



Key Takeaways of the Colorado Forest Carbon Inventory

Forest Ecosystem & Harvested Wood Product Carbon Accounting Framework Through 2019

Background

In response to HB22-1012, the Colorado State Forest Service (CSFS) was directed to develop a statewide carbon accounting framework. This framework provides a comprehensive understanding of how Colorado's forested lands impact climate mitigation by quantifying the carbon stored, captured, and released. Researchers from CSFS and the Natural Resource Ecology Lab (Colorado State University) analyzed carbon stored in various parts of forests, including trees, roots, and soil, as well as the carbon in harvested wood products, such as lumber. Forests act as **carbon sinks** when they absorb more carbon than they release, but disturbances such as wildfires and insect outbreaks can turn them into **carbon sources** by emitting more carbon than they absorb.

Carbon in Forest Ecosystems

- Colorado's forests store 1,553 Teragrams of carbon (TgC), with most carbon residing in live aboveground parts of the trees (20%) and soil (59%).
- Despite their significant carbon storage, forests were a net source of carbon, emitting an average of 0.9 TgC per year due to high tree mortality outpacing growth. Insects and diseases caused 85% of disturbances, accounting for 64% of disturbance-related carbon losses.
- Carbon trends vary widely by region, forest type, and ownership. While some forest types served as carbon sinks in certain regions, they acted as carbon sources in others. The western part of the state, containing the majority of forested areas and carbon stocks, experienced the greatest losses in forest carbon.

Carbon in Harvested Wood Products

- Since 1954, a total of 15.3 TgC was harvested in Colorado, with a notable decline in harvest volumes after 1979.
- As of 2019, 5.8 TgC remains stored in wood products, acting as a consistent carbon sink, though this accounts for just 0.4% of total forest carbon stocks.

Insights and Implications

- Nuanced carbon trends: Carbon dynamics reflect a combination of current and historical management practices, climate change, and disturbances. While some regions and forest types continue to sequester carbon, others have become carbon sources.
- Higher stocks, lower emissions: Compared to other inventories, Colorado's forest carbon stocks are higher, and emissions are lower than previously estimated.
- Future expectations: As data reflecting the 2020 wildfire season and subsequent fires become available, the magnitude of the carbon source is expected to increase.

More Information

The full report is available for download on the CSFS website (<https://csfs.colostate.edu/forest-carbon/>), along with several supporting resources, including an interactive data dashboard, podcast, and FAQs.