

Forestry Carbon Credits

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Carbon Credits

- There has been much discussion, and increasing market action on forest credits.
- Practices generally discussed include:
 - Planting trees on crop or pasture land
 - Improved forest management
 - Forest Conservation

Current Opportunities

- Off-Market Projects
 - These occur when a company sponsors a forestry project to gain early-action carbon credits and experience.
 - e.g. American Electric Power – Nature Conservancy
 - Not many projects, usually fairly large
- Market Sales
 - Chicago Climate Exchange

The Challenge

- As a commodity, carbon remains with the land; only the value of its presence and retention can be claimed or transferred.
- To become a commodity, stored carbon must be measured, regularly reported, and periodically audited.
- These techniques are well known; their cost can be a real deterrent to forest owners if they consume too much of the sale price.

Can producers enter an offset market with reasonable effort and cost?

- Depends heavily on the emerging rules of engagement, such as:
- Will permanent dedication of forest lands be required, or can we 'lease' carbon stocks for a defined time period?
- Can we count carbon stock change over time, or must we factor out natural growth or other conditions?
- What will landowners be required to provide to assure no loss of stored carbon?

Types of Forest Activities

- Biomass Energy Production
 - This would be a new product, not an ecosystem service, but there could be carbon credits attached as well.
 - Good potential, but most forest areas have no markets. If cellulosic ethanol plants are built, this could change significantly.
- Improved forest management
- Afforestation or reforestation

Energy Crops

- 2 types of carbon benefit
 - Sequestration – increase soil carbon, woody roots, standing biomass compared to cultivated crops.
 - Substitution -- replace net increase in atmospheric CO₂ from fossil fuels with a recycling, renewable process.
- Grass (switchgrass) or Trees (hybrid poplar; willow)
- Range of potential gain – 0.25 to 1 tCO₂e/Ac/yr sequestration plus 3-10 tCO₂e/ac/yr in substitution

Improved Forest Management

- Stocking Control
- Fertilization
- Species Selection
- Harvested Wood Products
- Wildfire Risk Reduction
- Adaptation to changing climate?
- Urban Forest Management

Afforestation

- Planting trees on formerly unforested land.
- For CCX, trees need to have been planted since January 1, 1990.
- Windbreaks – may qualify
- Carbon is computed from tables or from cruise information. There are formulas to convert wood volumes to carbon dioxide equivalents.
- Young plantations grow slowly at first, so best annual volumes are achieved after 10-15 years.

Carbon – Offset Opportunities

<u>Conservation Practice</u>	<u>Potential Carbon Effect (tCO₂e/ac/yr)</u>
Energy Crops	4 to 10+
Riparian Forest Buffers	.5 to 5 (?)
Cropland to Forest	1.6 to 4
Cropland to Grassland	0.4 to 1.3
Improved Forest Management	0.1 to 1.4
Harvested Wood Products	0.2 to 0.8
Drainage, Wetland mgt	???
Using Forest Products	???
Extending Wood Product Life	???

Current Realities

- Chicago Climate Exchange (CCX) is the only market available today.
 - There are other registries, and potential markets, but they are in the future
 - RGGI, CCAR, DOE 1605(b)
- CCX is a “learn by doing” effort.
- The CCX rules are for testing; they may change
 - Challenge is balancing between being credible enough for the market; feasible for forest managers.

Basic CCX Forest Rules

- Afforestation
 - Trees planted after January 1, 1990 on land formerly (10+ years) not in forest.
 - Land protected for long-term forest management (conservation easement or private contract)
 - Carbon credits for above- and below-ground biomass
 - Credits available for 2003-2010
 - Projects need verification by CCX-approved verifier

Basic CCX Forestry Rules

- Afforestation, Continued
 - Three Project Sizes
 - Small (< 2,000 tCO₂e/year)
 - Medium (2,000 to 12,500 tCO₂e/year)
 - Large (> 12,500 tCO₂e/year)
 - Small and Medium projects can use either direct measurement of tree biomass or use lookup tables in CCX handbook.
 - Planting must be 250+ trees/acre to use the table.

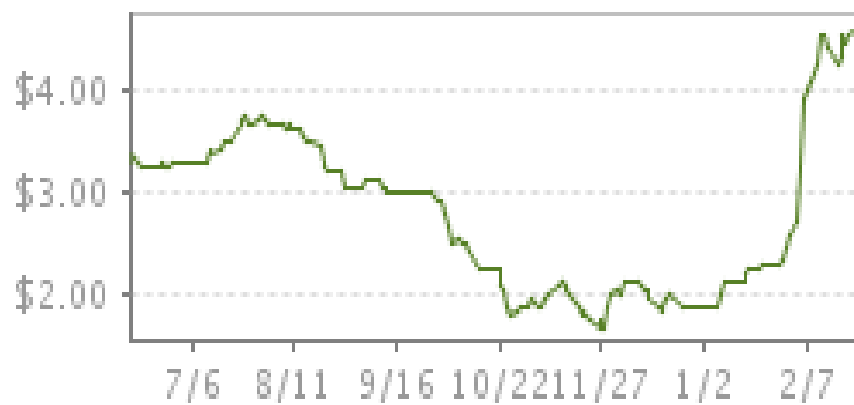
Afforestation - Windbreaks

- Currently being tested
- Using tables developed for urban tree plantings.
- Yield data being developed by University of Nebraska
- May not yield sufficient carbon credits to appeal to landowners.
- Can SCDs or Pheasants Forever or another local organization be a sub-aggregator?

Basic CCX Forestry Rules

- Sustainable Forest Management
 - Needs to be based on CCX-approved forest inventory done the year of project initiation or registration.
 - Each project must be CCX-verified, at project cost.
 - Include entire forest management area.
 - Forest must be certified sustainable by ATFS group certification, SFI, FSC, or other recognized system.
 - Owner grants reasonable access for audits, verification, etc.
 - Protocol for harvested wood products is available if landowner establishes ownership of carbon.

Recent Prices (per ton CO₂) on CCX



Putting Forest Credits on CCX

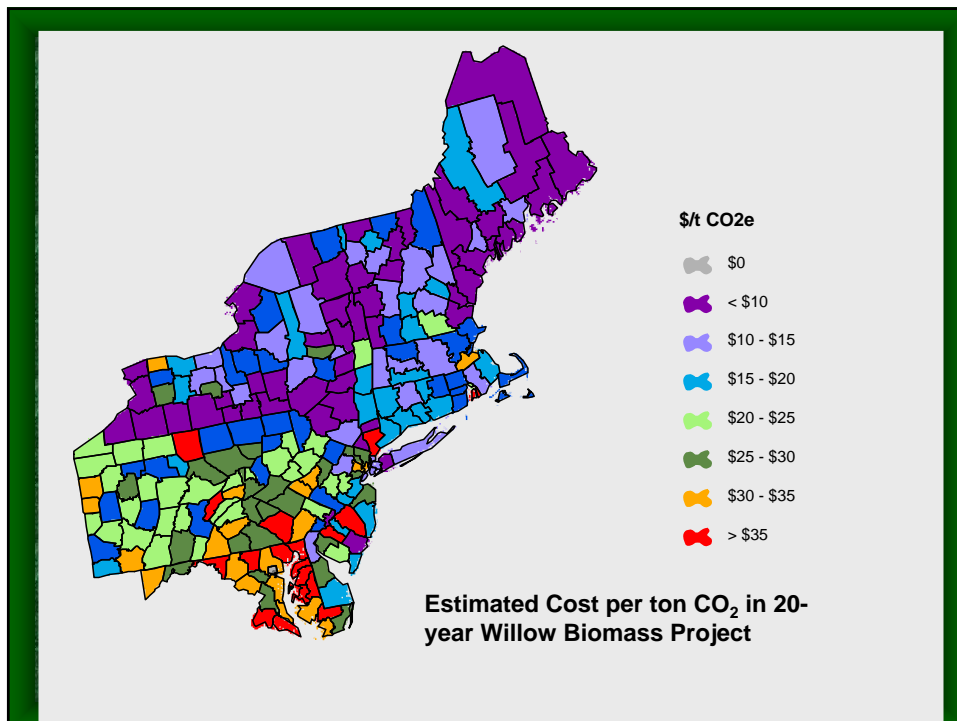
- Forest landowners need to work through a CCX aggregator. See www.chicagoclimatex.com for a list of aggregator organizations.
- Will need documentation of planting dates, species, survival counts, current condition
- Credits now available for 2003-2010.
- All projects must pay verification and registration costs, as well as aggregator fees.

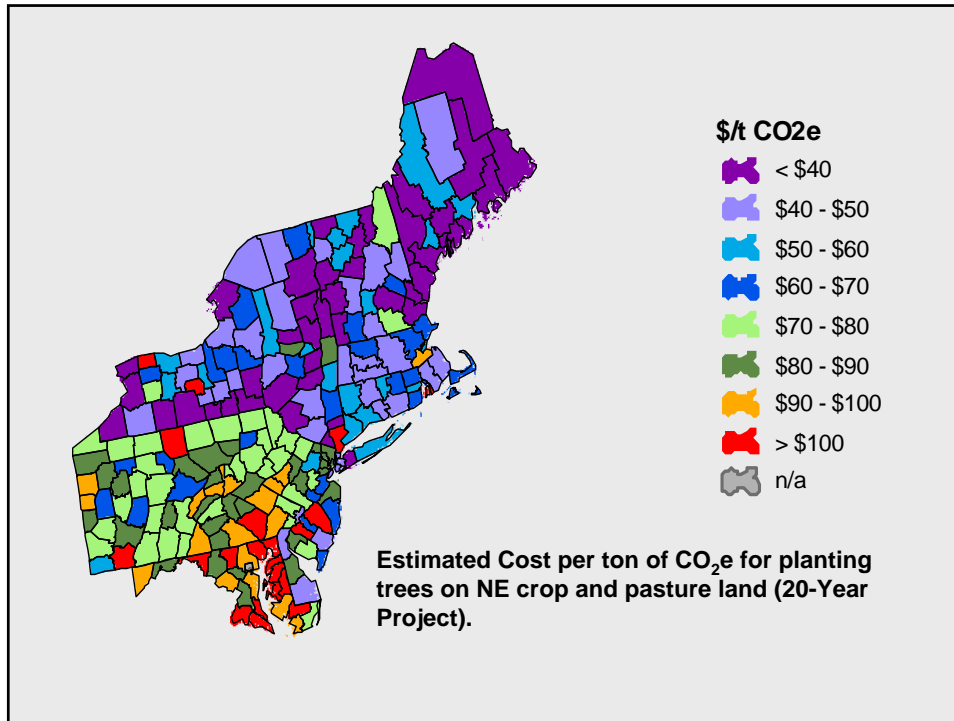
Markets (2/26/2008)

- United States – Chicago Climate Exchange
 - \$4.60/tCO₂e (2003 vintage)
- Europe – European Carbon Market
 - ~ \$30/tCO₂e (Up from around \$20 in July, 2006)
 - No forestry or agriculture credits allowed

Where are Future Opportunities and Costs?

- Northeast U.S. study
- The Nature Conservancy, Winrock International, The Sampson Group
- Sponsored by the Department of Energy
- Available at <http://conserveonline.org/workspaces/necarbonproject>





County area weighed mean \$/t CO ₂ e at 20 years					
	Trees on Cropland	Trees on Pasture	No-till	Permanent Vegetation	Biomass Energy
Connecticut	87.28	51.58	17.77	167.52	29.35
Delaware	69.70	51.81	21.86	119.91	27.76
Maine	99.91	30.67	11.32	168.08	31.50
Maryland	120.66	97.00	21.66	53.24	24.86
Massachusetts	87.04	51.26	13.79	129.77	27.41
New Hampshire	98.50	49.84	11.84	138.34	29.75
New Jersey	99.56	81.96	22.82	84.73	21.43
New York	99.12	48.36	18.55	177.63	26.49
Pennsylvania	106.73	84.18	19.35	139.60	27.99
Rhode Island	99.94	78.39	19.05	104.08	26.87
Vermont	89.59	40.38	14.27	165.31	28.22
All States	102.86	63.78	18.20	138.72	27.13
Minimum	35.82	12.51	9.84	-137.21	11.83
Maximum	254.37	265.29	29.26	347.95	37.95

Conclusions

- IF the sale of carbon credits were to become available to woodland owners to supplement current markets, we might see:
 - More tree planting on pasture land and biomass energy crops @ \$10 - \$15/t CO₂e
 - More biomass from forestry @ \$15 - \$20/t
 - Conversion of cropland to trees or permanent vegetation @ \$40 - \$50/t

Conclusions, Con't.

- Carbon Offset Credits, if appropriately designed and administered, could provide added economic and environmental value to forest land.
- With slow rates of carbon accumulation and currently envisioned prices, carbon credits can only be a small, supplemental source of income to landowners.
- If governments make carbon credit rules and requirements too stiff, the cost of certifying offset credits will eat up the benefits to landowners.

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