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Broader-scale Terrestrial Wildlife Monitoring Evaluation Report for the Intermountain Region

2025

Photo: Clark's Nutcracker, Elizabeth Wharton, Uinta-Wasatch-Cache National Forest.

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Need and Purpose of Monitoring

The 2012 Planning Rule (219.12) and Forest Service Handbook (1909.12, Chapter 30), require creating a Regional Forester's broader-scale monitoring evaluation report every 5 years. This document satisfies part of that requirement, based on the Intermountain Region Broader-scale Terrestrial Wildlife Monitoring Strategy (https://www.fs.usda.gov/detail/r4/plants-animals/wildlife/?cid=FSEPRD940029). Ideally, information presented here will guide regional and forest management priorities, forest plan assessment, and inform the public about conditions on US Forest Service lands.

Monitoring topics for terrestrial wildlife are a subset of the eight topics required for forests in the 2012 Rule. Only status[1] for topics 2,3, and 4 are the subject of this report.

Monitoring questions must address the following topics (per 36 CFR sec 219.12 - Monitoring and Forest Service Manual 1909.12 sec. 32.13 - Content of the Plan Monitoring Program):

1. Status of select watershed conditions.
2. **Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.**
3. **Status of focal species to assess the ecological conditions.**
4. **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.**
5. Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
6. Measurable changes on the plan area related to climate change and other stressors that might be affecting the plan area.
7. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
8. Effects of each management system to determine that they do not substantially and permanently impair the productivity of the land.
9. Social, economic, and cultural sustainability must also be addressed in the monitoring plan because sustainability is an inherent part of several of the required monitoring items.

[1] "Status" is not defined in Rule or Directives. At a minimum, status can be the documented presence of a species in a region or forest, but population trend over time is the preferred metric. The time scale used is not necessarily based on historical estimates but is in the context of the 10-15 year forest planning interval required by National Forest Management Act and the 2012 Rule.

Topic 1: Status of Select Ecosystems

Methods and Datasets

This status of general ecological conditions was assessed by evaluating the biodiversity of bird species on USFS lands. Birds are excellent indicators of biodiversity because a wide variety of species rely on a broad range of habitat types from wet to dry, low to high elevation, and early to late seral succession. A broad and stable array of bird species on a landscape indicates a broad array of favorable ecological conditions for that landscape.

Landscapes are diverse and dynamic due to natural and managed ecological conditions. At a given time in a dynamic system, some species will be favored by current conditions, with their populations increasing, but others will be adversely impacted, and their populations will be decreasing. As a forest ages, for example, early seral stage dependent bird species will be in decline while later seral stage species will be increasing dues to shifts in available habitat. A balance of upward, stable, and downward trending bird species likely indicates favorable ecological conditions across the landscape, so graphing species trends in a healthy and balanced ecosystem should produce a bell-shaped histogram with species trends centered around 1.0 (i.e., stable growth rates); compromised ecosystem health is suspected if the mean trend is <1.0 or the distribution is skewed <1.0 (Figure 1.) This approach was used to evaluate bird population trends as indicators of general ecological conditions.

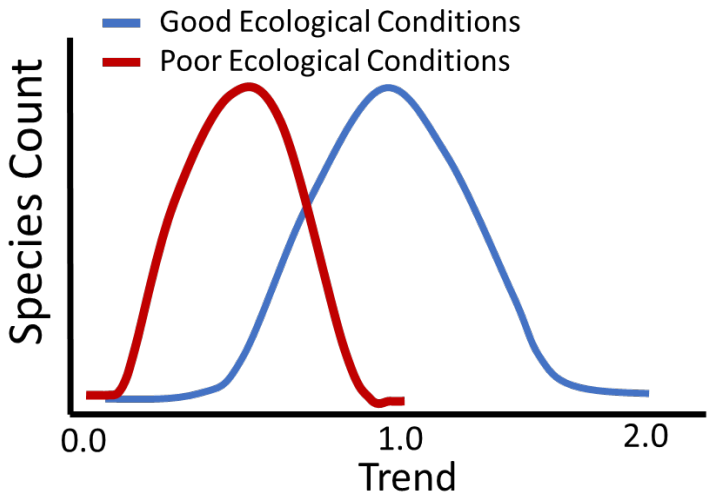

Figure 1. Representative example of bird population density trends as indicators of general ecological conditions. If most species populations are trending near and around 1.0 (i.e., stable), good ecological condition are inferred. If most species population trends are below 1.0, or the data skew below 1.0, it indicates species declines and poor ecological conditions.

Analysis and information are from the 2024 Intermountain Region Broad-Scale Bird Monitoring report (https://www.fs.usda.gov/detail/r4/plants-animals/wildlife/?cid=FSEPRD940029) using Integrated Monitoring for Bird Conservation Regions (IMBCR) data (2023 IMBCR estimates - Google Drive).

Monitoring Questions and Key Results

Ecological Conditions Question 1.1:

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

From 2017-2023, the overall trend of bird species is greater than 1.0 ($\bar{x}$=1.02, Figure 2) for the 59 species with high confidence population trend estimates (F≥0.85); there were 27 species declining and 32 species increasing. The largest count of species was in the 1.1 to 1.3 growth trend category, and the shape of the histogram indicated that the region has healthy ecological conditions for a diverse array of bird species.

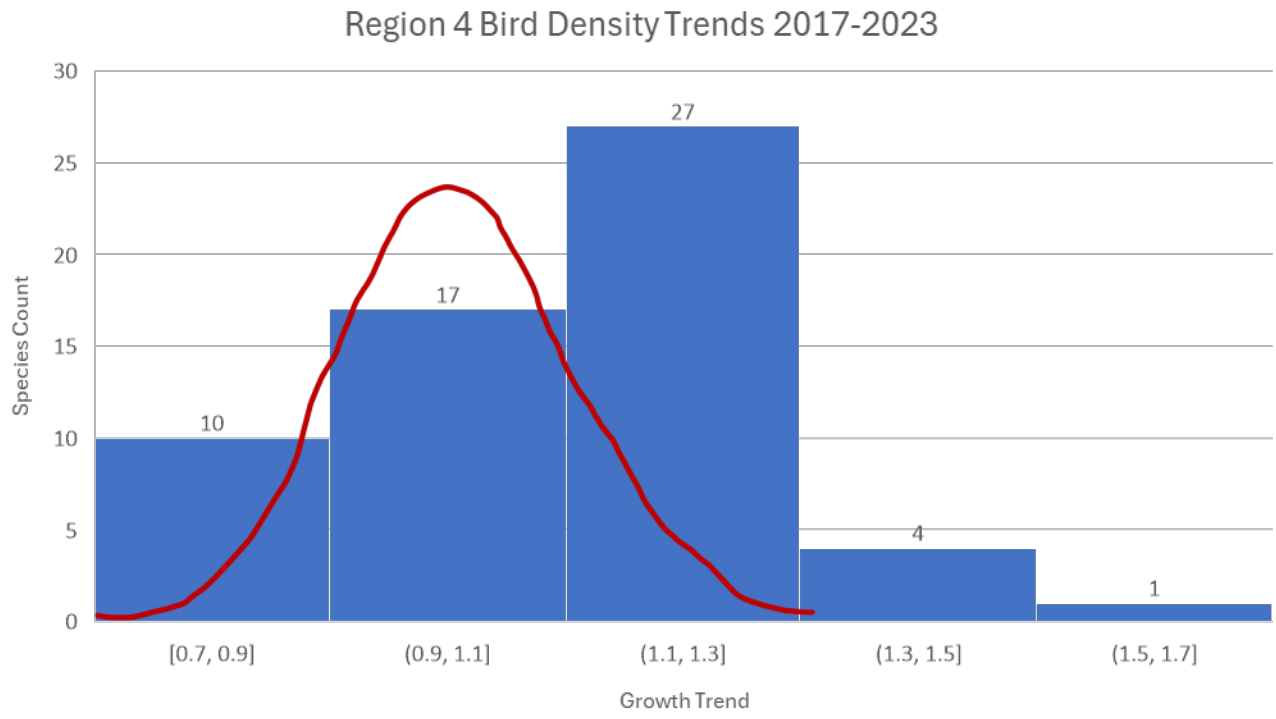

Figure 2. Bird density trends in the Intermountain Region 2017-2023. Histogram bars indicate counts of bird species in each density growth trend category, and the curve represents an idealized trend under stable conditions. Observations indicate stable to increasing trends in bird species densities.

Ecological Conditions Question 1.2:

Do downward trending bird species suggest additional species or select ecological conditions for conservation or monitoring?

From 2017-2023, 29 species had significant downward trends (F≥.85) at the regional scale (Table 1).

Table 1. Intermountain region trends for bird species with significant downward trends (F≥ 0.85) for 2017-2023. A trend of <1.0 indicates downward population trend, 1.0 indicates stable trend, and >1.0 indicates increasing trend. Credible Intervals (LCI 90=Lower 90% credible interval, UCI=Upper 90% credible interval) indicate precision of the estimate and the F-statistic indicates confidence in the direction of the reported trend, e.g., 0.83 suggests 83% confidence in the direction of an observed trend (but not its magnitude). Species are sorted with upper credible intervals below 1.0 at the top of the table.

Species	Trend	LCI 90	UCI 90	F
Mountain Quail	0.65	0.51	0.83	0.99
Canyon Wren	0.81	0.69	0.93	0.99
Townsend's Warbler	0.84	0.73	0.95	1.00
Rock Pigeon	0.76	0.61	0.96	0.98
Dark-eyed Junco	0.93	0.90	0.96	1.00
Bewick's Wren	0.85	0.76	0.96	0.99
American Pipit	0.68	0.46	0.96	0.97
Swainson's Hawk	0.83	0.70	0.97	0.98
Pacific Wren	0.81	0.63	0.98	0.97
Nashville Warbler	0.85	0.74	0.99	0.97
Pine Siskin	0.96	0.91	1.00	0.97
Ruby-crowned Kinglet	0.97	0.92	1.00	0.97
Golden-crowned Kinglet	0.88	0.79	1.01	0.96
American Kestrel	0.93	0.85	1.01	0.95
Woodhouse's Scrub-Jay	0.93	0.86	1.01	0.95
Clark's Nutcracker	0.96	0.91	1.02	0.92
American Goldfinch	0.89	0.77	1.02	0.93
Red-breasted Nuthatch	0.98	0.94	1.02	0.90
Black-billed Magpie	0.93	0.84	1.02	0.92
Cassin's Finch	0.96	0.90	1.03	0.88
Brown-headed Cowbird	0.96	0.89	1.04	0.90
Sharp-shinned Hawk	0.89	0.74	1.04	0.90
Fox Sparrow	0.94	0.84	1.05	0.85
Northern Harrier	0.93	0.80	1.06	0.85
Northern Rough-winged Swallow	0.93	0.81	1.06	0.85

Prairie Falcon	0.90	0.75	1.08	0.87
American Goshawk	0.90	0.75	1.09	0.85
Cactus Wren	0.65	0.38	1.10	0.92
Crissal Thrasher	0.72	0.39	1.24	0.87

Recommendations

Based on the population density trends of 59 bird species in the region, general ecological conditions for a wide variety of species are favorable. Additional investigation may be useful for determining if there should be additional concern for some species and their ecosystems, especially, mountain quail, canyon wren, Townsend's warbler, dark-eyed Junco, Bewick's wren, American pipit, Swainson's hawk, pacific wren, and Nashville warbler. Continuation of monitoring using current methods is recommended, but no broad changes to management are recommended.

Topic 2: Status of Focal Species

Methods and Datasets

The Integrated Monitoring for Bird Conservation Regions (IMBCR) program data and 2024 Regional Bird Monitoring Report (https://www.fs.usda.gov/detail/r4/plants-animals/wildlife/?cid=FSEPRD940029) were used for focal bird species monitoring.

For bats, the North American Bat Monitoring Program 2024 Performance Report was used (https://www.fs.usda.gov/detail/r4/plants-animals/wildlife/?cid=FSEPRD940029), to report detections of focal (and other) bat species on forests in the region.

Some species do not have readily available information compiled at the multiple forest and state scale, and their broader-scale status is not currently available.

Monitoring Questions and Key Results

Focal Species Monitoring Question 2.1:

What is the status (from population trends or documented presence) of focal species in the region?

Status, as indicated by species density trends or presence detected of focal species is reported in Table 2. Information was not available for all focal species at the regional scale.

Table 2. Status of Focal Species in the Intermountain Region. For birds, a trend <1.0 indicates downward population trend, 1.0 indicates stable trend, and >1.0 indicates increasing trend. Credible Intervals (CI, 90%) indicate precision of the estimate and the F-statistic indicates confidence in the direction of the reported trend, e.g., 0.83 suggests 83% confidence in the direction of an observed trend (but not its magnitude).

Focal Species Monitored	Forest	Status
American (Northern) goshawk	Dixie, Sawtooth	Evidence of decline. Trend=0.90, CI:0.75-1.09, F=0.85
Bald eagle	Dixie	Stable. Trend=1.0, CI: 0.78-1.71, F=0.7
Black-backed woodpecker	Boise	Trend=1.18, CI:0.95-1.43, F=0.89
Flammulated owl	Dixie	NA
Greater sage-grouse	Dixie, Sawtooth, Curlew	NA
Mule deer	Dixie	TBD
Northern flicker	Dixie	Stable. Trend=1.01, CI:0.97-1.05, F=0.5
Pileated woodpecker	Boise, Payette, Sawtooth	Significantly growing. Trend=1.21, CI:1.07-1.40, F=0.99
Pygmy rabbit	Dixie	TBD
Rocky mountain elk	Dixie	TBD
Spotted bat	Dixie	Present on Caribou-Targhee and Manti-La Sal National Forests
American three-toed woodpecker	Dixie	Statistically weak evidence for growth. Trend=1.07, CI:0.93-1.23, F=0.77
Townsends western big-eared bat	Dixie	Present on Boise and Manti-La Sal National Forests
White-headed woodpecker	Boise, Payette	Statistically weak evidence for growth. Trend=1.13, CI:0.82-1.50, F=0.71
Wild turkey	Dixie	Stable. Trend=1.03, CI:0.89-1.21, F=0.61

Focal Species Monitoring Question 2.2:

What are the quantities and qualities of habitats that support focal species in the region and forests?

Species-habitat map tools have not been developed for focal species at the regional scale, and this question cannot be addressed at present.

Focal Species Monitoring Question 2.3:

Are ecological conditions sufficient for long-term persistence of each focal species?

Species-habitat map tools have not been developed for focal species at the regional scale, and this question cannot be directly addressed at present. There is some evidence for sufficient ecological conditions for most focal species in Table 2.

Recommendations

For most focal bird species, trends are stable or positive, but American goshawk showed evidence of a 10% decline. Two bat focal species persist in the region, but their population trends are unknown. At least for the habitats associated with most focal species (other than American goshawk), monitoring information indicates satisfactory ecological conditions in the region.

For species where trends are not reported, either efforts for gathering monitoring information should be improved, or they should be considered for removal from focal species lists. Other species, such as wild turkey and mule deer, are generalist species managed by state fish and wildlife agencies, and they should be considered from removal from focal species lists. Additional effort is needed to identify causal factors in American goshawk negative trends.

Significant improvements to monitoring are recommended. For example, to assess the quantity and quality of habitats and ecological conditions for focal species, species-habitat maps or field-based protocols should be developed and incorporated into monitoring.

No changes to management are recommended.

Topic 3: Status of Ecological Conditions for At-Risk Species

Methods and Datasets

At-risk species include those addressed by the Endangered Species Act and those identified as Species of Conservation Concern. Under the 2012 Rule, the US Forest Service is required maintain ecological conditions that contribute to the recovery of at-risk species. General ecological conditions, i.e., associated habitats, were summarized (Table 3) with the intent of using species-habitat models to map extent of suitable habitat on forest system lands.

Table 3. Terrestrial at-risk species and broadly associated ecological conditions.

Endangered Species	Ecological (habitat) Conditions
Black-footed ferret	Dry, flat, sparsely vegetated grasslands where prairie dogs reside. Limited geographical range.
Sierra Nevada bighorn sheep	Alpine to Great Basin sagebrush scrub habitats, with minimal risk of disease exposure from domestic sheep, along the crest of the Sierra Nevada Mountains. Limited geographical range.
Sierra Nevada montane fox	Open and patchy subalpine habitat with a mosaic of high-elevation meadows, rocky areas, scrub vegetation, and woodlands (largely mountain hemlock (*Tsuga mertensiana*), whitebark pine, and lodgepole pine. Limited geographical range.
Southwestern Willow Flycatcher	Rivers, streams, and wetlands with dense vegetation of willow species, boxelder, tamarisk, and Russian olives.
Whooping crane	Isolated prairie marsh in aspen parkland with willows, cattails, and sedges.
Threatened Species	
Canada lynx	Regenerating, earlier successional forest stages, or mature stands with high understory structure (dense horizontal cover). Male home ranges 29-552 km2.
Grizzly bear	Large blocks of land with high-caloric food and low human impact.
Utah prairie dog	Swale-type formations, free of brush, where grasses and forbs are available even during drought periods. Management of plague. Limited geographical range.

Northern Idaho ground squirrel	Shallow, dry rocky meadows usually associated with deeper, well-drained soils and surrounded by ponderosa pine and Douglas-fir forests at elevations of about 915 to 1,650 meters. Minimal forest encroachment into meadows. Limited geographical range.
Mexican Spotted Owl	Old-growth or mature forests with complex structural components (uneven aged stands, high canopy closure, multi-storied levels, high tree density) with canyons and riparian communities.
Yellow-billed cuckoo	Dense riparian woodlands along low-gradient streams with riparian tree species such as cottonwood (*Populus* spp.) and willow (Salix spp.).
Desert tortoise	Low- to mid-elevation desert sites with soil suitable for den construction, including hillsides, bajadas, washes, and valleys.
Species of Conservation Concern	
American Pika	High mountain talus slopes with abundant vegetation and winter snowpack.
Black Rosy-Finch	Areas above tree line with cliffs and rockslides and no or few roads.
Fringed Myotis	Middle elevations in wide habitats with caves, mines, cliff faces rock crevices free of human disturbance from recreational caving and mine exploration.
Greater Sage-grouse	Foothills, plains, and mountain slopes dominated by sagebrush, but with adjacent meadows and low human disturbance.
Peregrine Falcon	Open landscapes with cliffs for nesting and adequate bird-prey availability.
Pygmy Rabbit	Tall, dense sage brush and loose, well-draining soils.
Townsends Big-eared Bat	Caves and mines near riparian areas with abundant moth populations.
Western Bumble Bee	Diverse plant communities with early and late blooming plants.

Monitoring Questions and Key Results

Ecological Conditions for At-risk Species Question 3.1:

What are the statuses of ecological conditions (amount and spatial distribution of habitats) that support at-risk species?

Suitable species-habitat or vegetation models or field monitoring have not been developed for at-risk species at the regional scale. This question cannot be adequately addressed at present.

Recommendations

Current information is inadequate for describing ecological trends for at-risk species in the Intermountain Region. Species-habitat maps and field methods should be created and incorporated into monitoring for at-risk species with wide distribution and dependence on USFS lands. Other species, especially pollinators such as the Western bumble bee, have been petitioned for listing under ESA and deserve more consideration. Because most terrestrial ESA species have very limited ranges or potential ranges on USFS lands throughout the Intermountain Region, monitoring their habitats may be more appropriate at the forest and not regional scale; ESA species are recommended for exclusion from future broader-scale reports. Species of Conservation Concern, however, range more widely within the region and regional monitoring is appropriate for them. Monitoring for pollinator habitat should be added to other vegetation sampling and activities such as range conditions monitoring.

Summary of Results and Recommendations

Table 4. Monitoring questions, results, and recommendations.

Monitoring question (MQ)	Assessment	Recommended Actions/Next Steps
MQ 1.1: Do species population trends in bird communities indicate adequate biodiversity and ecosystem health?	*General ecological conditions for a wide and balanced variety of species are favorable.*	*Continuation of monitoring using current methods. No changes to management, are recommended.*
MQ 1.2: Do downward trending bird species suggest additional species or select ecological conditions for conservation or monitoring?	*29 species had significant downward trends at the regional scale, with 9 having the most concerning evidence for negative trends since 2017.*	*Additional investigation determining if there should be additional conservation concern or monitoring for some species and ecosystems.*
MQ 2.1: What is the status (from population trends or documented presence) of focal species in the region?	*Monitoring information indicates sufficient ecological conditions for focal species in the region.*	*Recommend removing generalist species without readily available information from focal species lists. No changes to management are recommended.*
MQ 2.2: What are the quantities and qualities of habitats that support focal species in the region and forests?	*Adequate assessment not available.*	*Significant improvements to monitoring are recommended. No changes to management are recommended.*
MQ 3.1: What are the statuses of ecological conditions (amount and spatial distribution of habitats) that support at-risk species?	*Adequate assessment not available for most species. Need for habitat monitoring of at-risk species with wide distribution and dependence on USFS lands, such as pollinators.*	*Remove ecological conditions monitoring for ESA species from regional monitoring. Incorporate habitat monitoring for pollinators into other activities, e.g., range condition, monitoring. No changes to management are recommended.*