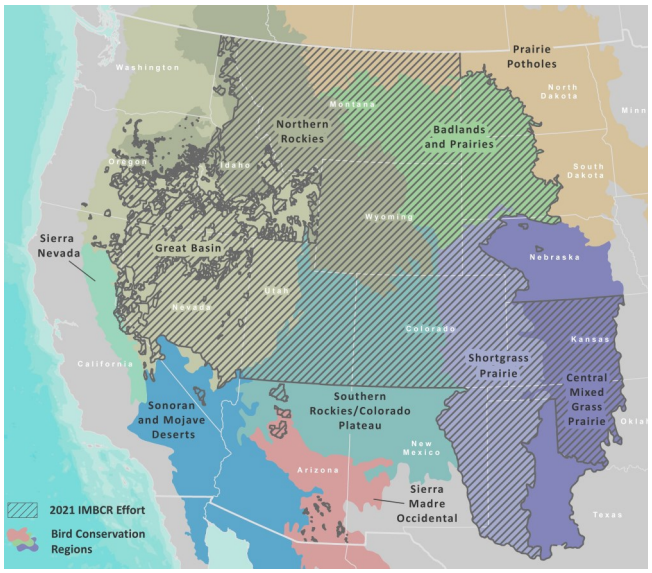
Monitoring Breeding Birds Across USFS Regions: A Collaborative Approach

A NEED TO MONITOR

The 2012 planning rule guides the development and revision of land management plans for all US Forest Service units. The rule requires that each plan include components to maintain and restore ecosystem integrity, such as structure and function, as well as ecosystem diversity. The rule also directs national forests and grasslands to monitor focal species representing desired conditions that are identified in forest plans but difficult to measure directly. **Monitoring focal species over time should provide information about the integrity of the ecological system on which the species depend**, the effect of management actions on desired conditions, and the effectiveness of the plan in providing for ecological integrity and desired conditions. Birds are a useful indicator to monitor because they are conspicuous during the breeding season, and we can obtain information about numerous species without specialized surveys, thus providing information on biodiversity. In addition, the USFS must also **evaluate the effects of agency action on migratory birds** for all NEPA projects, particularly for the US Fish and Wildlife Service's Birds of Conservation Concern lists. Finally, the planning rule requires the use of **best available scientific information** to inform planning and plan decisions.

A COLLABORATIVE APPROACH

For these reasons, the USFS has funded breeding landbird monitoring as part of the **Integrated Monitoring in Bird Conservation Regions** (IMBCR) program since 2008. IMBCR is a **partnership** in which multiple agencies and organizations pool monitoring resources to **increase efficiencies**, facilitating monitoring over larger spatial and temporal extents than would be possible with individual efforts. Every spring, trained observers collect bird and vegetation data at survey sites on private and public land. Our field protocol allows us to account for imperfect detection, so we can provide **population estimates, like abundance and density, for over 300 species**. Estimates are available for individual forests and grasslands within Regions 1, 2, 3, and 4, and also region-wide for Regions 1, 2, and 4.



Extent of the IMBCR program as of 2021.

HOW DO WE DO IT?

- *Within Bird Conservation Regions (BCR),* we create strata based on fixed attributes, such as management unit boundaries.
- *Stratification is determined by IMBCR partners*—for which areas do they wish to know about bird populations?
- *With our hierarchical sampling design,* we estimate population sizes across various spatial extents (e.g., management units, national forests, states, USFS regions).
- *Partners can adjust sampling effort* with changing funding or objectives while still maintaining spatial coverage.
- *Partners ask specific management questions* through targeted monitoring projects which use the same IMBCR field methods and sampling design. This places project populations within local and regional contexts.

USFS APPLICATIONS

Grace's warbler, a focal species for the Coconino National Forest.

- **USFS units benefit from annual IMBCR monitoring to track the status of avian focal species**, and assess changes in focal species populations to update forest plans. However, relationships between focal species and the desired forest conditions they are intended to represent are often based on existing literature and not evaluated empirically. We are using IMBCR data to evaluate selected focal species and their associated desired conditions for individual Forests. For example, habitat relationships for Kootenai, Idaho Panhandle, and Coconino focal species largely, but not entirely, supported habitat descriptions in the forest plans. Moreover, we can also identify additional species that relate with desired conditions, providing alternatives or additions to bolster focal species monitoring.

Cassin's finch, a Bird of Conservation Concern for BCR 10 and 16.

- **USFS biologists must consider migratory birds of concern when implementing NEPA projects**. IMBCR occurrence data and density estimates allow biologists to determine species that could be impacted by a project and assess potential population impacts. For example, we can estimate the number of Cassin's finches that may be impacted by a prescribed burn and other forest thinning activities in a lodgepole pine forest.
- **Forest managers expect restoration targeting vegetation structure to benefit ecological function**, much of which concerns providing habitat for wildlife. Targeted monitoring projects allow biologists to evaluate the effectiveness of management actions for restoring biodiversity and other components of ecological integrity.

EXAMPLES TO INFORM MANAGEMENT

We evaluated effectiveness of forest restoration treatments implemented across the Front Range in Colorado through a targeted monitoring project, and found that species richness increased with percent area treated, as well as occupancy for several species like olive-sided flycatcher, a sensitive species for Region 2. Effectiveness monitoring data also inform maps of opportunities to promote avian diversity, along with other ecosystem services, on public and private lands.

A prescribed burn conducted by the USFS.

Natural disturbances like bark beetle outbreak also influence forest structure, which in turn influences biodiversity. We monitored birds for two years and evaluated species and community relationships with beetle outbreaks in Colorado. Outbreaks increased occupancy for 17 species and promoted avian species richness in lodgepole pine forests, countering some public perceptions of beetle outbreaks being ecological disasters.

Biologists with the Coconino & Kaibab National Forests informed predictions of potential treatment effects for the Four-Forest Restoration Initiative using IMBCR data. Estimated habitat relationships with occupancy and abundance were consistent with most treatment effects hypotheses for 60 species, which can be used to inform management decisions.

ACKNOWLEDGEMENTS

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Integrated Monitoring in Bird Conservation Regions