



**Robert L. Ehrlich, Jr., Governor**

**Michael S. Steele, Lt. Governor**

**C. Ronald Franks, Secretary**

April 14, 2006

RE: Regional Greenhouse Gas Initiative Draft Model Rule

Staff Working Group  
Regional Greenhouse Gas Initiative

Dear Staff Working Group members:

I am writing today to request your consideration of attribution of credit for urban trees under Draft Model Rule Subpart XX-10. CO2 Emissions Offset Projects, section XX-10.3 General Requirements, (a).

On April 6, 2006, Maryland Governor Robert L. Ehrlich Jr. signed the Healthy Air Act into law ([http://www.hometownannapolis.com/cgi-bin/read/2006/04\\_06-53/GOV](http://www.hometownannapolis.com/cgi-bin/read/2006/04_06-53/GOV)). The law prohibits affected facilities collectively from emitting more than specified amounts per year of certain pollutants and requires Maryland's participation in the Regional Greenhouse Gas Initiative. Provision of credit for Urban Tree Canopy (UTC) will allow facilities obtaining allowances to make investments in communities, where most ratepayers reside. This will allow utilities to make positive reinvestments in the community while meeting their mitigation requirements and obtaining required allowances.

The Northeast Carbon Feasibility Project (<http://conserveonline.org/workspaces/necarbonproject/Part%20II%20--%20Recent%20Trends.pdf>) found that Urban Forests account for approximately 10% of estimated carbon sinks in the northeast. In Maryland, they account for an estimated 22% (Table 11). Due to many unique tree protection laws, Maryland has over 40% UTC. This ranks it among the top for UTC coverage among RGGI states (Table 10).

Nowak at al. ([http://www.fs.fed.us/ne/syracuse/Data/State/data\\_MD\\_bal\\_ufore.htm](http://www.fs.fed.us/ne/syracuse/Data/State/data_MD_bal_ufore.htm)) found that Baltimore City's urban forest avoids carbon emissions from power plants due to building energy conservation at an estimated 9,300 metric tons of carbon per year and stores approximately 527,300 metric tons of carbon (equivalent to the amount emitted from Baltimore's population in about 54 days based on average per-capita carbon emissions) at an estimated total value of \$10.7 million. These urban trees also remove about 10,800 metric tons of carbon per year at a value of \$219,000 annually.

To facilitate your consideration, we have attached draft language for your consideration. Thank you for your time and your consideration. If you have any questions regarding this material, please feel free to contact me.



Sincerely,

A handwritten signature in black ink, appearing to read "Michael F. Galvin". The signature is stylized with a large, looped "G" and a prominent "M".

Michael F. Galvin  
Supervisor, Urban & Community Forestry  
410-260-8507  
[mgalvin@dnr.state.md.us](mailto:mgalvin@dnr.state.md.us)

cc: Steven. W. Koehn, Director/State Forester  
Donald Van Hassent, Associate Director

## **RGGI Draft Model Rule comment**

### **Proposed allowance of sequestration of carbon due to urban tree canopy enhancement**

#### **(x) *Sequestration of carbon due to Urban Tree Canopy enhancement.***

Projects that sequester carbon through the expansion of Urban Tree Canopy may qualify for the award of CO<sub>2</sub> emissions offset allowances under this Subpart, provided they meet the requirements of this subdivision.

##### *(1) Eligibility.*

- (i) Project specifications, including the boundaries of the project, required pursuant to subparagraph (6) of this subdivision, shall be specified in the consistency application pursuant to subdivision XX-10.4(b), prior to commencement of the project.
- (ii) The project sponsor shall document that the project will be managed in accordance with environmentally sustainable forestry and arboricultural practices.

*(2) Project description.* The project sponsor shall provide a detailed narrative of the project actions to be taken, including supporting materials as appropriate. The project narrative shall include the following:

- (i) Detailed map of the land within the project boundary and areas adjacent to the project boundary;
- (ii) A copy of the Comprehensive Plan, Master Plan, or other form of Long Term protection required pursuant to paragraph (6) of this subdivision; and
- (iii) Urban Tree Canopy enhancement plan.

*(3) Carbon sequestration baseline determination.* The existing sequestered carbon within the project boundary shall be calculated prior to commencement of the project. The carbon sequestration baseline shall be determined based on a sum of measurements, made no more than 12 months prior to project commencement, of the carbon content of the following carbon pools:

(i) Carbon content shall be calculated for the following required carbon pools:

- (a) Live above-ground tree biomass;
- (b) Live below-ground tree biomass; and
- (c) Soil carbon.

(ii) Carbon content may be calculated for the following optional carbon pools:

- (a) Live above-ground non-tree biomass;
- (b) Dead organic matter, forest floor; and
- (c) Dead organic matter, coarse woody debris.

(iii) Carbon content shall be calculated individually for each carbon pool within the project boundary.

(iv) To increase the accuracy of measurement and verification, the area within the project boundary shall be divided into sub-populations that form relatively homogenous units. When defining sub-populations, the project sponsor shall consider vegetation and tree species (including existing vegetation and trees and those to be utilized as part of the project activity) and site factors (soil type, elevation, slope, age class, and other factors as warranted).

(v) Calculation of sequestered carbon for each carbon pool in each reporting sub-population shall be based on the following:

$$C = A \times C/ha$$

where:

C = Carbon content (for each carbon pool)

A = Area in hectares within each reporting sub-population

C/ha = Mean carbon content per hectare for each carbon pool

(vi) Total carbon contained within the project boundary represented in short tons of carbon) shall be calculated as follows:

$$TC_{pb} = TC_{latb} + TC_{lbtb} + TC_s [+ TC_{lantb} + TC_{doff} + TC_{docwd}]$$

where:

$TC_{pb}$  = Total carbon content within the project boundary (sum of carbon content of all carbon pools in all reporting sub-populations)

$TC_{latb}$  = Sum of carbon content of live above-ground tree biomass in all reporting sub-populations

$TC_{lbtb}$  = Sum of carbon content of live below-ground tree biomass in all reporting sub-populations

$TC_s$  = Sum of carbon content of soil carbon in all reporting sub-populations

$TC_{lantb}$  [option] = Sum of carbon content of live above-ground non-tree biomass in each reporting sub-population

$TC_{doff}$  [option] = Sum of carbon content of dead organic matter, forest floor in all reporting sub-populations

$TC_{docwd}$  [option] = Sum of carbon content of dead organic matter, coarse woody debris in all reporting sub-populations

(vii) Each individual carbon pool to be measured must be directly measured using a measurement protocol and sample size that achieves a demonstrated quantified accuracy such that there is 95% confidence that the resulting reported value is 2 within 10% of the true value.

Measurement and sampling practices shall meet the following requirements:

(a) An adequate sample size that meets the requirements of subparagraph (3)(vii) of this subdivision shall be determined for each sub-population.

(b) The minimum number of required sampling plots for each sub-population shall be determined based on the following:

$$n = (s \times 1.960) / (\text{mean} \times \text{re})^2$$

where:

n = required number of sample plots for each reporting sub-population

s = standard deviation

mean = mean reported carbon content for the sample population

re = level of sampling error (0.08) to assure a total maximum error of 10% for the 95% confidence interval, which assumes total error due to measurement error of 0.02

(viii) Direct measurement procedures shall be consistent with current forestry good practice and the guidance contained in Nowak, D.J.; Crane, D.E. 2000. The Urban Forest Effects (UFORE) Model: quantifying urban forest structure and functions. In: Hansen, M.; Burk, T., eds. Integrated tools for natural resources inventories in the 21st century: proceedings of the IUFRO conference. Gen. Tech. Rep. NC-212, St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station: 714-720. and Nowak, D.J., Crane, D.E., Stevens, J.C. and R.E. Hoehn. 2005. The Urban Forest Effects (UFORE) Model: Field Data Collection Manual. USDA Forest Service, Northeastern Research Station, 5 Moon Library, SUNY-ESF, Syracuse, NY 13210. 34 pp.

(4) *Calculating carbon sequestered.* Carbon sequestration (represented in short tons of carbon) shall be the amount of net additional carbon sequestered during each calculation period, based upon aggregate carbon uptake and carbon emissions for the sum of carbon pools, relative to the baseline carbon content or the carbon content as of the previous calculation period, as applicable. CO<sub>2</sub> emissions offsets shall be issued based on the amount of net additional carbon sequestered within the project boundary during each reporting period, and represented in short tons of CO<sub>2</sub> equivalent. Sequestered carbon shall be calculated using a stock-change approach as follows:

$$\text{NCS}_t = I_t - I_{t-1}$$

where:

NCS<sub>t</sub> = Net carbon sequestered in reporting period t

$I_t$  = Inventory of carbon stock for all carbon pools in all reporting sub populations within the project boundary in reporting period  $t$

$I_{t-1}$  = Inventory of carbon stock for all carbon pools in all reporting sub populations within the project boundary in the reporting period immediately preceding reporting period  $t$

(i) Each of the carbon pools that were measured as part of the baseline determination must be re-measured using the same methodology, and to the same or better quantified accuracy consistent with the requirements of subparagraph (3)(vii-viii) of this subdivision, as that used for the baseline determination.

(ii) The net change in each pool's carbon stock in each reporting sub population is calculated by subtracting the baseline carbon stock (or stock at the previous monitoring) from the carbon stock at the time of the current monitoring. Determination of carbon stock shall be in accordance with the formulas and procedures in paragraph (3) of this subdivision.

(iii) Net carbon stock change for the project is the sum of the net changes in the carbon stock of all applicable pools in all reporting sub-populations within the project boundary, less twenty percent (20%) to account for potential losses of sequestered carbon.

(5) *Monitoring and verification requirements.* Total carbon stock within the project boundary shall be calculated not less than every five years. Monitoring and verification is subject to the following requirements:

- (i) Monitoring and verification reports shall include data from direct measurement of carbon content for all plots used to determine baseline and reporting period carbon content.
- (ii) The consistency application shall include a monitoring and verification plan certified by the Maryland Department of the Environment or an independent certifier accredited pursuant to section XX-10.6 of this subpart. The monitoring and verification plan shall include the following:
  - (a) Direct carbon measurement procedures consistent with the requirements at subparagraph (3)(viii) of this of this subdivision.
  - (b) The designation of sub-populations pursuant to subparagraph (3)(iv) of this subdivision. The determination of the minimum number of sampling plots pursuant to subparagraph (3)(vii) of this subdivision.
  - (c) Assessment of management practices to ensure that the project has been managed in accordance with environmentally sustainable arboricultural practices consistent with the International Society of Arboriculture, or such other similar organizations as may be approved by the Maryland Department of Natural Resources.

(iii) The applicant shall allow access to the project site to the accredited independent certifier, or as requested by the Maryland Department of the Environment.

(6) *Carbon Sequestration Permanence*. The project shall meet the following requirements to address permanence of sequestered carbon. The project sponsor shall place the land within the project boundary under legally binding long term protection such as Comprehensive Plan or Master Plan, approved by the Maryland Department of the Environment, that requires the project area to maintained the target amount of Urban Tree Canopy in perpetuity.