

Carbon Sequestration

Greenhouse gases are increasing in the earth's atmosphere and causing climate change. Scientists, policy makers, and citizens are trying to determine how to decrease and possibly reverse emissions of greenhouse gases, especially carbon dioxide (CO₂). Carbon sequestration, the process where CO₂ is pulled from the atmosphere and stored for a long period of time, may be one way to slow or reverse the accumulation of CO₂ in the atmosphere. Terrestrial sequestration utilizes natural processes in ecosystems to absorb CO₂ from the atmosphere and store it in plants, animals, and soil.

Soil – In addition to leaves and stems, trees produce large quantities of roots that also contain carbon. Rotting leaves, debris, and soil organisms all contain carbon. In fact, northern forests can sequester twice as much carbon in the soil than aboveground.

Inorganic carbon in soils and rock – Carbon in the soil can slowly develop into other forms, including some types of rock, which are very stable and hold carbon in the soil for very long periods of time.

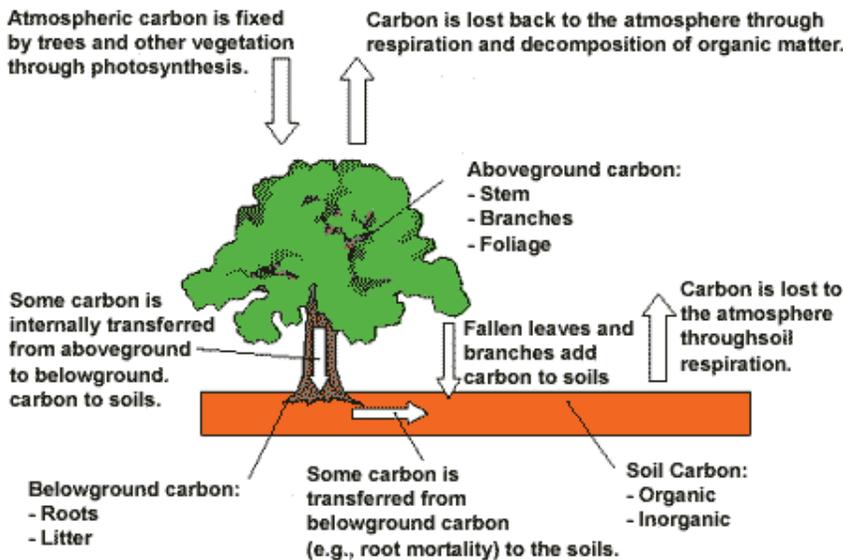
Forests can be managed to sequester greater amounts of carbon while still providing for wildlife, recreation, wood products, and other uses.

Avoiding deforestation – Deforestation is a major contributor to climate change. Maintaining current forestland is crucial for avoiding additional inputs of CO₂ in the atmosphere and for ensuring the ability of the forests to continue sequestering carbon. For example, deforestation, particularly in the tropics, is responsible for approximately 20% of human-caused CO₂ emissions.

Afforestation – Forestlands sequester CO₂ in larger quantities and for longer periods of time than many other land uses. Converting agricultural, developed, or degraded land to forest can dramatically increase the amount of carbon sequestered.

Reforestation – Reestablishing trees on previous forestland is a specific type of management. By maintaining areas as forest, trees will continue to sequester carbon.

Forest management – Slight changes in forest management practices can improve the ability of forests to store carbon while still providing other benefits. Extending the time between harvests, encouraging fast-growing species, and fertilization are a few examples of management techniques that could be used to improve forest carbon sequestration.



Forests function as carbon sinks, absorbing CO₂ from the atmosphere and sequestering it in tree biomass and forest soils. (Image Courtesy of US EPA)

In the US, forests store large amounts of carbon, composing 90% of the US carbon sink and sequestering approximately 10% of US CO₂ emissions. Forests sequester carbon in four different ways:

Aboveground – Carbon is stored in the leaves, stems, and other parts of plants when they use CO₂ from the atmosphere to grow. Trees are very important for carbon sequestration because they live a long time and, therefore, store their carbon for many years.

Long-lived products – Wood and other products made from trees still contain the carbon absorbed by the plants that they came from. When a tree is utilized for wood, its ability to sequester carbon is extended, and carbon is not released until the product burns or decomposes.