

Indicator 22. Area and Percent of Forest Land with Significant Compaction or Change in Soil Physical Properties Resulting from Human Activities

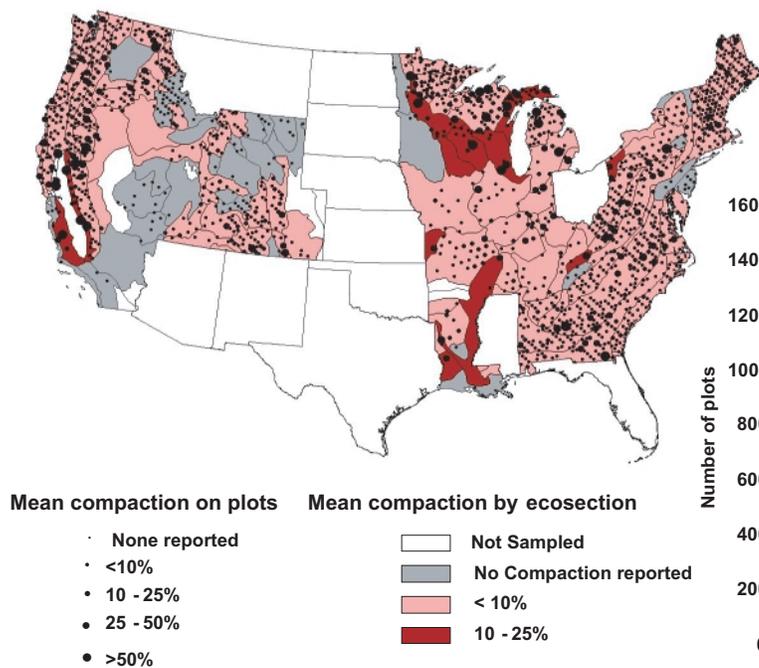


Figure 22-1. Mean surface compaction reported on forest health monitoring plots (1999–2000).

What Is the Indicator and Why Is It Important?

Soil is a complex mixture of air, water, mineral material, and organic matter. Compaction changes the ratio between these components and has the potential to negatively affect productivity. The purpose of this indicator is to quantify the extent of human-induced changes to soil physical characteristics that might adversely affect soil fertility, hydrology, or other ecosystem processes.

What Does the Indicator Show?

Visual estimates of surface soil compaction are currently measured on a subset of the national Forest Inventory and Analysis (FIA) plot network. Initial data collected from 1999 to 2000, as part of the Forest Health Monitoring (FHM) Program indicate that soil compaction was primarily a localized phenomena. More than 86 percent of the 2,006 FHM plots measured during this time reported only trace levels of soil

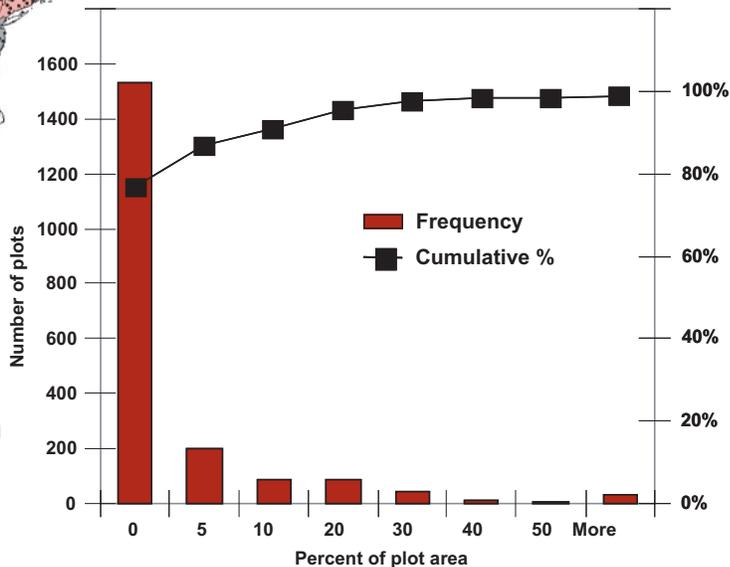


Figure 22-2. Frequency distribution of surface compaction reported on forest health monitoring plots (1999–2000).

compaction (< 5 percent of the plot area). In addition, only a small fraction of plots (1.6 percent) reported surface disturbance on more than 50 percent of the plot area. Soil compaction may be a serious problem on a local scale, however, as indicated by the high proportion of disturbance reported for some individual plots.

The FIA soil indicator program is still in the implementation phase, and plots have not yet been established in all States. As such, any analysis of data from this program is necessarily limited in scope. In addition, no measurements were made regarding the degree or intensity of compaction. Physical disturbances that are not readily visible from the surface may be underreported. Compaction data from FIA/FHM is intended to provide only a "presence/absence" index of the occurrence of disturbed soils across the landscape. Linkages to process-level research are needed to determine the ecological significance of these measurements for different forest systems and soil types.