



Northern Colorado Plateau Network Landbird Monitoring Report 2025



Burrowing owl (*Athene cunicularia*) at Arches National Park.

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Northern Colorado Plateau Network Landbird Monitoring Report 2025

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Abstract

In 2025, the University of Delaware, in cooperation with the National Park Service, completed the twentieth year of a habitat-based landbird monitoring program in 11 park units of the Northern Colorado Plateau Network. This program is designed to provide rigorous population trend data for most diurnal, regularly occurring breeding landbird species throughout the network. Using data from 2005–2025, we estimated density trends for 61 species in at least one of three habitats surveyed: low-elevation riparian, pinyon-juniper, and sagebrush shrubland. Twenty of these trends were significant, with eight negative trends and twelve positive trends. In addition to the habitat-based surveys, four point counts and one area search were conducted at Pipe Spring National Monument using a modified monitoring design. This population information is a useful decision-making tool for land managers and supports the National Park Service’s goal of long-term monitoring of biological indicators for network parks.

Acknowledgments

Thanks to the many hard-working field crew members who collected data for this project since 2005. Density modelling code was largely developed by Zach Ladin. Gregory Shriver and Dusty Perkins provided helpful reviews and expertise. Matthew McLaren provided database management support. Special thanks to Sam Roberts for his guidance, training, and logistical support.

1 Introduction

Detecting environmental change over broad temporal and spatial scales is an important goal of conservation science, especially in the face of climate change and other major anthropogenic disturbances. Through long-term data collection efforts, valuable ecological information about the causes and consequences of these changes can be gathered and used to inform natural resource management.

Diurnal bird species are commonly used as indicators of environmental health because they are sensitive to environmental change and relatively easy to monitor (Canterbury et al. 2000; Gardali et al. 2006; Gardali and Holmes 2011). Through long-term monitoring of breeding bird populations, we can estimate the population status and trends of individual species and bird communities in specific habitats, thus providing information about changes occurring in the surrounding landscape (Browder et al. 2002; Sauer et al. 2003; Gregory et al. 2007).

Rosenberg et al. (2019) estimated a loss of nearly 3 billion birds across North America since 1970, and the recent 2025 State of the Birds Report shows those losses are continuing, with aridland birds among the steepest in decline (NABCI 2025). As bird populations continue to decline, maintaining long-term population monitoring is essential to finding causes and solutions for threatened, endangered, and declining populations, and protected areas like the Northern Colorado Plateau Network (NCPN) parks play an important role in conserving biodiversity.

Bird communities that rely on arid habitats, such as sagebrush shrubland and pinyon-juniper, are among the most vulnerable to population declines in an era of warming temperatures and increasing anthropogenic land use (Rosenberg et al. 2016, 2019; NABCI 2025), although relationships between bird species and climate variables are complex and habitat-dependent in the study area (Roberts et al. 2021). Habitat loss and degradation due to grazing and agriculture (Fleischner 1994; Rosenberg et al. 2016), drought (Breshears et al. 2005; Noel et al. 2025), wildfire, and the spread of invasive plant species (Fusco et al. 2019) are among the major threats to arid landscapes and their inhabitants (Rosenberg et al. 2016; NABCI 2025). Public lands support more than half of the breeding range of 36 aridland-obligate species in the U.S. and Canada (Rosenberg et al. 2016), but threats of habitat loss and degradation remain. Concerted monitoring efforts are important for conserving bird communities in these areas.

The NCPN landbird monitoring program is designed to provide managers of 11 national parks in Colorado, Utah, and Wyoming with long-term population trend data for breeding birds in three habitats: low-elevation riparian, pinyon-juniper, and sagebrush shrubland. Using modified methods, monitoring is also conducted at Pipe Spring National Monument in Arizona. Starting in 2005, surveys for the NCPN landbird monitoring program were completed annually for 11 consecutive years by the Bird Conservancy of the Rockies (BCR), with a hiatus in 2016. In 2017, the University of Delaware resumed the NCPN landbird monitoring. In 2025, the University of Delaware, in cooperation with the National Park Service (NPS), completed the twentieth year of the habitat-based landbird monitoring program in NPS units of the NCPN.

In this report, we use distance sampling analysis to evaluate long-term density trends of all bird species present (with sufficient sample sizes) in the three focal habitats throughout the NCPN.

2 Methods

2.1 Study Area and Sampling Design

Three habitats were selected for NCPN landbird monitoring when the program was established in 2005: low-elevation riparian (LR), pinyon-juniper (PJ), and sagebrush shrubland (SA). Even with some overlap, each of these habitats hosts a distinct suite of bird species. Across 11 NPS units, 45 transect locations were selected, with 15 transects established in each habitat (Table 1; Figure 1). Each transect consists of 15 point-count locations, each 250 meters apart (Figures 2 to 4).

Table 1. The number of transects within each NCPN park by habitat.

Park	Low-elevation Riparian	Pinyon- juniper	Sagebrush Shrubland
Arches National Park	3	1	0
Black Canyon of the Gunnison National Park	0	1	1
Bryce Canyon National Park	0	1	2
Canyonlands National Park	3	2	0
Capitol Reef National Park	2	2	0
Colorado National Monument	0	2	0
Curecanti National Recreation Area	0	0	5
Dinosaur National Monument	3	4	5
Fossil Butte National Monument	0	0	2
Natural Bridges National Monument	2	1	0
Zion National Park	2	1	0

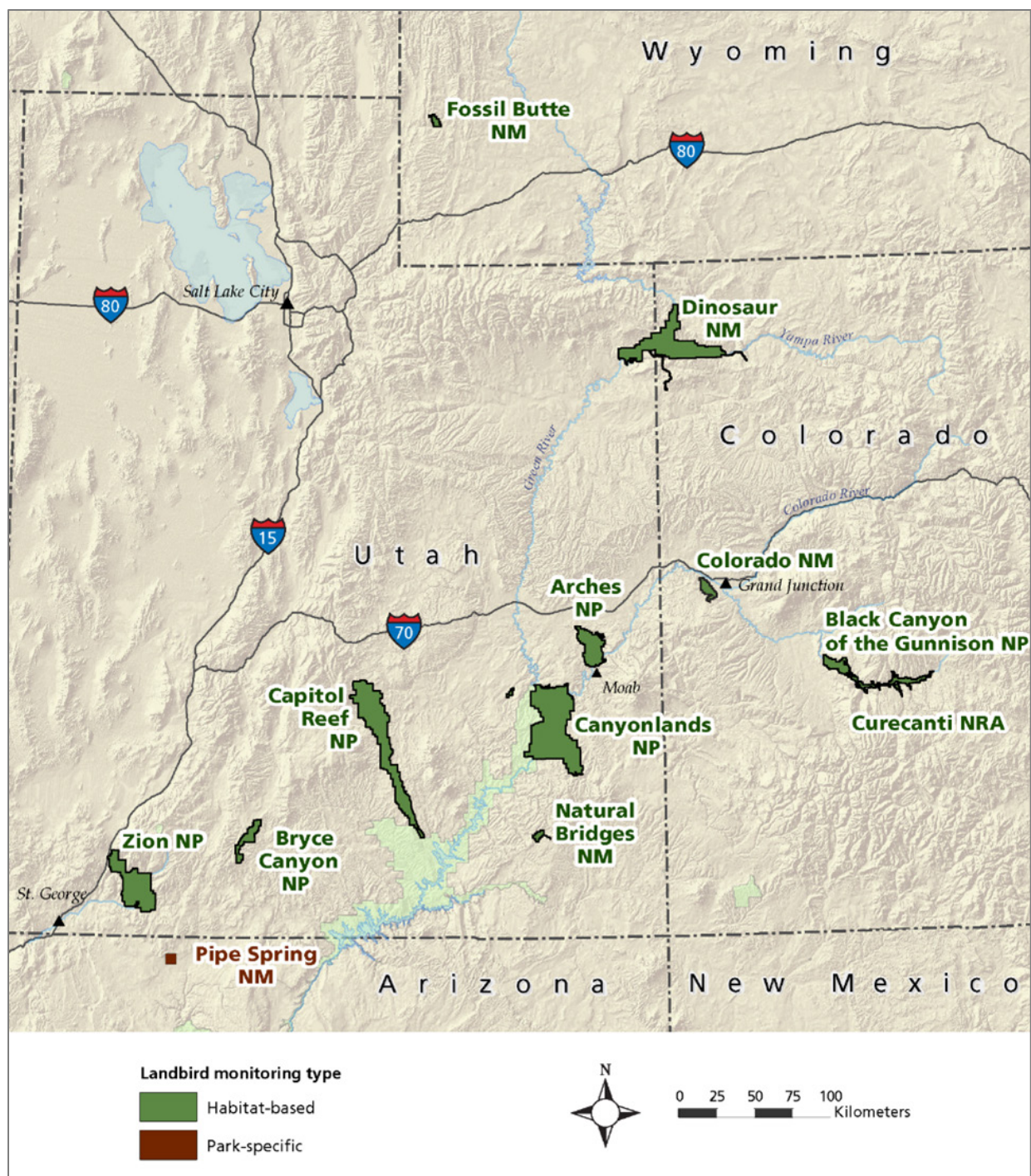


Figure 1. Northern Colorado Plateau Network parks where landbirds are monitored.

NPS

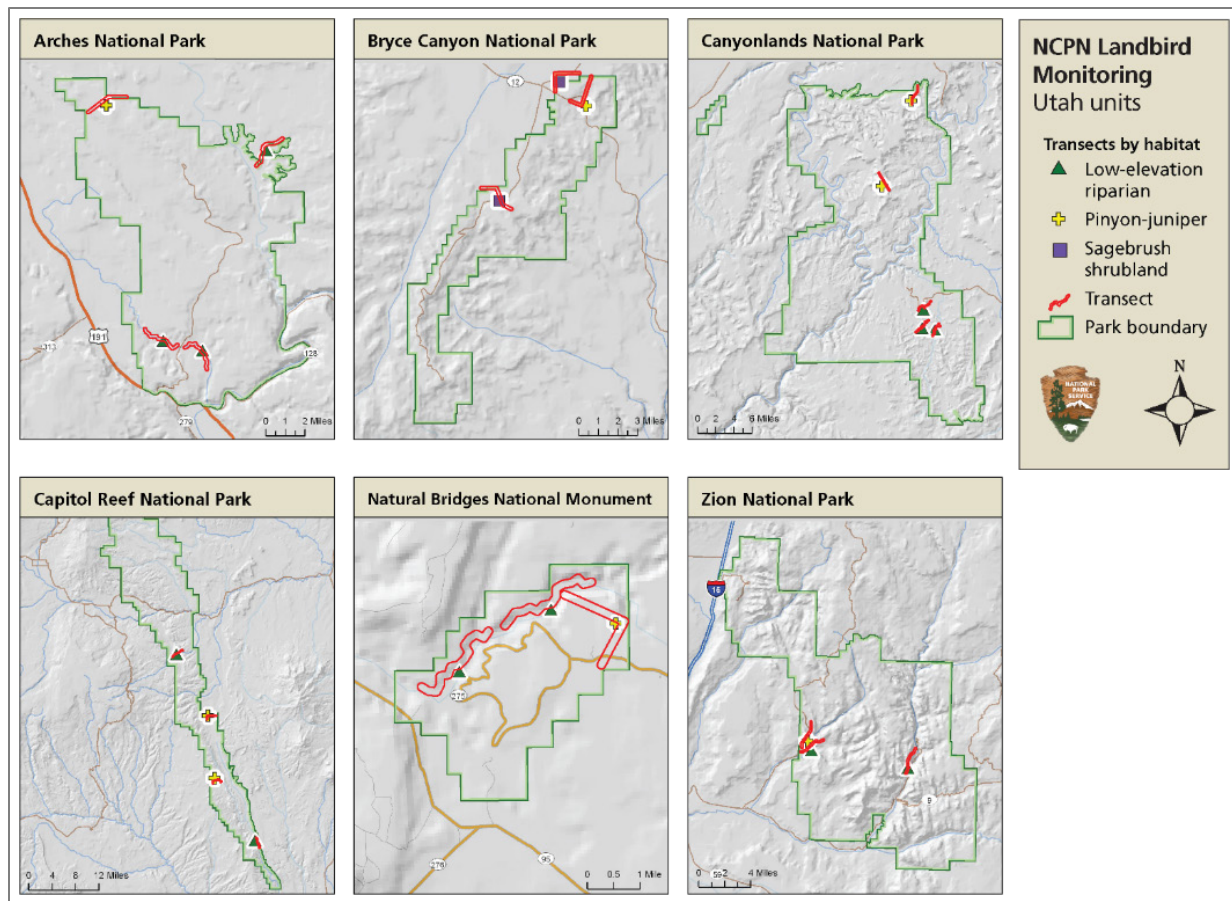
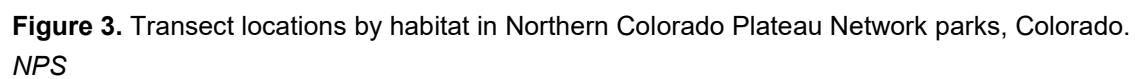


Figure 2. Transect locations by habitat in Northern Colorado Plateau Network parks, Utah.
NPS



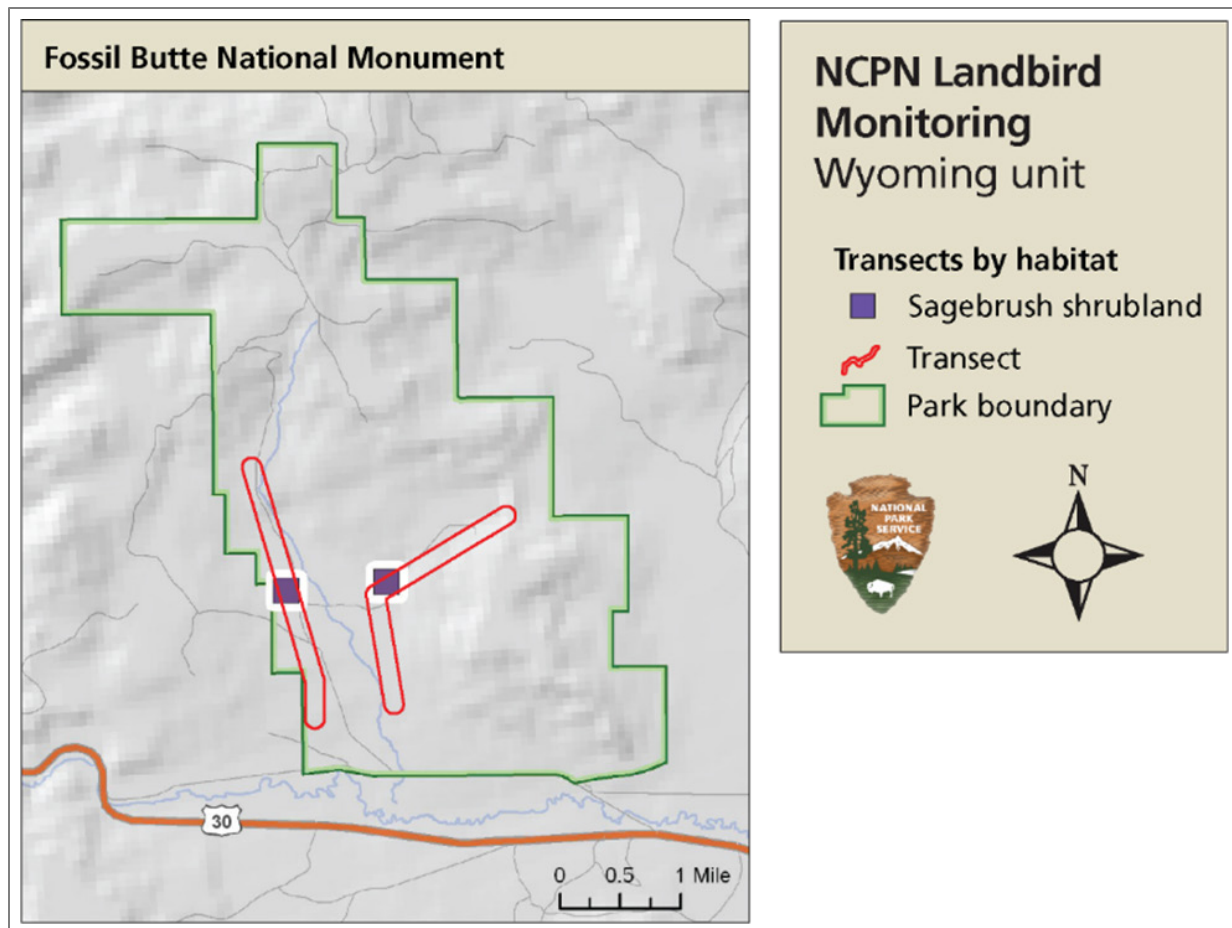


Figure 4. Transect locations in Fossil Butte National Monument, Wyoming.

NPS

The NPS and BCR used GIS and the Southwest Regional Re-GAP Analysis Project to randomly select PJ and SA transect locations (Lowry et al. 2005). Within those habitats, they excluded areas with >50% slope to ensure that each transect could be accessed on foot. Because of the scarcity of riparian habitat in the NCPN, LR transect locations were manually selected. Sites with crossable streams were chosen, excluding Colorado, Green, Gunnison, and Virgin Rivers.

Since 2005, the locations of all 45 transects have remained unchanged and have been surveyed annually, except when conditions limited fieldwork. From 2005 to 2013, each transect was surveyed by a field team twice per year. Starting in 2014, the survey effort was reduced to one visit per year. The number of completed surveys varied by year, with >75% completion of planned surveys annually (Table 2). Surveys were not conducted in 2016, and in 2020, the survey efforts were limited due to the COVID-19 pandemic.

Table 2. The annual number of point visits within each habitat in NCPN parks (when possible, points were visited twice from 2005–2013).

Year	Low-elevation Riparian	Pinyon- juniper	Sagebrush Shrubland
2005	436	447	432
2006	440	432	443
2007	445	439	438
2008	447	409	407
2009	378	406	392
2010	385	429	438
2011	401	383	434
2012	365	412	440
2013	325	324	395
2014	153	165	205
2015	157	151	196
2017	222	205	219
2018	219	197	219
2019	209	221	225
2020	0	0	205
2021	217	202	218
2022	206	208	219
2023	192	197	210
2024	191	221	206
2025	216	225	225

2.2 Field Methods

Each year, at the beginning of the field season, field technicians attend a week-long training session to practice bird and plant identification, review field protocols, and hone distance-estimation skills (see section 2.3.1). All transects are surveyed during the breeding season, which occurs between May 1 and July 15, depending on transect location. The elevation and latitudinal position of each transect are considered during the scheduling of each field season. The goal is to survey transects during the peak breeding season at each location.

Observers complete one transect per day, beginning within 30 minutes of sunrise and ending in less than five hours. Navigating to each point using a GPS unit, observers walk the transect, stopping at each of 15 point-count stations to record weather data, conduct a habitat assessment, and complete a five-minute point count.

At the beginning and end of each transect, observers record the following weather data: temperature, percent cloud cover, precipitation type, and estimated wind speed using the Beaufort scale. Surveys are not conducted if winds exceed 13–18 mph or precipitation is heavier than a drizzle.

During habitat assessments, observers record the seral stage, canopy cover, mean height, and relative abundance of the five most dominant tree or shrub species for both the overstory and the understory layer. Groundcover data and the presence of additional, non-dominant habitat types are also recorded.

During the five-minute point-count, observers record all bird detections, regardless of distance to the observer. For each detection, observers record species, sex, horizontal distance to the bird, method of detection (visual, call, song, or other), and, if applicable, the number of birds within a cluster. Clusters are defined as groups of conspecific birds in close proximity to each other that are not considered separate independent observations. The exact distance to each bird or cluster of birds is estimated using a laser rangefinder. Observers also record flyovers, defined as individuals or clusters that are detected during the point-counts but are not using the immediate surrounding landscape.

For more detailed information about survey protocols, refer to Daw et al. (2020); NCPN (n.d.); and Perkins (2005).

2.3 Data Analyses

2.3.1 Distance Sampling

We used the “Distance” package [version 1.0.9; Miller et al. (2019)] in program R [version 4.4.1; R Core Team (2025)] to estimate detection probabilities and bird population densities. Distance sampling relies on three main assumptions, which we met using established field protocols and training:

1. All objects at the sampling location are detected.
2. Objects are stationary or detected before movement occurs.
3. Distances to objects are measured accurately.

In distance sampling, the distribution of observed distances of objects is dependent on the actual distribution of objects with respect to the observer and the detectability of an object. As such, detection functions must first be fit to distance-sampling data to describe the probability of detection of an object. The selected detection function is then used to estimate an average probability of detection, which allows for observed counts to be corrected and used for density estimation.

2.3.2 Habitat-Based Density Trends

Our initial analysis focused on estimating habitat-based densities within each of the three habitat types for the full range of species present. We excluded flyovers, migrants, and juveniles from our analysis. With survey locations only 250 m apart, there can be double-counting of individuals from multiple points. To avoid this, we set a cut-off distance of 125 m between points and only included detections within this distance in our analysis.

Because low detection probabilities can result in inaccurate density estimates, we established a detection probability threshold of 0.05, removing density estimates with detection probabilities below this threshold. For each eligible species within a habitat each year, we fit a series of five pre-selected detection function models to the distribution of distances observed:

1. Uniform function with cosine series adjustments.
2. Half normal key function with no adjustments.
3. Half normal key function with cosine series adjustments.
4. Half normal key function with “observer” as a covariate.
5. Hazard rate key function with cosine series adjustments.

We ranked models using Akaike’s Information Criterion (AICc) to select the top model with the most parsimonious detection function for each species (Burnham and Anderson 2002). We used this model to estimate species density in each habitat for each year. We then fit a simple linear model to the annual density estimates for each species to determine trend direction and significance. In our trend analyses, we only included annual density estimates for a species in a habitat with a minimum of 10 acceptable detections (i.e., within the 125 m distance cut-off) to avoid inaccurate density estimates (MacKenzie et al. 2006). The datasets analyzed in this report are available in Perkins (2005).

3 Results

Over 20 years of data collection, 17,443 point-count surveys have been conducted in 11 NCPN units (see Table 2), detecting 168 unique species. Of those 168 species, 166 were within 125 meters of the observer, the established distance cut-off for our analyses. In 2025, between May 21 and June 26, field technicians visited each of the 45 habitat-based transects, but some survey points were excluded from analysis due to loud running water or wind. A total of 666 point-count surveys were conducted and 4,268 individual birds of 106 unique species were recorded. Two new species were detected in the NCPN for this monitoring program: an American avocet (*Recurvirostra americana*) in Curecanti National Recreation Area and green-winged teal (*Anas crecca*) in Fossil Butte National Monument.

Several species were detected in individual park units for the first time in this monitoring program. Common nighthawk (*Chordeiles minor*) was detected in Bryce Canyon National Park; Lucy's warbler (*Leiothlypis luciae*) was detected in Colorado National Monument; blue grosbeak (*Passerina caerulea*) and Northern house wren (*Troglodytes aedon*) were detected in Curecanti National Recreation Area; black phoebe (*Sayornis nigricans*), long-eared owl (*Asio otus*), and Northern house wren in Dinosaur National Monument; and American kestrel (*Falco sparverius*) in Zion National Park.

3.1 Habitat-Based Density Trends

We excluded density estimates with a detection probability with a coefficient of variation greater than 100. We had large enough sample sizes to estimate at least three annual densities for 61 species, each occurring in one or more of the three habitats. In total, we estimated 118 population density trends across the three habitats (Table 3). Twenty of the estimated density trends (17%) were statistically significant ($p < 0.05$), including eight negative trends and twelve positive trends (Table 4).

Table 3. Population-density trend slope, R² values, and sample size of estimated annual densities for individual species in low-elevation riparian, pinyon-juniper, and sagebrush shrubland habitats in the Northern Colorado Plateau Network, 2005–2025 (excluding 2016).

Common Name	Low-elevation Riparian			Pinyon-juniper			Sagebrush Shrubland		
	Slope ^A	R ²	Sample Size ^B	Slope ^A	R ²	Sample Size ^B	Slope ^A	R ²	Sample Size ^B
Mourning Dove	−0.56 ^E	0.56	17	−0.89 ^D	0.35	19	−0.13	0.13	11
White-throated Swift	−0.66 ^D	0.39	19	−0.43 ^D	0.39	18	−1.00	0.12	4
Hairy Woodpecker	0.80 ^C	0.82	5	N/A	N/A	N/A	N/A	N/A	N/A
Northern Flicker	N/A	N/A	N/A	N/A	N/A	N/A	−0.05	0.24	7
Western Wood-Pewee	0.10	0.04	14	N/A	N/A	N/A	N/A	N/A	N/A
Gray Flycatcher	N/A	N/A	N/A	−0.39	0.05	19	0.01	0.00	9
Dusky Flycatcher	N/A	N/A	N/A	−0.12	0.03	16	0.15	0.04	20
Black Phoebe	0.16	0.02	7	N/A	N/A	N/A	N/A	N/A	N/A
Say's Phoebe	−0.08	0.09	17	−0.13	0.67	4	0.05	0.31	8
Ash-throated Flycatcher	−0.09	0.01	19	0.08	0.01	19	−0.13	0.24	5
Gray Vireo	0.13	0.38	9	0.08	0.02	19	N/A	N/A	N/A
Plumbeous Vireo	−0.15	0.04	19	0.02	0.00	17	0.15	0.29	3
Warbling Vireo	−0.03	0.00	19	N/A	N/A	N/A	0.10	0.30	7
Pinyon Jay	N/A	N/A	N/A	−0.01	0.00	15	N/A	N/A	N/A
Woodhouse's Scrub-Jay	0.05	0.02	14	0.06	0.01	15	N/A	N/A	N/A
Black-billed Magpie	N/A	N/A	N/A	N/A	N/A	N/A	−0.05	0.08	13
Horned Lark	N/A	N/A	N/A	N/A	N/A	N/A	−0.05	0.01	12

^A Slope with no other table note = p-value > 0.05.

^B Sample sizes are the number of years in which densities could be estimated. Models could not be fit for each species-habitat combination for all years due to low detection sample sizes. Note that in 2020 only sagebrush shrubland transects were surveyed due to the Covid-19 pandemic.

^C p-value ≤ 0.05.

^D p-value ≤ 0.01.

^E p-value ≤ 0.001.

Table 3 (continued). Population-density trend slope, R^2 values, and sample size of estimated annual densities for individual species in low-elevation riparian, pinyon-juniper, and sagebrush shrubland habitats in the Northern Colorado Plateau Network, 2005–2025 (excluding 2016).

Common Name	Low-elevation Riparian			Pinyon-juniper			Sagebrush Shrubland		
	Slope ^A	R^2	Sample Size ^B	Slope ^A	R^2	Sample Size ^B	Slope ^A	R^2	Sample Size ^B
Violet-green Swallow	−3.60	0.08	17	0.69	0.07	17	0.13	0.12	14
Cliff Swallow	N/A	N/A	N/A	N/A	N/A	N/A	−0.14	0.01	6
Mountain Chickadee	N/A	N/A	N/A	−0.03	0.00	12	N/A	N/A	N/A
Juniper Titmouse	−0.16	0.06	11	−0.75	0.21	18	N/A	N/A	N/A
Bushtit	1.02 ^D	0.55	12	−0.30	0.00	15	N/A	N/A	N/A
White-breasted Nuthatch	N/A	N/A	N/A	−0.01	0.00	10	N/A	N/A	N/A
Rock Wren	−0.11	0.07	19	−0.01	0.00	15	−0.14 ^C	0.22	20
Canyon Wren	0.00	0.00	12	N/A	N/A	N/A	N/A	N/A	N/A
House Wren	0.52	0.12	18	N/A	N/A	N/A	0.13	0.31	8
Bewick's Wren	−0.31	0.16	15	−0.49 ^C	0.23	19	N/A	N/A	N/A
Blue-gray Gnatcatcher	−1.53	0.06	19	−2.11	0.12	19	0.23	0.04	18
Western Bluebird	N/A	N/A	N/A	N/A	N/A	N/A	0.25	0.38	3
Mountain Bluebird	N/A	N/A	N/A	−0.35 ^C	0.44	13	−0.06	0.01	18
Hermit Thrush	N/A	N/A	N/A	0.02	0.03	4	N/A	N/A	N/A
American Robin	1.38 ^C	0.46	10	0.34	0.24	9	0.87	0.20	14
Sage Thrasher	N/A	N/A	N/A	N/A	N/A	N/A	0.01	0.00	19
European Starling	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

^A Slope no other table note = p -value > 0.05.

^B Sample sizes are the number of years in which densities could be estimated. Models could not be fit for each species-habitat combination for all years due to low detection sample sizes. Note that in 2020 only sagebrush shrubland transects were surveyed due to the Covid-19 pandemic.

^C p -value ≤ 0.05.

^D p -value ≤ 0.01.

^E p -value ≤ 0.001.

Table 3 (continued). Population-density trend slope, R² values, and sample size of estimated annual densities for individual species in low-elevation riparian, pinyon-juniper, and sagebrush shrubland habitats in the Northern Colorado Plateau Network, 2005–2025 (excluding 2016).

Common Name	Low-elevation Riparian			Pinyon-juniper			Sagebrush Shrubland		
	Slope ^A	R ²	Sample Size ^B	Slope ^A	R ²	Sample Size ^B	Slope ^A	R ²	Sample Size ^B
Lucy's Warbler	0.83	0.16	14	N/A	N/A	N/A	N/A	N/A	N/A
Virginia's Warbler	−0.15	0.09	13	0.27	0.15	16	0.09	0.15	17
MacGillivray's Warbler	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Common Yellowthroat	0.22	0.02	14	N/A	N/A	N/A	N/A	N/A	N/A
Yellow Warbler	2.77 ^D	0.39	19	N/A	N/A	N/A	0.20	0.19	8
Yellow-rumped Warbler	0.11	0.00	6	0.67 ^D	0.81	7	0.38	0.27	6
Grace's Warbler	N/A	N/A	N/A	0.10	0.04	7	0.14 ^C	0.86	5
Black-throated Gray Warbler	0.15	0.05	18	−1.08	0.11	19	−0.01	0.00	11
Yellow-breasted Chat	0.34 ^D	0.38	18	N/A	N/A	N/A	N/A	N/A	N/A
Green-tailed Towhee	N/A	N/A	N/A	0.24	0.82	4	0.04	0.00	20
Spotted Towhee	−0.09	0.00	19	0.55 ^C	0.25	19	0.24	0.13	20
Chipping Sparrow	−0.36	0.08	8	−0.50	0.10	18	−0.18	0.03	19
Brewer's Sparrow	N/A	N/A	N/A	N/A	N/A	N/A	−0.44	0.01	20
Vesper Sparrow	N/A	N/A	N/A	0.33 ^D	0.69	9	−0.45	0.07	20
Lark Sparrow	N/A	N/A	N/A	0.08	0.03	12	0.32	0.12	20
Black-throated Sparrow	−0.12	0.02	17	−0.24	0.04	18	0.18	0.21	6
Sagebrush Sparrow	N/A	N/A	N/A	N/A	N/A	N/A	−0.25	0.29	6

^A slope with no other table note = p-value > 0.05.

^B Sample sizes are the number of years in which densities could be estimated. Models could not be fit for each species-habitat combination for all years due to low detection sample sizes. Note that in 2020 only sagebrush shrubland transects were surveyed due to the Covid-19 pandemic.

^C p-value ≤ 0.05.

^D p-value ≤ 0.01.

^E p-value ≤ 0.001.

Table 3 (continued). Population-density trend slope, R^2 values, and sample size of estimated annual densities for individual species in low-elevation riparian, pinyon-juniper, and sagebrush shrubland habitats in the Northern Colorado Plateau Network, 2005–2025 (excluding 2016).

Common Name	Low-elevation Riparian			Pinyon-juniper			Sagebrush Shrubland		
	Slope ^A	R^2	Sample Size ^B	Slope ^A	R^2	Sample Size ^B	Slope ^A	R^2	Sample Size ^B
Song Sparrow	0.07	0.00	16	N/A	N/A	N/A	N/A	N/A	N/A
Dark-eyed Junco	N/A	N/A	N/A	−0.13	0.02	4	N/A	N/A	N/A
Western Tanager	0.06	0.07	8	0.18 ^D	0.48	13	0.13 ^C	0.67	6
Black-headed Grosbeak	0.06	0.05	14	0.21	0.34	8	−0.02	0.07	3
Blue Grosbeak	0.26	0.12	11	N/A	N/A	N/A	N/A	N/A	N/A
Lazuli Bunting	0.36	0.01	18	1.52 ^C	0.53	9	0.02	0.00	12
Western Meadowlark	N/A	N/A	N/A	−0.45	0.27	6	−0.21 ^C	0.30	20
Brewer's Blackbird	N/A	N/A	N/A	N/A	N/A	N/A	−0.01	0.00	11
Brown-headed Cowbird	−0.24	0.04	7	−0.08	0.03	10	0.03	0.01	8
Bullock's Oriole	0.22	0.34	9	N/A	N/A	N/A	N/A	N/A	N/A
Cassin's Finch	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
House Finch	−0.40	0.06	18	−0.14	0.01	18	0.08	0.08	13
Red Crossbill	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pine Siskin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lesser Goldfinch	−0.78	0.13	16	−0.09	0.02	6	N/A	N/A	N/A

^A slope with no other table note = p -value > 0.05.

^B Sample sizes are the number of years in which densities could be estimated. Models could not be fit for each species-habitat combination for all years due to low detection sample sizes. Note that in 2020 only sagebrush shrubland transects were surveyed due to the Covid-19 pandemic.

^C p -value $\leq$ 0.05.

^D p -value $\leq$ 0.01.

^E p -value $\leq$ 0.001.

Table 4. Significant density trends for landbird species in the Northern Colorado Plateau Network, 2025.

Species	Habitat ^A		
	Low-elevation Riparian	Pinyon- juniper	Sagebrush Shrubland
Mourning Dove	↓	↓	–
White-throated Swift	↓	↓	–
Hairy Woodpecker	↑	N/A	N/A
Bushtit	↑	–	N/A
Bewick's Wren	–	↓	N/A
Rock Wren	–	–	↓
Mountain Bluebird	N/A	↓	–
American Robin	↑	–	–
Yellow Warbler	↑	N/A	–
Yellow-rumped Warbler	–	↑	–
Grace's Warbler	N/A	–	↑
Yellow-breasted Chat	↑	N/A	N/A
Spotted Towhee	–	↑	–
Vesper Sparrow	N/A	↑	–
Western Tanager	–	↑	↑
Lazuli Bunting	–	↑	–
Western Meadowlark	N/A	–	↓

^A Where "N/A" = not enough data available to estimate a trend; "–" = no trend detected, ↑ = increasing trend, and ↓ = decreasing trend

With the addition of 2025 density estimates, we found two changes: the spotted towhee (*Pipilo maculatus*) showed a significant increase in pinyon-juniper, and the rock wren (*Salpinctes obsoletus*) showed a significant decline in sagebrush shrubland.

We excluded raptors (i.e., hawks, eagles, and owls) and common raven (*Corvus corax*) from our density and trend estimates. While these larger avian species were included in previous years' analyses (with only enough detections of common raven to estimate trends in density), we do not think this was appropriate, as our study design and the use of point-counts as a monitoring method is not effective for species with minimal vocalizations and large territories, as is the case with raptors and common ravens. Similarly, we excluded hummingbirds (*Trochilidae* spp.) from our trend estimates because point-counts are not suited to detect hummingbirds effectively. While some hummingbirds do sing and many perform mating displays, these behaviors are less frequent and consistent than those of most passerines (songbirds) and the detection of hummingbirds is most commonly due to their audible wing-whir, which can only be detected within a short distance from the observer. As a result of this exclusion, black-chinned hummingbird (*Archilochus alexandri*) and broad-tailed hummingbird (*Selasphorus platycercus*) trends are no longer present in this report.

3.2 Pipe Spring National Monument Summary

In 2025, we completed four point-count surveys and the area search in Pipe Spring National Monument. We detected a total of 78 individuals of 30 species during these surveys (Table 5). Sample sizes were too low for density trends to be estimated. No new species were detected for the monitoring program at Pipe Spring in 2025.

Table 5. Number of individuals detected during point counts and area searches in Pipe Spring National Monument, 2009–2025. Surveys were not conducted in Pipe Spring National Monument in 2016 or 2020.

Species	Point Counts		Area Searches		Total
	2009–2024	2025	2009–2024	2025	
Mallard	0	0	1	0	1
Gambel's Quail	54	3	47	0	104
Black-crowned Night-Heron	1	0	12	0	13
Cooper's Hawk	3	1	5	2	11
Red-tailed Hawk	1	0	4	0	5
Eurasian Collared-Dove	54	1	88	0	143
Mourning Dove	32	2	54	0	88
Greater Roadrunner	0	0	1	0	1
Great Horned Owl	0	0	1	0	1
Common Poorwill	0	0	3	0	3
White-throated Swift	20	0	24	2	46
Black-chinned Hummingbird	2	0	5	0	7
Broad-tailed Hummingbird	1	0	4	1	6
Downy Woodpecker	1	0	0	0	1
Hairy Woodpecker	1	0	1	0	2
American Kestrel	5	0	11	0	16
Peregrine Falcon	5	0	1	0	6
Prairie Falcon	1	0	1	0	2
Western Wood-Pewee	3	0	10	0	13
Gray Flycatcher	1	0	2	1	4
Black Phoebe	6	0	18	0	24
Say's Phoebe	38	3	33	2	76
Ash-throated Flycatcher	40	2	34	2	78
Cassin's Kingbird	63	0	38	0	101
Western Kingbird	47	0	50	0	97
Gray Vireo	9	1	10	0	20
Warbling Vireo	0	0	5	0	5
Pinyon Jay	1	0	1	0	2

Table 5 (continued). Number of individuals detected during point counts and area searches in Pipe Spring National Monument, 2009–2025. Surveys were not conducted in Pipe Spring National Monument in 2016 or 2020.

Species	Point Counts		Area Searches		Total
	2009–2024	2025	2009–2024	2025	
Woodhouse's Scrub-Jay	3	1	7	0	11
Common Raven	44	4	32	3	83
Violet-green Swallow	31	0	73	2	106
Northern Rough-winged Swallow	11	0	6	0	17
Cliff Swallow	0	0	2	0	2
Barn Swallow	2	0	0	0	2
Juniper Titmouse	6	0	2	0	8
Bushtit	3	0	1	2	6
Rock Wren	31	1	6	0	38
Canyon Wren	2	0	1	0	3
House Wren	2	0	2	0	4
Bewick's Wren	25	1	39	5	70
Blue-gray Gnatcatcher	9	1	7	2	19
Ruby-crowned Kinglet	0	0	1	0	1
American Robin	3	0	0	0	3
Northern Mockingbird	29	0	8	0	37
Sage Thrasher	1	0	0	0	1
European Starling	28	0	92	0	120
Cedar Waxwing	1	0	3	1	5
Northern Waterthrush	0	0	1	0	1
Orange-crowned Warbler	0	0	2	1	3
Virginia's Warbler	0	0	1	0	1
MacGillivray's Warbler	2	0	1	1	4
Common Yellowthroat	2	0	10	2	14
Yellow Warbler	17	0	102	3	122
Yellow-rumped Warbler	2	0	5	0	7
Black-throated Gray Warbler	5	0	2	0	7
Wilson's Warbler	1	0	10	1	12
Yellow-breasted Chat	1	0	3	0	4
Green-tailed Towhee	3	0	11	0	14
Spotted Towhee	6	0	0	0	6
Chipping Sparrow	1	0	1	0	2
Brewer's Sparrow	6	0	3	0	9

Table 5 (continued). Number of individuals detected during point counts and area searches in Pipe Spring National Monument, 2009–2025. Surveys were not conducted in Pipe Spring National Monument in 2016 or 2020.

Species	Point Counts		Area Searches		Total
	2009–2024	2025	2009–2024	2025	
Lark Sparrow	1	0	23	0	24
Black-throated Sparrow	112	4	56	1	173
Lincoln's Sparrow	0	0	1	0	1
White-crowned Sparrow	28	0	102	0	130
Summer Tanager	1	0	0	0	1
Western Tanager	3	0	7	1	11
Black-headed Grosbeak	7	0	11	1	19
Blue Grosbeak	5	0	5	0	10
Lazuli Bunting	2	0	11	0	13
Red-winged Blackbird	1	0	0	0	1
Western Meadowlark	2	0	1	0	3
Yellow-headed Blackbird	1	0	1	0	2
Brewer's Blackbird	0	0	2	0	2
Brown-headed Cowbird	16	0	23	4	43
Bullock's Oriole	35	1	32	2	70
House Finch	153	3	113	4	273
Pine Siskin	2	0	31	0	33
Lesser Goldfinch	10	0	12	0	22
House Sparrow	8	2	54	1	65
Total	1053	31	1383	47	2514

4 Discussion

As the western landscape continues to change due to anthropogenic land use and climate change, bird populations that are unable to adapt are at risk for decline. Gradual changes continue to affect habitat integrity for bird populations. These include increases in regional drought (Breshears et al. 2005; Noel et al. 2025), the spread of invasive plant species, and more frequent wildfires (Fusco et al. 2019). Long-term monitoring is essential to detect these gradual shifts in populations.

In this report, we present 20-year population-density trends within low-elevation riparian, pinyon-juniper, and sagebrush shrubland habitats for 61 species (a total of 118 species/habitat combinations; Appendix A). The majority of density trend estimates were non-significant, indicating the potential for stable populations for many species in these protected national park units.

Of the 118 trend estimates, 20 (17%) were significant ($p < 0.05$). These included 8 declines and 12 increases:

Negative trends (8):

- Low-elevation riparian: mourning dove (*Zenaida macroura*), white-throated swift (*Aeronautes saxatalis*)
- Pinyon-juniper: mourning dove, white-throated swift, Bewick's wren (*Thryomanes bewickii*), mountain bluebird (*Sialia currucoides*)
- Sagebrush shrubland: rock wren (*Salpinctes obsoletus*), Western meadowlark (*Sturnella neglecta*)

Positive trends (12):

- Low-elevation riparian: hairy woodpecker (*Leuconotopicus villosus*), bushtit (*Psaltiriparus minimus*), American robin (*Turdus migratorius*), yellow warbler (*Setophaga petechia*), yellow-breasted chat (*Icteria virens*)
- Pinyon-juniper: lazuli bunting (*Passerina amoena*), yellow-rumped warbler (*Setophaga coronata*), vesper sparrow (*Pooecetes gramineus*), spotted towhee (*Pipilo maculatus*), western tanager (*Piranga ludoviciana*)
- Sagebrush shrubland: western tanager, Grace's warbler (*Setophaga graciae*)

It should be noted that it is possible that some species have a significantly negative or positive trend, but because annual density estimates were not calculated for species with fewer than 10 detections per habitat within a year, years with a low number of detections were excluded, leading to a non-significant trend. Of course, this is only relevant for difficult-to-detect and low-abundance species. Changes in trends of species with high abundance should be detected with the methods used in this study.

While this study does not explore specific factors linked to the bird population trends in the NCPN, we provide evidence of long-term regional declines and increases in individual bird populations within these three important habitats. Continued monitoring of these populations will be essential to acquiring significant trend estimates for a larger suite of species. With each year of additional monitoring, we will be able to assess the causes of longer-term changes in bird populations with greater confidence. These assessments will consider landscape and climate variables in the surrounding region.

It is important to note that because of the nature of low-elevation riparian, pinyon-juniper, and sagebrush shrubland habitat in this region, many transects in this study may contain components of more than one of these three habitat types. For example, all riparian transects in the region are thin strips of riparian vegetation fed by intermittent streams within a matrix of pinyon-juniper or sagebrush shrubland. As such, many species detected within 125 meters of an observer during riparian point counts are not directly using riparian habitat. Some transects originally classified as one habitat type have changed over time—for example, wildfire converted two pinyon-juniper transects into partial grassland. Even when species show significant trends within a habitat, these results should be interpreted cautiously when considering their biological relevance.

Future studies using these data will seek to evaluate the drivers of population trends for landbird species within the network. As birds face changing habitats and more extreme climate conditions, understanding how these factors influence population trends will allow us to identify major threats to declining species and guide parks in managing resources effectively.

5 Literature Cited

- Breshears, D.D., N.S. Cobb, P.M. Rich, K.P. Price, C.D. Allen, R.G. Balice, W.H. Romme, J.H. Kastens, M.L. Floyd, J. Belnap, J.J. Anderson, O.B. Myers, and C.W. Meyer. 2005. Regional vegetation die-off in response to global-change-type drought. *Proceedings of the National Academy of Sciences of the United States of America* 102:15144–15148. <https://doi.org/10.1073/pnas.0505734102>
- Browder, S.F., D.H. Johnson, and I.J. Ball. 2002. Assemblages of breeding birds as indicators of grassland condition. *Ecological Indicators* 2:257–270. [https://doi.org/10.1016/S1470-160X\(02\)00060-2](https://doi.org/10.1016/S1470-160X(02)00060-2)
- Burnham, K.P., and D.R. Anderson. 2002. *Model selection and multimodel inference: A practical information-theoretic approach*. 2nd edition. Springer, New York.
- Canterbury, G.E., T.E. Martin, D.R. Petit, L.J. Petit, and D.F. Bradford. 2000. Bird communities and habitat as ecological indicators of forest condition in regional monitoring. *Conservation Biology* 14:544–558. <https://doi.org/10.1046/j.1523-1739.2000.98235.x>
- Daw, S., M. Beer, and S.L. Garman. 2020. Landbird monitoring protocol narrative for park units in the Northern Colorado Plateau Network: Version 1.04. Natural Resource Report. NPS/NCPN/NRR—2020/2119. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2257072>
- Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. *Conservation Biology* 8:629–644. <https://doi.org/10.1046/j.1523-1739.1994.08030629.x>
- Fusco, E.J., J.T. Finn, J.K. Balch, R.C. Nagy, and B.A. Bradley. 2019. Invasive grasses increase fire occurrence and frequency across US ecoregions. *Proceedings of the National Academy of Sciences of the United States of America* 116:23594–23599. <https://doi.org/10.1073/pnas.1908253116>
- Gardali, T., A.L. Holmes, S.L. Small, N. Nur, G.R. Geupel, and G.H. Golet. 2006. Abundance patterns of landbirds in restored and remnant riparian forests on the Sacramento River, California, U.S.A. *Restoration Ecology* 14:391–403. <https://doi.org/10.1111/j.1526-100X.2006.00147.x>
- Gardali, T., and A.L. Holmes. 2011. Maximizing benefits from riparian revegetation efforts: Local- and landscape-level determinants of avian response. *Environmental Management* 48:28–37. <https://doi.org/10.1007/s00267-011-9623-6>
- Gregory, R.D., P. Vorisek, A. Van Strien, A.W. Gmelig Meyling, F. Jiguet, L. Fornasari, J. Reif, P. Chylarecki, and I.J. Burfield. 2007. Population trends of widespread woodland birds in Europe. *Ibis* 149:78–97. <https://doi.org/10.1111/j.1474-919X.2007.00698.x>

- Lowry, J.H., R.D. Ramsey, K. Boykin, D. Bradford, P. Comer, S. Falzarano, W. Kepner, J. Kirby, L. Langs, J. Prior-Magee, G. Manis, L. O'Brien, T. Sajwaj, K.A. Thomas, W. Rieth, S. Schrader, D. Schrupp, K. Schulz, B. Thompson, C. Velasquez, C. Wallace, E. Waller, and B. Wolk. 2005. Southwest regional gap analysis project: Final report on land cover mapping methods. Logan, UT, U.S.A. <https://swregap.org/data/landcover/>
- MacKenzie, D.I., J.D. Nichols, J.A. Royle, K.H. Pollock, L.L. Bailey, and J.E. Hines. 2006. Occupancy estimation and modeling: Inferring patterns and dynamics of species occurrence. Elsevier/Academic Press, Burlington, MA.
- Miller, D.L., E. Rexstad, L. Thomas, L. Marshall, and J.L. Laake. 2019. Distance sampling in R. *Journal of Statistical Software* 89:1–28. <https://doi.org/10.18637/jss.v089.i01>
- Noel, A., D.R. Schlaepfer, B.J. Butterfield, M.C. Swan, J. Norris, K. Hartwig, M.C. Duniway, and J.B. Bradford. 2025. Most pinyon–juniper woodland species distributions are projected to shrink rather than shift under climate change. *Rangeland Ecology & Management* 98:454–466. <https://doi.org/10.1016/j.rama.2024.09.002>
- North American Bird Conservation Initiative (NABCI). 2025. The state of the birds, United States of America, 2025. <https://www.stateofthebirds.org/2025/>
- Northern Colorado Plateau Network (NCPN). n.d. Landbird monitoring. National Park Service, U.S. Department of the Interior. Accessed September 2, 2025. <https://www.nps.gov/im/ncpn/landbirds.htm>
- Perkins, D. 2005. Northern Colorado Plateau Network landbird monitoring. National Park Service, Ft. Collins, Colorado. <https://irma.nps.gov/DataStore/Reference/Profile/2171624>
- R Core Team. 2025. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.
- Roberts, S.G., D.P. Thoma, D.W. Perkins, E.L. Tymkiw, Z.S. Ladin, and W.G. Shriver. 2021. A habitat-based approach to determining the effects of drought on aridland bird communities. *Ornithology* 138:ukab028. <https://doi.org/10.1093/ornithology/ukab028>
- Rosenberg, K.V., A.M. Dokter, P.J. Blancher, J.R. Sauer, A.C. Smith, P.A. Smith, J.C. Stanton, A. Panjabi, L. Helft, M. Parr, and P.P. Marra. 2019. Decline of the North American avifauna. *Science* 366:120–124. <https://doi.org/10.1126/science.aaw1313>

- Rosenberg, K.V., J.A. Kennedy, R. Dettmers, R.P. Ford, D. Reynolds, J.D. Alexander, C.J. Beardmore, P.J. Blancher, R.E. Bogart, G.S. Butcher, A.F. Camfield, A. Couturier, D.W. Demarest, W.E. Easton, J.J. Giocomo, R.H. Keller, A.E. Min, A.O. Panjabi, D.N. Pashley, T.D. Rich, J.M. Ruth, H. Stabins, J. Stanton, and T. Will. 2016. Partners in Flight landbird conservation plan: 2016 revision for Canada and continental United States. Partners in Flight Science Committee.
- Sauer, J.R., J.E. Fallon, and R. Johnson. 2003. Use of North American Breeding Bird Survey data to estimate population change for bird conservation regions. *The Journal of Wildlife Management* 67:372–389. <https://doi.org/10.2307/3802778>

6 Appendix A. Individual Species Habitat-based Density Trends by Habitat

Figures 5 through 20 show the individual species density trends by habitat. Red lines indicate significant trends from a simple linear regression model (LR = Low-elevation Riparian, PJ = Pinyon-juniper, SA = Sagebrush Shrubland).

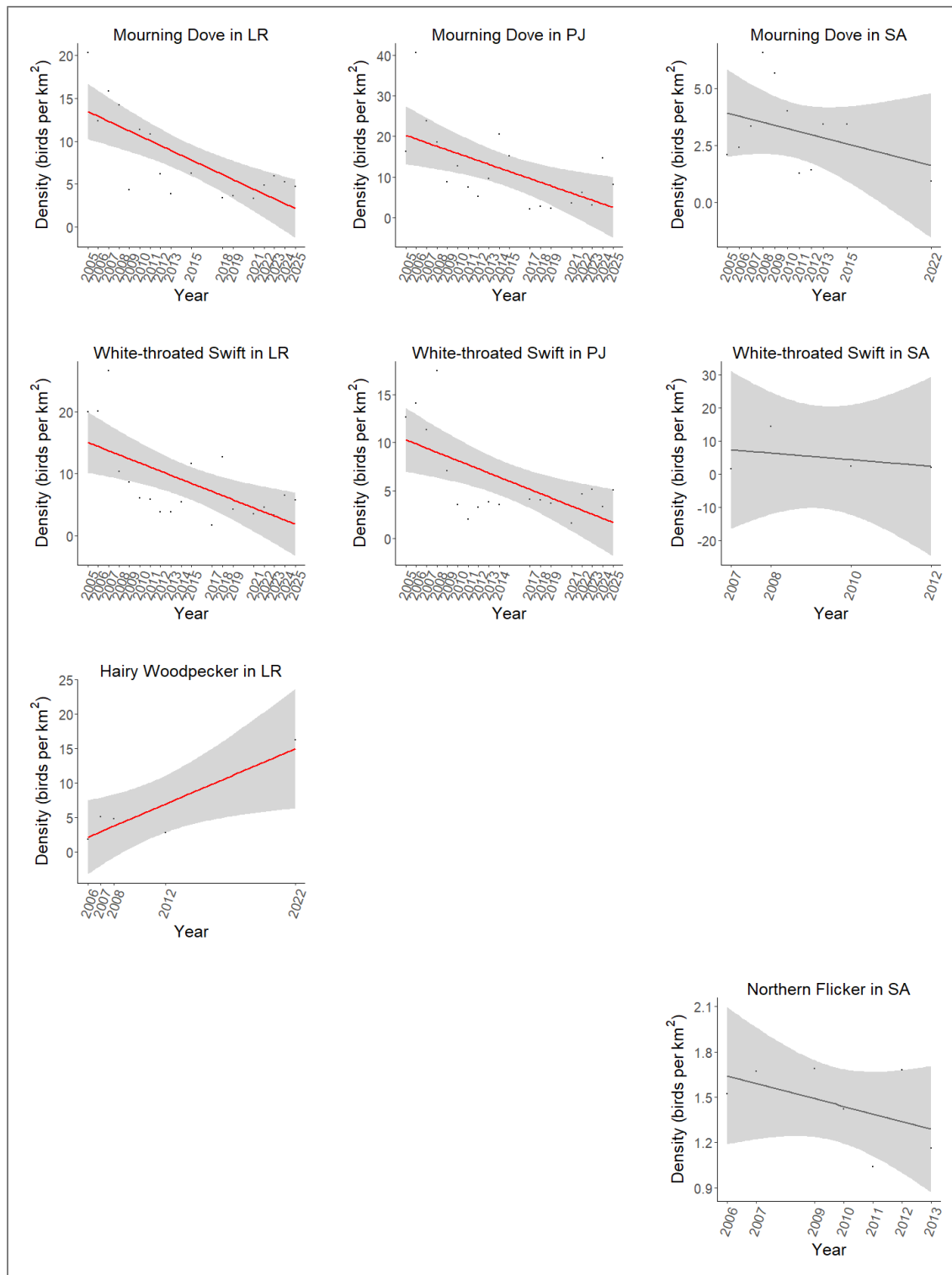


Figure 5. Density trends by habitat for mourning dove, white-throated swift, hairy woodpecker, and northern flicker. Mourning dove and white-throated swift show significant declines in low-elevation riparian and pinyon-juniper habitats, while hairy woodpecker shows a significant increase in low-elevation riparian. Other species-habitat combinations show no significant trend.

NPS

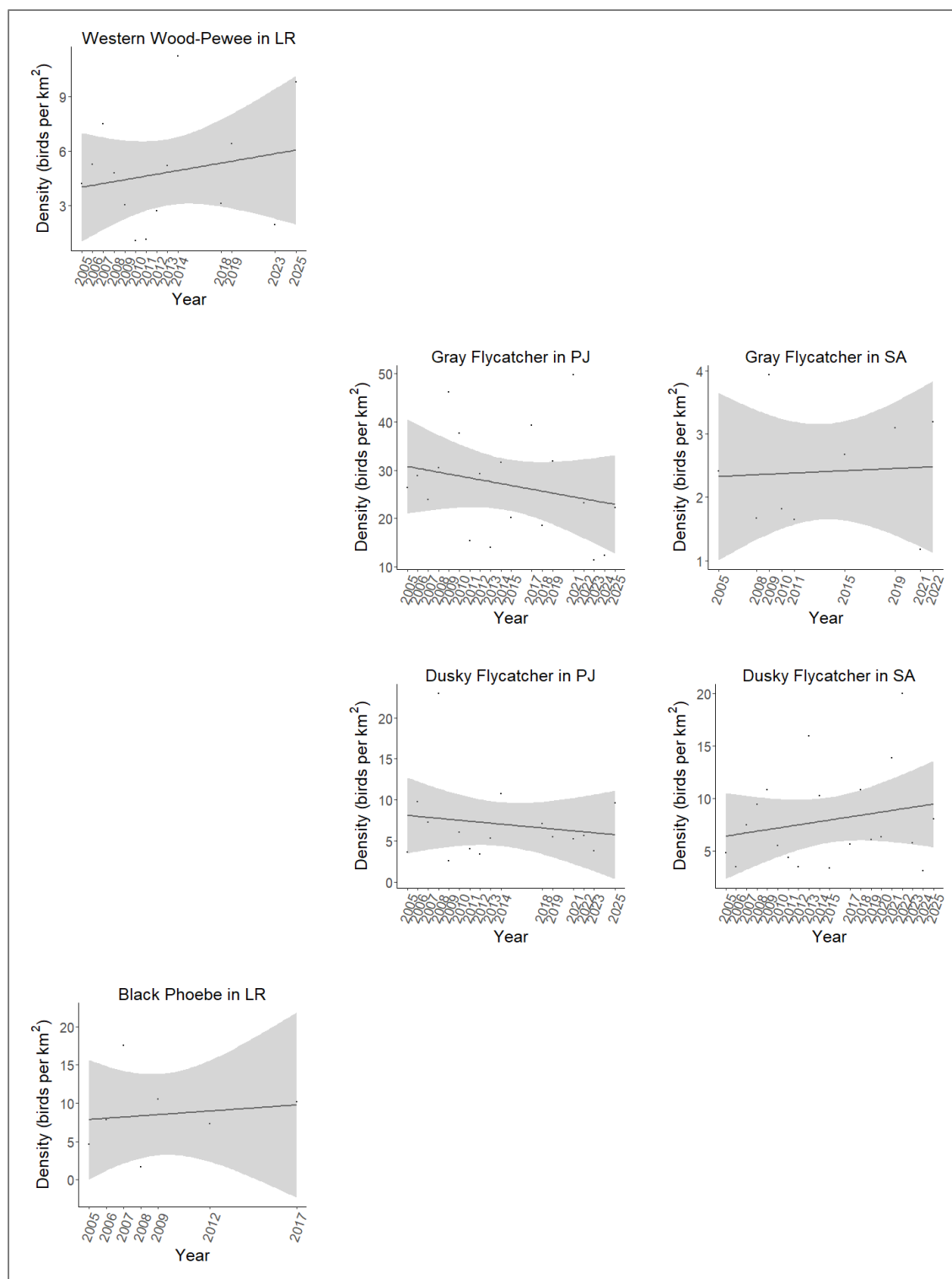


Figure 6. Density trends by habitat for western wood-pewee, gray flycatcher, dusky flycatcher, and black phoebe. All species-habitat combinations show no significant trends.

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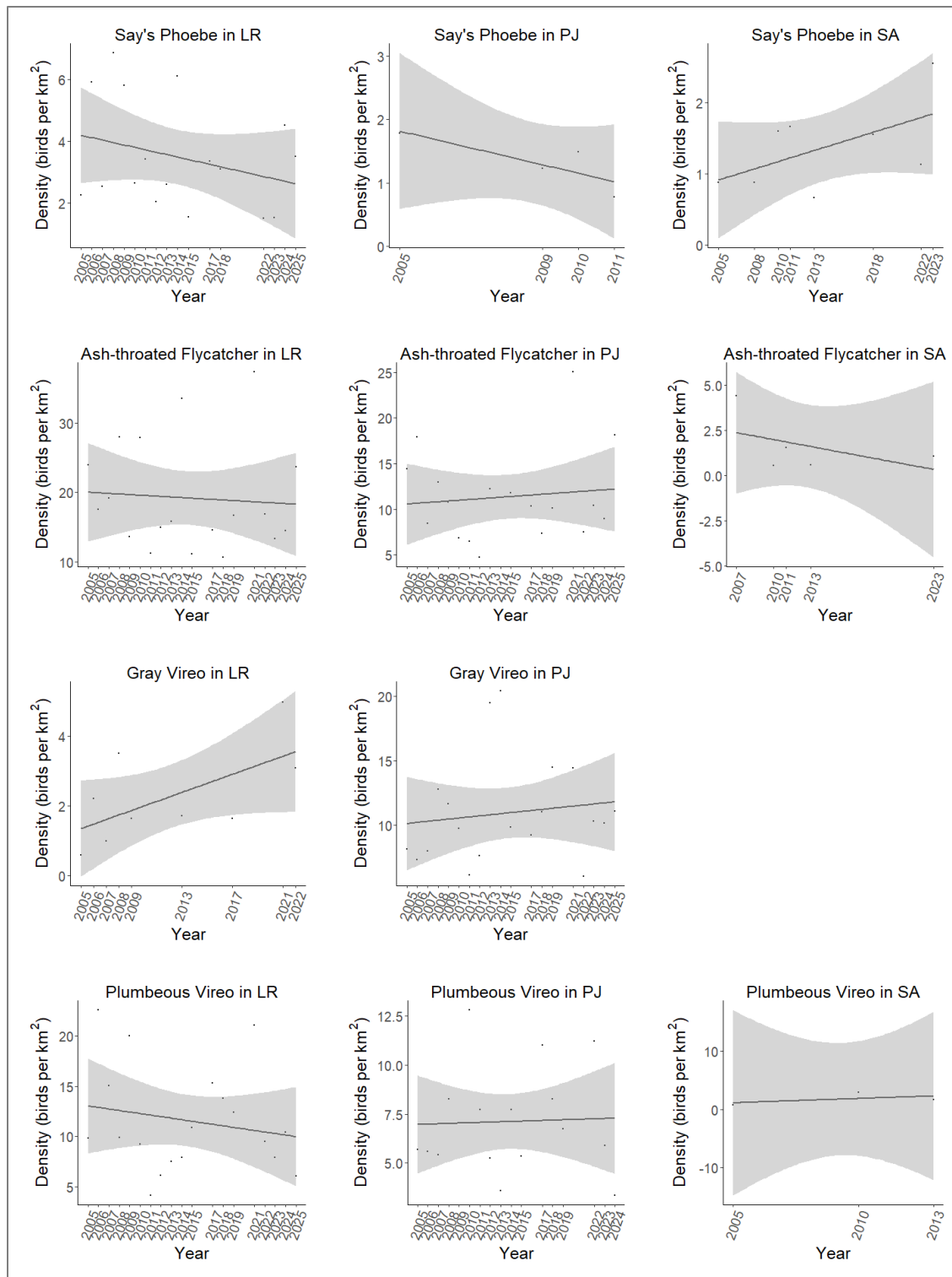


Figure 7. Density trends by habitat for Say's phoebe, ash-throated flycatcher, gray vireo, and plumbeous vireo. No significant trends were detected for any species-habitat combinations.

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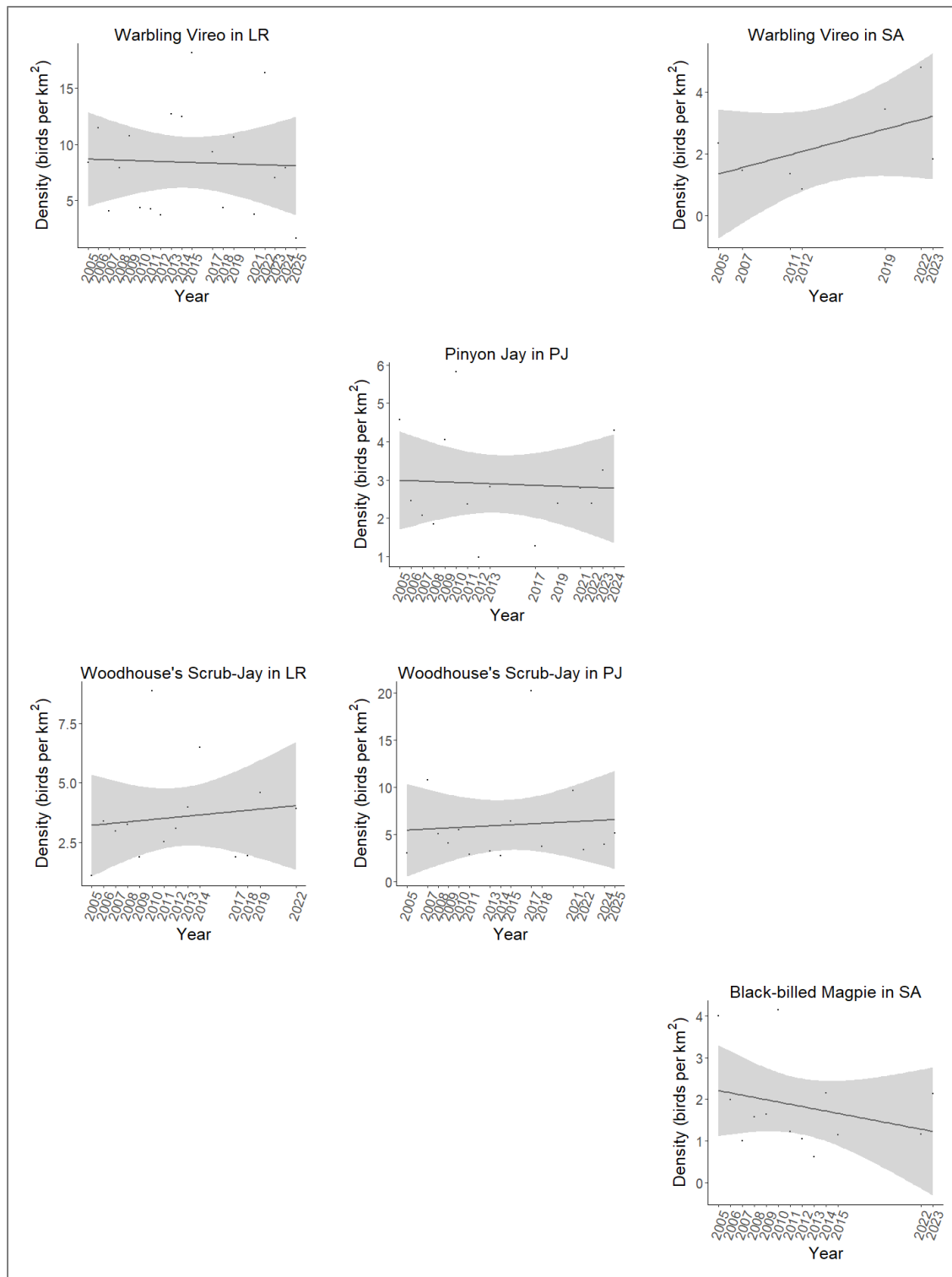


Figure 8. Density trends by habitat for warbling vireo, pinyon jay, Woodhouse's scrub-jay, and black-billed magpie. No significant trends were detected for any species-habitat combinations.

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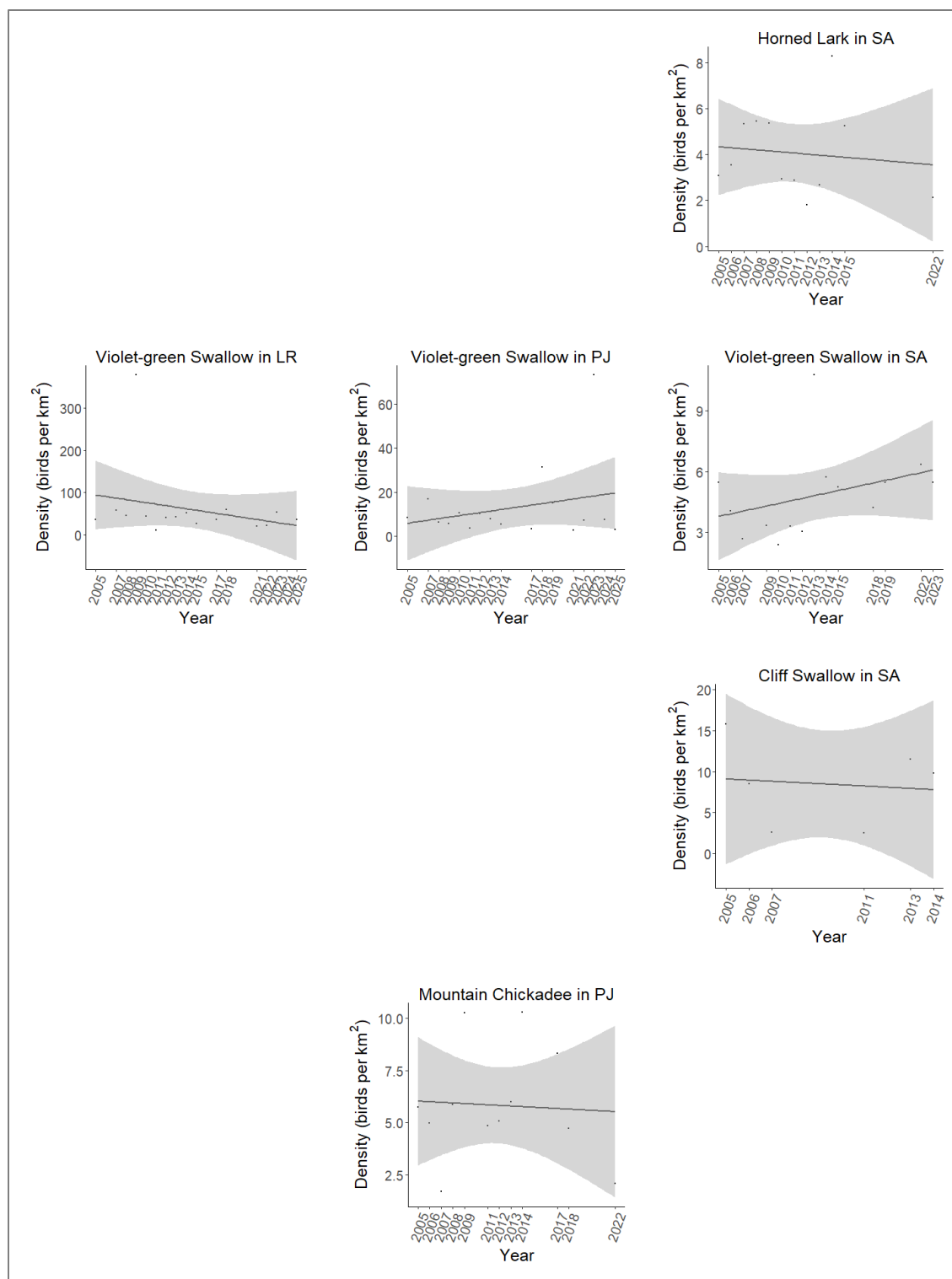


Figure 9. Density trends by habitat for horned lark, violet-green swallow, cliff swallow, and mountain chickadee. No significant trends were detected for any species-habitat combinations.

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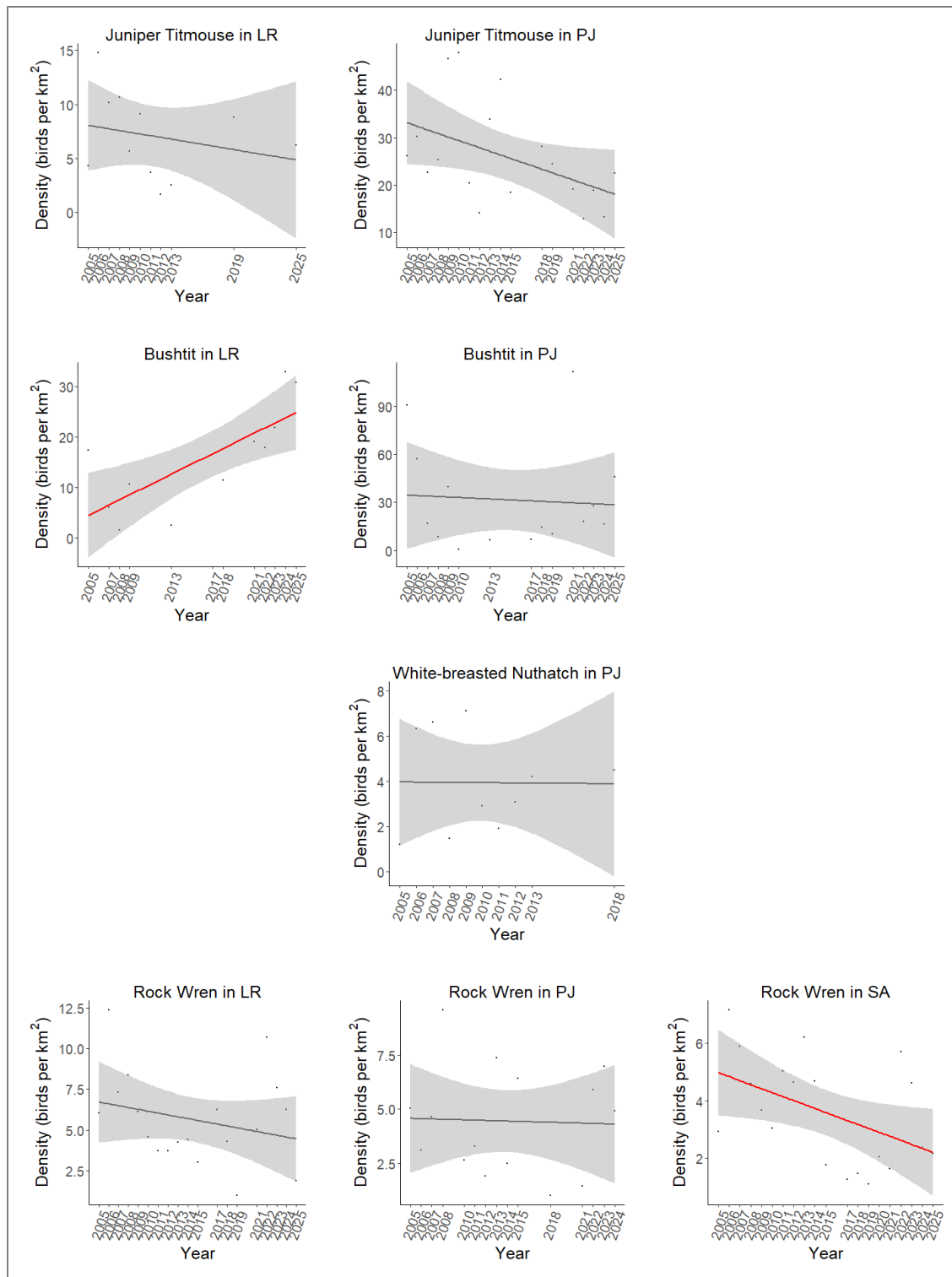


Figure 10. Density trends by habitat for juniper titmouse, bushtit, white-breasted nuthatch, and rock wren. Bushtit showed a significant increase in low-elevation riparian, while rock wren showed a significant decline in sagebrush shrubland. All other species-habitat combinations showed no significant trends.

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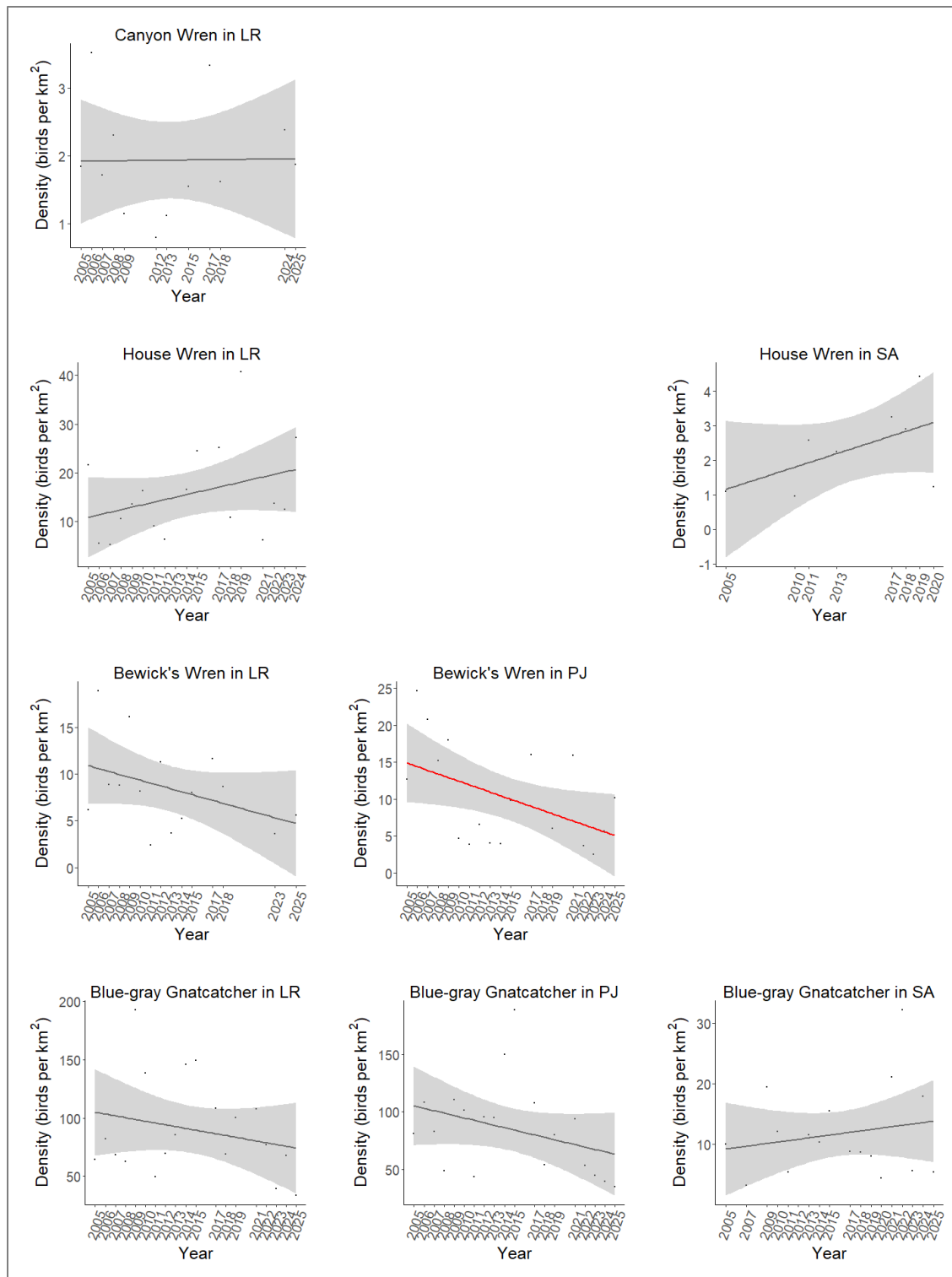


Figure 11. Density trends by habitat for canyon wren, house wren, Bewick's wren, and blue-gray gnatcatcher. Bewick's wren showed a significant decline in pinyon-juniper. All other species-habitat combinations showed no significant trends.

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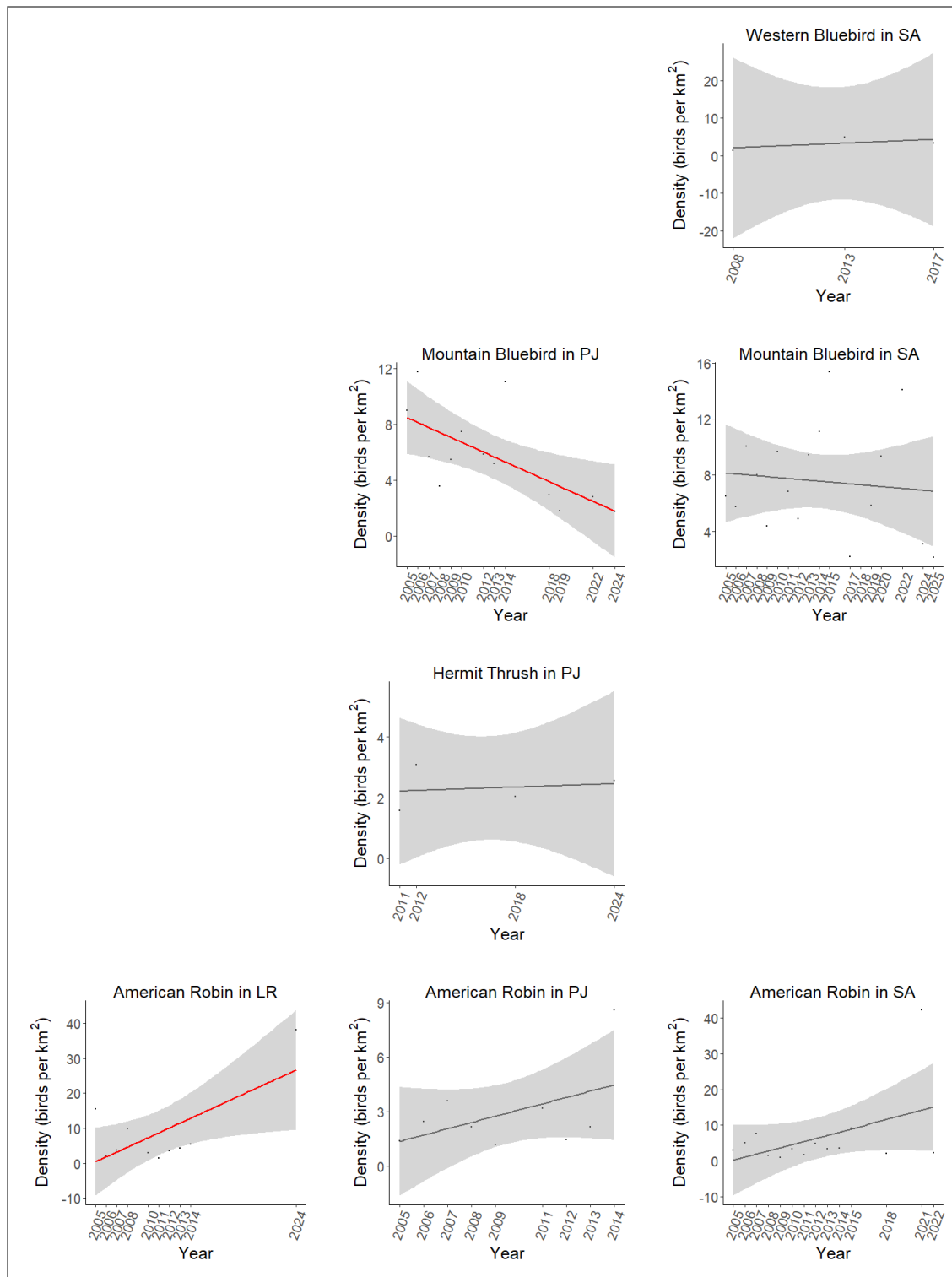


Figure 12. Density trends by habitat for western bluebird, mountain bluebird, hermit thrush, and American robin. Mountain bluebird showed a significant decline in pinyon-juniper, and American robin showed a significant increase in low-elevation riparian. All other species-habitat combinations showed no significant trends.

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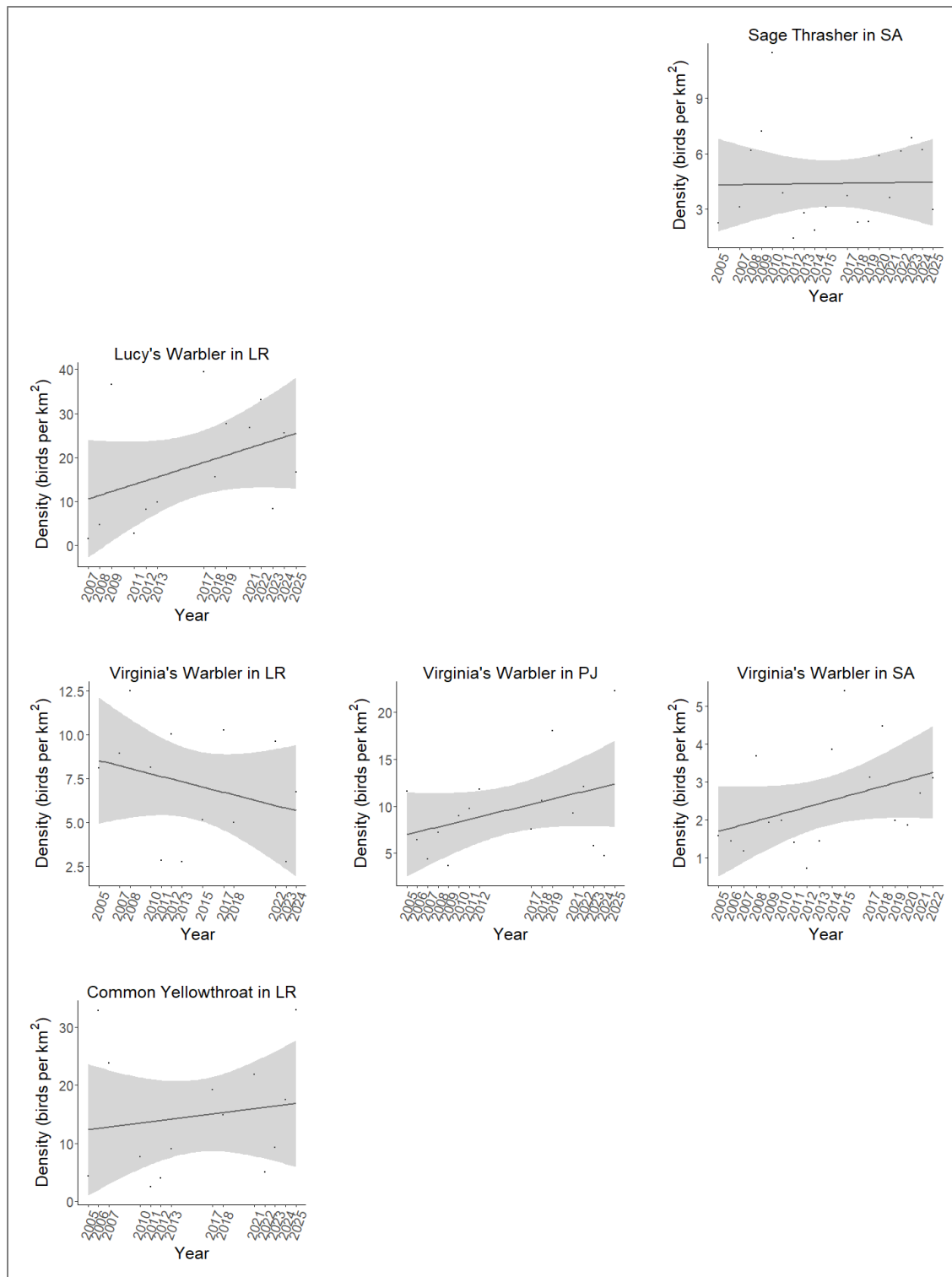


Figure 13. Density trends by habitat for sage thrasher, Lucy's warbler, Virginia's warbler, and common yellowthroat. No significant trends were detected for any species-habitat combinations.

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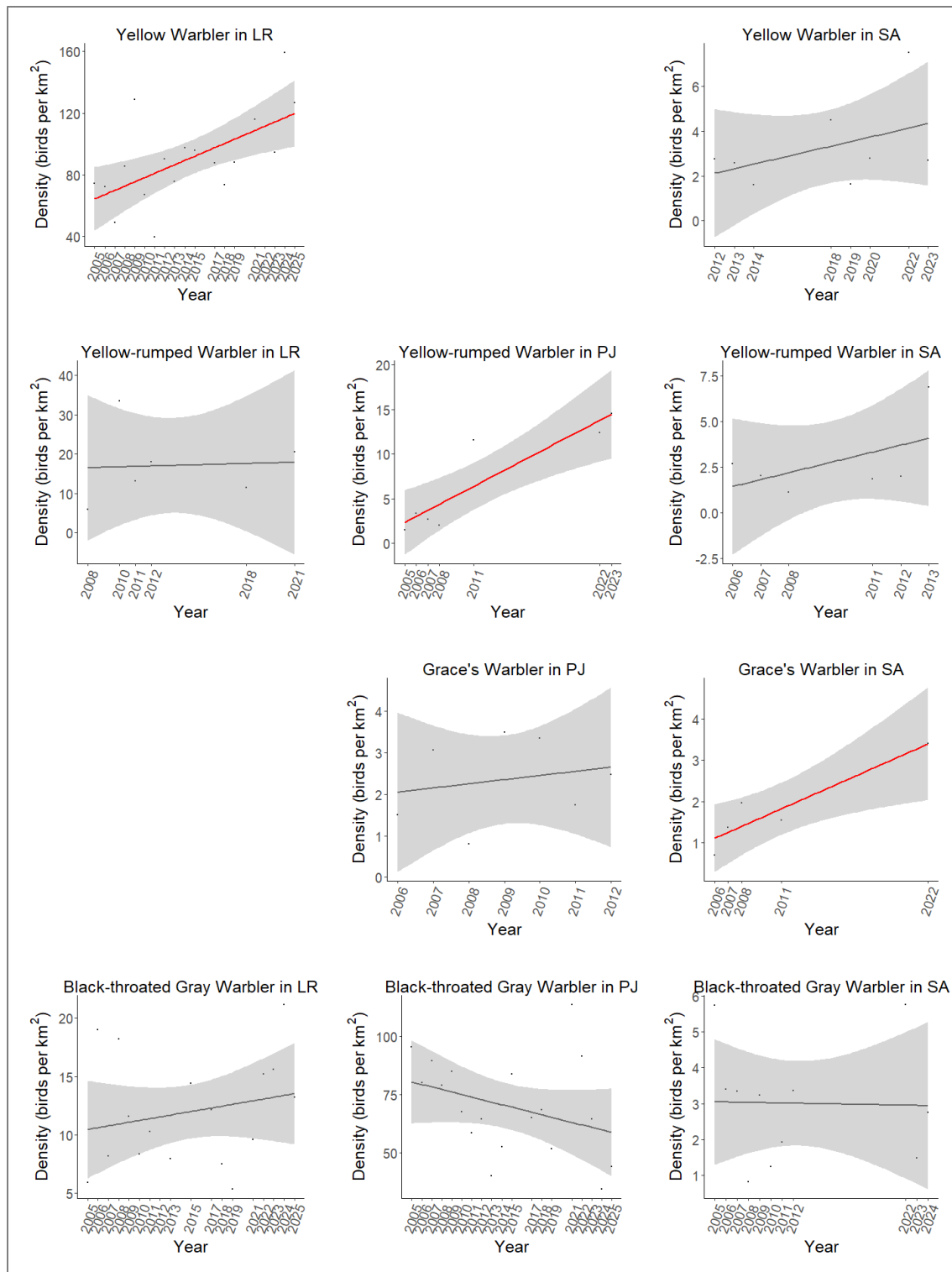


Figure 14. Density trends by habitat for yellow warbler, yellow-rumped warbler, Grace's warbler, and black-throated gray warbler. Yellow warbler increased significantly in low-elevation riparian. Yellow-rumped warbler increased significantly in pinyon-juniper. Grace's warbler increased significantly in sagebrush shrubland. All other species-habitat combinations showed no significant trends.

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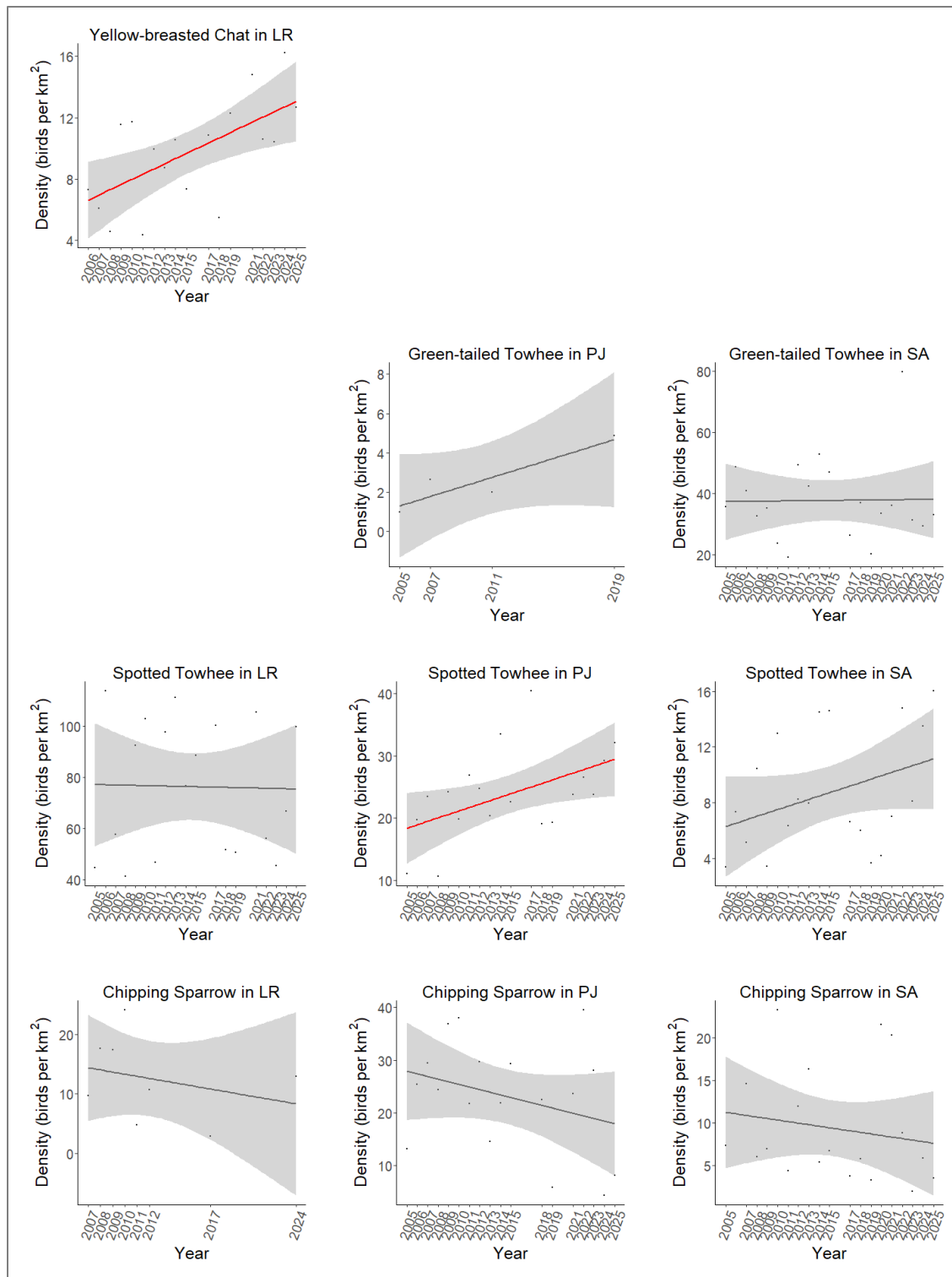


Figure 15. Density trends by habitat for yellow-breasted chat, green-tailed towhee, spotted towhee, and chipping sparrow. Yellow-breasted chat increased significantly in low-elevation riparian, and spotted towhee increased significantly in pinyon-juniper. All other species-habitat combinations showed no significant trends.

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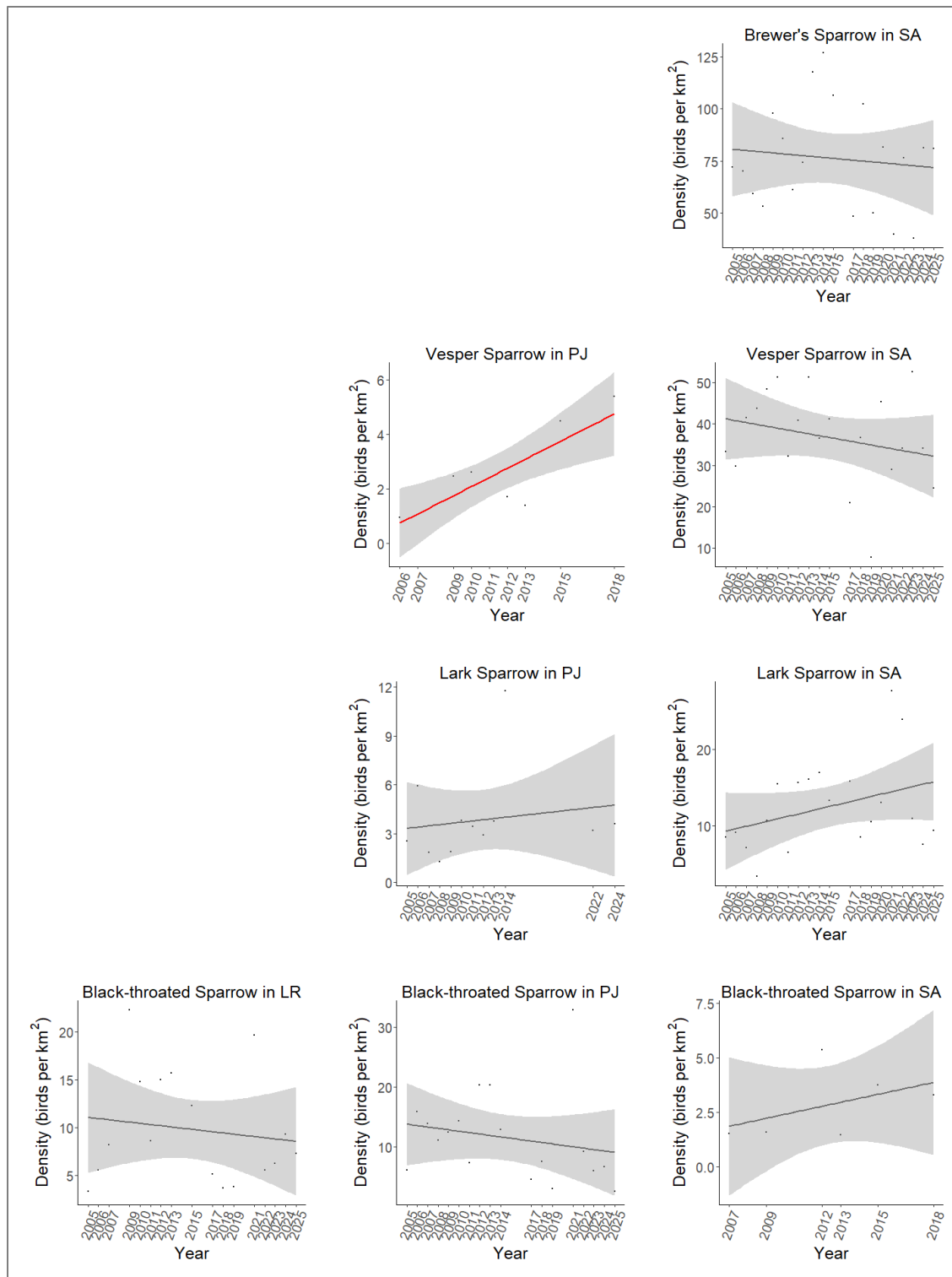


Figure 16. Density trends by habitat for Brewer's sparrow, vesper sparrow, lark sparrow, and black-throated sparrow. Vesper sparrow increased significantly in pinyon-juniper. All other species-habitat combinations showed no significant trends.

NPS

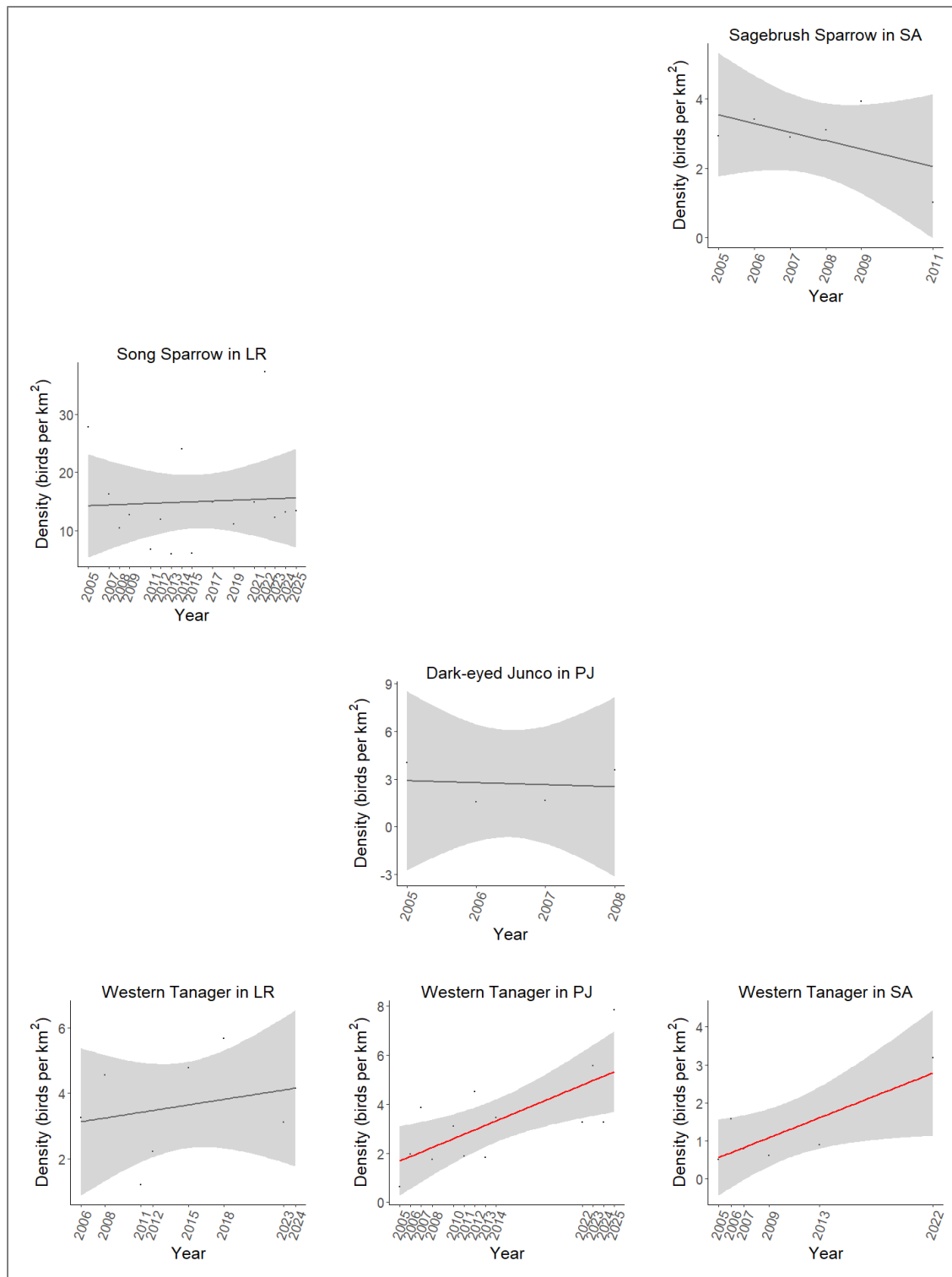


Figure 17. Density trends by habitat for sagebrush sparrow, song sparrow, dark-eyed junco, and western tanager. Western tanager increased significantly in both pinyon-juniper and sagebrush shrubland. All other species-habitat combinations showed no significant trends.

NPS

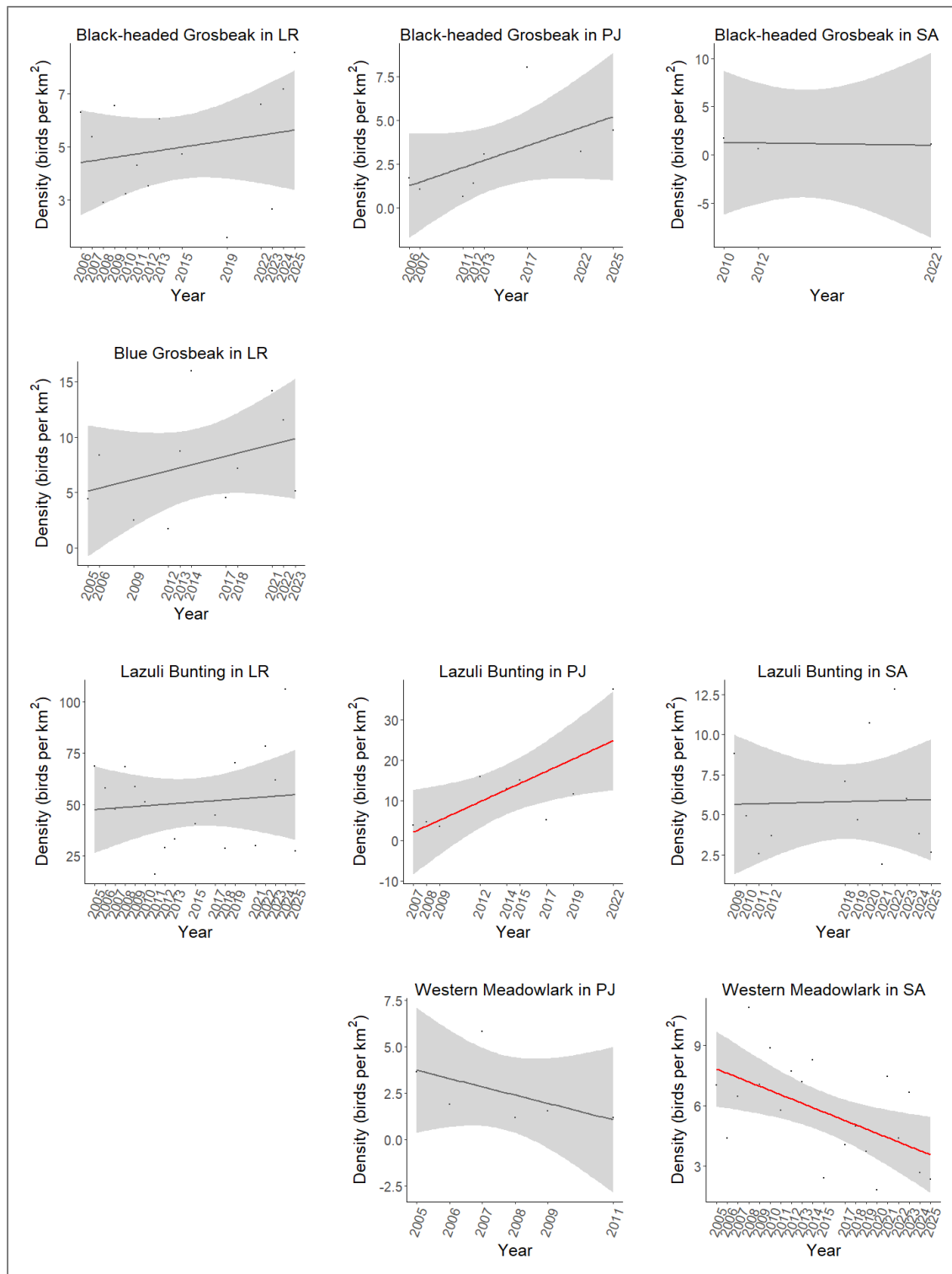


Figure 18. Density trends by habitat for black-headed grosbeak, blue grosbeak, lazuli bunting, and western meadowlark. Lazuli bunting increased significantly in pinyon-juniper, and western meadowlark declined significantly in sagebrush shrubland. All other species-habitat combinations showed no significant trends.

NPS

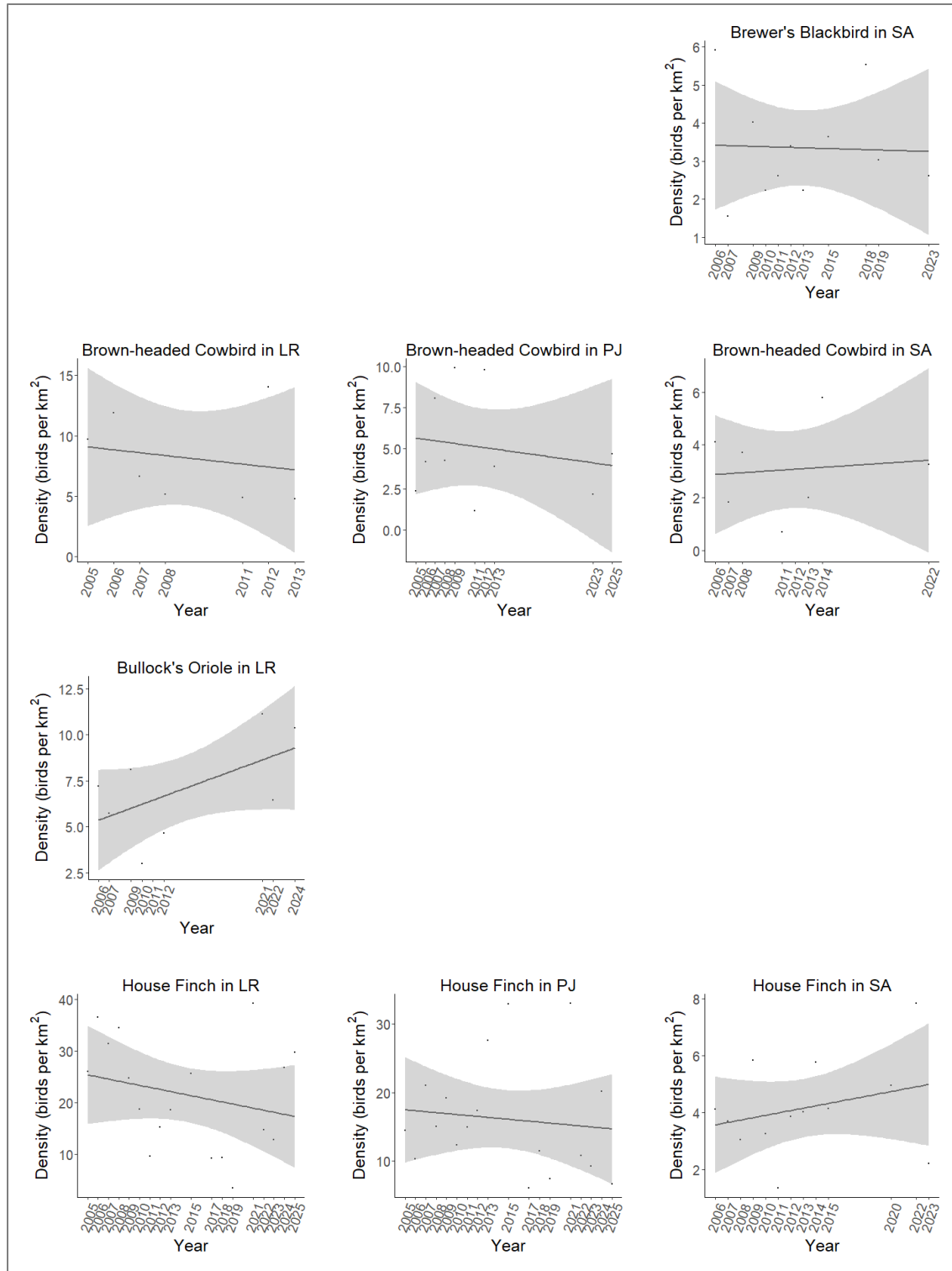


Figure 19. Density trends by habitat for Brewer's blackbird, brown-headed cowbird, Bullock's oriole, and house finch. No significant trends were detected for any species-habitat combinations.

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Figure 20. Density trends by habitat for lesser goldfinch. No significant trends were detected in low-elevation riparian or pinyon-juniper.

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