Indicator 1.03.

Fragmentation of Forests

What is the indicator and why is it important?

This indicator provides information on the extent to which forests are fragmented by human activities and natural processes. Fragmentation may lead to the isolation and loss of species and gene pools, degraded habitat quality, and a reduction in the forest's ability to sustain the natural processes necessary to maintain ecosystem health. The fragmentation of forest area into smaller pieces changes ecological processes and alters biological diversity. This indicator includes several measures of the extent to which forests are fragmented at several spatial scales of analysis.

What does the indicator show?

Analysis of fragmentation is scale dependent. Consequently, maps or summaries of fragmentation differ depending on whether the forest map is separated into small or large pieces (landscapes) for analysis.

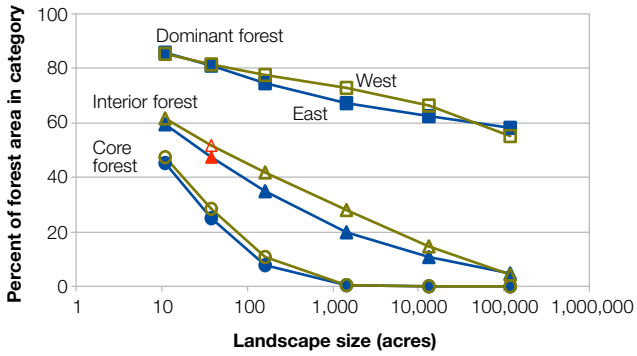
Maps of forest land derived from satellite imagery at 0.22-acre resolution (circa 2001) show that although forest is usually the dominant land cover in places where forest occurs, fragmentation is extensive. Simply stated, places that are forested tend to be clustered in proximity to other places that are forested, but blocks of forest land are usually fragmented by inclusions of nonforest land. This pattern is repeated across a wide range of spatial scales. For landscapes up to 160 acres, at least 76 percent of all forest land is in landscapes that are at least 60 percent forested. For larger landscapes up to 118,000 acres in size, at least 57 percent of forest land is in forest-dominated landscapes (figs. 3-1 and 3-2).

Core forest is forest on landscapes that are completely forested. The larger the landscape being examined is, the less likely that it will be core forest. For 10-acre landscapes, 46 percent of all forest land is classified as core forest. Less than 1 percent of forest land is classified as core forest in landscapes that are 1,500 acres or larger.

Interior forest is forest on landscapes that are more than 90 percent forested. As with core forest, larger landscapes are less likely to have interior forest. When examining landscapes that are 10 acres in size, 60 percent of all forest land is interior forest. For landscapes larger than 250 acres, however, less than one-third of forest land is classified as interior forest. Forest area in landscapes dominated by forest (more than 60 percent forest) is greater than either core or interior forest, and dominant forest area also decreases with increasing landscape size.

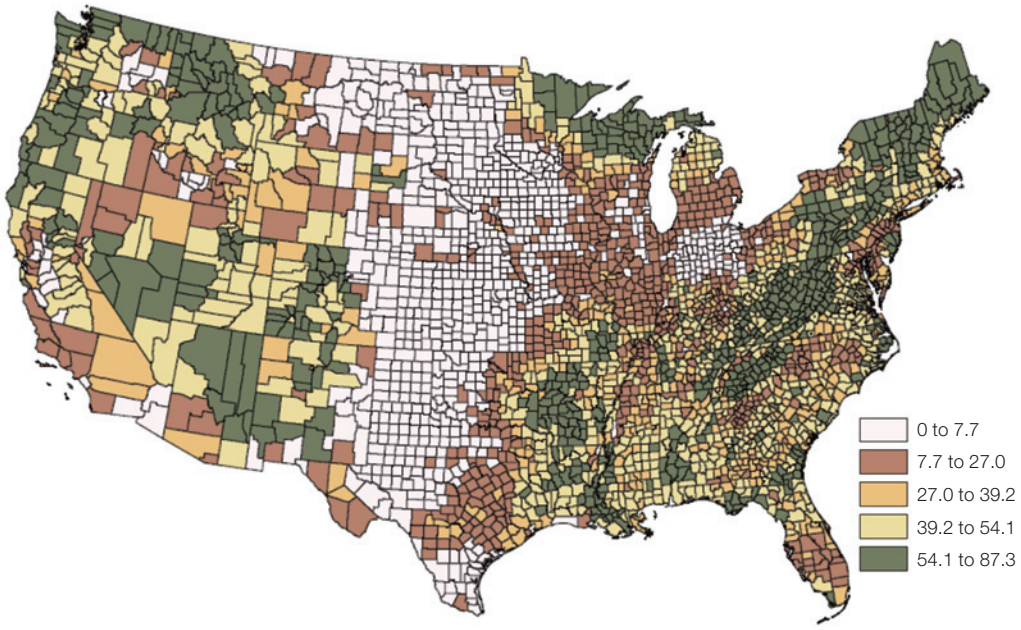
Edge habitats have a different microclimate and often support a different species mixture than forest, which is distant from an edge between forest and nonforest land. Overall, 54 percent of forest land is within 185 yards of forest land edge, 74 percent is within 330 yards of forest land edge, and less than 1 percent is at least 1,900 yards (1.1 miles) from forest land edge.

Figure 3-1. Forest land fragmentation (circa 2001) from national land-cover maps (National Land Cover Database). The chart shows the percentage of forest land in the coterminous United States that is considered core (completely forested landscape), interior (greater than 90 percent forested), or dominant (greater than 60 percent forested), and how those proportions decrease with increasing landscape size. The West includes the Pacific and Rocky Mountain regions; the East includes the North and South regions. Red symbols identify the conditions mapped in figure 3-2.



Source: 2007 NLCD compilation of 2001 data

Figure 3-2. The percent of all forest in a county that is interior forest (greater than 90 percent forested) when analyzed at an approximately 40-acre scale (corresponding to the red symbols in figure 3-1). Larger values indicate that a larger share of the existing county forest is relatively intact, in comparison to forest in other counties. In this quantile map, equal numbers of counties are shaded with each color.



What has changed since 2003?

Due to changes in land-cover mapping protocols, the statistics shown here are not directly comparable to those shown in the 2003 report.

Are there important regional differences?

Western forests (Pacific Coast and Rocky Mountain Regions) are less fragmented than eastern forests (North and South Regions). This difference is most pronounced for landscapes smaller than 250 acres in size (fig. 3-1).

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

Regional baseline conditions and the specific ecological implications of observed levels of fragmentation are mostly unknown. The available data permit an analysis of overall forest land fragmentation but do not incorporate the influence of small roads nor differences in land ownership (parcelization).