INTEGRATED BREEDING BIRD MONITORING ACROSS BLM LANDS IN COLORADO:

Population Trends in Selected Species from 2008-2023

*Introduction*

The BLM has a national MOU with the USFWS (MOU WO-230-2020-04; extended via HQ Information Bulletin IB 022-036) to promote conservation and avoid or minimize adverse impacts on migratory birds under the Migratory Bird Treaty Act.

Identifying migratory birds with decreasing populations on BLM land will help biologists prioritize species they should consider or include in NEPA analyses and Resource Management Plans. For example, restoration efforts intended to promote sagebrush habitat for sagebrush-associated species may have harmful effects on declining populations of pinyon-juniper-associated species (e.g., black-throated gray warbler). Local population trend information for the latter could be used to help refine project design.

Integrated Monitoring in Bird Conservation Regions (IMBCR) is a collaborative breeding bird monitoring program led by Bird Conservancy of the Rockies in which partners pool monitoring resources to create efficiencies in data collection and analysis. IMBCR is based on a spatially balanced sampling design which provides inference to avian populations at various scales, from local field offices to entire states or Bird Conservation Regions (BCR), facilitating conservation at local and national levels (Pavlacky et al. 2017). The nested design also provides a consistent and flexible framework for understanding and comparing annual changes of bird populations with local and regional context. Trained observers conduct point count surveys across public and private land from the Great Basin to the Great Plains.

Bird Conservancy has been monitoring breeding landbirds on BLM lands in Colorado from 2008 to 2023 with some change in surveyed strata over the 16-year period. These changes were due to 1) splitting out BLM lands in the BCR10-portion of Colorado from all other lands in 2011, and 2) in 2023, designating each field office as its own individual stratum. This recent change will allow biologists to make inference about the status of local bird populations and then compare to populations across all BLM land in Colorado for context. Since 2008, we have conducted over 8,000 surveys within 196 sampling units, and detected more than 85,000 individuals across 179 different species. IMBCR protocol targets breeding landbirds (e.g., songbirds). Therefore, species such as waterfowl and raptors are generally not detected frequently on IMBCR surveys. Rare species may also not be detected frequently enough due to their uncommonness, and we generally are not able to provide robust estimates for species with few detections.

Table 1 shows supported negative trend estimates for species on all BLM lands in Colorado (stratum = CO-BLM; from 2011-2023) and for two smaller regions: all BLM land in the BCR16-portion of Colorado (CO-BCR16-BLM; 2008-2023) and all BLM land in the BCR10-portion of Colorado (CO-BCR10-BLM; 2011-2023). The percent change per year based on density or occupancy (i.e., the trend) is the estimated percent loss each year for the population in a particular stratum (or percent increase each year for Table 2). We classify trend estimates as “robust” or supported if they have an f-value ≥ 0.9. The f-value is the probability that the true population change is in the direction of the percent change per year, or more simply, our confidence in the direction of the population change. For example, if a species has a percent change of -5% with an f-value of 0.93, then we are 93% certain the population is decreasing over the monitoring period and the estimated amount of population loss is 5% each year.

In Table 2, we list species with robust increasing trend estimates for BLM land in Colorado. We also include whether the listed species are designated as a Colorado BLM listed sensitive species or a Partners in Flight species of concern for the appropriate BCR in both tables. One important note for Tables 1 and 2 is that we now provide trend based on density and occupancy estimates, whereas before, we just provided trend based on density estimates. Density is the number of birds per square kilometer and occupancy is the proportion of surveyed points occupied by a species within a stratum. Although density and occupancy have different units of measure, their trend estimates are interpreted the same: as the amount of population change per year. Trend estimates based on density and occupancy are also oftentimes very similar. However, there may be discrepancies between trend based on density and trend based on occupancy in Table 1 or 2 where trend based on density is negative and trend based on occupancy is positive, for example. In this case, the trend with an f-value ≥ 0.9 is the trend to pay attention to because we are at least 90% confident of the trend direction. Trend on occupancy is likely to be more useful for less common species where we may not have sufficient detections to estimate density.

To access the individual density and occupancy estimates across all BLM land in Wyoming and for each field office, please visit the new and improved [Rocky Mountain Avian Data Center](https://bird-conservancy.shinyapps.io/rmadc/) (RMADC). On this site, you can see approximate survey locations within your field office, a list of species detected and their counts, and download tables for the density, occupancy, and trend estimates. Click on the “Tutorial” tab for instructions on viewing estimates for a particular stratum, like a field office. Click on the “Explore the Data” tab to select your stratum and/or species filters to find results. If you have any questions about the trend estimates included in this report, or accessing density, occupancy, or other information from the RMADC, please contact Jen Timmer (Jennifer.timmer@birdconservancy.org).

*Summary*

Overall, 32 species have supported decreasing population trends based on density or occupancy across all BLM land in Colorado, including 12 species, like pinyon jay and juniper titmouse, that are Partners in Flight (PIF) regional species of concern (Table 1). Identifying species which are decreasing with certainty across all BLM land in the state is important for updating the state sensitive species list, especially for species like sagebrush sparrow, which aren’t currently designated sensitive species in Colorado, but do have conservation concern for populations within their ranges. In contrast, 16 species have supported increasing population trends based on density or occupancy across all BLM land in Colorado, including two PIF species of concern, common nighthawk and western tanager (Table 2).

Statewide trends also highlight which avian species to consider when completing a NEPA report or Resource Management Plan. However, trends at a smaller scale may differ from statewide trends due to local management or conservation efforts, abiotic conditions, habitat availability, or because an area is outside a species’ range. These local trends are equally as important to consider for knowing which migratory birds should be on “your radar” for writing management plans and implementing projects because a species of concern may not have a supported decreasing trend across all BLM land in the state, but it could within a smaller region. Because we just began monitoring within each field office in Colorado, we do not yet have field office-specific trends. We do have trends for BLM lands in just the BCR10-portion of the state and in just the BCR16-portion of the state; however, the BCR16-portion of Colorado represents where a majority of the BLM lands occur (Fig. 1). At a smaller scale (i.e., the BCR10-portion of the state), we can see that two PIF species of concern, the vesper sparrow and mountain bluebird, are both decreasing. It’s also useful to note discrepancies between local and regional trends because these could indicate greater importance of local conditions or management activities compared to landscape drivers. For example, the Brewer’s sparrow population, a PIF species of concern and sensitive species, is increasing in the BCR10-portion of the state, but we do not have a robust trend estimate statewide. This could occur because the local conditions, habitat availability, or management activities within the Field Office are promoting greater populations of the species, or there could be high variability in number of detections for Brewer’s sparrow statewide across the monitoring period. This variability is more pronounced in “superstratum” estimates that are rolled up from individual stratum estimates (e.g., estimates for all BLM land in Colorado). Sage thrasher, is decreasing in just the BCR16-portion of the state, while gray vireo is increasing in this region. Both of these species are PIF species of concern and neither species has a robust trend across all BLM land in the state.

If you don’t see any or many robust trend estimates for species within your region, it could be due to a low sampling effort, high variability in numbers of species’ detections, or species could have relatively stable populations (i.e., the trend estimate is approximately 1.0). It is probable that with more years of monitoring data and/or an increased sampling effort within a field office, we may be able to provide robust trend estimates for several more species. In addition, we will soon be able to estimate population trends for each field office, although it will take several years to generate meaningful trends (i.e., >5 yr).

*Literature Cited*

Pavlacky DC Jr., PM Lukacs, JA Blakesley, RC Skorkowsky, DS Klute, BA Hahn, VJ Dreitz, TL George, and DJ Hanni. 2017. A statistically rigorous sampling design to integrate avian monitoring and management within Bird Conservation Regions. PLoS ONE 12(10): e0185924.

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population trends in selected species from 2008-2023. Bird Conservancy of the Rockies. Brighton, Colorado, USA.

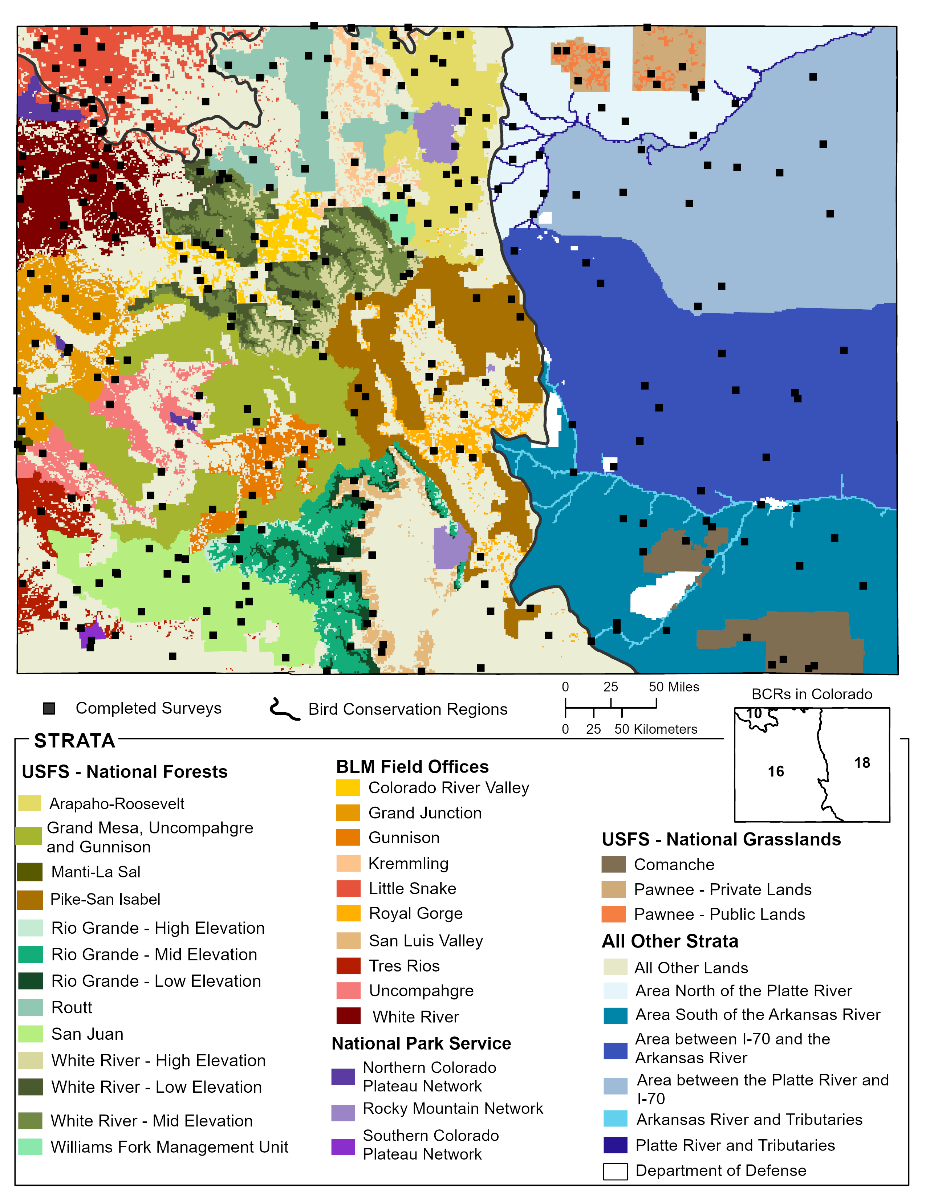


Figure 1. Sampled strata within Colorado in 2023. Black boxes represent surveyed sampling units and colored areas represent individual strata. Note the Bird Conservation Regions (BCR 10, 16, & 18).

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|  |  | | Table 1. Robust decreasing population trend estimates from the IMBCR program across all BLM land in Colorado from 2011-2023, and for the BCR16 region (2008-2023) and the BCR10 region (2011-2023). Information shown includes the percent population change per year based on density (% change per yr\_D), our confidence in the direction of the trend based on density (f\_D), the number of detections used to estimate trend based on density, the percent population change per year based on occupancy (% change per yr\_Occ), our confidence in the direction of the trend based on occupancy (f\_Occ), and the number of surveyed points with a detection. | | | | | | | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Stratum** | **Species** | **Years** | **% change per yr\_D** | **f\_D** | **No. of detections** | **% change per yr\_Occ** | **f\_Occ** | **No. of points** | | CO-BCR10-BLM | American Robin | 2011-2023 | -6.85 | 0.98 | 258 | -9.77 | 1.00 | 161 | | CO-BCR10-BLM | Bewick's Wren | 2011-2023 | -15.63 | 1.00 | 638 | -12.88 | 1.00 | 362 | | CO-BCR10-BLM | Black-billed Magpie | 2011-2023 | -8.55 | 0.99 | 306 | -17.15 | 1.00 | 69 | | CO-BCR10-BLM | Blue-gray Gnatcatcher | 2011-2023 | -3.29 | 0.85 | 191 | -6.26 | 0.94 | 185 | | CO-BCR10-BLM | Brewer's Blackbird | 2011-2023 | -13.08 | 1.00 | 56 | -11.07 | 0.98 | 40 | | CO-BCR10-BLM | Broad-tailed Hummingbird | 2011-2023 | -8.67 | 0.92 | 51 | -8.05 | 0.90 | 57 | | CO-BCR10-BLM | Brown-headed Cowbird | 2011-2023 | -13.96 | 1.00 | 219 | -15.39 | 1.00 | 171 | | CO-BCR10-BLM | Canada Goose | 2011-2023 | -12.67 | 0.98 | 24 | -12.79 | 0.96 | 22 | | CO-BCR10-BLM | Chipping Sparrow\* | 2011-2023 | -10.03 | 1.00 | 448 | -10.59 | 1.00 | 315 | | CO-BCR10-BLM | Common Raven | 2011-2023 | 3.37 | 0.87 | 461 | -6.15 | 0.90 | 30 | | CO-BCR10-BLM | Gray Flycatcher | 2011-2023 | -4.94 | 0.88 | 405 | -5.61 | 0.95 | 282 | | CO-BCR10-BLM | Killdeer | 2011-2023 | -7.80 | 0.87 | 13 | -8.32 | 0.91 | 6 | | CO-BCR10-BLM | Lark Sparrow | 2011-2023 | -2.09 | 0.81 | 340 | -3.32 | 0.90 | 225 | | CO-BCR10-BLM | Mountain Bluebird\* | 2011-2023 | -19.55 | 1.00 | 377 | -19.42 | 1.00 | 231 | | CO-BCR10-BLM | Mourning Dove | 2011-2023 | -0.15 | 0.73 | 1,093 | -3.99 | 0.91 | 404 | | CO-BCR10-BLM | Northern Flicker | 2011-2023 | -8.36 | 0.97 | 97 | -4.35 | 0.82 | 31 | | CO-BCR10-BLM | Plumbeous Vireo\* | 2011-2023 | -2.61 | 0.65 | 16 | -13.29 | 0.93 | 15 | | CO-BCR10-BLM | Sagebrush Sparrow | 2011-2023 | -7.62 | 1.00 | 1,923 | -9.65 | 1.00 | 941 | | CO-BCR10-BLM | Turkey Vulture | 2011-2023 | -15.64 | 0.99 | 7 | -17.97 | 1.00 | 7 | | CO-BCR10-BLM | Vesper Sparrow\* | 2011-2023 | -2.11 | 0.92 | 1,749 | -3.22 | 0.97 | 813 | | CO-BCR10-BLM | Western Kingbird | 2011-2023 | -19.25 | 1.00 | 65 | -21.95 | 1.00 | 30 | | CO-BCR10-BLM | Western Meadowlark | 2011-2023 | -2.42 | 0.95 | 4,118 | -7.80 | 0.99 | 1,000 | | CO-BCR10-BLM | Woodhouse's Scrub-Jay | 2011-2023 | -9.75 | 0.97 | 89 | -10.71 | 0.96 | 43 | | CO-BCR16-BLM | American Crow | 2008-2023 | -2.08 | 0.74 | 83 | -7.58 | 0.93 | 10 | | CO-BCR16-BLM | American Robin | 2008-2023 | -4.23 | 1.00 | 1,303 | -2.04 | 0.99 | 703 | | CO-BCR16-BLM | Barn Swallow | 2008-2023 | -5.79 | 0.91 | 19 | -7.03 | 0.94 | 18 | | CO-BCR16-BLM | Bewick's Wren | 2008-2023 | -3.08 | 0.93 | 591 | -2.53 | 0.92 | 432 | | CO-BCR16-BLM | Black-capped Chickadee | 2008-2023 | -5.48 | 0.92 | 53 | -5.66 | 0.91 | 42 | | CO-BCR16-BLM | Black-chinned Hummingbird | 2008-2023 | -9.97 | 1.00 | 88 | -12.07 | 1.00 | 101 | | CO-BCR16-BLM | Black-throated Gray Warbler\* | 2008-2023 | -3.83 | 1.00 | 2,118 | -4.08 | 1.00 | 1,386 | | CO-BCR16-BLM | Blue-gray Gnatcatcher | 2008-2023 | -3.63 | 1.00 | 1,450 | -6.39 | 1.00 | 1,254 | | CO-BCR16-BLM | Brewer's Blackbird | 2008-2023 | -8.91 | 1.00 | 341 | -7.59 | 1.00 | 171 | | CO-BCR16-BLM | Canada Goose | 2008-2023 | -5.55 | 0.86 | 18 | -7.90 | 0.93 | 18 | | CO-BCR16-BLM | Canyon Towhee | 2008-2023 | 2.36 | 0.56 | 4 | -10.12 | 0.91 | 4 | | CO-BCR16-BLM | Canyon Wren | 2008-2023 | -16.45 | 1.00 | 146 | -16.84 | 1.00 | 50 | | CO-BCR16-BLM | Cassin's Kingbird | 2008-2023 | 0.69 | 0.51 | 3 | -10.34 | 0.93 | 3 | | CO-BCR16-BLM | Chipping Sparrow | 2008-2023 | -3.22 | 1.00 | 1,434 | -3.27 | 1.00 | 1,130 | | CO-BCR16-BLM | Clark's Nutcracker | 2008-2023 | -2.71 | 0.94 | 358 | -3.67 | 0.92 | 116 | | CO-BCR16-BLM | Common Raven | 2008-2023 | -3.08 | 1.00 | 1,249 | -2.64 | 0.90 | 188 | | CO-BCR16-BLM | Gray Flycatcher | 2008-2023 | -3.91 | 1.00 | 1,089 | -2.96 | 0.97 | 922 | | CO-BCR16-BLM | Juniper Titmouse\* | 2008-2023 | -1.84 | 0.93 | 453 | -4.96 | 0.99 | 397 | | CO-BCR16-BLM | Lincoln's Sparrow | 2008-2023 | -5.64 | 0.79 | 9 | -7.92 | 0.91 | 5 | | CO-BCR16-BLM | Mountain Bluebird\* | 2008-2023 | -2.22 | 0.98 | 1,328 | 1.00 | 0.50 | 883 | | CO-BCR16-BLM | Northern Flicker | 2008-2023 | -1.13 | 0.91 | 612 | 1.33 | 0.57 | 267 | | CO-BCR16-BLM | Pinyon Jay\* | 2008-2023 | -6.35 | 1.00 | 1,121 | -6.72 | 1.00 | 310 | | CO-BCR16-BLM | Plumbeous Vireo\* | 2008-2023 | -4.07 | 1.00 | 669 | -4.36 | 0.99 | 545 | | CO-BCR16-BLM | Red-breasted Nuthatch | 2008-2023 | -4.14 | 0.87 | 99 | -6.44 | 0.96 | 86 | | CO-BCR16-BLM | Red-tailed Hawk | 2008-2023 | -3.34 | 0.92 | 49 | -2.68 | 0.92 | 46 | | CO-BCR16-BLM | Rock Pigeon | 2008-2023 | -4.15 | 0.77 | 6 | -8.44 | 0.93 | 4 | | CO-BCR16-BLM | Rock Wren | 2008-2023 | -1.39 | 0.96 | 1,722 | 0.42 | 0.63 | 707 | | CO-BCR16-BLM | Sage Thrasher\* | 2008-2023 | 1.59 | 0.57 | 201 | -5.06 | 0.93 | 79 | | CO-BCR16-BLM | Say's Phoebe | 2008-2023 | -3.37 | 0.97 | 139 | -4.80 | 0.97 | 74 | | CO-BCR16-BLM | Spotted Sandpiper | 2008-2023 | -7.52 | 0.92 | 13 | -1.11 | 0.63 | 2 | | CO-BCR16-BLM | Tree Swallow | 2008-2023 | -6.99 | 0.98 | 81 | -5.04 | 0.95 | 60 | | CO-BCR16-BLM | Violet-green Swallow | 2008-2023 | -4.59 | 0.99 | 427 | -3.40 | 0.95 | 343 | | CO-BCR16-BLM | Western Bluebird\* | 2008-2023 | -7.05 | 0.86 | 29 | -8.08 | 0.91 | 27 | | CO-BCR16-BLM | White-breasted Nuthatch | 2008-2023 | -3.82 | 0.97 | 164 | -3.12 | 0.91 | 138 | | CO-BCR16-BLM | White-crowned Sparrow | 2008-2023 | -6.97 | 0.91 | 61 | -6.12 | 0.92 | 22 | | CO-BCR16-BLM | Woodhouse's Scrub-Jay | 2008-2023 | -1.87 | 0.86 | 404 | -5.12 | 0.97 | 227 | | CO-BCR16-BLM | Yellow Warbler | 2008-2023 | -0.39 | 0.65 | 175 | -2.74 | 0.90 | 123 | | CO-BLM | American Kestrel\* | 2011-2023 | -4.60 | 0.95 | 112 | -4.36 | 0.94 | 115 | | CO-BLM | Barn Swallow | 2011-2023 | -9.95 | 0.99 | 43 | -11.04 | 0.98 | 39 | | CO-BLM | Bewick's Wren | 2011-2023 | -10.41 | 1.00 | 1,229 | -10.00 | 1.00 | 794 | | CO-BLM | Black-throated Gray Warbler\* | 2011-2023 | -3.46 | 0.98 | 2,233 | -3.16 | 0.96 | 1,475 | | CO-BLM | Brewer's Blackbird | 2011-2023 | -7.14 | 0.98 | 397 | -4.33 | 0.94 | 211 | | CO-BLM | Broad-tailed Hummingbird\* | 2011-2023 | -1.87 | 0.92 | 574 | -2.22 | 0.95 | 592 | | CO-BLM | Brown-headed Cowbird | 2011-2023 | -3.13 | 0.94 | 561 | -4.71 | 0.97 | 449 | | CO-BLM | Canada Goose | 2011-2023 | -6.50 | 0.88 | 42 | -11.02 | 0.96 | 40 | | CO-BLM | Canyon Towhee | 2011-2023 | 0.27 | 0.52 | 4 | -16.12 | 0.93 | 4 | | CO-BLM | Canyon Wren | 2011-2023 | -14.67 | 1.00 | 153 | -13.38 | 0.98 | 52 | | CO-BLM | Chipping Sparrow\* | 2011-2023 | -3.24 | 1.00 | 1,882 | -5.89 | 1.00 | 1,445 | | CO-BLM | Clark's Nutcracker\* | 2011-2023 | -7.56 | 1.00 | 366 | -4.65 | 0.95 | 119 | | CO-BLM | Cliff Swallow | 2011-2023 | -13.23 | 1.00 | 224 | -10.82 | 0.99 | 117 | | CO-BLM | Gray Flycatcher | 2011-2023 | -3.81 | 0.99 | 1,494 | -3.03 | 0.95 | 1,204 | | CO-BLM | House Finch | 2011-2023 | -2.77 | 0.90 | 926 | -3.42 | 0.96 | 633 | | CO-BLM | Juniper Titmouse\* | 2011-2023 | -2.85 | 0.95 | 544 | -8.60 | 1.00 | 469 | | CO-BLM | Killdeer | 2011-2023 | -3.13 | 0.77 | 30 | -7.70 | 0.97 | 14 | | CO-BLM | Lark Sparrow | 2011-2023 | 1.15 | 0.53 | 1,206 | -4.50 | 0.98 | 795 | | CO-BLM | MacGillivray's Warbler\* | 2011-2023 | -6.82 | 0.93 | 122 | -7.51 | 0.94 | 103 | | CO-BLM | Mountain Bluebird\* | 2011-2023 | -2.77 | 0.98 | 1,705 | -2.14 | 0.98 | 1,114 | | CO-BLM | Northern Harrier\* | 2011-2023 | -5.02 | 0.86 | 18 | -8.46 | 0.92 | 18 | | CO-BLM | Pinyon Jay\* | 2011-2023 | -6.70 | 1.00 | 1,241 | -5.25 | 0.98 | 342 | | CO-BLM | Plumbeous Vireo\* | 2011-2023 | 0.85 | 0.51 | 685 | -4.97 | 0.97 | 560 | | CO-BLM | Red-breasted Nuthatch\* | 2011-2023 | -5.14 | 0.85 | 99 | -10.20 | 0.97 | 86 | | CO-BLM | Sagebrush Sparrow\* | 2011-2023 | -4.19 | 0.97 | 2,232 | -5.71 | 1.00 | 1,122 | | CO-BLM | Savannah Sparrow | 2011-2023 | -14.42 | 0.91 | 8 | -13.35 | 0.91 | 6 | | CO-BLM | Swainson's Hawk | 2011-2023 | -7.21 | 0.91 | 11 | -6.74 | 0.91 | 12 | | CO-BLM | Vesper Sparrow\* | 2011-2023 | -1.79 | 0.94 | 3,760 | -2.96 | 0.98 | 1,794 | | CO-BLM | Violet-green Swallow | 2011-2023 | -6.84 | 1.00 | 544 | -6.82 | 1.00 | 427 | | CO-BLM | Western Meadowlark | 2011-2023 | -0.56 | 0.83 | 5,508 | -1.95 | 0.91 | 1,384 | | CO-BLM | Woodhouse's Scrub-Jay | 2011-2023 | -6.91 | 1.00 | 493 | -7.57 | 1.00 | 270 | | CO-BLM | Yellow-rumped Warbler | 2011-2023 | -5.66 | 0.98 | 233 | -5.55 | 0.98 | 212 | |  |  |  |  |  |

\* Indicates a species of concern for Bird Conservation Region (BCR) 10 and/or 16, as designated by Partners in Flight, if the stratum is located within the appropriate BCR.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Table 2. Robust increasing population trend estimates from the IMBCR program across all BLM land in Colorado from 2011-2023, and for the BCR16 region (2008-2023) and the BCR10 region (2011-2023). Information shown includes the percent population change per year based on density (% change per yr\_D), our confidence in the direction of the trend based on density (f\_D), the number of detections used to estimate trend based on density, the percent population change per year based on occupancy (% change per yr\_Occ), our confidence in the direction of the trend based on occupancy (f\_Occ), and the number of surveyed points with a detection. | | | | | | | | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Stratum** | **Species** | **Years** | **% change per yr\_D** | **f\_D** | **No. of detections** | **% change per yr\_Occ** | **f\_Occ** | **No. of points** |  | | CO-BCR10-BLM | Ash-throated Flycatcher | 2011-2023 | 11.20 | 0.97 | 148 | -1.06 | 0.63 | 84 |  | | CO-BCR10-BLM | Blue Grosbeak | 2011-2023 | 23.71 | 0.92 | 1 | 7.10 | 0.67 | 1 |  | | CO-BCR10-BLM | Brewer's Sparrow\*S | 2011-2023 | 1.77 | 0.65 | 4,186 | 5.96 | 0.99 | 1,536 |  | | CO-BCR10-BLM | Bushtit | 2011-2023 | 21.21 | 0.96 | 4 | 15.46 | 0.92 | 4 |  | | CO-BCR10-BLM | Chukar | 2011-2023 | 22.88 | 0.99 | 20 | 6.25 | 0.72 | 18 |  | | CO-BCR10-BLM | Common Nighthawk\* | 2011-2023 | 23.52 | 1.00 | 40 | 19.49 | 0.99 | 22 |  | | CO-BCR10-BLM | Eurasian Collared-Dove | 2011-2023 | 26.93 | 0.98 | 6 | 22.41 | 0.96 | 2 |  | | CO-BCR10-BLM | European Starling | 2011-2023 | 22.53 | 0.96 | 6 | 15.91 | 0.88 | 4 |  | | CO-BCR10-BLM | Gadwall | 2011-2023 | 12.79 | 0.84 | 1 | 16.99 | 0.90 | 1 |  | | CO-BCR10-BLM | Lesser Goldfinch | 2011-2023 | 27.88 | 0.97 | 4 | 16.02 | 0.87 | 5 |  | | CO-BCR10-BLM | Sandhill Crane | 2011-2023 | 19.46 | 0.93 | 10 | 11.50 | 0.86 | 11 |  | | CO-BCR10-BLM | Western Tanager\* | 2011-2023 | 14.70 | 0.91 | 26 | 15.41 | 0.90 | 17 |  | | CO-BCR16-BLM | Ash-throated Flycatcher | 2008-2023 | 3.29 | 0.93 | 1,103 | 4.28 | 0.92 | 728 |  | | CO-BCR16-BLM | Bushtit | 2008-2023 | 11.59 | 1.00 | 143 | 8.11 | 0.98 | 132 |  | | CO-BCR16-BLM | Chukar | 2008-2023 | 12.22 | 0.95 | 16 | -2.33 | 0.64 | 13 |  | | CO-BCR16-BLM | Common Grackle | 2008-2023 | 18.87 | 0.94 | 27 | 21.62 | 0.98 | 15 |  | | CO-BCR16-BLM | Common Nighthawk\* | 2008-2023 | 12.89 | 1.00 | 168 | 10.28 | 1.00 | 84 |  | | CO-BCR16-BLM | Dark-eyed Junco | 2008-2023 | 5.98 | 0.92 | 302 | 8.65 | 0.98 | 218 |  | | CO-BCR16-BLM | Eurasian Collared-Dove | 2008-2023 | 23.33 | 0.99 | 14 | 10.98 | 0.91 | 5 |  | | CO-BCR16-BLM | Gray Vireo\* | 2008-2023 | 5.85 | 0.93 | 384 | 0.60 | 0.55 | 299 |  | | CO-BCR16-BLM | Hairy Woodpecker | 2008-2023 | 5.17 | 0.93 | 118 | 5.01 | 0.90 | 106 |  | | CO-BCR16-BLM | Hammond's Flycatcher | 2008-2023 | 11.23 | 0.97 | 51 | 8.94 | 0.93 | 50 |  | | CO-BCR16-BLM | Lesser Goldfinch | 2008-2023 | 9.85 | 0.93 | 79 | 4.70 | 0.79 | 69 |  | | CO-BCR16-BLM | Mountain Chickadee | 2008-2023 | 2.24 | 0.72 | 489 | 4.07 | 0.93 | 378 |  | | CO-BCR16-BLM | Northern Mockingbird | 2008-2023 | 18.13 | 0.99 | 138 | 12.32 | 0.97 | 53 |  | | CO-BCR16-BLM | Spotted Towhee | 2008-2023 | 0.77 | 0.55 | 3,158 | 3.48 | 0.92 | 1,629 |  | | CO-BCR16-BLM | Warbling Vireo | 2008-2023 | 6.08 | 0.98 | 440 | 6.77 | 0.99 | 285 |  | | CO-BCR16-BLM | Western Tanager | 2008-2023 | 6.61 | 1.00 | 524 | 8.86 | 1.00 | 350 |  | | CO-BLM | Ash-throated Flycatcher | 2011-2023 | 5.10 | 0.98 | 1,251 | 4.29 | 0.95 | 812 |  | | CO-BLM | Black-headed Grosbeak | 2011-2023 | 8.59 | 0.97 | 370 | 5.19 | 0.87 | 229 |  | | CO-BLM | Blue Grosbeak | 2011-2023 | 14.88 | 0.92 | 5 | -0.66 | 0.57 | 5 |  | | CO-BLM | Bushtit | 2011-2023 | 18.74 | 1.00 | 147 | 15.73 | 1.00 | 136 |  | | CO-BLM | Chukar | 2011-2023 | 22.56 | 1.00 | 36 | 5.69 | 0.73 | 31 |  | | CO-BLM | Common Nighthawk\* | 2011-2023 | 9.56 | 1.00 | 208 | 8.31 | 0.97 | 106 |  | | CO-BLM | Common Poorwill | 2011-2023 | 9.62 | 0.91 | 33 | 5.04 | 0.73 | 14 |  | | CO-BLM | Eurasian Collared-Dove | 2011-2023 | 24.89 | 0.99 | 20 | 18.85 | 0.97 | 7 |  | | CO-BLM | European Starling | 2011-2023 | 18.41 | 0.96 | 8 | 12.81 | 0.88 | 6 |  | | CO-BLM | Gadwall | 2011-2023 | 12.79 | 0.84 | 1 | 16.67 | 0.90 | 1 |  | | CO-BLM | Hairy Woodpecker | 2011-2023 | 8.37 | 0.96 | 118 | 7.77 | 0.96 | 106 |  | | CO-BLM | Hermit Thrush | 2011-2023 | 3.81 | 0.73 | 380 | 7.76 | 0.90 | 160 |  | | CO-BLM | Lesser Goldfinch | 2011-2023 | 10.40 | 0.91 | 83 | 7.04 | 0.83 | 74 |  | | CO-BLM | Mourning Dove | 2011-2023 | 1.38 | 0.61 | 3,021 | 3.75 | 0.93 | 1,172 |  | | CO-BLM | Northern Mockingbird | 2011-2023 | 13.69 | 0.98 | 161 | 3.38 | 0.64 | 69 |  | | CO-BLM | Western Tanager\* | 2011-2023 | 7.03 | 0.98 | 550 | 9.97 | 1.00 | 367 |  | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |

\* indicates a species of concern for Bird Conservation Region (BCR) 10 and/or 16, as designated by Partners in Flight, if the stratum is located within the appropriate BCR.

S indicates a Colorado BLM listed sensitive species.