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Carbon Sequestration Facts and Consequences

The concentration of greenhouse gasses in the atmosphere is now significantly higher than historic levels. Agriculture has a part to play in sequestering one of the most prominent components. That component is carbon dioxide or CO₂.

Forests and rangelands both can play a constructive role in sequestering atmospheric carbon, for both trees and grass convert atmospheric carbon into soil organic matter as well as in above ground biomass.

Stored carbon is easily lost when soil and biomass are disturbed. Fragmentation, development, and conversion are three of the biggest disturbance threats to forests and rangelands today as our population and its demands continue to grow. Where our natural lands are intact, it is important to keep them healthy. Vigorous healthy trees and grasses will sequester carbon for many years. Certain types of forest continue to serve as carbon sinks for as long as 800 years if they remain in old growth. Many of our western forests cannot sustain themselves in these old growth conditions, however, due to the risk of catastrophic wildfires. These fires release millions of tons of carbon into the air every year.

Reforestation and afforestation (two types of planting trees) are ways to increase carbon storage. Planted in the right precipitation zones and ecological sites, these increases can last 90-120+ years. Rehabilitation in forests that are overstocked, homogeneous across too many acres, or encroaching on natural grasslands through brush management, forest thinning, and prescribed fire are ways to increase carbon storage - and create more stable ecosystems that are less likely to suffer insect or disease infestations or catastrophic

wildfires. If wood products are harvested the increase in carbon storage from management actions can last indefinitely without hitting a plateau.

On managed rangelands, to maximize the sequestration of carbon land managers must keep vegetation as vigorous as possible for as long a time as possible. To accomplish this three management items are critical – first, prescribed grazing that entails appropriate stocking rates; second, rotation of stock; and, third, a drought plan that normally means reducing stock in a timely manner when necessary.

Fire is a natural component of our forests and grasslands. In some forests, fires would burn surface fuels every 2-10 years. Grasslands once experienced frequent fires as well. Other vegetation types only saw fires every 300-800 years. While these natural, lightning-started fires historically released some carbon into the air, it was not as drastic as what is released in today's large catastrophic wildfires. These fires destroy millions of acres of biomass and create drastic soil erosion that releases soil carbon. However, adding fire back to the management picture is an important goal. The right kind of fire makes the land stronger and more resilient, especially when combined with the proper application of management.

Carbon sequestration, like so many natural phenomena, works best when natural resources are managed using sound science. This is a core value of the USDA-Natural Resources Conservation Service where more information is available at www.nm.nrcs.usda.gov