

Indicator 1.04. Number of Native Forest-Associated Species

What is this indicator and why is it important?

This indicator provides information on the health of forest ecosystems through the number of native forest-associated species. Because one of the more general signs of ecosystem stress is a reduction in the variety of organisms inhabiting a given locale, species counts are often used in assessing ecosystem well-being. The count of forest-associated species in a region will change when species become extinct, species colonize, or our knowledge base is improved. Although change in species counts because of improved knowledge of distribution or taxonomy is unrelated to biodiversity conservation, extinction, and colonization—it can alter ecological processes in ways that affect the kinds and quality of ecosystem services that humans derive from forest ecosystems. Therefore, the loss or addition of species in an ecosystem can provide valuable insights into the overall health and productivity of that system.

What does the indicator show?

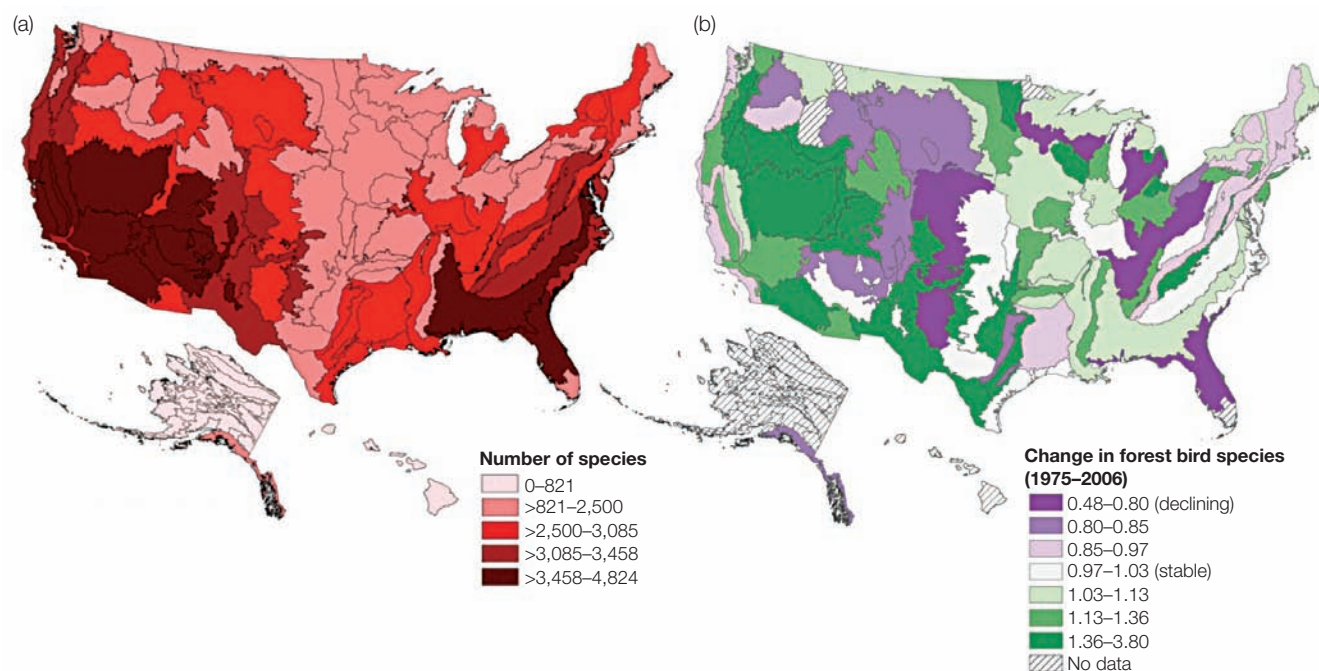
Data on the distribution of 12,865 vascular plants and 1,000 vertebrate species associated with forest habitats (including 230 mammals, 388 birds, 184 amphibians, and 198 reptiles) reveal notable differences in the number of species that occur in major

ecoregions of the United States. The number of forest-associated species is highest in the Southeast and in the arid ecoregions of the Southwest (fig. 4-1a). Long-term (1975 to 2006) trends in number of forest bird species within these ecoregions have been mixed (fig. 4-1b). Ecoregions where the number of forest bird species has had the greatest estimated increase include the desert systems of the intermountain West; the southern semi-arid prairie and plains; and scattered forest systems within the Great Lakes Region. The greatest estimated decline in forest bird numbers were observed in the semiarid prairies of the central Great Plains; the southern coast plain of peninsular Florida; and the plateau and mixed woodlands of the upper Midwest.

What has changed since 2003?

Since the 2003 report, a broader accounting of species that inhabit forests resulted in the addition of 11,690 species. Much of this increase is because of new habitat affinity data for vascular plants that extended the data beyond the 689 tree species covered in the 2003 report. These increases do not necessarily reflect national gains in forest species. Our knowledge of which bird species are associated with forest habitats has not changed since the 2003 report and we had sufficient data to quantify trends in the numbers of forest-associated bird species. Many regions throughout the coterminous United States have shown continued increases in the number of forest bird species or have changed to an increasing trend (42 ecoregions comprising

Figure 4-1. (a) The number of vascular plants and vertebrate species associated with forest habitats (2009, data provided by NatureServe). (b) The estimated change in the number of forest-associated bird species from 1975 to 2006 (data provided by U.S. Geological Survey). Change is measured by the ratio of the 2006 species count estimate to the 1975 species count estimate. Values greater than 1 indicate increasing species counts (green shades); values less than 1 indicate declining species counts (purple shades).



46 percent of the area) since the 2003 report (fig. 4-2a). Of particular note are the Appalachian Mountains; the Mississippi alluvial plains; the northern temperate prairies; the cold deserts of the central intermountain West; and the Cascade Mountains of the Pacific Northwest. Those regions, where the number of forest bird species have continued to decline or have changed to a decreasing trend (34 ecoregions comprising 47 percent of the area) since the 2003 report (fig. 4-2b), are prominent throughout the semiarid prairies of the Great Plains; the plateau region west of the Appalachian Mountains; coastal areas in New England, Texas, and the Pacific Northwest; and the regions that comprise the intensive agricultural lands in the upper Midwest.

Why can't the entire indicator be reported at this time?

Monitoring the count of different species over large geographic areas is difficult. For this reason, we lack systematic inventories that permit the estimation of species numbers for many groups (e.g., nonvascular plants, insects, and fungi). The increase in the number of forest-associated species reported here reflects growing inventory coverage among groups for which our understanding of habitat associations has been incomplete (e.g., vascular plants, and invertebrates). Until comprehensive biodiversity inventories are implemented, trends in the number of native forest species will have to be interpreted cautiously. The most fundamental need is to develop monitoring programs that are economically feasible and applicable across the diverse groups of species that inhabit forest ecosystems.

Indicator 1.05. Number and Status of Native Forest-Associated Species at Risk, as Determined by Legislation or Scientific Assessment

What is this indicator and why is it important?

This indicator provides information on the number and status of forest-associated species at risk or in serious decline. It accomplishes this by monitoring the number of native species that have been identified by conservation science or mandate to be at risk of global extinction. As the number of species considered to be rare increases, the likelihood of species extinction also increases. Demographic and environmental events such as failure to find a mate, disease, disturbance, habitat loss, and climate change interact to increase extinction risk as populations become smaller. Because important ecosystem functions (e.g., productivity, nutrient cycling, or resilience) can be degraded with the loss of species, concern exists that the goods and services humans derive from ecological systems will become diminished as more species become rare. For this reason, tracking the number and percent of at-risk species is a measure of the health of forest ecosystems and their ability to support species diversity.

What does the indicator show?

Among forest-associated species (vascular plants, vertebrates, and select invertebrates), 77 (less than 1 percent) were

Figure 4-2. A comparison of the 2003 report trends (1975–1999) to recent trends (1999–2006) in forest bird species counts. (a) Those strata that have continued to see increases in bird species counts or were declining in the 2003 report but have become increasing. (b) Those strata that have continued to see decreases in bird species counts or were increasing in the 2003 report but have become decreasing (data provided by U.S. Geological Survey).

