

Integrated Monitoring in Bird Conservation Regions (IMBCR):

2017 Field Season Report



April 2018

Bird 
Conservancy
of the Rockies
Connecting People, Birds and Land

Bird Conservancy of the Rockies

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Bird Conservancy of the Rockies

Connecting people, birds and land

Mission: Conserving birds and their habitats through science, education and land stewardship

Vision: Native bird populations are sustained in healthy ecosystems

Bird Conservancy of the Rockies conserves birds and their habitats through an integrated approach of science, education, and land stewardship. Our work radiates from the Rockies to the Great Plains, Mexico and beyond. Our mission is advanced through sound science, achieved through empowering people, realized through stewardship, and sustained through partnerships. Together, we are improving native bird populations, the land, and the lives of people.

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.

Goals:

1. Guide conservation action where it is needed most by conducting scientifically rigorous monitoring and research on birds and their habitats within the context of their full annual cycle.
2. Inspire conservation action in people by developing relationships through community outreach and science-based, experiential education programs.
3. Contribute to bird population viability and help sustain working lands by partnering with landowners and managers to enhance wildlife habitat.
4. Promote conservation and inform land management decisions by disseminating scientific knowledge and developing tools and recommendations.

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Executive Summary

Bird Conservancy of the Rockies (Bird Conservancy), in conjunction with its partners, conducted landbird monitoring for the tenth year in a row for the Integrated Monitoring in Bird Conservation Regions (IMBCR) program. 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 analysts to estimate species densities, population sizes, and occupancy rates for individual strata or biologically meaningful combinations of strata. The IMBCR design provides a spatially consistent and flexible framework for understanding the status and annual changes of bird populations. Collaboration across organizations and spatial scales increase sample sizes and improves the accuracy and precision of population estimates. Analyzing the data collectively allows us to estimate detection probabilities for species that would otherwise have insufficient numbers of detections at local scales.

In 2017, the IMBCR program's area of inference encompassed three entire states (Colorado, Utah, and Wyoming) and portions of 12 additional states (Arizona, California, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, South Dakota, and Texas). We surveyed across US Forest Service (USFS) Regions 1, 2, and 4 and in portions of Region 3; all of the Badlands and Prairies Bird Conservation Region (BCR 17), all of the Shortgrass Prairie Bird Conservation Region (BCR 18), and portions of eight other BCRs: Great Basin (9), Northern Rockies (10), Prairie Potholes (11), Sierra Nevada (15), Southern Rockies/Colorado Plateau (16), Central Mixed Grass Prairie (19), Sonoran and Mohave Deserts (33), and Sierra Madre Occidental (34). Field technicians conducted 20,732 point counts on 1,809 of 1,833 (98.7%) planned surveys between April 24 and July 22, 2017. They detected 260,815 individual birds representing 342 species.

This report summarizes the results of the 2017 field season. To view interactive maps illustrating survey and detection locations, species counts and density, population and occupancy results, please visit Bird Conservancy's Rocky Mountain Avian Data Center at <http://rmbo/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 this report's 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 combination of strata are summarized in this report. All individual strata and all biologically meaningful combinations of strata, or "superstrata", can be found on the Avian Data Center.

To demonstrate the use of IMBCR monitoring data for bird conservation, we focus on population trends from 2009-2017 for four forested bird species of conservation concern in U.S. Forest Service Regions 1 and 2. The four species exhibited different trends among each other, as well as between the two regions. For example, the population of Olive-sided Flycatchers has been fairly stable in Region 2, while the larger population in Region 1 has experienced more dramatic declines and increases over the time period. Occupancy of both Evening Grosbeaks and Cassin's Finches was higher in Region 1, but their individual trends differed from 2009-2017. By examining trends in population or occupancy for forested species of concern, biologists and managers can examine correlation with potential agents of population change, such as forest fire or pine beetle outbreaks, and set population objectives for species of concern.

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 2017 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: Collaborative Forest Landscape Restoration Program; Colorado Parks and Wildlife; Department of Defense; Farm Service Agency; Montana Fish, Wildlife and Parks; National Fish and Wildlife Foundation; Natural Resources Conservation Service; US Bureau of Land Management; US Forest Service; US National Park Service; and Wyoming Game and Fish Department. We thank Playa Lakes Joint Venture for building a collaborative partnership and acquiring funding across the states within their boundary to allow for the addition of IMBCR for PLJV. Funding for surveys in the PLJV region was provided by Colorado Parks & Wildlife; Kansas Department of Wildlife, Parks & Tourism; Nebraska Game & Parks Commission; New Mexico Department of Game & Fish; Oklahoma Department of Wildlife Conservation; Texas Parks & Wildlife Department; Farm Service Agency (USDA); US Forest Service; Great Plains Landscape Conservation Cooperative (USFWS); and The Migratory Bird Program (USFWS Southwest Region). We thank Department of Defense, Great Basin Bird Observatory, Intermountain Bird Observatory, Utah Division of Wildlife Resources, and Wyoming Natural Diversity Database for planning and implementing field work in their study areas. Bird Conservancy of the Rockies' landowner liaison, Jenny Berven, with help from Tiffany Peeken, 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 Ryan Wermager of The Nature Conservancy for providing excellent training facilities at the Whitney Preserve for the Northern Great Plains 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 Bird Conservancy staff and IMBCR partners.

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Introduction

Monitoring is an essential component of wildlife management and conservation science (Marsh & Trenham, 2008; Witmer, 2005). Common goals of population monitoring are to estimate the population status of target species and to detect changes in populations over time (Sauer & Knutson, 2008; Thompson, White, & Gowan, 1998). 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, Lukacs, & Knopf, 2006); provide an understanding of how management actions affect populations (Alexander, Stevens, Geupel, & Will, 2008; Lyons, Runge, Laskowski, & Kendall, 2008); and evaluate population responses to landscape alteration and climate change (Baron et al., 2008; Lindenmayer & Likens, 2009).

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 (Dreitz, Stinson, Hahn, Tack, & Lukacs, 2017; Lindenmayer & 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, Hayward, & Squires, 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, Schlesinger, Roth, & Van Horne, 2005; Sauer & Knutson, 2008).

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 & 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, Anderson, Giesen, Leukering, & Carter, 2002; Thompson, 2002). Addressing spatial variation entails the use of probabilistic sampling designs, which 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. 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).

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

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, Bird Conservancy of the Rockies and its partners initiated a broad-scale bird monitoring program in 2008, entitled “Integrated Monitoring in Bird Conservation Regions” (IMBCR) (Blakesley & Hanni, 2009). See Appendix B: IMBCR Program and Stratification History for a complete history of this program. The monitoring objectives of the IMBCR partnership 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 landbird 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.

The IMBCR design uses Bird Conservation Regions (BCRs) as sampling frames (Figure 1), stratified by land ownership inside each BCR (NABCI Monitoring Subcommittee, 2007). BCRs provide a spatially consistent framework for bird conservation in North America. Each BCR represents a distinct ecological region with similar bird communities, vegetation types and resource management interests (NABCI, 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 (Pavlacky et al., 2017; Ruth et al., 2003).

Important properties of the IMBCR design are:

- All areas are available for sampling including all vegetation types;
- Strata are based on fixed attributes, which allows 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 are directly comparable to regional trends; and
- Coordination among partners reduces the costs and/or increases efficiencies of monitoring per partner.

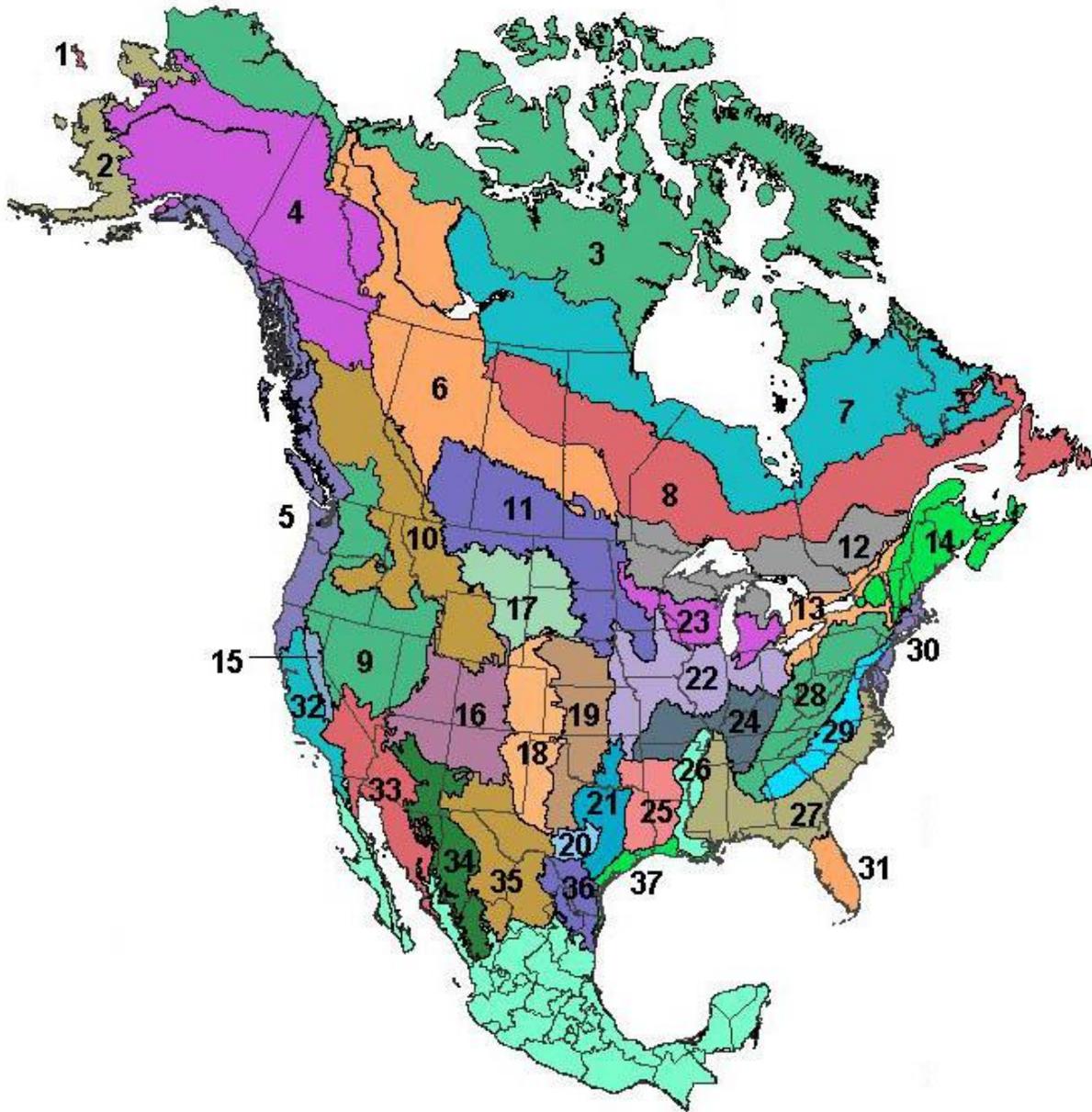


Figure 1. Bird Conservation Regions throughout North America, excluding Hawaii and Mexico (Source: <http://nabci-us.org/resources/bird-conservation-regions-map/>).

Methods

Study Area

In 2017, the IMBCR program’s area of inference encompassed three entire states (Colorado, Utah, and Wyoming) and portions of 12 additional states (Arizona, California, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, South Dakota, and Texas). We surveyed across US Forest Service (USFS) Regions 1, 2, and 4 and in portions of Region 3; all of the Badlands and Prairies Bird Conservation Region (BCR 17), all of the Shortgrass Prairie Bird Conservation Region (BCR 18), and portions of eight other BCRs: Great Basin (9), Northern Rockies (10), Prairie Potholes (11), Sierra Nevada (15), Southern Rockies/Colorado Plateau (16), Central Mixed Grass Prairie (19), Sonoran and Mohave Deserts (33), and Sierra Madre Occidental (34) (Figure 2).

For a map and complete descriptions of the Bird Conservation Regions, see the NABCI website: <http://nabci-us.org/resources/bird-conservation-regions-map/>.

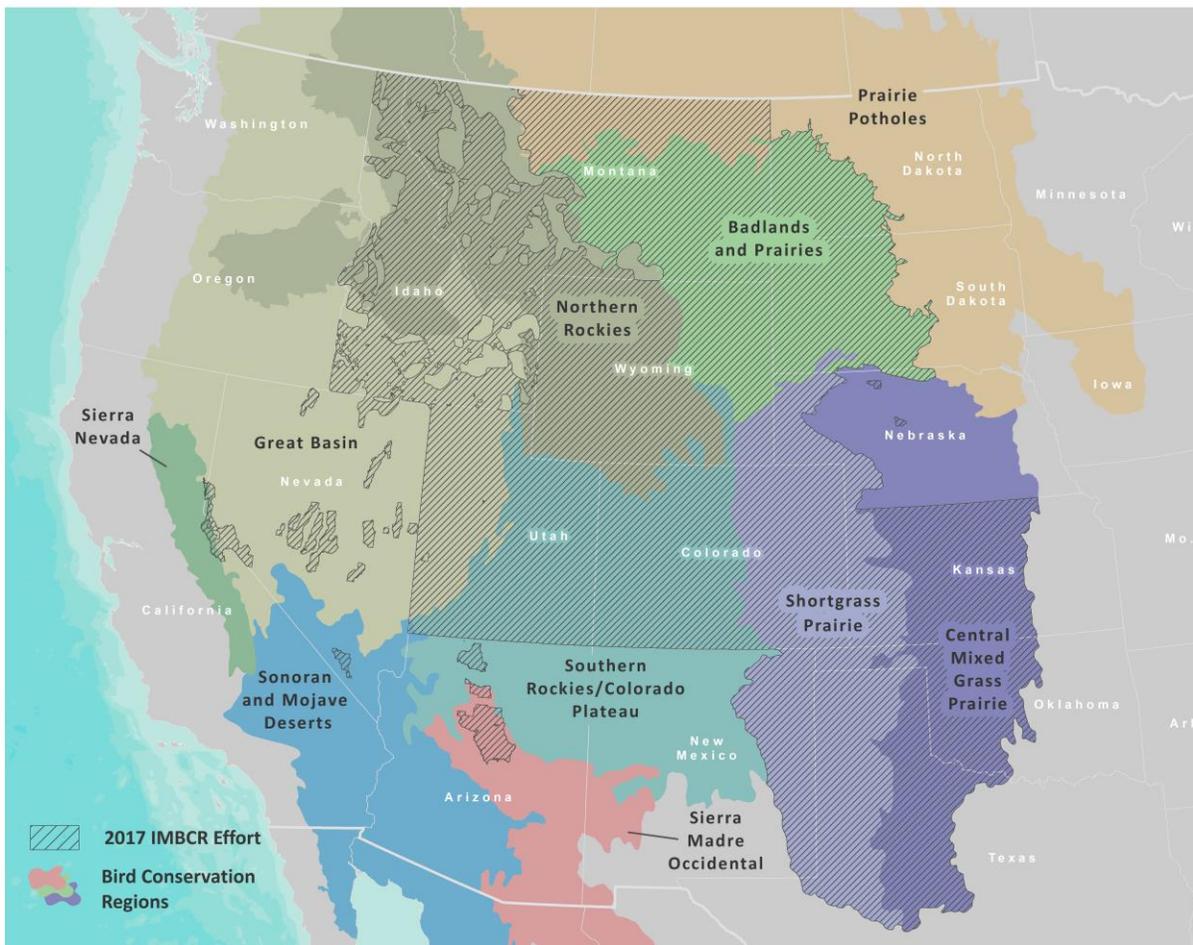


Figure 2. Spatial extent of sampled Bird Conservation Regions using the IMBCR design, 2017.

Sampling Design

Sampling Frame and Stratification

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 sampling frame by the intersection of state and BCR boundaries (e.g., Wyoming BCR 10). We based the strata within the state/BCRs frame on fixed attributes such as land ownership boundaries, elevation zones, major river systems and wilderness/roadless designations.

Sampling Units

The IMBCR design defines sampling units as 1 km² cells, each containing 16 evenly-spaced sample points, 250 meters apart (Figure 3). We define potential sampling units by superimposing a uniform grid of cells over each state in the study area. We then assign each cell to a stratum using ArcGIS version 10.X and higher (Environmental Systems Research Institute, 2017). For all stratifications developed after 2012, we used the United States National Grid (USNG), a nonproprietary alphanumeric referencing system derived from the Military Grid Reference System that was created by the Federal Geographic Data Committee.

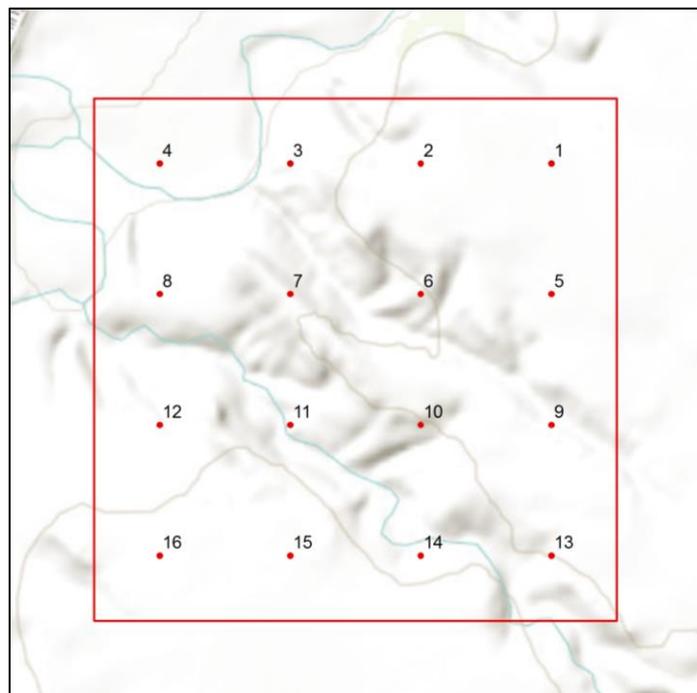


Figure 3. Example 1 km² sampling unit using the IMBCR design.

Sample Selection

Within each stratum, the IMBCR design used generalized random-tessellation stratification (GRTS), a spatially-balanced sampling algorithm, to select sample units (Stevens Jr. & Olsen, 2004). The GRTS design has some 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 Jr. & 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 Jr. & 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 within each stratum are required to estimate the variances of population parameters. However, reliable stratum-level occupancy estimates require larger sample 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, adding more samples to a particular stratum does not bias the overall estimate, it simply increases the precision. After the initial two sampling units were selected, the remaining allocation of sampling effort among strata was based on the priorities of the funding partners.

Sampling Methods

IMBCR surveyors (also referred to as field technician, technician or observer in this report), with excellent aural and visual bird-identification skills, conducted field work in 2017. 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 conducted point counts (Buckland et al., 2001) following protocols established by IMBCR partners (Hanni, White, Birek, Van Lanen, & McLaren, 2012). Observers conducted surveys in the morning, beginning one-half 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 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, observers estimated the distance by measuring to some object near the bird using a laser rangefinder. 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 squirrel (*Sciurus aberti*), American red squirrels (*Tamiasciurus hudsonicus*), and American pika (*Ochotona princeps*). 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 via ocular estimation. 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 Bird Conservancy’s Field Protocol for Spatially Balanced Sampling of Landbird Populations on our Avian Data Center website at <http://rmbo/v3/avian/DataCollection.aspx>. There you will find links to past and current protocols and data sheets.

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, Marsden, & Green, 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 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 in 2015, we streamlined the analysis by fitting models with no series expansions to all species and 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 best 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 (\hat{N}) for each stratum as $\hat{N} = \hat{D} * A$, where \hat{D} was the estimated population density and A was the number of 1 km² 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 km² 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 <125 m from the sample points. Truncating the data 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 Jr., Blakesley, White, Hanni, & Lukacs, 2012).

We expected 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; and

Model 4: Allowed both p and Theta to vary across BCRs.

We ran model 1 for species with <10 point detections in each BCR or <10 point detections in all but one BCR. We ran models 1 through 4 for species with >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 <10 point detections into adjacent BCRs with sufficient numbers of detections. We used model selection and AIC_c to weight models from which estimates of Psi were derived for each species (Burnham & Anderson, 2002). We model averaged the estimates of Psi from models 1 through 4 and calculated unconditional standard errors and 90% CIs (Burnham & 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 Jr. 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 Jr. et al., 2012).

Automated Analysis

We estimated population density using point transect distance sampling multi-scale occupancy models within a modified version of the RIMBCR package (R Core Team, 2017). The RIMBCR package called 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` (R Core Team, 2017; Thomas et al., 2010) to fit the point transect distance sampling model, and program MARK (White & Burnham, 1999) and package `RMark` (Laake, 2013; R Core Team, 2017) 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.

Between October 2014 and April 2015, we rewrote the RIMBCR distance sampling code. The updated code retained the “roll-up” code for combining the strata-level estimates from the previous version of RIMBCR. We discovered a delta method error in the RIMBCR “roll-up” code (Powell, 2007). We revised RIMBCR to fix the error, but were unable to troubleshoot the complex structure of the RIMBCR code. We plan to rewrite the RIMBCR occupancy code in a way that allows testing. In the meantime, 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 2012-2014 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 Bird Conservancy repository (Atlassian Stash, version 3.6.1).

Results

In 2017, field technicians completed 1,797 of 1,807 (99.4%) planned surveys throughout all or portions of BCRs 9, 10, 11, 15, 16, 17, 18, 19, 33 and 34 using the IMBCR design (Table 1, Figure 2). Reasons surveys were not completed are summarized in Table 2. 12 additional surveys were completed in Arizona, Colorado, and Idaho, bringing the total to 1,809 IMBCR surveys completed in 2017. Technicians conducted 20,732 point counts within the 1,809 surveyed sampling units between April 24 and July 22, 2017. They detected 260,815 individual birds representing 342 species.

Please note that not every stratum or superstratum is summarized in this report. We include details of specific strata or superstrata for which our partners are most interested. Results from all strata and all biologically meaningful superstrata 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, as well as 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 superstratum 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 58th supplement to the American Ornithologists' Union Check-list of North and Middle American Birds (Chesser et al., 2017).

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Table 1. Planned and completed surveys, by stratum, 2017. BCR = Bird Conservancy of the Rockies; DoD = Department of Defense; GBBO = Great Basin Bird Observatory; IBO = Intermountain Bird Observatory; UDWR = Utah Division of Wildlife Resources; WYNDD = Wyoming Natural Diversity Database.

State	BCR	Stratum	Stratum Description	Collected By	Area (km ²)	Planned	Completed	Percent Completed
AZ	16/34	AZ-BCR34-CF	Coconino National Forest	BCR	7,426	50	48	96.0%
AZ	16/34	AZ-KAIBAB-KH	Kaibab National Forest - High Elevation	BCR	4,319	15	16	106.7%
AZ	16/34	AZ-KAIBAB-KL	Kaibab National Forest - Low Elevation	BCR	2,182	5	5	100%
CA	9	CA-BCR9-HT	Humboldt-Toiyabe National Forest	GBBO	1,174	4	4	100%
CA	15	CA-BCR15-HT	Humboldt-Toiyabe National Forest	GBBO	1,635	4	4	100%
CO	10	CO-BCR10-AO	All Other Lands	BCR	5,060	6	6	100%
CO	10	CO-BCR10-BL	Bureau of Land Management	BCR	4,288	10	10	100%
CO	16	CO-BCR16-AO	All Other Lands	BCR	51,214	18	18	100%
CO	16	CO-BCR16-BL	Bureau of Land Management	BCR	27,825	27	27	100%
CO	16	CO-BCR16-GM	Grand Mesa; Uncompahgre and Gunnison National Forests	BCR	13,630	9	9	100%
CO	16	CO-BCR16-MA	Manti-La Sal National Forest	BCR	131	2	2	100%
CO	16	CO-BCR16-NC	National Park Service - Northern Colorado Plateau Network	BCR	807	2	2	100%
CO	16	CO-BCR16-PC	Pike and San Isabel National Forests Control	BCR	1,300	6	6	100%
CO	16	CO-BCR16-PO	Pike and San Isabel National Forests All Other	BCR	9,650	7	7	100%
CO	16	CO-BCR16-RA	Rio Grande National Forest - High Elevation	BCR	866	8	13	162.5%
CO	16	CO-BCR16-RC	Arapaho and Roosevelt National Forests Control	BCR	780	5	5	100%
CO	16	CO-BCR16-RM	National Park Service - Rocky Mountain Network	BCR	1,644	2	2	100%
CO	16	CO-BCR16-RO	Routt National Forest	BCR	5,734	15	15	100%
CO	16	CO-BCR16-RP	Rio Grande National Forest - Middle Elevation	BCR	5,410	8	8	100%
CO	16	CO-BCR16-RS	Rio Grande National Forest - Low Elevation	BCR	1,896	8	8	100%
CO	16	CO-BCR16-SA	San Juan National Forest	BCR	8,794	7	7	100%
CO	16	CO-BCR16-SC	National Park Service - Southern Colorado Plateau Network	BCR	214	2	2	100%
CO	16	CO-BCR16-VO	Arapaho and Roosevelt National Forests All Other	BCR	6,152	7	7	100%
CO	16	CO-BCR16-WA	White River National Forest - High Elevation	BCR	2,138	6	10	166.7%
CO	16	CO-BCR16-WF	USFS - Williams Fork Management Unit	BCR	551	7	7	100%
CO	16	CO-BCR16-WP	White River National Forest - Middle Elevation	BCR	5,443	6	6	100%
CO	16	CO-BCR16-WS	White River National Forest - Low Elevation	BCR	2,786	6	6	100%
CO	18	CO-BCR18-AR	Arkansas River and Tributaries	BCR	1,127	7	7	100%
CO	18	CO-BCR18-CO	Comanche National Grassland	BCR	4,836	6	6	100%
CO	18	CO-BCR18-DO	Department of Defense	BCR	1,647	2	2	100%
CO	18	CO-BCR18-IA	Area between I-70 and the Arkansas River	BCR	34,755	10	10	100%
CO	18	CO-BCR18-NP	Area North of the Platte River	BCR	11,457	8	8	100%

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State	BCR	Stratum	Stratum Description	Collected By	Area (km ²)	Planned	Completed	Percent Completed
CO	18	CO-BCR18-PC	Pawnee National Grassland - Private Lands	BCR	2,458	2	2	100%
CO	18	CO-BCR18-PG	Pawnee National Grassland - Public Lands	BCR	810	6	6	100%
CO	18	CO-BCR18-PI	Area between the Platte River and I-70	BCR	30,365	10	10	100%
CO	18	CO-BCR18-PT	Platte River and Tributaries	BCR	970	7	7	100%
CO	18	CO-BCR18-SA	Area South of the Arkansas River	BCR	24,985	9	9	100%
ID	9	ID-BCR9-BO	Boise National Forest	IBO	1,710	2	2	100%
ID	9	ID-BCR9-BR	Bureau of Land Management - Bruneau Field Office	IBO	5,953	10	10	100%
ID	9	ID-BCR9-BU	Bureau of Land Management - Burley Field Office	IBO	3,334	10	10	100%
ID	9	ID-BCR9-CH	Bureau of Land Management - Challis Field Office	IBO	1,862	6	6	100%
ID	9	ID-BCR9-CO	Bureau of Land Management - Cottonwood Field Office	IBO	138	4	4	100%
ID	9	ID-BCR9-CT	Caribou-Targhee National Forest	BCR	1,940	3	3	100%
ID	9	ID-BCR9-CU	Curlew National Grassland	BCR	300	10	12	120.0%
ID	9	ID-BCR9-FO	Bureau of Land Management - Four Rivers Field Office	IBO	1,720	5	5	100%
ID	9	ID-BCR9-JA	Bureau of Land Management - Jarbidge Field Office	IBO	5,386	10	10	100%
ID	9	ID-BCR9-MN	Morley Nelson Birds of Prey National Conservation Area	IBO	1,904	10	10	100%
ID	9	ID-BCR9-OW	Bureau of Land Management - Owyhee Field Office	IBO	5,066	10	10	100%
ID	9	ID-BCR9-PO	Bureau of Land Management - Pocatello Field Office	IBO	1,723	6	6	100%
ID	9	ID-BCR9-SA	Salmon-Challis National Forest	IBO	3,857	4	4	100%
ID	9	ID-BCR9-SH	Bureau of Land Management - Shoshone Field Office	IBO	5,288	8	8	100%
ID	9	ID-BCR9-SM	Bureau of Land Management - Salmon Field Office	IBO	1,340	7	7	100%
ID	9	ID-BCR9-SW	Sawtooth National Forest	IBO	2,175	3	3	100%
ID	9	ID-BCR9-US	Bureau of Land Management - Upper Snake Field Office	IBO	6,473	8	8	100%
ID	9	ID-MOON-L	National Park Service - Craters of the Moon Nat'l Mon. - Lava	IBO	1,790	2	2	100%
ID	9	ID-MOON-NL	National Park Service - Craters of the Moon Nat'l Mon. - No Lava	IBO	1,258	8	8	100%
ID	10	ID-BCR10-BI	Bitterroot National Forest	IBO	1,916	2	2	100%
ID	10	ID-BCR10-BO	Boise National Forest	IBO	8,778	8	8	100%
ID	10	ID-BCR10-CA	Bureau of Land Management - Coeur d'Alene Field Office	IBO	287	10	10	100%
ID	10	ID-BCR10-CH	Bureau of Land Management - Challis Field Office	IBO	1,350	4	4	100%
ID	10	ID-BCR10-CL	Clearwater National Forest - Roded/Managed	IBO	1,946	16	16	100%
ID	10	ID-BCR10-CO	Bureau of Land Management - Cottonwood Field Office	IBO	222	6	6	100%
ID	10	ID-BCR10-CR	Clearwater National Forest - Roadless/Wilderness	IBO	5,036	6	6	100%
ID	10	ID-BCR10-CT	Caribou-Targhee National Forest	BCR	7,752	8	8	100%
ID	10	ID-BCR10-FR	Bureau of Land Management - Four Rivers Field Office	IBO	1,269	5	5	100%
ID	10	ID-BCR10-IP	Idaho Panhandle National Forest - Roded/Managed	IBO	8,660	26	26	100%

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State	BCR	Stratum	Stratum Description	Collected By	Area (km ²)	Planned	Completed	Percent Completed
ID	10	ID-BCR10-IR	Idaho Panhandle National Forest - Roadless/Wilderness	IBO	3,155	7	7	100%
ID	10	ID-BCR10-KO	Kootenai National Forest	IBO	169	2	2	100%
ID	10	ID-BCR10-NP	Nez Perce National Forest - Roaded/Managed	IBO	2,864	16	16	100%
ID	10	ID-BCR10-NR	Nez Perce National Forest - Roadless/Wilderness	IBO	6,370	6	6	100%
ID	10	ID-BCR10-PA	Payette National Forest	IBO	9,857	10	10	100%
ID	10	ID-BCR10-PO	Bureau of Land Management - Pocatello Field Office	IBO	227	2	2	100%
ID	10	ID-BCR10-SA	Salmon-Challis National Forest	IBO	13,563	11	11	100%
ID	10	ID-BCR10-SH	Bureau of Land Management - Shoshone Field Office	IBO	507	2	2	100%
ID	10	ID-BCR10-SM	Bureau of Land Management - Salmon Field Office	IBO	637	3	3	100%
ID	10	ID-BCR10-SW	Sawtooth National Forest	IBO	6,302	5	5	100%
ID	10	ID-BCR10-US	Bureau of Land Management - Upper Snake Field Office	IBO	652	2	2	100%
ID	16	ID-BCR16-CT	Caribou-Targhee National Forest	BCR	831	2	2	100%
ID	16	ID-BCR16-PO	Bureau of Land Management - Pocatello Field Office	IBO	10	2	2	100%
KS	18	KS-BCR18-AO	All Other Lands	BCR	34,794	3	3	100%
KS	18	KS-BCR18-CM	Cimarron National Grassland	BCR	430	5	5	100%
KS	18	KS-BCR18-PL	Playas	BCR	370	3	3	100%
KS	18	KS-BCR18-RV	Rivers	BCR	1,409	3	3	100%
KS	19	KS-BCR19-AO	All Other Lands	BCR	98,649	3	3	100%
KS	19	KS-BCR19-PL	Playas	BCR	176	3	3	100%
KS	19	KS-BCR19-RV	Rivers	BCR	10,523	3	3	100%
MT	10	MT-BCR10-BE	Beaverhead-Deerlodge National Forest - Roaded/Managed	IBO	7,697	10	10	100%
MT	10	MT-BCR10-BI	Bitterroot National Forest - Roaded/Managed	IBO	2,324	9	9	100%
MT	10	MT-BCR10-BM	Bureau of Land Management - Missoula/Butte	IBO	1,356	3	3	100%
MT	10	MT-BCR10-BR	Beaverhead-Deerlodge National Forest - Roadless/Wilderness	IBO	8,236	3	3	100%
MT	10	MT-BCR10-BS	Bureau of Land Management - southwestern Montana	IBO	3,447	3	3	100%
MT	10	MT-BCR10-BW	Bitterroot National Forest - Roadless/Wilderness	IBO	2,763	3	3	100%
MT	10	MT-BCR10-CR	Custer National Forest - Roadless/Wilderness	IBO	1,783	3	3	100%
MT	10	MT-BCR10-CU	Custer National Forest - Roaded/Managed	IBO	779	3	3	100%
MT	10	MT-BCR10-FL	Flathead National Forest - Roaded/Managed	IBO	4,945	10	10	100%
MT	10	MT-BCR10-FR	Flathead National Forest - Roadless/Wilderness	IBO	6,410	3	3	100%
MT	10	MT-BCR10-GA	Gallatin National Forest - Roaded/Managed	IBO	3,479	10	10	100%
MT	10	MT-BCR10-GR	Gallatin National Forest - Roadless/Wilderness	IBO	5,787	3	3	100%
MT	10	MT-BCR10-HE	Helena National Forest - Roaded/Managed	IBO	3,024	10	10	100%
MT	10	MT-BCR10-HR	Helena National Forest - Roadless/Wilderness	IBO	2,248	3	3	100%

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MT	10	MT-BCR10-KO	Kootenai National Forest - Roaded/Managed	IBO	7,239	25	25	100%
MT	10	MT-BCR10-KR	Kootenai National Forest - Roadless/Wilderness	IBO	1,887	7	7	100%
MT	10	MT-BCR10-LC	Lewis and Clark National Forest - Roaded/Managed	IBO	2,778	5	4	80.0%
MT	10	MT-BCR10-LO	Lolo National Forest - Roaded/Managed	IBO	7,742	10	10	100%
MT	10	MT-BCR10-LR	Lewis and Clark National Forest - Roadless/Wilderness	IBO	5,007	3	3	100%
MT	10	MT-BCR10-LW	Lolo National Forest - Roadless/Wilderness	IBO	3,859	3	3	100%
MT	11	MT-BCR11-AO	All Other Lands	IBO	62,631	10	10	100%
MT	11	MT-BCR11-BN	Bureau of Land Management - North Valley	IBO	1,588	10	10	100%
MT	11	MT-BCR11-BO	Bureau of Land Management - Other	IBO	6,826	10	10	100%
MT	11	MT-BCR11-FW	Fish and Wildlife Service - all refuges and WPA lands	IBO	541	2	2	100%
MT	11	MT-BCR11-TR	Rocky Boys; Fort Peck; Fort Belknap and Blackfeet Reservations	IBO	11,829	4	4	100%
MT	17	MT-BCR17-AO	All Other Lands	IBO	102,779	16	16	100%
MT	17	MT-BCR17-BL	Bureau of Land Management	IBO	25,013	10	10	100%
MT	17	MT-BCR17-CU	Custer National Forest	IBO	2,649	5	5	100%
MT	17	MT-BCR17-FW	Fish and Wildlife Service - all refuges	IBO	4,035	2	2	100%
MT	17	MT-BCR17-LC	Lewis and Clark National Forest	IBO	867	3	3	100%
MT	17	MT-BCR17-RI	Rivers - Yellowstone; Tongue; Musselshell; and Missouri	IBO	4,575	4	4	100%
ND	17	ND-BCR17-BM	Bureau of Land Management	BCR	165	7	7	100%
ND	17	ND-BCR17-KR	Knife River Indian Villages National Historic Site	BCR	5	5	5	100%
ND	17	ND-BCR17-MG	Little Missouri National Grassland	BCR	4,133	5	5	100%
ND	17	ND-BCR17-ON	All Other Lands	BCR	45,456	8	8	100%
ND	17	ND-BCR17-RG	Cedar River National Grassland	BCR	20	5	5	100%
ND	17	ND-BCR17-TI	Tribal Lands	BCR	4,780	4	4	100%
ND	17	ND-BCR17-TN	Theodore Roosevelt National Park - North Unit	BCR	100	6	6	100%
ND	17	ND-BCR17-TS	Theodore Roosevelt National Park - South Unit	BCR	193	8	8	100%
NE	17	NE-BCR17-LG	Oglala National Grassland	BCR	350	4	4	100%
NE	17	NE-BCR17-ON	All Other Lands	BCR	4,553	2	2	100%
NE	17	NE-NGPIM-NI	Niobrara National Scenic River	BCR	64	14	14	100%
NE	18	NE-BCR18-AF	Agate Fossil Beds National Monument	BCR	12	9	9	100%
NE	18	NE-BCR18-AO	All Other Lands	BCR	28,452	8	8	100%
NE	18	NE-BCR18-GG	Oglala National Grassland	BCR	31	4	4	100%
NE	18	NE-BCR18-PR	Pineridge Biologically Unique Landscape	BCR	1,885	8	8	100%
NE	18	NE-BCR18-RD	Nebraska National Forest - Pine Ridge	BCR	200	4	4	100%
NE	18	NE-BCR18-SA	Sandsage Prairie Biologically Unique Landscape	BCR	2,894	8	8	100%

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NE	18	NE-BCR18-SB	Scotts Bluff National Monument	BCR	13	7	7	100%
NE	18	NE-BCR18-WH	Wildcat Hills Biologically Unique Landscape	BCR	1,665	8	8	100%
NE	19	NE-BCR19-BE	Nebraska National Forest - Bessey District	BCR	361	4	4	100%
NE	19	NE-BCR19-SG	Samuel R. McKelvie National Forest	BCR	468	4	4	100%
NE/SD	11	MR-NGPIM-FM	Missouri National Recreational River - 59 Mile District	BCR	243	8	7	87.5%
NE/SD	11	MR-NGPIM-TM	Missouri National Recreational River - 39 Mile District	BCR	248	8	8	100%
NM	18	NM-BCR18-AO	All Other Lands	BCR	65,011	18	18	100%
NM	18	NM-BCR18-KW	Kiowa National Grassland	BCR	553	2	2	100%
NM	18	NM-BCR18-PL	Playas	BCR	244	17	17	100%
NM	18	NM-BCR18-RV	Rivers	BCR	2,206	15	15	100%
NV	9	NV-BCR9-HT	Humboldt-Toiyabe National Forest	GBBO	22,324	12	12	100%
NV	15	NV-BCR15-HT	Humboldt-Toiyabe National Forest	GBBO	616	4	4	100%
NV	33	NV-BCR33-HT	Humboldt-Toiyabe National Forest	GBBO	1,313	5	5	100%
OK	18	OK-BCR18-AO	All Other Lands	BCR	10,556	8	8	100%
OK	18	OK-BCR18-PL	Playas	BCR	105	5	5	100%
OK	18	OK-BCR18-RB	Rita Blanca National Grassland	BCR	57	2	2	100%
OK	18	OK-BCR18-RV	Rivers	BCR	533	8	8	100%
OK	19	OK-BCR19-AO	All Other Lands	BCR	68,616	8	8	100%
OK	19	OK-BCR19-PL	Playas	BCR	14	2	2	100%
OK	19	OK-BCR19-RV	Rivers	BCR	6,531	8	8	100%
SD	17	SD-BCR17-BF	Black Hills National Forest - All other Watersheds	BCR	5,009	6	6	100%
SD	17	SD-BCR17-BM	Bureau of Land Management	BCR	831	7	7	100%
SD	17	SD-BCR17-BN	Badlands National Park - North Unit	BCR	399	16	16	100%
SD	17	SD-BCR17-BS	Badlands National Park - South Unit	BCR	568	2	2	100%
SD	17	SD-BCR17-GG	Buffalo Gap National Grassland	BCR	2,346	6	6	100%
SD	17	SD-BCR17-HU	Black Hills National Forest - Hydrologic Code 7 Watersheds	BCR	376	6	6	100%
SD	17	SD-BCR17-JC	Jewel Cave National Monument	BCR	5	5	5	100%
SD	17	SD-BCR17-MR	Mount Rushmore National Monument	BCR	6	6	6	100%
SD	17	SD-BCR17-ON	All Other Lands	BCR	64,642	10	10	100%
SD	17	SD-BCR17-PG	Fort Pierre National Grassland	BCR	482	4	4	100%
SD	17	SD-BCR17-RG	Grand River National Grassland	BCR	613	5	5	100%
SD	17	SD-BCR17-TI	Tribal Lands	BCR	27,561	4	4	100%
SD	17	SD-BCR17-UF	Custer National Forest	BCR	326	5	5	100%
SD	17	SD-BCR17-WC	Wind Cave National Park	BCR	136	14	14	100%

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State	BCR	Stratum	Stratum Description	Collected By	Area (km ²)	Planned	Completed	Percent Completed
SD	18	SD-BCR18-AO	All Other Lands	BCR	2,417	2	2	100%
TX	18	TX-BCR18-AO	All Other Lands	BCR	98,186	16	16	100%
TX	18	TX-BCR18-PL	Playas	BCR	4,507	16	16	100%
TX	18	TX-BCR18-RB	Rita Blanca National Grassland	BCR	305	2	2	100%
TX	18	TX-BCR18-RV	Rivers	BCR	1,200	16	16	100%
TX	19	TX-BCR19-AO	All Other Lands	BCR	84,131	16	16	100%
TX	19	TX-BCR19-PL	Playas	BCR	327	9	9	100%
TX	19	TX-BCR19-RV	Rivers	BCR	4,787	16	16	100%
UT	9	UT-BCR9-AO	All Other Lands	UDWR	34,037	38	38	100%
UT	9	UT-BCR9-CC	Bureau of Land Management - Cedar City Field Office	IBO	8,046	5	5	100%
UT	9	UT-BCR9-CT	Caribou-Targhee National Forest	BCR	54	2	2	100%
UT	9	UT-BCR9-DI	Dixie National Forest	IBO	1,008	2	2	100%
UT	9	UT-BCR9-DO	Department of Defense - Other Lands	DOD	2,704	31	31	100%
UT	9	UT-BCR9-FI	Bureau of Land Management - Fillmore Field Office	BCR	18,326	12	12	100%
UT	9	UT-BCR9-FL	Fishlake National Forest	IBO	590	2	2	100%
UT	9	UT-BCR9-MF	Department of Defense - Mudflats	DOD	4,384	2	1	50.0%
UT	9	UT-BCR9-RI	Bureau of Land Management - Richfield Field Office	IBO	617	3	3	100%
UT	9	UT-BCR9-SG	Bureau of Land Management - Saint George Field Office	IBO	232	3	3	100%
UT	9	UT-BCR9-SL	Bureau of Land Management - Salt Lake Field Office	BCR	12,340	8	8	100%
UT	9	UT-BCR9-SW	Sawtooth National Forest	IBO	364	2	2	100%
UT	9	UT-BCR9-WA	Uinta-Wasatch-Cache National Forest	BCR	1,648	3	3	100%
UT	10	UT-BCR10-AO	All Other Lands	UDWR	1,968	17	17	100%
UT	10	UT-BCR10-AS	Ashley National Forest	BCR	96	3	3	100%
UT	10	UT-BCR10-SL	Bureau of Land Management - Salt Lake Field Office	BCR	642	3	3	100%
UT	10	UT-BCR10-VE	Bureau of Land Management - Vernal Field Office	BCR	268	3	2	66.7%
UT	10	UT-BCR10-WA	Uinta-Wasatch-Cache National Forest	BCR	49	3	3	100%
UT	16	UT-BCR16-AH	Ashley National Forest	BCR	5,166	17	14	82.4%
UT	16	UT-BCR16-AO	All Other Lands	UDWR	45,439	43	43	100%
UT	16	UT-BCR16-CC	Bureau of Land Management - Cedar City Field Office	IBO	450	3	3	100%
UT	16	UT-BCR16-DI	Dixie National Forest	IBO	5,934	8	8	100%
UT	16	UT-BCR16-FI	Bureau of Land Management - Fillmore Field Office	IBO	40	2	2	100%
UT	16	UT-BCR16-FL	Fishlake National Forest	IBO	6,670	8	8	100%
UT	16	UT-BCR16-GS	Bureau of Land Management - Grand Staircase-Escalante Nat'l Monument	IBO	7,564	5	5	100%

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State	BCR	Stratum	Stratum Description	Collected By	Area (km ²)	Planned	Completed	Percent Completed
UT	16	UT-BCR16-KA	Bureau of Land Management - Kanab Field Office	IBO	2,267	5	5	100%
UT	16	UT-BCR16-MA	Manti-La Sal National Forest	IBO	5,280	25	25	100%
UT	16	UT-BCR16-MN	Bureau of Land Management - Monticello Field Office	BCR	7,321	5	5	100%
UT	16	UT-BCR16-MO	Bureau of Land Management - Moab Field Office	BCR	7,725	5	5	100%
UT	16	UT-BCR16-PR	Bureau of Land Management - Price Field Office	IBO	10,216	7	7	100%
UT	16	UT-BCR16-RI	Bureau of Land Management - Richfield Field Office	IBO	8,068	5	5	100%
UT	16	UT-BCR16-SA	Manti-La Sal National Forest - Sanpitch	IBO	307	3	3	100%
UT	16	UT-BCR16-SG	Bureau of Land Management - Saint George Field Office	IBO	1,904	4	4	100%
UT	16	UT-BCR16-SL	Bureau of Land Management - Salt Lake Field Office	IBO	87	2	2	100%
UT	16	UT-BCR16-VE	Bureau of Land Management - Vernal Field Office	BCR	6,612	5	5	100%
UT	16	UT-BCR16-WA	Uinta-Wasatch-Cache National Forest	BCR	9,913	3	3	100%
UT	33	UT-BCR33-AO	All Other Lands	UDWR	65	9	9	100%
UT	33	UT-BCR33-SG	Bureau of Land Management - Saint George Field Office	IBO	388	3	3	100%
WY	9	WY-BCR9-WY	Caribou-Targhee National Forest	BCR	119	2	2	100%
WY	10	WY-BCR10-AO	All Other Lands	BCR	52,161	15	15	100%
WY	10	WY-BCR10-AS	Ashley National Forest	BCR	540	2	2	100%
WY	10	WY-BCR10-BE	Bridger-Teton National Forest - Roaded/Managed	BCR	3,034	17	17	100%
WY	10	WY-BCR10-BH	Bighorn Canyon National Recreation Area	BCR	57	2	2	100%
WY	10	WY-BCR10-BI	Bighorn National Forest	WYNDD	4,712	9	9	100%
WY	10	WY-BCR10-BR	Bridger-Teton National Forest - Roadless/Wilderness	BCR	11,364	3	3	100%
WY	10	WY-BCR10-BU	Bureau of Land Management - Buffalo Field Office	BCR	547	2	2	100%
WY	10	WY-BCR10-CA	Bureau of Land Management - Casper Field Office	BCR	2,509	2	2	100%
WY	10	WY-BCR10-CO	Bureau of Land Management - Cody Field Office	BCR	4,704	2	2	100%
WY	10	WY-BCR10-CT	Caribou-Targhee National Forest	BCR	1,397	3	2	66.7%
WY	10	WY-BCR10-GR	Grand Teton National Park	BCR	856	2	2	100%
WY	10	WY-BCR10-KE	Bureau of Land Management - Kemmerer Field Office	BCR	5,733	2	2	100%
WY	10	WY-BCR10-LA	Bureau of Land Management - Lander Field Office	BCR	9,829	6	6	100%
WY	10	WY-BCR10-MB	Medicine Bow National Forest	WYNDD	773	3	3	100%
WY	10	WY-BCR10-PI	Bureau of Land Management - Pinedale Field Office	BCR	3,687	8	8	100%
WY	10	WY-BCR10-RA	Bureau of Land Management - Rawlins Field Office	BCR	13,954	8	8	100%
WY	10	WY-BCR10-RO	Bureau of Land Management - Rock Springs Field Office	BCR	15,152	8	8	100%
WY	10	WY-BCR10-SE	Shoshone National Forest - Roaded/Managed	BCR	2,101	6	6	100%
WY	10	WY-BCR10-SR	Shoshone National Forest - Roadless/Wilderness	BCR	8,311	6	6	100%
WY	10	WY-BCR10-WA	Wasatch National Forest	BCR	33	3	3	100%

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State	BCR	Stratum	Stratum Description	Collected By	Area (km ²)	Planned	Completed	Percent Completed
WY	10	WY-BCR10-WO	Bureau of Land Management - Worland Field Office	BCR	8,467	6	6	100%
WY	10	WY-BCR10-WR	Wind River Reservation	BCR	7,819	4	4	100%
WY	10	WY-BCR10-YE	Yellowstone National Park	BCR	7,592	4	4	100%
WY	16	WY-BCR16-AO	All Other Lands	BCR	5,438	5	5	100%
WY	16	WY-BCR16-BL	Bureau of Land Management	BCR	647	2	2	100%
WY	16	WY-BCR16-MB	Medicine Bow National Forest	WYNDD	5,329	16	16	100%
WY	16	WY-BCR16-WA	Wasatch National Forest	BCR	180	3	3	100%
WY	17	WY-BCR17-AO	All Other Lands	BCR	52,186	12	12	100%
WY	17	WY-BCR17-BH	Black Hills National Forest	BCR	1,085	6	6	100%
WY	17	WY-BCR17-BU	Bureau of Land Management - Buffalo Field Office	BCR	2,653	2	2	100%
WY	17	WY-BCR17-CA	Bureau of Land Management - Casper Field Office	BCR	2,695	2	2	100%
WY	17	WY-BCR17-NE	Bureau of Land Management - Newcastle Field Office	BCR	1,025	2	2	100%
WY	17	WY-BCR17-TB	Thunder Basin National Grassland	WYNDD	4,520	8	8	100%
WY	17	WY-NGPIM-DT	Devil's Tower NM	BCR	9	9	9	100%
WY	17	WY-NGPIM-FL	Fort Laramie NHS	BCR	6	5	5	100%
WY	18	WY-BCR18-AO	All Other Lands	BCR	12,064	12	12	100%
WY	18	WY-BCR18-BL	Bureau of Land Management	BCR	171	2	2	100%
WY	18	WY-BCR18-DO	Department of Defense	BCR	23	2	2	100%

Table 2. Reasons planned surveys were not completed, 2017.

Stratum	# Not Completed	Reason
AZ-BCR34-CF	2	Active wildfires
MR-NGPIM-FM	1	Crew leader/technician miscommunication
MT-BCR10-LC	1	Miscommunication regarding sample effort
UT-BCR9-MF	1	Miscommunication regarding sample effort
UT-BCR10-VE	1	Crew leader/technician miscommunication
UT-BCR16-AH	3	Inaccessible due to terrain (1); Crew leader/technician miscommunication (2)
WY-BCR10-CT	1	Transect inaccessible due to snow pack

I. Land Ownership

A. US Forest Service

Jump to:

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1. Region 1

a) Region 1 National Forests

Within this sampling design each national forest in Region 1 was 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 USFS-Region 1 National Forests by compiling and jointly analyzing data from 29 strata in three states.

Field technicians completed 216 of 217 planned surveys (99.5%) in 2017. Technicians conducted 2377 point counts within the 216 surveyed grid cells between May 23 and July 13. They detected 165 bird species, including six priority species (Appendix G).

We estimated densities and population sizes for 140 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 76 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout USFS-Region 1 National Forests for 137 species, three 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 USFS-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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 182 point counts within the 13 surveyed grid cells between June 6 and July 8. They detected 69 bird species, none of which are priority species.

We estimated densities and population sizes for 60 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Beaverhead-Deerlodge National Forest for 60 species, none 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 176 point counts within the 14 surveyed grid cells between May 30 and July 7. They detected 75 bird species, including one priority species (Appendix G).

We estimated densities and population sizes for 67 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 28 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Bitterroot National Forest for 66 species, one of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 41 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 195 point counts within the 22 surveyed grid cells between June 15 and July 13. They detected 71 bird species, including three priority species (Appendix G).

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We estimated densities and population sizes for 64 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Clearwater National Forest for 64 species, one 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 172 point counts within the 16 surveyed grid cells between June 9 and July 10. They detected 95 bird species, including seven priority species (Appendix G).

We estimated densities and population sizes for 87 species, six of which are priority species. The data yielded robust density estimates (CV < 50%) for 30 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Custer National Forest for 81 species, six 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 133 point counts within the 13 surveyed grid cells between May 23 and July 10. They detected 78 bird species, including two priority species (Appendix G).

We estimated densities and population sizes for 64 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 29 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Flathead National Forest for 64 species, one of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 38 of these species.

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 154 point counts within the 13 surveyed grid cells between June 12 and July 2. They detected 69 bird species, none of which are priority species (Appendix G).

We estimated densities and population sizes for 60 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Gallatin National Forest for 61 species, none 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 159 point counts within the 13 surveyed grid cells between May 29 and June 28. They detected 84 bird species, including three priority species (Appendix G).

We estimated densities and population sizes for 71 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 26 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Helena National Forest for 69 species, one of which is a 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 308 point counts within the 33 surveyed grid cells between May 25 and July 9. They detected 80 bird species, including six priority species (Appendix G).

We estimated densities and population sizes for 70 species, five of which are priority species. The data yielded robust density estimates (CV < 50%) for 39 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Idaho Panhandle National Forest for 70 species, five 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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

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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.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 372 point counts within the 34 surveyed grid cells between May 27 and July 8. They detected 99 bird species, including eight priority species (Appendix G).

We estimated densities and population sizes for 80 species, six of which are priority species. The data yielded robust density estimates (CV < 50%) for 41 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Kootenai National Forest for 78 species, six 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 ten of 11 planned surveys (90.9%) in 2017. Technicians conducted 114 point counts within the ten surveyed grid cells between June 27 and July 9. They detected 50 bird species, including one priority species (Appendix G).

We estimated densities and population sizes for 40 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Lewis and Clark National Forest for 37 species, none 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 160 point counts within the 13 surveyed grid cells between May 25 and July 3. They detected 92 bird species, including one priority species (Appendix G).

We estimated densities and population sizes for 82 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 26 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Lolo National Forest for 80 species, one of which is a 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 252 point counts within the 22 surveyed grid cells between June 7 and July 10. They detected 82 bird species, including three priority species (Appendix G).

We estimated densities and population sizes for 68 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 30 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Nez Perce National Forest for 69 species, two 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 & Hanni, 2013).

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 174 point counts within the 15 surveyed grid cells between June 26 and July 14. They detected 70 bird species, including three priority species (Appendix G).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout USFS-Region 1 National Grasslands for 58 species, three 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 USFS-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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Region 1 National Grasslands Results

(1) Little Missouri National Grassland

We obtained results for Little Missouri National Grassland by compiling and analyzing data from one stratum.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 57 point counts within the five surveyed grid cells between June 27 and July 9. They detected 49 bird species, including 16 priority species (Appendix G).

We estimated densities and population sizes for 46 species, 16 of which are priority species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Little Missouri National Grassland for 41 species, 13 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 Little Missouri 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[ND-BCR17-MG Results](#)

(2) Cedar River National Grassland

We obtained results for Cedar River National Grassland by compiling and analyzing data from one stratum.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 64 point counts within the five surveyed grid cells between June 26 and June 30. They detected 33 bird species, including 15 priority species (Appendix G).

We estimated densities and population sizes for 27 species, 14 of which are priority species. The data yielded robust density estimates (CV < 50%) for eight of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Cedar River National Grassland for 28 species, 13 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for ten of these species.

To view a map of survey locations, density and occupancy results and species counts within Cedar River 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Cedar River National Grassland Results](#)

(3) Grand River National Grassland

We obtained results for Grand River National Grassland by compiling and analyzing data from one stratum.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 53 point counts within the five surveyed grid cells between June 27 and July 14. They detected 39 bird species, including 17 priority species (Appendix G).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Grand River National Grassland for 26 species, 13 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for eight of these species.

To view a map of survey locations, density and occupancy results and species counts within Grand River 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Grand River National Grassland Results](#)

2. Region 2

a) Region 2 National Forests

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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 Region 2 National Forests by compiling and jointly analyzing data from 25 strata in 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 184 of 175 planned surveys (105.1%) in 2017. Technicians conducted 2240 point counts within the 184 surveyed grid cells between May 22 and July 22. They detected 189 bird species, including 14 priority species (Appendix H).

We estimated densities and population sizes for 155 species, nine of which are priority species. The data yielded robust density estimates (CV < 50%) for 84 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout USFS-Region 2 National Forests for 145 species, seven 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 USFS-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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 145 point counts within the 12 surveyed grid cells between June 18 and July 16. They detected 68 bird species, including six priority species (Appendix H).

We estimated densities and population sizes for 58 species, six of which are priority species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Arapaho and Roosevelt National Forests for 59 species, six of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 27 of these species.

To view a map of survey locations, density and occupancy results and species counts within Arapaho and Roosevelt National Forests across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 121 point counts within the nine surveyed grid cells between June 13 and July 22. They detected 54 bird species, including eight priority species (Appendix H).

We estimated densities and population sizes for 46 species, six of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Bighorn National Forest for 44 species, seven 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 205 point counts within the 18 surveyed grid cells between May 22 and July 15. They detected 89 bird species, including nine priority species (Appendix H).

We estimated densities and population sizes for 66 species, five of which are priority species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Black Hills National Forest for 68 species, five of which are 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Black Hills National Forest Results](#)

(5) 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 planned surveys (100%) in 2017. Technicians conducted 92 point counts within the nine surveyed grid cells between June 23 and July 11. They detected 58 bird species, including four priority species (Appendix H).

We estimated densities and population sizes for 56 species, four of which are priority species. The data yielded robust density estimates (CV < 50%) for 21 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Grand Mesa, Uncompaghre and Gunnison National Forests for 56 species, four 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Grand Mesa, Uncompaghre and Gunnison National Forest Results](#)

(6) 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 planned surveys (100%) in 2017. Technicians conducted 266 point counts within the 19 surveyed grid cells between June 24 and July 14. They detected 95 bird species, including four priority species (Appendix H).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Medicine Bow National Forest for 76 species, four 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Medicine Bow National Forest Results](#)

(7) 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.

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Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 150 point counts within the 12 surveyed grid cells between May 24 and July 11. They detected 90 bird species, including three priority species (Appendix H).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Nebraska National Forests for 66 species, two 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Nebraska National Forest Results

(8) Pike and San Isabel National Forests

We obtained results for Pike and San Isabel National Forests by compiling and jointly analyzing data from two strata.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 157 point counts within the 13 surveyed grid cells between June 13 and July 16. They detected 68 bird species, none of which are priority species.

We estimated densities and population sizes for 57 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Pike and San Isabel National Forests for 58 species, none of which are 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Pike and San Isabel National Forests Results

(9) 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 km² were added to the area of the RMNW strata.

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Field technicians completed 29 of 24 planned surveys (120.8%) in 2017. Five additional surveys were conducted by We to target Brown-capped Rosy Finch detections for a separate project. Technicians conducted 350 point counts within the 29 surveyed grid cells between June 11 and July 14. They detected 84 bird species, including six priority species (Appendix H).

We estimated densities and population sizes for 75 species, six of which are priority species. The data yielded robust density estimates (CV < 50%) for 36 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Rio Grande National Forest for 76 species, six 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rio Grande National Forest Results](#)

(10) 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 planned surveys (100%) in 2017. Technicians conducted 285 point counts within the 22 surveyed grid cells between June 14 and July 14. They detected 77 bird species, including three priority species (Appendix H).

We estimated densities and population sizes for 70 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 39 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Routt National Forest for 68 species, three of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 41 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Routt National Forest Results](#)

(11) San Juan National Forest

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

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 82 point counts within the seven surveyed grid cells between June 8 and July 8. They detected 77 bird species, including five priority species (Appendix H).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout San Juan National Forest for 66 species, three 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[San Juan National Forest Results](#)

(12) 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 all planned surveys (100%) in 2017. Technicians conducted 129 point counts within the 12 surveyed grid cells between June 5 and July 17. They detected 83 bird species, including three priority species (Appendix H).

We estimated densities and population sizes for 68 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 25 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Shoshone National Forest for 66 species, two 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Shoshone National Forest Results](#)

(13) 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 22 of 18 planned surveys (122.2%) in 2017. Four additional surveys were conducted by We to target Brown-capped Rosy Finch detections for a separate project. Technicians conducted 258 point counts within the 22 surveyed grid cells between June 6 and July 14. They detected 76 bird species, including four priority species (Appendix H).

We estimated densities and population sizes for 70 species, four of which are priority species. The data yielded robust density estimates (CV < 50%) for 29 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout White River National Forest for 69 species, four 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[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 Region 2 National Grasslands by compiling and jointly analyzing data from eight strata in five states. This grassland-level stratification distinction is made to allow for the summation of the data for individual Grasslands, BCRs, and States.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 569 point counts within the 43 surveyed grid cells between May 16 and July 2. They detected 124 bird species, including 13 priority species (Appendix H).

We estimated densities and population sizes for 102 species, nine of which are priority species. The data yielded robust density estimates (CV < 50%) for 25 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout USFS-Region 2 National Grasslands for 96 species, ten 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 USFS-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 2017, after you click on the link below select “Year”

from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 planned surveys (100%) in 2017. Technicians conducted 225 point counts within the 18 surveyed grid cells between May 23 and July 2. They detected 77 bird species, including six priority species (Appendix H).

We estimated densities and population sizes for 68 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Nebraska National Grasslands for 64 species, four 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Nebraska National Grasslands Results

(3) Cimarron National Grassland

We obtained results for Cimarron National Grassland by analyzing data from one stratum.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 61 point counts within the five surveyed grid cells between June 8 and June 20. They detected 30 bird species, including 17 priority species (Appendix H).

We estimated densities and population sizes for 24 species, 14 of which are priority species. The data yielded robust density estimates (CV < 50%) for seven of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Cimarron National Grassland for 20 species, 11 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for five of these species.

To view a map of survey locations, density and occupancy results and species counts within Cimarron National Grassland across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Cimarron National Grassland Results](#)

(4) Comanche National Grassland

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

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 72 point counts within the six surveyed grid cells between May 16 and May 26. They detected 53 bird species, including 21 priority species (Appendix H).

We estimated densities and population sizes for 42 species, 18 of which are priority species. The data yielded robust density estimates (CV < 50%) for nine of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Comanche National Grassland for 38 species, 14 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for ten 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Comanche National Grassland Results](#)

(5) 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 planned surveys (100%) in 2017. Technicians conducted 96 point counts within the six surveyed grid cells between May 17 and June 1. They detected 23 bird species, including 12 priority species (Appendix H).

We estimated densities and population sizes for 20 species, 12 of which are priority species. The data yielded robust density estimates (CV < 50%) for six of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Public Lands on Pawnee National Grassland for 17 species, ten of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for six 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Pawnee National Grassland Results

(6) Thunder Basin National Grassland

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

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 115 point counts within the eight surveyed grid cells between May 21 and June 2. They detected 58 bird species, including 21 priority species (Appendix H).

We estimated densities and population sizes for 45 species, 19 of which are priority species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Thunder Basin National Grassland for 43 species, 18 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 12 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Thunder Basin National Grassland Results

3. 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 48 of 50 planned surveys (96%) in 2017. Technicians conducted 665 point counts within the 48 surveyed grid cells between April 29 and June 29. They detected 124 bird species, including five priority species (Appendix I).

We estimated densities and population sizes for 111 species, five of which are priority species. The data yielded robust density estimates (CV < 50%) for 60 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Coconino National Forest for 106 species, four of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 65 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 21 of 20 planned surveys (105%) in 2017. Technicians conducted 262 point counts within the 21 surveyed grid cells between May 4 and June 27. They detected 80 bird species, including three priority species (Appendix I).

We estimated densities and population sizes for 73 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 35 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Kaibab National Forest for 71 species, three 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Kaibab National Forest Results

c) Kiowa National Grassland

We obtained results for Kiowa National Grassland from one stratum.

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 30 point counts within the two surveyed grid cells between June 2 and June 7. They detected 22 bird species, including 13 priority species (Appendix I).

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

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

Kiowa National Grassland Results

d) Rita Blanca National Grassland

We obtained results for Rita Blanca National Grassland by analyzing data from two strata corresponding to the portions of the Rita Blanca National Grassland that lie within Texas and

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Oklahoma. This state-level stratification distinction is made to allow for the summation of the data for individual states.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 47 point counts within the four surveyed grid cells between May 31 and June 16. They detected 25 bird species, including one priority species (Appendix I).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Rita Blanca National Grassland for 19 species, one of which is a 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rita Blanca National Grasslands Results](#)

4. Region 4

In this section, we summarize results for all 12 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 by forest (Caribou-Targhee, Ashley, and Wasatch National Forests), allowing for forest-wide estimates within Caribou-Targhee National Forest. 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 included Boise National Forest, Payette National Forest, Salmon-Challis National Forest, and Sawtooth National Forest. The Utah portion of Manti-La Sal National Forest was stratified in 2015 to provide forest-wide estimates and the BCR 16 portion of Ashley National Forest in Utah was added to the sampling frame in 2016. In 2017, we obtained region-wide estimates by completely stratifying Ashley, Boise, Dixie, Fishlake, Humboldt-Toiyabe, Salmon-Challis, Sawtooth, and Uinta-Wasatch-Cache National Forests.

a) Region 4 National Forests: Total

We obtained results for Region 4 National Forests by compiling and jointly analyzing data from 36 strata in six states.

Field technicians completed 197 of 201 planned surveys (98%) in 2017. Technicians conducted 2201 point counts within the 197 surveyed grid cells between May 2 and July 21. They detected 176 bird species, including nine priority species (Appendix J).

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We estimated densities and population sizes for 144 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 89 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Region 4 National Forests for 137 species, two of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 97 of these species.

To view a map of survey locations, density and occupancy results and species counts within Region 4 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Region 4 National Forests Results](#)

b) Ashley National Forest

We obtained results for Ashley National Forest from three strata in two states. 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. In 2017, the BCR 16 portion of Ashley National Forest in Utah was restratified to include private inholdings and maintain consistency with other forests in the state.

Field technicians completed 19 of 22 planned surveys (86.4%) in 2017. Technicians conducted 216 point counts within the 19 surveyed grid cells between June 10 and July 8. They detected 84 bird species, including five priority species (Appendix J).

We estimated densities and population sizes for 71 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Ashley National Forest for 69 species, two 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Ashley National Forest Results](#)

c) Boise National Forest

We obtained results for Boise National Forest by analyzing data from two strata.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 118 point counts within the ten surveyed grid cells between June 18 and July 10. They detected 75 bird species, including six priority species (Appendix J).

We estimated densities and population sizes for 62 species, four of which are priority species. The data yielded robust density estimates (CV < 50%) for 31 of these species.

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Boise National Forest for 61 species, five 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Boise National Forest Results](#)

d) 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 planned surveys (100%) in 2017. Technicians conducted 254 point counts within the 20 surveyed grid cells between June 14 and July 19. They detected 95 bird species, including three priority species (Appendix J).

We estimated densities and population sizes for 78 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Bridger-Teton National Forest for 74 species, two of which are 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Bridger-Teton National Forest Results](#)

e) Caribou-Targhee National Forest

We obtained results for Caribou-Targhee National Forest by compiling and jointly analyzing data from six strata in three states. 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.

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Field technicians completed 19 of 20 planned surveys (95%) in 2017. Technicians conducted 231 point counts within the 19 surveyed grid cells between May 27 and July 11. They detected 104 bird species, including three priority species (Appendix J).

We estimated densities and population sizes for 86 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 31 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Caribou-Targhee National Forest for 78 species, none 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Caribou-Targhee National Forest Results](#)

f) Dixie National Forest

We obtained results for Dixie National Forest by compiling and jointly analyzing data from two strata.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 105 point counts within the ten surveyed grid cells between May 16 and June 15. They detected 73 bird species, none of which are priority species.

We estimated densities and population sizes for 67 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Dixie National Forest for 66 species, none of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 33 of these species.

To view a map of survey locations, density and occupancy results and species counts within Dixie 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Dixie National Forest Results](#)

g) Fishlake National Forest

We obtained results for Fishlake National Forest by compiling and jointly analyzing data from two strata.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 106 point counts within the ten surveyed grid cells between June 3 and July 5. They detected 64 bird species, none of which are priority species (Appendix J).

We estimated densities and population sizes for 60 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for eight of these species.

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Fishlake National Forest for 60 species, none 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 Fishlake 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Fishlake National Forest Results](#)

h) Humboldt-Toiyabe National Forest

We obtained results for Humboldt-Toiyabe National Forest by compiling and jointly analyzing data from five strata in two states.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 289 point counts within the 29 surveyed grid cells between May 2 and July 16. They detected 103 bird species, none of which are priority species.

We estimated densities and population sizes for 85 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Humboldt-Toiyabe National Forest for 83 species, none 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 Humboldt-Toiyabe 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Humboldt-Toiyabe National Forest Results](#)

i) Manti-La Sal National Forest

We obtained results for Manti-La Sal National Forest by compiling and jointly analyzing data from three 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. In 2015, Sanpitch Recreation Area was added as an additional stratum and incorporated into forest-wide estimates for Manti-La Sal National Forest. This area is part of Uinta National Forest but administered by Manti-La Sal National Forest. The additional Utah strata allow 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 planned surveys (100%) in 2017. Technicians conducted 272 point counts within the 30 surveyed grid cells between May 14 and July 7. They detected 88 bird species, including two priority species (Appendix J).

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We estimated densities and population sizes for 75 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 33 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Manti-La Sal National Forest for 74 species, none 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Manti-La Sal National Forest Results](#)

j) Payette National Forest

We obtained results for Payette National Forest by analyzing data from one stratum.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 103 point counts within the ten surveyed grid cells between June 14 and July 8. They detected 70 bird species, including five priority species (Appendix J).

We estimated densities and population sizes for 56 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Payette National Forest for 54 species, three 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Payette National Forest Results](#)

k) Salmon-Challis National Forest

We obtained results for Salmon-Challis National Forest by analyzing data from two strata.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 190 point counts within the 15 surveyed grid cells between June 11 and July 6. They detected 83 bird species, including eight priority species (Appendix J).

We estimated densities and population sizes for 71 species, seven of which are priority species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Salmon-Challis National Forest for 64 species, five of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 33 of these species.

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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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Salmon Challis National Forest Results](#)

l) Sawtooth National Forest

We obtained results for Sawtooth National Forest by analyzing data from three strata in two states.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 138 point counts within the ten surveyed grid cells between June 19 and July 5. They detected 84 bird species, including two priority species (Appendix J).

We estimated densities and population sizes for 78 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 24 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Sawtooth National Forest for 75 species, one of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 33 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Sawtooth National Forest Results](#)

m) Uinta-Wasatch-Cache National Forest

We obtained results for Wasatch National Forest from five strata in two states. 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 planned surveys (100%) in 2017. Technicians conducted 179 point counts within the 15 surveyed grid cells between June 1 and July 21. They detected 82 bird species, including one priority species (Appendix J).

We estimated densities and population sizes for 72 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Uinta-Wasatch-Cache National Forest for 67 species, none 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 Uinta-Wasatch-Cache 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Uinta-Wasatch-Cache National Forest](#)

B. Bureau of Land Management

Jump to:

[BLM in Colorado](#)

[BLM in Idaho](#)

[BLM in Montana](#)

[BLM in Utah](#)

[BLM in Wyoming](#)

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 37 planned surveys (100%) in 2017. Technicians conducted 482 point counts within the 37 surveyed grid cells between May 15 and June 29. They detected 113 bird species, including six priority species (Appendix F).

We estimated densities and population sizes for 99 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 41 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Colorado for 95 species, two of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 54 of these species.

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 ten planned surveys (100%) in 2017. Technicians conducted 127 point counts within the ten surveyed grid cells between May 16 and June 3. They detected 58 bird species, including 13 priority species (Appendix F).

We estimated densities and population sizes for 43 species, nine of which are priority species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Colorado BCR 10 for 42 species, eight 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 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

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results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 27 planned surveys (100%) in 2017. Technicians conducted 355 point counts within the 27 surveyed grid cells between May 15 and June 29. They detected 103 bird species, including 13 priority species (Appendix F).

We estimated densities and population sizes for 93 species, ten of which are priority species. The data yielded robust density estimates (CV < 50%) for 37 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Colorado BCR 16 for 89 species, ten 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Colorado BCR 16 Results](#)

2. BLM in Idaho

a) BLM in Idaho: Total

We obtained results for BLM in Idaho by compiling and jointly analyzing data from 21 strata.

Field technicians completed all 130 planned surveys (100%) in 2017. Technicians conducted 1633 point counts within the 130 surveyed grid cells between May 27 and July 11. They detected 163 bird species, including 19 priority species (Appendix F).

We estimated densities and population sizes for 138 species, 18 of which are priority species. The data yielded robust density estimates (CV < 50%) for 64 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Idaho for 131 species, 16 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 BLM in Idaho across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Idaho Results](#)

b) BLM in Idaho BCR 9

We obtained results for BLM in Idaho BCR 9 by compiling and jointly analyzing data from 11 strata.

Field technicians completed all 84 planned surveys (100%) in 2017. Technicians conducted 1101 point counts within the 84 surveyed grid cells between May 27 and June 29. They detected 140 bird species, including 18 priority species (Appendix F).

We estimated densities and population sizes for 120 species, 17 of which are priority species. The data yielded robust density estimates (CV < 50%) for 40 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Idaho BCR 9 for 114 species, 16 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 50 of these species.

To view a map of survey locations, density and occupancy results and species counts within BLM in Idaho BCR 9 across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Idaho BCR 9 Results](#)

c) BLM in Idaho BCR 10

We obtained results for BLM in Idaho BCR 10 by compiling and jointly analyzing data from eight strata .

Field technicians completed all 34 planned surveys (100%) in 2017. Technicians conducted 368 point counts within the 34 surveyed grid cells between May 29 and July 11. They detected 123 bird species, including 13 priority species (Appendix F).

We estimated densities and population sizes for 103 species, 11 of which are priority species. The data yielded robust density estimates (CV < 50%) for 43 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) BLM in Idaho BCR 10 for 92 species, nine 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Idaho BCR 10 Results](#)

d) Challis Field Office

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

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Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 146 point counts within the ten surveyed grid cells between May 27 and June 25. They detected 66 bird species, including six priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Challis Field Office for 51 species, six 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 ID-BLM - Challis 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 2017, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2017, hit "Add Filter", then "Run Query".

[Challis Field Office Results](#)

e) Cottonwood Field Office

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

Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 85 point counts within the ten surveyed grid cells between June 14 and July 11. They detected 62 bird species, including two priority species (Appendix F).

We estimated densities and population sizes for 55 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Cottonwood Field Office for 53 species, one of which are 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 the Cottonwood 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 2017, after you click on the link below select "Year" from the Filter drop down box on the top left of the screen. Hit the "Add" button, select 2017, hit "Add Filter", then "Run Query".

[Cottonwood Field Office Results](#)

f) Four Rivers Field Office

We obtained results for the Four Rivers Field Office by compiling and jointly analyzing data from three strata.

Field technicians completed all 20 planned surveys (100%) in 2017. Technicians conducted 268 point counts within the 20 surveyed grid cells between May 30 and June 18. They detected 72 bird species, including ten priority species (Appendix F).

We estimated densities and population sizes for 58 species, six of which are priority species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Four Rivers Field Office for 50 species, six 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 the Four Rivers 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Four Rivers Field Office Results](#)

g) Pocatello Field Office

We obtained results for the Pocatello Field Office by compiling and jointly analyzing data from three strata.

Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 110 point counts within the ten surveyed grid cells between May 27 and June 30. They detected 72 bird species, including eight priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Pocatello Field Office for 66 species, six 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 the Pocatello 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Pocatello Field Office Results](#)

h) Salmon Field Office

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

Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 143 point counts within the ten surveyed grid cells between May 29 and June 29. They detected 74 bird species, including six priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Salmon Field Office for 54 species, five of which are 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 the Salmon 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Salmon Field Office Results](#)

i) Upper Snake Field Office

We obtained results for the Upper Snake Field Office by compiling and jointly analyzing data from two strata.

Field technicians completed all planned surveys (100%) in 2017. Technicians conducted 147 point counts within the ten surveyed grid cells between May 31 and June 16. They detected 39 bird species, including ten priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Upper Snake Field Office for 32 species, eight of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 13 of these species.

To view a map of survey locations, density and occupancy results and species counts within the Upper Snake 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Upper Snake Field Office Results](#)

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 36 planned surveys (100%) in 2017. Technicians conducted 475 point counts within the 36 surveyed grid cells between May 27 and July 6. They detected 117 bird species, including 11 priority species (Appendix F).

We estimated densities and population sizes for 100 species, nine of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Montana for 93 species, ten 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 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 2017, after you click on the link below select “Year” from the Filter drop down box

on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 six planned surveys (100%) in 2017. Technicians conducted 89 point counts within the six surveyed grid cells between June 4 and July 6. They detected 67 bird species, including four priority species (Appendix F).

We estimated densities and population sizes for 57 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 16 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Montana BCR 10 for 52 species, two 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Montana BCR 10 Results](#)

c) BLM in Montana BCR 11

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

Field technicians completed all 20 planned surveys (100%) in 2017. Technicians conducted 255 point counts within the 20 surveyed grid cells between May 27 and July 5. They detected 62 bird species, including ten priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Montana BCR 11 for 44 species, nine 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 ten planned surveys (100%) in 2017. Technicians conducted 131 point counts within the ten surveyed grid cells between May 30 and July 1. They detected 55 bird species, including 22 priority species (Appendix F).

We estimated densities and population sizes for 49 species, 19 of which are priority species. The data yielded robust density estimates (CV < 50%) for nine of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Montana BCR 17 for 46 species, 19 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 12 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 seven planned surveys (100%) in 2017. Technicians conducted 66 point counts within the seven surveyed grid cells between June 24 and July 12. They detected 62 bird species, including 21 priority species (Appendix F).

We estimated densities and population sizes for 56 species, 21 of which are priority species. The data yielded robust density estimates (CV < 50%) for five of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in North Dakota BCR 17 for 47 species, 17 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results and species counts within BLM 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 seven planned surveys (100%) in 2017. Technicians conducted 84 point counts within the seven surveyed grid cells between June 19 and July 5. They detected 75 bird species, including 26 priority species (Appendix F).

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We estimated densities and population sizes for 70 species, 23 of which are priority species. The data yielded robust density estimates (CV < 50%) for ten of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in South Dakota BCR 17 for 58 species, 18 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in South Dakota BCR 17 Results](#)

6. BLM in Utah

a) BLM in Utah: Total

We obtained results for BLM in Utah by compiling and jointly analyzing data from 19 strata.

Field technicians completed 87 of 88 planned surveys (98.9%) in 2017. Technicians conducted 968 point counts within the 87 surveyed grid cells between May 15 and June 23. They detected 122 bird species, including 19 priority species (Appendix F).

We estimated densities and population sizes for 106 species, 17 of which are priority species. The data yielded robust density estimates (CV < 50%) for 40 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Utah for 102 species, 15 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 BLM in Utah across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Utah Results](#)

b) BLM in Utah BCR 9

We obtained results for BLM in Utah BCR 9 by compiling and jointly analyzing data from five strata.

Field technicians completed all 31 planned surveys (100%) in 2017. Technicians conducted 367 point counts within the 31 surveyed grid cells between May 15 and June 7. They detected 84 bird species, including 16 priority species (Appendix F).

We estimated densities and population sizes for 72 species, 14 of which are priority species. The data yielded robust density estimates (CV < 50%) for 15 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Utah BCR 9 for 71 species, 13 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 22 of these species.

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To view a map of survey locations, density and occupancy results and species counts within BLM in Utah BCR 9 across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Utah BCR 9 Results](#)

c) BLM in Utah BCR 10

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

Field technicians completed five of six planned surveys (83.3%) in 2017. Technicians conducted 63 point counts within the five surveyed grid cells between June 15 and June 19. They detected 40 bird species, including six priority species (Appendix F).

We estimated densities and population sizes for 31 species, six of which are priority species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Utah BCR 10 BLM for 33 species, six 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 BLM in Utah 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Utah BCR 10 Results](#)

d) BLM in Utah BCR 16

We obtained results for BLM in Utah BCR 16 by compiling and jointly analyzing data from 11 strata.

Field technicians completed all 48 planned surveys (100%) in 2017. Technicians conducted 509 point counts within the 48 surveyed grid cells between May 16 and June 23. They detected 100 bird species, including 14 priority species (Appendix F).

We estimated densities and population sizes for 90 species, 13 of which are priority species. The data yielded robust density estimates (CV < 50%) for 31 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Utah BCR 16 for 85 species, 11 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 41 of these species.

To view a map of survey locations, density and occupancy results and species counts within BLM in Utah 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 2017, after you click on the link below select “Year” from the Filter drop down box

on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Utah BCR 16 Results](#)

e) Cedar City Field Office

We obtained results for Cedar City Field Office by compiling and jointly analyzing data from two strata.

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 114 point counts within the eight surveyed grid cells between May 22 and May 29. They detected 46 bird species, including eight priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Cedar City Field Office for 40 species, eight of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results and species counts within the Cedar City 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Cedar City Field Office Results](#)

f) Fillmore Field Office

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

Field technicians completed all 14 planned surveys (100%) in 2017. Technicians conducted 167 point counts within the 14 surveyed grid cells between May 15 and June 6. They detected 44 bird species, including 11 priority species (Appendix F).

We estimated densities and population sizes for 38 species, nine of which are priority species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Fillmore Field Office for 38 species, nine 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 the Fillmore 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Fillmore Field Office Results](#)

g) Kanab Field Office

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We obtained results for the Kanab Field Office by compiling and analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2017. Technicians conducted 55 point counts within the five surveyed grid cells between May 22 and June 14. They detected 40 bird species, including five priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Kanab Field Office for 35 species, five of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for ten of these species.

To view a map of survey locations, density and occupancy results and species counts within the Kanab 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Kanab Field Office Results](#)

h) Moab Field Office

We obtained results for the Moab Field Office by compiling and analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2017. Technicians conducted 58 point counts within the five surveyed grid cells between May 18 and June 7. They detected 45 bird species, including four priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Moab Field Office for 33 species, four of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 12 of these species.

To view a map of survey locations, density and occupancy results and species counts within the Moab 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Moab Field Office Results](#)

i) Monticello Field Office

We obtained results for the Monticello Field Office by compiling and analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2017. Technicians conducted 72 point counts within the five surveyed grid cells between May 20 and June 13. They detected 36 bird species, including three priority species (Appendix F).

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We estimated densities and population sizes for 33 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Monticello Field Office for 31 species, three of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results and species counts within the Monticello 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Monticello Field Office Results](#)

j) Price Field Office

We obtained results for the Price Field Office by compiling and analyzing data from one stratum.

Field technicians completed all seven planned surveys (100%) in 2017. Technicians conducted 59 point counts within the seven surveyed grid cells between May 27 and June 23. They detected 45 bird species, including four priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Price Field Office for 41 species, four of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for four of these species.

To view a map of survey locations, density and occupancy results and species counts within the Price 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Price Field Office Results](#)

k) Richfield Field Office

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

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 78 point counts within the eight surveyed grid cells between May 19 and June 17. They detected 39 bird species, including six priority species (Appendix F).

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

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Richfield Field Office for 32 species, four 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 the Richfield 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Richfield Field Office Results](#)

l) Saint George Field Office

We obtained results for the Saint George Field Office by compiling and jointly analyzing data from three strata.

Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 91 point counts within the ten surveyed grid cells between May 15 and May 22. They detected 59 bird species, including seven priority species (Appendix F).

We estimated densities and population sizes for 46 species, seven of which are priority species. The data yielded robust density estimates (CV < 50%) for five of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Saint George Field Office for 47 species, seven 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 the Saint George 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Saint George Field Office Results](#)

m) Salt Lake Field Office

We obtained results for the Salt Lake Field Office by compiling and jointly analyzing data from three strata.

Field technicians completed all 13 planned surveys (100%) in 2017. Technicians conducted 160 point counts within the 13 surveyed grid cells between May 16 and June 19. They detected 70 bird species, including 13 priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Salt Lake Field Office for 50 species, nine of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for seven of these species.

To view a map of survey locations, density and occupancy results and species counts within the Salt Lake 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Salt Lake Field Office Results](#)

n) Vernal Field Office

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

Field technicians completed seven of eight planned surveys (87.5%) in 2017. Technicians conducted 66 point counts within the seven surveyed grid cells between June 5 and June 19. They detected 38 bird species, including nine priority species (Appendix F).

We estimated densities and population sizes for 35 species, nine of which are priority species. The data yielded robust density estimates (CV < 50%) for three of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Vernal Field Office for 31 species, eight of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for seven of these species.

To view a map of survey locations, density and occupancy results and species counts within the Vernal 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Vernal Field Office Results](#)

7. 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 54 planned surveys (100%) in 2017. Technicians conducted 726 point counts within the 54 surveyed grid cells between May 22 and July 1. They detected 114 bird species, including nine priority species (Appendix F).

We estimated densities and population sizes for 93 species, seven of which are priority species. The data yielded robust density estimates (CV < 50%) for 37 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BLM in Wyoming for 86 species, five 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 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 2017, after you click on the link below select “Year” from the Filter drop down box

on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Wyoming Results](#)

b) 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 2017. Technicians conducted 14 point counts within the two surveyed grid cells between June 13 and June 16. They detected 28 bird species, including two priority species (Appendix F).

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

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Wyoming BCR 16 Results](#)

c) 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 2017. Technicians conducted 27 point counts within the two surveyed grid cells between June 1 and June 4. They detected 23 bird species, including ten priority species (Appendix F).

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

To view a map of survey locations, density and occupancy results and species counts within 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. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BLM in Wyoming BCR 18 Results](#)

d) 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 2017. Technicians conducted 58 point counts within the four surveyed grid cells between May 30 and June 30. They detected 52 bird species, including three priority species (Appendix F).

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We estimated densities and population sizes for 40 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 16 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) the Buffalo Field Office for 36 species, two 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Buffalo Field Office Results](#)

e) 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 2017. Technicians conducted 56 point counts within the four surveyed grid cells between May 22 and June 20. They detected 45 bird species, including three priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Casper Field Office for 36 species, three of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for seven 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Casper Field Office Results](#)

f) Cody Field Office

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

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 20 point counts within the two surveyed grid cells between June 6 and June 7. They detected 21 bird species, including five priority species (Appendix F).

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

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Cody Field Office Results](#)

g) Kemmerer Field Office

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

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 28 point counts within the two surveyed grid cells between June 1 and June 19. They detected 21 bird species, including six priority species (Appendix F).

We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Kemmerer Field Office Results](#)

h) Lander Field Office

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

Field technicians completed all six planned surveys (100%) in 2017. Technicians conducted 78 point counts within the six surveyed grid cells between May 26 and June 29. They detected 27 bird species, including six priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Lander Field Office for 23 species, four of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for eight of these species.

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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Lander Field Office Results](#)

i) Newcastle Field Office

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

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 31 point counts within the two surveyed grid cells between May 23 and June 8. They detected 26 bird species, including 12 priority species (Appendix F).

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We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Newcastle Field Office Results](#)

j) Pinedale Field Office

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

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 109 point counts within the eight surveyed grid cells between June 11 and June 29. They detected 55 bird species, including nine priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Pinedale Field Office for 36 species, seven of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for seven 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Pinedale Field Office Results](#)

k) Rawlins Field Office

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

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 117 point counts within the eight surveyed grid cells between May 27 and June 27. They detected 33 bird species, including ten priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Rawlins Field Office for 22 species, seven of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for nine 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 2017, after you click on the link below select “Year” from the Filter drop down box

on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rawlins Field Office Results](#)

l) Rock Springs Field Office

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

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 110 point counts within the eight surveyed grid cells between May 23 and July 1. They detected 48 bird species, including eight priority species (Appendix F).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Rock Springs Field Office for 34 species, six of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for eight 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rock Springs Field Office Results](#)

m) Worland Field Office

We obtained results for the Worland Field Office by analyzing data from one stratum.

Field technicians completed all six planned surveys (100%) in 2017. Technicians conducted 78 point counts within the six surveyed grid cells between May 23 and June 28. They detected 34 bird species, including nine priority species (Appendix F).

We estimated densities and population sizes for 31 species, seven of which are priority species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Worland Field Office for 23 species, six of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for nine of these species.

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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Worland Field Office Results](#)

C. Department of Defense

Jump to:

[DOD Lands in Colorado BCR 18](#)

[All Other DOD Lands in Utah BCR 9](#)

[DOD Lands in Wyoming BCR 18](#)

1. DOD Lands in Colorado BCR 18

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

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 22 point counts within the two surveyed grid cells between May 31 and June 13. They detected 30 bird species, including 12 priority species (Appendix E).

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

To view a map of survey locations and get species counts within DOD Lands in Colorado BCR 18 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[DOD in Colorado BCR 18 Results](#)

2. All Other DOD Lands in Utah BCR 9

We obtained results for UT-BCR9-DO by compiling and analyzing data from one stratum.

Field technicians completed all 31 planned surveys (100%) in 2017. Technicians conducted 427 point counts within the 31 surveyed grid cells between May 16 and June 22. They detected 40 bird species, including four priority species (Appendix E: Priority Species Designations by State Agency).

We estimated densities and population sizes for 35 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout UT-BCR9-DO for 33 species, one of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 13 of these species.

To view a map of survey locations, density and occupancy results and species counts within UT-BCR9-DO across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other DOD Lands in Utah BCR 9 Results](#)

3. DOD Lands in Utah BCR 9 Mudflats

We obtained results for mudflats in the DOD lands of UT BCR 9 from one stratum.

Field technicians completed one of two planned surveys (50%) in 2017. Technicians conducted 16 point counts within the one surveyed grid cell June 5. They detected 3 bird species, none of which is a priority species (Appendix E).

We did not generate density or occupancy results for this stratum nor were these data included in analysis as the minimum two surveys were not completed.

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

To view a map of survey locations and get species counts within Fort Carson across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[DOD Lands in Utah BCR 9 Mudflats Results](#)

4. DOD Lands in Wyoming BCR 18

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

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 21 point counts within the two surveyed grid cells between June 9 and June 10. They detected 29 bird species, including 11 priority species (Appendix E).

We 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 Fort Carson across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[DOD in Wyoming BCR 18 Results](#)

D. National Park Service

Jump to:

- [Greater Yellowstone Network](#)
- [Northern Colorado Plateau Network in Colorado](#)
- [Northern Great Plains Network](#)
- [Rocky Mountain Network in Colorado](#)
- [Southern Colorado Plateau Network in Colorado](#)
- [Craters of the Moon National Monument](#)

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 eight planned surveys (100%) in 2017. Technicians conducted 119 point counts within the eight surveyed grid cells between May 31 and July 10. They detected 87 bird species.

We estimated densities and population sizes for 77 species. The data yielded robust density estimates (CV < 50%) for 17 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Greater Yellowstone Network for 68 species. The data yielded robust occupancy estimates (CV < 50%) for 24 of these species.

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 2017. Technicians conducted 32 point counts within the two surveyed grid cells between June 10 and June 11. They detected 12 bird species.

We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 2017. Technicians conducted 32 point counts within the two surveyed grid cells between June 8 and July 9. They detected 40 bird species.

We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Grand Teton National Park Results](#)

d) Yellowstone National Park

We obtained results for Yellowstone National Park from one stratum.

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

Field technicians completed all four planned surveys (100%) in 2017. Technicians conducted 61 point counts within the four surveyed grid cells between July 6 and July 10. They detected 59 bird species.

We estimated densities and population sizes for 49 species. The data yielded robust density estimates (CV < 50%) for nine of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Yellowstone National Park for 44 species. The data yielded robust occupancy estimates (CV < 50%) for 11 of these species.

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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 2017. Technicians conducted 21 point counts within the two surveyed grid cells between May 18 and June 5. They detected 28 bird species.

We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 2017. Technicians conducted 97 point counts within the nine surveyed grid cells between June 12 and June 18. They detected 39 bird species.

We estimated densities and population sizes for 37 species. The data yielded robust density estimates (CV < 50%) for 17 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Agate Fossil Beds National Monument for 37 species. The data yielded robust occupancy estimates (CV < 50%) for 21 of these species.

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Agate Fossil Beds National Monument Results](#)

b) Badlands National Park - North Unit

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

Field technicians completed all 16 planned surveys (100%) in 2017. Technicians conducted 168 point counts within the 16 surveyed grid cells between May 22 and June 18. They detected 59 bird species.

We estimated densities and population sizes for 52 species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the North Unit of the Badlands National Park for 41 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 2017. Technicians conducted 56 point counts within the five surveyed grid cells between July 1 and July 5. They detected 48 bird species.

We estimated densities and population sizes for 39 species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Jewel Cave National Monument for 39 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 2017, after you click on the link below select “Year” from the Filter drop

down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 2017. Technicians conducted 55 point counts within the five surveyed grid cells between July 8 and July 13. They detected 85 bird species.

We estimated densities and population sizes for 68 species. The data yielded robust density estimates (CV < 50%) for 26 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Knife River Indian Villages National Historic Site for 69 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Knife River Indian Villages National Historic Site Results](#)

e) Missouri National Recreational River

1. We obtained results for Missouri National Recreational River by compiling and jointly analyzing data from two strata.

Field technicians completed 15 of 16 planned surveys (93.8%) in 2017. Technicians conducted 134 point counts within the 15 surveyed grid cells between June 11 and June 27. They detected 100 bird species.

We estimated densities and population sizes for 79 species. The data yielded robust density estimates (CV < 50%) for 39 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Missouri National Recreational River for 78 species. The data yielded robust occupancy estimates (CV < 50%) for 54 of these species.

To view a map of survey locations, density and occupancy results and species counts within Missouri National Recreational 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Missouri National Recreational River Results](#)

(1) Missouri National Recreational River - 59 Mile District

We obtained results for Missouri National Recreational River - 59 Mile District by analyzing data from one stratum.

Field technicians completed seven of eight planned surveys (87.5%) in 2017. Technicians conducted 58 point counts within the seven surveyed grid cells between June 11 and June 16. They detected 81 bird species.

We estimated densities and population sizes for 63 species. The data yielded robust density estimates (CV < 50%) for 24 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Missouri National Recreational River - 59 Mile District for 66 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 Missouri National Recreational River – 59 Mile District across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Missouri National Recreational River – 59 Mile District Results](#)

(2) Missouri National Recreational River - 39 Mile District

We obtained results for Missouri National Recreational River - 39 Mile District by analyzing data from one stratum.

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 76 point counts within the eight surveyed grid cells between June 13 and June 27. They detected 91 bird species.

We estimated densities and population sizes for 72 species. The data yielded robust density estimates (CV < 50%) for 32 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Missouri National Recreational River - 39 Mile District for 71 species. The data yielded robust occupancy estimates (CV < 50%) for 44 of these species.

To view a map of survey locations, density and occupancy results and species counts within Missouri National Recreational River – 39 Mile District across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Missouri National Recreational River – 39 Mile District Results](#)

f) Mount Rushmore National Monument

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

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

Field technicians completed all six planned surveys (100%) in 2017. Technicians conducted 65 point counts within the six surveyed grid cells between July 1 and July 6. They detected 43 bird species.

We estimated densities and population sizes for 38 species. The data yielded robust density estimates (CV < 50%) for 18 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Mount Rushmore National Monument for 37 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Mount Rushmore National Monument Results](#)

g) Niobrara National Scenic River

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

Field technicians completed all 14 planned surveys (100%) in 2017. Technicians conducted 146 point counts within the 14 surveyed grid cells between June 5 and June 19. They detected 91 bird species.

We estimated densities and population sizes for 78 species. The data yielded robust density estimates (CV < 50%) for 47 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Niobrara National Scenic River for 77 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Niobrara National Scenic River Results](#)

h) 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 2017. Technicians conducted 73 point counts within the seven surveyed grid cells between June 5 and July 8. They detected 56 bird species.

We estimated densities and population sizes for 45 species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Scotts Bluff National Monument for 36 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Scotts Bluff National Monument Results](#)

i) 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 14 planned surveys (100%) in 2017. Technicians conducted 155 point counts within the 14 surveyed grid cells between June 28 and July 14. They detected 75 bird species.

We estimated densities and population sizes for 69 species. The data yielded robust density estimates (CV < 50%) for 27 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Theodore Roosevelt National Park for 65 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Theodore Roosevelt National Park Results](#)

j) Wind Cave National Park

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

Field technicians completed all 14 planned surveys (100%) in 2017. Technicians conducted 183 point counts within the 14 surveyed grid cells between June 14 and June 27. They detected 90 bird species.

We estimated densities and population sizes for 77 species. The data yielded robust density estimates (CV < 50%) for 26 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Wind Cave National Park for 73 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Wind Cave National Park Results](#)

4. 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 2017. Technicians conducted 28 point counts within the two surveyed grid cells between July 10 and July 11. They detected 29 bird species.

We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rocky Mountain Network in Colorado 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 2017. Technicians conducted 21 point counts within the two surveyed grid cells between June 7 and June 8. They detected 35 bird species.

We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Southern Colorado Plateau Network in Colorado Results](#)

6. Craters of the Moon National Monument

We obtained results for Craters of the Moon National Monument in the Upper Columbia Basin Network by compiling and jointly analyzing data from two strata.

Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 152 point counts within the ten surveyed grid cells between May 28 and June 7. They detected 39 bird species.

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

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Craters of the Moon National Monument for 25 species. The data yielded robust occupancy estimates (CV < 50%) for 11 of these species.

To view a map of survey locations and get species counts within the Craters of the Moon 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Craters of the Moon National Monument Results](#)

7. Devil’s Towner National Monument

We obtained results for Devil’s Towner National Monument by compiling and analyzing data from one stratum.

Field technicians completed all nine planned surveys (100%) in 2017. Technicians conducted 76 point counts within the nine surveyed grid cells between June 1 and June 6. They detected 63 bird species.

We estimated densities and population sizes for 55 species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Devil’s Towner National Monument for 53 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 Devil’s Towner 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Devil's Tower National Monument Results](#)

8. Fort Laramie National Historic Site

We obtained results for Fort Laramie National Historic Site by compiling and analyzing data from one stratum.

Field technicians completed all five planned surveys (100%) in 2017. Technicians conducted 43 point counts within the five surveyed grid cells between June 4 and June 7. They detected 67 bird species.

We estimated densities and population sizes for 54 species. The data yielded robust density estimates (CV < 50%) for 27 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Fort Laramie National Historic Site for 47 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 Fort Laramie 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Fort Laramie National Historic Site Results](#)

E. Tribal Lands

Jump to:

[Blackfeet, Fort Belknap, Fort Peck and Rocky Boys Tribal Lands in Montana BCR 11](#)

[Tribal Lands in North Dakota BCR 17](#)

[Tribal Lands in South Dakota BCR 17](#)

[Wind River Tribal Lands in Wyoming BCR 10](#)

1. 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 all four planned surveys (100%) in 2017. Technicians conducted 60 point counts within the four surveyed grid cells between June 6 and June 21. They detected 72 bird species, including eight priority species (Appendix E).

We estimated densities and population sizes for 59 species, five of which are priority species. The data yielded robust density estimates (CV < 50%) for eight of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the stratum for 52 species, four of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 12 of these species.

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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Blackfeet, Fort Belknap, Fort Peck and Rocky Boys Tribal Lands in Montana BCR 11 Results](#)

2. Tribal Lands in North Dakota BCR 17

We obtained results for Tribal Lands in North Dakota BCR 17 by compiling and analyzing data from one stratum.

Field technicians completed all four planned surveys (100%) in 2017. Technicians conducted 48 point counts within the four surveyed grid cells between June 30 and July 11. They detected 56 bird species, including 20 priority species (Appendix E).

We estimated densities and population sizes for 46 species, 19 of which are priority species. The data yielded robust density estimates (CV < 50%) for six of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Tribal Lands in North Dakota BCR 17 for 43 species, 18 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 Tribal 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Tribal Lands in North Dakota BCR 17 Results](#)

3. Tribal Lands in South Dakota BCR 17

We obtained results for Tribal Lands in South Dakota BCR 17 by compiling and analyzing data from one stratum.

Field technicians completed all four planned surveys (100%) in 2017. Technicians conducted 35 point counts within the four surveyed grid cells between June 3 and July 7. They detected 45 bird species, including 16 priority species (Appendix E).

We estimated densities and population sizes for 37 species, 16 of which are priority species. The data yielded robust density estimates (CV < 50%) for seven of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Tribal Lands in South Dakota BCR 17 for 34 species, 14 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for six of these species.

To view a map of survey locations, density and occupancy results and species counts within Tribal 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Tribal Lands in South Dakota BCR 17 Results](#)

4. Wind River Tribal Lands in Wyoming BCR 10

We obtained results for Wind River Tribal Lands in Wyoming BCR 10 by analyzing data from one stratum.

Field technicians completed all four planned surveys (100%) in 2017. Technicians conducted 50 point counts within the four surveyed grid cells between June 13 and June 20. They detected 49 bird species, including nine priority species (Appendix E).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Wind River Tribal Lands in Wyoming BCR 10 for 45 species, eight 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Wind River Tribal Lands in Wyoming BCR 10 Results](#)

F. 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 and Wyoming are reported in Section II: States.

Jump to:

[All Other Lands in Montana BCR 11](#)

[All Other Lands in Montana BCR 17](#)

[Rivers in Montana BCR 17](#)

[Rivers in Montana BCR 17](#)

[We obtained results for the Yellowstone, Tongue, Musselshell, and Missouri Rivers in Montana BCR 17 by compiling and analyzing data from one stratum.](#)

Field technicians completed all four planned surveys (100%) in 2017. Technicians conducted 40 point counts within the four surveyed grid cells between May 24 and June 10. They detected 50 bird species, including 17 priority species (Appendix E).

We estimated densities and population sizes for 39 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for six of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi)s throughout these Rivers in Montana BCR 17 for 31 species, 11 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for seven of these species.

To view a map of survey locations, density and occupancy results and species counts within Rivers in Montana BCR 17 across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rivers in Montana BCR 17 Results](#)

[All Other Lands in Nebraska BCR 17](#)

[All Other Lands in Nebraska BCR 17 Results](#)

[All Other Lands in Nebraska BCR 18](#)

[All Other Lands in North Dakota BCR 17](#)

[All Other Lands in South Dakota BCR 17](#)

[All Other Lands in South Dakota BCR 18](#)

1. All Other Lands in Montana BCR 11

We obtained results for All Other Lands in Montana BCR 11 from one stratum.

Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 117 point counts within the ten surveyed grid cells between May 24 and June 24. They detected 88 bird species, including 14 priority species (Appendix E).

We estimated densities and population sizes for 72 species, 11 of which are priority species. The data yielded robust density estimates (CV < 50%) for nine of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Montana BCR 11 for 58 species, eight of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 19 of these species.

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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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Montana BCR 11 Results](#)

2. All Other Lands in Montana BCR 17

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

Field technicians completed all 16 planned surveys (100%) in 2017. Technicians conducted 196 point counts within the 16 surveyed grid cells between May 23 and July 3. They detected 108 bird species, including 28 priority species (Appendix E).

We estimated densities and population sizes for 82 species, 19 of which are priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Montana BCR 17 for 72 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Montana BCR 17 Results](#)

3. Rivers in Montana BCR 17

We obtained results for the Yellowstone, Tongue, Musselshell, and Missouri Rivers in Montana BCR 17 by compiling and analyzing data from one stratum.

Field technicians completed all four planned surveys (100%) in 2017. Technicians conducted 40 point counts within the four surveyed grid cells between May 24 and June 10. They detected 50 bird species, including 17 priority species (Appendix E).

We estimated densities and population sizes for 39 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for six of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi)s throughout these Rivers in Montana BCR 17 for 31 species, 11 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for seven of these species.

To view a map of survey locations, density and occupancy results and species counts within Rivers in Montana BCR 17 across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rivers in Montana BCR 17 Results](#)

4. All Other Lands in Nebraska BCR 17

We obtained results for All Other Lands in Nebraska BCR 17 by compiling and analyzing data from one stratum.

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 30 point counts within the two surveyed grid cells between June 2 and June 5. They detected 43 bird species, including one priority species (Appendix E).

We 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Nebraska BCR 17 Results](#)

5. All Other Lands in Nebraska BCR 18

We obtained results for All Other Lands in Nebraska BCR 18 by compiling and analyzing data from one stratum.

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 70 point counts within the eight surveyed grid cells between June 14 and June 29. They detected 36 bird species, including 15 priority species (Appendix E).

We estimated densities and population sizes for 31 species, 13 of which are priority species. The data yielded robust density estimates (CV < 50%) for five of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Nebraska BCR 18 for 28 species, 12 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for ten of these species.

To view a map of survey locations, density and occupancy results and species counts within All Other Lands in Nebraska 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Nebraska BCR 18 Results](#)

6. 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 eight planned surveys (100%) in 2017. Technicians conducted 80 point counts within the eight surveyed grid cells between June 26 and July 14. They detected 72 bird species, including 23 priority species (Appendix E).

We estimated densities and population sizes for 61 species, 21 of which are priority species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in North Dakota BCR 17 for 58 species, 19 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in North Dakota BCR 17 Results](#)

7. All Other Lands in South Dakota BCR 17

We obtained results for All Other Lands in South Dakota BCR 17 by compiling and analyzing data from one stratum.

Field technicians completed all ten planned surveys (100%) in 2017. Technicians conducted 79 point counts within the ten surveyed grid cells between May 27 and July 6. They detected 63 bird species, including 22 priority species (Appendix E).

We estimated densities and population sizes for 52 species, 20 of which are priority species. The data yielded robust density estimates (CV < 50%) for 13 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in South Dakota BCR 17 for 47 species, 18 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in South Dakota BCR 17 Results](#)

8. All Other Lands in South Dakota BCR 18

We obtained results for All Other Lands in South Dakota BCR 18 by compiling and analyzing data from one stratum.

Field technicians completed both planned surveys (100%) in 2017. Technicians conducted 21 point counts within the two surveyed grid cells between June 4 and July 3. They detected 50 bird species, including zero priority species (Appendix E).

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

To view a map of survey locations, density and occupancy results and species counts within All Other Lands in South Dakota 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 2017, after you click on the link below select “Year” from the Filter drop down

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box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in South Dakota BCR 18 Results](#)

II. Joint Ventures

Playa Lakes Joint Venture

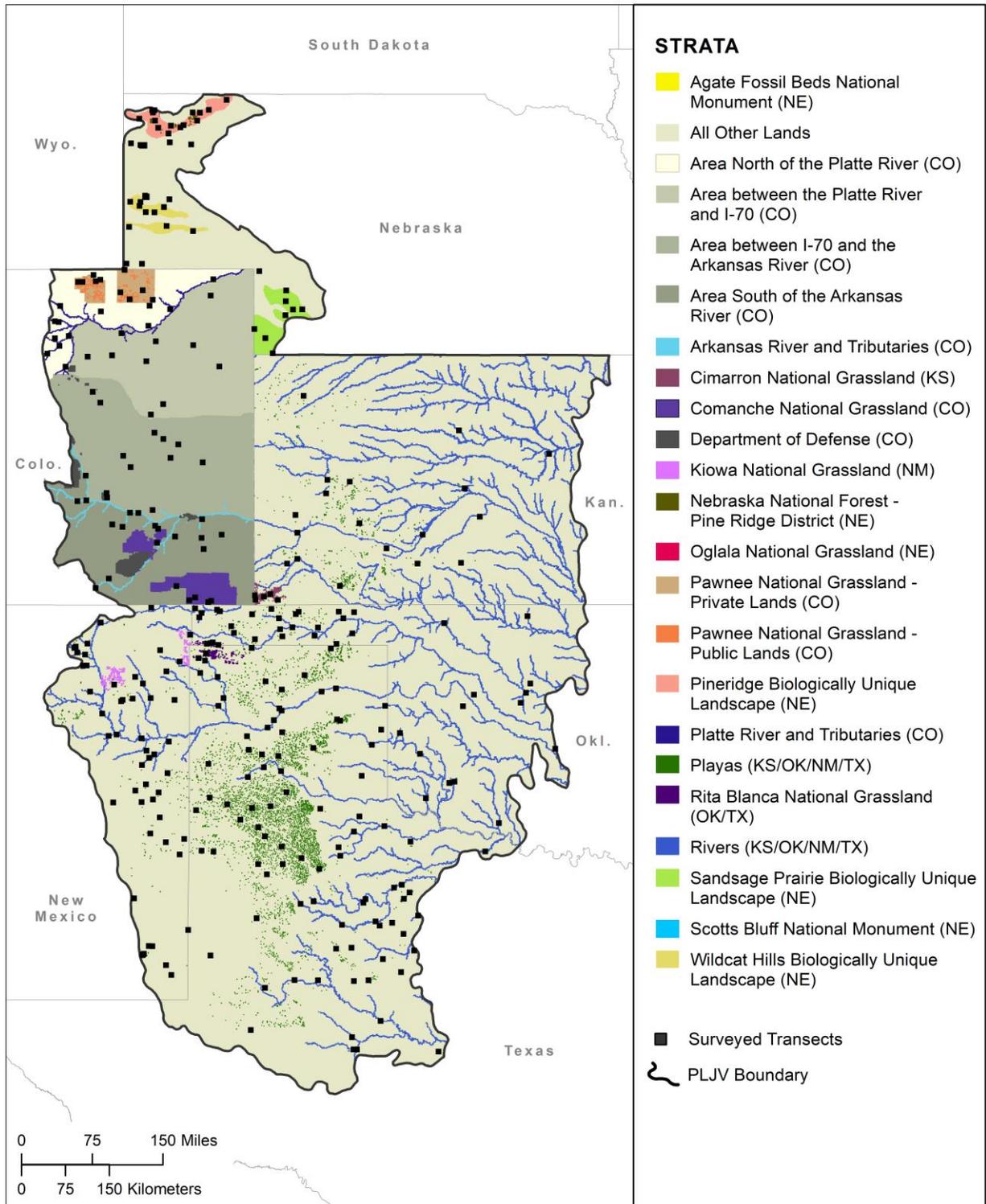


Figure 4. Survey locations in the Playa Lakes Joint Venture area in 2017.

1. Playa Lakes Joint Venture Total

We obtained results for the Playa Lakes Joint Venture area by compiling and jointly analyzing data from 43 Strata in six states (Figure 4).

Field technicians completed all 330 planned surveys (100%) in 2017. Technicians conducted 3169 point counts within the 330 surveyed grid cells between April 24 and July 11. They detected 220 bird species.

We estimated densities and population sizes for 156 species. The data yielded robust density estimates (CV < 50%) for 75 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Playa Lakes Joint Venture area for 151 species. The data yielded robust occupancy estimates (CV < 50%) for 86 of these species.

To view a map of survey locations, density and occupancy results and species counts within the Playa Lakes Joint Venture 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Playa Lakes Joint Venture Results](#)

2. Playas

a) Playas in BCR 18

We obtained results for playas in BCR 18 by compiling and jointly analyzing data from four Strata in four states (Figure 4).

Field technicians completed all 41 planned surveys (100%) in 2017. Technicians conducted 353 point counts within the 41 surveyed grid cells between April 24 and June 19. They detected 87 bird species, including 23 priority species (Appendix E: Priority Species Designations by State Agency).

We estimated densities and population sizes for 63 species, 21 of which are priority species. The data yielded robust density estimates (CV < 50%) for 19 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout playas in BCR 18 for 60 species, 21 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 playas in 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Playas in BCR 18 Results](#)

b) Playas in BCR 19

We obtained results for playas in BCR 19 by compiling and jointly analyzing data from three Strata in three states (Figure 4).

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Field technicians completed all 14 planned surveys (100%) in 2017. Technicians conducted 89 point counts within the 14 surveyed grid cells between April 27 and June 15. They detected 60 bird species, including 17 priority species (Appendix E: Priority Species Designations by State Agency).

We estimated densities and population sizes for 43 species, 14 of which are priority species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout playas in BCR 19 for 43 species, 13 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 playas in BCR 19 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Playas in BCR 19 Results](#)

3. Rivers

a) Rivers in BCR 18

We obtained results for Rivers in BCR 18 by compiling and jointly analyzing data from six Strata in five states (Figure 4).

Field technicians completed all 56 planned surveys (100%) in 2017. Technicians conducted 526 point counts within the 56 surveyed grid cells between April 24 and June 21. They detected 150 bird species, including 27 priority species (Appendix E: Priority Species Designations by State Agency).

We estimated densities and population sizes for 118 species, 25 of which are priority species. The data yielded robust density estimates (CV < 50%) for 60 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout rivers in BCR 18 for 112 species, 24 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 68 of these species.

To view a map of survey locations, density and occupancy results and species counts within rivers in 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rivers in BCR 18 Results](#)

b) Rivers in BCR 19

We obtained results for Rivers in BCR 19 by compiling and jointly analyzing data from three Strata in three states (Figure 4).

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

Field technicians completed all 27 planned surveys (100%) in 2017. Technicians conducted 200 point counts within the 27 surveyed grid cells between April 25 and June 14. They detected 119 bird species, including 29 priority species (Appendix E: Priority Species Designations by State Agency).

We estimated densities and population sizes for 76 species, 23 of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Rivers in BCR 19 for 74 species, 22 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 Rivers in BCR 19 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Rivers in BCR 19 Results](#)

4. All Other Lands

a) All Other Lands in BCR 18

We obtained results for All Other Lands in BCR 18 by compiling and jointly analyzing data from four Strata in four states (Figure 4).

Field technicians completed all 45 planned surveys (100%) in 2017. Technicians conducted 413 point counts within the 45 surveyed grid cells between April 24 and June 18. They detected 86 bird species, including 24 priority species (Appendix E: Priority Species Designations by State Agency).

We estimated densities and population sizes for 66 species, 20 of which are priority species. The data yielded robust density estimates (CV < 50%) for 28 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout PLJV BCR18-All Other Lands for 62 species, 19 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[PLJV All Other Lands in BCR 18 Results](#)

b) Pineridge Biologically Unique Landscape in Nebraska BCR 18

We obtained results for the Pineridge Biologically Unique Landscape by compiling and analyzing data from one stratum (Figure 4).

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 97 point counts within the eight surveyed grid cells between June 16 and June 30. They detected 65 bird species, including 14 priority species (Appendix E: Priority Species Designations by State Agency).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Pineridge Biologically Unique Landscape for 53 species, ten of which are priority 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 the Pineridge Biologically Unique Landscape across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Pineridge Biologically Unique Landscape Results](#)

c) Sandsage Prairie Biologically Unique Landscape in Nebraska BCR 18

We obtained results for the Sandsage Prairie Biologically Unique Landscape by compiling and analyzing data from one stratum (Figure 4).

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 76 point counts within the eight surveyed grid cells between June 12 and June 26. They detected 55 bird species, including 18 priority species (Appendix E: Priority Species Designations by State Agency).

Bird Conservancy estimated densities and population sizes for 46 species, 14 of which are priority species. The data yielded robust density estimates (CV < 50%) for ten of these species.

Bird Conservancy estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Sandsage Prairie Biologically Unique Landscape for 44 species, 13 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results and species counts within the Sandsage Prairie Biologically Unique Landscape across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Sandsage Prairie Biologically Unique Landscape Results](#)

d) Wildcat Hills Biologically Unique Landscape in Nebraska BCR 18

We obtained results for the Wildcat Hills Biologically Unique Landscape by compiling and analyzing data from one stratum (Figure 4).

Field technicians completed all eight planned surveys (100%) in 2017. Technicians conducted 59 point counts within the eight surveyed grid cells between June 15 and June

28. They detected 57 bird species, including 13 priority species (Appendix E: Priority Species Designations by State Agency).

Bird Conservancy estimated densities and population sizes for 54 species, 13 of which are priority species. The data yielded robust density estimates (CV < 50%) for 11 of these species.

Bird Conservancy estimated the proportion of 1 km² grid cells occupied (Psi) throughout the Wildcat Hills Biologically Unique Landscape for 46 species, 11 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results and species counts within the Wildcat Hills Biologically Unique Landscape across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Wildcat Hills Biologically Unique Landscape Results](#)

e) All Other Lands in BCR 19

We obtained results for All Other Lands in BCR 19 by compiling and jointly analyzing data from three Strata in three states (Figure 4).

Field technicians completed all 27 planned surveys (100%) in 2017. Technicians conducted 189 point counts within the 27 surveyed grid cells between April 24 and June 17. They detected 106 bird species, including 25 priority species (Appendix E: Priority Species Designations by State Agency).

We estimated densities and population sizes for 76 species, 21 of which are priority species. The data yielded robust density estimates (CV < 50%) for 24 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout PLJV BCR19-All Other Lands for 75 species, 21 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 All Other Lands in 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[PLJV All Other Lands in BCR 19 Results](#)

III. States

Jump to: [Colorado](#) [Utah](#) [Wyoming](#)

A. Colorado

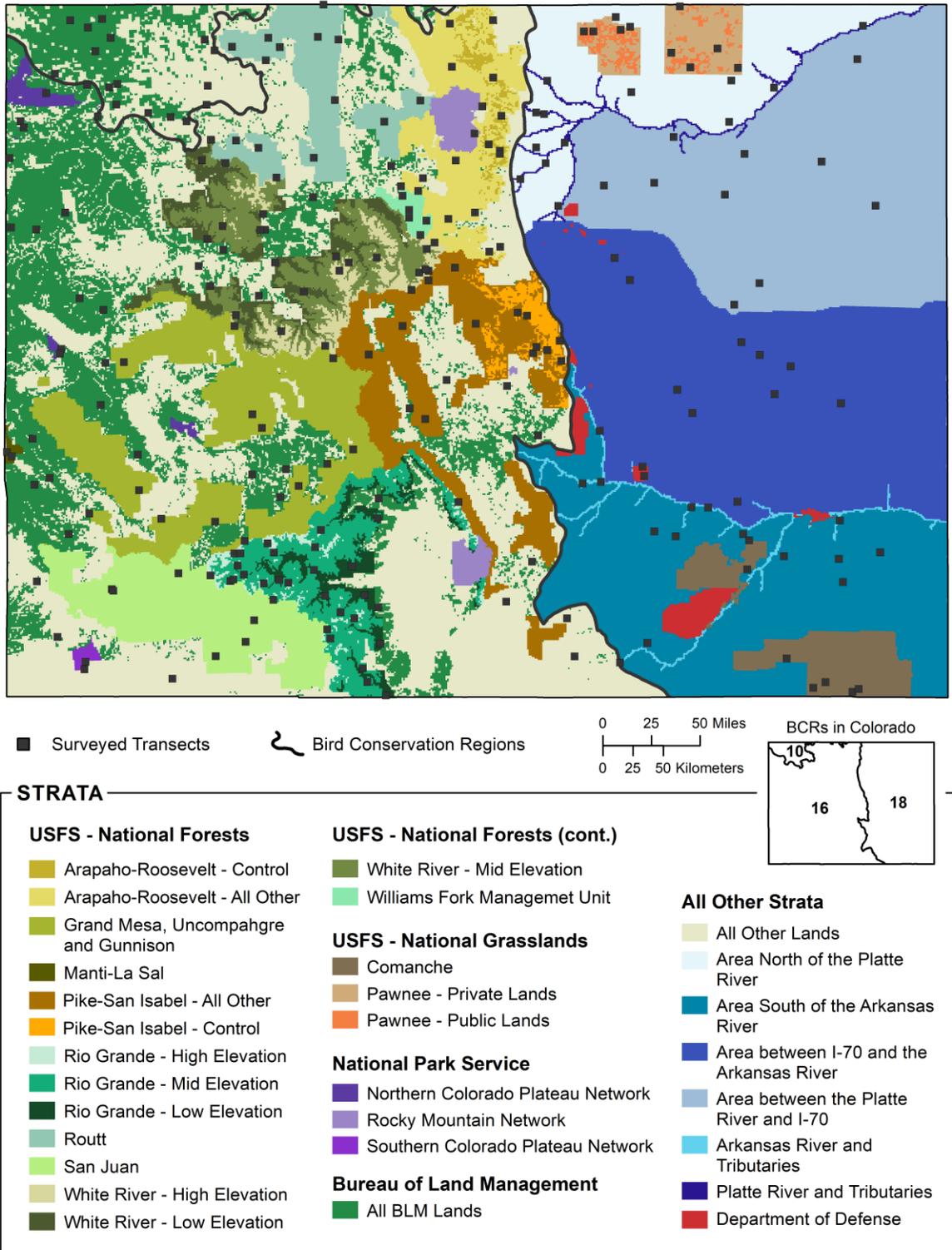


Figure 5. Survey locations in Colorado, 2017.

1. Colorado Statewide

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, DoD and USFS Lands within Colorado, refer to section III: Land Ownership.

Field technicians completed 250 of 241 planned surveys (103.7%) in 2017. Technicians conducted 3062 point counts within the 250 surveyed grid cells between May 15 and July 16. They detected 206 bird species, including 39 priority species (Appendix E).

We estimated densities and population sizes for 174 species, 32 of which are priority species. The data yielded robust density estimates (CV < 50%) for 109 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Colorado for 166 species, 28 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 116 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 all 63 planned surveys (100%) in 2017. Technicians conducted 774 point counts within the 63 surveyed grid cells between May 16 and June 23. They detected 152 bird species, including 26 priority species (Appendix E).

We estimated densities and population sizes for 134 species, 21 of which are priority species. The data yielded robust density estimates (CV < 50%) for 52 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Colorado for 127 species, 20 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 65 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Colorado Results](#)

2. Colorado BCR 10

a) Colorado BCR 10: Total

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

Field technicians completed all 16 planned surveys (100%) in 2017. Technicians conducted 204 point counts within the 16 surveyed grid cells between May 16 and June 11. They detected 91 bird species, including 18 priority species (Appendix E).

We estimated densities and population sizes for 73 species, 12 of which are priority species. The data yielded robust density estimates (CV < 50%) for 20 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Colorado BCR 10 for 69 species, ten 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 six planned surveys (100%) in 2017. Technicians conducted 77 point counts within the six surveyed grid cells between May 17 and June 11. They detected 78 bird species, including ten priority species (Appendix E).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Colorado BCR 10 for 61 species, six 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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).

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Field technicians completed 167 of 158 planned surveys (105.7%) in 2017. Technicians conducted 1995 point counts within the 167 surveyed grid cells between May 15 and July 16. They detected 152 bird species, including 25 priority species (Appendix E).

We estimated densities and population sizes for 133 species, 19 of which are priority species. The data yielded robust density estimates (CV < 50%) for 83 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Colorado BCR 16 for 131 species, 17 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 87 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 all 18 planned surveys (100%) in 2017. Technicians conducted 180 point counts within the 18 surveyed grid cells between May 26 and June 23. They detected 104 bird species, including 11 priority species (Appendix E).

We estimated densities and population sizes for 100 species, nine of which are priority species. The data yielded robust density estimates (CV < 50%) for 28 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in CO BCR 16 for 99 species, nine of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 41 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 67 planned surveys (100%) in 2017. Technicians conducted 863 point counts within the 67 surveyed grid cells between May 16 and June 13. They detected 134 bird species, including 20 priority species (Appendix E).

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We estimated densities and population sizes for 109 species, 16 of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Colorado BCR 18 for 101 species, 14 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 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 14 planned surveys (100%) in 2017. Technicians conducted 156 point counts within the 14 surveyed grid cells between May 16 and June 8. They detected 95 bird species, including eight priority species (Appendix E).

We estimated densities and population sizes for 81 species, seven of which are priority species. The data yielded robust density estimates (CV < 50%) for 30 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Colorado BCR 18 Rivers for 75 species, four 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 39 planned surveys (100%) in 2017. Technicians conducted 517 point counts within the 39 surveyed grid cells between May 16 and June 9. They detected 83 bird species, including 15 priority species (Appendix E).

We estimated densities and population sizes for 66 species, 13 of which are priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Colorado BCR 18 for 63 species, 13 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Colorado BCR 18 Results](#)

B. Utah

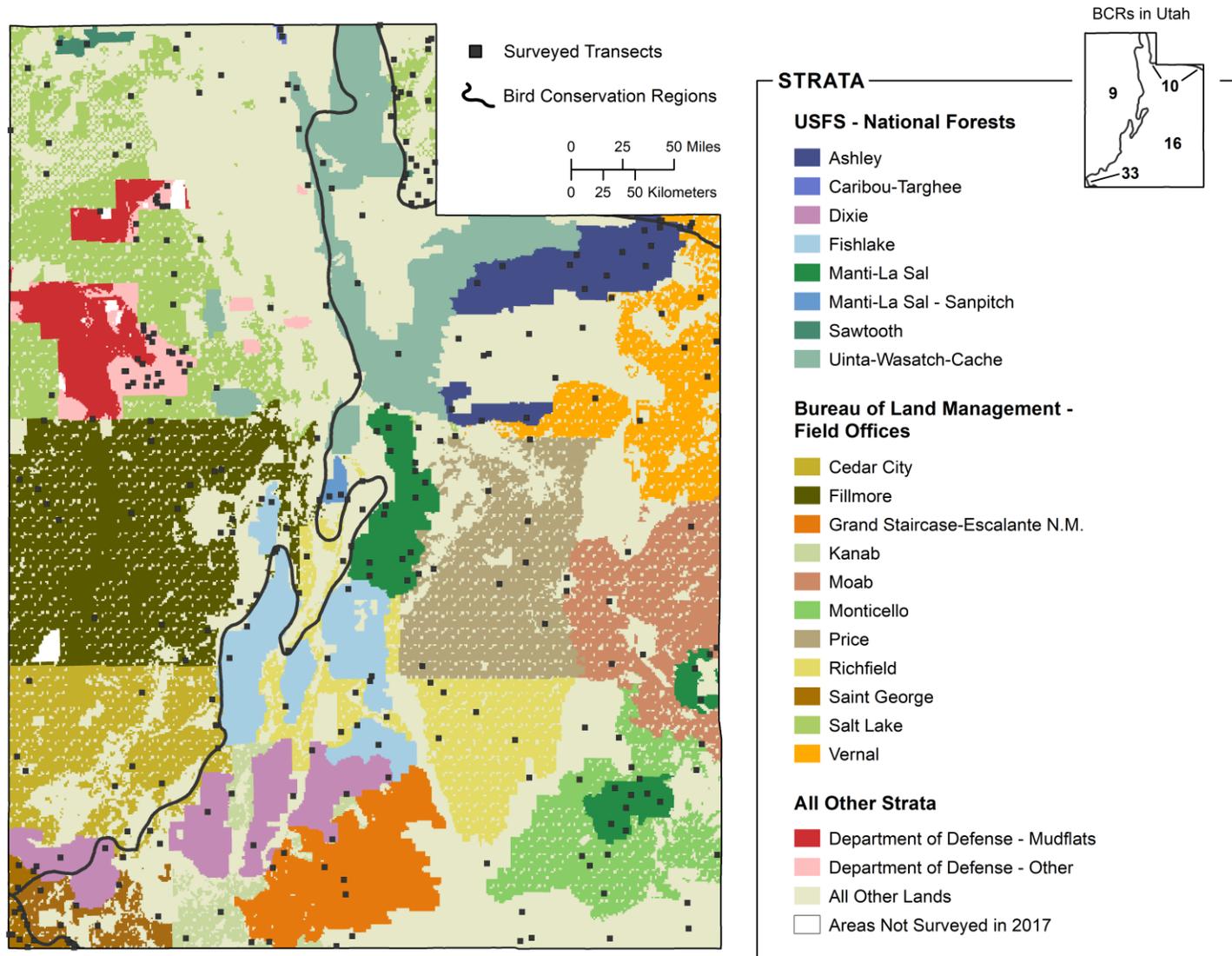


Figure 6. Survey locations in Utah, 2017.

5. Utah Statewide

In 2017 we completed one out of two planned surveys in the Department of Defense mudflats stratum in Utah. To produce estimates at larger scales we require that each stratum within a larger superstratum has a minimum of two completed surveys. Since we did not complete two surveys in the mudflats stratum, the estimates for Utah and Utah BCR 9 do not include the area covered by the mudflats stratum. We provide these estimates since we believe that they are relevant even though this small portion of the state is not included.

a) Utah Statewide: Total

We obtained results for Utah by compiling and jointly analyzing data from 38 strata (Figure 6).

Field technicians completed 304 of 308 planned surveys (98.7%) in 2017. Technicians conducted 3465 point counts within the 304 surveyed grid cells between May 12 and July 8. They detected 179 bird species, including ten priority species (Appendix E).

We estimated densities and population sizes for 154 species, four of which are priority species. The data yielded robust density estimates (CV < 50%) for 90 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Utah for 47 species, one of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 32 of these species.

To view a map of survey locations, density and occupancy results and species counts within Utah across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Utah Statewide Results](#)

b) All Other Lands in Utah

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

Field technicians completed all 107 planned surveys (100%) in 2017. Technicians conducted 1260 point counts within the 107 surveyed grid cells between May 12 and July 6. They detected 153 bird species, including eight priority species (Appendix E).

We estimated densities and population sizes for 133 species, four of which are priority species. The data yielded robust density estimates (CV < 50%) for 52 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Utah for 132 species, three of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 67 of these species.

To view a map of survey locations, density and occupancy results and species counts within All Other Lands in Utah across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Utah Results](#)

6. Utah BCR 9

a) Utah BCR 9: Total

We obtained results for Utah BCR 9 by compiling and jointly analyzing data from 13 strata (Figure 6).

Field technicians completed 112 of 113 planned surveys (99.1%) in 2017. Technicians conducted 1347 point counts within the 112 surveyed grid cells between May 15 and June 23. They detected 130 bird species, including six priority species (Appendix E).

We estimated densities and population sizes for 114 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 45 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Utah BCR 9 for 36 species, one of which is a priority species. The data yielded robust occupancy estimates (CV < 50%) for 20 of these species.

To view a map of survey locations, density and occupancy results and species counts within Utah BCR 9 across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Utah BCR 9 Results](#)

b) All Other Lands in Utah BCR 9

We obtained results for All Other Lands in Utah BCR 9 by analyzing data from one stratum.

Field technicians completed all 38 planned surveys (100%) in 2017. Technicians conducted 433 point counts within the 38 surveyed grid cells between May 16 and June 20. They detected 95 bird species, including four priority species (Appendix E).

We estimated densities and population sizes for 80 species, two of which are priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Utah BCR 9 for 82 species, one 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 All Other Lands in Utah BCR 9 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Utah BCR 9 Results](#)

7. Utah BCR 10

a) Utah BCR 10: Total

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We obtained results for Utah BCR 10 by compiling and jointly analyzing data from five strata (Figure 6).

Field technicians completed 28 of 29 planned surveys (96.5%) in 2017. Technicians conducted 333 point counts within the 28 surveyed grid cells between June 7 and June 26. They detected 87 bird species, including one priority species (Appendix E).

We estimated densities and population sizes for 73 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 23 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Utah BCR 10 for 68 species, none 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 Utah 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Utah BCR 10 Results](#)

b) All Other Lands in Utah BCR 10

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

Field technicians completed all 17 planned surveys (100%) in 2017. Technicians conducted 202 point counts within the 17 surveyed grid cells between June 7 and June 26. They detected 52 bird species, including one priority species (Appendix E).

We estimated densities and population sizes for 45 species, one of which is a priority species. The data yielded robust density estimates (CV < 50%) for 12 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Utah BCR 10 for 37 species, none 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 All Other Lands in Utah 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Utah BCR 10 Results](#)

8. Utah BCR 16

a) Utah BCR 16: Total

We obtained results for Utah BCR 16 by compiling and jointly analyzing data from 18 strata (Figure 6).

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Field technicians completed 152 of 155 planned surveys (98%) in 2017. Technicians conducted 1603 point counts within the 152 surveyed grid cells between May 13 and July 8. They detected 154 bird species, including seven priority species (Appendix E).

We estimated densities and population sizes for 138 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 73 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Utah BCR 16 for 132 species, three 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 Utah 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Utah BCR 16 Results](#)

b) All Other Lands in Utah BCR 16

We obtained results for All Other Lands in Utah BCR 16 by analyzing data from one stratum.

Field technicians completed all 43 planned surveys (100%) in 2017. Technicians conducted 488 point counts within the 43 surveyed grid cells between May 13 and July 6. They detected 131 bird species, including six priority species (Appendix E).

We estimated densities and population sizes for 115 species, three of which are priority species. The data yielded robust density estimates (CV < 50%) for 30 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout UT-BCR16-AO for 109 species, three of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 50 of these species.

To view a map of survey locations, density and occupancy results and species counts within All Other Lands in Utah 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Utah BCR 16 Results](#)

9. Utah BCR 33

a) Utah BCR 33: Total

We obtained results for Utah BCR 33 by compiling and jointly analyzing data from two strata (Figure 6).

Field technicians completed all 12 planned surveys (100%) in 2017. Technicians conducted 166 point counts within the 12 surveyed grid cells between May 12 and June 5. They detected 58 bird species, including zero priority species (Appendix E).

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

We estimated densities and population sizes for 49 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for four of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Utah BCR 33 for 46 species, none of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 12 of these species.

To view a map of survey locations, density and occupancy results and species counts within Utah BCR 33 across all years of the project, follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[Utah BCR 33 Results](#)

b) All Other Lands in Utah BCR 33

We obtained results for All Other Lands in Utah BCR 33 by analyzing data from one stratum.

Field technicians completed all nine planned surveys (100%) in 2017. Technicians conducted 137 point counts within the nine surveyed grid cells between May 12 and June 5. They detected 43 bird species, including zero priority species (Appendix E).

We estimated densities and population sizes for 40 species, none of which are priority species. The data yielded robust density estimates (CV < 50%) for seven of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Utah BCR 33 for 34 species, none of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 13 of these species.

To view a map of survey locations, density and occupancy results and species counts within All Other Lands in Utah BCR 33 across all years of the project follow the web link below and hit the “Run Query” button highlighted in red located near the top of the page. If you want to limit results to 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Utah BCR 33 Results](#)

C. Wyoming

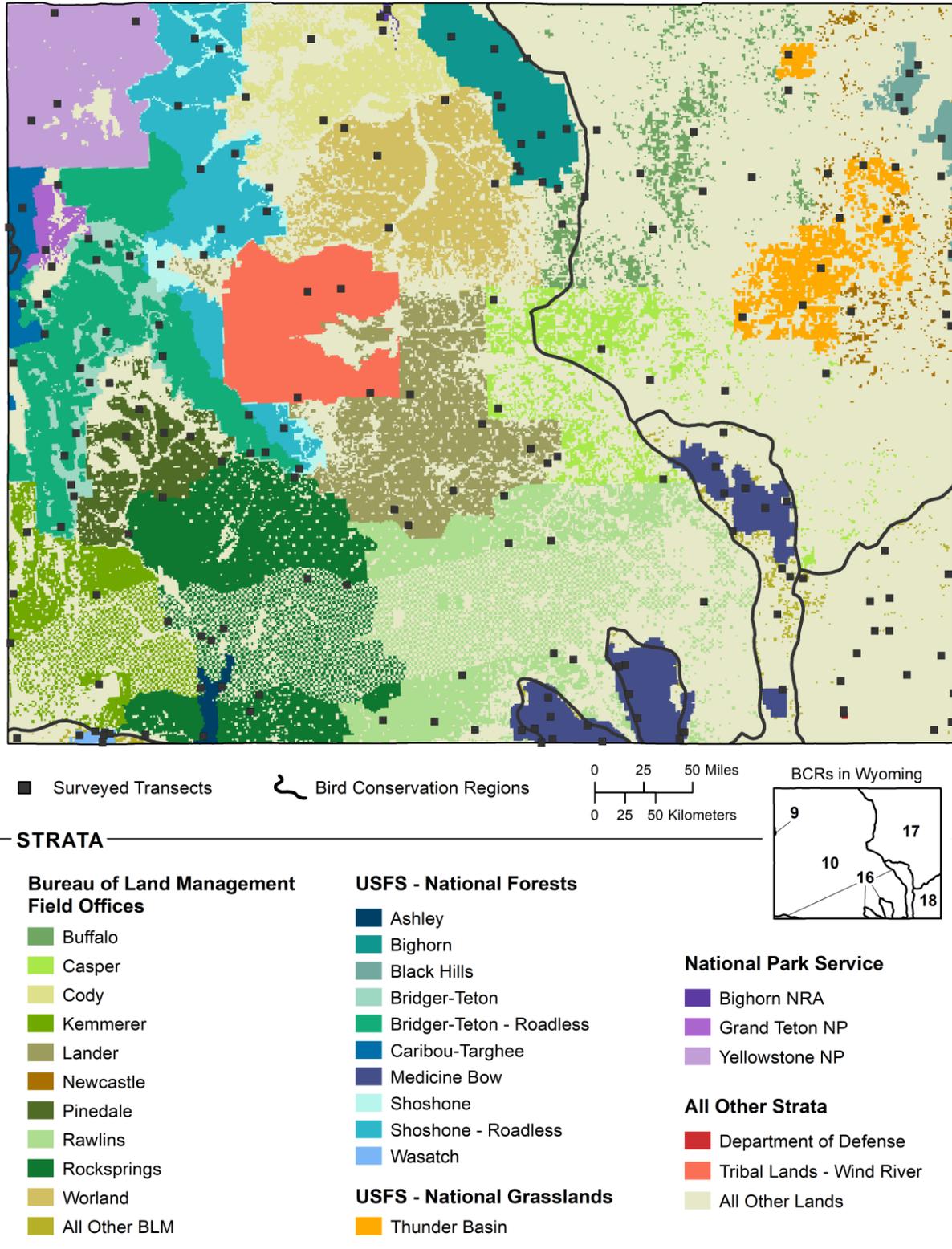


Figure 7. Survey locations in Wyoming, 2017.

1. Wyoming Statewide

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 the following section: I. Land Ownership.

Field technicians completed 198 of 199 planned surveys (99.5%) in 2017. Technicians conducted 2560 point counts within the 198 surveyed grid cells between May 21 and July 22. They detected 196 bird species, including 49 priority species (Appendix E).

We estimated densities and population sizes for 162 species, 39 of which are priority species. The data yielded robust density estimates (CV < 50%) for 80 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout WY for 158 species, 37 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 94 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 44 planned surveys (100%) in 2017. Technicians conducted 519 point counts within the 44 surveyed grid cells between May 22 and July 3. They detected 140 bird species, including 34 priority species (Appendix E).

We estimated densities and population sizes for 118 species, 28 of which are priority species. The data yielded robust density estimates (CV < 50%) for 36 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Wyoming for 111 species, 26 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 44 of these species.

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Wyoming Results](#)

2. Wyoming BCR 10

a) Wyoming BCR 10: Total

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

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

Field technicians completed 122 of 123 planned surveys (99.2%) in 2017. Technicians conducted 1608 point counts within the 122 surveyed grid cells between May 23 and July 22. They detected 175 bird species, including 41 priority species (Appendix E).

We estimated densities and population sizes for 144 species, 30 of which are priority species. The data yielded robust density estimates (CV < 50%) for 64 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Wyoming BCR 10 for 138 species, 27 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 80 of these species.

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 15 planned surveys (100%) in 2017. Technicians conducted 181 point counts within the 15 surveyed grid cells between May 24 and July 1. They detected 117 bird species, including 23 priority species (Appendix E).

We estimated densities and population sizes for 95 species, 16 of which are priority species. The data yielded robust density estimates (CV < 50%) for 17 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 10 for 92 species, 17 of which are 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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).

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Field technicians completed all 26 planned surveys (100%) in 2017. Technicians conducted 324 point counts within the 26 surveyed grid cells between June 5 and July 20. They detected 104 bird species, including 16 priority species (Appendix E).

We estimated densities and population sizes for 82 species, 11 of which are priority species. The data yielded robust density estimates (CV < 50%) for 34 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Wyoming BCR 16 for 83 species, 11 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 2017. Technicians conducted 48 point counts within the five surveyed grid cells between June 5 and July 3. They detected 40 bird species, including eight priority species (Appendix E).

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

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 16 for 21 species, four of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for six 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 32 planned surveys (100%) in 2017. Technicians conducted 402 point counts within the 32 surveyed grid cells between May 21 and June 19. They detected 118 bird species, including 24 priority species (Appendix E).

Integrated Monitoring in Bird Conservation Regions: 2017 Annual Report

We estimated densities and population sizes for 97 species, 20 of which are priority species. The data yielded robust density estimates (CV < 50%) for 22 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) Wyoming BCR 17 for 91 species, 16 of which are 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 12 planned surveys (100%) in 2017. Technicians conducted 138 point counts within the 12 surveyed grid cells between May 22 and June 11. They detected 88 bird species, including 32 priority species (Appendix E).

We estimated densities and population sizes for 70 species, 27 of which are priority species. The data yielded robust density estimates (CV < 50%) for ten of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 17 for 56 species, 21 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 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 16 planned surveys (100%) in 2017. Technicians conducted 200 point counts within the 16 surveyed grid cells between May 23 and June 12. They detected 67 bird species, including 17 priority species (Appendix E).

We estimated densities and population sizes for 59 species, 15 of which are priority species. The data yielded robust density estimates (CV < 50%) for seven of these species.

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We estimated the proportion of 1 km² grid cells occupied (Psi) throughout Wyoming BCR 18 for 45 species, 14 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 14 of these species.

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, 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 12 planned surveys (100%) in 2017. Technicians conducted 152 point counts within the 12 surveyed grid cells between May 23 and June 12. They detected 62 bird species, including 25 priority species (Appendix E).

We estimated densities and population sizes for 48 species, 23 of which are priority species. The data yielded robust density estimates (CV < 50%) for seven of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout All Other Lands in Wyoming BCR 18 for 37 species, 20 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for nine 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[All Other Lands in Wyoming BCR 18 Results](#)

VI. Bird Conservation Regions

Jump to: [Bird Conservation Region 17](#)

[Bird Conservation Region 18](#)

A. Bird Conservation Region 17

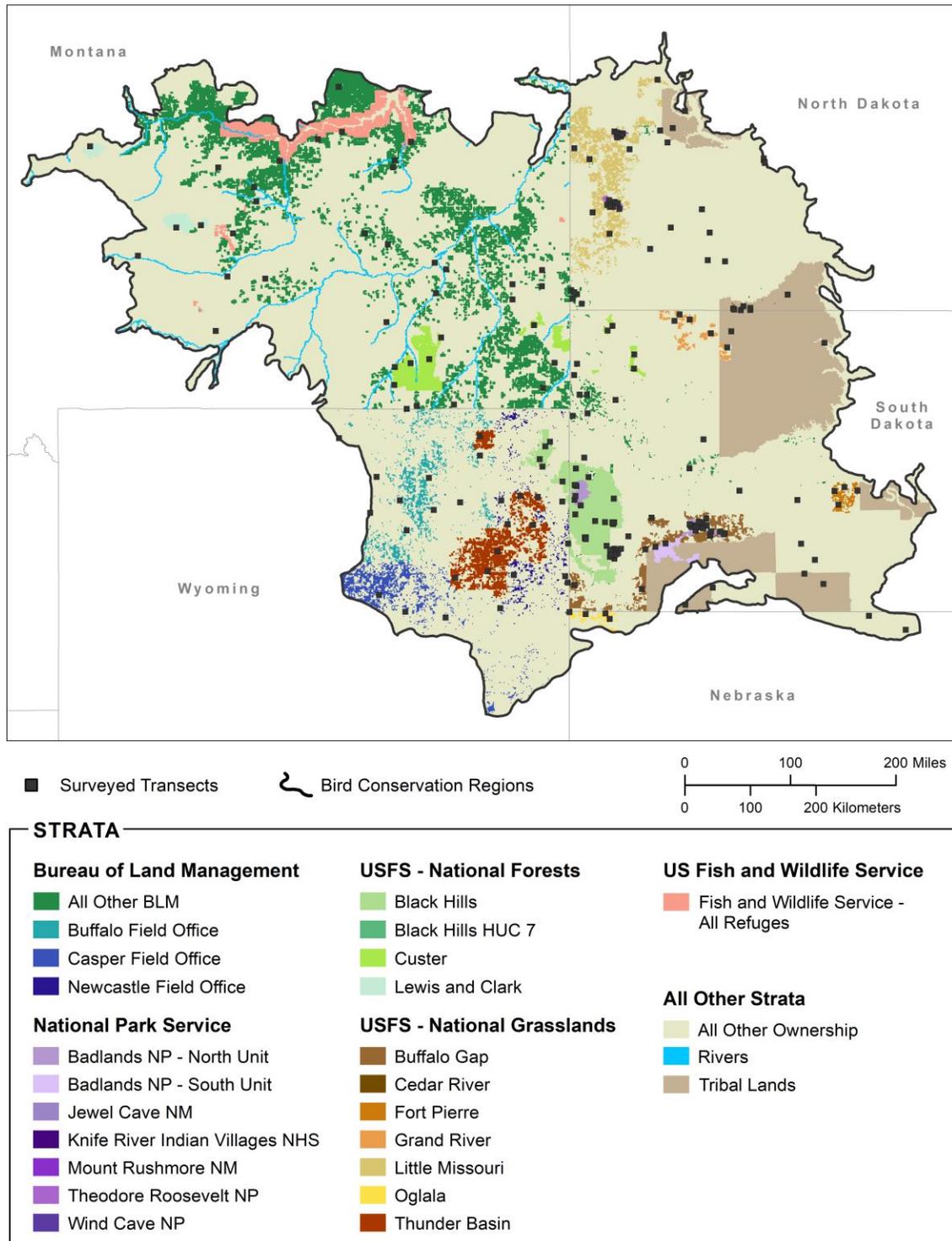


Figure 8. Survey locations in the Badlands and Prairies Bird Conservation Region (BCR 17), 2017.

1. BCR 17: Total

We obtained results for BCR 17 by compiling and jointly analyzing data from 37 Strata in five states (Figure 8).

Field technicians completed all 222 planned surveys (100%) in 2017. Technicians conducted 2553 point counts within the 222 surveyed grid cells between May 21 and July 15. They detected 201 bird species, including 69 priority species (Appendix D).

We estimated densities and population sizes for 167 species, 57 of which are priority species. The data yielded robust density estimates (CV < 50%) for 65 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BCR 17 for 155 species, 52 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BCR 17 Results](#)

B. Bird Conservation Region 18

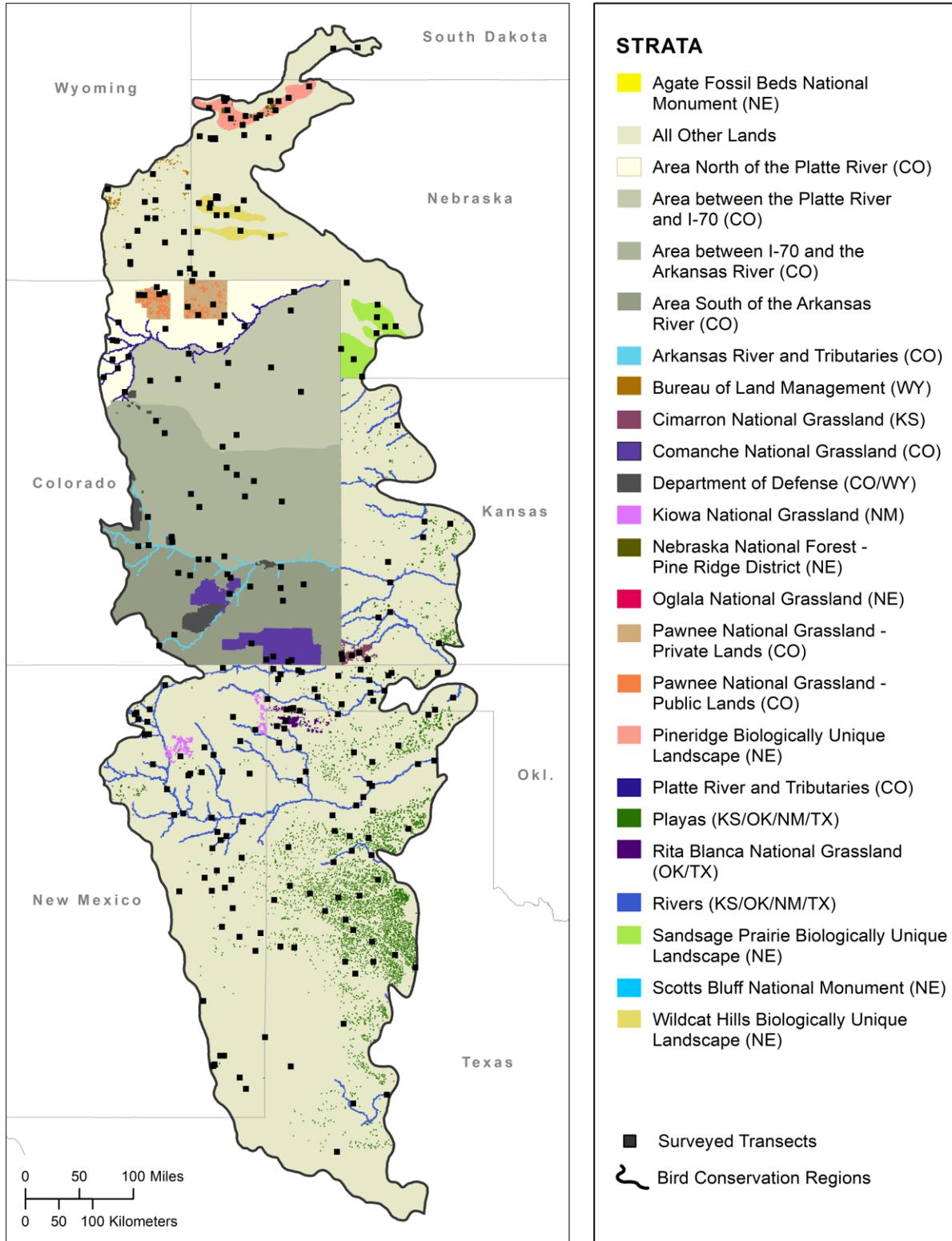


Figure 9. Survey location in the Shortgrass prairie Bird Conservation Region (BCR 18), 2017.

1. BCR 18 Total

We obtained results for BCR 18 by compiling and jointly analyzing data from 37 Strata in seven states (Figure 9).

Field technicians completed all 280 planned surveys (100%) in 2017. Technicians conducted 2912 point counts within the 280 surveyed grid cells between April 24 and July 11. They detected 201 bird species, including 44 priority species (Appendix D).

We estimated densities and population sizes for 153 species, 36 of which are priority species. The data yielded robust density estimates (CV < 50%) for 71 of these species.

We estimated the proportion of 1 km² grid cells occupied (Psi) throughout BCR 18 for 147 species, 33 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 76 of these species.

To view a map of survey locations, density and occupancy results and species counts within 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 2017, after you click on the link below select “Year” from the Filter drop down box on the top left of the screen. Hit the “Add” button, select 2017, hit “Add Filter”, then “Run Query”.

[BCR 18 Results](#)

Discussion

IMBCR as an Adaptive Management Resource and Management Tool

Monitoring is integral to the management and conservation of wildlife populations (Marsh & Trenham, 2008; Sauer & Knutson, 2008). In particular, monitoring is a key part of adaptive management, providing the means for assessing the impacts of management changes and improving system understanding (Lyons et al., 2008; Nichols & Williams, 2006). The IMBCR program accommodates the principles of adaptive monitoring (Lindenmayer & 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 (Pavlacky et al., 2017). The IMBCR program uses the best available science to support natural resource management by providing bird population estimates that appropriately account for spatial variation and incomplete detection (Pollock et al., 2002; Rosenstock et al., 2002; Thompson, 2002). As a relevant management tool, IMBCR population estimates can provide information about species' responses to local management efforts, which can be compared to those at the BCR scale to place the population estimates in a regional context.

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. The IMBCR program allows for different stratification schemes and the re-stratification of local management units to better address partner management objectives or new questions. The flexible hierarchical design also accommodates annual fluctuation of sampling intensity without compromising the regional population estimates. In addition, overlay projects can address specific management questions or hypotheses without affecting the integrity of the overall IMBCR framework.

Applications of IMBCR Data

We collect breeding bird information in all or portions of 15 states and calculate occupancy and density estimates at a variety of spatial scales each year. This information can be used in a variety of ways to inform avian conservation:

1. Compare bird population estimates across space. The IMBCR program was designed to provide accurate information about bird populations from local management units up to BCRs. The hierarchical design of the IMBCR program is critical for understanding bird populations because avian responses to biotic and abiotic features are often scale-dependent (Johnson, 1980; Wiens, Rotenberry, & Van Horne, 1987). The hierarchical framework of nested strata is useful for partitioning bird population estimates according to management units and aggregating bird population estimates at various scales to support both local and large-scale conservation efforts.
 - At the management unit scale, IMBCR population estimates can be used to support local management efforts. Stratum-level estimates can be compared to state and regional estimates to determine whether local populations are above or below estimates for the region. The large-scale context provides biological information for conservation planning and allows an assessment of conservation responsibility.
 - Bird population monitoring is 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.

- 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 while strata with low populations can be prioritized for conservation action. Managers could set a threshold to trigger a management action when populations reach a pre-determined level.
 - Occupancy rates can be multiplied by the land area in a region of interest to estimate the area occupied by a species.
2. Compare bird population estimates across time. Monitoring at regional and BCR scales provides land managers with dependable knowledge about the status and change of bird populations at ecologically relevant scales (NABCI, 2009).
- 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 driven by declines in local abundance. In contrast, if both density and occupancy rates of a species decline over time, then population change was likely the result of reduced distribution on the landscape.
 - Land managers and conservation organizations can use IMBCR population estimates to better understand annual fluctuations and long-term trends in landbird populations (NABCI, 2009). Simulations using 10 years of data from a similar avian monitoring program (J. Blakesley, unpublished data) indicated the IMBCR program would have 80% power to detect an average annual decline of 3% in a population within 25 years with CVs of the estimates $\leq 40\%$. A similar trend could be detected within 30 years with a CV of $\leq 50\%$. 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. More precise density estimates will be required to monitor population trends within 25-30 years for species exhibiting larger annual variation in density and abundance estimates. Currently, we are investigating Bayesian trend estimation, which should have greater power and precision to detect long-term trends and provide probability estimates of population changes.
 - The IMBCR data can also be used to investigate population, metapopulation, and community dynamics over time. Sampling units that are surveyed every year provide information on dynamic processes (e.g., colonization and extinction) that give rise to the patterns of abundance, occupancy, and species richness over time.
3. Model habitat relationships and develop spatially explicit abundance and occupancy maps. Although IMBCR does not use vegetation stratification, the monitoring data can be post-stratified to estimate vegetation-specific bird abundance and occupancy estimates.
- The IMBCR program is a rich data source for modeling habitat relationships, as well as developing spatially explicit abundance and occupancy maps. The IMBCR design provides a legitimate way to extend 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, Fletcher Jr., Evans, & Hutto, 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.

- Because IMBCR strata are based on fixed attributes rather than existing vegetation types, we can connect changes in bird populations to changes in vegetation (or other fluctuating variables) at multiple scales. The hierarchical stratification scheme is well-suited for linking bird population responses to climate and landscape change at biogeographical scales (Opdam & Wascher, 2004). Monitoring data are also useful for evaluating competing hypotheses about how bird populations respond to system dynamics. Understanding regional bird population dynamics will help land managers predict species’ responses to landscape change and large-scale conservation efforts (Jones, 2011; Noon, Bailey, Sisk, & McKelvey, 2012).
4. The IMBCR data provide a source for tool development to help land managers and resource professionals address important conservation issues and make more defensible decisions.
 - The foundation of decision support tools (DST) are species distribution maps used to prioritize landscapes for conservation and bird-habitat relationships used to evaluate the effectiveness of conservation practices. DST that integrate biological, social, and economic objectives are important for cost-effective conservation outcomes in working landscapes. For example, we developed a DST for sagebrush birds, which combined species distribution maps, local habitat relationships, and vegetation potential within a structured framework. The tool evaluated the optimal management action (e.g., prescribed grazing) to benefit sagebrush birds and forage production for livestock.
 5. Auxiliary, or “overlay”, projects are a growing component of the IMBCR program. They are designed to address specific management questions. Overlay 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 project-specific population estimates to be placed in a regional context. In this way, the collaborative efficiency of the IMBCR program is extended to overlay projects by improving the accuracy and precision of population estimates for infrequently detected species and allowing those estimates to be compared to larger, regional populations.

Special Focus: Priority Forest Bird Species of Western Forests

Forest structure and composition across western North America are constantly changing as a result of natural and anthropogenic disturbances, such as fire, beetle kill infestation, and logging. Similar changes are also occurring in Central and South American forested landscapes, and tropical deforestation is partly due to less enforcement of regulations (Rosenberg et al. 2016). Monitoring indicators of forest health enable biologists to understand the consequences of such disturbances and other management actions relative to historical conditions (Tierney, Faber-Langendoen, Mitchell, Shriver, & Gibbs, 2009). In addition, forests support a diversity of birds because of natural variability in structure, such as tree height, that allow partitioning of resources (King & Degraaf, 2000; Tews et al., 2004). Bird populations reflect changing forest conditions and individual bird species or guilds can be biological indicators of

ecosystem health (Canterbury, Martin, Petit, Petit, & Bradford, 2000). For example, some woodpeckers and understory-dwelling species respond positively to forest conditions associated with spruce beetle outbreak while other guilds show mixed responses (Pavlacky Jr. & Sparks, 2016).

Several bird species of forested habitats have exhibited population declines in Western forests and now face moderate to high threats in their breeding and/or non-breeding range (Rosenberg et al., 2016). The following is a brief summary of the status and trends of four forest species of concern in U.S. Forest Service Region 1 and/or Region 2 (Figure 10) using IMBCR data—Cassin’s Finch, Evening Grosbeak, Olive-sided Flycatcher, and Virginia’s Warbler. This summary demonstrates how IMBCR data can be used to determine status and trends of species of conservation concern in specific regions of interest. The data also provide a source for hypothesis generation, and further modeling efforts with biotic and abiotic agents could inform the ecology of these species.

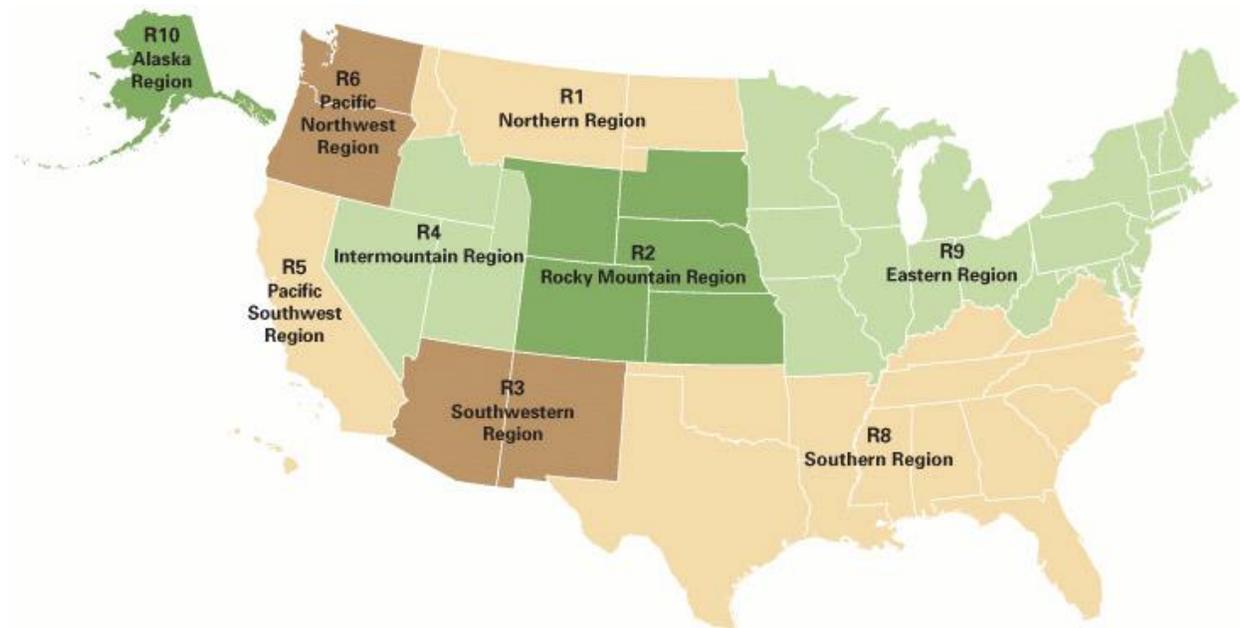


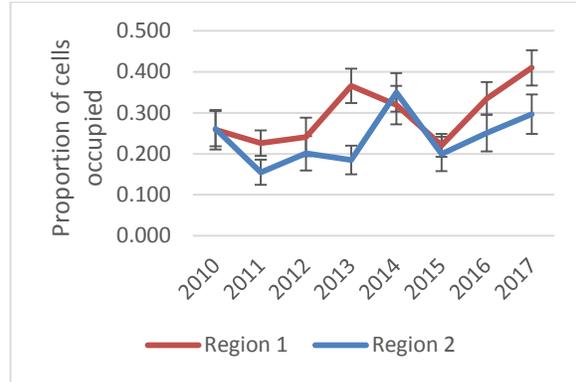
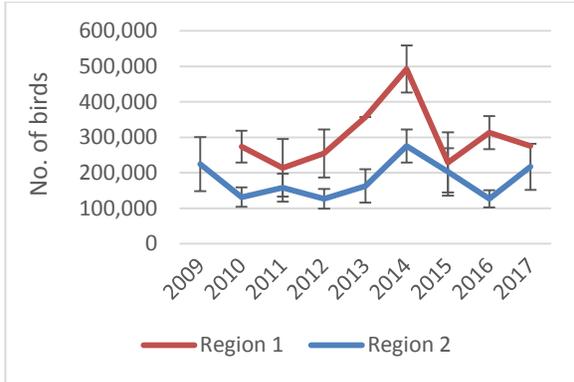
Figure 10. Map showing the U.S. Forest Service regions across the U.S. (<https://www.fs.fed.us/appeals/>)

From 2009 to 2017, the four forest species showed different trends in estimated abundances and occupancy rates in Regions 1 and 2 (Figure 11). Cassin’s Finch abundance was mostly stable in both regions during initial years of monitoring and populations peaked in both regions in 2014. Cassin’s Finches appear to be increasing in Region 2 during the last year of monitoring. Occupancy trends look similar for Cassin’s Finches in both regions with a peak in 2013 or 2014, followed by a steady increase over the last two years of monitoring. Evening Grosbeak abundance exhibited similar trends in both regions with a peak in 2013 and greater post-peak abundances than pre-peak abundances. Occupancy of Evening Grosbeaks in both regions also increased over the monitoring period. Olive-sided Flycatcher abundance in Region 1 increased between 2011 and 2014 and has mostly plateaued since, while abundance in Region 2 has been fairly steady at around 50,000 birds during the monitoring period. Flycatcher occupancy in Region 1 gradually increased throughout this time period (indicating increased distribution in this region), and in Region 2, occupancy increased after 2016. Finally, Virginia’s Warbler abundance in Region 2 declined after 2010 and has gradually increased since 2015. The occupancy trend

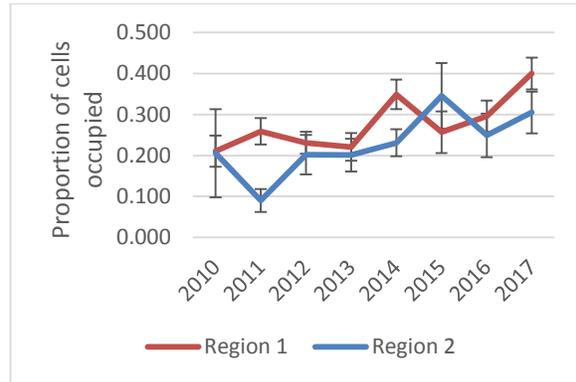
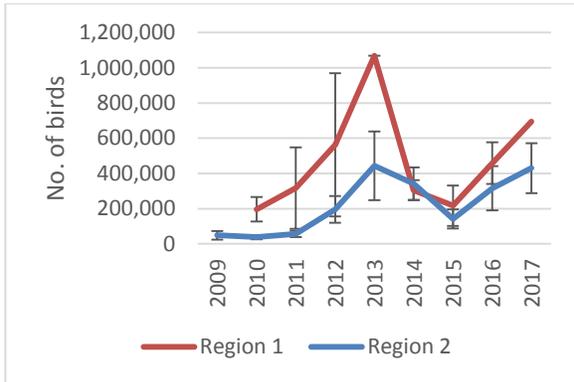
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for this species in Region 2 has been increasing since 2013. Region 1 is mostly outside the known range for Virginia’s Warblers, so we only present information for Region 2.

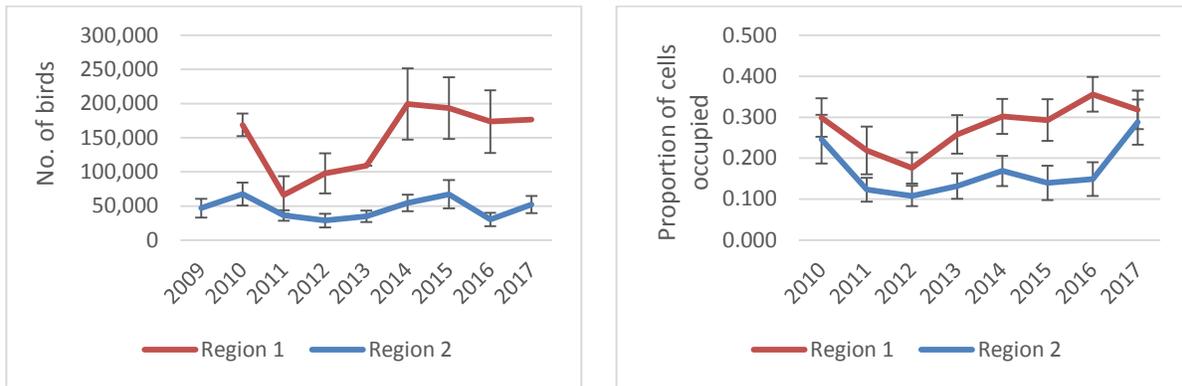
Cassin’s Finch



Evening Grosbeak



Olive-sided Flycatcher



Virginia’s Warbler



Figure 11. Abundance (left graph) and occupancy (right graph) estimates and standard error bars for four forest species of concern in U.S. Forest Service Regions 1 and/or 2 during 2009 – 2017.

These IMBCR data could be modeled with covariates such as fire frequency, fire severity, or area burned to gain better understanding of fire impacts on the decline and then increase in populations. For example, we could model Cassin’s Finch and Evening Grosbeak IMBCR trends with fire data in Region 1 to see if forest fires that occurred in 2015 in Montana and Idaho help explain population declines in these two species. In addition, we could model vegetation data collected at each IMBCR point count with bird abundance to explain the population trends in forest birds in this region. The peaks in Cassin’s Finch and Evening Grosbeak populations in both regions could also be attributable to pulses in precipitation or cone crops, which could shed further light on the ecology of these species.

For Virginia’s Warblers in Region 2, a biologist might be interested in the effects of pinyon-juniper removal as part of sage-grouse restoration efforts. Many of these efforts began in 2010 with the Sage Grouse Initiative (<https://www.sagegrouseinitiative.com/>) and could impact a variety of species associated with sagebrush and conifer habitats (Reinkensmeyer et al. 2007). To determine if there is a correlation between pinyon-juniper removal and the decline in Virginia’s Warbler abundance since 2010, a biologist could model acres treated in Region 2. On the other hand, the range of Virginia’s

Warbler does not appear to be shrinking (Figure 11) and its probability of occupancy is actually increasing in Region 2. Therefore, a manager may be interested in occupancy models for the warbler with total conifer landscape cover to see if the bird's preferred habitat is also increasing.

Conclusion

The availability of consistent monitoring data at multiple scales is an important challenge for avian conservation (Ruth et al., 2003). The IMBCR program meets this challenge through its randomized, hierarchical design, which allows for inference to multiple strata of interest, from National Forests to states to BCRs (Pavlacky et al., 2017). With this design, habitat relationships can be modeled to evaluate species' responses to local management actions and predict species' distributions for landscape prioritization. The stratification of the IMBCR sampling frame based on eco-region boundaries and other fixed attributes is also a critical feature of the program because it allows for the evaluation of long-term avian responses to landscape and climate change (Metzger et al., 2013; Pavlacky et al., 2017).

The importance of long-term population monitoring at larger spatial scales is well known (Jones, 2011; Thompson et al., 1998), but it is expensive and costs typically determine sampling effort. Further, probabilistic sampling may not seem feasible for monitoring populations at larger scales (Buckland et al., 2008). The IMBCR design reduces expenses through cooperation with multiple partners, one of the stated goals of effective collaboration and coordinated bird monitoring (NABCI Monitoring Subcommittee, 2007). Partners can investigate other priority species and taxa with slight modifications to the IMBCR design, further reducing costs associated with developing new studies and monitoring programs. Based on its spatially balanced design, the IMBCR program can also accommodate a shortage of monitoring funds in certain years or strata without reducing the overall rigor of the program (Stevens Jr. & Olsen, 2004). Cost savings from IMBCR's design could be used to increase sample effort, particularly in under-sampled strata, or to develop conservation and decision support tools and put the data to work.

The IMBCR program is well-positioned to address the conservation and management needs of a wide range of stakeholders due to the hierarchical design and IMBCR partnership. This partnership is a collaboration between multiple entities from state and federal agencies to non-governmental organizations, and was created to address management and conservation objectives of larger avian programs like NABCI (NABCI Monitoring Subcommittee, 2007). Through the IMBCR partnership, monitoring resources are pooled among separate management entities in a spatially balanced, probabilistic framework. This promotes a more efficient use of resources and allows for inference to larger regions of interest (Pavlacky et al., 2017). Further, by including multiple scales relevant to management and conservation, IMBCR can be integrated within a collaborative approach to bird conservation that combines monitoring, research, and management (Ruth et al., 2003). It is this integration across the IMBCR partnership that facilitates the use and perpetuity of the monitoring data (Lindenmayer & Likens, 2010; Pavlacky et al., 2017).

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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, as well as species counts, and density, population and occupancy results using the IMBCR study design please visit the [Rocky Mountain Avian Data Center](#). 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, Superstratum, 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 (also known as “overlays”).
- 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 Bird Conservancy 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 superstrata 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 superstrata 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.

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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.

Superstratum: 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

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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

Bird Conservancy of the Rockies
Conserving birds and their habitats

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) using Google Maps. If you have filtered by species, blue circles represent survey locations where that species was not detected and blue circles with a pink dot in the center represent survey locations where that species was detected. 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 will 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 Bird Conservancy 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 Bird Conservancy 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. The top-most feature’s name will appear if you left click your mouse inside the layer’s boundaries.

Viewing Occupancy/Density Results (Occupancy and Density Tabs)

Viewing Tables

You may view an occupancy or density results table 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 display species, stratum, year, Psi (proportion of sampling units expected to be occupied), number of sampling units the species was detected on and standard error (SE) of the estimate and the percent coefficient of variation (% CV). The density tables will display species, stratum or habitat type, year, number of birds expected per km² (D), total number of individuals expected to reside within the stratum (N), 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, we calculate occupancy and density estimates 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 inform management decisions on 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. **Treatment area population estimates 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 density and occupancy estimates 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 km² and the occupancy estimate for Western Meadowlark is 0.57, managers can estimate that 68,400 km² (120,000 km² * 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/superstrata 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 would 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, occupancy results for 2010 through 2017 and density results for 2008 through 2017 are available via the ADC.

Viewing Raw Count Statistics (Species Counts Tab)

You may view the raw count of detections for each species and the effort (expressed as the number of point count stations surveyed) for your query by clicking on the “Species Counts” tab located just below the drop down filter menu in the upper left corner of the screen. Both the counts (left table) and effort tables (right table) 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 “Superstrata”, viewing counts by Stratum is an excellent way of getting a list of all the strata that comprise a Superstratum. 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: IMBCR Program and Stratification History

In 1995, Bird Conservancy of the Rockies (Bird Conservancy; formerly Rocky Mountain Bird Observatory), in partnership 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. After a successful pilot year in 1998, Bird Conservancy implemented the protocol in 13 habitats in Colorado in 1999. Bird Conservancy and its partners used this methodology for 10 years and expanded the effort to include parts of Arizona, New Mexico, North Dakota, South Dakota, Utah, and Wyoming.

In 2007, the NABCI Monitoring Subcommittee published “Opportunities for Improving Avian Monitoring” (NABCI Monitoring Subcommittee, 2007) which offered recommendations for improving the efficiency and effectiveness of avian monitoring in North America. After taking NABCI’s recommendations into consideration, IMBCR partners developed a new study design and protocol for statewide bird monitoring in Colorado. The new study design used BCRs as the sampling frame and further stratified by land ownership within each BCR.

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 to target high order rivers and streams (based on Strahler stream order) and higher elevation habitats (e.g. alpine tundra), which occur in a small proportion of the landscape (Blakesley & Hanni, 2009).

2009

After the 2008 season, IMBCR partners determined the 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. Additionally, the All Other Lands stratum in Wyoming BCR 16 was split into two strata: All Other Lands and BLM Lands.

Based on the overall success of the pilot implementation, IMBCR expanded to include the Colorado and Wyoming portions of the Northern Rockies (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).

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 BCR 10 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.

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 km² 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. Stratification by watershed allows for adjusting sampling intensity to target Management Indicator Species on the Forest.

2012

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.

2013

2013 brought significant changes to the program's overall stratification methods. The original IMBCR sampling grids were created at the state scale and as the program expanded, additional sampling grids were created at the BCR scale. In response to a rapidly growing monitoring program, the partnership acknowledged the need for a standard national grid system to promote the coordination and application of monitoring data in conservation. The group proposed the use of the United States National Grid (USNG), a national grid system created by the Federal Geographic Data Committee, as its standard. There are three advantages to using the USNG. First, 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. Lastly, 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. Bird Conservancy started using the USNG for new stratification and re-stratification 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 southeastern 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, the preexisting stratum in BCR 10 containing all USFS Region 4 lands (other than Bridger-Teton National Forest) was re-stratified into three separate strata, one for each Forest (Caribou-Targhee, Ashley, and Wasatch). This allows for forest-wide estimates within Caribou-Targhee National Forest. If, in the future, Ashley and Wasatch National Forests are completely sampled, this will also allow for forest-wide estimates in each of those forests.

The North Dakota, South Dakota, and Nebraska portions of BCR 17 underwent a complete re-stratification 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 NPS strata were stratified by NPS unit to allow the NGPN to monitor birds on each of its units separately. New strata included 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.

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

2014

In Colorado, the Arapaho and Roosevelt and the Pike and San Isabel National Forests were re-stratified 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.

Significant stratification changes were made to the BCR 10 portion of Idaho. The four strata defined in the 2012 field season were further subdivided into nine strata. The boundary between USFS Regions 1 and 4 runs through Idaho and was taken into account when re-stratifying 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 included 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 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. Russell NWR stratum and an “All Other USFWS Lands” stratum.

In addition to restratification, we added a few new strata to the IMBCR program 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 allows for the generation of forest-wide estimates for Manti-La Sal.

2015

In 2015, the Department of Defense (DoD) stratum in Colorado BCR 18 was completely restratified as part of a DoD Legacy Resource Management Program Grant to represent six individual military installations: US Air Force Academy, Fort Carson, Pueblo Chemical Depot, Piñon Canyon, and All Other DoD Lands. This DoD installation-level stratification allows for the generation of density and occupancy estimates for each installation. Fort Carson and Piñon Canyon were further stratified by areas within range fans (training zones) and areas outside of range fans to allow the DoD to assess the effects of military training on bird species.

The Rocky Mountain Arsenal National Wildlife Refuge stratum also came out of the 2015 restratification. During WWII, the Rocky Mountain Arsenal, as it was originally known, was a chemical weapons manufacturing facility. At the time of the 2008 IMBCR stratification in the state Colorado, it was still partially owned by the US Army and was included in the DoD stratum. The refuge is now in its own individual stratum.

The IMBCR program expanded to include the Missouri National Recreational River (MNRR), part of the NPS NGPN in Nebraska and South Dakota. There are two strata for MNRR representing the 39 Mile District and the 59 Mile District. In Utah, an additional stratum was added for Sanpitch Recreation Area. This area is part of Uinta National Forest but administered by Manti-La Sal National Forest and will be incorporated into forest-wide estimates for Manti-La Sal National.

2016

In 2016, the Playa Lakes Joint Venture (PLJV) coordinated a partnership between several state wildlife agencies and Bird Conservancy to expand sampling in five of the joint venture’s six states: Nebraska, Kansas, New Mexico, Oklahoma, and Texas. PLJV’s sixth state, Colorado, was already included in the IMBCR program starting in 2008. This expansion now provides the program with nearly complete coverage of two BCRs that were only sparsely covered in past years: Shortgrass Prairie (BCR 18) and Central Mixed Grass Prairie (BCR 19). The BCR 18 and 19 portions of these 5 states were divided into several strata, including, playas, rivers, biologically unique landscapes in Nebraska, and all other lands.

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The IMBCR program also underwent a major expansion into the state of Utah in 2016. The entire state was stratified into BLM, USFS, DoD, and All Other Lands strata. This year was somewhat of a pilot year, with select BLM, USFS, DoD, and all other lands strata sampled across the state. In future years, sampling will be increased to a statewide level.

In addition to new strata, some existing strata were restratified for a variety of reasons. In North and South Dakota, we restratified the Tribal and All Other Lands strata to ensure all tribal lands were only included in the tribal lands strata. In the past, some tribal lands could still be found within the All Other Lands strata. We also restratified Cimarron, Kiowa, and Rita Blanca National Grasslands in Kansas, Oklahoma, New Mexico, and Texas. With the expansion of IMBCR throughout the PLJV region, these strata needed to be fit to the US National Grid to make them consistent with the rest of the IMBCR program in the region. In addition, we determined that the portion of Rita Blanca National Grassland that fell in New Mexico was actually managed by Kiowa National Grassland, so that portion was moved to the Kiowa National Grasslands stratum. All DoD lands in Colorado BCR18 were combined into one stratum. This was the same stratification used prior to 2015.

2017

In 2017, the IMBCR program expanded to include Humboldt-Toiyabe National Forest in two new states, Nevada and California. This, coupled with an expansion into national forests in Idaho BCR 9 and Utah yielded complete coverage of USFS lands at the regional level for USFS Region 4. Idaho also experienced a significant expansion with statewide coverage of BLM lands. In a concerted effort from several implementation partners, Utah sampling included statewide coverage, including several new BLM Field Offices, All Other Lands in BCR 10, and remaining Region 4 National Forests. We also obtained complete coverage of BCR 18 for the first time by expanding into the BCR 18 portion of South Dakota.

USFWS strata in Montana BCR 11 and BCR 17 were re-combined in 2017 and reverted back to their pre-2014 areas. In Idaho, BLM Four Rivers Field Office in BCR 9 was split into two strata, incorporating the boundaries of Morley Nelson Snake River Birds of Prey National Conservation Area into the design. Additionally, we resampled All Other Lands in Nebraska BCR 17 to include eastern areas not included in the sampling frame from 2013-2016.

Appendix C: 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 the region. Prior to 2012, technicians were allowed to conduct point counts until 11:00 AM 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

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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.

In 2015, we began recording American pika, similarly to the way we record Abert's and American red squirrels. In 2017, we added a checkbox onto the vegetation data sheet to mark the presence/absence of invasive cheatgrass.

Appendix D: Priority Species Designations by Partners in Flight

Priority species detected in all Bird Conservation Regions (BCRs) surveyed in 2017, as designated by Partners in Flight. BCRs include BCR 9 (Great Basin), BCR 10 (Northern Rockies), BCR 11 (Prairie Potholes), BCR 15 (Sierra Nevada) and BCR 16 (Southern Rockies and Colorado Plateau). 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.

Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR 9	BCR 10	BCR 11	BCR 15	BCR 16		
Ash-throated Flycatcher						X	X
American Kestrel	RC, RS, UCS	RC				X	X
Baird's Sparrow			RS, UCS, RC, TNC, UCC			X	X
Baltimore Oriole						X	X
Bank Swallow	CBSD	CBSD	CBSD, RC		CBSD	X	X
Barn Swallow	RC					X	X
Brown-capped Rosy-Finch					RS, UCS, RC, TNC, UCC	X	X
Black-billed Magpie	UCS		UCS		UCS	X	X
Black-chinned Sparrow	CBSD, UCC				CBSD, UCC	X	X
Belted Kingfisher	CBSD, RC	CBSD	CBSD	CBSD	CBSD	X	X
Bell's Vireo					RC, TNC, UCC	X	X
Black-headed Grosbeak				UCS		X	X
Black Rosy-Finch	RS, UCS, RC, TNC, UCC	RC, TNC, UCC, RS, UCS			TNC, RC, UCC	X	X
Bobolink		CBSD, UCC	CBSD, RC, RS, UCS, UCC			X	X
Brown Creeper				RC, RS, UCS		X	X
Brewer's Sparrow	CBSD, RS, UCS, RC	CBSD, RC	CBSD	CBSD, RC	CBSD, RC	X	X
Black-tailed Gnatcatcher						X	X
Broad-tailed Hummingbird					RS, UCS	X	X
Band-tailed Pigeon				RC		X	
Black-throated Sparrow	UCS					X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR 9	BCR 10	BCR 11	BCR 15	BCR 16		
Bullock's Oriole				RC		X	X
Burrowing Owl			RC			X	X
Bushtit						X	X
Botteri's Sparrow						X	X
Brewer's Blackbird	UCS					X	X
Cactus Wren						X	X
Cassin's Finch	UCC, CBSD, RS, UCS	RC, RS, UCC, CBSD, UCS		RC, RS, UCC, CBSD, UCS	UCC, CBSD, RC	X	X
Brown Thrasher			RC			X	X
Black-throated Gray Warbler					RC	X	X
Canyon Towhee						X	X
Cassin's Kingbird						X	X
Canyon Wren						X	X
Cassin's Vireo		RS, UCS		RS, UCS		X	X
Cassin's Sparrow						X	X
Chestnut-collared Longspur			TNC, UCC, RC, RS, UCS			X	X
Chihuahuan Raven						X	X
Chipping Sparrow		RS, UCS, RC				X	X
Clark's Nutcracker		RS, UCS			RC, RS, UCS	X	X
Cordilleran Flycatcher					RS, UCS	X	X
Chimney Swift			CBSD			X	X
Cooper's Hawk					RS, UCS	X	X
Common Nighthawk	CBSD	CBSD	CBSD	CBSD	CBSD, RC	X	X
California Quail	UCS					X	X
Clay-colored Sparrow			RS, UCS			X	X
Crissal Thrasher						X	X
Dickcissel			RC			X	X
Dusky Grouse	RC, RS, UCS	RS, UCS			RS, UCS	X	X
Eastern Meadowlark					CBSD	X	X
Eastern Kingbird			UCS			X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR 9	BCR 10	BCR 11	BCR 15	BCR 16		
Ferruginous Hawk	RC, RS, UCS	RC	RC, RS, UCS		RC		X
Golden-crowned Kinglet		UCS		RC		X	X
Field Sparrow			CBSD			X	X
Gambel's Quail						X	X
Golden Eagle	RC, RS, UCS		RC		RC	X	
Gray Flycatcher	RS, UCS					X	X
Greater Prairie-Chicken			TNC, UCC, RC			X	X
Greater Sage-Grouse	RC, TNC, UCC	RS, UCS, RC, TNC, UCC	RC, TNC, UCC		RC, UCC, TNC	X	X
Dusky Flycatcher		UCS				X	X
Evening Grosbeak		RC				X	X
Grasshopper Sparrow	CBSD	CBSD	CBSD, RC			X	X
Gray Vireo	UCC				RC, RS, UCC, UCS	X	X
Grace's Warbler					RS, UCS	X	X
Hepatic Tanager						X	X
Horned Lark	CBSD	CBSD	CBSD, RC	CBSD	CBSD	X	X
Juniper Titmouse					RS, UCS	X	X
Lark Bunting		CBSD	RC, CBSD			X	X
Lark Sparrow	RC					X	X
Lazuli Bunting	RS, UCS	UCS			RC, RS, UCS	X	X
Green-tailed Towhee	RC, RS, UCS				RS, UCS	X	X
Ladder-backed Woodpecker						X	X
Lesser Prairie-Chicken						X	X
Lewis's Woodpecker	RC, RS, UCS	RC		RC	RC, RS, UCS	X	X
Hammond's Flycatcher		UCS				X	X
Loggerhead Shrike	CBSD	CBSD	CBSD		RC, CBSD	X	X
Lucy's Warbler						X	X
McCown's Longspur		RC	RC, RS, UCS			X	X
Mountain Bluebird	UCS	UCS			RS, UCS, RC	X	X
MacGillivray's Warbler	RC	UCS				X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR 9	BCR 10	BCR 11	BCR 15	BCR 16		
Mountain Chickadee	RC	UCS		RS, UCS		X	X
Northern Flicker	CBSD, UCS	CBSD, UCS	CBSD	CBSD	CBSD, RS, UCS	X	X
Northern Bobwhite						X	X
Northern Harrier	RS, UCS		RC, RS, UCS			X	X
Olive Warbler						X	
Olive-sided Flycatcher	TNC, RC, UCC	RC, TNC, UCC		RC, TNC, UCC	TNC, UCC, RC	X	X
Marsh Wren			UCS			X	X
Phainopepla						X	X
Pinyon Jay	TNC, UCS, RC, RS, UCC	RC, UCC, TNC		RC, UCC, TNC	TNC, UCC, RC, RS, UCS	X	X
Northern Rough-winged Swallow	RC					X	X
Pine Siskin	CBSD, RC	RS, CBSD, UCS	CBSD	CBSD	CBSD, RS, UCS	X	X
Plumbeous Vireo					RS, UCS	X	X
Prairie Falcon	UCS, RS		RC		RC	X	X
Pygmy Nuthatch				RC	RS, UCS	X	X
Red-headed Woodpecker			CBSD, RC, UCC			X	X
Red Crossbill						X	X
Ring-necked Pheasant						X	X
Rock Wren	CBSD, RS, UCS	CBSD		CBSD	CBSD, RS, UCS	X	X
Red-breasted Nuthatch		UCS				X	X
Ruby-crowned Kinglet		UCS				X	X
Rufous-crowned Sparrow						X	X
Ruffed Grouse	CBSD	CBSD, RS, UCS	CBSD			X	X
Red-faced Warbler						X	X
Rufous-winged Sparrow						X	X
Rufous Hummingbird	CBSD, UCC	UCC, CBSD					X
Sagebrush Sparrow	RC, RS, UCS	RC			RC	X	X
Say's Phoebe					UCS	X	X
Scott's Oriole						X	X
Scaled Quail						X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR 9	BCR 10	BCR 11	BCR 15	BCR 16		
Sage Thrasher	UCS, RC, RS					X	X
Short-eared Owl	CBSD, RC	RC, CBSD	CBSD, RC			X	X
Sprague's Pipit		RC, TNC, UCC	TNC, UCC, UCS, RC, RS			X	X
Red-naped Sapsucker		RS, UCS				X	X
Sharp-shinned Hawk							X
Sharp-tailed Grouse	RC	RC	RS, UCS			X	X
Steller's Jay				RS, UCS		X	X
Swainson's Hawk			RC, RS, UCS			X	X
Swainson's Thrush		UCS				X	X
Townsend's Solitaire		RS, UCS				X	X
Townsend's Warbler	RC	RS, UCS				X	X
Varied Thrush		RC				X	X
Verdin						X	X
Savannah Sparrow			UCS			X	X
Violet-green Swallow					UCS	X	X
Virginia's Warbler	UCC				UCC, RS, UCS	X	X
Sedge Wren			UCS			X	X
Scissor-tailed Flycatcher						X	X
Western Meadowlark	UCS		UCS			X	X
White-breasted Nuthatch						X	X
Willow Flycatcher	RC	RS, UCS				X	X
Williamson's Sapsucker	RC	UCS, RS			RS, UCS	X	X
Wild Turkey						X	X
Western Kingbird						X	X
Wilson's Warbler	CBSD	CBSD		CBSD	CBSD	X	X
Tree Swallow		UCS				X	X
White-tailed Ptarmigan		RC, RS, UCS			RC		X
Vesper Sparrow		RC	UCS			X	X
Warbling Vireo		UCS			UCS	X	X
Western Bluebird						X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR 9	BCR 10	BCR 11	BCR 15	BCR 16		
Yellow-billed Cuckoo	CBSD, RC					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 (Partners in Flight, 2017).

Appendix D continued. Priority species detected in all Bird Conservation Regions (BCRs) surveyed in 2017, as designated by Partners in Flight (PIF). BCRs include BCR 17 (Badlands and Prairies), BCR 18 (Shortgrass Prairie), BCR 19 (Central Mixed-grass Prairie), BCR 33 (Sonoran and Mohave Deserts), and BCR 34 (Sierra Madre Occidental). An “X” in the Occupancy or Density Estimated column indicates that occupancy or density estimates were generated for the priority species at some level in one or more of the BCRs where it holds a priority designation.

Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR17	BCR18	BCR19	BCR33	BCR34		
Ash-throated Flycatcher				UCS	UCS	X	X
American Kestrel					RC	X	X
Baird's Sparrow	RC, UCC, TNC					X	X
Baltimore Oriole			RC, RS, UCS			X	X
Bank Swallow	CBSD	CBSD	CBSD			X	X
Barn Swallow						X	X
Brown-capped Rosy-Finch						X	X
Black-billed Magpie	RC					X	X
Black-chinned Sparrow				CBSD, UCC	CBSD, RC, UCC, RS, UCS	X	X
Belted Kingfisher	CBSD	CBSD	CBSD		CBSD	X	X
Bell's Vireo		RC, TNC, UCC	RC, UCC, TNC	TNC, UCC	UCC, RC, TNC	X	X
Black-headed Grosbeak						X	X
Black Rosy-Finch						X	X
Bobolink	UCC, CBSD		UCC, CBSD			X	X
Brown Creeper						X	X
Brewer's Sparrow	RC, CBSD	CBSD, RC		CBSD		X	X
Black-tailed Gnatcatcher				RS, UCS		X	X
Broad-tailed Hummingbird					RC	X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR17	BCR18	BCR19	BCR33	BCR34		
Band-tailed Pigeon						X	
Black-throated Sparrow				UCS, RC, RS	RC, RS, UCS	X	X
Bullock's Oriole		UCS	RC	RC		X	X
Burrowing Owl	RC	RC, RS, UCS	RC	UCS		X	X
Bushtit					RS, UCS	X	X
Botteri's Sparrow					RC	X	X
Brewer's Blackbird						X	X
Cactus Wren				RS, UCS, RC	RC, RS, UCS	X	X
Cassin's Finch						X	X
Brown Thrasher			RS, UCS			X	X
Black-throated Gray Warbler					RC	X	X
Canyon Towhee					RS, UCS	X	X
Cassin's Kingbird					UCS, RC, RS	X	X
Canyon Wren					RS, UCS	X	X
Cassin's Vireo						X	X
Cassin's Sparrow		UCS, RC, RS	RC			X	X
Chestnut-collared Longspur	RS, UCS, RC, TNC, UCC	RC, TNC, UCC				X	X
Chihuahuan Raven		UCS, RS				X	X
Chipping Sparrow						X	X
Clark's Nutcracker						X	X
Cordilleran Flycatcher					RS, UCS	X	X
Chimney Swift		CBSD	CBSD			X	X
Cooper's Hawk					RS, UCS	X	X
Common Nighthawk	RC, CBSD	CBSD, RC	CBSD, UCS		RC, CBSD	X	X
California Quail						X	X
Clay-colored Sparrow						X	X
Crissal Thrasher				RS, UCS	RS, UCS	X	X
Dickcissel	RC		RC, RS, UCS			X	X
Dusky Grouse						X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR17	BCR18	BCR19	BCR33	BCR34		
Eastern Meadowlark		CBSD	CBSD, RC, RS, UCS		CBSD	X	X
Eastern Kingbird	UCS		UCS			X	X
Ferruginous Hawk	RS, UCS, RC	RC, RS, UCS	RC				X
Golden-crowned Kinglet						X	X
Field Sparrow	CBSD		CBSD, RC			X	X
Gambel's Quail				RS, UCS	RS, UCS	X	X
Golden Eagle	RC				RC	X	
Gray Flycatcher						X	X
Greater Prairie-Chicken	RC, TNC, UCC	RC, UCC, TNC	TNC, UCC, RC, RS, UCS			X	X
Greater Sage-Grouse	TNC, UCC, RC, RS, UCS					X	X
Dusky Flycatcher						X	X
Evening Grosbeak					RC	X	X
Grasshopper Sparrow	CBSD, RS, UCS, RC	RC, RS, CBSD, UCS	CBSD, RC, RS, UCS		CBSD	X	X
Gray Vireo				RC, UCC	UCC, RC, RS, UCS	X	X
Grace's Warbler					RS, UCS, RC	X	X
Hepatic Tanager					UCS	X	X
Horned Lark	CBSD	CBSD, RS, UCS	CBSD	CBSD	CBSD	X	X
Juniper Titmouse					RC, RS, UCS	X	X
Lark Bunting	CBSD, RC, RS, UCS	CBSD, RC, RS, UCS	RC, CBSD			X	X
Lark Sparrow	RC	UCS	RC, RS, UCS			X	X
Lazuli Bunting	RS, UCS					X	X
Green-tailed Towhee						X	X
Ladder-backed Woodpecker				RC	RS, UCS	X	X
Lesser Prairie-Chicken		TNC, UCC, RC, RS, UCS	RC, RS, UCS, TNC, UCC			X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR17	BCR18	BCR19	BCR33	BCR34		
Lewis's Woodpecker	RC	RC			RC	X	X
Hammond's Flycatcher						X	X
Loggerhead Shrike	CBSD	CBSD	CBSD, RC	CBSD	CBSD	X	X
Lucy's Warbler				UCS, RC, RS	RC, RS, UCS	X	X
McCown's Longspur	RC, RS, UCS	RS, UCS				X	X
Mountain Bluebird						X	X
MacGillivray's Warbler						X	X
Mountain Chickadee						X	X
Northern Flicker	CBSD	CBSD	CBSD	CBSD	CBSD	X	X
Northern Bobwhite		CBSD	UCS, CBSD			X	X
Northern Harrier	UCS, RC, RS	RC	RC			X	X
Olive Warbler					RS, UCS	X	
Olive-sided Flycatcher					TNC, UCC	X	X
Marsh Wren						X	X
Phainopepla				RC, RS, UCS	RC, RS, UCS	X	X
Pinyon Jay	RC, TNC, UCC	RC, TNC, UCC			RC, TNC, UCC	X	X
Northern Rough-winged Swallow				RS, UCS		X	X
Pine Siskin	CBSD				CBSD	X	X
Plumbeous Vireo					UCS, RC, RS	X	X
Prairie Falcon		RC		RC	RC	X	X
Pygmy Nuthatch					RS, UCS	X	X
Red-headed Woodpecker	UCC, CBSD, RC	CBSD, UCC	RS, UCC, CBSD, UCS			X	X
Red Crossbill	UCS					X	X
Ring-necked Pheasant	UCS	RS, UCS				X	X
Rock Wren	CBSD	CBSD		CBSD, RS, UCS	CBSD	X	X
Red-breasted Nuthatch						X	X
Ruby-crowned Kinglet						X	X
Rufous-crowned Sparrow					RS, UCS	X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR17	BCR18	BCR19	BCR33	BCR34		
Ruffed Grouse	CBSD					X	X
Red-faced Warbler					RC, RS, UCS	X	X
Rufous-winged Sparrow				UCS, RS, UCC	UCC	X	X
Rufous Hummingbird							X
Sagebrush Sparrow	RC			RC		X	X
Say's Phoebe				RS, UCS		X	X
Scott's Oriole					RS, UCS	X	X
Scaled Quail		RC			RC	X	X
Sage Thrasher	RC					X	X
Short-eared Owl	CBSD, RC	CBSD				X	X
Sprague's Pipit	RC, TNC, UCC					X	X
Red-naped Sapsucker						X	X
Sharp-shinned Hawk					RC		X
Sharp-tailed Grouse	RS, UCS	RC				X	X
Steller's Jay						X	X
Swainson's Hawk		RS, UCS	RC		RC	X	X
Swainson's Thrush						X	X
Townsend's Solitaire						X	X
Townsend's Warbler						X	X
Varied Thrush						X	X
Verdin			CBSD	CBSD, RC, RS, UCS	CBSD, RS, UCS	X	X
Savannah Sparrow						X	X
Violet-green Swallow					UCS	X	X
Virginia's Warbler	UCC			UCC	UCS, RS, UCC	X	X
Sedge Wren						X	X
Scissor-tailed Flycatcher			RC			X	X
Western Meadowlark	UCS	RS, UCS, RC	RC, RS, UCS			X	X
White-breasted Nuthatch					UCS	X	X
Willow Flycatcher				RC		X	X

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Species	Partners In Flight*					Density Estimate	Occupancy Estimate
	BCR17	BCR18	BCR19	BCR33	BCR34		
Williamson's Sapsucker					RS, UCS	X	X
Wild Turkey			UCS			X	X
Western Kingbird		UCS				X	X
Wilson's Warbler						X	X
Tree Swallow						X	X
White-tailed Ptarmigan							X
Vesper Sparrow	RC, RS, UCS					X	X
Warbling Vireo						X	X
Western Bluebird					RS, UCS	X	X
Yellow-billed Cuckoo		CBSD, RC	CBSD, RC	CBSD	CBSD	X	X
Yellow-headed Blackbird						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 (Partners in Flight, 2017).

Appendix E: Priority Species Designations by State Agency

Priority species detected in 2017, 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), Kansas Department of Wildlife, Parks and Tourism (KDWPT), Montana Fish, Wildlife and Parks (MTFWP), North Dakota Game and Fish Department (NDGFD), Nebraska Game and Parks Commission (NGPC). An “X” in the Occupancy or Density Estimated columns indicates estimates were generated for that species at some level in one or more of the states where it holds a priority designation.

Species	State Agencies*							Density Estimate	Occupancy Estimate
	AZGFD	CPW	IDFG	KDWPT	MTFWP	NDGFD	NGPC		
Abert's Towhee	T1B								
Acorn Woodpecker	T1C							X	X
American Avocet				T2		L2		X	X
American Kestrel						L2		X	X
American Pipit	T1C							X	X
American Woodcock							T2		
Ash-throated Flycatcher								X	X
American Three-toed Woodpecker	T1C							X	X
American White Pelican		T2	T2	T2	S3B	L2		X	
Bald Eagle	T1A	SSC, T2		T2		L2	T2	X	X
Baird's Sparrow	T1C			T2	S3B	L1	T1	X	X
Baltimore Oriole				T2				X	X
Black-and-white Warbler							T2	X	X
Black-billed Cuckoo				T2	S3B	L1			
Black-billed Magpie	T1B						T2	X	X
Black-backed Woodpecker					S3				
Brown-crested Flycatcher	T1C							X	
Brown-capped Rosy-Finch		T1						X	X
Black-chinned Sparrow	T1C							X	X
Bendire's Thrasher	T1C								
Bell's Vireo	T1B			T2			T1	X	X
Bewick's Wren								X	X
Blue-gray Gnatcatcher					S2B			X	X

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Species	State Agencies*							Density Estimate	Occupancy Estimate
	AZGFD	CPW	IDFG	KDWPT	MTFWP	NDGFD	NGPC		
Blue Grosbeak								X	X
Black Rosy-Finch		T2	T3		S2			X	X
Barn Owl				T2			T2		
Bobolink		T2	T2	T2	S3B	L2		X	X
Boreal Chickadee					S3				
Botteri's Sparrow	T1B							X	X
Brewer's Blackbird							T2	X	X
Brown Creeper					S3		T2	X	X
Brewer's Sparrow	T1C	T2			S3B	L3	T1	X	X
Bridled Titmouse	T1C								
Black-tailed Gnatcatcher	T1C							X	X
Band-tailed Pigeon	T1C	T2						X	
Black-throated Gray Warbler	T1C							X	X
Bullock's Oriole	T1C			T2				X	X
Burrowing Owl	T1B	ST, T1	T2	T2	S3B	L2	T1	X	X
Bushtit								X	X
Carolina Chickadee									
Cassin's Finch		T2			S3			X	X
California Gull			T2					X	X
Calliope Hummingbird									
Cassin's Kingbird							T2	X	X
Canyon Wren								X	X
Cassin's Sparrow	T1C	T2		T2			T2	X	X
Caspian Tern			T2		S2B				
Curve-billed Thrasher				T2				X	X
Chestnut-collared Longspur	T1C	T2		T2	S2B	L1	T1	X	X
Clark's Grebe	T1C		T2		S3B		T2		
Clark's Nutcracker			T3		S3		T2	X	X
Cordilleran Flycatcher	T1C						T2	X	X
Costa's Hummingbird	T1C								

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Species	State Agencies*							Density Estimate	Occupancy Estimate
	AZGFD	CPW	IDFG	KDWPT	MTFWP	NDGFD	NGPC		
Common Loon			T2		S3B				
Common Nighthawk	T1B		T3	T2				X	X
Common Poorwill	T1C			T2					
Common Yellowthroat								X	X
Chuck-will's-widow				T2			T2		
Dickcissel				T2		L2		X	X
Dusky Flycatcher	T1C							X	X
Eastern Kingbird				T2				X	X
Eastern Meadowlark	T1C			T2				X	X
Eastern Wood-Pewee				T2				X	X
Evening Grosbeak	T1B				S3			X	X
Ferruginous Hawk	T1B	SSC, T2	T2	T2	S3B	L1	T1		X
Field Sparrow								X	X
Forster's Tern				T2	S3B		T2		
Franklin's Gull			T3		S3B	L1			X
Great Blue Heron					S3			X	X
Great Gray Owl			T3		S3				
Gilded Flicker	T1B								
Gila Woodpecker	T1B							X	
Golden Eagle	T1B	T1	T2	T2	S3	L2	T2	X	
Gray Flycatcher	T1C							X	X
Green Heron									
Greater Prairie-Chicken		T2		T2		L2	T1	X	X
Greater Sage-Grouse		SSC, T1	T1		S2	L1		X	X
Grasshopper Sparrow	T1B	T2	T3	T2		L1		X	X
Gray Vireo	T1C	T2						X	X
Grace's Warbler	T1C	T2						X	X
Green-tailed Towhee					S3B			X	X
Hooded Oriole	T1C								
Harris's Hawk	T1C								

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Species	State Agencies*							Density Estimate	Occupancy Estimate
	AZGFD	CPW	IDFG	KDWPT	MTFWP	NDGFD	NGPC		
Juniper Titmouse	T1C	T2						X	X
Lark Bunting		T2		T2		L1		X	X
Lark Sparrow				T2				X	X
Lazuli Bunting	T1C	T2						X	X
Long-billed Curlew		SSC, T2	T2	T2	S3B	L1	T1	X	X
Lesser Prairie-Chicken		ST, T1		T1				X	X
Least Tern	T1A	SE, T2		SE, T1	S1B	L2	T1		
Lewis's Woodpecker	T1C	T2	T2		S2B		T2	X	X
Loggerhead Shrike		T2		T2	S3B	L2	T1	X	X
Lucy's Warbler	T1C							X	X
Marbled Godwit				T2		L1		X	X
McCown's Longspur	T1C	T2		T2	S3B	L3	T1	X	X
Mexican Jay	T1C								
Merlin							T2		
MacGillivray's Warbler	T1B							X	X
Mississippi Kite	T1B			T2			T2		
Mountain Bluebird	T1C							X	X
Montezuma Quail	T1C								
Mountain Plover	T1B	SSC, T1		T2	S2B		T1	X	
Mountain Quail			T2						
Nelson's Sparrow					S3B	L1			
Northern Bobwhite	T1A	T2		T2				X	X
Northern Goshawk	T1B	T2			S3				
Northern Harrier		T2				L2		X	X
Northern Pygmy-Owl	T1B, T1C								
Orange-crowned Warbler	T1C							X	X
Olive Warbler	T1C							X	
Orchard Oriole								X	X
Olive-sided Flycatcher	T1C	T2	T3					X	X
Osprey								X	

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Species	State Agencies*							Density Estimate	Occupancy Estimate
	AZGFD	CPW	IDFG	KDWPT	MTFWP	NDGFD	NGPC		
Painted Bunting				T2				X	X
Painted Redstart	T1C								
Pacific Wren	T1B				S3			X	X
Peregrine Falcon	T1A	SSC, T2		T2	S3	L3	T2		
Phainopepla	T1C							X	X
Pinyon Jay	T1B	T2	T2		S3		T1	X	X
Piping Plover		ST, T2		ST, T1	S2B	L2	T1		
Pileated Woodpecker					S3		T2	X	X
Plumbeous Vireo							T2	X	X
Prairie Falcon	T1C	T2				L2	T2	X	X
Purple Martin	T1B, T1C	T2						X	X
Pygmy Nuthatch							T2	X	X
Ring-billed Gull			T3					X	X
Rufous-crowned Sparrow								X	X
Red Crossbill	T1C							X	X
Red-eyed Vireo								X	X
Red-faced Warbler	T1C							X	X
Red-headed Woodpecker				T2	S3B	L1		X	X
Ruby-throated Hummingbird							T2		
Ruffed Grouse								X	X
Rufous Hummingbird		T2							X
Rufous-winged Sparrow	T1B							X	X
Sandhill Crane		SSC, T1	T3				T2	X	X
Sagebrush Sparrow	T1C	T2	T2		S3B			X	X
Sage Thrasher	T1C		T2		S3B			X	X
Savannah Sparrow	T1B						T2	X	X
Scott's Oriole	T1C							X	X
Scaled Quail	T1C			T2				X	X
Short-eared Owl		T2	T3	T2		L2	T1	X	X
Sedge Wren					S3B		T2	X	X

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Species	State Agencies*							Density Estimate	Occupancy Estimate
	AZGFD	CPW	IDFG	KDWPT	MTFWP	NDGFD	NGPC		
Snowy Egret	T1C								
Snowy Plover	T1B	SSC, T2		ST, T1			T2		
Sora	T1C							X	
Sprague's Pipit	T1A			T2	S3B	L1	T1	X	X
Sharp-shinned Hawk							T2		X
Scissor-tailed Flycatcher				T2			T2	X	X
Sharp-tailed Grouse		SSC,SE, T1	T2		S1,S4	L2		X	X
Summer Tanager	T1C						T2	X	X
Swainson's Hawk	T1C	T2		T2		L1	T2	X	X
Swamp Sparrow							T2		
Trumpeter Swan			T2		S3		T1		
Upland Sandpiper		T2		T2		L2		X	X
Varied Bunting	T1C								
Varied Thrush					S3B			X	X
Veery		T2			S3B			X	X
Vermilion Flycatcher	T1C								X
Vesper Sparrow								X	X
Violet-green Swallow							T2	X	X
Virginia's Warbler	T1C	T2						X	X
White-crowned Sparrow	T1C							X	X
Western Bluebird								X	X
Western Grebe	T1C		T2	T2			T2		
Western Kingbird				T2				X	X
Western Meadowlark						L2		X	X
White-faced Ibis		T2	T2		S3B		T2		
Willow Flycatcher	T1A	SE, T1						X	X
Willet						L2		X	X
Wilson's Phalarope				T2		L1		X	X
Williamson's Sapsucker	T1C							X	X
Wilson's Snipe							T2	X	X

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Species	State Agencies*							Density Estimate	Occupancy Estimate
	AZGFD	CPW	IDFG	KDWPT	MTFWP	NDGFD	NGPC		
Wild Turkey	T1B							X	X
Woodhouse's Scrub-Jay	T1C							X	X
Wood Thrush							T1		X
White-tailed Ptarmigan		T1			S3				X
White-throated Swift	T1C						T2	X	X
Dark-eyed Junco (White-winged)									
Yellow-breasted Chat	T1C							X	X
Yellow-billed Cuckoo	T1A	SSC, T1	T1		S3B			X	X
Yellow Warbler	T1B							X	X
Yellow-throated Vireo							T2		X

***AZGFD:** T1A = scored 1 for vulnerability and meets one of the following criteria: federally listed species, candidate for federal listing species, species covered under a signed conservation agreement, species recently removed from listing, closed season species; T1B = scored 1 for vulnerability and does not meet any of the criteria for T1A; T1C = unknown status species (Arizona Game and Fish Department, 2012); **CPW:** T1 = species of highest conservation priority in the state; T2 = important in light of forestalling population trends or habitat conditions; SSC = State Special Concern; SE = State Endangered; ST = State Threatened (Colorado Parks and Wildlife, 2015); **IDFG:** T1 = Tier 1 priority species; T2 = Tier 2 priority species; T3 = Tier 3 priority species (J. Halka, personal communication, 2018); **KDWPT:** T1 = Tier 1 priority species; T2 = Tier 2 priority species (C. Berens, personal communication, 2018); **MTFWP:** S1 = at high risk; S1B = at high risk, breeding; S1M = at high risk, migratory; S2 = at risk; S2B = at risk, breeding; S3 = potentially at risk; S3B = potentially at risk, breeding; S4 = apparently secure; S5N = common, nonbreeding (Montana Fish Wildlife and Parks, 2015); **NDGFD:** L1 = Level 1: species having a high level of conservation priority because of declining status either here or across their range or a high rate of occurrence in North Dakota constituting the core of the species breeding range (i.e. “responsibility” species) but are at-risk range wide; L2 = Level 2: Species having a moderate level of conservation priority or a high level of conservation priority but a substantial level of non-SWG funding is available to them; L3 = Level 3: species having a moderate level of conservation priority but are believed to be peripheral or non-breeding in North Dakota (Hagen, Isakson, & Dyke, 2005); **NGPC:** T1 = Tier I: Globally or nationally most at-risk of extinction; T2 = Tier II: State Critically Imperiled, State Imperiled or State Vulnerable (Schneider, 2001).

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Appendix E Continued. Priority species detected in 2017, by state, with management designations by state agencies. Agencies include New Mexico Department of Game and Fish (NMDGF), Oklahoma Department of Wildlife Conservation (ODWC), South Dakota Game, Fish and Parks (SDGFP), Texas Parks and Wildlife (TPWD), Utah Division of Wildlife Resources (UDWR) and Wyoming Game and Fish Department (WGFD). An “X” in the Occupancy or Density Estimated columns indicates estimates were generated for that species at some level in one or more of the states where it holds a priority designation.

Species	State Agencies*						Density Estimate	Occupancy Estimate
	NMDGF	ODWC	SDGFP	TPWD	UDWR	WYGF		
Abert's Towhee	SGCN, ST							
Acorn Woodpecker							X	X
American Avocet							X	X
American Kestrel				S4B		T3	X	X
American Pipit						T3	X	X
American Woodcock		T3		S2B, S3N				
Ash-throated Flycatcher						T2	X	X
American Three-toed Woodpecker			3				X	X
American White Pelican			2B	S2B, S3N	S3B	T2	X	
Bald Eagle	SGCN, ST	T3	1	S3B, S3N	S2B, S4N	T2	X	X
Baird's Sparrow	SGCN, ST	T3	2A	S2		T2	X	X
Baltimore Oriole							X	X
Black-and-white Warbler							X	X
Black-billed Cuckoo						T2		
Black-billed Magpie							X	X
Black-backed Woodpecker			3			T2		
Brown-crested Flycatcher							X	
Brown-capped Rosy-Finch	SGCN					T2	X	X
Black-chinned Sparrow	SGCN						X	X
Bendire's Thrasher	SGCN				SU			
Bell's Vireo	SGCN, ST	T2		S3B			X	X
Bewick's Wren				S5B		T3	X	X
Blue-gray Gnatcatcher						T3	X	X
Blue Grosbeak						T3	X	X
Black Rosy-Finch					S1	T2	X	X

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Species	State Agencies*						Density Estimate	Occupancy Estimate
	NMDGF	ODWC	SDGFP	TPWD	UDWR	WYGFD		
Barn Owl		T3						
Bobolink						T2	X	X
Boreal Chickadee								
Botteri's Sparrow	SGCN			S3B			X	X
Brewer's Blackbird							X	X
Brown Creeper							X	X
Brewer's Sparrow						T2	X	X
Bridled Titmouse								
Black-tailed Gnatcatcher							X	X
Band-tailed Pigeon					S3B		X	
Black-throated Gray Warbler	SGCN					T2	X	X
Bullock's Oriole		T3					X	X
Burrowing Owl	SGCN	T2	3	S3B	S3B	T1	X	X
Bushtit						T2	X	X
Carolina Chickadee				S5B				
Cassin's Finch	SGCN						X	X
California Gull							X	X
Calliope Hummingbird						T2		
Cassin's Kingbird							X	X
Canyon Wren						T3	X	X
Cassin's Sparrow	SGCN	T2		S4B			X	X
Caspian Tern					S3B	T2		
Curve-billed Thrasher							X	X
Chestnut-collared Longspur	SGCN	T2	2A			T2	X	X
Clark's Grebe	SGCN					T2		
Clark's Nutcracker	SGCN					T2	X	X
Cordilleran Flycatcher							X	X
Costa's Hummingbird	SGCN, ST							
Common Loon						T1		
Common Nighthawk	SGCN					T3	X	X

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Species	State Agencies*						Density Estimate	Occupancy Estimate
	NMDGF	ODWC	SDGFP	TPWD	UDWR	WYGFD		
Common Poorwill								
Common Yellowthroat				S5B		T3	X	X
Chuck-will's-widow				S3, S4B				
Dickcissel				S4B		T2	X	X
Dusky Flycatcher							X	X
Eastern Kingbird							X	X
Eastern Meadowlark				S5B			X	X
Eastern Wood-Pewee							X	X
Evening Grosbeak	SGCN						X	X
Ferruginous Hawk		T3	3	S2B, S4N	S3B	T2		X
Field Sparrow				S5B			X	X
Forster's Tern				S5		T2		
Franklin's Gull				S2		T2		X
Great Blue Heron						T2	X	X
Great Gray Owl						T2		
Gilded Flicker								
Gila Woodpecker	SGCN, ST						X	
Golden Eagle		T3		S3B	S4	T2	X	
Gray Flycatcher							X	X
Green Heron				S5B				
Greater Prairie-Chicken		T3	2A	S1B			X	X
Greater Sage-Grouse			3		S3	T2	X	X
Grasshopper Sparrow	SGCN, SE			S3B		T2	X	X
Gray Vireo	SGCN, ST					T2	X	X
Grace's Warbler	SGCN						X	X
Green-tailed Towhee							X	X
Hooded Oriole								
Harris's Hawk				S3B				
Juniper Titmouse	SGCN	T3				T2	X	X
Lark Bunting			2A				X	X

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Species	State Agencies*						Density Estimate	Occupancy Estimate
	NMDGF	ODWC	SDGFP	TPWD	UDWR	WYGFD		
Lark Sparrow				S4B			X	X
Lazuli Bunting							X	X
Long-billed Curlew	SGCN	T2	2A	S3B, S5N		T2	X	X
Lesser Prairie-Chicken	SGCN	T2		S2B			X	X
Least Tern	SGCN, SE	T2	1, SE	S3B				
Lewis's Woodpecker	SGCN		3		S3	T2	X	X
Loggerhead Shrike	SGCN	T1		S4B		T2	X	X
Lucy's Warbler	SGCN						X	X
Marbled Godwit			2A				X	X
McCown's Longspur	SGCN	T2		S4		T2	X	X
Mexican Jay								
Merlin						T3		
MacGillivray's Warbler						T2	X	X
Mississippi Kite				S4B				
Mountain Bluebird	SGCN						X	X
Montezuma Quail				S3B				
Mountain Plover	SGCN	T1		S2		T1	X	
Mountain Quail								
Nelson's Sparrow		T3						
Northern Bobwhite		T3		S4B			X	X
Northern Goshawk			3			T1		
Northern Harrier				S2B, S3N			X	X
Northern Pygmy-Owl					S3, S4B	T2		
Orange-crowned Warbler							X	X
Olive Warbler							X	
Orchard Oriole				S4B			X	X
Olive-sided Flycatcher	SGCN				S3, S4B		X	X
Osprey			1, ST				X	
Painted Bunting		T2		S4B			X	X
Painted Redstart	SGCN							

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Species	State Agencies*						Density Estimate	Occupancy Estimate
	NMDGF	ODWC	SDGFP	TPWD	UDWR	WYGFD		
Pacific Wren							X	X
Peregrine Falcon	SGCN, ST	T3	1, SE	S3	S3B	T2		
Phainopepla							X	X
Pinyon Jay	SGCN	T3					X	X
Piping Plover		T3	1, ST	S2				
Pileated Woodpecker				S4B			X	X
Plumbeous Vireo							X	X
Prairie Falcon		T3					X	X
Purple Martin						T3	X	X
Pygmy Nuthatch	SGCN					T2	X	X
Ring-billed Gull							X	X
Rufous-crowned Sparrow				S4B			X	X
Red Crossbill						T2	X	X
Red-eyed Vireo						T2	X	X
Red-faced Warbler	SGCN						X	X
Red-headed Woodpecker	SGCN	T2		S3B		T2	X	X
Ruby-throated Hummingbird								
Ruffed Grouse			3				X	X
Rufous Hummingbird						T2		X
Rufous-winged Sparrow							X	X
Sandhill Crane							X	X
Sagebrush Sparrow	SGCN					T2	X	X
Sage Thrasher						T2	X	X
Savannah Sparrow							X	X
Scott's Oriole						T2	X	X
Scaled Quail		T3		S4B			X	X
Short-eared Owl		T3		S4N		T2	X	X
Sedge Wren				S4			X	X
Snowy Egret		T3		S5B		T2		
Snowy Plover	SGCN	T1		S3B	S3B	T3		

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Species	State Agencies*						Density Estimate	Occupancy Estimate
	NMDGF	ODWC	SDGFP	TPWD	UDWR	WYGFD		
Sora							X	
Sprague's Pipit	SGCN	T3	2A	S3N			X	X
Sharp-shinned Hawk								X
Scissor-tailed Flycatcher				S3B			X	X
Sharp-tailed Grouse					S2	T2	X	X
Summer Tanager				S5B			X	X
Swainson's Hawk		T2		S4B		T2	X	X
Swamp Sparrow								
Trumpeter Swan		T3	2B			T2		
Upland Sandpiper		T3				T2	X	X
Varied Bunting	SGCN, ST							
Varied Thrush							X	X
Veery							X	X
Vermilion Flycatcher								X
Vesper Sparrow	SGCN						X	X
Violet-green Swallow							X	X
Virginia's Warbler	SGCN					T2	X	X
White-crowned Sparrow							X	X
Western Bluebird	SGCN						X	X
Western Grebe						T2		
Western Kingbird							X	X
Western Meadowlark							X	X
White-faced Ibis				S4B	S2, S3B	T2		
Willow Flycatcher	SGCN, SE	T3			S1B	T3	X	X
Willet			2B				X	X
Wilson's Phalarope		T3	2B				X	X
Williamson's Sapsucker	SGCN					T2	X	X
Wilson's Snipe							X	X
Wild Turkey	SGCN, ST			S5B			X	X
Woodhouse's Scrub-Jay						T2	X	X

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Species	State Agencies*						Density Estimate	Occupancy Estimate
	NMDGF	ODWC	SDGFP	TPWD	UDWR	WYGFD		
Wood Thrush		T2		S4B				X
White-tailed Ptarmigan	SGCN, SE							X
White-throated Swift							X	X
Dark-eyed Junco (White-winged)			2B					
Yellow-breasted Chat							X	X
Yellow-billed Cuckoo	SGCN			S4, S5B	S2B	T2	X	X
Yellow Warbler							X	X
Yellow-throated Vireo								X

***NMDGF**: SGCN = Species of Greatest Conservation Need; ST = State Threatened; SE = State Endangered (New Mexico Department of Game and Fish, 2016); **ODWC**: Tier 1 = Species receiving a combined score of 13 to 15 on Oklahoma's Species of Greatest Conservation Need Selection and Scoring Criteria; Tier 2 = Species receiving a combined score of 11 or 12 on Oklahoma's Species of Greatest Conservation Need Selection and Scoring Criteria; Tier 3 = Species receiving a combined score of 6 to 10 on Oklahoma's Species of Greatest Conservation Need Selection and Scoring Criteria (Oklahoma Department of Wildlife Conservation, 2015); **SDGFP**: 1 = State or federally listed species for which the state has a mandate for recovery 2A = Species that are regionally or globally imperiled and for which South Dakota represents an important portion of their remaining range; 2B = Species that are regionally or globally secure* and for which South Dakota represents an important portion of their remaining range; 3 = Species with characteristics that make them vulnerable (E. Dowd, personal communication; 2018); **TPWD**: S1 = Critically Imperiled; S1B = Critically Imperiled Breeding; S2 = Imperiled; S2B = Imperiled Breeding; S3 = Vulnerable; S3B = Vulnerable Breeding; S3N = Vulnerable Nonbreeding; S4 = Apparently Secure; S4B = Apparently Secure Breeding; S5 = Secure; S5B = Secure Breeding; SHB = Possibly Extirpated Breeding; SXB = Presumed Extirpated Breeding (Texas Parks and Wildlife Department, 2012); **UDWR**: S1 = Critically Imperiled; S1B = Critically Imperiled Breeding; S2 = Imperiled; S2B = Imperiled Breeding; S3 = Vulnerable; S3B = Vulnerable Breeding; S3N = Vulnerable Nonbreeding; S4 = Apparently secure; S4B = Apparently secure Breeding; S4N = Apparently secure Nonbreeding; SU = Unrankable, due to conflicting or inadequate information; (Utah Wildlife Action Plan Joint Team, 2015); **WYGF**: Tier 1 = Species scoring 37-54 on WYGF's ranking matrix; Tier 2 = Species scoring 19-36 on WYGF's ranking matrix; Tier 3 = Species scoring 1-88 on the WYGF's ranking matrix (Wyoming Game and Fish Department, 2016).

Appendix F: Priority Species Designations for the Bureau of Land Management

Priority species detected on Bureau of Land Management lands in 2017, with management designations by state. An “X” in the Occupancy or Density Estimated columns indicates 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.

Species	Bureau of Land Management*							Density Estimate	Occupancy Estimate
	Colorado	Idaho	Montana	North Dakota	South Dakota	Utah	Wyoming		
Baird's Sparrow			SS	SS	SS		SS	X	X
Bald Eagle	SS	T2	SS	SS	SS	SS	SS	X	X
Black-chinned Sparrow						SS		X	X
Black-throated Gray Warbler						SS		X	X
Black-throated Sparrow		T2						X	X
Blue-gray Gnatcatcher			SS		SS			X	X
Brewer's Sparrow	SS	T2	SS		SS	SS	SS	X	X
Burrowing Owl	SS	T2	SS	SS	SS	SS	SS	X	X
Cassin's Finch		T2				SS		X	X
Chestnut-collared Longspur			SS		SS	SS		X	X
Ferruginous Hawk	SS	T2	SS	SS	SS	SS	SS		X
Franklin's Gull			SS		SS				X
Gambel's Quail						SS		X	X
Golden Eagle	SS	T2	SS	SS	SS	SS		X	
Grasshopper Sparrow		T2				SS		X	X
Gray Vireo						SS		X	X
Greater Sage-Grouse	SS	T2	SS	SS	SS	SS	SS	X	X
Green-tailed Towhee		T2				SS		X	X
Lewis's Woodpecker		T2	SS			SS		X	X
Loggerhead Shrike		T2	SS		SS	SS	SS	X	X

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Species	Bureau of Land Management*							Density Estimate	Occupancy Estimate
	Colorado	Idaho	Montana	North Dakota	South Dakota	Utah	Wyoming		
Long-billed Curlew	SS	T2	SS	SS	SS	SS	SS	X	X
Lucy's Warbler						SS		X	X
McCown's Longspur			SS		SS			X	X
Mountain Plover	SS		SS		SS	SS	SS	X	
Northern Goshawk	SS	T2				SS	SS		
Olive-sided Flycatcher		T2				SS		X	X
Peregrine Falcon	SS		SS	SS	SS	SS	SS		
Pinyon Jay		T2				SS		X	X
Prairie Falcon						SS		X	X
Sage Thrasher		T2	SS		SS	SS	SS	X	X
Sagebrush Sparrow		T2	SS		SS	SS	SS	X	X
Sharp-tailed Grouse	SS	T2				SS	SS	X	X
Short-eared Owl		T2				SS		X	X
Sprague's Pipit			SS	SS	SS			X	X
Vaux's Swift		T2							
Veery			SS		SS	SS		X	X
Virginia's Warbler		T2				SS		X	X
Willow Flycatcher		T2				SS		X	X

*SS = Sensitive Species; Colorado (R. Sell, personal communication, 2018); Montana (Montana Natural Heritage Program, 2015); North Dakota, South Dakota (Bureau of Land Management, 2014); Utah (G.D. Cook, personal communication, 2018); Wyoming (Bureau of Land Management, 2010); T2 = Tier 2 Sensitive Species; Idaho (Bureau of Land Management, 2015).

Appendix G: Priority Species Designations for USFS Region 1

Priority species detected on US Forest Service lands in Region 1 in 2017, with management designations by region and unit. Codes for Units: Beaverhead-Deerlodge NF (BDNF), Bitterroot NF (BINF), Clearwater NF (CLNF), Custer NF (CUNF), Flathead NF (FLNF), Gallatin NF (GANF), Helena NF (HENF), Idaho Panhandle NF (IPNF). An “X” in the Occupancy or Density Estimated columns indicates estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

Species	USFS Region 1*								Density Estimate	Occupancy Estimate
	BDNF	BINF	CLNF	CUNF	FLNF	GANF	HENF	IPNF		
American Three-toed Woodpecker									X	X
Baird's Sparrow				SS					X	X
Bald Eagle	SS	SS	MIS,SS	SS	MIS,SS	MIS,SS	SS,MIS	SS	X	X
Belted Kingfisher			MIS						X	X
Black-backed Woodpecker	SS	SS	SS	SS	SS,MIS	SS	SS	SS		
Brewer's Sparrow				MIS					X	X
Bullock's Oriole				MIS					X	X
Chipping Sparrow								FS	X	X
Common Loon					MIS,SS			SS		
Dusky Flycatcher								FS	X	X
Dusky Grouse									X	X
Golden Eagle									X	
Hairy Woodpecker							FS,MIS	FS	X	X
Hammond's Flycatcher								FS	X	X
Lark Sparrow				MIS					X	X
Loggerhead Shrike				SS					X	X
Mountain Quail										
Northern Goshawk			MIS	MIS		MIS	MIS			
Olive-sided Flycatcher								FS	X	X
Ovenbird				MIS					X	X
Pileated Woodpecker		MIS	MIS				MIS		X	X
Prairie Falcon									X	X
Pygmy Nuthatch			SS					SS	X	X
Ruffed Grouse				MIS					X	X
Spotted Towhee				MIS					X	X

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Species	USFS Region 1*								Density Estimate	Occupancy Estimate
	BDNF	BINF	CLNF	CUNF	FLNF	GANF	HENF	IPNF		
Sprague's Pipit									X	X
Western Kingbird				MIS					X	X
Yellow Warbler				MIS					X	X

*R1SS = Region 1 Sensitive Species; MIS = Management Indicator Species; FS = Focal Species; FT = Federally Threatened (C. Staab, personal communication, 2018)

Appendix G continued. Priority species detected on US Forest Service lands in Region 1 in 2017, with management designations by region and unit. Codes for Units: Kootenai NF (KONF), Lewis and Clark NF (LCNF), Lolo NF (LONF), Nez Perce NF (NPNF), Dakota Prairie NG (DPNG). An "X" in the Occupancy or Density Estimated columns indicates estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

Species	USFS Region 1*					Density Estimate	Occupancy Estimate
	KONF	LCNF	LONF	NPNF	DPNG		
American Three-toed Woodpecker		MIS				X	X
Baird's Sparrow					SS	X	X
Bald Eagle	SS	MIS,SS	SS	MIS,SS		X	X
Belted Kingfisher						X	X
Black-backed Woodpecker	SS	SS	SS	SS			
Brewer's Sparrow						X	X
Bullock's Oriole						X	X
Chipping Sparrow	FS					X	X
Common Loon	SS		SS	SS			
Dusky Flycatcher	FS					X	X
Dusky Grouse		MIS				X	X
Golden Eagle		MIS				X	
Hairy Woodpecker	FS					X	X
Hammond's Flycatcher	FS					X	X
Lark Sparrow						X	X
Loggerhead Shrike					SS	X	X
Mountain Quail				SS			
Northern Goshawk		MIS	MIS	MIS			

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Species	USFS Region 1*					Density Estimate	Occupancy Estimate
	KONF	LCNF	LONF	NPNF	DPNG		
Olive-sided Flycatcher	FS					X	X
Ovenbird						X	X
Pileated Woodpecker			MIS	MIS		X	X
Prairie Falcon		MIS				X	X
Pygmy Nuthatch				SS		X	X
Ruffed Grouse						X	X
Spotted Towhee						X	X
Sprague's Pipit					SS	X	X
Western Kingbird						X	X
Yellow Warbler						X	X

* R1SS = Region 1 Sensitive Species; MIS = Management Indicator Species; FS = Focal Species; FT = Federally Threatened (C. Staab, personal communication, 2018)

Appendix H: Priority Species Designations for USFS Region 2

Priority species detected on US Forest Service lands in Region 2 in 2017, 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/Samuel R. McKelvie NF (NENF), Rio Grande NF (RGNF), Routt NF (RONF), and San Juan NF (SJNF). An “X” in the Occupancy or Density Estimated columns indicates estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

Species	USFS Region 2*										Density Estimate	Occupancy Estimate
	Region 2	ARNF	BHNF	BINF	GMUG	MBNF	NENF	RGNF	RONF	SJNF		
American Bittern	R2SS											
American Dipper			SLC									
American Pipit											X	X
American Three-toed Woodpecker						MIS					X	X
Bald Eagle	R2SS				MIS						X	X
Brewer's Sparrow	R2SS			MIS	MIS						X	X
Broad-winged Hawk			SLC									
Brown Creeper			MIS			SSC		MIS			X	X
Brown-capped Rosy-Finch						SSC					X	X
Bullock's Oriole											X	X
Burrowing Owl	R2SS	MIS									X	X
Cassin's Sparrow	R2SS										X	X
Chestnut-collared Longspur	R2SS										X	X
Cooper's Hawk			SLC								X	X
Dusky Grouse											X	X
Ferruginous Hawk	R2SS	MIS									X	
Golden-crowned Kinglet		MIS	MIS	SLC		MIS			MIS		X	X
Grasshopper Sparrow	R2SS		MIS								X	X
Greater Prairie-Chicken	R2SS						MIS				X	X
Green-tailed Towhee										MIS	X	X
Hairy Woodpecker		MIS			MIS					MIS	X	X
Hermit Thrush								MIS			X	X

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Species	USFS Region 2*										Density Estimate	Occupancy Estimate	
	Region 2	ARNF	BHNF	BINF	GMUG	MBNF	NENF	RGNF	RONF	SJNF			
Lark Bunting		MIS										X	X
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
Mallard										MIS		X	X
McCown's Longspur	R2SS											X	X
Mountain Bluebird		MIS								MIS		X	X
Northern Goshawk	R2SS				MIS	MIS			MIS	MIS			
Northern Harrier	R2SS											X	X
Olive-sided Flycatcher	R2SS											X	X
Peregrine Falcon	R2SS				MIS								
Pinyon Jay					MIS							X	X
Purple Martin	R2SS											X	X
Pygmy Nuthatch		MIS	SLC	SLC			MIS	MIS				X	X
Red Crossbill					MIS							X	X
Red-breasted Nuthatch				MIS								X	X
Ruffed Grouse			MIS									X	X
Sharp-shinned Hawk			SLC									X	
Sharp-tailed Grouse	R2SS						MIS			MIS		X	X
Song Sparrow			MIS									X	X
Swainson's Hawk				SLC								X	X
Vesper Sparrow								MIS	MIS			X	X
Virginia's Warbler												X	X
Warbling Vireo		MIS										X	X
White-tailed Ptarmigan	R2SS											X	
Wild Turkey										MIS		X	X
Willow Flycatcher										MIS		X	X
Wilson's Warbler		MIS				MIS		MIS	MIS	MIS		X	X

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Species	USFS Region 2*										Density Estimate	Occupancy Estimate
	Region 2	ARNF	BHNF	BINF	GMUG	MBNF	NENF	RGNF	RONF	SJNF		
Yellow-billed Cuckoo	R2SS										X	X

*R2SS = Region 2 Sensitive Species; MIS = Management Indicator Species; SLC = Species of Local Concern; SC = Species of Concern; SVC = Species of Viability Concern; SSC = Species of Special Concern (US Forest Service, 2008)

Appendix H continued. Priority species detected on US Forest Service lands in Region 2 in 2017, with management designations by region and unit. Codes for Units: Shoshone NF (SHNF), White River NF (WRNF), Buffalo Gap NG (BGNG) Comanche NG (CONG), Fort Pierre NG (FPNG), Oglala NG (OGNG), Pawnee NG (PANG), and Thunder Basin NG (TBNG). An “X” in the Occupancy or Density Estimated columns indicates estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

Species	USFS Region 2*										Density Estimate	Occupancy Estimate
	Region 2	SHNF	WRNF	BGNG	CONG	FPNG	OGNG	PANG	TBNG			
American Bittern	R2SS											
American Dipper												
American Pipit			MIS								X	X
American Three-toed Woodpecker											X	X
Bald Eagle	R2SS	MIS									X	X
Brewer's Sparrow	R2SS	MIS	MIS								X	X
Broad-winged Hawk												
Brown Creeper											X	X
Brown-capped Rosy-Finch											X	X
Bullock's Oriole					MIS						X	X
Burrowing Owl	R2SS								MIS		X	X
Cassin's Sparrow	R2SS										X	X
Chestnut-collared Longspur	R2SS										X	X
Cooper's Hawk											X	X
Dusky Grouse		MIS									X	X
Ferruginous Hawk	R2SS								MIS		X	
Golden-crowned Kinglet									MIS		X	X
Grasshopper Sparrow	R2SS										X	X

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Species	USFS Region 2*									Density Estimate	Occupancy Estimate
	Region 2	SHNF	WRNF	BGNG	CONG	FPNG	OGNG	PANG	TBNG		
Greater Prairie-Chicken	R2SS					MIS				X	X
Green-tailed Towhee										X	X
Hairy Woodpecker		MIS						MIS		X	X
Hermit Thrush										X	X
Lark Bunting								MIS		X	X
Lewis's Woodpecker	R2SS									X	X
Lincoln's Sparrow										X	X
Loggerhead Shrike	R2SS									X	X
Long-billed Curlew	R2SS				MIS					X	X
Mallard										X	X
McCown's Longspur	R2SS									X	X
Mountain Bluebird								MIS		X	X
Northern Goshawk	R2SS	MIS									
Northern Harrier	R2SS									X	X
Olive-sided Flycatcher	R2SS									X	X
Peregrine Falcon	R2SS	MIS	SC								
Pinyon Jay										X	X
Purple Martin	R2SS									X	X
Pygmy Nuthatch			SVC					MIS		X	X
Red Crossbill										X	X
Red-breasted Nuthatch										X	X
Ruffed Grouse		MIS								X	X
Sharp-shinned Hawk										X	
Sharp-tailed Grouse	R2SS			MIS		MIS	MIS		MIS	X	X
Song Sparrow										X	X
Swainson's Hawk										X	X
Vesper Sparrow										X	X
Virginia's Warbler			MIS							X	X
Warbling Vireo								MIS		X	X
White-tailed Ptarmigan	R2SS									X	

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Species	USFS Region 2*									Density Estimate	Occupancy Estimate
	Region 2	SHNF	WRNF	BGNG	CONG	FPNG	OGNG	PANG	TBNG		
Wild Turkey										X	X
Willow Flycatcher										X	X
Wilson's Warbler								MIS		X	X
Yellow-billed Cuckoo	R2SS									X	X

*R2SS = Region 2 Sensitive Species; MIS = Management Indicator Species; SLC = Species of Local Concern; SC = Species of Concern; SVC = Species of Viability Concern; SSC = Species of Special Concern (US Forest Service, 2008)

Appendix I: Priority Species Designations for USFS Region 3

Priority species detected on US Forest Service lands in Region 3 in 2017, with management designations by region and unit. An “X” in the Occupancy or Density Estimated columns indicates estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

Species	USFS Region 3*				Density Estimate	Occupancy Estimate
	Region 3	Coconino NF	Kaibab NF	Kiowa & Rita Blanca National Grasslands		
Bald Eagle	R3SS				X	X
Burrowing Owl	R3SS			PMIS	X	X
Grace's Warbler			FS		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	X	X
Pygmy Nuthatch		MIS			X	X
Ruby-crowned Kinglet			FS		X	X
Western Bluebird			FS		X	X
Wild Turkey	R3SS	MIS			X	X

*R3SS = USFS Region 3 Sensitive Species; MIS = Management Indicator Species; PMIS = Proposed Management Indicator Species; SS = Sensitive Species; FS = Focal Species (S. R. Plunkett and N. Kline, personal communication, 2018).

Appendix J: Priority Species Designations for USFS Region 4

Priority species detected on US Forest Service lands in Region 4 in 2017, 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 estimates were generated for that species in at least one USFS stratum where it holds a priority designation.

Species	USFS Region 4*											Density Estimate	Occupancy Estimate	
	Region 4	ASNF	BONF	BTNF	CTNF	HTNF	MLNF	PANF	SCNF	SANF	UWCNF			
American Dipper			FS											
American Three-toed Woodpecker	R4SS		SS								MIS		X	X
Bald Eagle	R4SS		SS	MIS	MIS								X	X
Black-backed Woodpecker			MIS											
Brewer's Sparrow				MIS				MIS		SI			X	X
Brown Creeper										MIS			X	X
Brown-headed Cowbird						MIS							X	X
Burrowing Owl						CAS							X	X
Cooper's Hawk								SS					X	X
Dusky Grouse			FS					MIS					X	X
Golden Eagle		MIS						MIS, SS						X
Great Gray Owl	R4SS		SS							MIS				
Greater Sage-Grouse	R4SS		SS			MIS, S		MIS	PMIS	MIS			X	X
Lewis's Woodpecker			FS				SS	MIS					X	X
Lincoln's Sparrow		MIS											X	X
Loggerhead Shrike			FS										X	X
Mountain Bluebird										MIS			X	X
Mountain Chickadee								MIS					X	X
Mountain Quail	R4SS													

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Species	USFS Region 4*											Density Estimate	Occupancy Estimate
	Region 4	ASNF	BONF	BTNF	CTNF	HTNF	MLNF	PANF	SCNF	SANF	UWCNF		
Northern Goshawk	R4SS	MIS	SS		MIS	CAS, MIS			MIS	MIS	MIS		
Olive-sided Flycatcher										SI		X	X
Peregrine Falcon	R4SS		SS	MIS	MIS								
Pileated Woodpecker			MIS					MIS	MIS			X	X
Pine Siskin			FS									X	X
Pinyon Jay						SC						X	X
Pygmy Nuthatch									MIS			X	X
Red-naped Sapsucker		MIS										X	X
Ruby-crowned Kinglet									MIS			X	X
Sharp-tailed Grouse	R4SS		SS					MIS		SI		X	X
Song Sparrow		MIS										X	X
Vesper Sparrow								MIS	MIS			X	X
Warbling Vireo		MIS										X	X
Western Meadowlark			FS									X	X
Western Tanager						MIS						X	X
White-headed Woodpecker	R4SS		MIS					PMIS					
Williamson's Sapsucker						MIS		MIS				X	X
Willow Flycatcher	FE											X	X
Wilson's Warbler			FS									X	X
Yellow Warbler								MIS	MIS			X	X
Yellow-rumped Warbler						MIS						X	X

*CAS = Conservation Agreement Species; FE = Federally Endangered Species; FS = Focal Species; MIS = Management Indicator Species; PMIS = Proposed Management Indicator Species; R4SS = Region 4 Sensitive Species; SC = Species of Concern; SI = Species of Interest; SS = Sensitive Species (R. Sadak, personal communication, 2018)