Climate Action Commission | Forest Carbon Sequestration

Basic overview (including status)

Forest are a major carbon sink that cover roughly 78% of the land area of state. Nearly 80% of our forestlands are in relatively small, private ownerships. Our growing forests absorb between 50% and 70% of our annual CO_2 emissions. Forest management, by itself is a marginally profitable enterprise for the landowner, yet forestry and wood products contribute over $1.4m to the state's economic output and 10,000 jobs.

For the average acre, roughly 35% of the carbon is in the trees and 65% is in the soil. The soil component is stable, assuming limited soil disturbance. The tree component fluctuates from the net impact of growth, mortality, and harvesting. For at least the last three decades, Vermont generally harvested about ½ of its growth, statewide. Net carbon sequestration in forests is increasing, at a slightly declining rate. Carbon is also stored for long periods in wood products such as furniture and wooden buildings. Wood burned for electricity and heat emits carbon immediately as CO_2 into the atmosphere.

Future trends (without additional action):

Forest managers face myriad impacts to forests as a direct result of climate change. Among the negative impacts are increased invasive pests and pathogens, drought, shorter available winter harvest periods, more difficult regeneration of trees after harvest. Other threats include changing landowner demographics, changing attitudes toward harvesting, and parcel fragmentation by subdivision. Forest products markets are constrained by fewer opportunities for low-value trees, uncertainties related to trade, and a slow housing recovery. The products of our forests are commodities; yet unlike food, "branding" or otherwise adding value to local wood products is a more complicated value proposition. The most recent statewide survey of forests (USFS) suggests the area of forestland has declined slightly for the first time in recent history.

Bright spots include growing public awareness of the benefits of forests in general, growing support for working lands and local wood products. Maple sugaring has seen explosive growth, increasing revenues to many landowners. Recent legislation now requires large forest blocks and habitat connectivity be formally incorporated into the municipal planning process. The state's support of the Use Value program is relatively strong, despite budget challenges in many areas. The mantra of forest advocates is succinct: let's keep forests as forest. We need to pay attention to these complex interactions of climate, ownership, markets, and policy to forestall the loss of forests by any number of conspiring forces.

Potential opportunities & challenges: *(specific to C sequestration)*

Opportunities

- While complex, programs and markets exist where the annual accumulation of carbon in trees can be monetized and can contribute to a landowner's income. Markets include those created as part of a cap-and-trade programs (RGGI, CA ARB), and those that have arisen out of voluntary, corporate social accountability.
- Some areas of the country are exploring ways in which soil health, fertility, and carbon storage might be increased using bio-char as a soil amendment.

Challenges

- Landowners' entry into the market for forest carbon offsets face many barriers. Small property size relative to the fixed expenses of program participation is a primary hurdle.

- Biochar, a stable form of charcoal used as a soil amendment, while potentially increasing sequestration, currently has no mechanism for monetization.

Technical potential

Various Vermont partners are exploring opportunity in forest carbon offset sales for small landowners by a) aggregating ownerships, b) increasing local technical capacity, and c) reducing direct program costs through innovative technologies and methods. Increasing payments to landowners from carbon credits supports the viability of working forests; however, the total amount of carbon sequestered statewide would likely change only marginally as result.

Before biochar amendments could be monetized, research would have to provide support for the *permanence* of the benefit, and protocols for measurement would have to be developed.

Links for more information

https://www.fs.fed.us/nrs/pubs/ru/ru_fs119.pdf

http://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Vermont_Forests/Library/NEFA13_Econ_Importance_VT_final_web_Jan29.pdf

http://www.wri.org/blog/2011/09/what-woodland-owners-should-know-about-forest-carbon-offsets-us-south