

Indicator 2.11:

U.S. Forest Sustainability Indicators <https://www.fs.fed.us/research/sustain/>

Total growing stock and annual increment of both merchantable and nonmerchantable tree species in forests available for wood production

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What is the indicator and why is it important?

This indicator measures the growing stock and annual increment of forest areas available for wood production. The majority of the 800-plus tree species on timberland in the United States are considered merchantable, with the exception of rare or endangered species. Nonetheless, not all species are valuable in the commercial marketplace. In the United States, growing stock trees are defined as individuals of commercial (merchantable) species that currently or could potentially contain at least one 12-foot log or two 8-foot logs in the saw-log portion of the tree. Growing-stock volume may be calculated from those trees as the cubic-foot volume of sound wood from a 1-foot stump to a 4-inch top, outside of bark. The annual increment and

growing stock can be related to the volume harvested each year to determine whether the forest resource is sustainably managed from the limited perspective of timber volume.

What does the indicator show?

Timber volume on U.S. timberland totals 1.1 trillion cubic feet. Of that, 985 billion cubic feet is considered “growing-stock” volume, which is what most people think of when they think of trees that might be harvestable. Tree volume in the Nation is almost evenly split between hardwood and softwood species, with total volumes of 527 billion cubic feet of hardwood and 599 billion cubic feet of softwood (fig. 11.1).

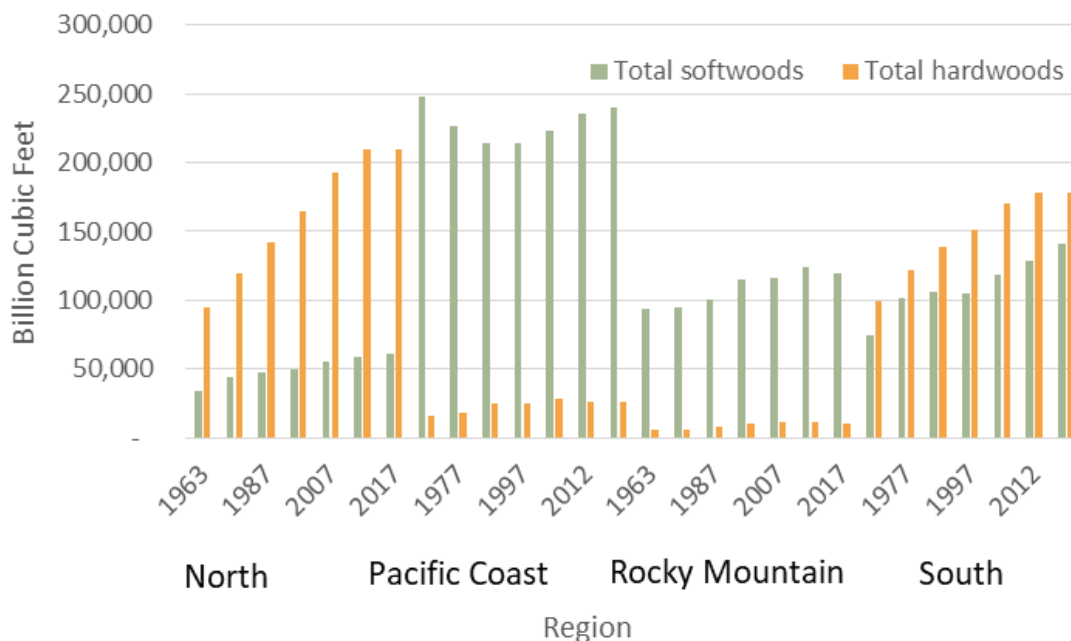


Figure 11-1—Growing-stock volume on timberland by region and major species group, 1963, 1987, 2007, and 2017 (Source: Oswalt et al. 2019).

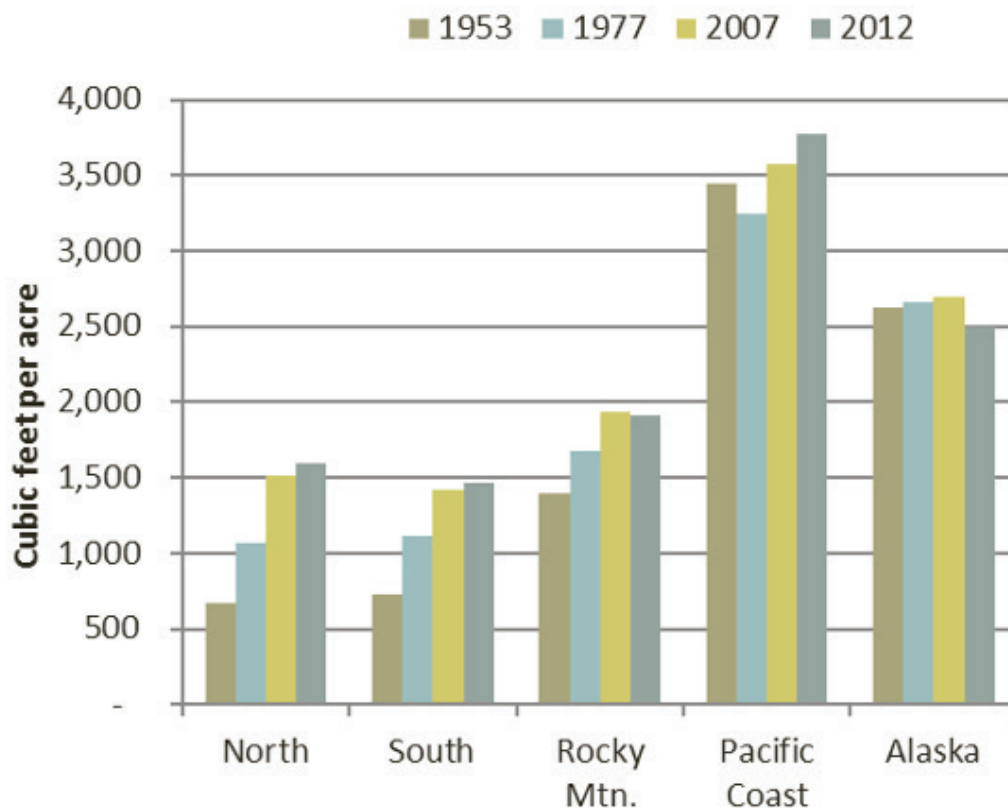


Figure 11-2—Volume per acre of growing stock on timberland by region and year, 1953 to 2012 (Source: Oswalt et al. 2019).

Growing stock has increased consistently since 1963 and, in fact, growing stock volume on timberland in the United States is now 48 percent higher than it was in 1963 (fig. 11.1). Since 2012, growing stock volume has increased by an additional 12 billion cubic feet, with nearly all the increase occurring in softwood species (fig. 11.1).

Per-acre timber volume continued to increase in most regions, except the Rocky Mountains, which has recently suffered large degrees of mortality from a combination of insects and disease, drought-induced mortality, and wildfires (fig. 11.2). Overall per-acre volumes increased from 1,865 cubic feet per acre in 2012 to 1,915 cubic feet per acre in 2017.

Three primary drivers of change impact tree volume on timberland: growth on live trees, removals of live trees, and tree mortality. These components of change are averaged, annually, and are reported as “net” growth

(growth minus mortality) compared against removals. The “growth-to-removal ratio” can help foresters understand whether they are removing too much or too little wood from the landscape.

Nationally, average annual net growth is 2.5 percent of growing stock inventory. This means the United States grows approximately 25 billion cubic feet per year, on average, when 10 billion cubic feet of average annual mortality is accounted for. By comparison, removals in the United States average 13 billion cubic feet per year, or 1.3 percent of growing stock inventory. Therefore, the growth-to-removals ratio at the national scale is 1.92, or we grow nearly twice the volume we remove from timberland, annually. This simplified statistic does not account for regional patterns and other landscape dynamics that impact the sustainability or health of the forest, however.

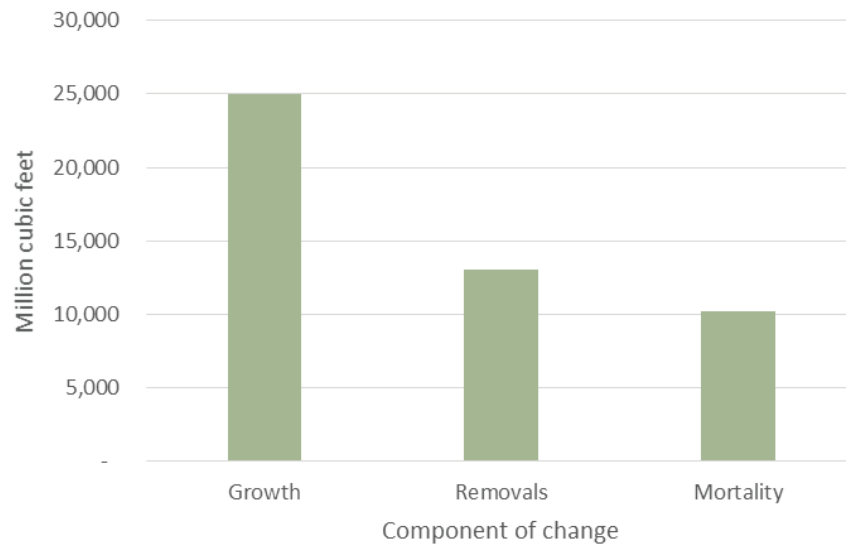


Figure 11-3—Average annual net growth (growth minus mortality), removals, and mortality, 2017 (Source: Oswalt et al. 2019).

What has changed since 2015?

Growing stock has consistently increased since 1963. Growing-stock volume was 1,900 cubic feet per acre—an increase from 1,865 cubic feet per acre in 2012. Currently, we grow nearly twice the volume we remove from timberland, once mortality is taken into account.

References:

Oswalt, S.N.; Smith, W.B.; Miles, P.D.; Pugh, S.A., coords. 2019. Forest resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment. Gen. Tech. Rep. WO-97. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. 223 p. <https://doi.org/10.2737/WO-GTR-97>