Forest Bird Habitat

This indicator depicts potential forest bird habitat based on patch size and suitable landcover at multiple spatial scales. It is designed to represent suitable habitat for a variety of forest birds as ranges shift due to climate change and other factors. Habitat suitability is based on observations and ecology of ten bird Regional Species of Greatest Conservation Need associated with upland and wetland forests (cerulean warbler, Kentucky warbler, Louisiana waterthrush, prothonotary warbler, Swainson's warbler, swallow-tailed kite, wood thrush, worm-eating warbler, yellow-billed cuckoo, yellow-throated warbler). It uses landcover from the 2021 National Land Cover Database and detections from the Cornell Lab of Ornithology's eBird database.

Reason for Selection

Birds are an important and extensively studied component of forest ecosystems (USFS). Rather than using specific habitat requirements and ranges for particular bird species or life stages, this indicator uses a broad approach to identify suitable habitat at multiple spatial scales for a suite of ten birds. This approach is intended to make the indicator more resilient to species range shifts as a result of climate change.

We defined a spectrum of landcover suitability for the selected birds by comparing species detections from eBird with the naturalness of landcover at multiple scales to identify thresholds in overall landscape naturalness and alteration. We also introduced simple patch size thresholds of 100 and 1,000 acres in order to generally encompass minimum forest bird patch requirements and match the methods used in another Blueprint indicator (landcape condition). We selected the ten species (Cerulean warbler, Kentucky warbler, Louisiana waterthrush, prothonotary warbler, Swainson's warbler, swallow-tailed kite, wood thrush, worm-eating warbler, yellow-billed cuckoo, yellow-throated warbler) from the Southeast animal Regional Species of Greatest Conservation Need list. This ensures consistency with the shared bird priorities from state fish and wildlife agencies and with the upland forest birds and forested wetland birds indicators in the SECAS Goal Report (NWF 2021, SECAS 2023).

Input Data

- Cornell Lab of Ornithology eBird database: Basic Dataset (EBD), accessed 9-2023, 10-2023, and 1-2024
- Southeast Blueprint 2024 extent
- 2021 National Land Cover Database (NLCD)

Mapping Steps

- Reclassify the NLCD into three habitat classes where 2 is habitat, 1 is partial habitat, and 0 is not habitat. Assign a value of 2 to all pixels with a land cover class of 41 Deciduous Forest, 43 Mixed Forest, or 90 Woody Wetlands. Assign a value of 1 to all pixels with a land cover class of 21 Developed Open Space, 22 Developed Low Intensity, 42 Evergreen Forest, or 52 Scrub/Shrub. Assign a value of 0 to everything else.

- Forest birds are highly mobile and respond to habitat at multiple scales. To account for this, estimate the average habitat using a moving window (or neighborhood) analysis at three different scales: single pixel, approximately 10 acres; and approximately 100 acres. Then average the values across all scales. This results in continuous values from 0 to 2.
- Reclassify the raster into 3 categories: <0.9 (not suitable), 0.9-1.3 (partly suitable), and 1.3-2.0 (mostly suitable). These thresholds are based on 2021 eBird detections for ten bird Regional Species of Greatest Conservation Need associated with upland hardwoods and forested wetlands (cerulean warbler, Kentucky warbler, Louisiana waterthrush, prothonotary warbler, Swainson's warbler, swallow-tailed kite, wood thrush, worm-eating warbler, yellow-billed cuckoo, yellow-throated warbler). Areas scoring at or above the partly suitable cutoff of 0.9 included almost all detections in forests (99.6-100% depending on species). Areas scoring at or above the mostly suitable cutoff of 1.3 focused on better habitat and still included most species detections in forests (85-99% depending on species).
- Estimate patch sizes within mostly suitable areas (value of 1.3+), then bin into the indicator categories below. Values 2-4 of the final indicator are based on patch size within mostly suitable areas. Value 1 includes partly suitable areas with values 0.9-1.3.
- Assign a value of zero to all remaining areas within the Southeast Blueprint 2024 extent.
- As a final step, clip to the spatial extent of Southeast Blueprint 2024.

Final indicator values

Indicator values are assigned as follows:

4 = 1,000+ acre core of mostly suitable forest bird habitat
3 = 100 to <1,000 acre core of mostly suitable forest bird habitat
2 = <100 acre core of mostly suitable forest bird habitat
1 = Partly suitable forest bird habitat
0 = Not suitable forest bird habitat

Known Issues

- This indicator slightly underprioritizes the importance of long, thin, and connected linear features of forest bird habitat surrounded by non-habitat. These areas can be suitable for species like prothonotary warbler and yellow-billed cuckoo.

Disclaimer: Comparing with Older Indicator Versions

There are numerous problems with using Southeast Blueprint indicators for change analysis. Please consult Blueprint staff if you would like to do this (email hilary_morris@fws.gov).

Literature Cited

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