Carbon, Climate, and Forest Management

by Jacob Muller and Jordan Shockley

Forest carbon is a hot topic, but we probably don't need to tell you that. Family forest owners are increasingly interested in enrolling their forests in carbon credit programs, though many are unsure if a carbon program is right for them or if they are even eligible to participate. If you are eligible to participate, it's so important not to rush to sign any contracts until you know exactly what the terms of the contract mean for you and your land.

As we detailed in the article "Ins and Outs of Forest Carbon" in the last issue of Kentucky Woodlands Magazine, carbon sequestration is the process of carbon dioxide being pulled from the atmosphere by trees and stored as woody biomass. The carbon is only temporarily stored in the forest while the trees are alive and growing. Depending on the species of tree, this may range from 100 to over 300 years. Carbon is cycled through the atmosphere, soil, and forests, as trees continually gain and lose carbon through sequestration, respiration, and decay. Because of this, accounting for carbon must consider the losses and gains, which we call "total carbon."

Forest management alters the rate of carbon losses and gains. Climate-smart forestry and carbon-focused forestry aims to increase the amount of carbon gains to the forest. This means that management is focused on increasing the capacity of the forest to absorb and store carbon. Promoting healthy forests that are productive and long-lived is critical. This means that the ways we manage the forest and the species we promote matter. Removing unhealthy (dead and decaying) trees and creating more growing space for healthy trees is important. It's also important to manage for tree species that have longevity. This means tree species that are resilient to future disturbances and adapted to future climates.

Forests and climate are interlinked. Forests help moderate the climate by controlling the amount of carbon dioxide in the atmosphere. A stable climate helps forests grow and live longer by reducing the likelihood of extreme events and intense storms. However, this is a complex relationship and one that we still are learning about. There are many ways to look at climate-smart (and carbon-smart) forestry. Whether the focus is reforestation, stand improvement, or controlling pests and pathogens, the aim is to increase healthy forests and decrease unhealthy forests. But there must be something more to it, right? Well, yes, there are always tradeoffs. When you reforest an area, you may be losing valuable ag lands. When you manage your forests on a longer rotation, you may be delaying some economic returns through frequent timber harvest. And certainly, there can be additional costs when implementing non-commercial treatments to increase the health and resiliency of your forests. The goal for woodland owners must be to balance the costs and benefits, the losses and gains. Timber is an incredibly valuable resource here in Kentucky; we can't lose that resource in the name of carbon programs. However, we think it is possible to find a balance to climate-smart forestry, forest commodities, and carbon.

This article barely scratches the surface. In the coming months, we will be releasing a series of carbon Extension publications for landowners in Kentucky. We look forward to expanding on these topics (and many more) and sharing them with you!

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