

Office of Sustainability & Climate

Carbon on National Forests & Grasslands

The Forest Carbon Cycle

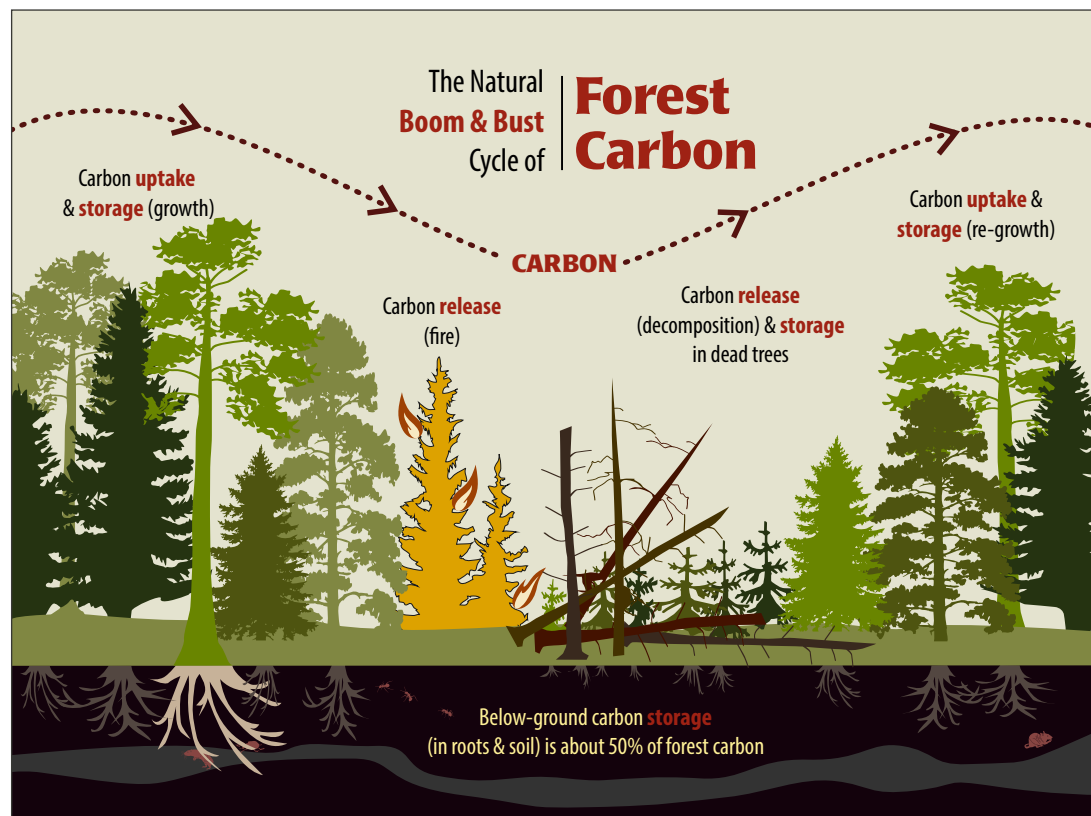
Carbon uptake and storage are some of the many ecosystem services provided by forests and grasslands. Through the process of photosynthesis, growing plants remove carbon dioxide from the atmosphere and store it in forest biomass (plant stems, branches, foliage, roots). Much of this organic material is eventually stored in forest soils. This uptake and storage of carbon from the atmosphere helps modulate greenhouse gas concentrations in the atmosphere.

The rate of carbon removal by plants from the atmosphere is influenced by many factors, including natural disturbances, management, forest age and successional pathways, climate and environmental factors, and availability of nutrients and water.

Boom and Bust

Forests are dynamic systems that naturally undergo fluctuations in carbon storage and emissions as they establish and grow, die through natural aging, competition processes or disturbances (e.g. fires, insects), and re-establish and regrow. When trees and other vegetation die, carbon is transferred from living carbon pools to dead pools, which release carbon dioxide through decomposition. Fires also release carbon dioxide directly to the atmosphere through combustion.

The long-term capacity of forest ecosystems to absorb and sequester carbon depends in large part on their health, productivity, resilience, and ability to adapt to changing conditions.

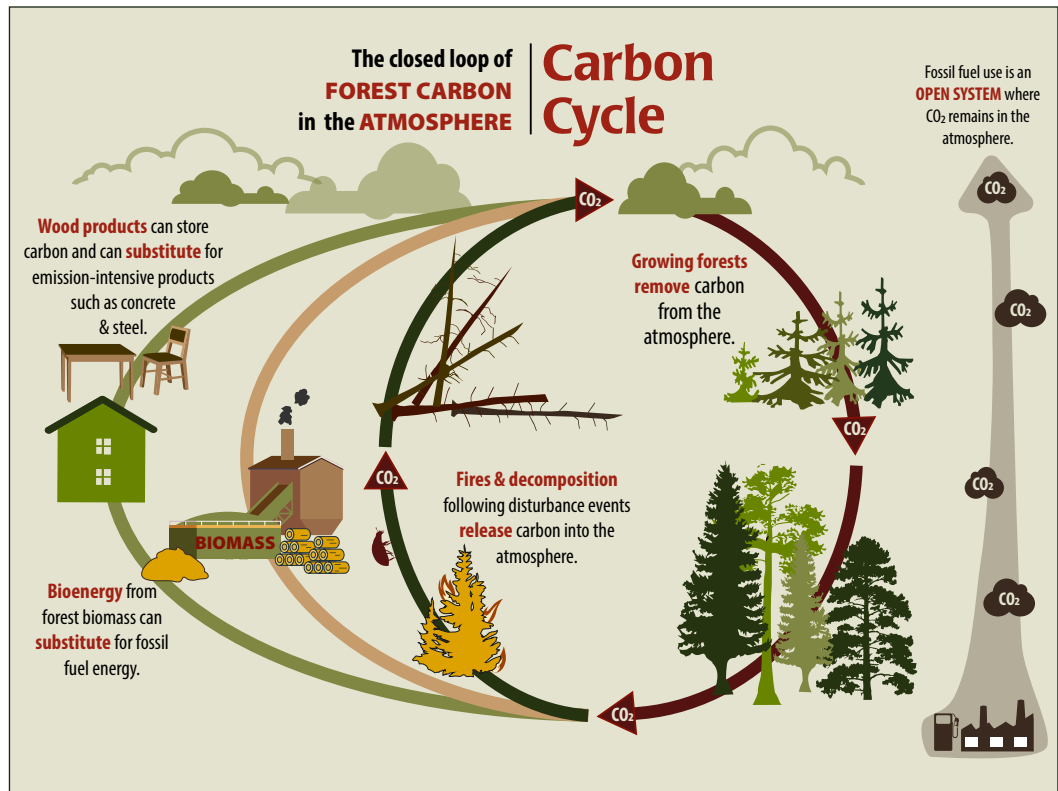


Carbon Storage in Harvested Wood Products

Management activities include timber harvests, thinning, and fuel reduction treatments that remove carbon from the forest and transfer a portion to wood products. Carbon can then be **stored** in wood-based commodities (e.g., paper, lumber) for a variable duration ranging from days to centuries.

Wood products can be **substituted** for other products

that emit more greenhouse gases in manufacturing, such as concrete and steel. Wood may also be burned to produce heat or electrical energy, or converted to liquid fuels and chemicals that would otherwise come from fossil fuels.



Estimates of Carbon Storage in U.S. Forest Sector and National Forest System

Estimates of net annual storage of carbon indicate that forests in the United States constitute an important carbon sink, removing more carbon from the atmosphere than they are emitting. **Forests in the U.S. remove the equivalent of about 12 percent of annual U.S. fossil fuel emissions** or about 206 teragrams of carbon after accounting for natural emissions, such as wildfire and decomposition.

The majority of federal forests and forest carbon stocks are managed by the U.S. Forest Service. The current estimate of total ecosystem carbon on Forest Service forests is approximately 13,800 teragrams carbon.



Questions About Forest Carbon? Contact Us!

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Visit our website:
<https://www.fs.fed.us/managing-land/sc/carbon>

Forest Service employees can visit our internal website:
<https://usdagcc.sharepoint.com/sites/fs-nfs-osc/Pages/Carbon.aspx>