

2025 Intermountain Region Broad-Scale Bird Monitoring Report

July 23, 2025

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“A plan... must provide for the diversity of plant and animal communities, within Forest Service authority and consistent with the inherent capability of the plan area.”

2012 Rule: Code of Federal Regulations, Title 36, Pt. 219, § 219.9

“The agency also shall inventory and monitor bird habitat and populations within the agency’s capabilities and authorities ...”

Executive Order 13186

“Monitoring information should enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed.”

2012 Rule: Code of Federal Regulations, Title 36, Pt. 219, § 219.12

Photo: Kevin Abel, Dixie NF

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Background

Relevant Aspects of 2012 Rule (219.12) and Executive Order 13186

United States Forest Service (USFS) monitoring provides information for projects and planning by tracking ecological conditions on Forest System lands over time. Monitoring reports help determine whether a change to management or monitoring should be considered.

Specific monitoring topics addressed in this report are from the 2012 Rule, 219.12 (5):

- (ii): The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
- (iii): The status of focal species to assess the ecological conditions...
- (iv): The status of a select set of the ecological conditions...to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.

The purpose of the Intermountain Region Bird Monitoring Report is to accomplish required monitoring in accordance with the Intermountain Region Broader-Scale Terrestrial Wildlife Monitoring Strategy (2024). This report provides succinct information on general ecological conditions and the current status¹ of bird species. It also provides information about forest management relevant to Executive Order 13186 (Migratory Bird Treaty Act), and context for project analyses and forest plan revision.

Data Source: Integrated Monitoring in Bird Conservation Regions

The Intermountain Region continues to support broad-scale monitoring of bird communities in partnership with state and federal agencies, the Bird Conservancy of the Rockies, Idaho Bird Observatory, and the Great Basin Bird Observatory; the effort is known as Integrated Monitoring in Bird Conservation Regions (IMBCR). Yearly reports and trend data are produced by the Bird Conservancy of the Rockies, and 2024 trend data (<https://apps.birdconservancy.org/rmadc/>) were used to compile this monitoring report. Sufficient data (beginning when all forests were sampled) to estimate trends at the regional

¹ "Status" is not defined in Rule or Directives. At a minimum, status could be documented presence of a species in the region or forest, but population trend under current management conditions is preferred. According to the 2012 Rule, "monitoring questions and associated indicators must be designed to inform the management of resources on the plan area, including by testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives." Determining "status" is within the context of progress toward desired future conditions and is not necessarily in relation to historical or range wide estimates, so the appropriate spatial and temporal scales are the region and planning unit under current management conditions (e.g. during the previous 10-15 years).

scale began in 2017, but at the forest scale, some units have more historical information. Benefits of IMBCR include its stratified random sampling design and confidence metrics, but caveats are that sampling methods tend to be insufficient for waterfowl and nocturnal species. Refer to the Tutorial tab and McLaren et al. (2020) at Bird Conservancy of the Rockies (<https://apps.birdconservancy.org/rmadc/>) for data reporting methods, assumptions, and cautions about data use.

Monitoring Questions and Metrics

Ecological Conditions Question 1.1

Do bird species population trends indicate stable biodiversity and ecosystem health?

Birds are excellent indicators of biodiversity and ecosystem health because a wide variety of avian species exist in a broad range of habitat types across ecological conditions (wet and dry habitats, low and high elevations, and early and late seral succession, etc.). Therefore, the assemblage of bird population trends (e.g., increasing or decreasing species' densities) reflects general conditions across an ecosystem through time. A balanced bird community indicates stability in an ecosystem, and an unbalanced community indicates change (Appendix 1).

The stability of the regional and forest bird communities was examined by graphing the distribution of species trends through time (2017-2024) for species with credible interval widths <100 (Appendix 2). The distribution was compared to an equivalently scaled normal distribution (norm.dist function in Excel using the observed standard deviation and a mean of 0) and the statistical significance of observed community change was evaluated using a one-sample t-test with an expectation of a trend of 0 (using Excel).

Ecological Conditions Question 1.2

Do decreasing or increasing bird species suggest additional species or ecological conditions for conservation or monitoring?

Significant increase or decrease of each species' population density was determined by evaluating the median trend and its associated credible interval. Species with credible intervals that did not overlap zero were considered to have highly significant, immediately management-relevant, positive or negative trends.

Focal Species Monitoring Question 2.1

What is the status (from population trends) of focal bird species, and what does their status indicate about ecological conditions in the region, especially the sufficiency of ecological conditions to support the focal species?

Avian species currently identified as focal species on forests in the Intermountain Region are: American goshawk, Brewer's sparrow, pileated woodpecker, black-backed woodpecker, greater sage-grouse, and white-headed woodpecker. Their status was assessed using their trend and density (birds/km²) estimates and the associated variance metrics. Stable or increasing trends for a species indicate that the quantity and quality of habitat (and overall ecological conditions) is sufficient for long-term persistence. If trends are downward, causal factors, including habitat requirements, can be investigated.

Ecological Conditions for At-risk Species Question 3.1

What is the status of ecological conditions for each at-risk species², and do USFS lands contribute to long-term persistence of the species?

The seven at-risk bird species in the Intermountain Region are Mexican spotted owl, yellow-billed cuckoo, whooping crane, southwestern willow flycatcher, peregrine falcon, black rosy-finch, and greater sage-grouse. Their statuses were assessed using their trend and density (birds/km²) estimates and the associated variance metrics. Stable or increasing trends for a species indicate that the quantity and quality of mapped habitat may be sufficient for long-term persistence. If trends are downward, causal factors, including habitat requirements, can be investigated.

² At-risk species include those listed as Endangered, Threatened, and listed as Species of Conservation Concern. One requirement for the US Forest Service, (under the 2012 Rule) is to maintain ecological conditions that contribute to the recovery of at-risk species.

Results and Assessment

Ecological Conditions Question 1.1

Do species population trends in bird communities indicate stable biodiversity and ecosystem health?

The mean of species' trends for birds in the Intermountain Region was not significantly different from zero ($\bar{x} = 0.40$, $p = 0.54$, $df = 188$; Fig. 1). Relatively normally distributed, the community indicates stable ecological conditions and biodiversity, with declining species balancing increasing species. Monitoring of the regional bird community should be continued, but there are no recommended changes to management.

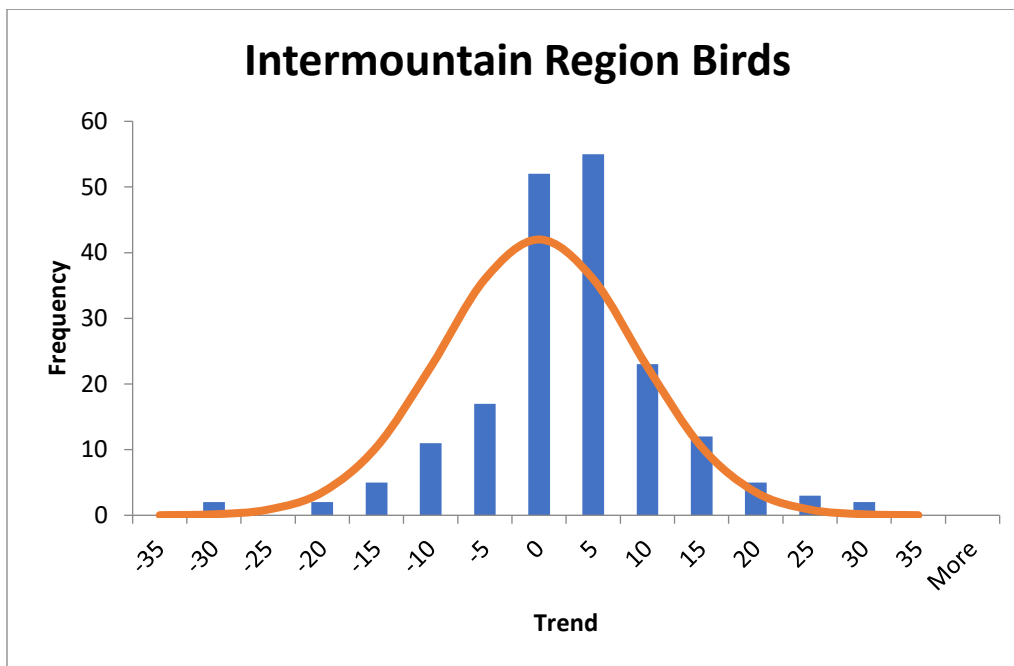


Fig. 1. Species trend distribution for bird species observed in the Intermountain Region (R4) from 2017 through 2024. The orange curve shows a normal curve scaled to the data with a mean of 0 and a standard deviation equal to that from the observed data.

Of the 189 species with reliable estimates, 89 species were declining and 100 species were increasing from 2017-2024 (Table 1).

Table 1. Estimated population change per year for species in the Intermountain Region 2017-2024. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend, e.g., 0.83 suggests 83% confidence in the positive or negative direction of the trend; L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Trend	f	L95CI	U95CI
American Crow	3.25	0.71	-7.11	16.11
American Dipper	-4.09	0.64	-27.67	23.94
American Goldfinch	-5.45	0.78	-17.56	8.32
American Goshawk	-12.07	0.92	-25.16	5.57
American Kestrel	-1.96	0.69	-9.96	6.96
American Pipit	-30.74	0.99	-48.99	-5.57
American Robin	0.93	0.68	-2.3	4.18
American Three-toed Woodpecker	0.51	0.53	-10.94	13.53
American White Pelican	2.54	0.56	-27.32	47.25
Anna's Hummingbird	4.6	0.62	-26.01	44.43
Ash-throated Flycatcher	7.97	0.96	-0.88	20.15
Bald Eagle	5.58	0.65	-21.59	37.5
Band-tailed Pigeon	14.82	0.87	-11.49	46
Bank Swallow	-15.57	0.88	-35.91	13.88
Barn Swallow	0.18	0.50	-20.32	24.14
Belted Kingfisher	-0.05	0.50	-27.09	32.73
Bewick's Wren	-10.43	0.96	-20.24	1.07
Black Rosy-Finch	-13.76	0.78	-42.67	24.47
Black-backed Woodpecker	21.02	0.97	-0.55	45.38
Black-billed Magpie	-2.05	0.66	-11.04	7.92
Black-capped Chickadee	2.44	0.68	-7.34	13.2
Black-chinned Hummingbird	-7.88	0.87	-24.36	6.99
Black-chinned Sparrow	-3.07	0.57	-24.52	31.16
Black-headed Grosbeak	7.69	0.99	1.75	14.25
Black-throated Gray Warbler	0.52	0.55	-8.05	9.53
Black-throated Sparrow	-2.95	0.67	-14.38	11.79
Blue Grosbeak	7.37	0.66	-22.82	49.35
Blue-gray Gnatcatcher	2.3	0.76	-4.22	10.17
Blue-winged Teal	-3.14	0.57	-30.74	36.08
Brewer's Blackbird	4.01	0.77	-6.7	15.74
Brewer's Sparrow	1.64	0.69	-4.56	7.95
Broad-tailed Hummingbird	3.86	0.79	-4.8	13.26
Brown Creeper	-0.29	0.53	-6.34	6.16
Brown-headed Cowbird	-4.1	0.84	-10.71	3.16
Bullock's Oriole	-2.65	0.64	-15.99	14.45
Bushtit	13.18	0.99	2.59	23.9
Cactus Wren	-30.07	0.93	-58.6	13.08

Species	Trend	f	L95CI	U95CI
California Quail	0.96	0.53	-19.67	24.85
Calliope Hummingbird	0.36	0.52	-16.96	18.92
Canada Goose	2.7	0.59	-18.21	29.61
Canada Jay	-4.99	0.87	-13.38	3.21
Canyon Wren	-10.5	0.96	-21.57	1.32
Cassin's Finch	-8.48	0.98	-14.51	-1.42
Cassin's Vireo	-9.07	0.98	-17.46	-0.51
Cedar Waxwing	-3.65	0.69	-16.08	11.56
Chipping Sparrow	-0.04	0.51	-3.3	3.33
Chukar	5.63	0.80	-9.13	21.87
Cinnamon Teal	2.37	0.56	-36.66	55.24
Clark's Nutcracker	-4.04	0.89	-9.43	4.72
Cliff Swallow	8.03	0.79	-9.52	31.14
Common Grackle	9.96	0.69	-22.09	54
Common Merganser	-4.69	0.65	-24.11	18.94
Common Nighthawk	5.5	0.89	-3.37	14.29
Common Poorwill	4.97	0.75	-10.3	24.66
Common Raven	2.82	0.89	-1.8	7.5
Common Yellowthroat	-4.69	0.70	-22.63	16.51
Cooper's Hawk	1.43	0.61	-9.41	11.66
Costa's Hummingbird	24.17	0.89	-11.51	83.97
Crissal Thrasher	-23.1	0.87	-51.1	22.86
Dark-eyed Junco	-3.77	0.99	-6.72	-0.62
Downy Woodpecker	-7.17	0.90	-19.38	5.34
Dusky Flycatcher	-3.8	0.97	-7.42	0.08
Dusky Grouse	10.85	0.99	1.72	22.79
Eastern Kingbird	-0.59	0.51	-24.81	31.84
Eurasian Collared-Dove	-1.28	0.56	-16.23	17.55
European Starling	13.07	0.83	-12.38	46.15
Evening Grosbeak	-14.33	0.98	-25.64	-1.15
Fox Sparrow	-1.27	0.59	-11.74	9.31
Franklin's Gull	-12.23	0.76	-39.14	24.65
Gadwall	23.65	0.92	-7.68	62.38
Gambel's Quail	19.86	0.85	-14.3	74.87
Golden Eagle	-9.09	0.94	-20.69	2.11
Golden-crowned Kinglet	-4.49	0.76	-15.58	8.5
Grace's Warbler	18.51	0.96	-3.68	41.44
Grasshopper Sparrow	-0.7	0.52	-23.04	26.61
Gray Catbird	-0.6	0.53	-17.72	20.86
Gray Flycatcher	1.17	0.61	-6.41	10.09
Gray Vireo	0.22	0.52	-10.73	12.17

Species	Trend	f	L95CI	U95CI
Great Blue Heron	8.29	0.72	-18.05	42.21
Great Horned Owl	-1.3	0.58	-14.03	13.66
Greater Roadrunner	0.24	0.51	-33.01	51.8
Greater Sage-Grouse	-5.19	0.68	-28.19	22.38
Green-tailed Towhee	0.26	0.53	-5.12	6.02
Green-winged Teal	13.76	0.80	-16.19	55.83
Hairy Woodpecker	1.83	0.74	-3.59	7.93
Hammond's Flycatcher	2.8	0.77	-5.59	11.61
Hermit Thrush	-4.73	0.99	-8.63	-0.96
Horned Lark	7.81	0.90	-4.33	21.15
House Finch	8.86	0.92	-3.43	21.9
House Wren	-1.47	0.67	-7.33	5.16
Juniper Titmouse	-1.81	0.65	-10.62	8.06
Killdeer	-0.9	0.54	-17.19	19.81
Lark Sparrow	9.77	0.98	1.07	19.02
Lazuli Bunting	3.9	0.87	-2.65	11.02
Least Flycatcher	2.05	0.57	-22.2	35.21
Lesser Goldfinch	7.89	0.86	-6.88	23.81
Lesser Scaup	8.3	0.68	-30.86	49.48
Lewis's Woodpecker	12.33	0.89	-6.66	38.09
Lincoln's Sparrow	-3.5	0.77	-11.15	5.15
Loggerhead Shrike	14.29	0.89	-7.24	44.06
Long-billed Curlew	6.71	0.62	-28.48	61.87
MacGillivray's Warbler	2.46	0.81	-2.86	8.18
Mallard	0.35	0.52	-14.66	17.39
Merlin	2.04	0.55	-24.74	39.94
Mountain Bluebird	-0.99	0.63	-6.61	4.27
Mountain Chickadee	1.05	0.72	-2.52	4.74
Mountain Quail	-21.13	0.96	-38.06	3.65
Mourning Dove	3.78	0.88	-2.14	10.03
Nashville Warbler	-18.07	1.00	-28.06	-7.01
Northern Flicker	-0.11	0.52	-3.79	4.29
Northern Harrier	-3.87	0.72	-16.03	10.61
Northern Mockingbird	0.85	0.53	-18.29	26.44
Northern Pygmy-Owl	3.85	0.66	-12.72	27.59
Northern Rough-winged Swallow	-3.22	0.67	-17.3	10.83
Northern Saw-whet Owl	25.16	0.94	-4.46	66.65
Northern Waterthrush	-1.5	0.54	-36.04	50.34
Olive-sided Flycatcher	5.24	0.90	-3.07	12.86
Orange-crowned Warbler	-2.26	0.71	-9.86	6.04
Osprey	4.73	0.70	-14.3	27.81

Species	Trend	f	L95CI	U95CI
Pacific Wren	-18.23	0.99	-32.51	-3
Peregrine Falcon	-5.45	0.70	-24.71	15.93
Pileated Woodpecker	9.45	0.90	-5.03	28.15
Pine Grosbeak	-5.77	0.86	-16.98	5.54
Pine Siskin	-4.46	0.98	-8.42	-0.12
Pinyon Jay	5.95	0.80	-6.43	21.32
Plumbeous Vireo	0.19	0.52	-7.94	8.98
Prairie Falcon	-3.96	0.70	-17.36	13.92
Pygmy Nuthatch	15.72	0.94	-4.23	39.53
Red Crossbill	4.84	0.91	-2.5	13.36
Red-breasted Nuthatch	-4.61	0.98	-8.6	-0.34
Red-eyed Vireo	15.19	0.87	-11.28	49.9
Red-naped Sapsucker	1.52	0.63	-7.81	10.79
Red-tailed Hawk	0.1	0.51	-6.53	7.7
Red-winged Blackbird	-0.13	0.50	-15.64	19.73
Ring-necked Pheasant	-9.08	0.70	-36.31	28.49
Rock Pigeon	-12.69	0.89	-29.43	8.82
Rock Wren	3.71	0.90	-1.68	9.37
Ruby-crowned Kinglet	-8	1.00	-11.69	-4.06
Ruddy Duck	13.79	0.78	-21.82	70.3
Ruffed Grouse	-4.52	0.77	-16.18	9.55
Rufous Hummingbird	-2.95	0.63	-19.29	18.25
Rufous-crowned Sparrow	-8.72	0.70	-38.23	31.05
Sage Thrasher	-1.18	0.57	-11.52	10.62
Sagebrush Sparrow	-10.37	0.88	-24.6	9.62
Sandhill Crane	-1.94	0.61	-14.22	12
Savannah Sparrow	1.06	0.53	-20.35	25.95
Say's Phoebe	4.53	0.75	-9.21	18.53
Scott's Oriole	15.82	0.84	-13.41	60.04
Sharp-shinned Hawk	-7.29	0.83	-19.17	7.94
Song Sparrow	1.74	0.65	-7.63	11.06
Spotted Sandpiper	-5.37	0.75	-19.82	12.36
Spotted Towhee	-1.47	0.68	-7.27	4.74
Spruce Grouse	-11.58	0.82	-33.97	16.86
Steller's Jay	3.21	0.79	-4.57	12.31
Swainson's Hawk	-13.64	0.97	-27.34	1.03
Swainson's Thrush	8.02	0.99	1	16.46
Townsend's Solitaire	-10.08	1.00	-15.85	-3.99
Townsend's Warbler	-16.94	0.99	-25.96	-6.04
Tree Swallow	-1.03	0.58	-12.32	9.88
Turkey Vulture	1.76	0.63	-9.45	14.78

Species	Trend	f	L95CI	U95CI
Varied Thrush	-16.02	0.87	-38.3	17.49
Vaux's Swift	0.66	0.51	-31.2	47.2
Veery	11.29	0.82	-12.41	45.42
Vesper Sparrow	6.22	0.93	-1.56	14.22
Violet-green Swallow	0.69	0.56	-8.47	10.65
Virginia Rail	1.39	0.53	-34.8	47.7
Virginia's Warbler	1.61	0.63	-8.28	12
Warbling Vireo	2.91	0.92	-1.08	7.27
Western Bluebird	10.38	0.88	-6.42	34.63
Western Flycatcher	9.44	0.98	-0.02	21.3
Western Kingbird	3.04	0.66	-10.51	18.13
Western Meadowlark	-0.16	0.52	-10.17	11.18
Western Tanager	1.26	0.78	-1.93	4.57
Western Wood-Pewee	2.14	0.72	-4.94	9.5
White-breasted Nuthatch	2.23	0.66	-7.87	14.8
White-crowned Sparrow	-1.63	0.64	-10.23	8.79
White-headed Woodpecker	10.81	0.72	-19.4	49.4
White-throated Swift	-6.07	0.77	-20.15	10.13
White-winged Crossbill	25.55	0.90	-11.42	76.03
Wild Turkey	3.3	0.66	-11.21	19.27
Williamson's Sapsucker	12.16	0.96	-1.88	28.38
Willow Flycatcher	5.96	0.73	-12.8	29.5
Wilson's Snipe	-3.3	0.64	-21.11	20.61
Wilson's Warbler	-7.05	0.89	-18.66	5.08
Wood Duck	-3.92	0.60	-31.23	34.82
Woodhouse's Scrub-Jay	-5.35	0.90	-14.48	3.04
Yellow Warbler	-0.31	0.54	-6.6	6.5
Yellow-breasted Chat	8.48	0.79	-11.36	33.47
Yellow-rumped Warbler	-3.42	0.98	-6.56	-0.08

Ecological Conditions Question 1.2

Do decreasing or increasing bird species suggest additional species or ecological conditions for conservation or monitoring?

When evaluating significant negative trends for individual species at the regional scale, 11 species were decreasing (Table 2), and 5 species were increasing (Table 3). Both increasing and decreasing species are associated with a variety of habitat types, and the causal factors for observed trends are unknown. No changes to management are recommended. Monitoring of declining species should continue. Research into causal factors for the observed increasing and decreasing trends would be useful. Some species may be evaluated for at-risk species designation.

Table 2. Decreasing bird species in the Intermountain Region 2017-2024. Trend=median population change (%); Density=mean density (birds/km²); L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Trend	Density	L95CI	U95CI	Associated Habitat
American Pipit	-30.74	0.38	-48.99	-5.57	Alpine, subalpine meadows
Pacific Wren	-18.23	0.29	-32.51	-3	Old-growth coniferous forest
Nashville Warbler	-18.07	1.46	-28.06	-7.01	Shrubby, second-growth
Townsend's Warbler	-16.94	2.85	-25.96	-6.04	Old-growth coniferous forest
Evening Grosbeak	-14.33	0.64	-25.64	-1.15	Coniferous and mixed forests
Townsend's Solitaire	-10.08	1.11	-15.85	-3.99	Mid to high-elevation dry coniferous forests
Cassin's Vireo	-9.07	1.04	-17.46	-0.51	Coniferous, deciduous, and mixed forests
Cassin's Finch	-8.48	4.02	-14.51	-1.42	Tall evergreen forests and in groves of quaking aspen
Ruby-crowned Kinglet	-8	7.35	-11.69	-4.06	Coniferous and deciduous forests, thickets, scrub, edge
Hermit Thrush	-4.73	3.63	-8.63	-0.96	Boreal and mountainous coniferous forests
Red-breasted Nuthatch	-4.61	5.71	-8.6	-0.34	Fir-spruce forests
Pine Siskin	-4.46	29.02	-8.42	-0.12	Open coniferous forests
Dark-eyed Junco	-3.77	34.86	-6.72	-0.62	Coniferous forests
Yellow-rumped Warbler	-3.42	21.10	-6.56	-0.08	Coniferous and mixed forests to shrublands

Table 3. Increasing bird species in the Intermountain Region 2017-2024. Trend=median population change (%); Density=mean density (birds/km²); L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Trend	Density	L95CI	U95CI	Associated Habitat
Bushtit	13.18	9.86	2.59	23.9	Woody and brush, pinyon-juniper
Black-headed Grosbeak	7.69	1.93	1.75	14.25	Mixed open woods and edges
Dusky Grouse	10.85	0.32	1.72	22.79	Mountain forests
Lark Sparrow	9.77	2.24	1.07	19.02	Open grassy habitats with scattered trees and shrubs
Swainson's Thrush	8.02	3.46	1	16.46	Dense, mixed, coniferous forest

Focal Species Monitoring Question 2.1

What is the status (from population trends) of bird focal species in the region and what does their status indicate about ecological conditions in the region, especially the sufficiency of ecological conditions to support them?

Most (4) focal species are increasing and 2 are decreasing at the regional scale, with 3 species having significant estimates ($f > 0.85$, Table 4). Interestingly, both significantly increasing and decreasing species are all associated with mature and old-growth forests. Recent fires are a hypothetical cause, as goshawks may be more impacted by habitat loss compared to woodpecker species which can benefit from burns that create dead wood and snags for foraging. Results suggest sufficient ecological conditions for most species, but monitoring should continue, including a more extensive causal factor analysis for the observed downward trend for goshawks.

Table 4. Focal bird species in the Intermountain region 2017-2024. Trend=median population change (%); f=confidence in the direction (not magnitude) of the trend; Density (birds/km²); L95CI=lower 95% credible interval; U95CI=upper 95% credible interval

Species	Trend	f	Density	L95CI	U95CI	Associated Habitat
American Goshawk	-12.07	0.92	0.03	-25.16	5.57	Mature old-growth forest
Brewer's Sparrow	1.64	0.69	8.28	-4.56	7.95	Sagebrush steppe
Pileated Woodpecker	9.45	0.90	0.06	-5.03	28.15	Mature forest with snags
Black-backed Woodpecker	21.02	0.97	0.16	-0.55	45.38	Post-fire coniferous forests
Greater Sage-Grouse	-5.19	0.68	0.01	-28.19	22.38	Sagebrush
White-headed Woodpecker	10.81	0.72	0.02	-19.4	49.4	Mature forest with snags

Ecological Conditions for At-risk Species Question 3.1

What is the status of ecological conditions for each at-risk species, and do USFS lands contribute to long-term persistence of the species?

Population data were only available for Species of Conservation Concern (SCC) and not for any of the threatened or endangered species. The small ranges and limited populations of ESA listed species limits data collection using IMBCR sampling.

Table 5. At-risk species density trends in the Intermountain region (2017-2024), with status under the Endangered Species Act or as a Species of Conservation Concern (SCC).

Trend=median population change (%); f=confidence in the direction (but not magnitude) of the reported trend; L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Status	Trend	f	L95CI	U95CI	Associated Habitat
Mexican spotted owl	Threatened	NA	NA	NA	NA	Mature old-growth
Yellow-billed cuckoo	Threatened	NA	NA	NA	NA	Woodland riparian
Southwestern willow flycatcher	Endangered	NA	NA	NA	NA	Dense riparian
Whooping crane	Endangered	NA	NA	NA	NA	Wetlands, marshes
Black Rosy-Finch	SCC	-13.76	0.78	-42.67	24.47	High alpine
Greater Sage-Grouse	SCC	-5.19	0.68	-28.19	22.38	Sagebrush
Peregrine Falcon	SCC	-5.45	0.70	-24.71	15.93	Ledges and cliffs

Species listed under the ESA in the Intermountain Region tend to have low population numbers and very restricted geographic ranges, so broad-scale monitoring using IMBCR sampling has limited use for those species. No management changes are recommended, but monitoring of ESA listed species and their habitats should be emphasized at the forest, and not regional, scale.

References

McLaren, M. F., Smith, M., Timmer, J. M., Drilling, N. E., Green, A. W., Leslie, B. J., White, C. M., Van Lanen, N. J., Pavlacky Jr., D. C., Sparks, R. A., & Van Boer, A. G. (2020). Integrated Monitoring in Bird Conservation Regions (IMBCR): 2019 Field Season Report. Bird Conservancy of the Rockies. Brighton, Colorado, USA.

Appendix 1. Bird Community Expected Trends

Bird Community Concept

The assemblage of bird species within a forest or region is a community. Communities tend to be composed of a few abundant species and many non-abundant species in a distribution that is stable through time (Fig. 1-1).

Evaluating Bird Communities

Species in a community tend to be distributed consistently (Fig. 1-1), but ecosystems are not static. Habitats transition through time slowly (e.g., seral stages) or more rapidly, due to stochastic events (e.g., drought and fire). Habitat changes will favor some species of birds but be detrimental to others. Intuitively, the population trends of favored species will increase, and the trends of unfavored species will decrease, and the community will remain stable because declining species are balanced with increasing species. An unbalanced community, with more species declining than increasing, may indicate a loss of biodiversity (i.e., species richness) for the ecosystem.

Therefore, ecosystem stability and biodiversity can be evaluated by examining bird community characteristics. Specifically, stability can be assessed by determining if the community represents a balanced assemblage of species trends. To demonstrate the method, I simulated communities of 50 species for 20 years under different growth rate scenarios. In the balanced, random scenario, growth trend for each species was randomly chosen within each year from values between -20% and 20% (Fig. 1-2). In the half declining scenario, a trend between -20% and 20% was randomly assigned for the first 25 species, and a trend was assigned between -20% and 0 each year for the other 25 species (Fig. 1-3).

I graphed examples of resulting histograms to demonstrate the effects of variation in species' population growth on community distribution and overall mean population trend.

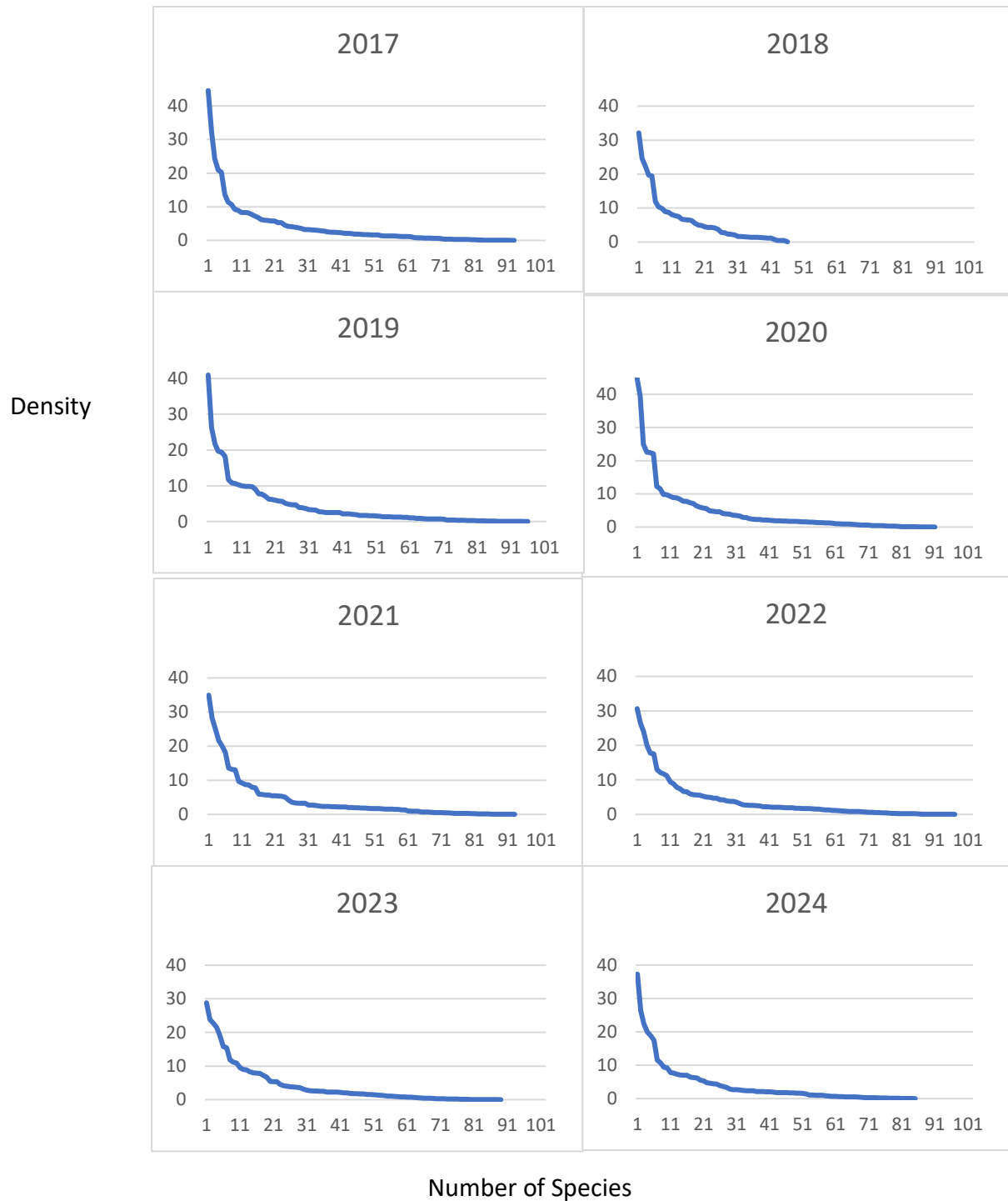


Figure 1-1. Relationship, and the consistency in the relationship through time, between the number of individual species at each density for the bird community in the Intermountain Region.

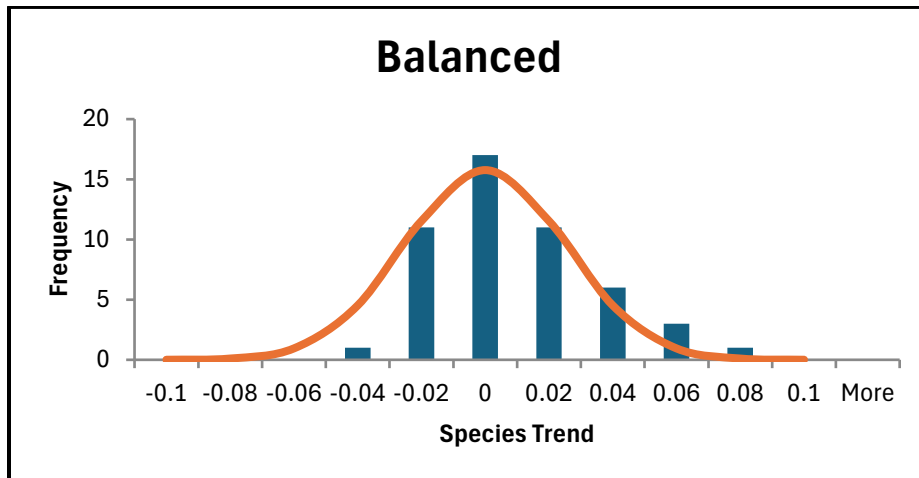


Figure 1-2. Simulated species trends with a balanced scenario of 50 species for 20 years. Simulated species varied randomly between -20% and 20% each year. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

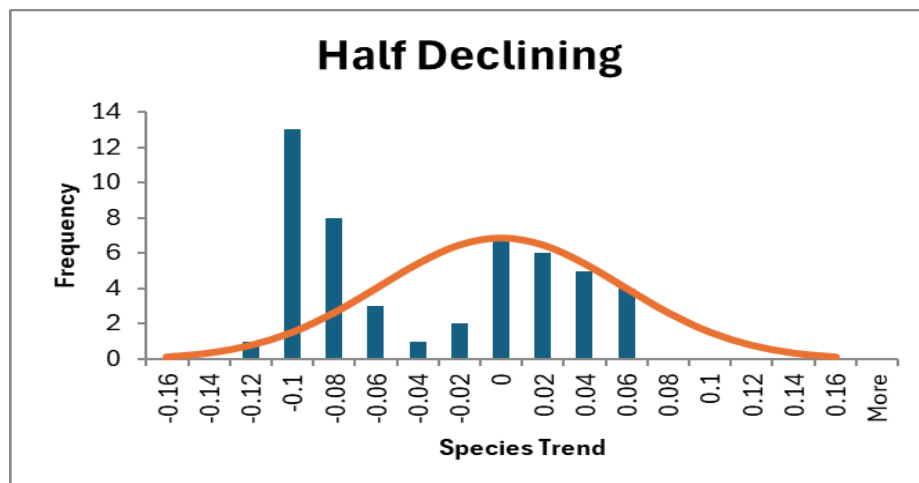


Figure 1-3. Simulated species trends with a half declining scenario of 50 species for 20 years. Half of the simulated species varied randomly between 0 and -20% and the other half between -20% and 20% each year. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Interpretation

In the balanced scenario, stochasticity within species' trends created variance in the community distribution, but the mean of the trend approached an expected value of zero ($\bar{x}=-0.0005$). In the half declining scenario, the distribution was impacted by shifting the mean trend away from zero ($\bar{x}= -0.05$) and the normality of the distribution was disrupted.

Basic simulations, allowing for yearly stochasticity within species, demonstrate how assessing the trend distribution of bird communities is a simple method for evaluating overall species richness—biodiversity—through time. If the assemblage is balanced and the ecosystem is stable, the distribution will tend toward normality and have a mean trend near zero, which can be evaluated with a one-sample t-test. In the above scenarios, for example, the mean trend in the balanced scenario was not significantly different than 0 ($P=0.90$), but the half declining scenario mean was significantly different than 0 ($P<0.001$). A mean trend significantly above or below 0 can be interpreted as increasing or decreasing biodiversity, respectively.

Appendix 2. Filtering for Robust Estimates

Credible Interval Widths

A weakness of IMBCR data is that all species are not sampled with the same precision, but there is not a standard threshold for only including robust and reliable estimates in analyses. The f-statistic is a useful metric for evaluating the direction of a trend (positive or negative), but not the magnitude of the trend. The f-statistic cannot be used to assess the precision or reliability of a species' trend magnitude because the value of the f-statistic decreases as trend estimates approach zero. The width of the credible interval (CI) directly indicates the precision of the estimate, however, and the CI is reported in IMBCR data.

I calculated the credible interval width (CIW) to determine at what point uncertainty (CIW) increased more than information added (species trend estimate) by evaluating the asymptote of the cumulative CIW curve. Using regional trend data from 2017-2024, 90% of species trends have a CIW<100. Therefore, species with a CIW>100 were excluded from analyses (Fig. 2-1).

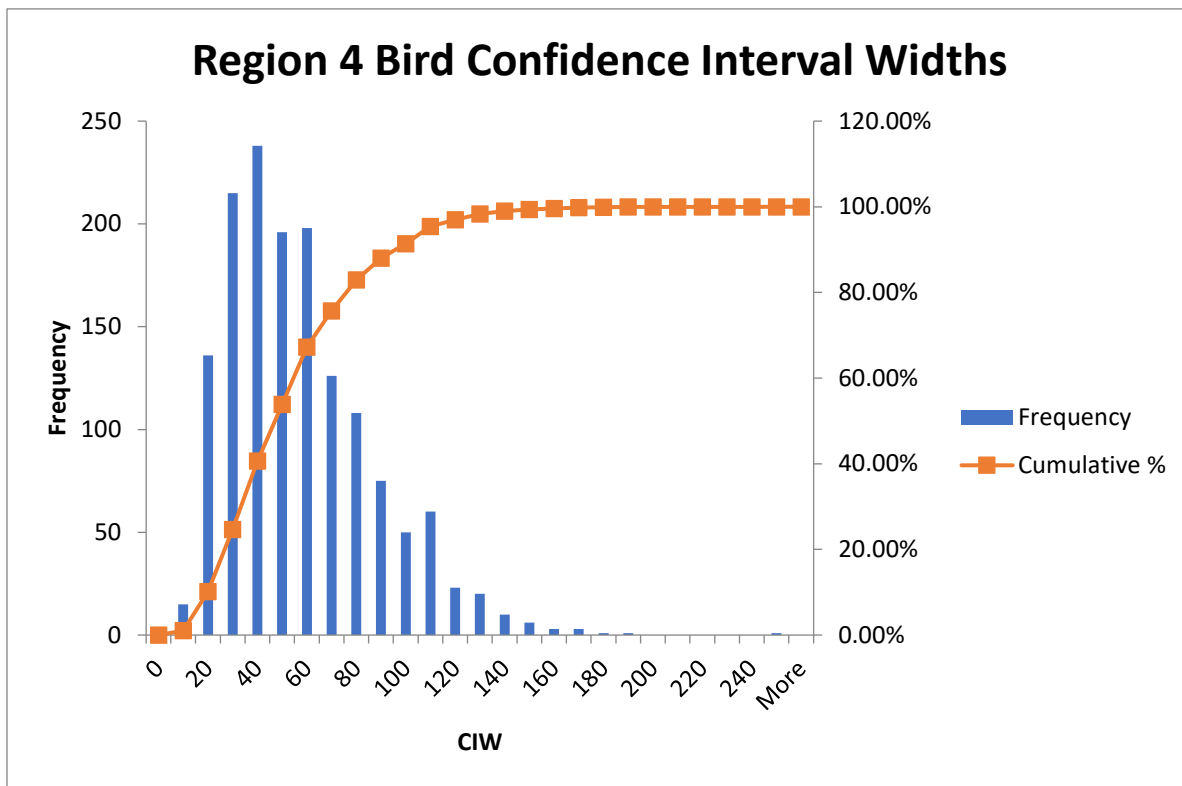


Figure 2-1. Cumulative frequency distribution for R4 species frequency by credible interval width (CIW). Above a CIW of 100, species contribute relatively more variability than trend information to analyses.

Appendix 3. Bird Density Trends by Forest

Ashley National Forest

For the Ashley National Forest, 56 species were declining and 58 were increasing; the mean trend overall was not significantly different than 0 ($\bar{x}=0.81$, $P=0.48$, $df=113$), indicating balanced and stable ecological conditions and biodiversity (Fig. Ashley 1). There were 7 species with highly significant negative trends and 2 with positive trends (Table Ashley 1) of all 114 species monitored (Table Ashley 2).

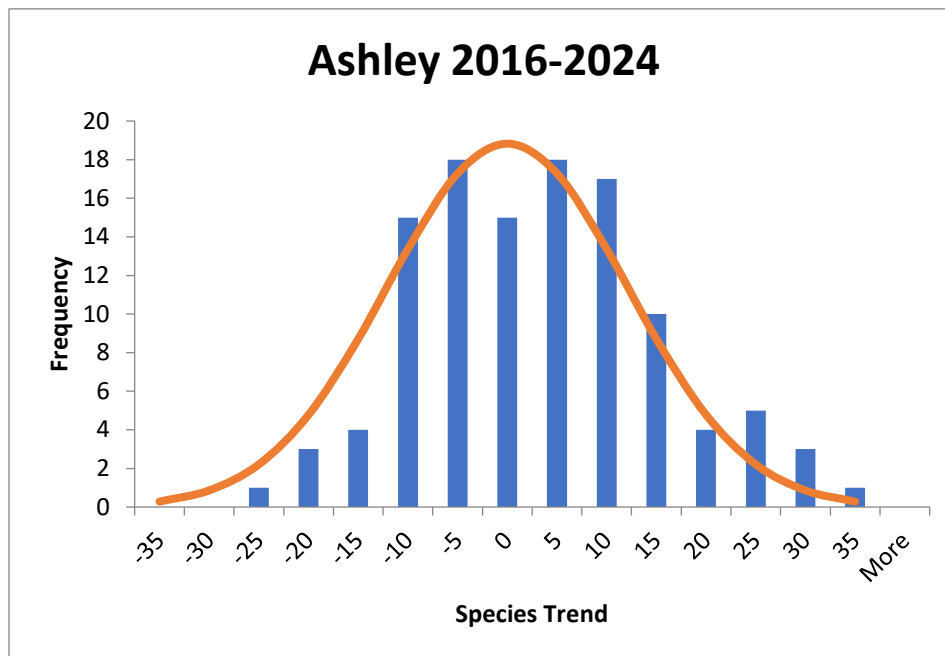


Figure Ashley 1. Bird species trend distribution on the Ashley National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table Ashley 1. Highly significant negatively and positively trending species on the Ashley National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Greater Sage-Grouse	2016-2024	-28.54	0.99	-46.71	-2.8
Lincoln's Sparrow	2016-2024	-23.53	0.98	-46.82	-1.15
Cassin's Finch	2016-2024	-17.95	0.98	-39.37	-0.6
Ruby-crowned Kinglet	2016-2024	-11.2	0.99	-21.01	-1.23
Pine Siskin	2016-2024	-10.37	0.98	-20.66	-0.85
American Robin	2016-2024	-10.03	0.98	-20.72	-0.33
Dark-eyed Junco	2016-2024	-9.59	0.99	-19.1	-1.14
<u>Positive Trend</u>					
Species	Years	Trend	F	L95CI	U95CI
Common Nighthawk	2016-2024	26.92	0.98	1.15	72.11
Spotted Towhee	2016-2024	24.96	0.98	1.19	55.16

Table Ashley 2. Estimated population change per year for birds on the Ashley National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2016-2024	13.64	0.73	-22.15	76.12
American Kestrel	2016-2024	6.02	0.73	-13.95	29.09
American Pipit	2016-2024	3.21	0.55	-34.94	62.57
American Robin	2016-2024	-10.03	0.98	-20.72	-0.33
American Three-toed Woodpecker	2017-2024	-2.79	0.60	-19.84	21.36
Ash-throated Flycatcher	2016-2024	2.40	0.58	-23.11	30.42
Bank Swallow	2016-2024	-8.63	0.63	-48.58	53.63
Barn Swallow	2016-2024	-7.76	0.71	-32.13	25.73
Bewick's Wren	2017-2024	-7.37	0.64	-36.96	36.51
Black Rosy-Finch	2017-2024	-3.82	0.57	-41.37	58.81
Black-billed Magpie	2016-2024	12.80	0.90	-6.47	36.99
Black-capped Chickadee	2017-2024	24.58	0.83	-18.93	101.61
Black-chinned Hummingbird	2016-2024	-1.86	0.55	-26.71	30.96
Black-headed Grosbeak	2016-2024	-1.22	0.54	-26.75	32.13
Black-throated Gray Warbler	2016-2024	1.19	0.54	-22.68	30.96

Species	Years	Trend	f	L95CI	U95CI
Black-throated Sparrow	2017-2024	2.09	0.53	-40.31	77.72
Blue-gray Gnatcatcher	2016-2024	5.81	0.66	-19.76	37.49
Brewer's Blackbird	2016-2024	17.97	0.90	-8.66	55.02
Brewer's Sparrow	2016-2024	13.04	0.97	-0.93	29.13
Broad-tailed Hummingbird	2016-2024	8.53	0.83	-7.62	28.87
Brown Creeper	2016-2024	-5.18	0.72	-25.25	13.41
Brown-headed Cowbird	2016-2024	28.34	0.97	-2.22	76.75
Bushtit	2017-2024	24.64	0.85	-17.81	92.30
Canada Goose	2016-2024	11.42	0.70	-22.51	69.79
Canada Jay	2016-2024	-5.85	0.71	-29.10	14.56
Canyon Wren	2017-2024	-10.99	0.76	-39.70	25.47
Cassin's Finch	2016-2024	-17.95	0.98	-39.37	-0.60
Cedar Waxwing	2016-2024	4.09	0.58	-30.85	50.35
Chipping Sparrow	2016-2024	-12.05	0.96	-24.54	2.08
Chukar	2017-2024	27.87	0.91	-11.07	75.85
Clark's Nutcracker	2016-2024	-14.79	0.98	-28.33	0.09
Cliff Swallow	2016-2024	-7.76	0.70	-29.58	22.47
Common Grackle	2017-2024	23.07	0.81	-25.43	100.01
Common Nighthawk	2016-2024	26.92	0.98	1.15	72.11
Common Raven	2016-2024	7.78	0.90	-3.88	22.61
Cooper's Hawk	2017-2024	4.79	0.65	-20.75	34.99
Dark-eyed Junco	2016-2024	-9.59	0.99	-19.10	-1.14
Downy Woodpecker	2016-2024	-17.60	0.93	-37.90	7.68
Dusky Flycatcher	2016-2024	-6.98	0.78	-26.85	11.92
Dusky Grouse	2017-2024	0.01	0.50	-31.07	28.23
Ferruginous Hawk	2016-2024	5.66	0.64	-23.99	45.74
Fox Sparrow	2017-2024	1.49	0.53	-40.39	71.21
Golden Eagle	2016-2024	1.27	0.56	-18.00	29.40
Golden-crowned Kinglet	2016-2024	-24.68	0.93	-53.16	7.87
Grasshopper Sparrow	2017-2024	-6.23	0.60	-47.53	59.50
Gray Flycatcher	2017-2024	13.24	0.80	-16.35	51.27
Gray Vireo	2017-2024	7.56	0.62	-30.84	76.51
Greater Sage-Grouse	2016-2024	-28.54	0.99	-46.71	-2.80
Green-tailed Towhee	2016-2024	-4.55	0.70	-20.36	12.79
Hairy Woodpecker	2016-2024	-11.00	0.90	-28.65	5.62
Hammond's Flycatcher	2016-2024	-17.33	0.86	-46.18	16.33
Hermit Thrush	2016-2024	-4.75	0.87	-12.88	3.64
Horned Lark	2016-2024	12.29	0.96	-1.34	29.21
House Finch	2016-2024	30.07	0.95	-6.93	81.38
House Wren	2016-2024	-5.12	0.65	-28.16	21.58
Juniper Titmouse	2017-2024	-1.32	0.53	-31.01	35.14

Species	Years	Trend	f	L95CI	U95CI
Lark Bunting	2016-2024	9.89	0.65	-30.40	71.35
Lark Sparrow	2016-2024	5.91	0.71	-12.70	27.37
Lazuli Bunting	2016-2024	-1.92	0.56	-26.22	28.83
Lesser Goldfinch	2016-2024	3.86	0.60	-24.29	38.31
Lewis's Woodpecker	2017-2024	15.23	0.79	-20.53	71.62
Lincoln's Sparrow	2016-2024	-23.53	0.98	-46.82	-1.15
Loggerhead Shrike	2016-2024	7.81	0.74	-14.78	41.32
MacGillivray's Warbler	2016-2024	4.31	0.63	-19.42	36.68
Mountain Bluebird	2016-2024	-5.35	0.77	-18.35	10.05
Mountain Chickadee	2016-2024	4.08	0.84	-3.96	12.92
Mourning Dove	2016-2024	22.07	0.97	-0.44	62.70
Northern Flicker	2016-2024	-9.36	0.92	-21.20	4.40
Northern Harrier	2016-2024	-5.26	0.64	-29.76	27.08
Northern Mockingbird	2016-2024	24.34	0.87	-17.14	90.51
Northern Saw-whet Owl	2017-2024	8.78	0.64	-33.08	74.81
Olive-sided Flycatcher	2017-2024	6.75	0.66	-22.96	45.31
Orange-crowned Warbler	2016-2024	-12.56	0.81	-38.02	15.58
Pine Grosbeak	2016-2024	-11.80	0.86	-30.62	12.13
Pine Siskin	2016-2024	-10.37	0.98	-20.66	-0.85
Pinyon Jay	2016-2024	14.88	0.86	-10.65	48.30
Plumbeous Vireo	2016-2024	-11.42	0.80	-34.01	16.73
Prairie Falcon	2017-2024	-5.31	0.63	-29.98	31.53
Pygmy Nuthatch	2017-2024	17.07	0.72	-27.82	93.72
Red Crossbill	2016-2024	-16.27	0.95	-32.37	3.04
Red-breasted Nuthatch	2016-2024	-8.59	0.82	-30.27	9.48
Red-naped Sapsucker	2016-2024	4.09	0.61	-22.43	43.15
Red-tailed Hawk	2017-2024	-2.70	0.59	-23.68	21.57
Ring-billed Gull	2016-2024	5.53	0.58	-35.16	73.39
Rock Wren	2016-2024	1.96	0.60	-10.74	16.94
Ruby-crowned Kinglet	2016-2024	-11.20	0.99	-21.01	-1.23
Ruffed Grouse	2017-2024	-2.88	0.58	-36.91	37.08
Rufous Hummingbird	2017-2024	10.26	0.69	-32.36	100.63
Sage Thrasher	2016-2024	0.60	0.53	-12.57	19.76
Sagebrush Sparrow	2016-2024	-1.65	0.58	-17.10	16.91
Sandhill Crane	2016-2024	-2.73	0.58	-28.87	34.61
Savannah Sparrow	2017-2024	8.64	0.63	-39.37	104.52
Say's Phoebe	2016-2024	5.89	0.68	-16.60	41.08
Song Sparrow	2016-2024	-4.30	0.64	-25.68	22.04
Spotted Sandpiper	2017-2024	-1.66	0.54	-37.35	52.32
Spotted Towhee	2016-2024	24.96	0.98	1.19	55.16
Steller's Jay	2016-2024	8.90	0.74	-16.14	39.57

Species	Years	Trend	f	L95CI	U95CI
Swainson's Thrush	2017-2024	64.38	0.95	-9.41	240.06
Townsend's Solitaire	2016-2024	-13.15	0.94	-29.07	3.70
Tree Swallow	2016-2024	-6.69	0.66	-32.70	26.54
Turkey Vulture	2017-2024	4.93	0.62	-22.73	42.05
Vesper Sparrow	2016-2024	7.38	0.80	-8.52	26.05
Violet-green Swallow	2016-2024	6.36	0.73	-12.97	30.45
Virginia's Warbler	2016-2024	11.23	0.81	-13.09	41.89
Warbling Vireo	2016-2024	-6.90	0.76	-23.51	11.93
Western Flycatcher	2017-2024	-13.01	0.88	-35.28	10.00
Western Meadowlark	2016-2024	17.07	0.94	-3.60	43.08
Western Tanager	2016-2024	-10.44	0.83	-30.66	10.27
Western Wood-Pewee	2016-2024	4.31	0.60	-23.83	39.74
White-breasted Nuthatch	2016-2024	2.63	0.58	-20.83	33.68
White-crowned Sparrow	2016-2024	-21.62	0.95	-46.29	4.63
White-tailed Ptarmigan	2017-2024	-10.27	0.67	-49.52	50.87
White-throated Swift	2016-2024	-10.11	0.73	-35.36	23.63
Williamson's Sapsucker	2017-2024	10.28	0.67	-31.02	66.97
Wilson's Warbler	2016-2024	-7.38	0.69	-35.21	29.78
Woodhouse's Scrub-Jay	2017-2024	9.66	0.75	-16.82	42.72
Yellow Warbler	2016-2024	-2.27	0.55	-25.93	27.97
Yellow-breasted Chat	2017-2024	15.20	0.66	-43.24	126.19

Boise National Forest

For the Boise National Forest, 52 species were declining and 48 were increasing; the mean trend overall was not significantly different than 0 ($\bar{x} = -0.42$, $P = 0.68$, $df = 99$), indicating balanced and stable ecological conditions and biodiversity (Fig. Boise 1). There were 7 species with highly significant negative trends and none with positive trends (Table Boise 1) for the 100 species monitored (Table Boise 2).

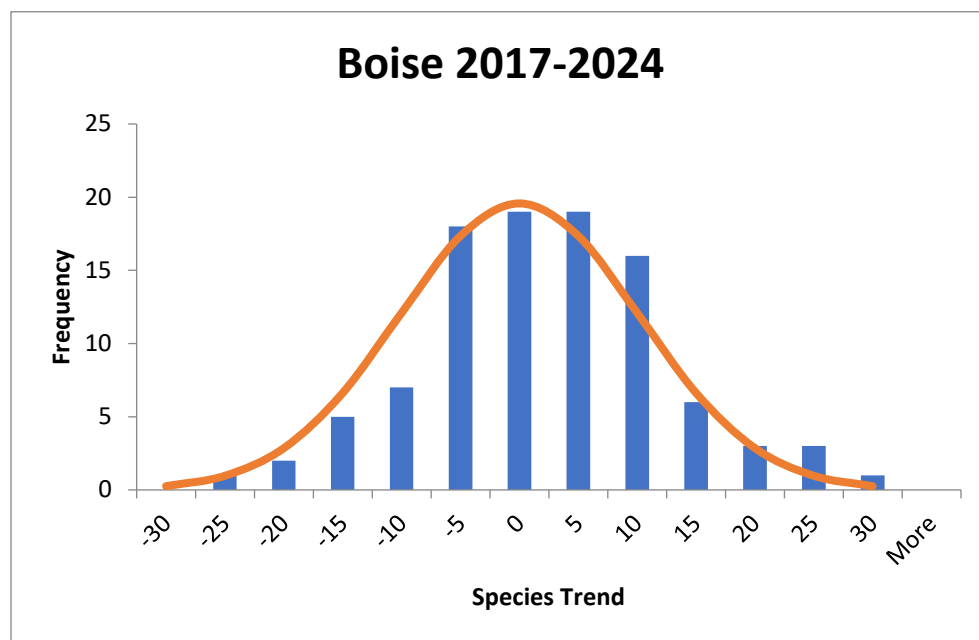


Figure Boise 1. Bird species trend distribution on the Boise National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table Boise 1. Highly significant negatively and positively trending species on the Boise National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Townsend's Warbler	2017-2024	-28.02	1.00	-39.71	-13.89
Evening Grosbeak	2017-2024	-23.88	0.98	-44.53	-0.7
Nashville Warbler	2017-2024	-18.1	0.99	-31.03	-2.7
Ruby-crowned Kinglet	2017-2024	-17.4	1.00	-27.62	-6.59
Cassin's Finch	2017-2024	-17.04	0.99	-29.65	-2.34
Cassin's Vireo	2017-2024	-15.11	0.99	-25.42	-3.99
Yellow-rumped Warbler	2017-2024	-10.08	0.99	-17.06	-3.04

Table Boise 2. Estimated population change per year for birds on the Boise National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2017-2024	10.99	0.82	-11.12	38.24
American Goldfinch	2017-2024	7.65	0.71	-19.36	49.97
American Goshawk	2017-2024	-9.57	0.71	-36.82	38.50
American Kestrel	2017-2024	1.84	0.57	-16.84	27.60
American Robin	2017-2024	1.08	0.59	-7.82	9.60
American Three-toed Woodpecker	2017-2024	-12.25	0.79	-39.06	23.87
Black-backed Woodpecker	2017-2024	23.48	0.91	-8.16	65.26
Black-billed Magpie	2017-2024	5.15	0.65	-17.52	36.40
Black-capped Chickadee	2017-2024	11.09	0.76	-16.81	52.90
Black-headed Grosbeak	2017-2024	-1.98	0.63	-13.68	10.87
Brewer's Sparrow	2017-2024	-6.82	0.76	-24.10	14.50
Brown Creeper	2017-2024	-6.24	0.74	-23.77	13.44
Brown-headed Cowbird	2017-2024	-1.05	0.54	-26.13	25.29
Bullock's Oriole	2017-2024	2.65	0.57	-21.75	35.51
California Quail	2017-2024	20.74	0.86	-14.91	76.40
Calliope Hummingbird	2017-2024	2.45	0.57	-21.22	31.98
Canada Goose	2017-2024	9.75	0.71	-22.17	56.30
Canada Jay	2017-2024	5.92	0.65	-24.52	47.12
Canyon Wren	2017-2024	-8.95	0.69	-37.89	37.02
Cassin's Finch	2017-2024	-17.04	0.99	-29.65	-2.34
Cassin's Vireo	2017-2024	-15.11	0.99	-25.42	-3.99
Cedar Waxwing	2017-2024	-5.38	0.64	-33.03	31.46
Chipping Sparrow	2017-2024	-7.74	0.96	-15.36	0.85
Chukar	2017-2024	12.35	0.80	-16.58	53.49
Clark's Nutcracker	2017-2024	-11.59	0.84	-33.25	12.87
Cliff Swallow	2017-2024	-11.08	0.69	-42.18	40.82
Common Nighthawk	2017-2024	6.66	0.67	-19.43	41.55
Common Raven	2017-2024	2.95	0.68	-9.31	16.65
Common Yellowthroat	2017-2024	-5.09	0.61	-32.46	35.34
Cooper's Hawk	2017-2024	6.75	0.69	-19.12	40.53
Dark-eyed Junco	2017-2024	-3.46	0.84	-9.92	3.58
Downy Woodpecker	2017-2024	3.02	0.58	-27.50	52.64
Dusky Flycatcher	2017-2024	-5.92	0.90	-15.42	3.55
Dusky Grouse	2017-2024	4.72	0.68	-18.48	27.72
Eastern Kingbird	2017-2024	8.57	0.67	-28.33	65.35
Evening Grosbeak	2017-2024	-23.88	0.98	-44.53	-0.70
Fox Sparrow	2017-2024	-3.73	0.64	-22.30	18.90

Species	Years	Trend	f	L95CI	U95CI
Golden-crowned Kinglet	2017-2024	18.23	0.86	-12.66	63.77
Grasshopper Sparrow	2017-2024	-13.10	0.70	-50.01	50.34
Green-tailed Towhee	2017-2024	4.98	0.59	-29.91	61.84
Hairy Woodpecker	2017-2024	-2.03	0.62	-14.95	11.52
Hammond's Flycatcher	2017-2024	5.50	0.78	-8.93	25.21
Hermit Thrush	2017-2024	-9.28	0.94	-20.79	1.97
House Wren	2017-2024	-0.64	0.53	-15.19	16.37
Lark Sparrow	2017-2024	0.64	0.52	-23.57	32.56
Lazuli Bunting	2017-2024	1.36	0.56	-12.93	17.34
Lesser Goldfinch	2017-2024	12.52	0.72	-25.10	69.84
Lewis's Woodpecker	2017-2024	12.96	0.84	-12.39	47.70
MacGillivray's Warbler	2017-2024	-0.99	0.58	-12.05	10.04
Mountain Bluebird	2017-2024	-0.97	0.55	-16.82	16.78
Mountain Chickadee	2017-2024	2.63	0.68	-8.21	14.48
Mourning Dove	2017-2024	2.98	0.66	-12.00	21.87
Nashville Warbler	2017-2024	-18.10	0.99	-31.03	-2.70
Northern Flicker	2017-2024	0.39	0.53	-10.69	12.56
Northern Harrier	2017-2024	-4.96	0.62	-32.99	39.45
Northern Pygmy-Owl	2017-2024	-5.83	0.62	-36.42	45.12
Olive-sided Flycatcher	2017-2024	-0.20	0.51	-15.75	17.72
Orange-crowned Warbler	2017-2024	-6.84	0.78	-24.95	12.54
Osprey	2017-2024	8.60	0.72	-18.02	50.00
Pacific Wren	2017-2024	-2.45	0.55	-41.12	58.29
Pileated Woodpecker	2017-2024	7.22	0.71	-17.02	43.45
Pine Siskin	2017-2024	-9.33	0.93	-19.64	2.49
Prairie Falcon	2017-2024	-9.58	0.75	-36.33	21.25
Red Crossbill	2017-2024	11.84	0.88	-7.24	34.71
Red-breasted Nuthatch	2017-2024	0.49	0.54	-9.46	11.77
Red-eyed Vireo	2017-2024	25.49	0.91	-9.75	86.84
Red-naped Sapsucker	2017-2024	-6.31	0.68	-28.61	19.57
Red-tailed Hawk	2017-2024	-2.57	0.61	-17.92	15.76
Red-winged Blackbird	2017-2024	-2.72	0.57	-25.92	32.65
Rock Wren	2017-2024	-5.28	0.70	-23.62	17.44
Ruby-crowned Kinglet	2017-2024	-17.40	1.00	-27.62	-6.59
Ruffed Grouse	2017-2024	-1.57	0.53	-25.81	34.48
Sage Thrasher	2017-2024	-2.16	0.54	-43.75	53.11
Sandhill Crane	2017-2024	7.64	0.64	-27.39	60.71
Sharp-shinned Hawk	2017-2024	-7.37	0.69	-33.41	31.98
Song Sparrow	2017-2024	17.35	0.94	-5.15	43.04
Spotted Sandpiper	2017-2024	-13.19	0.81	-36.42	17.15
Spotted Towhee	2017-2024	-12.20	0.95	-24.21	2.18

Species	Years	Trend	f	L95CI	U95CI
Spruce Grouse	2017-2024	-5.64	0.65	-42.25	48.02
Steller's Jay	2017-2024	15.84	0.84	-14.79	63.80
Swainson's Thrush	2017-2024	9.75	0.95	-1.95	22.90
Townsend's Solitaire	2017-2024	-1.81	0.58	-15.78	15.55
Townsend's Warbler	2017-2024	-28.02	1.00	-39.71	-13.89
Tree Swallow	2017-2024	23.27	0.85	-16.26	81.45
Turkey Vulture	2017-2024	0.23	0.50	-21.62	31.92
Varied Thrush	2017-2024	-22.60	0.87	-51.51	24.94
Veery	2017-2024	8.55	0.66	-31.26	67.65
Vesper Sparrow	2017-2024	5.76	0.66	-22.65	47.33
Violet-green Swallow	2017-2024	0.99	0.53	-23.18	30.92
Warbling Vireo	2017-2024	0.97	0.58	-8.26	10.96
Western Flycatcher	2017-2024	-2.12	0.55	-32.17	36.75
Western Tanager	2017-2024	-2.19	0.70	-9.46	5.83
Western Wood-Pewee	2017-2024	6.86	0.69	-16.60	41.04
White-breasted Nuthatch	2017-2024	5.63	0.69	-15.44	34.34
White-crowned Sparrow	2017-2024	1.66	0.54	-22.82	33.53
Wilson's Snipe	2017-2024	-17.62	0.77	-52.35	35.15
Wilson's Warbler	2017-2024	-6.47	0.64	-39.16	44.34
Yellow Warbler	2017-2024	-4.27	0.74	-16.47	8.91
Yellow-breasted Chat	2017-2024	2.72	0.57	-20.63	36.07
Yellow-rumped Warbler	2017-2024	-10.08	1.00	-17.06	-3.04

Bridger-Teton National Forest

For the Bridger National Forest, 40 species were declining and 87 were increasing; the mean trend overall was significantly greater than 0 ($\bar{x} = 2.90$, $P < 0.001$, $df = 126$), indicating that biodiversity is increasing under current ecological conditions (Fig. BT 1). There were no species with highly significant negative trends and 4 highly significant positive trends (Table BT 1) for the 127 species monitored (Table BT 2).

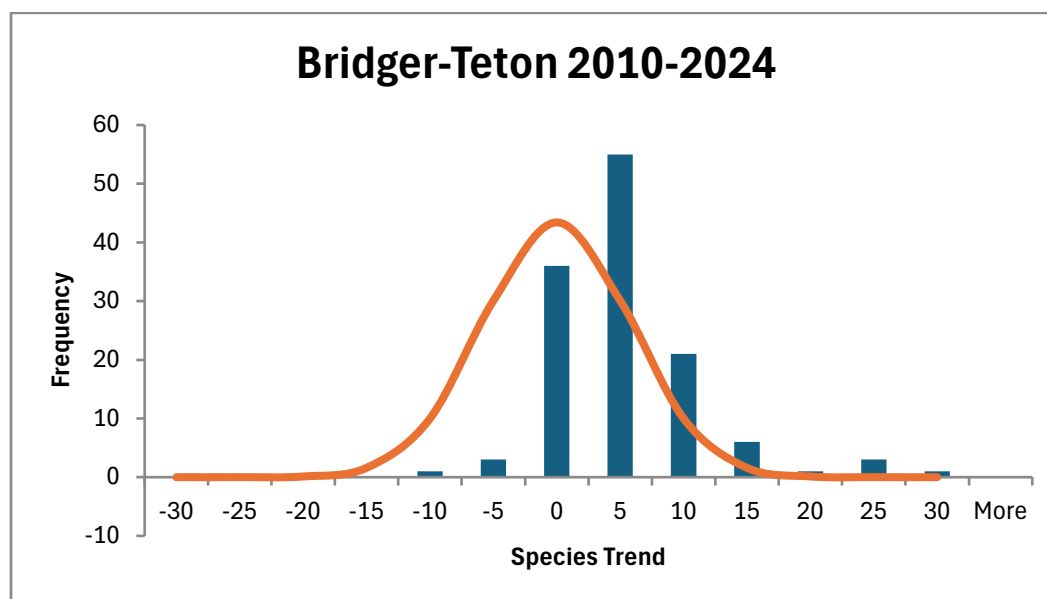


Figure BT 1. Bird species trend distribution on the Bridger-Teton National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table BT 1. Highly significant positively trending species on the Bridger-Teton National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Fox Sparrow	2010-2024	25.73	1.00	7.61	55.09
Eurasian Collared-Dove	2010-2024	23.62	0.99	2.19	50.97
Pinyon Jay	2010-2024	20.64	0.99	1.85	48.04
Olive-sided Flycatcher	2010-2024	9.50	0.99	0.77	19.17

Table BT 2. Estimated population change per year for birds on the Bridger-Teton National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2010-2024	3.63	0.68	-9.72	19.97
American Dipper	2010-2024	-1.36	0.57	-15.98	14.52
American Goldfinch	2010-2024	3.39	0.69	-9.54	18.96
American Goshawk	2010-2024	-1.8	0.59	-14.78	15.79
American Kestrel	2010-2024	-2.76	0.70	-13.06	8.54
American Pipit	2010-2024	-4.27	0.71	-18.4	13.78
American Robin	2010-2024	-0.74	0.63	-4.73	3.45
American Three-toed Woodpecker	2010-2024	-6.48	0.87	-17.47	5.33
American White Pelican	2010-2024	-0.47	0.52	-16.97	19.87
Bald Eagle	2010-2024	0.23	0.51	-16.57	19.64
Belted Kingfisher	2010-2024	4.58	0.74	-11.14	21.93
Black Rosy-Finch	2010-2024	-10.73	0.92	-27.09	5.78
Black-backed Woodpecker	2010-2024	6.62	0.85	-5.68	19.63
Black-billed Magpie	2010-2024	5.82	0.78	-9.37	23.93
Black-capped Chickadee	2010-2024	-3.64	0.71	-15.65	10.17
Black-headed Grosbeak	2010-2024	1.61	0.63	-7.53	12.25
Black-throated Gray Warbler	2010-2024	22.8	0.97	-0.83	56.84
Blue-gray Gnatcatcher	2010-2024	12.37	0.91	-6.12	35.94
Blue-winged Teal	2010-2024	1.31	0.57	-14.54	22.88
Brewer's Blackbird	2010-2024	8.7	0.94	-2.55	21.37
Brewer's Sparrow	2010-2024	2.85	0.70	-6.7	13.65
Broad-tailed Hummingbird	2010-2024	-0.64	0.55	-10.26	9.16
Brown Creeper	2010-2024	-4.75	0.89	-11.97	3.36
Brown-headed Cowbird	2010-2024	0.11	0.51	-12.53	14.43
Bullock's Oriole	2010-2024	0.88	0.54	-14.74	19.01
Calliope Hummingbird	2010-2024	-3.19	0.68	-15.59	10.79
Canada Goose	2010-2024	4.89	0.70	-13.26	28.56
Canada Jay	2010-2024	-1.17	0.59	-9.15	7.03
Cassin's Finch	2010-2024	2.05	0.66	-6.99	11.28
Cedar Waxwing	2010-2024	5.73	0.79	-7.83	20.42
Chipping Sparrow	2010-2024	-4.69	0.94	-9.9	1.48
Clark's Nutcracker	2010-2024	-0.4	0.55	-6.43	5.34
Cliff Swallow	2010-2024	1.37	0.58	-12.28	17.93
Common Grackle	2010-2024	8.65	0.77	-12.44	36.03
Common Merganser	2010-2024	3.6	0.68	-11.32	22.4
Common Nighthawk	2010-2024	8.12	0.96	-0.78	18.07

Species	Years	Trend	f	L95CI	U95CI
Common Poorwill	2010-2024	11.28	0.93	-5.19	29.74
Common Raven	2010-2024	1.89	0.67	-5.96	11.07
Common Yellowthroat	2010-2024	-4.37	0.67	-20.47	15.95
Cooper's Hawk	2010-2024	4.52	0.80	-6.53	17.13
Dark-eyed Junco	2010-2024	2.72	0.84	-2.32	7.74
Downy Woodpecker	2010-2024	-3.12	0.69	-13.44	8.8
Dusky Flycatcher	2010-2024	-1.4	0.68	-7.74	4.64
Dusky Grouse	2010-2024	2.63	0.70	-6.59	14.29
Eurasian Collared-Dove	2010-2024	23.62	0.99	2.19	50.97
European Starling	2010-2024	14	0.91	-5.37	36.78
Evening Grosbeak	2010-2024	1.41	0.55	-17.36	22.02
Fox Sparrow	2010-2024	25.73	1.00	7.61	55.09
Golden Eagle	2010-2024	4.44	0.78	-6.36	19.38
Golden-crowned Kinglet	2010-2024	-2.49	0.64	-15.9	12.55
Gray Catbird	2010-2024	1.96	0.59	-14.96	20.38
Great Blue Heron	2010-2024	3.82	0.69	-11.35	23.91
Green-tailed Towhee	2010-2024	7.22	0.95	-1.12	15.84
Hairy Woodpecker	2010-2024	-2.64	0.79	-8.93	3.78
Hammond's Flycatcher	2010-2024	0.29	0.52	-10.78	15.9
Hermit Thrush	2010-2024	-0.43	0.55	-5.89	5.8
Horned Lark	2010-2024	8.73	0.91	-4.02	23.55
House Finch	2010-2024	11.8	0.88	-8.33	34.3
House Wren	2010-2024	0.64	0.57	-7.47	9.79
Killdeer	2010-2024	1.39	0.59	-11.91	14.81
Lark Sparrow	2010-2024	1.38	0.57	-10.72	16.54
Lazuli Bunting	2010-2024	4.99	0.83	-4.59	16.31
Least Flycatcher	2010-2024	-5.3	0.73	-22.97	13.58
Lincoln's Sparrow	2010-2024	-0.16	0.52	-7.41	6.87
Long-billed Curlew	2010-2024	8.93	0.80	-12.7	35.59
MacGillivray's Warbler	2010-2024	6.15	0.91	-2.92	16.31
Mallard	2010-2024	2.11	0.60	-11.58	18.33
Merlin	2010-2024	2.05	0.60	-13.4	22
Mountain Bluebird	2010-2024	-3.15	0.78	-10.15	4.78
Mountain Chickadee	2010-2024	0.92	0.66	-3.58	5.51
Mourning Dove	2010-2024	5.28	0.78	-6.89	19.84
Nashville Warbler	2010-2024	0.81	0.54	-17.17	21.8
Northern Flicker	2010-2024	0.93	0.61	-5.19	8.39
Northern Harrier	2010-2024	1.59	0.59	-10.32	17.67
Northern Pygmy-Owl	2010-2024	4.81	0.80	-7.66	19.24
Northern Rough-winged Swallow	2010-2024	7.61	0.83	-8.95	29.5
Northern Waterthrush	2010-2024	2.44	0.61	-15.16	24.85

Species	Years	Trend	f	L95CI	U95CI
Olive-sided Flycatcher	2010-2024	9.5	0.99	0.77	19.17
Orange-crowned Warbler	2010-2024	1.34	0.58	-11.86	17.07
Osprey	2010-2024	-0.55	0.53	-15.21	15.12
Pacific Wren	2010-2024	-0.99	0.53	-22.3	24.66
Peregrine Falcon	2010-2024	4.17	0.69	-10.05	20.46
Pine Grosbeak	2010-2024	-2.77	0.75	-11.16	5.61
Pine Siskin	2010-2024	4.77	0.94	-1.34	11.64
Pinyon Jay	2010-2024	20.64	0.99	1.85	48.04
Plumbeous Vireo	2010-2024	4.35	0.67	-13.14	24.9
Red Crossbill	2010-2024	4.81	0.88	-3.41	13.92
Red-breasted Nuthatch	2010-2024	-1.95	0.73	-8.14	4.32
Red-naped Sapsucker	2010-2024	-0.21	0.52	-7.22	8.19
Red-tailed Hawk	2010-2024	-2.92	0.78	-10.1	4.29
Red-winged Blackbird	2010-2024	10.35	0.88	-6.54	30.54
Rock Pigeon	2010-2024	2.66	0.63	-14.67	25.27
Rock Wren	2010-2024	4.06	0.81	-5.28	13.69
Ruby-crowned Kinglet	2010-2024	-0.84	0.62	-5.82	4.96
Ruffed Grouse	2010-2024	8.49	0.84	-7.5	29.65
Rufous Hummingbird	2010-2024	-2.94	0.69	-14	11.95
Sage Thrasher	2010-2024	16.26	0.93	-4.96	39.37
Sandhill Crane	2010-2024	6.18	0.79	-7.55	25.05
Savannah Sparrow	2010-2024	3.76	0.69	-10.27	19.63
Say's Phoebe	2010-2024	5.89	0.82	-5.9	21.17
Sharp-shinned Hawk	2010-2024	-1.8	0.62	-13.92	11.72
Song Sparrow	2010-2024	10.64	0.97	-0.1	23.3
Spotted Sandpiper	2010-2024	-3.5	0.72	-15.28	9.23
Spotted Towhee	2010-2024	8.78	0.89	-4.6	24.59
Steller's Jay	2010-2024	-1.08	0.58	-11.54	10.96
Swainson's Hawk	2010-2024	2.78	0.69	-7.34	16.37
Swainson's Thrush	2010-2024	4.34	0.74	-7.73	20.02
Townsend's Solitaire	2010-2024	-4.82	0.84	-14.41	5.24
Tree Swallow	2010-2024	-1.8	0.65	-11.69	8.76
Turkey Vulture	2010-2024	2.23	0.62	-9.64	16.99
Vesper Sparrow	2010-2024	3.12	0.78	-4.54	12.21
Violet-green Swallow	2010-2024	-5.92	0.85	-16.35	5.19
Warbling Vireo	2010-2024	3.43	0.86	-3.16	10.54
Western Flycatcher	2010-2024	3.62	0.75	-6.78	15.02
Western Kingbird	2010-2024	-0.29	0.51	-14.98	18.44
Western Meadowlark	2010-2024	7.2	0.76	-11.8	32.29
Western Tanager	2010-2024	1.71	0.69	-5.22	9.79
Western Wood-Pewee	2010-2024	3.93	0.81	-4.14	13.28

Species	Years	Trend	f	L95CI	U95CI
White-breasted Nuthatch	2010-2024	0.41	0.53	-10.37	11.67
White-crowned Sparrow	2010-2024	4.15	0.87	-3.3	11.88
White-winged Crossbill	2010-2024	6.16	0.78	-8.93	24.16
Williamson's Sapsucker	2010-2024	0.68	0.54	-11.9	14.6
Willow Flycatcher	2010-2024	4.22	0.70	-10.63	20.9
Wilson's Snipe	2010-2024	6.06	0.83	-5.91	22.84
Wilson's Warbler	2010-2024	1.34	0.60	-7.6	11.92
Yellow Warbler	2010-2024	5.72	0.91	-2.71	14.45
Yellow-rumped Warbler	2010-2024	-4.23	0.96	-8.41	0.53

Caribou-Targhee National Forest

For the Caribou-Targhee National Forest, 60 species were declining and 91 were increasing; the mean trend overall was significantly greater than 0 ($\bar{x} = 2.99$, $P < 0.001$, $df = 150$), indicating that biodiversity is increasing under current ecological conditions (Fig. CT 1). There were 7 species with highly significant negative trends and 4 with positive trends (Table CT 1) of the 151 species monitored (Table CT 2).

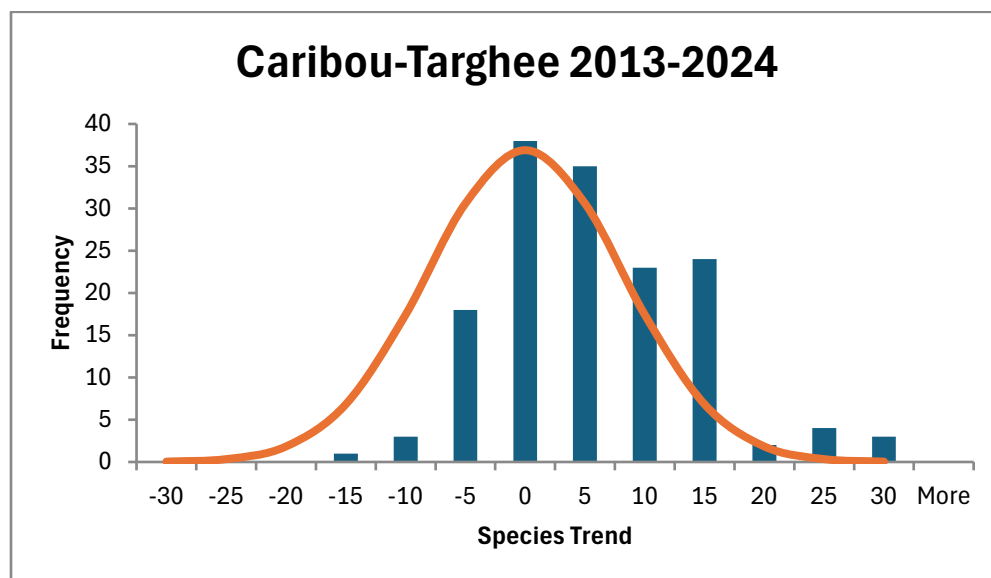


Fig. CT 1. Bird species trend distribution on the Caribou-Targhee National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table CT 1. Highly significant negatively and positively trending species on the Caribou-Targhee National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Orange-crowned Warbler	2013-2024	-11.31	0.99	-19.64	-2.47
Black-capped Chickadee	2013-2024	-10.04	0.99	-17.46	-1.63
American Robin	2013-2024	-7.27	1.00	-11.66	-2.17
Dark-eyed Junco	2013-2024	-5.5	1.00	-9.4	-1.34
Northern Flicker	2013-2024	-5.43	0.99	-10.42	-0.54
Dusky Flycatcher	2013-2024	-5.17	0.98	-10.53	-0.07
Chipping Sparrow	2013-2024	-4.93	0.98	-8.83	-0.2

<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Cliff Swallow	2013-2024	28.81	1.00	9.57	53.87
European Starling	2013-2024	26.36	0.99	3.06	55.41
Common Nighthawk	2013-2024	11.54	1.00	2.07	22.34
Western Meadowlark	2013-2024	10.64	0.98	0.28	22.03

Table CT 2. Estimated population change per year for birds on the Caribou-Targhee National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2013-2024	5.05	0.81	-5.43	16.28
American Goldfinch	2013-2024	-4.59	0.77	-16.33	7.18
American Goshawk	2013-2024	-2.5	0.63	-18.41	15.21
American Kestrel	2013-2024	-3.16	0.77	-10.96	4.94
American Robin	2013-2024	-7.27	1.00	-11.66	-2.17
American Three-toed Woodpecker	2013-2024	0.55	0.53	-11.55	14.05
American White Pelican	2013-2024	1.53	0.55	-20.98	32.47
Ash-throated Flycatcher	2013-2024	7.16	0.77	-11.67	31.81
Bald Eagle	2013-2024	15.48	0.89	-8.02	46.83
Bank Swallow	2013-2024	-2.88	0.58	-32.46	29.83
Barn Swallow	2013-2024	6.6	0.74	-13.05	29.15
Belted Kingfisher	2013-2024	8.76	0.79	-12.63	37.12
Black-billed Magpie	2013-2024	-5.54	0.86	-15.33	4.89
Black-capped Chickadee	2013-2024	-10.04	0.99	-17.46	-1.63
Black-chinned Hummingbird	2013-2024	4.51	0.70	-11	22.62
Black-headed Grosbeak	2013-2024	3.83	0.84	-3.35	11.58
Black-throated Gray Warbler	2013-2024	10.97	0.93	-4.09	26.01
Black-throated Sparrow	2013-2024	24.82	0.95	-4.33	66.86
Blue Grosbeak	2013-2024	8.02	0.67	-24.41	59.78
Blue Jay	2013-2024	12.12	0.77	-19.35	57.98
Blue-gray Gnatcatcher	2013-2024	12.41	0.95	-3.82	30.76
Brewer's Blackbird	2013-2024	-7.52	0.80	-22.79	9.98
Brewer's Sparrow	2013-2024	-0.2	0.51	-9.93	8.25
Broad-tailed Hummingbird	2013-2024	0.35	0.53	-8.27	10.9
Brown Creeper	2013-2024	-1.69	0.67	-8.52	6.13
Brown-headed Cowbird	2013-2024	-6.21	0.95	-13.36	1.27
Bullock's Oriole	2013-2024	2.68	0.60	-15.28	22.58
Calliope Hummingbird	2013-2024	-1.03	0.55	-16.17	17.28
Canada Goose	2013-2024	-2.49	0.62	-18.28	15.38

Species	Years	Trend	f	L95CI	U95CI
Canada Jay	2013-2024	1.61	0.63	-7.33	11.1
Canyon Wren	2013-2024	0.14	0.51	-16.03	18.25
Cassin's Finch	2013-2024	-7.07	0.96	-14.29	0.88
Cedar Waxwing	2013-2024	0.72	0.55	-10.8	14.72
Chipping Sparrow	2013-2024	-4.93	0.98	-8.83	-0.2
Chukar	2013-2024	12.52	0.88	-6.57	33.22
Clark's Nutcracker	2013-2024	-7.07	0.97	-14.09	0.5
Cliff Swallow	2013-2024	28.81	1.00	9.57	53.87
Common Grackle	2013-2024	24.52	0.92	-7.98	69.45
Common Nighthawk	2013-2024	11.54	1.00	2.07	22.34
Common Poorwill	2013-2024	8.28	0.90	-5.24	23.33
Common Raven	2013-2024	1.38	0.68	-3.95	6.93
Common Yellowthroat	2013-2024	12.14	0.83	-10.85	40.78
Cooper's Hawk	2013-2024	1.95	0.63	-12.35	18.07
Dark-eyed Junco	2013-2024	-5.5	1.00	-9.4	-1.34
Downy Woodpecker	2013-2024	-0.66	0.54	-13.57	13.77
Dusky Flycatcher	2013-2024	-5.17	0.98	-10.53	-0.07
Dusky Grouse	2013-2024	-3.77	0.78	-12.64	6.94
Eurasian Collared-Dove	2013-2024	14.39	0.92	-4.87	38.97
European Starling	2013-2024	26.36	0.99	3.06	55.41
Evening Grosbeak	2013-2024	-1.29	0.56	-15.74	16.46
Fox Sparrow	2013-2024	5.06	0.72	-10	22.68
Franklin's Gull	2013-2024	5.05	0.71	-12.98	26.32
Golden Eagle	2013-2024	1.88	0.62	-9.89	13.35
Golden-crowned Kinglet	2013-2024	-5.75	0.80	-18.26	8.71
Grasshopper Sparrow	2013-2024	12.71	0.87	-8.49	36.53
Gray Catbird	2013-2024	5.34	0.76	-9.64	19.84
Gray Flycatcher	2013-2024	13.19	0.88	-6.9	39.19
Great Blue Heron	2013-2024	13.84	0.90	-7.83	45.91
Great Horned Owl	2013-2024	5.39	0.82	-5.6	18.86
Greater Sage-Grouse	2013-2024	-5.37	0.73	-23.48	18.27
Green-tailed Towhee	2013-2024	-1.46	0.68	-7.69	5.45
Hairy Woodpecker	2013-2024	0.44	0.55	-6.46	7.48
Hammond's Flycatcher	2013-2024	3.81	0.81	-4.85	12.36
Hermit Thrush	2013-2024	-3.61	0.93	-8.47	1.36
Horned Lark	2013-2024	12.02	0.95	-2.19	28.22
House Finch	2013-2024	10.47	0.93	-3.93	28.36
House Wren	2013-2024	2.19	0.70	-5.89	11.05
Juniper Titmouse	2013-2024	10.83	0.82	-12.03	34.68
Killdeer	2013-2024	11.99	0.87	-8.18	33.98
Lark Sparrow	2013-2024	12.46	0.96	-1.07	29.31

Species	Years	Trend	f	L95CI	U95CI
Lazuli Bunting	2013-2024	-7.42	0.96	-14.84	0.8
Least Flycatcher	2013-2024	-3.79	0.69	-18.23	12.51
Lesser Goldfinch	2013-2024	11.21	0.80	-14.09	45.92
Lesser Scaup	2013-2024	11.43	0.80	-12.83	45.9
Lincoln's Sparrow	2013-2024	-3.21	0.78	-11.8	4.93
MacGillivray's Warbler	2013-2024	-1.5	0.68	-8.19	4.9
Mallard	2013-2024	8.51	0.84	-9.26	29.19
Marsh Wren	2013-2024	-5.5	0.66	-32.51	26.69
Merlin	2013-2024	3.67	0.62	-18.53	30.61
Mountain Bluebird	2013-2024	-4.25	0.84	-11.84	3.92
Mountain Chickadee	2013-2024	-2.99	0.89	-7.52	1.56
Mourning Dove	2013-2024	-1.05	0.63	-7.32	6.17
Northern Flicker	2013-2024	-5.43	0.99	-10.42	-0.54
Northern Harrier	2013-2024	2.2	0.62	-10.67	19.01
Northern Pygmy-Owl	2013-2024	-3.11	0.65	-17.62	12.85
Northern Rough-winged Swallow	2013-2024	3.65	0.70	-9.05	18.84
Northern Saw-whet Owl	2013-2024	15.55	0.89	-7.87	47.91
Northern Waterthrush	2013-2024	-6.86	0.73	-28.58	19.87
Olive-sided Flycatcher	2013-2024	6.18	0.92	-2.19	14.97
Orange-crowned Warbler	2013-2024	-11.31	0.99	-19.64	-2.47
Osprey	2013-2024	10.26	0.84	-10.32	38.1
Ovenbird	2013-2024	9.94	0.80	-11.96	38.09
Pacific Wren	2013-2024	-10.93	0.76	-35.45	23.04
Peregrine Falcon	2013-2024	1.39	0.56	-17.06	21.35
Pine Grosbeak	2013-2024	-3.83	0.75	-13.98	7.13
Pine Siskin	2013-2024	3.08	0.89	-1.73	7.58
Plumbeous Vireo	2013-2024	1.78	0.61	-9.51	15.42
Prairie Falcon	2013-2024	-0.76	0.54	-15.15	16.13
Pygmy Nuthatch	2013-2024	2.83	0.62	-14.59	25.49
Red Crossbill	2013-2024	0.51	0.55	-7.09	9.29
Red-breasted Nuthatch	2013-2024	-3.83	0.94	-8.55	0.94
Red-eyed Vireo	2013-2024	22.26	0.92	-8.81	63.26
Red-naped Sapsucker	2013-2024	-3.61	0.79	-11.99	4.54
Red-tailed Hawk	2013-2024	5.09	0.91	-2.44	13.66
Red-winged Blackbird	2013-2024	8.85	0.84	-8.1	30.13
Ring-billed Gull	2013-2024	8.39	0.74	-16.96	39.6
Ring-necked Pheasant	2013-2024	0.5	0.52	-23.32	27.18
Rock Pigeon	2013-2024	-15.91	0.97	-31.08	0.37
Rock Wren	2013-2024	5.08	0.90	-2.58	12.28
Ruby-crowned Kinglet	2013-2024	-4.56	0.97	-9.29	0.31
Ruffed Grouse	2013-2024	-3.8	0.79	-12.77	6.48

Species	Years	Trend	f	L95CI	U95CI
Rufous-crowned Sparrow	2013-2024	-0.62	0.51	-27.36	35.82
Sage Thrasher	2013-2024	11.67	0.90	-5.81	30.36
Sagebrush Sparrow	2013-2024	7.83	0.75	-14.76	37.22
Sandhill Crane	2013-2024	-7.96	0.93	-17.99	2.81
Savannah Sparrow	2013-2024	0.61	0.52	-24.83	32.82
Say's Phoebe	2013-2024	12.07	0.90	-5.06	32.77
Sharp-shinned Hawk	2013-2024	-4.86	0.81	-15.78	5.91
Song Sparrow	2013-2024	1.75	0.60	-8.99	13.05
Spotted Sandpiper	2013-2024	-9.95	0.87	-28.2	8.31
Spotted Towhee	2013-2024	1.26	0.61	-8.7	12.23
Steller's Jay	2013-2024	2.9	0.72	-6.12	13.97
Swainson's Thrush	2013-2024	4.14	0.84	-4.12	12.76
Townsend's Solitaire	2013-2024	-7.36	0.96	-15.09	1.18
Tree Swallow	2013-2024	-0.57	0.54	-11.33	12.1
Turkey Vulture	2013-2024	0.3	0.51	-9.84	11.81
Veery	2013-2024	10.38	0.89	-7.4	31.95
Vesper Sparrow	2013-2024	0.07	0.51	-7.57	7.89
Violet-green Swallow	2013-2024	3.34	0.71	-7.61	14.92
Virginia's Warbler	2013-2024	10.94	0.92	-4.51	27.49
Warbling Vireo	2013-2024	-2.25	0.81	-7.32	2.83
Western Bluebird	2013-2024	7.98	0.66	-24.27	51.41
Western Flycatcher	2013-2024	-0.16	0.51	-10.94	11.65
Western Kingbird	2013-2024	11.14	0.91	-5.12	29.68
Western Meadowlark	2013-2024	10.64	0.98	0.28	22.03
Western Tanager	2013-2024	0.97	0.65	-3.68	5.62
Western Wood-Pewee	2013-2024	4.48	0.82	-5.21	15.9
White-breasted Nuthatch	2013-2024	-0.62	0.54	-13.1	13.23
White-crowned Sparrow	2013-2024	-3.81	0.81	-11.9	5.12
White-throated Swift	2013-2024	5.4	0.76	-9.15	23.64
White-winged Crossbill	2013-2024	26.53	0.97	-2.95	61.19
Wild Turkey	2013-2024	7.78	0.77	-12.15	27.53
Williamson's Sapsucker	2013-2024	-0.77	0.57	-11.02	9.66
Willow Flycatcher	2013-2024	5.9	0.73	-13.7	28.79
Wilson's Snipe	2013-2024	-0.15	0.51	-25.51	33.74
Wilson's Warbler	2013-2024	-8.36	0.91	-19.12	3.98
Wood Duck	2013-2024	5.36	0.67	-19.01	42.44
Woodhouse's Scrub-Jay	2013-2024	1.28	0.55	-20.2	26.03
Yellow Warbler	2013-2024	-1.5	0.63	-10.44	7.42
Yellow-breasted Chat	2013-2024	21.73	0.88	-11.02	69.31
Yellow-rumped Warbler	2013-2024	-3.41	0.92	-7.74	1.47

Curlew National Grassland

For the Curlew National Grassland, 45 species were declining and 20 were increasing; the mean trend overall was significantly less than 0 ($\bar{x} = -2.96$, $P=0.02$, $df=64$), indicating that species biodiversity is decreasing under current ecological conditions (Fig. Curlew 1). There were 3 species with highly significant negative trends and none with positive trends (Table Curlew 1) of the 65 species monitored (Table Curlew 2).

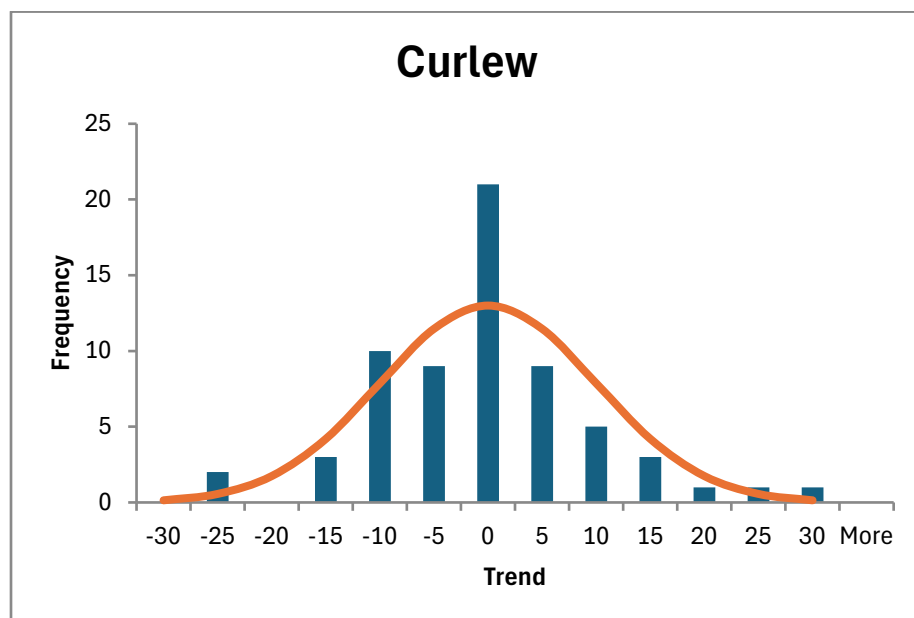


Figure Curlew 1. Bird species trend distribution on the Curlew National Grassland. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table Curlew 1. Highly significant negatively trending species on the Dixie National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Swainson's Hawk	2017-2024	-19.54	0.98	-35.35	-2.1
Common Raven	2017-2024	-12.86	0.98	-24.57	-0.88
Vesper Sparrow	2017-2024	-12.03	0.98	-21.12	-0.13

Curlew 2. Estimated population change per year for birds on the Curlew National Grassland. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Goldfinch	2017-2024	-18.18	0.83	-50.51	22.62
American Kestrel	2017-2024	-4.33	0.64	-23.6	21.71
American Robin	2017-2024	-10.82	0.79	-36.62	19.85
Barn Swallow	2017-2024	-16.78	0.90	-40.47	11.37
Black-billed Magpie	2017-2024	-12.73	0.90	-32.02	7.29
Blue-gray Gnatcatcher	2017-2024	10.24	0.70	-22.75	53.3
Brewer's Blackbird	2017-2024	4.7	0.67	-14.5	27.24
Brewer's Sparrow	2017-2024	-2.86	0.72	-11.91	7.32
Broad-tailed Hummingbird	2017-2024	2.47	0.54	-31.97	65.28
Brown-headed Cowbird	2017-2024	-3.71	0.69	-19.42	13.38
Bullock's Oriole	2017-2024	-4.82	0.58	-35.04	42.26
Burrowing Owl	2017-2024	-13.39	0.85	-35.86	14.01
Canada Goose	2017-2024	6.02	0.61	-28.71	56.75
Canada Jay	2017-2024	0.23	0.51	-36.57	46.72
Cliff Swallow	2017-2024	-11.29	0.73	-40.44	30.49
Common Grackle	2017-2024	-5.25	0.59	-42.44	53.52
Common Nighthawk	2017-2024	-9.46	0.79	-30	15.17
Common Raven	2017-2024	-12.86	0.98	-24.57	-0.88
Common Yellowthroat	2017-2024	11.11	0.71	-22.52	64.54
Eurasian Collared-Dove	2017-2024	3.97	0.58	-25.98	50.49
European Starling	2017-2024	-7.28	0.70	-32.84	23.07
Ferruginous Hawk	2017-2024	8.81	0.67	-25.35	62.95
Golden Eagle	2017-2024	-8.36	0.76	-27.86	14.05
Grasshopper Sparrow	2017-2024	-8.08	0.82	-25.12	10.41
Gray Flycatcher	2017-2024	-4.99	0.68	-22.17	14.72
Great Blue Heron	2017-2024	-0.27	0.50	-29	43.48
Great Horned Owl	2017-2024	-4.66	0.63	-32.73	33.79
Greater Sage-Grouse	2017-2024	9.93	0.76	-15.72	37.61
Green-tailed Towhee	2017-2024	-3.69	0.61	-28.75	26.55
Horned Lark	2017-2024	-1.97	0.60	-16.04	14.71
House Finch	2017-2024	-2.58	0.54	-39.01	47.74
House Wren	2017-2024	-5.4	0.62	-35.26	39.09
Killdeer	2017-2024	-1.25	0.55	-23.27	24.18
Lark Sparrow	2017-2024	2.98	0.60	-17.06	28.92
Lazuli Bunting	2017-2024	1.27	0.52	-35.88	57.48
Loggerhead Shrike	2017-2024	-0.84	0.53	-19.82	22.68
Long-billed Curlew	2017-2024	21.48	0.89	-11.24	70.77

Species	Years	Trend	f	L95CI	U95CI
Mountain Bluebird	2017-2024	-1.38	0.54	-29.94	37.43
Mourning Dove	2017-2024	7.18	0.89	-4.17	19.33
Northern Harrier	2017-2024	-13.31	0.90	-32.82	7.93
Northern Rough-winged Swallow	2017-2024	-13.63	0.80	-40.06	23.71
Pied-billed Grebe	2017-2024	-9.02	0.67	-49.37	40.79
Red-tailed Hawk	2017-2024	-11.46	0.87	-30.7	10.47
Red-winged Blackbird	2017-2024	-1.04	0.52	-24.79	29.78
Ring-necked Pheasant	2017-2024	-4.92	0.66	-25.82	20.2
Rock Wren	2017-2024	-4.91	0.63	-31.34	25.81
Sage Thrasher	2017-2024	-8.02	0.88	-20.74	5.33
Sandhill Crane	2017-2024	10.24	0.73	-19.56	58.05
Sharp-tailed Grouse	2017-2024	2.13	0.55	-28.41	51.61
Short-eared Owl	2017-2024	-26.79	0.94	-51.29	7.93
Song Sparrow	2017-2024	-6.53	0.68	-31.05	25.72
Spotted Towhee	2017-2024	-4.16	0.59	-36.65	41.55
Swainson's Hawk	2017-2024	-19.54	0.98	-35.35	-2.1
Turkey Vulture	2017-2024	27.43	0.94	-5.49	80.57
Upland Sandpiper	2017-2024	3.73	0.56	-36.33	63.21
Vesper Sparrow	2017-2024	-12.03	0.98	-21.12	-0.13
Virginia Rail	2017-2024	-2.75	0.56	-43.22	56.03
Virginia's Warbler	2017-2024	7.18	0.64	-26.98	52
Western Kingbird	2017-2024	3.33	0.62	-18.33	30.77
Western Meadowlark	2017-2024	-0.03	0.51	-7.83	7.83
Willet	2017-2024	-10.97	0.74	-38.88	26.46
Willow Flycatcher	2017-2024	-1.41	0.53	-32.21	44.78
Wilson's Snipe	2017-2024	-26.4	0.91	-57.84	14.83
Yellow Warbler	2017-2024	-1.01	0.52	-28.44	40.31
Yellow-headed Blackbird	2017-2024	18.26	0.79	-24.64	64.64

Dixie National Forest

For the Dixie National Forest, 60 species were declining and 37 were increasing; the mean trend overall was significantly greater than 0 ($\bar{x} = -1.71$, $P=0.06$, $df=96$), indicating that species biodiversity is increasing under current ecological conditions (Fig. Dixie 1). There was 1 species with highly significant negative trends and none with positive trends (Table Dixie 1) of the 97 species monitored (Table Dixie 2).

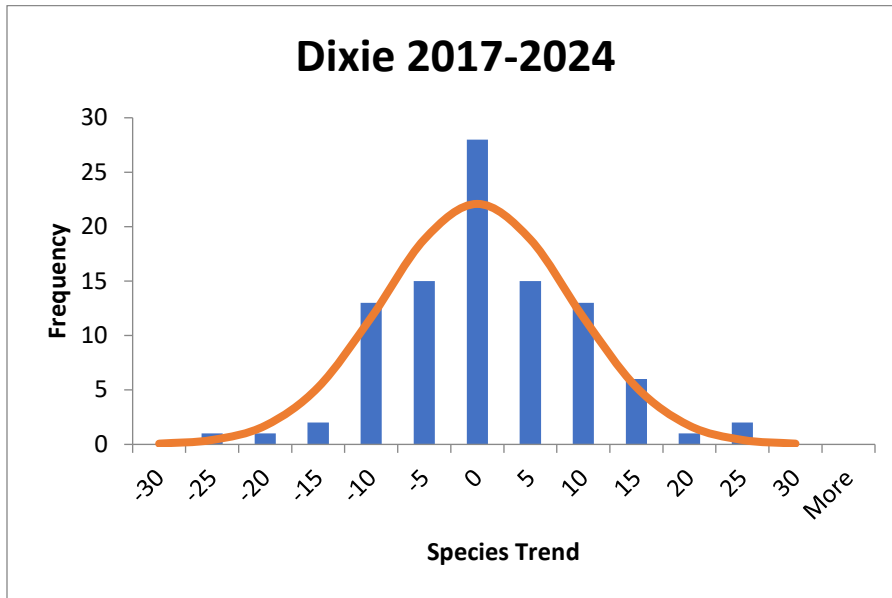


Figure Dixie 1. Bird species trend distribution on the Dixie National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table Dixie 1. Highly significant negatively trending species on the Dixie National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Negative Trend					
Species	Years	Trend	f	L95CI	U95CI
Canyon Wren	2017-2024	-26.9	0.987	-48.34	-4.29

Table Dixie 2. Estimated population change per year for birds on the Dixie National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2017-2024	12.66	0.769	-17.32	58.04
American Goshawk	2017-2024	-16.99	0.903	-42.5	9.91
American Kestrel	2017-2024	-7.26	0.769	-26.94	15.41
American Robin	2017-2024	-0.39	0.516	-15.13	17.12
Ash-throated Flycatcher	2017-2024	-2.18	0.621	-16.96	13.25
Barn Swallow	2017-2024	-0.79	0.513	-32.44	45.89
Bewick's Wren	2017-2024	-3.49	0.635	-22.81	17.04
Black-chinned Hummingbird	2017-2024	-18.12	0.947	-37.24	4.46
Black-chinned Sparrow	2017-2024	-0.65	0.510	-25.91	36.39
Black-headed Grosbeak	2017-2024	2.45	0.656	-9.62	17.75
Black-throated Gray Warbler	2017-2024	-8.41	0.891	-20.66	4.96
Black-throated Sparrow	2017-2024	-14.58	0.911	-32.95	8.34
Blue-gray Gnatcatcher	2017-2024	-7.27	0.865	-18.36	5.89
Brewer's Blackbird	2017-2024	6.57	0.620	-30.44	60.29
Brewer's Sparrow	2017-2024	8.52	0.700	-19.7	48.69
Broad-tailed Hummingbird	2017-2024	4.27	0.702	-11.2	22.92
Brown Creeper	2017-2024	-9.59	0.838	-26.62	10.32
Brown-headed Cowbird	2017-2024	-3.05	0.620	-21.24	22.14
Bullock's Oriole	2017-2024	3.97	0.593	-23.93	40.05
Bushtit	2017-2024	0.57	0.530	-14.69	17.93
Canyon Wren	2017-2024	-26.9	0.987	-48.34	-4.29
Cassin's Finch	2017-2024	6	0.693	-15.48	33.23
Chipping Sparrow	2017-2024	0.63	0.553	-9.88	12.44
Chukar	2017-2024	10.92	0.683	-25.44	68.46
Clark's Nutcracker	2017-2024	-4.57	0.733	-16.8	10.47
Common Merganser	2017-2024	-11.27	0.741	-45.93	28.77
Common Nighthawk	2017-2024	7.32	0.682	-19.88	42.52
Common Raven	2017-2024	-4.58	0.785	-14.86	6.47
Cooper's Hawk	2017-2024	6.18	0.677	-18.97	39.14
Dark-eyed Junco	2017-2024	-4.27	0.714	-18.4	12.42
Downy Woodpecker	2017-2024	0.96	0.530	-27.55	50.46
Dusky Flycatcher	2017-2024	-12.92	0.970	-26.72	0.68
Dusky Grouse	2017-2024	-5.32	0.639	-31.59	22.21
Eurasian Collared-Dove	2017-2024	-12.27	0.775	-37.41	20.96
Evening Grosbeak	2017-2024	-14.65	0.793	-45.15	24.82
Gray Flycatcher	2017-2024	-3.49	0.683	-16.85	11.77
Gray Vireo	2017-2024	-7	0.834	-19.18	8.05
Greater Roadrunner	2017-2024	0.24	0.506	-33.01	51.8

Species	Years	Trend	f	L95CI	U95CI
Green-tailed Towhee	2017-2024	-5.41	0.727	-21.29	14.42
Hairy Woodpecker	2017-2024	-0.25	0.512	-14.2	17.33
Hammond's Flycatcher	2017-2024	-4.7	0.581	-44.7	52.88
Hermit Thrush	2017-2024	5.18	0.718	-12.17	25.79
Horned Lark	2017-2024	5.87	0.606	-29.89	64.94
House Finch	2017-2024	-10.91	0.861	-28.74	9.44
House Wren	2017-2024	10.75	0.740	-18.84	52
Juniper Titmouse	2017-2024	-6.32	0.760	-22.56	11.52
Lark Sparrow	2017-2024	4.42	0.658	-15.84	30.13
Lazuli Bunting	2017-2024	-11.84	0.865	-29.52	12.36
Lesser Goldfinch	2017-2024	7.53	0.675	-20.14	44.61
Lincoln's Sparrow	2017-2024	8.29	0.640	-31.31	66.2
MacGillivray's Warbler	2017-2024	-14.82	0.858	-35.43	12.83
Mountain Bluebird	2017-2024	-5.38	0.715	-20.72	12.54
Mountain Chickadee	2017-2024	6.06	0.835	-6.36	19.46
Mourning Dove	2017-2024	-1	0.583	-11.85	10.48
Northern Flicker	2017-2024	-1.52	0.594	-12.89	11.26
Northern Mockingbird	2017-2024	-2.73	0.573	-25.39	31.21
Northern Pygmy-Owl	2017-2024	-2.24	0.554	-28.22	35.17
Northern Rough-winged Swallow	2017-2024	-3.29	0.569	-33.18	41.82
Olive-sided Flycatcher	2017-2024	-5.63	0.670	-28.7	20.21
Orange-crowned Warbler	2017-2024	12.37	0.773	-19.36	49.99
Osprey	2017-2024	9.2	0.699	-23.17	70.84
Peregrine Falcon	2017-2024	-20.05	0.892	-46.75	13.35
Pine Grosbeak	2017-2024	-2.46	0.555	-36.76	44.14
Pine Siskin	2017-2024	-13.81	0.956	-28.77	2.25
Pinyon Jay	2017-2024	-7.82	0.711	-30.53	21.58
Plumbeous Vireo	2017-2024	-3.14	0.667	-16.83	12.84
Red Crossbill	2017-2024	20.53	0.924	-6.64	65.54
Red-breasted Nuthatch	2017-2024	-2.64	0.634	-16.82	13.15
Red-naped Sapsucker	2017-2024	-4.27	0.604	-33.54	35.41
Red-tailed Hawk	2017-2024	1.07	0.545	-17.53	23.83
Rock Wren	2017-2024	-9.33	0.823	-26.17	10.01
Ruby-crowned Kinglet	2017-2024	-11.13	0.919	-25.33	5.19
Say's Phoebe	2017-2024	-1.5	0.543	-25.05	31.27
Sharp-shinned Hawk	2017-2024	-7.93	0.696	-36.62	27.47
Song Sparrow	2017-2024	4.23	0.657	-17.74	30.06
Spotted Towhee	2017-2024	-3.31	0.709	-15.58	9.47
Steller's Jay	2017-2024	3.97	0.674	-13.02	22.45
Townsend's Solitaire	2017-2024	-12.93	0.918	-29.67	6.05
Tree Swallow	2017-2024	-4.06	0.609	-32.76	42.81

Species	Years	Trend	f	L95CI	U95CI
Turkey Vulture	2017-2024	15.74	0.886	-9.95	50.4
Vesper Sparrow	2017-2024	14.63	0.719	-24.84	74.76
Violet-green Swallow	2017-2024	-1.91	0.563	-23.12	23.87
Virginia's Warbler	2017-2024	4.52	0.734	-9.81	21.57
Warbling Vireo	2017-2024	10.23	0.891	-6.43	29.1
Western Bluebird	2017-2024	6.35	0.682	-17.17	38.72
Western Flycatcher	2017-2024	7.32	0.693	-20.2	49.9
Western Kingbird	2017-2024	-3.26	0.598	-28.07	30.03
Western Meadowlark	2017-2024	0.18	0.506	-24.29	32.56
Western Tanager	2017-2024	3.12	0.685	-8.91	15.28
Western Wood-Pewee	2017-2024	4.82	0.691	-12.86	26.18
White-breasted Nuthatch	2017-2024	-7.01	0.788	-22.25	13.39
White-throated Swift	2017-2024	-12.25	0.774	-36.34	22.84
Wild Turkey	2017-2024	23.81	0.919	-7.26	66.41
Wilson's Warbler	2017-2024	-0.82	0.518	-29.09	43.61
Woodhouse's Scrub-Jay	2017-2024	-11.59	0.945	-23.5	2.85
Yellow Warbler	2017-2024	-8.54	0.798	-27.12	12.6
Yellow-rumped Warbler	2017-2024	-1.7	0.594	-17.05	16.23

Fishlake National Forest

For the Fishlake National Forest, 33 species were declining and 53 were increasing; the mean trend overall was significantly greater than 0 ($\bar{x} = 3.88$, $P < 0.01$, $df = 85$), indicating a biodiversity increase under current ecological conditions (Fig. Fishlake 1). There were no species with highly significant negative trends and 6 with positive trends (Table Fishlake 1) of the 86 species monitored (Table Fishlake 2).

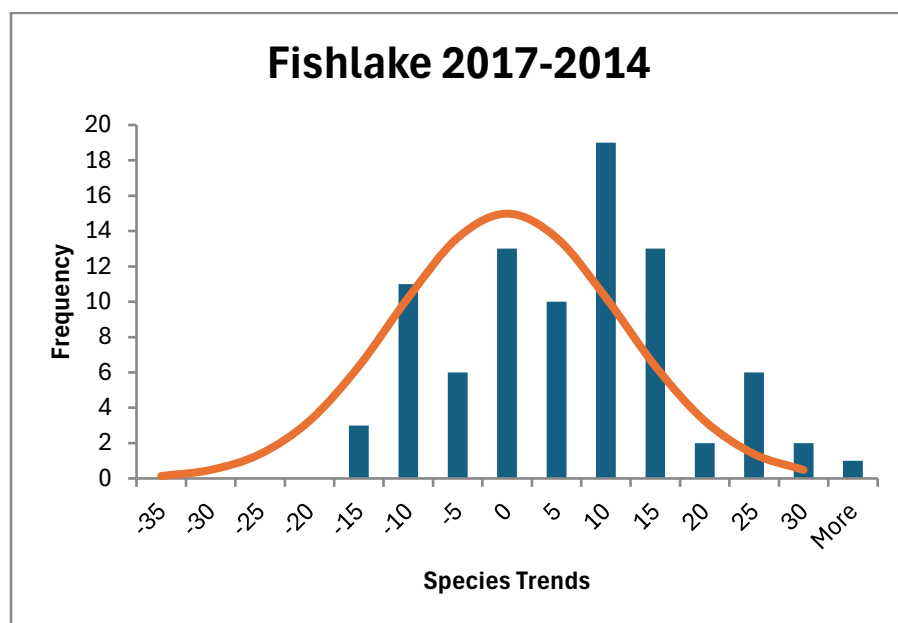


Figure Fishlake 1. Bird species trend distribution on the Fishlake National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table Fishlake 1. Highly significant positively trending species on the Fishlake National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Lark Sparrow	2017-2024	21.78	0.996	5.81	43.17
Chipping Sparrow	2017-2024	13.54	0.997	2.69	25.17
Brewer's Sparrow	2017-2024	28.99	0.983	2.34	68.99
Mourning Dove	2017-2024	14.86	0.984	1.91	29.15
Pine Siskin	2017-2024	23.92	0.978	1.2	59.96
Vesper Sparrow	2017-2024	31.53	0.980	0.73	73.91

Table Fishlake 2. Estimated population change per year for birds on the Fishlake National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Goldfinch	2017-2024	3.3	0.56	-30.74	65.34
American Kestrel	2017-2024	-4.86	0.61	-29.89	30.01
American Robin	2017-2024	4.15	0.76	-7.11	18.46
Ash-throated Flycatcher	2017-2024	11.47	0.85	-9.45	38.51
Bewick's Wren	2017-2024	-8.8	0.78	-30.15	15.89
Black-billed Magpie	2017-2024	-0.54	0.52	-22.16	26.55
Black-chinned Hummingbird	2017-2024	-10.37	0.75	-34.82	21.96
Black-headed Grosbeak	2017-2024	13.9	0.92	-4.58	37.53
Black-throated Gray Warbler	2017-2024	-3.8	0.69	-18.73	12.17
Black-throated Sparrow	2017-2024	25.73	0.94	-5.51	75.33
Blue-gray Gnatcatcher	2017-2024	2.07	0.60	-12.31	17.28
Brewer's Blackbird	2017-2024	8.2	0.65	-24.47	60.48
Brewer's Sparrow	2017-2024	28.99	0.98	2.34	68.99
Broad-tailed Hummingbird	2017-2024	6.33	0.76	-9.99	26.19
Brown-headed Cowbird	2017-2024	-1.09	0.55	-20.9	22.39
Bushtit	2017-2024	16.4	0.90	-7.76	53.21
Canada Jay	2017-2024	-10.15	0.71	-40.2	29.08
Canyon Wren	2017-2024	-16.47	0.92	-39.29	9.25
Cassin's Finch	2017-2024	-5.97	0.70	-28.11	21.44
Chipping Sparrow	2017-2024	13.54	1.00	2.69	25.17
Chukar	2017-2024	6.44	0.68	-17.39	36.04
Clark's Nutcracker	2017-2024	18.29	0.97	-1.7	48.85
Common Nighthawk	2017-2024	3.61	0.62	-17.42	30.38
Common Raven	2017-2024	8.09	0.91	-4.52	24.01
Cooper's Hawk	2017-2024	2.34	0.56	-23.42	34.83
Dark-eyed Junco	2017-2024	-6.61	0.80	-20.16	8.7
Downy Woodpecker	2017-2024	7.84	0.64	-26.85	68.48
Dusky Flycatcher	2017-2024	7.17	0.84	-7.38	25.75
Dusky Grouse	2017-2024	-3.12	0.57	-31.36	28.06
Eurasian Collared-Dove	2017-2024	5.99	0.61	-26.67	54.28
Golden Eagle	2017-2024	-6.19	0.68	-28.91	22.68
Gray Flycatcher	2017-2024	-1.86	0.60	-14.36	15.35
Gray Vireo	2017-2024	4.05	0.66	-14.84	26.85
Green-tailed Towhee	2017-2024	4.13	0.70	-10.52	21.6
Green-winged Teal	2017-2024	13.55	0.78	-18.96	63.5
Hairy Woodpecker	2017-2024	9.39	0.67	-27.83	66.37
Hammond's Flycatcher	2017-2024	-9.91	0.67	-44.58	47.27
Hermit Thrush	2017-2024	6.16	0.77	-10.7	24.11

Species	Years	Trend	f	L95CI	U95CI
Horned Lark	2017-2024	-2.78	0.60	-23.11	26.5
House Finch	2017-2024	20.27	0.93	-6.75	57.31
House Wren	2017-2024	8.16	0.70	-19.15	41.5
Juniper Titmouse	2017-2024	-11.16	0.88	-31.47	8.35
Lark Sparrow	2017-2024	21.78	1.00	5.81	43.17
Lazuli Bunting	2017-2024	2.36	0.58	-17.18	27.06
MacGillivray's Warbler	2017-2024	13.32	0.84	-12.42	43.62
Mallard	2017-2024	6.23	0.63	-28.83	71.12
Mountain Bluebird	2017-2024	4.52	0.74	-8.67	18.25
Mountain Chickadee	2017-2024	-0.32	0.51	-11.64	12.78
Mourning Dove	2017-2024	14.86	0.98	1.91	29.15
Northern Flicker	2017-2024	8.22	0.86	-5.47	25.35
Northern Mockingbird	2017-2024	10.03	0.68	-25.54	66.47
Northern Rough-winged Swallow	2017-2024	-3.62	0.59	-31.02	36.99
Orange-crowned Warbler	2017-2024	21.51	0.91	-9.59	78.39
Pine Grosbeak	2017-2024	-11.32	0.74	-39.63	28.9
Pine Siskin	2017-2024	23.92	0.98	1.2	59.96
Pinyon Jay	2017-2024	11.05	0.80	-10.69	39.39
Plumbeous Vireo	2017-2024	5.68	0.73	-11.27	30.45
Prairie Falcon	2017-2024	-10.07	0.75	-35.9	24.95
Red-breasted Nuthatch	2017-2024	-17.6	0.94	-37.73	4.35
Red-tailed Hawk	2017-2024	-1.9	0.56	-24.69	29.21
Rock Wren	2017-2024	10.22	0.89	-6.44	28.72
Ruby-crowned Kinglet	2017-2024	-0.21	0.51	-17.29	22.02
Ruddy Duck	2017-2024	13.79	0.78	-21.82	70.3
Ruffed Grouse	2017-2024	-17.96	0.87	-43.41	15.18
Sage Thrasher	2017-2024	-4.4	0.60	-33.24	37.26
Sagebrush Sparrow	2017-2024	-5.4	0.62	-34.16	42.93
Say's Phoebe	2017-2024	7.66	0.71	-17.04	42.64
Song Sparrow	2017-2024	24.52	0.94	-5.91	70.96
Spotted Towhee	2017-2024	-4.63	0.76	-17.17	8.78
Steller's Jay	2017-2024	-10.7	0.76	-36.85	21.77
Townsend's Solitaire	2017-2024	-14	0.80	-44.82	23.12
Tree Swallow	2017-2024	14.17	0.74	-22.67	78.13
Turkey Vulture	2017-2024	5.67	0.62	-27.14	56.17
Vesper Sparrow	2017-2024	31.53	0.98	0.73	73.91
Violet-green Swallow	2017-2024	1.54	0.54	-23.79	34.94
Virginia's Warbler	2017-2024	10.89	0.83	-10.45	34.96
Warbling Vireo	2017-2024	6.38	0.81	-8.12	24.36
Western Flycatcher	2017-2024	7.22	0.69	-17.1	41.83
Western Meadowlark	2017-2024	9.31	0.80	-11.95	37.42

Species	Years	Trend	f	L95CI	U95CI
Western Tanager	2017-2024	8.61	0.86	-6.09	27.26
Western Wood-Pewee	2017-2024	-11.15	0.79	-33.53	19.7
Wild Turkey	2017-2024	-13.3	0.84	-38.97	15.34
Wilson's Warbler	2017-2024	-14.89	0.78	-42.29	28.85
Woodhouse's Scrub-Jay	2017-2024	-14.51	0.96	-28.82	1.05
Yellow Warbler	2017-2024	23.84	0.93	-6.52	72.21
Yellow-rumped Warbler	2017-2024	14.55	0.94	-4.3	39.31

Humboldt-Toiyabe National Forest

For the Humboldt-Toiyabe National Forest, species 63 species were declining and 58 were increasing; the mean trend overall was not significantly different than 0 ($\bar{x} = -0.70$, $P=0.45$, $df=120$), indicating stable ecological conditions for bird species (Fig. HT 1). There were no species with highly significant negative trends and 1 with a highly significant positive trend (Table HT 1) of the 121 species monitored (Table HT 2).

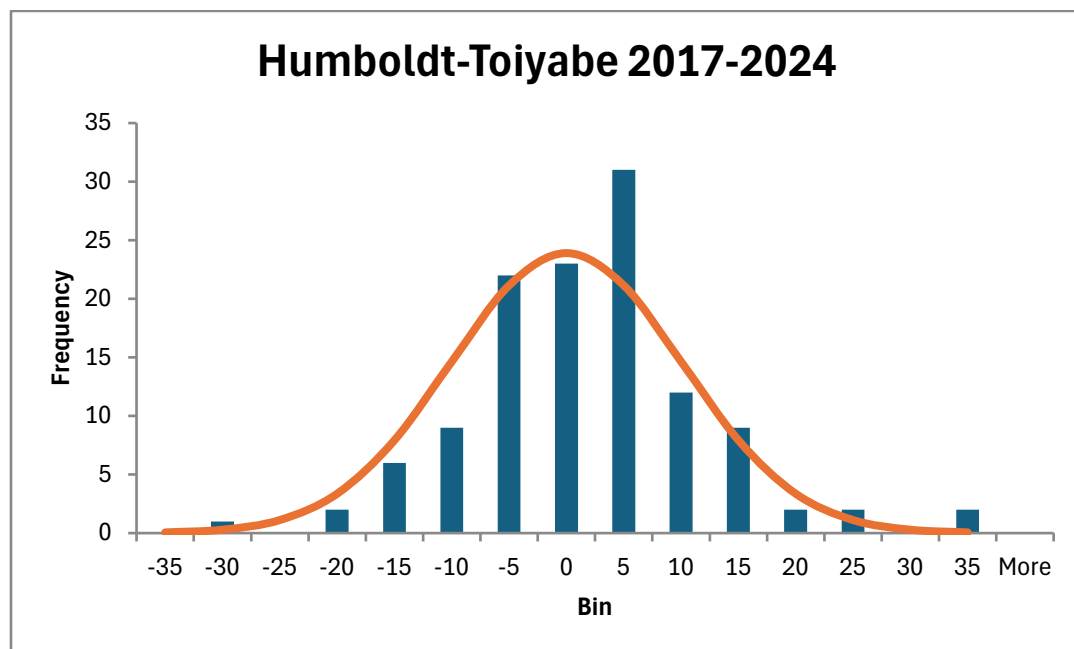


Figure HT 1. Bird species trend distribution on the Humboldt-Toiyabe National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table HT 1. Highly significant positively trending species on the Humboldt-Toiyabe National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Western Tanager	2017-2024	14.99	0.987	2.07	28.6

Table HT 2. Estimated population change per year for birds on the Humboldt-Toiyabe National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2017-2024	6.43	0.623	-27.12	61.75
American Kestrel	2017-2024	-8.4	0.817	-23.78	10.49
American Robin	2017-2024	1.18	0.600	-8.8	12.42
Anna's Hummingbird	2017-2024	4.6	0.616	-26.01	44.43
Ash-throated Flycatcher	2017-2024	8.56	0.789	-11.78	31.92
Band-tailed Pigeon	2017-2024	13.06	0.811	-15.15	46.11
Barn Swallow	2017-2024	-6.69	0.654	-38.11	31.3
Bewick's Wren	2017-2024	-14.1	0.958	-26.61	2.06
Black-backed Woodpecker	2017-2024	33.24	0.971	-1.85	87.21
Black-billed Magpie	2017-2024	-13.08	0.842	-34.19	14.67
Black-chinned Sparrow	2017-2024	-17.32	0.799	-48.88	30.85
Black-headed Grosbeak	2017-2024	4.21	0.690	-10.31	22.63
Black-throated Gray Warbler	2017-2024	3.68	0.716	-9.31	16.72
Black-throated Sparrow	2017-2024	-6.25	0.727	-23.61	14.69
Blue-gray Gnatcatcher	2017-2024	0.74	0.538	-11	15.06
Brewer's Blackbird	2017-2024	2.35	0.569	-20.71	30.28
Brewer's Sparrow	2017-2024	-11.38	0.958	-22.33	1.88
Broad-tailed Hummingbird	2017-2024	4.96	0.690	-13.5	31.74
Brown Creeper	2017-2024	10.45	0.888	-7.26	30.16
Brown-headed Cowbird	2017-2024	3.23	0.670	-12.74	22.09
Bullock's Oriole	2017-2024	-5.31	0.616	-32.33	36.16
Bushtit	2017-2024	14.44	0.973	-0.27	30.82
Cactus Wren	2017-2024	-30.07	0.928	-58.6	13.08
California Quail	2017-2024	-7.61	0.694	-30.97	25.32
Calliope Hummingbird	2017-2024	0.57	0.516	-22.42	29.4
Canyon Wren	2017-2024	-13.13	0.825	-36.95	15.08
Cassin's Finch	2017-2024	-2.87	0.671	-14.44	12.7
Cassin's Vireo	2017-2024	-3	0.602	-29.59	37.63
Chipping Sparrow	2017-2024	6.4	0.889	-3.97	18.05
Chukar	2017-2024	0.44	0.513	-22.54	29.19
Clark's Nutcracker	2017-2024	-10.06	0.916	-21.73	4.28
Cliff Swallow	2017-2024	10.81	0.721	-20.65	52.11
Common Merganser	2017-2024	1.78	0.528	-34.18	50.32
Common Nighthawk	2017-2024	5.73	0.737	-12.54	26.96
Common Poorwill	2017-2024	-1.48	0.548	-20.07	25.93
Common Raven	2017-2024	-3.9	0.758	-14.28	8.33
Cooper's Hawk	2017-2024	-0.57	0.513	-20.56	21.56
Costa's Hummingbird	2017-2024	24.17	0.894	-11.51	83.97

Species	Years	Trend	f	L95CI	U95CI
Crissal Thrasher	2017-2024	-23.1	0.873	-51.1	22.86
Dark-eyed Junco	2017-2024	0.59	0.539	-9.41	12.9
Dusky Flycatcher	2017-2024	-8.02	0.893	-18.73	5.3
Dusky Grouse	2017-2024	-3.14	0.593	-31.97	27.07
Eurasian Collared-Dove	2017-2024	-3.47	0.590	-29.65	30.34
Fox Sparrow	2017-2024	-5.08	0.759	-18.46	9.76
Golden Eagle	2017-2024	-16.71	0.943	-36.38	4.19
Golden-crowned Kinglet	2017-2024	-10.33	0.645	-49.99	49.35
Gray Flycatcher	2017-2024	1.39	0.587	-9.34	15.3
Gray Vireo	2017-2024	5.79	0.697	-15.28	32.05
Green-tailed Towhee	2017-2024	-4.14	0.774	-13.56	7.09
Hairy Woodpecker	2017-2024	1.18	0.555	-13.5	19.62
Hammond's Flycatcher	2017-2024	-6.68	0.663	-35.8	26.83
Hermit Thrush	2017-2024	-7.96	0.831	-22.12	10.16
Horned Lark	2017-2024	2.32	0.559	-23.02	38.82
House Finch	2017-2024	12.94	0.863	-10.32	39.11
House Wren	2017-2024	-2.88	0.646	-18.08	13.82
Juniper Titmouse	2017-2024	-0.59	0.527	-15.12	15.76
Lark Sparrow	2017-2024	11.25	0.788	-16.71	45.67
Lazuli Bunting	2017-2024	-5.74	0.760	-19.41	11.73
Lesser Goldfinch	2017-2024	2.44	0.594	-16.29	25.71
Lewis's Woodpecker	2017-2024	6.92	0.675	-21.74	44.32
Lincoln's Sparrow	2017-2024	3.85	0.610	-21.71	35.48
Loggerhead Shrike	2017-2024	18.78	0.897	-8.56	64.79
MacGillivray's Warbler	2017-2024	-3.45	0.658	-18.07	14.45
Mallard	2017-2024	-6.41	0.661	-31.38	29.77
Mountain Bluebird	2017-2024	3.44	0.718	-8.62	16.41
Mountain Chickadee	2017-2024	3.07	0.732	-6.72	14.05
Mountain Quail	2017-2024	-21.45	0.967	-39.43	2.92
Mourning Dove	2017-2024	-0.18	0.511	-10.36	13.76
Nashville Warbler	2017-2024	-5.37	0.616	-35.6	36.35
Northern Flicker	2017-2024	-5.71	0.852	-14.96	5.85
Northern Harrier	2017-2024	-8.64	0.783	-27.5	16.21
Northern Pygmy-Owl	2017-2024	-6.88	0.628	-38.69	43.45
Northern Rough-winged Swallow	2017-2024	3.64	0.584	-25.33	46.48
Olive-sided Flycatcher	2017-2024	0.96	0.536	-16.28	17.81
Orange-crowned Warbler	2017-2024	-6.93	0.724	-26.22	17.08
Peregrine Falcon	2017-2024	0.58	0.511	-30.42	46.25
Pine Grosbeak	2017-2024	-2.14	0.571	-28.69	37.56
Pine Siskin	2017-2024	2.67	0.602	-16.94	28.7
Pinyon Jay	2017-2024	5.05	0.671	-14.61	30.5

Species	Years	Trend	f	L95CI	U95CI
Plumbeous Vireo	2017-2024	3.61	0.634	-13.54	24.82
Pygmy Nuthatch	2017-2024	16.59	0.848	-13.41	56.67
Red Crossbill	2017-2024	10.52	0.788	-13.33	44.85
Red-breasted Nuthatch	2017-2024	-2.71	0.599	-21.51	18.02
Red-naped Sapsucker	2017-2024	8.45	0.707	-19.46	48.34
Red-tailed Hawk	2017-2024	-2.88	0.631	-19.81	17.68
Red-winged Blackbird	2017-2024	-9.23	0.672	-41.13	33.52
Rock Pigeon	2017-2024	-17.29	0.857	-46.51	17.5
Rock Wren	2017-2024	-1.99	0.659	-11.7	8.26
Ruby-crowned Kinglet	2017-2024	5.75	0.689	-15.74	33.11
Rufous Hummingbird	2017-2024	-17.64	0.922	-37.02	8.02
Rufous-crowned Sparrow	2017-2024	-10.04	0.700	-44.33	38.45
Sage Thrasher	2017-2024	-5.03	0.646	-24.16	22.07
Sagebrush Sparrow	2017-2024	-18.56	0.926	-38.81	9.03
Say's Phoebe	2017-2024	5.14	0.617	-22.79	46.35
Sharp-shinned Hawk	2017-2024	1.84	0.540	-29.7	52.26
Song Sparrow	2017-2024	-5.41	0.716	-24.55	15.15
Spotted Towhee	2017-2024	-6.77	0.866	-16.87	4.93
Steller's Jay	2017-2024	-0.28	0.515	-14.03	17.08
Townsend's Solitaire	2017-2024	-2	0.574	-19.18	19.27
Tree Swallow	2017-2024	1.62	0.529	-29.93	45.51
Turkey Vulture	2017-2024	-2.56	0.586	-26.02	24.58
Vesper Sparrow	2017-2024	6.01	0.683	-16.43	32.72
Violet-green Swallow	2017-2024	-10.99	0.775	-32.88	18.17
Virginia's Warbler	2017-2024	6.67	0.686	-17.62	40.85
Warbling Vireo	2017-2024	-2.95	0.634	-18.25	15.08
Western Bluebird	2017-2024	21.98	0.917	-8.77	68.27
Western Flycatcher	2017-2024	0.62	0.520	-22.33	34.37
Western Kingbird	2017-2024	-5.74	0.610	-38.43	38.5
Western Meadowlark	2017-2024	-4.33	0.592	-38.15	39.64
Western Tanager	2017-2024	14.99	0.987	2.07	28.6
Western Wood-Pewee	2017-2024	2.83	0.673	-9.16	15.84
White-breasted Nuthatch	2017-2024	2.37	0.596	-15.14	24.18
White-crowned Sparrow	2017-2024	-9.61	0.842	-26.33	10.32
White-headed Woodpecker	2017-2024	10.81	0.724	-19.4	49.4
White-throated Swift	2017-2024	-12.78	0.802	-38.49	20.05
Williamson's Sapsucker	2017-2024	34.7	0.973	-0.6	84.48
Willow Flycatcher	2017-2024	3.18	0.554	-33.82	53.6
Wilson's Warbler	2017-2024	-17.01	0.974	-31.82	0.11
Woodhouse's Scrub-Jay	2017-2024	-4.74	0.798	-16.41	5.96
Yellow Warbler	2017-2024	0.81	0.526	-16.7	22.49

Species	Years	Trend	f	L95CI	U95CI
Yellow-rumped Warbler	2017-2024	-0.55	0.530	-13.81	15.64

Manti-La Sal National Forest

For the Manti-La Sal National Forest, 59 species were declining and 82 were increasing; the mean trend overall was significantly different than 0 ($\bar{x}$ = 2.75, $P < 0.001$, $df = 140$), indicating increasing biodiversity under current ecological conditions (Fig. ML 1). There was 1 species with a highly significant negative trend and 5 with highly significant positive trends (Table ML 1) of the 121 species monitored (Table ML 2).

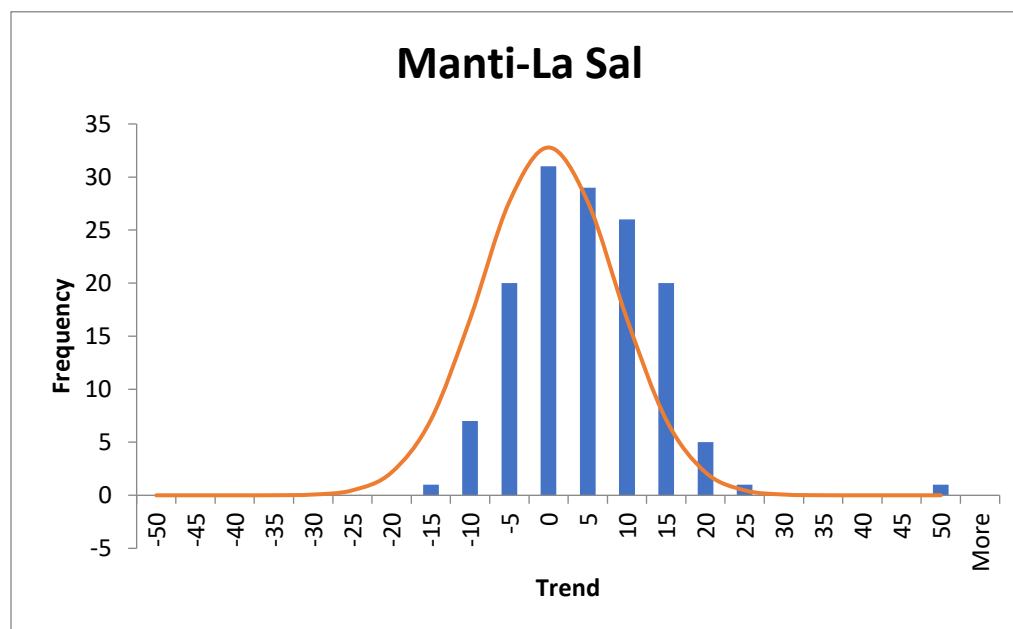


Figure ML 1. Bird species trend distribution on the Manti-La Sal National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table ML 1. Highly significant positively trending species on the Manti-La Sal National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Mountain Bluebird	2015-2024	-19.59	1.000	-29.13	-9.58
<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Red Crossbill	2015-2024	45.19	1.000	27.16	64.91
Hairy Woodpecker	2015-2024	13.91	0.996	4.00	24.62
Warbling Vireo	2015-2024	8.02	0.996	2.29	14.47
Grace's Warbler	2015-2024	16.15	0.984	1.47	34.58
Western Tanager	2015-2024	5.89	0.987	0.89	11.32

Table ML 2. Estimated population change per year for birds on the Manti-La Sal National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Avocet	2015-2024	13.19	0.80	-16.63	64.45
American Crow	2015-2024	-3.05	0.63	-18.88	16.6
American Dipper	2015-2024	-0.09	0.50	-24.13	33.35
American Goldfinch	2015-2024	9.97	0.69	-21.94	64.21
American Goshawk	2015-2024	-5.53	0.69	-26.12	23.31
American Kestrel	2015-2024	1.64	0.59	-12.8	17.94
American Pipit	2015-2024	8.55	0.67	-23.66	58.69
American Robin	2015-2024	4.92	0.93	-1.57	10.54
American Three-toed Woodpecker	2015-2024	8.99	0.78	-13.03	35.67
Ash-throated Flycatcher	2015-2024	12.21	0.94	-3.15	28.5
Bald Eagle	2015-2024	3.03	0.56	-29.41	43.61
Band-tailed Pigeon	2015-2024	16.12	0.83	-14.56	57.38
Bank Swallow	2015-2024	-2.44	0.54	-40.39	43.17
Barn Swallow	2015-2024	-5.85	0.71	-27.13	18.17
Bewick's Wren	2015-2024	-8.95	0.87	-23.15	7.09
Black-billed Magpie	2015-2024	-3.55	0.67	-17.33	12.81
Black-capped Chickadee	2015-2024	-6.07	0.76	-21.75	12.05
Black-chinned Hummingbird	2015-2024	-5.2	0.72	-21.24	12.89
Black-headed Grosbeak	2015-2024	2.26	0.72	-6.04	10.13
Black-throated Gray Warbler	2015-2024	-6.47	0.91	-16.62	3.55
Black-throated Sparrow	2015-2024	8.75	0.76	-15.5	36.64
Blue Grosbeak	2015-2024	8.12	0.71	-17.99	41.18
Blue-gray Gnatcatcher	2015-2024	-5.2	0.85	-15.04	5.79
Blue-winged Teal	2015-2024	-7.9	0.72	-31.04	26.07
Brewer's Blackbird	2015-2024	10.28	0.84	-8.81	33.09
Brewer's Sparrow	2015-2024	-6.5	0.86	-16.75	7.06
Broad-tailed Hummingbird	2015-2024	-6.77	0.96	-13.57	0.72
Brown Creeper	2015-2024	12.57	0.93	-5.14	30.14
Brown-headed Cowbird	2015-2024	5.25	0.73	-11.26	24.34
Bullock's Oriole	2015-2024	-1.22	0.54	-21.92	25.55
Bushtit	2015-2024	12.97	0.95	-2.26	30.58
Canada Jay	2015-2024	15.47	0.84	-13.22	62.29
Canyon Wren	2015-2024	-10.93	0.90	-26.83	6.84
Cassin's Finch	2015-2024	-11.01	0.95	-22.18	2.18
Chipping Sparrow	2015-2024	1.33	0.67	-4.16	8.51
Chukar	2015-2024	22.19	0.97	-1.66	51.63
Cinnamon Teal	2015-2024	0.68	0.52	-26.9	36.13
Clark's Nutcracker	2015-2024	-8.78	0.96	-19.14	1.18

Species	Years	Trend	f	L95CI	U95CI
Common Nighthawk	2015-2024	8.68	0.77	-12.8	34.72
Common Poorwill	2015-2024	12.99	0.85	-9.97	45.56
Common Raven	2015-2024	-6.17	0.95	-13.67	1.17
Cooper's Hawk	2015-2024	-1.07	0.55	-15.76	14.66
Dark-eyed Junco	2015-2024	-0.25	0.54	-5.53	4.85
Downy Woodpecker	2015-2024	9.14	0.77	-14.56	39.53
Dusky Flycatcher	2015-2024	-0.58	0.57	-6.4	5.94
Dusky Grouse	2015-2024	3.05	0.65	-12.91	20.79
Eurasian Collared-Dove	2015-2024	16.12	0.90	-7.69	46.83
Evening Grosbeak	2015-2024	14.88	0.78	-19.23	63.19
Fox Sparrow	2015-2024	4.29	0.63	-17.76	31.78
Gadwall	2015-2024	10.71	0.74	-20.87	59.92
Gambel's Quail	2015-2024	7.29	0.69	-19.57	43.01
Golden Eagle	2015-2024	1.34	0.57	-15.06	20.9
Golden-crowned Kinglet	2015-2024	-12.55	0.83	-38.33	13.11
Grace's Warbler	2015-2024	16.15	0.98	1.47	34.58
Gray Flycatcher	2015-2024	-1.43	0.58	-13.64	13.54
Gray Vireo	2015-2024	-12.69	0.96	-25.46	1.97
Great Blue Heron	2015-2024	-3.27	0.60	-27.62	25.05
Great Horned Owl	2015-2024	7.11	0.70	-15.65	37.23
Green-tailed Towhee	2015-2024	-5.61	0.95	-11.62	1.19
Green-winged Teal	2015-2024	5.33	0.64	-24.61	40.6
Hairy Woodpecker	2015-2024	13.91	1.00	4	24.62
Hammond's Flycatcher	2015-2024	-11.98	0.95	-27.57	2.4
Hermit Thrush	2015-2024	2.79	0.81	-2.94	8.69
Horned Lark	2015-2024	2.89	0.60	-20.63	30.8
House Finch	2015-2024	16.75	0.95	-2.93	41.61
House Wren	2015-2024	2.57	0.71	-7.12	12.41
Juniper Titmouse	2015-2024	0.93	0.54	-17.48	20.41
Killdeer	2015-2024	4.53	0.65	-19.08	42.27
Lark Sparrow	2015-2024	2.81	0.65	-12.13	18.79
Lazuli Bunting	2015-2024	-4.34	0.74	-16.46	9.92
Least Flycatcher	2015-2024	14.94	0.77	-21.69	69.02
Lesser Goldfinch	2015-2024	9.42	0.81	-9.96	30.69
Lewis's Woodpecker	2015-2024	8.55	0.75	-16.42	35.71
Lincoln's Sparrow	2015-2024	4.85	0.73	-9.75	22.53
MacGillivray's Warbler	2015-2024	-3.85	0.83	-12.45	5.21
Mallard	2015-2024	-2.2	0.58	-21.61	18.18
Mountain Bluebird	2015-2024	-19.59	1.00	-29.13	-9.58
Mountain Chickadee	2015-2024	1.4	0.70	-3.74	5.88
Mourning Dove	2015-2024	0.88	0.58	-7.49	10.4

Species	Years	Trend	f	L95CI	U95CI
Northern Flicker	2015-2024	-1.33	0.66	-7.32	4.76
Northern Harrier	2015-2024	-0.09	0.50	-17.49	20.67
Northern Mockingbird	2015-2024	9.99	0.70	-25.67	71.03
Northern Pygmy-Owl	2015-2024	13.57	0.81	-16.01	56
Northern Rough-winged Swallow	2015-2024	5.57	0.64	-20	36.23
Olive-sided Flycatcher	2015-2024	12.12	0.94	-4.02	30.19
Orange-crowned Warbler	2015-2024	-8.18	0.96	-15.68	1.15
Osprey	2015-2024	-0.34	0.51	-23.53	26.47
Pied-billed Grebe	2015-2024	9.36	0.72	-25.83	54.93
Pine Grosbeak	2015-2024	-1.64	0.56	-23.82	24.51
Pine Siskin	2015-2024	2.59	0.73	-5.04	10.96
Pinyon Jay	2015-2024	-6.53	0.78	-20.68	9.06
Plumbeous Vireo	2015-2024	-6.52	0.86	-17.73	5.35
Prairie Falcon	2015-2024	-1.4	0.55	-23.66	27.04
Purple Martin	2015-2024	11.41	0.81	-16.29	47.95
Pygmy Nuthatch	2015-2024	12.38	0.95	-2.74	31.4
Red Crossbill	2015-2024	45.19	1.00	27.16	64.91
Red-breasted Nuthatch	2015-2024	-3.65	0.75	-14.49	6.94
Red-naped Sapsucker	2015-2024	11.54	0.91	-5.19	30.81
Red-tailed Hawk	2015-2024	5.06	0.80	-6.83	17.87
Red-winged Blackbird	2015-2024	-2.62	0.56	-34.32	39.75
Rock Wren	2015-2024	4.5	0.75	-7.79	16.81
Ruby-crowned Kinglet	2015-2024	-0.55	0.55	-10.16	9.31
Ruffed Grouse	2015-2024	-11.91	0.85	-33.9	11.6
Rufous Hummingbird	2015-2024	8.31	0.76	-15.2	41.38
Sage Thrasher	2015-2024	12.12	0.78	-18.44	51.01
Sagebrush Sparrow	2015-2024	4.43	0.66	-15.07	29.85
Sandhill Crane	2015-2024	9.72	0.75	-17.09	51.47
Savannah Sparrow	2015-2024	11.09	0.69	-26	57.47
Say's Phoebe	2015-2024	3.39	0.65	-11.02	19.72
Sharp-shinned Hawk	2015-2024	1.67	0.58	-14.22	26.43
Song Sparrow	2015-2024	13.6	0.93	-4.65	34.01
Spotted Sandpiper	2015-2024	-2.89	0.61	-22.22	19.88
Spotted Towhee	2015-2024	-2.1	0.71	-8.75	5.18
Steller's Jay	2015-2024	3.56	0.77	-6.6	12.62
Summer Tanager	2015-2024	-2.66	0.55	-38.54	44.12
Swainson's Hawk	2015-2024	-1.31	0.55	-19.97	27.02
Swainson's Thrush	2015-2024	17.59	0.78	-25.81	77.15
Townsend's Solitaire	2015-2024	-3.54	0.72	-15.93	9.44
Tree Swallow	2015-2024	-6.31	0.75	-23.93	12.71
Turkey Vulture	2015-2024	5.56	0.73	-11.22	24.26

Species	Years	Trend	f	L95CI	U95CI
Vesper Sparrow	2015-2024	5.16	0.82	-6.85	17.16
Violet-green Swallow	2015-2024	8.5	0.92	-3.55	22.04
Virginia's Warbler	2015-2024	-8.81	0.97	-17.01	1
Warbling Vireo	2015-2024	8.02	1.00	2.29	14.47
Western Bluebird	2015-2024	-3.85	0.67	-21.38	16.42
Western Flycatcher	2015-2024	10.77	0.94	-2.77	24.93
Western Grebe	2015-2024	-1.98	0.53	-37.3	54.92
Western Kingbird	2015-2024	2.63	0.61	-14.95	23.2
Western Meadowlark	2015-2024	3.63	0.60	-21.13	36.91
Western Tanager	2015-2024	5.89	0.99	0.89	11.32
Western Wood-Pewee	2015-2024	-0.62	0.55	-9.31	9.14
White-breasted Nuthatch	2015-2024	4.96	0.77	-7.28	17.67
White-crowned Sparrow	2015-2024	-7.15	0.87	-19.88	5.1
White-throated Swift	2015-2024	-10.69	0.90	-26.55	6.97
Wild Turkey	2015-2024	5.08	0.62	-23.42	32.59
Williamson's Sapsucker	2015-2024	4.85	0.65	-17.65	33.16
Willow Flycatcher	2015-2024	9.14	0.77	-13.79	36.61
Wilson's Warbler	2015-2024	-3.25	0.63	-21.01	17.01
Woodhouse's Scrub-Jay	2015-2024	-5.95	0.87	-17.05	4.86
Yellow Warbler	2015-2024	12.79	0.92	-4.41	34.57
Yellow-breasted Chat	2015-2024	-0.11	0.50	-26.87	35.06
Yellow-rumped Warbler	2015-2024	4.41	0.93	-1.67	10.72

Payette National Forest

For the Payette National Forest, 61 species were declining and 52 were increasing; the mean trend overall was not significantly different than 0 ($\bar{x} = -0.40$, $P = 0.66$, $df = 112$), indicating stable ecological conditions and biodiversity (Fig. Payette 1). There were 7 species with highly significant negative trends and 4 with highly significant positive trends (Table Payette 1) of the 121 species monitored (Table Payette 2).

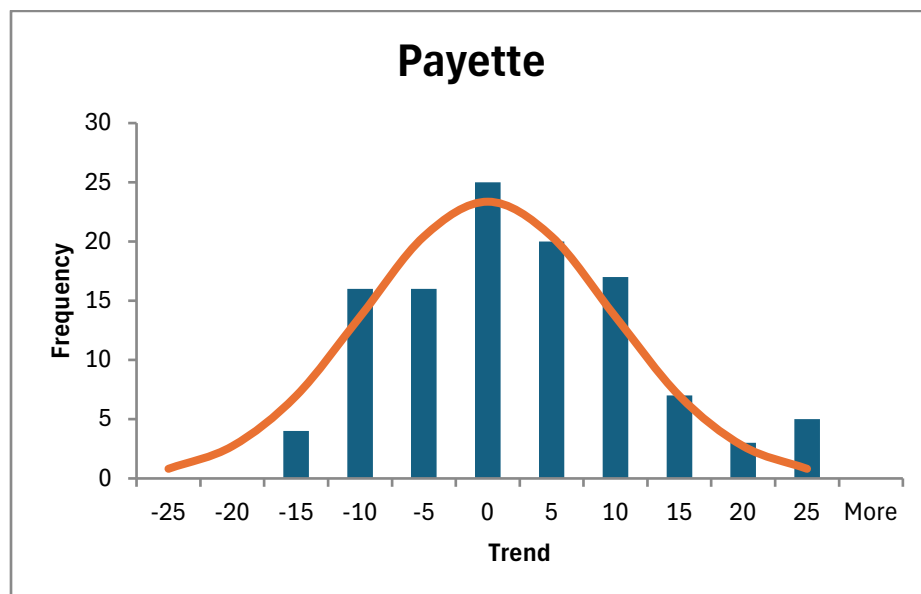


Figure Payette 1. Bird species trend distribution on the Payette National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table Payette 1. Highly significant positively trending species on the Payette National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Ruby-crowned Kinglet	2014-2024	-16.43	0.999	-26.5	-6.04
Dark-eyed Junco	2014-2024	-9.72	0.998	-15.61	-3.4
Western Meadowlark	2014-2024	-17.5	0.990	-29.77	-3.33
Pine Siskin	2014-2024	-12.13	0.993	-22.6	-2.68
Townsend's Warbler	2014-2024	-14.15	0.996	-25.18	-2.58
Hermit Thrush	2014-2024	-11.25	0.984	-20.84	-0.36
Evening Grosbeak	2014-2024	-18.65	0.976	-37.61	-0.14

<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
MacGillivray's Warbler	2014-2024	23.41	0.999	6.58	51
Spotted Towhee	2014-2024	22.9	0.989	2.52	51.44
Orange-crowned Warbler	2014-2024	22.78	0.981	1.76	57.06
Lazuli Bunting	2014-2024	18.35	0.987	1.67	38.65

Table Payette 2. Estimated population change per year for birds on the Payette National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2014-2024	-4.9	0.672	-25.01	19.15
American Dipper	2014-2024	-6.05	0.685	-25.33	19.23
American Goldfinch	2014-2024	5.07	0.638	-18.09	42.53
American Goshawk	2014-2024	-7.15	0.768	-27.93	15.42
American Kestrel	2014-2024	-1.22	0.565	-14.45	14.49
American Robin	2014-2024	-1.2	0.631	-7.16	5.48
American Three-toed Woodpecker	2014-2024	0.15	0.508	-21.71	30.45
Black-backed Woodpecker	2014-2024	7.11	0.749	-13.49	36.94
Black-billed Magpie	2014-2024	-1.54	0.543	-23.34	29.06
Black-capped Chickadee	2014-2024	4.66	0.641	-18.19	36.48
Black-chinned Hummingbird	2014-2024	5.14	0.641	-18.87	37.32
Black-headed Grosbeak	2014-2024	11.14	0.936	-2.97	29.99
Brewer's Blackbird	2014-2024	-7.65	0.745	-26.81	14.71
Brewer's Sparrow	2014-2024	-7.43	0.761	-26.03	15.51
Broad-tailed Hummingbird	2014-2024	-5.39	0.662	-27.72	26.3
Brown Creeper	2014-2024	-10.12	0.882	-24.78	8.4
Brown-headed Cowbird	2014-2024	-8.67	0.871	-22.69	7.79
California Quail	2014-2024	0.36	0.506	-28.91	43.7
Calliope Hummingbird	2014-2024	-5.58	0.703	-24.47	15.78
Canada Jay	2014-2024	-11.7	0.941	-26.12	4.19
Canyon Wren	2014-2024	-0.74	0.526	-23.08	32.87
Cassin's Finch	2014-2024	-1.46	0.588	-12.3	11.12
Cassin's Vireo	2014-2024	-10.46	0.961	-21.81	1.59
Cedar Waxwing	2014-2024	4.09	0.676	-11.9	25.71
Chestnut-backed Chickadee	2014-2024	-7.29	0.700	-32.42	25.19
Chipping Sparrow	2014-2024	-6.2	0.920	-12.89	3.07
Chukar	2014-2024	21.79	0.944	-3.26	60.26
Clark's Nutcracker	2014-2024	-14.32	0.968	-27.39	1.63
Cliff Swallow	2014-2024	-3.91	0.616	-25.87	26.18
Common Nighthawk	2014-2024	5.52	0.695	-14.92	36.2
Common Raven	2014-2024	-8.74	0.910	-21.93	5.32

Species	Years	Trend	f	L95CI	U95CI
Cooper's Hawk	2014-2024	-0.92	0.547	-16.98	17.46
Dark-eyed Junco	2014-2024	-9.72	0.998	-15.61	-3.4
Downy Woodpecker	2014-2024	-3	0.618	-24.43	22.02
Dusky Flycatcher	2014-2024	8.36	0.945	-2.15	22.26
Dusky Grouse	2014-2024	13.51	0.946	-3.73	34.65
Evening Grosbeak	2014-2024	-18.65	0.976	-37.61	-0.14
Fox Sparrow	2014-2024	8.95	0.736	-18.26	38.26
Golden-crowned Kinglet	2014-2024	-3.12	0.613	-21.6	20.05
Gray Catbird	2014-2024	6.27	0.626	-22.65	47.68
Great Horned Owl	2014-2024	1.58	0.548	-18.12	22.83
Hairy Woodpecker	2014-2024	-7.35	0.913	-18.35	3.64
Hammond's Flycatcher	2014-2024	0.18	0.509	-13.92	16.64
Hermit Thrush	2014-2024	-11.25	0.984	-20.84	-0.36
House Finch	2014-2024	10.93	0.746	-20.58	55.13
House Wren	2014-2024	6.92	0.807	-8.39	24.8
Killdeer	2014-2024	-8.81	0.789	-29.14	15.04
Lark Sparrow	2014-2024	0.14	0.504	-22.5	31.85
Lazuli Bunting	2014-2024	18.35	0.987	1.67	38.65
Lewis's Woodpecker	2014-2024	10.34	0.827	-11.14	39.81
Lincoln's Sparrow	2014-2024	-2.52	0.610	-19.97	17.13
MacGillivray's Warbler	2014-2024	23.41	0.999	6.58	51
Merlin	2014-2024	9.29	0.730	-20.08	46.92
Mountain Bluebird	2014-2024	-1.49	0.577	-15.13	15.61
Mountain Chickadee	2014-2024	0.59	0.580	-5.78	8.06
Mountain Quail	2014-2024	-10.84	0.776	-37.55	23.68
Mourning Dove	2014-2024	-6.31	0.870	-17	6.78
Nashville Warbler	2014-2024	2.42	0.595	-16.28	25.89
Northern Flicker	2014-2024	3.03	0.748	-5.88	12.57
Northern Pygmy-Owl	2014-2024	3.13	0.605	-21.36	35.86
Northern Rough-winged Swallow	2014-2024	-2.99	0.588	-25.87	26.09
Olive-sided Flycatcher	2014-2024	6.11	0.786	-7.98	23.99
Orange-crowned Warbler	2014-2024	22.78	0.981	1.76	57.06
Osprey	2014-2024	5.29	0.675	-16.89	36.59
Pacific Wren	2014-2024	-14.99	0.872	-37.78	14.35
Pileated Woodpecker	2014-2024	3.9	0.677	-12.69	27.87
Pine Grosbeak	2014-2024	-14.34	0.877	-32.26	12.04
Pine Siskin	2014-2024	-12.13	0.993	-22.6	-2.68
Pygmy Nuthatch	2014-2024	3.84	0.591	-25.51	44.99
Red Crossbill	2014-2024	-10.54	0.953	-21.96	1.38
Red-breasted Nuthatch	2014-2024	-2.09	0.713	-8.34	5.02
Red-naped Sapsucker	2014-2024	-2.76	0.601	-22.75	23.24

Species	Years	Trend	f	L95CI	U95CI
Red-tailed Hawk	2014-2024	8.56	0.901	-4.53	26.38
Red-winged Blackbird	2014-2024	-14.88	0.828	-40.19	20.22
Rock Wren	2014-2024	4.02	0.695	-10.42	24.36
Ruby-crowned Kinglet	2014-2024	-16.43	0.999	-26.5	-6.04
Ruffed Grouse	2014-2024	-14.47	0.932	-34.48	4.66
Rufous Hummingbird	2014-2024	-4.38	0.636	-26.29	20.34
Sandhill Crane	2014-2024	-4.89	0.654	-24.91	20.62
Savannah Sparrow	2014-2024	-11.77	0.772	-35.74	19.19
Say's Phoebe	2014-2024	-3.45	0.620	-21.93	23.99
Sharp-shinned Hawk	2014-2024	-3.93	0.673	-21.24	15.67
Song Sparrow	2014-2024	15.42	0.922	-5.28	41.78
Spotted Sandpiper	2014-2024	-0.07	0.502	-23.49	33.15
Spotted Towhee	2014-2024	22.9	0.989	2.52	51.44
Steller's Jay	2014-2024	10.02	0.885	-5.31	31.32
Swainson's Hawk	2014-2024	1.68	0.569	-16.49	24.95
Swainson's Thrush	2014-2024	6.35	0.833	-5.74	22.29
Townsend's Solitaire	2014-2024	-13.49	0.966	-30.28	1.33
Townsend's Warbler	2014-2024	-14.15	0.996	-25.18	-2.58
Tree Swallow	2014-2024	-3.65	0.631	-24.39	23.82
Turkey Vulture	2014-2024	0.73	0.521	-18.81	24.14
Varied Thrush	2014-2024	-17.66	0.939	-38.77	5.36
Vaux's Swift	2014-2024	6.48	0.718	-15.98	38.3
Veery	2014-2024	-1.84	0.567	-23.65	24.36
Vesper Sparrow	2014-2024	-10.43	0.837	-28.63	12.01
Violet-green Swallow	2014-2024	-7.61	0.716	-31.86	22.17
Warbling Vireo	2014-2024	9.67	0.937	-2.41	28.68
Western Bluebird	2014-2024	-2.25	0.558	-32.96	47.44
Western Flycatcher	2014-2024	3.04	0.578	-21.21	40.48
Western Meadowlark	2014-2024	-17.5	0.990	-29.77	-3.33
Western Tanager	2014-2024	0.35	0.553	-5.68	7.24
Western Wood-Pewee	2014-2024	0.36	0.527	-11.19	15.02
White-breasted Nuthatch	2014-2024	-4.5	0.625	-26.14	32.16
White-crowned Sparrow	2014-2024	7.84	0.728	-15.28	40.25
Wild Turkey	2014-2024	1.42	0.543	-23.35	34.65
Williamson's Sapsucker	2014-2024	11.85	0.865	-9.32	40.98
Willow Flycatcher	2014-2024	19.33	0.939	-4.78	54.61
Wilson's Snipe	2014-2024	5.64	0.643	-19.72	44.09
Wilson's Warbler	2014-2024	-8.36	0.771	-28.15	17.03
Yellow Warbler	2014-2024	13.49	0.912	-4.55	39.21
Yellow-breasted Chat	2014-2024	24.28	0.891	-11.11	87.82
Yellow-rumped Warbler	2014-2024	-1.26	0.657	-7.22	5.25

Salmon-Challis National Forest

For the Salmon-Challis National Forest, 54 species were declining and 43 were increasing; the mean trend overall was not significantly different than 0 ($\bar{x} = -1.72$, $P=0.09$, $df=96$), indicating stable ecological conditions and biodiversity (Fig. SC 1). There were 6 species with highly significant negative trends and 1 with a highly significant positive trend (Table SC 1) of the 97 species monitored (Table SC 2).

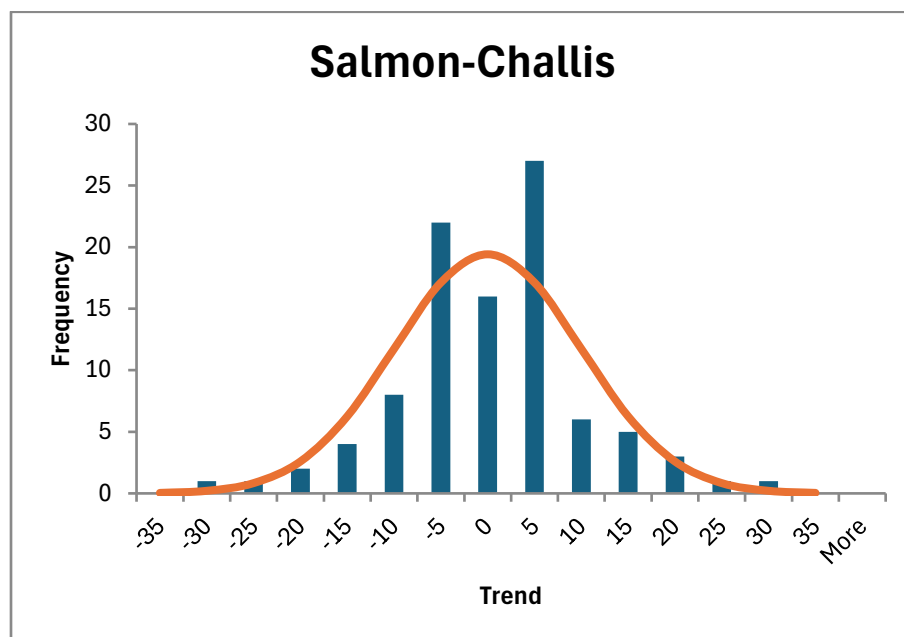


Figure SC 1. Bird species trend distribution on the Salmon-Challis National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table SC 1. Highly significant positively trending species on the Salmon-Challis National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Townsend's Solitaire	2017-2024	-21.66	1.000	-34.38	-8.92
Pacific Wren	2017-2024	-31.36	0.983	-57.62	-1.77
Pine Siskin	2017-2024	-10.94	0.991	-19.32	-1.49
Hermit Thrush	2017-2024	-9.46	0.985	-17.87	-1.13
Yellow-rumped Warbler	2017-2024	-7.61	0.982	-14.23	-0.59
Red-breasted Nuthatch	2017-2024	-12.32	0.978	-22.84	-0.3
<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Steller's Jay	2017-2024	26.75	0.976	0.26	77.16

Table SC 2. Estimated population change per year for birds on the Salmon-Challis National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2017-2024	13.15	0.774	-19.04	60.48
American Goldfinch	2017-2024	-23.05	0.896	-51.84	15.41
American Kestrel	2017-2024	-2.88	0.621	-21.47	17.93
American Robin	2017-2024	-1.37	0.635	-10.51	8.44
American Three-toed Woodpecker	2017-2024	-2.31	0.543	-32.67	38.98
Bank Swallow	2017-2024	-25.78	0.924	-53.66	13.48
Black-backed Woodpecker	2017-2024	22.46	0.914	-9.00	68.23
Black-billed Magpie	2017-2024	3.76	0.641	-17.3	28.2
Black-chinned Hummingbird	2017-2024	0.79	0.513	-33.13	56.61
Black-headed Grosbeak	2017-2024	19.33	0.859	-12.27	67.62
Brewer's Blackbird	2017-2024	7.11	0.687	-18.63	44.19
Brewer's Sparrow	2017-2024	1.42	0.579	-11.8	14.63
Brown Creeper	2017-2024	-0.24	0.513	-16.8	21.42
Brown-headed Cowbird	2017-2024	-10.23	0.733	-42.67	33.33
Bullock's Oriole	2017-2024	-5.26	0.611	-40.34	45.22
Calliope Hummingbird	2017-2024	0.54	0.519	-30.6	40.02
Canada Jay	2017-2024	-15.75	0.960	-32.73	2.7
Canyon Wren	2017-2024	-9.61	0.701	-38.52	35.42
Cassin's Finch	2017-2024	-9.79	0.913	-22.18	4.73
Cassin's Vireo	2017-2024	-8.16	0.755	-31.78	19.13
Cedar Waxwing	2017-2024	-17.09	0.829	-48.05	22.5
Chipping Sparrow	2017-2024	-5.59	0.911	-12.93	2.62
Chukar	2017-2024	3.13	0.576	-27.58	52.13
Clark's Nutcracker	2017-2024	-1.18	0.581	-11.94	11.24
Cliff Swallow	2017-2024	3.55	0.581	-24.1	42.89
Common Merganser	2017-2024	-6.36	0.633	-37.72	44.3
Common Nighthawk	2017-2024	13.84	0.888	-8.41	43.7
Common Poorwill	2017-2024	18.03	0.842	-16.00	68.19
Common Raven	2017-2024	2.00	0.631	-9.23	13.67
Cooper's Hawk	2017-2024	6.77	0.692	-18.63	40.37
Dark-eyed Junco	2017-2024	-4.45	0.881	-12.22	2.8
Dusky Flycatcher	2017-2024	-7.37	0.914	-17.24	3.23
Dusky Grouse	2017-2024	3.21	0.610	-19.28	27.61
Eastern Kingbird	2017-2024	-5.02	0.604	-37.58	43.74
Evening Grosbeak	2017-2024	-19.09	0.874	-49.69	15.51
Golden Eagle	2017-2024	-7.31	0.742	-29.21	17.58
Golden-crowned Kinglet	2017-2024	-4.07	0.625	-26.29	26.74
Gray Flycatcher	2017-2024	-2.92	0.560	-33.53	35.22

Species	Years	Trend	f	L95CI	U95CI
Great Horned Owl	2017-2024	3.98	0.628	-19.04	32.17
Greater Sage-Grouse	2017-2024	-7.26	0.675	-34.6	27.83
Green-tailed Towhee	2017-2024	2.12	0.600	-12.68	20.03
Hairy Woodpecker	2017-2024	-4.98	0.754	-18.78	8.99
Hammond's Flycatcher	2017-2024	11.51	0.844	-7.50	40.64
Hermit Thrush	2017-2024	-9.46	0.985	-17.87	-1.13
Horned Lark	2017-2024	8.80	0.711	-19.79	45.23
House Wren	2017-2024	2.18	0.573	-18.2	27.46
Lark Sparrow	2017-2024	11.71	0.788	-14.59	44
Lazuli Bunting	2017-2024	-12.71	0.851	-32.13	9.94
Lincoln's Sparrow	2017-2024	4.48	0.611	-20.43	39.12
MacGillivray's Warbler	2017-2024	4.21	0.672	-13.36	22.11
Mountain Bluebird	2017-2024	-6.39	0.860	-17.49	5.59
Mountain Chickadee	2017-2024	-7.81	0.963	-15.88	0.9
Mourning Dove	2017-2024	17.88	0.879	-11	56.15
Nashville Warbler	2017-2024	-11.15	0.695	-49.07	37.11
Northern Flicker	2017-2024	-1.8	0.626	-11.91	9.56
Northern Harrier	2017-2024	-6.38	0.669	-31.08	27.61
Northern Rough-winged Swallow	2017-2024	-3.76	0.584	-33.96	42.25
Olive-sided Flycatcher	2017-2024	2.74	0.629	-13.74	20.86
Orange-crowned Warbler	2017-2024	-7.69	0.712	-30.25	20.87
Pacific Wren	2017-2024	-31.36	0.983	-57.62	-1.77
Peregrine Falcon	2017-2024	-5.12	0.639	-32.89	27.55
Pileated Woodpecker	2017-2024	7.85	0.710	-21.37	49.07
Pine Siskin	2017-2024	-10.94	0.991	-19.32	-1.49
Prairie Falcon	2017-2024	-2.9	0.596	-24.41	25.51
Red Crossbill	2017-2024	2.34	0.603	-12.64	20.61
Red-breasted Nuthatch	2017-2024	-12.32	0.978	-22.84	-0.3
Red-naped Sapsucker	2017-2024	4.66	0.650	-18.5	37.38
Red-tailed Hawk	2017-2024	3.7	0.651	-13.76	24.63
Rock Pigeon	2017-2024	-13.62	0.760	-40.81	25.1
Rock Wren	2017-2024	4.03	0.740	-7.2	17.44
Ruby-crowned Kinglet	2017-2024	-7.58	0.960	-15.43	1.03
Sage Thrasher	2017-2024	-1.73	0.574	-22.97	22.62
Sandhill Crane	2017-2024	3.41	0.564	-31.68	57.95
Sharp-shinned Hawk	2017-2024	-5.45	0.629	-30.91	42.11
Song Sparrow	2017-2024	11.78	0.797	-12.72	45.67
Spotted Towhee	2017-2024	-5.24	0.659	-29.3	24.14
Steller's Jay	2017-2024	26.75	0.976	0.26	77.16
Swainson's Hawk	2017-2024	-12.65	0.829	-32.64	18.79
Swainson's Thrush	2017-2024	3.00	0.604	-16.72	27.58

Species	Years	Trend	f	L95CI	U95CI
Townsend's Solitaire	2017-2024	-21.66	1.000	-34.38	-8.92
Townsend's Warbler	2017-2024	-16.24	0.808	-46.36	27.61
Tree Swallow	2017-2024	1.21	0.544	-21.62	30.13
Vesper Sparrow	2017-2024	2.63	0.613	-12.01	21.53
Violet-green Swallow	2017-2024	3.26	0.612	-17.27	27.63
Warbling Vireo	2017-2024	3.54	0.787	-5.58	14.34
Western Flycatcher	2017-2024	7.63	0.698	-16.77	40.98
Western Meadowlark	2017-2024	0.43	0.513	-24.71	29.16
Western Tanager	2017-2024	-5.37	0.910	-12.81	3.04
Western Wood-Pewee	2017-2024	-0.54	0.518	-18.84	22.24
White-breasted Nuthatch	2017-2024	-11.22	0.730	-40.14	33.61
White-crowned Sparrow	2017-2024	-2.74	0.561	-28.49	30.85
White-throated Swift	2017-2024	-1.41	0.529	-31.57	40.48
Williamson's Sapsucker	2017-2024	9.85	0.709	-22.23	54.7
Willow Flycatcher	2017-2024	2.33	0.540	-31.33	58.04
Wilson's Warbler	2017-2024	-6.15	0.625	-35.42	39.27
Yellow Warbler	2017-2024	2.63	0.607	-16.44	25.71
Yellow-rumped Warbler	2017-2024	-7.61	0.982	-14.23	-0.59

Sawtooth National Forest

For the Sawtooth National Forest, 59 species were declining and 56 were increasing; the mean trend overall was not significantly different than 0 ($\bar{x} = -0.61$, $P=0.48$, $df=114$), indicating stable ecological conditions and biodiversity (Fig. Sawtooth 1). There were 2 species with highly significant negative trends and 1 with a highly significant positive trend (Table Sawtooth 1) of the 115 species monitored (Table Sawtooth 2).

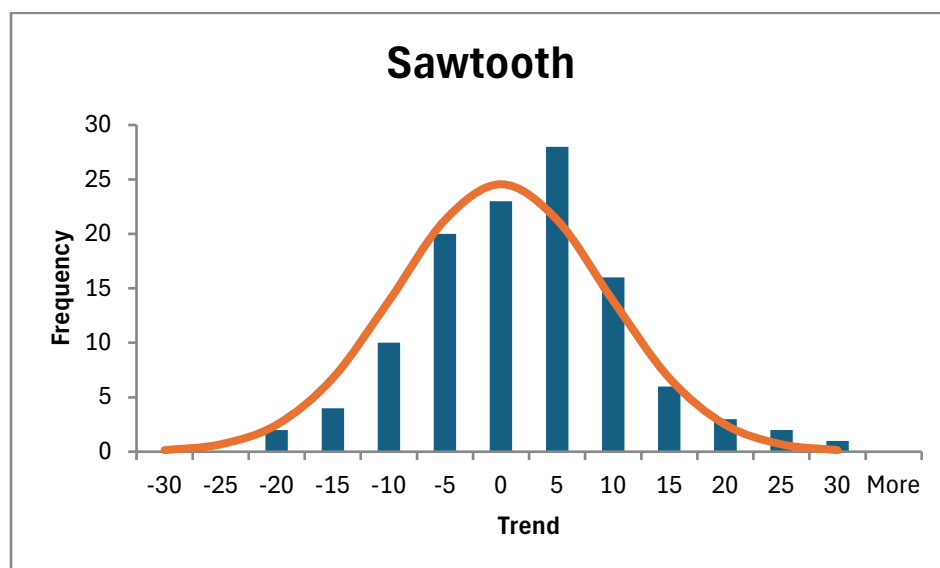


Figure Sawtooth 1. Bird species trend distribution on the Sawtooth National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table Sawtooth 1. Highly significant positively trending species on the Sawtooth National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Townsend's Solitaire	2017-2024	-21.19	0.986	-39.75	-2.71
Ruby-crowned Kinglet	2017-2024	-12.64	0.994	-22.38	-2.45
<u>Positive Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Hairy Woodpecker	2017-2024	17.01	0.980	0.8	38.38

Table Sawtooth 2. Estimated population change per year for birds on the Sawtooth National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Goldfinch	2017-2024	-13.92	0.81	-38.54	22.87
American Goshawk	2017-2024	-9.19	0.71	-40.22	39.22
American Kestrel	2017-2024	-10.67	0.78	-35	21.37
American Robin	2017-2024	-1.16	0.63	-9.89	7.31
American Three-toed Woodpecker	2017-2024	5.47	0.59	-30.51	67.39
Ash-throated Flycatcher	2017-2024	23.67	0.92	-7.97	78.48
Bank Swallow	2017-2024	-21.38	0.84	-53.3	24.48
Bewick's Wren	2017-2024	7.48	0.65	-25.98	63.65
Black-backed Woodpecker	2017-2024	24.4	0.92	-9.52	70.53
Black-billed Magpie	2017-2024	-1.95	0.56	-25.18	27.16
Black-capped Chickadee	2017-2024	8.7	0.74	-16.34	43.61
Black-chinned Hummingbird	2017-2024	-3.77	0.58	-35.19	43.17
Black-headed Grosbeak	2017-2024	18.5	0.96	-2.39	42.69
Black-throated Gray Warbler	2017-2024	-1.29	0.53	-25.2	30.55
Blue-gray Gnatcatcher	2017-2024	2.05	0.58	-19	29.24
Brewer's Blackbird	2017-2024	2.1	0.55	-26.35	41.81
Brewer's Sparrow	2017-2024	-6.23	0.84	-17.58	5.75
Broad-tailed Hummingbird	2017-2024	6.14	0.66	-18.55	43.08
Brown Creeper	2017-2024	-9.56	0.85	-26.03	12.26
Brown-headed Cowbird	2017-2024	3.34	0.64	-13.37	26.78
Bullock's Oriole	2017-2024	-13.97	0.82	-37.46	16.39
Bushtit	2017-2024	13.68	0.80	-15.44	66.58
Calliope Hummingbird	2017-2024	1.57	0.54	-31.71	47.43
Canada Jay	2017-2024	8.61	0.73	-17.24	58.73
Cassin's Finch	2017-2024	-6.33	0.80	-18.56	9.58
Cedar Waxwing	2017-2024	-3.65	0.57	-33.91	39.71
Chipping Sparrow	2017-2024	-4.87	0.85	-14.06	5.05
Clark's Nutcracker	2017-2024	4.96	0.73	-10.02	23.52
Cliff Swallow	2017-2024	-0.59	0.51	-37.6	61
Common Merganser	2017-2024	-12.77	0.76	-43.44	34.5
Common Nighthawk	2017-2024	-3.75	0.64	-20.95	19.68
Common Raven	2017-2024	1.16	0.56	-10.74	15.12
Common Yellowthroat	2017-2024	-9.21	0.74	-28.82	22.53
Cooper's Hawk	2017-2024	0.6	0.52	-20.2	25.89
Dark-eyed Junco	2017-2024	-5.12	0.89	-12.94	2.88
Downy Woodpecker	2017-2024	7.64	0.67	-22.88	56.54
Dusky Flycatcher	2017-2024	-0.65	0.55	-10.59	10.15
Dusky Grouse	2017-2024	10.18	0.84	-8.74	34.24

Species	Years	Trend	f	L95CI	U95CI
Eurasian Collared-Dove	2017-2024	1.81	0.53	-31.01	55.4
European Starling	2017-2024	2.95	0.55	-34.3	63.13
Fox Sparrow	2017-2024	8.63	0.73	-16.26	40.47
Golden-crowned Kinglet	2017-2024	-15.73	0.78	-49.21	30.08
Gray Flycatcher	2017-2024	6.82	0.73	-13.59	32.81
Great Horned Owl	2017-2024	-11.19	0.79	-32.15	19.71
Green-tailed Towhee	2017-2024	-4.6	0.73	-18.05	11.19
Hairy Woodpecker	2017-2024	17.01	0.98	0.8	38.38
Hammond's Flycatcher	2017-2024	0.36	0.52	-16.88	23.65
Hermit Thrush	2017-2024	-7.97	0.94	-17.79	2.42
Horned Lark	2017-2024	-5.28	0.61	-37.39	43.85
House Finch	2017-2024	13.45	0.77	-20.87	70.19
House Wren	2017-2024	-5.84	0.80	-18.68	8.99
Juniper Titmouse	2017-2024	0.93	0.52	-23.76	36.48
Killdeer	2017-2024	-7.5	0.70	-36.08	36.33
Lark Sparrow	2017-2024	3.6	0.63	-16.39	27.45
Lazuli Bunting	2017-2024	0.29	0.52	-16.22	20.49
Lesser Goldfinch	2017-2024	12.11	0.70	-27.39	68.05
Lewis's Woodpecker	2017-2024	10.87	0.71	-22.93	66.72
Lincoln's Sparrow	2017-2024	9.14	0.81	-12.73	37.58
Loggerhead Shrike	2017-2024	5.55	0.63	-21.16	44.17
MacGillivray's Warbler	2017-2024	1.64	0.60	-10.68	15.77
Mallard	2017-2024	0.67	0.52	-36.29	61.75
Mountain Bluebird	2017-2024	1.71	0.61	-9.95	14.44
Mountain Chickadee	2017-2024	-5.36	0.86	-14.13	4.58
Mourning Dove	2017-2024	-2.4	0.64	-14.22	13.73
Nashville Warbler	2017-2024	-14.26	0.81	-41.71	20
Northern Flicker	2017-2024	-2.65	0.69	-13.59	8.76
Northern Harrier	2017-2024	-2.93	0.58	-27.25	32.88
Northern Rough-winged Swallow	2017-2024	-4.42	0.62	-29.14	30.69
Olive-sided Flycatcher	2017-2024	15.4	0.94	-4.61	41.8
Orange-crowned Warbler	2017-2024	-6.8	0.77	-21.54	12.3
Pacific Wren	2017-2024	-18.92	0.80	-51.18	42.81
Pine Grosbeak	2017-2024	-13.29	0.77	-42.75	24.99
Pine Siskin	2017-2024	-9.77	0.97	-19.33	0.5
Pinyon Jay	2017-2024	4.3	0.59	-24.84	42.95
Plumbeous Vireo	2017-2024	-15.76	0.87	-38.21	13.08
Red Crossbill	2017-2024	1.25	0.53	-21.21	25.27
Red-breasted Nuthatch	2017-2024	0.2	0.51	-9.89	11.99
Red-naped Sapsucker	2017-2024	-7.47	0.77	-26.27	15.96
Red-tailed Hawk	2017-2024	0.87	0.54	-13.72	20.39

Species	Years	Trend	f	L95CI	U95CI
Rock Wren	2017-2024	9.31	0.89	-5.28	25.98
Ruby-crowned Kinglet	2017-2024	-12.64	0.99	-22.38	-2.45
Ruffed Grouse	2017-2024	-8.27	0.75	-30.77	18.99
Sage Thrasher	2017-2024	-7.97	0.70	-31.48	22.72
Sandhill Crane	2017-2024	8.51	0.65	-25.8	64.02
Savannah Sparrow	2017-2024	0.78	0.51	-38.2	55.82
Say's Phoebe	2017-2024	9.31	0.71	-23.03	56.48
Sharp-shinned Hawk	2017-2024	0.24	0.50	-27.99	47.61
Song Sparrow	2017-2024	-4.99	0.69	-25.54	21.09
Spotted Sandpiper	2017-2024	-9.69	0.69	-40.82	39.63
Spotted Towhee	2017-2024	-1.67	0.55	-22.03	25.52
Spruce Grouse	2017-2024	-15.38	0.83	-42.85	21.26
Steller's Jay	2017-2024	5.24	0.61	-27.5	58.97
Swainson's Hawk	2017-2024	-4.24	0.60	-27.54	35.6
Swainson's Thrush	2017-2024	-1.04	0.55	-16.57	15.96
Townsend's Solitaire	2017-2024	-21.19	0.99	-39.75	-2.71
Townsend's Warbler	2017-2024	-5.43	0.61	-39.04	42.32
Tree Swallow	2017-2024	7.88	0.71	-18.89	44.25
Turkey Vulture	2017-2024	2.1	0.56	-22.91	30.61
Vesper Sparrow	2017-2024	-0.05	0.50	-16.89	19.26
Violet-green Swallow	2017-2024	-5.36	0.67	-28.67	21.01
Virginia's Warbler	2017-2024	29.74	0.93	-7.31	86.84
Warbling Vireo	2017-2024	-2.01	0.64	-12.42	9.53
Western Flycatcher	2017-2024	9.83	0.77	-16.06	42.84
Western Meadowlark	2017-2024	-4.37	0.63	-26.74	24.13
Western Tanager	2017-2024	1.15	0.58	-8.3	11.16
Western Wood-Pewee	2017-2024	2.94	0.60	-20.84	33.36
White-breasted Nuthatch	2017-2024	4.43	0.59	-28.44	60.77
White-crowned Sparrow	2017-2024	1.77	0.58	-13.55	19.6
White-throated Swift	2017-2024	-11.42	0.71	-46.51	43.81
Willow Flycatcher	2017-2024	14.1	0.75	-22.52	71.41
Wilson's Snipe	2017-2024	-13.6	0.72	-50.12	39.09
Wilson's Warbler	2017-2024	-8.5	0.70	-33.17	27.77
Woodhouse's Scrub-Jay	2017-2024	0.01	0.50	-24.58	29.27
Yellow Warbler	2017-2024	-3.89	0.68	-19.59	13.55
Yellow-rumped Warbler	2017-2024	-3.44	0.81	-10.83	4.62

Uinta-Wasatch-Cache National Forest

For the Uinta-Wasatch-Cache National Forest, 48 species were declining and 63 were increasing; the mean trend overall was significantly different than 0 ($\bar{x}= 2.00$, $P=0.04$, $df=110$), indicating increasing biodiversity under current ecological conditions (Fig. UWC 1). There was 1 species with highly significant negative trends and 3 with highly significant positive trends (Table UWC 1) of the 111 species monitored (Table UWC 2).

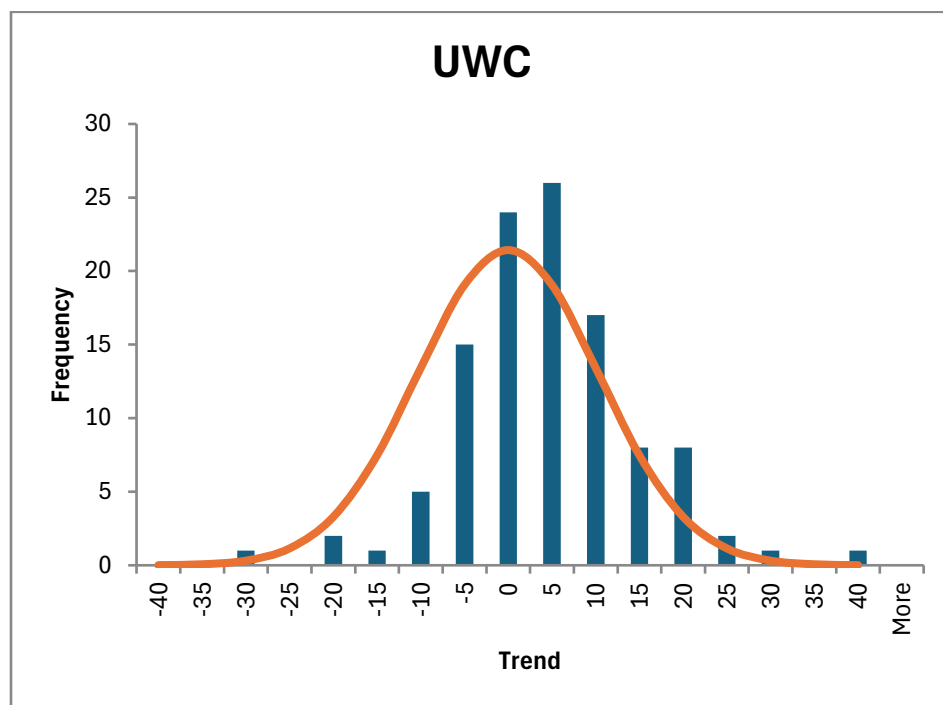


Figure UWC 1. Bird species trend distribution on the Uinta-Wasatch-Cache National Forest. The orange curve represents a normal distribution scaled to the observed data, using the standard deviation of the observed data, but with a mean of zero.

Table UWC 1. Highly significant positively trending species on the Uinta-Wasatch-Cache National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

<u>Negative Trend</u>					
Species	Years	Trend	f	L95CI	U95CI
Golden-crowned Kinglet	2017-2024	-33.66	0.98	-56.12	-0.67
Positive Trend					
Species	Years	Trend	F	L95CI	U95CI
Lazuli Bunting	2017-2024	23.01	0.99	4.45	45.18
Western Flycatcher	2017-2024	37.11	0.99	4.03	91.92
Common Raven	2017-2024	29.56	0.99	1.99	67.79

Table UWC 2. Estimated population change per year for birds on the Uinta-Wasatch-Cache National Forest. Trend=median population change (%); f=confidence in the direction (not magnitude) of the reported trend. L95CI=lower 95% credible interval; U95CI=upper 95% credible interval.

Species	Years	Trend	f	L95CI	U95CI
American Crow	2017-2024	4.82	0.601	-26.47	51.53
American Goldfinch	2017-2024	4.87	0.609	-22.38	40.93
American Goshawk	2017-2024	-11.07	0.764	-37.38	22.87
American Kestrel	2017-2024	-4.28	0.626	-27.85	27.01
American Robin	2017-2024	4.1	0.738	-7	17.38
American Three-toed Woodpecker	2017-2024	8.66	0.658	-24.65	58.87
Ash-throated Flycatcher	2017-2024	-0.39	0.510	-36.69	49.89
Bewick's Wren	2017-2024	-5.25	0.613	-36.17	41.01
Black-backed Woodpecker	2017-2024	22.16	0.884	-13.92	75.5
Black-billed Magpie	2017-2024	3.23	0.595	-20.28	33.51
Black-capped Chickadee	2017-2024	1.57	0.556	-20.04	29.48
Black-chinned Hummingbird	2017-2024	11.55	0.778	-17.09	46.73
Black-headed Grosbeak	2017-2024	9.65	0.878	-6.03	28.1
Black-throated Gray Warbler	2017-2024	-1.37	0.527	-35.41	49.86
Blue-gray Gnatcatcher	2017-2024	14.45	0.814	-13.04	55.06
Brewer's Blackbird	2017-2024	-3.16	0.616	-24.47	27.61
Brewer's Sparrow	2017-2024	5.13	0.637	-18.54	34.9
Broad-tailed Hummingbird	2017-2024	6.18	0.793	-8.35	23.22
Brown Creeper	2017-2024	16.37	0.823	-16.48	65.77
Brown-headed Cowbird	2017-2024	4.81	0.628	-22.12	40.54
Bullock's Oriole	2017-2024	-7.93	0.693	-33.82	29.86
Bushtit	2017-2024	11.84	0.743	-19.02	58.48
Calliope Hummingbird	2017-2024	1.67	0.547	-29.16	46.44
Canada Jay	2017-2024	1.4	0.573	-17.8	20.07
Canyon Wren	2017-2024	-17.36	0.835	-45.61	22.95
Cassin's Finch	2017-2024	-20	0.943	-38.25	3.41
Cedar Waxwing	2017-2024	-2.97	0.549	-39.01	58.07
Chipping Sparrow	2017-2024	7.19	0.807	-7.92	24.7
Chukar	2017-2024	-5.26	0.615	-32.62	28.74
Clark's Nutcracker	2017-2024	-4.86	0.657	-25.87	25.43
Cliff Swallow	2017-2024	0.14	0.503	-29	45.76
Common Nighthawk	2017-2024	18.1	0.953	-3.58	45.78
Common Raven	2017-2024	29.56	0.988	1.99	67.79
Common Yellowthroat	2017-2024	-8.11	0.668	-41.5	34.26
Cooper's Hawk	2017-2024	0.45	0.516	-18.42	26.92
Dark-eyed Junco	2017-2024	-2.7	0.655	-15.64	10.43
Downy Woodpecker	2017-2024	-23.09	0.948	-45.62	4.76

Species	Years	Trend	f	L95CI	U95CI
Dusky Flycatcher	2017-2024	4.84	0.707	-11.16	20.85
Dusky Grouse	2017-2024	13.29	0.884	-8.19	46.33
Eurasian Collared-Dove	2017-2024	-6.24	0.630	-34.62	38.83
Fox Sparrow	2017-2024	9.42	0.683	-23.49	56.93
Golden Eagle	2017-2024	-2.75	0.613	-21.98	23.72
Golden-crowned Kinglet	2017-2024	-33.66	0.978	-56.12	-0.67
Gray Flycatcher	2017-2024	-0.48	0.510	-34.61	49.49
Great Blue Heron	2017-2024	-12.72	0.768	-36.93	24.72
Great Horned Owl	2017-2024	3.48	0.582	-23.99	41.37
Greater Sage-Grouse	2017-2024	-6.54	0.648	-34.81	35.17
Green-tailed Towhee	2017-2024	9.96	0.883	-6.35	29.61
Hairy Woodpecker	2017-2024	12.25	0.810	-13.24	39.62
Hammond's Flycatcher	2017-2024	-9.87	0.824	-29.59	13.12
Hermit Thrush	2017-2024	-0.5	0.526	-12.57	13.72
Horned Lark	2017-2024	-3.46	0.598	-27.11	26.05
House Finch	2017-2024	15.96	0.799	-18.23	64.79
House Wren	2017-2024	-4.38	0.661	-23.95	17.88
Killdeer	2017-2024	-3.72	0.589	-33.24	41.4
Lark Sparrow	2017-2024	17.43	0.863	-12.91	55.15
Lazuli Bunting	2017-2024	23.01	0.994	4.45	45.18
Lesser Goldfinch	2017-2024	5.91	0.626	-27.24	57.79
Lewis's Woodpecker	2017-2024	14.25	0.780	-22.71	72.37
Lincoln's Sparrow	2017-2024	-3.79	0.618	-26.22	24.91
MacGillivray's Warbler	2017-2024	8.88	0.873	-6.4	25.59
Mallard	2017-2024	-8.44	0.692	-36.75	31.74
Mountain Bluebird	2017-2024	1.86	0.558	-18.29	25.94
Mountain Chickadee	2017-2024	1.94	0.617	-12.47	17.61
Mourning Dove	2017-2024	5.23	0.658	-15.96	32.43
Northern Flicker	2017-2024	10.8	0.907	-4.62	30.09
Northern Harrier	2017-2024	0.93	0.533	-20.41	29.29
Northern Pygmy-Owl	2017-2024	6.95	0.667	-22.39	47.64
Northern Rough-winged Swallow	2017-2024	-0.03	0.501	-34	45.61
Olive-sided Flycatcher	2017-2024	6.68	0.666	-20.2	38.46
Orange-crowned Warbler	2017-2024	-7.31	0.773	-24.51	12.78
Pine Grosbeak	2017-2024	-3.57	0.609	-27.35	26.18
Pine Siskin	2017-2024	2.72	0.639	-12.14	21.24
Plumbeous Vireo	2017-2024	-3.59	0.579	-36.48	43.35
Red Crossbill	2017-2024	-7.54	0.744	-26.94	18.05
Red-breasted Nuthatch	2017-2024	-4.86	0.767	-16.88	8.48
Red-naped Sapsucker	2017-2024	-2.64	0.568	-27.05	37.54
Red-tailed Hawk	2017-2024	-0.59	0.527	-21.51	23.21

Species	Years	Trend	f	L95CI	U95CI
Rock Wren	2017-2024	9.49	0.804	-12.81	36.27
Ruby-crowned Kinglet	2017-2024	-14.29	0.969	-27.14	0.8
Ruffed Grouse	2017-2024	-12.43	0.799	-33.12	16.83
Rufous Hummingbird	2017-2024	-10.85	0.678	-41.76	43.47
Sage Thrasher	2017-2024	-0.52	0.513	-29.33	38.89
Sagebrush Sparrow	2017-2024	1.92	0.533	-34.97	60.59
Sandhill Crane	2017-2024	1.75	0.538	-30.91	45.72
Say's Phoebe	2017-2024	2.61	0.556	-26.93	49.06
Sharp-shinned Hawk	2017-2024	-5.42	0.659	-30.19	29.32
Song Sparrow	2017-2024	1.7	0.542	-21.72	29.44
Spotted Towhee	2017-2024	2.91	0.616	-15.79	25.25
Steller's Jay	2017-2024	4.22	0.641	-16.67	34.11
Swainson's Hawk	2017-2024	-2.4	0.570	-27.94	41.97
Swainson's Thrush	2017-2024	19.22	0.854	-16.32	73.35
Townsend's Solitaire	2017-2024	-6.56	0.691	-27.63	20.17
Tree Swallow	2017-2024	-8.58	0.674	-38.15	35.87
Turkey Vulture	2017-2024	7.15	0.659	-23.67	44.54
Vesper Sparrow	2017-2024	16.25	0.833	-16.79	59.8
Violet-green Swallow	2017-2024	1.32	0.524	-30.03	51.95
Virginia's Warbler	2017-2024	3.66	0.611	-19.48	34.95
Warbling Vireo	2017-2024	4.7	0.740	-9.49	21.46
Western Flycatcher	2017-2024	37.11	0.985	4.03	91.92
Western Kingbird	2017-2024	9.24	0.661	-27.52	68.03
Western Tanager	2017-2024	15.46	0.970	-0.57	33.4
Western Wood-Pewee	2017-2024	-8.41	0.764	-27.99	16.74
White-breasted Nuthatch	2017-2024	7.46	0.641	-27.07	57.43
White-crowned Sparrow	2017-2024	10.53	0.728	-18.76	51.55
White-throated Swift	2017-2024	-5.94	0.627	-37.18	36.12
Williamson's Sapsucker	2017-2024	15.89	0.798	-17.95	66.92
Wilson's Snipe	2017-2024	-0.46	0.513	-31.44	42.17
Wilson's Warbler	2017-2024	-2.53	0.547	-36.47	45.72
Yellow Warbler	2017-2024	6.18	0.680	-15.6	33.69
Yellow-rumped Warbler	2017-2024	2.91	0.664	-10.89	19.06