

Indicator 1.08

Population Levels of Selected Representative Forest-Associated Species to Describe Genetic Diversity, 2017

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What is this indicator and why is it important?

This indicator provides information on the population status of selected forest-associated species that are considered to reflect the genetic diversity present in forest ecosystems. Some forest species support or rely heavily on particular forest structures, patterns, associations, and processes and can therefore be used to describe the status of genetic diversity in forests as a whole.

This indicator uses population trends of selected bird and tree species as a surrogate measure of genetic diversity. Population decreases, especially associated with small populations, can lead to decreases in genetic diversity and contribute to increased risk of extinction. There are many forest-dependent species that rely on some particular forest structure, forest vegetation association, or ecological process. Monitoring population

levels of such representative species can indicate the status of the associations of species dependent on specialized conditions. Continued monitoring and assessment of this indicator can help inform management efforts to maintain and improve forest health conditions, specifically to help avoid species extinction or loss of genetic diversity within species.

What does the indicator show?

Stem numbers can serve as a measure of tree population size. Of the 43 tree species or species groups analyzed nationally between 1977 and 2017, a majority of those in moderate- to large-diameter size classes (greater than 15 inches in diameter) exhibited more than 50 percent increases in number of stems (fig. 8-1). However, more than half of the tree species or species groups had decreasing trends in the smallest diameter class.

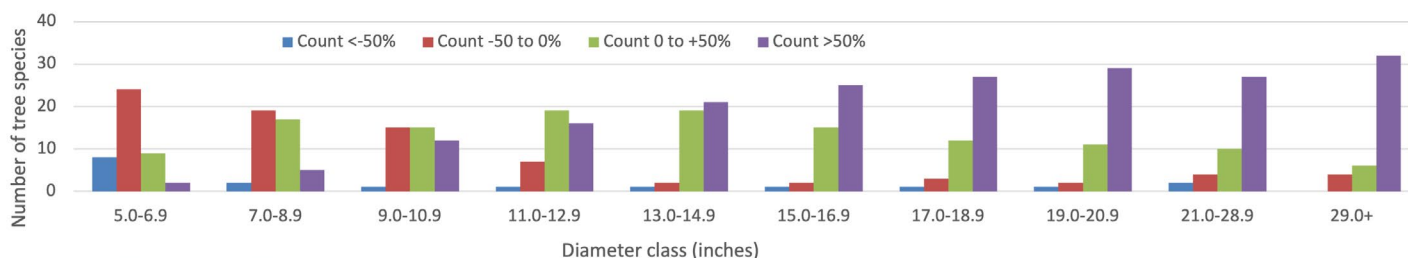


Figure 8-1—Number of tree species or groups of species with percent change in stem numbers (a measure of tree population size), by diameter class (inches), for trees ≥ 5 inches in diameter at breast height, between 1977 and 2017 in the conterminous United States. Data from Resources Planning Act (RPA) Assessment tables and the Forest Inventory and Analysis (FIA) database (Oswalt et al. 2019).

What has changed since 2011?

Most forest-associated bird species with significantly decreasing population trends between 1966 and 2003 also exhibited decreasing trends between 1966 and 2011 and between 1966 and 2015 (fig. 8-2), suggesting that historical trends are continuing in recent years. Bird species with 1966–2015 population trends in greatest

decline include northern bobwhite, pinyon jay, black-billed cuckoo, loggerhead shrike, olive-sided flycatcher, eastern whip-poor-will, and golden-winged warbler—species of both early and late successional forest and open/shrub habitat. Populations of some generalist bird species and some that favor dead trees as foraging and nesting substrates show increasing trends, including American three-toed woodpecker, lesser goldfinch, western bluebird, ruby-crowned kinglet, and red-breasted nuthatch.

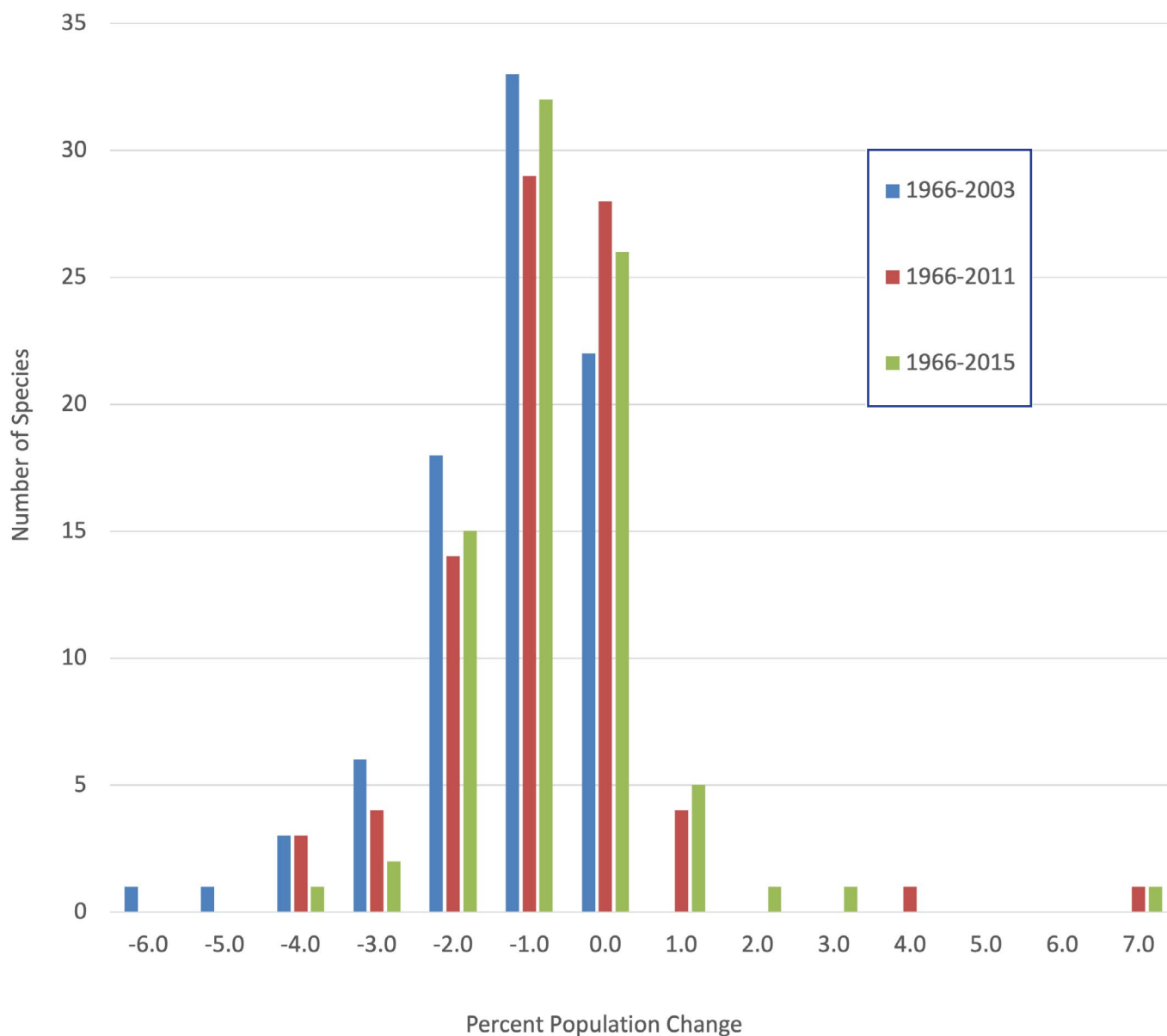


Figure 8-2—Number of forest bird species by population trend classes between 1966 and 2011 and between 1966 and 2015 for the subset of 84 species that had significantly ($P < 0.1$) decreasing population trends between 1966 and 2003, calculated from the Breeding Bird Survey (BBS) database.
 Sources: 1966–2003 data: Sauer et al. (2008); 1966–2011 data: Sauer et al. (2012); 1966–2015 data: Sauer et al. (2017).

Are there important regional differences?

Between 1966 and 2018, Bird Conservation Regions (BCRs) with more bird species having significantly decreasing trends than species with significantly increasing trends include the West Gulf Coastal Plain/Ouachita Mountains, Peninsular Florida, Northern Rockies, Northern Pacific Rainforest, and Sierra Nevada

regions. In contrast, the Prairie Hardwood Transition, Lower Great Lakes/St. Lawrence Plain, Piedmont, and Oaks and Prairies (east-central Texas) BCRs had higher numbers of forest bird species with significantly increasing trends compared to bird species with significantly decreasing trends (fig. 8-3). The Pacific Coast region had a greater number of tree species or species groups showing declines in large diameter classes compared to North, South, and Rocky Mountain Resources Planning Act (RPA) Assessment regions (fig. 8-4) (Bird Studies Canada and NABCI 2014).

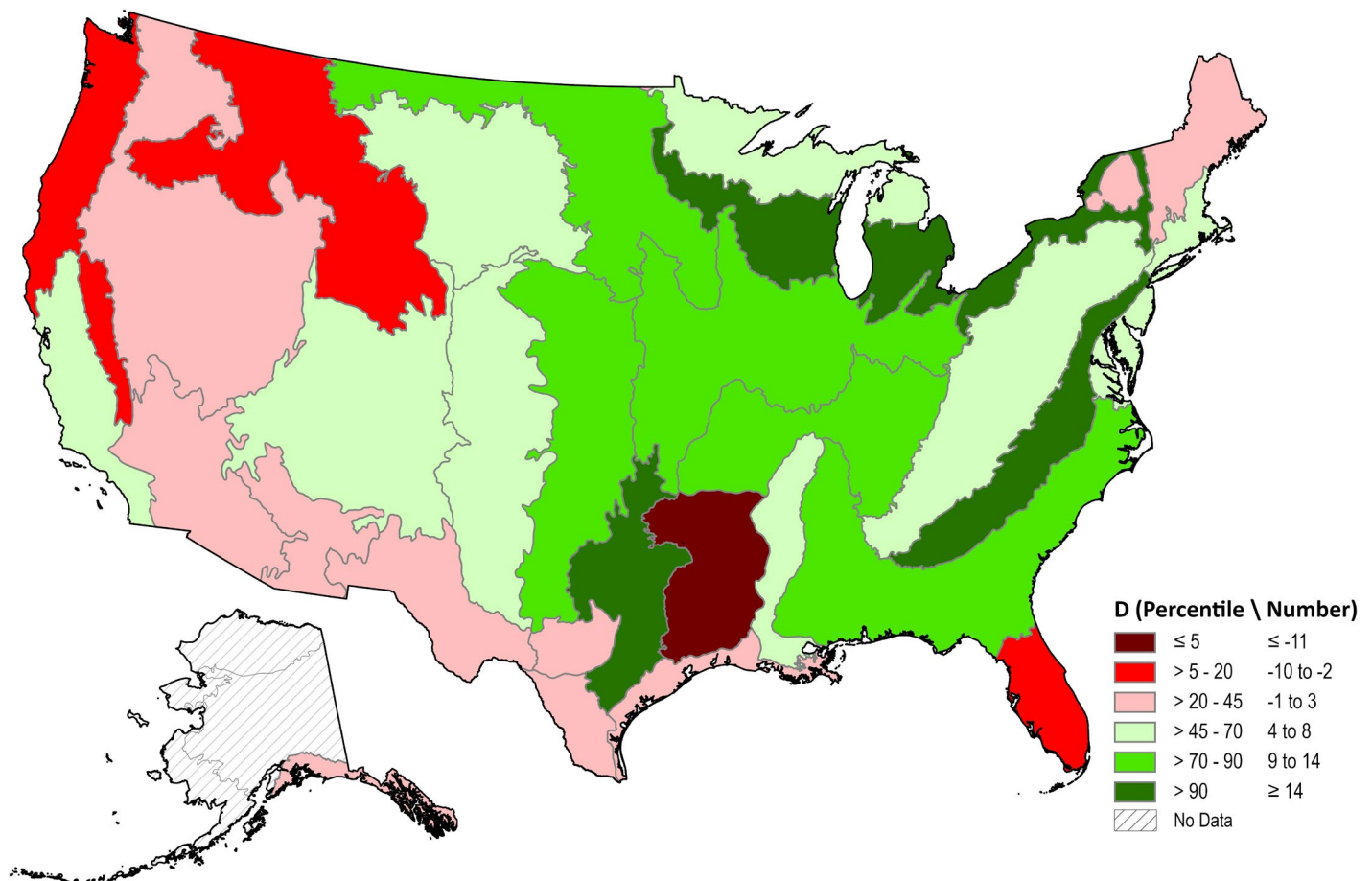


Figure 8-3—Difference (D) between the number of forest bird species with significantly ($P < 0.1$) increasing and decreasing population trends by Bird Conservation Region (BCR), between 1966 and 2018, calculated from the Breeding Bird Survey (BBS) database. Cut points based on 5-20-45-70-90-100 percentiles. Sources: U.S. Geological Survey (2018); Bird Studies Canada and NABCI (2014).

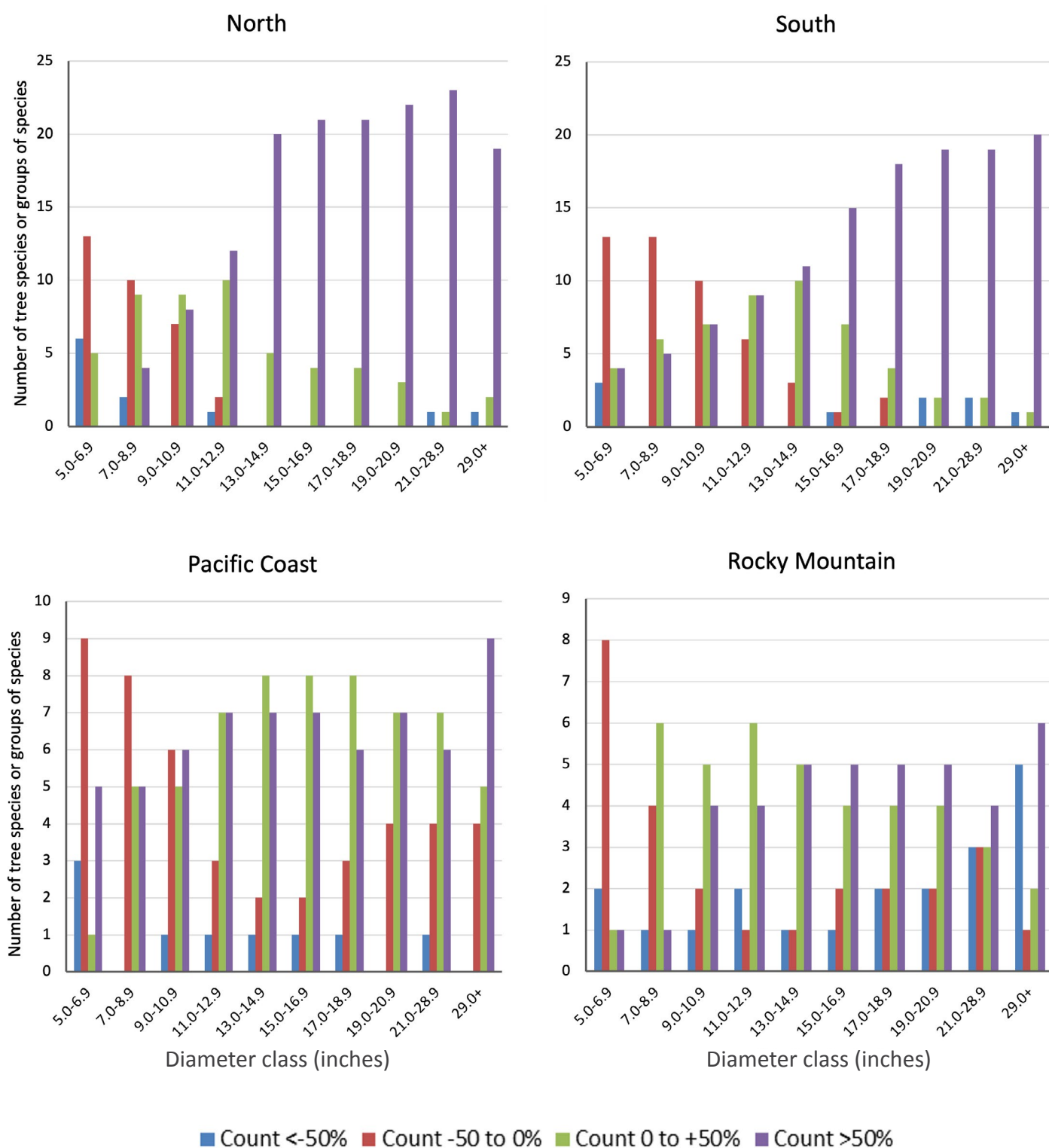


Figure 8-4—Number of tree species or groups of species with percent change in stem numbers, by diameter class, for trees ≥ 5 inches diameter breast height, between 1977 and 2017, by region. Data from RPA tables and Forest Inventory and Analysis (FIA) database (Oswalt et al. 2019).

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

There is a paucity of population data for taxa other than trees, birds, and a small subset of hunted species. Systematic strategies for monitoring population levels of other taxa are needed as well as an objective approach for selecting a minimum subset of species that will adequately represent the status of genetic diversity across the full biota.

Literature Cited

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