Integrated Monitoring in Bird Conservation Regions (IMBCR): 2014 Field Season Report

August 2015

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Tech. Report # SC-IMBCR-05

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.*

Suggested Citation:

White, C. M., M. F. McLaren, N. J. Van Lanen, D.C. Pavlacky Jr., J. A. Blakesley, R. A. Sparks, J. J. Birek and D. J. Hanni. 2015. Integrated Monitoring in Bird Conservation Regions (IMBCR): 2014 Field Season Report. Rocky Mountain Bird Observatory. Brighton, Colorado, USA.

Cover Photo:

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EXECUTIVE SUMMARY

Rocky Mountain Bird Observatory (RMBO), in conjunction with its partners, conducted landbird monitoring for the seventh year in a row for the "Integrated Monitoring in Bird Conservation Regions" (IMBCR) program. In 2014, IMBCR sampled across three states (Colorado, Montana, and Wyoming) and portions of nine additional states (Arizona, Idaho, North Dakota, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Utah), two USFS Regions (Regions 1 and 2) and portions of Regions 3 and 4, all of the Badlands and Prairies Bird Conservation Region (BCR) and portions of many other BCRs (Great Basin, Northern Rockies, Prairie Potholes, Southern Rockies/Colorado Plateau, Shortgrass Prairie, Central Mixed-grass Prairie, 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 2014, field technicians completed 1,180 of 1,186 (99.5%) planned surveys. Twelve additional unplanned surveys were also completed. Technicians conducted 14,328 point counts within the 1,192 surveyed sampling units between 3 May and 21 July 2014. They detected 181,506 individual birds representing 307 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 2014 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; US Fish and Wildlife Service; Great Northern Landscape Conservation Cooperative; and Intermountain West Joint Venture. We thank the Avian Science Center, Intermountain 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. We thank Kelli Turner and Bob Paulson of The Nature Conservancy for providing excellent new training facilities at the Whitney Preserve 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
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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
CPW	Colorado Parks and Wildlife
DOD	Department of Defense
GRTS	Generalized Random-Tessellation Stratification
IBO	Intermountain Bird Observatory
IMBCR	Integrated Monitoring in Bird Conservation Regions
MRGS	Military Grid Reference System
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
USNG	US National Grid
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). In addition to providing basic information on species distributions, 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); and 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). Accounting 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 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).

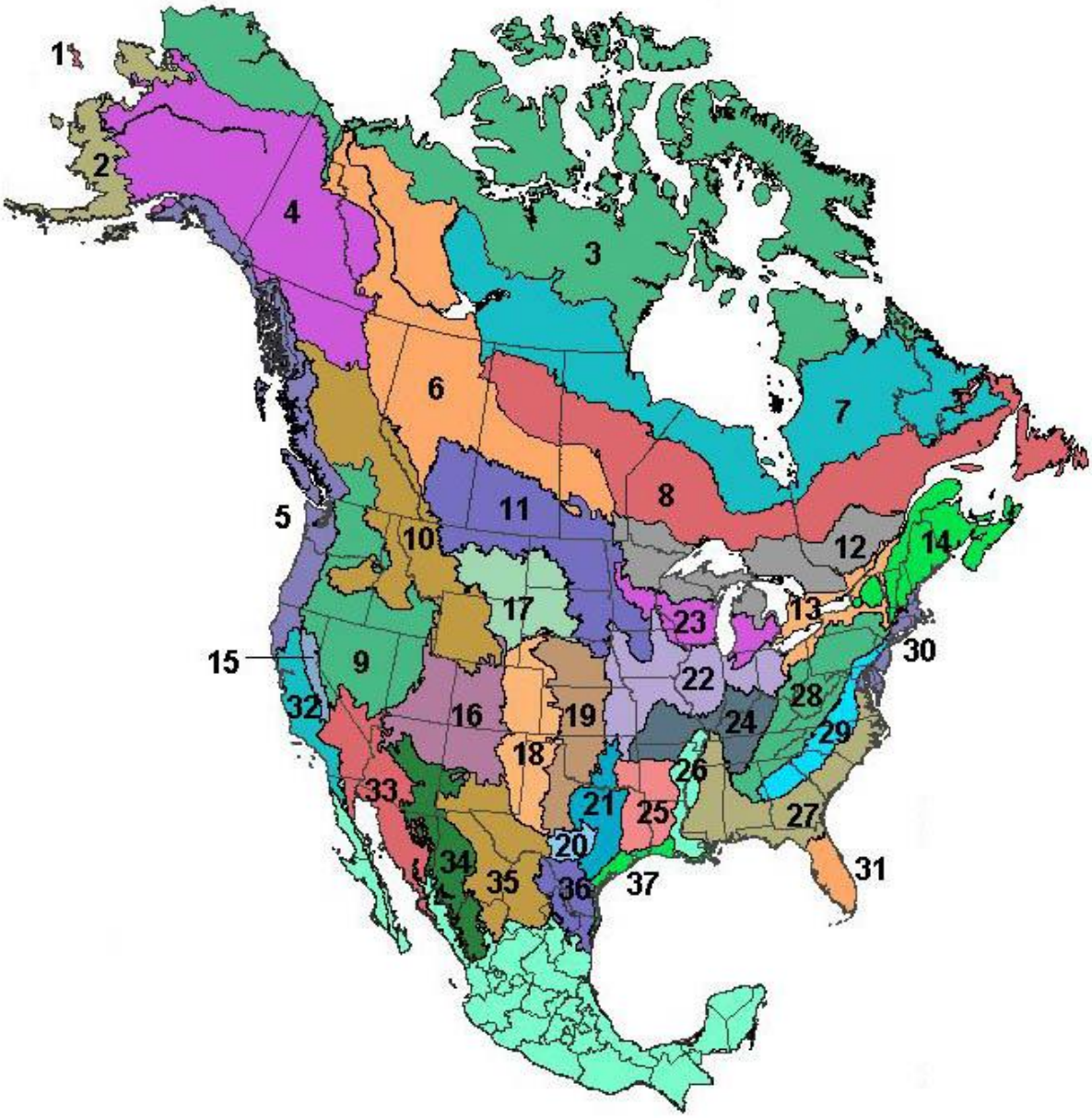

Figure 1. Bird Conservation Regions throughout North America, excluding Hawaii and Mexico (Source: http://www.nabci-us.org/map.html).

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 NABCI Monitoring Subcommittee suggested ways to improve bird monitoring efforts in North America in 2007, IMBCR partners developed a new study design and protocol for statewide bird monitoring in Colorado based on these suggestions. This study design used BCRs as the sampling frame 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. Furthermore, 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). Field crews completed over 209 surveys within BCR 16 and BCR 18, resulting in density estimates for 69 landbird species.

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). Some changes were made for the 2009 effort based on lessons learned from the 2008 field season. 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.

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 small easternmost portion of BCR 10 that dips into Colorado so all Colorado BCR 10 lands are represented. The “NPS Rocky Mountain Inventory and Monitoring Network (RMNW)” and “Northern Colorado Plateau Inventory and Monitoring Network (NCPN)” were restratified because some NCPN park units were initially misclassified 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 specifically 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 improved 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 allowed sampling intensity changes 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 had mixed administration between the Routt National Forest and the Arapahoe and Roosevelt National Forests. 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, we added four strata in Idaho to account for all of BCR10 within the state. We took into account the boundary between USFS Regions 1 and 4, which runs through Idaho, when stratifying so estimates could be generated at the USFS Region level. The new strata include “All Other Lands in the Region 1 portion of Idaho BCR 10” (all lands outside of national forest boundaries), “All Other Lands in the Region 4 portion of Idaho BCR 10” (all lands outside of national forest boundaries), “other USFS lands in the Region 1 portion of Idaho BCR 10”, and “USFS designated roadless/wilderness areas within the Region 4 portion of Idaho BCR 10”. 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 sampling intensity changes 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, and perhaps most importantly, the use of standard grids allows for the integration of datasets and subsequent identification of areas where sampling should or has not occurred. Second, it provides a means to identify sampled areas in a consistent manner so results of monitoring projects can be evaluated in a spatially comparable way. 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 NABCI committee. RMBO started using the USNG for new IMBCR stratification or restratification schemes in 2013.

We added several USFS strata 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. Because Caribou-Targhee National Forest spans three states and three BCRs, it was necessary to divide the forest into four strata. The state and BCR-level stratification distinctions allowed the summation of the data for individual states or BCRs. The four new strata in Idaho and Utah join a preexisting Caribou-Targhee stratum in west-central Wyoming as a part of Wyoming's statewide effort. In addition, Pawnee National Grassland was split into two strata – public lands and private lands – since Pawnee National Grassland contains a large amount of private land within its administrative boundary. 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 three separate strata, one for each Forest (Caribou-Targhee, Ashley, and Wasatch). This allowed 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 incorporate several NPS Northern Great Plains Inventory and Monitoring Network (NGPN) strata. All of the non-NPS strata in these states were retained but renamed to avoid confusion. The original NPS strata were broken up so each NPS unit was 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 allows the NGPN to monitor birds on each of its units separately.

Nebraska BCR 18 also underwent a complete restratification to allow for the individual stratification for Agate Fossil Beds and Scotts Bluff National Monuments. We also added an additional IMBCR stratum for Cherry Ranch in Nebraska, a property owned by The Nature Conservancy (TNC).

In 2014, we restratified the Arapaho and Roosevelt and the Pike and San Isabel National Forests to allow these forests to monitor treatments intended to mitigate fire hazard and improve forest health. We divided each forest into two strata – a control stratum and the remainder of the forest. The control portion of the Arapaho and Roosevelt National Forests consists of lands ranging in elevation from 6,000 ft (1,829 m) to 9,000 ft (2,743 m) and excludes treatment areas and areas burned between 1998 and 2013. The Pike and San Isabel control stratum ranges from 6,000 ft (1,829 m) to 9,500 ft (2,896 m) and excludes treatment areas and areas burned between 1998 and 2013. We created a single experiment overlay stratum for all of Arapaho and Roosevelt and Pike and San Isabel National Forests consisting of actual treatment areas (areas with >30% treatment). Since this stratum spans multiple forests, it is not considered to be a part of the IMBCR design. However, detections from this stratum do contribute to the number of detections used in analyses.

There were some significant stratification changes made to the BCR 10 portion of Idaho between for the 2014 field season. The four strata defined for the 2012 field season were further subdivided. The boundary between USFS Regions 1 and 4 runs through Idaho and was taken into account when restratifying so that estimates could be generated at the USFS Region level. The new strata created in Idaho BCR 10 include the "Idaho portion of Bitterroot National Forest", "BLM Lands within Idaho BCR10", "Boise National Forest", "the Idaho portion of Kootenai National Forest", "Payette National Forest", "Salmon-Challis National Forest", "Sawtooth National Forest", "All other Lands within Idaho BCR 10 and USFS Region 1" (all lands outside of

national forest and BLM boundaries), and “All Other Lands within Idaho BCR 10 and USFS Region 4” (all lands outside of national forest and BLM boundaries). Since Bitterroot and Kootenai National Forests span Idaho and Montana, 2014 density and occupancy estimates for those forests will include strata from both states. In the past, “forest-wide” estimates have only represented the Montana portion of these forests.

We subdivided the US Fish and Wildlife Service (USFWS) strata in Montana BCRs 11 and 17 in 2014 to allow density and occupancy estimation specifically within the Charles M. Russell National Wildlife Refuge. Previously, we grouped all USFWS lands together in these BCRs, limiting estimates for individual refuges. In each BCR, we created two new strata – a Charles M. Russel NWR stratum and an “All Other USFWS Lands” stratum.

In addition to restratification, we added a few new strata to the IMBCR project in 2014. In Nebraska, NGPN began monitoring on the Niobrara National Scenic River spanning BCRs 17 and 19. In Utah, we created a new stratum for Manti-La Sal National Forest. Previously, only the Colorado portion of Manti-La Sal was stratified and surveyed. The additional Utah portion will allow for the generation of forest-wide estimates for Manti-La Sal.

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

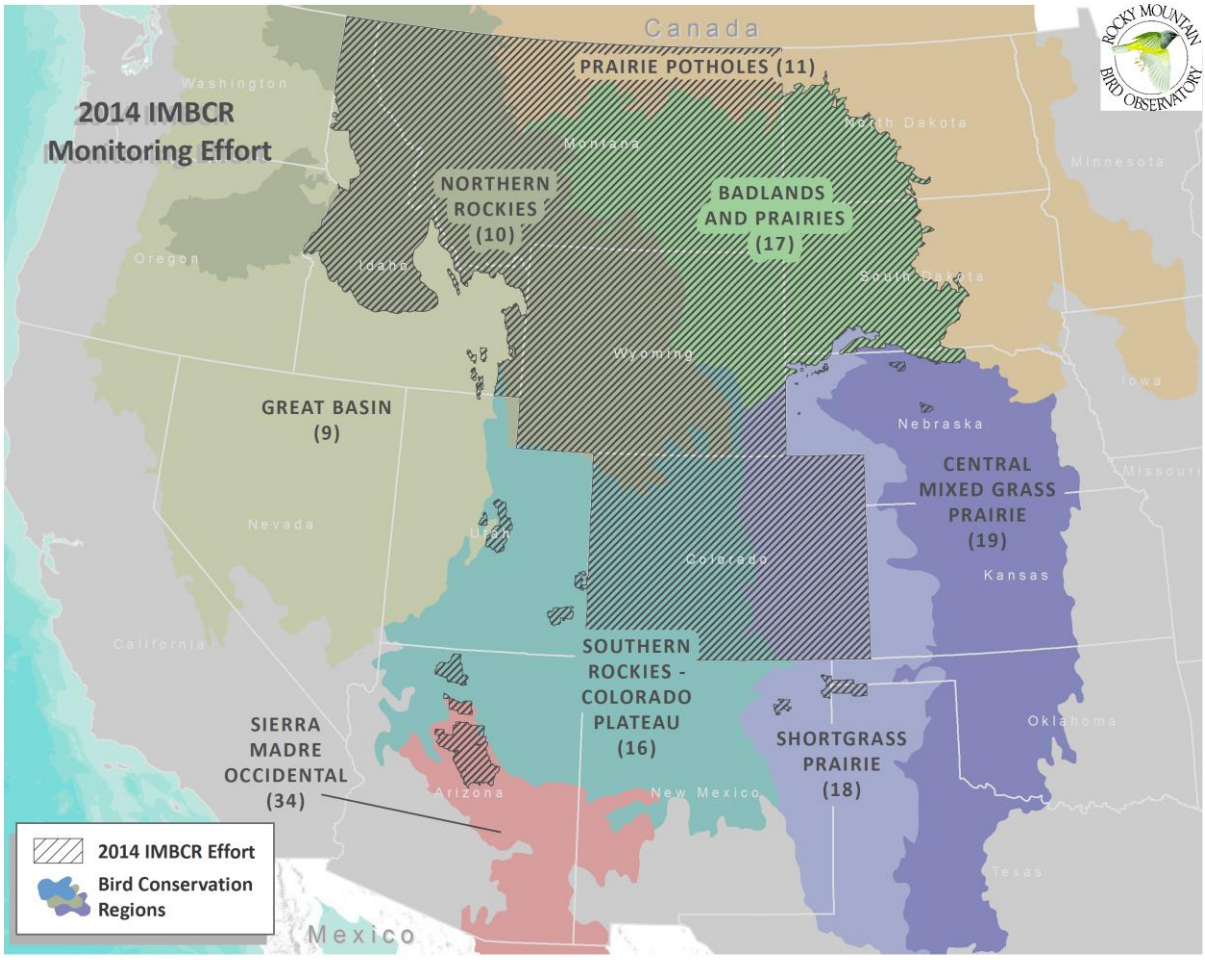

Figure 2. Spatial extent of sampled strata using the IMBCR design, 2014.

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 fourth year we implemented IMBCR within BCR 9. The 2014 survey effort in BCR 9 took place within the Wyoming, Idaho and Utah portions of Caribou-Targhee National Forest. RMBO conducted surveys within three strata comprising 2,113 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 sixth year we implemented IMBCR within BCR 10. Avian Science Center (ASC), Intermountain Bird Observatory (IBO), RMBO, and Wyoming Natural Diversity Database (WYNDD) conducted surveys within the Colorado, Idaho, Montana and Wyoming portions of BCR 10 comprising 67 strata covering 437,693 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 fifth year we implemented within BCR 11. ASC conducted surveys within the Montana portion of BCR 11 comprising six strata covering 83,415 km^2.

***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 seventh year we implemented IMBCR 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, Caribou-Targhee National Forest in Idaho and Utah, and Manti-La Sal National Forest in Utah. This area comprises 29 strata covering 178,675 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 sixth year we implemented IMBCR within BCR 17. ASC, RMBO, and WYNDD conducted surveys throughout the entire BCR comprising 38 strata covering 364,494 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 seventh year we implemented IMBCR within BCR 18. RMBO conducted surveys throughout the Wyoming and Colorado portions of BCR 18, NPS lands in Nebraska BCR 18, and USFS lands in the Nebraska, New Mexico, Oklahoma and Texas portions of the BCR comprising 21 strata covering 127,675 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 fourth year we implemented IMBCR within BCR 19. RMBO conducted surveys in USFS lands throughout BCR 19 in Nebraska, comprising two strata covering 829 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 sixth year we implemented IMBCR within BCR 34. RMBO conducted surveys in Coconino, and Kaibab National Forests within BCR 34, comprising three strata covering 13,927 km^2.

Sampling Design

Sampling Frame and Stratification
In 2014, IMBCR encompassed three entire states (Colorado, Montana, and Wyoming) and portions of nine additional states (Arizona, Idaho, 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 infer 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 statewide estimates; data from each individual stratum in BCR 17 are combined to produce BCR-wide estimates.

We defined strata based on areas to which IMBCR partners wanted to make inferences. We defined the largest scale strata by the intersection of state and BCR boundaries (e.g., Wyoming BCR 10). We based the smaller-order strata within BCRs 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). We defined potential sampling units by superimposing a uniform grid of cells over each state in the study area, then we assigned each cell 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.

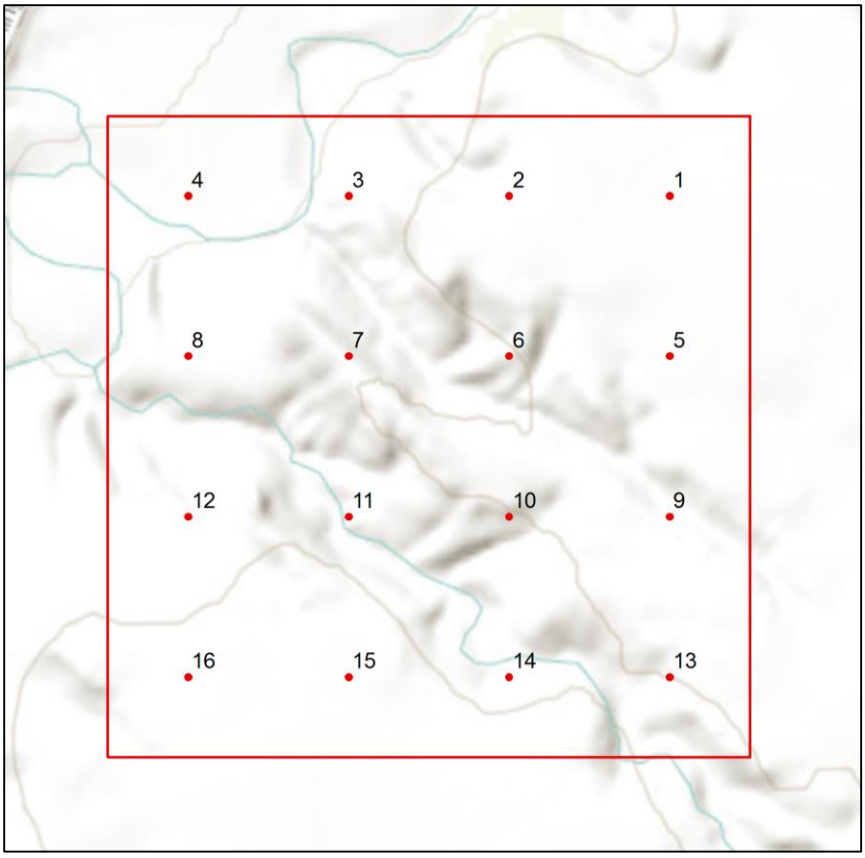

Figure 3. Example 1 km^2 sampling unit using the IMBCR design.

Sampling Methods

IMBCR surveyors with excellent aural and visual bird-identification skills conducted field work in 2014. Prior to conducting surveys, technicians completed an intensive training program to ensure full understanding of the field protocol, review bird and plant identification, and 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 (also referred to as technician, or observer in this report) conducted point counts (Buckland et al. 2001) following protocols established by IMBCR partners (Hanni et al. 2014). Observers conducted surveys in the morning, beginning ½-hour before sunrise and concluding no later than five 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 object near the bird. In addition to recording all bird species detected in the area during point counts, observers 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. 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 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. We added categorical habitat options to facilitate data proofing, to incorporate habitat in analysis and to link the IMBCR data and results with the older habitat-based monitoring program. Technicians also began recording the presence of water and snow within 50 m of each point as a type of ground cover.

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. We added a "visual" checkbox 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 for birds in addition to listening for them, and helps crew leaders make decisions regarding unusual or rare bird detections while proofing data. We provided technicians with an additional datasheet to record the reasons points were not surveyed (e.g., weather issues, unsafe terrain, denied permission by landowner, etc.). 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, we did not record distances because we do not use flyover detections in analysis. However, technicians sometimes incorrectly distinguish flyovers from birds using the surrounding habitat while foraging on the wing (e.g., swallows, swifts and raptors). Therefore, if we find an incorrectly recorded flyover, we can still use the detection data in analysis.

In 2012 technicians began recording the start time for every point count conducted so we could use temporal information as a variable in analyses. Start times for the entire transect and for individual points were all recorded in Mountain Daylight Time for consistency across projects. Prior to 2012, technicians were allowed to conduct point counts until 1100 local time each day. In order to account for variability across study areas from Arizona to Montana, crew leaders instructed technicians to survey no later than five hours after sunrise in 2012. Technicians also began noting migrant detections on surveys. After the field season, we thoroughly review the migrant records; if those records are verified, they are not included in analysis. Previously, crew leaders instructed technicians to record a bird as a male if 1) it was a singing warbler or sparrow, or 2) it was singing repeatedly and emphatically. In 2012, we instructed technicians to only identify the sex of a visually observed bird of a sexually dimorphic species. We instructed technicians to record subspecies only if they visually identified a bird as such. In the past we used geographic range to assume a bird was of a particular subspecies. Up until the 2012 field season, we provided technicians with 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, we eliminated the list and technicians recorded any species they came across while traveling between points they had not documented during a point count. That way all species encountered within the sampling unit would be documented for distribution mapping purposes.

Also in 2012, several changes were made to the vegetation datasheet. First, we removed distance to the nearest road, forest structural stage, and human structures from the data sheet. We no longer collect these types of data in the field because they can be obtained through remote sensing. Second, we modified the datasheet to simply record whether a mid-story was present. In the past, if mid-story vegetation was present, technicians would record the species found in that layer. Data analysis found mid-story vegetation data to be extremely variable from year to year. Third, we added a ground cover category for residual grass. Finally, we limited acceptable overstory, understory, and ground cover relative abundance values to 1%, 5%, or increments of 10%. In the past, technicians estimated cover to the nearest percent for all categories where percent cover or relative abundance was recorded. We made the change to improve the consistency of cover and relative abundance estimates and to decrease the amount of time technicians spend estimating these values.

In 2012, crew leaders provided technicians with 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 data sheet contained the name, contact information, and any pertinent notes about the landowner. 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.

We have made no changes to the protocol since the 2012 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 five critical assumptions be met: 1) all birds at and near the sampling location (distance = 0) are detected; 2) distances to birds are measured accurately; 3) birds do not move in response to the observer's presence (Buckland et al. 2001, Thomas et al. 2010); 4) cluster sizes are recorded without error; and 5) the sampling units are representative of the entire survey region (Buckland et al. 2008).

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. 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 density for each species using a sequential framework where 1) year specific detection functions were applied to species with greater than or equal to 80 detections per year ($n \geq 80$), 2) global detection functions were applied to species with less than 80 detections per year ($n < 80$) and greater than or equal to 80 detections over the life of the project ($n \geq 80$), and 3) remedial measures were used for species with moderate departures from the assumptions of distance sampling (Buckland et al. 2001).

Beginning this year, we streamlined the analysis by fitting models with no series expansions to all species using the recommended 10% truncation for point transects. For the year specific detection functions, we fit Conventional Distance Sampling models using the half-normal and hazard-rate key functions with no series expansions (Thomas et al. 2010). For the global detection functions, in addition to the above models, we fit Multiple-Covariate Distance Sampling models using half-normal and hazard-rate key function models with a categorical year covariate and no series expansions (Thomas et al. 2010). We selected the most parsimonious detection function for each species using Akaike's Information Criterion adjusted for sample size (AIC_c; Burnham & Anderson 2002; Thomas et al. 2010) , and considered the most parsimonious model as the estimation model. We estimated population size ($\widehat{N}$) for each stratum as $\widehat{N} = \widehat{D} * A$, where $\widehat{D}$ was the estimated population density and A was the number of 1 km^2 sampling units in each stratum. We calculated Satterthwaite 90% Confidence Intervals (CI) for the estimates of density and population size for each stratum (Buckland et al. 2001). In addition, we combined the stratum-level density estimates at various spatial scales, such as management entity, State and BCR, using an area-weighted mean. For the combined density estimates, we estimated the variance for detection and cluster size using the delta method (Powell 2007, Thomas et al. 2010) and the variance for the encounter rate using the design-based estimator of Fewster et al. (2009).

We reviewed the highest ranking detection function for each species to check the shape criteria, evaluate the fit of the model and identify species with moderate departure from the assumptions of distance sampling (Buckland et al. 2001). First, we checked the shape criteria of the histogram to make sure the detection data exhibited a "shoulder" that fell away at increasing distances from the point. Second, we evaluated the fit of the model using the Kolmogorov-Smirnov goodness-of-fit test. Finally, we visually inspected the detection histograms to identify species that demonstrated evasive movement and/ or measurement errors. We looked for a type of measurement error involving the heaping of detections at certain distances that occurs

when observers round detection distances. We also looked for histograms with detections that were highly skewed to the right, which may indicate a pattern of evasive movement (Buckland et al. 2001).

For species with moderate departures from the assumptions and shape criteria, we used two sequential remedial measures. First, we truncated the data to the point where detection probability was approximately 0.1 [$g(w) \sim 0.1$] and included key functions with second order cosine series-expansion terms in the candidate set of models (Buckland et al. 2001). We did not include detection function models with a single cosine expansion term because the half-normal and hazard-rate models require the order of the terms are > 1 (Buckland et al. 2001). Second, when the goodness-of-fit test and/ or inspection of the detection histogram continued to suggest evasive movement and/or measurement errors, we grouped the distance data into four to eight bins, and applied custom truncation and second order expansion terms. These remedial measures can ameliorate problems associated with moderate levels of evasive movement and/ or distance measurement errors (Buckland et al. 2001).

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 (θ, Theta) and 3) the proportion of sampling units occupied by a species (ψ, 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, p and Theta were held constant across the BCRs and/or allowed to vary by BCR. Models are defined as follows:

Model 1: Held p and Theta 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 point detections in each BCR or less than 10 point detections in all but one BCR. We ran models 1 through 4 for species with greater than 10 point detections in more than one BCR. For the purpose of estimating regional variation in detection (*p*) and availability (Theta), we pooled data for BCRs with fewer than 10 point detections into adjacent BCRs with sufficient numbers of detections. We used model selection and AIC corrected for small sample size (AIC_c) to weight 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 and 90% CIs (Burnham and Anderson 2002). We combined stratum-level estimates of Psi using an area-weighted mean. The variances and standard errors for the combined estimates of Psi were estimated using the delta method (Powell 2007).

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).

Automated Analysis

We estimated population density using point transect distance sampling and site occupancy using the multi-scale occupancy model within a modified version of the RIMBCR package (R Core Team 2014; Paul Lukacs, University of Montana, Missoula). The RIMBCR package streamlined the analyses by calling the raw data from the IMBCR Structured Query Language (SQL) server database and incorporated 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 global detection rates for population density and site occupancy. The RIMBCR package used package mrds (Thomas et al. 2010, R Core Team 2014) to fit the point transect distance sampling model, and program MARK (White and Burnham 1999) and package RMark (Laake 2013, R Core Team 2014) to fit the multi-scale occupancy model. The RIMBCR package provided an automated framework for combining strata-level estimates of population density and site occupancy at multiple spatial scales, as well as approximating the standard errors and CIs for the combined estimates.

In October 2014, we revised the RIMBCR distance sampling code to accommodate updates to package mrds 2.18. However, because we were unable to troubleshoot the complex structure of the RIMBCR code, we completely rewrote the distance sampling code between October 2014 and April 2015. The new distance sampling code retained the “roll-up” code for combining the strata-level estimates from the previous version of RIMBCR. In March 2015, we discovered a delta method (Powell 2007) error in the RIMBCR “roll-up” code(Powell 2007). We estimated the proportion of sampling units occupied (Psi) for all species that estimates the standard errors and CIs for the combined occupancy estimates. In April 2015, we revised RIMBCR to fix the error, but we were unable to troubleshoot the complex structure of the RIMBCR code. We plan to rewrite the RIMBCR occupancy code in way that allows testing, but in the mean time we developed an R “roll-up” patch that correctly estimates the standard errors and CIs for the combined occupancy estimates. We reran the “roll-up” patch for 2012 – 2104 to retroactively correct the standard errors and CIs for the previous combined (superstrata) occupancy estimates. We currently maintain version control of the automated analysis code in the RMBO repository (Atlassian Stash, version 3.6.1).

RESULTS

In 2014, field technicians completed 1,180 of 1,186 (99.5%) planned surveys throughout all or portions of BCRs 9, 10, 11, 16, 17, 18, 19, and 34 using the IMBCR design (Table 1, Figure 2). Reasons surveys were not completed are summarized in Table 2. Twelve additional unplanned surveys were completed throughout the study area in 2014. Technicians conducted 14,328 point counts within the 1,192 surveyed sampling units between 3 May and 21 July 2014. They detected 181,506 individual birds representing 307 species.

Please note that not every stratum or super stratum is summarized in this report. We include details of specific strata or super strata for which our partners are most interested. Results from all strata and all biologically meaningful super strata can be found on the Rocky Mountain Avian Data Center (http://rmbo.org/v3/avian/ExploretheData.aspx).This online database contains interactive maps showing survey and detection locations, species counts, and density, population and occupancy results using the IMBCR study design. 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.

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, 2014.

State	BCR	Stratum	Stratum Definition	Collected By	Area (km²)	Planned	Completed	% Completed
AZ	16/34	AZ-BCR34-CF	Coconino National Forest	RMBO	7,426	65	65	100.0%
AZ	16/34	AZ-KAIBAB-KH	Kaibab National Forest - High Elevation	RMBO	4,319	30	30	100.0%
AZ	16/34	AZ-KAIBAB-KL	Kaibab National Forest - Low Elevation	RMBO	2,182	10	10	100.0%
				Subtotal	**13,927**	**105**	**105**	**100.0%**
CO	10	CO-BCR10-AO	All Other Lands	RMBO	5,060	5	5	100.0%
CO	10	CO-BCR10-BL	Bureau of Land Management	RMBO	4,288	23	23	100.0%
				Subtotal	**9,348**	**28**	**28**	**100.0%**
CO	16	CO-BCR16-AO	All Other Lands	RMBO	51,214	23	22	95.7%
CO	16	CO-BCR16-BL	Bureau of Land Management	RMBO	27,825	25	25	100.0%
CO	16	CO-BCR16-GM	Grand Mesa; Uncompahgre and Gunnison National Forests	RMBO	13,630	10	10	100.0%
CO	16	CO-BCR16-MA	Manti-La Sal National Forest	RMBO	131	2	2	100.0%
CO	16	CO-BCR16-NC	National Park Service - Northern Colorado Plateau Network	RMBO	807	2	2	100.0%
CO	16	CO-BCR16-PC	Pike-San Isabel National Forest Control	RMBO	1,300	30	30	100.0%
CO	16	CO-BCR16-PO	Pike-San Isabel National Forest All Other	RMBO	9,650	10	10	100.0%
CO	16	CO-BCR16-RA	Rio Grande National Forest - High Elevation	RMBO	866	8	8	100.0%
CO	16	CO-BCR16-RC	Arapaho-Roosevelt National Forest Control	RMBO	780	30	30	100.0%
CO	16	CO-BCR16-RM	National Park Service - Rocky Mountain Network	RMBO	1,644	2	2	100.0%
CO	16	CO-BCR16-RO	Routt National Forest	RMBO	5,734	23	23	100.0%
CO	16	CO-BCR16-RP	Rio Grande National Forest - Middle Elevation	RMBO	5,410	10	10	100.0%
CO	16	CO-BCR16-RS	Rio Grande National Forest - Low Elevation	RMBO	1,896	8	8	100.0%
CO	16	CO-BCR16-SA	San Juan National Forest	RMBO	8,794	10	10	100.0%
CO	16	CO-BCR16-SC	National Park Service - Southern Colorado Plateau Network	RMBO	214	2	2	100.0%
CO	16	CO-BCR16-VO	Arapaho-Roosevelt National Forest All Other	RMBO	6,152	10	10	100.0%
CO	16	CO-BCR16-WA	White River National Forest - High Elevation	RMBO	2,138	10	10	100.0%
CO	16	CO-BCR16-WF	USFS - Williams Fork Management Unit	RMBO	551	9	9	100.0%
CO	16	CO-BCR16-WP	White River National Forest - Middle Elevation	RMBO	5,443	9	9	100.0%
CO	16	CO-BCR16-WS	White River National Forest - Low Elevation	RMBO	2,786	9	9	100.0%
				Subtotal	**146,965**	**242**	**241**	**99.6%**
CO	18	CO-BCR18-AR	Arkansas River and Tributaries	RMBO	1,127	9	9	100.0%
CO	18	CO-BCR18-CO	Comanche National Grassland	RMBO	4,836	10	10	100.0%

State	BCR	Stratum	Stratum Definition	Collected By	Area (km²)	Planned	Completed	% Completed
CO	18	CO-BCR18-DO	Department of Defense	RMBO	1,647	2	2	100.0%
CO	18	CO-BCR18-IA	Area between I-70 and the Arkansas River	RMBO	34,755	10	10	100.0%
CO	18	CO-BCR18-NP	Area North of the Platte River	RMBO	11,457	10	10	100.0%
CO	18	CO-BCR18-PC	Pawnee National Grassland - Private Lands	RMBO	2,458	2	2	100.0%
CO	18	CO-BCR18-PG	Pawnee National Grassland - Public Lands	RMBO	810	8	8	100.0%
CO	18	CO-BCR18-PI	Area between the Platte River and I-70	RMBO	30,365	10	10	100.0%
CO	18	CO-BCR18-PT	Platte River and Tributaries	RMBO	970	9	9	100.0%
CO	18	CO-BCR18-SA	Area South of the Arkansas River	RMBO	24,985	10	10	100.0%
				Subtotal	**113,410**	**80**	**80**	**100.0%**
ID	9	ID-BCR9-CT	Caribou-Targhee National Forest	RMBO	1,940	6	6	100.0%
ID	10	ID-BCR10-BI	Bitterroot National Forest	IBO	1,916	2	2	100.0%
ID	10	ID-BCR10-BL	BLM Lands in Idaho BCR 10	IBO	4,015	4	4	100.0%
ID	10	ID-BCR10-BO	Boise National Forest	IBO	8,778	3	3	100.0%
ID	10	ID-BCR10-CL	Clearwater National Forest - Roaded/Managed	IBO	1,946	12	12	100.0%
ID	10	ID-BCR10-CR	Clearwater National Forest - Roadless/Wilderness	IBO	5,036	3	3	100.0%
ID	10	ID-BCR10-CT	Caribou-Targhee National Forest	RMBO	7,752	14	14	100.0%
ID	10	ID-BCR10-IP	Idaho Panhandle National Forest - Roaded/Managed	IBO	8,660	16	16	100.0%
ID	10	ID-BCR10-IR	Idaho Panhandle National Forest - Roadless/Wilderness	IBO	3,155	4	4	100.0%
ID	10	ID-BCR10-KO	Kootenai National Forest	IBO	169	2	2	100.0%
ID	10	ID-BCR10-NI	All Other Lands in Idaho BCR 10 and USFS Region 1	IBO	13,000	10	10	100.0%
ID	10	ID-BCR10-NP	Nez Perce National Forest - Roaded/Managed	IBO	2,864	12	12	100.0%
ID	10	ID-BCR10-NR	Nez Perce National Forest - Roadless/Wilderness	IBO	6,370	3	3	100.0%
ID	10	ID-BCR10-PA	Payette National Forest	IBO	9,857	3	3	100.0%
ID	10	ID-BCR10-SA	Salmon-Challis National Forest	IBO	13,563	3	3	100.0%
ID	10	ID-BCR10-SI	All Other Lands in Idaho BCR 10 and USFS Region 4	IBO	11,423	10	10	100.0%
ID	10	ID-BCR10-SW	Sawtooth National Forest	IBO	6,302	3	3	100.0%
				Subtotal	**104,806**	**104**	**104**	**100.0%**
ID	16	ID-BCR16-CT	Caribou-Targhee National Forest	RMBO	909	4	4	100.0%
MT	10	MT-BCR10-AO	All Other Lands	ASC	53,215	10	10	100.0%

State	BCR	Stratum	Stratum Definition	Collected By	Area (km²)	Planned	Completed	% Completed
MT	10	MT-BCR10-BE	Beaverhead-Deerlodge National Forest - Roaded/Managed[1]	ASC	7,697	7	7	100.0%
MT	10	MT-BCR10-BI	Bitterroot National Forest - Roaded/Managed[1]	ASC	2,324	7	7	100.0%
MT	10	MT-BCR10-BM	Bureau of Land Management - Missoula/Butte	ASC	1,356	2	2	100.0%
MT	10	MT-BCR10-BR	Beaverhead-Deerlodge National Forest - Roadless/Wilderness	ASC	8,236	2	2	100.0%
MT	10	MT-BCR10-BS	Bureau of Land Management - southwestern Montana	ASC	3,447	6	6	100.0%
MT	10	MT-BCR10-BW	Bitterroot National Forest - Roadless/Wilderness	ASC	2,763	2	2	100.0%
MT	10	MT-BCR10-CR	Custer National Forest - Roadless/Wilderness	ASC	1,783	2	2	100.0%
MT	10	MT-BCR10-CU	Custer National Forest - Roaded/Managed	ASC	779	2	2	100.0%
MT	10	MT-BCR10-FL	Flathead National Forest - Roaded/Managed	ASC	4,945	7	7	100.0%
MT	10	MT-BCR10-FR	Flathead National Forest - Roadless/Wilderness	ASC	6,410	2	2	100.0%
MT	10	MT-BCR10-FW	Fish and Wildlife Service - All Refuges	ASC	359	2	2	100.0%
MT	10	MT-BCR10-GA	Gallatin National Forest - Roaded/Managed	ASC	3,479	7	7	100.0%
MT	10	MT-BCR10-GR	Gallatin National Forest - Roadless/Wilderness	ASC	5,787	2	2	100.0%
MT	10	MT-BCR10-HE	Helena National Forest - Roaded/Managed[1]	ASC	3,024	7	7	100.0%
MT	10	MT-BCR10-HR	Helena National Forest - Roadless/Wilderness	ASC	2,248	2	2	100.0%
MT	10	MT-BCR10-KO	Kootenai National Forest - Roaded/Managed	ASC	7,239	16	16	100.0%
MT	10	MT-BCR10-KR	Kootenai National Forest - Roadless/Wilderness[2]	ASC	1,887	4	4	100.0%
MT	10	MT-BCR10-LC	Lewis and Clark National Forest - Roaded/Managed	ASC	2,778	4	4	100.0%
MT	10	MT-BCR10-LO	Lolo National Forest - Roaded/Managed	ASC	7,742	7	7	100.0%
MT	10	MT-BCR10-LR	Lewis and Clark National Forest - Roadless/Wilderness	ASC	5,007	2	2	100.0%
MT	10	MT-BCR10-LW	Lolo National Forest - Roadless/Wilderness	ASC	3,859	2	2	100.0%
MT	10	MT-BCR10-NG	National Park Service - Glacier National Park	ASC	3,936	2	2	100.0%
MT	10	MT-BCR10-RI	Rivers[1]	ASC	3,515	10	10	100.0%
MT	10	MT-BCR10-TB	Blackfeet and Crow Reservations	ASC	9,349	2	2	100.0%
MT	10	MT-BCR10-TF	Flathead Reservation	ASC	5,043	2	2	100.0%
				Subtotal	**158,207**	**120**	**120**	**100.0%**
MT	11	MT-BCR11-AO	All Other Lands	ASC	62,631	10	10	100.0%
MT	11	MT-BCR11-BN	Bureau of Land Management - North Valley	ASC	1,588	2	2	100.0%
MT	11	MT-BCR11-BO	Bureau of Land Management - Other	ASC	6,826	8	8	100.0%
MT	11	MT-BCR11-CM	Charles M. Russell National Wildlife Refuge	ASC	93	7	7	100.0%
MT	11	MT-BCR11-FO	All other USFWS lands	ASC	448	2	2	100.0%

State	BCR	Stratum	Stratum Definition	Collected By	Area (km²)	Planned	Completed	% Completed
MT	11	MT-BCR11-TR	Rocky Boys; Fort Peck; Fort Belknap and Blackfeet Reservations	ASC	11,829	2	2	100.0%
				Subtotal	**83,415**	**31**	**31**	**100.0%**
MT	17	MT-BCR17-AO	All Other Lands[2]	ASC	102,779	12	12	100.0%
MT	17	MT-BCR17-BL	Bureau of Land Management[2]	ASC	25,013	10	10	100.0%
MT	17	MT-BCR17-CM	Charles M. Russell National Wildlife Refuge	ASC	3,709	37	35	94.6%
MT	17	MT-BCR17-CU	Custer National Forest	ASC	2,649	5	5	100.0%
MT	17	MT-BCR17-FO	All other USFWS lands	ASC	326	2	2	100.0%
MT	17	MT-BCR17-LC	Lewis and Clark National Forest	ASC	867	2	2	100.0%
MT	17	MT-BCR17-RI	Rivers - Yellowstone; Tongue; Musselshell; and Missouri	ASC	4,575	10	10	100.0%
				Subtotal	**139,918**	**78**	**76**	**97.4%**
ND	17	ND-BCR17-BM	Bureau of Land Management	RMBO	165	5	5	100.0%
ND	17	ND-BCR17-KR	Knife River Indian Villages National Historic Site	RMBO	5	5	5	100.0%
ND	17	ND-BCR17-MG	Little Missouri National Grassland	RMBO	4,133	5	5	100.0%
ND	17	ND-BCR17-OW	All Other Lands	RMBO	48,631	7	7	100.0%
ND	17	ND-BCR17-RG	Cedar River National Grassland	RMBO	20	5	5	100.0%
ND	17	ND-BCR17-TB	Select Tribal Lands	RMBO	1,768	2	2	100.0%
ND	17	ND-BCR17-TN	Theodore Roosevelt National Park - North Unit	RMBO	100	7	7	100.0%
ND	17	ND-BCR17-TS	Theodore Roosevelt National Park - South Unit[2]	RMBO	193	8	8	100.0%
				Subtotal	**55,015**	**44**	**44**	**100.0%**
NE	17	NE-BCR17-LG	Oglala National Grassland	RMBO	350	4	4	100.0%
NE	17	NE-BCR17-OW	All Other Lands	RMBO	1,898	2	2	100.0%
				Subtotal	**2,248**	**6**	**6**	**100.0%**
NE	18	NE-BCR18-AF	Agate Fossil Beds National Monument	RMBO	12	9	9	100.0%
NE	18	NE-BCR18-GG	Oglala National Grassland	RMBO	31	3	3	100.0%
NE	18	NE-BCR18-RD	Nebraska National Forest - Pine Ridge	RMBO	200	3	3	100.0%
NE	18	NE-BCR18-SB	Scotts Bluff National Monument	RMBO	13	7	7	100.0%
				Subtotal	**256**	**22**	**22**	**100.0%**
NE	19	NE-BCR19-BE	Nebraska National Forest - Bessey District	RMBO	361	3	3	100.0%
NE	19	NE-BCR19-SG	Samuel R. McKelvie National Forest	RMBO	468	3	3	100.0%
				Subtotal	**829**	**6**	**6**	**100.0%**
NE	17/19	NE-NGPIM-NI	Niobrara National Scenic River	RMBO	64	14	12	85.7%

State	BCR	Stratum	Stratum Definition	Collected By	Area (km²)	Planned	Completed	% Completed
NM	18	NM-BCR18-KI	Kiowa National Grassland	RMBO	565	3	3	100.0%
NM	18	NM-BCR18-RI	Rita Blanca National Grassland	RMBO	473	3	3	100.0%
				Subtotal	**1,038**	**6**	**6**	**100.0%**
OK	18	OK-BCR18-RI	Rita Blanca National Grassland	RMBO	187	2	2	100.0%
SD	17	SD-BCR17-BF	Black Hills National Forest - All other Watersheds	RMBO	5,009	4	4	100.0%
SD	17	SD-BCR17-BM	Bureau of Land Management	RMBO	831	5	5	100.0%
SD	17	SD-BCR17-BN	Badlands National Park - North Unit	RMBO	434	16	16	100.0%
SD	17	SD-BCR17-BS	Badlands National Park - South Unit	RMBO	539	2	2	100.0%
SD	17	SD-BCR17-GG	Buffalo Gap National Grassland	RMBO	2,356	5	5	100.0%
SD	17	SD-BCR17-HU	Black Hills National Forest - Hydrologic Code 7 Watersheds	RMBO	376	3	3	100.0%
SD	17	SD-BCR17-JC	Jewel Cave National Monument	RMBO	5	5	5	100.0%
SD	17	SD-BCR17-MR	Mount Rushmore National Monument	RMBO	6	6	6	100.0%
SD	17	SD-BCR17-OW	All Other Lands	RMBO	87,072	10	10	100.0%
SD	17	SD-BCR17-PG	Fort Pierre National Grassland	RMBO	482	5	5	100.0%
SD	17	SD-BCR17-RG	Grand River National Grassland	RMBO	125	5	5	100.0%
SD	17	SD-BCR17-TB	Select Tribal Lands	RMBO	5,388	2	2	100.0%
SD	17	SD-BCR17-UF	Custer National Forest	RMBO	326	5	5	100.0%
SD	17	SD-BCR17-WC	Wind Cave National Park	RMBO	136	15	15	100.0%
				Subtotal	**103,085**	**88**	**88**	**100.0%**
TX	18	TX-BCR18-RI	Rita Blanca National Grassland	RMBO	526	3	3	100.0%
UT	9	UT-BCR9-CT	Caribou-Targhee National Forest	RMBO	54	2	2	100.0%
UT	16	UT-BCR16-MA	Manti-La Sal National Forest	RMBO	5,280	4	4	100.0%
WY	9	WY-BCR9-WY	Caribou-Targhee National Forest	RMBO	119	2	2	100.0%
WY	10	WY-BCR10-AO	All Other Lands	RMBO	52,161	8	8	100.0%
WY	10	WY-BCR10-AS	Ashley National Forest	RMBO	540	2	2	100.0%

State	BCR	Stratum	Stratum Definition	Collected By	Area (km²)	Planned	Completed	% Completed
WY	10	WY-BCR10-BE	Bridger-Teton National Forest - Roaded/Managed	RMBO	3,034	17	17	100.0%
WY	10	WY-BCR10-BH	Bighorn Canyon National Recreation Area	RMBO	57	2	2	100.0%
WY	10	WY-BCR10-BI	Bighorn National Forest	WYNDD	4,712	10	10	100.0%
WY	10	WY-BCR10-BR	Bridger-Teton National Forest - Roadless/Wilderness	RMBO	11,364	3	3	100.0%
WY	10	WY-BCR10-BU	Bureau of Land Management - Buffalo Field Office	RMBO	547	2	2	100.0%
WY	10	WY-BCR10-CA	Bureau of Land Management - Casper Field Office	RMBO	2,509	2	2	100.0%
WY	10	WY-BCR10-CO	Bureau of Land Management - Cody Field Office	RMBO	4,704	2	2	100.0%
WY	10	WY-BCR10-CT	Caribou-Targhee National Forest	RMBO	1,397	4	4	100.0%
WY	10	WY-BCR10-GR	Grand Teton National Park	RMBO	856	2	2	100.0%
WY	10	WY-BCR10-KE	Bureau of Land Management - Kemmerer Field Office	RMBO	5,733	2	2	100.0%
WY	10	WY-BCR10-LA	Bureau of Land Management - Lander Field Office	RMBO	9,829	2	2	100.0%
WY	10	WY-BCR10-MB	Medicine Bow National Forest	WYNDD	773	3	3	100.0%
WY	10	WY-BCR10-PI	Bureau of Land Management - Pinedale Field Office	RMBO	3,687	5	5	100.0%
WY	10	WY-BCR10-RA	Bureau of Land Management - Rawlins Field Office	RMBO	13,954	6	6	100.0%
WY	10	WY-BCR10-RO	Bureau of Land Management - Rock Springs Field Office	RMBO	15,152	6	6	100.0%
WY	10	WY-BCR10-SE	Shoshone National Forest - Roaded/Managed	RMBO	2,101	20	20	100.0%
WY	10	WY-BCR10-SR	Shoshone National Forest - Roadless/Wilderness	RMBO	8,311	6	5	83.3%
WY	10	WY-BCR10-WA	Wasatch National Forest	RMBO	33	2	2	100.0%
WY	10	WY-BCR10-WO	Bureau of Land Management - Worland Field Office	RMBO	8,467	2	2	100.0%
WY	10	WY-BCR10-WR	Wind River Reservation	RMBO	7,819	2	2	100.0%
WY	10	WY-BCR10-YE	Yellowstone National Park	RMBO	7,592	2	2	100.0%
				Subtotal	**165,332**	**112**	**111**	**99.1%**
WY	16	WY-BCR16-AO	All Other Lands	RMBO	5,438	5	5	100.0%
WY	16	WY-BCR16-BL	Bureau of Land Management	RMBO	647	2	2	100.0%
WY	16	WY-BCR16-MB	Medicine Bow National Forest	WYNDD	5,329	27	27	100.0%
WY	16	WY-BCR16-WA	Wasatch National Forest	RMBO	180	2	2	100.0%
				Subtotal	**11,594**	**36**	**36**	**100.0%**
WY	17	WY-BCR17-AO	All Other Lands	RMBO	52,186	10	10	100.0%
WY	17	WY-BCR17-BH	Black Hills National Forest	RMBO	1,085	3	3	100.0%
WY	17	WY-BCR17-BU	Bureau of Land Management - Buffalo Field Office	RMBO	2,653	2	2	100.0%
WY	17	WY-BCR17-CA	Bureau of Land Management - Casper Field Office	RMBO	2,695	2	2	100.0%

State	BCR	Stratum	Stratum Definition	Collected By	Area (km²)	Planned	Completed	% Completed
WY	17	WY-BCR17-NE	Bureau of Land Management - Newcastle Field Office	RMBO	1,025	2	2	100.0%
WY	17	WY-BCR17-TB	Thunder Basin National Grassland	WYNDD	4,520	10	10	100.0%
				Subtotal	**64,164**	**29**	**29**	**100.0%**
WY	18	WY-BCR18-AO	All Other Lands	RMBO	12,064	8	8	100.0%
WY	18	WY-BCR18-BL	Bureau of Land Management	RMBO	171	2	2	100.0%
WY	18	WY-BCR18-DO	Department of Defense	RMBO	23	2	2	100.0%
				Subtotal	**12,258**	**12**	**12**	**100.0%**
				Grand Total	**1,194,894**	**1,186**	**1,180**	**99.5%**

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

Table 2. Reasons planned surveys were not completed, 2014.

Stratum	# Not Completed	Reason
CO-BCR16-AO	1	Backup survey was too low in elevation to survey
MT-BCR17-CM	2	Bad weather and wet roads
WY-BCR10-SR	1	High water in river unsafe to cross
NE-NGPIM-NI	2	Denied permission or no contact with landowners

I. Bird Conservation Region 17

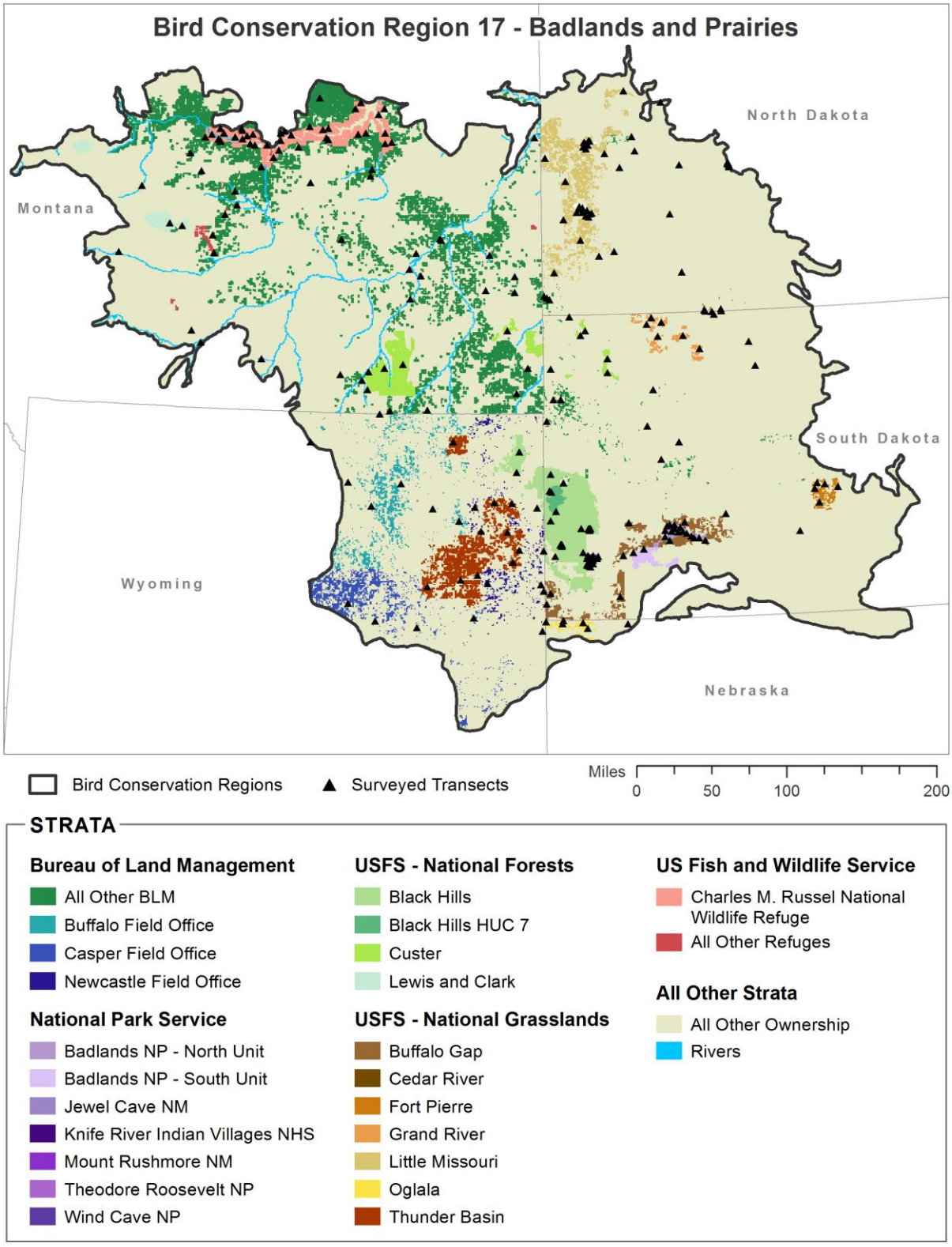

Figure 4. Survey locations in the Badlands and Prairies Bird Conservation Region (BCR 17), 2014.

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 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.

We obtained results for BCR 17 by compiling and jointly analyzing data from 37 strata in five states (Figure 4).

Field technicians completed 243 of 245 planned surveys (99.2%) in 2014. They also completed six extra surveys in BCR 17. Technicians conducted 2,907 point counts within the 249 surveyed sampling units between 16 May and 12 July. They detected 196 bird species, including 41 priority species (Appendix B).

RMBO estimated densities and population sizes for 150 species, 34 of which are priority species. The data yielded robust density estimates (CV < 50%) for 66 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout BCR 17 for 149 species, 31 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 74 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BCR 17 Results

B. Montana BCR 17

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

Field technicians completed 76 of 78 planned surveys (97.4%) in 2014. They also completed four extra surveys in Montana BCR 17. Technicians conducted 948 point counts within the 80 surveyed sampling units between 17 May and 10 July. They detected 160 bird species, including 25 priority species (Appendix C).

RMBO estimated densities and population sizes for 125 species, 18 of which are priority species. The data yielded robust density estimates (CV < 50%) for 41 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Montana BCR 17 for 121 species, 15 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Montana BCR 17 Results

C. North Dakota BCR 17

We obtained results for North Dakota BCR 17 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 44 planned surveys (100%) in 2014. They also completed two extra surveys in North Dakota BCR 17. Technicians conducted 474 point counts within the 46 surveyed sampling units between 1 June and 12 July. They detected 130 bird species, including 27 priority species (Appendix C).

RMBO estimated densities and population sizes for 105 species, 21 of which are priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout North Dakota BCR 17 for 101 species, 19 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

North Dakota BCR 17 Results

D. Nebraska BCR 17

We obtained results for Nebraska BCR 17 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 six planned surveys (100%) in 2014. Technicians conducted 81 point counts within the six surveyed sampling units between 25 May and 15 June. They detected 38 bird species, including 4 priority species (Appendix C).

RMBO estimated densities and population sizes for 29 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 sampling units occupied (Psi) throughout Nebraska BCR 17 for 24 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 7 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Nebraska BCR 17 Results

E. South Dakota BCR 17

We obtained results for South Dakota BCR 17 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.

Field technicians completed all 88 planned surveys (100%) in 2014. Technicians conducted 1,037 point counts within the 88 surveyed sampling units between 19 May and 11 July. They detected 141 bird species, including 15 priority species (Appendix C).

RMBO estimated densities and population sizes for 122 species, 11 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 sampling units occupied (Psi) throughout South Dakota BCR 17 for 113 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 40 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

South Dakota BCR 17 Results

F. Wyoming BCR 17

We obtained results for Wyoming BCR 17 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 29 planned surveys (100%) in 2014. Technicians conducted 367 point counts within the 29 surveyed sampling units between 16 May and 11 July. They detected 103 bird species, including 10 priority species (Appendix C).

RMBO estimated densities and population sizes for 86 species, 9 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 sampling units occupied (Psi) throughout Wyoming BCR 17 for 79 species, 6 of which are priority 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Wyoming BCR 17 Results

II. States

A. Colorado

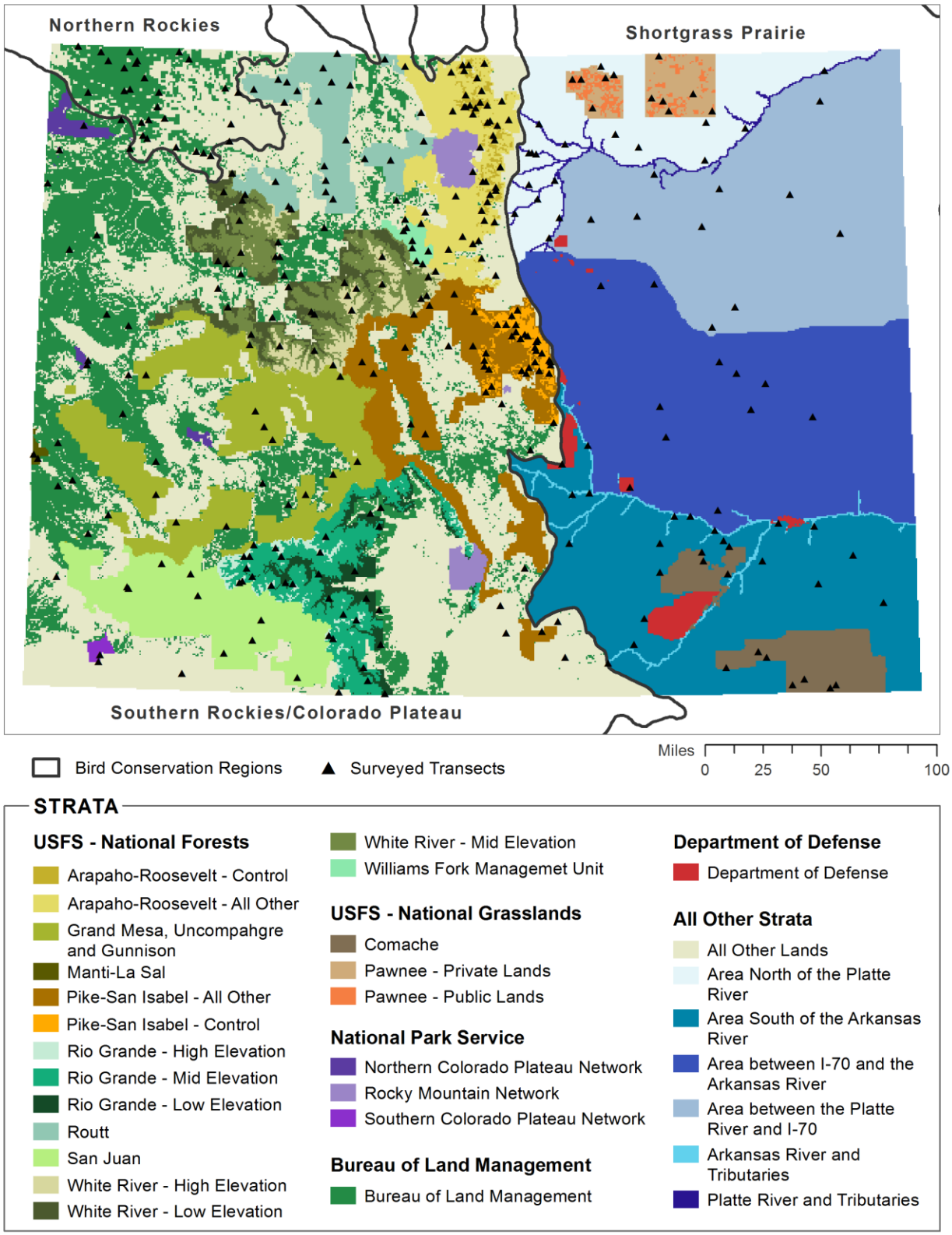

Figure 5. Survey locations in Colorado, 2014.

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 misclassified 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.

In 2014, the Arapaho and Roosevelt and the Pike and San Isabel National Forests were restratified to allow these forests to monitor treatments within heavy beetle kill areas. Each forest was divide into two strata – a control stratum and the remainder of the forest. The control portion of the Arapaho and Roosevelt National Forests consisted of lands ranging in elevation from 6,000 ft to 9,000 ft, excluding burn areas. The Pike and San Isabel control stratum ranges from 6,300 ft to 9,000 ft and also excludes burn areas. An experiment overlay stratum was created for Arapaho and Roosevelt and Pike and San Isabel National Forests consisting of actual treatment areas. Since this stratum spans multiple forests it is not actually considered to be a part of the IMBCR design and is not presented in this report. However, detections from this stratum do contribute to the number of detections used in analyses for IMBCR.

a) Colorado Statewide: Total
We obtained results for Colorado by compiling and jointly analyzing data from 32 strata (Figure 5). For results on BLM, NPS, Department of Defense (DOD) and USFS Lands within Colorado, refer to section III: Land Ownership.

Field technicians completed 349 of 350 planned surveys (99.7%) in 2014. Technicians conducted 4,066 point counts within the 349 surveyed sampling units between 12 May and 20 July. They detected 208 bird species, including 41 priority species (Appendix C).

RMBO estimated densities and population sizes for 161 species, 27 of which are priority species. The data yielded robust density estimates (CV < 50%) for 112 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Colorado for 154 species, 23 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 111 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Colorado Statewide Results

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

Field technicians completed 69 of 70 planned surveys (98.6%) in 2014. Technicians conducted 816 point counts within the 69 surveyed sampling units between 12 May and 11 July. They detected 152 bird species, including 27 priority species (Appendix C).

RMBO estimated densities and population sizes for 134 species, 20 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 sampling units occupied (Psi) throughout All Other Lands in Colorado for 126 species, 16 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Colorado Results

2. Colorado BCR 10

a) Colorado BCR 10: Total

We obtained results for Colorado BCR 10 by compiling and jointly analyzing data from two strata (Figure 5).

Field technicians completed all 28 planned surveys (100%) in 2014. Technicians conducted 385 point counts within the 28 surveyed sampling units between 13 May and 9 June. They detected 86 bird species, including 13 priority species (Appendix C).

RMBO estimated densities and population sizes for 68 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 sampling units occupied (Psi) throughout Colorado BCR 10 for 65 species, 8 of which are priority 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Colorado BCR 10 Results

b) All Other Lands in Colorado BCR 10

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

Field technicians completed all five planned surveys (100%) in 2014. Technicians conducted 65 point counts within the five surveyed sampling units between 14 May and 9 June. They detected 68 bird species, including 9 priority species (Appendix C).

RMBO estimated densities and population sizes for 55 species, 5 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 sampling units occupied (Psi) throughout All Other Lands in Colorado BCR 10 for 52 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Colorado BCR 10 Results

3. Colorado BCR 16

a) Colorado BCR 16: Total

We obtained results for Colorado BCR 16 by compiling and jointly analyzing data from 20 strata (Figure 5).

Field technicians completed 241 of 242 planned surveys (99.6%) in 2014. Technicians conducted 2,745 point counts within the 241 surveyed sampling units between 12 May and 20 July. They detected 160 bird species, including 28 priority species (Appendix C).

RMBO estimated densities and population sizes for 134 species, 18 of which are priority species. The data yielded robust density estimates (CV < 50%) for 88 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Colorado BCR 16 for 133 species, 18 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 91 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Colorado BCR 16 Results

b) All Other Lands in Colorado BCR 16

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

Field technicians completed 22 of 23 planned surveys (95.7%) in 2014. Technicians conducted 231 point counts within the 22 surveyed sampling units between 12 May and 11 July. They detected 125 bird species, including 18 priority species (Appendix C).

RMBO estimated densities and population sizes for 110 species, 12 of which are priority species. The data yielded robust density estimates (CV < 50%) for 41 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout All Other Lands in Colorado BCR 16 for 103 species, 10 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

All Other Lands in Colorado BCR 16 Results

4. Colorado BCR 18

a) Colorado BCR 18: Total

We obtained results for Colorado BCR 18 by compiling and jointly analyzing data from 10 strata (Figure 5).

Field technicians completed all 80 planned surveys (100%) in 2014. Technicians conducted 936 point counts within the 80 surveyed sampling units between 13 May and 12 June. They detected 145 bird species, including 23 priority species (Appendix C).

RMBO estimated densities and population sizes for 111 species, 17 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 sampling units occupied (Psi) throughout Colorado BCR 18 for 101 species, 11 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 43 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Colorado BCR 18 Results

b) Colorado BCR 18 Rivers

We obtained results for Colorado BCR 18 Rivers by compiling and jointly analyzing data from two strata (Figure 5).

Field technicians completed all 18 planned surveys (100%) in 2014. Technicians conducted 175 point counts within the 18 surveyed sampling units between 13 May and 10 June. They detected 118 bird species, including 13 priority species (Appendix C).

RMBO estimated densities and population sizes for 89 species, 6 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 sampling units occupied (Psi) throughout Colorado BCR 18 Rivers for 84 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 42 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Colorado BCR 18 Rivers 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Colorado BCR 18 Rivers Results

c) All Other Lands in Colorado BCR 18

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

Field technicians completed all 42 planned surveys (100%) in 2014. Technicians conducted 520 point counts within the 42 surveyed sampling units between 13 May and 12 June. They detected 78 bird species, including 17 priority species (Appendix C).

RMBO estimated densities and population sizes for 66 species, 12 of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout All Other Lands in Colorado BCR 18 for 58 species, 9 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Colorado BCR 18 Results

B. Montana

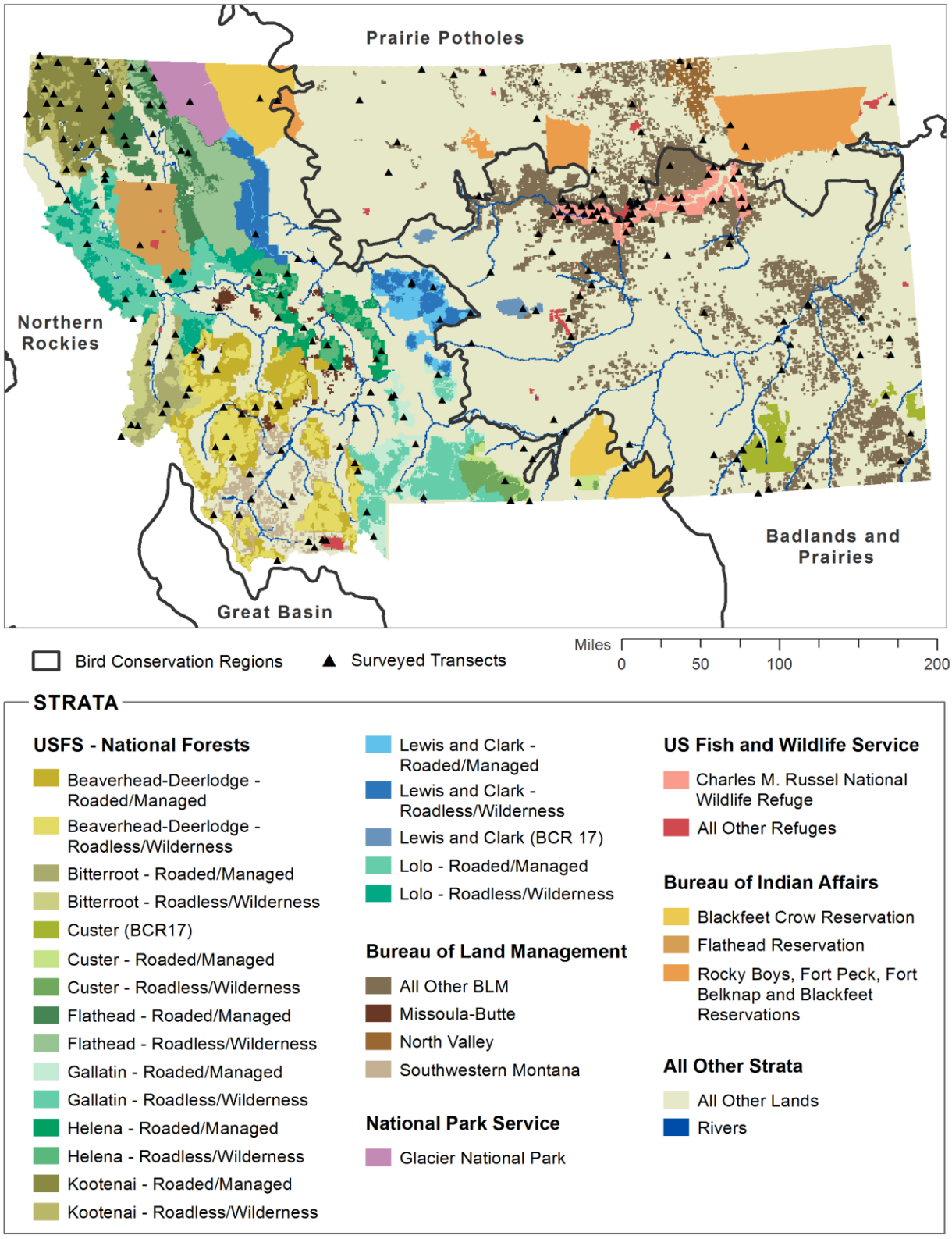

Figure 6. Survey locations in Montana, 2014.

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.

The USFWS strata in Montana BCRs 11 and 17 were subdivided in 2014 to allow density and occupancy estimation specifically within the Charles M. Russell National Wildlife Refuge. Previously, all USFWS lands were grouped together in these BCRs, limiting our ability to get estimates for individual refuges. In each BCR, two new strata were created – a Charles M. Russel NWR stratum and an All Other USFWS Lands stratum.

a) Montana Statewide: Total

We obtained results for Montana by compiling and jointly analyzing data from 39 strata (Figure 6). For results on BLM, NPS, Tribal, USFS, and USFWS lands within Montana, refer to section III: Land Ownership.

Field technicians completed 227 of 229 planned surveys (99.1%) in 2014. They also completed 10 extra surveys in Montana. Technicians conducted 2,851 point counts within the 237 surveyed sampling units between 17 May and 14 July. They detected 215 bird species, including 39 priority species (Appendix C).

RMBO estimated densities and population sizes for 163 species, 25 of which are priority species. The data yielded robust density estimates (CV < 50%) for 105 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Montana for 163 species, 22 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 121 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Montana Statewide Results

b) All Other Lands in Montana

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

Field technicians completed all 32 planned surveys (100%) in 2014. They also completed two extra surveys in All Other Lands in Montana. Technicians conducted

389 point counts within the 34 surveyed sampling units between 18 May and 25 June. They detected 149 bird species, including 19 priority species (Appendix C).

RMBO estimated densities and population sizes for 126 species, 17 of which are priority species. The data yielded robust density estimates (CV < 50%) for 50 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout All Other Lands in Montana for 121 species, 15 of which are priority 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

All Other Lands in Montana Results

2. Montana BCR 10

a) Montana BCR 10: Total
We obtained results for Montana BCR 10 by compiling and jointly analyzing data from 26 strata (Figure 6).

Field technicians completed all 120 planned surveys (100%) in 2014. They also completed six extra surveys in Montana BCR 10. Technicians conducted 1,489 point counts within the 126 surveyed sampling units between 25 May and 14 July. They detected 172 bird species, including 26 priority species (Appendix C).

RMBO estimated densities and population sizes for 142 species, 19 of which are priority species. The data yielded robust density estimates (CV < 50%) for 69 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Montana BCR 10 for 142 species, 18 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 96 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Montana BCR 10 Results

b) Montana BCR 10 Rivers
We obtained results for Rivers in Montana BCR 10 by analyzing data from one stratum (Figure 6).

Field technicians completed all 10 planned surveys (100%) in 2014. One extra survey was also completed in Montana BCR 10 Rivers. Technicians conducted 137 point counts within the 11 surveyed sampling units between 28 May and 27 June. They detected 109 bird species, including 11 priority species (Appendix C).

RMBO estimated densities and population sizes for 95 species, 10 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 sampling units occupied (Psi) throughout Montana BCR 10 Rivers for 92 species, 9 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 37 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Montana BCR 10 Rivers 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Montana BCR 10 Rivers Results

c) All Other Lands in Montana BCR 10
We obtained results for All Other Lands in Montana BCR 10 by analyzing data from one stratum (Figure 6).

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 100 point counts within the 10 surveyed sampling units between 25 May and 17 June. They detected 100 bird species, including 7 priority species (Appendix C).

RMBO estimated densities and population sizes for 86 species, 7 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 sampling units occupied (Psi) throughout All Other Lands in Montana BCR 10 for 78 species, 5 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Montana BCR 10 Results

3. Montana BCR 11

a) Montana BCR 11: Total
We obtained results for Montana BCR 11 by compiling and jointly analyzing data from six strata (Figure 6).

Field technicians completed all 31 planned surveys (100%) in 2014. Technicians conducted 414 point counts within the 31 surveyed sampling units between 19 May and 8 July. They detected 119 bird species, including 17 priority species (Appendix C).

RMBO estimated densities and population sizes for 90 species, 12 of which are priority species. The data yielded robust density estimates (CV < 50%) for 25 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Montana BCR 11 for 86 species, 9 of which are priority 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Montana BCR 11 Results

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

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 126 point counts within the 10 surveyed sampling units between 19 May and 15 June. They detected 99 bird species, including 11 priority species (Appendix C).

RMBO estimated densities and population sizes for 80 species, 10 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 sampling units occupied (Psi) throughout All Other Lands in Montana BCR 11 for 71 species, 8 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

All Other Lands in Montana BCR 11 Results

4. Montana BCR 17

a) Montana BCR 17: Total

We obtained results for Montana BCR 17 by compiling and jointly analyzing data from seven strata (Figure 4).

Field technicians completed 76 of 78 planned surveys (97.4%) in 2014. They also completed four extra surveys in Montana BCR 17. Technicians conducted 948 point counts within the 80 surveyed sampling units between 17 May and 10 July. They detected 160 bird species, including 25 priority species (Appendix C).

RMBO estimated densities and population sizes for 125 species, 18 of which are priority species. The data yielded robust density estimates (CV < 50%) for 41 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Montana BCR 17 for 121 species, 15 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Montana BCR 17 Results

b) Montana BCR 17 Rivers

We obtained results for Montana BCR 17 Rivers by analyzing data from one stratum (Figure 6).

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 101 point counts within the 10 surveyed sampling units between 17 May and 28 June. They detected 101 bird species, including 10 priority species (Appendix C).

RMBO estimated densities and population sizes for 74 species, 7 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 sampling units occupied (Psi) throughout Montana BCR 17 Rivers for 65 species, 5 of which are 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 Montana BCR 17 Rivers 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Montana BCR 17 Rivers Results

c) All Other Lands in Montana BCR 17

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

Field technicians completed all 12 planned surveys (100%) in 2014. They also completed two extra surveys in All Other Lands in Montana BCR 17. Technicians conducted 163 point counts within the 14 surveyed sampling units between 18 May and 25 June. They detected 101 bird species, including 11 priority species (Appendix C).

RMBO estimated densities and population sizes for 89 species, 10 of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout All Other Lands in Montana BCR 17 for 80 species, 8 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Montana BCR 17 Results

C. Wyoming

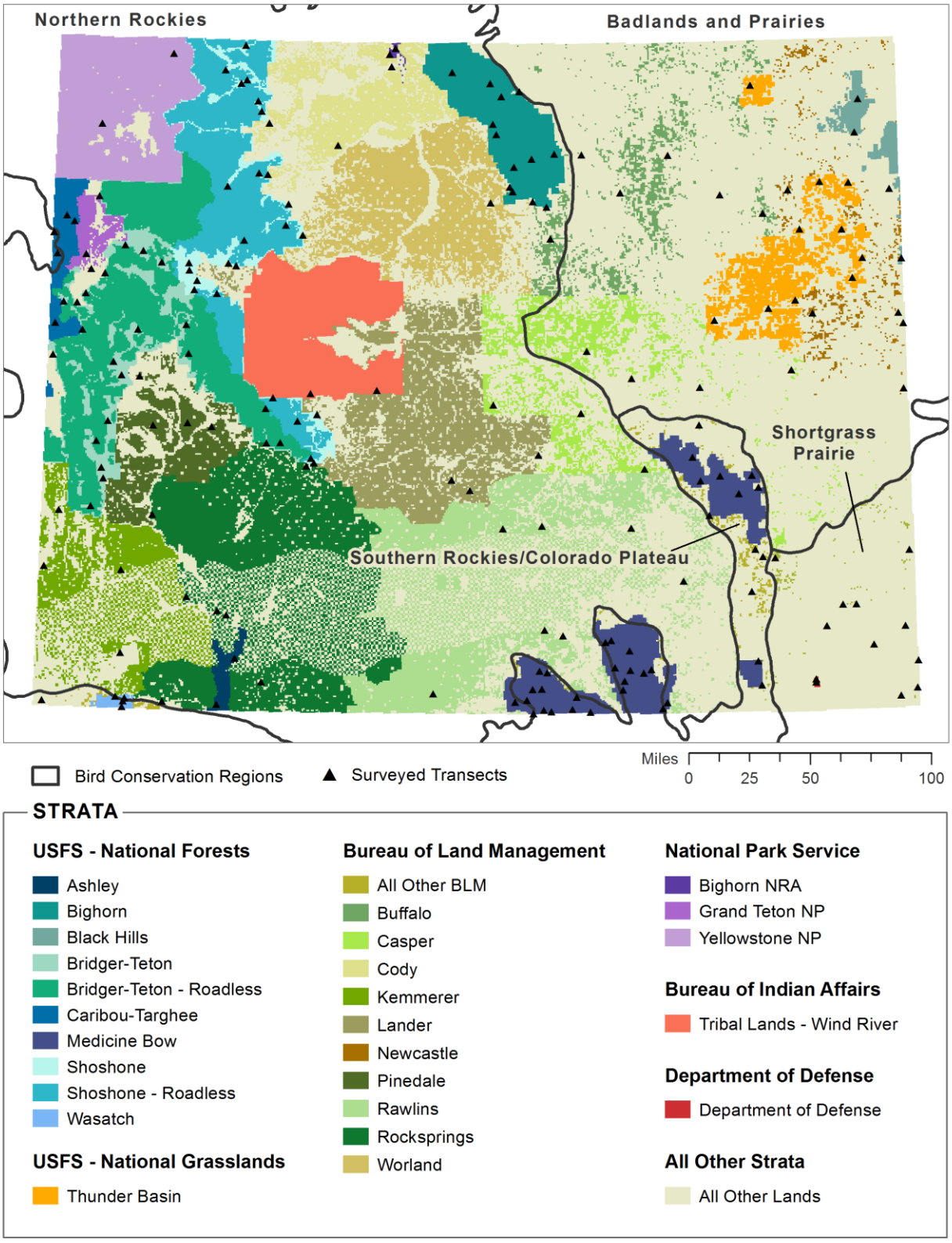

Figure 7. Survey locations in Wyoming, 2014.

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 2014, the remainder of USFS Region 4 was split out into three 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

We obtained results for Wyoming by compiling and jointly analyzing data from 37 strata (Figure 7). For results on BLM, DOD, NPS, Tribal and USFS lands within Wyoming refer to section III: Land Ownership.

Field technicians completed 190 of 191 planned surveys (99.5%) in 2014. Technicians conducted 2,455 point counts within the 190 surveyed sampling units between 16 May and 14 August. They detected 176 bird species, including 25 priority species (Appendix C).

RMBO estimated densities and population sizes for 150 species, 18 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 sampling units occupied (Psi) throughout Wyoming for 143 species, 15 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Wyoming Statewide Results

b) All Other Lands in Wyoming

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

Field technicians completed all 31 planned surveys (100%) in 2014. Technicians conducted 380 point counts within the 31 surveyed sampling units between 19 May and 23 June. They detected 113 bird species, including 12 priority species (Appendix C).

RMBO estimated densities and population sizes for 100 species, 11 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 sampling units occupied (Psi) throughout All Other Lands in Wyoming for 89 species, 9 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

All Other Lands in Wyoming Results

2. Wyoming BCR 10

a) Wyoming BCR 10: Total

We obtained results for Wyoming BCR 10 by compiling and jointly analyzing data from 23 strata (Figure 7).

Field technicians completed 111 of 112 planned surveys (99.1%) in 2014. Technicians conducted 1,478 point counts within the 111 surveyed sampling units between 20 May and 14 August. They detected 150 bird species, including 19 priority species (Appendix C).

RMBO estimated densities and population sizes for 125 species, 12 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 sampling units occupied (Psi) throughout Wyoming BCR 10 for 123 species, 11 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Wyoming BCR 10 Results

b) All Other Lands in Wyoming BCR 10

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

Field technicians completed all eight planned surveys (100%) in 2014. Technicians conducted 105 point counts within the eight surveyed sampling units between 22 May and 23 June. They detected 87 bird species, including 9 priority species (Appendix C).

RMBO estimated densities and population sizes for 73 species, 8 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 sampling units occupied (Psi) throughout All Other Lands in Wyoming BCR 10 for 63 species, 7 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 19 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Wyoming BCR 10 Results

3 Wyoming BCR 16

a) Wyoming BCR 16: Total

We obtained results for Wyoming BCR 16 by compiling and jointly analyzing data from four strata (Figure 7).

Field technicians completed all 36 planned surveys (100%) in 2014. Technicians conducted 442 point counts within the 36 surveyed sampling units between 31 May and 21 July. They detected 101 bird species, including 7 priority species (Appendix C).

RMBO estimated densities and population sizes for 92 species, 7 of which are priority species. The data yielded robust density estimates (CV < 50%) for 43 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Wyoming BCR 16 for 87 species, 6 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Wyoming BCR 16 Results

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

Field technicians completed all five planned surveys (100%) in 2014. Technicians conducted 53 point counts within the five surveyed sampling units between 31 May and 22 June. They detected 37 bird species, including 4 priority species (Appendix C).

RMBO estimated densities and population sizes for 28 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 sampling units occupied (Psi) throughout All Other Lands in Wyoming BCR 16 for 24 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Wyoming BCR 16 Results

4. Wyoming BCR 17

a) Wyoming BCR 17: Total
We obtained results for Wyoming BCR 17 by compiling and jointly analyzing data from six strata (Figure 4).

Field technicians completed all 29 planned surveys (100%) in 2014. Technicians conducted 367 point counts within the 29 surveyed sampling units between 16 May and 11 July. They detected 103 bird species, including 10 priority species (Appendix C).

RMBO estimated densities and population sizes for 86 species, 9 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 sampling units occupied (Psi) throughout Wyoming BCR 17 for 79 species, 6 of which are priority 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Wyoming BCR 17 Results

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

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 126 point counts within the 10 surveyed sampling units between 19 May and 5 June. They detected 76 bird species, including 6 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 7 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout All Other Lands in Wyoming BCR 17 for 62 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 19 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

All Other Lands in Wyoming BCR 17 Results

5. Wyoming BCR 18

a) Wyoming BCR 18: Total
We obtained results for Wyoming BCR 18 by compiling and jointly analyzing data from three strata (Figure 7).

Field technicians completed all 12 planned surveys (100%) in 2014. Technicians conducted 150 point counts within the 12 surveyed sampling units between 22 May and 8 June. They detected 67 bird species, including 9 priority species (Appendix C).

RMBO estimated densities and population sizes for 56 species, 9 of which are priority species. The data yielded robust density estimates (CV < 50%) for 6 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Wyoming BCR 18 for 49 species, 6 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Wyoming BCR 18 Results

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

Field technicians completed all eight planned surveys (100%) in 2014. Technicians conducted 96 point counts within the eight surveyed sampling units between 22 May and 8 June. They detected 60 bird species, including 7 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 5 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout All Other Lands in Wyoming BCR 18 for 43 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 7 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 2014, 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 2014, 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

We obtained results for All Other Lands in Idaho BCR 10 by compiling and jointly analyzing data from two strata. There were some major stratification changes made to the BCR 10 portion of Idaho between 2013 and 2014. The general strata All Other Lands in USFS Region 1, All Other Lands in USFS Region 4, and other strata were further subdivided into National Forest Lands, BLM Lands, and two remaining All Other Lands strata. Since area was removed from each of the All Other Lands strata, the estimates presented in this section represent a smaller area than in the past (43,014 km^2 in 2013 down to 24,423 km^2 in 2014).

Field technicians completed all 20 planned surveys (100%) in 2014. Technicians conducted 224 point counts within the 20 surveyed sampling units between 2 June and 8 July. They detected 119 bird species, including 7 priority species (Appendix C).

RMBO estimated densities and population sizes for 102 species, 6 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 sampling units occupied (Psi) throughout All Other Lands in Idaho BCR 10 for 99 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 55 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

All Other Lands in Idaho BCR 10 Results

2. All Other Lands in Nebraska BCR 17
We obtained results for All Other Lands in Nebraska BCR 17 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 21 point counts within the two surveyed sampling units between 2 June and 15 June. They detected 25 bird species, including 2 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 species counts within All Other Lands in 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

All Other Lands in Nebraska BCR 17 Results

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

Field technicians completed all nine planned surveys (100%) in 2014. Technicians conducted 75 point counts within the nine surveyed sampling units between 1 June and 12 July. They detected 74 bird species, including 16 priority species (Appendix C).

RMBO estimated densities and population sizes for 62 species, 14 of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout All Other Lands in North Dakota BCR 17 for 55 species, 13 of which are priority 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 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 2014, 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 2014, 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

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

Field technicians completed all 12 planned surveys (100%) in 2014. Technicians conducted 149 point counts within the 12 surveyed sampling units between 26 May and 2 July. They detected 78 bird species, including 8 priority species (Appendix C).

RMBO estimated densities and population sizes for 66 species, 7 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 sampling units occupied (Psi) throughout All Other Lands in South Dakota BCR 17 for 59 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 19 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 2014, 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 2014, 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

We obtained results for BLM in Colorado by compiling and jointly analyzing data from two strata.

Field technicians completed all 48 planned surveys (100%) in 2014. Technicians conducted 637 point counts within the 48 surveyed sampling units between 13 May and 11 July. They detected 114 bird species, including 5 priority species (Appendix D).

RMBO estimated densities and population sizes for 98 species, 2 of which are priority species. The data yielded robust density estimates (CV < 50%) for 47 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout BLM in Colorado for 95 species, 2 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 BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Colorado Results

b) BLM in Colorado BCR 10

We obtained results for BLM in Colorado BCR 10 by analyzing data from one stratum.

Field technicians completed all 23 planned surveys (100%) in 2014. Technicians conducted 320 point counts within the 23 surveyed sampling units between 13 May and 7 June. They detected 70 bird species, including 5 priority species (Appendix D).

RMBO estimated densities and population sizes for 56 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 sampling units occupied (Psi) throughout BLM in Colorado BCR 10 for 50 species, 1 of which is a 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 BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Colorado BCR 10 Results

c) BLM in Colorado BCR 16

We obtained results for BLM in Colorado BCR 16 by analyzing data from one stratum.

Field technicians completed all 25 planned surveys (100%) in 2014. Technicians conducted 317 point counts within the 25 surveyed sampling units between 19 May and 11 July. They detected 104 bird species, including 3 priority species (Appendix D).

RMBO estimated densities and population sizes for 91 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 43 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout BLM in Colorado BCR 16 for 89 species, 1 of which is a 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Colorado BCR 16 Results

2. BLM in Idaho BCR 10

We obtained results for BLM in Idaho BCR 10 by analyzing data from one stratum.

Field technicians completed all four planned surveys (100%) in 2014. Technicians conducted 50 point counts within the four surveyed sampling units between 30 May and 12 July. They detected 72 bird species, including 7 priority species (Appendix D).

RMBO estimated densities and population sizes for 56 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 1 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout BLM in Idaho BCR 10 for 53 species, 3 of which are 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 BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Idaho BCR 10

3. BLM in Montana

a) BLM in Montana: Total

We obtained results for BLM in Montana by compiling and jointly analyzing data from five strata.

Field technicians completed all 28 planned surveys (100%) in 2014. They also completed two extra surveys in BLM in Montana. Technicians conducted 398 point counts within the 30 surveyed sampling units between 18 May and 3 July. They detected 133 bird species, including 14 priority species (Appendix D).

RMBO estimated densities and population sizes for 107 species, 9 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 sampling units occupied (Psi) throughout BLM in Montana for 101 species, 9 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 40 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Montana Results

b) BLM in Montana BCR 10
We obtained results for BLM in Montana BCR 10 by compiling and jointly analyzing data from two strata.

Field technicians completed all eight planned surveys (100%) in 2014. Technicians conducted 112 point counts within the eight surveyed sampling units between 28 May and 3 July. They detected 81 bird species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 69 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout BLM in Montana BCR 10 for 65 species, 3 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 BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Montana BCR 10 Results

c) BLM in Montana BCR 11
We obtained results for BLM in Montana BCR 11by compiling and jointly analyzing data from two strata.

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 143 point counts within the 10 surveyed sampling units between 21 May and 30 June. They detected 75 bird species, including 10 priority species (Appendix D).

RMBO estimated densities and population sizes for 56 species, 7 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 sampling units occupied (Psi) throughout BLM in Montana BCR 11 for 49 species, 7 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 BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Montana BCR 11 Results

d) BLM in Montana BCR 17

We obtained results for BLM in Montana BCR 17 by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2014. They also completed two extra surveys in BLM in Montana BCR 17. Technicians conducted 143 point counts within the 12 surveyed sampling units between 18 May and 1 July. They detected 84 bird species, including 10 priority species (Appendix D).

RMBO estimated densities and population sizes for 69 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 sampling units occupied (Psi) throughout BLM in Montana BCR 17 for 58 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 18 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Montana BCR 17 Results

4. BLM in North Dakota BCR 17

We obtained results for BLM in North Dakota BCR 17 by analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2014. Technicians conducted 62 point counts within the five surveyed sampling units between 12 June and 1 July. They detected 65 bird species, including 8 priority species (Appendix D).

RMBO estimated densities and population sizes for 58 species, 7 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 sampling units occupied (Psi) throughout BLM in North Dakota BCR 17 for 51 species, 7 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in North Dakota BCR 17 Results

5. BLM in South Dakota BCR 17

We obtained results for BLM in South Dakota BCR 17 by analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2014. Technicians conducted 61 point counts within the five surveyed sampling units between 22 May and 4 July. They detected 61 bird species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 53 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 6 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout BLM in South Dakota BCR 17 for 48 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 BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in South Dakota BCR 17 Results

6. BLM in Wyoming

a) BLM in Wyoming: Total

We obtained results for BLM in Wyoming by compiling and jointly analyzing data from 14 strata.

Field technicians completed all 39 planned surveys (100%) in 2014. Technicians conducted 531 point counts within the 39 surveyed sampling units between 19 May and 19 July. They detected 116 bird species, including 7 priority species (Appendix D).

RMBO estimated densities and population sizes for 94 species, 5 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 sampling units occupied (Psi) throughout BLM in Wyoming for 90 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 37 of these species.

To view a map of survey locations, density and occupancy results, and species counts within BLM 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

BLM in Wyoming Results

b) Buffalo Field Office
We obtained results for the Buffalo Field Office by compiling and jointly analyzing data from two strata.

Field technicians completed all four planned surveys (100%) in 2014. Technicians conducted 61 point counts within the four surveyed sampling units between 19 May and 19 July. They detected 50 bird species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 42 species, 3 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 sampling units occupied (Psi) throughout the Buffalo Field Office for 34 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Buffalo Field Office Results

c) Casper Field Office
We obtained results for the Casper Field Office by compiling and jointly analyzing data from two strata.

Field technicians completed all four planned surveys (100%) in 2014. Technicians conducted 46 point counts within the four surveyed sampling units between 30 May and 20 June. They detected 36 bird species, including 3 priority species (Appendix D).

RMBO estimated densities and population sizes for 29 species, 3 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 sampling units occupied (Psi) throughout the Casper Field Office for 28 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Casper Field Office Results

d) Cody Field Office
We obtained results for the Cody Field Office from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 32 point counts within the two surveyed sampling units between 20 May and 26 May. They detected 31 bird 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. If you want to limit results to 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Cody Field Office Results

e) Kemmerer Field Office
We obtained results for the Kemmerer Field Office from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 28 point counts within the two surveyed sampling units between 4 June and 5 June. They detected 11 bird 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. If you want to limit results to 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Kemmerer Field Office Results

f) Lander Field Office
We obtained results for the Lander Field Office from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 31 point counts within the two surveyed sampling units between 27 May and 28 May. They detected 50 bird 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Lander Field Office Results

g) Newcastle Field Office
We obtained results for the Newcastle Field Office from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 31 point counts within the two surveyed sampling units between 19 May and 20 May. They detected 23 bird 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Newcastle Field Office Results

h) Pinedale Field Office
We obtained results for the Pinedale Field Office by analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2014. Technicians conducted 63 point counts within the five surveyed sampling units between 30 May and 19 June. They detected 45 bird species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 33 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 sampling units occupied (Psi) throughout the Pinedale Field Office for 31 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Pinedale Field Office Results

i) Rawlins Field Office
We obtained results for the Rawlins Field Office by analyzing data from one stratum.

Field technicians completed all six planned surveys (100%) in 2014. Technicians conducted 82 point counts within the six surveyed sampling units between 1 June and 24 June. They detected 31 bird species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 25 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 sampling units occupied (Psi) throughout the Rawlins Field Office for 24 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Rawlins Field Office Results

j) Rock Springs Field Office
We obtained results for the Rock Springs Field Office by analyzing data from one stratum.

Field technicians completed all six planned surveys (100%) in 2014. Technicians conducted 84 point counts within the six surveyed sampling units between 7 June and 8 July. They detected 30 bird species, including 4 priority species (Appendix D).

RMBO estimated densities and population sizes for 26 species, 4 of which are priority species. The data yielded robust density estimates (CV < 50%) for 6 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout the Rock Springs Field Office for 20 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 7 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Rock Springs Field Office Results

k) Worland Field Office
We obtained results for the Worland Field Office from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 20 point counts within the two surveyed sampling units between 21 May and 18 July. They detected 24 bird 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Worland Field Office Results

l) BLM in Wyoming BCR 16
We obtained results for BLM in Wyoming BCR 16 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 21 point counts within the two surveyed sampling units between 4 June and 3 July. They detected 35 bird 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

BLM in Wyoming BCR 16 Results

m) BLM in Wyoming BCR 18
We obtained results for BLM in Wyoming BCR 18 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 32 point counts within the two surveyed sampling units between 28 May and 3 June. They detected 26 bird 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 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 in Wyoming BCR 18 Results

C. Department of Defense

1. DOD in Colorado BCR 18
We obtained results for DOD in Colorado BCR 18 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 26 point counts within the two surveyed sampling units between 22 May and 24 May. They detected 53 bird species, including 6 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

DOD in Colorado BCR 18 Results

2. DOD in Wyoming BCR 18
We obtained results for DOD in Wyoming BCR 18 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 22 point counts within the two surveyed sampling units between 28 May and 29 May. They detected 30 bird 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 DOD 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 2014, 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 2014, 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

We obtained results for the Greater Yellowstone Network by compiling and jointly analyzing data from three strata.

Field technicians completed all six planned surveys (100%) in 2014. Technicians conducted 78 point counts within the six surveyed sampling units between 23 May and 19 July. They detected 63 bird species.

RMBO estimated densities and population sizes for 54 species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout the Greater Yellowstone Network for 48 species. The data yielded robust occupancy estimates (CV < 50%) for 18 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Greater Yellowstone Network Results

b) Bighorn Canyon National Recreation Area

We obtained results for Bighorn Canyon National Recreation Area from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 26 point counts within the two surveyed sampling units between 23 May and 24 May. They detected 26 bird 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Bighorn Canyon National Recreation Area Results

c) Grand Teton National Park
We obtained results for Grand Teton National Park from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 22 point counts within the two surveyed sampling units between 23 May and 19 June. They detected 32 bird 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Grand Teton National Park Results

d) Yellowstone National Park
We obtained results for Yellowstone National Park from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 30 point counts within the two surveyed sampling units between 30 June and 19 July. They detected 36 bird 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Yellowstone National Park Results

2. Northern Colorado Plateau Network in Colorado
We obtained results for Northern Colorado Plateau Network in Colorado from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 21 point counts within the two surveyed sampling units between 14 May and 3 June. They detected 35 bird 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Northern Colorado Plateau Network Results

3. Northern Great Plains Network

a) Agate Fossil Beds National Monument

We obtained results for Agate Fossil Beds National Monument by analyzing data from one stratum.

Field technicians completed all nine planned surveys (100%) in 2014. Technicians conducted 82 point counts within the nine surveyed sampling units between 10 June and 19 June. They detected 40 bird species.

RMBO estimated densities and population sizes for 33 species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Agate Fossil Beds National Monument for 31 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Agate Fossil Beds National Monument Results

b) Badlands National Park - North Unit

We obtained results for North Unit of the Badlands National Park by analyzing data from one stratum.

Field technicians completed all 16 planned surveys (100%) in 2014. Technicians conducted 187 point counts within the 16 surveyed sampling units between 20 May and 4 July. They detected 75 bird species.

RMBO estimated densities and population sizes for 58 species. The data yielded robust density estimates (CV < 50%) for 14 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout North Unit of the Badlands National Park for 50 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Badlands National Park - North Unit Results

c) Jewel Cave National Monument
We obtained results for Jewel Cave National Monument by analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2014. Technicians conducted 52 point counts within the five surveyed sampling units between 30 June and 9 July. They detected 53 bird species.

RMBO estimated densities and population sizes for 52 species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Jewel Cave National Monument for 47 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Jewel Cave National Monument Results

d) Knife River Indian Villages National Historic Site
We obtained results for Knife River Indian Villages National Historic Site by analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2014. Technicians conducted 59 point counts within the five surveyed sampling units between 5 June and 9 June. They detected 83 bird species.

RMBO estimated densities and population sizes for 73 species. The data yielded robust density estimates (CV < 50%) for 28 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Knife River Indian Villages National Historic Site for 68 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Knife River Indian Villages National Historic Site Results

e) Mount Rushmore National Monument
We obtained results for Mount Rushmore National Monument by analyzing data from one stratum.

Field technicians completed all six planned surveys (100%) in 2014. Technicians conducted 55 point counts within the six surveyed sampling units between 5 July and 11 July. They detected 43 bird species.

RMBO estimated densities and population sizes for 39 species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Mount Rushmore National Monument for 37 species. The data yielded robust occupancy estimates (CV < 50%) for 22 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Mount Rushmore National Monument Results

f) Niobrara National Scenic River
We obtained results for Niobrara National Scenic River by analyzing data from one stratum.

Field technicians completed 12 of 14 planned surveys (85.7%) in 2014. Technicians conducted 141 point counts within the 12 surveyed sampling units between 5 June and 7 July. They detected 77 bird species.

RMBO estimated densities and population sizes for 61 species. The data yielded robust density estimates (CV < 50%) for 37 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Niobrara National Scenic River for 64 species. The data yielded robust occupancy estimates (CV < 50%) for 43 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Niobrara National Scenic River 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Niobrara National Scenic River Results

g) Scotts Bluff National Monument
We obtained results for Scotts Bluff National Monument by analyzing data from one stratum.

Field technicians completed all seven planned surveys (100%) in 2014. Technicians conducted 74 point counts within the seven surveyed sampling units between 12 June and 1 July. They detected 43 bird species.

RMBO estimated densities and population sizes for 39 species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Scotts Bluff National Monument for 36 species. The data yielded robust occupancy estimates (CV < 50%) for 22 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Scotts Bluff National Monument Results

h) Theodore Roosevelt National Park
We obtained results for Theodore Roosevelt National Park by compiling and jointly analyzing data from two strata.

Field technicians completed all 15 planned surveys (100%) in 2014. They also completed two extra surveys in Theodore Roosevelt National Park. Technicians conducted 161 point counts within the 17 surveyed sampling units between 4 June and 12 July. They detected 76 bird species.

RMBO estimated densities and population sizes for 64 species. The data yielded robust density estimates (CV < 50%) for 26 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Theodore Roosevelt National Park for 59 species. The data yielded robust occupancy estimates (CV < 50%) for 31 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Theodore Roosevelt National Park Results

i) Wind Cave National Park

We obtained results for Wind Cave National Park by analyzing data from one stratum.

Field technicians completed all 15 planned surveys (100%) in 2014. Technicians conducted 179 point counts within the 15 surveyed sampling units between 8 June and 3 July. They detected 82 bird species.

RMBO estimated densities and population sizes for 69 species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Wind Cave National Park for 67 species. The data yielded robust occupancy estimates (CV < 50%) for 29 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Wind Cave National Park Results

4. Rocky Mountain Network

a). Rocky Mountain Network in Colorado

We obtained results for Rocky Mountain Network in Colorado from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 29 point counts within the two surveyed sampling units between 16 June and 3 July. They detected 25 bird 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Rocky Mountain Network in Colorado Results

b) Glacier National Park
We obtained results for Glacier National Park from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 19 point counts within the two surveyed sampling units between 15 June and 2 July. They detected 44 bird 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Glacier National Park Results

5. Southern Colorado Plateau Network in Colorado
We obtained results for Southern Colorado Plateau Network in Colorado from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 23 point counts within the two surveyed sampling units between 3 June and 4 June. They detected 40 bird 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Southern Colorado Plateau Network in Colorado Results

E. Tribal Lands

1. Blackfeet and Crow Tribal Lands in Montana BCR 10

We obtained results for Blackfeet and Crow Tribal Lands in Montana BCR 10 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 23 point counts within the two surveyed sampling units between 29 June and 30 June. They detected 36 bird species, including 5 priority 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 2014, 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 2014, 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

We obtained results for Flathead Tribal Lands in Montana BCR 10 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 23 point counts within the two surveyed sampling units between 11 June and 12 June. They detected 62 bird species, including 3 priority 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 2014, 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 2014, 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

We obtained results for Blackfeet, Fort Belknap, Fort Peck and Rocky Boys Tribal Lands in Montana BCR 11 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 24 point counts within the two surveyed sampling units between 4 June and 5 June. They detected 45 bird species, including 7 priority 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 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 2014, 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 2014, 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
We obtained results for Wind River Tribal Lands in Wyoming BCR 10 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 23 point counts within the two surveyed sampling units between 20 May and 15 June. They detected 36 bird species, including 4 priority 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Wind River Tribal Lands in Wyoming BCR 10 Results

F. US Fish and Wildlife Service

1. Charles M. Russell National Wildlife Refuge
We obtained results for Charles M. Russell National Wildlife Refuge by compiling and jointly analyzing data from two strata. The USFWS strata in Montana BCRs 11 and 17 were subdivided in 2014 to allow density and occupancy estimation specifically within the Charles M. Russell National Wildlife Refuge. Previously, all USFWS lands were grouped together in these BCRs, limiting our ability to get estimates for individual refuges. In each BCR, two new strata were created – a Charles M. Russel NWR stratum and an All Other USFWS Lands stratum. This refuge level stratification distinction between BCRs is made to allow for the summation of the data for individual BCRs involved.

Field technicians completed 42 of 44 planned surveys (95.5%) in 2014. Technicians conducted 548 point counts within the 42 surveyed sampling units between 20 May and 10 July. They detected 113 bird species, including 4 priority species (Appendix I).

RMBO estimated densities and population sizes for 92 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 41 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Charles M. Russell National Wildlife Refuge for 86 species, 3 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 Charles M. Russell National Wildlife Refuge 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Charles M. Russell National Wildlife Refuge Results

2. Montana BCR 10 US Fish and Wildlife Service
We obtained results for US Fish and Wildlife Service Lands in Montana BCR 10 from one stratum.

Field technicians completed both planned surveys (100%) in 2014. Technicians conducted 29 point counts within the two surveyed sampling units between 22 June and 23 June. They detected 38 bird 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Montana BCR 10 US Fish and Wildlife Service Results

3. Montana BCR 11 US Fish and Wildlife Service
We obtained results for US Fish and Wildlife Service Lands in Montana BCR 11 by compiling and jointly analyzing data from two strata.

Field technicians completed all nine planned surveys (100%) in 2014. Technicians conducted 121 point counts within the nine surveyed sampling units between 20 May and 8 July. They detected 70 bird species, including 5 priority species (Appendix I).

RMBO estimated densities and population sizes for 59 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 sampling units occupied (Psi) throughout Montana BCR 11 US Fish and Wildlife Service for 45 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 US 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Montana BCR 11 US Fish and Wildlife Service Results

4. Montana BCR 17 US Fish and Wildlife Service
We obtained results for U.S. Fish and Wildlife Service Lands in Montana BCR 17by compiling and jointly analyzing data from two strata.

Field technicians completed 37 of 39 planned surveys (94.9%) in 2014. Technicians conducted 482 point counts within the 37 surveyed sampling units between 21 May and 10 July. They detected 117 bird species, including 16 priority species (Appendix I).

RMBO estimated densities and population sizes for 95 species, 11 of which are priority species. The data yielded robust density estimates (CV < 50%) for 44 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Montana BCR 17 US Fish and Wildlife Service for 93 species, 11 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Montana BCR 17 US Fish and Wildlife Service 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. 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
We obtained results for Region 1 National Forests by compiling and jointly analyzing data from 29 strata in three 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 all 150 planned surveys (100%) in 2014. They also completed five extra surveys in Region 1 National Forests. Technicians conducted 1,659 point counts within the 155 surveyed sampling units between 27

May and 14 July. They detected 150 bird species, including 16 priority species (Appendix E).

RMBO estimated densities and population sizes for 126 species, 10 of which are priority species. The data yielded robust density estimates (CV < 50%) for 69 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Region 1 National Forests for 124 species, 10 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Region 1 National Forests Results

(2) Beaverhead-Deerlodge National Forest

We obtained results for Beaverhead-Deerlodge National Forest 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 nine planned surveys (100%) in 2014. One extra survey was also completed in Beaverhead-Deerlodge National Forest. Technicians conducted 123 point counts within the 10 surveyed sampling units between 27 May and 6 July. They detected 63 bird species (Appendix E).

RMBO estimated densities and population sizes for 56 species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Beaverhead-Deerlodge National Forest for 54 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Beaverhead-Deerlodge National Forest Results

(3) Bitterroot National Forest
We obtained results for Bitterroot National Forest by compiling and jointly analyzing data from three strata in two states: Montana front-country/managed areas, Montana designated roadless/wilderness areas, and Idaho. This forest-level stratification distinction in Montana 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 stratification distinction between states is made to allow for the summation of the data for individual states involved.

There were some significant stratification changes made to the BCR 10 portion of Idaho between the 2013 and 2014 field seasons. The “All Other Lands in the Region 1 portion of Idaho BCR 10” (all lands outside of national forest boundaries), “All Other Lands in the Region 4 portion of Idaho BCR 10” (all lands outside of national forest boundaries), “other USFS lands in the Region 1 portion of Idaho BCR 10”, and “USFS designated roadless/wilderness areas within the Region 4 portion of Idaho BCR 10” strata were further subdivided. The new strata created in Idaho BCR 10 include the Idaho portion of Bitterroot National Forest. Since Bitterroot National Forest spans Idaho and Montana, 2014 density and occupancy estimates for this forest will include strata from both states. In the past, “forest-wide” estimates have only represented the Montana portion of this forest.

Field technicians completed all 11 planned surveys (100%) in 2014. One extra survey was also completed in Bitterroot National Forest. Technicians conducted 136 point counts within the 12 surveyed sampling units between 6 June and 5 July. They detected 70 bird species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 65 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 16 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Bitterroot National Forest for 62 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 31 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Bitterroot National Forest Results

(4) Clearwater National Forest
We obtained results for Clearwater National Forest 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 15 planned surveys (100%) in 2014. Technicians conducted 129 point counts within the 15 surveyed sampling units between 6 June and 8 July. They detected 58 bird species, including 1 priority species (Appendix E).

RMBO estimated densities and population sizes for 53 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Clearwater National Forest for 53 species, 1 of which is a 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Clearwater National Forest Results

(5) Custer National Forest

We obtained results for Custer National Forest 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 2014. Technicians conducted 150 point counts within the 14 surveyed sampling units between 3 June and 4 July. They detected 85 bird species, including 9 priority species (Appendix E).

RMBO estimated densities and population sizes for 76 species, 8 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 sampling units occupied (Psi) throughout Custer National Forest for 74 species, 8 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 31 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Custer National Forest Results

(6) Flathead National Forest
We obtained results for Flathead National Forest 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 nine planned surveys (100%) in 2014. Technicians conducted 100 point counts within the nine surveyed sampling units between 13 June and 13 July. They detected 61 bird species, including 1 priority species (Appendix E).

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

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Flathead National Forest for 50 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Flathead National Forest Results

(7) Gallatin National Forest
We obtained results for Gallatin National Forest 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 nine planned surveys (100%) in 2014. Technicians conducted 90 point counts within the nine surveyed sampling units between 30 May and 4 July. They detected 67 bird species (Appendix E).

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

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Gallatin National Forest for 50 species. The data yielded robust occupancy estimates (CV < 50%) for 22 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Gallatin National Forest Results

(8) Helena National Forest
We obtained results for Helena National Forest 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 nine planned surveys (100%) in 2014. One extra survey was also completed in Helena National Forest. Technicians conducted 111 point counts within the 10 surveyed sampling units between 4 June and 1 July. They detected 77 bird species, including 2 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 18 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Helena National Forest for 63 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 31 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Helena National Forest Results

(9) Idaho Panhandle National Forest
We obtained results for Idaho Panhandle National Forest 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 2014. Technicians conducted 204 point counts within the 20 surveyed sampling units between 30 May and 10 July. They detected 72 bird species, including 7 priority species (Appendix E).

RMBO estimated densities and population sizes for 57 species, 6 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 sampling units occupied (Psi) throughout Idaho Panhandle National Forest for 59 species, 6 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 40 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Idaho Panhandle National Forest Results

(10) Kootenai National Forest

We obtained results for Kootenai National Forest by compiling and jointly analyzing data from three strata; Montana front-country/managed areas, Montana designated roadless/wilderness areas, and Idaho. This forest-level stratification distinction in Montana 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 stratification distinction between states is made to allow for the summation of the data for individual states involved.

There were some significant stratification changes made to the BCR 10 portion of Idaho between the 2013 and 2014 field seasons. The "All Other Lands in the Region 1 portion of Idaho BCR 10" (all lands outside of National Forest boundaries), "All Other Lands in the Region 4 portion of Idaho BCR 10" (all lands outside of National Forest boundaries), "other USFS lands in the Region 1 portion of Idaho BCR 10", and "USFS designated roadless/wilderness areas within the Region 4 portion of Idaho BCR 10" strata were further subdivided. The new strata created in Idaho BCR 10 include the Idaho portion of Kootenai National Forest. Since Kootenai National Forest spans Idaho and Montana, 2014 density and occupancy estimates for this forest will include strata from both states. In the past, "forest-wide" estimates have only represented the Montana portion of this forest.

Field technicians completed all 22 planned surveys (100%) in 2014. They also completed ttwo extra surveys in Kootenai National Forest. Technicians conducted 280 point counts within the 24 surveyed sampling units between 27 May and 14 July. They detected 89 bird species, including 6 priority species (Appendix E).

RMBO estimated densities and population sizes for 77 species, 6 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 sampling units occupied (Psi) throughout Kootenai National Forest for 74 species, 6 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Kootenai National Forest Results

(11) Lewis and Clark National Forest
We obtained results for Lewis and Clark National Forest 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 eight planned surveys (100%) in 2014. Technicians conducted 92 point counts within the eight surveyed sampling units between 10 June and 28 June. They detected 63 bird species, including 3 priority species (Appendix E).

RMBO estimated densities and population sizes for 57 species, 2 of which are priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Lewis and Clark National Forest for 58 species, 2 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 31 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Lewis and Clark National Forest Results

(12) Lolo National Forest
We obtained results for Lolo National Forest 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 nine planned surveys (100%) in 2014. Technicians conducted 102 point counts within the nine surveyed sampling units between 2 June and 11 July. They detected 83 bird species, including 2 priority species (Appendix E).

RMBO estimated densities and population sizes for 72 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 sampling units occupied (Psi) throughout Lolo National Forest for 72 species, 1 of which is a 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Lolo National Forest Results

(13) Nez Perce National Forest
We obtained results for Nez Perce National Forest 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 15 planned surveys (100%) in 2014. Technicians conducted 142 point counts within the 15 surveyed sampling units between 4 June and 4 July. They detected 72 bird species, including 2 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 25 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Nez Perce National Forest for 63 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 28 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Nez Perce National Forest Results

b) Region 1 National Grasslands

We obtained results for Region 1 National Grasslands 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 15 planned surveys (100%) in 2014. Technicians conducted 177 point counts within the 15 surveyed sampling units between 28 May and 30 June. They detected 84 bird species, including 17 priority species (Appendix E).

RMBO estimated densities and population sizes for 77 species, 15 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 sampling units occupied (Psi) throughout Region 1 National Grasslands for 64 species, 11 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 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 2014, 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 2014, 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. 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

We obtained results for all Region 2 National Forests combined by compiling and jointly analyzing data from 25 strata in USFS Region 2 across four 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 270 of 271 planned surveys (99.6%) in 2014. Technicians conducted 3,163 point counts within the 270 surveyed sampling units between 23 May and 21 July. They detected 165 bird species, including 11 priority species (Appendix F).

RMBO estimated densities and population sizes for 138 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 80 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Region 2 National Forests for 132 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 85 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Region 2 National Forests Results

(2) Arapaho and Roosevelt National Forests

We obtained results for this section by analyzing data from compiling and jointly analyzing data from two strata. 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. For information on the Williams Fork Management Unit, please refer to the Routt National Forest section.

In 2014, the Arapaho and Roosevelt National Forests were restratified to allow these forests to monitor treatments intended to mitigate fire hazard and improve forest health. The forest was divide into two strata – a control stratum and the remainder of the forest. The control portion consists of lands ranging in elevation from 6,000 ft to 9,000 ft and excludes treatment areas and areas burned between 1998 and 2013. An experiment overlay stratum was created for Arapaho and Roosevelt and Pike and San Isabel National Forests consisting of actual treatment areas (areas with >30% treatment). Since this stratum spans multiple forests it is not actually considered to be a part of the IMBCR design. However, detections from this stratum do contribute to the number of detections used in analyses.

Field technicians completed all 40 planned surveys (100%) in 2014. Technicians conducted 423 point counts within the 40 surveyed sampling units between 2 June and 14 July. They detected 88 bird 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 22 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Arapaho and Roosevelt National Forests for 79 species, 6 of which are priority 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Arapaho and Roosevelt National Forests Results

(3) Bighorn National Forest
We obtained results for Bighorn National Forest by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 112 point counts within the 10 surveyed sampling units between 16 June and 20 July. They detected 49 bird species, including 3 priority species (Appendix F).

RMBO estimated densities and population sizes for 44 species, 2 of which are priority species. The data yielded robust density estimates (CV < 50%) for 14 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Bighorn National Forest for 44 species, 2 of which are priority 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Bighorn National Forest Results

(4) Black Hills National Forest
We obtained results for the Black Hills National Forest 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 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 10 planned surveys (100%) in 2014. Technicians conducted 114 point counts within the 10 surveyed sampling units between 27 June and 11 July. They detected 54 bird species, including 2 priority species (Appendix F).

RMBO estimated densities and population sizes for 51 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Black Hills National Forest for 51 species, 2 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Black Hills National Forest Results

(5) Collaborative Forest Landscape Restoration Program Study

We obtained results for the Collaborative Forest Landscape Restoration Program Study by analyzing data from one stratum. In 2014, the Arapaho and Roosevelt and the Pike and San Isabel National Forests were restratified to allow these forests to monitor treatments intended to mitigate fire hazard and improve forest health. Each forest was divide into two strata – a control stratum and the remainder of the forest. The control portion of the forests consists of lands ranging in elevation from 6,000 ft to 9,500 ft and excludes treatment areas and areas burned between 1998 and 2013. A single experiment overlay stratum was created for all of Arapaho and Roosevelt and Pike and San Isabel National Forests consisting of actual treatment areas (called the Collaborative Forest Landscape Restoration Program Study in this report).Because this stratum spans multiple forests it is not technically part of the IMBCR design. However, it is surveyed using the same protocol and is closely tied to the Arapaho and Roosevelt and Pike and San Isabel National Forests, thus it is covered in this report.

Field technicians completed all 60 planned surveys (100%) in 2014. Technicians conducted 749 point counts within the 60 surveyed sampling units between 4 June and 3 July. They detected 97 bird species, including 6 priority species (Appendix F).

RMBO estimated densities and population sizes for 84 species, 6 of which are priority species. The data yielded robust density estimates (CV < 50%) for 49 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Collaborative Forest Landscape Restoration Program for 82 species, 6 of which are priority 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 Collaborative Forest Landscape Restoration Program Study 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Collaborative Forest Landscape Restoration Program Study Results

(6) Grand Mesa, Uncompaghre and Gunnison National Forests
We obtained results for Grand Mesa, Uncompaghre and Gunnison National Forests by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 127 point counts within the 10 surveyed sampling units between 5 June and 17 July. They detected 63 bird species, including 4 priority species (Appendix F).

RMBO estimated densities and population sizes for 56 species, 2 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 sampling units occupied (Psi) throughout Grand Mesa, Uncompaghre and Gunnison National Forests for 54 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Grand Mesa, Uncompaghre and Gunnison National Forest Results

(7) Medicine Bow National Forest
We obtained results for Medicine Bow National Forest 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 2014. Technicians conducted 383 point counts within the 30 surveyed sampling units between 13 June and 21 July. They detected 93 bird species, including 3 priority species (Appendix F).

RMBO estimated densities and population sizes for 84 species, 3 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 sampling units occupied (Psi) throughout Medicine Bow National Forest for 79 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 47 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Medicine Bow National Forest Results

(8) Nebraska National Forests
We obtained results for Nebraska National Forests 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 nine planned surveys (100%) in 2014. Technicians conducted 106 point counts within the nine surveyed sampling units between 23 May and 14 June. They detected 67 bird species, including 2 priority species (Appendix F).

RMBO estimated densities and population sizes for 53 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 sampling units occupied (Psi) throughout Nebraska National Forests for 48 species. The data yielded robust occupancy estimates (CV < 50%) for 26 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Nebraska National Forest Results

(9) Pike and San Isabel National Forests
We obtained results for this section by analyzing data from two Pike and San Isabel National Forests strata in Colorado BCR 16. In 2014, the Pike and San Isabel National Forests were restratified to allow these forests to monitor treatments intended to mitigate fire hazard and improve forest health. The forest was divide into two strata – a control stratum and the remainder of the forest. The

control portion consists of lands ranging from 6,000 ft to 9,500 ft and excludes treatment areas and areas burned between 1998 and 2013. An experiment overlay stratum was created for Arapaho and Roosevelt and Pike and San Isabel National Forests consisting of actual treatment areas (areas with >30% treatment). Since this stratum spans multiple forests it is not actually considered to be a part of the IMBCR design. However, detections from this stratum do contribute to the number of detections used in analyses.

Field technicians completed all 40 planned surveys (100%) in 2014. Technicians conducted 450 point counts within the 40 surveyed sampling units between 26 May and 14 July. They detected 89 bird species (Appendix F).

RMBO estimated densities and population sizes for 71 species. The data yielded robust density estimates (CV < 50%) for 28 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Pike and San Isabel National Forests for 69 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Pike and San Isabel National Forests Results

(10) Rio Grande National Forest

We obtained results for Rio Grande National Forest 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 all 26 planned surveys (100%) in 2014. Technicians conducted 324 point counts within the 26 surveyed sampling units between 8 June and 11 July. They detected 89 bird species, including 6 priority species (Appendix F).

RMBO estimated densities and population sizes for 75 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 sampling units occupied (Psi) throughout Rio Grande National Forest for 71 species, 6 of which are priority

species. The data yielded robust occupancy estimates (CV < 50%) for 42 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Rio Grande National Forest Results

(11) Routt National Forest
We obtained results for Routt National Forest 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 all 32 planned surveys (100%) in 2014. Technicians conducted 363 point counts within the 32 surveyed sampling units between 15 June and 20 July. They detected 88 bird species, including 3 priority species (Appendix F).

RMBO estimated densities and population sizes for 75 species, 2 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 sampling units occupied (Psi) throughout Routt National Forest for 76 species, 2 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 42 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Routt National Forest Results

(12) San Juan National Forest
We obtained results for San Juan National Forest by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 123 point counts within the 10 surveyed sampling units between 8

June and 12 July. They detected 91 bird species, including 4 priority species (Appendix F).

RMBO estimated densities and population sizes for 79 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 sampling units occupied (Psi) throughout San Juan National Forest for 81 species, 4 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 43 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

San Juan National Forest Results

(13) Shoshone National Forest

We obtained results for Shoshone National Forest 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 25 of 26 planned surveys (96.2%) in 2014. Technicians conducted 340 point counts within the 25 surveyed sampling units between 28 May and 17 July. They detected 93 bird species, including 5 priority species (Appendix F).

RMBO estimated densities and population sizes for 77 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Shoshone National Forest for 77 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 29 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Shoshone National Forest Results

(14) White River National Forest

We obtained results for White River National Forest 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 28 planned surveys (100%) in 2014. Technicians conducted 298 point counts within the 28 surveyed sampling units between 6 June and 18 July. They detected 89 bird species, including 4 priority species (Appendix F).

RMBO estimated densities and population sizes for 79 species, 4 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 sampling units occupied (Psi) throughout White River National Forest for 72 species, 4 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 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 2014, 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 2014, 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

We obtained results for the Region 2 National Grasslands from seven USFS Region 2 strata across four 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 45 of 50 planned surveys (90%) in 2014. Due to a communication error the five surveys in Cimarron National Grassland were not sampled in 2014. Technicians conducted 563 point counts within the 45 surveyed sampling units between 13 May and 6 June. They detected 135 bird species, including 14 priority species (Appendix F).

We are unable to produce 2014 density or occupancy estimates for all of Region 2 National Grasslands combined because Cimarron National Grassland was not surveyed this year.

To view a map of survey locations 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Region 2 National Grasslands Results

(2) Nebraska National Grasslands (Buffalo Gap, Fort Pierre, and Oglala)
We obtained results for Nebraska National Grasslands by analyzing data from four strata in two states; 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 in Oglala National Grassland is made to allow for the summation of the data for individual BCRs.

Field technicians completed all 17 planned surveys (100%) in 2014. Technicians conducted 213 point counts within the 17 surveyed sampling units between 19 May and 6 June. They detected 87 bird species, including 9 priority species (Appendix F).

RMBO estimated densities and population sizes for 70 species, 7 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 sampling units occupied (Psi) throughout Nebraska National Grasslands for 64 species, 4 of which are priority 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Nebraska National Grasslands Results

(3) Comanche National Grassland
We obtained results for Comanche National Grassland by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 106 point counts within the 10 surveyed sampling units between 13

May and 25 May. They detected 64 bird species, including 1 priority species (Appendix F).

RMBO estimated densities and population sizes for 52 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 sampling units occupied (Psi) throughout Comanche National Grassland for 45 species, 1 of which is a 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Comanche National Grassland Results

(4) Public Lands on Pawnee National Grassland
We obtained results for Public Lands on Pawnee National Grassland by analyzing data from one stratum.

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. We only present estimates for the public lands portion of Pawnee National Grasslands in this report.

Field technicians completed all eight planned surveys (100%) in 2014. Technicians conducted 109 point counts within the eight surveyed sampling units between 13 May and 28 May. They detected 27 bird species, including 1 priority species (Appendix F).

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

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Public Lands on Pawnee National Grassland for 17 species, 1 of which is a 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Pawnee National Grassland Results

(5) Thunder Basin National Grassland
We obtained results for Thunder Basin National Grassland by analyzing data from one stratum.

Field technicians completed all 10 planned surveys (100%) in 2014. Technicians conducted 135 point counts within the 10 surveyed sampling units between 16 May and 1 June. They detected 59 bird species (Appendix F).

RMBO estimated densities and population sizes for 46 species. The data yielded robust density estimates (CV < 50%) for 10 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Thunder Basin National Grassland for 40 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 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 2014, 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 2014, 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 two national forests and two national grasslands in Region 3: Coconino National Forest, Kaibab National Forest, Kiowa National Grassland and Rita Blanca National Grassland.

a) Coconino National Forest
We obtained results for Coconino National Forest by analyzing data from one stratum.

Field technicians completed all 65 planned surveys (100%) in 2014. Technicians conducted 904 point counts within the 65 surveyed sampling units between 3 May and 23 June. They detected 140 bird species, including 5 priority species (Appendix G).

RMBO estimated densities and population sizes for 115 species, 5 of which are priority species. The data yielded robust density estimates (CV < 50%) for 64 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Coconino National Forest for 116 species, 5 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 70 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Coconino National Forest Results

b) Kaibab National Forest
We obtained results for Kaibab National Forest 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. Stratification by elevation allows for adjusting sampling intensity to target different Management Indicator Species on the Forest.

Field technicians completed all 40 planned surveys (100%) in 2014. Technicians conducted 571 point counts within the 40 surveyed sampling units between 6 May and 20 June. They detected 105 bird species, including 3 priority species (Appendix G).

RMBO estimated densities and population sizes for 89 species, 3 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 sampling units occupied (Psi) throughout Kaibab National Forest for 87 species, 3 of which are priority 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Kaibab National Forest Results

c) Kiowa National Grassland
We obtained results for Kiowa National Grassland by analyzing data from one stratum.

Field technicians completed all three planned surveys (100%) in 2014. Technicians conducted 21 point counts within the 3 surveyed sampling units between 16 June and 18 June. They detected 43 bird species (Appendix G).

RMBO estimated densities and population sizes for 37 species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Kiowa National Grassland for 40 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 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Kiowa National Grassland Results

d) Rita Blanca National Grassland

We obtained results for Rita Blanca National Grassland 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 is made to allow for the summation of the data for individual states.

Field technicians completed all eight planned surveys (100%) in 2014. Technicians conducted 89 point counts within the eight surveyed sampling units between 8 June and 15 June. They detected 27 bird species, including 1 priority species (Appendix G).

RMBO estimated densities and population sizes for 22 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 7 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Rita Blanca National Grassland for 20 species. The data yielded robust occupancy estimates (CV < 50%) for 7 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 2014, 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 2014, 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 nine national forests in Region 4. 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 three separate strata, one for each Forest (Caribou-Targhee, Ashley, and Wasatch NFs). This allows for forest-wide estimates within Caribou-Targhee National Forest since the remainder of the forest outside of Wyoming was also sampled. 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. There were some significant stratification changes made to the BCR 10 portion of Idaho between the 2013 and 2014 field seasons. The boundary between USFS Regions 1 and 4 runs through Idaho and was taken into account when restratifying so that estimates could be generated at the USFS Region level. The new USFS Region 4 strata created in Idaho BCR 10 include Boise National Forest, Payette National Forest, Salmon-Challis National Forest, and Sawtooth National Forest

a) Ashley National Forest
We obtained results for Ashley National Forest from one stratum in Wyoming.

These samples were added to supplement statewide 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 2014. Technicians conducted 32 point counts within the two surveyed sampling units between 2 June and 6 June. They detected 8 bird 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Ashley National Forest Results

b) Boise National Forest
We obtained results for Boise National Forest by analyzing data from one stratum. There were some significant stratification changes made to the BCR 10 portion of Idaho between the 2013 and 2014 field seasons. The “All Other Lands in the Region 1 portion of Idaho BCR 10” (all lands outside of national forest boundaries), “All Other Lands in the Region 4 portion of Idaho BCR 10” (all lands outside of national forest boundaries), “other USFS lands in the Region 1 portion of Idaho BCR 10”, and “USFS designated roadless/wilderness areas within the Region 4 portion of Idaho BCR 10” strata were further subdivided. The new strata created in Idaho BCR 10 include Boise National Forest. This is the first year density and occupancy estimates were generated specifically within Boise National Forest.

Field technicians completed all three planned surveys (100%) in 2014. Technicians conducted 33 point counts within the three surveyed sampling units between 29 May and 7 July. They detected 60 bird species, including 4 priority species (Appendix E).

RMBO estimated densities and population sizes for 48 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 10 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Boise National Forest for 49 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 18 of these species.

To view a map of survey locations, density and occupancy results, and species counts within Boise 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Boise National Forest Results

c) 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. We separated this forest from the rest of the Region 4 USFS lands to estimate density and occupancy at the National Forest level for the Bridger-Teton National Forest. We obtained results for Bridger-Teton National Forest by analyzing data from the front-country/managed stratum and the designated roadless/wilderness stratum. We stratified at the forest-level 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 2014. Technicians conducted 260 point counts within the 20 surveyed sampling units between 29 May and 16 July. They detected 85 bird species, including 2 priority species (Appendix H).

RMBO estimated densities and population sizes for 74 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 sampling units occupied (Psi) throughout Bridger-Teton National Forest for 71 species, 1 of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 26 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Bridger-Teton National Forest Results

d) Caribou-Targhee National Forest

We obtained results for Caribou-Targhee National Forest by compiling and jointly analyzing data from six strata. Caribou-Targhee was separated into six strata because it spans three states and three BCRs. The state-level stratification distinction is made 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 32 planned surveys (100%) in 2014. Technicians conducted 455 point counts within the 32 surveyed sampling units between 21 May and 14 August. They detected 115 bird species, including 1 priority species (Appendix H).

RMBO estimated densities and population sizes for 97 species. The data yielded robust density estimates (CV < 50%) for 47 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Caribou-Targhee National Forest for 97 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Caribou-Targhee National Forest Results

e) Manti-La Sal National Forest

We obtained results for Manti-La Sal National Forest by compiling and jointly analyzing data from two strata across two states. In 2014 a new stratum was created for Manti-La Sal National Forest in Utah. Previously, only the Colorado portion of Manti-La Sal was stratified and surveyed. The additional Utah portion allows for the generation of forest-wide estimates for Manti-La Sal National Forest. The state-level stratification distinction is made to allow for the summation of the data for individual states

Field technicians completed all six planned surveys (100%) in 2014. Technicians conducted 67 point counts within the six surveyed sampling units between 20 May and 10 July. They detected 63 bird species, including 1 priority species (Appendix H).

RMBO estimated densities and population sizes for 58 species, 1 of which is a priority species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Manti-La Sal National Forest for 56 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Manti-La Sal National Forest Results

f) Payette National Forest

We obtained results for Payette National Forest by analyzing data from one stratum. There were some significant stratification changes made to the BCR 10 portion of Idaho between the 2013 and 2014 field seasons. The "All Other lands in the Region 1 portion of Idaho BCR 10" (all lands outside of national forest boundaries), "All Other lands in the Region 4 portion of Idaho BCR 10" (all lands outside of national forest boundaries), "other USFS lands in the Region 1 portion of Idaho BCR 10", and "USFS designated roadless/wilderness areas within the Region 4 portion of Idaho BCR 10" strata were further subdivided. The new strata created in Idaho BCR 10 include Payette National Forest. This is the first year density and occupancy estimates were generated specifically within Payette National Forest.

Field technicians completed all three planned surveys (100%) in 2014. Technicians conducted 29 point counts within the three surveyed sampling units between 23 June and 11 July. They detected 51 bird species, including 4 priority species (Appendix E).

RMBO estimated densities and population sizes for 44 species, 3 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 sampling units occupied (Psi) throughout Payette National Forest for 43 species, 3 of which are 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 Payette 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Payette National Forest Results

g) Salmon-Challis National Forest

We obtained results for Salmon-Challis National Forest by analyzing data from one stratum. There were some significant stratification changes made to the BCR 10 portion of Idaho between the 2013 and 2014 field seasons. The "All Other lands in the Region 1 portion of Idaho BCR 10" (all lands outside of national forest boundaries), "All Other lands in the Region 4 portion of Idaho BCR 10" (all lands outside of national forest boundaries), "other USFS lands in the Region 1 portion of Idaho BCR 10", and "USFS designated roadless/wilderness areas within the Region 4 portion of Idaho BCR 10" strata were further subdivided. The new strata created in Idaho BCR 10 include Salmon-Challis National Forest. This is the first year density and occupancy estimates were generated specifically within Salmon-Challis National Forest.

Field technicians completed all three planned surveys (100%) in 2014. Technicians conducted 32 point counts within the three surveyed sampling units between 12 July and 13 July. They detected 57 bird species, including 4 priority species (Appendix E).

RMBO estimated densities and population sizes for 42 species, 3 of which are priority species. The data yielded robust density estimates (CV < 50%) for 6 of these species.

RMBO estimated the proportion of 1 km^2 sampling units occupied (Psi) throughout Salmon-Challis National Forest for 40 species, 3 of which are 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 Salmon-Challis 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Salmon Challis National Forest Results

h) Sawtooth National Forest

We obtained results for Sawtooth National Forest by analyzing data from one stratum. There were some significant stratification changes made to the BCR 10 portion of Idaho between the 2013 and 2014 field seasons. The "All Other lands in the Region 1 portion of Idaho BCR 10" (all lands outside of national forest boundaries), "All Other lands in the Region 4 portion of Idaho BCR 10" (all lands outside of national forest boundaries), "other USFS lands in the Region 1 portion of Idaho BCR 10", and "USFS designated roadless/wilderness areas within the Region 4 portion of Idaho BCR 10" strata were further subdivided. The new strata created in Idaho BCR 10 include Sawtooth National Forest. This is the first year density and occupancy estimates were generated specifically within Sawtooth National Forest.

Field technicians completed all three planned surveys (100%) in 2014. Technicians conducted 35 point counts within the three surveyed sampling units between 8 July and 11 July. They detected 41 bird species, including 4 priority species (Appendix E).

RMBO estimated densities and population sizes for 33 species, 3 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 sampling units occupied (Psi) throughout Sawtooth National Forest for 33 species, 3 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 Sawtooth 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 2014, 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 2014, hit "Add Filter", and then "Run Query".

Sawtooth National Forest Results

i) Wasatch National Forest

We obtained results for Wasatch National Forest 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 statewide 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 in (100%) in 2014. Technicians conducted 61 point counts within the four surveyed sampling units between 5 July and 7 July. They detected 36 bird species, including 2 priority 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 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 2014, 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 2014, hit “Add Filter”, and then “Run Query”.

Wasatch National Forest Results

DISCUSSION

Applications of IMBCR Data

The IMBCR program collects breeding bird information in all or portions of 12 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 US 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 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 treated to improve Greater Sage-grouse (GRSG) habitat, 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 estimates from 2010 through 2013 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.

Research Applications

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 their 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 for infrequently detected species as well as allowing those estimates to be compared to larger, regional populations. 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).

Value as a Management Tool

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 local management units to 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 management unit scale, IMBCR population estimates can be used to support local management efforts. Whereas, 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, population estimates at the management unit scale 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) because it: 1) addresses well-defined and tractable questions; 2) is underpinned by rigorous science ; 3) is based on a conceptual model of how bird populations function; and 4) is relevant to the management of natural resources. Under the adaptive monitoring framework, the objectives, sampling design, data collection, analysis and interpretation are iterative; allowing 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, this 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. Occupancy estimates track temporal and spatial trends in the area occupied, including range contraction and expansion.

IMBCR and Adaptive Resource Management

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. 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).

Population estimates for a particular species or group of species can be used to make informed management decisions to focus conservation efforts. For example, management units with large populations can be targeted for protection or management units with small populations can be prioritized for conservation action. Although IMBCR does not employ vegetation stratification, 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 (Figure 8). The IMBCR design provides a legitimate way to extend the population estimates to un-sampled regions, and the models provide population estimates that account 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. 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). Bird distributions can be summarized for un-sampled management units and regions, extending the ability of IMBCR to inform management and assess conservation responsibility.

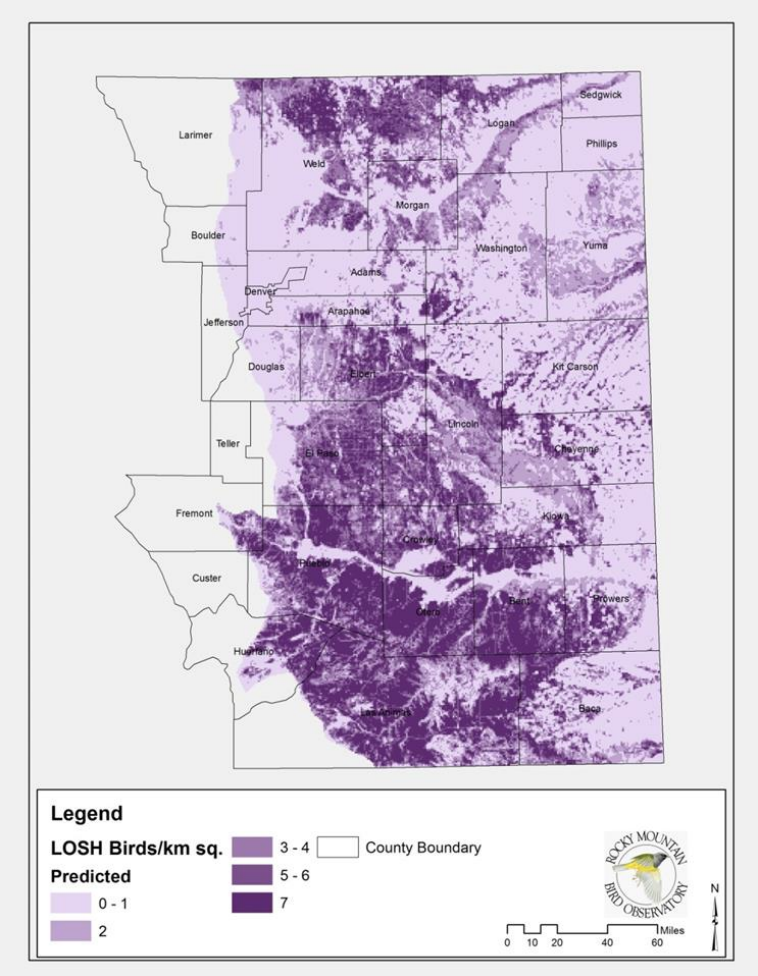

Figure 8. Loggerhead Shrike predicted distribution showing population density within the Colorado Shortgrass Prairie Bird Conservation Region (Sparks et al.)

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 used to prioritize landscapes for conservation and bird-habitat relationships used 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.

Future Directions and Limitations

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 the IMBCR 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 local 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 will provide probability estimates of population decline. The IMBCR data can also be used to investigate population, metapopulation and community dynamics over time. Annually surveyed sampling units provide 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. A minimum number of two samples per stratum is necessary to estimate regional density and occupancy. 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.

Conclusion

Although the importance of long-term and intensive population monitoring is well known, it is expensive, with costs typically determining 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. 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 statewide 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 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 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 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 2014, as designated by Partners in Flight. 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), 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*				Density	Occupancy
Species	**BCR 9**	**BCR 10**	**BCR 11**	**BCR 16**	**Estimated**	**Estimated**
American Dipper		RS,UCS				
American Kestrel	RC,RS,UCS	RC			X	X
Baird's Sparrow			RC,RS,TNC,UCC,UCS		X	X
Bank Swallow	CBSD	CBSD	CBSD,RC	CBSD	X	X
Barn Swallow	RC					
Bell's Vireo				RC,TNC,UCC		
Belted Kingfisher	CBSD,RC	CBSD	CBSD	CBSD		
Black Rosy-Finch	RC,RS,TNC,UCC,UCS	RC,RS,TNC,UCC,UCS		RC,TNC,UCC		
Black Swift	RC,TNC,UCC	RC,TNC,UCC		RC,TNC,UCC		
Black-billed Cuckoo			CBSD,RC,UCC			
Black-billed Magpie	UCS		UCS	UCS	X	X
Black-chinned Sparrow	CBSD,UCC			CBSD,UCC		
Black-throated Gray Warbler				RC	X	X
Black-throated Sparrow	UCS					
Bobolink		CBSD,UCC	CBSD,RC,RS,UCC,UCS		X	X
Boreal Chickadee		CBSD				
Brewer's Blackbird	UCS					
Brewer's Sparrow	CBSD,RC,RS,UCS	CBSD,RC	CBSD	CBSD,RC	X	X
Broad-tailed Hummingbird				RS,UCS	X	X
Brown Thrasher			RC		X	X
Brown-capped Rosy-Finch				RC,RS,TNC,UCC,UCS	X	X
Burrowing Owl			RC		X	
California Quail	UCS					
Calliope Hummingbird	RS,UCS	RS,UCS				X

Species	Partners In Flight*				Density Estimated	Occupancy Estimated
	BCR 9	BCR 10	BCR 11	BCR 16		
Cassin's Finch	CBSD,RS,UCC,UCS	CBSD,RC,RS,UCC,UCS		CBSD,RC,UCC	X	X
Cassin's Vireo		RS,UCS			X	X
Chestnut-collared Longspur			RC,RS,TNC,UCC,UCS		X	X
Chimney Swift			CBSD			
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	CBSD	CBSD	CBSD	CBSD,RC	X	X
Common Poorwill				RC		X
Cooper's Hawk				RS,UCS	X	X
Cordilleran Flycatcher				RS,UCS	X	X
Dickcissel			RC			
Dusky Flycatcher		UCS			X	X
Dusky Grouse	RC,RS,UCS	RS,UCS		RS,UCS	X	X
Eastern Kingbird			UCS		X	X
Eastern Meadowlark				CBSD		
Evening Grosbeak		RC			X	X
Ferruginous Hawk	RC,RS,UCS	RC	RC,RS,UCS	RC		
Field Sparrow			CBSD		X	X
Golden Eagle	RC,RS,UCS		RC	RC	X	
Golden-crowned Kinglet		UCS			X	X
Grace's Warbler				RS,UCS	X	X
Grasshopper Sparrow	CBSD	CBSD	CBSD		X	X
Gray Flycatcher	RS,UCS				X	X
Gray Vireo	UCC			RC,RS,UCC,UCS	X	X
Greater Prairie-Chicken			RC,TNC,UCC			
Greater Sage-Grouse	RC,TNC,UCC	RC,RS,TNC,UCC,UCS	RC,TNC,UCC	RC,TNC,UCC		X
Green-tailed Towhee	RC,RS,UCS			RS,UCS	X	X
Hammond's Flycatcher		UCS			X	X
Horned Lark	CBSD	CBSD	CBSD,RC	CBSD	X	X

Species	Partners In Flight*				Density Estimated	Occupancy Estimated
	BCR 9	BCR 10	BCR 11	BCR 16		
Juniper Titmouse				RS,UCS	X	X
Lark Bunting		CBSD	CBSD,RC		X	X
Lark Sparrow	RC					
Lazuli Bunting	RS,UCS	UCS		RC,RS,UCS,	X	X
Lewis's Woodpecker	RC,RS	RC		RC,RS,UCS	X	X
Loggerhead Shrike	CBSD	CBSD	CBSD	CBSD,RC	X	X
MacGillivray's Warbler	RC	UCS			X	X
Marsh Wren			UCS		X	X
McCown's Longspur		RC	RC,RS,UCS		X	X
Mountain Bluebird	UCS	UCS		RC,RS	X	X
Mountain Chickadee	RC	UCS			X	X
Northern Flicker	CBSD,UCS	CBSD,UCS	CBSD	CBSD,RS,UCS	X	X
Northern Goshawk	RC	RS,UCS				
Northern Harrier	RS,UCS		RC,RS		X	X
Northern Rough-winged Swallow	RC				X	X
Northern Saw-whet Owl	RC					
Olive-sided Flycatcher	RC,TNC,UCC	RC,TNC,UCC		RC,TNC,UCC	X	X
Pine Siskin	CBSD,RC	CBSD,RS,UCS	CBSD	CBSD,RS,UCS	X	X
Pinyon Jay	RC,RS,TNC,UCC,UCS	RC,TNC,UCC		RC,RS,TNC,UCC,UCS	X	X
Plumbeous Vireo				RS,UCS	X	X
Prairie Falcon	RS,UCS		RC	RC		
Pygmy Nuthatch				RS,UCS	X	X
Red-breasted Nuthatch		UCS			X	X
Red-headed Woodpecker			CBSD,RC,UCC			
Red-naped Sapsucker		RS,UCS			X	X
Rock Wren	CBSD,RS,UCS	CBSD		CBSD,RS,UCS	X	X
Ruby-crowned Kinglet		UCS			X	X
Ruffed Grouse	CBSD	CBSD,RS,UCS	CBSD		X	X
Rufous Hummingbird	CBSD,UCC	CBSD,UCC			X	X
Sage Sparrow	RC,RS,UCS	RC		RC	X	X

Species	Partners In Flight*				Density Estimated	Occupancy Estimated
	BCR 9	BCR 10	BCR 11	BCR 16		
Sage Thrasher	RC,RS,UCS					
Savannah Sparrow			UCS		X	X
Say's Phoebe				UCS	X	X
Sedge Wren			UCS			
Sharp-tailed Grouse	RC	RC	RS,UCS		X	X
Short-eared Owl	CBSD,RC	CBSD,RC	CBSD,RC			
Sprague's Pipit		RC,TNC,UCC	RC,RS,TNC,UCC,UCS		X	X
Swainson's Hawk			RC,RS,UCS		X	
Swainson's Thrush		UCS			X	X
Townsend's Solitaire		RS,UCS			X	X
Townsend's Warbler	RC	RS,UCS			X	X
Tree Swallow		UCS			X	X
Varied Thrush		RC			X	X
Vesper Sparrow		RC	UCS		X	X
Violet-green Swallow				UCS	X	X
Virginia's Warbler	UCC			RS,UCC,UCS	X	X
Warbling Vireo		UCS		UCS	X	X
Western Meadowlark	UCS		UCS		X	X
White-tailed Ptarmigan		RC,RS,UCS		RC		
Williamson's Sapsucker	RC	RS,UCS		RS,UCS	X	X
Willow Flycatcher	RC	RS,UCS			X	X
Wilson's Warbler	CBSD	CBSD		CBSD	X	X
Yellow-headed Blackbird	UCS		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 2014, 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), 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*				Density	Occupancy
Species	BCR 17	BCR 18	BCR 19	BCR 34	Estimated	Estimated
American Dipper	RC			RC		
American Kestrel				RC	X	X
Ash-throated Flycatcher				UCS	X	X
Baird's Sparrow	RC,TNC,UCC				X	X
Baltimore Oriole			RC,RS,UCS			
Bank Swallow	CBSD	CBSD	CBSD		X	X
Bell's Vireo		RC,TNC,UCC	RC,TNC,UCC	RC,TNC,UCC	X	X
Belted Kingfisher	CBSD	CBSD	CBSD	CBSD		
Black-billed Cuckoo	CBSD,RC,UCC		CBSD,UCC			
Black-billed Magpie	RC				X	X
Black-chinned Sparrow				CBSD,RC,RS,UCC,UCS	X	X
Black-throated Gray Warbler				RC	X	X
Black-throated Sparrow				RC,RS,UCS	X	X
Bobolink	CBSD,UCC		CBSD,UCC		X	X
Brewer's Sparrow	CBSD,RC	CBSD,RC			X	X
Broad-tailed Hummingbird				RC	X	X
Brown Thrasher			RS,UCS			
Bullock's Oriole		UCS	RC		X	X
Burrowing Owl	RC	RC,RS,UCS	RC		X	
Bushtit				RS,UCS	X	X
Cactus Wren				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

Species	Partners In Flight*				Density Estimated	Occupancy Estimated
	BCR 17	BCR 18	BCR 19	BCR 34		
Chestnut-collared Longspur	RC,RS,TNC,UCC,UCS	RC,TNC,UCC			X	X
Chihuahuan Raven		RS,UCS			X	
Chimney Swift		CBSD	CBSD			
Common Black-Hawk				RC		
Common Nighthawk	CBSD,RC	CBSD,RC	CBSD,UCS	CBSD,RC	X	X
Common Poorwill				RS,UCS		X
Cooper's Hawk				RS,UCS	X	X
Cordilleran Flycatcher				RS,UCS	X	X
Crissal Thrasher				RS,UCS	X	X
Dickcissel	RC		RC,RS,UCS		X	X
Eastern Kingbird	UCS		UCS		X	X
Eastern Meadowlark		CBSD	CBSD,RC,RS,UCS	CBSD	X	X
Evening Grosbeak				RC	X	X
Ferruginous Hawk	RC,RS,UCS	RC,RS,UCS	RC			
Field Sparrow	CBSD		CBSD,RC		X	X
Gambel's Quail				RS,UCS	X	X
Golden Eagle	RC			RC	X	
Grace's Warbler				RC,RS,UCS	X	X
Grasshopper Sparrow	CBSD,RC,RS,UCS	CBSD,RC,RS,UCS	CBSD,RC,RS,UCS	CBSD	X	X
Gray Vireo				RC,RS,UCC,UCS	X	X
Greater Prairie-Chicken	RC,TNC,UCC	RC,TNC,UCC	RC,RS,TNC,UCC,UCS		X	
Greater Sage-Grouse	RC,RS,TNC,UCC,UCS					
Hepatic Tanager				UCS	X	X
Horned Lark	CBSD	CBSD,RS,UCS	CBSD	CBSD	X	X
Juniper Titmouse				RC,RS,UCS	X	X
Ladder-backed Woodpecker				RS,UCS	X	X
Lark Bunting	CBSD,RC,RS,UCS	CBSD,RC,RS,UCS	CBSD,RC		X	X
Lark Sparrow	RC	UCS	RC,RS,UCS		X	X
Lazuli Bunting	RS,UCS				X	X
Lewis's Woodpecker	RC	RC		RC	X	

Species	Partners In Flight*				Density Estimated	Occupancy Estimated
	BCR 17	BCR 18	BCR 19	BCR 34		
Loggerhead Shrike	CBSD	CBSD	CBSD,RC	CBSD	X	X
Lucy's Warbler				RC,RS,UCS	X	X
McCown's Longspur	RC,RS,UCS	RS,UCS			X	X
Northern Bobwhite	CBSD	CBSD,UCS			X	X
Northern Flicker	CBSD	CBSD	CBSD	CBSD	X	X
Northern Goshawk	RC			RC		
Northern Harrier	RC,RS,UCS	RC	RC		X	X
Olive Warbler				RS,UCS		X
Olive-sided Flycatcher				TNC,UCC	X	X
Painted Redstart				RC,RS,UCS		
Phainopepla				RC,RS,UCS	X	X
Pine Siskin	CBSD			CBSD	X	X
Pinyon Jay	RC,TNC,UCC	RC,TNC,UCC		RC,TNC,UCC	X	X
Plumbeous Vireo				RC,RS,UCS	X	X
Prairie Falcon		RC		RC		
Pygmy Nuthatch				RS,UCS	X	X
Red Crossbill	UCS				X	X
Red-faced Warbler				RC,RS,UCS	X	X
Red-headed Woodpecker	CBSD,RC,UCC	CBSD,UCC	CBSD,RS,UCC,UCS		X	X
Ring-necked Pheasant	UCS	RS,UCS			X	X
Rock Wren	CBSD	CBSD		CBSD	X	X
Ruffed Grouse	CBSD					X
Rufous-crowned Sparrow				RS,UCS	X	X
Sage Sparrow	RC					
Sage Thrasher	RC				X	X
Scaled Quail		RC		RC	X	X
Scott's Oriole				RS,UCS	X	X
Sharp-shinned Hawk				RC		
Sharp-tailed Grouse	RS,UCS	RC			X	X
Short-eared Owl	CBSD,RC	CBSD				

Species	Partners In Flight*				Density Estimated	Occupancy Estimated
	BCR 17	BCR 18	BCR 19	BCR 34		
Sprague's Pipit	RC,TNC,UCC				X	X
Swainson's Hawk		RS,UCS	RC	RC	X	X
Verdin			CBSD	CBSD,RS,UCS	X	X
Vesper Sparrow	RC,RS,UCS				X	X
Violet-green Swallow				UCS	X	X
Virginia's Warbler	UCC			RS,UCC,UCS	X	X
Western Bluebird				RS,UCS	X	X
Western Kingbird		UCS			X	X
Western Meadowlark	UCS	RC,RS,UCS	RC,RS,UCS		X	X
Western Screech-Owl		RC		RS,UCS		
White-breasted Nuthatch				UCS	X	X
Wild Turkey			UCS		X	
Williamson's Sapsucker				RS,UCS	X	X
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 2014, 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), North Dakota Game and Fish Department (NDGFD), Nebraska Game and Parks Commission (NGPC), 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*								Density	Occupancy
Species	**AZGFD**	**CPW**	**IDFG**	**MTFWP**	**NDGFD**	**NGPC**	**SDGFP**	**WGFD**	**Estimated**	**Estimated**
Acorn Woodpecker	SGCN								X	X
Alder Flycatcher				SOC						
American Avocet			SGCN		SoCP L2	T2			X	X
American Bittern	SGCN	T2		SOC	SoCP L1	T2		SGCN		
American Dipper	SGCN						SGCN,ST			
American Pipit	SGCN									
American Wigeon						T2			X	X
Ash-throated Flycatcher								SGCN		
American Three-toed Woodpecker	SGCN		SGCN				SGCN	SGCN	X	X
American White Pelican		T2	SGCN	SOC	SoCP L1	T2	SGCN		X	
Bald Eagle	SGCN	SSC,T2	SGCN		SoCP L2	T1	SGCN,ST	SGCN		
Barrow's Goldeneye		T2						SGCN		
Baird's Sparrow	SGCN			SOC	SoCP L1		SGCN		X	X
Black-and-white Warbler						T2			X	X
Black-billed Cuckoo				SOC	SoCP L1	T2				
Black-billed Magpie	SGCN									
Black-backed Woodpecker				SOC			SGCN	SGCN		X
Brown-crested Flycatcher	SGCN								X	X
Black-crowned Night-Heron			SGCN	SOC		T2		SGCN		
Brown-capped Rosy-Finch		T1						SGCN	X	X
Black-chinned Sparrow	SGCN								X	X
Barred Owl						T2				
Bell's Vireo	SGCN	T2				T1			X	X
Blue-gray Gnatcatcher				SOC		T2			X	X

Species	State Agencies*								Density Estimated	Occupancy Estimated
	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	SDGFP	WGFD		
Blue Grosbeak			SGCN							
Black Rosy-Finch		T2	SGCN	SOC				SGCN		
Black Swift		T2	SGCN	SOC						
Black Tern		T2	SGCN	SOC	SoCP L1	T2	SGCN	SGCN		
Bobolink		T2		SOC	SoCP L2			SGCN	X	X
Boreal Chickadee				SOC						
Boreal Owl		T2	SGCN					SGCN		
Brewer's Blackbird						T2			X	X
Brown Creeper				SOC		T2			X	X
Brewer's Sparrow	SGCN	T2	SGCN	SOC		T1		SGCN	X	X
Black-tailed Gnatcatcher	SGCN								X	X
Band-tailed Pigeon	SGCN	T2							X	X
Black-throated Gray Warbler	SGCN								X	X
Bullock's Oriole	SGCN								X	X
Burrowing Owl	SGCN	ST,T1	SGCN	SOC	SoCP L2	T1	SGCN	SGCN	X	
Bushtit								SGCN		
Cassin's Finch		T2		SOC					X	X
California Gull			SGCN							
Cassin's Kingbird						T2				
Canvasback					SoCP L2	T2		SGCN		
Cassin's Sparrow	SGCN	T2							X	X
Common Black-Hawk	SGCN									
Chestnut-collared Longspur	SGCN	T2		SOC	SoCP L1	T2	SGCN	SGCN	X	X
Cinnamon Teal						T2				
Clark's Nutcracker				SOC		T2			X	X
Cordilleran Flycatcher	SGCN					T2			X	X
Cooper's Hawk						T2				X
Costa's Hummingbird	SGCN									
Common Loon			SGCN	SOC				SGCN		
Common Nighthawk	SGCN								X	X

Species	State Agencies*								Density Estimated	Occupancy Estimated
	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	SDGFP	WGFD		
Common Poorwill	SGCN					T2				X
Common Tern				SOC						
Dark-eyed Junco						T2				
Dickcissel					SoCP L2			SGCN	X	X
Dusky Flycatcher	SGCN								X	X
Dusky Grouse	SGCN									
Eastern Bluebird	SGCN									
Eastern Meadowlark	SGCN					T2			X	X
Evening Grosbeak	SGCN			SOC					X	X
Ferruginous Hawk	SGCN	SSC,T2	SGCN	SOC	SoCP L1	T1	SGCN	SGCN		
Franklin's Gull			SGCN	SOC	SoCP L1			SGCN		
Great Blue Heron				SOC					X	X
Golden-crowned Kinglet	SGCN								X	
Gray-crowned Rosy-Finch				SOC						
Gila Woodpecker	SGCN								X	X
Golden Eagle	SGCN	T1		SOC	SoCP L2	T2			X	
Gray Jay	SGCN									
Gray Catbird	SGCN									
Great Egret	SGCN		SGCN							
Gray Flycatcher	SGCN								X	X
Greater Prairie-Chicken		T2			SoCP L2	T1	SGCN		X	
Greater Sage-Grouse		SSC,T1	SGCN	SOC	SoCP L2	T2	SGCN	SGCN		X
Grasshopper Sparrow	SGCN	T2	SGCN		SoCP L1			SGCN	X	X
Gray Vireo	SGCN	T2							X	X
Grace's Warbler	SGCN	T2							X	X
Green-tailed Towhee				SOC					X	X
Hooded Merganser			SGCN							
Juniper Titmouse	SGCN	T2	SGCN					SGCN	X	X
Lark Bunting		T2			SoCP L1		SGCN	SGCN	X	X
Lazuli Bunting	SGCN	T2							X	X

Species	State Agencies*								Density Estimated	Occupancy Estimated
	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	SDGFP	WGFD		
Long-billed Curlew		SSC,T2	SGCN	SOC	SoCP L1	T1	SGCN	SGCN	X	X
Lesser Goldfinch			SGCN							
Long-eared Owl	SGCN					T2				
Lesser Scaup			SGCN			T2		SGCN		
Lewis's Woodpecker	SGCN	T2	SGCN	SOC		T1	SGCN	SGCN	X	X
Lincoln's Sparrow	SGCN									
Loggerhead Shrike		T2		SOC	SoCP L2	T2			X	X
Lucy's Warbler	SGCN								X	X
Marbled Godwit					SoCP L1		SGCN		X	X
Marsh Wren	SGCN									
McCown's Longspur	SGCN	T2		SOC		T1		SGCN	X	
Merlin			SGCN			T2		SGCN		
MacGillivray's Warbler	SGCN								X	X
Mountain Bluebird	SGCN					T2			X	X
Mountain Plover	SGCN	SSC,T1		SOC		T1		SGCN	X	
Northern Bobwhite	SGCN	T2				T2			X	X
Northern Goshawk	SGCN	T2		SOC			SGCN	SGCN		
Northern Harrier		T2			SoCP L2	T2			X	X
Northern Pintail			SGCN		SoCP L2			SGCN	X	X
Northern Pygmy-Owl	SGCN							SGCN		
Northern Saw-whet Owl	SGCN									
Orange-crowned Warbler	SGCN								X	X
Olive Warbler	SGCN									X
Olive-sided Flycatcher	SGCN	T2							X	X
Osprey							SGCN,ST			
Ovenbird						T2			X	X
Painted Redstart	SGCN									
Pacific Wren	SGCN			SOC					X	X
Peregrine Falcon	SGCN	SSC,T2	SGCN	SOC		T2	SGCN,SE	SGCN		
Phainopepla	SGCN								X	X

Species	State Agencies*								Density Estimated	Occupancy Estimated
	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	SDGFP	WGFD		
Pine Grosbeak	SGCN									
Pinyon Jay	SGCN	T2	SGCN	SOC		T2			X	X
Pine Siskin						T2			X	X
Pileated Woodpecker				SOC		T2			X	X
Plumbeous Vireo						T2			X	X
Prairie Falcon	SGCN	T2			SoCP L2	T2				
Purple Martin	SGCN	T2							X	X
Pygmy Nuthatch			SGCN			T2		SGCN	X	X
Red Crossbill	SGCN		SGCN			T2			X	X
Redhead					SoCP L2			SGCN		
Red-faced Warbler	SGCN								X	X
Red-headed Woodpecker				SOC	SoCP L2				X	X
Red-naped Sapsucker	SGCN									
Ruby-throated Hummingbird						T2				
Rufous Hummingbird		T2								
Sandhill Crane		SSC,T1	SGCN			T2		SGCN	X	
Sage Sparrow	SGCN	T2		SOC				SGCN	X	X
Sage Thrasher	SGCN			SOC		T2		SGCN	X	X
Savannah Sparrow	SGCN					T2			X	
Scott's Oriole	SGCN								X	X
Scaled Quail	SGCN									
Short-eared Owl		T2	SGCN		SoCP L2	T1		SGCN		
Sedge Wren				SOC	SoCP L2	T2				X
Snowy Egret	SGCN		SGCN					SGCN		
Sora	SGCN									
Sprague's Pipit	SGCN			SOC	SoCP L1		SGCN		X	X
Sharp-shinned Hawk						T2				
Sharp-tailed Grouse		SE,SSC,T1	SGCN		SoCP L2			SGCN	X	X
Summer Tanager	SGCN					T2				X
Swainson's Hawk	SGCN	T2	SGCN		SoCP L1	T2		SGCN	X	X

Species	State Agencies*								Density Estimated	Occupancy Estimated
	AZGFD	CPW	IDFG	MTFWP	NDGFD	NGPC	SDGFP	WGFD		
Swainson's Thrush	SGCN									
Townsend's Solitaire						T2				
Trumpeter Swan			SGCN	SOC		T1	SGCN	SGCN		
Upland Sandpiper		T2	SGCN		SoCP L1			SGCN	X	X
Varied Thrush				SOC					X	X
Veery		T2		SOC					X	
Violet-green Swallow						T2			X	X
Virginia Rail	SGCN					T2		SGCN		
Virginia's Warbler	SGCN	T2	SGCN						X	X
White-crowned Sparrow	SGCN									
Western Grebe	SGCN		SGCN			T2				
Western Scrub-Jay	SGCN							SGCN	X	X
Western Screech-Owl	SGCN									
Western Tanager						T2			X	X
White-faced Ibis		T2	SGCN	SOC		T2		SGCN		
Willow Flycatcher	SGCN	FE,SE,T1						SGCN	X	X
Willet					SoCP L1	T2	SGCN		X	X
Wilson's Phalarope			SGCN		SoCP L1		SGCN		X	X
Williamson's Sapsucker	SGCN								X	X
Wild Turkey	SGCN								X	X
Wood Duck	SGCN									
White-tailed Ptarmigan		T1		SOC						
White-throated Swift	SGCN					T2			X	X
White-winged Crossbill			SGCN							
White-winged Dove							SGCN			
Yellow-breasted Chat	SGCN					T2			X	
Yellow-billed Cuckoo	SGCN	FT,SSC,T1	SGCN	SOC		T2		SGCN		
Yellow Warbler	SGCN								X	X
Yellow-throated Vireo						T2				

*__AZGFD:__ SGCN = Species of Greatest Conservation Need (Arizona Game and Fish Department 2012); __CPW:__ T1 = Tier 1 priority species; T2 = Tier 2 priority species; FE = Federally Endangered; FT= Federally Threatened; SCC = State Special Concern; SE = State Endangered; ST = State Threatened (Colorado Parks and Wildlife (CPW) 2015); __IDFG:__ SGCN = Species of Greatest Conservation Need (Idaho Department of Fish and Game 2005) ; __MTFWP:__ SOC = Species of Concern(Montana Natural Heritage Program (MTNHP) 2015); __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:__ T1 = Tier I: Globally or nationally most at-risk of extinction; T2 = Tier II: State Critically Imperiled, State Imperiled or State Vulnerable; __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 lands in 2014, 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*						Density	Occupancy
species	Colorado	Idaho	Montana	North Dakota	South Dakota	Wyoming	Estimated	Estimated
American Three-toed Woodpecker				SS	SS			
Baird's Sparrow			SS	SS	SS	SS	X	X
Bald Eagle	SS	T2		SS	SS	SS		
Black-throated Sparrow		T2						
Blue-gray Gnatcatcher			SS	SS	SS		X	X
Bobolink			SS	SS	SS		X	X
Brewer's Sparrow	SS	T2	SS	SS	SS	SS	X	X
Burrowing Owl	SS	T2	SS	SS	SS	SS		
Cassin's Finch		T2						
Chestnut-collared Longspur			SS	SS	SS		X	X
Ferruginous Hawk	SS	T2	SS	SS	SS	SS		
Franklin's Gull			SS	SS	SS			
Golden Eagle		T2	SS	SS	SS			
Grasshopper Sparrow		T2					X	X
Greater Sage-Grouse	SS	T2	SS	SS	SS	SS		X
Green-tailed Towhee		T2					X	X
Loggerhead Shrike		T2	SS	SS	SS	SS	X	X
Long-billed Curlew	SS	T2	SS	SS	SS	SS	X	X
Marbled Godwit				SS	SS		X	X
McCown's Longspur			SS	SS	SS		X	X
Mountain Plover	SS		SS	SS	SS	SS	X	
Olive-sided Flycatcher		T2						
Peregrine Falcon	SS		SS	SS	SS	SS		
Pinyon Jay		T2						
Sage Sparrow		T2	SS	SS	SS	SS	X	X
Sage Thrasher		T2	SS	SS	SS	SS	X	X

species	Bureau of Land Management*						Density Estimated	Occupancy Estimated
	Colorado	Idaho	Montana	North Dakota	South Dakota	Wyoming		
Sharp-tailed Grouse	SS	T2				SS		
Short-eared Owl		T2						
Sprague's Pipit			SS	SS	SS		X	X
Swainson's Hawk				SS	SS		X	
Trumpeter Swan		T2	SS	SS	SS	SS		
Vaux's Swift		T2						
Virginia's Warbler		T2						
Willow Flycatcher		T2						

*SS = Sensitive Species; Colorado (Bureau of Land Management 2000); Montana (Montana Natural Heritage Program (MTNHP) 2015); North Dakota, South Dakota (Bureau of Land Management 2009); Wyoming (Bureau of Land Management 2010); T2 = Tier 23 Sensitive Species; Idaho (USDI Bureau of Land Management (BLM) 2015).

APPENDIX E

Priority species detected on US Forest Service lands in Region 1 in 2014, with management designations by region and unit. Codes for Units: 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*								Density	Occupancy
Species	**Region 1**	**BINF**	**CLNF**	**CUNF**	**FLNF**	**GANG**	**HENF**	**IPNF**	**Estimated**	**Estimated**
Alder Flycatcher	Other									
American Dipper	Other									
Baird's Sparrow	R1SS								X	X
Bald Eagle	R1SS	MIS	MIS	MIS	MIS	MIS	MIS	MIS		
Belted Kingfisher			MIS							
Black-and-white Warbler	Other								X	X
Black-backed Woodpecker	R1SS				MIS					X
Bobolink	Other								X	X
Boreal Chickadee	Other									
Brewer's Sparrow				MIS					X	X
Bullock's Oriole				MIS					X	X
Cassin's Kingbird				MIS					X	X
Chestnut-collared Longspur	Other								X	X
Chipping Sparrow								MIS	X	X
Clark's Nutcracker	Other								X	X
Dickcissel	Other								X	X
Dusky Flycatcher								MIS	X	X
Grasshopper Sparrow	Other								X	X
Gray Jay	Other								X	X
Hairy Woodpecker							MIS	MIS	X	X
Hammond's Flycatcher								MIS	X	X
Lark Bunting	Other								X	X
Lark Sparrow				MIS					X	X
Lewis's Woodpecker	Other								X	X
Loggerhead Shrike	R1SS								X	X

Species	USFS Region 1*								Density Estimated	Occupancy Estimated
	Region 1	BINF	CLNF	CUNF	FLNF	GANG	HENF	IPNF		
Long-billed Curlew	R1SS								X	
Marbled Godwit	Other								X	X
Northern Goshawk			MIS	MIS		MIS	MIS	MIS		
Northern Harrier	Other								X	
Olive-sided Flycatcher	Other							MIS	X	X
Osprey	Other									
Ovenbird				MIS					X	X
Pileated Woodpecker		MIS	MIS				MIS	MIS	X	X
Red-headed Woodpecker	Other								X	X
Red-naped Sapsucker	Other								X	X
Ruffed Grouse				MIS						
Sandhill Crane	Other								X	
Sharp-tailed Grouse				MIS					X	
Spotted Towhee				MIS					X	X
Sprague's Pipit	R1SS								X	
Swainson's Hawk	Other								X	
Upland Sandpiper	Other								X	X
Western Kingbird				MIS					X	X
Willet	Other									
Williamson's Sapsucker	Other								X	X
Wilson's Phalarope	Other								X	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 2014, with management designations by region and unit. Codes for Units: 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								Density	Occupancy
Species	**Region 1**	**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
Bald Eagle	R1SS	MIS	MIS	MIS	MIS					
Black-and-white Warbler	Other								X	X
Black-backed Woodpecker	R1SS									X
Bobolink	Other								X	X
Boreal Chickadee	Other									
Chestnut-collared Longspur	Other								X	X
Chipping Sparrow		MIS							X	X
Clark's Nutcracker	Other								X	X
Dickcissel	Other								X	X
Dusky Flycatcher		MIS							X	X
Dusky Grouse			MIS						X	X
Golden Eagle			MIS							
Grasshopper Sparrow	Other								X	X
Gray Jay	Other								X	X
Hairy Woodpecker		MIS							X	X
Hammond's Flycatcher		MIS							X	X
Lark Bunting	Other								X	X
Lewis's Woodpecker	Other								X	X
Loggerhead Shrike	R1SS								X	X
Long-billed Curlew	R1SS								X	
Marbled Godwit	Other								X	X
Northern Goshawk			MIS	MIS	MIS					

Species	USFS Region 1								Density Estimated	Occupancy Estimated
	Region 1	KONF	LCNF	LONF	NPNF	CRNG	GRNG	LMNG		
Northern Harrier	Other								X	
Olive-sided Flycatcher	Other	MIS							X	X
Osprey	Other									
Pileated Woodpecker		MIS		MIS	MIS				X	X
Red-headed Woodpecker	Other								X	X
Red-naped Sapsucker	Other								X	X
Sandhill Crane	Other								X	
Sharp-tailed Grouse						MIS	MIS	MIS	X	
Sprague's Pipit	R1SS								X	
Swainson's Hawk	Other								X	
Upland Sandpiper	Other								X	X
Willet	Other									
Williamson's Sapsucker	Other								X	X
Wilson's Phalarope	Other								X	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 2014, 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 R. McKelvie NF (SMNF), San Juan NF (SJNF), Shoshone NF (SHNF), White River NF (WRNF), Comanche NG (CONG), 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*										Density	Occupancy
Species	**Region 2**	**ARNF**	**BINF**	**BHNF**	**GMUG**	**MBNF**	**NENF**	**PSINF**	**RGNF**	**RONF**	**Estimated**	**Estimated**
American Dipper				SOLC								
American Three-toed Woodpecker						MIS					X	X
Bald Eagle	R2SS				MIS							
Black Tern	R2SS											
Boreal Owl	R2SS											
Brewer's Sparrow	R2SS		MIS		MIS						X	X
Brown Creeper				MIS		SSC			MIS		X	X
Brown-capped Rosy-Finch						SSC						
Burrowing Owl	R2SS	MIS									X	
Calliope Hummingbird			SOLC									
Cassin's Sparrow	R2SS										X	X
Chestnut-collared Longspur	R2SS										X	X
Cooper's Hawk				SOLC								
Golden-crowned Kinglet		MIS	SOLC	MIS		MIS				MIS	X	X
Grasshopper Sparrow	R2SS			MIS							X	X
Greater Prairie-Chicken	R2SS						MIS				X	
Hairy Woodpecker		MIS			MIS						X	X
Hermit Thrush									MIS		X	X
Juniper Titmouse					MIS							
Lark Bunting		MIS										
Lewis's Woodpecker	R2SS				MIS						X	X
Lincoln's Sparrow						MIS			MIS		X	X
Loggerhead Shrike	R2SS										X	X
Long-billed Curlew	R2SS										X	X

Species	USFS Region 2*										Density Estimated	Occupancy Estimated
	Region 2	ARNF	BINF	BHNF	GMUG	MBNF	NENF	PSINF	RGNF	RONF		
McCown's Longspur	R2SS										X	X
Mountain Bluebird		MIS									X	X
Mountain Plover	R2SS	MIS									X	
Northern Goshawk	R2SS				MIS	MIS				MIS		
Northern Harrier	R2SS											
Northern Saw-whet Owl				SOLC								
Olive-sided Flycatcher	R2SS										X	X
Peregrine Falcon	R2SS				MIS							
Pinyon Jay					MIS							
Purple Martin	R2SS										X	X
Pygmy Nuthatch		MIS	SOLC	SOLC			MIS		MIS		X	X
Red Crossbill					MIS						X	X
Red-breasted Nuthatch			MIS								X	X
Ruffed Grouse				MIS								
Sharp-shinned Hawk				SOLC								
Sharp-tailed Grouse	R2SS						MIS				X	
Song Sparrow				MIS								X
Swainson's Hawk			SOLC									
Vesper Sparrow									MIS	MIS	X	X
Warbling Vireo		MIS									X	X
White-tailed Ptarmigan	R2SS											
Wilson's Warbler		MIS				MIS			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; SVC = Species of Viability Concern; SSC = Species of Special Concern.

Appendix F continued. Priority species detected on US Forest Service lands in Region 2 in 2014, 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 R. McKelvie NF (SMNF), San Juan NF (SJNF), Shoshone NF (SHNF), White River NF (WRNF), Comanche NG (CONG), 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*									Density	Occupancy
Species	**Region 2**	**SMNF**	**SJNF**	**SHNF**	**WRNF**	**CONG**	**NBNG**	**PANG**	**TBNG**	**Estimated**	**Estimated**
American Pipit					MIS					X	X
Bald Eagle	R2SS			MIS							
Barrow's Goldeneye					SVC						
Black Tern	R2SS										
Boreal Owl	R2SS										
Brewer's Sparrow	R2SS			MIS	MIS					X	X
Bullock's Oriole						MIS				X	X
Burrowing Owl	R2SS							MIS		X	
Cassin's Sparrow	R2SS									X	X
Chestnut-collared Longspur	R2SS									X	X
Dusky Grouse				MIS							
Golden-crowned Kinglet								MIS			
Grasshopper Sparrow	R2SS									X	X
Greater Prairie-Chicken	R2SS	MIS								X	
Green-tailed Towhee			MIS							X	X
Hairy Woodpecker			MIS	MIS				MIS		X	X
Lark Bunting								MIS		X	X
Lewis's Woodpecker	R2SS									X	X
Loggerhead Shrike	R2SS									X	X
Long-billed Curlew	R2SS					MIS				X	X
Mallard			MIS								
McCown's Longspur	R2SS									X	X
Mountain Bluebird			MIS					MIS		X	X
Mountain Plover	R2SS							MIS		X	
Northern Goshawk	R2SS		MIS	MIS							

Species	USFS Region 2*									Density Estimated	Occupancy Estimated
	Region 2	SMNF	SJNF	SHNF	WRNF	CONG	NBNG	PANG	TBNG		
Northern Harrier	R2SS										
Olive-sided Flycatcher	R2SS									X	X
Peregrine Falcon	R2SS			MIS	SOC						
Purple Martin	R2SS									X	X
Pygmy Nuthatch		MIS			SVC			MIS		X	X
Ruffed Grouse				MIS						X	X
Sharp-tailed Grouse	R2SS	MIS	MIS						MIS	X	
Virginia's Warbler					MIS					X	X
Warbling Vireo								MIS			
White-tailed Ptarmigan	R2SS										
Wild Turkey			MIS							X	X
Willow Flycatcher			MIS								
Wilson's Warbler								MIS			

*R2SS = Region 2 Sensitive Species (US Forest Service 2008b); MIS = Management Indicator Species; SOLC = Species of Local Concern; SOC = Species of Concern; SVC = Species of Viability Concern; SSC = Species of Special Concern.

APPENDIX G

Priority species detected on US Forest Service lands in Region 3 in 2014, 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*				Density	Occupancy
Species	**Region 3**	**Coconino NF**	**Kaibab NF**	**Kiowa/Rita Blanca NG**	**Estimated**	**Estimated**
Bell's Vireo	R3SS				X	X
Burrowing Owl	R3SS			PMIS	X	
Common Black-Hawk	R3SS					
Costa's Hummingbird	R3SS					
Gila Woodpecker	R3SS				X	X
Grace's Warbler			MIS		X	X
Grasshopper Sparrow	R3SS				X	X
Gray Vireo	R3SS				X	X
Hairy Woodpecker		MIS			X	X
Juniper Titmouse		MIS			X	X
Lucy's Warbler		MIS			X	X
Mountain Bluebird				MIS		
Peregrine Falcon	R3SS					
Pygmy Nuthatch		MIS			X	X
Ruby-crowned Kinglet			MIS		X	X
Western Bluebird			MIS		X	X
Wild Turkey	R3SS	MIS			X	X
Yellow-breasted Chat		MIS				

*R3SS = USFS Region 3 Sensitive Species (US Forest Service 2013); MIS = Management Indicator Species; PMIS = Proposed Management Indicator Species; SOC = Species of Concern.

APPENDIX H

Priority species detected on US Forest Service lands in Region 4 in 2014, with management designations by region and unit. Codes for Units: Ashley NF (ASNF), Boise NF (BONF), Bridger-Teton NF (BTNF), Caribou-Targhee NF (CTNF), Manti-La Sal NF (MLNF), Payette NF (PANF), Salmon-Challis National Forest (SCNF), Sawtooth NF (SANF), Uinta-Wasatch-Cache National Forest (UWCNF). 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*										Density	Occupancy
Species	**Region 4**	**ASNF**	**BONF**	**BTNF**	**CTNF**	**MLNF**	**PANF**	**SCNF**	**SANF**	**UWCNF**	**Estimated**	**Estimated**
American Three-toed Woodpecker	R4SS									MIS	X	X
Bald Eagle	R4SS			MIS	MIS							
Brewer's Sparrow			MIS	MIS			MIS		MIS		X	X
Brown Creeper								MIS				
Cooper's Hawk						SS						
Dusky Grouse						MIS						
Golden Eagle		MIS				MIS					X	
Lincoln's Sparrow		MIS										
Mountain Bluebird								MIS			X	X
Mountain Chickadee			MIS				MIS		MIS		X	X
Northern Goshawk	R4SS	MIS			MIS			MIS		MIS		
Peregrine Falcon	R4SS			MIS	MIS							
Pileated Woodpecker			MIS				MIS	MIS	MIS			
Pygmy Nuthatch								MIS				
Red-naped Sapsucker		MIS										
Ruby-crowned Kinglet								MIS				
Song Sparrow		MIS										
Vesper Sparrow			MIS				MIS	MIS	MIS		X	X
Warbling Vireo		MIS										
Williamson's Sapsucker			MIS				MIS		MIS		X	X
Willow Flycatcher	FE										X	X
Yellow Warbler			MIS				MIS	MIS	MIS		X	X

*FE = Federally Endangered Species; MIS = Management Indicator Species; R4SS = Region 4 Sensitive Species (US Forest Service 2008a); SS = Sensitive Species.

APPENDIX I

Priority species detected on US Fish and Wildlife Service lands in Charles M. Russell National Wildlife Refuge in 2014, with management designations (Charles M. Russell National Wildlife Refuge 2015). An "X" in the Occupancy or Density Estimated columns indicates that estimates were generated for that species in Charles M. Russell National Wildlife Refuge.

Species	Charles M. Russell NWR	Density Estimated	Occupancy Estimated
Brewer's Blackbird	Focal Bird	X	X
Ovenbird	Focal Bird		
Sharp-tailed Grouse	Focal Bird	X	X
Western Wood-Pewee	Focal Bird	X	X