

CANADA

INFORMATION ON OPTIONS FOR LAND USE, LAND USE CHANGE AND FORESTRY ACCOUNTING

15 August 2008

Introduction

At its resumed fifth session, the Ad-hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) encouraged Parties to share information through informal submissions that would allow better assessment of the implications of options and issues identified for land use, land-use change and forestry (LULUCF). This informal submission responds to the request by laying out key objectives for improved LULUCF rules and elaborating in detail an option that addresses these objectives for forest management. This submission also explains the importance to Canada of an approach to forest management accounting that addresses the issue of the scale and inter-annual variability of natural disturbances.

Objectives for LULUCF Rules

In its Fourth Assessment Report the IPCC reported significant economic mitigation potential from the forest and agriculture sectors globally. Roughly 30% of this potential is in developed countries. Unfortunately, experience shows that the current LULUCF rules provide little incentive to land managers in developed countries to achieve the full mitigation potential associated with land management, a situation that is inconsistent with the obligation under Article 4.1 (d) of the Convention to promote sustainable management.

Along with other Parties, Canada wants to enhance the effectiveness of means within the LULUCF sector to achieve mitigation objectives. This can be achieved if rules aim to achieve three objectives.

1. Provide substantially improved incentives for mitigation benefits through sustainable land management.
2. Ensure an accurate reflection of what happens to LULUCF carbon.
3. Implement accounting that focuses on anthropogenic emissions and removals in the LULUCF sector.

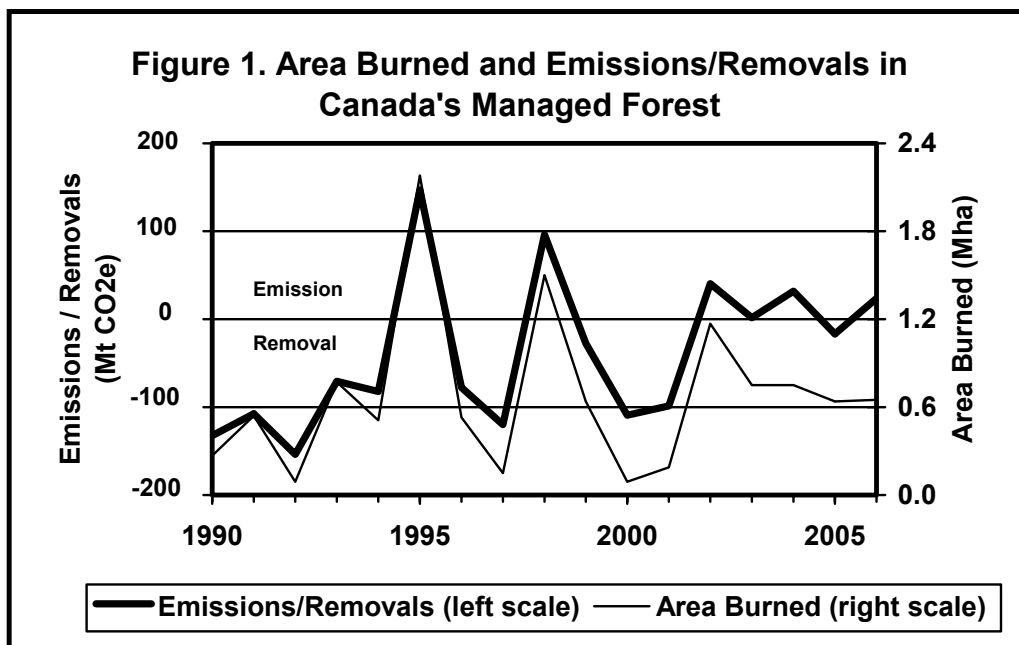
The revised set of rules will need to make sense for all developed countries. Moreover, consistency is needed between the rules applied to developed countries and those applied to developing countries. One obvious example is the treatment of harvested wood products: the same rules must apply to all countries. Revised LULUCF rules should be robust and broadly applicable across countries, taking into account the substantial differences that exist in terms of the characteristics of their land, how it is used and managed, and the institutional and policy settings. Finally, revised treatment of LULUCF should allow the use of current measuring and monitoring systems.

One major issue for Canada is the treatment of forest management (FM, which in Canada is the same area as the managed forest). Under Article 3.4 of the Kyoto Protocol, Annex I Parties have the option of including FM in their accounting, with caps

applied to FM credits or debits. The caps were agreed as a crude way of addressing the factoring out issue (i.e. removing natural and indirect human effects on forest carbon and GHG emissions from the accounting). However, one important side effect of the caps was that, for almost all Parties, any incentive to reduce emissions or increase removals through FM was removed. Moreover, this approach did not adequately focus the accounting on anthropogenic emissions and removals due to forest management.

Canada's Forest Management

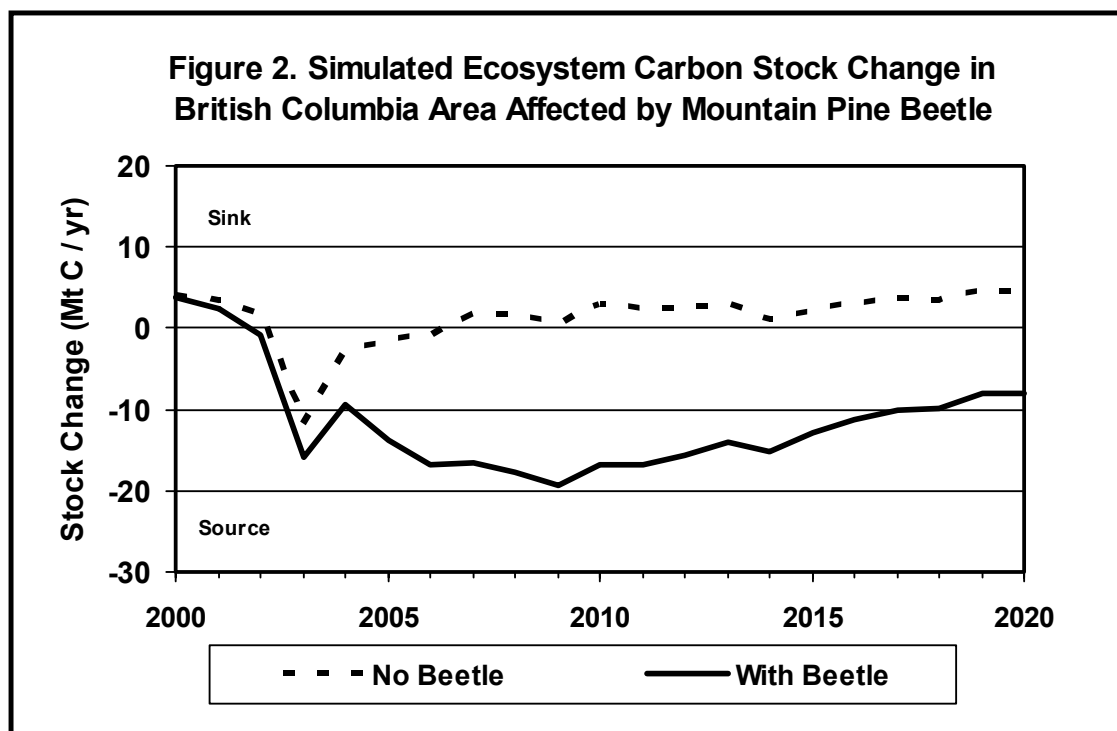
In Canada's managed forest the impacts of natural disturbances such as fire and insect infestations on forest carbon can far outweigh the impacts of FM. As a result, and as shown in Canada's annual greenhouse gas inventory, the pattern of emissions and removals in our managed forest is extremely variable and has been highly correlated with the area of forest that burns each year, an influence that is unpredictable and uncontrollable. Thus Canada's managed forest has fluctuated between being a large source and a large sink from year to year depending on the amount of wildfire that occurs. More recently it has been trending to becoming a source due mainly to a mountain pine beetle infestation since 1999. Figure 1 below shows this relationship, using data from Canada's 2008 National GHG Inventory Submission to the UNFCCC.



In addition, we predict that in the very near future our managed forest will almost certainly become a large source for many years due to the combination of fires, the mountain pine beetle infestation in western Canada (which currently affects 13 million hectares), and an emerging spruce budworm infestation in eastern Canada. The mountain pine beetle infestation has been triggered by climate change, while the spruce budworm infestation is a natural cyclic phenomenon in our eastern boreal forest.

The current FM accounting rules do not distinguish between emissions and removals due to direct human activity and those that occur due to natural or indirect human causes such as wildfires and the consequences of a changing climate. Such natural effects will continue to have a large impact on Canada's managed forest. For example,

Figure 2 shows simulated ecosystem carbon stock changes in the 37 million hectare region of British Columbia in which most of the mountain pine beetle infestation has occurred (see Kurz et al, 2008, Mountain pine beetle and forest carbon feedback to climate change. *Nature* 452: 987-990). The infestation is projected to have a cumulative impact of a loss of 270 megatonnes of carbon between 2000 and 2020. If warmer winters had not allowed the infestation to occur, the area would instead have constituted a small sink, as shown by the top line in Figure 2.



Thus it is fundamental for Canada that negotiations on rules for LULUCF consider how to revise the treatment of FM so that rules achieve the objectives described above. Canada is currently analyzing the LULUCF options and issues compiled in the conclusions of the AWG-KP at its resumed fifth session. Canada believes that the forward-looking baseline approach has particular merit for FM accounting.

Forward-Looking Baseline Approach

This approach is a type of net-net approach in which estimated emissions and removals in the commitment period are compared to a projected baseline. It is presented here as an approach for FM although it is possible to apply it to agriculture or other activities. It is assumed that accounting for harvested wood products would be addressed and incorporated into the approach. This approach should be compatible with existing FM measuring and monitoring systems.

Step 1 – Before the commitment period begins a Party establishes a FM carbon stock change and GHG emission business-as-usual baseline for the commitment period. A new baseline would be established for each subsequent commitment period.

- The baseline would reflect projected business-as-usual management activities including harvesting, post-harvest forest regeneration and so on, as well as HWP accounting. These business-as-usual activities should be known from existing

management plans, FM policies, FM practice standards or requirements, sector forecasts or other analyses.

- The baseline would reflect the characteristics of the forest just before the beginning of the commitment period. This would include age class structure, growth rates, decomposition rates and other factors that affect carbon dynamics and GHG emissions.
- The potential impacts of natural disturbances occurring in the commitment period would not be included in the baseline.

In essence, the baseline would reflect the expected future sinks and sources resulting from business-as-usual management (i.e. anthropogenic activities) in the forest.

Step 2 – The Party measures and monitors actual carbon stock changes and GHG emissions in the FM area that occur in the commitment period. After the end of the commitment period the reported commitment period carbon stock changes and GHG emissions would reflect the combined effects of management, the age-class structure of the forest, natural disturbances and any other natural and indirect effects.

Step 3 – After the commitment period ends, the Party removes the influence of natural disturbances from the accounting and estimates credits and debits in relation to the baseline. A natural disturbance in the commitment period would typically result in emissions initially but later the area could have removals during the commitment period as a result of natural forest regeneration following the disturbance – both these effects of natural disturbances would be removed. This step could be implemented in two ways that are conceptually identical – Parties would need to agree on the preferred approach.

In the first method the baseline is updated after the commitment periods ends to reflect the effects of actual natural disturbances that occurred in the commitment period. When the updated baseline carbon stock changes and GHG emissions are subtracted from the reported commitment period carbon stock changes and GHG emissions, the effects of the natural disturbances will be removed and credits or debits would result only from changes in management relative to the baseline.

In the second method the effects of the natural disturbances that occurred in the commitment period are removed from the reported commitment period carbon stock changes and GHG emissions, yielding an estimate of emissions/removals due to management. When the baseline carbon stock changes and GHG emissions are subtracted from this, credits or debits would result only from changes in management relative to the baseline

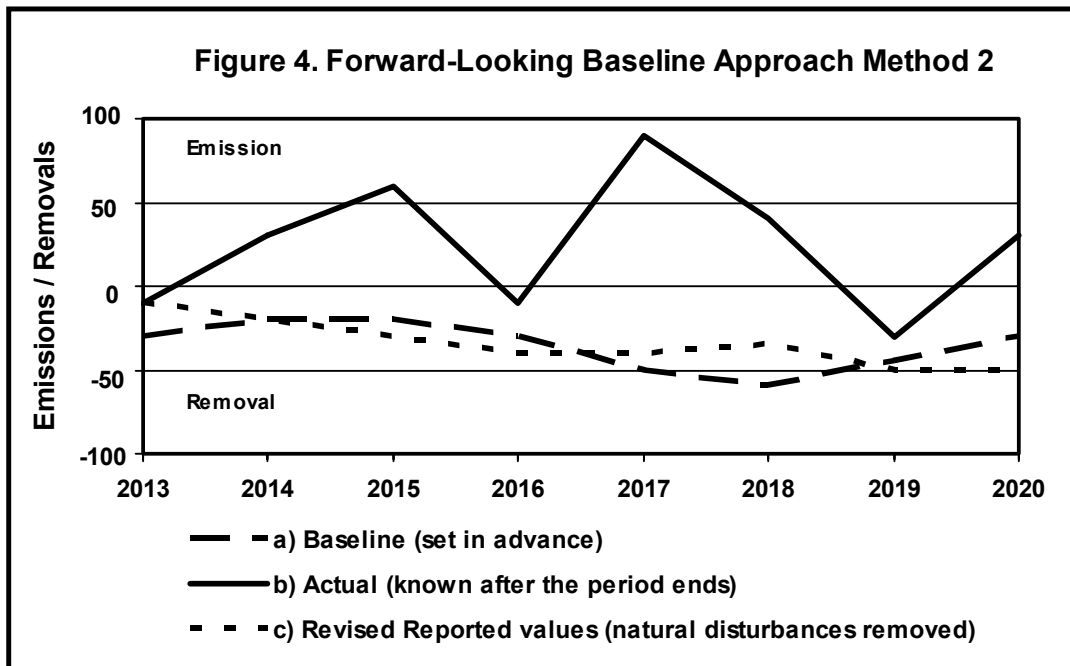
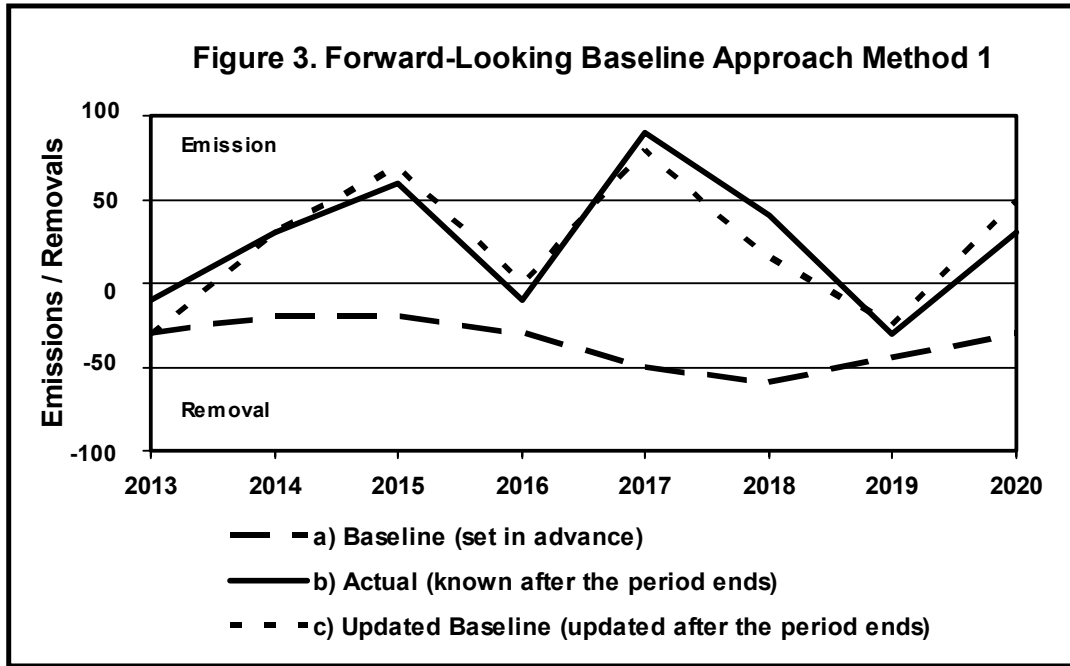
Step 4 – Reporting, review and adjustment. What is reported will be somewhat different depending on which method Parties agree should be used. All the estimates would be subject to expert review and adjustment using procedures like those that already exist.

In the first method reporting would include a) the baseline, b) the reported commitment period carbon stock changes and GHG emissions, c) the baseline updated to reflect actual natural disturbances, and d) the calculated difference between b) and c), which represents the impact of changes in management.

In the second method reporting would include a) the baseline, b) the reported commitment period carbon stock changes and GHG emissions, c) the reported

commitment period carbon stock changes and GHG emissions with the effect of natural disturbances removed, and d) the calculated difference between c) and a), which represents the impact of changes in management.

Figures 3 (first method) and 4 (second method) illustrate how this approach would work using hypothetical numbers for an assumed commitment period.



In Figure 3, accounting is based on subtracting the updated baseline (c) from the actual (b). In Figure 4, the accounting is based on subtracting the baseline (a) from the revised reported values (c). The two approaches yield identical results. Both credits and

debits can occur. For example, in 2013 and 2018 management results in a smaller sink contribution than expected based on the business as usual projection so debits result. Conversely, in 2015 and 2020, management results in a larger sink contribution than expected so credits result. In both methods, the solid line (actual) is what Parties currently report to the UNFCCC.

The forward-looking baseline approach is attractive for a number of reasons. One is that it meets the objectives for rules outlined above. The accounting focuses on direct human FM activity and provides clear incentives by directly linking credits and debits to changes in management activity. Credits would result if management were changed to increase sequestration (removals) or reduce emissions. Debits would result if management were changed to reduce sequestration or increase emissions. As well, natural disturbances and inter-annual variability are removed from the accounting by the adjustment to the actual values before the comparison to the baseline. Age-class effects and indirect human effects (such as CO₂ fertilization, N deposition, positive and negative climate change impacts, and the impacts of historic management) are removed through comparison to the baseline.

The carbon dynamics in areas affected by natural disturbances for which emissions / removals were not accounted in the previous period would be included in the baseline at the start of the subsequent commitment period. Thus re-growth on these naturally-disturbed areas would not contribute to future credits. Continued emissions (for example, due to the decay of insect-killed trees) would also be included in the baseline of the next commitment period and would not contribute to debits.

It is also worth noting that the development of forward-looking projects using models is common practice in forest management policy and planning, so the basic tools for the calculations of a baseline should already exist. And, in general, the methods, estimates and parameters needed would be the same as those used for developing current inventory estimates, and so should already be readily available and useable by developed countries.

Negotiations on this approach would need to address a number of topics:

- Criteria or guidance for establishing a baseline before the beginning of the commitment period.
- A reporting process for baselines, including justification against the criteria or guidance.
- A review and approval process for the baseline by an expert review team and application of adjustments where necessary. Existing Kyoto inventory review and adjustment procedures could be used.
- Criteria or guidelines for updating the baseline after the commitment period to include natural disturbances that occurred during the period (method 1) or revising the actual carbon stock changes and GHG emissions after the commitment period to remove the impacts of natural disturbances (method 2). This could include criteria for defining a natural disturbance and which natural disturbances to consider, and how.
- A review and approval process for these calculations by an expert review team and application of adjustments where necessary. Existing Kyoto inventory review and adjustment procedures could be used.