

Forest Carbon Markets and Programs

► Carbon offset programs have historically been unfeasible for many forest landowners. This document is an overview of forest carbon markets and forest carbon offset programs currently available to landowners in Alabama and Mississippi. Other documents in this series will address various aspects of forest carbon markets in greater depth.

Specifically, carbon offset programs involve profitability and limitation issues that narrow the pool of landowners who participate. These issues include minimum land-holding sizes, long-contract periods, high setup and upfront costs, expensive ongoing measurement and monitoring requirements, and land (and resource) use limitations. For example, the California Cap and Trade program—beginning around 2012 or 2013 and until recently—was essentially the only option available for forest landowners in the United States. The program requires 100-year minimum contracts, has strict requirements administered by the California Air and Resource Board, and has strict harvest limitations. Even for landowners who have the acreage to enter this program, the limitations to timber harvest are not appealing to many because these landowners are also using those acres as working forests, managed to supply wood to local markets. Due in large part to increases in interest from companies voluntarily wanting to reduce their carbon footprint or becoming carbon neutral over time, a shift in how carbon markets operate is rapidly evolving. The most significant change comes in creating applicable or attractive markets to more landowners, especially family forest landowners, and resulting in possibly more carbon credits across the country. Carbon markets, trends, current opportunities, and future possibilities are discussed below.

The Carbon Story

Atmospheric CO₂ levels are rising and have been attributed to increases in emissions of greenhouse gas (GHG) from fossil fuels and land use change. Climate model predictions indicate rises in temperature, sea levels, and shifts in climate in the form of more intense and frequent droughts, floods, and catastrophic storms.



Forests are a critical tool for reducing atmospheric CO₂ levels and climate impacts. Trees sequester CO₂ from the atmosphere as they grow through photosynthesis, which converts that CO₂ into carbon stored in the wood, roots, and leaves. Currently, the US Forest Service estimates that forests in the United States capture approximately 16 percent of US GHG emissions. Further, to have a market, you must have a measurable, quantifiable, verifiable, and trackable commodity. Carbon sequestered by forests checks all of these boxes.

Carbon Credits

Understanding forest carbon markets requires understanding how CO₂ is measured and traded. The standardized carbon unit is metric tons of carbon dioxide equivalent (MtCO₂e), commonly referred to as an *offset*. CO₂ is one of the most common GHGs in the atmosphere, and as a result, all other gases are compared to it for simplicity. Therefore, the CO₂ equivalent emerged as the standard unit for describing

GHGs and the impact of adding or removing a unit of MtCO₂e from the atmosphere.

1 MtCO₂e is defined as the warming impact of 1 ton of emitted CO₂ over 100 years.

- When 1 ton of CO₂ is emitted in the atmosphere, it gradually moves to carbon sinks over subsequent years through naturally occurring biogeophysical processes.
- Naturally, that 1 ton of emitted CO₂ is slowly reduced over time.
- Because of the long-time horizon of atmospheric carbon residence, a 100-year benchmark is used as a way to quantify the warming impact of 1 ton of emitted CO₂.
- Carbon credits are then traded in markets as MtCO₂e; 1 credit = 1 MtCO₂e.

Carbon Markets

Carbon markets can be voluntary or involuntary. Involuntary markets are often called *compliance markets*. Voluntary carbon markets provide a means for companies or individuals to purchase carbon credits merely to offset GHG emissions. An involuntary (or compliance) carbon market is a mandated or regulated market where companies must purchase carbon credits to offset their emissions beyond a specified GHG emission—or cap. Sometimes involuntary carbon markets are referred to as *cap-and-trade* markets.

Table 1 highlights the diversity of forest carbon markets rapidly evolving in the United States. A lot of options are currently available in terms of attributes, and as time moves on, more programs and varying characteristics of programs will modify or change.

- Some of these markets pay directly for the carbon stored in existing forests, while others are indirect, including payments for management practices and even reforestation, afforestation, or establishment costs for converting nonforested land into forested land. Some markets trade credits using both direct and indirect carbon sequestration processes. One of the common methods is deferring harvest and keeping carbon stored longer in the trees. Currently, there are three different types of forest projects accepted for producing carbon credits, but we are defining a fourth as deferred harvest.
 - **Afforestation/Reforestation (R)**
 - Restores tree cover to nonforested land
 - Involves high costs due to planting
 - **Avoided Conversion (AC)**
 - Prevents conversion of forest to nonforest
 - Demonstrates forest is at significant risk of conversion to be viable

Table 1. Attributes of Different Forest Carbon Market Programs Currently in the United States

Attributes	Programs						
	Family Forest Carbon	NCX	California Cap & Trade	CORE Carbon (Finite)	Bluesource	Forest Carbon Works	Green Trees
Contract Length	20 years	1 year	100 years	40 years	40 to over 100 years	125 years in renewable 6-year contract periods	40 years
Minimum Acreage	30 acres	No minimum to enroll	5,000 acres	40 acres	3,000 acres	40 acres	5 acres
Is Harvesting Allowed?	Yes, with restrictions	Not during 1-year contract period	Yes, with restrictions; focused on natural stand management	Yes, with restrictions	Yes, with restrictions	Yes, with restrictions	Yes, with restrictions; focused on afforestation and hardwoods

■ Improved Forest Management (IFM)

- Involves management activities to maintain or increase current carbon stocking levels
- Includes examples such as increasing rotation age, competition control, thinning treatments, and improved stocking levels

■ Deferred Harvest (DH)

- Defers harvest resulting in an additional amount of carbon on the landscape for a limited time.
- Is vital for a program to accurately conclude that a particular forest could be harvested at the current time if so desired by the landowner

IFM projects currently dominate the list of available programs. However, a relatively new Natural Capital Exchange (NCX) program uses the Deferred Harvest approach. For landowners with 500 acres or less of ownership, it is becoming a popular forest carbon market option across the United States. Regardless of the project type, participants must be able to show that their forest(s) are sequestering more carbon than a business-as-usual scenario for any of the acceptable project types. Each project type will have different costs, benefits, and approaches to carbon accounting. In a scenario where all four project options are available, understanding the best fit for your property and goals would be step one. Three main requirements must be met to be considered an eligible project:

■ Additionality

- Must sequester more carbon than business-as-usual scenario.
- Must demonstrate that sequestration would not have occurred without specific offset project.

■ Permanence

- Must maintain enhancements for up to 100 years (This is one of the definitions of permanence.)
- Must undergo third-party verification of inventory reports.

- **Non-Leakage** (GHG reduction in one area causes an unattended increase in GHG emissions in another area.)

- Must demonstrate that it has no leakage, a concern for croplands converted to forests

Currently, the NCX program (table 1) is the most available program available for most forest landowners in Alabama and Mississippi. However, programs such as the California Cap and Trade and Finite Carbon could be options for forest landowners with large tracts of forestland, depending on their objectives and receptiveness to the attributes associated with these programs. More options will likely become available for forest landowners in the future.

Conclusion

Because of the variety of programs, attributes, and the pace at which new forest carbon programs are entering the market, forest landowners interested in carbon programs should do their homework and understand their responsibility before signing a contract. As a result of the rapid evolution of these programs and expansion of the market, current programs are likely to adjust their methods, requirements, and contracts. To better achieve their objectives, landowners should clearly understand the ramifications to their forested property resulting from enrolling in a particular carbon program. Landowners should clearly understand all aspects of contract length, restrictions toward land and tree use, and penalties or ramifications of failing to produce carbon as expected, including the implications of timber lost to natural disasters, insects, and diseases. Landowners should be aware of and feel comfortable with any limitations placed on their ability to conduct forest management activities and where those activities would best meet their objectives.

Contact your county Extension office or professional forester if you are interested in learning more about forest carbon market programs and specific program details and requirements.



Adam Maggard, *Extension Specialist*, Associate Professor, Forestry, Wildlife and Environment, Auburn University, and Curtis VanderSchaaf, *Forestry Extension Specialist*, Assistant Professor, Central Mississippi Research and Extension Center, Mississippi State University

For more information, contact your county Extension office. Visit www.aces.edu/directory.

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