Sustainable Forest Management: A Climate Change Mitigation Tool

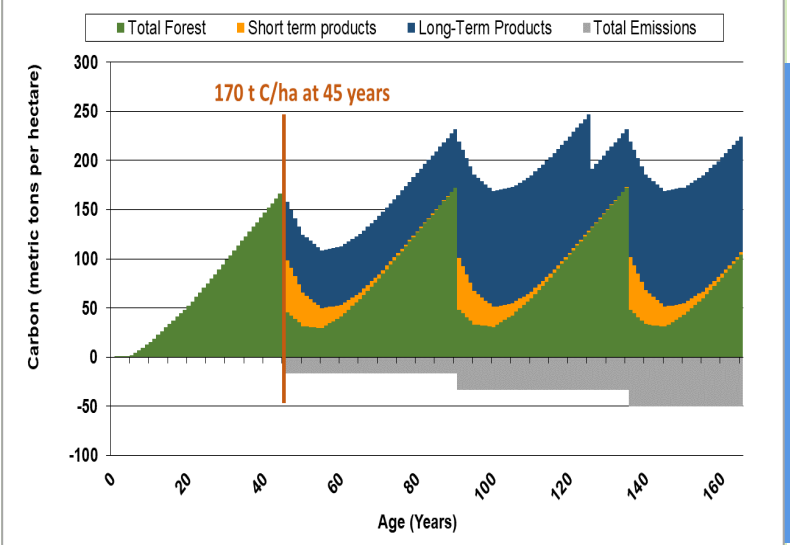
FACTSHEET 3 January 2022

Sustainable forest management acts like a pump that transfers forest carbon to other uses and storage pools.

Harvesting trees transfers carbon from the forest to wood products. Replanting after harvest on a continuous basis offsets the removals and keeps the average carbon stable across forested landscapes. Continued investment in sustainably managed forests can increase forest carbon storage while providing for a continuous supply of wood for future needs.

Lippke et al. 2011 show that forest management and more efficient of use of resources for wood product production provide significant opportunities to mitigate climate change because carbon is stored both in the forest and in wood products. These efficiencies allow other forests to serve other important needs (see over).

Figure 1: Managed Timberland Carbon Pools



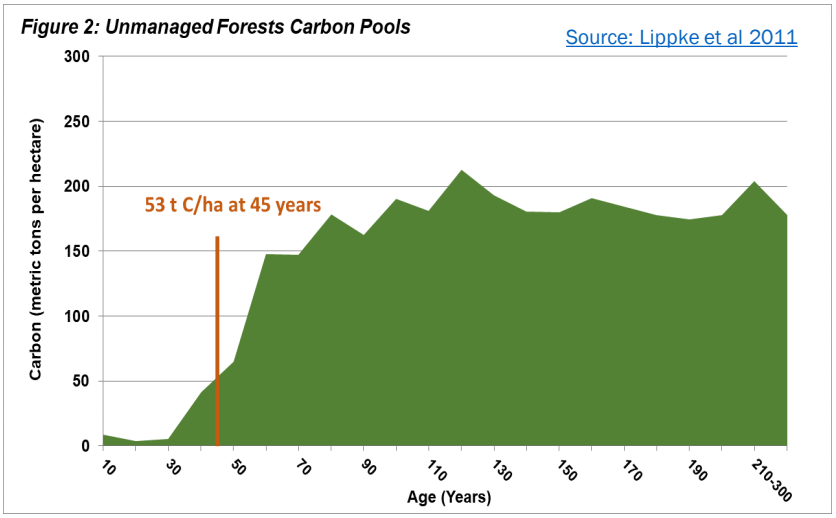
Overview

Concerns over climate change have become a global priority. Proposed natural climate solutions to address this issue include stopping forest harvest, extending harvest rotation age, and planting more trees. These measures have only limited ability to reduce atmospheric carbon dioxide and can possibly be counterproductive because:

- Intensive management increases carbon sequestration rates, allowing for fewer acres to produce more wood
- Tree growth slows down with age
- Climate driven disturbance impacts are reducing the benefits of longer rotations (see next page).

Figure 2: Unmanaged Forests Carbon Pools

Source: Lippke et al 2011



Figures 1 and 2 compare growth patterns for intensively managed and unmanaged (natural) forests in the PNW. They show that within 45 years, managed forests can sequester 3.2 times more carbon (170 tons/hectare vs. 53 tons/ hectare) than unmanaged (natural) forests.

The Takeaway

- **Managed forests worldwide represent 7% of total area but provide 41% of the global wood supply. They are highly efficient at removing CO_2 from the atmosphere and converting it to carbon storing products.**
- **Forests managed for timber sequester carbon at a faster rate than unmanaged forests.**
- **Carbon uptake in US forests and wood products offset 14% of the US annual carbon emissions.**

Forest Management Works

Forest represent the largest terrestrial carbon sink on the planet. One third of the US is forested. In the US, forest land and wood products sequester 753 million tons of CO^2 per year offsetting more than 14% of the US annual carbon emissions.

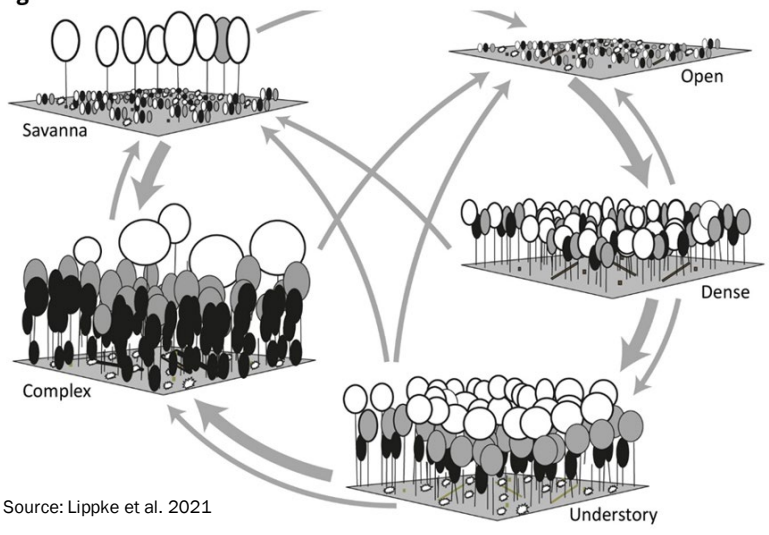
Forests managed for timber transfer carbon to the wood products which are used in houses, decks, fences, furniture, doors, and cabinets and more. It may be decades or centuries before the carbon is released back to the atmosphere.

For example, Ganguly et al. (2019) show that privately owned managed forests in Washington state provide essential climate mitigation benefits. This study led to a 2020 WA State law (ESSHB 2528), formally recognizing the State's forestry sector as a climate solution. This law recognizes that all long-lasting wood products are net carbon negative and contribute to economy wide climate mitigation strategies.

Habitat Impacts

Forests are continually changing their structure due to tree growth (broad arrows) and disturbances (narrow arrows), both natural and human (Figure 3). Each structure provides a specific habitat for animals and plants. A healthy mixture of structures can ensure that most species (biodiversity) needs are provided. Structural diversity also reduces forest susceptibility to wildfires and insect outbreaks, as well as other ecosystem services such as water quality and flow. Lippke et al. 2021 found that increasing managed timberlands in the world will make it easier to provide the desired mix of structures for all types of habitats (dense, open, understory, complex, or savanna) and other values on forests conserved for other uses.

Figure 3: Forest Structures

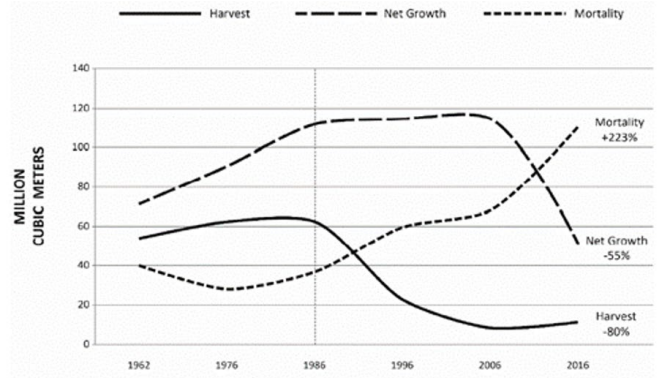


Source: Lippke et al. 2021

Climate change impacts in unmanaged forests

Forest ecosystems can suffer from extreme disturbances under a changing climate as shown for US National Forests below. The figure shows annual harvest, net timber growth, and tree mortality in all National Forest timberlands between 1962 and 2016. In many states, National Forests now emit more carbon than they store – adding to the climate crisis with additional CO_2 in the atmosphere.

Figure 4: Annual Harvest, Net Growth, and Mortality on National Forest Timberlands between 1962-2016



Source: Lippke et al. 2021

- **Unmanaged forests are not faring well due to climate change impacts. The acres burned in these forests has more than doubled since 2000.**
- **Forestland that is *sustainably managed* will sequester more carbon over medium to long-term time horizons.**
- **Supporting the whole forest products sector as a climate solution is being adopted by State governments.**
- **Intensive forest management on timberlands to meet global wood demand frees up other forests to provide benefits such as biodiversity that require a different management approach.**

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