

**CANADA – INFORMAL SUBMISSION TO THE AWG-KP: DATA ON FOREST MANAGEMENT**  
**November 30, 2009**

**1. INTRODUCTION**

Canada's September 2009 submission on land use, land-use change and forestry provided substantial information on Canada's forests and forest management (FM), as well as information and projections of emissions and removals for afforestation / reforestation, deforestation and cropland management. Canada believes that data on FM supported by complete explanations are required to support transparent negotiations on FM reference levels. Canada is pleased to provide this informal submission on FM using the table format discussed by Parties in Barcelona. The attached technical Annex provides explanations for the data in the following table.

**2. DATA ON FOREST MANAGEMENT** (Removals are negative; emissions are positive)

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
<b>1990 emissions/ removals</b>	<b>Proposed reference level</b>	<b>Forecast for 1<sup>st</sup> CP (without application of 1st commitment period cap)</b>	<b>Forecast for 2013-2020</b>	<b>Forecast contribution based on 1990</b>	<b>Forecast contribution based on reference level</b>	<b>Forecast contribution based on 1<sup>st</sup> CP</b>	<b>Forecast for Forest Land for 2013-20</b>
(MtCO <sub>2</sub> e/yr)	(MtCO <sub>2</sub> e/yr)	(MtCO <sub>2</sub> e/yr)	(MtCO <sub>2</sub> e/yr)	(MtCO <sub>2</sub> e/yr) (E = D-A)	(MtCO <sub>2</sub> e/yr) (F = D-B)	(MtCO <sub>2</sub> e/yr) (G=D-C)	(MtCO <sub>2</sub> e/yr)
*	-105.4	-87.4	-105.4	*	0	-18.0	-106.7
<b>Comments</b>							
<ul style="list-style-type: none"> <li>• Using the projected reference level (Column B) the contribution of FM is expected to be zero (Column F). This creates an incentive to take actions to increase removals and to avoid actions that would lead to an increase in emissions.</li> <li>• Values are derived based on the data, parameters and methodologies used in Canada's annual GHG inventory submission, supplemented by harvest projections to 2020 and methods to remove natural disturbance impacts. Specifically, the values were derived using the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3), a model that integrates forest inventory and yield data with data on forest management, natural disturbances, and regional ecological and climate parameters to simulate in a realistic way the carbon transfers among pools, to the forest product sector and to the atmosphere. A "background" low level of natural disturbance that is expected to occur every year in the future is included. The projection of future harvests is derived from projections by provincial and territorial governments, and harvested carbon is assumed to be instantaneously oxidized for the purposes of this submission (Canada strongly believes that more accurate accounting for harvested wood products emissions is necessary).</li> </ul>							
* A value for 1990 excluding the impact of natural disturbances would not be comparable to the forecast for 2013-20 in Column D and for this reason has not been shown.							

## TECHNICAL ANNEX

This technical annex describes key data, assumptions and methods used by Canada in preparing the data shown in the Table. Additional detail on Canada's forests and forest management (FM) can be found in Canada's September 2009 submission on LULUCF.

### 1. Brief description of estimates

#### *Column A: 1990 emissions/removals*

No value is shown because a value for 1990 should exclude the impact of natural disturbances but then would not be comparable to the forecast for 2013-20 shown in Column D. This is because the latter is derived by using historic emissions/removals up to 2008 including the impact of natural disturbances, and then projecting as described below.

#### *Column B: Proposed reference level*

Column B indicates the proposed reference level if a forward looking approach is used for the period 2013-20. The derivation of the reference level started with historic emissions/removals up to 2008 including the impact of natural disturbances – these are estimates that appear in Canada's GHG national inventory reporting. This was the basis for then modeling 2009-20 emissions/removals taking into account expected future harvests and other management activities and assuming that, starting in 2009, only a background level of natural disturbance (see Section 3) occurs in the projection period. The projection also includes the delayed net emissions from forest stands that were subject to natural disturbance between 1990 and 2008 – these net emissions are the sum of the delayed emissions that result from slow decay of dead organic matter left after natural disturbance plus removals that occur as forest stands regenerate after natural disturbance.

#### *Column C: Forecast for 1<sup>st</sup> commitment period*

This is a forecast of emissions/removals before application of the cap agreed for the first Kyoto commitment period. Natural disturbance emissions above those due to a background level of natural disturbance (see Section 3) are excluded.

#### *Column D: Forecast for 2013-20*

This forecast is the same projected value as shown in Column B. Section 3 below describes how this estimate accounts for natural disturbances.

#### *Column H: Forecast for Forest Land for 2013-20*

The forecast for forest land (FL) is the sum of the forecast for forest management (from Column A) plus forecasted removals from post-1990 afforestation/deforestation (as provided in Canada's September 2009 submission).

## **2. Methods for derivation of estimates**

In Canada the managed forest is the same as the area subject to FM. Estimates for FM in Canada are almost identical to the estimates Canada provides in its GHG inventory for Forest Land Remaining Forest Land (FL-FL). The only difference is that FM estimates include removals from 20 years of conversion of land to forest land that occurred prior to 1990. These are reported in the inventory as land converted to FL. These removals are quite small because very little afforestation has occurred in Canada. Moreover, this pre-1990 conversion to forest land will be completely captured in the FL-FL estimates starting in 2010 (i.e. 20 years after 1990), so that from that point on FM and FL-FL will be identical. Note that future deforestation will result in small annual reductions in Canada's FM area. However, these area reductions (0.03% or less per year) have negligible effect on projections of FM emissions and removals. Therefore, projections of future deforestation areas were not taken into account in this submission.

The values shown in the Table were derived using exactly the same data, parameters and methodologies described in Canada's annual GHG inventory submission, supplemented by projections of harvests to 2020 (see Section 4) and methods to remove the impact of natural disturbances (see Section 3). As well, updated data for natural disturbances and harvests for 2005-2008 that will be used in Canada's 2010 GHG National Inventory Report have been used for this submission. Readers are referred to Canada's most recent National Inventory Report, available at [http://www.ec.gc.ca/pdb/ghg/inventory\\_e.cfm](http://www.ec.gc.ca/pdb/ghg/inventory_e.cfm) or from the UNFCCC website, for details on the basic methods for estimating FM emissions and removals.

Briefly, Canada applies a Tier 3 methodology, estimating GHG emissions and removals in its managed forests using the National Forest Carbon Monitoring, Accounting and Reporting System (NFCMARS) which includes the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3). The model integrates forest inventory and yield data with spatially referenced activity data on forest management, forest fires and insect infestations to estimate forest carbon stocks, carbon stock changes and non-CO<sub>2</sub> emissions and removals. The model uses regional ecological and climate parameters to simulate in a realistic way the carbon transfers among pools, to the forest product sector and to the atmosphere. For example, harvesting and natural disturbance result in significant transfers of dead biomass carbon to the litter and dead organic matter pools, and the model simulates the subsequent slow decay of the biomass, resulting in emissions for years or decades following the harvesting or natural disturbance, depending on the decay rates.

One issue that deserves consideration is how to accommodate improvements that are made to FM estimates up to and during the accounting period. In keeping with IPCC guidance, Canada's GHG inventory production follows a principle of planned, continuous improvement. The result is that, like all other countries, Canada makes periodic recalculations of its FM estimates. This raises the possibility that calculated FM emissions / removals in the future may differ from those of the reference level not because of a change in management practices but simply because of improvements to emission factors or estimation methods compared to those used in deriving the reference level. Canada welcomes further discussion of this issue.

## **3. Treatment of Natural Disturbance Emissions**

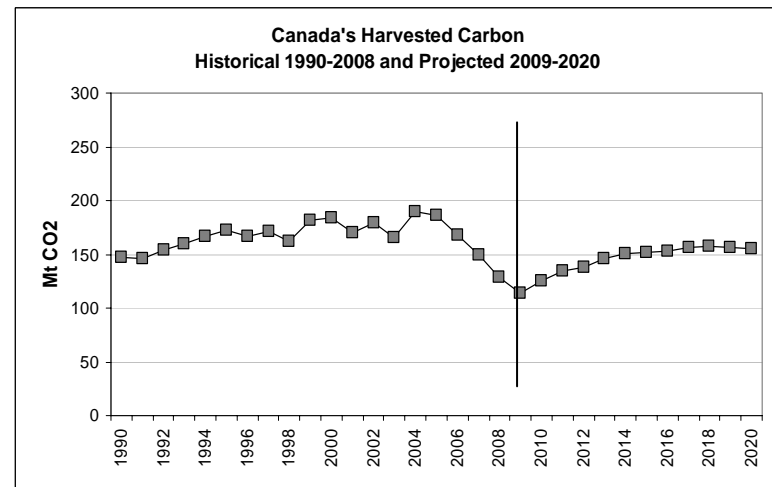
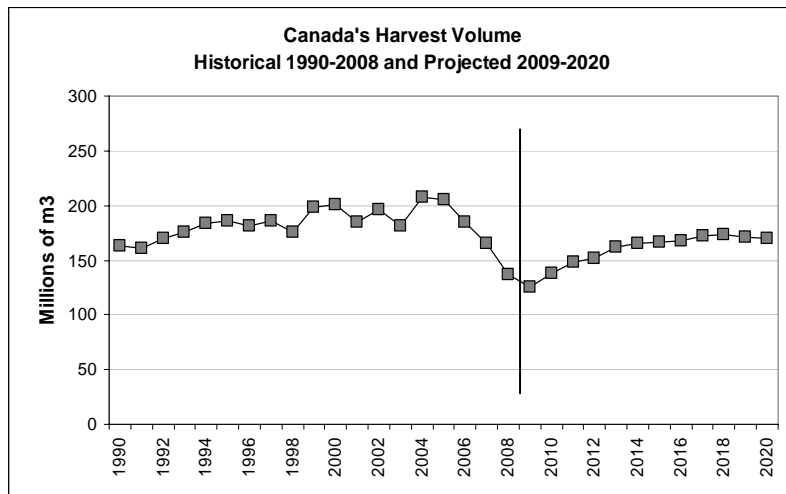
Since 1990, the only natural disturbances with a significant national impact in Canada have been wildfire and insect infestations. Although it is impossible to predict with confidence how future natural disturbances will affect Canada's managed forest, this submission reflects a "background" level of natural disturbance of 95 thousand hectares of managed forest burned per year. This value is based on the fact that over the past 50 years (1959-2008) there was a 90 percent chance that at least this amount would burn per year in Canada. Because of a warming climate, it is likely that at

least this area will burn annually in the future. The background level also accounts for the effects of endemic insect infestations. Canada’s forest carbon modeling does not explicitly account for these effects, but they are captured in forest inventory data because they affect forest productivity. All values in the Table include the impact of this “background” level of natural disturbance.

Canada believes that Parties should be able to exclude from their accounting the emissions and removals associated with natural disturbance or force majeure events. In doing so, it will be important to ensure consistency in the treatment of natural disturbances in the reference level and in the actual accounting. As explained in Section 1, the reference level in Column B was derived by projecting from 2009 to 2020 using an assumption that only a background level of natural disturbance happens. By the time accounting occurs relative to this reference level (for example in 2022), the actual natural disturbances, harvest rates and other management practices will be known for the period the accounting covers. To derive an estimate comparable to the reference level for use in accounting, the FM emissions/removals would be modeled from 2009 onward using the actual harvest rates and other management practices but assuming only the background level of natural disturbance occurs. This will ensure that accounting reflects only impacts of changes in harvest rates and other management practices on emissions and removals.

#### 4. Harvested wood products

The graphs below shows historical harvest volumes and carbon data for 1990-2008 and projections for 2009-2020. The latter are the sum of projections of harvest volumes provided by provincial and territorial governments. As owners of about 80 percent of the managed forest in Canada, provincial and territorial governments engage in detailed forest management planning exercises that provide a good basis for projecting expected future harvests. Canada’s harvest has fallen very substantially since 2005 due to competitiveness issues and the global recession. Harvests are expected to start to slowly recover starting in 2010.



In accordance with current accounting guidelines, the values in these graphs are based on the assumption that the harvested biomass carbon transferred out of the managed forest is instantaneously oxidized. This is known to be inaccurate, and Canada strongly believes that more accurate

accounting for harvested wood is necessary and supports the Option 1 approach for harvested wood products contained in paragraphs 21bis to 21octies of Option A of Annex II of FCCC/KP/AWG/2009/10/Add.3/Rev.3, pages 24-25. If Parties agree to a new approach for accounting for harvested wood products, it will be important to ensure methodological consistency in the estimation of emissions from harvested wood products in the reference level and the estimation of emissions from harvested wood products during accounting. This can be accomplished, if necessary, by correcting the accounting estimates for any methodological differences.

#### **5. Elements in Paragraph 11, Option 3 (Option A of Annex II of FCCC/KP/AWG/2009/Add.3/Rev.3, page 20)**

The elements in paragraph 11, Option 3 were addressed in the following way.

*Paragraph 11(a) - “Removals or emissions from forest management as shown in GHG inventories and relevant historical data”.* As described above, GHG inventory data was the basis for the estimates in this submission, including all parameters and assumptions used in Canada’s annual GHG inventory reporting for FL-FL. Historical data and trends were taken into account in projecting harvesting volumes.

*Paragraph 11(b) - “Age-class structure”.* The impacts of age-class structure are taken into account by including them in the same way in both the reference level and the accounting period.

*Paragraph 11(c) - “Forest management activities already undertaken”.* Activities already undertaken are used in producing annual GHG inventory estimates, for example harvesting, pre-commercial thinning and slash-burning activities.

*Paragraph 11(d) - “Projected forest management activities”.* Projections required taking into account expected harvesting activity, as described above.

*Paragraph 11(e) - “Continuity with treatment of forest management in the first commitment period”.* This refers to any considerations related to accounting rules for FM in the first commitment period. This was not taken into account as Canada did not include FM in its first commitment period accounting.