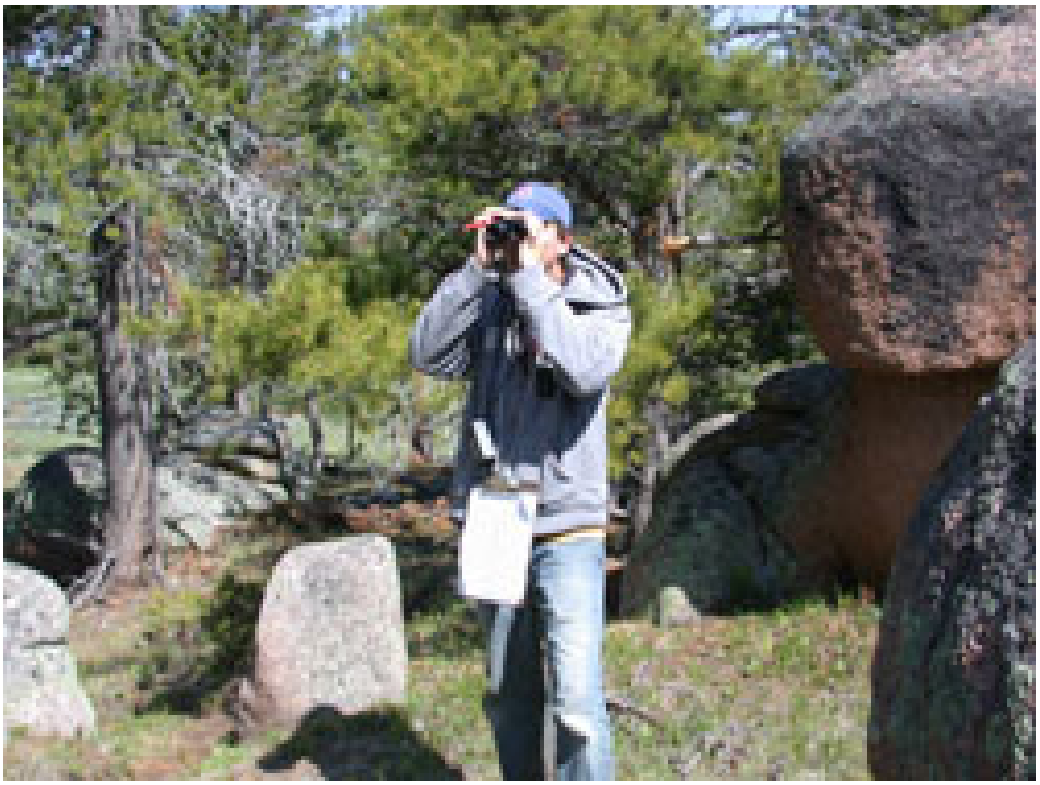
# Monitoring Wyoming's Birds

## 2002-2004 Final Report

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## Executive Summary

In 2002, Rocky Mountain Bird Observatory (RMBO), in cooperation with Bureau of Land Management, U.S. Forest Service, Wyoming Game and Fish Department, and the Wyoming Partners In Flight group, implemented a long-term, habitat-based bird monitoring program designed to provide rigorous population trend data on most diurnal, regularly occurring breeding bird species in Wyoming (Leukering et al. 2001). Modeled after *Monitoring Colorado's Birds* (Leukering et al. 2000), this program is entitled *Monitoring Wyoming's Birds* (MWB). *Monitoring Wyoming's Birds* is consistent with goals emphasized in the Partners In Flight National Landbird Monitoring Strategy (Bart et al. 2001) and, in addition to monitoring bird populations, generates a wealth of information useful in managing birds (e.g., habitat associations, spatial distribution). This report summarizes the findings from the first three years of what is designed to be a long-term, cooperative effort to monitor bird populations in Wyoming.

# Statewide Monitoring

## Report Format

The format for this report differs from the reports of the previous two years. I have done this to simplify how the data are presented and to subdue the powerful desire to compare summarized data from year to year based solely on these reports. So, in this document, I provide the raw number of individuals per habitat per year and expound in the individual species accounts the effectiveness of this program to monitor that particular, or suite, of species. The previous reports incorporated density estimates, however, because that parameter can be a confusing (and its only real purpose is for use in trend analyses which we are not prepared to conduct so early in the program) I have not included it in this report. Bird species scientific names appear in Appendix A.

## Data Requests

Raw data can be obtained by contacting either Michele Shimomura, RMBO Monitoring Database Manager (michele.shimomura@rmbo.org or 970-482-1707) or Hamilton Smith, Wyoming Natural Diversity Database Assistant Zoologist (bhsmith@uwyo.edu or 307-766-3035).

## Methods

Habitats

During 2002-2004, we conducted statewide transects in six habitats: Aspen, Grassland, Juniper Woodland, Mid-elevation Conifer, Montane Riparian, and Shrubsteppe. We also surveyed in Plains/Basin Riparian for as much of three navigable rivers as possible: Bighorn River, Green River, and North Platte River. The riparian surveys were intended to determine the capacity of these rivers for future monitoring work and to provide a base from which to select 30 random miles to survey annually.

*Aspen*
This habitat consists of stands dominated by quaking aspen (*Populus tremuloides*). However, these stands are rarely homogeneous and are often intermixed with coniferous trees. This habitat is widespread in all of the major mountain ranges with the most extensive tracts occurring in the Medicine Bow National Forest along the Colorado border. GAP code: 4100

*Shortgrass Prairie* (*Grassland*)
Because this habitat can include shortgrass prairie, mixed-grass prairie, and Great Basin foothills grassland, this program uses Grassland for the habitat name instead of Shortgrass Prairie. Stand selection, however, did not allocate any transects in stands of Great Basin Foothills grassland. This habitat is primarily restricted to east of the continental divide. GAP codes: 31001, 31002

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

*Mid-elevation Conifer*
This habitat generally contains several conifer species in either pure or mixed stands. Tree species include Douglas-fir (*Pseudotsuga menziesii*), blue spruce (*Picea pungens*), lodgepole pine (*Pinus contorta*), limber pine (*Pinus flexilis*), ponderosa pine (*Pinus ponderosa*), and occasionally has an aspen component. This is the dominant forest habitat (6.38% of land area; Nicholoff 2003) in Wyoming and occurs in all major mountain ranges, except in the far northeast corner of the state. GAP codes: 42003, 42004, 42009, 42016, 42001 (between 7,000 and 8,500 feet)

*Montane Riparian*
This habitat is associated with higher-elevation (i.e., montane) rivers and streams where willow (*Salix* spp.) is the dominant woody cover. This habitat's transects focus on the suite of bird species dependent on willows as a nesting substrate (e.g.,Veery, Wilson's Warbler, and Fox Sparrow). However, these areas tend to be linear and narrow in nature, so the surrounding forest type usually influences species recorded. GAP codes: 61001, 62001, 62003 (above 7,500 feet)

*Plains/Basin Riparian*
Habitat associated with low-elevation (i.e., non-montane) rivers and streams that contain a woody overstory component. Overstory tree species include cottonwoods (*Populus* spp.), Russian olive (*Elaeagnaceae augustifolia*), willows (*Salix* spp.), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americanus*).

This is perhaps the most difficult habitat to survey, as it requires boat-handling skills and considerable preparation in determining potential safety hazards (i.e., weirs, dangerous whitewater, property line fences crossing water, etc.), and relies on adequate water flow,

as well as public put-in and take-out locations. GAP codes: 61001, 62001, 62003 (below 7,500 feet)

*Shrubsteppe*
This habitat is dominated by sagebrush (*Artemisia* spp.), greasewood (*Sarcobatus vermiculatus*), saltbrush (*Altriplex* spp.), and rabbitbrush (*Chrysothamnus* spp.) and can include a grass component. This is the most extensive habitat in Wyoming (42.74% of land area; Nicholoff 2003) and is found in low-elevation settings throughout the state.
GAP codes: 32002, 32006, 32007, 32008, 32009, 32010, 32011, 32012, 32013

Transect selection
Stand selection depended on initial GAP Analysis Land Cover data with secondary ground-truthing during the field season by the technician responsible for that transect. Nathan Nibbelink performed the GIS stand selection through a contract with the Bighorn National Forest. His final report to the Bighorn NF describing the selection process and criteria accompanies this report with the permission of Jon Warder, Bighorn NF.

For each habitat, we randomly selected 60 stands, of which 30 were again randomly chosen as study sites. The remaining 30 stands were held as alternates in case any of the selected 30 stands were unsuitable (i.e., wrong habitat, not accessible, dangerous topography, etc.). In cases where an alternate was not available, the nearest suitable stand was used.

In 2004, because of difficulties locating transects on publicly managed Grassland stands, we opted to place transects along public right-of-ways (i.e., secondary or tertiary roads) regardless of land ownership. This situation also occurred in the Colorado program, an apparently universal dilemma inherent to performing transects in a predominantly privately owned habitat.

Survey technique
*Point transects* – Transects consisted of 15 five-minute point counts spaced at 250-m intervals along the line. We considered the intervals between points as legs of a line transect. At the individual points, observers recorded the radial distance to each bird detected. Along the transect legs, we recorded individuals of a short list of the habitat's target species whose population densities are relatively low (thus, poorly recorded on point counts) and estimated the perpendicular distance to each. Observers also recorded perpendicular distances for individuals of these target species detected on points in order to be able to pool birds on points with birds on transect legs. Individual birds initially detected on points were not recorded between points.

A departure in the bird data collection protocol from previous years was that starting in 2004, RMBO monitoring programs now treat all non-independent detections of individual birds as part of a 'cluster' together with the first independently observed bird, rather than as separate independent observations of those individuals. This means that if the detection of an individual bird is dependent upon the previous detection of another individual, the resulting observation is recorded as one independent detection with a

cluster size of C, where C is the original individual detected plus the sum of any additional individuals detected as a result of the first individual revealing its presence. For example, a bird sings, and is thus detected independently. The observer then looks over to that bird, and as a result, detects a second individual. The resulting observation is recorded as a single detection of a cluster of two birds. This practice ensures that we adhere more strictly to the assumption inherent in random sampling that all observations are independent of each other.

One observer conducted each transect once each year using protocol established by Leukering (2000). Field biologists conducted transects beginning with the low-elevation habitats in mid-May and progressing to the montane habitats in June. They ran transects in each habitat in about a three-week window, with the windows primarily tied to the main song period of the majority of the habitat's breeding birds. However, they had to compromise at the end of the seasons due to logistical constraints, especially regarding snowstorms in June that would have made attempting those transects unsafe.

When establishing a new transect, the observer located the selected stand on the ground and conducted the transect along a randomly selected bearing. For many transects, observers found it impossible to run the entire transect along the random bearing, because stand boundaries, property boundaries, and physical obstructions forced turns in the transect direction. When this happened, the observer randomly turned right or left perpendicular to the random bearing, subsequently alternating perpendicular directions if additional turns were necessary. In some stands, the narrowness of the stands determined the location and bearing of the transects. Universal Transverse Mercator (UTM) locations are gathered using hand-held GPS units at each point count. In subsequent years, each transect is run on the same bearings as established.

Observers recorded weather data and the time at the start and end of each transect. Weather data recorded were sky condition (cloud cover and precipitation), wind (on the Beaufort scale), and temperature. They did not conduct transects in high winds (>4 Beaufort), rain, or snow (though, drizzle and flurries were acceptable). At each point, observers recorded whether or not the point was within 100m of a road. In 2002 and 2003, observers recorded the specific habitat and seral stage (1-5 scale; Buttery and Gillam 1983) of each of the two predominant habitats around each point (often there was only one habitat present). The observers also recorded the two most common understory types present within 50m of the point and the percentage of that 50m circle that each occupied. In 2004, they continued to record the specific habitat and seral stage, but also included canopy cover, height of canopy, five most dominant tree species, sub-canopy species composition and percent volume, shrub layer species composition, mean height, and percent volume, and percent ground cover of woody, herbaceous, grass, and bare ground categories.

Rocky Mountain Bird Observatory staff used program DISTANCE (Thomas et al. 1998) to analyze distance-estimate data and provided those results in the first two year's annual reports. In this report, however, I do not report densities. Density is the identified parameter for trend analysis and it is premature to conduct such analyses with only three

year's worth of data. In addition, the DISTANCE program continues to evolve and recent analyses may not be comparable to those in subsequent years. So, to avoid possible confusion and comparison between years, I provide only the summarized raw data here.

*Plains/Basin Riparian transects* – The years 2002-2004 coincided with a broad regional drought pattern that greatly affected the number of rivers that could be effectively navigated for monitoring. Therefore, we opted to conduct surveys on as many miles of river as possible on three main river systems. By canoe or raft, we surveyed continuous one-mile stretches on the Bighorn, Green, and North Platte rivers, with one person responsible for watercraft operation and the other conducting the survey. We recorded UTMs for beginning and end of each survey mile. All birds detected were recorded.

The bulk of this report focuses on the main survey technique–point transects–and results from those efforts. Current funding levels are not sufficient to conduct additional survey work, except for what can be completed by either volunteers or during non-transect hours (i.e., after 10 A.M.) as time allows.

*Colony counts* – Colonial waterbird counts are conducted almost entirely on a volunteer basis. Field biologists used direct nest counts, whereupon observers surveyed colonies from the perimeter, typically with a spotting scope or binoculars to minimize disturbance, and counted the number of active nests of each species in the colony.

*Nocturnal surveys* – Field biologists conducted non-systematic nocturnal surveys in the Medicine Bow National Forest in 2002 for Flammulated Owl. Surveys involved searching for likely suitable habitat during the day and listening for spontaneous calling owls and/or using tape playback to solicit responses at those sites at night.

*Survey of ponds and lakes* – These surveys were also conducted on a volunteer basis, and mostly on an opportunistic basis. Waterbodies were surveyed for all birds, typically along the perimeter using a spotting scope and/or binoculars.

*Survey from bridges* – The 2004 field season saw a pilot project directed at gathering data on species that nest on bridges, specifically, and those typically associated with riparian, generally. Again, conducted on a volunteer and opportunistic basis, detections of a previously determines suite of species were recorded at each location.

**Results and Discussion**

In this section, I provide species accounts for bird species detected during the first three years of this program and the status of each in regards to the *Monitoring Wyoming's Birds* statewide program. These summaries are intended to provide an idea of how well the habitat-based transects monitor Wyoming's breeding birds in the habitats currently surveyed. There are many species that we are not effectively monitoring with transects and in these summaries (or collectively as a group – e.g., raptors) I provide my thoughts on what will be required to monitor these species. Results for Bighorn National Forest

and Shoshone National Forest are provided in their separate sections. For groups or species already monitored by other means (e.g., waterfowl and Threatened and Endangered species), I do not offer alternative monitoring suggestions.

Changes in data collection methodology (recording dependent observations as a cluster) and DISTANCE analysis techniques (cluster analysis) will radically enhance RMBO's capability to monitor species prone to flocking behavior (e.g., Red Crossbill; see Survey Technique above). Obviously, completion of the full complement of transects in each habitat is pertinent to increasing sample sizes of sparsely populated species. Cluster analysis does not take into consideration the number of individuals, so the number of individual birds presented in this report may be mis-leading when considering whether a species can be monitored. For simplification, I consider a sample size of 20 individuals the absolute minimum to give us a reasonable chance of monitoring a species, although for some species prone to flocking behavior (e.g., swallows) this may not be true. When relevant, species prone to flocking are noted as such in the species accounts.

Species are listed in taxonomic order according to the American Ornithologists' Union (1998 and supplements). The habitat codes are: AS – Aspen; GR – Grassland; JW – Juniper Woodland; MC – Mid-elevation Conifer; MR – Montane Riparian; LR – Plains/Basin (low-elevation) Riparian; and SS – Shrubsteppe. This program does not currently conduct transects in Alpine Tundra, High-elevation Conifer, Low-elevation Conifer, Mountain-foothills Shrub, or Wetlands as recognized in the Wyoming Bird Conservation Plan (Nicholoff 2003). We strongly recommend that agencies support transects in these habitats, as they are important for a number of species' populations and we make notation to that fact in some of the species accounts.

Table 1 cross tabulates all species detected on state-based transects, providing total number of individuals detected by year and habitat for 2002-2004 field seasons.

**Acknowledgements**

No effective monitoring program can exist without the dedicated field biologists to collect data. My gratitude to all of them who worked on this program during its first three years: Tim Avery (2003, 2004), Matthew Bauer (2003), Jason Beason (2003), Ken Behrens (2003, 2004), Jon Bortle (2002), Katie Brashear (2002), Robert Clouse (2004), Rob Comey (2004), Sean Cordill (2003), Cameron Cox (2003), Eva Crane (2002, 2004), Bard Edrington (2002, 2003), Scott Gillihan (2002), Glenn Giroir (2002, 2003, 2004), Pete Hosner (2004), Kelly Idema (2004), Pete Idema (2004), Michelle Johnson (2003), Joanne McDonald (2002), Tracey Ostheimer (2004), Ben Pacheco (2002), Bill Reddinger (2003), Tom Riley (2002), and David Waltz (2003).

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appreciative to the entire Wyoming Partners In Flight group for their support and oversight of this program. Our thanks also to Duke Philips for housing the training session in 2004 at Chico Basin Ranch and to Trina Lynch (CO Division of Wildlife) for providing the safety training session.

Cover photo: Representative example of a *MWB* field biologist conducting a point count. In this particular case, Ken Behrens in the Bighorn Mountains in 2004. Photo by Pete Hosner.

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**Species Accounts**

*Waterfowl*

This monitoring program does not target waterfowl species. Breeding species for which we do have some detections include: Canada Goose, Gadwall, American Wigeon, Mallard, Blue-winged Teal, Cinnamon Teal, Northern Pintail, Green-winged Teal, Ring-necked Duck, Lesser Scaup, Bufflehead, Barrow's Goldeneye, and Common Merganser. Incorporating Wetlands will increase sample sizes for waterfowl, however, this suite of species is better monitored by the WY Game and Fish Department (WGFD).

*Gallinaceous birds*

This monitoring program does not target gallinaceous birds, all of which are game species in Wyoming, whose populations are monitored by the WGFD. We do detect several species sporadically, including Chukar, Ring-necked Pheasant, Ruffed Grouse, Greater Sage-Grouse, Blue Grouse, and Wild Turkey.

*Colonial waterbirds – pelicans and herons*

This suite of species is currently monitored by WGFD, although the *Monitoring Wyoming's Birds* (*MWB*) program can enhance those efforts by including a volunteer-based ColonyWatch project similar to Colorado's statewide monitoring program. However, inherent challenges with running this type of project in Wyoming include a sparse human population source for volunteers and the size of the state (i.e., long driving distances). RMBO field staff has visited colonial waterbird species sites, but those data are not sufficient for monitoring purposes.

**American White Pelican** – We have observed only two individuals of this species during the course of the program.

**Great Blue Heron** – Transects are not suitable for monitoring colonial waterbirds.

*Vultures*

**Turkey Vulture** – Sample size is limited for this highly nomadic species.

*Diurnal raptors*

Many raptors species are already monitored by state or federal agencies. This suite of species is very difficult to monitor on a large landscape scale due to low densities. Pilot projects designed to monitor these species in Colorado have not proven fruitful.

**Osprey** – Only three individuals have been observed on transects.

**Bald Eagle** – Only two individuals have been observed on transects.

**Northern Harrier** – Very few detections overall, mostly in Grassland.

**Sharp-shinned Hawk** – Very few detections overall, mostly confined to Aspen and Mid-elevation Conifer.

**Cooper's Hawk** – Eight of ten detections total are from Mid-elevation Conifer.

**Northern Goshawk** – Seldomly detected, the most being three in Mid-elevation Conifer in 2004.

**Broad-winged Hawk** – Observed only once during the program's tenure. Most likely this individual was a migrant.

**Swainson's Hawk** – Half of all detections are from Grassland, but the sample size is too low to monitor this species.

**Red-tailed Hawk** – Pooled statewide data are sufficient to monitor this species.

**Ferruginous Hawk** – This program does not monitor this open-country species.

**Golden Eagle** – Another raptor this program does not obtain adequate sample size on for monitoring purposes.

**American Kestrel** – In 2004, we obtained enough pooled statewide detections to monitor this species. However, neither of the previous years had a sufficient number of detections. Monitoring for this species may be haphazard unless consistent sample size is obtained over several subsequent years.

**Merlin** – This northern raptor may have the lowest breeding density of all raptors in Wyoming, therefore it is not surprising that we detected very few individuals.

**Prairie Falcon** – Only ten individuals were detected during the first three years of this program.

*Rails*

This suite of species is not monitored by transects in the habitats currently surveyed. Wetland surveys would undoubtedly increase the number of detections for these, and other, wetland species. We detected very few Sora and American Coots. However, the number of Sandhill Crane detections was considerably higher, probably a result of this species having a long-ranging call.

*Shorebirds, gulls, and terns*

Overall transects are not well-suited for monitoring this suite of species. As with rails, adding transects in Wetlands would increase our ability to monitor these species. Some, such as the gulls, are colonial-nesters, and are already monitored by WGFD's non-game component, or could be with ColonyWatch volunteers.

**Killdeer** – Pooled statewide sample size was sufficient for all three years. However, we suggest that Plains/Basin Riparian transects will have enough detections to monitor this species in that habitat alone.

**Mountain Plover** – Although 16 were detected in 2003, we observed only one bird in 2004. Only two birds were detected in 2002.

**American Avocet** – Only three detections total for the program, all in 2004.

**Willet** – Only two detections total for the program, all in 2004.

**Spotted Sandpiper** – This species is currently monitored in Montane Riparian, although once we initiate Plains/Basin Riparian, we should be able to monitor this species in two habitats.

**Upland Sandpiper** – Ten of the 12 detections came in 2004.

**Long-billed Curlew** – Only one detection total for the program.

**Wilson's Snipe** – This species achieves borderline sample size in Montane Riparian for monitoring, but pooled statewide inference may be more appropriate for this species.

**Wilson's Phalarope** – Detected in only one year of the program.

**Ring-billed Gull** – Only one detection total for the program.

**California Gull** – Only five detections total for the program.

*Pigeons and doves*

**Rock Pigeon** – Only three detections total for the program for this non-native, mainly urban, species.

**Mourning Dove** – This species achieved adequate sample size in all three years in only Juniper Woodland, however 2004 detections were adequate in all habitats except Mid-elev. Conifer.

*Owls*

A very difficult suite of species to monitor, nocturnal call playback surveys were unsuccessful in Colorado due to a number of factors (T. Leukering, pers. comm..). We detected Great Horned Owl, Northern Pygmy-Owl, Burrowing Owl, and Short-eared Owl in too few numbers to monitor those species. Except for Burrowing Owl, it is unlikely that a cost-effective approach is available to monitor owls on a statewide basis. For Burrowing Owl, site surveys similar to those done for colonial-nesting species have been successful in other states through other RMBO programs.

**Flammulated Owl** – First detected on species-specific nocturnal tape playback surveys in 2002 and found again in 2003 and 2004, we believe there is a small population of this species in the Medicine Bow National Forest along the Colorado border. However, this species is peripheral to the state and it is probably best to conduct cost-effective, low-intensity surveillance, preferably using volunteers.

*Nightjars*

**Common Nighthawk** – This species is detected in insufficient numbers for monitoring. Although it is active in the early morning and is sometimes flushed while walking between transects, this species is most detectable at dusk outside our normal survey time.

**Common Poorwill** – Only one detection total for the program. Similar to the owls, a cost-effective statewide monitoring protocol does not exist for this nocturnal species.

*Swifts and hummingbirds*

**White-throated Swift** – This colonial species is not monitored by this program. It is doubtful any technique would be adequate to monitor this species across the state given its colonial nature and difficult-to-access cliff breeding sites.

**Black-chinned Hummingbird** – Confined to the Juniper Woodland and riparian areas in the extreme southwestern portion of the state, we have detected only one bird total for the program.

**Calliope Hummingbird** – Detected every year, but in extremely small numbers. This species breeds only in the northern montane areas of Wyoming.

**Broad-tailed Humminbird** – This montane hummingbird is monitored in Montane Riparian.

**Rufous Hummingbird** – Mainly limited as a breeder to the extreme northwest, we detect very few individuals of this species. Due to range limitations, we do not expect to monitor this species.

*Kingfishers*

**Belted Kingfisher** – This riparian specialist is ancillary to the habitats we currently survey, even Montane Riparian does not provide any significant number of detections. We anticipate initiation of Plains/Basin Riparian transects will allow us to monitor this species.

*Woodpeckers*

**Williamson's Sapsucker** – Averaging about a dozen detections each year statewide, the addition of more transects, particularly in Low-elevation Conifer, would be required to have any chance of monitoring this species.

**Red-naped Sapsucker** – This species is monitored in Aspen and Montane Riparian.

**Downy Woodpecker** – Pooled statewide detections are adequate to monitor this species, although Aspen stands out as producing the most number of detections.

**Hairy Woodpecker** – Certainly pooling statewide detections are sufficient to monitor this species, but Aspen and Mid-elevation Conifer are borderline for monitoring in those separate habitats.

**American Three-toed Woodpecker** – Mainly a high-elevation spruce-fir associated species, most detections were in Mid-elevation Conifer and Montane Riparian, although sample sizes were too small for monitoring purposes. Initiation of High-elevation Conifer transects is necessary to monitor this species.

**Black-backed Woodpecker** – We detected only one total for the program. Including High-elevation Conifer would be helpful, although recognition of recently burned forest, where this species is more likely to occur (and easier to detect) could be utilized as a separate habitat type for monitoring (e.g., Burned Conifer) as many woodpecker species are attracted to the prey base available in dead conifers.

**Northern Flicker** – Sample sizes are sufficient for monitoring this ubiquitous species in Aspen, Mid-elevation Conifer, and Montane Riparian.

*Flycatchers*

**Olive-sided Flycatcher** – Only the 2004 field season produced enough pooled statewide detections to conduct distance analyses. Subsequent years with adequate sample size will be needed to monitor this species.

**Western Wood-Pewee** – This species can be monitored in Aspen.

**Willow Flycatcher** – Very few detections overall, however the 24 in Montane Riparian in 2004 is encouraging. Completing more transects (current average of 20/year in Montane Riparian) should be sufficient for monitoring this species.

**Least Flycatcher** – Only two detections total for the program. This species is occurs in deciduous forest, so the addition of Plains/Basin Riparian could produce enough detections for monitoring this species.

**Hammond's Flycatcher** – Pooled statewide data are sufficient to monitor this species, however the 44 detected in Aspen in 2004 is encouraging for that habitat.

**Gray Flycatcher** – Extremely robust sample sizes (ave. 155 individuals/year) in Juniper Woodland are obtained so we will be able to monitor this species. Of interest, conventional thought was that this species only occurred in the southwestern part of the state, however we are observing territorial males in Juniper Woodland northward to the Montana border.

**Dusky Flycatcher** – Robust sample sizes are obtained in Aspen, Mid-elevation Conifer, and Montane Riparian.

**Cordilleran Flycatcher** – Pooled statewide detections would be adequate for monitoring this species, which we detect most often on Mid-elevation Conifer and Montane Riparian transects.

**Say's Phoebe** – Sample sizes are also too low for this low-density, open-country species. It is unlikely that we can monitor this species.

**Ash-throated Flycatcher** – This southern pinyon-juniper species achieves its northern limit in Wyoming. Thus, we do not detect many individuals on Juniper Woodland transects.

**Cassin's Kingbird** – Only five individuals have been detected of this peripheral species.

**Western Kingbird** – Although the 17 detected in Grassland in 2004 is encouraging, we do not expect to monitor this open-country species with point-transects.

**Eastern Kingbird** – As with Western Kingbird, although with 19 in Grassland in 2004, we do not expect to monitor this species.

*Shrikes*

**Loggerhead Shrike** – The 27 detected statewide in 2004 is encouraging, however subsequent years will have to also have sufficient sample sizes for monitoring – something that 2002 and 2003 did not.

*Vireos*

**Plumbeous Vireo** – Mostly found on Juniper Woodland transects, this species' sample size is too low for monitoring. The inclusion of other habitats, like Plains/Basin Riparian and Low-elevation Conifer, could produce enough statewide detections.

**Warbling Vireo** – Very robust sample sizes are obtained in Aspen, and monitoring can also be accomplished in Mid-elevation Conifer and Montane Riparian.

**Red-eyed Vireo** – Only one detection total for the program. This is a peripheral species.

*Jays, crows, and ravens*

**Gray Jay** – Pooled statewide detections are needed to monitor this low-density species. High-elevation Conifer would be beneficial to our monitoring efforts for this species.

**Steller's Jay** – Pooled statewide detections were sufficient in 2002 and 2003, but a dramatic dip in detections in 2004 may signal a cause for concern in being able to effectively monitor this low-density species.

**Western Scrub-Jay** – Peripheral to the state, we have detected only 19 individuals of this pinyon-juniper specialist on Juniper Woodland transects.

**Pinyon Jay** – Although the number of individuals in Juniper Woodland is satisfactory for monitoring (118 in 2003, 120 in 2004), this species is prone to flocking in large numbers, so some caution is warranted in predicting whether we can monitor this pinyon-juniper species.

**Clark's Nutcracker** – Another species likely to be observed in flocks, usually only in pairs though, the number of individuals reported are sufficient for monitoring in Mid-elevation Conifer.

**Black-billed Magpie** – Another species likely to be observed in flocks (usually family groups of this early breeding species), the number of individuals would indicate that we can monitor this species in Juniper Woodland.

**American Crow** – There are too few detections for this mainly urban species to be monitored.

**Common Raven** – Sample sizes border on the absolute minimum in several habitats. It may be best to monitor this species using pooled statewide data.

*Larks*

**Horned Lark** – One of the most abundant species detected on transects, particularly Grassland, this species is easily monitored.

*Martins and swallows*

**Purple Martin** – Only two detections total for the program. However, we discovered a small breeding colony in the Medicine Bow National Forest, which suggests that this species may be overlooked as a breeding species in the state. However, we doubt that the population size is very large due to the few observations from the general birdwatching community and during this program's first three years. Annual surveillance of this colony, and any other colonies, is the most prudent approach for tracking this species' population.

**Tree Swallow** – This species and Violet-green Swallow are less prone to being detected in large flocks than the other swallow species, so sample sizes in Aspen and Montane Riparian suggest that we can monitor this species in those habitats.

**Violet-green Swallow** – Sample sizes are adequate for monitoring this species in Juniper Woodland and Montane Riparian.

**Northern Rough-winged Swallow** – There are too few detections for this species to be monitored. Surveying colonies may be the best approach for monitoring this species, although considerable effort is needed to locate enough colonies.

**Bank Swallow** – Only ten detections total for the program. Surveying colonies may be the best approach for monitoring this species, although considerable effort is needed to locate enough colonies.

**Cliff Swallow** – Prone to flocking, and more likely detected near nesting colonies, sample sizes are deceptive for this species. Alternative survey methods, such as bridge surveys, would be more effective at monitoring this species than point-transects.

**Barn Swallow** – There are too few detections for this species to be monitored. The bridge survey technique should be explored for monitoring this species.

*Chickadees, titmouses, and allies*

**Black-capped Chickadee** – Pooled statewide detections barely reach the 20 minimum threshold, so, although that is our criteria, we do not expect the current program will satisfactorily monitor this species. Inclusion of Plains/Basin transects should strengthen this program's ability for monitoring.

**Mountain Chickadee** – Robust sample sizes are obtained in Aspen, Mid-elevation Conifer, and Montane Riparian.

**Juniper Titmouse** – Only one year produced enough detections for distance analysis (24 in 2003 in Juniper Woodland), so monitoring is not likely for this peripheral pinyon-juniper specialist.

**Bushtit** – There are too few detections for this species to be monitored. This species occurs in such low densities that monitoring is unlikely.

*Nuthatches*

**Red-breasted Nuthatch** – Robust sample sizes are obtained in Aspen and Mid-elevation Conifer.

**White-breasted Nuthatch** – There are too few detections for this species to be monitored. Inclusion of other montane forest habitats into the program will be helpful.

**Pygmy Nuthatch** – There are too few detections for this species to be monitored. Inclusion of Low-elevation Conifer should allow us to monitor this Ponderosa Pine associated species.

*Creepers*

**Brown Creeper** – Pooled statewide detections are tantalizingly borderline for monitoring this species. Inclusion of other montane forest habitats would be helpful.

*Wrens*

**Rock Wren** – Robust sample sizes are obtained in Juniper Woodland.

**Canyon Wren** – Only one detection total for the program. This is surprising for a species that occurs in canyons, regardless of surrounding habitat.

**Bewick's Wren** – Sample sizes are solid for monitoring this species in Juniper Woodland.

**House Wren** – Robust sample sizes are obtained in Aspen.

*Dippers*

**American Dipper** – There are too few detections for this species to be monitored. Bridge surveys along mountain streams could produce enough detections for monitoring this species.

*Kinglets*

**Golden-crowned Kinglet** – Sample sizes are borderline in Mid-elevation Conifer. Inclusion of High-elevation Conifer into the program should satisfy the sample size demands for monitoring this montane species.

**Ruby-crowned Kinglet** – Extremely robust sample sizes are obtained in Aspen, Mid-elevation Conifer, and Montane Riparian.

*Gnatcatchers*

**Blue-gray Gnatcatcher** – Sample sizes are sufficient in Juniper Woodland for this relatively recent colonizer in Wyoming.

*Thrushes*

**Western Bluebird** – Only two detections total for the program. This enigmatic species is peripheral to the state at best.

**Mountain Bluebird** – Robust sample sizes are obtained in Juniper Woodland, and the species can also be monitored in Aspen.

**Townsend's Solitaire** – Pooled statewide detections are sufficient for monitoring this species.

**Veery** – There are too few detections to monitor this species. Associated with large willows in Montane Riparian, apparently there are too few Montane Riparian transects that occur in areas with that specific habitat requirement.

**Swainson's Thrush** – Sample sizes fluctuate considerably across the 20 individual threshold from year to year, so monitoring in any single habitat is possible but pooled statewide data may be necessary for robust sample sizes.

**Hermit Thrush** – Sample sizes are adequate in Aspen and Mid-elevation Conifer, and are borderline in Montane Riparian.

**American Robin** – This ubiquitous species can be monitored in four habitats.

*Mimids*

**Gray Catbird** – There are too few detections for monitoring this species. Plains/Basin Riparian may increase sample sizes, especially if surveying stretches with high-density undergrowth.

**Northern Mockingbird** – Only three detections total for the program of this open-country species.

**Sage Thrasher** – Robust sample sizes are obtained in Shrubsteppe.

**Brown Thrasher** – Only four detections total for the program. Inclusion of Plains/Basin Riparian transects may increase this sample size, but the species occurs in such low density that monitoring is not likely.

*Starlings*

**European Starling** – There are too few detections for monitoring this highly urbanized, non-native species.

*Pipits*

**American Pipit** – Only one detection total for the program. Inclusion of Alpine Tundra is necessary to monitor this species.

*Waxwings*

**Cedar Waxwing** – This highly nomadic species is not likely to be monitored on a statewide basis by any currently known methodology.

*Warblers*

**Orange-crowned Warbler** – Pooled statewide detections are needed to monitor this species.

**Virginia's Warbler** – Only two detections total for the program. Inclusion of Montane Shrubland will improve our chances of monitoring this species, although this species' limited breeding distribution in the state may be too prohibitive for us to obtain ample sample size.

**Yellow Warbler** – Robust sample sizes are obtained in Montane Riparian.

**Yellow-rumped Warbler** – Robust sample sizes are obtained in Aspen, Mid-elevation Conifer, and Montane Riparian.

**Black-throated Gray Warbler** – This pinyon-juniper specialist is monitored in Juniper Woodland.

**Northern Waterthrush** – There are too few detections of this peripheral species for monitoring.

**MacGillivray's Warbler** – Sample sizes are sufficient for monitoring in Aspen and Montane Riparian.

**Common Yellowthroat** – There are too few detections for monitoring purposes. Inclusion of Plains/Basin Riparian should allow us to monitor this species.

**Wilson's Warbler** – Robust sample sizes are obtained in Montane Riparian.

**Yellow-breasted Chat** – Only one detection total for the program. Inclusion of Plains/Basin Riparian should allow us to monitor this species.

*Tanagers*

**Western Tanager** – Samples sizes are sufficient in Aspen and Mid-elevation Conifer.

*Towhees and Sparrows*

**Green-tailed Towhee** – This species can be monitored in five habitats.

**Spotted Towhee** – There are too few detections for monitoring this species. Inclusion of Montane Shrubland should allow us to monitor this species.

**Chipping Sparrow** – Robust sample sizes are obtained in four habitats.

**Brewer's Sparrow** – This species can be monitored in five habitats; although, the presence of this species on habitat transects other than Shrubsteppe is most likely the result of sagebrush occurrence along the transect route.

**Field Sparrow** – Peripheral to the state, only two detections total have been recorded, both in 2004 on newly established Grassland transects in the NE part of the state.

**Vesper Sparrow** – Robust sample sizes are obtained in Grassland, Juniper Woodland, and Shrubsteppe.

**Lark Sparrow** – Sample sizes are adequate in Juniper Woodland and Shrubsteppe.

**Sage Sparrow** – Robust sample sizes are obtained in Shrubsteppe for this sage-obligate species.

**Lark Bunting** – Sample sizes are extremely large (1264 individuals in Grassland in 2004), however this species is highly nomadic, flocks, and migrates later in the state than other breeding species. This combination is cause for concern regarding the proclivity of this program to monitor this species. Considerable post-data collection manipulation (e.g., restricting analyses to only detections in June, for instance) may be necessary for accurately monitoring this species.

**Savannah Sparrow** – Sample sizes fluctuate too much in the first three years of this program to accurately assess whether these habitats are useful for monitoring this species.

**Grasshopper Sparrow** – Sample sizes are borderline in Grassland. Since 2004 was the first year in which 30 Grassland, and we obtained 34 detections that year, we are optimistic about monitoring this species.

**Fox Sparrow** – There are too few detections for monitoring this species. As with Veery, this species is associated with large willows in Montane Riparian and, apparently, the current transects do not occur in areas with that requirement.

**Song Sparrow** – Robust sample sizes are obtained in Montane Riparian.

**Lincoln's Sparrow** – Robust sample sizes are obtained in Montane Riparian.

**White-crowned Sparrow** - Robust sample sizes are obtained in Montane Riparian, and sample sizes are sufficient in Aspen and Mid-elevation Conifer.

**Dark-eyed Junco** – Robust samples sizes are obtained in Aspen, Mid-elevation Conifer, and Montane Riparian.

**McCown's Longspur** – Robust sample sizes are obtained in Grassland.

**Chestnut-collared Longspur** – Robust sample sizes are obtained in Grassland.

*Grosbeaks and buntings*

**Black-headed Grosbeak** – There are too few detections for monitoring this species. Inclusion of Montane Shrubland should allow us to monitor this species.

**Blue Grosbeak** – Only one detection total for the program. Inclusion of Plains/Basin Riparian will increase the sample size for this species, however we doubt that it can be monitored.

**Lazuli Bunting** – Pooled statewide detections are sufficient to monitor this species.

*Blackbirds and orioles*

**Red-winged Blackbird** – The number of individuals is above the minimum threshold; however, this species is prone to flocking. Inclusion of Wetlands should be enough to monitor this species.

**Western Meadowlark** – Robust sample sizes are obtained in Grassland, Juniper Woodland, and Shrubsteppe. The detections in Juniper Woodland is undoubtedly the result of shrubsteppe presence.

**Yellow-headed Blackbird** – There are too few detections for monitoring this species. Inclusion of Wetlands should be enough to monitor this species.

**Brewer's Blackbird** – Pooled statewide detections is the best way to monitor this species, which is often encountered in small flocks.

**Common Grackle** – There are too few detections for monitoring this urban species.

**Brown-headed Cowbird** – Sample sizes have been sufficient all three years of this program only in Juniper Woodland. Pooled statewide detections may be better suited for this habitat-generalist.

**Orchard Oriole** – Only one detection for the program. Inclusion of Plains/Basin Riparian, particularly in the eastern third of the state, should increase sample size for this species.

**Bullock's Oriole** – There are too few detections for monitoring this species. As with Orchard Oriole, including eastern Plains/Basin Riparian should result in better sample sizes for this species.

**Scott's Oriole** – Too few detections for monitoring this species. This species reaches its northern limit in juniper country of southwest Wyoming.

*Finches*

**Pine Grosbeak** – There are too few detections for monitoring this species. Inclusion of High-elevation Conifer would be necessary for monitoring.

**Cassin's Finch** – Sample sizes are sufficient in Mid-elevation Conifer, although pooled statewide detections and/or including High-elevation Conifer would allow for more robust density estimates.

**House Finch** – Samples sizes are borderline in Juniper Woodland. Surprisingly, this species is not regularly recorded in other habitats.

**Red Crossbill** – Individual habitat sample sizes fluctuate considerably for this flocking nomadic species. Pooled statewide data would best monitor this species.

**White-winged Crossbill** – There are too few detections for monitoring this species. Inclusion of High-elevation Conifer will likely increase the sample size, but we are doubtful it will be enough to monitor this species.

**Pine Siskin** – Robust sample sizes exist for Aspen, Mid-elevation Conifer, and Montane Riparian. This species is likely to be recorded in flocks, however, so caution is warranted.

**American Goldfinch** – Inconsistent sample sizes among habitats and through years prevent us from monitoring this species. Inclusion of Plains/Basin Riparian should be enough to monitor this species.

**Evening Grosbeak** – Only six detections total for the program. Inclusion of High-elevation should increase sample size for this species, but since it occurs in such low-density, and in flocks, we are unsure about the possibility of monitoring this species.

Table 1. Number of individuals recorded for 2002-2004 on statewide transects.

| | Aspen | | | | Grassland | | | | Juniper Woodland | | | | Mid-elev. Conifer | | | | Montane Riparian | | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 |
| # of transects | 23 | 25 | 26 | | 21 | 19 | 30 | | 18 | 24 | 28 | | 21 | 24 | 26 | | 20 | 21 | 20 | | 25 | 30 | 30 |
| Canada Goose | | | | | 2 | | 11 | | | 1 | 1 | | 2 | | | | 4 | 5 | | | 2 | | 13 |
| Gadwall | | | | | | | 2 | | | | | | | | | | | 1 | 3 | | 1 | | |
| American Wigeon | | | | | | | 4 | | | | | | | | | | | | 9 | | | | |
| Mallard | 5 | | | | 2 | | 6 | | | | 1 | | | | | | 5 | 13 | 22 | | | | |
| Blue-winged Teal | | | | | | | 5 | | | | | | | | | | | 1 | 1 | | | | |
| Cinnamon Teal | | | | | 1 | | | | | | | | | | | | | 4 | 7 | | | | |
| Northern Pintail | | | | | 2 | | 6 | | | | | | | | | | | 2 | | | | | |
| Green-winged Teal | | | | | | | 1 | | | | | | | | | | | 2 | 4 | | | | 3 |
| Ring-necked Duck | | | | | | | | | | | | | | | | | 1 | | | | | | 8 |
| Lesser Scaup | | | | | | | | | | | | | | | | | 1 | 7 | 14 | | | | |
| Bufflehead | | | | | | | | | | | | | | | | | | 6 | 2 | | | | |
| Barrow's Goldeneye | | | 1 | | | | | | | | | | | | | | | 1 | 8 | | | | |
| Common Merganser | | | | | 1 | | | | | | 1 | | | | | | 2 | 10 | 17 | | | | |
| Chukar | | | | | | | | | 1 | | 7 | | | | | | | | | | 1 | 1 | |
| Ring-necked Pheasant | | | | | 1 | | 1 | | | | | | | | | | | | | | | 2 | 2 |
| Ruffed Grouse | 17 | 3 | 3 | | | | | | | | | | 13 | 2 | | | 5 | 2 | 2 | | | | |
| Greater Sage-Grouse | | | 1 | | 3 | | 1 | | | | | | | | | | | | | | | 2 | 1 |
| Blue Grouse | 5 | 15 | 12 | | | | | | | 1 | | | 10 | 6 | 11 | | | | | | | 2 | |
| Wild Turkey | | | 1 | | | 7 | | | | | | | | | | | | | | | | | |
| American White Pelican | | | | | | | | | | | 2 | | | | | | | | | | | | |
| Great Blue Heron | | | 2 | | 2 | 2 | 1 | | | | | | | | 1 | | 3 | 1 | 5 | | | | 1 |
| Turkey Vulture | 3 | 1 | 2 | | 1 | 1 | 8 | | 1 | 10 | 3 | | 1 | 2 | 5 | | 1 | | | | | 1 | 1 |
| Osprey | | 1 | | | | | | | | | | | | | | | 1 | | 1 | | | | |
| Bald Eagle | | 1 | 1 | | | | | | | | | | | | | | | | | | | | |
| Northern Harrier | | | | | 1 | 5 | 9 | | | | | | | | | | 1 | | 2 | | 1 | 1 | |
| Sharp-shinned Hawk | 1 | 1 | 4 | | | | | | | | | | 2 | 3 | 2 | | | | 1 | | | | |
| Cooper's Hawk | | | 1 | | | | | | | | | | | 6 | 2 | | | | 1 | | | | |
| Northern Goshawk | | | 1 | | | | | | | | | | | | 3 | | 1 | | 1 | | | | |
| Broad-winged Hawk | | | | | | | | | | | | | | | 1 | | | | | | | | |
| Swainson's Hawk | 1 | | | | 2 | 2 | 2 | | | | | | | | 5 | | | | 1 | | | | |
| Red-tailed Hawk | 8 | 8 | 15 | | 1 | 1 | 2 | | 2 | 3 | 10 | | 5 | 9 | 13 | | 8 | 10 | 6 | | 1 | 3 | 4 |

Table 1. continued

| | Aspen | | | | Grassland | | | | Juniper Woodland | | | | Mid-elev. Conifer | | | | Montane Riparian | | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 |
| Ferruginous Hawk | | | | | | | 6 | | | | 1 | | | | | | | | 1 | | 2 | 4 | 1 |
| Golden Eagle | | 1 | 1 | | | 2 | 3 | | | | 1 | | | | 1 | | | | | | 2 | 2 | 3 |
| American Kestrel | 3 | 1 | 11 | | 1 | 2 | 10 | | 4 | 1 | 7 | | 1 | | 1 | | | 2 | | | 2 | 4 | 4 |
| Merlin | | | | | 1 | | | | | | | | | | | | 1 | | | | | | 1 |
| Prairie Falcon | | 1 | | | | 3 | 1 | | | 1 | 1 | | | | | | | 1 | | | 2 | | |
| Sora | | | | | | | | | | | | | | | | | | 2 | 3 | | | | |
| American Coot | | | | | | | 3 | | | | | | | | | | | | | | | | |
| Sandhill Crane | 6 | 2 | 2 | | | | | | | | 1 | | 1 | 1 | | | 4 | 5 | 14 | | | | 3 |
| Killdeer | 1 | 2 | 2 | | 15 | 16 | 26 | | | 2 | 2 | | | | | | 5 | 14 | 1 | | 11 | 9 | 14 |
| Mountain Plover | | | | | | 10 | 1 | | | | | | | | | | | | | | 2 | 6 | |
| American Avocet | | | | | | | 3 | | | | | | | | | | | | | | | | |
| Willet | | | | | | | 2 | | | | | | | | | | | | | | | | |
| Spotted Sandpiper | 2 | 1 | 3 | | | | 6 | | | | | | 10 | 16 | 1 | | 43 | 71 | 46 | | | | |
| Upland Sandpiper | | | | | | 2 | 9 | | | | | | | | | | | | | | | | 1 |
| Long-billed Curlew | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Wilson's Snipe | 2 | | 6 | | 5 | | 6 | | | | | | | 1 | 3 | | 7 | 25 | 20 | | | | 7 |
| Wilson's Phalarope | | | | | | | 32 | | | | | | | | | | | | | | | | |
| Ring-billed Gull | | | | | | | | | | | | | | | | | | | | | | | 1 |
| California Gull | | | | | | | 5 | | | | | | | | | | | | | | | | |
| Rock Pigeon | | | | | | | 1 | | | | 2 | | | | | | | | | | | | |
| Mourning Dove | 13 | 13 | 68 | | 15 | 13 | 97 | | 85 | 95 | 144 | | 9 | 7 | 5 | | 6 | 7 | 27 | | 4 | 22 | 39 |
| Great Horned Owl | | | | | | 2 | 1 | | | | | | | | | | | | | | | | |
| Northern Pygmy-Owl | | | | | | | | | | | | | | 1 | | | | | | | | | |
| Burrowing Owl | | | | | | | 3 | | | | | | | | | | | | | | | | |
| Short-eared Owl | | | | | | | 9 | | | | | | | | | | | | | | | | |
| Common Nighthawk | | 1 | 1 | | 1 | | 2 | | 6 | 6 | | | | 2 | 1 | | | 1 | 1 | | | | 3 |
| Common Poorwill | | | | | | | | | | 1 | | | | | | | | | | | | | |
| White-throated Swift | | | | | | | | | 1 | 6 | 8 | | | | | | | | 6 | | 3 | | |
| Black-chinned Hummingbird | | | | | | | | | | | 1 | | | | | | | | | | | | |
| Calliope Hummingbird | 1 | 1 | | | | | | | | | | | | | | | | | 2 | | | | |
| Broad-tailed Hummingbird | 11 | 19 | 37 | | | | 1 | | | 6 | 4 | | 10 | 24 | 17 | | 28 | 46 | 63 | | 4 | 5 | 7 |
| Rufous Hummingbird | | | | | | | | | | | | | | 1 | | | | 4 | 1 | | | | |

Table 1. continued

| | Aspen | | | | Grassland | | | | Juniper Woodland | | | | Mid-elev. Conifer | | | | Montane Riparian | | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 |
| Belted Kingfisher | | | | | | | | | | | 1 | | | 2 | | | 5 | | 5 | | | | |
| Williamson's Sapsucker | 6 | 7 | 1 | | | | | | | | | | 2 | 10 | 6 | | 2 | | 3 | | | | |
| Red-naped Sapsucker | 15 | 30 | 84 | | | | | | | | | | 4 | 17 | 26 | | 14 | 31 | 39 | | | | 3 |
| Downy Woodpecker | 4 | 19 | 28 | | | | | | | | | | 1 | 8 | 7 | | 3 | 4 | 1 | | | | |
| Hairy Woodpecker | 11 | 16 | 37 | | 1 | | | | 1 | | | | 11 | 27 | 24 | | 3 | | 5 | | | | 1 |
| Three-toed Woodpecker | | | 1 | | | | | | | | | | 1 | 3 | 6 | | 1 | 3 | 5 | | | | |
| Black-backed Woodpecker | | | | | | | | | | | | | 1 | | | | | | | | | | |
| Northern Flicker | 28 | 55 | 71 | | | 2 | 2 | | 13 | 12 | 19 | | 15 | 36 | 41 | | 26 | 41 | 39 | | 1 | 4 | 6 |
| Olive-sided Flycatcher | 7 | 4 | 14 | | | | | | | | 1 | | 6 | 12 | 23 | | 4 | 5 | 17 | | | | 1 |
| Western Wood-Pewee | 60 | 33 | 81 | | | | | | | | | | 6 | 2 | 6 | | 5 | 10 | 10 | | | | |
| Willow Flycatcher | | 1 | | | | | | | | | | | | | | | 13 | 14 | 24 | | | | 1 |
| Least Flycatcher | | | | | | | | | | | | | 1 | | | | 1 | | | | | | |
| Hammond's Flycatcher | 2 | 7 | 44 | | | | | | | | | | 9 | 65 | 19 | | | 6 | 11 | | | | |
| Gray Flycatcher | 1 | | | | | | | | 171 | 144 | 151 | | | | | | | | | | 1 | 1 | 3 |
| Dusky Flycatcher | 79 | 38 | 107 | | 9 | | | | 2 | 9 | 66 | | 24 | 45 | 58 | | 33 | 59 | 109 | | 3 | 4 | 7 |
| Cordilleran Flycatcher | 2 | 5 | 6 | | | | | | | | | | 1 | 10 | 15 | | 1 | 12 | 12 | | | | 1 |
| Say's Phoebe | | | | | | 6 | 6 | | 4 | 13 | 8 | | | | | | | | | | 5 | 7 | 7 |
| Ash-throated Flycatcher | | | | | | | | | 10 | 8 | 7 | | | | | | | | | | | | |
| Cassin's Kingbird | | | | | | | 5 | | | | | | | | | | | | | | | | |
| Western Kingbird | | | | | 6 | 4 | 17 | | | 2 | 2 | | | | | | | | | | 5 | | |
| Eastern Kingbird | 1 | | 1 | | 1 | 1 | 19 | | | 1 | 1 | | | | | | | | | | | | 5 |
| Loggerhead Shrike | | | | | | 1 | 13 | | 2 | 2 | 5 | | | | | | | | | | 3 | 3 | 9 |
| Plumbeous Vireo | 16 | 1 | | | | | | | 15 | 6 | 13 | | 10 | 1 | | | 1 | | | | | | |
| Warbling Vireo | 161 | 175 | 361 | | | | | | | | 4 | | 14 | 78 | 91 | | 30 | 49 | 108 | | | 1 | 2 |
| Red-eyed Vireo | | | | | | | | | | | | | | | | | | | 1 | | | | |
| Gray Jay | 6 | 3 | 2 | | | | | | | | | | 4 | 20 | 19 | | 5 | 6 | 5 | | | | |
| Steller's Jay | 8 | 4 | 11 | | | | | | | | | | 28 | 26 | 5 | | 8 | 3 | 2 | | | | |
| Western Scrub-Jay | | | | | | | | | 9 | 5 | 5 | | | | | | | | | | | | |
| Pinyon Jay | | | | | | | | | 30 | 118 | 120 | | | | | | | | | | 1 | | |
| Clark's Nutcracker | 4 | 20 | 25 | | | | | | 5 | 19 | 12 | | 29 | 59 | 78 | | 11 | 6 | 34 | | | | 4 |
| Black-billed Magpie | 1 | 5 | 9 | | 4 | 1 | 4 | | 19 | 34 | 35 | | 1 | 1 | | | 11 | 4 | 3 | | 2 | 6 | 6 |
| American Crow | 1 | 6 | 13 | | 2 | | 7 | | | 4 | 1 | | | 5 | | | | | 2 | | | 1 | 6 |

Table 1. continued

| | Aspen | | | | Grassland | | | | Juniper Woodland | | | | Mid-elev. Conifer | | | | Montane Riparian | | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 |
| Common Raven | 17 | 13 | 29 | | | 3 | 22 | | 10 | 22 | 15 | | 25 | 15 | 30 | | 23 | 16 | 24 | | 10 | 20 | 31 |
| Horned Lark | 1 | | 3 | | 314 | 618 | 1112 | | 8 | 6 | 54 | | | | | | 4 | 4 | 1 | | 298 | 434 | 694 |
| Purple Martin | 2 | | | | | | | | | | | | | | | | | | | | | | |
| Tree Swallow | 29 | 58 | 19 | | 1 | 2 | 1 | | | 18 | 8 | | 2 | 8 | 1 | | 25 | 36 | 28 | | | 4 | 5 |
| Violet-green Swallow | 6 | 4 | 46 | | 6 | | 8 | | 17 | 59 | 40 | | 1 | 14 | 6 | | 18 | 34 | 44 | | 6 | | 2 |
| N. Rough-winged Swallow | | | 1 | | | 4 | 2 | | | | | | | | | | 4 | 2 | | | | 1 | |
| Bank Swallow | | | | | | | 2 | | | | | | | | | | | 3 | | | 2 | | 3 |
| Cliff Swallow | | | | | 7 | 81 | 21 | | | | 13 | | | | 2 | | 8 | 14 | 32 | | 1 | | 29 |
| Barn Swallow | | | | | 4 | 1 | 20 | | | | 1 | | | | | | | | 10 | | | 2 | 1 |
| Black-capped Chickadee | 55 | 14 | 13 | | | | | | 1 | 1 | 1 | | 19 | 9 | 1 | | 14 | 1 | 5 | | | 1 | |
| Mountain Chickadee | 80 | 101 | 103 | | | | | | 17 | 14 | 10 | | 188 | 208 | 144 | | 16 | 60 | 55 | | | 2 | |
| Juniper Titmouse | | | | | | | | | 11 | 24 | 10 | | | | | | | | | | | | |
| Bushtit | | | | | | | | | | 5 | 18 | | | | | | | | | | | | |
| Red-breasted Nuthatch | 44 | 73 | 67 | | | | | | 2 | | | | 94 | 112 | 130 | | 6 | 8 | 13 | | | | |
| White-breasted Nuthatch | | 1 | 4 | | | | | | | | | | | 4 | 4 | | | 3 | 1 | | | | |
| Pygmy Nuthatch | 1 | | | | | | | | | | | | 8 | | | | | | | | | | |
| Brown Creeper | 1 | 9 | 9 | | | | | | | | | | | 9 | 24 | | 2 | 4 | 5 | | | | |
| Rock Wren | 2 | 3 | 9 | | 3 | 9 | 17 | | 70 | 101 | 151 | | | 6 | 8 | | | | 7 | | 17 | 24 | 20 |
| Canyon Wren | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Bewick's Wren | | | | | | | | | 44 | 31 | 154 | | | | | | | | | | | | |
| House Wren | 115 | 156 | 244 | | | | 2 | | | 6 | 11 | | 4 | 18 | 13 | | 14 | 51 | 27 | | 2 | | 2 |
| American Dipper | | | | | | | | | | | 1 | | 5 | 10 | 1 | | 7 | 16 | 8 | | | | |
| Golden-crowned Kinglet | | 2 | 6 | | | | | | | | | | 9 | 29 | 21 | | 5 | | 1 | | | | |
| Ruby-crowned Kinglet | 133 | 155 | 140 | | | | | | | 2 | 3 | | 192 | 218 | 238 | | 57 | 146 | 155 | | | 3 | |
| Blue-gray Gnatcatcher | 2 | | | | | | | | 42 | 41 | 82 | | | | | | | | | | 2 | 1 | |
| Western Bluebird | | | | | | | | | | | | | | | | | 2 | | | | | | |
| Mountain Bluebird | 30 | 32 | 50 | | | | 2 | | 56 | 110 | 188 | | 3 | 23 | 24 | | 4 | 24 | 17 | | | 7 | 11 |
| Townsend's Solitaire | 13 | 3 | 13 | | | | | | | 5 | | | 17 | 9 | 34 | | 7 | 1 | 2 | | | | 3 |
| Veery | | 13 | 4 | | | | | | | | | | 2 | | | | 7 | 2 | 5 | | | | |
| Swainson's Thrush | 9 | 17 | 38 | | | | | | | | | | 5 | 69 | 57 | | 25 | 9 | 15 | | | 1 | 2 |
| Hermit Thrush | 34 | 37 | 56 | | | | | | 3 | 1 | 21 | | 22 | 62 | 99 | | 3 | 21 | 25 | | | | 2 |
| American Robin | 163 | 198 | 244 | | 5 | 2 | 7 | | 26 | 45 | 89 | | 112 | 168 | 208 | | 143 | 282 | 261 | | 10 | 19 | 29 |

Table 1. continued

| | Aspen | | | | Grassland | | | | Juniper Woodland | | | | Mid-elev. Conifer | | | | Montane Riparian | | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 | | 2002 | 2003 | 2004 |
| Gray Catbird | | | 1 | | 2 | | 1 | | | | | | | | | | 1 | 3 | 6 | | | | |
| Northern Mockingbird | | | | | | | 1 | | 1 | | 1 | | | | | | | | | | | | |
| Sage Thrasher | | 2 | | | 5 | 11 | 11 | | 5 | 18 | 20 | | | | | | | | | | 67 | 192 | 220 |
| Brown Thrasher | | | | | 4 | | | | | | | | | | | | | | | | | | |
| European Starling | | | | | | | 59 | | 2 | | 3 | | | | | | | 5 | | | | | |
| American Pipit | | | 1 | | | | | | | | | | | | | | | | | | | | |
| Cedar Waxwing | 6 | 1 | | | | | | | | | 18 | | | 2 | 3 | | 7 | 4 | 17 | | | | |
| Orange-crowned Warbler | 13 | 15 | 36 | | 2 | | | | | | | | 12 | 9 | 9 | | | 9 | 1 | | | | 4 |
| Virginia's Warbler | | | | | | | | | | | 2 | | | | | | | | | | | | |
| Yellow Warbler | 27 | 35 | 34 | | | | 8 | | | | 5 | | 2 | 3 | 3 | | 141 | 105 | 197 | | 2 | 3 | 5 |
| Yellow-rumped Warbler | 188 | 84 | 135 | | | | | | | 7 | 28 | | 259 | 234 | 216 | | 34 | 79 | 104 | | 1 | 5 | 6 |
| Black-throated Gray Warbler | 2 | | | | | | | | 54 | 47 | 77 | | | | | | | | | | | | |
| Northern Waterthrush | | | | | | | | | | | | | | | | | 5 | 2 | | | | | |
| MacGillivray's Warbler | 26 | 38 | 42 | | | | | | | | 1 | | 7 | 54 | 36 | | 29 | 21 | 61 | | | | |
| Common Yellowthroat | | | | | | | 1 | | | | | | | | | | | 2 | 10 | | 1 | | |
| Wilson's Warbler | | | 3 | | | | | | | | | | | 1 | | | 89 | 68 | 75 | | | | |
| Yellow-breasted Chat | | | | | | | | | 1 | | | | | | | | | | | | | | |
| Western Tanager | 25 | 31 | 68 | | 1 | | | | 1 | 2 | | | 45 | 93 | 90 | | 4 | 8 | 15 | | | 7 | 1 |
| Green-tailed Towhee | 37 | 41 | 75 | | 8 | 11 | 4 | | 122 | 84 | 143 | | 5 | 37 | 31 | | 17 | 44 | 45 | | 25 | 72 | 54 |
| Spotted Towhee | 3 | 15 | | | | | 3 | | 2 | | 4 | | 1 | | | | | 3 | 8 | | | 3 | 8 |
| Chipping Sparrow | 81 | 60 | 224 | | 7 | | 4 | | 130 | 260 | 361 | | 58 | 89 | 134 | | 26 | 64 | 82 | | 3 | 28 | 5 |
| Brewer's Sparrow | 13 | 47 | 67 | | 71 | 134 | 262 | | 106 | 54 | 199 | | | 4 | 24 | | 8 | 48 | 54 | | 277 | 466 | 607 |
| Field Sparrow | | | | | | | 2 | | | | | | | | | | | | | | | | |
| Vesper Sparrow | 15 | 9 | 9 | | 72 | 118 | 253 | | 77 | 45 | 75 | | | | 5 | | 17 | 11 | 10 | | 157 | 156 | 229 |
| Lark Sparrow | | 1 | | | 17 | 9 | 13 | | 20 | 30 | 30 | | | | | | | | 1 | | 40 | 41 | 28 |
| Sage Sparrow | | 2 | | | 5 | 5 | 1 | | 20 | 6 | 5 | | | | | | | | | | 61 | 97 | 103 |
| Lark Bunting | | 1 | | | 378 | 627 | 1264 | | | | 15 | | | | | | | | | | 99 | 7 | 269 |
| Savannah Sparrow | 6 | | | | 16 | 5 | 3 | | | | | | | | | | 7 | 53 | 26 | | 6 | 10 | 20 |
| Grasshopper Sparrow | | | | | 14 | 21 | 34 | | | | | | | | | | | | 1 | | 6 | 20 | |
| Fox Sparrow | | 1 | | | | | | | | | | | | | 6 | | 8 | 10 | 10 | | | | |
| Song Sparrow | 10 | 24 | 11 | | 1 | | | | | | 3 | | 6 | 5 | 8 | | 213 | 97 | 116 | | 2 | | 2 |
| Lincoln's Sparrow | 5 | 20 | 33 | | 4 | | 4 | | | | | | 3 | 48 | 33 | | 117 | 128 | 173 | | | | |

Table 1. continued

| | Aspen | | | | Grassland | | | | Juniper Woodland | | | | Mid-elev. Conifer | | | | Montane Riparian | | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** |
| White-crowned Sparrow | 25 | 39 | 54 | | | | | | 5 | | | | 1 | 62 | 43 | | 144 | 134 | 120 | | | 1 | |
| Dark-eyed Junco | 157 | 113 | 219 | | | | | | 3 | 10 | 9 | | 198 | 285 | 291 | | 33 | 86 | 104 | | | 4 | 1 |
| McCown's Longspur | | | | | 71 | 82 | 138 | | | | | | | | | | | | | | | 1 | |
| Chestnut-collared Longspur | | | | | 74 | 147 | 48 | | | | | | | | | | | | | | | | |
| Black-headed Grosbeak | 17 | 7 | 25 | | 2 | | 1 | | | 1 | 1 | | 7 | 6 | 4 | | 4 | 4 | 2 | | | | |
| Blue Grosbeak | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lazuli Bunting | 12 | 6 | 14 | | | | | | 2 | 1 | 3 | | | 2 | 5 | | 11 | 14 | 10 | | | | |
| Red-winged Blackbird | 7 | 1 | 2 | | 21 | 29 | 36 | | 4 | 2 | 4 | | | | 2 | | 2 | 8 | 9 | | 5 | 6 | 9 |
| Western Meadowlark | 8 | 20 | 12 | | 250 | 427 | 1136 | | 77 | 90 | 113 | | | | | | 3 | 4 | 7 | | 61 | 232 | 227 |
| Yellow-headed Blackbird | | | | | 4 | 2 | 8 | | | | | | | | | | | | | | | 3 | |
| Brewer's Blackbird | 5 | 10 | 50 | | 11 | 13 | 47 | | 7 | 19 | 2 | | 1 | 2 | 4 | | 16 | 29 | 46 | | 16 | 8 | 24 |
| Common Grackle | 10 | 12 | 8 | | | 2 | 6 | | 3 | | 2 | | | | | | | | 6 | | | | |
| Brown-headed Cowbird | 17 | 20 | 35 | | 12 | 31 | 41 | | 42 | 35 | 38 | | 2 | | 7 | | 12 | 12 | 28 | | 3 | 11 | 25 |
| Orchard Oriole | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Bullock's Oriole | | 2 | 4 | | | | 8 | | | 1 | 1 | | | | | | | 2 | | | | | |
| Scott's Oriole | | | | | | | | | | 5 | 3 | | | | | | | | | | | | |
| Pine Grosbeak | 1 | 1 | 4 | | | | | | | | | | 6 | 7 | 9 | | 1 | 1 | 1 | | | | |
| Cassin's Finch | 14 | 11 | 26 | | | | | | 3 | | 7 | | 27 | 31 | 38 | | 7 | 19 | 18 | | | | |
| House Finch | | | | | | | 1 | | 27 | 21 | 36 | | | 3 | | | | | | | | | |
| Red Crossbill | | 17 | 22 | | | | | | | | 2 | | 4 | 38 | 61 | | 6 | 19 | 3 | | | | |
| White-winged Crossbill | | | | | | | | | | | | | 5 | 4 | | | | | | | | | |
| Pine Siskin | 55 | 59 | 196 | | | | | | | 1 | 2 | | 93 | 186 | 250 | | 47 | 79 | 167 | | 2 | | |
| American Goldfinch | 1 | 9 | 11 | | 2 | | 8 | | 3 | | 12 | | | 4 | | | 1 | 1 | 12 | | | 1 | 2 |
| Evening Grosbeak | | | | | | | | | | | | | 4 | 1 | | | | | 1 | | | | |
| Red Squirrel | 3 | 2 | 6 | | | | | | | | | | | | 41 | | 4 | 19 | 39 | | | | |

# Bighorn National Forest

## Overview

Protocols follow those previously described above for the statewide monitoring program, except for the habitats surveyed and the number of transects. For the Bighorn National Forest, we selected ten transects to be surveyed annually in four habitats – High-elevation Conifer, Mid-elevation Conifer, Montane Riparian, and Shrubsteppe. We actually analyze 12 transects in Montane Riparian, since two MR transects were randomly placed in the Bighorn NF for the statewide program.

*High-elevation Conifer*
This habitat generally contains several conifer species in either pure or mixed stands. Tree species include subalpine fir (*Abies lasiocarpa*), Engelmann Spruce (*Picea engelmanni*), limber pine (*Pinus flexilis*), and lodgepole pine (*Pinus contorta*), with occasional aspen (*Populus tremuloides*) intrusion. After Mid-elevation Conifer, this is the most dominant forest type in the state (4.79% of land area; Nicholoff 2003, see literature cited above). GAP codes: 42001, 42008, 42004, 42016 above 8,500 feet elevation

In 2003, as a pilot project, we initiated a systematic approach to photographically record habitat characteristics at each point. Briefly, for each point in High-elevation Conifer and Montane Riparian, field biologists took two digital photos at each point count. In 2004, we photographed points in Mid-elevation Conifer and Shrubsteppe. These photos can then be used as a baseline (we intend to photograph points again) to demonstrate large-scale changes in habitat conditions.

The parsimonious explanation for most species NOT monitored is due to low sample size (i.e., only 10 or 12 transects conducted). Therefore, we do not offer suggestions for alternative methods to monitor these species. For suite of species (e.g., owls), recommendations follow those suggested in the statewide section above.

## Species Accounts

*Waterfowl*
Very few individuals are detected on these mostly montane forested transects.

**Mallard** – Only eight individuals total for the program.

**Green-winged Teal** – Only two individuals total for the program.

*Gallinaceous birds*
**Gray Partridge** – Only two individuals total for the program.

**Blue Grouse** – Surprisingly, only two individuals of this montane species have been detected on transects.

*Vultures*
**Turkey Vulture** – Only one individual total for the program.

*Diurnal raptors*
A notoriously difficult suite of species to monitor, particularly with point counts or transects.

**Northern Harrier** – Only five individuals total for the program.

**Sharp-shinned Hawk** – Only seven individuals total for the program.

**Cooper's Hawk** – Only three individuals total for the program.

**Northern Goshawk** – Only three individuals total for the program.

**Swainson's Hawk** – Only one individual total for the program.

**Red-tailed Hawk** – Only 15 individuals total for the program.

**Golden Eagle** – Only three individuals total for the program.

**American Kestrel** – Only 19 individuals total for the program.

*Cranes*
**Sandhill Crane** – Only five individuals total for the program.

*Shorebirds*
**Killdeer** – Only seven individuals total for the program.

**Spotted Sandpiper** – For 2003 and 2004, the sample size for this species was just under the minimum requirement.

**Wilson's Snipe** – The 2003 field season produced enough detections to sample this species in Montane Riparian, however neither 2002 nor 2004 did.

*Doves*
**Mourning Dove** – Only two individuals total for the program.

*Owls*
**Great Horned Owl** – Only four individuals total for the program.

*Nightjars*
**Common Nighthawk** – Only two individuals total for the program.

*Swifts and Hummingbirds*
**White-throated Swift** – Only 21 individuals total for the program, tallied over two years.

**Broad-tailed Hummingbird** – This species reaches its northeastern-most extent in Wyoming in the Bighorn Mountains, thus we would expect low population density and difficulty in monitoring this species although it is quite common in other mountain ranges west and south.

*Kingfishers*
**Belted Kingfisher** – Only one individual total for the program.

*Woodpeckers*
**Williamson's Sapsucker** – Only 13 individuals total for the program.

**Red-naped Sapsucker** – Only 15 individuals total for the program.

**Downy Woodpecker** – Only four individuals total for the program.

**Hairy Woodpecker** – Pooled Forest detections are satisfactory for monitoring this species across habitats.

**Three-toed Woodpecker** – Pooled Forest detections were sufficient to produce a density estimate in 2004 only, with most detections in High-elevation Conifer. More extensive training on identifying woodpeckers based on drum cadence should increase this and other woodpecker species' sample sizes.

**Northern Flicker** – Sample sizes are just below the minimum limit in all four habitats, however pooled Forest detections would provide a substantially robust sample size.

*Flycatchers*
**Olive-sided Flycatcher** – Only 13 individuals total for the program.

**Western Wood-Pewee** – Pooled Forest detections were sufficient in 2003, however neither 2002 nor 2004 came close.

**Hammond's Flycatcher** – Pooled Forest detections were sufficient in 2002, however neither 2003 nor 2004 came close.

**Dusky Flycatcher** – Sample sizes are sufficient for monitoring in Montane Riparian.

**Cordilleran Flycatcher** – Pooled Forest detections will allow us to monitor this species.

*Kingbirds*
**Eastern Kingbird** – Only one individual total for the program.

*Vireos*
**Warbling Vireo** – Sample sizes are sufficient for monitoring in Montane Riparian.

*Jays, crows, and ravens*
**Gray Jay** – Pooled Forest detections are sufficient for monitoring this species.

**Steller's Jay** – Only seven individuals total for the program.

**Clark's Nutcracker** – Sample sizes are suggestive for monitoring this species, however caution should be used considering the proclivity of this species to flock.

**Black-billed Magpie** – Only five individuals total for the program.

**American Crow** – Only five individuals total for the program.

**Common Raven** – Pooled Forest detections are sufficient for monitoring this species, although some caution is warranted as this species tends to be observed in pairs.

*Larks*
**Horned Lark** – Sample sizes are borderline for monitoring this species.

*Swallows*
**Tree Swallow** – Only two individuals total for the program.

**Violet-green Swallow** – There are too few detections for monitoring this species.

**Cliff Swallow** – Only six individuals total for the program.

*Chickadees*
**Black-capped Chickadee** – Only 11 individuals total for the program.

**Mountain Chickadee** – Sample sizes are extremely robust for monitoring this species in High-elevation Conifer, Mid-elevation Conifer, and Montane Riparian.

*Nuthatches*
**Red-breasted Nuthatch** – We detect enough individuals for monitoring in High-elevation Conifer and Mid-elevation Conifer.

**White-breasted Nuthatch** – Only one individual detected for the program.

*Creepers*
**Brown Creeper** – Pooled Forest detections are adequate for monitoring this species, although it would be possible to monitor in High-elevation with a small increase in sample size.

*Wrens*
**Rock Wren** – Pooled Forest detections are more than sufficient, and Shrubsteppe detections are borderline, for monitoring this species.

**House Wren** – There are too few detections for monitoring this species.

**Winter Wren** – A very rare find in 2004, one individual was detected in Mid-elevation Conifer. This species is at best peripheral to the Bighorn Mountains.

*Dippers*
**American Dipper** – Only four individuals total for the program.

*Kinglets*
**Golden-crowned Kinglet** – There are too few detections for monitoring this species.

**Ruby-crowned Kinglet** – Sample sizes are extremely robust in all four habitats, although its presence in Shrubsteppe is most likely the result of transects being in close proximity to conifers forest.

*Thrushes*
**Mountain Bluebird** – Sample sizes are sufficient in Mid-elevation Conifer and Shrubsteppe for monitoring this species.

**Townsend's Solitaire** – Pooled Forest detections were adequate in 2004, however that was the only year.

**Swainson's Thrush** – Only six individuals total for the program.

**Hermit Thrush** – Sample sizes are robust in High-elevation Conifer and Mid-elevation Conifer.

**American Robin** – Samples sizes are robust in all four habitats for this ubiquitous species.

*Mimids*
**Gray Catbird** – Only one individual total for the program.

**Sage Thrasher** – Only one individual total for the program.

*Pipits*
**American Pipit** – There are too few detections for monitoring this species.

*Waxwings*
**Cedar Waxwing** – Only eight individuals total for the program.

*Warblers*
**Orange-crowned Warbler** – Only three individuals total for the program.

**Yellow Warbler** – Only 13 individuals total for the program.

**Yellow-rumped Warbler** – Sample sizes are robust in High-elevation Conifer and Mid-elevation Conifer, and adequate in the other two habitats.

**Ovenbird** – Only one individual total for the program.

**MacGillivray's Warbler** – Only eight individuals total for the program.

**Common Yellowthroat** – There are too few detections for monitoring this species.

**Wilson's Warbler** – Sample sizes are extremely robust in Montane Riparian for monitoring this species.

**Yellow-breasted Chat** – Only one individual total for the program.

*Tanagers*
**Western Tanager** – There are too few detections for monitoring this species.

*Towhees and sparrows*
**Green-tailed Towhee** – Sample sizes are ample for monitoring this species in Shrubsteppe.

**Spotted Towhee** – Only two individuals total for the program.

**Chipping Sparrow** – This species can be monitored by all four habitat's transects.

**Brewer's Sparrow** – This near sage-obligate can be monitored in Shrubsteppe.

**Vesper Sparrow** – As with Brewer's Sparrow, this open-country sparrow is well-monitored in Shrubsteppe.

**Lark Bunting** – Only recorded twice total for the program.

**Savannah Sparrow** – We obtained sufficient sample sizes in Montane Riparian and Shrubsteppe in 2003 and 2004, so this species should be monitored by this program.

**Fox Sparrow** – Only three individuals total for the program.

**Song Sparrow** – Sample sizes were sufficient in Montane Riparian in 2002 and 2004, but the unexplainable absence of detections in 2003 is intriguing.

**Lincoln's Sparrow** – Sample sizes are robust in Montane Riparian for monitoring this species.

**White-crowned Sparrow** – Sample sizes are sufficient in all four habitats, although the species is best monitored in Montane Riparian and Shrubsteppe.

**Dark-eyed Junco** – We achieve robust sample sizes in all four habitats.

*Grosbeaks and buntings*
**Black-headed Grosbeak** – Only four individuals total for the program.

**Lazuli Bunting** – Pooled Forest detections were sufficient for 2003, however no other year achieved the minimum threshold.

*Blackbirds*
**Red-winged Blackbird** – There are too few detections for monitoring this species.

**Western Meadowlark** – Samples sizes fluctuate in Shrubsteppe, but should be sufficient for monitoring the species.

**Brewer's Blackbird** – Sample sizes fluctuate for this species also, and it is prone to flocking, however pooled Forest detections should allow us to monitor this species.

**Common Grackle** – There are too few detections for monitoring this species.

**Brown-headed Cowbird** – There are too few detections for monitoring this species.

*Finches*
**Pine Grosbeak** – The 2003 surveys produced enough detections for density estimation, however no other year did.

**Cassin's Finch** – There are too few detections for monitoring this species.

**Red Crossbill** – This species is prone to flocking, however the number of individuals is suggestive of monitoring potential.

**White-winged Crossbill** – There are too few detections for monitoring this species.

**Pine Siskin** – another flocking species, sample sizes are suggestive for all habitats, but the best way to monitor this species may be to pool detections across habitats.

**American Goldfinch** – Only six individuals total for the program.

**Evening Grosbeak** – Only one individual total for the program.

*Weavers*
**House Sparrow** – Only one individual total for the program.

*Mammals*
**Red Squirrel** – Sample sizes are very robust in High-elevation Conifer, and this species could also be monitored in Mid-elevation Conifer and Montane Riparian.

.Table 2. Number of individuals recorded for 2002-2004 on Bighorn NF transects

| | High-elev. Conifer | | | Mid-elev. Conifer | | | Montane Riparian | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 |
| number of transects | 10 | 10 | 10 | 10 | 10 | 10 | 12 | 12 | 12 | 10 | 10 | 10 |
| Mallard | | | | | | | 4 | 4 | | | | |
| Green-winged Teal | | | | | | | | | 2 | | | |
| Gray Partridge | | | | | | | | | | | | 2 |
| Blue Grouse | | 1 | | | | | | | | 2 | | |
| Turkey Vulture | | | | | 1 | | | | | | | |
| Northern Harrier | | | | | | 1 | | 1 | 3 | | | |
| Sharp-shinned Hawk | | | 1 | | 1 | 2 | | 1 | | 1 | | 1 |
| Cooper's Hawk | | | 1 | | | | | | 1 | | | 1 |
| Northern Goshawk | | | | 1 | | | 1 | | | | 1 | |
| Swainson's Hawk | | | | | | | | | | | | 1 |
| Red-tailed Hawk | | | 1 | 2 | | 1 | 1 | 1 | 1 | 2 | 3 | 3 |
| Golden Eagle | | | 1 | | 1 | | | 1 | | | | |
| American Kestrel | | 1 | 2 | | | 1 | | | 1 | 2 | 4 | 8 |
| Sandhill Crane | | | | | | | 4 | | | | | 1 |
| Killdeer | | | | | 1 | | | 3 | | 1 | | 2 |
| Spotted Sandpiper | | 2 | 2 | | | | 8 | 18 | 13 | | | 1 |
| Wilson's Snipe | 1 | 2 | 3 | | 1 | | 16 | 30 | 14 | 1 | 1 | |
| Mourning Dove | | | | 1 | | | | | | 1 | | |
| Great Horned Owl | | | 2 | | | 1 | 1 | | | | | |
| Common Nighthawk | | | | | 1 | | | | | | | 1 |
| White-throated Swift | | | | | 3 | | | | | | 10 | 8 |
| Broad-tailed Hummingbird | | 1 | | | 1 | | | 4 | 3 | | | 4 |
| Belted Kingfisher | | | | | | | | | | | | 1 |
| Williamson's Sapsucker | 1 | 6 | 2 | | 2 | 2 | | | | | | |
| Red-naped Sapsucker | | | 1 | 1 | 1 | 1 | 1 | 2 | 2 | | 3 | 3 |
| Downy Woodpecker | 2 | | | | 1 | 1 | | | | | | |
| Hairy Woodpecker | 11 | 23 | 13 | 7 | 20 | 9 | | 5 | 7 | 1 | 7 | 7 |
| Three-toed Woodpecker | 2 | 4 | 14 | | 4 | 5 | | 2 | 4 | | | 2 |
| Northern Flicker | 10 | 15 | 16 | 9 | 10 | 6 | 11 | 20 | 14 | 22 | 16 | 17 |
| Olive-sided Flycatcher | | 1 | 1 | | 3 | 2 | 1 | 3 | | 1 | | 1 |
| Western Wood-Pewee | 2 | 4 | 4 | 11 | 14 | 2 | 7 | 18 | 7 | 1 | 2 | 1 |
| Hammond's Flycatcher | 10 | 3 | | 11 | | 1 | | | | 2 | | 1 |
| Dusky Flycatcher | | 7 | | | 17 | 1 | | 36 | 20 | 16 | 10 | 10 |
| Cordilleran Flycatcher | | 6 | 14 | | 16 | 14 | | 8 | 13 | | 9 | 15 |
| Eastern Kingbird | | | | | | | | 1 | | | | |
| Warbling Vireo | | 2 | 1 | | 2 | 1 | 41 | 20 | 20 | 1 | 21 | 17 |
| Gray Jay | 9 | 12 | 22 | 4 | 19 | 15 | 2 | 8 | 1 | 2 | 2 | 2 |
| Steller's Jay | | 3 | | 2 | | | | 1 | 1 | | | |
| Clark's Nutcracker | 8 | 27 | 26 | 12 | 26 | 28 | | 7 | 4 | 9 | 25 | 11 |
| Black-billed Magpie | | | 3 | | | | | | | 1 | 1 | |
| American Crow | | | 1 | | 2 | | 1 | | | 1 | | |

Table 2. continued

| | High-elev. Conifer | | | Mid-elev. Conifer | | | Montane Riparian | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 |
| Common Raven | 10 | 5 | 9 | 3 | 10 | 15 | 19 | 8 | 9 | 8 | 9 | 11 |
| Horned Lark | | 5 | 12 | | | | | | 1 | 8 | 23 | 6 |
| Tree Swallow | | | | | | | | 1 | 1 | | | |
| Violet-green Swallow | | | 5 | | 2 | 4 | 5 | 9 | 6 | | 12 | 7 |
| Cliff Swallow | | | | | | | | 6 | | | | |
| Black-capped Chickadee | | | | | | | 11 | | | | | |
| Mountain Chickadee | 76 | 160 | 117 | 84 | 135 | 110 | 29 | 85 | 42 | 22 | 27 | 34 |
| Red-breasted Nuthatch | 32 | 34 | 12 | 36 | 35 | 13 | 17 | 5 | 4 | 7 | 16 | 10 |
| White-breasted Nuthatch | | 1 | | | | | | | | | | |
| Brown Creeper | | 17 | 29 | | 9 | 15 | | 4 | 5 | | 1 | 1 |
| Rock Wren | | 7 | 18 | 2 | 3 | 18 | | | | 4 | 18 | 24 |
| House Wren | | | | 1 | 1 | 1 | 4 | 1 | 2 | 2 | 4 | 5 |
| Winter Wren | | | | | | 1 | | | | | | |
| American Dipper | | | | | | | | 2 | 2 | | | |
| Golden-crowned Kinglet | | 3 | | | 6 | 2 | | | 1 | | | 1 |
| Ruby-crowned Kinglet | 104 | 143 | 210 | 147 | 179 | 180 | 137 | 149 | 133 | 45 | 76 | 72 |
| Mountain Bluebird | 15 | 6 | 43 | 24 | 29 | 48 | 22 | 17 | 8 | 31 | 33 | 37 |
| Townsend's Solitiare | | 5 | 9 | | 10 | 19 | | | 2 | | 3 | 5 |
| Swainson's Thrush | | | | | | | 5 | 1 | | | | |
| Hermit Thrush | 62 | 93 | 91 | 36 | 102 | 76 | 12 | 36 | 21 | 4 | 18 | 15 |
| American Robin | 77 | 103 | 152 | 58 | 121 | 120 | 141 | 281 | 269 | 83 | 121 | 114 |
| Gray Catbird | | | | | | | | 1 | | | | |
| Sage Thrasher | | | | | | | | | | | 1 | |
| American Pipit | | | 5 | | | 1 | | | | 12 | 12 | 15 |
| Cedar Waxwing | | | | | | 3 | 3 | 1 | | | | 1 |
| Orange-crowned Warbler | | | | | | | | | 1 | | 1 | 1 |
| Yellow Warbler | | | | | | | | 13 | | | | |
| Yellow-rumped Warbler | 63 | 101 | 127 | 59 | 90 | 100 | 14 | 57 | 71 | 32 | 28 | 28 |
| Ovenbird | | | | | | | | | | | | 1 |
| MacGillivray's Warbler | | | | | | | | | 3 | | 1 | 4 |
| Common Yellowthroat | | | | | | | 2 | 7 | 10 | | | 3 |
| Wilson's Warbler | | 2 | 3 | | 5 | 6 | 176 | 124 | 111 | 1 | 1 | |
| Yellow-breasted Chat | | | | | | | | | | | | 1 |
| Western Tanager | | | | 1 | 1 | | | 5 | 1 | | 13 | 9 |
| Green-tailed Towhee | | 2 | | | 1 | 4 | | 2 | 8 | 35 | 65 | 76 |
| Spotted Towhee | | | | | | | | 1 | | | 1 | |
| Chipping Sparrow | 20 | 30 | 82 | 17 | 49 | 60 | 77 | 56 | 39 | 24 | 63 | 77 |
| Brewer's Sparrow | 2 | | 11 | 5 | 3 | 5 | 3 | 3 | 6 | 78 | 100 | 81 |
| Vesper Sparrow | | | 12 | 6 | 6 | 13 | 24 | 1 | 3 | 216 | 75 | 97 |
| Lark Bunting | | | | | | | | | 1 | | | 15 |
| Savannah Sparrow | | 9 | 10 | | 9 | 4 | | 82 | 57 | | 38 | 25 |
| Fox Sparrow | | | 1 | | 1 | | | | | | 1 | |

Table 2. continued

| | High-elev. Conifer | | | Mid-elev. Conifer | | | Montane Riparian | | | Shrubsteppe | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2002** | **2003** | **2004** | **2002** | **2003** | **2004** | **2002** | **2003** | **2004** | **2002** | **2003** | **2004** |
| Song Sparrow | 7 | | 1 | 14 | | | 115 | | 22 | 35 | | 3 |
| Lincoln's Sparrow | | 14 | 10 | | 17 | 17 | | 171 | 203 | | 38 | 58 |
| White-crowned Sparrow | 16 | 22 | 35 | 10 | 29 | 23 | 44 | 111 | 55 | 51 | 117 | 92 |
| Dark-eyed Junco | 105 | 145 | 154 | 121 | 165 | 158 | 71 | 143 | 100 | 27 | 63 | 59 |
| Black-headed Grosbeak | | | | 2 | | | | 2 | | | | |
| Lazuli Bunting | | 3 | | 4 | 2 | | 6 | 11 | | | 12 | 7 |
| Red-winged Blackbird | | | 2 | | | | 5 | 13 | 3 | 2 | 1 | |
| Western Meadowlark | | | 5 | 1 | 3 | 4 | 13 | 3 | 8 | 23 | 19 | 44 |
| Brewer's Blackbird | | | | 1 | 2 | 1 | 46 | 16 | 27 | 6 | 46 | 29 |
| Common Grackle | | | | | | | | 25 | | 5 | | |
| Brown-headed Cowbird | 1 | | | | 3 | 1 | | 10 | 16 | | | 4 |
| Pine Grosbeak | | 9 | 10 | | 18 | 3 | | | 1 | | 1 | 2 |
| Cassin's Finch | 1 | 1 | 7 | | | 6 | | 2 | 5 | 5 | 1 | 7 |
| Red Crossbill | 3 | 26 | 26 | | 42 | 41 | | 12 | 2 | | 10 | 6 |
| White-winged Crossbill | | 1 | 5 | | 3 | 3 | | | 1 | | | 13 |
| Pine Siskin | 25 | 49 | 46 | 35 | 30 | 61 | 7 | 64 | 93 | | 28 | 68 |
| American Goldfinch | | | 3 | | | | | 1 | | | 1 | 1 |
| Evening Grosbeak | | | 1 | | | | | | | | | |
| House Sparrow | | | | | 1 | | | | | | | |
| Red Squirrel | 87 | 117 | 181 | 64 | | 119 | 20 | 49 | 70 | | | 39 |

# Shoshone National Forest

## Overview

Protocols follow those previously described above for the statewide monitoring program, except for the habitats surveyed and the number of transects. For the Shoshone National Forest, we selected a total of ten transects to be surveyed annually in three habitats –Mid-elevation Conifer, Montane Grassland, and Montane Riparian.

*Montane Grassland*
Shoshone NF used their Forest-level vegetation maps to allocate transects in this habitat, thus, specific GAP codes are not available. The habitat consists of typical grassland and shrubsteppe components.

The parsimonious explanation for most species NOT monitored is due to low sample size (i.e., only 10 transects conducted). Therefore, we do not offer suggestions for alternative methods to monitor these species. For suite of species (e.g., owls), recommendations follow those suggested in the statewide section above.

## Species Accounts

*Waterfowl*
**Canada Goose** – Only six individuals total for the program.

**Mallard** – Only four individuals total for the program.

**Green-winged Teal** – Only two individuals total for the program.

**Common Merganser** – Only four individuals total for the program.

*Gallinaceous birds*
**Chukar** – Only four individuals total for the program.

**Ruffed Grouse** – Only 15 individuals total for the program.

**Greater Sage-Grouse** – Only three individuals total for the program.

**Blue Grouse** – Only eight individuals total for the program.

*Diurnal raptors*
**Osprey** – Only one individual total for the program.

**Sharp-shinned Hawk** – Only three individuals total for the program.

**Cooper's Hawk** – Only two individuals total for the program.

**Northern Goshawk** – Only three individuals total for the program.

**Red-tailed Hawk** – There are too few detections for monitoring this species.

**Golden Eagle** – Only seven individuals total for the program.

**American Kestrel** – Only three individuals total for the program.

**Prairie Falcon** – Only one individual total for the program.

*Rails*
**Sora** – Only one individual total for the program.

**Sandhill Crane** – Only one individual total for the program.

*Shorebirds*
**Killdeer** – Only three individuals total for the program.

**Spotted Sandpiper** – Sample sizes in 2002 and 2003 were sufficient in Montane Riparian, however those numbers dropped off in 2004. The reason for this in unknown, although fewer transects were completed in 2004 than the other two years of the program.

**Long-billed Curlew** – Only one individual total for the program.

**Wilson's Snipe** – Only one individual total for the program.

*Doves*
**Mourning Dove** – There are too few detections for monitoring this species.

*Nightjars*
**Common Nighthawk** – Only one individual total for the program.

*Swifts and hummingbirds*
**White-throated Swift** – This species has been recorded only twice during the three years of this program.

**Broad-tailed Hummingbird** – Only nine individuals total for the program.

**Rufous Hummingbird** – Only five individuals total for the program, some or all of these may pertain to migrants.

*Kingfishers*
**Belted Kingfisher** – Only six individuals total for the program.

*Woodpeckers*
**Williamson's Sapsucker** – Only ten individuals total for the program.

**Red-naped Sapsucker** – There are too few detections for monitoring this species.

**Downy Woodpecker** – Only five individuals total for the program.

**Hairy Woodpecker** – There are too few detections for monitoring this species.

**American Three-toed Woodpecker** – Only five individuals total for the program.

**Northern Flicker** – Pooled Forest detections are adequate for monitoring this species.

*Flycatchers*
**Olive-sided Flycatcher** – Only 15 individuals total for the program.

**Western Wood-Pewee** – Only 13 individuals total for the program.

**Least Flycatcher** – Only two individuals total for the program.

**Hammond's Flycatcher** – Although the sample size was sufficient in Mid-elevation Conifer in 2003, we did not achieve the minimum threshold in other years or habitats. It is unlikely this species can be monitored .

**Gray Flycatcher** – Only three individuals total for the program.

**Dusky Flycatcher** – Sample sizes are adequate in Montane Riparian, however pooled Forest detections may be better for monitoring this species.

**Cordilleran Flycatcher** – There are too few detections for monitoring this species.

*Vireos*
**Warbling Vireo** – This species can be monitored in Mid-elevation Conifer and Montane Riparian.

*Jays, crows, and ravens*
**Gray Jay** – Only 17 individuals total for the program.

**Steller's Jay** – Only ten individuals total for the program.

**Clark's Nutcracker** – This species is prone to flocking and, although the number of individuals is above the minimum threshold, caution is warranted in predicting whether this species can be monitored.

**Black-billed Magpie** – Only recorded in Montane Grassland, there are, however, too few detections for monitoring this species.

**American Crow** – Only 16 individuals total for the program.

**Common Raven** – There are too few detections for monitoring this species.

*Larks*
**Horned Lark** – There are too few detections for monitoring this species.

*Swallows*
**Tree Swallow** – Only two individuals total for the program.

**Violet-green Swallow** – Pooled Forest detections may be possible to monitor this species, however caution is warranted as this species is prone to being detected in groups.

**Cliff Swallow** – Only recorded twice during the three years of the program.

*Chickadees*
**Black-capped Chickadee** – Only 13 individuals total for the program.

**Mountain Chickadee** – Robust sample sizes are obtained in Mid-elevation Conifer.

*Nuthatches*
**Red-breasted Nuthatch** – This species is monitored in Mid-elevation Conifer.

**White-breasted Nuthatch** – Only two individuals total for the program.

*Creepers*
**Brown Creeper** – Only nine individuals total for the program.

*Wrens*
**Rock Wren** – This species is monitored in Montane Grassland.

**House Wren** – There are too few detections for monitoring this species, although the 20 individuals in Montane Riparian in 2003 is intriguingly higher than other years and habitats.

*Dippers*
**American Dipper** – There are too few detections for monitoring this species.

*Kinglets*
**Golden-crowned Kinglet** – There are too few detections for monitoring this high-elevation conifer species.

**Ruby-crowned Kinglet** – Robust sample sizes are obtained in Mid-elevation Conifer.

*Thrushes*
**Western Bluebird** – Only one individual total for the program.

**Mountain Bluebird** – Pooled Forest detections will allow us to monitor this species.

**Townsend's Solitaire** – Pooled Forest detections in 2004 were barely above the minimum threshold, however neither of the other years were close.

**Veery** – Only four individuals total for the program.

**Swainson's Thrush** – The 35 individuals in Mid-elevation Conifer is ten times as high as any other year or habitat. It is doubtful this species can be monitored.

**Hermit Thrush** – Pooled Forest detections will allow us to monitor this species.

**American Robin** – Sample sizes are sufficient in all three habitats.

*Mimids*
**Gray Catbird** – Only two individuals total for the program.

**Sage Thrasher** – Only 14 individuals total for the program.

*Pipits*
**American Pipit** – Only one individual total for the program.

*Warblers*
**Orange-crowned Warbler** – Only six individuals total for the program.

**Yellow Warbler** – Sample sizes fluctuate too much around the minimum threshold between years for us to predict the possibility of monitoring this species.

**Yellow-rumped Warbler** – Robust sample sizes are obtained in Mid-elevation Conifer and Montane Riparian.

**MacGillivray's Warbler** – There are too few detections for monitoring this species.

**Wilson's Warbler** – There are too few detections for monitoring this species.

*Tanagers*
**Western Tanager** – There are too few detections for monitoring this species.

*Towhees and sparrows*
**Green-tailed Towhee** – Sample sizes are sufficient in Montane Grassland to monitor this species.

**Chipping Sparrow** – Sample sizes vary considerably from year to year in single habitats, so pooled Forest detections may be best for monitoring this species.

**Brewer's Sparrow** – Robust sample sizes are obtained in Montane Grassland.

**Vesper Sparrow** – Robust sample sizes are obtained in Montane Grassland.

**Lark Sparrow** – There are too few detections to monitor this species.

**Savannah Sparrow** – There are too few detections to monitor this species.

**Song Sparrow** – This species can be monitored in Montane Grassland.

**Lincoln's Sparrow** – Sample sizes fluctuate in Montane Riparian, but it should be possible monitor this species.

**White-crowned Sparrow** – This species can be monitoring in Montane Riparian.

**Dark-eyed Junco** – This species can be monitored in Mid-elevation Conifer.

*Grosbeaks and buntings*
**Black-headed Grosbeak** – Only one individual total for the program.

**Lazuli Bunting** – Only five individuals total for the program.

*Blackbirds*
**Red-winged Blackbird** – Only ten individuals total for the program.

**Western Meadowlark** – This species is well-monitored in Montane Grassland.

**Brewer's Blackbird** – There are too few detections for monitoring this species.

**Common Grackle** – Recorded only twice during the three years of the program.

**Brown-headed Cowbird** – There are too few detections for monitoring this species.

*Finches*
**Cassin's Finch** – There are too few detections for monitoring this species.

**Red Crossbill** – There are too few detections for monitoring this species.

**Pine Siskin** – The number of individuals recorded is sufficient in Mid-elevation Conifer and Montane Riparian, however this species is prone to flocking, so caution is warranted.

**American Goldfinch** – Only two individuals total for the program.

**Evening Grosbeak** – Only one individual total for the program.

*Mammals*
**Red Squirrel** – There are too few detections for monitoring this species.

Table 3. Number of individuals recorded for 2002-2004 on Shoshone NF transects.

| | Mid-elev. Conifer | | | | Montane Grassland | | | | Montane Riparian | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** |
| number of transects | 8 | 7 | 10 | | 10 | 9 | 10 | | 10 | 9 | 7 |
| Canada Goose | | | | | 6 | | | | | | |
| Mallard | | | | | | | | | 4 | | |
| Green-winged Teal | | | | | | | | | 2 | | |
| Common Merganser | | | | | 2 | | | | 2 | | |
| Chukar | | | | | | | 4 | | | | |
| Ruffed Grouse | 3 | | | | 3 | 2 | | | 4 | 3 | |
| Greater Sage-Grouse | | | | | 3 | | | | | | |
| Blue Grouse | 4 | 3 | 1 | | | | | | | | |
| Osprey | | | | | | | | | | | 1 |
| Sharp-shinned Hawk | | 2 | | | | | | | 1 | | |
| Cooper's Hawk | | | 2 | | | | | | | | |
| Northern Goshawk | | | 2 | | | | | | | | 1 |
| Red-tailed Hawk | 2 | 1 | 6 | | 1 | 3 | 1 | | 3 | 7 | |
| Golden Eagle | | | | | 1 | 2 | 2 | | 1 | | 1 |
| American Kestrel | 1 | | | | | | 2 | | | | |
| Prairie Falcon | | | | | | | 1 | | | | |
| Sora | | | | | | | 1 | | | | |
| Sandhill Crane | | | | | | | 1 | | | | |
| Killdeer | | | | | 1 | | 1 | | 1 | | |
| Spotted Sandpiper | 10 | 16 | 1 | | 2 | | 1 | | 28 | 51 | 13 |
| Long-billed Curlew | | | | | | 1 | | | | | |
| Wilson's Snipe | | | | | | | 1 | | | | |
| Mourning Dove | | | | | 4 | 2 | 12 | | 1 | 4 | |
| Common Nighthawk | | | | | | | 1 | | | | |
| White-throated Swift | | | | | | | 25 | | | | 6 |
| Broad-tailed Hummingbird | | 2 | | | | | | | | 2 | 5 |
| Rufous Hummingbird | | | | | | | | | | 4 | 1 |
| Belted Kingfisher | | 2 | | | 2 | | | | | | 2 |
| Williamson's Sapsucker | 2 | 6 | | | | | | | | | 2 |
| Red-naped Sapsucker | 1 | 5 | 4 | | 1 | 5 | 8 | | 1 | 5 | 3 |
| Downy Woodpecker | 1 | 2 | | | | | | | | 2 | |
| Hairy Woodpecker | 3 | 10 | 6 | | 1 | 1 | | | | | 3 |
| Three-toed Woodpecker | | 3 | | | | | | | | | 2 |
| Northern Flicker | 3 | 20 | 17 | | 5 | 11 | 20 | | 3 | 1 | 5 |
| Olive-sided Flycatcher | 1 | 3 | 1 | | | | | | 1 | 4 | 5 |
| Western Wood-Pewee | | | | | | 1 | 1 | | 1 | 4 | 6 |
| Least Flycatcher | 1 | | | | | | | | 1 | | |
| Hammond's Flycatcher | 3 | 61 | 6 | | | | | | | 6 | |
| Gray Flycatcher | | | | | 1 | | | | | 2 | |
| Dusky Flycatcher | | 16 | 23 | | 11 | 12 | 12 | | 6 | 24 | 27 |
| Cordilleran Flycatcher | | 6 | 2 | | | | | | 11 | 7 | |

Table 3. continued

| | Mid-elev. Conifer | | | | Montane Grassland | | | | Montane Riparian | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** |
| Warbling Vireo | 2 | 20 | 27 | | 4 | 12 | 22 | | 22 | 33 | 45 |
| Gray Jay | | 6 | 6 | | | | 1 | | 4 | | |
| Steller's Jay | 2 | 6 | | | | | | | | | 2 |
| Clark's Nutcracker | 22 | 37 | 37 | | 7 | 9 | 17 | | 5 | 1 | 3 |
| Black-billed Magpie | | | | | 13 | 6 | 10 | | | | |
| American Crow | | 4 | | | 1 | 8 | | | | 3 | |
| Common Raven | 6 | | 11 | | 5 | 4 | 10 | | 3 | 4 | |
| Horned Lark | | | | | 17 | 2 | 8 | | | | |
| Tree Swallow | | | | | 1 | | 1 | | | | |
| Violet-green Swallow | | 10 | 3 | | | 1 | 13 | | 3 | 21 | 10 |
| Cliff Swallow | | | | | 1 | | | | 11 | | |
| Black-capped Chickadee | 1 | 9 | 1 | | | | | | | 2 | |
| Mountain Chickadee | 56 | 90 | 27 | | 13 | 3 | 10 | | 20 | 15 | 24 |
| Red-breasted Nuthatch | 10 | 54 | 46 | | 8 | 2 | 6 | | 9 | | 3 |
| White-breasted Nuthatch | | 2 | | | | | | | | | |
| Brown Creeper | | 4 | 1 | | | | 1 | | 2 | 1 | |
| Rock Wren | | 4 | 3 | | 48 | 38 | 80 | | | | 1 |
| House Wren | | 6 | 2 | | 4 | 3 | 1 | | | 20 | 2 |
| American Dipper | 4 | 10 | 1 | | 1 | | | | 4 | 9 | 1 |
| Golden-crowned Kinglet | | 14 | | | | | | | | | 1 |
| Ruby-crowned Kinglet | 57 | 102 | 64 | | 13 | 3 | 17 | | 37 | 16 | 33 |
| Western Bluebird | | | | | 1 | | | | | | |
| Mountain Bluebird | 2 | 14 | 18 | | 8 | 22 | 22 | | | | |
| Townsend's Solitaire | 2 | 6 | 16 | | 5 | | 4 | | | 5 | 3 |
| Veery | 1 | | | | | | | | 1 | | 2 |
| Swainson's Thrush | | 35 | 3 | | | | | | 1 | 1 | 3 |
| Hermit Thrush | 1 | 16 | 40 | | 1 | 1 | 6 | | 3 | 4 | 11 |
| American Robin | 25 | 66 | 48 | | 28 | 17 | 21 | | 28 | 39 | 53 |
| Gray Catbird | | | | | | | | | | 2 | |
| Sage Thrasher | | | | | | 9 | 5 | | | | |
| American Pipit | | | | | 1 | | | | | | |
| Orange-crowned Warbler | | | | | | 4 | 2 | | | | |
| Yellow Warbler | | | | | 2 | 2 | 2 | | 17 | 31 | 13 |
| Yellow-rumped Warbler | 49 | 140 | 47 | | 11 | 5 | 6 | | 43 | 56 | 36 |
| MacGillivray's Warbler | | 2 | 1 | | | | 1 | | 1 | 6 | 7 |
| Wilson's Warbler | | | | | | | | | 29 | 1 | 1 |
| Western Tanager | 1 | 12 | 16 | | | 3 | 7 | | | 5 | 5 |
| Green-tailed Towhee | 1 | | 4 | | 23 | 27 | 27 | | 5 | 11 | 12 |
| Chipping Sparrow | 6 | 50 | 13 | | 21 | 4 | 13 | | 8 | 21 | 26 |
| Brewer's Sparrow | | 4 | 9 | | 53 | 45 | 67 | | 3 | 3 | 2 |
| Vesper Sparrow | | | 4 | | 84 | 91 | 122 | | 1 | | 1 |
| Lark Sparrow | | | | | 24 | 9 | 9 | | | | |

Table 3. continued

| | Mid-elev. Conifer | | | | Montane Grassland | | | | Montane Riparian | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** | | **2002** | **2003** | **2004** |
| Savannah Sparrow | | | | | 6 | 10 | 19 | | 1 | | |
| Song Sparrow | 3 | 2 | 1 | | 2 | 1 | | | 80 | 23 | 18 |
| Lincoln's Sparrow | | 32 | | | | | | | | 52 | 19 |
| White-crowned Sparrow | | 18 | 7 | | 10 | 5 | 3 | | 45 | 23 | 6 |
| Dark-eyed Junco | 22 | 124 | 74 | | 1 | | 16 | | 15 | 23 | 41 |
| Black-headed Grosbeak | | | | | 1 | | | | | | |
| Lazuli Bunting | | | 1 | | 1 | | | | | 2 | 1 |
| Red-winged Blackbird | | | 2 | | | 3 | 3 | | 1 | 1 | |
| Western Meadowlark | | | | | 89 | 134 | 108 | | | | |
| Brewer's Blackbird | | | | | | 7 | 23 | | 1 | | |
| Common Grackle | | | | | 25 | | | | 1 | | |
| Brown-headed Cowbird | 2 | | 2 | | | 6 | | | 3 | 3 | 2 |
| Cassin's Finch | 11 | 10 | | | | | 1 | | 5 | 1 | 13 |
| Red Crossbill | | | 17 | | | | | | | | 2 |
| Pine Siskin | 4 | 66 | 93 | | 1 | | 14 | | 6 | 22 | 56 |
| American Goldfinch | | 2 | | | | | | | | | |
| Evening Grosbeak | | 1 | | | | | | | | | |
| Red Squirrel | 13 | 50 | | | | | | | 5 | | |

Appendix A. Common and scientific names of bird species recorded.

| Common Name | Scientific Name | Common Name | Scientific Name |
|---|---|---|---|
| Canada Goose | *Branta canadensis* | Upland Sandpiper | *Bartramia longicauda* |
| Gadwall | *Anas strepera* | Long-billed Curlew | *Numenius americanus* |
| American Wigeon | *Anas americana* | Wilson's Snipe | *Gallinago delicata* |
| Mallard | *Anas platyrhynchos* | Wilson's Phalarope | *Phalaropus tricolor* |
| Blue-winged Teal | *Anas discors* | Ring-billed Gull | *Larus delawarensis* |
| Cinnamon Teal | *Anas cyanoptera* | California Gull | *Larus californicus* |
| Northern Pintail | *Anas acuta* | Rock Pigeon | *Columba livia* |
| Green-winged Teal | *Anas crecca* | Mourning Dove | *Zenaida macroura* |
| Ring-necked Duck | *Aythya collaris* | Great Horned Owl | *Bubo virginianus* |
| Lesser Scaup | *Aythya affinis* | Northern Pygmy-Owl | *Glaucidium gnoma* |
| Bufflehead | *Bucephala albeola* | Burrowing Owl | *Athene cunicularia* |
| Barrow's Goldeneye | *Bucephala islandica* | Short-eared Owl | *Asio flammeus* |
| Common Merganser | *Mergus merganser* | Common Nighthawk | *Chordeiles minor* |
| Chukar | *Alectoris chukar* | Common Poorwill | *Phalaenoptilus nuttallii* |
| Gray Partridge | *Perdix perdix* | White-throated Swift | *Aeronautes saxatalis* |
| Ring-necked Pheasant | *Phasianus colchicus* | Black-chinned Hummingbird | *Archilochus alexandri* |
| Ruffed Grouse | *Bonasa umbellus* | Calliope Hummingbird | *Stellula calliope* |
| Greater Sage-Grouse | *Centrocercus urophasianus* | Broad-tailed Hummingbird | *Selasphorus platycercus* |
| Blue Grouse | *Dendragapus obscurus* | Rufous Hummingbird | *Selasphorus rufus* |
| Wild Turkey | *Meleagris gallopavo* | Belted Kingfisher | *Ceryle alcyon* |
| American White Pelican | *Pelecanus erythrorhynchos* | Williamson's Sapsucker | *Sphyrapicus thyroideus* |
| Great Blue Heron | *Ardea herodias* | Red-naped Sapsucker | *Sphyrapicus nuchalis* |
| Turkey Vulture | *Cathartes aura* | Downy Woodpecker | *Picoides pubescens* |
| Osprey | *Pandion haliaetus* | Hairy Woodpecker | *Picoides villosus* |
| Bald Eagle | *Haliaeetus leucocephalus* | Three-toed Woodpecker | *Picoides dorsalis* |
| Northern Harrier | *Circus cyaneus* | Black-backed Woodpecker | *Picoides arcticus* |
| Sharp-shinned Hawk | *Accipiter striatus* | Northern Flicker | *Colaptes auratus* |
| Cooper's Hawk | *Accipiter cooperii* | Olive-sided Flycatcher | *Contopus cooperi* |
| Northern Goshawk | *Accipiter gentilis* | Western Wood-Pewee | *Contopus sordidulus* |
| Broad-winged Hawk | *Buteo platypterus* | Willow Flycatcher | *Empidonax traillii* |
| Swainson's Hawk | *Buteo swainsoni* | Least Flycatcher | *Empidonax minimus* |
| Red-tailed Hawk | *Buteo jamaicensis* | Hammond's Flycatcher | *Empidonax hammondii* |
| Ferruginous Hawk | *Buteo regalis* | Gray Flycatcher | *Empidonax wrightii* |
| Golden Eagle | *Aquila chrysaetos* | Dusky Flycatcher | *Empidonax oberholseri* |
| American Kestrel | *Falco sparverius* | Cordilleran Flycatcher | *Empidonax occidentalis* |
| Merlin | *Falco columbarius* | Say's Phoebe | *Sayornis saya* |
| Prairie Falcon | *Falco mexicanus* | Ash-throated Flycatcher | *Myiarchus cinerascens* |
| Sora | *Porzana carolina* | Cassin's Kingbird | *Tyrannus vociferans* |
| American Coot | *Fulica americana* | Western Kingbird | *Tyrannus verticalis* |
| Sandhill Crane | *Grus canadensis* | Eastern Kingbird | *Tyrannus tyrannus* |
| Killdeer | *Charadrius vociferus* | Loggerhead Shrike | *Lanius ludovicianus* |
| Mountain Plover | *Charadrius montanus* | Plumbeous Vireo | *Vireo plumbeus* |
| American Avocet | *Recurvirostra americana* | Warbling Vireo | *Vireo gilvus* |
| Willet | *Catoptrophorus semipalmatus* | Red-eyed Vireo | *Vireo olivaceus* |
| Spotted Sandpiper | *Actitis macularia* | Gray Jay | *Perisoreus canadensis* |

Appendix A. continued

| Common Name | Scientific Name | Common Name | Scientific Name |
|---|---|---|---|
| Steller's Jay | *Cyanocitta stelleri* | Cedar Waxwing | *Bombycilla cedrorum* |
| Western Scrub-Jay | *Aphelocoma californica* | Orange-crowned Warbler | *Vermivora celata* |
| Pinyon Jay | *Gymnorhinus cyanocephalus* | Virginia's Warbler | *Vermivora virginiae* |
| Clark's Nutcracker | *Nucifraga columbiana* | Yellow Warbler | *Dendroica petechia* |
| Black-billed Magpie | *Pica hudsonia* | Yellow-rumped Warbler | *Dendroica coronata* |
| American Crow | *Corvus brachyrhynchos* | Black-throated Gray Warbler | *Dendroica nigrescens* |
| Common Raven | *Corvus corax* | Ovenbird | *Seiurus aurocapilla* |
| Horned Lark | *Eremophila alpestris* | Northern Waterthrush | *Seiurus noveboracensis* |
| Purple Martin | *Progne subis* | MacGillivray's Warbler | *Oporornis tolmiei* |
| Tree Swallow | *Tachycineta bicolor* | Common Yellowthroat | *Geothlypis trichas* |
| Violet-green Swallow | *Tachycineta thalassina* | Wilson's Warbler | *Wilsonia pusilla* |
| N. Rough-winged Swallow | *Stelgidopteryx serripennis* | Yellow-breasted Chat | *Icteria virens* |
| Bank Swallow | *Riparia riparia* | Western Tanager | *Piranga ludoviciana* |
| Cliff Swallow | *Petrochelidon pyrrhonota* | Green-tailed Towhee | *Pipilo chlorurus* |
| Barn Swallow | *Hirundo rustica* | Spotted Towhee | *Pipilo maculatus* |
| Black-capped Chickadee | *Poecile atricapillus* | Chipping Sparrow | *Spizella passerina* |
| Mountain Chickadee | *Poecile gambeli* | Brewer's Sparrow | *Spizella breweri* |
| Juniper Titmouse | *Baeolophus ridgwayi* | Field Sparrow | *Spizella pusilla* |
| Bushtit | *Psaltriparus minimus* | Vesper Sparrow | *Pooecetes gramineus* |
| Red-breasted Nuthatch | *Sitta canadensis* | Lark Sparrow | *Chondestes grammacus* |
| White-breasted Nuthatch | *Sitta carolinensis* | Sage Sparrow | *Amphispiza belli* |
| Pygmy Nuthatch | *Sitta pygmaea* | Lark Bunting | *Calamospiza melanocorys* |
| Brown Creeper | *Certhia americana* | Savannah Sparrow | *Passerculus sandwichensis* |
| Rock Wren | *Salpinctes obsoletus* | Grasshopper Sparrow | *Ammodramus savannarum* |
| Canyon Wren | *Catherpes mexicanus* | Fox Sparrow | *Passerella iliaca* |
| Bewick's Wren | *Thryomanes bewickii* | Song Sparrow | *Melospiza melodia* |
| House Wren | *Troglodytes aedon* | Lincoln's Sparrow | *Melospiza lincolnii* |
| Winter Wren | *Troglodytes troglodytes* | White-crowned Sparrow | *Zonotrichia leucophrys* |
| American Dipper | *Cinclus mexicanus* | Dark-eyed Junco | *Junco hyemalis* |
| Golden-crowned Kinglet | *Regulus satrapa* | McCown's Longspur | *Calcarius mccownii* |
| Ruby-crowned Kinglet | *Regulus calendula* | Chestnut-collared Longspur | *Calcarius ornatus* |
| Blue-gray Gnatcatcher | *Polioptila caerulea* | Black-headed Grosbeak | *Pheucticus melanocephalus* |
| Western Bluebird | *Sialia mexicana* | Blue Grosbeak | *Passerina caerulea* |
| Mountain Bluebird | *Sialia currucoides* | Lazuli Bunting | *Passerina amoena* |
| Townsend's Solitaire | *Myadestes townsendi* | Red-winged Blackbird | *Agelaius phoeniceus* |
| Veery | *Catharus fuscescens* | Western Meadowlark | *Sturnella neglecta* |
| Swainson's Thrush | *Catharus ustulatus* | Yellow-headed Blackbird | *Xanthocephalus xanthocephalus* |
| Hermit Thrush | *Catharus guttatus* | Brewer's Blackbird | *Euphagus cyanocephalus* |
| American Robin | *Turdus migratorius* | Common Grackle | *Quiscalus quiscula* |
| Gray Catbird | *Dumetella carolinensis* | Brown-headed Cowbird | *Molothrus ater* |
| Northern Mockingbird | *Mimus polyglottos* | Orchard Oriole | *Icterus spurius* |
| Sage Thrasher | *Oreoscoptes montanus* | Bullock's Oriole | *Icterus bullockii* |
| Brown Thrasher | *Toxostoma rufum* | Scott's Oriole | *Icterus parisorum* |
| European Starling | *Sturnus vulgaris* | Pine Grosbeak | *Pinicola enucleator* |
| American Pipit | *Anthus rubescens* | Cassin's Finch | *Carpodacus cassinii* |

Appendix A. continued

| **Common Name** | **Scientific Name** |
|---|---|
| American Goldfinch | *Carduelis tristis* |
| Evening Grosbeak | *Coccothraustes vespertinus* |
| House Sparrow | *Passer domesticus* |
| House Finch | *Carpodacus mexicanus* |
| Red Crossbill | *Loxia curvirostra* |
| White-winged Crossbill | *Loxia leucoptera* |
| Pine Siskin | *Carduelis pinus* |