



Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Intermountain Region

December 2024

Broader-scale Terrestrial Wildlife Monitoring Strategy for the Intermountain Region 2024



Photo: Goshawk, Tony Davis, Sawtooth National Forest

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Table of Contents

Need and Purpose of Monitoring	3
Partnerships and Data Sources	4
Monitoring Topics	5
Topic 1: Status of Select Ecosystems	5
Topic 2: Status of Focal Species	6
Topic 3: Status of Ecological Conditions for Terrestrial At-risk Species.....	8
Other Monitoring and Surveying Activities.....	10
Monitoring Species of Conservation Interest	10
Project Scale and Ad-hoc Monitoring	10
Appendix: Monitoring Report Examples	11
Example 1. Do trends in bird communities indicate overall ecosystem health (Question 1.1)?	11
Example 2. Are ecological conditions sufficient for long-term persistence of a species (Question 2.3)?	12

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 strategy for each region.

Monitoring topics for terrestrial wildlife are a subset of the eight topics required for forests from the 2012 Rule. Only status¹ for topics 2,3, and 4 are the subject of this strategy.

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.

Broader-Scale Terrestrial Wildlife Monitoring should address specific questions relative to the above topics. Forests may have additional plan monitoring requirements and questions. Key results and recommendations should be incorporated into Biennial Forest Monitoring Evaluation Reports and Quinquennial Broader-Scale Monitoring Reports and dashboards. Ideally, information presented will guide forest management and plan assessment and assist with forming regional priorities, as well as inform the public about conditions on US Forest Service lands. The Regional Wildlife Ecologist is responsible for summarizing broader-scale information.

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 is not necessarily based on historical estimates but is in the context of the 10–15-year forest planning interval dictated in the National Forest Management Act and the 2012 Rule.

Partnerships and Data Sources

Forests and the Regional Office should partner with agencies across all levels of government, nonprofit and for-profit entities, universities, and communities to implement monitoring programs. USFS Research was consulted regarding this strategy on February 22 and April 11, 2024, and State and Private Forestry was contacted for comment on February 23, 2024. The public is also encouraged to comment.

Birds: Use of the Integrated Monitoring for Bird Conservation Regions (IMBCR) Rocky Mountain Avian Data Center (<https://www.birdconservancy.org/resource-center/databases/>) is preferred over other datasets because the rigorously designed monitoring effort provides trend information (with credible intervals) for bird species at forest, region, and multi-regional scales. The regional wildlife ecologist is responsible for summarizing trend information for focal (and other) bird species and posting on the Intermountain Region Wildlife Information Site: <https://www.fs.usda.gov/detail/r4/plants-animals/wildlife/?cid=FSEPRD940029>. Additional context may be found using Avian Knowledge Network tools such as the Rapid Avian Information Locator (<https://data.pointblue.org/apps/rail/>) and other resources.

Mammals: For bats, information (largely from acoustic recording units) may be summarized by the Northwestern Bat Hub to indicate detections of focal (and other) bat species on forests in the region. Some species may be monitored by state wildlife agencies and information may be adapted from state reports also. The regional wildlife ecologist should summarize bat data for the region and post on the Intermountain Region Wildlife Information Site. Other mammal species should be monitored using best available information until formal strategies and programs are created.

Species-habitat Models: NatureServe Explorer Pro (<https://explorer.natureserve.org/pro/Welcome>) and other available sources should be used to obtain species-habitat models and create suitable habitat maps for focal and at-risk species.

ESA Listed Species: Species under the jurisdiction of the US Fish and Wildlife Service have an abundance of information readily available on USFWS websites. Various sources, especially the Information for Planning and Consultation website ([IPaC: Home](#)), and should be used.

Forest Monitoring: Species and ecosystems should be identified based on the 2012 Rule and evaluate concise questions associated with each monitoring topic in the rule. Monitoring should be based on an ongoing forest-wide strategy, in the context of broader-scale monitoring, and not using ad hoc project-level surveys. Forest biologists should ensure that terrestrial wildlife monitoring information is incorporated into Biennial Monitoring Evaluation Reports.

Monitoring Topics

Topic 1: Status of Select Ecosystems

Ecosystem Status Question 1.1:

Do trends in bird communities indicate overall ecosystem health?

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. Therefore, the population trends of bird species may be used as an indicator of general ecological conditions on US Forest Service lands.

Landscapes are diverse and dynamic due to natural and managed ecological conditions. At any given time, 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 may be in decline while later seral stage species may be increasing. 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.)

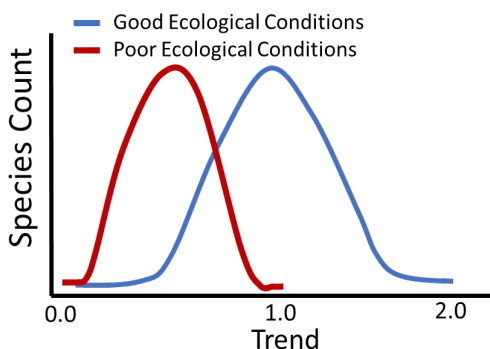


Figure 1. Representative example of bird population density trends as indicators of general ecological conditions. If most species populations are trending near 1.0 (i.e., stable) and balanced around 1.0, good ecological condition are inferred. If most species population trends are below 1.0 or the data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

Histograms of species trends can be created using IMBCR data (see Appendix). If downward trends are observed, causal factors should be identified if possible, and recommendations should be made for improved management practices, especially during the assessment phase of plan revision.

Ecological Conditions Question 1.2:

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

Answering Question 1.1 requires creating tables of population trends for bird species. A secondary analysis is to identify and examine species that are exhibiting negative trends. Future species of conservation concern or problematic ecosystems could be identified by examining the list of downward trending species.

Topic 2: Status of Focal Species

Focal Species Monitoring Question 2.1:

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

General Focal Species Monitoring: For each focal species (Table 1), status in the Region and each Forest should be reported as a trend (upward, downward or stable, including magnitude and confidence in the trend estimate). If trend data are not available, use documented presence (observed or not detected, including an indicator of survey effort) from available databases until a more rigorous monitoring strategy for each focal species is implemented.

Forest scale trends should be incorporated into biennial monitoring reports and used to identify any concerns about the status of focal species and the ecological conditions that support them. If downward trends are observed, causal factors should be identified if possible, and recommendations should be made for improved management practices, especially during the assessment phase of plan revision.

Table 1. List of species, metrics, and data sources for current Intermountain Region Terrestrial Focal Species. IMBCR is Integrated Monitoring for Bird Conservation Regions.

Focal Species Monitored	Forest	Metric	Data Source
Bald eagle	Dixie	Population Trend	IMBCR, NatureServe
Black-backed woodpecker	Boise	Population Trend	IMBCR, NatureServe
Flammulated owl	Dixie	To Be Determined (TBD)	IMBCR, NatureServe

Greater sage-grouse	Dixie, Sawtooth, Curlew	Population Trend	IMBCR, NatureServe
Mule deer	Dixie	TBD	TBD, Game species managed by states
Northern flicker	Dixie	Population Trend	IMBCR, NatureServe
Northern goshawk	Dixie, Sawtooth	Population Trend, Nest occupancy trends	IMBCR, NatureServe, Forest Surveys
Pileated woodpecker	Boise, Payette, Sawtooth	Population Trend	IMBCR, NatureServe
Pygmy rabbit	Dixie	TBD	TBD
Rocky mountain elk	Dixie	TBD	TBD, Game species managed by states
Spotted bat	Dixie	Presence Detected	North American Bat Monitoring Program
American three-toed woodpecker	Dixie	TBD	IMBCR, NatureServe, Forest Surveys
Townsend's western big-eared bat	Dixie	Presence Detected	North American Bat Monitoring Program
White-headed woodpecker	Boise, Payette	Population Trend	IMBCR, NatureServe, Forest Surveys
Wild turkey	Dixie	Population Trend	IMBCR, Game species managed by states

Focal Species Monitoring Question 2.2:

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

As available, species-habitat map tools should be used to indicate the quality, quantity, and spatial distribution of habitats for each species in the region and forests. See Appendix for an example.

Focal Species Monitoring Question 2.3:

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

When both trend information and habitat maps are available, they should be combined to indicate sufficient or insufficient ecological conditions for the species. Stable or increasing trends of a species indicates that the quantity and quality of mapped habitat is sufficient for long-term persistence. If trends are downward, available habitat can be assessed as a causal factor for observed trends. See Appendix for an example.

Topic 3: Status of Ecological Conditions for Terrestrial At-risk Species.

Ecological Conditions for At-risk Species Question 3.1:

What is the status of ecological conditions (amount and spatial distribution of habitats) for each at-risk species² and is it sufficient for, or contribute to, long-term persistence of the species?

General habitat associations are known for the current list of at-risk species (Table 3). As available, species-habitat map tools should be used to indicate the quality, quantity, and spatial distribution of habitats for each species in the region and forests.

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 (<i>Tsuga mertensiana</i>), 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 km ² .
Grizzly bear	Large blocks of land with high-caloric food and low human impact.

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.

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 (<i>Populus</i> spp.) and willow (<i>Salix</i> 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 treeline 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.
Townsend's 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.

Other Monitoring and Surveying Activities

Monitoring Species of Conservation Interest

Required monitoring (see above) should be accomplished before other survey and monitoring efforts are supported. The concepts of at-risk and focal species were created by the 2012 Rule to efficiently evaluate diversity of species on the planning unit, and the forests and region should avoid ad-hoc or haphazard surveys for other species. There is no requirement in NEPA or ESA for baseline information to be collected that doesn't already exist, and funds should be prioritized on work that is necessary to have (e.g., monitoring strategies required by the Rule and Forest Plan) versus surveys or monitoring that is only interesting and potentially useful to have. State fish and game agencies, universities, and research organizations have the mission to collect basic biological data, and although forests should be supportive of such activities, forest should not duplicate or necessarily fund research studies.

On some occasions, however, information may be desired for species not identified as at-risk or focal species. For example, when public comment or new information shows particular concern for a species, additional surveys or monitoring may address that interest. Such surveying or monitoring should be focused, however, on status of the species and its habitats on USFS lands; basic natural history questions are the purview of other agencies and entities. If collected information indicates substantial concern or interest for the species, it should be considered for designation as an SCC or focal species with formal monitoring incorporated into regional and forest strategies.

Project Scale and Ad-hoc Monitoring

Project scale surveys should not be default activities and should be avoided unless they 1) are a forest plan requirement, 2) are a component of formally designed monitoring programs for focal species or at-risk species, 3) additional information is needed that will impact choice of design features or implementation of the management action and activities, or 4) public comment has elevated the issue and concern.

Appendix: Monitoring Report Examples

Example 1. Do trends in bird communities indicate overall ecosystem health (Question 1.1)?

1. General ecological conditions for bird species can be visually assessed by using IMBCR data to create a histogram of trends for species within the region (Figure A1, data from 2022 Intermountain Region Broader-scale Bird Monitoring Report).

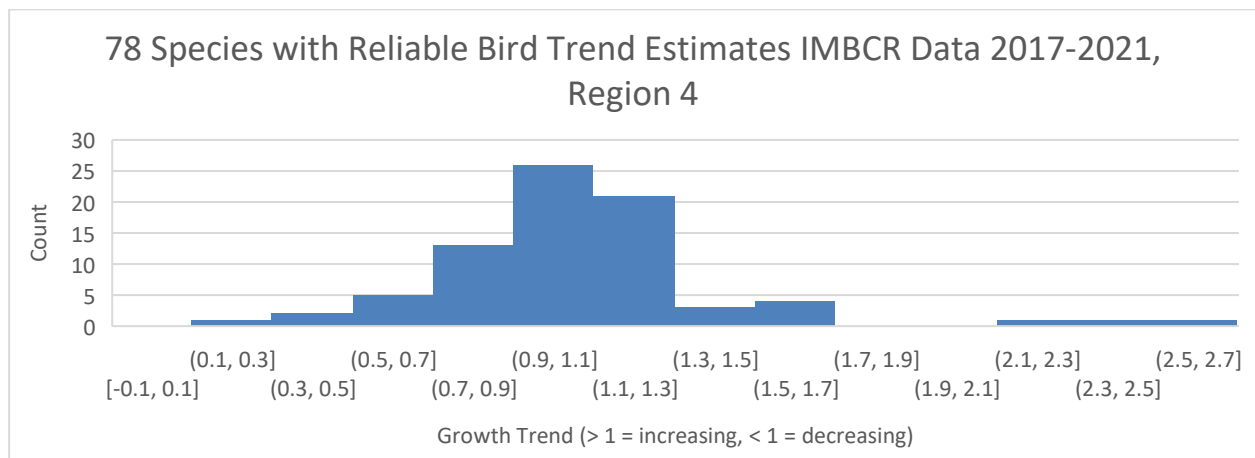


Figure A1. Histogram of species population growth trends for birds in the Intermountain Region. The mean trend for all species was 1.07, indicating overall stability of bird populations.

2. Conclusion and Recommendation

The mean trend for monitored bird species was 1.07, indicating that overall, the population trends for bird species in the Intermountain Region is stable to positive. The histogram of species trends shows a generally bell-shaped curve around 1.0 with a skew >1.0. The general health of bird populations suggests sufficient ecological conditions for a diversity of species under current management for USFS lands in the Intermountain Region.

Example 2. Are ecological conditions sufficient for long-term persistence of a species (Question 2.3)?

Using Regional Data and Targhee National Forest Mapping for American Goshawk

Four steps can be taken to assess quality and quantity of habitat for maintaining persistence of a species on a planning unit.

Step 1. Assess Population Trend Using IMBCR, or other, data.

Table A1. Trend estimates (from 2022 Intermountain Region Bird Monitoring Report) for Northern Goshawk on the Caribou-Targhee National Forest (Table A1). LCI90=lower credible interval; Median=median trend (<1.0 indicates downward population trend, 1.0 indicates stable trend, and >1.0 indicates increasing trend); UCI90=upper credible interval; Conf.=confidence in the direction of the reported trend of the mean, e.g., 0.83 suggests 83% confidence in the direction of an observed trend (but not its magnitude); N. Detect=number of surveys where the species was detected.

Species	LCI90	Median	UCI90	Conf.	N. Detect
Northern Goshawk	0.471	0.938	1.783	0.424	15

Step 2. Classify habitat using species-habitat models (Figure A1).

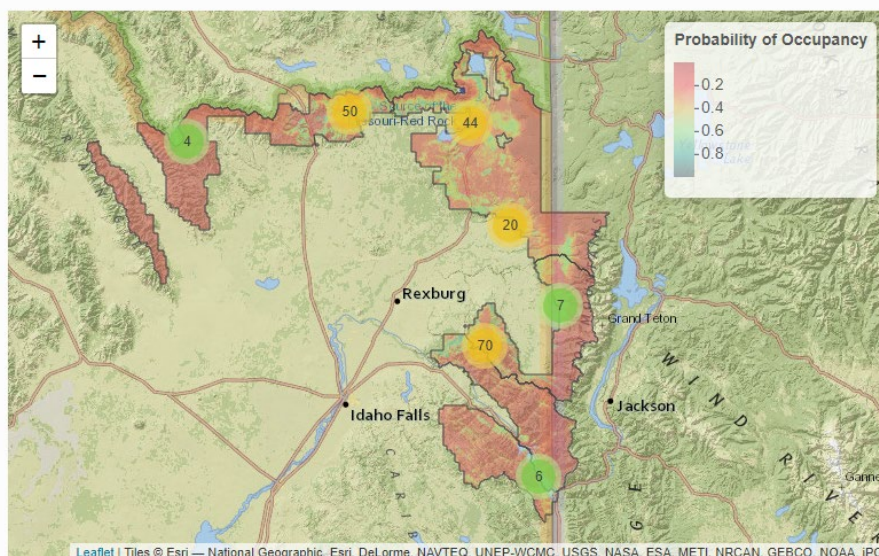


Figure A2. Map of predicted probability of occupancy and count of observed American Goshawk nest locations on the Targhee National Forest. From Robert A. Miller, Stephanie Coates, Jay D. Carlisle, 2022-Intermountain Bird Observatory.

Step 3. Quantify predicted habitat using species-habitat models (Table A2).

Table A2. Area associated with predicted American Goshawk occupancy on the Targhee NF (from Figure A1).

Forest-wide habitat quality for Northern Goshawk

Score	Hectares	Acres	Proportion
Very Good ($0.8 < X$)	5,225	12,911	0.01
Good ($0.6 < X \leq 0.8$)	28,739	71,015	0.04
Moderate ($0.4 < X \leq 0.6$)	76,320	188,590	0.11
Poor ($0.2 < X \leq 0.4$)	154,990	382,988	0.23
Very Poor ($X \leq 0.2$)	413,774	1,022,456	0.61

Step 4. Conclusion and Recommendation.

Although the median trend is < 1.0 (indicating negative population trend) in IMBCR information, lower and upper credible intervals bracket 1.0 and do not provide sufficient evidence of a declining or increasing population. The species may be considered stable on the Targhee National Forest. The approximately 272 acres of moderate or better habitat appear to provide sufficient ecological conditions for this species. Due to uncertainty in the estimates, however, monitoring of goshawk trends and habitats should continue.