



A Short Explanation of the Role of Forests in the Kyoto Protocol

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Note to reader: This short explanatory document has been prepared to help people from other sectors who have an interest in carbon sequestration in forests and forest carbon credits understand how forests are included in the Kyoto Protocol. It is the viewpoint of the writer. It has been reviewed by other foresters with strong background knowledge of the Kyoto Protocol to avoid obvious errors. It should be used as a guide not as a "bible".

Canadian forest management terminology has been used, rather than 'Kyoto-speak', for purposes of simplicity and clarity. For example: two words –afforestation and reforestation are used in the Kyoto Protocol to denote the planting of two categories of treeless land. 'Afforestation' is used here to denote the planting of trees on any eligible land (vacant/treeless land with primary emphasis on marginal/sub-marginal agricultural land) to avoid confusion with the usual Canadian forestry meaning of 'reforestation' which is 'regeneration after harvest'

Forests are included in the Kyoto Protocol under two headings: Afforestation, The Managed Forest, and Carbon Credits as a Commodity.

1. Afforestation

Afforestation is the establishment of plantations on land that was bare of trees in 1990. In practice this will usually be poor pasture land that is on the economic margins for agriculture. Most of the eligible land is in private ownership. If planted with trees to develop carbon credits it must remain under forest for a period of 20-50 years depending on the species planted. Not all species grow at the same rate. Hybrid poplars grow faster than conifers and are generally managed on shorter rotations.

The dedication of private land to forest for long periods of time is a substantial contribution by the landowner. Other land use opportunities may be lost.

There is no cap on the amount of carbon credits that can be developed through Afforestation.

Starting Date – No project to plant trees on eligible land will produce tradable carbon credits if it is started before the official starting date determined by the government. The government can set any date after January 1 1990. A starting date has not been set as of September 2003.

Carbon Accounting – The carbon accounting is pretty simple. Measure the amount of carbon on the site before planting trees to establish a baseline.

After planting with trees, periodically measure the carbon stored on the site, including; tree stems, limbs and foliage, stumps, root mass, soil and litter on the forest floor, to calculate the amount of carbon sequestered. A mix of field measurements and factors will probably be used.

Subtract the baseline. Convert the net gain in carbon to Carbon Dioxide equivalent (CO₂e) using appropriate conversion factors and we have the carbon credits.

Risk management to make provision for possible carbon losses is not complicated. Sell only a percentage of the total, perhaps 70-80%. Keep the rest in the bank, as insurance against loss. Loss may be due to natural disturbances like fire, insect attack, disease, or to logging, clearing or other management and stewardship failures.

Risk management strategies should be part of the management plan.

Leakage – Leakage will be of two types- some clearing/deforestation by landowners and perhaps the GHG emissions involved in establishing the plantation (site preparation, fertilization, weed control, seedling production and delivery, supervision, etc.) Getting into excruciating detail and 4 places of decimals on this will be an impediment to action. The management control system may cost more than the value of the things being controlled/managed.

Permanence – Permanence is a problem. A lack of permanence can be caused by deforestation by fire or clearing for development of one type or another. Risk management strategies will help to overcome these problems. But lack of permanence gets to be less of a problem as we move up the size scale from a very small patch of trees covering 1ha, to a plantation of 100 ha, to a new forest at a landscape scale covering perhaps 100,000 ha or more. A new forest of 100,000 ha or more has a dynamic of its own and will tend to become a permanent forest.

Ownership of Carbon Credits – Ownership of the carbon credits is not absolutely crystal clear but landowners have the strongest and natural claim to title. Legal certainty will be required. Sale of a commodity with a clouded title will not work. There should be legal work done on this to provide certainty before any program starts.

There are two areas requiring legal work:

- The contract between the landowner and the buyer of carbon must be very clear;
- There must be no provincial government title to timber on private lands that is a residual artifact of colonial times.

There may be some joint funding partnerships to establish plantations on private lands. In this case the ownership of some or all of the carbon credits may be contracted by the landowner to the investors.

Purchase and Sale of Carbon Credits – Carbon Credits will be sold by the owner to any customer who needs credits to meet their emission reduction targets. In some instances the purchase of Carbon Credits can be a cost-effective way to meet emission reduction targets. The price will be established by the market.

2. The Managed Forest

The managed forest is also in the Kyoto Protocol, but it took a lot of negotiation to get it adequately defined to be useful. Canada has 418 million ha of forest. Approximately 210 million ha is Multiple Use Forest and is available for forest management. Approximately 150 million ha is now subject to active management and fire and pest control operations.

It is this +/-150 million ha, or a significant part thereof, that Canada may designate as our “managed Kyoto Forest”. The Canadian government must designate the area of managed forest to be included in the Kyoto Protocol by 2006, if we intend to use the potential sink in this managed forest in the first measurement period (2008-2012). There is a huge potential sink capacity here as the area is very large.

Not all species grow at the same rate. Hybrid poplars and some strains of Aspen grow faster than conifers and may offer ways to increase rates of sequestration in the managed forest.

Canada's Forested Lands - Total forested area - 418 million ha. Possible area of 'managed Kyoto forest' - +/-150 million ha.

- Federal lands are a very small part of the managed forest
- Provincial Ownership- +/-125 million ha
- Industrial Private Ownership +/-8 million ha
- Small Private Woodlots +/-17 million ha (450,000 owners)

Carbon Credit Accounting – There is a cap on carbon credits from the managed forest in the first measurement period. It is approximately 64 Mega tonnes (Mt). Canada has made a commitment for the first measurement period (2008-2012). There is no commitment beyond this period. The future status of this sink and any extension of the cap will be sorted out during negotiations for the Kyoto GHG Emissions reduction targets for the second measurement period (2013-2017), as will everything else in the agreement.

The carbon accounting is complex because there is a lot going on in the managed forest.

- On the debit side we have; harvesting, some thinning, fire, insect damage and disease as well as some deforestation, deletions for development, mining etc.

The situation on linear deforestation such as clearing for roads and transmission lines is still unclear and is the subject of negotiation. The situation for linear afforestation is also unclear but will presumably be resolved in a complementary manner.

- On the credit side of the ledger we have; natural regeneration, planting, juvenile spacing and natural growth, etc. All of these activities (at their present level of implementation) and natural disturbances are considered to be Business As Usual (BAU). To develop and claim carbon credits we require a forest carbon measurement and inventory system that will allow us to measure change. We must also start implementing new and additional forest management and silvicultural operations and strategies (above and beyond BAU) that will increase the rate of sequestration and the size of the forest carbon sink. We can also implement new or additional forest protection strategies to reduce the loss of forest carbon to natural disturbances like fire, insect epidemic and disease.

It is the changes in the rate of sequestration and in the volume of carbon in the forest, brought about by the implementation of these new and additional forest management and silvicultural operations and forest protection strategies that will provide the carbon credits.

If we don't have a good measurement system we will not be able to detect and verify the changes so there will be no credits identified. The first job required of the measurement system will be to establish a carbon content baseline. The next task will be the measurement of changes in the carbon content of this vast forest due to the application of additional forest management and silvicultural operations and forest protection strategies. Simulation and modeling supported by sample plots to provide base data is one possibility.

No one should minimize the scale of the task involved in getting all this done in a way that is; timely, credible, verifiable and accurate enough to pass the test that will be applied by critics and buyers of carbon credits. The area of forest is huge and there is a lot of diversity that must be accommodated in any sampling system. There is a huge potential for us here but it is not easy or cheap. There will be substantial additional benefits to the Canadian forest sector from any such program of management strategies, silvicultural operations, growth and yield studies and forest inventory

Starting Date – An official starting date must be established by the government.

Ownership of Carbon Credits – The question of the ownership of carbon credits is politically and economically charged.

The federal government has a strategic interest in the way forest carbon credits are used and applied.

The provinces own the vast majority (+/- 80%) of the land in question (Crown Land) and so have the first claim to ownership of the carbon credits. Private interests own the other 20%. They too have a stake in carbon credits from the Managed Forest.

The forest products companies are now doing the bulk of the forest management and silvicultural operations and are also the likely implementation agents for any new forest management activities.

Forest protection strategies such as enhanced control of fire and insect attack are generally under the control of the provincial governments.

None of these players are likely to do anything extra unless they are rewarded.

Another factor causing uncertainty is the effects of Native Land Claims, eventually resulting in a possible change in the ownership of forestland and of course, the ownership of any related carbon credits. This possibility may cloud the title to carbon credits.

It is useful to note that agreement by all the provinces may not be required for some parts of the country to move forward on developing carbon credits from the managed forest.

The main negotiators will be the governments. When will they agree on who controls and manages the credits? How will the credits be allocated among the provinces? How much will be allocated to the private owners in each province? Will there be agreement, and measurement systems established in time to get some benefits during the first measurement period? Will the available credits be handed out on a 'first come first served' basis or allocated? And what happens if one party cannot develop all the credits allocated? Can they sell the unused allocation to another party?

To add to the complexity, Canada has a relatively small cap (64 Mt) to be shared among these players.

A significant area (20-25 million ha) of this Multiple Use Forest land is in private ownership. Here the forest management activities are the responsibility of the private owners. About 30% of this private land are large blocks of forest land in industrial ownership. The rest is owned by 450,000 small private owners with property size averaging 40 ha. Again the presumption is that title to the carbon credits lies with the private owners. Legal clarity will be required.

Some system of aggregation will be needed to bundle the credits from small private properties to create marketable volumes and reduce transaction costs. But even the private owners access to any carbon credits is probably dependent on agreement between the governments on how to share the cap and the carbon credit benefits from additional forest management activities in the managed forest.

There are enough questions here to provide uncertainty for a while.

Permanence – Permanence should not be a big concern in the managed forest. Forest cover is the only true and rational vocation for the overwhelming majority of this vast area of land. Most of the Crown Land is protected by legislation or policy, and will remain forested land. Only a very small percentage will be alienated to other uses over the foreseeable future. There is always the danger of fire. Again risk management strategies will have to be implemented.

3. Is a Carbon Credit a Real Product with Enduring Value on the Market?

Carbon credits are not like wood, which has a long-standing value in the marketplace. The carbon embodied in wood became a commodity due only to the negotiation and signature of the Kyoto Protocol. Carbon embodied in wood had no value before then, except perhaps when wood is used as a fuel. It is the carbon that is the main component of wood that combusts and produces heat.

Carbon in wood has value as a carbon credit only as long as the Climate Change Convention is legally in force or is honoured by Canada. Carbon credits are a compliance tool for the first measurement period (2008-2012). Their value will be increased if the Canadian government states that they will also be a compliance tool for the second, third and ongoing measurement periods. Carbon credits have value in a market that is entirely dependent on the Canadian government staying in the Climate Change Convention or establishing a domestic GHG emissions reduction program that is based on the same general principles and reduction mechanisms.

Under the circumstances it is reasonable to expect the Government of Canada to provide assurance that the value of carbon credits will be maintained. Or the government of Canada could undertake to provide a significant part of the investment required to establish plantations under any afforestation program. This investment would serve to underwrite the risk to any investment made by private landowners or others interested in the development and use of carbon credits.

Landowners and forest managers must understand and accept the nature and foundation of the value of carbon credits in their decisions to invest in the production of carbon credits.

Landowners who invest in afforestation on marginal/sub-marginal agricultural lands may want to consider the value of a 'basket of benefits' that will result from their expenditures on plantation establishment. Some of these benefits will be more certain and tangible than others.

The 'basket of benefits' will include such things as: wood, carbon credits, aesthetics, wildlife habitat, water quality conservation and rural jobs and community stability. All of these are good things but with very different returns on investment.

These returns are enjoyed by society at large, not just the landowner. This is an additional reason for government action to provide assurances of the long-term value of carbon credits or to underwrite the risks by becoming an important investor.

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