Carbon

The Forest Steward Handbook

Forest Harvest and Carbon

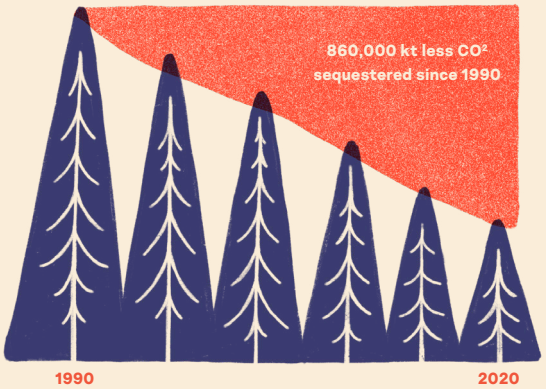
Our forests in Southern Alberta are incredibly important for carbon storage. As trees grow and mature they sequester carbon, effectively drawing the carbon out of the atmosphere and mitigating the effects of climate change for decades. Trees become more effective at storing carbon the older they get. When trees are removed from the landscape, the result is an emission of greenhouse gases into the atmosphere that are not quickly reabsorbed by young trees. The process of carbon cycling and storage is very complex and also involves many interacting factors including forest fires, insect impacts, and forest harvest.

SEQUESTRATION

Carbon sequestration is the method in which trees, through the process of photosynthesis, take in CO^2 from the atmosphere and store the carbon in the tree's biomass (mainly in the trunks, but also in roots, leaves, and branches), or in the forest soil. Studies estimate that over 50% of a dry tree's biomass is carbon.

Forests sequester carbon in very large amounts, most of which is stored in older trees. Approximately 25% of global anthropogenic emissions are sequestered in forests. However, this is significantly reduced when forests experience disturbance. Since 1990, Canada's managed forests have sequestered 860,000 kilotonnes (kt) less CO^2 eq, or about 30,000 kt CO^2 eq a year on average, or the equivalent of 5.9 million passenger cars being driven". This reduction in carbon storage is due to land conversion from forested to non-forest landscapes.

REDUCTION IN CARBON STORAGE OVER TIME FOLLOWING LAND DISTURBANCE

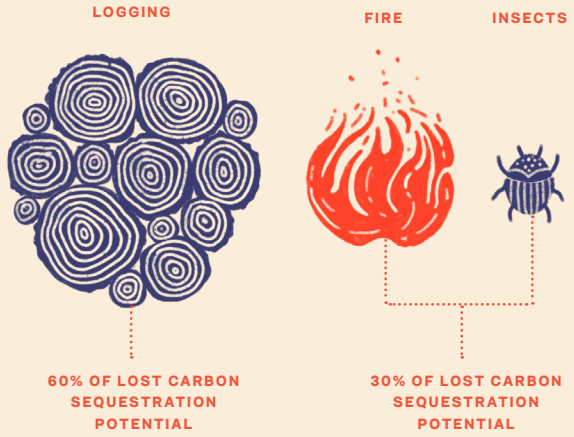


THE VALUE OF OLDER FORESTS

Disturbances and land cover changes such as forest harvest, insects, disease, fires, tree die-off and decomposition result in net emissions of carbon into the atmosphere. The statistics vary, but forest harvest is responsible for approximately 20% of global greenhouse gas emissions. The release of carbon that occurs when forests are harvested is largely the result of the conversion to non-forested lands.

The argument that when trees are replanted, these younger trees will sequester more carbon is not entirely true. Much of the literature has concluded that the replacement of older forests by younger ones will result in a net release of carbon into the atmosphere. Old growth forests are not carbon neutral, in fact older forests continue to sequester carbon.

> ***The replacement of older forests by younger ones results in a net release of carbon into the atmosphere.***



The opportunity for forests to reach full sequestration potential is compromised by mainly logging, fire and insect.

The overwhelming majority of carbon loss comes from the extraction of timber from the landscape.

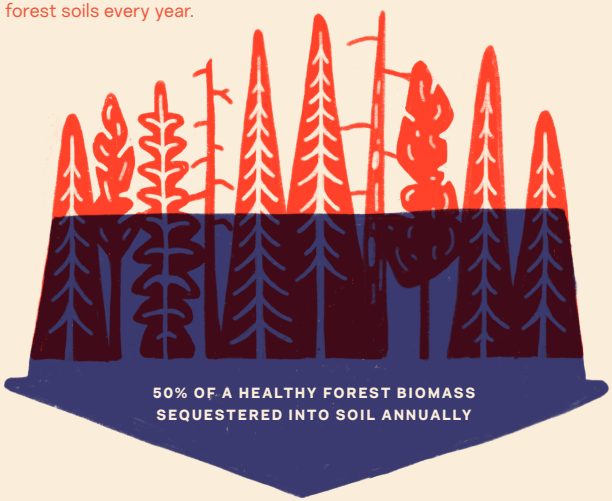
PROFORESTATION

Forests are an important tool in mitigating climate change. A recently coined term, “proforestation”, described the process of maintaining and/or increasing the ability of forests to store carbon by allowing them to reach their “full ecological potential”. The argument is that if forests are protected and land conversion is avoided, the full carbon sequestration potential can be harnessed as a climate mitigation strategy.

CARBON FROM FORESTS FIRES

While forest fires emit carbon, we must also consider the important role natural disturbance plays in forest health and biodiversity. Forest harvest does not replace the ecological role of fire nor reduce the risk of wildfires across the landscape. When trees are harvested, their ability to sequester the carbon is gone. Both activities result in emissions and harvest should not be prioritized over a natural fire regime.

An old growth forest that has reached full proforestation potential will sequester half its biomass into forest soils every year.



STORED CARBON

While it is sometimes argued that forest harvest reduces carbon emissions in the short term by storing carbon in wood products, it is not so simple and ignores the complexities of the forest system. When trees are removed from the landscape, carbon is released or the potential for carbon to be stored is removed. Younger trees sequester less carbon, and take years to decades to get to a point where the carbon that is stored becomes significant.

While it is true that carbon is stored in forest products, its value for reducing GHG emissions depends on many factors, including how many GHG emissions are emitted from making the product, whether the forest overall is a carbon sink or source, the duration in which the carbon stays stored in the product, whether other more GHG intensive products are not being made as a result of that product, and many other factors that relate to decomposition and product life cycle.

For sources and more information visit:
cpaws-southernalberta.org/forest-stewards/