Integrated Monitoring in Bird Conservation Regions (IMBCR): 2013 Field Season Report

April 2014

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ROCKY MOUNTAIN BIRD OBSERVATORY

***Mission**: To conserve birds and their habitats*

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

***Core Values**:*

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

RMBO accomplishes its mission by:

- ***Monitoring** long-term bird population trends to provide a scientific foundation for conservation action.*
- ***Researching** bird ecology and population response to anthropogenic and natural processes to evaluate and adjust management and conservation strategies using the best available science.*
- ***Educating** people of all ages through active, experiential programs that create an awareness and appreciation for birds.*
- ***Fostering** good stewardship on private and public lands through voluntary, cooperative partnerships that create win-win situations for wildlife and people.*
- ***Partnering** with state and federal natural resource agencies, private citizens, schools, universities and other non-governmental organizations to build synergy and consensus for bird conservation.*
- ***Sharing** the latest information on bird populations, land management and conservation practices to create informed publics.*
- ***Delivering** bird conservation at biologically relevant scales by working across political and jurisdictional boundaries in western North America.*

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EXECUTIVE SUMMARY

Rocky Mountain Bird Observatory (RMBO), in conjunction with its partners, conducted landbird monitoring for the sixth year in a row as part of a program entitled “Integrated Monitoring in Bird Conservation Regions” (IMBCR). In 2013, IMBCR encompassed three entire states (Colorado, Montana and Wyoming) and portions of nine additional states (Arizona, Idaho, Kansas, North Dakota, Nebraska, New Mexico, Oklahoma, South Dakota, and Texas), two entire USFS Regions (Regions 1 and 2) and portions of Regions 3 and 4, all of the Badlands and Prairies BCR and portions of many other BCRs (Great Basin, Northern Rockies, Prairie Potholes, Southern Rockies/Colorado Plateau, Shortgrass Prairie, Central Mixed-grass Prairie, Sonoran and Mohave Deserts, and Sierra Madre Occidental).

IMBCR uses a spatially balanced sampling design which allows inferences to avian species occurrence and population sizes at various scales, from local management units to entire BCRs or states, facilitating conservation at local and national levels. The sampling design allows for the estimation of density, population size and occupancy for individual strata or biologically meaningful combinations of strata. In the past, these estimates were calculated in several steps, using Programs Distance, Mark and R. In 2012, Paul Lukacs of the University of Montana created an R package that automates the estimation of density and occupancy. In the future, this will reduce data analysis costs and free up time for more in-depth analyses of the IMBCR data.

In 2013, IMBCR Partners completed 1,363 of 1,368 (99.6%) planned surveys. Seven additional unplanned surveys were also completed. Technicians conducted 15,480 point counts within the 1,370 surveyed sampling units between 27 April and 22 July 2013. They recorded over 181,000 individual birds representing 338 species.

To view interactive maps illustrating survey and detection locations, species counts, and density, population and occupancy results, please visit RMBO’s Avian Data Center at http://rmbo.org/v3/avian/ExploretheData.aspx. Instructions for using the Avian Data Center are included in Appendix A of this report and are available on the Avian Data Center itself. Each stratum or combination of strata presented in the results section contains a web link that leads directly to the Avian Data Center with the appropriate queries already populated. Please note that not every stratum or conceivable combinations of strata are summarized in this report. All strata and all biologically meaningful combinations of strata, termed “super strata”, will be found on the Avian Data Center

The IMBCR design provides a spatially consistent and flexible framework for understanding the status and annual changes of bird populations. The collaboration across organizations and spatial scales increased sample sizes, and improved the accuracy and precision of the population estimates. Analyzing the data collectively allowed the estimation of detection probabilities for species that would have otherwise had insufficient numbers of detections at local scales.

The IMBCR program is well positioned to address conservation and management needs for a wide range of stakeholders, landowners and government entities at various spatial scales. By focusing on multiple scales from local management units to BCRs, IMBCR can easily be integrated within an interdisciplinary approach to bird conservation that combines monitoring, research and management. Recently developed habitat analyses and species distribution maps can be used as the basis of decision support tools for avian conservation.

ACKNOWLEDGEMENTS

Many individuals helped make the 2013 field season a success. Stratification and allocation of survey efforts were determined in collaboration with partner agencies and organizations, each of which provided funding or in-kind assistance: US Forest Service; US Bureau of Land Management; US National Park Service, Northern Great Plains Joint Venture; Wyoming Game and Fish Department; Montana Fish, Wildlife and Parks; Colorado Division of Parks and Wildlife; Utah Division of Wildlife Resources, US Fish and Wildlife Service Refuge System, Great Northern Landscape Conservation Cooperative, and Intermountain West Joint Venture. We thank the Avian Science Center, Idaho Bird Observatory and Wyoming Natural Diversity Database for planning and implementing field work in their study areas. Rocky Mountain Bird Observatory's landowner liaison, Jenny Berven, contacted county assessors to determine land ownership of survey locations. We thank Gary White, professor emeritus of Colorado State University, who wrote the initial SAS code and implemented the multi-scale occupancy model in program MARK and Paul Lukacs of the University of Montana who wrote code in program R to automate data analysis for density and occupancy estimates. We thank Jeff Laake for implementing the multi-scale occupancy model in the RMark package which aided in the automation of the analyses. Lance Catron and Craig Pugsley of Custer State Park and the staff at the Creekside Lodge provided excellent training facilities for the northern monitoring effort. We also thank the many field technicians who collected avian and vegetation point count data and contacted private landowners to obtain access to survey locations and establish working relationships for the future. Without the efforts of these technicians and the cooperation of numerous private landowners IMBCR partners would have been unable to conduct avian monitoring on private lands. Finally, this report benefited greatly from review by IMBCR partners.

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ACRONYMS

ASC	Avian Science Center
BCR	Bird Conservation Region
BCR 9	Great Basin Bird Conservation Region
BCR 10	Northern Rockies Bird Conservation Region
BCR 11	Prairie Potholes Bird Conservation Region
BCR 16	Southern Rockies and Colorado Plateau Bird Conservation Region
BCR 17	Badlands and Prairies Bird Conservation Region
BCR 18	Shortgrass Prairie Bird Conservation Region
BCR 19	Central Mixed-grass Prairie Bird Conservation Region
BCR 33	Sonoran and Mohave Deserts Bird Conservation Region
BCR 34	Sierra Madre Occidental Bird Conservation Region
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
DOD	Department of Defense
GRTS	Generalized Random-Tessellation Stratification
IBO	Idaho Bird Observatory
IMBCR	Integrated Monitoring in Bird Conservation Regions
NABCI	North American Bird Conservation Initiative
NCPN	Northern Colorado Plateau Network
NF	National Forest
NG	National Grassland
NGPN	Northern Great Plains Network
NPS	National Park Service
RMBO	Rocky Mountain Bird Observatory
RMNW	Rocky Mountain Network
TNC	The Nature Conservancy
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
WYNDD	Wyoming Natural Diversity Database

INTRODUCTION

Monitoring is an essential component of wildlife management and conservation science (Witmer 2005, Marsh and Trenham 2008). Common goals of population monitoring are to estimate the population status of target species and to detect changes in populations over time (Thompson et al. 1998, Sauer and Knutson 2008). Effective monitoring programs can identify species that are at-risk due to small or declining populations (Dreitz et al. 2006); provide an understanding of how management actions affect populations (Alexander et al. 2008, Lyons et al. 2008); evaluate population responses to landscape alteration and climate change (Baron et al. 2008, Lindenmayer and Likens 2009); as well as provide basic information on species distributions.

While monitoring at local scales remains critical, there is an increasing need to monitor the consequences of environmental change over large spatial and temporal scales and address questions much larger than those that can be answered within individual management units, such as a National Forest (Lindenmayer and Likens 2009). Reconciling disparities between the geographic scale of management actions and the scale of ecological and species-specific responses is a persistent challenge for natural resource management agencies (Ruggiero et al. 1994). Population monitoring of eco-regional landscapes provides an important context for evaluating population change at local and regional scales, with the potential to identify causal factors and management actions for species recovery (Manley et al. 2005, Sauer and Knutson 2008).

Bird Conservation Regions (BCRs) provide a spatially consistent framework for bird conservation in North America (Figure 1) (US North American Bird Conservation Initiative 2007). The BCRs represent distinct ecological regions with similar bird communities, vegetation types and resource management interests (US North American Bird Conservation Initiative 2000). Population monitoring within BCRs can be implemented with a flexible hierarchical framework of nested units, where information on status of bird populations can be partitioned into smaller units for small-scale conservation planning, or aggregated to support large-scale conservation efforts throughout a species' geographic range. By focusing on scales relevant to management and conservation, information obtained from monitoring in BCRs can be integrated into research and management at various scales applicable to land managers (Ruth et al. 2003).

The apparent large-scale declines of avian populations and the loss, fragmentation and degradation of native habitats highlight the need for extensive and rigorous landbird monitoring programs (Rich et al. 2004, US North American Bird Conservation Initiative 2007). Population monitoring helps to achieve the intent of legislation such as the Migratory Bird Treaty Act (1918), National Environmental Policy Act (1969), Endangered Species Act (1973), the National Forest Management Act (1976) and various state laws (Manley et al. 1993, Sauer 1993).

Before monitoring can be used by land managers to guide conservation efforts, sound program designs and analytic methods are necessary to produce unbiased population estimates (Sauer and Knutson 2008). At the most fundamental level, reliable knowledge about the status of avian populations requires accounting for spatial variation and incomplete detection of the target species (Pollock et al. 2002, Rosenstock et al. 2002, Thompson 2002). Addressing spatial variation entails the use of probabilistic sampling designs that allow population estimates to be extended over the entire area of interest (Thompson et al. 1998). Adjusting for incomplete detection involves the use of appropriate sampling and analytic methods to address the fact that few, if any, species are so conspicuous that they are detected with certainty, even when present during a survey (Pollock et al. 2002, Thompson 2002). Accounting for these two sources of

variation ensures observed trends reflect true population changes rather than artifacts of the sampling and observation processes (Pollock et al. 2002, Thompson 2002).

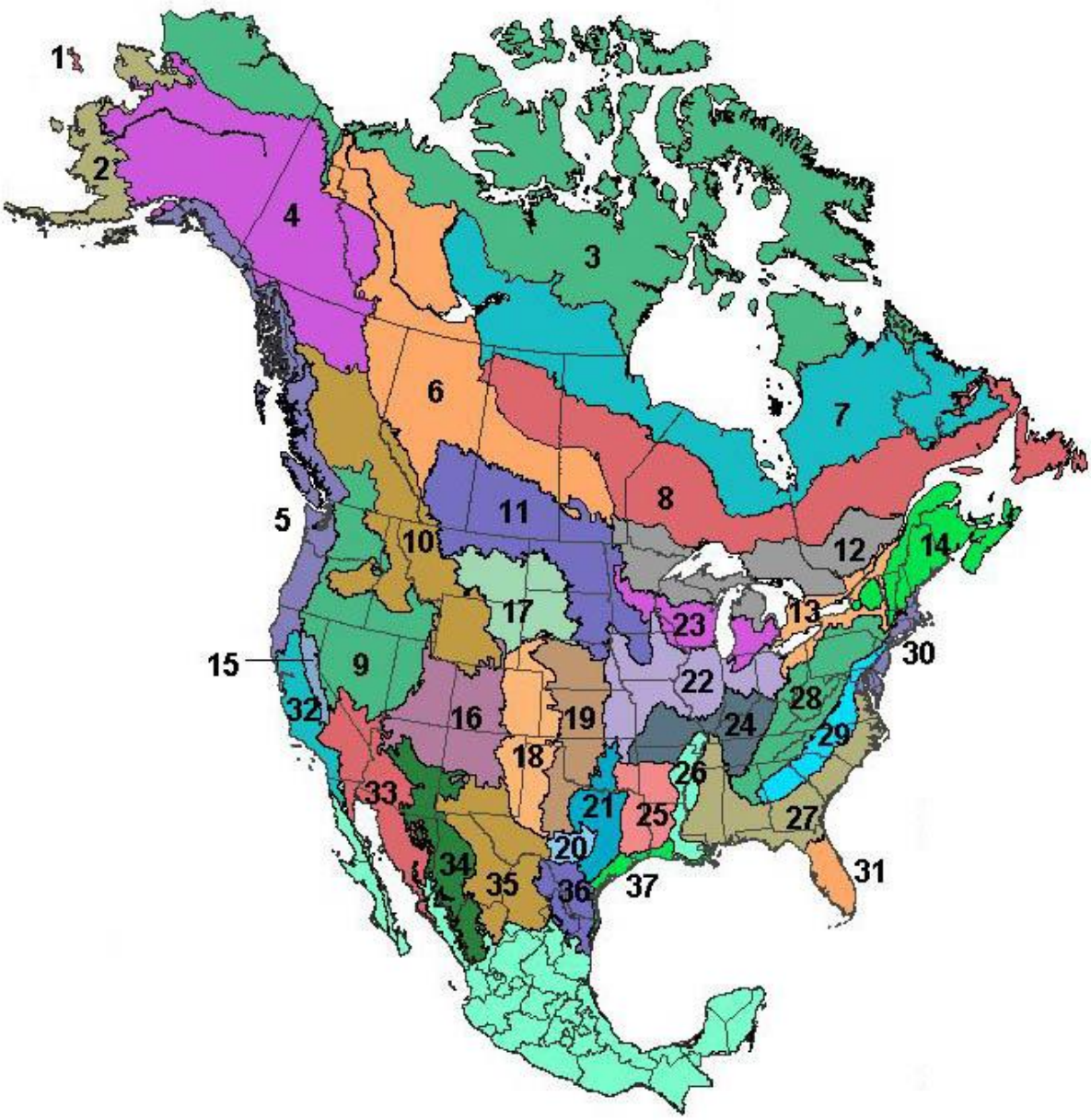

Figure 1. Bird Conservation Regions throughout North America, excluding Hawaii and Mexico (Source: http://www.nabci-us.org/map.html).

The US North American Bird Conservation Initiative's (NABCI) "Opportunities for Improving Avian Monitoring" (US North American Bird Conservation Initiative 2007) provided goals for avian monitoring programs:

> Goal 1: Fully integrate monitoring into bird management and conservation practices and ensure that monitoring is aligned with management and conservation priorities.
>
> Goal 2: Coordinate monitoring programs among organizations and integrate them across spatial scales to solve conservation or management problems effectively.
>
> Goal 3: Increase the value of monitoring information by improving statistical design.
>
> Goal 4: Maintain bird population monitoring data in modern data management systems. Recognize legal, institutional, proprietary and other constraints while still providing greater availability of raw data, associated metadata and summary data for bird monitoring programs.

With the NABCI Monitoring Subcommittee (2007) guidelines in mind, the IMBCR partners designed a broad-scale monitoring program entitled "Integrated Monitoring in Bird Conservation Regions" (IMBCR) (Blakesley and Hanni 2009). Important properties of the IMBCR design are:

- All areas are available for sampling including all vegetation types.
- Strata are based on fixed attributes; this will allow us to relate changes in bird populations to changes on the landscape through time.
- Each state's portion of a BCR can be stratified differently, depending upon local needs and areas to which one wants to make inferences.
- Aggregation of strata-wide estimates to BCR- or state-wide estimates is built into the design.
- Local population trends can be directly compared to regional trends.
- Coordination among partners can reduce the costs and/or increase efficiencies of monitoring per partner.

Using the IMBCR design, the IMBCR partnership monitoring objectives are to:

1. Provide robust density, population and occupancy estimates that account for incomplete detection and are comparable at different geographic extents;
2. Provide long-term status and trend data for all regularly occurring breeding species throughout the study area;
3. Provide a design framework to spatially integrate existing bird monitoring efforts in the region to provide better information on distribution and abundance of breeding landbirds, especially for high priority species;
4. Provide basic habitat association data for most bird species to address habitat management issues;
5. Maintain a high-quality database that is accessible to all of our collaborators as well as to the public over the internet, in the form of raw and summarized data and;
6. Generate decision support tools that help guide conservation efforts and provide a better measure of conservation success.

PROGRAM HISTORY

In 1995 Rocky Mountain Bird Observatory (RMBO), in conjunction with Colorado Parks and Wildlife (CPW; formerly Colorado Division of Wildlife), the United States Forest Service (USFS), the Bureau of Land Management (BLM) and the National Park Service (NPS), began efforts to create and conduct a Colorado-wide program to monitor breeding bird populations. This was the first attempt in the nation to develop and implement a statewide landbird monitoring program. In 1999, after a successful pilot year, RMBO implemented the protocol in 13 habitats in Colorado. This methodology was used for 10 years and efforts expanded to all or parts of Arizona, New Mexico, North Dakota, South Dakota, Utah and Wyoming.

After the US NABCI Monitoring Subcommittee suggested ways to improve bird monitoring efforts in North America in 2007, IMBCR partners considered the NABCI subcommittee suggestions and developed a new protocol for statewide bird monitoring in Colorado. This protocol used BCRs as the sampling frames and stratified by land ownership within each of the BCRs. In 2008 IMBCR partners stratified and surveyed the Southern Rockies/Colorado Plateau BCR (BCR 16) and the Shortgrass Prairie BCR (BCR 18) portions of Colorado, as well as the BCR 16 portion of Wyoming. No samples were surveyed in the Northern Rockies BCR (BCR 10) portion of Colorado that year because of issues getting permission to conduct surveys on private lands.

In 2008, in Colorado BCR 16, we used cell weighting based on Strahler stream order to target higher order rivers and streams, and cell weighting based on elevation to target higher elevation habitats such as Alpine Tundra which occur in a small proportion of the landscape (Blakesley and Hanni 2009). However, IMBCR partners decided after the initial field season that cell weighting had caused middle-elevations in Colorado to be under-sampled. To correct this, all strata in the Colorado and Wyoming portions of BCR 16 were restratified without cell weighting in 2009. Additionally, the All Other lands stratum in Wyoming BCR 16 was split into two strata: All Other lands and BLM lands.

Based on the success and lessons learned from the 2008 pilot implementation, the IMBCR program was expanded in 2009 to include the Colorado and Wyoming portions of BCR 10; the Great Basin (BCR 9) and BCR 18 portions of Wyoming; all of the Badlands and Prairies (BCR 17); the USFS National Forests and Grasslands within BCR 18; and Coconino and Prescott National Forests in the Sierra Madre Occidental (BCR 34).

In 2010, the program expanded to include the BCR 10 and the Prairie Potholes BCR (BCR 11) portions of Montana, three National Forests in the Idaho portion of BCR 10 and Kaibab National Forest in BCRs 16 and 34. Additionally, there were several restratifications done in Colorado BCRs 10 and 16 between 2009 and 2010. The Colorado BCR10 stratum was restratified to include the tiny easternmost portion of BCR 10 that dips into Colorado so that it now represents all of BCR 10 in Colorado. The NPS Rocky Mountain Inventory and Monitoring Network (RMNW) and Northern Colorado Plateau Inventory and Monitoring Network (NCPN) were restratified because under the initial design some NCPN park units were mis-classified into the RMNW stratum. In Wyoming, the USFS Region 4 stratum was restratified into three separate strata: Bridger-Teton National Forest front-country/managed areas, Bridger-Teton National Forest designated roadless/wilderness areas, and the remainder of USFS Region 4 lands in Wyoming BCR 10. This restratification was done to allow for density and occupancy estimation at the National Forest level for the Bridger-Teton National Forest.

In 2011, the geographic extent of the IMBCR program expanded to the Nebraska portion of the Central Mixed-grass Prairie (BCR 19) and included all of the National Forests and Grasslands in Nebraska. Additionally, there were several restratifications done in Colorado. The Colorado BCR 10 stratum was split into two strata: BLM lands and All Other lands. This was done to facilitate better tracking of priority species on BLM lands throughout Colorado. Rio Grande National Forest and White River National Forest strata were each split into three strata: low, medium, and high elevations. This stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forests. The Routt National Forest and Arapaho and Roosevelt National Forests strata were reorganized and a third stratum, the Williams Fork Area, was created from the two, because it is a portion of the Routt National Forest that is managed by the Arapaho and Roosevelt National Forest but falls within the Routt National Forest Plan. The RMNW stratum was restratified to accurately reflect land ownership. There was a land acquisition within Great Sand Dunes National Monument and some samples were removed from Rio Grande National Forest and added to the RMNW stratum; 16 km^2 were added to the area of the RMNW strata. In South Dakota, the Black Hills National Forest stratum was split into two strata based on watersheds in the Forest: Hydrologic Code 7 Watersheds and all other watersheds. This stratification by watershed allows for adjusting sampling intensity to target Management Indicator Species on the Forest.

In 2012, strata were added to the Idaho portion of BCR 10 so that the entirety of this BCR in Idaho was available for sampling. The boundary between USFS Regions 1 and 4 runs through this portion of Idaho and was taken into account when strata were added so that estimates could be generated at the scale of USFS Regions. The new strata include All Other lands in Region 1, All Other lands in Region 4, other USFS lands in Region 1, and USFS designated roadless/wilderness areas within Region 4. In Arizona, Tonto National Forest became a part of the IMBCR survey effort. The forest was stratified into two strata based on elevation to allow for adjusting sampling intensity to target Management Indicator Species on the Forests. Kaibab National Forest was restratified into two strata based on elevation for the same reason. In Montana, several strata were restratified and combined within BCR 17. The three All Other Lands strata were combined with the Tribal Lands stratum into one All Other Lands stratum. The four BLM strata within Montana BCR 17 were combined into one BLM stratum. These strata were collapsed into larger strata to maximize the number of samples conducted within two strata rather than spread them out amongst eight strata.

The first IMBCR sampling grids were created at the state scale and then as the IMBCR program expanded, sampling grids were created at the Bird Conservation Region scale. In response to a growing monitoring program RMBO and partners acknowledged the need for a standard national and even global grid system to promote coordination and application of monitoring data in conservation and proposed the use of the Military Grid Reference System (MRGS)/United States National Grid (USNG) as the standard. There are three advantages of using the US National Grid. First, it provides a means to identify sampled areas in a consistent manner so that results of monitoring projects can be evaluated in a spatially comparable way. Second, and perhaps more important, the use of standard grids allows for the integration of datasets and subsequent identification of areas where sampling should or has not occurred. And third, it facilitates regional and national-level avian distribution modeling and the development of broad-scale avian distribution maps. This standard was approved by the North American Bird Conservation Initiative committee. RMBO started using the USNG for new IMBCR re-stratification schemes in 2013.

Several USFS strata were added to the sampling frame for the 2013 field season – Coronado National Forest in southern Arizona, Carson National Forest in north-central New Mexico, and

Caribou-Targhee National Forest in south-eastern Idaho. Coronado and Carson National Forests were stratified into two strata based on elevation to allow for adjusting sampling intensity to target Management Indicator Species on the Forests. Since Caribou-Targhee National Forest spans 3 states and 3 BCRs, it was necessary to divide the forest into four strata. The state and BCR-level stratification distinctions were made to allow for the summation of the data for individual states or BCRs. These four strata join another Caribou-Targhee stratum created in 2009 in west-central Wyoming as a part of the state-wide effort there. In addition, Pawnee National Grasslands was split into two strata – public lands and private lands – since Pawnee National Grasslands contains a large amount of private land within its borders. This allowed the USFS to concentrate more survey effort specifically on public lands. In Wyoming, a previously existing stratum in BCR 10 containing all USFS Region 4 lands (other than Bridger-Teton National Forest) was restratified into 3 separate strata, one for each Forest (Caribou-Targhee, Ashley, and Wasatch NFs). This will allow for forest-wide estimates within Caribou-Targhee National Forest. If, in the future Ashley and Wasatch National Forests are completely sampled, this will also allow for forest-wide estimates in each of those forests.

In 2013 the North Dakota, South Dakota, and Nebraska portions of BCR 17 underwent a complete restratification to allow for the creation of several NPS Northern Great Plains Inventory and Monitoring Network (NGPN) strata. All of the strata in these states were retained and renamed to avoid confusion, except for the original NPS strata. These strata were broken up so that each NPS unit is now its own stratum (including Knife River Indian Villages National Historic Site, Theodore Roosevelt National Park, Badlands National Park, Jewel Cave National Monument, Mount Rushmore National Monument, and Wind Cave National Park). This will allow the NGPN to monitor birds on each of its units separately.

Nebraska BCR 18 also underwent a complete restratification to allow for the creation of NGPN strata (Agate Fossil Beds National Monument and Scotts Bluff National Monument). In Nebraska, an additional IMBCR stratum was added for Cherry Ranch, a property owned by The Nature Conservancy (TNC).

To read more about the IMBCR program, please refer to the IMBCR page on RMBO's website: http://rmbo.org/v3/OurWork/Science_/BirdPopulationMonitoring/IntegratedMonitoringinBCRs(IMBCR).aspx

METHODS

Study Area

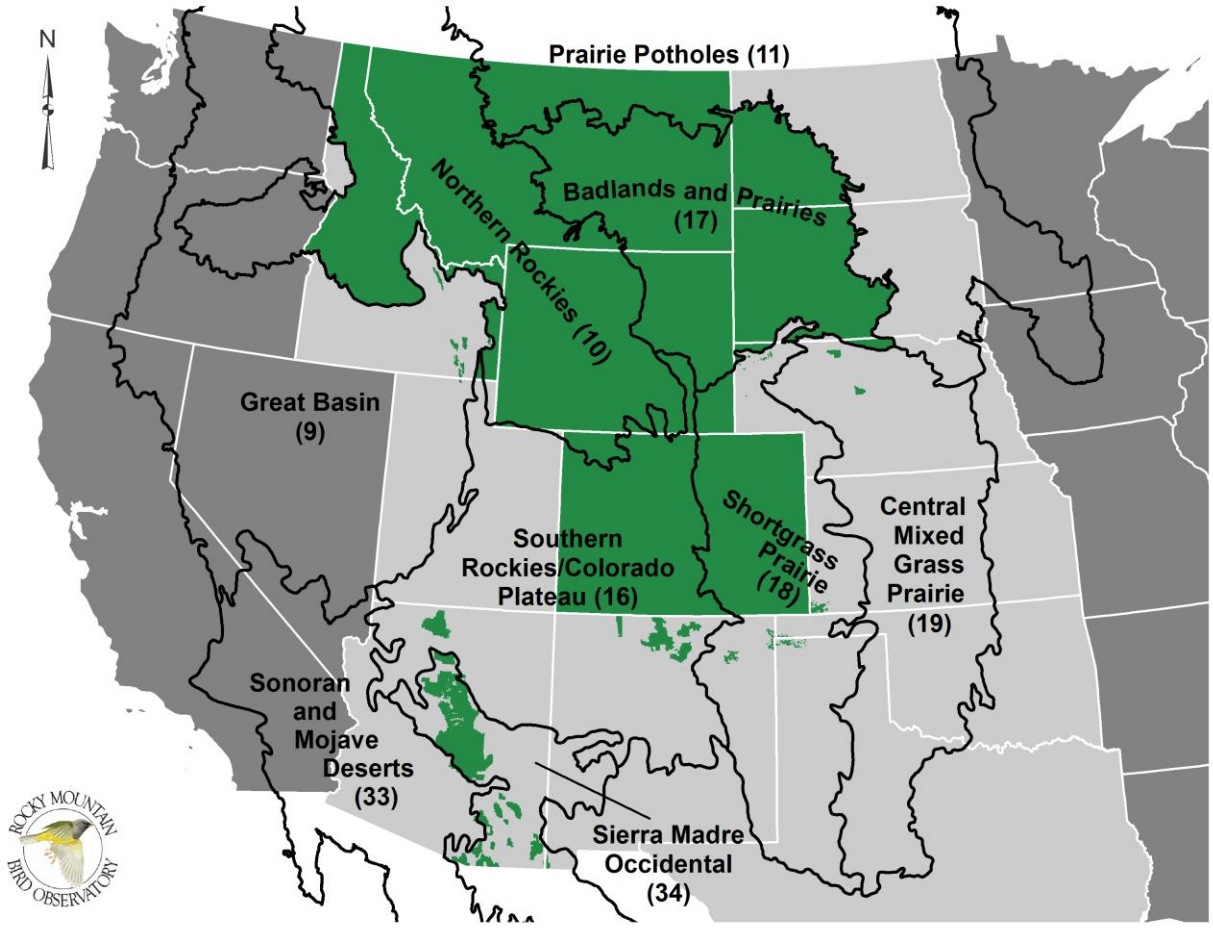

Figure 2. Spatial extent of sampled strata using the IMBCR design, 2013.

BCR 9: Great Basin

The Great Basin Bird Conservation Region is a large area encompassing a wide variety of habitats throughout lowlands and mountains(US North American Bird Conservation Initiative 2000). It is a mostly dry region of grassland and semi-desert shrubland spread across the lowlands and flat country, interspersed with a few marshes and lakes that are very important to shorebirds and waterbirds. At higher elevations Pinyon-Juniper woodlands and Ponderosa Pine forests transition into Lodgepole Pine and sub-alpine fir forests. BCR 9 covers portions of British Columbia, Washington, Oregon, California, Nevada, Idaho, Utah and Wyoming.

This was the third year for IMBCR implementation within BCR 9. The 2013 survey effort in BCR 9 took place within the Wyoming and Idaho portions of Caribou-Targhee National Forest. RMBO conducted surveys within two strata comprising 173 km^2.

BCR 10: Northern Rockies

The Northern Rockies Bird Conservation Region is characterized by high-elevation mountain ranges with mixed conifer forests and intermountain regions dominated by sagebrush steppe

and grasslands (Partners in Flight 2000). Higher elevation forests consist mainly of Ponderosa Pine, Douglas-Fir, Lodgepole Pine, Engelmann Spruce and Subalpine Fir. Tundra occurs at the highest elevations. BCR 10 covers portions of Wyoming, Montana, Idaho, British Columbia, Oregon and small portions of Colorado, Washington and Alberta.

This was the fifth year IMBCR was implemented within BCR 10. RMBO, Idaho Bird Observatory (IBO), Wyoming Natural Diversity Database (WYNDD) and Avian Science Center (ASC) conducted field work throughout the Colorado, Idaho, Montana and Wyoming portions of BCR 10. Surveys were conducted in 62 strata comprising 437,741 km^2.

BCR 11: Prairie Potholes

The Prairie Potholes Bird Conservation Region consists of mixed grass prairie in the west, tall grass prairie in the east and thousands of small wetlands scattered across its geographical extent (US North American Bird Conservation Initiative 2000). About 70% of BCR 11's original grasslands have been converted to agriculture, but large tracts of grassland still exist on larger ranches and on preserved land (Prairie Pothole Joint Venture 2005). BCR 11 covers portions of Montana, North Dakota, South Dakota, Minnesota, Nebraska, Iowa, Alberta, Saskatchewan and Manitoba.

This was the fourth year IMBCR was implemented within BCR 11. Surveys were conducted within the Montana portion of BCR 11, which consisted of 5 strata comprising 83,415 km^2. This field work was completed by ASC.

***BCR 16:* Southern Rockies and Colorado Plateau**

The Southern Rockies and Colorado Plateau Bird Conservation Region is a diverse area ranging from the southern Rocky Mountains in the east to the Wasatch and Uinta mountains in the west. In the center of the region are the tablelands of the Colorado Plateau. Within this region vegetation types transition from shrubsteppe; pinyon-juniper; montane shrubland; mixed conifer and aspen; and alpine tundra with increasing elevation (Parrish et al. 2002). BCR 16 is centered on the Four Corners Region and consists mainly of Colorado, Utah, New Mexico and Arizona, with portions extending into southern Wyoming and Idaho.

This was the sixth year IMBCR was implemented within BCR 16. RMBO and WYNDD conducted surveys across the Colorado and Wyoming portions of BCR 16, as well as the BCR16 portion of Kaibab and Coconino National Forests in Arizona and Carson National Forest in New Mexico. Surveys were conducted in 26 strata comprising 171,511 km^2.

***BCR 17:* Badlands and Prairies**

The Badlands and Prairies Bird Conservation Region is characterized by rolling plains and mixed-grass prairie that contain large, continuous, tracts of intact dry grassland managed predominately as ranchland (US North American Bird Conservation Initiative 2000). The Black Hills and western portions of BCR 17 contain pine and spruce forests at higher elevations. BCR 17 covers portions of five states: Montana; North Dakota; South Dakota; Wyoming and Nebraska.

This was the fifth year IMBCR was implemented within BCR 17. RMBO, ASC and WYNDD conducted surveys throughout the entire BCR in 2013. Surveys were conducted in 36 strata comprising 364,430 km^2.

***BCR 18:* Shortgrass Prairie**

The Shortgrass Prairie Bird Conservation Region is characterized by unique shortgrass prairie. What was once contiguous prairie is now fragmented by agriculture and the remnant grasslands are now exposed to new grazing regimes (Playa Lakes Joint Venture Landbird Team 2007). Numerous playa lakes dot the region and wetlands occur along major river corridors that drain the Rocky Mountains. Because of a change in the hydrology of these rivers, more shrubs and trees have encroached upon the wetlands (US North American Bird Conservation Initiative 2000). BCR 18 stretches north-south in the rain shadow of the Rocky Mountains and covers portions of Colorado, Wyoming, Nebraska, Kansas, Oklahoma, South Dakota, Texas and New Mexico.

This was the sixth year IMBCR was implemented within BCR 18. RMBO conducted surveys throughout the Wyoming and Colorado portions of BCR 18 and USFS lands in the Kansas, Nebraska, New Mexico, Oklahoma and Texas portions of the BCR. Surveys were conducted in 23 strata comprising 128,395 km^2.

***BCR 19:* Central Mixed-grass Prairie**

The Central Mixed-grass Prairie Bird Conservation Region lies between shortgrass prairie to the west and tallgrass prairie to the east (US North American Bird Conservation Initiative 2000). This region consists of a mixture of shortgrass and tallgrass prairie habitats, with some native and hand-planted Ponderosa Pine forests in northwestern Nebraska. BCR 19 runs north-south from the southern border of South Dakota through Nebraska, Kansas and Oklahoma down into north-central Texas.

This was the second year IMBCR was implemented within BCR 19. RMBO conducted surveys in USFS lands throughout BCR 19 in Nebraska. Surveys were conducted in 2 strata comprising 829 km^2.

***BCR 33:* Sonoran and Mohave Deserts**

The Sonoran and Mohave Deserts Bird Conservation Region is an arid region known for creosote, cacti, and other desert shrubs (US North American Bird Conservation Initiative 2000). This BCR covers southeastern California, southern Nevada, southwestern Arizona, and extends south into Mexico.

This was the second year IMBCR was implemented within BCR 33. RMBO conducted surveys in two strata in Tonto National Forest in BCR 33 and BCR 34, covering an area of 11,990 km^2.

***BCR 34:* Sierra Madre Occidental**

The Sierra Madre Occidental Bird Conservation Region contains rugged, high-elevation mountains supporting oak-pine, pine and fir forests and semi-desert shrubland. BCR 34 stretches from the northwest to the southeast covering portions of New Mexico, Arizona and Mexico.

This was the fifth year IMBCR was implemented within BCR 34. RMBO conducted surveys in Coconino, Coronado, Kaibab, and Tonto National Forests within BCR 34. Surveys were conducted in 7 strata comprising 33,117 km^2.

Sampling Design

Sampling Frame and Stratification
The spatial extent of the sampling frame increased from 2008 to 2013 as the number of agencies and organizations participating in the IMBCR program increased (see Program History, above). In 2013, IMBCR encompassed 3 entire states (Colorado, Montana and Wyoming) and portions of 10 additional states (Arizona, Idaho, Kansas, North Dakota, Nebraska, New Mexico, Oklahoma, South Dakota, and Texas), two entire USFS Regions (Regions 1 and 2) and portions of Regions 3 and 4, all of the Badlands and Prairies BCR and portions of many other BCRs (Great Basin, Northern Rockies, Prairie Potholes, Southern Rockies/Colorado Plateau, Shortgrass Prairie, Central Mixed-grass Prairie, Sonoran and Mohave Deserts, and Sierra Madre Occidental; Figure 2).

A key component of the IMBCR design is the ability to derive inferences across spatial scales, from small management units such as individual National Forests or BLM Field Offices to entire states and BCRs. This is accomplished through hierarchical (nested) stratification, which allows data from smaller-order strata to be combined to make inferences about higher-order strata. For example, data from each individual National Forest stratum in USFS Region 2 are combined to produce Region-wide avian population estimates; data from each individual stratum in Montana are combined to produce state-wide estimates; data from each individual stratum in BCR 17 are combined to produce BCR-wide estimates.

Strata were defined based on areas to which IMBCR partners wanted to make inferences. The largest scale strata were defined by the intersection of state and BCR boundaries (e.g., Wyoming BCR 10). The smaller-order strata within BCRs were based on fixed attributes such as land ownership boundaries, elevation zones, major river systems, and wilderness/roadless designations.

Sampling Units
The IMBCR design defined sampling units as 1-km^2 cells, each containing 16 evenly-spaced sample points, 250 meters apart (Figure 3). Potential sampling units were defined by superimposing a uniform grid of cells over each state in the study area. Each cell was assigned to a stratum using ARCGIS versions 9.2 and higher (Environmental Systems Research Institute 2006).

Sample Selection
Within each stratum, the IMBCR design used generalized random-tessellation stratification (GRTS), a spatially-balanced sampling algorithm, to select sample units (Stevens and Olsen 2004). The GRTS design has several appealing properties with respect to long-term monitoring of birds at large spatial scales:

- Spatially-balanced sampling is generally more efficient than simple random sampling of natural resources (Stevens and Olsen 2004). Incorporating information about spatial autocorrelation in the data can increase precision in density estimates;

- All sample units in the sampling frame are ordered, such that any set of consecutively numbered units is a spatially well-balanced sample (Stevens and Olsen 2004). In the case of fluctuating budgets, IMBCR partners can adjust the sampling effort among years within each stratum while still preserving a random, spatially-balanced sampling design.

A minimum of two sampling units were required within each stratum to estimate the variances of population parameters. The remaining allocation of sampling effort among strata was based on the priorities of the funding partners.

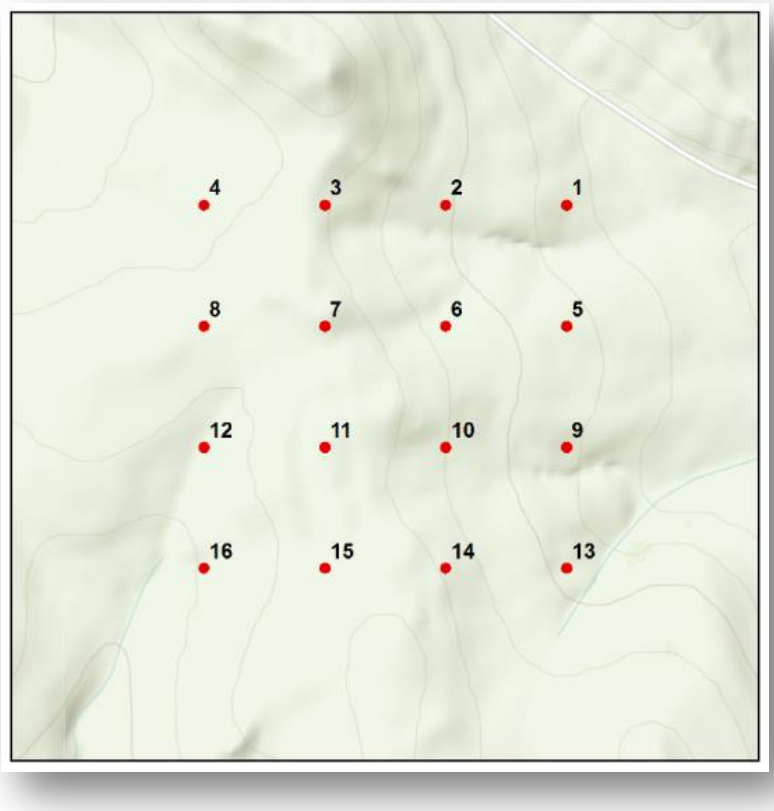

Figure 3. Example 1 km^2 sampling unit using the IMBCR design.

Sampling Methods

IMBCR surveyors with excellent aural and visual bird-identification skills conducted field work in 2013. Prior to conducting surveys, technicians completed an intensive training program to ensure full understanding of the field protocol, to review bird and plant identification, and to practice distance estimation in a variety of habitats. Many field technicians attended a second, shorter mid-season training to review protocol and practice bird and plant identification at high-elevation sites that were inaccessible earlier in the season.

Field technicians conducted point counts (Buckland et al. 2001) following protocols established by IMBCR partners (Hanni et al. 2013). Observers conducted surveys in the morning, beginning ½-hour before sunrise and concluding no later than 5 hours after sunrise. Technicians recorded the start time for every point count conducted. For every bird detected during the six-minute period, observers recorded species, sex; horizontal distance from the observer; minute, type of detection (e.g., call, song, visual), whether the bird was thought to be a migrant, and whether or not the observer was able to visually identify each record.

Observers measured distances to each bird using laser rangefinders when possible. When it was not possible to measure the distance to a bird, observers estimated the distance by measuring to some nearby object. In addition to recording all bird species detected in the area during point counts, surveyors recorded birds flying over but not using the immediate surrounding landscape. Observers also recorded Abert's and red squirrels. While observers traveled between points within a sampling unit they recorded the presence of any species not recorded during a point count that morning. The opportunistic detections of these species are used for distribution mapping purposes only.

Technicians considered all non-independent detections of birds (i.e., flocks or pairs of conspecific birds together in close proximity) as part of a "cluster" rather than as independent observations. Observers recorded the number of birds detected within each cluster along with a letter code to distinguish between multiple clusters.

At the start and end of each survey, observers recorded time, ambient temperature, cloud cover, precipitation and wind speed. Technicians navigated to each point using hand-held Global Positioning System units. Before beginning each six-minute count, surveyors recorded vegetation data (within a 50 m radius of the point). Vegetation data included the dominant habitat type and relative abundance; percent cover and mean height of trees and shrubs by species; as well as grass height and ground cover types. Technicians recorded vegetation data quietly to allow birds time to return to their normal habits prior to beginning each count.

For more detailed information about survey methods and vegetation data collection protocols, refer to RMBO's Field Protocol for Spatially Balanced Sampling of Landbird Populations on our Avian Data Center website at http://rmbo.org/v3/avian/DataCollection.aspx. There you will find links to past and current protocols and data sheets.

Protocol Changes Over Time

The original protocol implemented in 2008 has changed and evolved slightly over time to better facilitate analysis and meet partner needs. In 2009, technicians began recording the primary habitat type at each sample point from a list of habitat options. This was added to facilitate data proofing, to be used in analysis and to link the IMBCR data and results with the habitat-based monitoring program implemented prior to 2008. Technicians also began recording the presence of water and snow within 50m of each point as a type of ground cover that year.

Beginning in 2010, the point count duration was increased from five minutes to six minutes to facilitate occupancy estimation, which is easier to analyze using equal time intervals (in this case, two minutes each). Technicians began recording juvenile birds detected during point counts. Observers placed a "J" in the sex column for these detections. Previously, juvenile birds were not recorded because this study focuses on recording breeding birds. Juvenile bird detections are used for distribution mapping purposes only and are not factored into data analysis. A minute column was added to the bird datasheet so technicians could record the actual minute of each bird detection during a point count. Previously, technicians used tick marks to separate minute intervals. A "visual" checkbox was added to the bird datasheet for technicians to check if they visually observed and identified any of the species recorded. This reminds technicians that they need to look around for birds in addition to listening for them, and helps crew leaders make decisions regarding unusual or rare bird detections while proofing data. Technicians were provided an additional datasheet to record the reasons points were not surveyed (e.g., weather issues, unsafe terrain, denied permission by landowner, etc.), to allow crew leaders to track this information. This sheet also provided space to record additional

landowner information as needed. Lastly, technicians began recording horizontal distance to each flyover detection. In the past, distances were not recorded because flyover detections are not used in analysis. However, technicians occasionally have difficulty distinguishing flyovers from birds using the surrounding habitat while foraging on the wing (e.g., swallows, swifts and raptors). By having technicians record distances for flyovers, the detection data can still be used in analysis if a technician records a bird as a flyover that is later determined to not meet the definition of a true flyover.

During the 2012 field season technicians began recording the start time for every point count conducted so that temporal information could be used as a variable in analyses. Start times for the entire transect and for individual points were all recorded in Mountain Standard Time for consistency across projects. Prior to 2012 technicians were allowed to conduct point counts until 11am each day. In order to account for variability across study areas from Arizona to Montana, technicians were instructed to survey no later than 5 hours after sunrise in 2012. Technicians began noting if species detected on surveys were actually migrants in 2012. If they thought a particular bird was actually a migrant species moving through the study area and not actually breeding in the area, they checked the Migrant box. After the field season the list of species marked as migrants are thoroughly reviewed and those records deemed to be correctly marked as migrants are not included in analyses. In the past technicians were instructed to record birds as male if the bird was singing and it was a warbler, sparrow, or it was singing repeatedly and emphatically. In 2012, technicians were instructed to only identify the sex of a bird if it was a sexually dimorphic species observed visually. Technicians were instructed to record species to the subspecies level only if they visually identified it as such. In the past we used geographic range to assume a bird was of a particular subspecies and recorded it as such. Up until the 2012 field season, technicians were given a list of rare or difficult to detect species to record while traveling between points within a sampling unit. In 2012, in order to simplify the protocol and collect more useful information, technicians were instructed to record any species they came across while traveling between points that they had not documented during a point count. That way, any and all species encountered within the sampling unit would be documented for distribution mapping purposes.

Some data that were recorded in the past were removed from the vegetation data sheet in 2012, including the distance to the nearest road, forest structural stage, and human structures. These types of data are no longer collected in the field because they can be obtained through remote sensing. In the past, if mid-story vegetation was present technicians would record the species found in that layer. These data were found to be extremely variable from year to year, so the data sheet was modified to simply record whether a mid-story was present. A ground cover category for residual grass was added. In the past technicians were instructed to estimate cover to the nearest percent for all categories where percent cover or relative abundance was recorded. The protocol was modified and the acceptable values were limited to 1%, 5%, or increments of 10%. This was done in an attempt to get technicians to estimate cover and relative abundance as consistently as possible.

In 2012 field technicians were given two additional data sheets to facilitate working on private lands. The first contained specific information about the land ownership of each point located within a given sampling unit. In cases where a point fell on private property, the name, contact information, and any pertinent notes about the landowner were provided. The second data sheet was a contact log where technicians recorded all contacts or attempted contacts they had with landowners. This information was later entered into the landowner database when the technician had internet access.

No changes were made to the protocol between the 2012 and 2013 field season.

Data Analysis

Distance Analysis

Distance sampling theory was developed to account for the decreasing probability of detecting an object of interest (e.g., a bird) with increasing distance from the observer to the object (Buckland et al. 2001). The detection probability is used to adjust the count of birds to account for birds that were present but undetected. Application of distance theory requires that three critical assumptions be met: 1) all birds at and near the sampling location (distance = 0) are detected; 2) distances to birds are measured accurately; and 3) birds do not move in response to the observer's presence (Buckland et al. 2001, Thomas et al. 2010). Removal modeling is based on mark-recapture theory; detection probability is estimated based on the number of birds detected during consecutive sampling intervals (Farnsworth et al. 2002). In this design, sampling intervals consist of one minute segments of the six minute sampling period. Removal modeling can also incorporate distance data.

Analysis of distance data includes fitting a detection function to the distribution of recorded distances (Buckland et al. 2001). The distribution of distances can be a function of characteristics of the object (e.g., for birds, size and color, movement, volume of song or call and frequency of call), the surrounding environment (e.g., density of vegetation) and observer ability. Because detectability varies among species, we analyzed these data separately for each species. We attempted to estimate densities of all species detected within the IMBCR program. The development of robust density estimates typically requires 80 or more independent detections ($n \geq 80$) within the entire sampling area. We excluded birds flying over, but not using the immediate surrounding landscape, birds detected while migrating (not breeding), juvenile birds, and birds detected between points from analyses.

We estimated bird densities using the new RIMBCR package in Program R (R Core Team 2012) developed by Paul Lukacs of the University of Montana. RIMBCR streamlined data analysis procedures we had previously completed in multiple steps. RIMBCR calls the raw data from the IMBCR SQL server database maintained by RMBO and outputs final estimates in tabular format. For each species, RIMBCR fit one of three detection functions: global detection functions across years, detection functions modeling year as a covariate, and year-specific detection functions. RIMBCR used Akaike's Information Criterion (AIC) corrected for small sample size (AIC_c) and model selection theory to select the most parsimonious detection function for each species (Burnham and Anderson 2002). RIMBCR incorporated the SPSURVEY package (Kincaid 2008) in Program R to estimate density, population size and confidence intervals for each species. The SPSURVEY package uses spatial information from the survey locations to improve estimates of the variance of density. We computed density estimates for each stratum as well as for aggregations of strata by management unit, landowner, state and BCR. Estimates from multiple strata represent an area-weighted mean.

Occupancy Analysis

Occupancy estimation is most commonly used to quantify the proportion of sample units (i.e., 1-km^2 cells) occupied by an organism (MacKenzie et al. 2002). The application of occupancy modeling requires multiple surveys of the sample unit in space or time to estimate a detection probability (MacKenzie et al. 2006). The detection probability adjusts the proportion of sites occupied to account for species that were present but undetected (MacKenzie et al. 2002). We used a removal design (MacKenzie et al. 2006), to estimate a detection probability for each

species, in which we binned minutes one and two, minutes three and four and minutes five and six to meet the assumption of a monotonic decline in the detection rates through time. After the target species was detected at a point, we set all subsequent sampling intervals at that point to "missing data" (MacKenzie et al. 2006).

The 16 points in each sampling unit served as spatial replicates for estimating the proportion of points occupied within the sampled sampling units. We used a multi-scale occupancy model to estimate 1) the probability of detecting a species given presence (*p*), 2) the proportion of points occupied by a species given presence within sampled sampling units (Theta) and 3) the proportion of sampling units occupied by a species (Psi).

We truncated the data, using only detections less than 125 m from the sample points. Truncating the data at less than 125 m allowed us to use bird detections over a consistent plot size and ensured that the points were independent (points were spread 250 m apart), which in turn allowed us to estimate Theta (the proportion of points occupied within each sampling unit) (Pavlacky et al. 2012).
We expected that regional differences in the behavior, habitat use and local abundance of species would correspond to regional variation in detection and the fraction of occupied points. Therefore, we estimated the proportion of sampling units occupied (Psi) for each stratum by evaluating four models with different structure for detection (*p*) and the proportion of points occupied (Theta). Within these models, the estimates of *p* and Theta were held constant across the BCRs and/or allowed to vary by BCR. Models are defined as follows:

Model 1: Constrained *p* and Theta by holding these parameters constant;
Model 2: Held *p* constant, but allowed Theta to vary across BCRs;
Model 3: Allowed *p* to vary across BCRs, but held Theta constant;
Model 4: Allowed both *p* and Theta to vary across BCRs.

We ran model 1 for species with less than 10 detections in all BCRs or less than 10 detections in all but 1 BCR. We ran models 1 through 4 for species with greater than 10 detections in more than 1 BCR. For the purpose of estimating regional variation in detection (*p*) and availability (Theta), we pooled data for BCRs with fewer than 10 detections into adjacent BCRs with sufficient numbers of detections. We used AIC corrected for small sample size (AIC_c) and model selection theory to evaluate models from which estimates of Psi were derived for each species (Burnham and Anderson 2002). We model averaged the estimates of Psi from models 1 through 4 and calculated unconditional standard errors (Burnham and Anderson 2002).

Our application of the multi-scale model was analogous to a within-season robust design (Pollock 1982) where the two-minute intervals at each point were the secondary samples for estimating *p* and the points were the primary samples for estimating Theta (Nichols et al. 2008, Pavlacky et al. 2012). We considered both *p* and Theta to be nuisance variables that were important for generating unbiased estimates of Psi. Theta can be considered an availability parameter or the probability a species was present and available for sampling at the points (Nichols et al. 2008, Pavlacky et al. 2012).

The new RIMBCR package streamlined occupancy analyses by calling the raw data from the IMBCR SQL server database and incorporating the R code created in previous years. We allowed the input of all data collected in a manner consistent with the IMBCR design to increase the number of detections available for estimating *p* and Theta. The RIMBCR package utilized program MARK (White and Burnham 1999) and package RMark (Laake 2013) to fit the multi-scale occupancy models and to estimate model parameters. We combined stratum-level

estimates of Psi using an area-weighted mean. Sampling variances and standard errors for the combined estimates of Psi were estimated in RIMBCR using the delta method (Powell 2007). We estimated the proportion of sampling units occupied (Psi) for all species that were detected on a minimum of 10 points within 125 m of each point, except in cases where model convergence failed. We did not report occupancy estimates for species occurring on fewer than 10 points because of unreliable model convergence.

RESULTS

In 2013, field technicians completed 1,363 of 1,368 (99.6%) planned surveys throughout all or portions of BCRs 9, 10, 11, 16, 17, 18, 19, 33 and 34 using the IMBCR design (Table 1, Figure 2). Reasons surveys were not completed are summarized in Table 2. Seven additional unplanned surveys were completed throughout the study area in 2013. Technicians conducted 15,480 point counts within the 1,370 surveyed sampling units between 27 April and 22 July 2013. They detected over 181,000 individual birds representing 338 species.

The IMBCR sampling design allows for the estimation of density, population size and occupancy for individual strata or biologically meaningful combinations of strata, termed “super strata”. In the past, these estimates were calculated in several steps, using Programs Distance, Mark and R. In 2012, Paul Lukacs of the University of Montana created an R package that automated the estimation of density and occupancy. In the future, this will reduce data analysis costs and free up time for more in-depth analyses of the IMBCR data (see “Additional Applications of IMBCR data”, below).

All results, including parameter estimates, distribution maps, raw count data, and effort are available online and are not presented in this report. To view interactive maps showing survey and detection locations, species counts, and density, population and occupancy results using the IMBCR study design please visit the Rocky Mountain Avian Data Center at http://rmbo.org/v3/avian/ExploretheData.aspx. Instructions for using the Avian Data Center are included in Appendix A of this report and are available on the Avian Data Center itself. Each stratum or super stratum presented in the Results section contains a web link that leads directly to the Avian Data Center with the appropriate queries already populated. Please note that not every stratum or super stratum was summarized in this report. Results from all strata and all biologically meaningful super strata can be found on the Avian Data Center.

Unless otherwise specified, all bird species names listed in this report are from the American Ornithologists’ Union Check-list of North and Middle American Birds, seventh edition (2007).

Table 1. Planned and completed surveys, by stratum, 2013.

State	BCR	Stratum	Stratum Definition	Collected BY	Area (km2)	Planned	Completed	% Complete
AZ	16/34	AZ-BCR34-CF	Coconino National Forest	RMBO	7,426	50	50	100%
AZ	16/34	AZ-KAIBAB-KH	Kaibab National Forest - High Elevation	RMBO	4,319	18	18	100%
AZ	16/34	AZ-KAIBAB-KL	Kaibab National Forest - Low Elevation	RMBO	2,182	10	10	100%
AZ	33/34	AZ-CORONADO-RH	Coronado National Forest - High Elevation	RMBO	1,652	6	6	100%
AZ	33/34	AZ-CORONADO-RL	Coronado National Forest - Low Elevation	RMBO	5,548	19	19	100%
AZ	33/34	AZ-TONTO-TH	Tonto National Forest - High Elevation	RMBO	1,892	13	13	100%
AZ	33/34	AZ-TONTO-TL	Tonto National Forest - Low Elevation	RMBO	10,098	26	26	100%
				Subtotal	**33,117**	**142**	**142**	**100%**
CO	10	CO-BCR10-AO	All Other Lands	RMBO	5,060	5	5	100%
CO	10	CO-BCR10-BL	Bureau of Land Management	RMBO	4,288	15	15	100%
				Subtotal	**9,348**	**20**	**20**	**100%**
CO	16	CO-BCR16-AO	All Other Lands	RMBO	51,214	25	25	100%
CO	16	CO-BCR16-AR	Arapaho-Roosevelt National Forest	RMBO	6,932	18	18	100%
CO	16	CO-BCR16-BL	Bureau of Land Management	RMBO	27,825	22	22	100%
CO	16	CO-BCR16-GM	Grand Mesa, Uncompahgre and Gunnison National Forests	RMBO	13,630	15	15	100%
CO	16	CO-BCR16-MA	Manti-La Sal National Forest	RMBO	131	2	2	100%
CO	16	CO-BCR16-NC	National Park Service - Northern Colorado Plateau Network	RMBO	807	2	2	100%
CO	16	CO-BCR16-RM	National Park Service - Rocky Mountain Network	RMBO	1,644	2	2	100%
CO	16	CO-BCR16-SC	National Park Service - Southern Colorado Plateau Network	RMBO	214	2	2	100%
CO	16	CO-BCR16-PS	Pike-San Isabel National Forest	RMBO	10,950	15	15	100%
CO	16	CO-BCR16-RA	Rio Grande National Forest - High Elevation	RMBO	866	8	7	88%
CO	16	CO-BCR16-RS	Rio Grande National Forest - Low Elevation[1]	RMBO	1,896	10	10	100%
CO	16	CO-BCR16-RP	Rio Grande National Forest - Middle Elevation	RMBO	5,410	15	15	100%
CO	16	CO-BCR16-RO	Routt National Forest	RMBO	5,734	30	30	100%
CO	16	CO-BCR16-SA	San Juan National Forest	RMBO	8,794	15	15	100%
CO	16	CO-BCR16-WF	USFS - Williams Fork Management Unit	RMBO	551	15	14	93%
CO	16	CO-BCR16-WA	White River National Forest - High Elevation	RMBO	2,138	10	10	100%
CO	16	CO-BCR16-WS	White River National Forest - Low Elevation	RMBO	2,786	15	15	100%
CO	16	CO-BCR16-WP	White River National Forest - Middle Elevation[1]	RMBO	5,443	10	10	100%
				Subtotal	**146,965**	**231**	**229**	**99%**
CO	18	CO-BCR18-IA	Area between I-70 and the Arkansas River	RMBO	34,755	10	10	100%
CO	18	CO-BCR18-PI	Area between the Platte River and I-70	RMBO	30,365	10	10	100%
CO	18	CO-BCR18-NP	Area North of the Platte River	RMBO	11,457	10	10	100%

State	BCR	Stratum	Stratum Definition	Collected BY	Area (km2)	Planned	Completed	% Complete
CO	18	CO-BCR18-SA	Area South of the Arkansas River	RMBO	24,985	10	10	100%
CO	18	CO-BCR18-AR	Arkansas River and Tributaries	RMBO	1,127	10	10	100%
CO	18	CO-BCR18-CO	Comanche National Grassland	RMBO	4,836	10	10	100%
CO	18	CO-BCR18-DO	Department of Defense	RMBO	1,647	2	2	100%
CO	18	CO-BCR18-PC	Pawnee National Grassland - Private Lands	RMBO	2,458	2	2	100%
CO	18	CO-BCR18-PG	Pawnee National Grassland - Public Lands	RMBO	810	8	8	100%
CO	18	CO-BCR18-PT	Platte River and Tributaries	RMBO	970	10	10	100%
				Subtotal	**113,410**	**82**	**82**	**100%**
ID	9	ID-BCR9-CT	Caribou-Targhee National Forest	RMBO	1,940	6	5	83%
ID	10	ID-BCR10-AN	All Other Lands in USFS Region 1	IBO	13,397	9	9	100%
ID	10	ID-BCR10-AS	All Other Lands in USFS Region 4	IBO	29,617	11	11	100%
ID	10	ID-BCR10-CT	Caribou-Targhee National Forest	RMBO	7,752	20	20	100%
ID	10	ID-BCR10-CL	Clearwater National Forest - Roaded/Managed	IBO	1,946	16	16	100%
ID	10	ID-BCR10-CR	Clearwater National Forest - Roadless/Wilderness	IBO	5,036	4	4	100%
ID	10	ID-BCR10-IP	Idaho Panhandle National Forest - Roaded/Managed	IBO	8,660	24	24	100%
ID	10	ID-BCR10-IR	Idaho Panhandle National Forest - Roadless/Wilderness	IBO	3,155	6	6	100%
ID	10	ID-BCR10-NP	Nez Perce National Forest - Roaded/Managed	IBO	2,864	16	16	100%
ID	10	ID-BCR10-NR	Nez Perce National Forest - Roadless/Wilderness	IBO	6,370	4	4	100%
ID	10	ID-BCR10-OF	Other USFS lands in USFS Region 1	IBO	2,137	2	2	100%
ID	10	ID-BCR10-WR	USFS Roadless/Wilderness lands within USFS Region 4	IBO	31,672	2	2	100%
				Subtotal	**112,606**	**114**	**114**	**100%**
ID	16	ID-BCR16-CT	Caribou-Targhee National Forest	RMBO	909	2	2	100%
KS	18	KS-BCR18-CI	Cimarron National Grassland	RMBO	690	5	5	100%
MT	10	MT-BCR10-AO	All Other Lands[1]	ASC	53,215	14	14	100%
MT	10	MT-BCR10-BE	Beaverhead-Deerlodge National Forest - Roaded/Managed	ASC	7,697	8	7	88%
MT	10	MT-BCR10-BR	Beaverhead-Deerlodge National Forest - Roadless/Wilderness	ASC	8,236	2	2	100%
MT	10	MT-BCR10-BI	Bitterroot National Forest - Roaded/Managed	ASC	2,324	8	8	100%
MT	10	MT-BCR10-BW	Bitterroot National Forest - Roadless/Wilderness	ASC	2,763	2	2	100%
MT	10	MT-BCR10-TB	Blackfeet and Crow Reservations	ASC	9,349	2	2	100%
MT	10	MT-BCR10-BM	Bureau of Land Management - Missoula/Butte	ASC	1,356	2	2	100%
MT	10	MT-BCR10-BS	Bureau of Land Management - southwestern Montana	ASC	3,447	6	6	100%
MT	10	MT-BCR10-CU	Custer National Forest - Roaded/Managed	ASC	779	2	2	100%

State	BCR	Stratum	Stratum Definition	Collected BY	Area (km2)	Planned	Completed	% Complete
MT	10	MT-BCR10-CR	Custer National Forest - Roadless/Wilderness	ASC	1,783	2	2	100%
MT	10	MT-BCR10-FW	Fish and Wildlife Service - All Refuges	ASC	359	2	2	100%
MT	10	MT-BCR10-FL	Flathead National Forest - Roaded/Managed[1]	ASC	4,945	8	8	100%
MT	10	MT-BCR10-FR	Flathead National Forest - Roadless/Wilderness	ASC	6,410	2	2	100%
MT	10	MT-BCR10-TF	Flathead Reservation	ASC	5,043	2	2	100%
MT	10	MT-BCR10-GA	Gallatin National Forest - Roaded/Managed	ASC	3,479	8	8	100%
MT	10	MT-BCR10-GR	Gallatin National Forest - Roadless/Wilderness	ASC	5,787	2	2	100%
MT	10	MT-BCR10-HE	Helena National Forest - Roaded/Managed	ASC	3,024	8	8	100%
MT	10	MT-BCR10-HR	Helena National Forest - Roadless/Wilderness	ASC	2,248	2	2	100%
MT	10	MT-BCR10-KO	Kootenai National Forest - Roaded/Managed	ASC	7,239	22	22	100%
MT	10	MT-BCR10-KR	Kootenai National Forest - Roadless/Wilderness	ASC	1,887	6	6	100%
MT	10	MT-BCR10-LC	Lewis and Clark National Forest - Roaded/Managed	ASC	2,778	5	5	100%
MT	10	MT-BCR10-LR	Lewis and Clark National Forest - Roadless/Wilderness	ASC	5,007	3	3	100%
MT	10	MT-BCR10-LO	Lolo National Forest - Roaded/Managed	ASC	7,742	8	8	100%
MT	10	MT-BCR10-LW	Lolo National Forest - Roadless/Wilderness	ASC	3,859	2	2	100%
MT	10	MT-BCR10-NG	National Park Service - Glacier National Park	ASC	3,936	2	2	100%
MT	10	MT-BCR10-RI	Rivers	ASC	3,515	14	14	100%
				Subtotal	**158,207**	**144**	**143**	**99%**
MT	11	MT-BCR11-AO	All Other Lands	ASC	62,631	10	10	100%
MT	11	MT-BCR11-BN	Bureau of Land Management - North Valley	ASC	1,588	2	2	100%
MT	11	MT-BCR11-BO	Bureau of Land Management - Other	ASC	6,826	8	8	100%
MT	11	MT-BCR11-FW	Fish and Wildlife Service - All Refuges and WPA Lands	ASC	541	2	2	100%
MT	11	MT-BCR11-TR	Rocky Boys, Fort Peck, Fort Belknap and Blackfeet Reservations	ASC	11,829	2	2	100%
				Subtotal	**83,415**	**24**	**24**	**100%**
MT	17	MT-BCR17-AO	All Other Lands[2]	ASC	102,779	10	10	100%
MT	17	MT-BCR17-BL	Bureau of Land Management	ASC	25,013	12	12	100%
MT	17	MT-BCR17-CU	Custer National Forest	ASC	2,649	5	5	100%
MT	17	MT-BCR17-FW	Fish and Wildlife Service - All Refuges	ASC	4,035	2	2	100%
MT	17	MT-BCR17-LC	Lewis and Clark National Forest	ASC	867	3	3	100%
MT	17	MT-BCR17-RI	Rivers - Yellowstone, Tongue, Musselshell, and Missouri	ASC	4,575	10	10	100%
				Subtotal	**139,918**	**42**	**42**	**100%**
ND	17	ND-BCR17-OW	All Other Lands	RMBO	48,631	7	7	100%
ND	17	ND-BCR17-BM	Bureau of Land Management	RMBO	165	5	5	100%
ND	17	ND-BCR17-RG	Cedar River National Grassland	RMBO	20	5	5	100%
ND	17	ND-BCR17-KR	Knife River Indian Villages National Historic Site	RMBO	5	5	5	100%

State	BCR	Stratum	Stratum Definition	Collected BY	Area (km2)	Planned	Completed	% Complete
ND	17	ND-BCR17-MG	Little Missouri National Grassland	RMBO	4,133	10	10	100%
ND	17	ND-BCR17-TB	Select Tribal Lands	RMBO	1,768	2	2	100%
ND	17	ND-BCR17-TN	Theodore Roosevelt National Park - North Unit	RMBO	100	7	7	100%
ND	17	ND-BCR17-TS	Theodore Roosevelt National Park - South Unit	RMBO	193	8	8	100%
				Subtotal	**55,015**	**49**	**49**	**100%**
NE	17	NE-BCR17-OW	All Other Lands	RMBO	1,898	2	2	100%
NE	17	NE-BCR17-LG	Oglala National Grassland	RMBO	350	3	3	100%
				Subtotal	**2,248**	**5**	**5**	**100%**
NE	18	NE-BCR18-AF	Agate Fossil Beds National Monument	RMBO	12	6	6	100%
NE	18	NE-BCR18-CR	Cherry Ranch Nature Conservancy Property	RMBO	30	20	20	100%
NE	18	NE-BCR18-RD	Nebraska National Forest - Pine Ridge	RMBO	200	3	3	100%
NE	18	NE-BCR18-GG	Oglala National Grassland	RMBO	31	3	3	100%
NE	18	NE-BCR18-SB	Scotts Bluff National Monument	RMBO	13	6	6	100%
				Subtotal	**286**	**38**	**38**	**100%**
NE	19	NE-BCR19-BE	Nebraska National Forest - Bessey District	RMBO	361	4	4	100%
NE	19	NE-BCR19-SG	Samuel R. McKelvie National Forest	RMBO	468	4	4	100%
				Subtotal	**829**	**8**	**8**	**100%**
NM	16	NM-CARSON-LE	Carson National Forest - Low Elevation	RMBO	3,909	30	30	100%
NM	16	NM-CARSON-MH	Carson National Forest - Medium and High Elevation	RMBO	2,542	20	20	100%
				Subtotal	**6,451**	**50**	**50**	**100%**
NM	18	NM-BCR18-KI	Kiowa National Grassland	RMBO	565	3	3	100%
NM	18	NM-BCR18-RI	Rita Blanca National Grassland	RMBO	473	3	3	100%
				Subtotal	**1,038**	**6**	**6**	**100%**
OK	18	OK-BCR18-RI	Rita Blanca National Grassland	RMBO	187	2	2	100%
SD	17	SD-BCR17-OW	All Other Lands	RMBO	87,072	7	7	100%
SD	17	SD-BCR17-BN	Badlands National Park - North Unit	RMBO	434	15	15	100%
SD	17	SD-BCR17-BS	Badlands National Park - South Unit	RMBO	539	2	2	100%
SD	17	SD-BCR17-BF	Black Hills National Forest - All other Watersheds	RMBO	5,009	64	64	100%
SD	17	SD-BCR17-HU	Black Hills National Forest - Hydrologic Code 7 Watersheds	RMBO	376	34	34	100%
SD	17	SD-BCR17-GG	Buffalo Gap National Grassland	RMBO	2,356	5	5	100%
SD	17	SD-BCR17-BM	Bureau of Land Management	RMBO	831	8	8	100%
SD	17	SD-BCR17-UF	Custer National Forest	RMBO	326	5	5	100%
SD	17	SD-BCR17-PG	Fort Pierre National Grassland	RMBO	482	3	3	100%
SD	17	SD-BCR17-RG	Grand River National Grassland	RMBO	125	5	5	100%

State	BCR	Stratum	Stratum Definition	Collected BY	Area (km2)	Planned	Completed	% Complete
SD	17	SD-BCR17-JC	Jewel Cave National Monument	RMBO	5	5	5	100%
SD	17	SD-BCR17-MR	Mount Rushmore National Monument	RMBO	6	6	6	100%
SD	17	SD-BCR17-TB	Select Tribal Lands	RMBO	5,388	2	2	100%
SD	17	SD-BCR17-WC	Wind Cave National Park	RMBO	136	15	15	100%
				Subtotal	**103,085**	**176**	**176**	**100%**
TX	18	TX-BCR18-RI	Rita Blanca National Grassland	RMBO	526	3	3	100%
UT	9	UT-BCR9-CT	Caribou-Targhee National Forest	RMBO	54	2	2	100%
WY	9	WY-BCR9-WY	Caribou-Targhee National Forest	RMBO	119	2	2	100%
WY	10	WY-BCR10-AO	All Other Lands	RMBO	52,161	10	10	100%
WY	10	WY-BCR10-AS	Ashley National Forest	RMBO	540	2	2	100%
WY	10	WY-BCR10-BH	Bighorn Canyon National Recreation Area	RMBO	57	2	2	100%
WY	10	WY-BCR10-BI	Bighorn National Forest	WYNDD	4,712	10	10	100%
WY	10	WY-BCR10-BE	Bridger-Teton National Forest - Roaded/Managed	RMBO	3,034	17	17	100%
WY	10	WY-BCR10-BR	Bridger-Teton National Forest - Roadless/Wilderness	RMBO	11,364	3	3	100%
WY	10	WY-BCR10-BU	Bureau of Land Management - Buffalo Field Office	RMBO	547	2	2	100%
WY	10	WY-BCR10-CA	Bureau of Land Management - Casper Field Office	RMBO	2,509	2	2	100%
WY	10	WY-BCR10-CO	Bureau of Land Management - Cody Field Office	RMBO	4,704	2	2	100%
WY	10	WY-BCR10-KE	Bureau of Land Management - Kemmerer Field Office	RMBO	5,733	2	2	100%
WY	10	WY-BCR10-LA	Bureau of Land Management - Lander Field Office	RMBO	9,829	2	2	100%
WY	10	WY-BCR10-PI	Bureau of Land Management - Pinedale Field Office	RMBO	3,687	8	8	100%
WY	10	WY-BCR10-RA	Bureau of Land Management - Rawlins Field Office	RMBO	13,954	8	8	100%
WY	10	WY-BCR10-RO	Bureau of Land Management - Rock Springs Field Office	RMBO	15,152	8	8	100%
WY	10	WY-BCR10-WO	Bureau of Land Management - Worland Field Office	RMBO	8,467	2	2	100%
WY	10	WY-BCR10-CT	Caribou-Targhee National Forest	RMBO	1,397	4	3	75%
WY	10	WY-BCR10-GR	Grand Teton National Park	RMBO	856	2	2	100%
WY	10	WY-BCR10-MB	Medicine Bow National Forest	WYNDD	773	3	3	100%
WY	10	WY-BCR10-SE	Shoshone National Forest - Roaded/Managed	RMBO	2,101	20	20	100%
WY	10	WY-BCR10-SR	Shoshone National Forest - Roadless/Wilderness	RMBO	8,311	5	5	100%
WY	10	WY-BCR10-WA	Wasatch National Forest	RMBO	33	2	2	100%
WY	10	WY-BCR10-WR	Wind River Reservation	RMBO	7,819	2	2	100%
WY	10	WY-BCR10-YE	Yellowstone National Park	RMBO	7,592	2	2	100%
				Subtotal	**165,332**	**120**	**119**	**99%**

State	BCR	Stratum	Stratum Definition	Collected BY	Area (km2)	Planned	Completed	% Complete
WY	16	WY-BCR16-AO	All Other Lands	RMBO	5,438	10	10	100%
WY	16	WY-BCR16-BL	Bureau of Land Management	RMBO	647	2	2	100%
WY	16	WY-BCR16-MB	Medicine Bow National Forest	WYNDD	5,329	27	27	100%
WY	16	WY-BCR16-WA	Wasatch National Forest	RMBO	180	2	2	100%
				Subtotal	**11,594**	**41**	**41**	**100%**
WY	17	WY-BCR17-AO	All Other Lands	RMBO	52,186	12	12	100%
WY	17	WY-BCR17-BH	Black Hills National Forest	RMBO	1,085	12	12	100%
WY	17	WY-BCR17-BU	Bureau of Land Management - Buffalo Field Office	RMBO	2,653	2	2	100%
WY	17	WY-BCR17-CA	Bureau of Land Management - Casper Field Office	RMBO	2,695	2	2	100%
WY	17	WY-BCR17-NE	Bureau of Land Management - Newcastle Field Office	RMBO	1,025	2	2	100%
WY	17	WY-BCR17-TB	Thunder Basin National Grassland	WYNDD	4,520	10	10	100%
				Subtotal	**64,164**	**40**	**40**	**100%**
WY	18	WY-BCR18-AO	All Other Lands	RMBO	12,064	10	10	100%
WY	18	WY-BCR18-BL	Bureau of Land Management	RMBO	171	2	2	100%
WY	18	WY-BCR18-DO	Department of Defense	RMBO	23	2	2	100%
				Subtotal	**12,258**	**14**	**14**	**100%**
				Grand Total	**1,223,711**	**1368**	**1363**	**99.6%**

[1]One extra survey was completed in this stratum.
[2]Three extra surveys were completed in this stratum.

Table 2. Reasons planned surveys were not completed, 2013.

Stratum	Reason
CO-BCR16-RA	Technician completed wrong back-up survey
CO-BCR16-WF	Backup too low in elevation to survey
ID-BCR9-CT	Survey site inaccessible (locked gate)
MT-BCR10-BE	Completed, but data never sent in or entered by technician
WY-BCR10-CT	Survey site inaccessible (terrain)

I. Bird Conservation Region 17

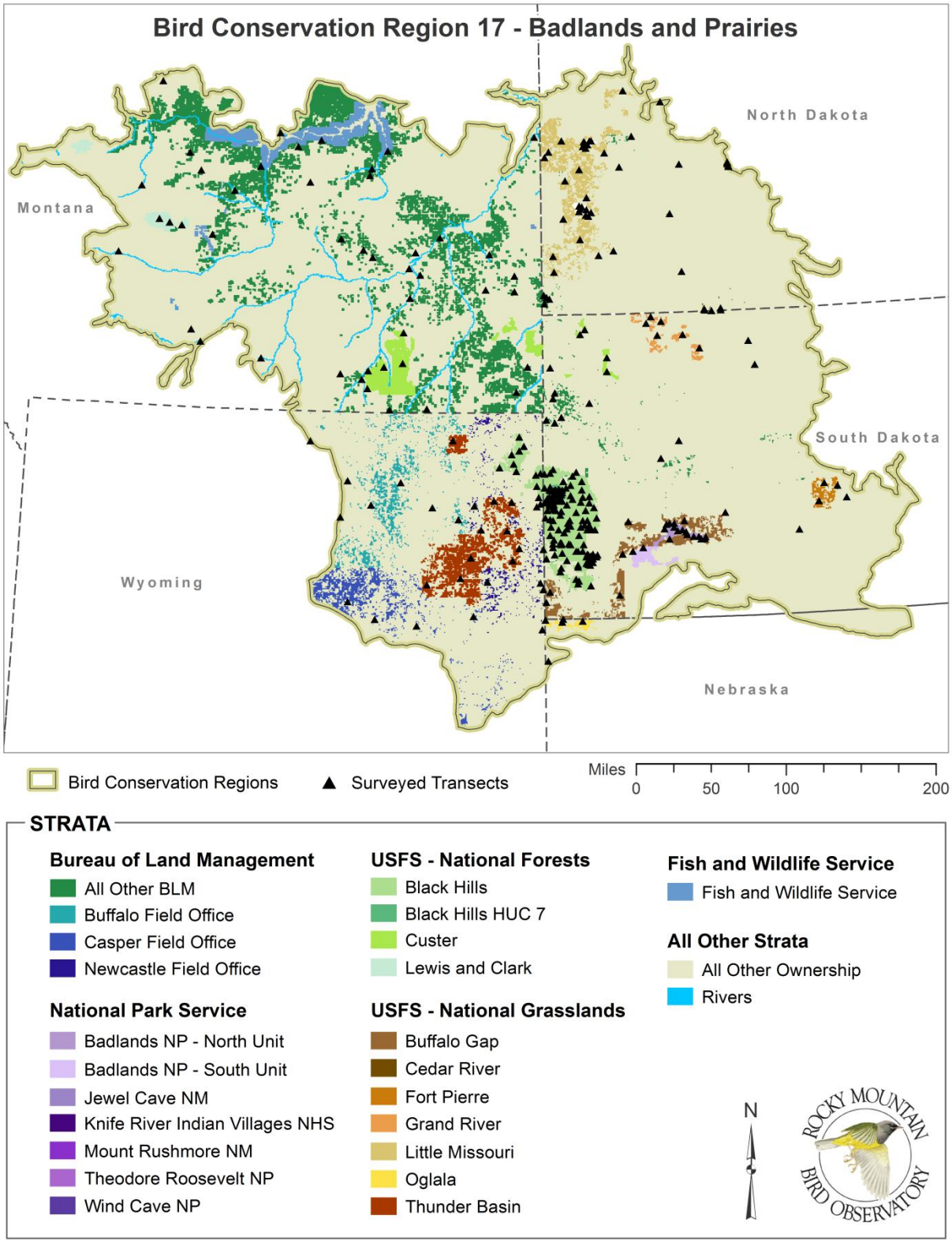

Figure 4. Survey locations in the Badlands and Prairies Bird Conservation Region (BCR 17), 2013.

A. BCR 17: Total

The IMBCR program was expanded in 2009 to include all of the Badlands and Prairies (BCR 17). This is currently the only BCR that is entirely stratified and sampled through this program. There have been several changes made within this BCR to allow for greater efficiency and to provide land managers with more useful data. In 2011, the Black Hills National Forest stratum in South Dakota BCR 17 was split into two strata based on watersheds in the Forest: Hydrologic Code 7 Watersheds and all other watersheds. This stratification by watershed allows for adjusting sampling intensity to target Management Indicator Species on the Forest. In Montana in 2012, several strata were restratified and combined within BCR 17. The three All Other Lands strata were combined with the Tribal Lands stratum into one All Other Lands stratum. The four BLM strata within Montana BCR 17 were combined into one BLM stratum. These strata were collapsed into larger strata to maximize the number of samples conducted within two strata rather than spread them out amongst eight strata.

In 2013 the North Dakota, South Dakota, and Nebraska portions of BCR 17 underwent a complete restratification to allow for the creation of several NPS Northern Great Plains Network (NGPN) strata. During restratification, the new strata were created using the US National Grid, a grid system that covers the entire country. There are three advantages of using the US National Grid. First, it provides a means to identify sampled areas in a consistent manner so that results of monitoring projects can be evaluated in a spatially comparable way. Second, and perhaps more important, the use of standard grids allows for the integration of datasets and subsequent identification of areas where sampling should or has not occurred. And third, it facilitates regional and national-level avian distribution modeling and the development of broad-scale avian distribution maps. All of the strata in these states were retained and renamed to avoid confusion, except for the original NPS strata. These strata were broken up so that each NPS unit is now its own stratum (including Knife River Indian Villages National Historic Site, Theodore Roosevelt National Park, Badlands National Park, Jewel Cave National Monument, Mount Rushmore National Monument, and Wind Cave National Park). This will allow the NGPN to monitor birds on each of its units separately.

Results for BCR 17 were obtained by compiling and jointly analyzing data from 36 strata in 5 states (Figure 4).

Field technicians completed all 312 planned surveys (100%) in 2013. Three extra surveys were also completed in BCR 17. Technicians conducted 3,273 point counts within the 315 surveyed grid cells between 19 May and 13 July. They detected 189 species, including 39 priority species (Appendix B).

RMBO estimated densities and population sizes for 134 species, 33 of which are priority species. The data yielded robust density estimates (CV < 50%) for 58 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BCR 17 for 144 species, 33 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 144 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BCR 17 Results

B. Montana BCR 17

Results for Montana BCR 17 were obtained by compiling and jointly analyzing data from six strata (Figure 4). For statewide results within Montana, refer to Section II: States. For results on BLM, NPS, Tribal and USFS lands within Montana refer to Section III: Land Ownership.

Field technicians completed all 42 planned surveys (100%) in 2013. Three extra surveys were also completed in Montana BCR 17. Technicians conducted 426 point counts within the 45 surveyed grid cells between 22 May and 12 July. They detected 127 species, including 28 priority species (Appendix C).

RMBO estimated densities and population sizes for 94 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for 30 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Montana BCR 17 for 95 species, 16 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 95 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Montana BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 17 Results

C. North Dakota BCR 17

Results for North Dakota BCR 17 were obtained by compiling and jointly analyzing data from eight strata (Figure 4). For results on All Other lands, BLM, NPS and USFS lands within North Dakota refer to section III: Land Ownership.

Field technicians completed all 49 planned surveys (100%) in 2013. Technicians conducted 485 point counts within the 49 surveyed grid cells between 27 May and 4 July. They detected 128 species, including 26 priority species (Appendix C).

RMBO estimated densities and population sizes for 87 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for 16 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout North Dakota BCR 17 for 89 species, 11 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 89 of these species.

To view a map of survey locations, density and occupancy results, and species counts within North Dakota BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

North Dakota BCR 17 Results

D. Nebraska BCR 17

Results for Nebraska BCR 17 were obtained by compiling and jointly analyzing data from two strata (Figure 4). For results on All Other lands and Oglala National Grassland refer to section III: Land Ownership.

Field technicians completed all five planned surveys (100%) in 2013. Technicians conducted 65 point counts within the 5 surveyed grid cells between 3 June and 29 June. They detected 46 species, including 5 priority species (Appendix C).

RMBO estimated densities and population sizes for 38 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 3 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Nebraska BCR 17 for 32 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 32 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Nebraska BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Nebraska BCR 17 Results

E. South Dakota BCR 17

Results for South Dakota BCR 17 were obtained by compiling and jointly analyzing data from 14 strata (Figure 4). For results on All Other lands, BLM, NPS and USFS lands within South Dakota refer to section III: Land Ownership.

RMBO estimated densities and population sizes for 116 species, 9 of which are priority species. The data yielded robust density estimates (CV < 50%) for 42 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout South Dakota BCR 17 for 119 species, 9 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 119 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout South Dakota BCR 17 for 119 species, 9 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 119 of these species.

To view a map of survey locations, density and occupancy results, and species counts within South Dakota BCR 17 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

South Dakota BCR 17 Results

F. Wyoming BCR 17

Results for Wyoming BCR 17 were obtained by compiling and jointly analyzing data from six strata (Figure 4). For additional results within Wyoming, refer to section II: States. For results on BLM, NPS, Tribal and USFS lands within Wyoming refer to section III: Land Ownership.

Field technicians completed all 40 planned surveys (100%) in 2013. Technicians conducted 498 point counts within the 40 surveyed grid cells between 19 May and 11 July. They detected 104 species, including 12 priority species (Appendix C).

RMBO estimated densities and population sizes for 87 species, 10 of which are priority species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Wyoming BCR 17 for 84 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 84 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Wyoming BCR 17 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Wyoming BCR 17 Results

II. States

A. Colorado

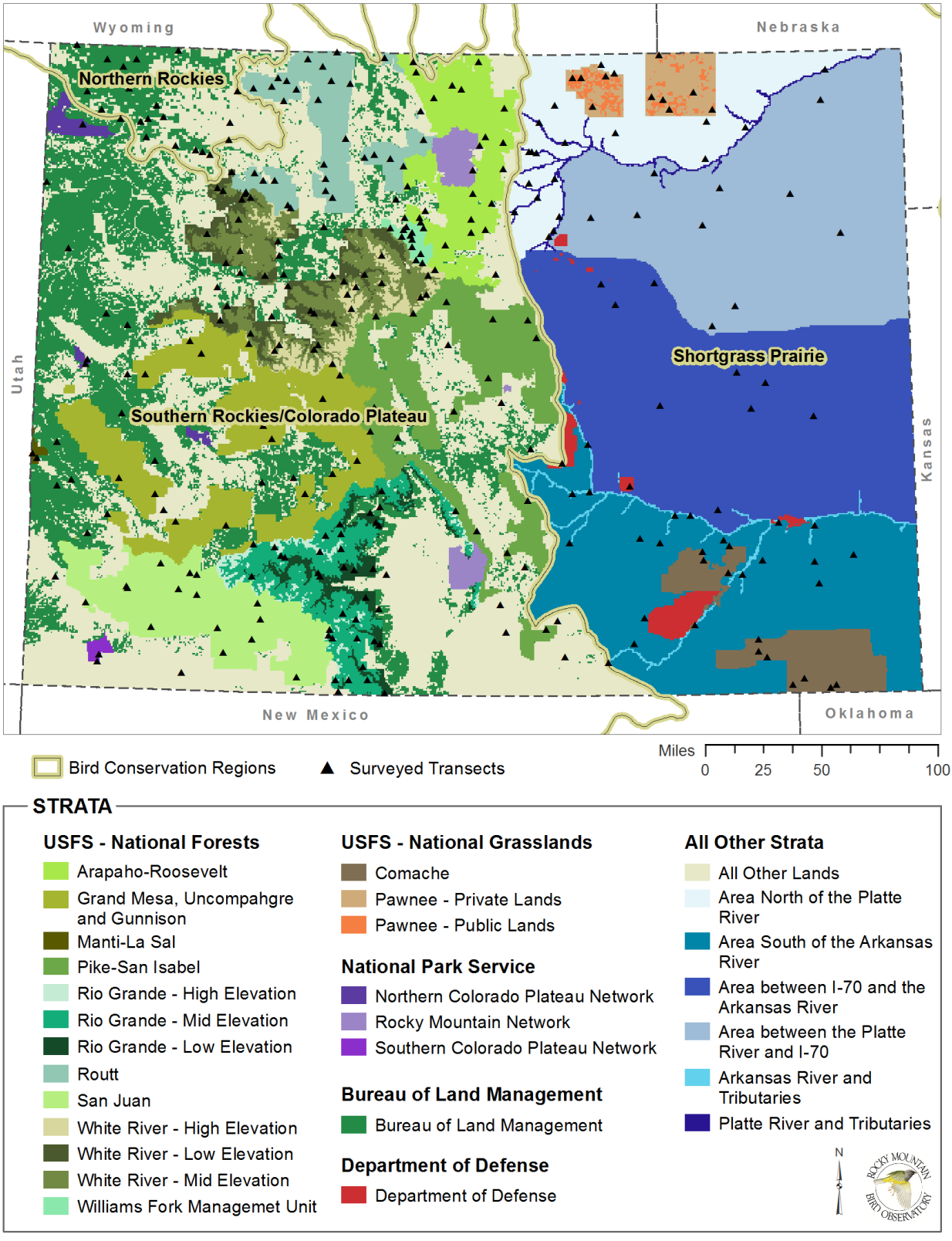

Figure 5. Survey locations in Colorado, 2013.

1. Colorado Statewide

Colorado was the first state to implement the IMBCR design in 2008. In the first season of surveys in Colorado BCR 16 we used cell weighting based on Strahler stream order to target higher order rivers and streams, and cell weighting based on elevation to target higher elevation habitats such as Alpine Tundra which occur in a small proportion of the landscape (Blakesley and Hanni 2009). However, IMBCR partners decided after the initial field season that cell weighting had caused middle-elevations in Colorado to be under-sampled. To correct this, all strata in Colorado BCR 16 were restratified without cell weighting in 2009. No samples were surveyed in the BCR 10 portion of Colorado that year because of issues getting permission to conduct surveys on private lands.

There were several restratifications done in Colorado BCRs 10 and 16 between 2009 and 2010. The Colorado BCR10 stratum was restratified to include the tiny easternmost portion of BCR 10 that dips into Colorado so that it now represents all of BCR 10 in Colorado. The NPS Rocky Mountain Inventory and Monitoring Network (RMNW) and Northern Colorado Plateau Inventory and M Network (NCPN) were restratified because under the initial design some NCPN park units were mis-classified into the RMNW stratum.

In 2011, the Colorado BCR 10 stratum was split into two strata: BLM lands and All Other lands. This was done to facilitate better tracking of priority species on BLM lands throughout Colorado. Rio Grande National Forest and White River National Forest strata were each split into three strata: low, medium, and high elevations. This stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forests. The Routt National Forest and Arapaho and Roosevelt National Forest strata were reorganized and a third stratum, the Williams Fork Area, was created from the two, because it is a portion of the Routt National Forest that is managed by the Arapaho and Roosevelt National Forests but falls within the Routt National Forest Plan. The RMNW stratum was restratified to accurately reflect land ownership. There was a land acquisition within Great Sand Dunes National Monument and some samples were removed from Rio Grande National Forest and added to the RMNW stratum; 16 km^2 were added to the area of the RMNW strata.

In 2013, the Pawnee National Grasslands stratum in BCR 18 was split into two strata – public lands and private lands – since Pawnee National Grasslands contains a large amount of private land within its borders. This allowed the USFS to concentrate more survey effort specifically on public lands.

a) Colorado Statewide: Total

Results for Colorado were obtained by compiling and jointly analyzing data from 30 strata (Figure 5).

Field technicians completed 331 of 333 planned surveys (99%) in 2013. Two extra surveys were also completed in Colorado. Technicians conducted 4,006 point counts within the 333 surveyed grid cells between 13 May and 22 July. They detected 213 species, including 64 priority species (Appendix C).

RMBO estimated densities and population sizes for 157 species, 43 of which are priority species. The data yielded robust density estimates (CV < 50%) for 97 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Colorado for 162 species, 41 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 162 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Colorado across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Colorado Statewide Results

b). All Other Lands in Colorado
Results for All Other Lands in Colorado were obtained by compiling and jointly analyzing data from seven strata (Figure 5).

Field technicians completed all 72 planned surveys (100%) in 2013. Technicians conducted 872 point counts within the 72 surveyed grid cells between 13 May and 9 July. They detected 147 species, including 45 priority species (Appendix C).

RMBO estimated densities and population sizes for 126 species, 34 of which are priority species. The data yielded robust density estimates (CV < 50%) for 48 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Colorado for 125 species, 35 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 125 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Colorado across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Colorado Results

2. Colorado BCR 10

a) Colorado BCR 10: Total
Results for Colorado BCR 10 were obtained by compiling and jointly analyzing data from two strata (Figure 5).

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 295 point counts within the 20 surveyed grid cells between 13 May and 18 June. They detected 85 species, including 24 priority species (Appendix C).

RMBO estimated densities and population sizes for 68 species, 17 of which are priority species. The data yielded robust density estimates (CV < 50%) for 16 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Colorado BCR 10 for 69 species, 17 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 69 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Colorado BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Colorado BCR 10 Results

b) All Other Lands in Colorado BCR 10
Results for All Other Lands in Colorado BCR 10 were obtained by analyzing data from one stratum (Figure 5).

Field technicians completed all five planned surveys (100%) in 2013. Technicians conducted 73 point counts within the 5 surveyed grid cells between 15 May and 6 June. They detected 68 species, including 15 priority species (Appendix C).

RMBO estimated densities and population sizes for 54 species, 12 of which are priority species. The data yielded robust density estimates (CV < 50%) for 5 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Colorado BCR 10 for 55 species, 12 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Colorado BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Colorado BCR 10 Results

3. Colorado BCR 16

a) Colorado BCR 16: Total
Results for Colorado BCR 16 were obtained by compiling and jointly analyzing data from 18 strata (Figure 5).

Field technicians completed 229 of 231 planned surveys (99%) in 2013. Two extra surveys were also completed in Colorado BCR 16. Technicians conducted 2,740 point counts within the 231 surveyed grid cells between 13 May and 22 July. They detected 157 species, including 45 priority species (Appendix C).

RMBO estimated densities and population sizes for 130 species, 33 of which are priority species. The data yielded robust density estimates (CV < 50%) for 77 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Colorado BCR 16 for 133 species, 33 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 133 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Colorado BCR 16 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Colorado BCR 16 Results

b) All Other Lands in Colorado BCR 16
Results for All Other Lands in Colorado BCR 16 were obtained by analyzing data from one stratum (Figure 5).

Field technicians completed all 25 planned surveys (100%) in 2013. Technicians conducted 293 point counts within the 25 surveyed grid cells between 13 May and 9 July. They detected 124 species, including 30 priority species (Appendix C).

RMBO estimated densities and population sizes for 111 species, 24 of which are priority species. The data yielded robust density estimates (CV < 50%) for 31 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Colorado BCR 16 for 111 species, 27 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 51 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Colorado BCR 16 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Colorado BCR 16 Results

4. Colorado BCR 18

a) Colorado BCR 18: Total
Results for Colorado BCR 18 were obtained by compiling and jointly analyzing data from 10 strata (Figure 5). For results on Department of Defense (DOD) and USFS lands within Colorado BCR18 refer to section III: Land Ownership.

Field technicians completed all 82 planned surveys (100%) in 2013. Technicians conducted 971 point counts within the 82 surveyed grid cells between 13 May and 19 June. They detected 148 species, including 33 priority species (Appendix C).

RMBO estimated densities and population sizes for 99 species, 19 of which are priority species. The data yielded robust density estimates (CV < 50%) for 31 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Colorado BCR 18 for 103 species, 18 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 103 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Colorado BCR 18 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Colorado BCR 18 Results

b) Colorado BCR 18 Rivers
Results for Rivers in Colorado BCR 18 were obtained by compiling and jointly analyzing data from two strata (Figure 5).

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 213 point counts within the 20 surveyed grid cells between 13 May and 31 May. They detected 130 species, including 25 priority species (Appendix C).

RMBO estimated densities and population sizes for 84 species, 12 of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Rivers in Colorado BCR 18 for 90 species, 12 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 90 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Rivers in Colorado BCR 18 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Colorado BCR 18 Rivers Results

c) All Other Lands in Colorado BCR 18
Results for All Other Lands in Colorado BCR 18 were obtained by compiling and jointly analyzing data from five strata (Figure 5).

Field technicians completed all 42 planned surveys (100%) in 2013. Technicians conducted 506 point counts within the 42 surveyed grid cells between 13 May and 19 June. They detected 73 species, including 21 priority species (Appendix C).

RMBO estimated densities and population sizes for 55 species, 13 of which are priority species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Colorado BCR 18 for 51 species, 11 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 51 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Colorado BCR 18 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

All Other Lands in Colorado BCR 18 Results

B. Montana

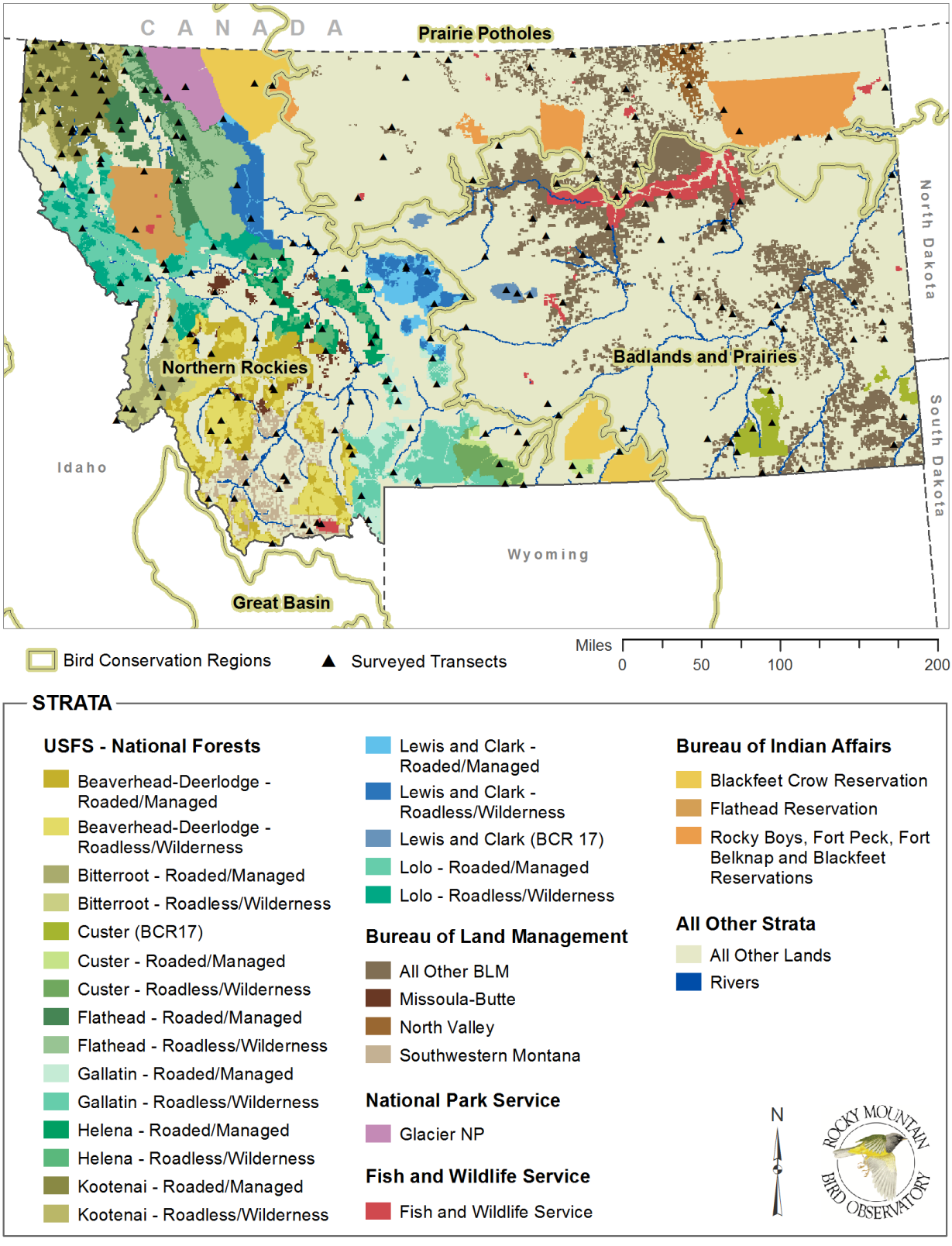

Figure 6. Survey locations in Montana, 2013.

1. Montana Statewide

IMBCR surveys were first conducted in Montana in 2009 within the BCR 17 portion of the state. This was part of the larger sampling effort throughout all of BCR 17. In 2010, the program expanded to include the BCR 10 and the Prairie Potholes BCR (BCR 11) portions of Montana, making it a statewide effort.

In 2012, several strata were restratified and combined within the Montana portion of BCR 17. The three All Other Lands strata were combined with the Tribal Lands stratum into one All Other Lands stratum. The four BLM strata within Montana BCR 17 were combined into one BLM stratum. These strata were collapsed into larger strata to maximize the number of samples conducted within two strata rather than spread them out amongst eight strata.

a) Montana Statewide: Total

Results for Montana were obtained by compiling and jointly analyzing data from 37 strata (Figure 6).

Field technicians completed 209 of 210 planned surveys (99%) in 2013. Five extra surveys were also completed in Montana. Technicians conducted 2,182 point counts within the 214 surveyed grid cells between 22 May and 17 July. They detected 211 species, including 52 priority species (Appendix C).

RMBO estimated densities and population sizes for 145 species, 26 of which are priority species. The data yielded robust density estimates (CV < 50%) for 82 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Montana for 158 species, 30 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 158 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Montana across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Montana Statewide Results

b) All Other Lands in Montana

Results for All Other Lands in Montana were obtained by compiling and jointly analyzing data from three strata (Figure 6).

Field technicians completed all 34 planned surveys (100%) in 2013. Four extra surveys were also completed in All Other Lands in Montana. Technicians conducted 347 point counts within the 38 surveyed grid cells between 22 May and 11 July. They detected 144 species, including 29 priority species (Appendix C).

RMBO estimated densities and population sizes for 112 species, 18 of which are priority species. The data yielded robust density estimates (CV < 50%) for 29 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Montana for 110 species, 19 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 110 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Montana across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Montana Results

2. Montana BCR 10

a) Montana BCR 10: Total

Results for Montana BCR 10 were obtained by compiling and jointly analyzing data from 26 strata (Figure 6). For results on BLM, NPS, Tribal and USFS lands within Montana BCR 10 refer to section III: Land Ownership.

Field technicians completed 143 of 144 planned surveys (99%) in 2013. Two extra surveys were also completed in Montana BCR 10. Technicians conducted 1,558 point counts within the 145 surveyed grid cells between 25 May and 17 July. They detected 192 species, including 43 priority species (Appendix C).

RMBO estimated densities and population sizes for 135 species, 21 of which are priority species. The data yielded robust density estimates (CV < 50%) for 67 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Montana BCR 10 for 147 species, 25 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 147 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Montana BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 10 Results

b) Montana BCR 10 Rivers

Results for Rivers in Montana BCR 10 were obtained by analyzing data from one stratum (Figure 6).

Field technicians completed all 14 planned surveys (100%) in 2013. Technicians conducted 147 point counts within the 14 surveyed grid cells between 1 June and 5 July. They detected 115 species, including 19 priority species (Appendix C).

RMBO estimated densities and population sizes for 94 species, 13 of which are priority species. The data yielded robust density estimates (CV < 50%) for 27 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Rivers in Montana BCR 10 for 99 species, 13 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 48 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Rivers in Montana BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 10 Rivers Results

c) Montana BCR 10 US Fish and Wildlife Service
Results for U.S. Fish and Wildlife Service Lands in Montana BCR 10 were obtained from one stratum (Figure 6).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 28 point counts within the 2 surveyed grid cells between 1 July and 2 July. They detected 39 species, including 1 priority species (Appendix C).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within U.S. Fish and Wildlife Service Lands in Montana BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 10 US Fish and Wildlife Service Results

d) All Other Lands in Montana BCR 10
Results for All Other Lands in Montana BCR 10 were obtained by analyzing data from one stratum (Figure 6).

Field technicians completed all 14 planned surveys (100%) in 2013. One extra survey was also completed in All Other Lands in Montana BCR 10. Technicians conducted 156 point counts within the 15 surveyed grid cells between 31 May and 11 July. They detected 122 species, including 18 priority species (Appendix C).

RMBO estimated densities and population sizes for 95 species, 13 of which are priority species. The data yielded robust density estimates (CV < 50%) for 7 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Montana BCR 10 for 97 species, 14 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 23 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Montana BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Montana BCR 10 Results

3. Montana BCR 11

a) Montana BCR 11: Total

Results for Montana BCR 11 were obtained by compiling and jointly analyzing data from five strata (Figure 6). For results on BLM and Tribal lands within Montana BCR 11 refer to section III: Land Ownership.

Field technicians completed all 24 planned surveys (100%) in 2013. Technicians conducted 198 point counts within the 24 surveyed grid cells between 22 May and 29 June. They detected 81 species, including 13 priority species (Appendix C).

RMBO estimated densities and population sizes for 58 species, 9 of which are priority species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Montana BCR 11 for 49 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 49 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Montana BCR 11 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 11 Results

b) Montana BCR 11 US Fish and Wildlife Service

Results for U.S. Fish and Wildlife Service Lands in Montana BCR 11 were obtained from one stratum (Figure 6).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 20 point counts within the 2 surveyed grid cells between 11 June and 17 June. They detected 21 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within U.S. Fish and Wildlife Service Lands in Montana BCR 11 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 11 US Fish and Wildlife Service Results

c) All Other Lands in Montana BCR 11

Results for All Other Lands in Montana BCR 11 were obtained by analyzing data from one stratum (Figure 6).

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 73 point counts within the 10 surveyed grid cells between 23 May and 29 June. They detected 62 species, including 11 priority species (Appendix C).

RMBO estimated densities and population sizes for 41 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Montana BCR 11 for 35 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 13 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Montana BCR 11 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Montana BCR 11 Results

4. Montana BCR 17

a) Montana BCR 17: Total

Results for Montana BCR 17 were obtained by compiling and jointly analyzing data from 6 strata (Figure 6). For results on USFS and BLM lands within Montana BCR17 refer to section III: Land Ownership.

Field technicians completed all 42 planned surveys (100%) in 2013. Three extra surveys were also completed in Montana BCR 17. Technicians conducted 426 point counts within the 45 surveyed grid cells between 22 May and 12 July. They detected 127 species, including 28 priority species (Appendix C).

RMBO estimated densities and population sizes for 94 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for 30 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Montana BCR 17 for 95 species, 16 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 95 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Montana BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 17 Results

b) Montana BCR 17 Rivers
Results for Rivers in Montana BCR 17 were obtained by analyzing data from one stratum (Figure 6).

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 84 point counts within the 10 surveyed grid cells between 25 May and 9 July. They detected 91 species, including 16 priority species (Appendix C).

RMBO estimated densities and population sizes for 63 species, 8 of which are priority species. The data yielded robust density estimates (CV < 50%) for 17 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Rivers in Montana BCR 17 for 64 species, 7 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 36 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Rivers in Montana BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 17 Rivers Results

c) Montana BCR 17 US Fish and Wildlife Service
Results for U.S. Fish and Wildlife Service Lands in Montana BCR 17 were obtained from one stratum (Figure 6).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 17 point counts within the 2 surveyed grid cells between 22 June and 25 June. They detected 21 species, including 4 priority species (Appendix C).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within U.S. Fish and Wildlife Service Lands in Montana BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Montana BCR 17 US Fish and Wildlife Service Results

d) All Other Lands in Montana BCR 17

Results for All Other Lands in Montana BCR 17 were obtained by analyzing data from one stratum (Figure 6).

Field technicians completed all 10 planned surveys (100%) in 2013. Three extra surveys were also completed in All Other Lands in Montana BCR 17. Technicians conducted 118 point counts within the 13 surveyed grid cells between 22 May and 6 July. They detected 84 species, including 13 priority species (Appendix C).

RMBO estimated densities and population sizes for 62 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 16 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Montana BCR 17 for 58 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 58 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Montana BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Montana BCR 17 Results

C. Wyoming

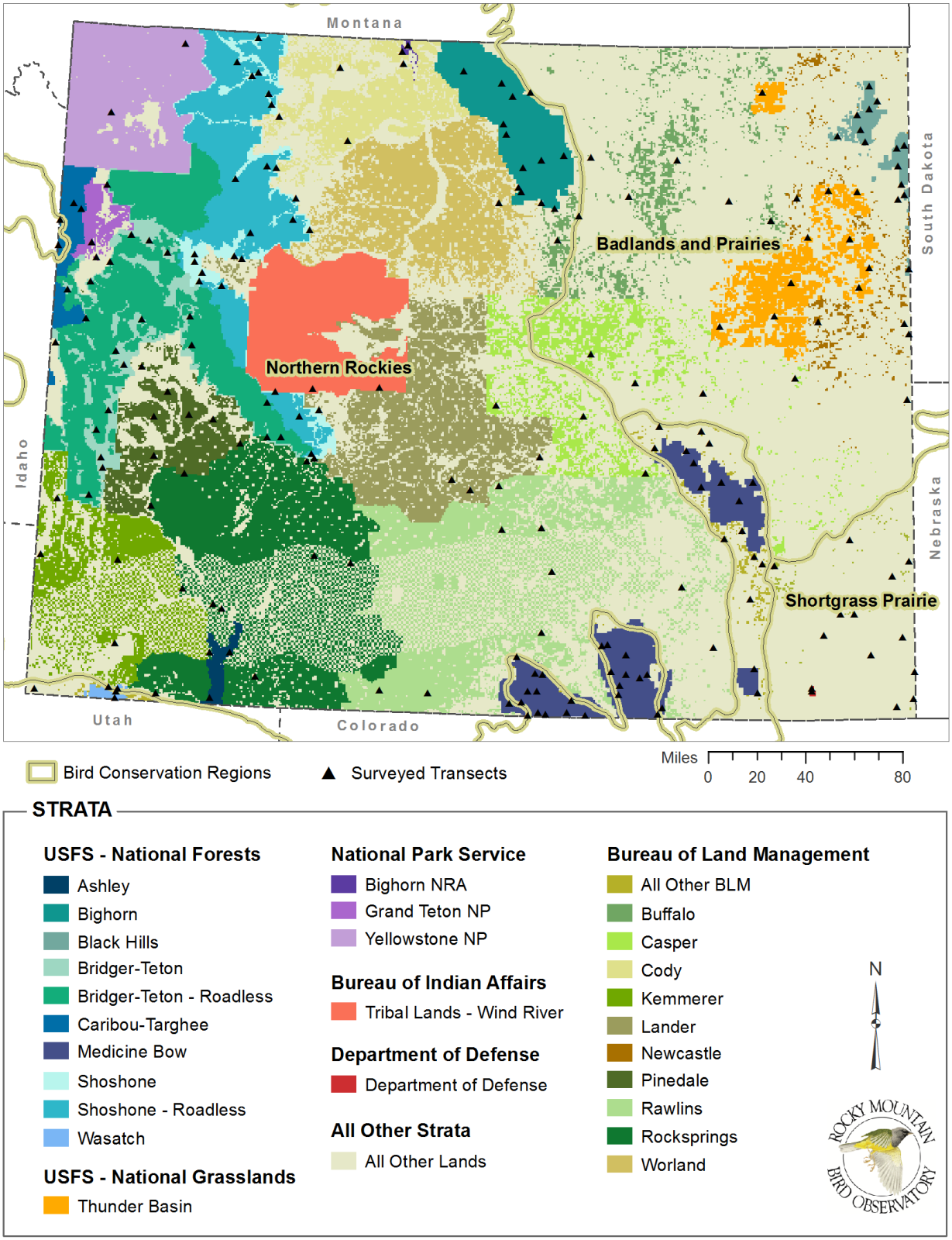

Figure 7. Survey locations in Wyoming, 2013.

1. Wyoming Statewide

In 2008, the Wyoming portion of BCR 16 was sampled under the IMBCR design as a part of the pilot effort in Colorado. That year we used cell weighting based on Strahler stream order to target higher order rivers and streams, and cell weighting based on elevation target to higher elevation habitats such as Alpine Tundra which occur in a small proportion of the landscape (Blakesley and Hanni 2009). However, IMBCR partners decided after the initial field season that cell weighting had caused middle-elevations to be under-sampled. To correct this, all strata in the Colorado and Wyoming portions of BCR 16 were restratified without cell weighting in 2009. Additionally, the All Other lands stratum in Wyoming BCR 16 was split into two strata: All Other lands and BLM lands.

The IMBCR program was expanded in 2009 to include the entire state of Wyoming. Most of the strata in Wyoming have remained unchanged since then. In 2010, the USFS Region 4 stratum in Wyoming BCR 10 was restratified into three separate strata: Bridger-Teton National Forest front-country/managed areas, Bridger-Teton National Forest designated roadless/wilderness areas, and the remainder of USFS Region 4 lands in Wyoming BCR 10. Later, in 2013, the remainder of USFS Region 4 was split out into 3 separate strata, one for each remaining National Forest (Caribou-Targhee, Ashley, and Wasatch). This restratification was done to allow for density and occupancy estimation at the National Forest level within Wyoming for these USFS Region 4 Forests.

a) Wyoming Statewide: Total

Statewide results for Wyoming were obtained by compiling and jointly analyzing data from 37 strata (Figure 7).

Field technicians completed 216 of 217 planned surveys (99%) in 2013. Technicians conducted 2,814 point counts within the 216 surveyed grid cells between 18 May and 19 July. They detected 172 species, including 24 priority species (Appendix C).

RMBO estimated densities and population sizes for 137 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for 62 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Wyoming for 138 species, 14 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 138 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Wyoming across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Wyoming Statewide Results

b) All Other Lands in Wyoming

Results for All Other Lands in Wyoming were obtained by compiling and jointly analyzing data from four strata (Figure 7).

Field technicians completed all 42 planned surveys (100%) in 2013. Technicians conducted 453 point counts within the 42 surveyed grid cells between 18 May and 24 June. They detected 124 species, including 15 priority species (Appendix C).

RMBO estimated densities and population sizes for 101 species, 10 of which are priority species. The data yielded robust density estimates (CV < 50%) for 26 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Wyoming for 99 species, 9 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 99 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Wyoming across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Wyoming Results

2. Wyoming BCR 10

a) Wyoming BCR 10: Total

Results for Wyoming BCR 10 were obtained by compiling and jointly analyzing data from 23 strata (Figure 7). For results on BLM, NPS, Tribal and USFS lands within Wyoming BCR 10 refer to section III: Land Ownership.

Field technicians completed 119 of 120 planned surveys (99%) in 2013. Technicians conducted 1,616 point counts within the 119 surveyed grid cells between 28 May and 18 July. They detected 151 species, including 20 priority species (Appendix C).

RMBO estimated densities and population sizes for 118 species, 10 of which are priority species. The data yielded robust density estimates (CV < 50%) for 45 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Wyoming BCR 10 for 120 species, 12 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 120 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Wyoming BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Wyoming BCR 10 Results

b) All Other Lands in Wyoming BCR 10

Results for All Other Lands in Wyoming BCR 10 were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 84 point counts within the 10 surveyed grid cells between 30 May and 21 June. They detected 83 species, including 11 priority species (Appendix C).

RMBO estimated densities and population sizes for 65 species, 7 of which are priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 10 for 63 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 20 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Wyoming BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Wyoming BCR 10 Results

3 Wyoming BCR 16

a) Wyoming BCR 16: Total

Results for the Wyoming portion of BCR 16 were obtained by compiling and jointly analyzing data from four strata (Figure 7). For results on BLM and USFS lands within Wyoming BCR 16 refer to section III: Land Ownership.

Field technicians completed all 41 planned surveys (100%) in 2013. Technicians conducted 531 point counts within the 41 surveyed grid cells between 30 May and 19 July. They detected 100 species, including 8 priority species (Appendix C).

RMBO estimated densities and population sizes for 90 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 40 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Wyoming BCR 16 for 92 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 92 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Wyoming BCR 16 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Wyoming BCR 16 Results

b) All Other Lands in Wyoming BCR 16

Results for All Other Lands in Wyoming BCR 16 were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 122 point counts within the 10 surveyed grid cells between 9 June and 24 June. They detected 60 species, including 6 priority species (Appendix C).

RMBO estimated densities and population sizes for 48 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 8 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 16 for 49 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 17 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Wyoming BCR 16 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Wyoming BCR 16 Results

4. Wyoming BCR 17

a) Wyoming BCR 17: Total

Results for Wyoming BCR 17 were obtained by compiling and jointly analyzing data from six strata (Figure 7). For results on BLM and USFS lands within Wyoming BCR 17, refer to section III: Land Ownership.

Field technicians completed all 40 planned surveys (100%) in 2013. Technicians conducted 498 point counts within the 40 surveyed grid cells between 19 May and 11 July. They detected 104 species, including 12 priority species (Appendix C).

RMBO estimated densities and population sizes for 87 species, 10 of which are priority species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Wyoming BCR 17 for 84 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 84 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Wyoming BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Wyoming BCR 17 Results

b) All Other Lands in Wyoming BCR 17

Results for All Other Lands in Wyoming BCR 17 were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed all 12 planned surveys (100%) in 2013. Technicians conducted 139 point counts within the 12 surveyed grid cells between 22 May and 11 June. They detected 80 species, including 8 priority species (Appendix C).

RMBO estimated densities and population sizes for 67 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 17 for 64 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 24 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Wyoming BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Wyoming BCR 17 Results

5. Wyoming BCR 18

a) Wyoming BCR 18: Total

Results for Wyoming BCR 18 were obtained by compiling and jointly analyzing data from three strata (Figure 7). For results on BLM, and DOD lands within Wyoming BCR 18 refer to section III: Land Ownership.

Field technicians completed all 14 planned surveys (100%) in 2013. Technicians conducted 157 point counts within the 14 surveyed grid cells between 18 May and 13 June. They detected 61 species, including 6 priority species (Appendix C).

RMBO estimated densities and population sizes for 50 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 4 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Wyoming BCR 18 for 45 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 45 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Wyoming BCR 18 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Wyoming BCR 18 Results

b) All Other Lands in Wyoming BCR 18

Results for All Other Lands in Wyoming BCR 18 were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 108 point counts within the 10 surveyed grid cells between 18 May and 12 June. They detected 53 species, including 5 priority species (Appendix C).

RMBO estimated densities and population sizes for 45 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 4 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 18 for 41 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 9 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Wyoming BCR 18 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Wyoming BCR 18 Results

III. Land Ownership

A. All Other Lands

This section contains results for All Other Lands sampled in states that do not have full IMBCR coverage across the entire state. Results for All Other Lands strata within Colorado, Montana, and Wyoming are reported in Section II: States.

1. All Other Lands in Idaho BCR 10

Results for All Other Lands in Idaho BCR 10 were obtained by compiling and jointly analyzing data from two strata.

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 198 point counts within the 20 surveyed grid cells between 31 May and 7 July. They detected 130 species, including 12 priority species (Appendix C).

RMBO estimated densities and population sizes for 98 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 39 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in Idaho BCR 10 for 101 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 98 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in Idaho BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Idaho BCR 10 Results

2. All Other Lands in Nebraska BCR 17
Results for All Other Lands in Nebraska BCR 17 were obtained from one strata.

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 26 point counts within the 2 surveyed grid cells between 10 June and 29 June. They detected 36 species, including 3 priority species (Appendix C).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in North Dakota BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in Nebraska BCR 17 Results

3. All Other Lands in North Dakota BCR 17
Results for All Other Lands in North Dakota BCR 17 were obtained by compiling and jointly analyzing data from two strata.

Field technicians completed all nine planned surveys (100%) in 2013. Technicians conducted 59 point counts within the 9 surveyed grid cells between 4 June and 3 July. They detected 78 species, including 12 priority species (Appendix C).

RMBO estimated densities and population sizes for 58 species, 7 of which are priority species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in North Dakota BCR 17 for 58 species, 7 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 58 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in North Dakota BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in North Dakota BCR 17 Results

4. All Other Lands in South Dakota BCR 17
Results for All Other Lands in South Dakota BCR 17 were obtained by compiling and jointly analyzing data from two strata.

Field technicians completed all nine planned surveys (100%) in 2013. Technicians conducted 94 point counts within the 9 surveyed grid cells between 23 May and 3 July. They detected 63 species, including 4 priority species (Appendix C).

RMBO estimated densities and population sizes for 54 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout All Other Lands in South Dakota BCR 17 for 51 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 51 of these species.

To view a map of survey locations, density and occupancy results, and species counts within All Other Lands in South Dakota BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

All Other Lands in South Dakota BCR 17 Results

B. Bureau of Land Management

1. BLM in Colorado

a) BLM in Colorado: Total

Results for BLM Lands in Colorado were obtained by compiling and jointly analyzing data from two strata (Figure 5).

Field technicians completed all 37 planned surveys (100%) in 2013. Technicians conducted 493 point counts within the 37 surveyed grid cells between 13 May and 27 June. They detected 107 species, including 5 priority species (Appendix D).

RMBO estimated densities and population sizes for 84 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 36 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Colorado for 84 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 84 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Colorado across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Colorado Results

b) BLM in Colorado BCR 10

Results for BLM Lands in Colorado BCR 10 were obtained by analyzing data from one stratum (Figure 5).

Field technicians completed all 15 planned surveys (100%) in 2013. Technicians conducted 222 point counts within the 15 surveyed grid cells between 13 May and 18 June. They detected 62 species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 47 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 17 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Colorado BCR 10 for 47 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 20 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Colorado BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Colorado BCR 10 Results

c) BLM in Colorado BCR 16
Results for BLM Lands in Colorado BCR 16 were obtained by analyzing data from one stratum (Figure 5).

Field technicians completed all 22 planned surveys (100%) in 2013. Technicians conducted 271 point counts within the 22 surveyed grid cells between 26 May and 27 June. They detected 93 species, including 2 priority species (Appendix D).

RMBO estimated densities and population sizes for 79 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 32 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Colorado BCR 16 for 79 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 39 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Colorado BCR 16 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Colorado BCR 16 Results

2. BLM in Montana

a) BLM in Montana: Total
Results for BLM Lands in Montana were obtained by compiling and jointly analyzing data from five strata (Figure 6).

Field technicians completed all 30 planned surveys (100%) in 2013. Technicians conducted 315 point counts within the 30 surveyed grid cells between 22 May and 3 July. They detected 115 species, including 9 priority species (Appendix D).

RMBO estimated densities and population sizes for 91 species, 8 of which are priority species. The data yielded robust density estimates (CV < 50%) for 29 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Montana for 88 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 88 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Montana across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Montana Results

b) BLM in Montana BCR 10

Results for BLM Lands in Montana BCR 10 were obtained by compiling and jointly analyzing data from two strata (Figure 6).

Field technicians completed all eight planned surveys (100%) in 2013. Technicians conducted 92 point counts within the 8 surveyed grid cells between 31 May and 3 July. They detected 78 species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 60 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 17 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Montana BCR 10 for 62 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 62 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Montana BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Montana BCR 10 Results

c) BLM in Montana BCR 11

Results for BLM Lands in Montana BCR 11 were obtained by compiling and jointly analyzing data from two strata (Figure 6).

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 87 point counts within the 10 surveyed grid cells between 22 May and 27 June. They detected 63 species, including 6 priority species (Appendix D).

RMBO estimated densities and population sizes for 45 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Montana BCR 11 for 38 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 38 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Montana BCR 11 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Montana BCR 11 Results

d) BLM in Montana BCR 17

Results for BLM Lands in Montana BCR 17 were obtained by analyzing data from one stratum (Figure 6).

Field technicians completed all 12 planned surveys (100%) in 2013. Technicians conducted 136 point counts within the 12 surveyed grid cells between 23 May and 2 July. They detected 60 species, including 7 priority species (Appendix D).

RMBO estimated densities and population sizes for 42 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 8 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Montana BCR 17 for 46 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 46 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Montana BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Montana BCR 17 Results

3. BLM in North Dakota BCR 17

Results for BLM Lands in North Dakota BCR 17 were obtained by analyzing data from one stratum (Figure 4).

Field technicians completed all five planned surveys (100%) in 2013. Technicians conducted 74 point counts within the 5 surveyed grid cells between 24 June and 2 July. They detected 42 species, including 5 priority species (Appendix D).

RMBO estimated densities and population sizes for 37 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in North Dakota BCR 17 for 33 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 11 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in North Dakota BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in North Dakota BCR 17 Results

4. BLM in South Dakota BCR 17
Results for BLM Lands in South Dakota BCR 17 were obtained by analyzing data from one stratum (Figure 4).

Field technicians completed all eight planned surveys (100%) in 2013. Technicians conducted 84 point counts within the 8 surveyed grid cells between 23 May and 9 July. They detected 57 species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 49 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in South Dakota BCR 17 for 44 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in South Dakota BCR 17 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in South Dakota BCR 17 Results

5. BLM in Wyoming

a) BLM in Wyoming: Total
Results for BLM Lands in Wyoming were obtained by compiling and jointly analyzing data from 14 strata (Figure 7).

Field technicians completed all 46 planned surveys (100%) in 2013. Technicians conducted 668 point counts within the 46 surveyed grid cells between 22 May and 16 July. They detected 84 species, including 6 priority species (Appendix D).

RMBO estimated densities and population sizes for 71 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 21 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout BLM Lands in Wyoming for 69 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 69 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM Lands in Wyoming across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

BLM in Wyoming Results

b) Buffalo Field Office

Results for the Buffalo Field Office were obtained by compiling and jointly analyzing data from two strata; one in BCR 10 and one in BCR 17 (Figure 7). This BCR-level stratification distinction is made to allow for the summation of the data for individual BCRs.

Field technicians completed all four planned surveys (100%) in 2013. Technicians conducted 62 point counts within the 4 surveyed grid cells between 22 May and 16 July. They detected 40 species, including 3 priority species (Appendix D).

RMBO estimated densities and population sizes for 38 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 7 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout the Buffalo Field Office for 35 species, 2 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 35 of these species.

To view a map of survey locations, density and occupancy results, and species counts within the Buffalo Field Office across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Buffalo Field Office Results

c) Casper Field Office

Results for the Casper Field Office were obtained by compiling and jointly analyzing data from two strata; one in BCR 10 and one in BCR 17 (Figure 7). This BCR-level stratification distinction is made to allow for the summation of the data for individual BCRs.

Field technicians completed all four planned surveys (100%) in 2013. Technicians conducted 64 point counts within the 4 surveyed grid cells between 3 June and 16 June. They detected 37 species, including 3 priority species (Appendix D).

RMBO estimated densities and population sizes for 31 species, 2 of which are priority species. The data yielded robust density estimates (CV < 50%) for 4 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout the Casper Field Office for 30 species, 2 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 30 of these species.

To view a map of survey locations, density and occupancy results, and species counts within the Casper Field Office across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Casper Field Office Results

d) Cody Field Office
Results for Cody Field Office were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 32 point counts within the 2 surveyed grid cells between 3 June and 6 June. They detected 20 species, including 2 priority species (Appendix D).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Cody Field Office across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page.

Cody Field Office Results

e) Kemmerer Field Office
Results for Kemmerer Field Office were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 28 point counts within the 2 surveyed grid cells between 30 May and 31 May. They detected 12 species, including 3 priority species (Appendix D).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Kemmerer Field Office across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page.

Kemmerer Field Office Results

f) Lander Field Office
Results for Lander Field Office were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 25 point counts within the 2 surveyed grid cells between 16 June and 25 June. They detected 29 species, including 1 priority species (Appendix D).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Lander Field Office across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Lander Field Office Results

g) Newcastle Field Office
Results for Newcastle Field Office were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 31 point counts within the 2 surveyed grid cells between 22 May and 2 June. They detected 20 species, including 3 priority species (Appendix D).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Newcastle Field Office across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Newcastle Field Office Results

h) Pinedale Field Office
Results for Pinedale Field Office were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed all eight planned surveys (100%) in 2013. Technicians conducted 119 point counts within the 8 surveyed grid cells between 19 June and 30 June. They detected 23 species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 17 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 5 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout the Pinedale Field Office for 13 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 6 of these species.

To view a map of survey locations, density and occupancy results, and species counts within the Pinedale Field Office across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Pinedale Field Office Results

i) Rawlins Field Office

Results for the Rawlins Field Office were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed all eight planned surveys (100%) in 2013. Technicians conducted 120 point counts within the 8 surveyed grid cells between 28 May and 23 June. They detected 24 species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 18 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 3 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout the Rawlins Field Office for 18 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 5 of these species.

To view a map of survey locations, density and occupancy results, and species counts within the Rawlins Field Office across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Rawlins Field Office Results

j) Rock Springs Field Office

Results for Rock Springs Field Office were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed all eight planned surveys (100%) in 2013. Technicians conducted 116 point counts within the 8 surveyed grid cells between 29 May and 3 July. They detected 35 species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 29 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 5 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout the Rock Springs Field Office for 28 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 8 of these species.

To view a map of survey locations, density and occupancy results, and species counts within the Rock Springs Field Office across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Rock Springs Field Office Results

k) Worland Field Office
Results for Worland Field Office were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 24 point counts within the 2 surveyed grid cells between 10 June and 20 June. They detected 12 species, including 1 priority species (Appendix D).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Worland Field Office across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Worland Field Office Results

l) BLM Lands in Wyoming BCR 16
Results for BLM Lands in Wyoming BCR 16 were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 20 point counts within the 2 surveyed grid cells between 8 June and 16 June. They detected 32 species (Appendix D).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within BLM Lands in Wyoming BCR 16 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

BBLM Lands in Wyoming BCR 16

m) BLM Lands in Wyoming BCR 18
Results for BLM Lands in Wyoming BCR 18 were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 27 point counts within the 2 surveyed grid cells between 5 June and 13 June. They detected 20 species, including 2 priority species (Appendix D).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within BLM Lands in Wyoming BCR 18 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page.

BLM Lands in Wyoming BCR 18 Results

C. Department of Defense (DOD)

1. DOD in Colorado BCR 18

Results for DOD Lands in Colorado BCR 18 were obtained from one stratum (Figure 5).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 23 point counts within the 2 surveyed grid cells between 23 May and 4 June. They detected 48 species, including 8 priority species (Appendix C).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within DOD Lands in Colorado BCR 18 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

DOD in Colorado BCR 18 Results

2. DOD in Wyoming BCR 18

Results for DOD Lands in Wyoming BCR 18 were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 22 point counts within the 2 surveyed grid cells between 2 June and 3 June. They detected 27 species, including 3 priority species (Appendix C).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within DOD Lands in Wyoming BCR 18 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

DOD in Wyoming BCR 18 Results

D. National Park Service

1. Greater Yellowstone Network

a) Greater Yellowstone Network: Total

Results for the Greater Yellowstone Network were obtained by compiling and jointly analyzing data from three strata (Figure 7).

Field technicians completed all six planned surveys (100%) in 2013. Technicians conducted 81 point counts within the 6 surveyed grid cells between 28 May and 9 July. They detected 62 species.

RMBO estimated densities and population sizes for 49 species, 0 of which are priority species. The data yielded robust density estimates (CV < 50%) for 7 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout the Greater Yellowstone Network for 53 species. The data yielded robust occupancy estimates (CV < 50%) for 53 of these species.

To view a map of survey locations, density and occupancy results, and species counts within the Greater Yellowstone Network across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Greater Yellowstone Network Results

b) Bighorn Canyon National Recreation Area

Results for Bighorn Canyon National Recreation Area were obtained by analyzing data from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 22 point counts within the 2 surveyed grid cells between 29 May and 30 May. They detected 21 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within Bighorn Canyon National Recreation Area across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Bighorn Canyon National Recreation Area Results

c) Grand Teton National Park
Results for Grand Teton National Park were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 32 point counts within the 2 surveyed grid cells between 28 May and 27 June. They detected 38 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within Grand Teton National Park across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Grand Teton National Park Results

d) Yellowstone National Park
Results for Yellowstone NP were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 27 point counts within the 2 surveyed grid cells between 4 July and 9 July. They detected 31 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within Yellowstone National Park across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Yellowstone National Park Results

2. Northern Colorado Plateau Network in Colorado
Results for the Northern Colorado Plateau Network in Colorado were obtained from one stratum (Figure 5).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 17 point counts within the 2 surveyed grid cells between 14 May and 16 May. They detected 40 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Northern Colorado Plateau Network in Colorado across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Northern Colorado Plateau Network Results

3. Northern Great Plains Network

a) Agate Fossil Beds National Monument

Results for Agate Fossil Beds National Monument were obtained by analyzing data from one stratum.

Field technicians completed all six planned surveys (100%) in 2013. Technicians conducted 64 point counts within the 6 surveyed grid cells between 11 June and 18 June. They detected 52 species.

RMBO estimated densities and population sizes for 36 species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Agate Fossil Beds National Monument for 32 species. The data yielded robust occupancy estimates (CV < 50%) for 17 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Agate Fossil Beds National Monument across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Agate Fossil Beds National Monument Results

b) Badlands National Park - North Unit

Results for the North Unit of the Badlands National Park were obtained by analyzing data from one stratum (Figure 4).

Field technicians completed all 15 planned surveys (100%) in 2013. Technicians conducted 128 point counts within the 15 surveyed grid cells between 22 May and 20 June. They detected 54 species.

RMBO estimated densities and population sizes for 42 species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout North Unit of the Badlands National Park for 38 species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results, and species counts within the North Unit of the Badlands National Park across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Badlands National Park - North Unit Results

c) Jewel Cave National Monument
Results for Jewel Cave National Monument were obtained by analyzing data from one stratum (Figure 4).

Field technicians completed all five planned surveys (100%) in 2013. Technicians conducted 51 point counts within the 5 surveyed grid cells between 30 June and 9 July. They detected 51 species.

RMBO estimated densities and population sizes for 40 species. The data yielded robust density estimates (CV < 50%) for 21 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Jewel Cave National Monument for 38 species. The data yielded robust occupancy estimates (CV < 50%) for 21 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Jewel Cave National Monument across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Jewel Cave National Monument Results

d) Knife River Indian Villages National Historic Site
Results for Knife River Indian Villages National Historic Site were obtained by analyzing data from one stratum (Figure 4).

Field technicians completed all five planned surveys (100%) in 2013. Technicians conducted 56 point counts within the 5 surveyed grid cells between 2 June and 7 June. They detected 86 species.

RMBO estimated densities and population sizes for 56 species. The data yielded robust density estimates (CV < 50%) for 24 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Knife River Indian Villages National Historic Site for 54 species. The data yielded robust occupancy estimates (CV < 50%) for 34 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Knife River Indian Villages National Historic Site across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Knife River Indian Villages National Historic Site Results

e) Mount Rushmore National Monument
Results for Mount Rushmore National Monument were obtained by analyzing data from one stratum (Figure 4).

Field technicians completed all six planned surveys (100%) in 2013. Technicians conducted 46 point counts within the 6 surveyed grid cells between 28 June and 3 July. They detected 47 species.

RMBO estimated densities and population sizes for 45 species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Mount Rushmore National Monument for 47 species. The data yielded robust occupancy estimates (CV < 50%) for 27 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Mount Rushmore National Monument across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Mount Rushmore National Monument Results

f) Scotts Bluff National Monument
Results for Scotts Bluff National Monument were obtained by analyzing data from one stratum.

Field technicians completed all six planned surveys (100%) in 2013. Technicians conducted 58 point counts within the 6 surveyed grid cells between 5 June and 2 July. They detected 46 species.

RMBO estimated densities and population sizes for 38 species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Scotts Bluff National Monument for 37 species. The data yielded robust occupancy estimates (CV < 50%) for 16 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Scotts Bluff National Monument across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below

select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Scotts Bluff National Monument Results

g) Theodore Roosevelt National Park
Results for Theodore Roosevelt National Park were obtained by compiling and jointly analyzing data from two strata (Figure 4).

Field technicians completed all 15 planned surveys (100%) in 2013. Technicians conducted 141 point counts within the 15 surveyed grid cells between 1 June and 27 June. They detected 69 species.

RMBO estimated densities and population sizes for 54 species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Theodore Roosevelt National Park for 54 species. The data yielded robust occupancy estimates (CV < 50%) for 54 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Theodore Roosevelt National Park across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Theodore Roosevelt National Park Results

h) Wind Cave National Park
Results for Wind Cave National Park were obtained by analyzing data from one stratum (Figure 4).

Field technicians completed all 15 planned surveys (100%) in 2013. Technicians conducted 160 point counts within the 15 surveyed grid cells between 3 June and 3 July. They detected 70 species.

RMBO estimated densities and population sizes for 60 species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Wind Cave National Park for 64 species. The data yielded robust occupancy estimates (CV < 50%) for 27 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Wind Cave National Park across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Wind Cave National Park Results

4. Rocky Mountain Network

a). Rocky Mountain Network in Colorado
Results for Rocky Mountain Network in Colorado were obtained from one stratum (Figure 5).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 25 point counts within the 2 surveyed grid cells between 20 June and 11 July. They detected 31 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Rocky Mountain Network in Colorado across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Rocky Mountain Network in Colorado Results

b) Glacier National Park
Results for Glacier National Park were obtained from one stratum (Figure 6).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 17 point counts within the 2 surveyed grid cells between 7 July and 9 July. They detected 32 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within Glacier National Park across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Glacier National Park Results

5. Southern Colorado Plateau Network in Colorado
Results for Southern Colorado Plateau Network in Colorado were obtained from one stratum (Figure 5).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 22 point counts within the 2 surveyed grid cells between 28 May and 29 May. They detected 39 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Southern Colorado Plateau Network in Colorado across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Southern Colorado Plateau Network in Colorado Results

E. The Nature Conservancy

Cherry Ranch Preserve
Results for Cherry Ranch were obtained by analyzing data from one stratum.

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 222 point counts within the 20 surveyed grid cells between 29 May and 3 July. They detected 35 species.

RMBO estimated densities and population sizes for 27 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 7 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Cherry Ranch for 23 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 9 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Cherry Ranch across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Cherry Ranch Preserve Results

F. Tribal Lands

1. Blackfeet and Crow Tribal Lands in Montana BCR 10
Results for the Blackfeet and Crow Tribal Lands in Montana BCR 10 were obtained from one stratum (Figure 6).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 26 point counts within the 2 surveyed grid cells between 21 June and 29 June. They detected 35 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Blackfeet and Crow Tribal Lands in Montana BCR 10 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Blackfeet and Crow Tribal Lands in Montana BCR 10 Results

2. Flathead Tribal Lands in Montana BCR 10
Results for the Flathead Tribal Lands in Montana BCR 10 were obtained from one stratum (Figure 6).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 25 point counts within the 2 surveyed grid cells between 18 June and 26 June. They detected 58 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Flathead Tribal Lands in Montana BCR 10 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Flathead Tribal Lands in Montana BCR 10 Results

3. Blackfeet, Fort Belknap, Fort Peck and Rocky Boys Tribal Lands in Montana BCR 11
Results for the Rocky Boys; Fort Peck; Fort Belknap and Blackfeet Tribal Lands in Montana BCR 11 were obtained from one stratum (Figure 6).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 18 point counts within the 2 surveyed grid cells between 20 June and 21 June. They detected 29 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only one sample are not informative. This stratum did not have the minimum number of two samples surveyed in order to be included in analyses.

To view a map of survey locations and get species counts within the Rocky Boys; Fort Peck; Fort Belknap and Blackfeet Tribal Lands in Montana BCR 11 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Blackfeet, Fort Belknap, Fort Peck and Rocky Boys Tribal Lands in Montana BCR 11 Results

4. Wind River Tribal Lands in Wyoming BCR 10

Results for Wind River Tribal Lands in Wyoming BCR 10 were obtained from one stratum (Figure 7).

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 29 point counts within the 2 surveyed grid cells between 6 June and 7 June. They detected 49 species.

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within the Wind River Tribal Lands in Wyoming BCR 10 across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Wind River Tribal Lands in Wyoming BCR 10 Results

G. US Forest Service

1. US Forest Service Region 1

a) Region 1 National Forests

Within this sampling design each National Forest in Region 1 is stratified separately. This forest-level stratification distinction is made so we can analyze the data separately for each Forest. In this section of the report, we summarize results for all Region 1 Forests combined, followed by summaries for each individual National Forest.

(1) Region 1 National Forests: Total

Results for Region 1 National Forests were obtained by compiling and jointly analyzing data from 28 USFS Region 1 strata across 3 states.

Field technicians completed 184 of 185 planned surveys (99%) in 2013. One extra survey was also completed in Flathead National Forest. Technicians conducted 1,837 point counts within the 185 surveyed grid cells between 25 May and 17 July. They detected 162 species, including 28 priority species (Appendix E).

RMBO estimated densities and population sizes for 124 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for 71 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Region 1 National Forests for 131 species, 14 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 131 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Region 1 National Forests across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Region 1 National Forests Results

(2) Beaverhead-Deerlodge National Forest
Results for Beaverhead-Deerlodge National Forest were obtained by compiling and jointly analyzing data from two strata: front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed 9 of 10 planned surveys (90%) in 2013. Technicians conducted 85 point counts within the 10 surveyed grid cells between 29 May and 4 July. They detected 56 species (Appendix E).

RMBO estimated densities and population sizes for 51 species. The data yielded robust density estimates (CV < 50%) for 17 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Beaverhead-Deerlodge National Forest for 52 species. The data yielded robust occupancy estimates (CV < 50%) for 52 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Beaverhead-Deerlodge National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Beaverhead-Deerlodge National Forest Results

(3) Bitterroot National Forest
Results for Bitterroot National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 103 point counts within the 10 surveyed grid cells between 3 June and 1 July. They detected 61 species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 55 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Bitterroot National Forest for 57 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 57 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Bitterroot National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Bitterroot National Forest Results

(4) Clearwater National Forest
Results for Clearwater National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 172 point counts within the 20 surveyed grid cells between 4 June and 5 July. They detected 76 species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 60 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Clearwater National Forest for 68 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 68 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Clearwater National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Clearwater National Forest Results

(5) Custer National Forest
Results for Custer National Forest were obtained by compiling and jointly analyzing data from four strata across two states (Montana and South Dakota) and two BCRs (10 and 17). Within Montana BCR 10, Custer National Forest is further split into front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit. The state-level stratification distinction is made for the benefit of the state partners to allow for the summation of the data for individual

states. Likewise, the BCR-level stratification distinction is made to allow for the summation of the data for individual BCRs.

Field technicians completed all 14 planned surveys (100%) in 2013. Technicians conducted 169 point counts within the 14 surveyed grid cells between 8 June and 7 July. They detected 88 species, including 9 priority species (Appendix E).

RMBO estimated densities and population sizes for 81 species, 8 of which are priority species. The data yielded robust density estimates (CV < 50%) for 24 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Custer National Forest for 76 species, 7 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 76 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Custer National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Custer National Forest Results

(6) Flathead National Forest

Results for Flathead National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 10 planned surveys (100%) in 2013. One extra survey was also completed in Flathead National Forest. Technicians conducted 118 point counts within the 11 surveyed grid cells between 25 May and 14 July. They detected 73 species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 59 species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Flathead National Forest for 64 species. The data yielded robust occupancy estimates (CV < 50%) for 64 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Flathead National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Flathead National Forest Results

(7) Gallatin National Forest
Results for Gallatin National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 92 point counts within the 10 surveyed grid cells between 29 May and 2 July. They detected 68 species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 54 species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Gallatin National Forest for 61 species. The data yielded robust occupancy estimates (CV < 50%) for 61 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Gallatin National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Gallatin National Forest Results

(8) Helena National Forest
Results for Helena National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 108 point counts within the 10 surveyed grid cells between 15 June and 12 July. They detected 66 species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 59 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Helena National Forest for 64 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 64 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Helena National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Helena National Forest Results

(9) Idaho Panhandle National Forest
Results for Idaho Panhandle National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 30 planned surveys (100%) in 2013. Technicians conducted 264 point counts within the 30 surveyed grid cells between 4 June and 13 July. They detected 83 species, including 6 priority species (Appendix E).

RMBO estimated densities and population sizes for 61 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 31 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Idaho Panhandle National Forest for 68 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 68 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Idaho Panhandle National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Idaho Panhandle National Forest Results

(10) Kootenai National Forest
Results for Kootenai National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 28 planned surveys (100%) in 2013. Technicians conducted 321 point counts within the 28 surveyed grid cells between 1 June and 13 July. They detected 93 species, including 6 priority species (Appendix E).

RMBO estimated densities and population sizes for 73 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Kootenai National Forest for 80 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 80 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Kootenai National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Kootenai National Forest Results

(11) Lewis and Clark National Forest
Results for Lewis and Clark National Forest were obtained by compiling and jointly analyzing data from three strata; one in BCR 17 and two in BCR 10. Within BCR 10, the Forest is split into front-country/managed areas and designated roadless/wilderness areas due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit. The BCR-level stratification distinction is made to allow for the summation of the data for individual BCRs.

Field technicians completed all 11 planned surveys (100%) in 2013. Technicians conducted 109 point counts within the 11 surveyed grid cells between 2 June and 13 July. They detected 67 species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 56 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 14 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Lewis and Clark National Forest for 60 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 60 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Lewis and Clark National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Lewis and Clark National Forest Results

(12) Lolo National Forest
Results for Lolo National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made

due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 94 point counts within the 10 surveyed grid cells between 13 June and 17 July. They detected 74 species, including 2 priority species (Appendix E).

RMBO estimated densities and population sizes for 62 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 25 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Lolo National Forest for 66 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 66 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Lolo National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Lolo National Forest Results

(13) Nez Perce National Forest

Results for Nez Perce National Forest were obtained by compiling and jointly analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 187 point counts within the 20 surveyed grid cells between 2 June and 8 July. They detected 75 species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 61 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Nez Perce National Forest for 67 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 67 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Nez Perce National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Nez Perce National Forest Results

b) Region 1 National Grasslands

Results for the National Grasslands in Region 1 were obtained by compiling and jointly analyzing data from three strata in two states: Cedar River, Grand River and Little Missouri National Grasslands. This grassland-level stratification is made so we can produce results for each Grassland individually as well as for all three of them as a whole. All of the National Grasslands in USFS Region 1 fall within the Dakota Prairie National Grasslands. We did not survey one National Grassland within Region 1 – Sheyenne National Grassland. We have collect data from this grassland using a different study design in the past. For more information on this, refer to the 'Monitoring of Grassland Birds on Little Missouri, Sheyenne and Grand River National Grasslands' report (Sparks and Hanni 2013).

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 214 point counts within the 20 surveyed grid cells between 24 May and 4 July. They detected 79 species, including 14 priority species (Appendix E).

RMBO estimated densities and population sizes for 63 species, 11 of which are priority species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Region 1 National Grasslands for 59 species, 10 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 59 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Region 1 National Grasslands across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Region 1 National Grasslands Results

2. US Forest Service Region 2

a) Region 2 National Forests

Within this sampling design each National Forest in Region 2 is stratified separately. This forest-level stratification distinction is made so we can analyze the data separately for each Forest. In this section of the report, we summarize results for all Region 2 Forests combined, followed by summaries for each individual Forest.

(1) Region 2 National Forests: Total

Results for all Region 2 National Forests combined were obtained by compiling and jointly analyzing data from 23 USFS Region 2 strata across 4 states. This forest-level stratification distinction is made to allow for the summation of the data for individual Forests, BCRs and States.

Field technicians completed 360 of 362 planned surveys (99%) in 2013. One extra survey was completed in each of two National Forests – Rio Grande and White River. Technicians conducted 4,228 point counts within the 362 surveyed grid cells between 25 May and 22 July. They detected 186 species, including 19 priority species (Appendix F).

RMBO estimated densities and population sizes for 143 species, 8 of which are priority species. The data yielded robust density estimates (CV < 50%) for 89 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Region 2 National Forests for 147 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 147 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Region 2 National Forests across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Region 2 National Forests Results

(2) Arapaho and Roosevelt National Forests

Results for this section were obtained by analyzing data from the Arapaho and Roosevelt National Forests stratum in Colorado BCR 16. In 2011, the Routt and Arapaho and Roosevelt National Forests strata were reorganized and a third stratum, the Williams Fork Area, was created from the two, because it is a portion of the Arapaho and Roosevelt National Forests that is included in the Routt National Forest land management plan, but administered by the Arapaho and Roosevelt National Forests. This stratum allows data to be rolled-up to meet multiple needs of these two units. For information on the Williams Fork Management Unit, please refer to the Routt National Forest section.

Field technicians completed all 18 planned surveys (100%) in 2013. Technicians conducted 195 point counts within the 18 surveyed grid cells between 29 May and 14 July. They detected 69 species, including 5 priority species (Appendix F).

RMBO estimated densities and population sizes for 62 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 21 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Arapaho and Roosevelt National Forests for 61 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 27 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Arapaho and Roosevelt National Forests across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Arapaho and Roosevelt National Forests Results

(3) Bighorn National Forest
Results for Bighorn National Forest were obtained by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 138 point counts within the 10 surveyed grid cells between 12 June and 18 July. They detected 53 species, including 1 priority species (Appendix F).

RMBO estimated densities and population sizes for 46 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Bighorn National Forest for 47 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 16 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Bighorn National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Bighorn National Forest Results

(4) Black Hills National Forest
Results for the Black Hills National Forest were obtained by compiling and jointly analyzing data from three strata spanning two states. This forest-level stratification distinction is made to allow for the summation of the data for individual BCRs and States. In 2011, the South Dakota Black Hills National Forest stratum was split into two strata based on watersheds in the Forest: Hydrologic Code 7 Watersheds and all other watersheds. This stratification by watershed allows for adjusting sampling intensity to target Management Indicator Species on the Forest.

Field technicians completed all 110 planned surveys (100%) in 2013. Technicians conducted 1,134 point counts within the 110 surveyed grid cells between 2 June and 13 July. They detected 106 species, including 9 priority species (Appendix F).

RMBO estimated densities and population sizes for 90 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 51 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Black Hills National Forest for 93 species, 7 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 93 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Black Hills National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Black Hills National Forest Results

(5) Grand Mesa, Uncompaghre and Gunnison National Forests
Results for Grand Mesa, Uncompahgre and Gunnison National Forests were obtained by analyzing data from one stratum.

Field technicians completed all 15 planned surveys (100%) in 2013. Technicians conducted 189 point counts within the 15 surveyed grid cells between 6 June and 12 July. They detected 78 species, including 4 priority species (Appendix F).

RMBO estimated densities and population sizes for 70 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 28 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Grand Mesa, Uncompaghre and Gunnison National Forests for 73 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 35 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Grand Mesa, Uncompaghre and Gunnison National Forests across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Grand Mesa, Uncompaghre and Gunnison National Forest Results

(6) Medicine Bow National Forest
Results for Medicine Bow National Forest were obtained by compiling and jointly analyzing data from two strata. This forest-level stratification distinction is made to allow for the summation of the data for individual BCRs.

Field technicians completed all 30 planned surveys (100%) in 2013. Technicians conducted 405 point counts within the 30 surveyed grid cells between 30 May and 19 July. They detected 92 species, including 3 priority species (Appendix F).

RMBO estimated densities and population sizes for 80 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Medicine Bow National Forest for 81 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 81 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Medicine Bow National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Medicine Bow National Forest Results

(7) Nebraska National Forests
Results for Nebraska National Forests were obtained by compiling and jointly analyzing data from three strata: Nebraska National Forest Pine Ridge and Bessey Ranger Districts and Samuel R. McKelvie National Forest. This district-level stratification distinction is made to allow for the summation of the data for individual BCRs and Ranger Districts.

Field technicians completed all 11 planned surveys (100%) in 2013. Technicians conducted 115 point counts within the 11 surveyed grid cells between 28 May and 29 June. They detected 81 species, including 3 priority species (Appendix F).

RMBO estimated densities and population sizes for 63 species, 2 of which are priority species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Nebraska National Forests for 58 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 58 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Nebraska National Forests across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Nebraska National Forest Results

(8) Pike and San Isabel National Forests
Results for Pike and San Isabel National Forests were obtained by analyzing data from one stratum.

Field technicians completed all 15 planned surveys (100%) in 2013. Technicians conducted 201 point counts within the 15 surveyed grid cells between 6 June and 10 July. They detected 76 species (Appendix F).

RMBO estimated densities and population sizes for 62 species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Pike and San Isabel National Forests for 68 species. The data yielded robust occupancy estimates (CV < 50%) for 25 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Pike and San Isabel National Forests across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Pike and San Isabel National Forests Results

(9) Rio Grande National Forest

Results for Rio Grande National Forest were obtained by compiling and jointly analyzing data from three strata: low, medium and high elevations. From 2008 - 2010, the Rio Grande National Forest was contained within one forest-wide stratum. The stratum was split into three strata based on elevation prior to the 2011 field season. The new stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forest. There was a land acquisition within Great Sand Dunes National Monument so during the restratification some samples were removed from Rio Grande National Forest and added to the RMNW stratum; 16 km^2 were added to the area of the RMNW strata.

Field technicians completed 32 of 33 planned surveys (97%) in 2013. One extra survey was also completed in Rio Grande National Forest. Technicians conducted 408 point counts within the 33 surveyed grid cells between 9 June and 22 July. They detected 93 species, including 6 priority species (Appendix F).

RMBO estimated densities and population sizes for 81 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 36 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Rio Grande National Forest for 83 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 83 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Rio Grande National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Rio Grande National Forest Results

(10) Routt National Forest

Results for Routt National Forest were obtained by compiling and jointly analyzing data from two strata: Routt National Forest and the Williams Fork Management Unit. In 2011, the Routt National Forest and Arapaho and Roosevelt National Forests strata were reorganized and a third stratum, the Williams Fork Area, was created from the two. The Williams Fork Area is a portion of the Arapaho and Roosevelt National Forests that is included in the Routt National Forest land management plan but administered by the Arapaho

and Roosevelt National Forests. This stratum allows data to be rolled-up to meet multiple needs of these two units.

Field technicians completed 44 of 45 planned surveys (98%) in 2013. Technicians conducted 536 point counts within the 45 surveyed grid cells between 11 June and 20 July. They detected 90 species, including 3 priority species (Appendix F).

RMBO estimated densities and population sizes for 74 species, 2 of which are priority species. The data yielded robust density estimates (CV < 50%) for 37 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Routt National Forest for 79 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 79 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Routt National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Routt National Forest Results

(11) San Juan National Forest
Results for San Juan National Forest were obtained by analyzing data from one stratum.

Field technicians completed all 15 planned surveys (100%) in 2013. Technicians conducted 168 point counts within the 15 surveyed grid cells between 10 June and 17 July. They detected 104 species, including 5 priority species (Appendix F).

RMBO estimated densities and population sizes for 87 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 27 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout San Juan National Forest for 89 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 36 of these species.

To view a map of survey locations, density and occupancy results, and species counts within San Juan National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

San Juan National Forest Results

(12) Shoshone National Forest
Results for Shoshone National Forest were obtained by analyzing data from two strata; front-country/managed areas and designated roadless/wilderness areas. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 25 planned surveys (100%) in 2013. Technicians conducted 347 point counts within the 25 surveyed grid cells between 8 June and 12 July. They detected 88 species, including 5 priority species (Appendix F).

RMBO estimated densities and population sizes for 74 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Shoshone National Forest for 72 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 72 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Shoshone National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Shoshone National Forest Results

(13) White River National Forest
Results for White River National Forest were obtained by compiling and jointly analyzing data from three strata: low, medium and high elevations. From 2008 - 2010, the White River National Forest was contained within one forest-wide stratum. The stratum was split into three strata based on elevation prior to the 2011 field season. The new stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forest.

Field technicians completed all 35 planned surveys (100%) in 2013. One extra survey was also completed in White River National Forest. Technicians conducted 392 point counts within the 36 surveyed grid cells between 25 May and 19 July. They detected 93 species, including 4 priority species (Appendix F).

RMBO estimated densities and population sizes for 81 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 32 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout White River National Forest for 84 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 84 of these species.

To view a map of survey locations, density and occupancy results, and species counts within White River National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.
To view a map of survey locations, density and occupancy results, and species counts within White River National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page.

White River National Forest Results

b) Region 2 National Grasslands
Within this sampling design each National Grassland in Region 2 is stratified separately. This grassland-level stratification distinction is made so we can analyze the data separately for each Grassland, or together as a whole. In this section of the report, we summarize results for all Region 2 Grasslands combined, followed by summaries for each individual Grassland.

(1) Region 2 National Grasslands: Total
Results for all the Region 2 National Grasslands were obtained by compiling and jointly analyzing data from eight USFS Region 2 strata across five states. This grassland-level stratification distinction is made to allow for the summation of the data for individual Grasslands, BCRs and States.

Field technicians completed all 47 planned surveys (100%) in 2013. Technicians conducted 583 point counts within the 47 surveyed grid cells between 11 May and 11 June. They detected 119 species, including 12 priority species (Appendix F).

RMBO estimated densities and population sizes for 85 species, 10 of which are priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Region 2 National Grasslands for 79 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 79 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Region 2 National Grasslands across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Region 2 National Grasslands Results

(2) Cimarron National Grassland
Results for Cimarron National Grassland were obtained by analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2013. Technicians conducted 53 point counts within the 5 surveyed grid cells between 11 May and 15 May. They detected 44 species, including 3 priority species (Appendix F).

RMBO estimated densities and population sizes for 27 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 6 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Cimarron National Grassland for 26 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 10 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Cimarron National Grassland across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Cimarron National Grassland Results

(3) Nebraska National Grasslands (Buffalo Gap, Fort Pierre, and Oglala)
Results for Nebraska National Grasslands were obtained by analyzing data from four strata; Buffalo Gap National Grassland, Fort Pierre National Grassland, Oglala National Grassland in BCR 17 and Oglala National Grassland in BCR 18. This grassland-level stratification distinction is made so we can analyze the data separately for each Grassland, or together as a whole. The BCR-level stratification distinction is made to allow for the summation of the data for individual BCRs.

Field technicians completed all 14 planned surveys (100%) in 2013. Technicians conducted 154 point counts within the 14 surveyed grid cells between 23 May and 11 June. They detected 74 species, including 6 priority species (Appendix F).

RMBO estimated densities and population sizes for 57 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Nebraska National Grasslands for 56 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 56 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Nebraska National Grasslands across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Nebraska National Grasslands Results

(4) Comanche National Grassland
Results for Comanche National Grassland were obtained by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 121 point counts within the 10 surveyed grid cells between 14 May and 28 May. They detected 59 species, including 2 priority species (Appendix F).

RMBO estimated densities and population sizes for 41 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Comanche National Grassland for 35 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 9 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Comanche National Grassland across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Comanche National Grassland Results

(5) Pawnee National Grassland
In 2013 Pawnee National Grasslands was split into two strata – public lands and private lands – since Pawnee National Grasslands contains a large amount of private land within its borders. This allowed the USFS to concentrate more survey effort on public lands. Results for Pawnee National Grassland were obtained by analyzing data from the public lands stratum.

Field technicians completed all eight planned surveys (100%) in 2013. Technicians conducted 108 point counts within the 8 surveyed grid cells between 16 May and 30 May. They detected 18 species, including 1 priority species (Appendix F).

RMBO estimated densities and population sizes for 12 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 5 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Public Lands on Pawnee National Grassland for 14 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 6 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Public Lands on Pawnee National Grassland across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Pawnee National Grassland Results

(6) Thunder Basin National Grassland

Results for Thunder Basin National Grassland were obtained by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2013. Technicians conducted 147 point counts within the 10 surveyed grid cells between 19 May and 29 May. They detected 53 species, including 1 priority species (Appendix F).

RMBO estimated densities and population sizes for 42 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 9 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Thunder Basin National Grassland for 34 species. The data yielded robust occupancy estimates (CV < 50%) for 11 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Thunder Basin National Grassland across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Thunder Basin National Grassland Results

3. US Forest Service Region 3

In this section of the report we summarize results for five National Forests and two National Grasslands in Region 3: Carson National Forest, Coconino National Forest, Coronado National Forest, Kaibab National Forest, Tonto National Forest, Kiowa National Grassland and Rita Blanca National Grassland.

a) Carson National Forest

Results for Carson National Forest were obtained by compiling and jointly analyzing data from two strata. Two strata were created within this Forest based on elevation prior to the 2013 field season. The stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forest. 2013 was the first year surveys were conducted in Carson National Forest using the IMBCR design.

Field technicians completed all 50 planned surveys (100%) in 2013. Technicians conducted 559 point counts within the 50 surveyed grid cells between 24 May and 13 July. They detected 118 species, including 6 priority species (Appendix G).

RMBO estimated densities and population sizes for 106 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 57 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Carson National Forest for 108 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 76 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Carson National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Carson National Forest Results

b) Coconino National Forest
Results for Coconino National Forest were obtained by analyzing data from one stratum.

Field technicians completed all 50 planned surveys (100%) in 2013. Technicians conducted 669 point counts within the 50 surveyed grid cells between 3 May and 26 June. They detected 126 species, including 5 priority species (Appendix G).

RMBO estimated densities and population sizes for 103 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 52 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Coconino National Forest for 110 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 68 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Coconino National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Coconino National Forest Results

c) Coronado National Forest
Results for Coronado National Forest were obtained by compiling and jointly analyzing data from two strata. Two strata were created within this Forest based on elevation prior to the 2013 field season. The stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forest. 2013 was the first year surveys were conducted in Coronado National Forest using the IMBCR design.

Field technicians completed all 25 planned surveys (100%) in 2013. Technicians conducted 223 point counts within the 25 surveyed grid cells between 27 April and 17 June. They detected 125 species, including 27 priority species (Appendix G).

RMBO estimated densities and population sizes for 79 species, 16 of which are priority species. The data yielded robust density estimates (CV < 50%) for 32 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Coronado National Forest for 93 species, 19 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 45 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Coronado National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Coronado National Forest Results

d) Kaibab National Forest

Results for Kaibab National Forest were obtained by compiling and jointly analyzing data from two strata. The stratum was split into two strata based on elevation prior to the 2012 field season. The new stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forest.

Field technicians completed all 28 planned surveys (100%) in 2013. Technicians conducted 359 point counts within the 28 surveyed grid cells between 9 May and 22 June. They detected 97 species, including 16 priority species (Appendix G).

RMBO estimated densities and population sizes for 83 species, 8 of which are priority species. The data yielded robust density estimates (CV < 50%) for 37 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Kaibab National Forest for 82 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 44 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Kaibab National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Kaibab National Forest Results

e) Tonto National Forest

Results for Tonto National Forest were obtained by compiling and jointly analyzing data from two strata. Two strata were created within this Forest based on elevation prior to the 2012 field season. The stratification by elevation allows for adjusting sampling intensity to target Management Indicator Species on the Forest.

Field technicians completed all 39 planned surveys (100%) in 2013. Technicians conducted 449 point counts within the 39 surveyed grid cells between 27 April and 12 June. They detected 126 species, including 20 priority species (Appendix G).

RMBO estimated densities and population sizes for 88 species, 17 of which are priority species. The data yielded robust density estimates (CV < 50%) for 54 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Tonto National Forest for 101 species, 18 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 66 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Tonto National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Tonto National Forest Results

f) Kiowa National Grassland
Results for Kiowa National Grassland were obtained from one stratum.

Field technicians completed all three planned surveys (100%) in 2013. Technicians conducted 28 point counts within the 3 surveyed grid cells between 26 May and 29 May. They detected 39 species (Appendix G).

RMBO estimated densities and population sizes for 32 species. The data yielded robust density estimates (CV < 50%) for 8 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Kiowa National Grassland for 34 species. The data yielded robust occupancy estimates (CV < 50%) for 15 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Kiowa National Grassland across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Kiowa National Grassland Results

g) Rita Blanca National Grassland
Results for Rita Blanca National Grassland were obtained by analyzing data from three strata corresponding to the portions of the Rita Blanca National Grassland that lie within Texas, New Mexico and Oklahoma. This state-level stratification distinction is made so we can incorporate Rita Blanca National Grassland data into state-wide estimates.

Field technicians completed all eight planned surveys (100%) in 2013. Technicians conducted 73 point counts within the 8 surveyed grid cells between 16 May and 25 May. They detected 28 species (Appendix G).

RMBO estimated densities and population sizes for 17 species. The data yielded robust density estimates (CV < 50%) for 8 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Rita Blanca National Grassland for 16 species. The data yielded robust occupancy estimates (CV < 50%) for 8 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Rita Blanca National Grassland across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Rita Blanca National Grasslands Results

4. US Forest Service Region 4

In this section, we summarize results for all or portions of five National Forests in Region 4: Ashley, Bridger-Teton, Caribou-Targhee, Manti-La Sal, and Wasatch National Forests. In 2010, the USFS Region 4 stratum in Wyoming BCR 10 was restratified into three separate strata: Bridger-Teton National Forest front-country/managed areas, Bridger-Teton National Forest designated roadless/wilderness areas, and the remainder of USFS Region 4 lands in Wyoming BCR 10. This restratification was done to allow for density and occupancy estimation at the National Forest level for the Bridger-Teton National Forest. Similarly, in 2013 the remaining USFS Region 4 stratum was restratified into 3 separate strata, one for each Forest (Caribou-Targhee, Ashley, and Wasatch NFs). This allows for forest-wide estimates within Caribou-Targhee National Forest. If, in the future Ashley and Wasatch National Forests are completely sampled, this will also allow for forest-wide estimates in each of those forests.

a) Ashley National Forest

Results for Ashley National Forest were obtained from one stratum in Wyoming. These samples were added to supplement state-wide estimates in Wyoming and were supported by state and regional partners. Only the Wyoming portion of Ashley National Forest was surveyed using the IMBCR design.

Field technicians completed both planned surveys (100%) in 2013. Technicians conducted 32 point counts within the 2 surveyed grid cells between 2 June and 4 June. They detected 13 species (Appendix H).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within Ashley across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Ashley National Forest Results

b) Bridger-Teton National Forest

In 2010 the USFS Region 4 stratum in Wyoming was restratified into three separate strata: Bridger-Teton National Forest front-country/managed areas, Bridger-Teton National Forest designated roadless/wilderness areas, and the remainder of USFS Region 4 lands in Wyoming BCR 10. Separating this forest from the rest of the Region 4 USFS lands was done to allow for density and occupancy estimation at the National Forest level for the Bridger-Teton National Forest. Results for Bridger-Teton National Forest were obtained by analyzing data from the front-country/managed stratum and the designated roadless/wilderness stratum. This forest-level stratification distinction was made due to field implementation cost considerations and the desire to focus monitoring on the more highly managed areas while maintaining inference to the entire management unit.

Field technicians completed all 20 planned surveys (100%) in 2013. Technicians conducted 269 point counts within the 20 surveyed grid cells between 29 May and 14 July. They detected 91 species, including 2 priority species (Appendix H).

RMBO estimated densities and population sizes for 79 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Bridger-Teton National Forest for 79 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 79 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Bridger-Teton National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Bridger-Teton National Forest Results

c) Caribou-Targhee National Forest

Results for Caribou-Targhee National Forest were obtained by compiling and jointly analyzing data from six strata. Caribou-Targhee was separated into 6 strata because it spans three states and three BCRs. The state-level stratification distinction is made for the benefit of the state partners to allow for the summation of the data for individual states. Likewise, the BCR-level stratification distinction is made to allow for the summation of the data for individual BCRs.

Field technicians completed 34 of 36 planned surveys (94%) in 2013. Technicians conducted 410 point counts within the 36 surveyed grid cells between 31 May and 13 July. They detected 115 species, including 2 priority species (Appendix H).

RMBO estimated densities and population sizes for 91 species. The data yielded robust density estimates (CV < 50%) for 40 of these species.

RMBO estimated the proportion of 1 km^2 grid cells occupied (Psi) throughout Caribou-Targhee National Forest for 93 species. The data yielded robust occupancy estimates (CV < 50%) for 60 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Caribou-Targhee National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Caribou-Targhee National Forest Results

d) Manti-La Sal National Forest

Results for Manti-La Sal National Forest were obtained from one stratum in Colorado. These samples were added to supplement state-wide estimates in Colorado and were supported by state and regional partners. Only the Colorado portion of Manti-La Sal National Forest has been surveyed using the IMBCR design.

Results for Manti-La Sal National Forest were obtained from one stratum.

Field technicians completed both planned surveys (100%) in 2012. Technicians conducted 18 point counts within the 2 surveyed sampling units between 17 June and 16 July. They detected 42 species (Appendix H).

RMBO did not generate density or occupancy results for this stratum, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within Manti-La Sal National Forest across all years of the project follow the web link below and hit the "Run Query" button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2013, hit "Add Filter", and then "Run Query".

Manti-La Sal National Forest Results

e) Wasatch National Forest

Results for Wasatch National Forest were obtained from two strata. Two strata were created for Wasatch National Forest in Wyoming, since the forest spans two BCRs (10 and 16) in that state. The BCR-level stratification distinction is made to allow for the summation of the data for individual BCRs within Wyoming. These samples were added to supplement state-wide estimates in Wyoming and were supported by state and regional partners. Only the Wyoming portion of Wasatch National Forest has

been surveyed using the IMBCR design. The strata were not combined to generate a single estimate since it would not represent the entirety of the National Forest.

Field technicians completed both planned surveys in each of the Wasatch National Forest strata (100%) in 2013. Technicians conducted 62 point counts within the 4 surveyed grid cells between 4 July and 7 July. They detected 36 species (Appendix H).

RMBO did not generate density or occupancy results for either of these strata, because results from strata with only two samples are not informative. However, these data were incorporated into larger scale estimates.

To view a map of survey locations and get species counts within Wasatch National Forest across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2013, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2013, hit “Add Filter”, and then “Run Query”.

Wasatch National Forest Results

SELECTED ADDITIONAL APPLICATIONS OF IMBCR DATA

I. Pygmy Nuthatch Abundance and Distribution

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Relating species density or abundance to landscape and habitat structure is fundamental to ecological science. Abundance estimates allow us to measure changes in population size and to assess the impact of habitat loss or harvesting (Buckland et al. 2008). Management for most species requires reliable abundance estimates (Bowden et al. 2003).

Royle (2004) developed hierarchical models that account for spatial variation in abundance and detection probability at spatially referenced sampling units. These models can be used to create spatially explicit maps (Sillett et al. 2012). This is appealing for conservation managers in that they can characterize the structure of local populations in space (Royle 2004). These models are especially useful for the conservation and management of species with uncertain trends and regional population declines.

Here we apply the hierarchical multinomial mixture model (Chandler et al. 2011) to Pygmy Nuthatch (Sitta pygmaea) to estimate abundance, availability and detection (Sparks et al. in prep). We use this model in a novel way to account for imperfect spatial coverage when conducting spatially replicated surveys within the sampling unit by trading space for time. Our application of the model accounts for potential bias that may arise when estimating detection from spatially replicated surveys without replacement discussed in Kendall and White (2009).

Our purpose here is to 1) Estimate local abundance, availability and detection from a collection of samples using the IMBCR design, 2) Provide a hypothesis driven case study to determine the relative importance of environmental covariates for predicting the abundance distribution, 3) Map the abundance distribution of the Pygmy Nuthatch within Bird Conservation Regions.

The Breeding Bird Survey (BBS) does not adequately sample ponderosa pine habitat and there are insufficient detections to reliably estimate Pygmy Nuthatch abundance in the Northern and Southern Rockies (Sauer et al. 2012). This species is a conifer specialist and breeds almost exclusively in ponderosa pine forests. Ponderosa pine (pinus ponderosa) is a wide ranging and diverse forest type occurring throughout the western United States, southern Canada and northern Mexico (Little 1971). This species is a Management Indicator Species of ponderosa pine forest health, as designated by USFS (Diem and Zeveloff 1980).

We confirmed the hypothesis that Pygmy Nuthatch abundance demonstrated an optimum at intermediate Ponderosa Pine tree cover (Figure 8, panel B). We also confirmed the hypothesis that Pygmy Nuthatch abundance was greater in BCR 34 and BCR 16 than in BCR 10 (Figure 8, panel A). However, we found little support for the hypothesis for an optimum abundance at intermediate Elevation or the hypothesis that abundance increased with increasing Secondary Habitat cover. The Ponderosa Pine [w+(j) = 1.00] and BCR [w+(j) = 0.99] covariates demonstrated high ability to predict Pygmy Nuthatch abundance with less support for Secondary Habitat [w+(j) = 0.40], Elevation [w+(j) = 0.36] and Year [w+(j) = 0.20].

The Pygmy Nuthatch distribution map highlights areas of high abundance in the Arizona national forests and the Southern Rockies/Colorado Plateau BCR with low areas of abundance

in the Northern Rockies BCR (Figure 9). This distribution map can be used by managers to summarize abundance for any area of interest.

We developed a hierarchical abundance model that uses the IMBCR design to improve inference of spatial variation in abundance. We improved our inference of spatial variation in abundance by including covariates on abundance for each sampled location to quantify the association between the covariate and abundance. In addition we used covariates to predicted abundance at unsampled locations to visualize the spatial pattern of abundance. This hierarchical model can be used to model habitat relationships and distribution for other species of conservation concern using the IMBCR design.

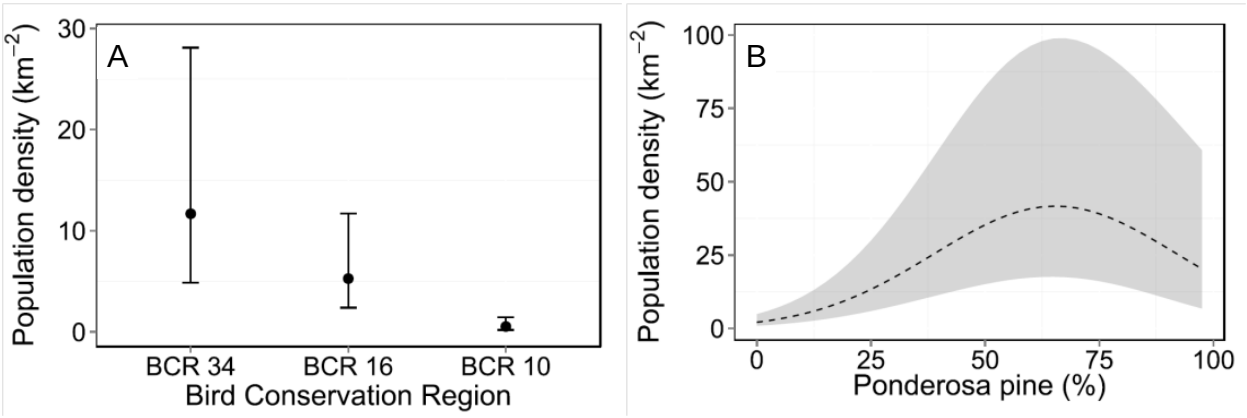

Figure 8. The estimated population density of the Pygmy Nuthatch by A) Bird Conservation Region (BCR) and B) Ponderosa Pine land cover in the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR 16). The point symbols and dashed lines are model averaged estimates of population density, and the error bars and filled regions are unconditional 95% confidence intervals.

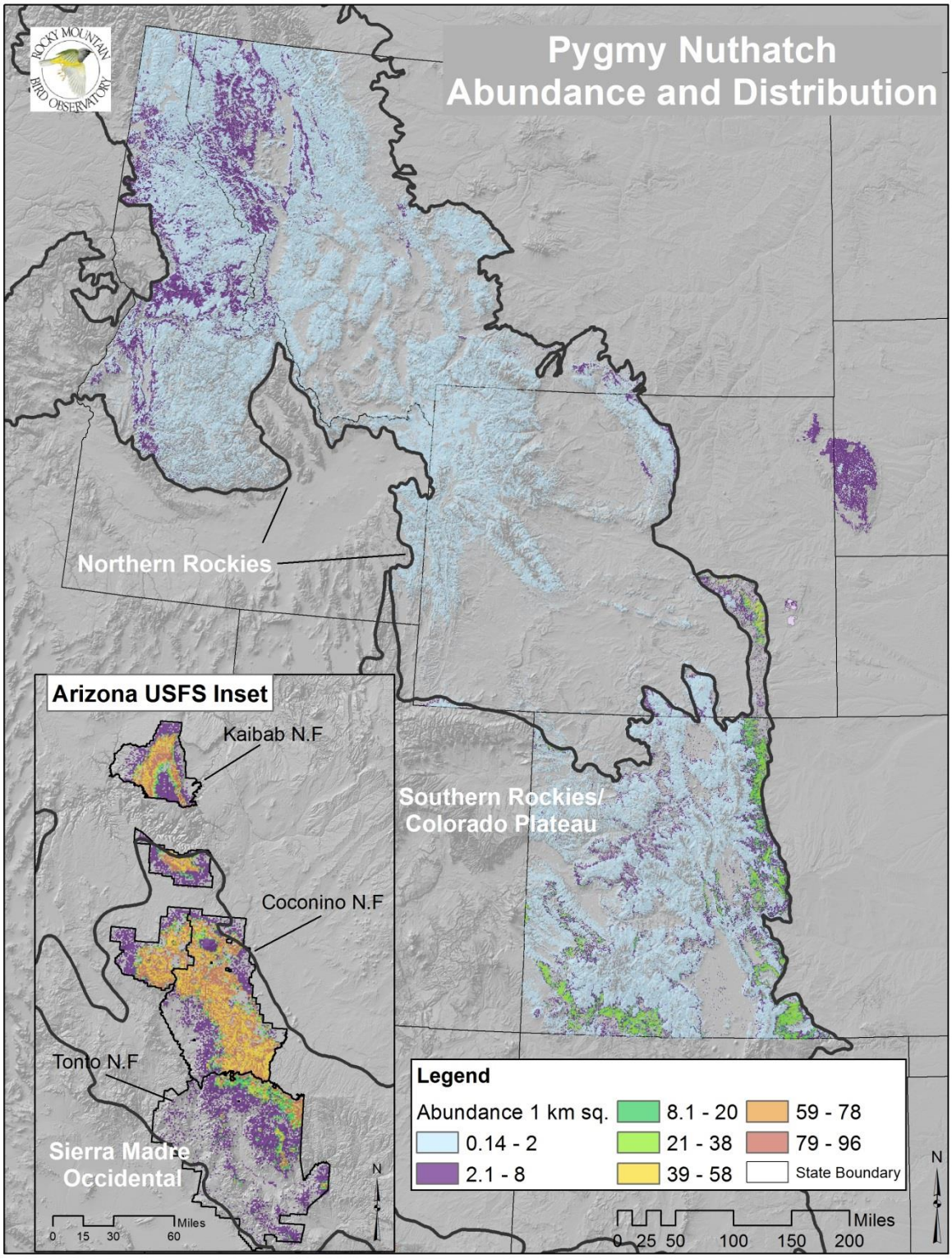

Figure 9. Model averaged abundance predictions using percent tree cover of Ponderosa Pine, Secondary Habitat cover, Elevation and BCR.

II. Evaluating the impact of roads and well pads on occupancy of three species of sagebrush-obligate songbirds

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Development associated with natural gas extraction, including roads and well pads, can have numerous effects on existing habitat and wildlife. We assessed the effects of natural gas development on the distributions of three sagebrush-obligate avian species; Brewer's Sparrow (*Spizella breweri*), Sagebrush Sparrow (*Amphispiza belli*) and Sage Thrasher (*Oreoscoptes montanus*) at a natural gas extraction site in Wyoming, USA using data collected from 2010 through 2012 under the Integrated Monitoring in Bird Conservation Regions program. Two drivers of habitat disturbance were investigated; natural gas well pads and roadways. Habitat disturbances were quantified on a small scale (minimum distance to a disturbance) and a large scale (landscape density of a disturbance) and their effects on the study species' distributions were assessed using a multi-scale occupancy model.

Minimum distances to wells and roadways were found to not have significant impacts on small scale occupancy; however, roadway and well density significantly impacted the large-scale occupancy of Sagebrush Sparrows (Figure 10) and Sage Thrashers (Figure 11). The results confirmed our hypotheses that increasing road density negatively affects the large scale occupancy rates of Sagebrush Sparrow (Figure 10) and Sage Thrasher (Figure 11), but did not confirm our hypotheses that increasing well density negatively impacts large scale occupancy.

We recommend that future well construction be focused along existing roadways, deactivation and restoration of roadways be implemented once wells are no longer in service, and that managers should consider the deactivation of roadways as a possible mitigation strategy when new roads are to be built. Habitat disturbance caused by circular well pad construction did not adversely affect sagebrush-obligate occupancy indicating that linear features affecting patch-size may be more important in determining sagebrush-obligate songbird occupancy.

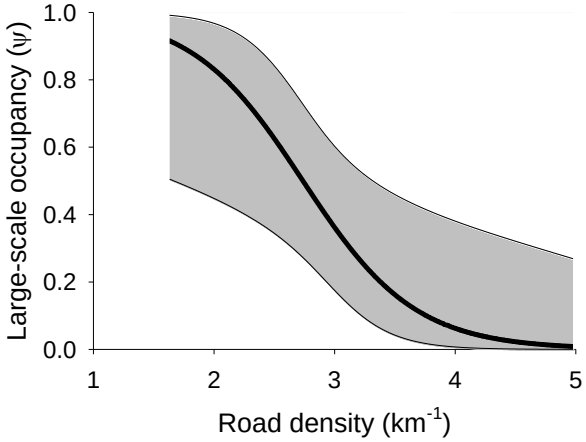

Figure 10. The estimated probability of large-scale occupancy for the Sagebrush Sparrow by road density in the high development stratum. The bold trend line represents the model averaged estimate of occupancy at mean values for the other continuous covariates in the model and the filled regions are unconditional 95% confidence intervals.

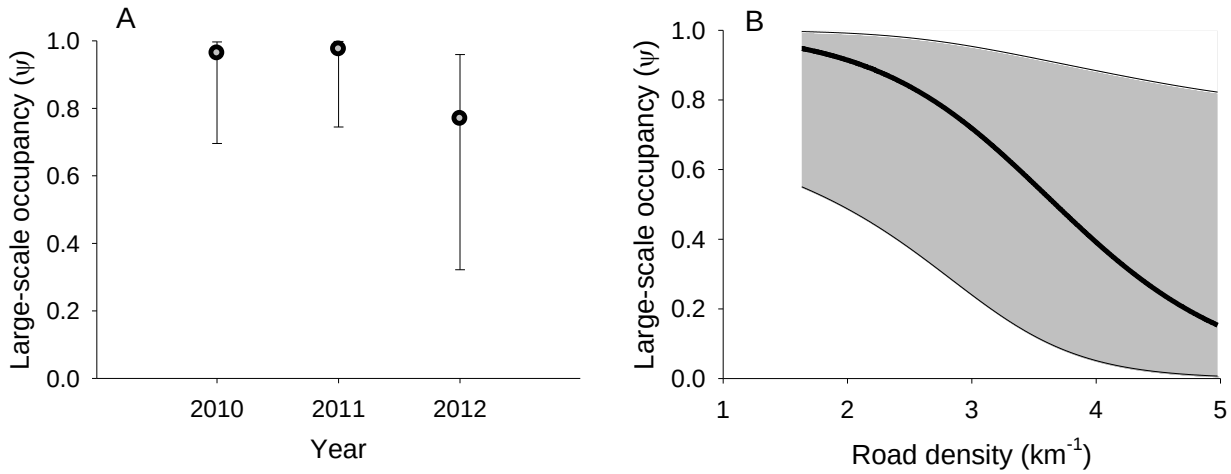

Figure 11. The estimated probability of large-scale occupancy for the Sage Thrasher by A) year in the high development stratum and by B) road density for 2012 in the high development stratum. The bold trend line represents the model averaged estimate of occupancy at mean values for the other continuous covariates in the model and the filled regions are unconditional 95% confidence intervals.

III. Sagebrush Decision Support Tool

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Introduction

Natural resource management groups are becoming more interested in utilizing decision support systems to guide management practices (Lancia et al. 1996, D'Erchia et al. 2001, Ruth et al. 2003, Lyons et al. 2008, Partners in Flight 2012). These systems provide an overview of complex ecological dynamics by incorporating spatial data, habitat features, biological information, economics, stakeholder interests, etc. These systems are most effectively applied when considering different ecosystem management strategies, especially when the land is subjected to multiple uses, stakeholders, and regulatory constraints.

The consideration of multiple objectives is important for working landscapes in privately and publicly owned sagebrush land across the west. Agriculture (including ranching), energy development, recreation, and wildlife use all need to be considered when creating land management plans. In particular, increased attention is being focused on the continuing decline of many sagebrush associated species. The State of the Birds Report for 2011 identifies that 39% of arid land (including sagebrush) bird species are of conservation concern and more than 75% are declining. Several sagebrush associated bird species have been listed by state agencies as threatened or sensitive and others have been petitioned for listing with the federal Endangered Species Act (ESA). The Greater Sage-Grouse (*Centrocercus urophasianus*) was petitioned to be listed under the ESA and determined to have a "Warranted, but Precluded" status. The US Fish and Wildlife Service will make a final determination on its status in 2015. Thus there is a need for strategic actions and proactive cooperation to protect the sagebrush ecosystem and the wildlife and stakeholders dependent on it.

The Sage Grouse Initiative (SGI) has provided unprecedented amounts of technical and financial support for the recovery of grouse populations. This presents the opportunity to ensure SGI management actions benefit other sagebrush bird needs in addition to the Greater Sage-Grouse. Accordingly, Rocky Mountain Bird Observatory's long-term conservation vision is proactive sagebrush species conservation that raises awareness and results in informed management on both private and public lands. This approach is likely to improve rangeland conditions and ensure viable populations of Greater Sage-Grouse and other sagebrush associated species throughout the Intermountain West.

Objectives

Rocky Mountain Bird Observatory has been developing a Decision Support Tool (DST) to help land managers achieve viable populations while maximizing sustainable grazing. The tool incorporates existing management strategies (i.e., State & Transition Models [STMs] for Ecological Sites) and scientifically sound bird monitoring data to ensure land managers are using an integrated and standardized framework for evaluating and managing the sagebrush landscape. The DST will identify 1) where within the sagebrush ecosystem (both within and outside of Greater Sage-Grouse core areas) resource dollars should be allocated to positively affect sagebrush obligate bird species, 2) which Conservation Practices are most applicable to achieve positive increases in targeted bird species (including Greater Sage-Grouse), and 3) the economics of implementing these practices. The preliminary objectives of the DST are to help land managers 1) increase populations of Greater Sage-Grouse, 2) increase populations of sagebrush obligate songbird species and 3) maximize sustainable grazing.

This DST will enhance the utility of Ecological Site Descriptions (ESDs) as a management tool in the sagebrush ecosystem by incorporating wildlife habitat information. Williams et al. (2011) tested the ability of ESDs to identify songbird density and diversity in northwest Colorado. RMBO and its partners will build and expand upon these findings by developing a DST that integrates bird monitoring data across public and private lands with ESDs across the sagebrush range so that more informed management decisions can be made. This project is unique as it will incorporate a multi-species approach to complement the Sage Grouse Initiative by using two years of IMBCR monitoring data to inform the models and management strategies. The information used to build the DST and guide management decisions will be organized and readily accessible to land managers.

Description

We are analyzing regional monitoring data to estimate occupancy rates for several sagebrush obligate species, including Greater Sage-Grouse, Sagebrush Sparrow (*Amphispiza belli*), Sage Thrasher (*Oreoscoptes montanus*), and Brewer's Sparrow (*Spizella breweri*). The data was collected using the IMBCR framework and includes information collected at 15,270 point count locations across the sagebrush ecosystem in Colorado, Wyoming, Montana, Idaho, and North and South Dakota from 2010 – 2011 (White et al. 2012, Hanni et al. 2013). Habitat relationship models will help determine how management actions can influence the vegetation structure of different sagebrush communities and in turn affect the local occurrence of the bird species. In addition, distribution maps for the bird species are created to determine occurrence of the bird species at the landscape scale.

To be compatible with existing conservation planning efforts, a map of pertinent Ecological Sites will be overlaid with the bird data within each Major Land Resource Area. By overlaying the two types of data the habitat preferences of bird species are linked to ecological sites. The habitat relationship models will be used in a structured decision making process to determine the optimal management actions that maximize stakeholder objectives while also maximizing the occurrence of Greater Sage-Grouse and other sagebrush obligate bird species. Because one of

the objectives is to maximize sustainable grazing across an agricultural landscape, we incorporate the following SGI Conservation Practices:

- Shrub Management-Sagebrush
- Shrub Management-Conifer
- Prescribed Grazing
- Prescribed Grazing and Shrub Management-Sagebrush
- Deferred Grazing

Using the DST
Based on the condition of a particular management unit, land managers will be able to determine not only what the most effective Conservation Practices are but where on the landscape to do them. Land managers will input existing and desired landscape conditions into the web-based DST. The DST will quantify changes in the occupancy rates of sagebrush obligate birds under different management scenarios to determine which practices will provide the greatest net return at the local scale. At the landscape scale, the DST will use Greater Sage-Grouse core area maps and bird distribution maps to determine the most effective places to enhance habitat for sagebrush obligate bird species. Training on how to use the tool will be provided during training sessions and webinars. This project will help biologists, landowners and land managers identify the potential of their land for supporting a diversity of sagebrush birds. Such documentation will help landowners rank higher when applying for financial or technical assistance programs such as the Environmental Quality Incentives Program.

In summary the DST can:

1. Check assumptions and help make management decisions – land managers are generally aware of the best management land practices to accomplish specific objectives, such as increasing grazing production. This tool can help land managers evaluate assumptions for how management affects sagebrush obligate bird species.

2. Provide estimates of how much habitat was created after management was implemented – the tool can be used to estimate how bird species occupancy will increase or decrease according to what management actions were implemented.

3. Increase land managers awareness of sagebrush birds and their habitat needs and demonstrate how sagebrush bird conservation can be incorporated into land management actions.

IV. An Evaluation of Monitoring Programs to Assess Status of Avian Management Indicator Species on the Black Hills National Forest

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The USFS uses ecological indicators, termed management indicator species (MIS), to evaluate management actions and to improve the status of ecosystems. The Black Hills National Forest (BHNF) identified five non-game avian MIS: 1) black-backed woodpecker (Picoides arcticus), 2) brown creeper (Certhia americana), 4) golden-crowned kinglet (Regulus satrapa), 4) song sparrow (Melospiza melodia), and 5) grasshopper sparrow (Ammodramus savannarum). Starting in 2001 data has been collected to monitor population status of multiple avian species,

including the five MIS, on BHNF using habitat-stratified monitoring (MBBH) and the integrated monitoring in bird conservation regions (IMBCR) programs. We evaluated the MBBH and IMBCR to monitor population trend of these MIS. The precision of the density estimates for all five MIS were similar between the MBBH and IMBCR programs and the ability to detect a trend is high (>0.9). Data from the IMBCR was used to estimate occupancy which was only feasible on the brown creeper and golden-crowned kinglet due to low numbers of observations. We recommend the continuation of the IMBCR program with a minimum of 75 transects with 90-100 transects producing more reliable results for rare species such as the MIS. Lastly, we recommend three options to monitor population trend for species that are habitat-specific and rare such as the black-backed woodpecker: two-stage sampling, network sampling, or increased number of IMBCR transects. The latter approach has additional benefits for other avian species but additional data based on additional transects (>75 transects per year) and years need to be collected to further evaluate this option.

V. A multi-scale perspective for managing prairie avifauna assemblages across the Western US

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Biodiversity metrics are common indicators for ecosystem services, such as food production. Future demands for increased food production are expected to have severe impacts on prairie biodiversity and ecosystem integrity. The North America prairie avifauna has experienced drastic population declines, prompting numerous conservation efforts, which have been informed primarily by local scale studies. We used a multi-scale perspective to disentangle local- and broad-scale avian responses by analyzing observations of 20 prairie bird species of concern, including 17 grassland obligates and 3 sagebrush obligates, from 2009-2012. The study area covered over 140 000 000 ha situated within the prairie landscape of the US; covering seven western states and six Bird Conservation Regions. Within our study area, we overlaid land cover data from the USGS National Gap Analysis Program to select sampling plots containing prairie habitats (< 30% Forested & Woodland; n = 413). We used a multi-species model to examine the relationship of habitat, land ownership and latitude to broad-scale species richness. Our findings suggest that patterns and processes influencing avian assemblages at local scales may not function at broad scales. Local-scale information can document species presence within a study area, but broad-scale studies provide an essential complement to inform conservation actions and policies by placing local biodiversity in the context of an entire region or ecosystem.

VI. The response of songbird communities to pine beetle outbreaks on National Forest Lands

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Changes in ecosystems resulting from the demand for commodities and increased rates of resource consumption have been linked to population declines and losses in biodiversity worldwide. A common goal of many management policies is to increase, or at least maintain, biological diversity and ecosystem functions. Forest ecosystems have the potential to support greater levels of biological diversity than any other terrestrial ecosystem. Factors such wildfire and insect outbreaks alter forest ecosystems. Natural resource managers require information to promote positive ecological outcomes and ameliorate deleterious practices where and when they occur. Monitoring the entire set of forest system attributes exceeds the capacity of resource managers due to the paucity of funds, time, and knowledge because it is not possible to survey the distribution of all organisms. The use of ecological indicators is often suggested as a way to reconcile these opposing forces of complexity and practicality.
Ecological indicators must be selected that can be monitored effectively and efficiently to provide information about different aspects of ecosystem changes over multiple landscape scales to provide insights for management. Avian species, songbirds in particular, are often used as ecological indicators for many reasons including: 1) they have high social value, 2) their life history characteristics are well understood, 3) their distributions are relatively broad, 4) they are easily detected, 5) they include a wide range of trophic guilds, and 6) they are known to respond quickly to changes in habitat quality over multiple landscape scales. Songbirds are ubiquitous across forests worldwide and possess attributes of ecological indicator species capturing the complexity of forests over large landscapes in a straightforward and interpretable framework to inform forest management. We will examine the response of songbirds to pine beetle outbreaks in four national forests in Region 2 – Arapaho Roosevelt, Medicine Bow, Routt, and White River based on IMBCR data.

DISCUSSION

The Integrated Monitoring in Bird Conservation Regions Program collects breeding bird information in all or portions of 13 states annually. Each year, occupancy and density estimates are calculated at a variety of spatial scales. This information can be used in the following ways to inform avian conservation:

1. Bird Population estimates can be compared in space and time. Stratum-level estimates can be compared to state and regional estimates to determine whether local populations are above or below estimates for the region.

   Example: Bobolink is designated as a Common Bird in Steep Decline and a U.S and Canada Concern species in BCR 17 by Partners in Flight (Appendix B). We can compare any of the strata or combinations of strata within BCR 17 to the BCR-wide estimate. The density estimate for Bobolink in Knife River Indian Villages NHS is much higher than the BCR 17 estimate, indicating that Knife River may have excellent habitat for this species. On the other hand, Theodore Roosevelt National Park actually had a lower density estimate than BCR 17 overall. There could be a number of reasons to explain this, one being a lack of appropriate habitat for Bobolink in the Park. If land managers are interested in maintaining a healthy Bobolink population in BCR 17, they could compare stratum-level estimates and then attempt to protect areas where the species is doing very well while targeting areas with low population estimates for habitat management projects.

   Table 3. Density estimates for Bobolink in Bird Conservation Region 17, Theodore Roosevelt National Park, and Knife River Indian Villages National Historic Site, 2013. The estimated densities per km^2 (D), the total estimated population size of the study area (N), the percent coefficient of variation of estimates (% CV) and the number of independent detections used in analyses (n) are shown.

Stratum/Superstratum	D	N	% CV	n
BCR 17	2.15	783,522	42	334
Theodore Roosevelt National Park	1.12	328	57	9
Knife River Indian Villages NHS	51.68	258	11	155

2. Population estimates can be used to make informed management decisions about where to focus conservation efforts. For example, strata with large populations can be targeted for protection and strata with low populations can be prioritized for conservation action; a threshold could be set to trigger a management action when populations reach a predetermined level.

   Example: Brewer's Sparrow is designated as a Species of Greatest Conservation Need by Wyoming Game and Fish and a Sensitive Species by the Bureau of Land Management in Wyoming. Population estimates were generated for several BLM field offices within the state of Wyoming. Comparing Brewer's Sparrow population estimates across the various offices shows that the largest estimated population size falls within the Rawlins field office (Table 4). When comparing population sizes it is also important to look at the size of the area involved. Rawlins is the second largest field office in Wyoming, after the Rock Springs field office. Rock Springs has the largest area and yet has a smaller population size than Rawlins. It also has the smallest density estimate compared to the other field offices and statewide BLM estimates. This may indicate the need for further investigation to determine why this may be. Perhaps the Rock Springs BLM field office naturally contains less ideal habitat for Brewer's Sparrow or there could be anthropogenic disturbances that are

contributing to the lower population densities.

Table 4. Density estimates for Brewer's Sparrow in Wyoming and on BLM Lands in Wyoming, 2013. The estimated densities per km^2 (D), the total estimated population size of the study area (N), the percent coefficient of variation of estimates (% CV), the number of independent detections used in analyses (n), and the total area (in km^2) are shown.

Stratum/Superstratum	D	N	% CV	n	Area (km^2)
WY	24.20	6,134,460	16	1235	253,467
WY-BLM	33.12	2,377,177	21	557	71,773
Buffalo Field Office	57.78	184,885	62	60	3,200
Casper Field Office	56.33	293,167	35	82	5,204
Pinedale Field Office	66.34	244,577	21	175	3,687
Rawlins Field Office	23.75	331,473	31	62	13,954
Rock Springs Field Office	19.66	297,874	39	51	15,152

3. Stratum-level population estimates of treatment areas can be compared to regional estimates to evaluate effectiveness of management actions. For example, if sagebrush habitat is being treated to improve habitat for Greater Sage-grouse (GRSG) these areas can be defined as an individual stratum and sampling can take place within the stratum. If estimates for sagebrush-obligate songbirds increase within this stratum compared to regional estimates, the results would suggest that the GRSG management actions are also beneficial to sagebrush-obligate songbird species.

   Example: In 2015 we will create and survey within a new stratum encompassing the Flagstaff Watershed Project Area in Coconino National Forest. The goal of the project is to thin Mixed-Conifer habitat within the Flagstaff Watershed to reduce the potential for a catastrophic fire event. The surveys will be conducted pre- and post-thinning and the estimates generated can be compared to forest-wide estimates for Coconino National Forest.

4. Annual estimates of density and occupancy can be compared over time to determine if population changes are a result of population growth or decline and/or range expansion or contraction. For example, if population densities of a species declined over time, but the occupancy rates remained constant, then the population change was due to declines in local abundance. In contrast, if both density and occupancy rates of a species declined, then population change was due to range contraction.

   Example: Hairy Woodpecker is a Management Indicator Species in Idaho Panhandle National Forest. We've been monitoring in this forest since 2010, and if we look at 2010 through 2013 estimates there appears to be a decline in density over time. Similarly, there appears to be a decline in occupancy from 2010 – 2013 as well. This seems to indicate that Hairy Woodpeckers may be undergoing a range contraction within Idaho Panhandle NF. These results indicate further research on Hairy Woodpecker may be warranted in the forest to determine the reason for the range contraction.

Table 5. Density and Occupancy estimates for Hairy Woodpecker in Idaho Panhandle National Forest, 2010 – 2013. The estimated densities per km^2 (D), the total estimated population size of the study area (N), the percent coefficient of variation of estimates on density (D %CV), the number of independent detections used in density analyses (n), estimated proportion of 1 km^2 sample units occupied (Psi), percent coefficient of variation of Psi (Psi % CV), and number of sample cells with one or more detections used to calculate occupancy (nTran) are shown.

Year	D	N	D %CV	n	Psi	Psi %CV	nTran
2010	10.29	121,630	25	15	0.901	16	10
2011	5.92	69,980	42	6	0.889	28	6
2012	3.89	45,931	31	14	0.702	6	12
2013	3.48	41,132	37	11	0.536	8	10

5. Occupancy rates can be multiplied by the land area in a region of interest to estimate the area occupied by a species. For example, if a stratum comprises 120,000 km^2 and the occupancy estimate for Western Meadowlark is 0.57, managers can estimate that 68,400 km^2 (120,000 km^2 * 0.57) of habitat within that stratum are occupied by Western Meadowlarks.

   Example: Sprague's Pipit is a priority species in Montana as designated by Montana Fish, Wildlife, and Parks. The occupancy estimate for Sprague's Pipit is 0.028 and the total area of the Montana superstratum is 381,540km^2. Multiplying the occupancy estimate by the area gives an estimate of 10,683km^2 of habitat occupied by Sprague's Pipit in Montana. This information can be used by land managers to set goals for how much habitat should be provided for the species in Montana.

In 2013, the Integrated Bird Monitoring in Bird Conservation Regions Program continued to make achievements towards understanding the status and annual changes of bird populations within nine BCRs and 13 states of the monitoring region. Successes included a productive field season, advances in automated population estimation and an increase in the number of auxiliary projects. The IMBCR program provides population estimates in an efficient, adaptive framework that informs the conservation and adaptive management of bird populations at multiple scales. Currently, IMBCR data are being used to model bird-habitat relationships and map species distributions with applications to habitat management, conservation planning and the development of decision support tools.

To the credit of our implementation partners, the Avian Science Center, Idaho Bird Observatory, and Wyoming Natural Diversity Database, we achieved a 99.6% completion rate of planned field work. A streamlined landowner contact system and an improved web-based data entry system, both accomplished by RMBO, also contributed to success in the field. In 2013, we expanded our area of inference for the IMBCR monitoring program to 1,215,959 km^2 (> 300,000,000 acres). Within this region, the stratified design provided population estimates at the level of management units to suit partner needs. The collaboration across organizations and spatial scales contributed to the sampling efficiency of the monitoring program. Increasing the spatial extent and combining data across management units increased sample sizes, and improved the accuracy and precision of the population estimates. The IMBCR collaboration allowed the estimation of common detection probabilities for species that would have otherwise had an insufficient number of detections within individual management units. Combining detection data across additional years allowed us to estimate population densities for several infrequently detected species.

The automation of the density and occupancy analyses by Paul Lukacs of the University of Montana has further increased the efficiency of the monitoring program. The automated analysis package, RIMBCR, was developed using the free software environment R (R Core Team 2012). The RIMBCR package calls raw data from the database, estimates population parameters using previously established methods and combines population estimates at biologically relevant scales. The time previously spent generating population estimation for hundreds of bird species and strata will now be available for applying IMBCR data to important conservation issues facing the avifauna of the region.

Auxiliary, or "overlay", projects are a growing component of the IMBCR program that improve efficiency and can be tailored to address specific management questions. Auxiliary projects utilize the IMBCR sampling design and field methods but are not integrated into the nested stratification of the IMBCR program. These projects benefit from the IMBCR program by incorporating detection data from relevant IMBCR surveys in analyses. Utilizing the IMBCR design also allows the resulting population estimates to be placed in a regional context. In this way, the collaborative efficiency of the IMBCR program is extended to auxiliary projects by improving the accuracy and precision of population estimates, and allowing population estimates for infrequently detected species. In a similar fashion, data collected as part of auxiliary projects contributes to the efficiency of the IMBCR program. The project entitled "Monitoring Birds in the Atlantic Rim Natural Gas Development Project Area" is an example of an auxiliary project conducted jointly by the BLM and Rocky Mountain Bird Observatory. We monitored bird populations on the Atlantic Rim Natural Gas Development Project Area to investigate the influence of oil and gas development on the bird community (Van Lanen et al. 2012). This project found few differences between bird communities in high and low development areas, but bird species richness was much greater for the Atlantic Rim than other BLM lands in the Northern Rockies BCR, highlighting the conservation value of the Atlantic Rim Project Area (Van Lanen et al. 2012).

The availability of consistent monitoring data at multiple scales is an important challenge for avian conservation (Ruth et al. 2003). The IMBCR program is well positioned to address conservation and management needs of a wide range of stakeholders, landowners and government entities at various spatial scales. The program was designed to provide accurate information about bird populations from the scale of local management units to the scale of BCRs. The hierarchical framework of nested strata is useful for partitioning bird populations according to management units, and aggregating bird populations at various scales to support large-scale conservation efforts. At the scale of management units, IMBCR population estimates can be used to support local management efforts. Monitoring at regional and BCR scales provides land managers with dependable knowledge about the status and change of bird populations at ecologically relevant scales (US North American Bird Conservation Initiative 2009). In addition, the population estimates at the scale of management units can be compared to those at the BCR scale to place the population estimates in a regional context. The large-scale context provides biological information for conservation planning and allows an assessment of conservation responsibility.

By focusing on multiple scales relevant to management and conservation, IMBCR can easily be integrated within an interdisciplinary approach to bird conservation that combines monitoring, research and management (Ruth et al. 2003). The IMBCR program accommodates the principles of adaptive monitoring (Lindenmayer and Likens 2009): 1) address well-defined and tractable questions; 2) underpinned by rigorous science ; 3) based on a conceptual model of how bird populations function; and 4) relevant to the management of natural resources. Under the adaptive monitoring framework, the objectives, sampling design, data collection, analysis and interpretation are iterative. This allows the program to evolve and develop in response to new information or new management questions. For example, The IMBCR program allows for

different stratification schemes and the re-stratification of local management units to better address partner management objectives. The flexible hierarchical design accommodates annual re-stratification and fluctuation of sampling intensity without compromising the regional population estimates. Because IMBCR strata are based on fixed attributes rather than existing vegetation types, the Program is in a strong position to directly tie changes in bird populations to changes in vegetation at multiple scales. The hierarchical stratification scheme is well suited for linking bird population responses to climate and landscape change at biogeographical scales (Opdam and Wascher 2004). Finally, the IMBCR program uses the best available science to support the management of natural resources by providing bird population estimates that appropriately account for spatial variation and incomplete detection (Pollock et al. 2002, Rosenstock et al. 2002, Thompson 2002). The population density estimates are useful for evaluating temporal and spatial trends in population size. The occupancy estimates are able to track temporal and spatial trends in the area occupied, including range contraction and expansion.

Monitoring is integral to the management and conservation of wildlife populations (Marsh and Trenham 2008, Sauer and Knutson 2008). In particular, monitoring is necessary for the adaptive management of wildlife populations (Nichols and Williams 2006, Lyons et al. 2008). Monitoring in adaptive management is used to 1) make state-dependent management decisions, 2) evaluate the effectiveness of management, and 3) improve understanding of the system (Lyons et al. 2008). For example, management decisions may depend on the state of a bird population and a threshold can be set to trigger a management action when the population reaches a predetermined level. Bird population monitoring is also necessary to determine if management actions implemented in previous management cycle(s) are achieving conservation objectives. The population estimates within management units can be compared over time and space, and to average conditions in the region to evaluate effectiveness of management actions. Monitoring data are also useful for evaluating competing hypotheses about how bird populations respond to system dynamics. A better understanding of regional bird population dynamics will help land managers predict species responses to landscape change and large-scale conservation efforts (Jones 2011, Noon et al. 2012).

The population estimates for a particular species or group of species can be used to make informed management decisions about where to focus conservation efforts. For example, management units with large populations can be targeted for protection and management units with small populations can be prioritized for conservation action. Although IMBCR does not employ stratification by existing vegetation, the monitoring data can easily be post stratified to estimate vegetation-specific population density and occupancy rates. The IMBCR program is a rich data source for modeling habitat relationships, as well as developing spatially explicit abundance and occupancy maps. Recently, RMBO completed a project to determine multi-scale habitat relationships for sagebrush birds. This project used vegetation data collected at sampling points to model habitat relationships, and digital land cover data within sampling units to map bird occupancy rates at large-scales. In addition, RMBO adapted a hierarchical model developed by Chandler et al. (2011) to the IMBCR design that allows the prediction and mapping of bird population densities at large-scales. The IMBCR design provides a legitimate way to extend the population estimates to un-sampled regions, and the models provide population estimates that are adjusted for incomplete detection. The population estimation approach to species distribution modeling represents an improvement over opportunistic, index-based approaches (Rota et al. 2011), especially when the fate of declining species depends on conservation action. The large-scale species distribution maps and local habitat relationships are useful for answering the “where” and “what to do” questions in conservation planning (Wilson et al. 2007). The bird distributions can be summarized for un-sampled management units and regions, extending the ability of IMBCR to inform management and assess conservation responsibility.

The IMBCR data provide a source for the development of decision support tools to help land managers and resource professionals address important conservation issues. RMBO is currently developing a decision support tool that will assist resource professionals, land managers, and private landowners in managing the sagebrush bird community. The foundation of the tool will be species distribution maps to prioritize landscapes for conservation and bird-habitat relationships to evaluate the effectiveness of conservation practices. Decision support tools that integrate biological, social and economic objectives are important for cost effective conservation outcomes in working landscapes.

Land managers and conservation organizations can use IMBCR population estimates to better understand annual trends in landbird populations (US North American Bird Conservation Initiative 2009). Simulations using 10 years of data from a similar avian monitoring program (J. Blakesley, RMBO, unpublished) indicated this monitoring program would have 80% power to detect an average annual decline of 3% in a population within 25 years when % CVs of the estimates are ≤ 40%. A similar trend could be detected within 30 years with a % CV of ≤ 50%. The ability to detect population trends for any species is a function of the sampling effort, abundance and annual variation of abundance for individual species. Some grassland bird species such as Lark Bunting shift their breeding ranges from year to year based on environmental conditions (Shane 2000), resulting in abundance estimates that fluctuate significantly among years. More precise density estimates will be required to monitor population trends within 25-30 years for species exhibiting larger degree annual variation in density and abundance estimates. Currently, we are investigating Bayesian trend estimation, which should have greater power to detect a trend, and also will provide estimates of the probability that a species is declining. The IMBCR data can also be used to investigate population, metapopulation and community dynamics over time. Annually surveyed sampling units provide the information on dynamic processes that give rise to the patterns of abundance, occupancy and species richness over time.

The primary limitation in estimating avian population parameters using the IMBCR approach is sample size within strata. The minimum number of samples per stratum necessary to estimate regional density and occupancy is two samples. However, reliable stratum-level occupancy estimates require larger samples sizes, with a minimum of approximately 10 samples per stratum. Furthermore, additional samples may be required for strata comprising large geographic areas. Because we estimate regional density and occupancy using an area weighted mean, estimates from large, under-sampled strata often receive more weight than estimates from small, well sampled strata.

Although the importance of long-term and intensive population monitoring is well known, it is expensive, with costs typically determining the sampling effort. The IMBCR design reduces costs through cooperation with multiple partners, one of the stated goals of effective collaboration and coordinated bird monitoring (US North American Bird Conservation Initiative 2007). Partners and managers can investigate other priority species and taxa with only slight modifications to the IMBCR design, further reducing costs associated with developing new studies and monitoring programs. Ideally, these cost savings can be used to increase sample efforts, particularly in under-sampled strata, and conduct additional avian-habitat relationship analyses.

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APPENDIX A: AVIAN DATA CENTER USAGE TIPS

Overview

All results, including parameter estimates, distribution maps, raw count data, and effort are available online and are not presented in this report. To view interactive maps showing survey and detection locations, species counts, and density, population and occupancy results using the IMBCR study design please visit the Rocky Mountain Avian Data Center at http://rmbo.org/v3/avian/ExploretheData.aspx. Click on the "Explore the Data" tab to view IMBCR results.

The Avian Data Center has been designed to provide information for specific questions and therefore works best when users select multiple filters for a query. To run a query, click the arrow for the drop down "Filter" menu (located in the extreme upper left corner of the screen) and select one of the following filter types: Study Design, BCR, State, County, Management Entity, Priority Species List, Species, Year, Super Stratum, or Individual Stratum. After selecting the filter type, click the "Add" button immediately to the right of the drop down menu. A box will appear with options for the filter that you may select. Use the drop down menu in the box to select the specific filter and then click "Add filter". The selected filter will appear near the top of the screen. Users may add multiple filter types to view results for a very specific inquiry (e.g., to view IMBCR results for BRSP in CO you would apply the following filters: Study Design = IMBCR, Species = Brewer's Sparrow, and State = CO) or to view multiple outputs at once (e.g., to view data and results for Brewer's Sparrow and Vesper Sparrow at the same time select Species = Brewer's Sparrow and Species = Vesper Sparrow). Below is an explanation of the different filter types you may choose from.

Study Design: This filter will allow users to select data and results for IMBCR, , GRTS, Migration phenology, NEON, or NPS study designs.

- Selecting the GRTS filter will display data and results for monitoring efforts which used the IMBCR design but do NOT contribute to state-wide and regional estimates (these have been called "overlays" at some of the IMBCR meetings).
- The IMBCR filter will select data and results collected under the IMBCR protocol that contribute to state and BCR-wide estimates.
- The Migration Phenology filter will select data and results for the Migration Phenology project.
- The NEON study design is a specific study design developed by NEON and RMBO for surveys conducted at NEON research locations.
- The NPS study designs are a mixture of study designs specifically designed for individual national parks. Please note that we are still working on adding some of the historic data to the Avian Data Center so not all study designs are currently available.

BCR: This filter will allow users to select IMBCR data and results for a particular Bird Conservation Region. Selecting this filter will provide you with results for all strata and super strata within a particular BCR.

State: This filter will allow users to select data and results for all study designs for a particular state. Selecting this filter will supply the user with IMBCR data and results for all strata and super strata within a particular state.

County: This filter will allow users to select data for a particular county. Please note that only raw count data and survey locations are available at the county level.

Management Entity: This filter will allow users to select data and results for All Other Lands, Colorado State Land Board, The Nature Conservancy (TNC), US Bureau of Indian Affairs (BIA),US Bureau of Land Management (BLM), US Department of Defense (DOD), US Fish and Wildlife Service (USFWS), US Forest Service (USFS), or National Park Service (NPS). Once a management entity is chosen, users may notice that additional filter types are available in the filters drop down list. These additional filter types, listed from most general to most specific, are management regions (e.g., USFS Region 1), management units (e.g., Dakota Prairie Grasslands), management forests (e.g., Shoshone National Forest), or management districts (e.g., North Kaibab district within Kaibab National Forest). Below is the filter hierarchy for the different management entities.

Priority Species List: This filter will allow users to select data and results for multiple species at once. The query will display data and results for all species included on the selected management indicator list, species of conservation concern list, etc.

Species: This filter allows users to select data and results for a particular species.

Year: This filter will allow users to select all data and results for a particular year.

Super Stratum: This filter allows users to select IMBCR data and results for multiple strata that were analyzed jointly (e.g., the entire Bridger-Teton National Forest which was broken up into 2 strata or the entire state of Colorado which was broken up into 30 strata).

Individual Stratum: This filter allows users to select IMBCR and GRTS data and results for a particular stratum.

Hierarchy for the different management entities

All Other Lands:
Tier One – Management Entity – All Other Lands
Tier Two – Management Region – Not applicable
Tier Three – Management Unit – Not applicable
Tier Four – National Forest or Grassland – Not applicable
Tier Five – Management District – Not applicable

Colorado State Land board:
Tier One – Management Entity – Colorado State Land Board
Tier Two – Management Region – Lowry Range
Tier Three – Management Unit – Not applicable
Tier Four – National Forest or Grassland – Not applicable
Tier Five – Management District – Not applicable

TNC:
Tier One – Management Entity – The Nature Conservancy
Tier Two – Management Region – Cherry Creek
Tier Three – Management Unit – Not applicable
Tier Four – National Forest or Grassland – Not applicable
Tier Five – Management District – Not applicable

Tribal Lands:

Tier One – Management Entity – US Bureau of Indian Affairs
Tier Two – Management Region – Reservation
Tier Three – Management Unit – Not applicable
Tier Four – National Forest or Grassland – Not applicable
Tier Five – Management District – Not applicable

BLM:
Tier One – Management Entity – Bureau of Land Management
Tier Two – Management Region – BLM Field Office
Tier Three – Management Unit – Not applicable
Tier Four – National Forest or Grassland – Not applicable
Tier Five – Management District – Not applicable

DOD:
Tier One – Management Entity – US Department of Defense
Tier Two – Management Region – US DOD Installation
Tier Three – Management Unit – Not applicable
Tier Four – National Forest or Grassland – Not applicable
Tier Five – Management District – Not applicable

USFWS:
Tier One – Management Entity – US Fish and Wildlife Service
Tier Two – Management Region – USFWS Region
Tier Three – Management Unit – USFWS Management Unit, Refuge, etc.
Tier Four – National Forest or Grassland – Not applicable
Tier Five – Management District – Not applicable

USFS:
Tier One – Management Entity – US Forest Service
Tier Two – Management Region – USFS Regions
Tier Three – Management Unit – National Forest (NF) or National Grassland (NG) management units (used to represent situations where multiple forests are managed jointly)
Tier Four – National Forest or Grassland – NF or NG
Tier Five – Management District – NF or NG Ranger Districts

NPS:
Tier One – Management Entity – National Park Service
Tier Two – Management Region – Inventory and Monitoring Network
Tier Three – Management Unit – Individual NPS Parks, Monuments, Memorials, Recreation Areas, and Historic Sites
Tier Four – Management Forest – Not applicable
Tier Five – Management District – Not applicable

Clearing Filters
Filters can be cleared in one of two ways. You may click on the circled “X” to the left of an individual filter at the top of the screen to remove it or you may click the “clear all filters” button at the top of the screen to start building a new query.

Running Queries
Once you have selected your desired filters, please click on the “Run Query” button located at the top of the screen. The amount of time it takes for the desired data and results to be displayed will depend on how specific your query is.

Comparing Multiple Queries
Users may view results of multiple queries at once. To do this, run the first query as described above and then click the button “New Query Window” (located at the top of the screen). A new window will appear where a separate query can be run. The two windows can then be viewed side by side.

Share a Created Query with a Colleague
It is possible to create a link to the Avian Data Center/ Explore the Data screen with a pre-loaded set of filters for a query. To do this, add the custom set of filters for your query per the instructions above and then click the “Generate URL” button near the top right corner of the screen. A pop-up box will appear with a highlighted URL address. Once you copy the highlighted text you may paste the URL address into an email or document using conventional means. Please note that whoever receives the URL address will need to run the query after clicking on the link to see the survey locations, results, and raw count statistics for the set of filters of interest.

Viewing Maps (Map Tab)

What is displayed?
By default, the map tab is the initial start-up page. After clicking the “Run Query” button, the ADC will display a map of all survey locations corresponding to your set of filters (surveyed sampling units are represented by blue semi-transparent circles) in Google Earth. If you have filtered by species, survey locations where that species was not detected will be represented by the blue circle. Locations where a survey was conducted and the target species was detected will have a pink dot in the center of the blue circle. To see the specific name of a survey location, hover the mouse arrow over the blue circle. After a moment the name of the surveyed sampling unit should appear. You may view the bird detection information for a sampling unit and the survey dates by left clicking your mouse on the blue circle.

By default, the zoom capability of the maps page is restricted to protect the privacy of private landowners. Funding and/or implementation partners wishing for more precise location information to be displayed should request a password from RMBO IT staff via email. Once a user has a password, click on the “View Options” button at the top of the screen, enter the password in the “Password for RMBO staff and partners” field, and click “Save”. If you have run a query prior to entering the password, you will need to click the “Run Query” button again in order to utilize the enhanced zooming features now available to you.

Adding map layers
You may add the following layers to the map: Bird Conservation Region boundaries, BIA boundaries, DOD boundaries, NPS boundaries, USFS boundaries, and BLM field office boundaries. To do this, left click on the drop down menu at the top left corner of the map, select the desired layer, and click the “add layer” button. It is possible to add multiple layers to the map by repeating this process. If you left click your mouse inside of any of these boundaries a text box will appear that contains the name of the region encompassed by the boundary.

Viewing Occupancy/Density Results (Occupancy and Density Tabs)

Viewing Tables
You may view a table of occupancy or density results and a chart for all appropriate strata (based on the set of filters) for which we have results by clicking on the tabs labeled “Occupancy” or “Density”. These tabs are located just below the drop down filter menu in the upper left corner of the screen. The occupancy tables will display the species for which the estimate was produced, the stratum the estimate pertains to, the year, Psi (proportion of

sampling units expected to be occupied), the number of sampling units the species was detected on, the standard error (SE) of the estimate, and the percent coefficient of variation (% CV). The density tables will display the species for which the estimate was produced, the stratum or habitat type that the estimate pertains to, the year, the number of birds expected per km^2 (D), the total number of individuals expected to reside within the stratum (N), the percent coefficient of variation (% CV), and the number of independent detections used in analyses (*n*). You may view a description of the column headings by moving the mouse arrow over the column heading. You may also sort the table by clicking on any of the column headings.

Viewing the Charts

When viewing the occupancy and density charts, the point estimate of Psi or D is indicated with a dot. Additionally, short horizontal dashes above and below the point estimate represent values one standard error away from the point estimate. To view the species, stratum, and year that correspond to an estimate on the chart, simply move your mouse arrow over the point estimate or standard error bar. A message will pop up with the appropriate information. If you have queried out multiple years of data the point estimates for each year will be connected with a solid line. You may remove an individual estimate from the chart by clicking on the corresponding row of the table on the left side of the screen. Estimates that are not displayed on the chart will turn a peach color in the table. You may add the estimate back onto the chart by clicking on the peach colored row in the table.

How to interpret the estimates

The Integrated Monitoring in Bird Conservation Regions Program annually collects breeding bird information in all or portions of 13 states. Each year, occupancy and density estimates are calculated at a variety of spatial scales. This information can be used in the following ways to inform avian conservation:

1. **Bird Population estimates can be compared in space and time.** For example, stratum-level estimates can be compared to state and regional estimates to determine whether local populations are above or below estimates for the region;
2. **Population estimates can be used to make informed management decisions about where to focus conservation efforts.** For example, strata with large populations can be targeted for protection and strata with low populations can be prioritized for conservation action; a threshold could be set to trigger a management action when populations reach a predetermined level;
3. **Population estimates of treatment areas can be compared to regional estimates to evaluate effectiveness of management actions.** For example, if sagebrush areas are being treated to improve habitat for Greater Sage-grouse (GRSG) and estimates for sagebrush-obligate birds increase in these areas in relation to regional estimates where treatment is not occurring, the results would suggest that the GRSG management actions are also beneficial to other sagebrush-obligate bird species;
4. **Annual estimates of density and occupancy can be compared over time to determine if population changes are a result of population growth or decline and/or range expansion or contraction.** For example, if population densities of a species declined over time, but the occupancy rates remained constant, then the population change was due to declines in local abundance. In contrast, if both density and occupancy rates of a species declined, then population change was due to range contraction;
5. **Occupancy rates can be multiplied by the land area in a region of interest to estimate the area occupied by a species.** For example, if a stratum comprises 120,000 km^2 and the occupancy estimate for Western Meadowlark is 0.57, managers can estimate that 68,400 km^2 (120,000 km^2 * 0.57) of habitat within that stratum is occupied by Western Meadowlarks.

Knowing which species have estimates
To restrict the species filter to display only those species for which occupancy and/or density estimates have been produced, click on the "View Options" button on the very top of the screen and then check the box next to "Only show species for which occupancy/density results are available". This will prevent you from querying out numerous species for which occupancy or density estimates are not available.

Saving results of your query
You may easily save the results of your query by clicking the "Copy to clipboard" button and pasting the results into another program such as excel or by clicking the "Save to CSV" button. Similarly, to save a chart click on the "View Image" button below the chart, right click on anywhere on the image and select "Copy image" or "Save image as".

Functionality
Please keep in mind that queries with very generic filters will result in long wait times and may not function optimally (your browser may end up crashing). For instance, if a user selects only the IMBCR filter, occupancy results will be displayed for every species and strata/super strata combination for which there are occupancy and/or density results. If your query is not specific enough, the chart on the right side of the screen will not be displayed or a pop-up box will appear asking if you'd like to continue. This pop-up box is designed to prevent your web browser from crashing while the ADC attempts to create a chart that would be extremely difficult to interpret. We recommend that you cancel the proposed query and add additional filters to make your query less generic.

What is available?
Currently, the 2010 through 2013 occupancy results and density results for 2008 through 2013 are available via the ADC.

Viewing Raw Count Statistics (Species Counts Tab)

You may view the raw count of detections for each species (left table) and the effort (expressed as the number of point count stations surveyed) (right table) for your query by clicking on the "Species Counts" tab located next to the "Density Tab" in the upper left corner of your screen. Both the counts and effort tables may be sorted by clicking on the row header. Additionally, you may view the counts and effort by BCR, State, County, Stratum, or Management Entity by clicking on the "Count by" drop down menu located above the counts table. If you have filtered using "Super Strata", viewing counts by Stratum is an excellent way of getting a list of all the strata that comprise a Super Stratum. If you would prefer to view effort expressed as the number of sampling units surveyed, click on the "View Options" button located at the top of the screen and check the box labeled "Show effort by number of sampling units instead of by point".

APPENDIX B

Priority species detected in all Bird Conservation Regions (BCRs) surveyed in 2013, as designated by Partners in Flight (PIF). BCRs include BCR 9 (Great Basin), BCR 10 (Northern Rockies), BCR 11 (Prairie Potholes), BCR 16 (Southern Rockies and Colorado Plateau), BCR 17 (Badlands and Prairies), BCR 18 (Shortgrass Prairie), BCR 19 (Central Mixed-grass Prairie), BCR 33 (Sonoran and Mohave Deserts), and BCR 34 (Sierra Madre Occidental). An "X" in the Occupancy or Density Estimated column indicates that occupancy or density estimates were generated for the priority species at some level in one or more of the BCRs where it holds a priority designation.

	Partners in Flight*					Occupancy	Density
Species	BCR 9	BCR 10	BCR 11	BCR 16	BCR 17	Estimated	Estimated
American Dipper		RS,UCS					
American Kestrel	RC,RS,UCS	RC				X	X
Baird's Sparrow			RC,UCC,TNC,RS,UCS		RC,UCC,TNC	X	X
Bank Swallow		CBSD	RC,CBSD	CBSD	CBSD	X	X
Belted Kingfisher		CBSD	CBSD		CBSD	X	
Black Rosy-Finch		RC,UCC,TNC,RS,UCS					
Black-billed Cuckoo					RC,UCC,CBSD		
Black-billed Magpie	UCS		UCS	UCS	RC	X	X
Black-chinned Sparrow				UCC,CBSD			
Black-throated Gray Warbler				RC		X	X
Bobolink		UCC,CBSD	RC,UCC,CBSD,RS,UCS		UCC,CBSD	X	X
Boreal Chickadee		CBSD					
Brewer's Sparrow	RS,UCS	RC,CBSD	CBSD	RC,CBSD	RC,CBSD	X	X
Broad-tailed Hummingbird				RS,UCS		X	X
Brown Thrasher			RC				X
Brown-capped Rosy-Finch				RC,UCC,TNC,RS,UCS			
Burrowing Owl					RC		X
Calliope Hummingbird	CBSD	RS,UCS				X	
Cassin's Finch	RC,RS,UCS	RC,UCC,CBSD,RS,UCS		RC,UCC,CBSD		X	X
Cassin's Vireo		RS,UCS				X	X
Chestnut-collared Longspur			RC,UCC,TNC,RS,UCS		RC,UCC,TNC,RS,UCS	X	X
Chipping Sparrow		RC,RS,UCS				X	X
Clark's Nutcracker		RS,UCS		RC,RS,UCS		X	X
Clay-colored Sparrow			RS,UCS			X	X
Common Nighthawk	RC,RS,UCS	CBSD	CBSD	RC,CBSD	RC,CBSD	X	X
Common Poorwill				RC			

Species	Partners in Flight*					Occupancy Estimated	Density Estimated
	BCR 9	BCR 10	BCR 11	BCR 16	BCR 17		
Cooper's Hawk				RS,UCS		X	
Cordilleran Flycatcher				RS,UCS		X	X
Dickcissel					RC	X	X
Dusky Flycatcher		UCS					X
Dusky Grouse		RS,UCS		RS,UCS		X	X
Eastern Kingbird			UCS		UCS	X	X
Evening Grosbeak		RC				X	X
Ferruginous Hawk		RC	RC,RS,UCS				
Field Sparrow					CBSD	X	X
Flammulated Owl		UCC		UCC,RS,UCS			
Golden Eagle	RS,UCS			RC	RC		X
Golden-crowned Kinglet		UCS				X	X
Grace's Warbler				RS,UCS		X	X
Grasshopper Sparrow	UCC	CBSD	RC,CBSD		RC,CBSD,RS,UCS	X	X
Gray Vireo				RC,UCC,RS,UCS		X	X
Greater Prairie-Chicken					RC,UCC,TNC		
Greater Sage-Grouse		RC,UCC,TNC,RS,UCS		RC,UCC,TNC	RC,UCC,TNC,RS,UCS		
Green-tailed Towhee	RC			RS,UCS		X	X
Gunnison Sage-Grouse				RC,UCC,TNC,RS,UCS			
Hammond's Flycatcher		UCS				X	X
Horned Lark		CBSD	RC,CBSD	CBSD	CBSD	X	X
Juniper Titmouse				RS,UCS		X	X
Lark Bunting		CBSD	RC,CBSD		RC,CBSD,RS,UCS	X	X
Lark Sparrow	RC,RS,UCS				RC	X	X
Lazuli Bunting	CBSD	UCS		RC,RS,UCS	RS,UCS	X	X
Lewis's Woodpecker		RC		RC,RS,UCS	RC	X	X
Loggerhead Shrike		CBSD	CBSD	RC,CBSD	CBSD	X	X
MacGillivray's Warbler	RC	UCS				X	X
McCown's Longspur		RC	RC,RS,UCS		RC,RS,UCS	X	X
Mountain Bluebird	RC	UCS		RC,RS,UCS		X	X
Mountain Chickadee	CBSD,UCS	UCS				X	X
Northern Flicker	RS,UCS	CBSD,UCS	CBSD	CBSD,RS,UCS	CBSD	X	X

Species	Partners in Flight*					Occupancy Estimated	Density Estimated
	BCR 9	BCR 10	BCR 11	BCR 16	BCR 17		
Northern Goshawk		RS,UCS			RC		
Northern Harrier	RC		RC,RS,UCS		RC,RS,UCS	X	X
Olive-sided Flycatcher		RC,UCC,TNC		RC,UCC,TNC		X	X
Pine Siskin	RS,UCS	CBSD,RS,UCS		CBSD,RS,UCS	CBSD	X	X
Pinyon Jay		RC,UCC,TNC		RC,UCC,TNC,RS,UCS	RC,UCC,TNC	X	X
Plumbeous Vireo				RS,UCS		X	X
Prairie Falcon	CBSD			RC			
Pygmy Nuthatch				RS,UCS		X	X
Red Crossbill					UCS	X	X
Red-breasted Nuthatch		UCS				X	X
Red-headed Woodpecker					RC,UCC,CBSD	X	X
Red-naped Sapsucker		RS,UCS				X	X
Ring-necked Pheasant					UCS	X	X
Rock Wren	UCC,CBSD	CBSD		CBSD,RS,UCS	CBSD	X	X
Ruby-crowned Kinglet		UCS				X	X
Ruffed Grouse	RC,RS,UCS	CBSD,RS,UCS			CBSD	X	X
Rufous Hummingbird	RC,RS,UCS	UCC,CBSD				X	
Sage Sparrow		RC		RC		X	X
Sage Thrasher	RC,CBSD				RC	X	X
Savannah Sparrow			UCS			X	X
Say's Phoebe				UCS		X	X
Sharp-tailed Grouse		RC	RS,UCS		RS,UCS	X	X
Short-eared Owl		RC,CBSD	RC,CBSD				
Sprague's Pipit		RC,UCC,TNC	RC,UCC,TNC,RS,UCS		RC,UCC,TNC	X	X
Swainson's Hawk			RC,RS,UCS				
Swainson's Thrush		UCS				X	X
Townsend's Solitaire		RS,UCS				X	X
Townsend's Warbler		RS,UCS					X
Tree Swallow		UCS				X	X
Varied Thrush		RC				X	X
Vesper Sparrow		RC	UCS		RC,RS,UCS	X	X
Violet-green Swallow				UCS		X	X

Species	Partners in Flight*					Occupancy Estimated	Density Estimated
	BCR 9	BCR 10	BCR 11	BCR 16	BCR 17		
Virginia's Warbler	RC			UCC,RS,UCS		X	X
Warbling Vireo		UCS		UCS		X	X
Western Meadowlark	RC		UCS		UCS	X	X
White-headed Woodpecker		RC					
White-tailed Ptarmigan				RC			
Williamson's Sapsucker		RS,UCS		RS,UCS		X	X
Willow Flycatcher		RS,UCS				X	X
Wilson's Warbler	UCS	CBSD		CBSD		X	X
Yellow-headed Blackbird			UCS			X	X

*CBSD = Common Bird in Steep Decline; RC = Regional Concern Species; RS = Regional Stewardship Species; TNC = Tri-National Concern Species; UCC = U.S and Canada Concern Species; UCS = U.S. and Canada Stewardship Species (PIF Science Committee 2012).

Appendix B continued. Priority species detected in all Bird Conservation Regions (BCRs) surveyed in 2013, as designated by Partners in Flight (PIF). BCRs include BCR 9 (Great Basin), BCR 10 (Northern Rockies), BCR 11 (Prairie Potholes), BCR 16 (Southern Rockies and Colorado Plateau), BCR 17 (Badlands and Prairies), BCR 18 (Shortgrass Prairie), BCR 19 (Central Mixed-grass Prairie), BCR 33 (Sonoran and Mohave Deserts), and BCR 34 (Sierra Madre Occidental). An "X" in the Occupancy or Density Estimated column indicates that occupancy or density estimates were generated for the priority species at some level in one or more of the BCRs where it holds a priority designation.

	Partners in Flight*				Occupancy	Density
Species	BCR 18	BCR 19	BCR 33	BCR 34	Estimated	Estimated
American Kestrel				RC	X	X
Arizona Woodpecker				UCC,RS,UCS		
Ash-throated Flycatcher			UCS	UCS	X	X
Bank Swallow	CBSD	CBSD			X	X
Bell's Vireo		RC,UCC,TNC		RC,UCC,TNC	X	X
Belted Kingfisher	CBSD				X	
Black-chinned Sparrow			UCC,CBSD	RC,UCC,CBSD,RS,UCS	X	X
Black-tailed Gnatcatcher			RS,UCS			X
Black-throated Gray Warbler				RC	X	X
Black-throated Sparrow			RC,RS,UCS	RC,RS,UCS	X	X
Botteri's Sparrow				RC	X	
Brewer's Sparrow	RC,CBSD		CBSD		X	X
Bridled Titmouse				RS,UCS	X	
Broad-billed Hummingbird				RS,UCS		
Broad-tailed Hummingbird				RC	X	X
Brown Thrasher		RS,UCS			X	X
Bullock's Oriole	UCS		RC		X	X
Burrowing Owl	RC,RS,UCS					X
Bushtit				RS,UCS	X	X
Cactus Wren			RC,RS,UCS	RC,RS,UCS	X	X
Canyon Towhee				RS,UCS	X	X
Canyon Wren				RS,UCS	X	X
Cassin's Kingbird				RC,RS,UCS	X	X
Cassin's Sparrow	RC,RS,UCS	RC			X	X
Chestnut-collared Longspur	RC,UCC,TNC				X	X
Chihuahuan Raven	RS,UCS					X

Species	Partners in Flight*				Occupancy Estimated	Density Estimated
	BCR 18	BCR 19	BCR 33	BCR 34		
Chimney Swift	CBSD					
Common Black-Hawk				RC		
Common Nighthawk	RC,CBSD	CBSD,UCS		RC,CBSD	X	X
Common Poorwill				RS,UCS		
Cooper's Hawk				RS,UCS	X	
Cordilleran Flycatcher				RS,UCS	X	X
Costa's Hummingbird			RS,UCS			
Crissal Thrasher				RS,UCS	X	
Curve-billed Thrasher			RS,UCS			X
Dickcissel		RC,RS,UCS			X	X
Eastern Kingbird		UCS			X	X
Eastern Meadowlark				CBSD	X	X
Elegant Trogon				RC,UCC		
Ferruginous Hawk	RC,RS,UCS					
Field Sparrow		RC,CBSD			X	X
Five-striped Sparrow				RC,UCC,RS,UCS		
Flame-colored Tanager				UCC		
Gambel's Quail			RS,UCS	RS,UCS	X	X
Gila Woodpecker			RC,RS,UCS			X
Gilded Flicker			RC,UCC,RS,UCS	RC,UCC		
Grace's Warbler				RC,RS,UCS	X	X
Grasshopper Sparrow	RC,CBSD,RS,UCS	RCCBSDRSUCS		CBSD	X	X
Gray Vireo			RC,UCC	RC,UCC,RS,UCS	X	X
Greater Pewee				RS,UCS		
Greater Prairie-Chicken	RC,UCC,TNC	RC,UCC,TNC,RS,UCS				
Hepatic Tanager				UCS	X	X
Hooded Oriole				RS,UCS		
Horned Lark	CBSD,RS,UCS	CBSD		CBSD	X	X
Juniper Titmouse				RC,RS,UCS	X	X
Ladder-backed Woodpecker			RC	RS,UCS	X	X
Lark Bunting	RC,CBSD,RS,UCS	RC,CBSD			X	X
Lark Sparrow	UCS	RC,RS,UCS			X	X

Species	Partners in Flight*				Occupancy Estimated	Density Estimated
	BCR 18	BCR 19	BCR 33	BCR 34		
Lesser Prairie-Chicken	RC,UCC,TNC,RS,UCS					
Lewis's Woodpecker	RC			RC	X	X
Loggerhead Shrike	CBSD			CBSD	X	X
Lucy's Warbler			RC,RS,UCS	RC,RS,UCS	X	X
Magnificent Hummingbird				RS,UCS		
McCown's Longspur	RS,UCS				X	X
Mexican Jay				RS,UCS		X
Montezuma Quail				RC,RS,UCS		
Northern Bobwhite	CBSD					X
Northern Flicker	CBSD			CBSD	X	X
Northern Harrier	RC				X	X
Olive Warbler				RS,UCS	X	
Olive-sided Flycatcher				UCC,TNC	X	X
Painted Redstart				RC,RS,UCS	X	
Phainopepla			RC,RS,UCS	RC,RS,UCS	X	X
Pine Siskin				CBSD	X	X
Pinyon Jay	RC,UCC,TNC			RC,UCC,TNC	X	X
Plumbeous Vireo				RC,RS,UCS	X	X
Prairie Falcon	RC			RC		
Pygmy Nuthatch				RS,UCS	X	X
Red-faced Warbler				RC,RS,UCS	X	X
Red-headed Woodpecker	UCC,CBSD	UCC,CBSD,RS,UCS			X	X
Ring-necked Pheasant	RS,UCS				X	X
Rock Wren	CBSD			CBSD	X	X
Rufous-crowned Sparrow				RS,UCS	X	X
Rufous-winged Sparrow				UCC		
Say's Phoebe			RS,UCS			X
Scaled Quail	RC				X	X
Scott's Oriole				RS,UCS	X	X
Sharp-shinned Hawk				RC	X	
Sharp-tailed Grouse	RC				X	X
Spotted Owl				RC,UCC,TNC,RS,UCS		

Species	Partners in Flight*				Occupancy Estimated	Density Estimated
	BCR 18	BCR 19	BCR 33	BCR 34		
Swainson's Hawk	RS,UCS				X	X
Verdin			RC,CBSD,RS,UCS	CBSD,RS,UCS	X	X
Violet-green Swallow				UCS	X	X
Virginia's Warbler				UCC,RS,UCS	X	X
Western Bluebird				RS,UCS	X	X
Western Kingbird	UCS				X	X
Western Meadowlark	RC,RS,UCS	RC,RS,UCS			X	X
Western Screech-Owl				RS,UCS		
White-breasted Nuthatch				UCS	X	X
White-winged Dove			UCS			X
Wild Turkey		UCS				
Williamson's Sapsucker				RS,UCS	X	X
Yellow-billed Cuckoo	RC,CBSD					
Yellow-eyed Junco				RS,UCS		
Zone-tailed Hawk				RS,UCS		

*CBSD = Common Bird in Steep Decline; RC = Regional Concern Species; RS = Regional Stewardship Species; TNC = Tri-National Concern Species; UCC = U.S and Canada Concern Species; UCS = U.S. and Canada Stewardship Species (PIF Science Committee 2012).

APPENDIX C

Priority species detected in 2013, by state, with management designations by state agencies. Agencies include Arizona Game and Fish Department (AZGFD), Colorado Parks and Wildlife (CPW), Idaho Fish and Game Department (IDFG), Montana Fish, Wildlife and Parks (MTFWP), New Mexico Department of Game and Fish (NMDGF), North Dakota Game and Fish Department (NDGFD), Nebraska Game and Parks Commission (NGPC), New Mexico Department of Game and Fish (NMDGF), South Dakota Game, Fish and Parks (SDGFP) and Wyoming Game and Fish Department (WGFD). An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species at some level in one or more of the states where it holds a priority designation.

	State Agencies*									Occupancy	Density
Species	**AZGFD**	**CPW**	**IDFG**	**MTFWP**	**NDGFD**	**NGPC**	**NMDGF**	**SDGFP**	**WGFD**	**Estimated**	**Estimated**
Abert's Towhee	SGCN										
Acorn Woodpecker	SGCN									X	X
Alder Flycatcher				S3							
American Avocet					SoCP LII						X
American Bittern				S3		Tier II					
American Dipper		SGCN									
American Three-toed Woodpecker		SGCN	SGCN					SGCN	SGCN	X	X
American White Pelican		SGCN	SGCN	S3	SoCP LI	Tier II					
Arizona Woodpecker	SGCN										
Ash-throated Flycatcher									SGCN	X	X
Baird's Sparrow				S3	SoCP LI			SGCN		X	X
Bald Eagle		SGCN,ST	SGCN	S3	SoCP LII				SGCN		
Band-tailed Pigeon	SGCN	SGCN					SGCN				
Bank Swallow							SGCN			X	X
Bell's Vireo	SGCN					Tier I				X	X
Black Rosy-Finch				S2					SGCN		
Black Tern						Tier II			SGCN		
Black-and-white Warbler				S4							
Black-backed Woodpecker				S3				SGCN		X	
Black-billed Cuckoo				S3	SoCP LI						
Black-chinned Hummingbird		SGCN								X	X
Black-chinned Sparrow	SGCN									X	X

	State Agencies*									Occupancy	Density
Species	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	NMDGF	SDGFP	WGFD	Estimated	Estimated
Black-crowned Night-Heron				S3							
Black-tailed Gnatcatcher	SGCN									X	X
Black-throated Gray Warbler	SGCN	SGCN					SGCN			X	X
Blue-gray Gnatcatcher				S2		Tier II				X	X
Bobolink		SGCN		S3	SoCP LII					X	X
Boreal Chickadee				S3							
Boreal Owl		SGCN					ST,SGCN				
Botteri's Sparrow	SGCN									X	
Brewer's Blackbird						Tier II				X	X
Brewer's Sparrow	SGCN	SGCN	SGCN	S3	SoCP LIII				SGCN	X	X
Bridled Titmouse	SGCN									X	
Broad-billed Hummingbird	SGCN										
Broad-tailed Hummingbird		SGCN		S4						X	X
Brown Creeper				S3						X	X
Brown-capped Rosy-Finch		SGCN									
Brown-crested Flycatcher	SGCN									X	
Bullock's Oriole	SGCN									X	X
Burrowing Owl		SGCN,ST			SoCP LII	Tier I		SGCN			X
Caspian Tern			SGCN								
Cassin's Finch		SGCN		S3						X	X
Cassin's Kingbird				S4						X	X
Cassin's Sparrow	SGCN	SGCN								X	X
Chestnut-collared Longspur				S2	SoCP LI	Tier II		SGCN	SGCN	X	X
Clark's Nutcracker				S3						X	X
Common Black-Hawk	SGCN										
Common Nighthawk	SGCN									X	X
Common Loon			SGCN	S3							
Common Poorwill	SGCN			S4							
Cordilleran Flycatcher	SGCN	SGCN				Tier II				X	X

	State Agencies*									Occupancy	Density
Species	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	NMDGF	SDGFP	WGFD	Estimated	Estimated
Costa's Hummingbird	SGCN									X	
Curve-billed Thrasher		SGCN								X	X
Dark-eyed Junco						Tier II				X	X
Double-crested Cormorant											
Downy Woodpecker											
Dusky Flycatcher	SGCN	SGCN									X
Dusky Grouse		SGCN					SE,SGCN			X	X
Dusky-capped Flycatcher	SGCN									X	
Eastern Meadowlark	SGCN									X	X
Elegant Trogon	SGCN										
Evening Grosbeak	SGCN	SGCN		S3						X	X
Ferruginous Hawk		SGCN,SC		S3			SGCN				
Five-striped Sparrow	SGCN										
Flammulated Owl		SGCN		S3							
Forster's Tern				S3							
Franklin's Gull			SGCN	S3	SoCPI						
Gila Woodpecker	SGCN									X	X
Gilded Flicker	SGCN										
Golden Eagle		SGCN		S3	SoCP LII						X
Golden-crowned Kinglet	SGCN									X	X
Grace's Warbler	SGCN	SGCN					SGCN			X	X
Grasshopper Sparrow	SGCN		SGCN	S3	SoCP LI				SGCN	X	X
Gray Flycatcher	SGCN	SGCN								X	X
Gray Hawk											
Gray Vireo	SGCN	SGCN					ST,SGCN			X	X
Great Blue Heron				S3						X	X
Greater Pewee	SGCN										
Greater Prairie-Chicken		SGCN				Tier I		SGCN			
Greater Sage-Grouse		SGCN,SC		S2					SGCN		

	State Agencies*									Occupancy	Density
Species	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	NMDGF	SDGFP	WGFD	Estimated	Estimated
Green-tailed Towhee				S3						X	X
Gunnison Sage-Grouse		SGCN,SC									
Harris's Hawk	SGCN										
Hooded Oriole	SGCN										
Juniper Titmouse	SGCN	SGCN					SGCN			X	X
Lark Bunting		SGCN			SoCP LI			SGCN	SGCN	X	X
Lazuli Bunting	SGCN	SGCN								X	X
Le Conte's Sparrow					SoCP LII						
Lewis's Woodpecker	SGCN	SGCN	SGCN				SGCN	SGCN		X	X
Loggerhead Shrike		SGCN		S3	SoCP LII	Tier II	SS,SGCN			X	X
Long-billed Curlew		SGCN,SC	SGCN	S3		Tier I	SGCN	SGCN		X	X
Lucy's Warbler	SGCN									X	X
MacGillivray's Warbler	SGCN										
Magnificent Hummingbird	SGCN										
Marbled Godwit					SoCP LI			SGCN		X	X
McCown's Longspur		SGCN		S3		Tier I			SGCN	X	X
Merlin			SGCN						SGCN		
Mexican Jay	SGCN										X
Montezuma Quail	SGCN										
Mountain Bluebird	SGCN					Tier II				X	X
Mountain Plover		SGCN,SC							SGCN	X	X
Mountain Quail			SGCN								
Mourning Dove							SGCN			X	X
Northern Goshawk		SGCN		S3				SGCN	SGCN		
Northern Harrier		SGCN			SoCP LII	Tier II				X	X
Northern Pintail					SoCP LII				SGCN		
Northern Pygmy-Owl	SGCN								SGCN	X	
Northern Saw-whet Owl	SGCN										
Olive Warbler	SGCN									X	

	State Agencies*									Occupancy	Density
Species	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	NMDGF	SDGFP	WGFD	Estimated	Estimated
Olive-sided Flycatcher	SGCN	SGCN					SGCN			X	X
Orange-crowned Warbler	SGCN										
Osprey		SGCN									
Ovenbird				S4		Tier II				X	X
Pacific Wren				S3						X	X
Painted Redstart	SGCN									X	
Peregrine Falcon	SGCN	SGCN,SC	SGCN	S3			ST,SGCN		SGCN		
Phainopepla	SGCN									X	X
Pileated Woodpecker				S3						X	X
Pinyon Jay	SGCN	SGCN		S3			SGCN			X	X
Plumbeous Vireo				S3		Tier II				X	X
Prairie Falcon	SGCN	SGCN			SoCP LII						
Purple Martin	SGCN	SGCN								X	X
Pygmy Nuthatch		SGCN	SGCN			Tier II			SGCN	X	X
Red Crossbill	SGCN	SGCN	SGCN			Tier II				X	X
Red-faced Warbler	SGCN									X	X
Red-headed Woodpecker				S3	SoCP LII					X	X
Red-naped Sapsucker		SGCN								X	X
Ruby-crowned Kinglet											
Rufous Hummingbird		SGCN		S4						X	
Rufous-winged Sparrow	SGCN										
Sage Sparrow	SGCN	SGCN					SGCN		SGCN	X	X
Sage Thrasher				S3			SGCN		SGCN	X	X
Sandhill Crane		SGCN,SC	SGCN			Tier II			SGCN		X
Scaled Quail		SGCN								X	X
Scott's Oriole	SGCN									X	X
Sedge Wren					SoCP LII					X	
Sharp-tailed Grouse		SGCN		S1,S4	SoCP LII				SGCN	X	X
Short-eared Owl				S4							

	State Agencies*									Occupancy	Density
Species	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	NMDGF	SDGFP	WGFD	Estimated	Estimated
Snowy Egret		SGCN									
Spotted Owl	SGCN										
Sprague's Pipit				S3	SoCP LI			SGCN		X	X
Summer Tanager	SGCN									X	
Swainson's Hawk		SGCN	SGCN		SoCP LI	Tier II			SGCN	X	X
Townsend's Solitaire						Tier II				X	X
Trumpeter Swan				S3							
Upland Sandpiper		SGCN			SoCP LI				SGCN	X	X
Varied Thrush				S3						X	X
Veery				S3						X	X
Vermilion Flycatcher	SGCN									X	
Vesper Sparrow		SGCN								X	X
Violet-green Swallow						Tier II				X	X
Virginia's Warbler	SGCN	SGCN	SGCN							X	X
Western Grebe		SGCN									
Western Screech-Owl	SGCN										
Western Scrub-Jay	SGCN									X	X
Western Tanager						Tier II				X	X
White-crowned Sparrow	SGCN										
White-faced Ibis		SGCN		S3					SGCN		
White-headed Woodpecker			SGCN								
White-tailed Ptarmigan		SGCN									
White-throated Swift	SGCN	SGCN				Tier II				X	X
White-winged Crossbill			SGCN							X	
Wild Turkey	SGCN						SE,SGCN			X	X
Willet					SoCP LI			SGCN			
Williamson's Sapsucker	SGCN	SGCN					SGCN			X	X
Willow Flycatcher		SGCN,FE,SE							SGCN	X	X
Wilson's Phalarope					SoCP LI			SGCN			

	State Agencies*									Occupancy	Density
Species	**AZGFD**	**CPW**	**IDFG**	**MTFWP**	**NDGFD**	**NGPC**	**NMDGF**	**SDGFP**	**WGFD**	**Estimated**	**Estimated**
Yellow Warbler	SGCN						SGCN			X	X
Yellow-billed Cuckoo		SGCN,SC									
Yellow-breasted Chat	SGCN					Tier II				X	X
Yellow-eyed Junco	SGCN										

*__AZGFD:__ SGCN = Species of Greatest Conservation Need (Arizona Game and Fish Department 2012); __CPW:__ SGCN = Species of Greatest Conservation Need; FE = Federally Endangered; SE = State Endangered; ST = State Threatened; SC = State Candidate (Colorado Division of Wildlife (CDOW) 2006;2007); __IDFG:__ SGCN = Species of Greatest Conservation Need (Idaho Department of Fish and Game 2005) ; __MTFWP:__ S1 = Species at high risk because of extremely limited and/or rapidly declining numbers, range and/or habitat; S2 = Species at risk because of very limited and/or declining numbers, range and/or habitat; S3 = Species potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas (Montana Natural Heritage Program (MTNHP) and Montana Fish Wildlife and Parks (MTFWP) 2009); __NDGFD:__ SoCP = Species of Conservation Priority; L1 = Level 1: Species in greatest need of conservation; L2 = Level 2: Species in need of conservation; but that have had support from other wildlife programs (Hagen et al. 2005); __NGPC:__ Tier I = Globally or nationally most at-risk of extinction; Tier II = State Critically Imperiled, State Imperiled or State Vulnerable; __NMDGF:__ SGCN = Species of Greatest Conservation Need; FE = Federally Endangered; FT = Federal Threatened; FC = Federal Candidate; SE = State Endangered; ST = State Threatened; SC = State Candidate; SS = State Sensitive Species (New Mexico Department of Game and Fish 2006) __SDGFP:__ SGCN = Species of Greatest Conservation Need; ST = State Threatened Species; SE = State Endangered (South Dakota Department of Game Fish and Parks (SDGFP) 2006;2008); __WGFD:__ SGCN = Species of Greatest Conservation Need (Wyoming Game and Fish Department (WGFD) 2005).

APPENDIX D

Priority species detected on Bureau of Land Management (BLM) lands in 2013, with management designations by state. An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in at least one BLM stratum in one or more of the states where it holds a priority designation.

	Bureau of Land Management*					Occupancy	Density
Species	Colorado	Montana	North Dakota	South Dakota	Wyoming	Estimated	Estimated
American White Pelican	SS						
Baird's Sparrow		SS				X	X
Bobolink		SS	SS			X	X
Brewer's Sparrow	SS	SS	SS		SS	X	X
Burrowing Owl			SS				X
Chestnut-collared Longspur		SS	SS	SS		X	X
Golden Eagle		SS					
Greater Sage-Grouse	SS				SS		
Loggerhead Shrike		SS	SS	SS	SS	X	X
Long-billed Curlew		SS		SS		X	X
Marbled Godwit				SS		X	X
Mountain Plover					SS	X	X
Northern Goshawk	SS						
Peregrine Falcon	SS						
Sage Sparrow					SS	X	X
Sage Thrasher		SS			SS	X	X
Sprague's Pipit		SS				X	X

*SS = Sensitive Species; Montana, North Dakota, South Dakota (Bureau of Land Management 2009); Wyoming (Bureau of Land Management 2010); Colorado (Bureau of Land Management 2000).

APPENDIX E

Priority species detected on US Forest Service lands in Region 1 in 2013, with management designations by region and unit. Codes for Units: Beaverhead/Deerlodge NF (BDNF), Bitterroot NF (BINF), Clearwater NF (CLNF), Custer NF (CUNF), Flathead NF (FLNF), Gallatin NF (GANF), Helena NF (HENF), Idaho Panhandle NF (IPNF), Kootenai NF (KONF), Lewis and Clark NF (LCNF), Lolo NF (LONF), Nez Perce NF (NPNF), Cedar River NG (CRNG), Grand River NG (GRNG), and Little Missouri NG (LMNG). An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

	USFS Region 1*								Occupancy	Density
Species	Region 1	BDNF	BINF	CLNF	CUNF	FLNF	GANF	HENF	Estimated	Estimated
Alder Flycatcher	Other									
American Dipper	Other									
Baird's Sparrow	R1SS								X	X
Black Rosy-Finch	Other									
Black-and-white Warbler	Other								X	
Black-backed Woodpecker	R1SS								X	
Bobolink	Other								X	X
Boreal Chickadee	Other									
Brewer's Sparrow					MIS				X	X
Broad-tailed Hummingbird	Other								X	X
Bullock's Oriole					MIS				X	X
Cassin's Kingbird					MIS				X	X
Chestnut-collared Longspur	Other								X	X
Clark's Nutcracker	Other								X	X
Common Loon	R1SS					MIS				
Ferruginous Hawk	Other									
Flammulated Owl	R1SS									
Grasshopper Sparrow	Other								X	X
Gray Jay	Other								X	X
Hairy Woodpecker								MIS	X	X
Lark Bunting	Other								X	X
Lark Sparrow					MIS				X	X

Species	USFS Region 1*								Occupancy Estimated	Density Estimated
	Region 1	BDNF	BINF	CLNF	CUNF	FLNF	GANF	HENF		
Lewis's Woodpecker	Other								X	X
Loggerhead Shrike	R1SS								X	X
Marbled Godwit	Other									
Mountain Quail	R1SS									
Northern Goshawk							MIS			
Northern Harrier	Other								X	X
Olive-sided Flycatcher	Other								X	X
Osprey	Other									
Ovenbird					MIS				X	X
Peregrine Falcon	R1SS									
Pileated Woodpecker			MIS	MIS					X	X
Red-headed Woodpecker	Other								X	X
Red-naped Sapsucker	Other								X	X
Sage Thrasher	Other									X
Sandhill Crane	Other									X
Sharp-tailed Grouse					MIS					X
Spotted Towhee					MIS				X	X
Sprague's Pipit	R1SS								X	X
Swainson's Hawk	Other									X
Trumpeter Swan	R1SS									
Upland Sandpiper	Other								X	X
Western Kingbird					MIS					X
Willet	Other									
Williamson's Sapsucker	Other								X	X
Wilson's Phalarope	Other									X
Yellow Warbler					MIS				X	X

*R1SS = Region 1 Sensitive Species; Other = Other Priority Species in Region 1; MIS = Management Indicator Species (Skorkowsky and Hahn 2010).

Appendix E continued. Priority species detected on US Forest Service lands in Region 1 in 2013, with management designations by region and unit. Codes for Units: Beaverhead/Deerlodge NF (BDNF), Bitterroot NF (BINF), Clearwater NF (CLNF), Custer NF (CUNF), Flathead NF (FLNF), Gallatin NF (GANF), Helena NF (HENF), Idaho Panhandle NF (IPNF), Kootenai NF (KONF), Lewis and Clark NF (LCNF), Lolo NF (LONF), Nez Perce NF (NPNF), Cedar River NG (CRNG), Grand River NG (GRNG), and Little Missouri NG (LMNG). An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

	USFS Region 1*									Occupancy	Density
Species	Region 1	IPNF	KONF	LCNF	LONF	NPNF	CRNG	GRNG	LMNG	Estimated	Estimated
Alder Flycatcher	Other										
American Dipper	Other										
American Three-toed Woodpecker				MIS						X	X
Baird's Sparrow	R1SS									X	X
Black Rosy-Finch	Other										
Black-and-white Warbler	Other									X	
Black-backed Woodpecker	R1SS									X	
Bobolink	Other									X	X
Boreal Chickadee	Other										
Broad-tailed Hummingbird	Other									X	X
Chestnut-collared Longspur	Other									X	X
Chipping Sparrow		MIS	MIS							X	X
Clark's Nutcracker	Other									X	X
Common Loon	R1SS										
Dusky Flycatcher		MIS	MIS								X
Ferruginous Hawk	Other										
Flammulated Owl	R1SS										
Grasshopper Sparrow	Other									X	X
Gray Jay	Other									X	X
Hairy Woodpecker		MIS	MIS							X	X
Hammond's Flycatcher		MIS	MIS							X	X
Lark Bunting	Other									X	X
Lewis's Woodpecker	Other									X	X
Loggerhead Shrike	R1SS									X	X

Species	USFS Region 1*									Occupancy Estimated	Density Estimated
	Region 1	IPNF	KONF	LCNF	LONF	NPNF	CRNG	GRNG	LMNG		
Marbled Godwit	Other										
Mountain Quail	R1SS										
Northern Goshawk					MIS						
Northern Harrier	Other									X	X
Olive-sided Flycatcher	Other	MIS	MIS							X	X
Osprey	Other										
Peregrine Falcon	R1SS										
Pileated Woodpecker		MIS	MIS		MIS	MIS				X	X
Red-headed Woodpecker	Other									X	X
Red-naped Sapsucker	Other									X	X
Sage Thrasher	Other										X
Sandhill Crane	Other										X
Sharp-tailed Grouse							MIS	MIS	MIS	X	X
Sprague's Pipit	R1SS									X	X
Swainson's Hawk	Other										X
Trumpeter Swan	R1SS										
Upland Sandpiper	Other									X	X
Willet	Other										
Williamson's Sapsucker	Other									X	X
Wilson's Phalarope	Other										X

*R1SS = Region 1 Sensitive Species; Other = Other Priority Species in Region 1; MIS = Management Indicator Species (Skorkowsky and Hahn 2010).

APPENDIX F

Priority species detected on US Forest Service lands in Region 2 in 2013, with management designations by region and unit. Codes for Units: Arapaho and Roosevelt NF (ARNF), Bighorn NF (BINF), Black Hills NF (BHNF), Grand Mesa, Uncompaghre and Gunnison NF (GMUG), Medicine Bow NF (MBNF), Nebraska NF (NENF), Pike and San Isabel NF (PSINF), Rio Grande NF (RGNF), Routt NF (RONF), Samuel McKelvie NF (SMNF), San Juan NF (SJNF), Shoshone NF (SHNF), White River NF (WRNF), Comanche and Cimarron NG (CO and CING), Pawnee NG (PANG), Nebraska NG (NBNG) and Thunder Basin NG (TBNG). An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

	USFS Region 2 *									Occupancy	Density
Species	**Region 2**	**ARNF**	**BINF**	**BHNF**	**GMUG**	**MBNF**	**NENF**	**PSINF**	**RGNF**	**Estimated**	**Estimated**
American Three-toed Woodpecker						MIS				X	X
Bald Eagle	R2SS										
Black Tern	R2SS										
Black-backed Woodpecker	R2SS			MIS						X	
Boreal Owl	R2SS										
Brewer's Sparrow	R2SS				MIS					X	X
Broad-winged Hawk				SOLC							
Brown Creeper				MIS		SOSC			MIS	X	X
Burrowing Owl	R2SS										X
Cassin's Sparrow	R2SS									X	X
Chestnut-collared Longspur	R2SS									X	X
Ferruginous Hawk	R2SS										
Flammulated Owl	R2SS										
Golden-crowned Kinglet		MIS		MIS						X	X
Grasshopper Sparrow	R2SS			MIS						X	X
Greater Prairie-Chicken	R2SS						MIS				
Greater Sage-Grouse	R2SS										
Hairy Woodpecker		MIS			MIS					X	X
Hermit Thrush									MIS	X	X
Lesser Prairie-Chicken	R2SS										
Lewis's Woodpecker	R2SS				MIS					X	X
Lincoln's Sparrow						MIS			MIS	X	X

	USFS Region 2 *									Occupancy	Density
Species	Region 2	ARNF	BINF	BHNF	GMUG	MBNF	NENF	PSINF	RGNF	Estimated	Estimated
Loggerhead Shrike	R2SS									X	X
Long-billed Curlew	R2SS									X	X
McCown's Longspur	R2SS									X	X
Mountain Bluebird		MIS								X	X
Mountain Plover	R2SS									X	X
Northern Goshawk	R2SS										
Northern Harrier	R2SS									X	X
Northern Saw-whet Owl				SOLC							
Olive-sided Flycatcher	R2SS									X	X
Peregrine Falcon	R2SS										
Purple Martin	R2SS									X	X
Pygmy Nuthatch		MIS		SOLC			MIS		MIS	X	X
Red Crossbill					MIS					X	X
Red-breasted Nuthatch			MIS							X	X
Ruffed Grouse				MIS						X	X
Sharp-tailed Grouse	R2SS						MIS			X	X
Song Sparrow				MIS						X	X
Vesper Sparrow									MIS	X	X
Warbling Verio		MIS								X	X
White-tailed Ptarmigan	R2SS										
Wilson's Warbler		MIS							MIS	X	X

*R2SS = Region 2 Sensitive Species (US Forest Service 2008b); MIS = Management Indicator Species; SOLC = Species of Local Concern; SOC = Species of Concern; SOVC = Species of Viability Concern; SOSC = Species of Special Concern.

Appendix F continued. Priority species detected on US Forest Service lands in Region 2 in 2013, with management designations by region and unit. Codes for Units: Arapaho and Roosevelt NF (ARNF), Bighorn NF (BINF), Black Hills NF (BHNF), Grand Mesa, Uncompaghre and Gunnison NF (GMUG), Medicine Bow NF (MBNF), Nebraska NF (NENF), Pike and San Isabel NF (PSINF), Rio Grande NF (RGNF), Routt NF (RONF), Samuel McKelvie NF (SMNF), San Juan NF (SJNF), Shoshone NF (SHNF), White River NF (WRNF), Comanche and Cimarron NG (CO and CING), Pawnee NG (PANG), Nebraska NG (NBNG) and Thunder Basin NG (TBNG). An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

	USFS Region 2*										Occupancy	Density
Species	Region 2	RONF	SMNF	SJNF	SHNF	WRNF	CO and CING	PANG	NBNG	TBNG	Estimated	Estimated
American Pipit						MIS					X	X
Bald Eagle	R2SS											
Black Tern	R2SS											
Black-backed Woodpecker	R2SS										X	
Boreal Owl	R2SS											
Brewer's Sparrow	R2SS				MIS	MIS					X	X
Bullock's Oriole							MIS				X	X
Burrowing Owl	R2SS											X
Cassin's Sparrow	R2SS										X	X
Chestnut-collared Longspur	R2SS										X	X
Dusky Grouse					MIS						X	X
Ferruginous Hawk	R2SS											
Flammulated Owl	R2SS											
Grasshopper Sparrow	R2SS										X	X
Greater Prairie-Chicken	R2SS								MIS			
Greater Sage-Grouse	R2SS											
Green-tailed Towhee				MIS							X	X
Hairy Woodpecker				MIS	MIS						X	X
Lark Bunting								MIS			X	X
Lesser Prairie-Chicken							MIS					
Lewis's Woodpecker	R2SS										X	X
Loggerhead Shrike	R2SS										X	X
Long-billed Curlew	R2SS						MIS				X	X

Species	USFS Region 2*										Occupancy Estimated	Density Estimated
	Region 2	RONF	SMNF	SJNF	SHNF	WRNF	CO and CING	PANG	NBNG	TBNG		
McCown's Longspur	R2SS										X	X
Mountain Bluebird				MIS							X	X
Mountain Plover	R2SS										X	X
Northern Goshawk	R2SS			MIS	MIS							
Northern Harrier	R2SS										X	X
Olive-sided Flycatcher	R2SS										X	X
Peregrine Falcon	R2SS				MIS							
Purple Martin	R2SS										X	X
Pygmy Nuthatch						SOVC					X	X
Sharp-tailed Grouse	R2SS		MIS						MIS	MIS	X	X
Virginia's Warbler						MIS					X	X
White-tailed Ptarmigan	R2SS											
Wild Turkey				MIS								X
Wilson's Warbler		MIS									X	X

*R2SS = Region 2 Sensitive Species (US Forest Service 2008b); MIS = Management Indicator Species; SOLC = Species of Local Concern; SOC = Species of Concern; SOVC = Species of Viability Concern; SOSC = Species of Special Concern.

APPENDIX G

Priority species detected on US Forest Service lands in Region 3 in 2013, with management designations by region and unit. An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

	USFS Region 3*							Occupancy	Density
Species	Region 3	Carson NF	Coconino NF	Coronado NF	Kaibab NF	Tonto NF	Kiowa/Rita Blanca NG	Estimated	Estimates
Abert's Towhee	R3SS								
Acorn Woodpecker				MIS				X	X
Arizona Woodpecker	R3SS			MIS					
Ash-throated Flycatcher				MIS		MIS		X	X
Bell's Vireo	R3SS			MIS		MIS		X	X
Bewick's Wren				MIS				X	X
Black-chinned Sparrow						MIS		X	X
Black-throated Sparrow						MIS		X	X
Boreal Owl	R3SS								
Broad-billed Hummingbird	R3SS								
Brewer's Sparrow		MIS						X	X
Bridled Titmouse				MIS				X	
Brown Creeper				MIS				X	X
Brown-crested Flycatcher				MIS				X	
Canyon Towhee						MIS		X	X
Cordilleran Flycatcher				MIS				X	X
Common Black-Hawk	R3SS					MIS			
Common Ground-Dove	R3SS							X	
Costa's Hummingbird	R3SS							X	
Dusky-capped Flycatcher				MIS				X	
Elegant Trogon	R3SS			MIS					
Ferruginous Hawk									
Five-striped Sparrow				MIS					

Species	USFS Region 3*							Occupancy Estimated	Density Estimates
	Region 3	Carson NF	Coconino NF	Coronado NF	Kaibab NF	Tonto NF	Kiowa/Rita Blanca NG		
Gila Woodpecker	R3SS			MIS				X	X
Grace's Warbler					MIS			X	X
Grasshopper Sparrow	R3SS							X	X
Gray Hawk				MIS					
Gray Vireo	R3SS					MIS		X	X
Hairy Woodpecker		MIS	MIS	MIS	MIS	MIS		X	X
Hooded Oriole						MIS			
House Wren				MIS				X	X
Juniper Titmouse		MIS	MIS	MIS	MIS	MIS		X	X
Ladder-backed Woodpecker				MIS				X	X
Loggerhead Shrike									X
Lucy's Warbler			MIS	MIS				X	X
Montezuma Quail				MIS					
Northern Flicker				MIS		MIS		X	X
Northern Pygmy-Owl				MIS					
Peregrine Falcon	R3SS			MIS					
Pygmy Nuthatch			MIS	MIS	MIS	MIS		X	X
Ruby-crowned Kinglet					MIS			X	X
Spotted Towhee						MIS		X	X
Summer Tanager						MIS		X	
Swainson's Hawk									
Townsend's Solitaire						MIS		X	X
Violet-green Swallow						MIS		X	X
Warbling Vireo						MIS		X	X
Western Bluebird					MIS	MIS		X	X
Western Wood-Pewee						MIS		X	X
Western Screech-Owl				MIS					
Wild Turkey	R3SS	MIS	MIS	MIS	MIS	MIS		X	X
White-breasted Nuthatch				MIS				X	X

Species	USFS Region 3*							Occupancy Estimated	Density Estimates
	Region 3	Carson NF	Coconino NF	Coronado NF	Kaibab NF	Tonto NF	Kiowa/Rita Blanca NG		
Yellow-eyed Junco	R3SS								

*R3SS = USFS Region 3 Sensitive Species (US Forest Service 2013); MIS = Management Indicator Species; SOC = Species of Concern.

APPENDIX H

Priority species detected on US Forest Service lands in Region 4 in 2013, with management designations by region and unit. An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

	USFS Region 4*						Occupancy	Density
Species	**Region 4**	**Ashley NF**	**Bridger-Teton NF**	**Caribou-Targhee NF**	**Manti-La Sal NF**	**Wasatch NF**	**Estimated**	**Estimated**
American Three-toed Woodpecker	R4SS						X	X
Bald Eagle	R4SS		MIS					
Brewer's Sparrow			MIS			PS	X	X
Broad-tailed Hummingbird						PS		X
Peregrine Falcon	R4SS			MIS				
Willow Flycatcher	FE						X	X

*R4SS = Region 4 Sensitive Species (US Forest Service 2008a); MIS = Management Indicator Species; SS = Sensitive Species.