B.C. Forest Wake-Up Call: Heavy Carbon Losses Hit 10 Year Mark

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Bugaboo Creek Logging—Photo Credit TJ Watt

British Columbia is primarily covered by forests, including temperate rainforests with globally outstanding capacity to store large amounts of carbon. Globally, forests and oceans provide critical carbon sinks and are currently absorbing approximately half of human-caused greenhouse gas emissions (around one quarter each).

Unfortunately, B.C. government forest carbon emissions[1] data shows that the province's forests have been losing significantly more carbon than they have absorbed in the last full ten year period for which information is publicly available (2003-2012). B.C.'s forest functioned as a carbon sink until 2002, likely since the end of the last ice age.

The analysis for this 10-year period shows net B.C. forest emissions of 256 million tonnes of carbon dioxide. Net emissions from provincial forests are the result of logging (after accounting for carbon stored in wood products), wild fires, slash-burning and the reduced carbon sequestration capacity of B.C.'s forests as a result of the Mountain Pine Beetle outbreak. The 10-year net forest emissions are equivalent to four times the official annual emissions of the province (63 million tonnes in 2013).

Combined, these factors have turned B.C.'s forests from a carbon sink to a carbon source for the last 10 years. In contrast, B.C.'s forests were still a net carbon sink in the previous 10 year period, from 1993 to 2002, in which they absorbed 441 million tonnes of carbon dioxide. During this period, B.C.'s forests absorbed the equivalent of 70 percent of the cumulative official emissions of the province (629 million tonnes of carbon dioxide).

B.C.'s forest carbon emissions are not counted as part of the official greenhouse gas emissions of the province. Instead these emissions are reported as a 'memo' item and tend to be ignored, despite their alarming growth. They appear under the category "Forest Land remaining Forest Land", in contrast to emissions from deforestation which are much smaller and are counted as part of the official emissions. While B.C.'s forest carbon loss has been made worse by the Mountain Pine Beetle outbreak and a number of serious wildfire years, the biggest factors remain poor forest management and destructive logging practices like clear-cutting of old-growth rainforest and slash-burning.

Emissions from logging and slash burning alone were 577 million tonnes of carbon dioxide in the period 2003 -2012. This number is close to B.C.'s entire official emissions during the same 10 year period (638 million tonnes). Contrary to the provincial data, the Sierra Club BC estimate accounts for carbon stored in wood products. Based on our literature review we estimate that 23 percent of the carbon removed through harvesting remains stored in wood products (only a portion long-term).[2]

Comparison of two 10-year periods of B.C. forest carbon data, 2003-2012 and 1993-2002

The following is a summary of B.C. government data on forest carbon emissions for the period 2003 to 2012 (forests emissions data is included as a memo item but not counted in the official provincial inventory)[1].

- **2003—2012 net carbon emissions: 256 million tonnes of carbon dioxide**
  - ◊ Equivalent to 40 percent of the cumulative official emissions of the province during this period (638 million tonnes of carbon dioxide).

- Carbon lost:
  - ◊ Emissions from logging (after considering carbon stored in wood products[2]): 495 million tonnes of carbon dioxide (carbon remaining stored in wood products equivalent to 148 million tonnes of carbon dioxide)
  - ◊ Emissions from slash burning: 82 million tonnes of carbon dioxide
  - ◊ Emissions from forest fires: 271 million tonnes of carbon dioxide

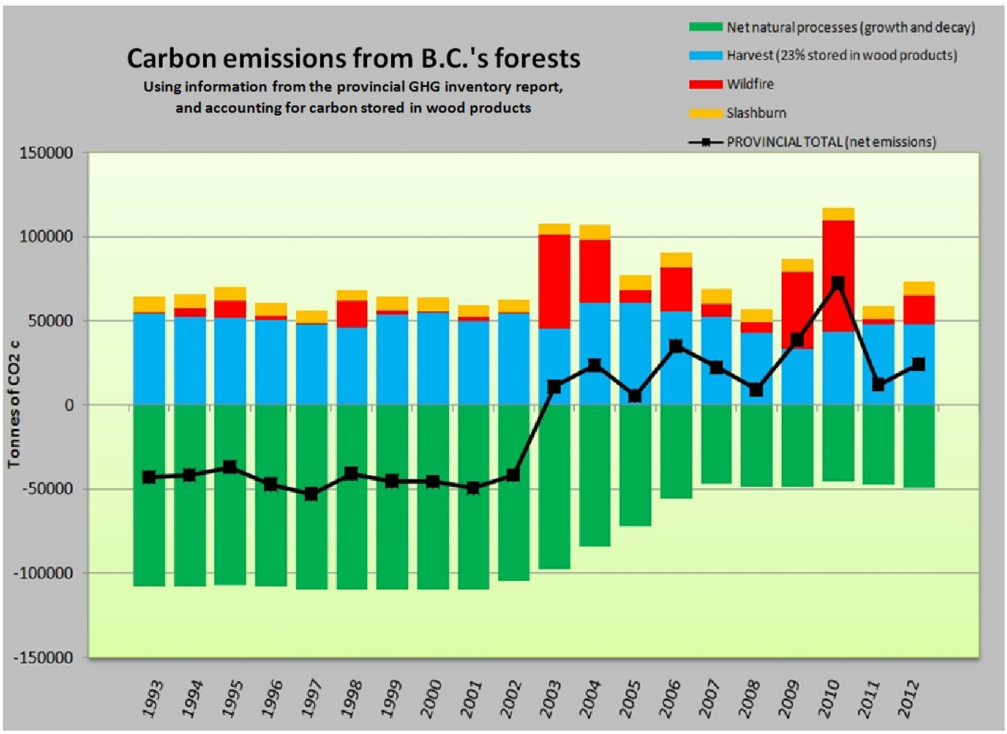
- Carbon gained (carbon gained/sequestered is highlighted with a 'minus' in inventories)
  - ◊ Natural processes (growth/decay etc.): minus 592 million tonnes of carbon dioxide

- **1993—2002 net carbon gain: minus 441 million tonnes of carbon dioxide**
  (carbon gained/sequestered is highlighted with a 'minus' in inventories)
  - ◊ Equivalent to 70 percent of the cumulative official emissions of the province during this period (629 million tonnes of carbon dioxide).

- Carbon lost:
  - ◊ Emissions from logging (after considering carbon stored in wood products): 520 million tonnes of carbon dioxide (carbon remaining stored in wood products: equivalent to 155 million tonnes of carbon dioxide)
  - ◊ Emissions from slash burning: 78 million tonnes of carbon dioxide
  - ◊ Emissions from forest fires: 41 million tonnes of carbon dioxide

- Carbon gained (carbon gained or sequestered is highlighted with a 'minus' in inventories)
  - ◊ Natural processes (growth, decay etc) : minus 1,080 million tonnes of carbon dioxide

Vancouver Island clearcuts —Photo Credit: TJ Watt



Graph: Sarah Amundrud

Key findings:

- The overall capacity of B.C.'s forests to sequester carbon dioxide as a result of natural processes (forest growth and decay) declined to 592 million tonnes in the period 2003 – 2012, from 1,080 million tonnes of carbon dioxide 1993 - 2002 (a reduction of 488 million tonnes), primarily as a result of the Mountain Pine Beetle outbreak
- Emissions from wildfires more than sextupled from 41 to 271 million tonnes
- Emissions from logging remain the single biggest factor of forest carbon loss, even after accounting for carbon stored in wood products, at 520 million tonnes of carbon dioxide
- Including forest emissions in B.C.'s officially reported emissions results in a massive shift in overall provincial emissions from 188 million tonnes of carbon dioxide for 1993 to 2002, to 894 million tonnes for 2003 to 2012. In contrast, without including forest emissions, emissions were similar in the two decades (629 and 638 million tonnes)

B.C'.s forests are already severely harmed by climate driven impacts like the Mountain Pine Beetle and wildfires at just below one degree of global warming. Droughts, floods, pests and fires are projected to increase as a result of climate change and their impacts will be worse without strong action to increase forest conservation and forest management.

Forest management, particularly the choice of logging practices, can significantly influence how much carbon is being lost as a result of harvesting. Poor forest management like slash-burning, excessive wood waste and extended clearcuts in carbon rich old-growth rainforests, are causing significant loss of carbon.

In contrast, shifting logging from old-growth to second-growth, from clearcutting to selective logging, from shorter to longer harvesting cycles and from wasteful practices to lighter touch logging will allow producing high quality wood products while at the same time increasing the carbon stock of our forests.

How much carbon is stored in wood products?

While a certain amount of carbon is being released to the atmosphere as a result of logging, there is also a portion that remains stored in wood products, some of it long-term. The percentage of carbon stored in wood products depends on the type of forest (e.g. old-growth will lose more carbon compared to previously disturbed second-growth), the type of logging (e.g. clearcut with waste wood vs. selectively logged forest without waste wood) and how long-lasting the products will be (e.g. used in a building compared to a newspaper in use for a day).

A number of studies indicate that 15 – 30 percent of carbon remains stored in wood products after logging[3]. So far, B.C. government emissions reports have not accounted for carbon stored in wood products. This exaggerates emissions from logging. In our analysis we have used a factor of 23 percent. The province however stated in its last report that it will introduce a factor of 52 percent to account for carbon stored in wood products. This appears to be too high and will downplay emissions from logging, especially in the light of the destructive logging practices common in B.C. which cause a lot of wood waste and carbon loss. Sierra Club BC recommends to undertake more research into the question of how much carbon remains stored in wood products and how to increase this factor.

TimberWest clearcuts in the Great Bear Rainforest - Photo by Garth Lenz

Shift government support and subsidies from fossil fuels to forest management

Sierra Club BC recommends phasing out subsidies to the oil and gas industry ($1 billion in 2012/13 and 2013/14) and instead set aside $1 billion to develop and implement a 5-year plan to restore B.C.'s forest's function as a carbon sink, create forestry jobs and ensure the province's preparedness for climate change impacts by restoring healthy forests, intact watersheds, habitat to allow species a better chance to adapt to the changing climate and ensure timber supply for the future. Shifting fossil fuel subsidies to forestry and implementing a B.C. forest action plan should be a key strategy in B.C.'s climate action plan 2.0.

B.C'.s auditor general reported[3] in 2014 that the provincial government had given the oil and gas industry $1.25-billion in credits over about five years ($1 billion in the last two fiscal years 2012/13 and 2013/14)[4].

Sierra Club BC recommends phasing out this support and instead set aside $1 billion to develop and implement a 5-year plan to restore B.C.'s forest's function as a carbon sink, create forestry jobs and ensure the province's preparedness for climate change impacts by restoring healthy forests, intact watersheds, habitat to allow species a better chance to adapt to the changing climate and ensure timber supply for the future.

Ongoing political support and subsidies for fossil fuel industries, especially LNG projects, would make it impossible for the province to reduce its greenhouse gas emissions and meet its emission reduction targets. Shifting fossil fuel subsidies to forestry should be a key strategy in B.C.'s climate action plan 2.0.

Core elements of a B.C. forest action plan must include with strategies considering different ecozones, must include:

- Make carbon an integral element of forest management in B.C. and systematically revise regulation and create incentives to reduce carbon losses and enhance carbon sequestration in natural, resilient forest ecosystems, especially longer harvesting cycles, selective logging, avoidance of slash burning and wood waste.
- Boost government funding to restore forest stewardship, monitoring and enforcement
- Restore government capacity to map forests, update inventories and undertake research, especially related to climate change impacts such as fire and pests and climate adaptation.
- Adjust the Annual Cut to a realistic, sustainable level reflecting past overharvesting and climate impacts like the Mountain Pine Beetle outbreak.
- Amend regulation and create incentives to support forestry operations and value added businesses that create a higher number of jobs per cubic metre, reduce raw log exports and other forestry business practices which create too few jobs per cubic metre and use wood in wasteful ways.
- Increase conservation of carbon-rich old growth rainforest, in particular finalization of the outstanding steps of the Great Bear Rainforest Agreements, support for First Nations aspirations towards protection of intact old-growth valleys in Clayoquot Sound and conservation and restoration of rare, endangered rainforest ecosystems on Vancouver Island and the South Coast.
- Provide transition assistance to forestry dependent communities and workers hit by climate change impacts like the Mountain Pine Beetle and mill closures to restore healthy forest landscapes and forestry opportunities for the future.

In order to be successful, a B.C. forest action plan needs to be coupled with strong leadership to reduce emissions from fossil fuels. More oil pipelines, coal mines and fracking wells will speed up global warming and result in worst case scenarios for our forests, clean air, clean water and communities.

The world's forests offer us a spectacular service by absorbing carbon and giving us oxygen to breathe. They are also our only viable hope to reverse at least a portion of our carbon emissions. Only by taking immediate climate action will our forest return to being an ally in the fight against global warming.

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[1] http://www2.gov.bc.ca/gov/DownloadAsset?assetId=DD0170E645E348C3B5C24F50F86CB3F6&filename=2012_land-use-forestry.xls

[2] Based on our literature review we estimate that 23 percent of the carbon removed through harvesting remains stored in wood products (only a portion long-term). Harmon ME, Harmon JM, Ferrell WK, Brooks D: **Modeling carbon stores in Oregon and Washington forest products: 1900–1992.** *Clim Chang* 1996, **33:**521-550

[3] For example: Ingerson, Ann L. 2007. U.S. Forest Carbon and Climate Change. Washington,D.C.: The Wilderness Society. http://www.uvm.edu/rsenr/greenforestry/LIBRARYFILES/ForestCarbonReport.pdf
Restaino, Joseph C.; Peterson, David L. 2013. Wildfire and fuel treatment effects on forest carbon dynamics in the western United States. Forest Ecology and Management 303:46-60. http://www.fs.fed.us/pnw/pubs/journals/pnw_2013_restiano001.pdf

[4] http://www.theglobeandmail.com/news/british-columbia/oil-gas-incentives-have-already-cost-bc-125-billion-report/article21396443/