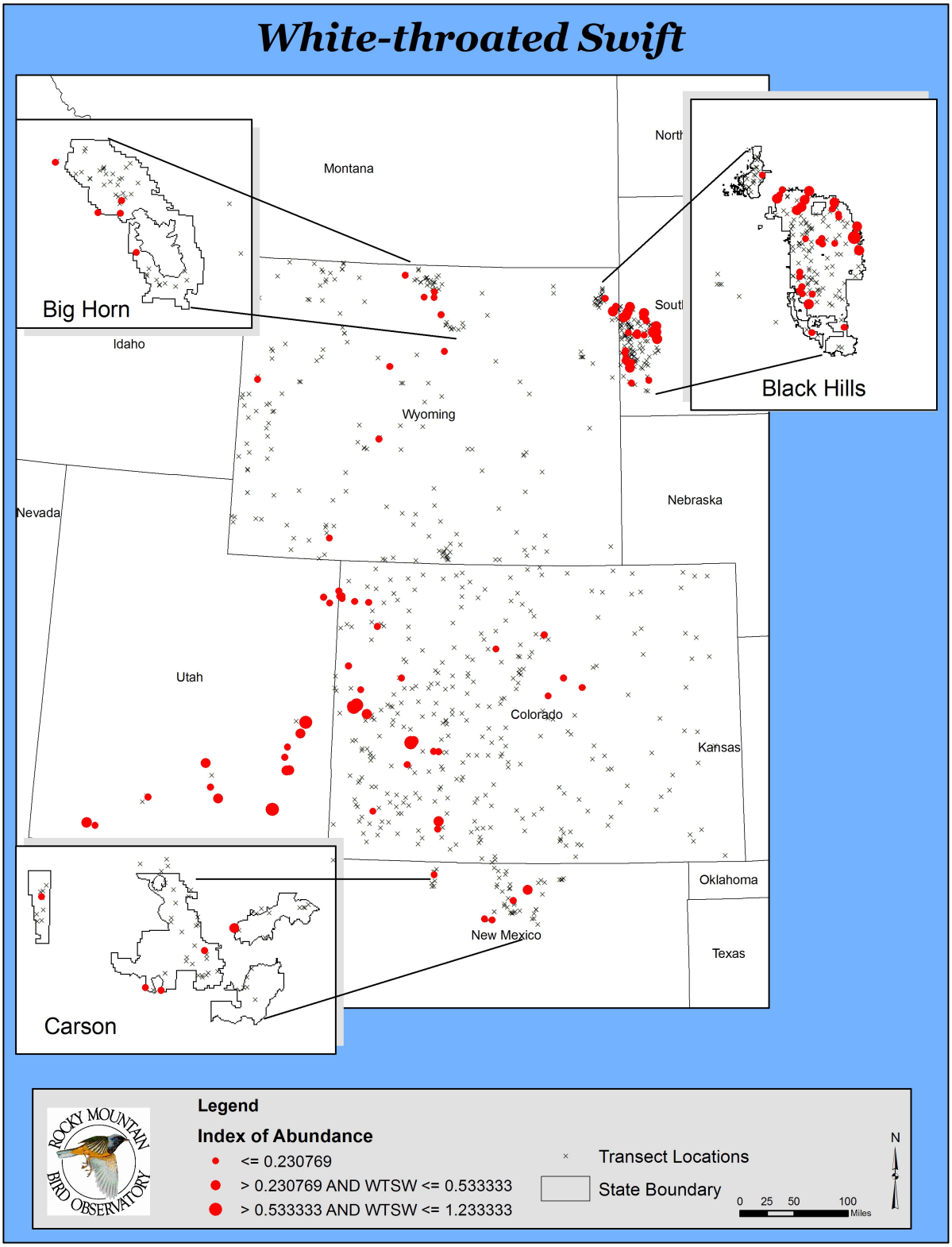
Habitat	D	LCL	UCL	CV	n	N
LR	52.46	24.07	114.32	41%	138	348
PJ	10.67	5.00	22.79	37%	97	190
SA	--	--	--	--	--	12

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.



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

Summary – White-throated Swifts typically nest on high cliffs in small colonies (Righter et al. 2004). If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor White-throated Swift in low-elevation riparian and pinyon-juniper habitats in the NCPN. However, because of White-throated Swift's colonial nature, obtaining reliable sample size from year to year may be difficult. A more reliable monitoring scheme for this species may require more intensive and focused effort involving censusing birds at known nesting sites and searching for new nesting sites in potential habitat.


White-throated Swift
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Broad-tailed Hummingbird
(*Selasphorus platycercus)*

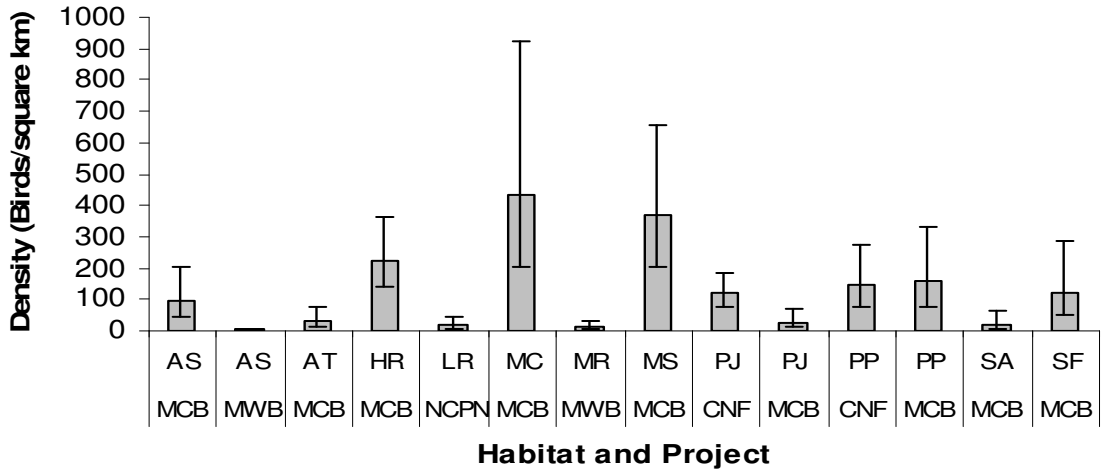
*PIF Species of Regional Importance

In 2005, we detected 69 individual Broad-tailed Hummingbirds in three habitats on NCPN transects. We detected Broad-tailed Hummingbirds on all of our RMBO point-transect monitoring projects, and detections were sufficient to calculate density estimates in at least one habitat on all projects except MBBH.

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

Habitat	D	LCL	UCL	CV	n	N
LR	18.72	8.38	41.84	41%	25	27
PJ	--	--	--	--	--	19
SA	--	--	--	--	--	23

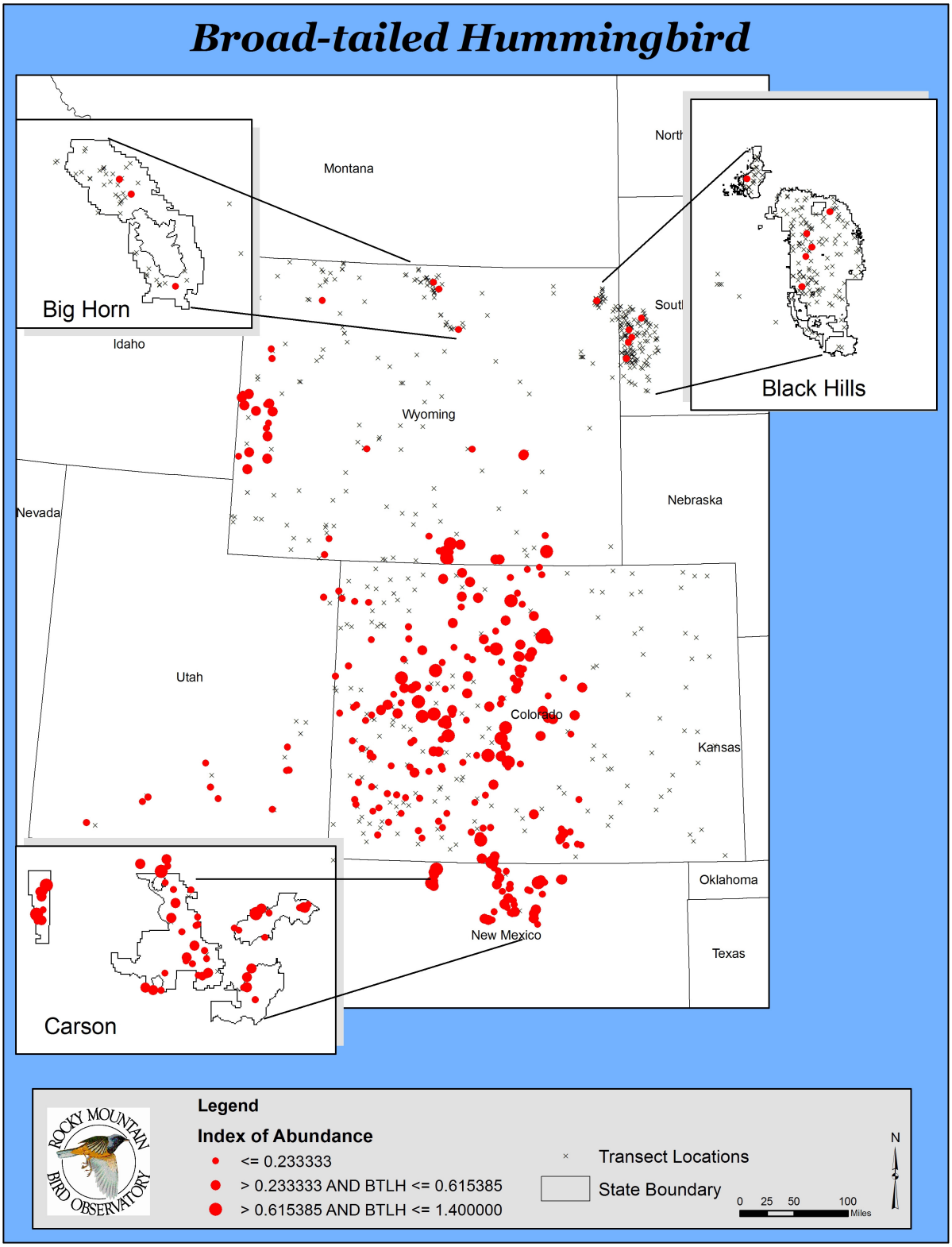
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – On the Colorado Plateau, Broad-tailed Hummingbirds inhabit a variety of forest types, wetlands, and riparian areas (Righter et al. 2004).

We detected Broad-tailed Hummingbirds in largest numbers in low-elevation riparian habitat on NCPN transects, but they were nearly as abundant in the other two habitats surveyed. Most of the detections in sage habitat were from individuals using bordering habitats such as pinyon-juniper and riparian. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Broad-tailed Hummingbird in at least one habitat in the NCPN.


Broad-tailed Hummingbird
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Williamson's Sapsucker
(*Sphyrapicus traillii*)

*PIF Species of Regional Importance

In 2005, we detected only one Williamson's Sapsucker on NCPN transects. We detected Williamson's Sapsucker on all of our RMBO point-transect monitoring projects but were able to calculate a density estimate in at least one habitat only on MCB.

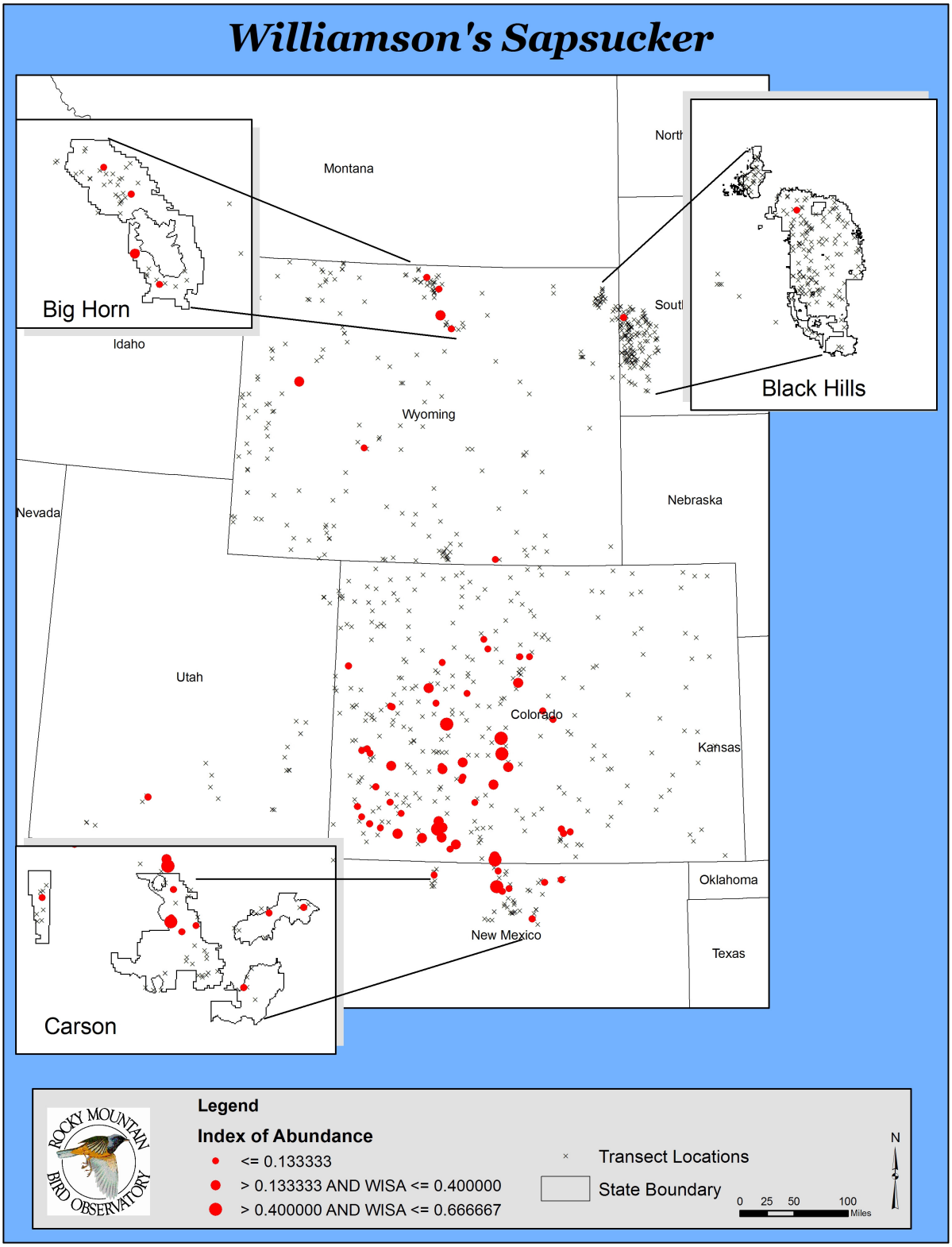
Total number of detections, number of individuals, and habitat-specific density estimates for Williamson's Sapsucker on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
PJ	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 – Williamson's Sapsuckers breed primarily in Ponderosa Pine, but will also use Douglas fir, spruce-fir, and aspen habitats (Righter et al. 2004).

Given the specific habitat requirements of Williamson's Sapsucker, it is unlikely we will be able to monitor the species in any of the habitats that we currently survey in the NCPN.


Williamson's Sapsucker
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Olive-sided Flycatcher
(*Contopus cooperi*)

*PIF Species of Regional Importance

In 2005, we detected 16 individual Olive-sided Flycatchers in two habitats on NCPN transects. We detected Olive-sided Flycatcher on all of our RMBO point-count monitoring projects except MBBH, which is outside of the species' normal breeding range. We did not detect Olive-sided Flycatcher in sufficient numbers to calculate density on any monitoring project.

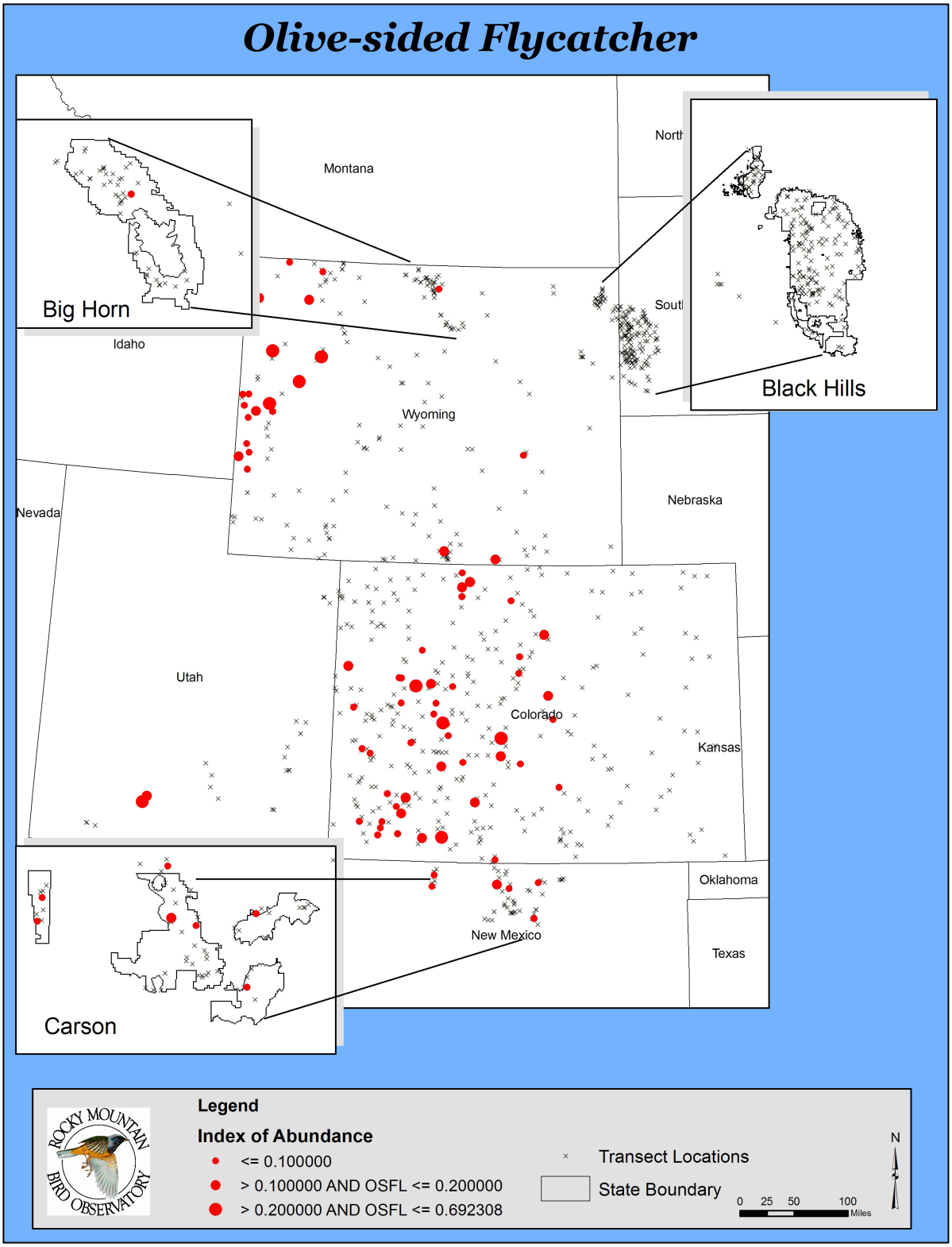
Total number of detections, number of individuals, and habitat-specific density estimates for Olive-sided Flycatcher on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
PJ	ID	--	--	--	--	2
SA	ID	--	--	--	--	14

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

Summary – Olive-sided Flycatchers occur throughout the Colorado Plateau region, but they are usually never abundant. They will utilize low-elevation pinyon-juniper stands for nesting when they provide adequate perches for singing and foraging, but they prefer high-elevation conifers (Righter et al. 2004).

Most of our detections of the species on NCPN transects were from ponderosa pine stands on the periphery of sage habitat that we were sampling. Given the specific habitat requirements of Olive-sided Flycatcher, it is unlikely we will be able to monitor the species in any of the habitats that we currently survey in the NCPN. Given interest, however, with several years' 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 density estimate that may be robust enough for population-trend monitoring.


Olive-sided Flycatcher
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
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

Willow Flycatcher
(*Empidonax traillii*)

*PIF Species of Regional Importance

In 2005, we detected only one Willow Flycatcher on NCPN transects. We detected the species on only two other projects, MCB and MWB. We did not detect Willow Flycatcher in sufficient numbers (n > 24 birds in an individual habitat) to calculate density on any monitoring project

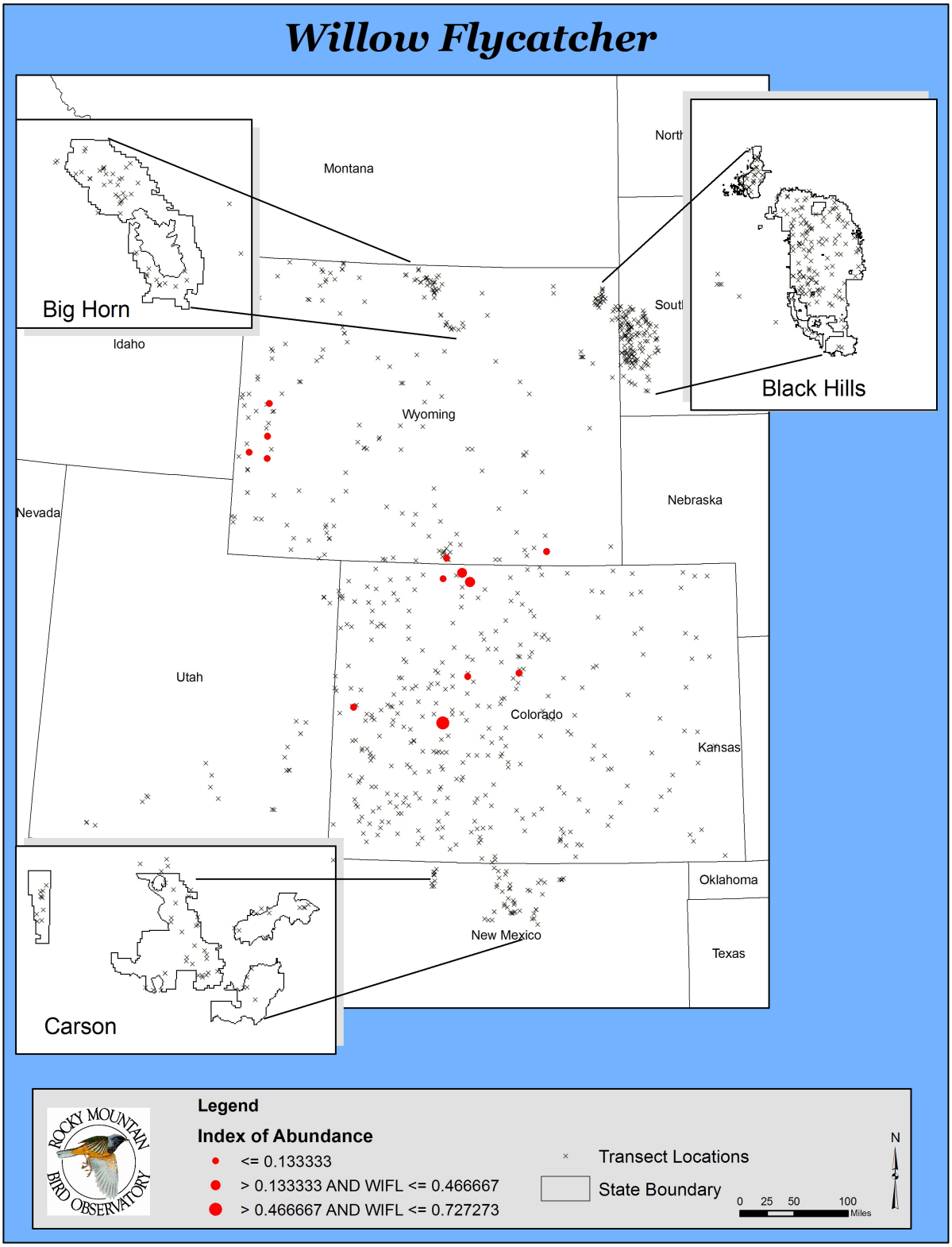
Total number of detections, number of individuals, and habitat-specific density estimates for Willow Flycatcher on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
PJ	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 – Willow Flycatchers nest in thick willow stands, usually adjacent to open, standing water (Righter et al. 2004).

Since we do not sample any large stands of willow, it is unlikely that we will be able to monitor Willow Flycatcher in the NCPN.


Willow Flycatcher
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
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

Cordilleran Flycatcher
(*Empidonax occidentalis*)

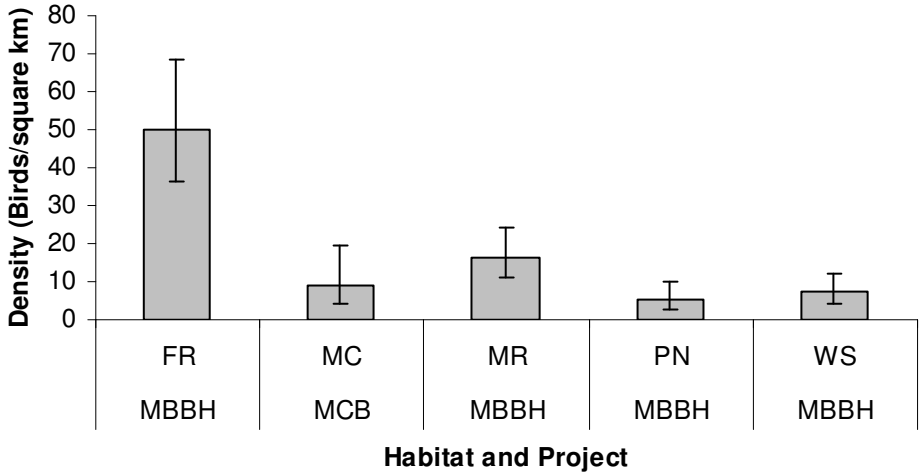
*PIF Species of Regional Importance

In 2005, we detected three individual Cordilleran Flycatchers in two habitats on NCPN transects. We detected Cordilleran Flycatchers on all of our RMBO point-transect monitoring projects and were able to calculate a density estimate in at least one habitat on MBBH and MCB.

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

Habitat	D	LCL	UCL	CV	n	N
LR	ID	--	--	--	--	1
PJ	ID	--	--	--	--	2

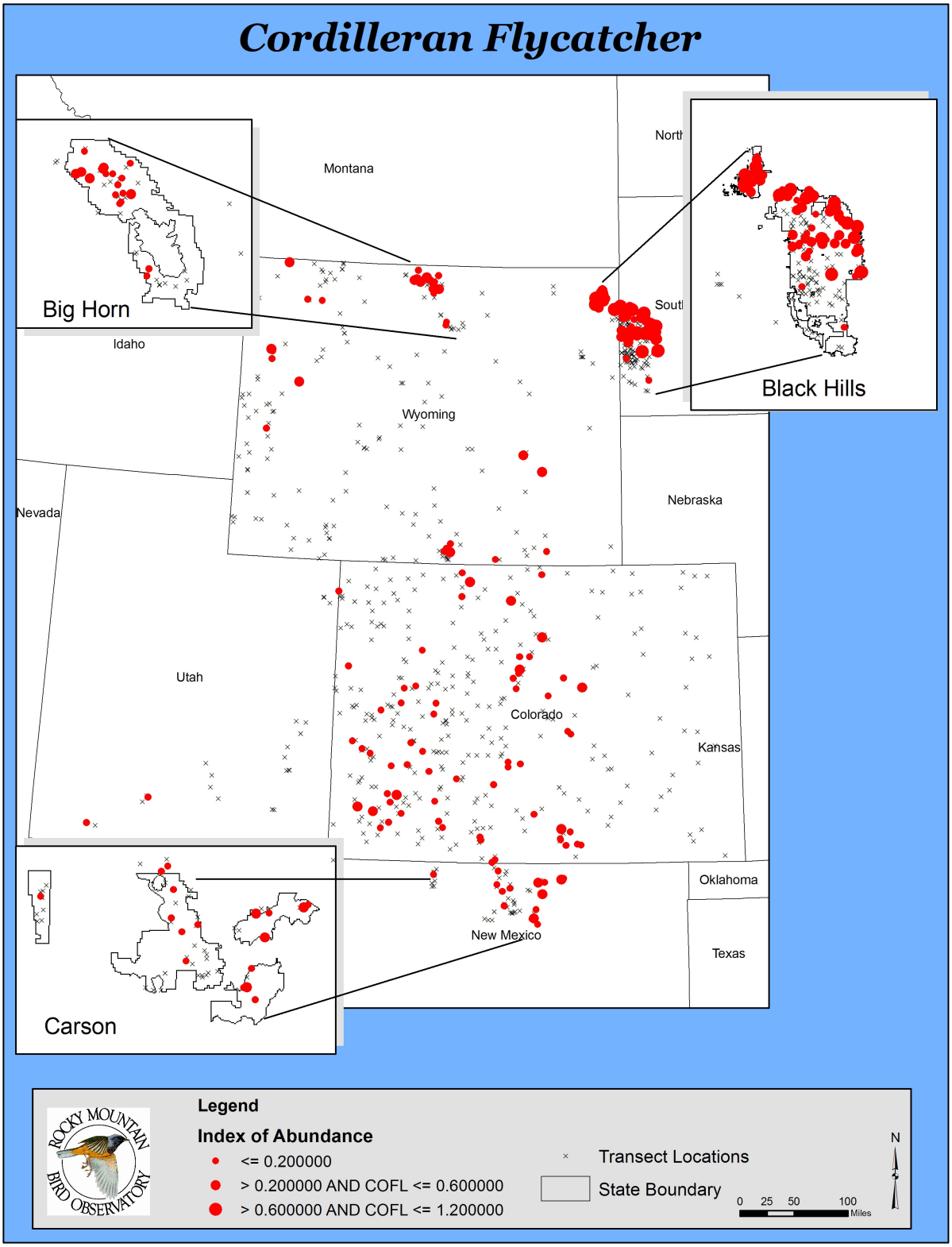
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Cordilleran Flycatchers nest in forested areas with cliffs or rocky ledges and in riparian areas with available vertical surfaces. The species is also occasionally found in pinyon-juniper stands that have some element of deciduous vegetation (Righter et al. 2004).

If our first year of surveys is an indication of the species' distribution and abundance, detections will be too few to calculate density in any habitat that we survey in the NCPN.


Cordilleran Flycatcher
Montana
North
Big Horn
Idaho
Wyoming
South
Black Hills
Nevada
Nebraska
Utah
Colorado
Kansas
Oklahoma
New Mexico
Texas
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)*

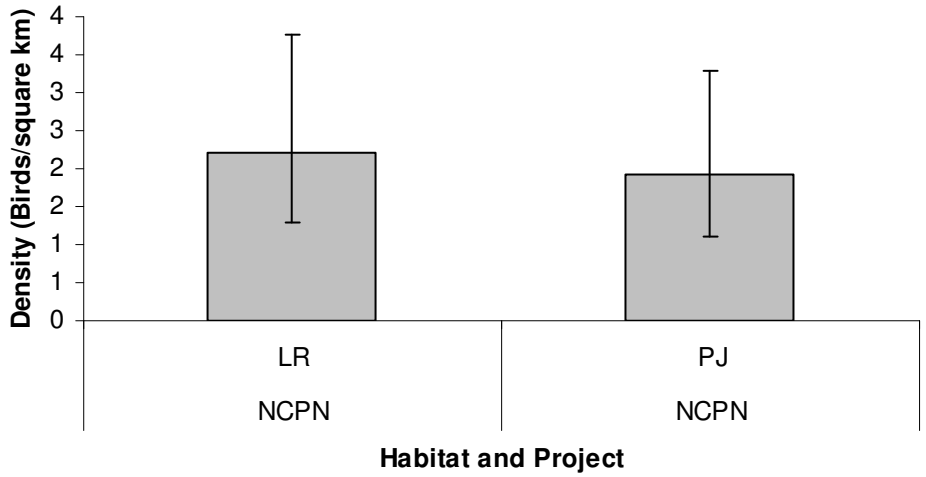
*PIF Species of Regional Importance

In 2005, we detected 95 individual Say's Phoebe in three habitats on NCPN transects. We detected Say's Phoebe on all of our RMBO point-transect monitoring projects except MBBH. We detected Say's Phoebe in sufficient numbers to calculate density only on NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	2.20	1.28	3.77	27%	41	43
PJ	1.91	1.10	3.30	27%	30	31
SA	--	--	--	--	--	21

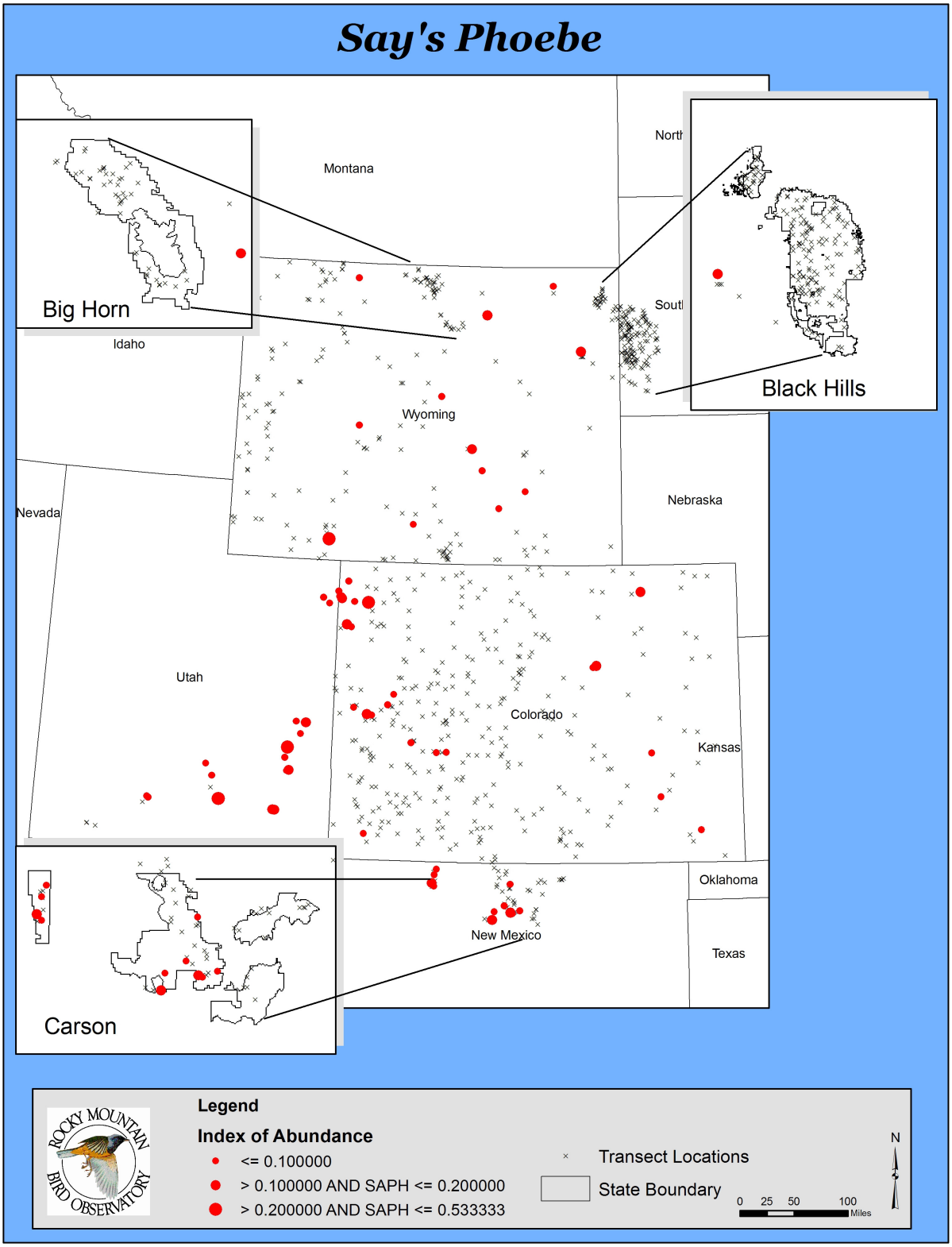
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Say's Phoebes nest in niches and crevasses of cliffs and rocky outcrops in open shrubland habitats and along streams in those habitats (Righter et al. 2004).

This species arrives on its breeding grounds earlier that most other migrants, and as a result, our surveys may miss the period when it is most actively singing. However, if our first year of surveys is an indication of the species' distribution and abundance we should be able to monitor Say's Phoebe in low-elevation riparian and pinyon-juniper habitats in the NCPN.


Say's Phoebe
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
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

Loggerhead Shrike
(*Lanius ludovicianus*)

*PIF Species of Regional Importance

In 2005, we detected three individual Loggerhead Shrikes in two habitats on NCPN transects. We also detected Loggerhead Shrike on our MCB and MWB projects. We did not detect Loggerhead Shrike in sufficient numbers to calculate density on any monitoring project

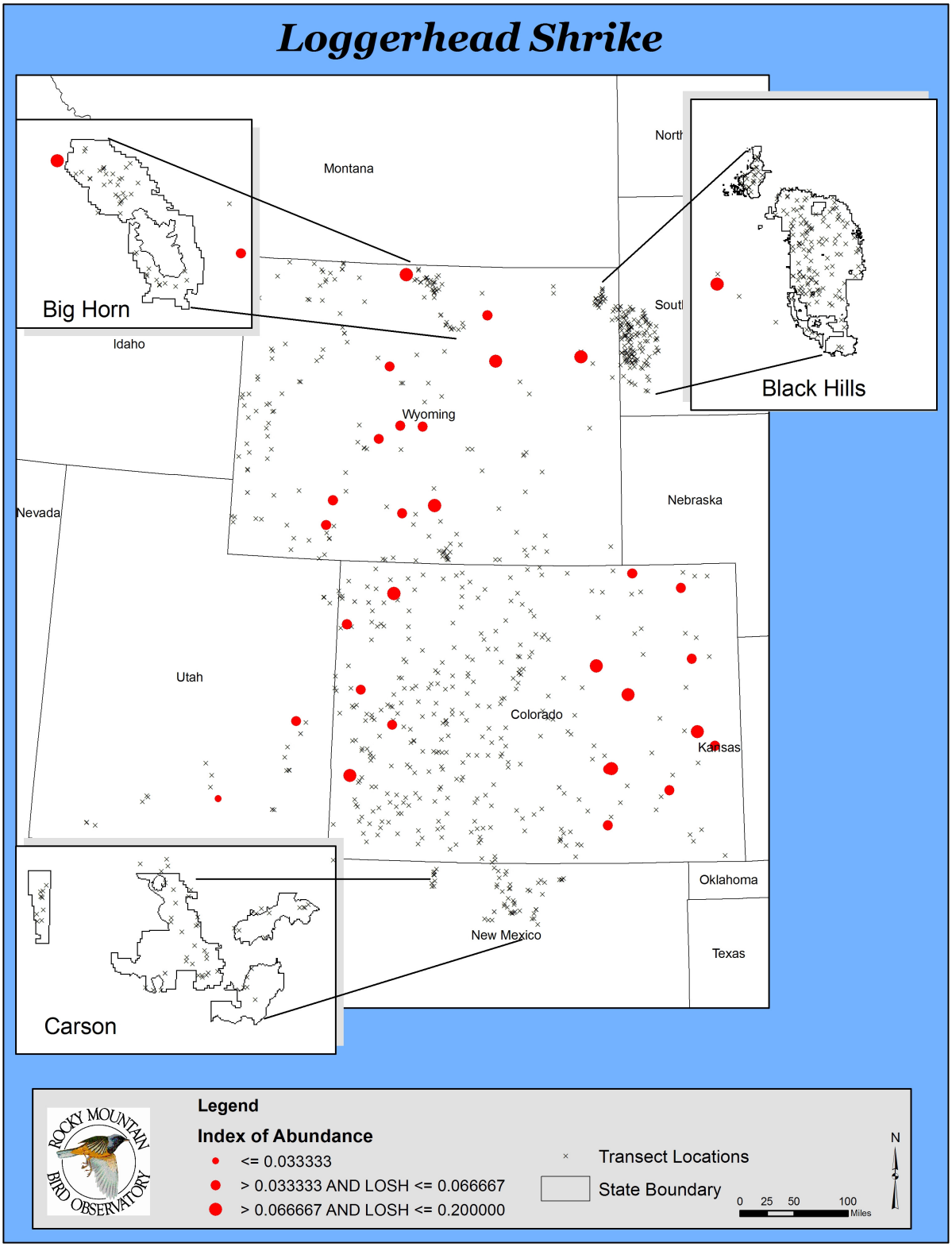
Total number of detections, number of individuals, and habitat-specific density estimates for Loggerhead Shrike on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	ID	--	--	--	--	1
PJ	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 – On the Colorado Plateau, Loggerhead Shrikes nest sparsely in desert shrublands (Righter et al. 2004).

Due especially to its low density and large territory size, it is unlikely that we will be able to effectively monitor Loggerhead Shrike through point transects under the NCPN project. Adding transects may yield better information for this species; however, effective monitoring would likely require a more intensive and focused effort.


Loggerhead Shrike
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Gray Vireo
(*Vireo vicinior)*

*PIF Species of Regional Importance

In 2005, we detected 131 individual Gray Vireos in three habitats on NCPN transects. Gray vireo was also detected in small numbers on MBCNF, MCB, and MWB. We detected Gray Vireo in sufficient numbers to calculate density only on NCPN.

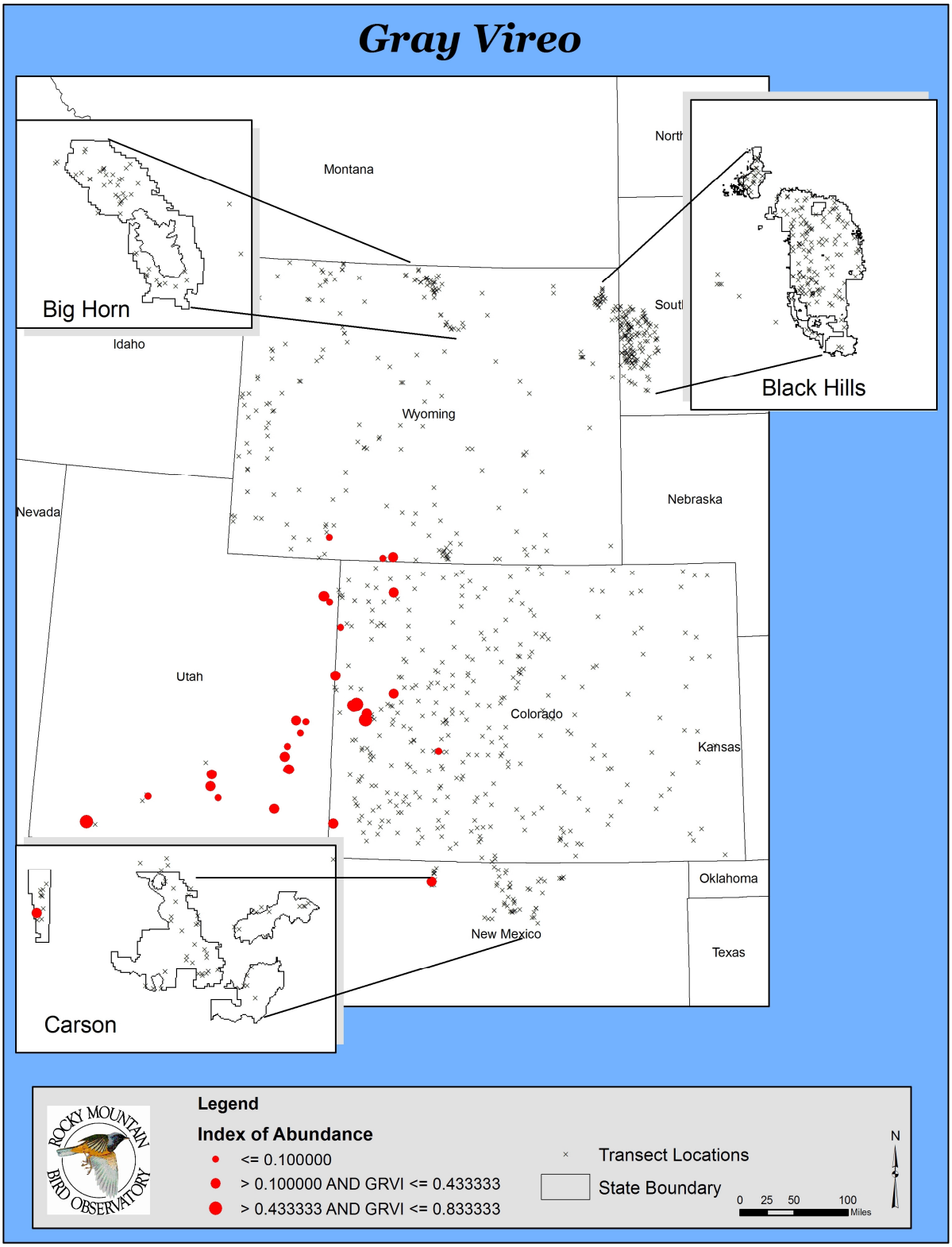
Total number of detections, number of individuals, and habitat-specific density estimates for Gray Vireo on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	--	--	--	--	--	19
PJ	6.85	3.78	12.43	29%	101	105
SA	--	--	--	--	--	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.

Summary – Gray Vireos nest in arid pinyon-juniper habitat usually with a deciduous shrub component (Righter et al. 2004).

Almost all of our detections of Gray Vireo on NCPN transects were from pinyon-juniper habitat. The detections from low-elevation riparian and sage shrubland habitats were always associated with nearby pinyon-juniper. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Gray Vireo in pinyon-juniper habitat in the NCPN.


Gray Vireo
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
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

Plumbeous Vireo
(*Vireo plumbeus)*

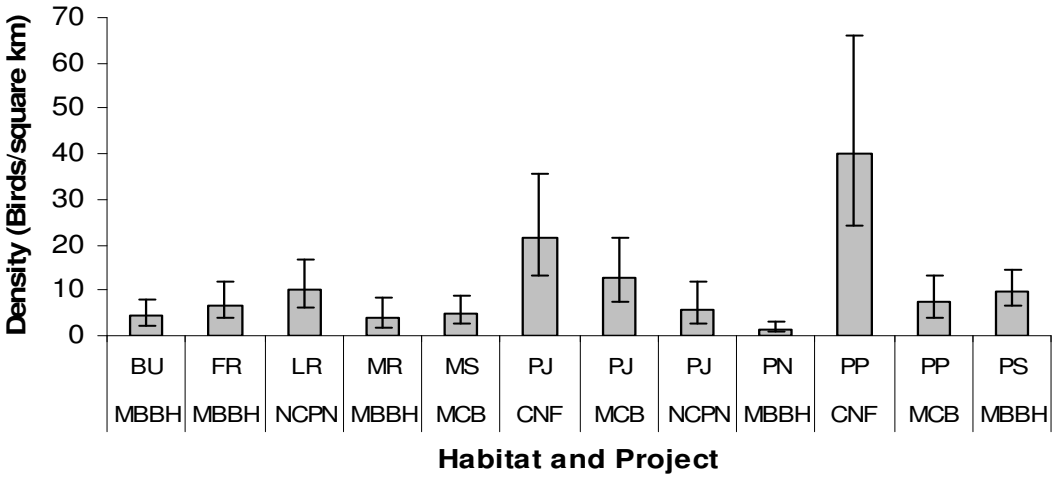
*PIF Species of Regional Importance

In 2005, we detected 147 individual Plumbeous Vireos in three habitats on NCPN transects. We detected Plumbeous Vireo on all of our RMBO point-transect monitoring projects and were able to calculate a density estimate in at least one habitat on four projects, including NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	10.19	6.17	16.81	25%	60	62
PJ	5.81	2.80	12.09	36%	67	69
SA	--	--	--	--	--	16

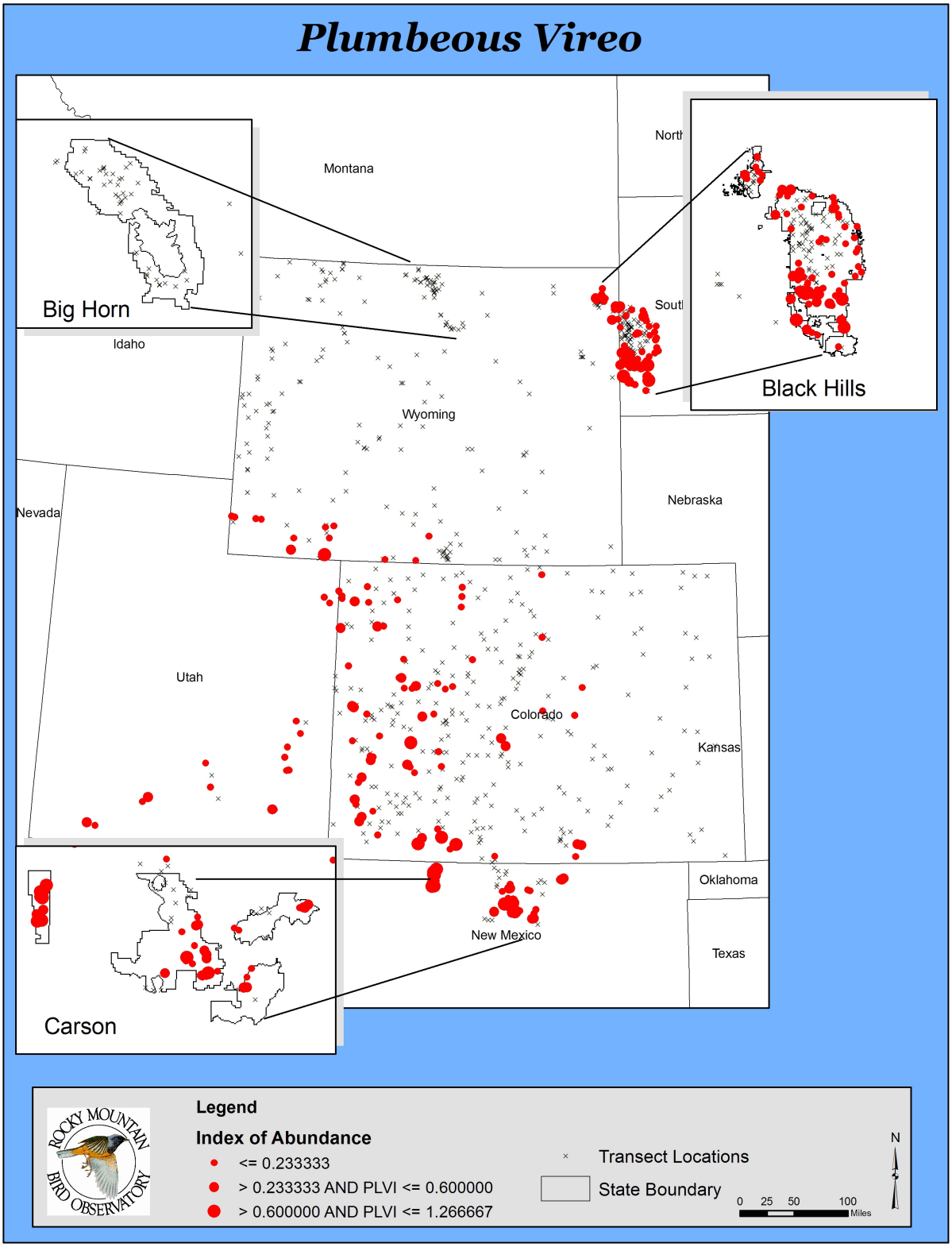
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Plumbeous Vireos commonly nest throughout the Colorado Plateau region on ridges, mesas, mountain slopes, and plateaus. They nest most often in pinyon-juniper woodlands where they prefer the taller, denser stands. They also, less frequently, nest in riparian cottonwood habitats (Righter et al. 2004).

If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Plumbeous Vireo in low-elevation riparian and pinyon-juniper habitats in the NCPN.


Plumbeous Vireo
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Warbling Vireo
(*Vireo gilvus*)

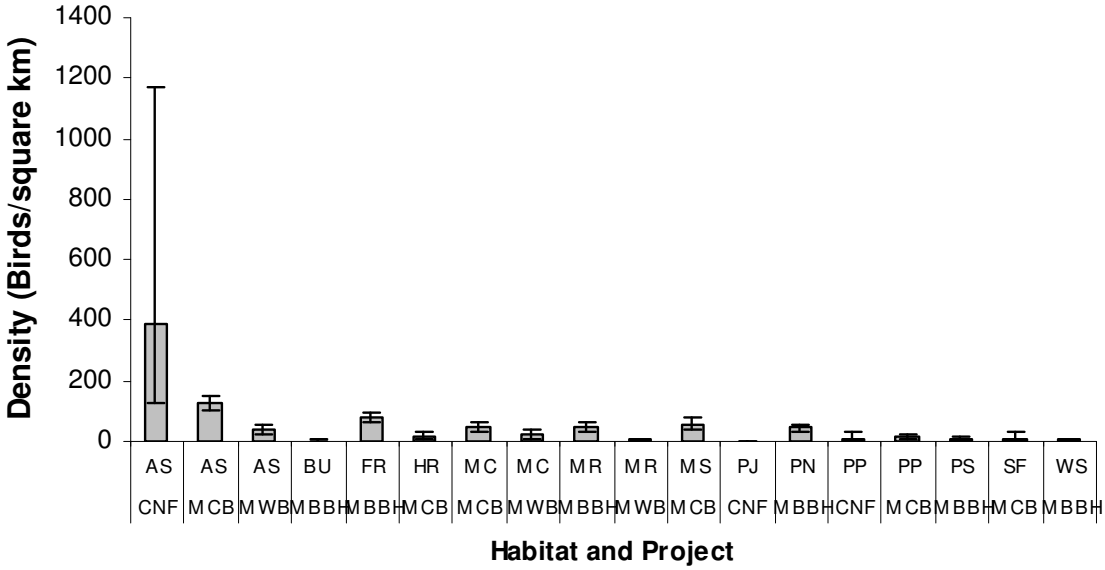
*PIF Species of Regional Importance

In 2005, we detected 44 individual Warbling Vireos in two habitats on NCPN transects. We detected Warbling Vireo on all of our RMBO point-transect monitoring projects and 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 Warbling Vireo on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	ID	--	--	--	--	23
SA	ID	--	--	--	--	21

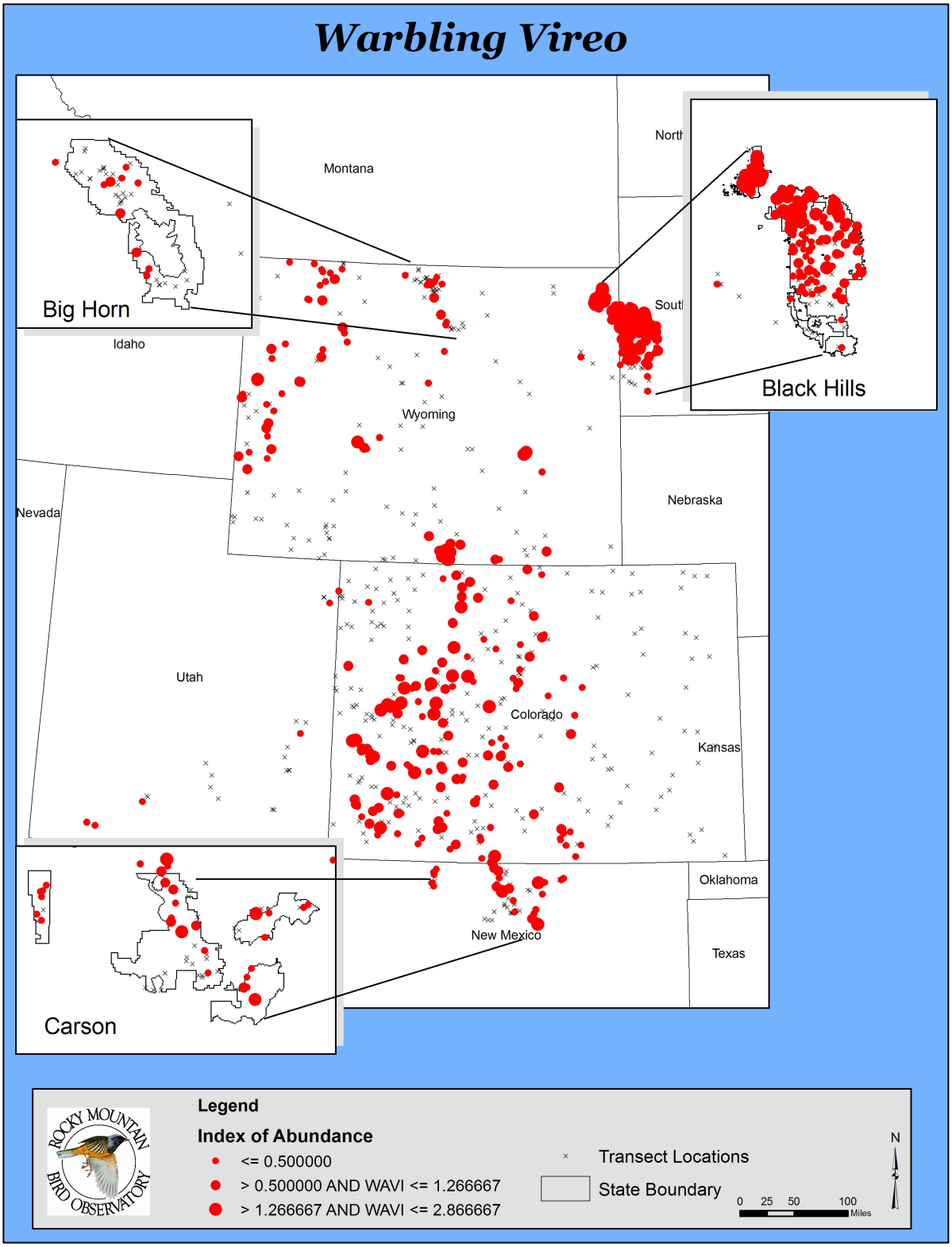
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Warbling Vireos nest in a variety of habitats, including pinyon-juniper, and cottonwood galleries in riparian habitat (Righter et al. 2004).

Although Warbling Vireo will breed in the low elevations of NCPN, it is much more common in higher-elevation deciduous forests, especially aspen. Given the specific habitat requirements of Warbling Vireo, it is unlikely we will be able to monitor the species in any of the habitats that we currently survey in the NCPN.


Warbling Vireo
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.500000
> 0.500000 AND WAVI <= 1.266667
> 1.266667 AND WAVI <= 2.866667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Pinyon Jay

(*Gymnorhinus cyanocephalus)*

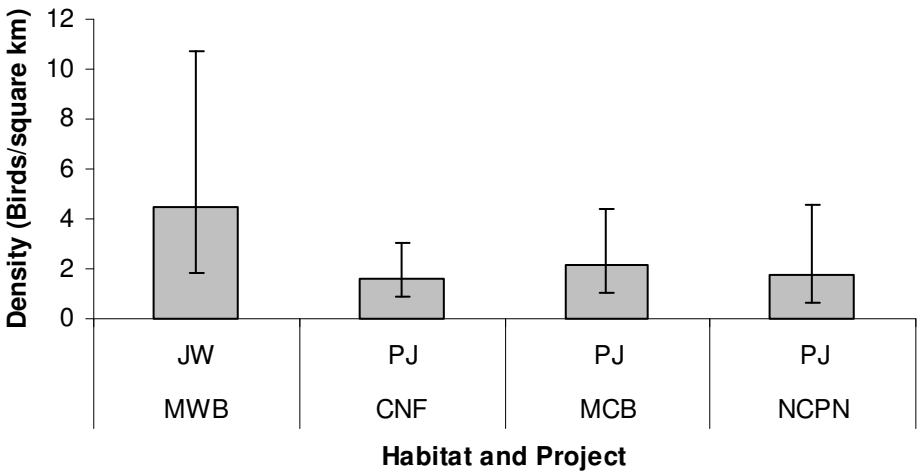
*PIF Species of Regional Importance

In 2005, we detected 116 individual Pinyon Jays in three habitats on NCPN transects. We detected Pinyon Jay on all of our RMBO point-transect monitoring projects and were able to calculate a density estimate in pinyon-juniper (juniper woodland) habitat on four projects, including NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	--	--	--	--	--	1
PJ	1.73	0.65	4.59	51%	47	85
SA	--	--	--	--	--	30

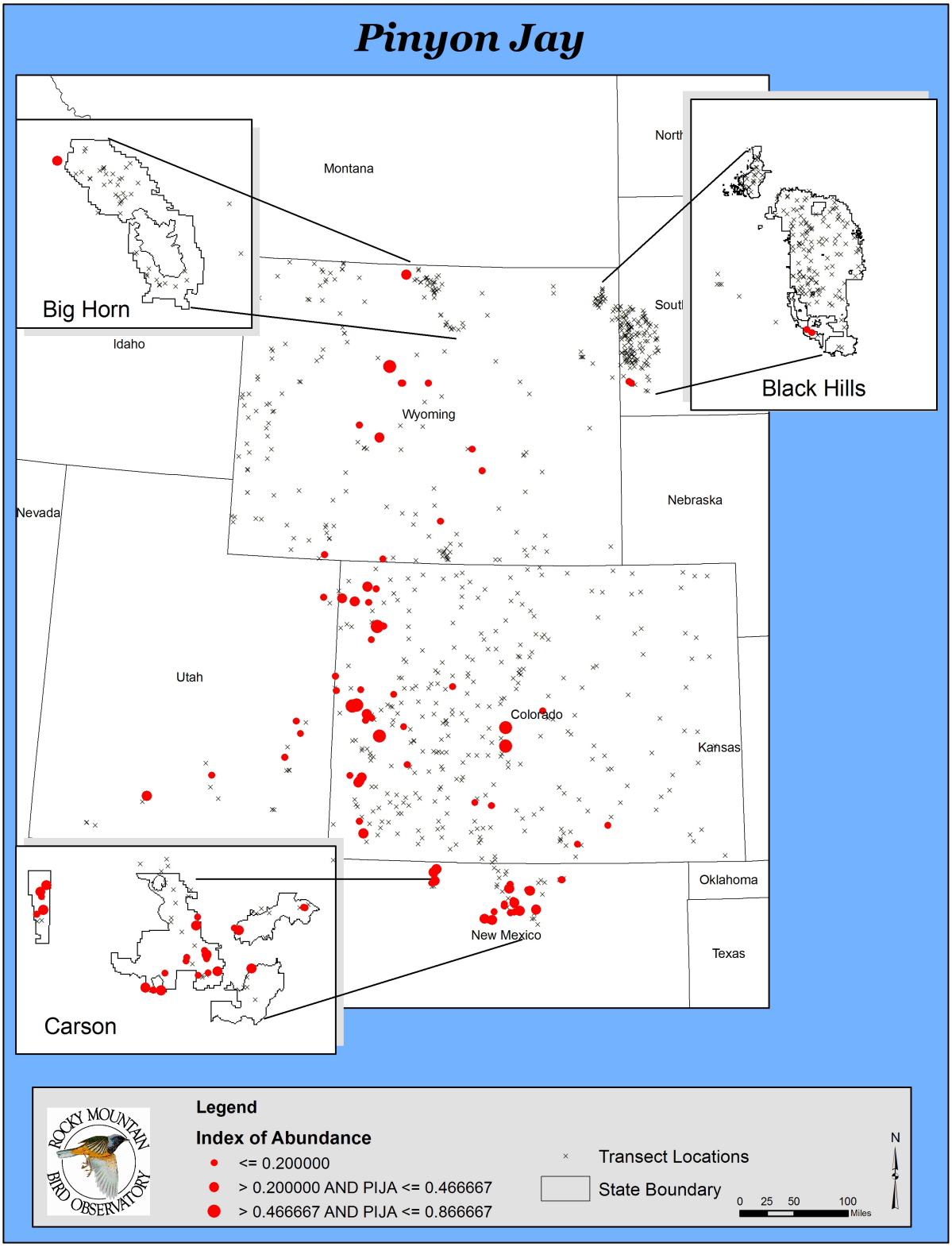
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Pinyon Jays are rarely found in habitats other than pinyon juniper. They are important for the overall health of pinyon forests as they cache (basically planting) large amounts of seeds. They frequently travel in large flocks, and it is rare to detect a single individual (Righter et al. 2004).

If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Pinyon Jay in pinyon-juniper habitat in the NCPN. However, Pinyon Jay is an early season breeder and without noting juveniles, it is possible to calculate inflated density estimates.


Pinyon Jay
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND PIJA <= 0.466667
> 0.466667 AND PIJA <= 0.866667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Clark's Nutcracker
(*Nucifraga columbiana*)

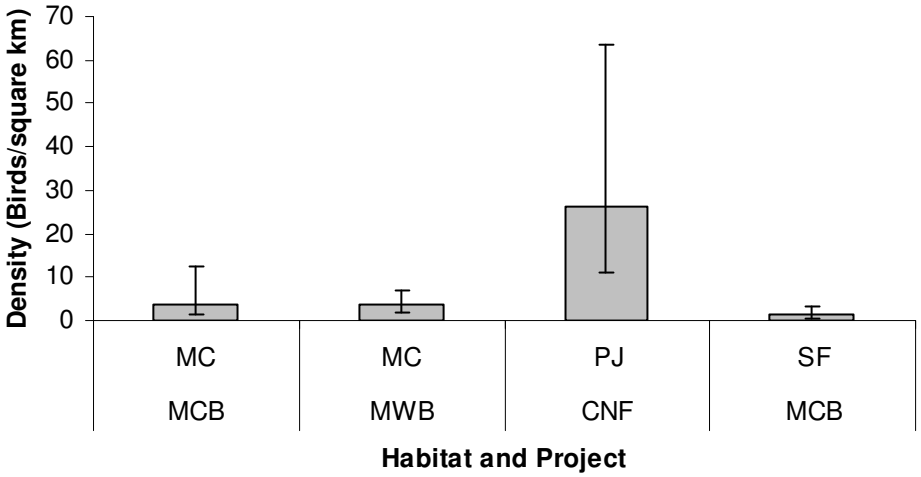
*PIF Species of Regional Importance

In 2005, we detected 65 individual Clark's Nutcrackers in three habitats on NCPN transects. We detected Clark's Nutcrackers on all of our RMBO point-transect monitoring projects and detected the species in sufficient numbers to calculate a density estimate in at least one habitat on MBCNF, MCB and MWB.

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

Habitat	D	LCL	UCL	CV	n	N
LR	ID	--	--	--	--	32
PJ	ID	--	--	--	--	10
SA	ID	--	--	--	--	23

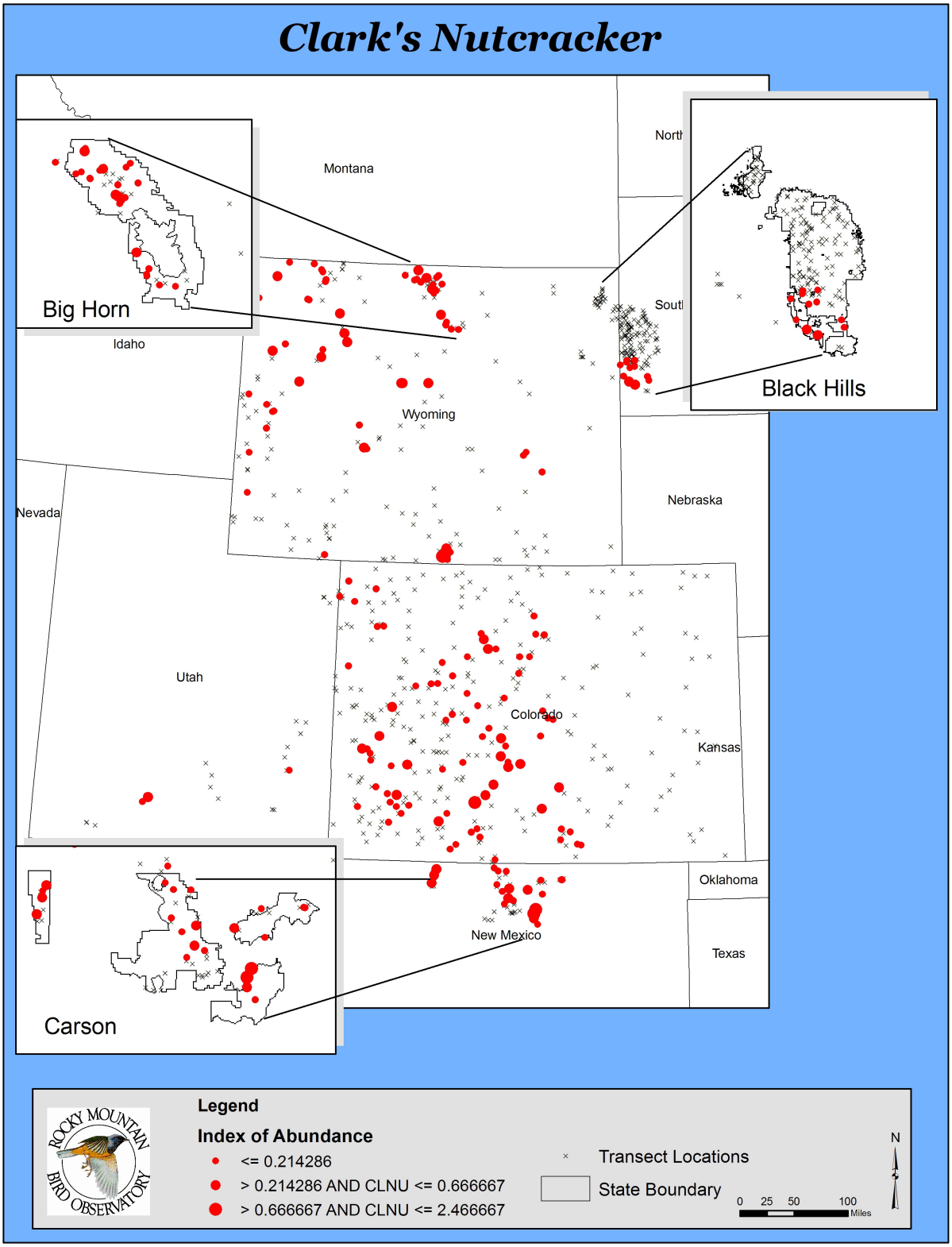
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – On the Colorado Plateau, Clark's Nutcrackers nest on mountain slopes and mesa tops, usually above 6,000 feet (Righter et al 2004). They travel long distances in search of food, which may explain our detections of the species in low elevations in the NCPN.

Clark's Nutcrackers typically breed in habitats that are higher than those that we survey on NCPN transects. Total independent detections were insufficient to calculate a density estimate in any habitat. It is unlikely that we will be able to monitor the species in the NCPN in any one habitat, but we may be able to loosely track its population trends by pooling data from all habitats.


Clark's Nutcracker
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
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

Black-billed Magpie
(*Pica hudsonia*)

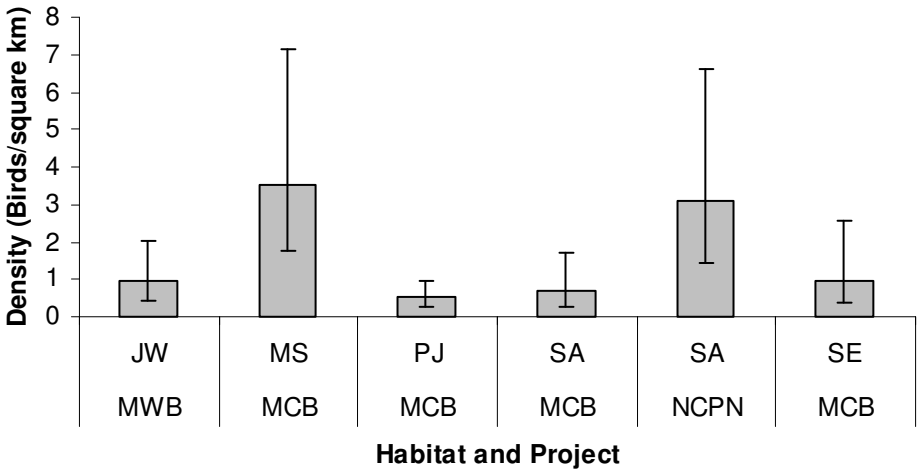
*PIF Species of Regional Importance

In 2005, we detected 109 individual Black-billed Magpies in 3 habitats on NCPN transects. We detected Black-billed Magpie on all of our RMBO point-transect monitoring projects and were able to calculate a density estimate in at least one habitat on three projects, including NCPN.

Total number of detections, number of individuals, and habitat-specific density estimates for Black-billed Magpie on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	--	--	--	--	--	2
PJ	--	--	--	--	--	2
SA	3.10	1.45	6.63	38%	63	105

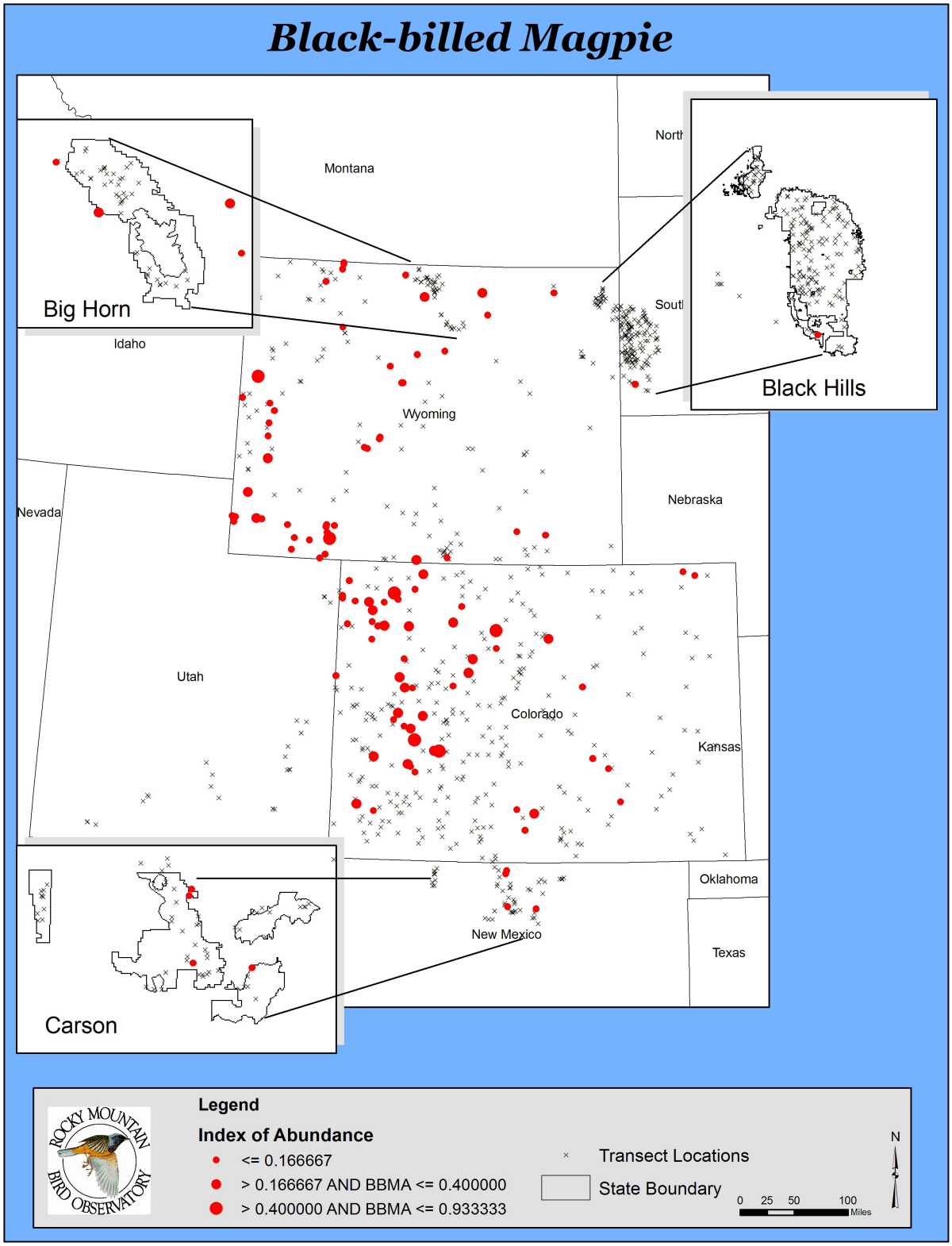
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Black-billed Magpies occur throughout the Colorado Plateau region. Since they require a supply of mud to construct nests, they are most often found near water sources. They have adapted well to human disturbances, though, and are also often seen near development, particularly roads, where they forage for road-kill and refuse (Righter et al 2004).

We detected Black-billed Magpie in highest numbers in sage habitat on NCPN transects. Most of the detections, though, were from individuals in bordering habitats such as pinyon-juniper and riparian. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Black-billed Magpie in at least one habitat in the NCPN.


Black-billed Magpie
Montana
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 BBMA <= 0.400000
> 0.400000 AND BBMA <= 0.933333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Violet-green Swallow
(*Tachycineta thalassina)*

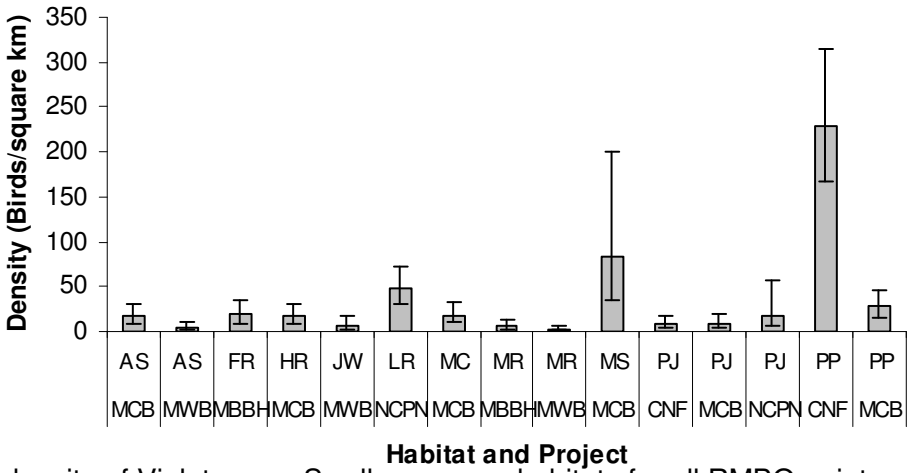
*PIF Species of Regional Importance

In 2005, we detected 283 individual Violet-green Swallows in three habitats on NCPN transects. We detected Violet-green Swallow on all of our RMBO point-transect monitoring projects and 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 Violet-green Swallow on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	48.21	31.88	72.92	21%	103	199
PJ	17.90	5.62	57.06	63%	39	49
SA	--	--	--	--	--	35

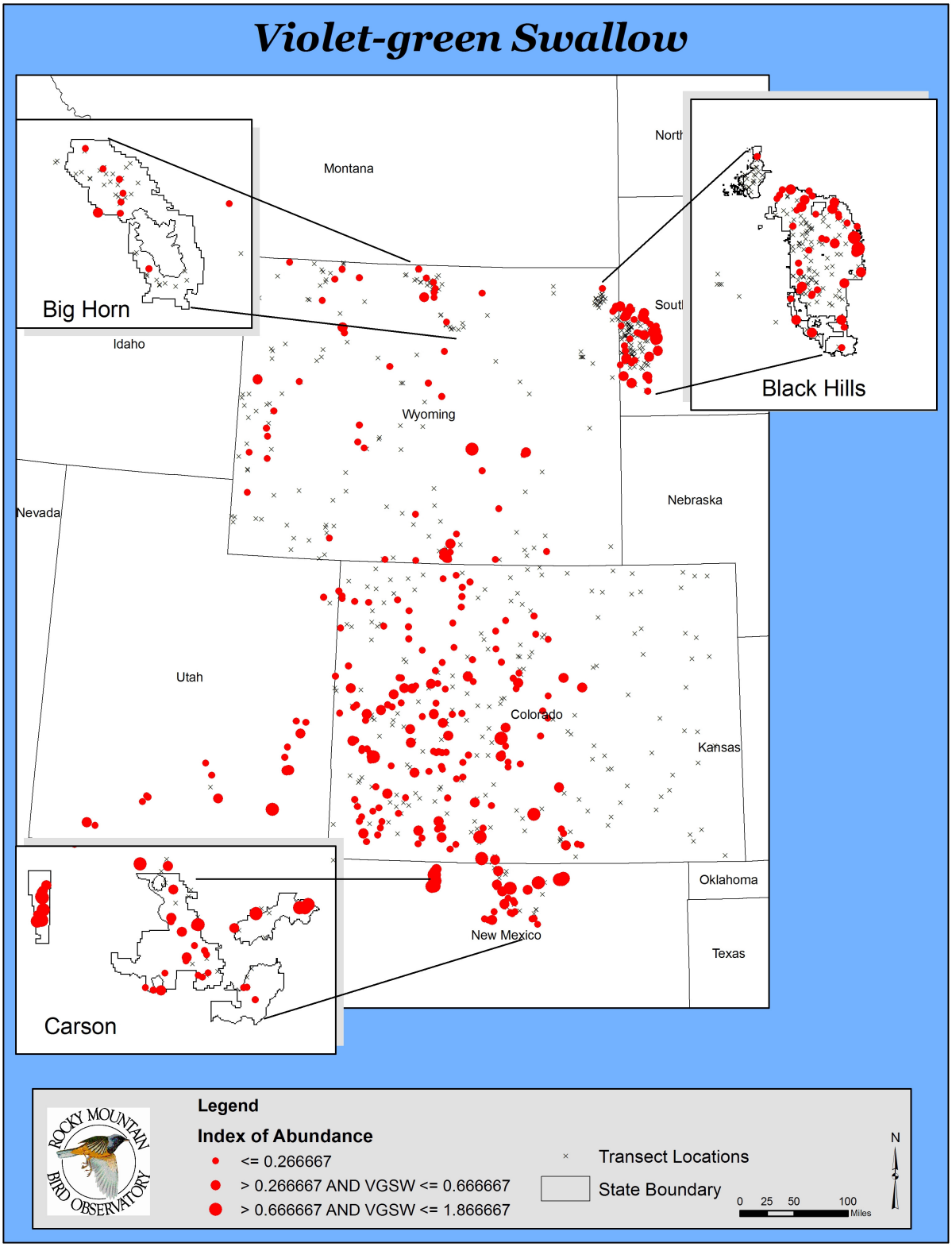
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Violet-green Swallows often nest on cliffs, sometimes near White-throated Swifts. They will also nest in aspen stands or in ponderosa pine snags, often in association with Tree Swallows (Righter et al. 2004).

If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Violet-green Swallow in low-elevation riparian and pinyon-juniper habitats in the NCPN.


Violet-green Swallow
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Legend
Index of Abundance
<= 0.266667
> 0.266667 AND VGSW <= 0.666667
> 0.666667 AND VGSW <= 1.866667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Juniper Titmouse
(*Baeolophus ridgwayi)*

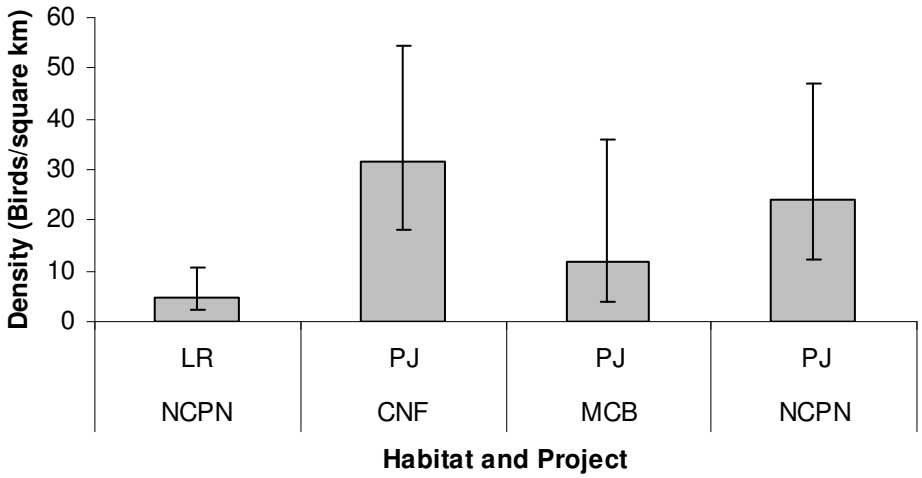
*PIF Species of Regional Importance

In 2005, we detected 147 individual Juniper Titmice in three habitats on NCPN transects. We detected Juniper Titmouse on all of our RMBO point-transect monitoring projects except MBBH, which is outside of the species' normal breeding range. We detected Juniper Titmouse in sufficient numbers to calculate density in at least one habitat on three projects, including NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	4.79	2.19	10.48	39%	27	36
PJ	24.14	12.35	47.17	35%	84	105
SA	--	--	--	--	--	6

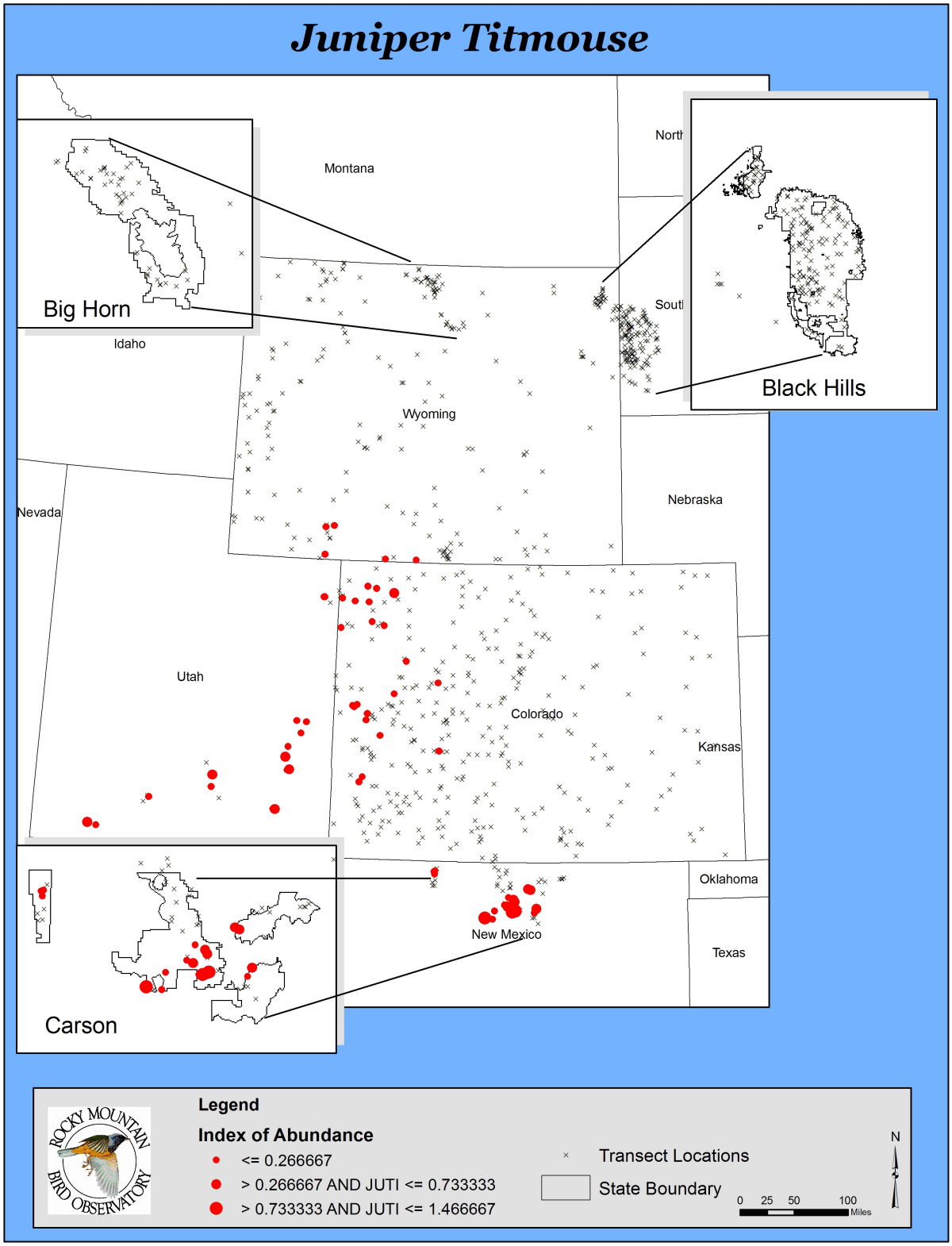
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Common birds of the Colorado Plateau region, Juniper Titmice nest in knotholes or other natural cavities that occur abundantly in junipers (Righter et al. 2004).

If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Juniper Titmouse in pinyon-juniper habitat and perhaps in low-elevation riparian habitat in the NCPN.


Juniper Titmouse
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
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

Pygmy Nuthatch
(*Sitta pygmaea*)

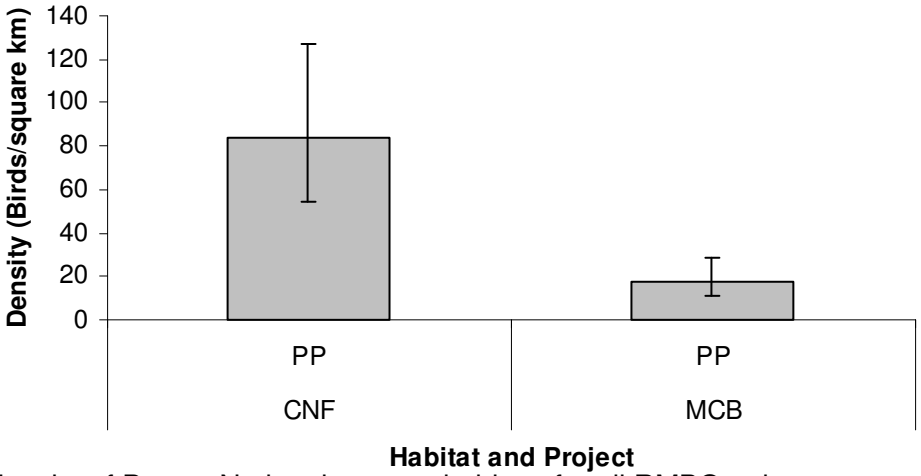
*PIF Species of Regional Importance

In 2005, we detected 13 individual Pygmy Nuthatches in two habitats on NCPN transects. We detected Pygmy Nuthatch on all of our RMBO point-transect monitoring projects but were able to calculate a density estimate in at least one habitat only on MBCNF and MCB.

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

Habitat	D	LCL	UCL	CV	n	N
PJ	ID	--	--	--	--	5
SA	ID	--	--	--	--	8

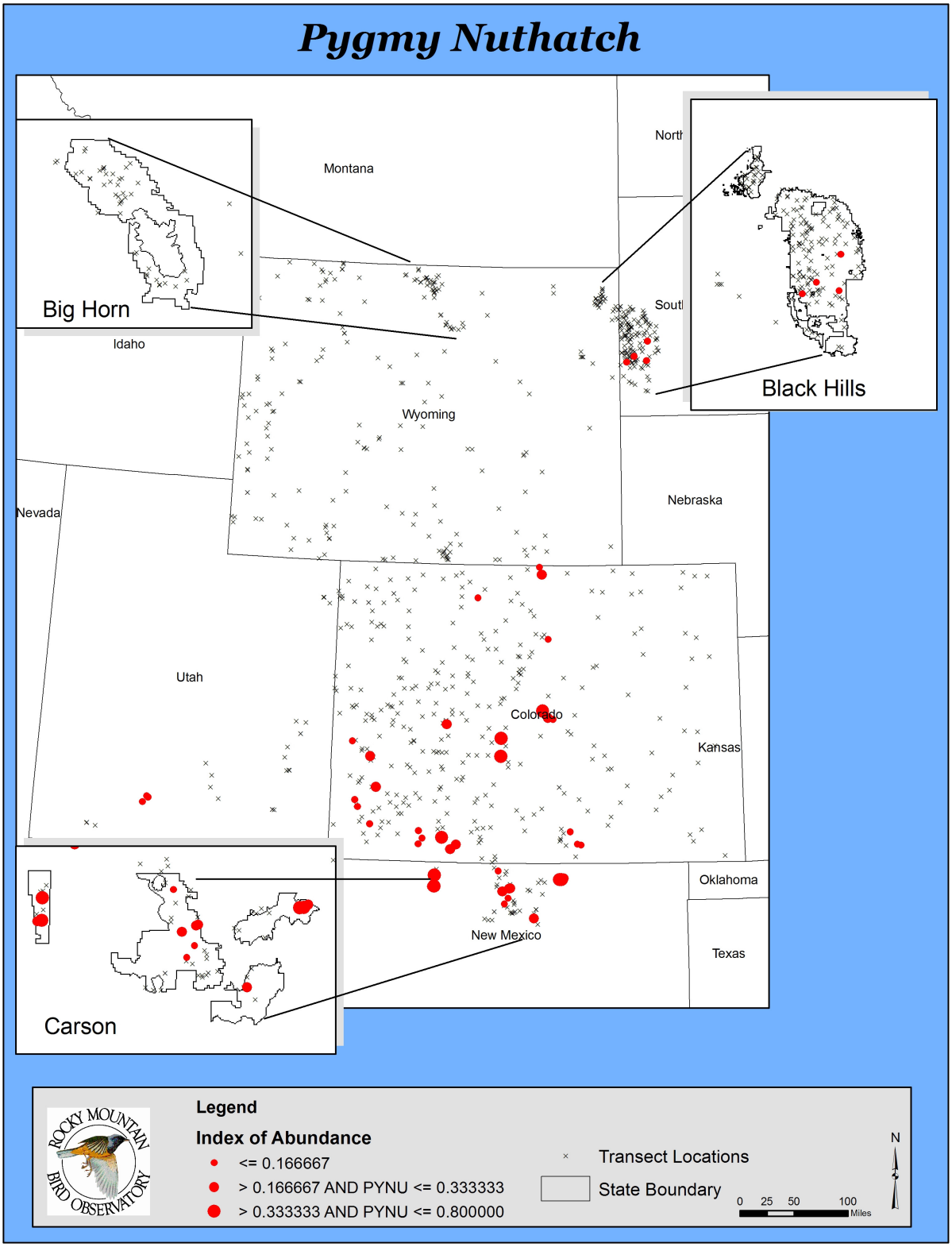
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Pygmy Nuthatches are closely associated with ponderosa pine. Sometimes they will use other habitats, especially pinyon-juniper, but invariably these are within a short distance of ponderosa pine (Righter et al. 2004).

All of our detections of the species were from ponderosa pine bordering the habitats that we survey. Given the specific habitat requirements of Pygmy Nuthatch, it is unlikely we will be able to monitor the species in any of the habitats that we currently survey in the NCPN.


Pygmy Nuthatch
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Rock Wren
(*Salpinctes obsoletus)*

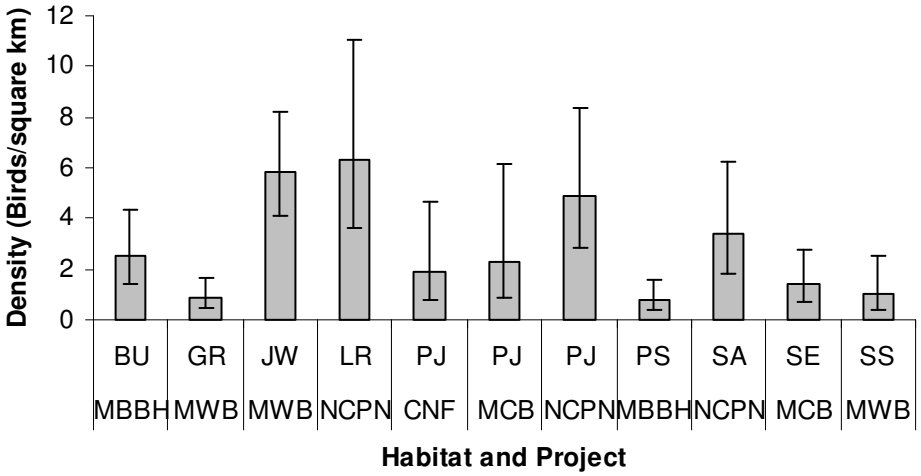
*PIF Species of Regional Importance

In 2005, we detected 309 individual Rock Wrens in three habitats on NCPN transects. We detected Rock Wren on all of our RMBO point-transect monitoring projects and 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 Rock Wren on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	6.32	3.61	11.07	27%	91	93
PJ	4.86	2.82	8.37	27%	83	112
SA	3.39	1.84	6.25	31%	99	104

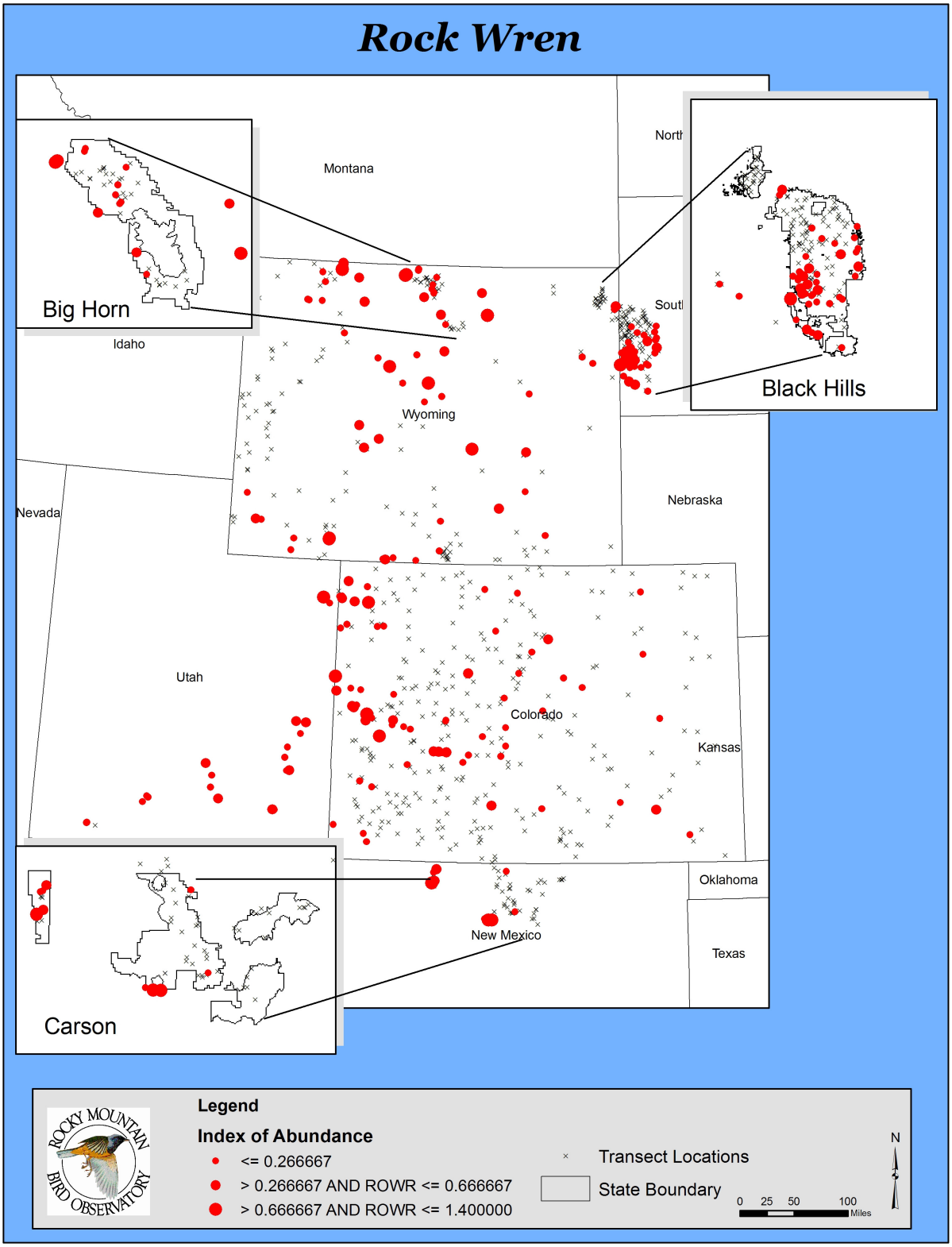
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Rock Wrens typically inhabit rocky outcrops and slopes in open areas (Righter et al. 2004)

We detected the species in large numbers in all habitats that we surveyed in the NCPN. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Rock Wren in all three habitats that we survey in the NCPN.


Rock Wren
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Canyon Wren
(*Catherpes mexicanus)*

*PIF Species of Regional Importance

In 2005, we detected 48 individual Canyon Wrens in three habitats on NCPN transects. We detected Canyon Wren on all of our RMBO point-transect monitoring projects. NCPN is the only project that extensively samples canyons, and detections were sufficient to calculate a density estimate only on this project.

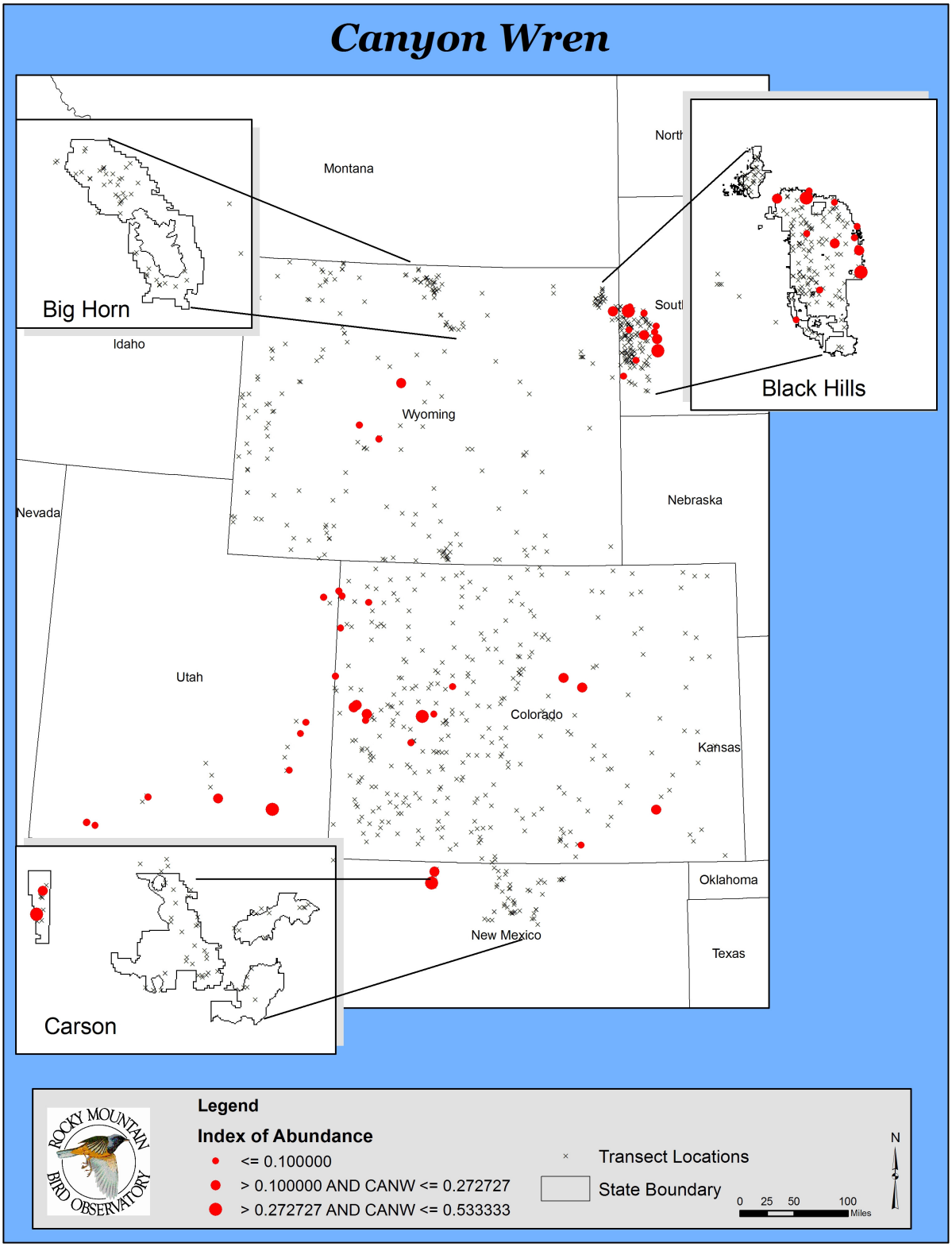
Total number of detections, number of individuals, and habitat-specific density estimates for Canyon Wren on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	1.47	0.64	3.37	42%	28	31
PJ	--	--	--	--	--	15
SA	--	--	--	--	--	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 – Canyon Wrens nest throughout the Colorado Plateau region on high cliffs, generally near streams or rivers, which carve out the canyons that they prefer (Righter et al. 2004).

We detected just enough Canyon Wrens on NCPN transects to calculate a density estimate. Most of the detections were in low-elevation riparian habitat. If our first year of surveys is an indication of the species distribution and abundance, we should be able to monitor Canyon Wren in low-elevation riparian habitat in the NCPN.


Canyon Wren
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Bewick's Wren
(*Thryomanes bewickii*)

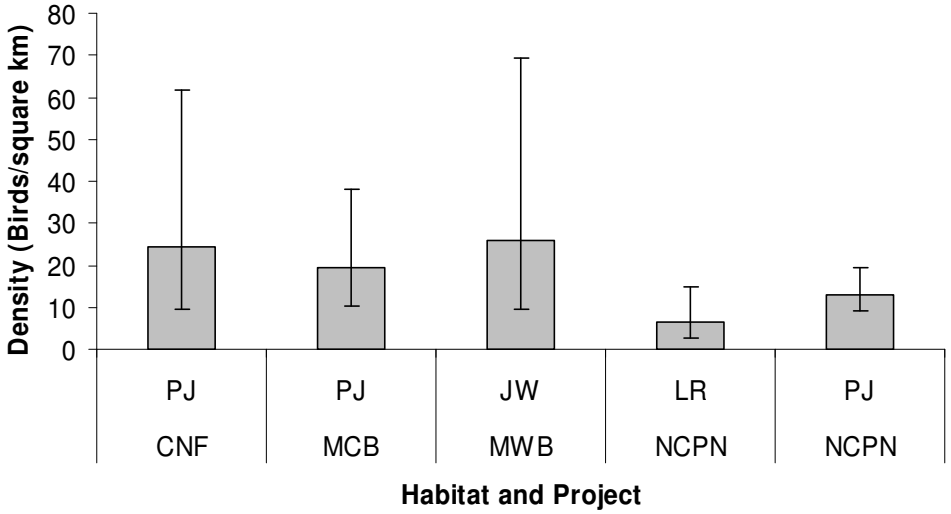
*PIF Species of Regional Importance

In 2005, we detected 240 individual Bewick's Wrens in three habitats on NCPN transects. We detected Bewick's Wren on all of our RMBO point-transect monitoring projects except MBBH, which is outside of the species' normal breeding range. We detected Bewick's Wren in sufficient numbers to calculate density on three projects, including NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	6.30	2.67	14.84	0.43	51	55
PJ	13.14	8.96	19.26	0.19	164	174
SA	--	--	--	--	--	11

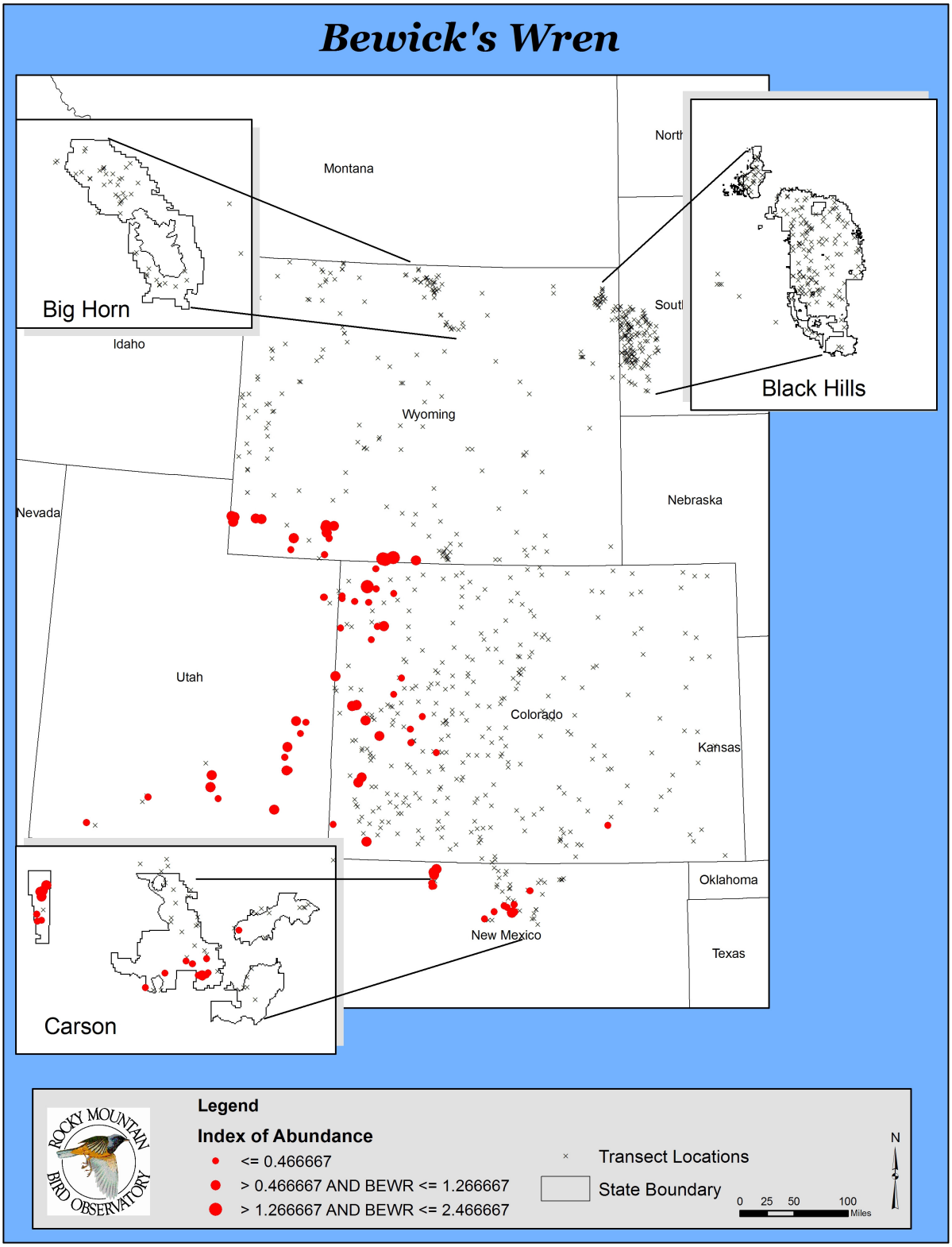
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Bewick's Wren occurs throughout most of the Colorado Plateau region and breeds in a variety of habitats that contain brush (Righter et al. 2004). The species was detected in greatest numbers in pinyon-juniper habitat, but was also common in low riparian habitat.

If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Bewick's Wren in both low-elevation riparian and pinyon-juniper habitats in the NCPN.


Bewick's Wren
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
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

Western Bluebird
(*Sialia mexicana*)

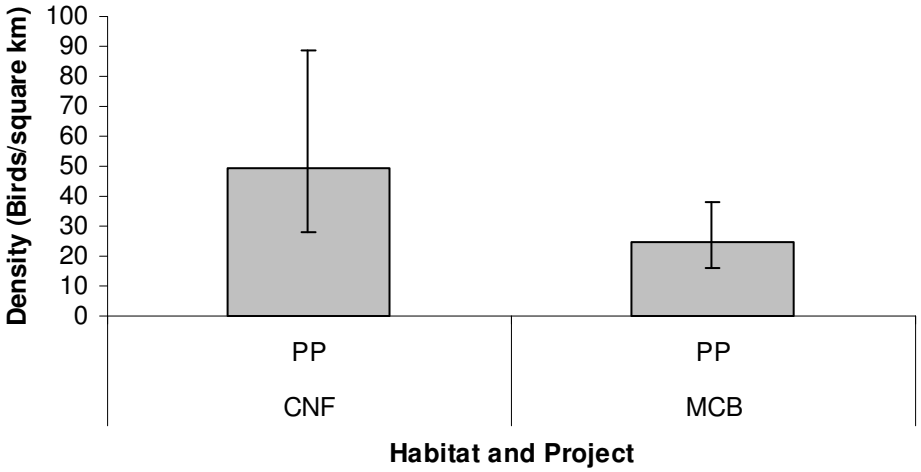
*PIF Species of Regional Importance

In 2005, we detected 16 individual Western Bluebirds in three habitats on NCPN transects. We detected Western Bluebird on most of the other RMBO point-transect monitoring projects except MWB and MBBH, which are at the northern periphery of the species' normal breeding range. We detected Western Bluebird in sufficient numbers to calculate density in at least one habitat only on MBCNF and MCB.

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

Habitat	D	LCL	UCL	CV	n	N
LR	ID	--	--	--	--	4
PJ	ID	--	--	--	--	4
SA	ID	--	--	--	--	8

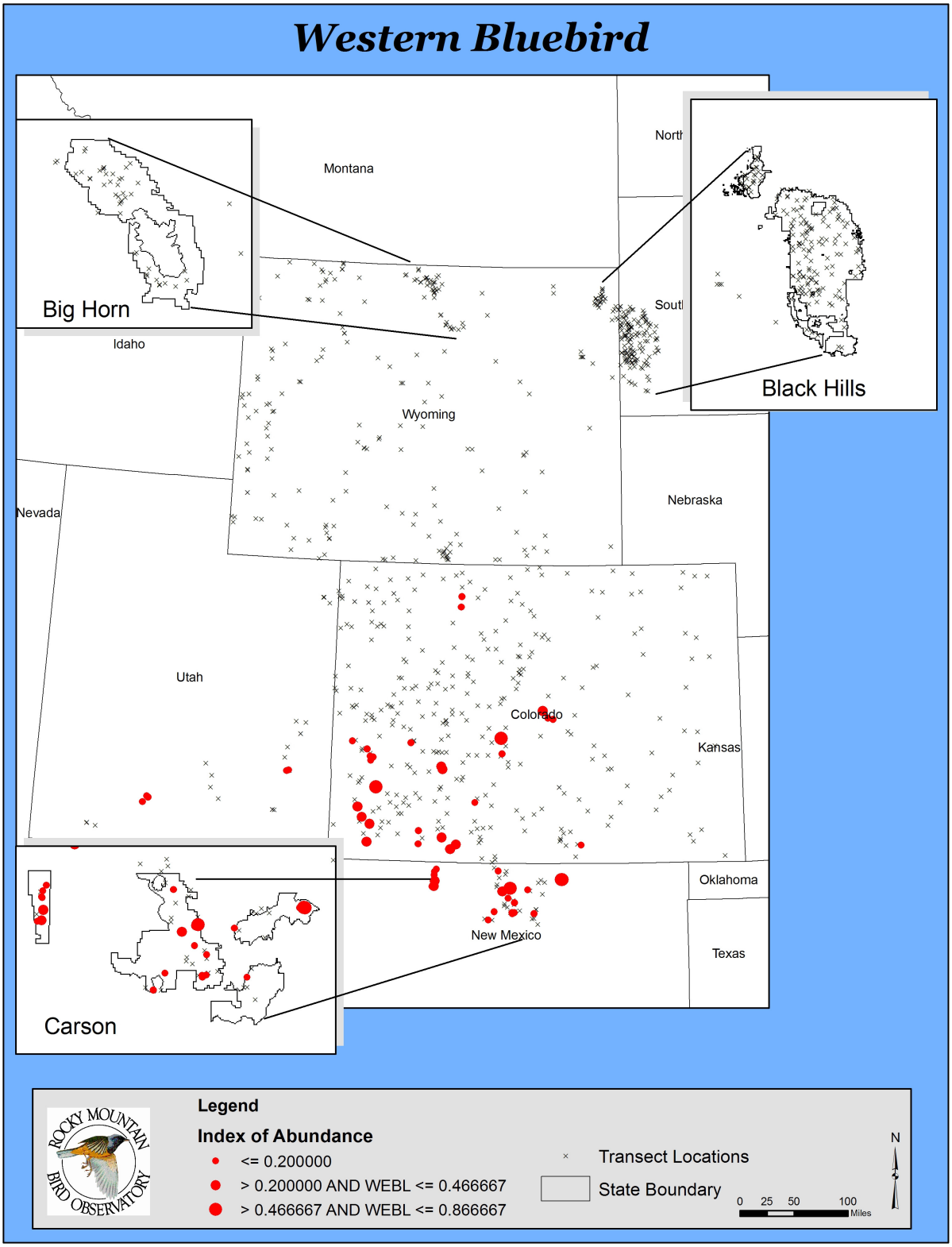
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Western Bluebird is a cavity-nester that prefers ponderosa pine forests but will also occasionally nest in pinyon-juniper habitat (Righter et al. 2004).

Given the specific habitat requirements of Western Bluebird, it is unlikely we will be able to monitor the species in any of the habitats or across the habitats that we currently survey in the NCPN. Given interest, however, with several years' 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 density estimate that may be robust enough for population-trend monitoring.


Western Bluebird
Big Horn
Black Hills
Carson
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND WEBL <= 0.466667
> 0.466667 AND WEBL <= 0.866667
Transect Locations
State Boundary
0 25 50 100
Miles
N

Mountain Bluebird
(*Salia currucoides)*

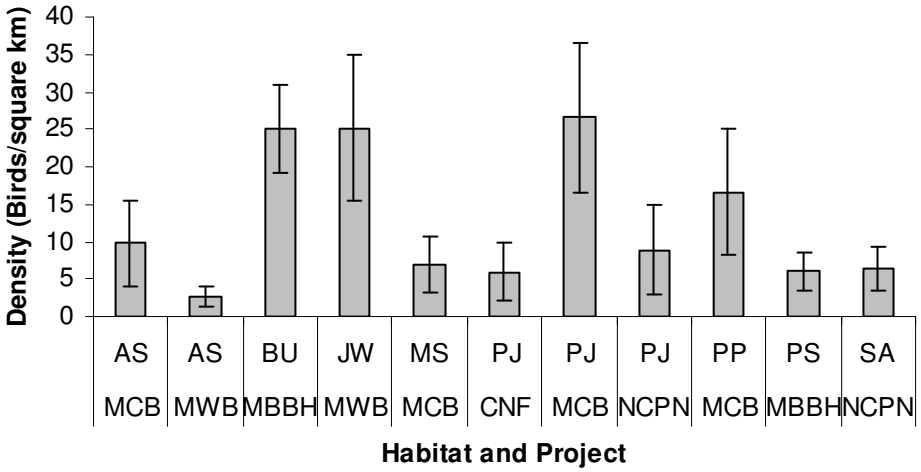
*PIF Species of Regional Importance

In 2005, we detected 160 individual Mountain Bluebirds in three habitats on NCPN transects. We detected Mountain Bluebird on all of our RMBO point-transect monitoring projects and 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 Mountain Bluebird on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	--	--	--	--	--	5
PJ	8.91	2.85	27.89	58%	66	75
SA	6.36	3.45	11.70	31%	72	80

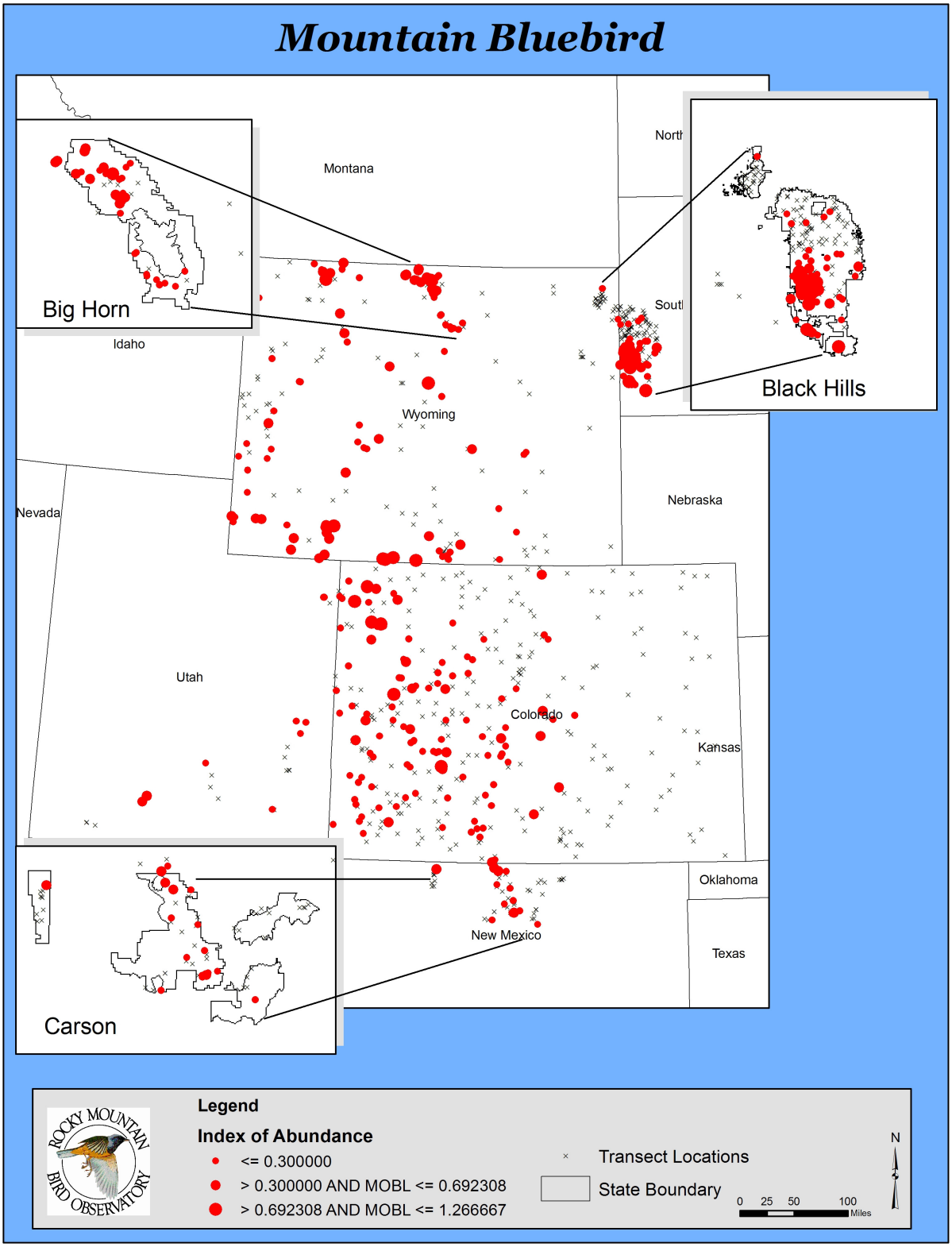
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Mountain Bluebirds are secondary cavity nesters that rely largely on cavities excavated by woodpeckers for nest sites (Righter et al 2004).

While we detected the largest numbers of Mountain Bluebirds in sage shrubland habitat, most of those detections were related to bordering pinyon-juniper habitat. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to effectively monitor Mountain Bluebird in pinyon-juniper and sage habitats in the NCPN.


Mountain Bluebird
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.300000
> 0.300000 AND MOBL <= 0.692308
> 0.692308 AND MOBL <= 1.266667
Transect Locations
State Boundary
0 25 50 100
Miles
N

Virginia's Warbler
(*Vermivora virginiae)*

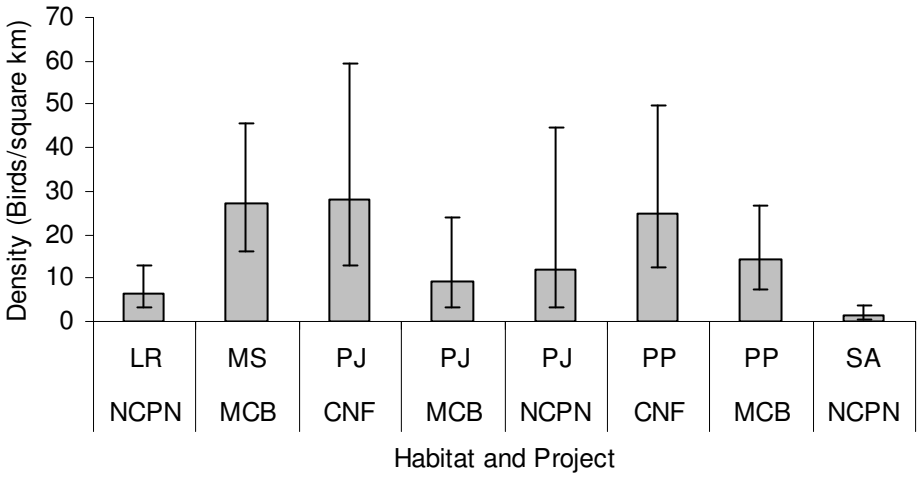
*PIF Species of Regional Importance

In 2005, we detected 118 individual Virginia's Warblers in three habitats on NCPN transects. We detected Virginia's Warbler on all of our RMBO point-transect monitoring projects and were able to calculate a density estimate in at least one habitat on three projects, including NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	6.29	3.11	12.71	35%	35	36
PJ	11.94	3.19	44.70	74%	53	56
SA	1.24	0.44	3.46	51%	26	26

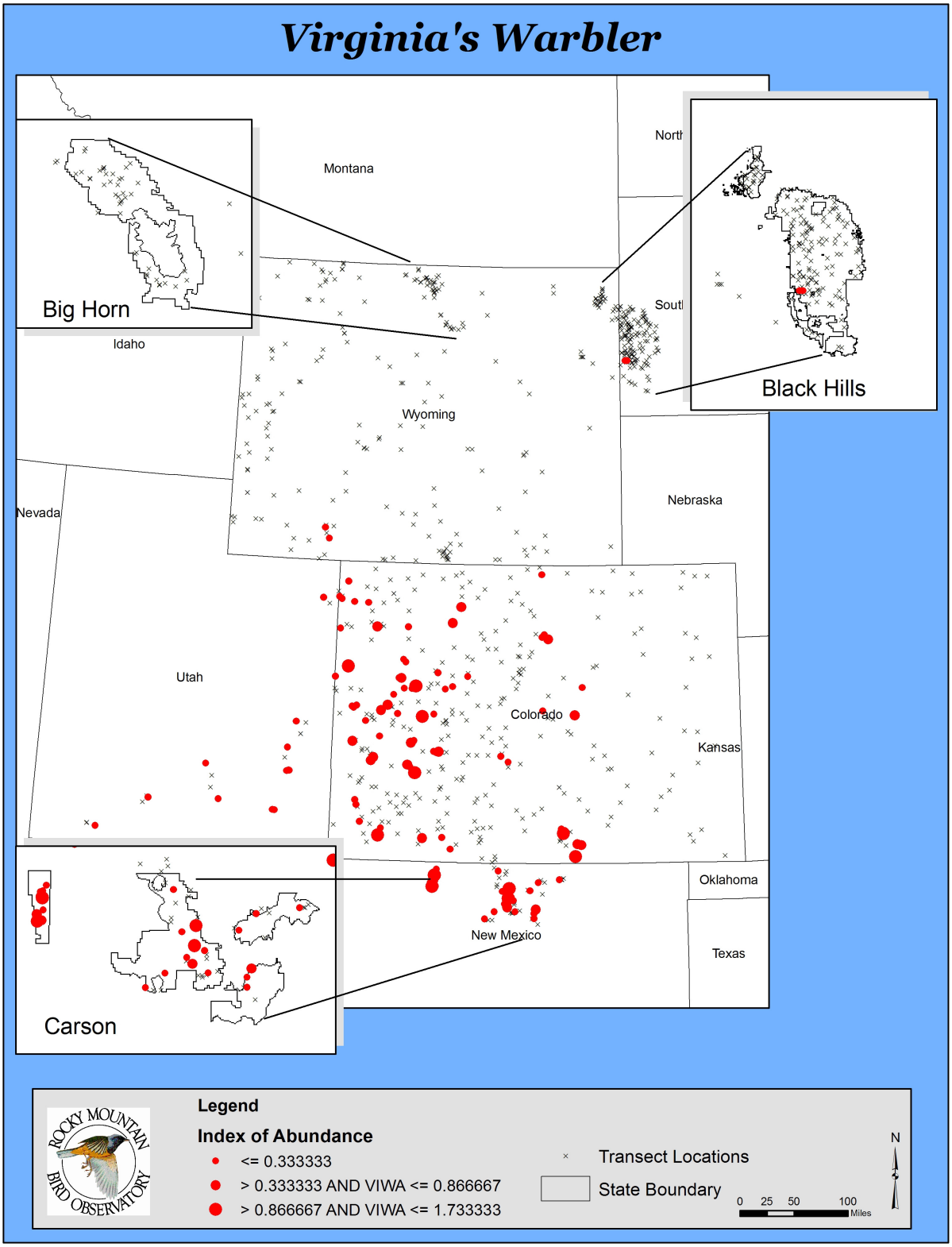
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Virginia's warblers nest in dense shrublands, usually on the slopes of mesas and in open ravines (Righter et al. 2004).

If our first year of surveys is an indication of the species' distribution and abundance, we may be able to monitor Virginia's Warbler in all three habitats in the NCPN.


Virginia's Warbler
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
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*)

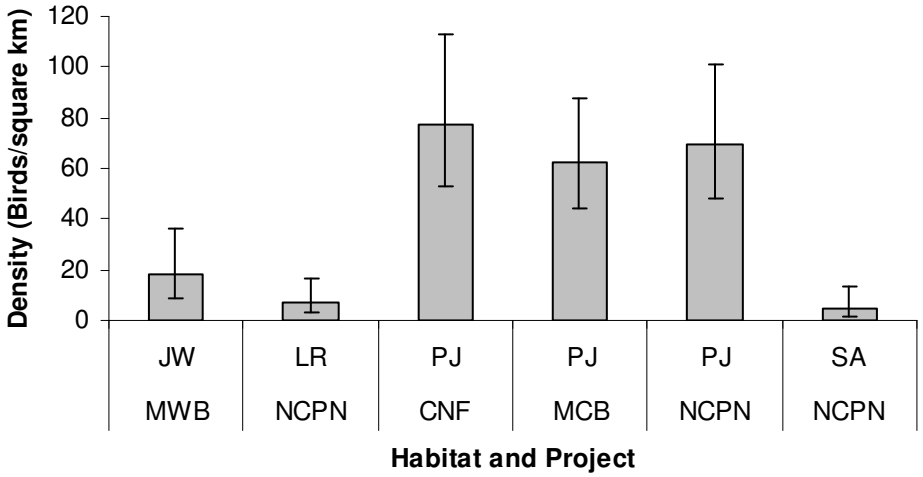
*PIF Species of Regional Importance

In 2005, we detected 400 individual Black-throated Gray Warblers in three habitats on NCPN transects. We detected Black-throated Gray Warblers on all of our RMBO point-transect monitoring projects except MBBH, which is outside of the species' normal breeding range. We detected Black-throated Gray Warbler in sufficient numbers to calculate a density estimate in at least one habitat on all projects except MBBH.

Total number of detections, number of individuals, and habitat-specific density estimates for Black-throated Gray Warblers on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	7.11	3.02	16.76	43%	38	39
PJ	69.70	48.12	100.96	18%	311	329
SA	4.82	1.76	13.22	51%	28	32

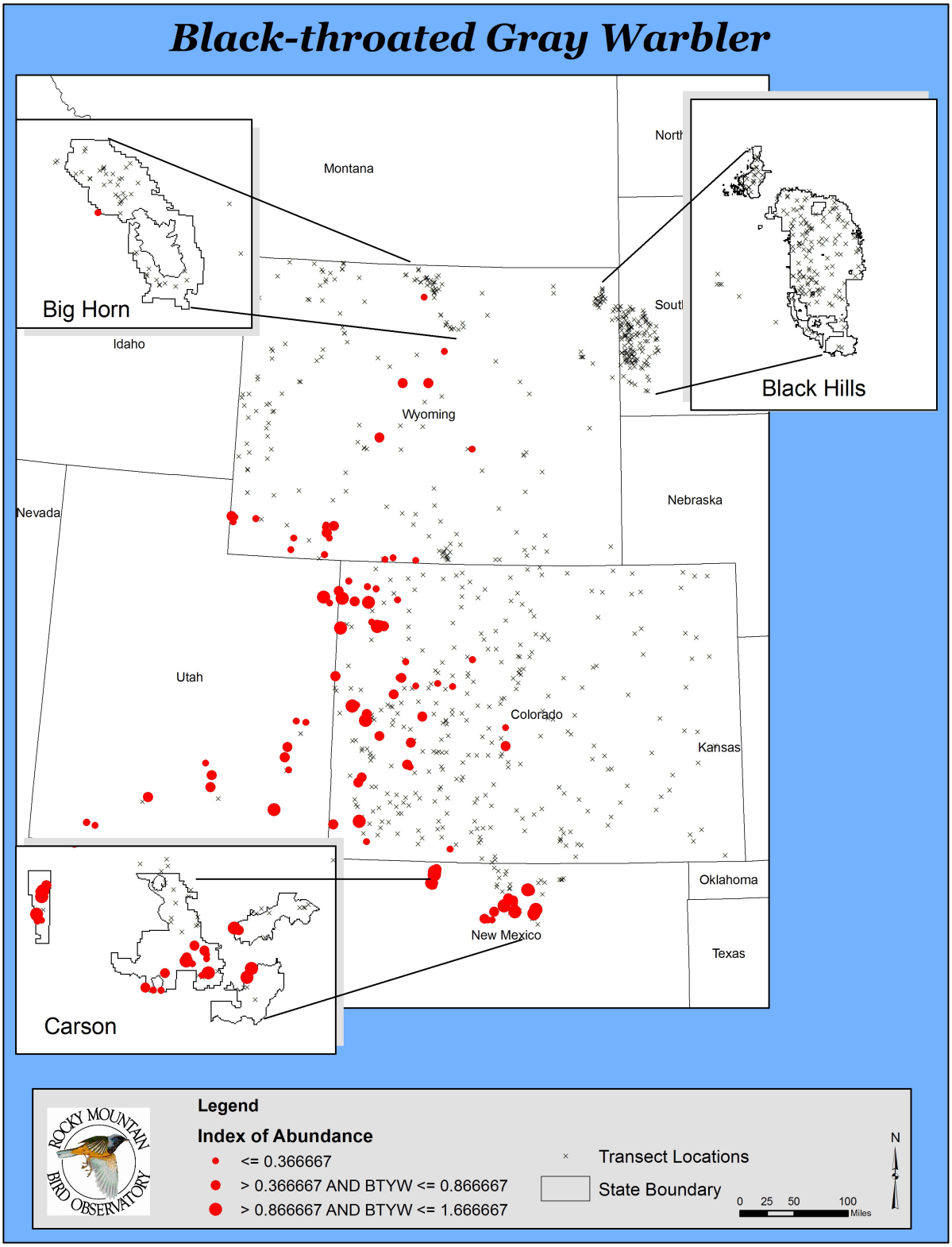
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – On the Colorado Plateau, Black-throated Gray Warblers prefer large stands of pinyon-dominated woodland. It is very rare to find the species outside of pinyon-juniper habitat during the breeding season (Righter et al 2004).

In our first year of surveys, Black-throated Gray Warbler was the most abundant species in pinyon-juniper habitat in the NCPN. When the species was detected in either low-elevation riparian or sage shrubland habitat, there was always nearby pinyon-juniper habitat. We should be able to effectively monitor the species in pinyon-juniper habitat in the NCPN.


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

Grace's Warbler
(*Dendroica graciae*)

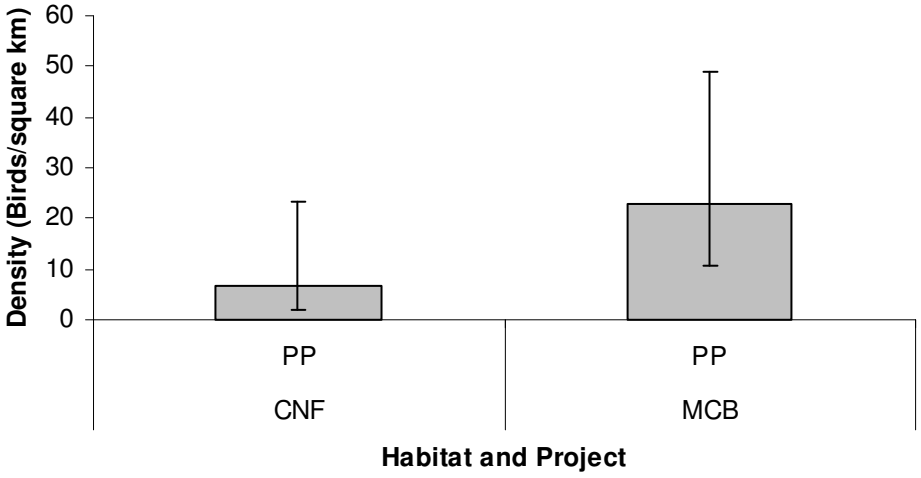
*PIF Species of Regional Importance

In 2005, we detected 12 individual Grace's Warblers in two habitats on NCPN transects. We detected Grace's Warblers most of our RMBO point-transect monitoring projects except MWB and MBBH, which are outside of the species' normal breeding range. We detected Grace's Warbler in sufficient numbers to calculate a density estimate in at least one habitat on MBCNF and MCB.

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

Habitat	D	LCL	UCL	CV	n	N
PJ	ID	--	--	--	--	6
SA	ID	--	--	--	--	6

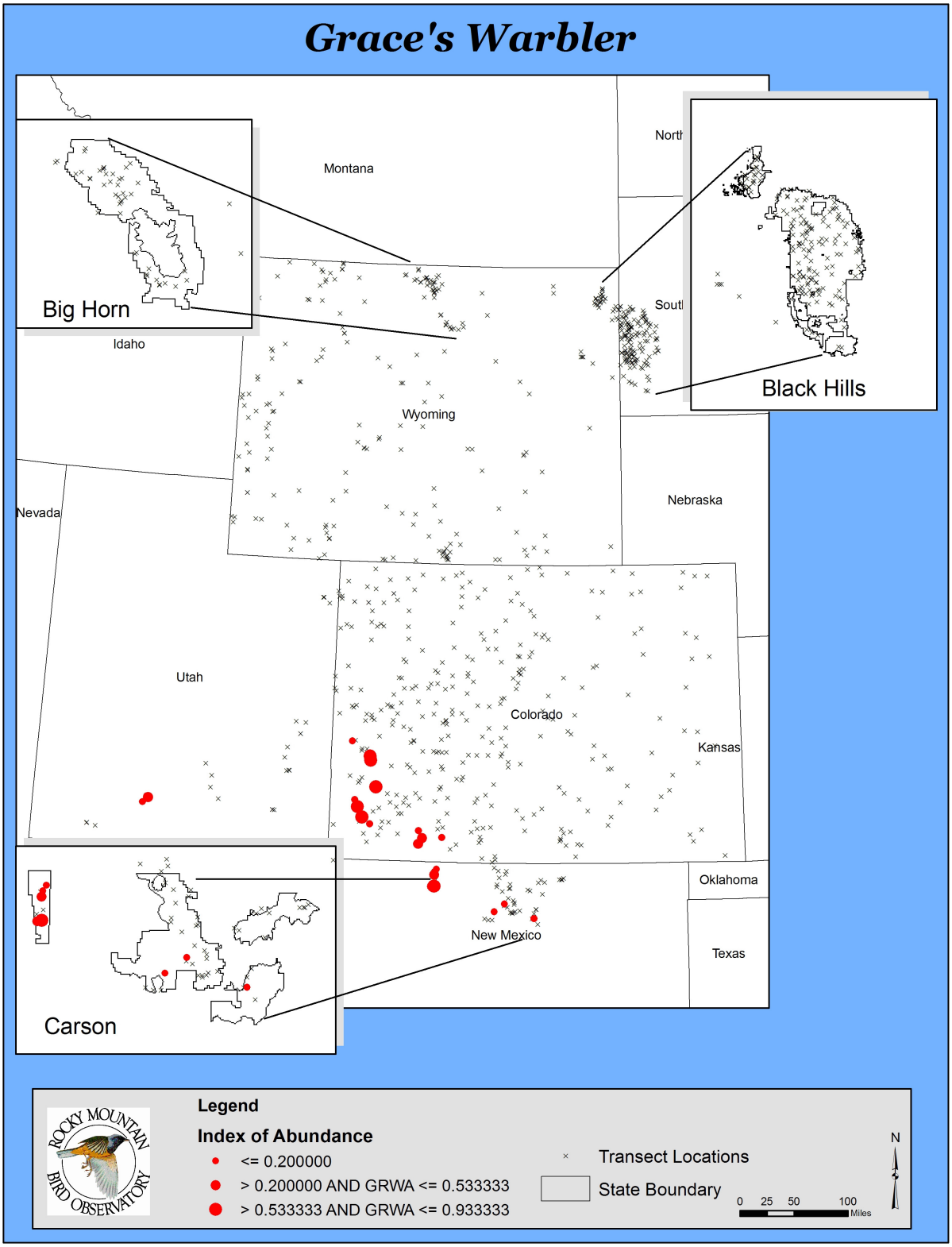
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Grace's Warblers nest in open, mature ponderosa pine forests that typically have an understory of scrub oak (Righter et al. 2004).

Almost all of our detections of this species were from ponderosa pine stands bordering our sage shrubland and pinyon-juniper transects. Given this species' habitat requirements, it is unlikely that we will be able to monitor it in any of the habitats that we currently survey in the NCPN.


Grace's Warbler
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.200000
> 0.200000 AND GRWA <= 0.533333
> 0.533333 AND GRWA <= 0.933333
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Green-tailed Towhee
(*Pipilo chlorurus)*

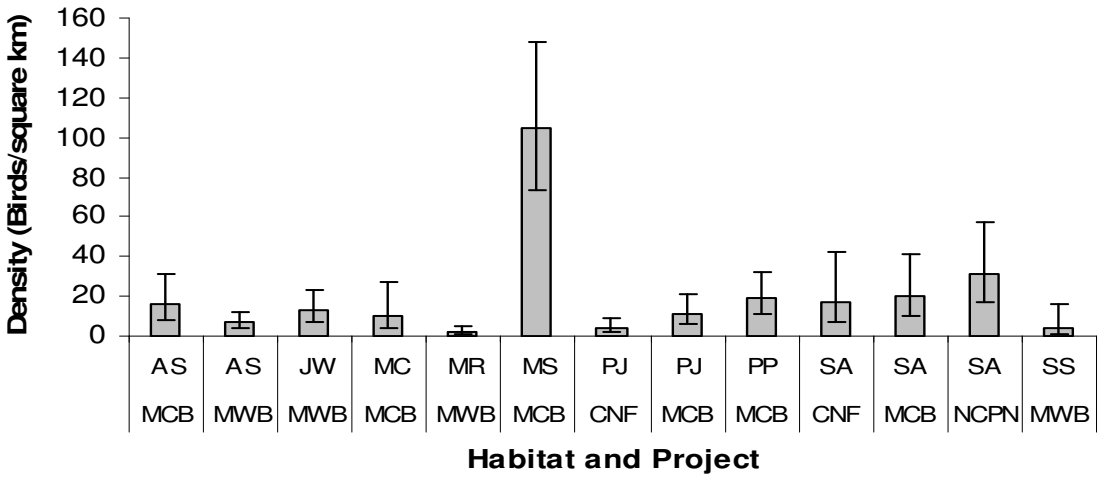
*PIF Species of Regional Importance

In 2005, we detected 350 individual Green-tailed Towhees in 3 habitats on NCPN transects. We detected Green-tailed Towhee on all of our RMBO point-transect monitoring projects except MBBH, which is outside of the species' normal breeding range. We were able to calculate a density estimate in at least one habitat on four projects, including NCPN.

Total number of Green-tailed Towhee detections, number of individuals, and habitat-specific density estimates for on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	--	--	--	--	--	7
PJ	--	--	--	--	--	15
SA	31.37	17.13	57.44	30%	320	328

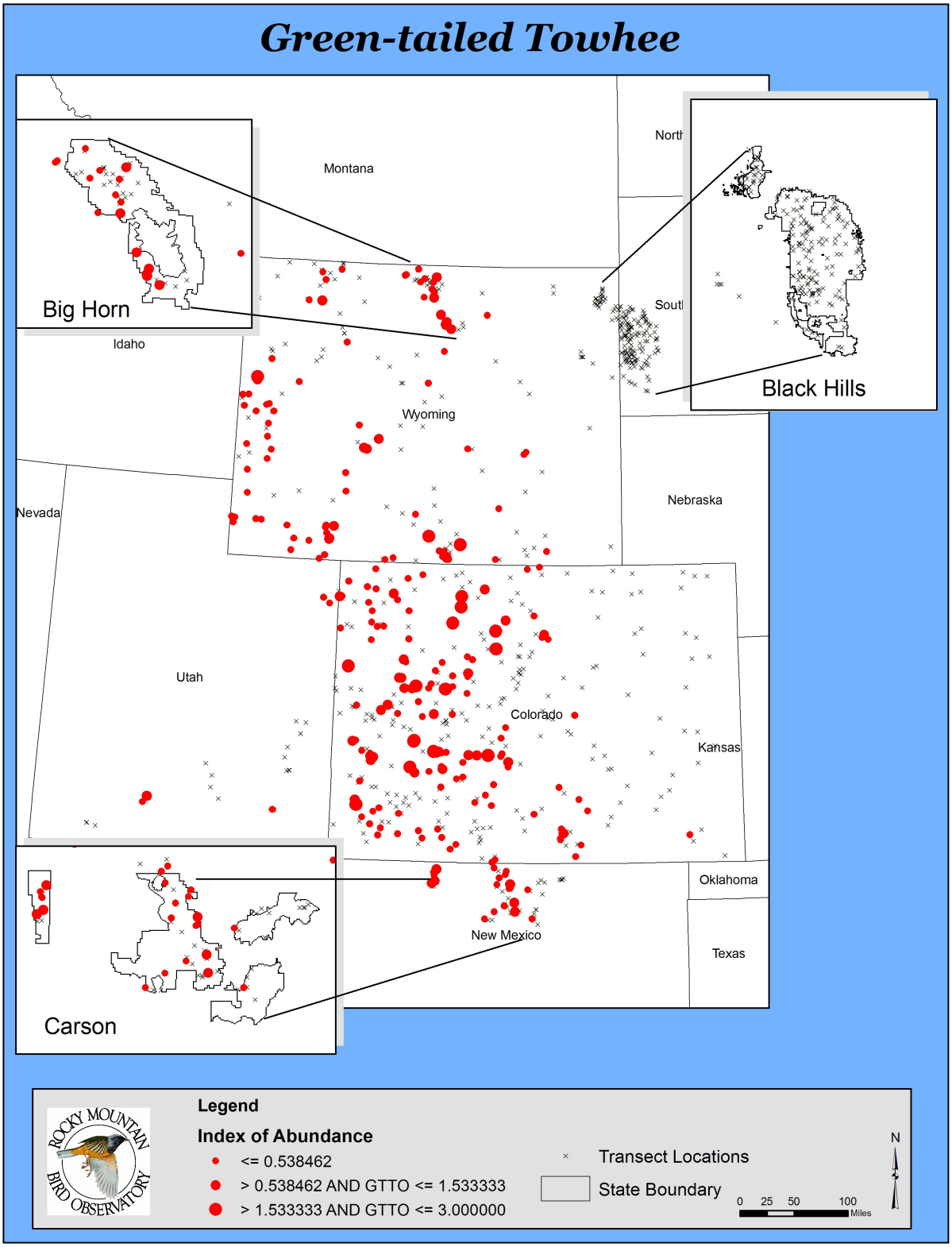
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – On the Colorado Plateau, Green-tailed Towhee is one of the most abundant breeding birds of sagebrush habitats (Righter et al. 2004).

We detected Green-tailed Towhees in large numbers in sage shrubland habitat on NCPN transects. Most detections in pinyon-juniper and low-elevation riparian habitats were associated with nearby sage shrubland. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Green-tailed Towhee in sage shrubland habitat in the NCPN.


Green-tailed Towhee
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.538462
> 0.538462 AND GTTO <= 1.533333
> 1.533333 AND GTTO <= 3.000000
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Brewer's Sparrow
(*Spizella breweri)*

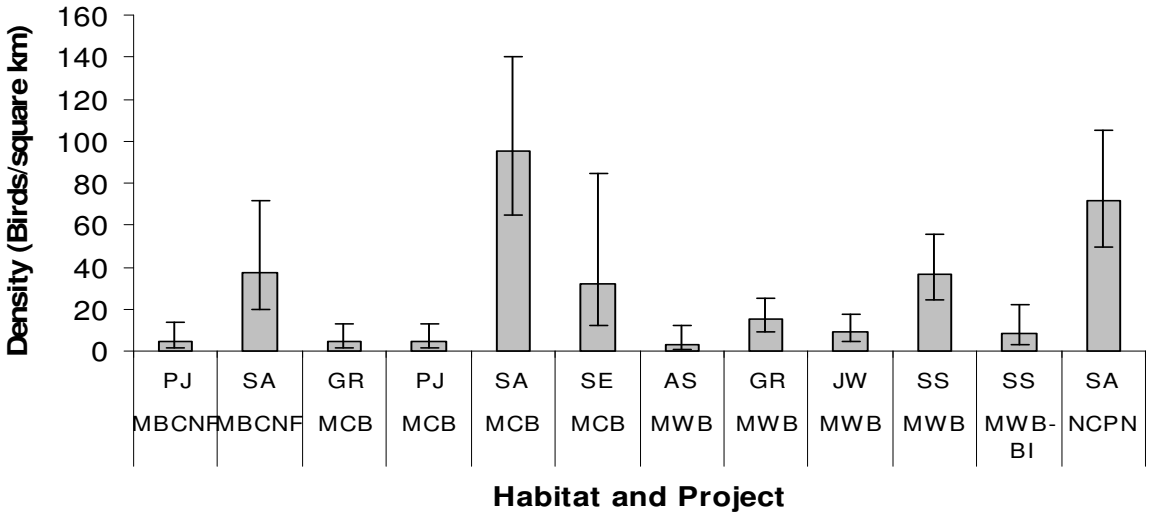
*PIF Species of Regional Importance

In 2005, we detected individual 598 Brewer's Sparrows in three habitats on NCPN transects. We detected Brewer's Sparrow on all of our RMBO point-transect monitoring projects except MBBH, which is at the periphery of the species' normal breeding range. We detected Brewer's Sparrows in sufficient numbers to calculate density in at least one habitat on four projects, including NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	--	--	--	--	--	2
PJ	--	--	--	--	--	7
SA	71.88	49.18	105.07	18%	567	589

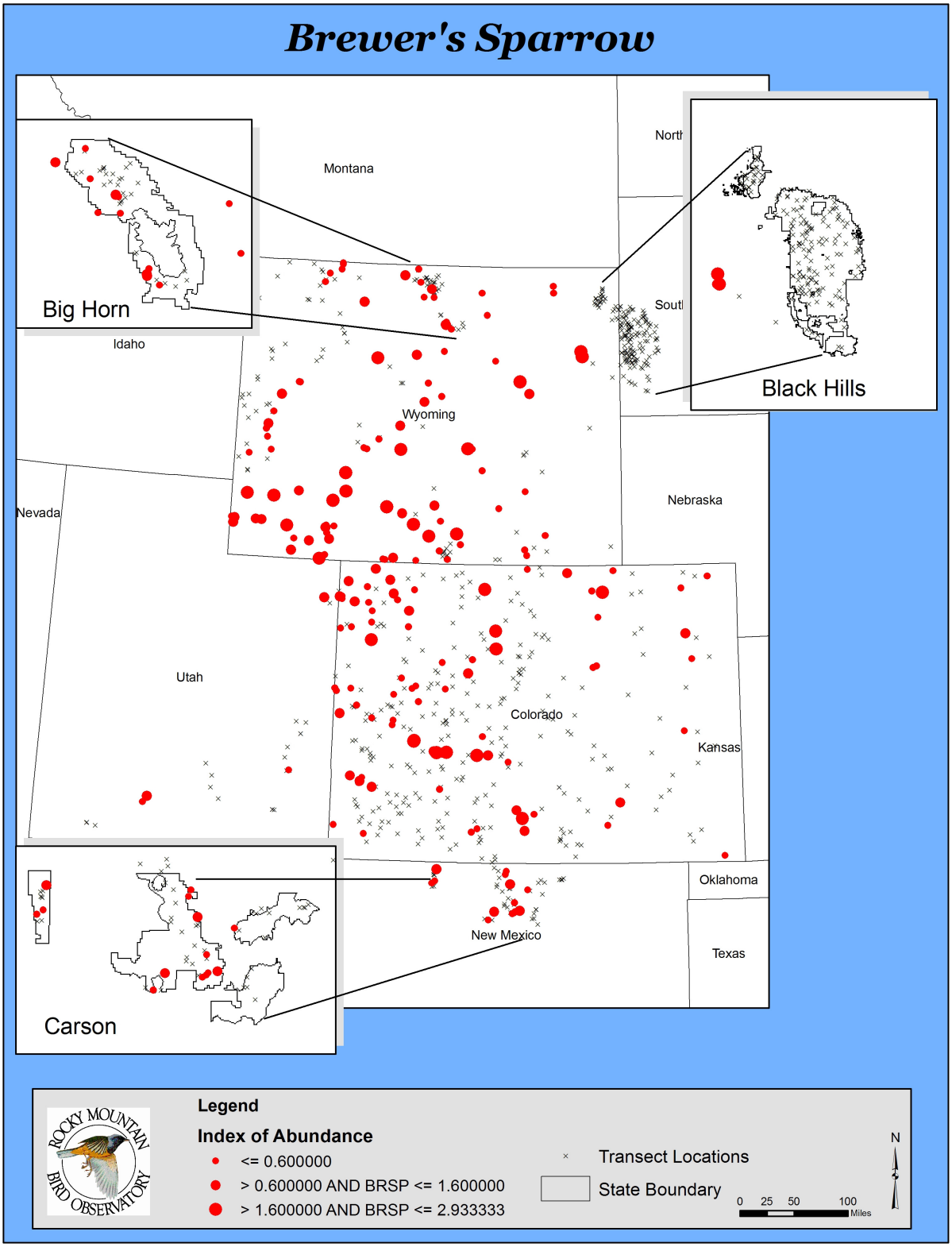
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – On the Colorado Plateau, Brewer's Sparrows prefer sagebrush but will also breed in greasewood, rabbitbrush, and other shrubby habitats (Righter et al. 2004).

We detected Brewer's Sparrow almost exclusively in sage habitat on NCPN transects. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor the species in sage shrubland habitat in the NCPN.


Brewer's Sparrow
Montana
Idaho
Wyoming
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

Black-chinned Sparrow
(*Spizella atrogularis*)

*PIF Species of Regional Importance

In 2005, we detected eight individual Black-chinned Sparrows in three habitats on NCPN transects. We detected Black-chinned Sparrow on all of our RMBO point-transect monitoring projects except MWB and MBBH, which are far north of the species' normal breeding range. We did not detect Black-chinned Sparrow in sufficient numbers to calculate a density estimate on any of our monitoring projects, most likely because all of our projects are outside of the species' normal breeding range.

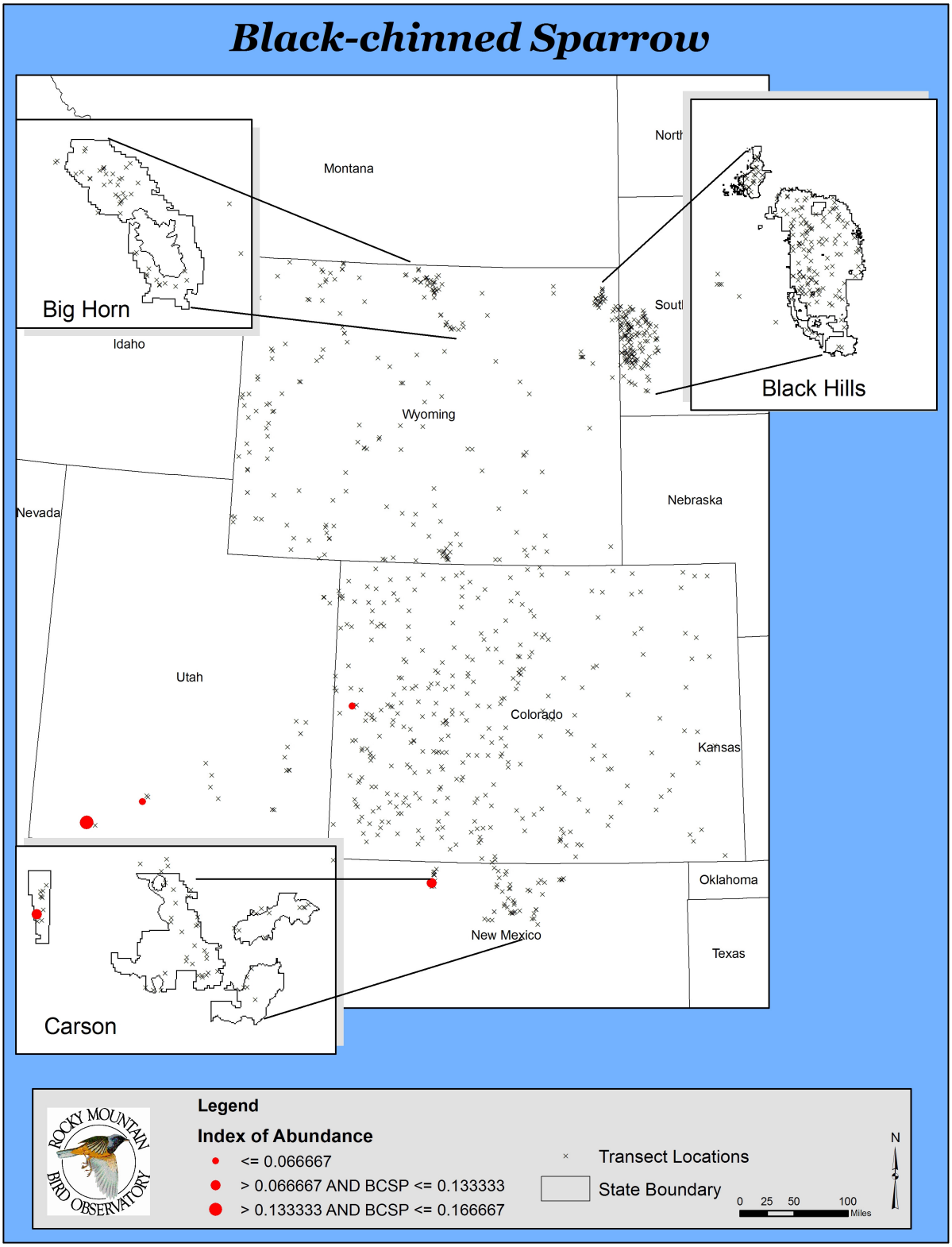
Total number of detections, number of individuals, and habitat-specific density estimates for Black-chinned Sparrow on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
LR	ID	--	--	--	--	3
PJ	ID	--	--	--	--	4
SA	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 Sparrows prefer arid shrublands on rugged slopes that are often south-facing (Audubon 2002). The species is considered rare in the areas that RMBO currently monitors, and we do not know whether the birds detected this summer were actually breeding locally or if they were individuals migrating to their breeding grounds.

All of the Black-chinned Sparrow detections on NCPN transects were in Zion National Park, which is at the northern extreme of the species' normal breeding range. Due to its rarity in the NCPN, we will probably not be able to monitor or track the species, but we will continue to note its presence. Repeat visits and nest searches at the locations that the species is detected could provide more information on the breeding status of this species in the NCPN.


Black-chinned Sparrow
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.066667
> 0.066667 AND BCSP <= 0.133333
> 0.133333 AND BCSP <= 0.166667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Black-throated Sparrow
(*Amphispixza bilineata)*

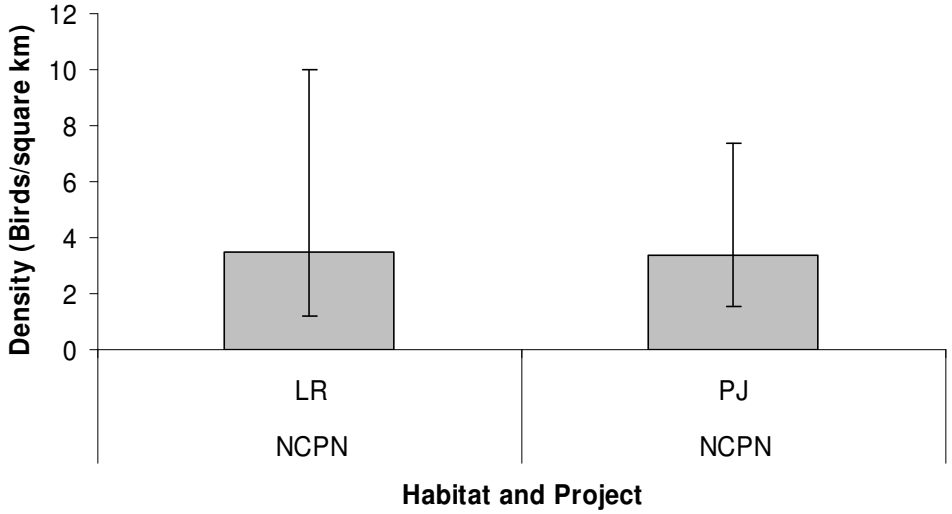
*PIF Species of Regional Importance

In 2005, we detected 113 individual Black-throated Sparrows in three habitats on NCPN transects. We detected Black-throated Sparrow on all of our RMBO point-transect monitoring programs except MBBH and MWB, which are both outside of the species' normal breeding range. NCPN was the only project on which we were able to calculate a density estimate for Black-throated Sparrow in at least one habitat.

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

Habitat	D	LCL	UCL	CV	n	N
LR	3.47	1.21	9.99	53%	52	55
PJ	3.40	1.57	7.38	38%	45	46
SA	--	--	--	--	--	12

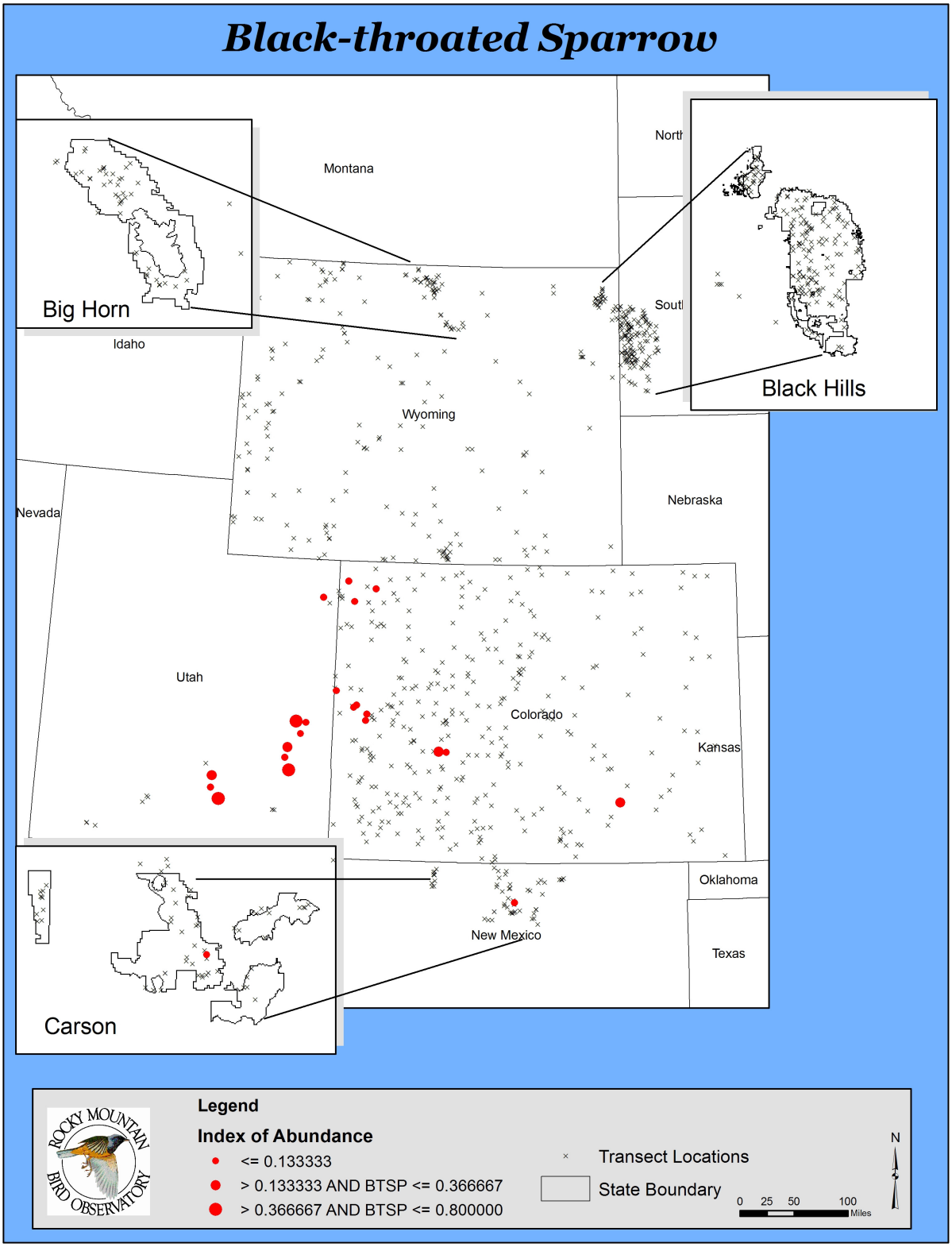
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – On the Colorado Plateau, Black-throated Sparrows nest in arid low-elevation habitats with widely scattered shrubs and trees (Righter et al. 2004).

Although most of our detections of Black-throated Sparrows were from low-elevation riparian habitat, those birds were typically using the arid areas bordering that habitat. In pinyon-juniper, they were typically detected in open, arid woodland. If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Black-throated Sparrow in both pinyon-juniper and low-elevation riparian habitats in the NCPN.


Black-throated Sparrow
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.133333
> 0.133333 AND BTSP <= 0.366667
> 0.366667 AND BTSP <= 0.800000
Transect Locations
State Boundary
0 25 50 100
Miles
N

Sage Sparrow
(*Amphispiza belli)*

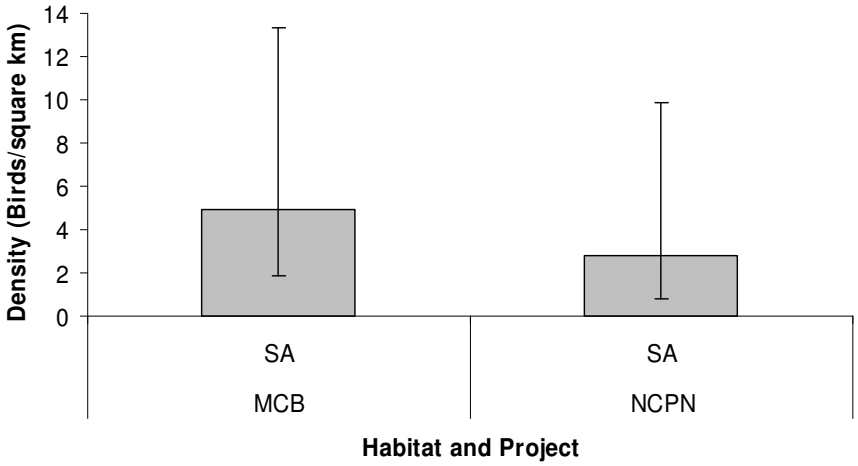
*PIF Species of Regional Importance

In 2005, we detected 43 individual Sage Sparrows in two habitats on NCPN transects. We detected Sage Sparrow on all of our RMBO point-transect monitoring projects except MBBH, which is outside of the species' normal breeding range. We detected Sage Sparrow in sufficient numbers to calculate density only on MCB and NCPN.

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

Habitat	D	LCL	UCL	CV	n	N
LR	--	--	--	--	--	1
SA	2.79	0.79	9.88	65%	38	42

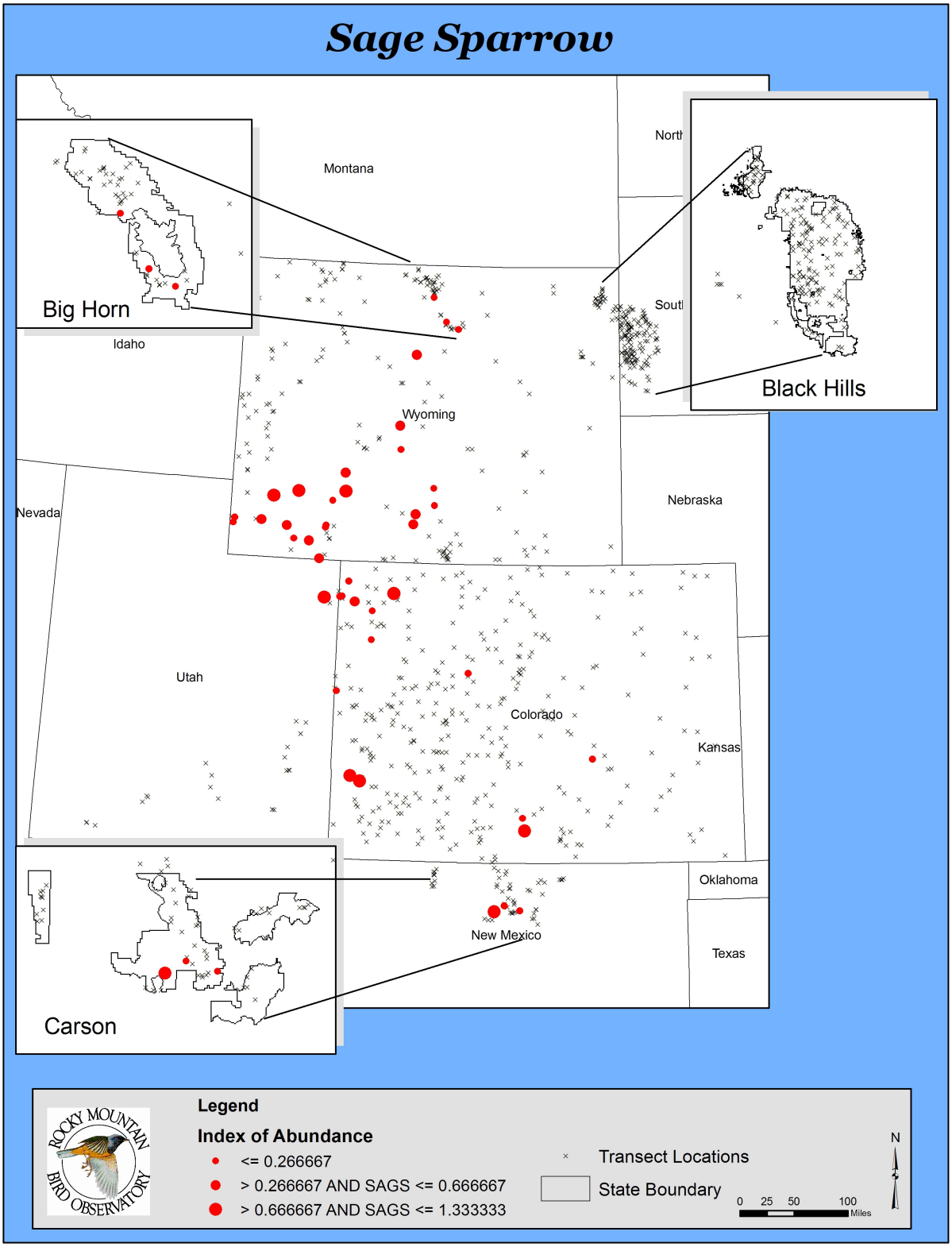
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Sage Sparrows nest primarily in large, unbroken stands of sagebrush (Righter et al. 2004).

If our first year of surveys is an indication of the species' distribution and abundance, we should be able to monitor Sage Sparrow in sage shrubland habitat in the NCPN.


Sage Sparrow
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
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

Cassin's Finch
(*Carpodacus cassinii*)

*PIF Species of Regional Importance

In 2005, we detected four individual Cassin's Finches in pinyon-juniper habitat on NCPN transects. We detected Cassin's Finch on all of our RMBO point-transect monitoring projects, but detections were sufficient to calculate density only on MCB, which is the only project that extensively samples high-elevation conifers, the species' preferred habitat.

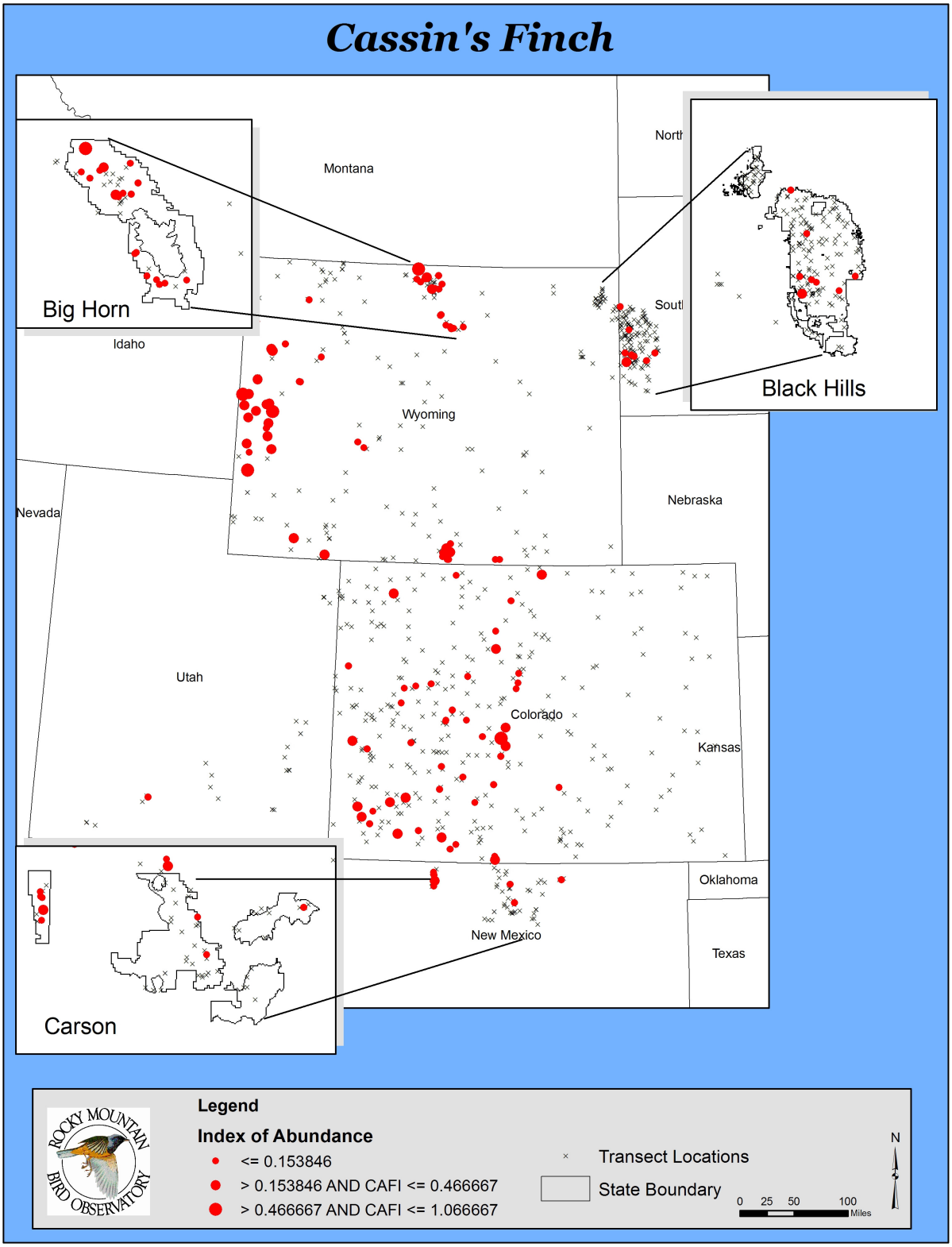
Total number of detections, number of individuals, and habitat-specific density estimates for Cassin's Finches on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
PJ	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 – Cassin's Finch nests in all coniferous forests, but prefers high elevation conifers and is typically found above 7,000 feet during the breeding season (Righter et al. 2004).

Given the specific habitat requirements of Cassin's Finch, it is unlikely that we will be able to monitor the species in any of the habitats that we currently survey in the NCPN.


Cassin's Finch
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Kansas
Nebraska
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.153846
> 0.153846 AND CAFI <= 0.466667
> 0.466667 AND CAFI <= 1.066667
Transect Locations
State Boundary
0 25 50 100
Miles
N
ROCKY MOUNTAIN BIRD OBSERVATORY

Pine Siskin
(*Carduelis pinus*)

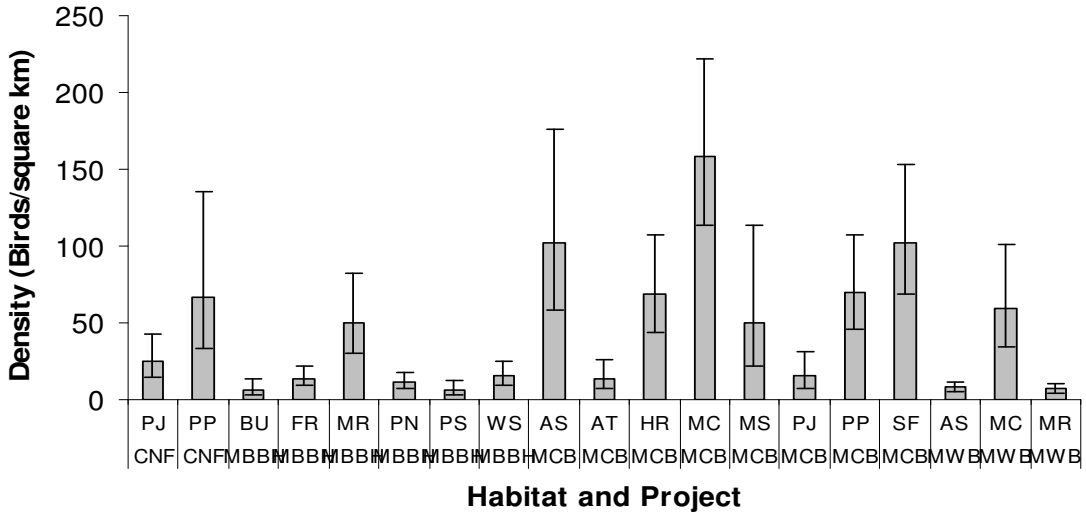
*PIF Species of Regional Importance

In 2005, we detected four individual Pine Siskins in pinyon-juniper habitat on NCPN transects. We detected Pine Siskin on all of our RMBO point-transect monitoring projects and were able to calculate a density estimate in at least one habitat on four projects, but not on NCPN.

Total number of detections, number of individuals, and habitat-specific density estimates for Pine Siskin on the NCPN monitoring project, 2005.

Habitat	D	LCL	UCL	CV	n	N
PJ	ID	--	--	--	--	4

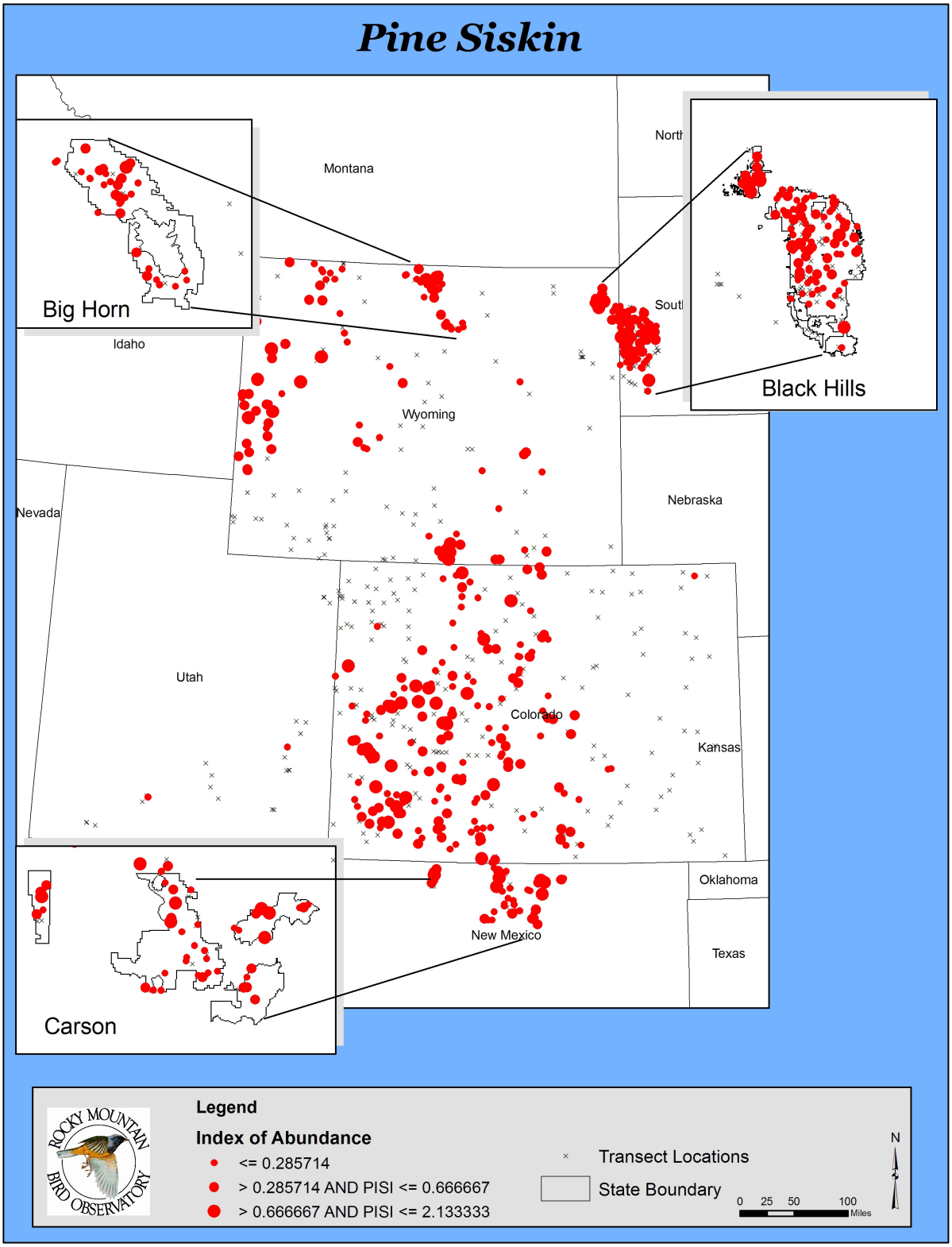
D = Density (birds/square kilometer); LCL = lower 95% confidence interval of the density; UCL = upper 95% confidence interval of the density; CV(%) = coefficient of variation of the density; n = number of independent detections; N = number of individuals; ID = insufficient data.



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

Summary – Pine Siskins nest primarily in spruce-fir forests, but may use a variety of coniferous forests, including pinyon-juniper (Righter et al. 2004).

Given the specific habitat requirements of Pine Siskin, it is unlikely we will be able to monitor the species in any of the habitats that we currently survey in the NCPN.


Pine Siskin
Montana
Idaho
Wyoming
Nevada
Utah
Colorado
Nebraska
Kansas
Oklahoma
Texas
New Mexico
Big Horn
Black Hills
Carson
Legend
Index of Abundance
<= 0.285714
> 0.285714 AND PISI <= 0.666667
> 0.666667 AND PISI <= 2.133333
Transect Locations
State Boundary
0 25 50 100
Miles
N

APPENDIX B. LIST OF ALL BIRD SPECIES OBSERVED DURING POINT-COUNT TRANSECTS IN THE NORTHERN COLORADO PLATEAU NETWORK (NCPN), 2005, WITH MANAGEMENT DESIGNATION AND SPECIES TOTALS.

	Special Management Designation[2]		Total #individuals observed per habitat[3], 2005			
Common Name[1]	PIF	USFWS	LR	PJ	SA	All Habitats
Canada Goose			0	0	12	12
Gadwall			0	0	2	2
Mallard			1	0	1	2
Blue-winged Teal			0	0	1	1
Common Merganser			0	0	6	6
Greater Sage-Grouse	BCR16, BCR10		0	0	19	19
Blue Grouse	BCR16, BCR10		0	0	1	1
Wild Turkey			5	0	0	5
Gambel's Quail			0	9	0	9
Great Blue Heron			1	0	9	10
White-faced Ibis			0	0	1	1
Turkey Vulture			8	5	2	15
Cooper's Hawk			9	5	1	15
Red-tailed Hawk			3	3	7	13
Golden Eagle	BCR16	BCC	0	5	2	7
American Kestrel			2	1	7	10
Peregrine Falcon		BCC	3	0	0	3
Prairie Falcon	BCR16	BCC	0	0	1	1
Killdeer			1	0	3	4
Spotted Sandpiper			0	0	1	1
California Gull			0	0	13	13
Rock Pigeon			0	2	0	2
Mourning Dove			131	194	93	418
Great Horned Owl			3	0	0	3
Common Nighthawk	BCR16		0	1	0	1
White-throated Swift	BCR16, BCR10		348	190	12	550
Black-chinned Hummingbird			33	10	5	48
Broad-tailed Hummingbird	BCR16		27	19	23	69
Williamson's Sapsucker	BCR16, BCR10	BCC	0	1	0	1
Downy Woodpecker			4	1	0	5
Hairy Woodpecker			3	7	2	12
Northern Flicker			9	13	28	50
Olive-sided Flycatcher	BCR16, BCR10		0	2	14	16
Western Wood-Pewee			30	2	9	41
Willow Flycatcher	BCR16, BCR10		0	1	0	1
Gray Flycatcher			2	132	25	159
Dusky Flycatcher	BCR10		4	12	34	50
Cordilleran Flycatcher	BCR16		1	2	0	3
Black Phoebe			5	0	0	5

Common Name[1]	Special Management Designation[2]		Total #individuals observed per habitat[3], 2005			
	PIF	USFWS	LR	PJ	SA	All Habitats
Say's Phoebe	BCR16		43	31	21	95
Ash-throated Flycatcher			156	131	16	303
Western Kingbird			1	1	0	2
Loggerhead Shrike	BCR16, BCR10	BCC	1	2	0	3
Gray Vireo	BCR16	BCC	19	105	7	131
Plumbeous Vireo	BCR16		62	69	16	147
Warbling Vireo	BCR16		23	0	21	44
Gray Jay			0	1	0	1
Steller's Jay			0	0	5	5
Western Scrub-Jay			31	66	16	113
Pinyon Jay	BCR16, BCR10		1	85	30	116
Clark's Nutcracker	BCR16, BCR10		32	10	23	65
Black-billed Magpie	BCR16		2	2	105	109
American Crow			0	7	5	12
Common Raven			37	62	35	134
Horned Lark			0	2	28	30
Tree Swallow			0	0	3	3
Violet-green Swallow	BCR16		199	49	35	283
Northern Rough-winged Swallow			3	1	2	6
Cliff Swallow			21	19	149	189
Barn Swallow			1	0	0	1
Black-capped Chickadee			1	0	0	1
Mountain Chickadee			0	25	9	34
Juniper Titmouse	BCR16		36	105	6	147
Bushtit			59	84	21	164
Red-breasted Nuthatch			0	6	5	11
White-breasted Nuthatch			1	22	4	27
Pygmy Nuthatch	BCR16		0	5	8	13
Rock Wren	BCR16		93	112	104	309
Canyon Wren	BCR16		31	15	2	48
Bewick's Wren		BCC	55	174	11	240
House Wren			44	0	15	59
American Dipper	BCR10		1	0	0	1
Ruby-crowned Kinglet			0	0	4	4
Blue-gray Gnatcatcher			141	166	37	344
Western Bluebird	BCR16		4	4	8	16
Mountain Bluebird	BCR16		5	75	80	160
Townsend's Solitaire	BCR10		0	4	1	5
Hermit Thrush			0	11	4	15
American Robin			18	35	51	104
Sage Thrasher			0	0	93	93
European Starling			0	4	11	15
Orange-crowned Warbler			1	1	0	2
Virginia's Warbler	BCR16	BCC	36	56	26	118

Common Name[1]	Special Management Designation[2]		Total #individuals observed per habitat[3], 2005			
	PIF	USFWS	LR	PJ	SA	All Habitats
Lucy's Warbler			1	0	0	1
Yellow Warbler			147	1	9	157
Yellow-rumped Warbler			5	12	9	26
Black-throated Gray Warbler	BCR16		39	329	32	400
Grace's Warbler	BCR16		0	6	6	12
MacGillivray's Warbler			0	0	3	3
Common Yellowthroat			11	0	1	12
Wilson's Warbler			0	1	0	1
Yellow-breasted Chat			44	1	6	51
Western Tanager			9	18	18	45
Green-tailed Towhee	BCR16		7	15	328	350
Spotted Towhee			254	108	68	430
Chipping Sparrow			15	100	42	157
Brewer's Sparrow	BCR16, BCR10	BCC	2	7	589	598
Black-chinned Sparrow	BCR16		3	4	1	8
Vesper Sparrow			0	9	373	382
Lark Sparrow			9	25	104	138
Black-throated Sparrow	BCR16		55	46	12	113
Sage Sparrow	BCR16		1	0	42	43
Song Sparrow			51	1	10	62
Lincoln's Sparrow			1	0	0	1
Dark-eyed Junco			2	20	18	40
Black-headed Grosbeak			13	4	10	27
Blue Grosbeak			14	0	0	14
Lazuli Bunting			393	3	13	409
Western Meadowlark			3	50	176	229
Brewer's Blackbird			1	1	5	7
Brown-headed Cowbird			14	23	15	52
Bullock's Oriole			4	0	3	7
Cassin's Finch	BCR16, BCR10		0	4	0	4
House Finch			137	141	8	286
Red Crossbill	BCR10		0	1	0	1
Pine Siskin	BCR16		0	4	0	4
Lesser Goldfinch			34	11	0	45
American Goldfinch			4	9	1	14

[1] Common names are from the A.O.U. Check-list of North American Birds, Seventh Edition (2003).
[2] Special management designations: PIF=Partners In Flight (from the Species Assessment Database version 2005 found at www.rmbo.org, for BCR16 and 10); USFWS=U.S. Fish and Wildlife Service, BCC= Bird of Conservation Concern for Region 6.
[3] Habitats: LR=Low-elevation Riparian; PJ=Pinyon-Juniper; SA=Sage Shrubland