

## ***Interactive comment on “Quantifying the biophysical climate change mitigation potential of Canada’s forest sector” by C. E. Smyth et al.***

**Anonymous Referee #2**

Received and published: 6 April 2014

This manuscript analyzed carbon mitigation potential of Canada’s forest sectors under various management scenarios. The topic is of significance and scenario based results are meaningful, but some problems in logic and structure degrade its overall quality.

Major comments: The title is bit confusing. Forests affect climate through biophysical and biogeochemical processes. Biophysical processes often refer to albedo, evapotranspiration (as in your discussion)... and biogeochemical processes mainly refer to carbon (and other GHGs). The study is actually dealing with how forest management affects CO<sub>2</sub> (biogeochemical effect), so the term “biophysical climate change potential” may cause some misunderstanding (at least from my perspective). I would expect something related to albedo stuffs comes with the current title. My suggestion is to change the title like “Quantifying the climate change mitigation potential of forest man-

C777

agement on Canada’s forest sector”. From the texts, biophysical potential is relative to the technical potential. I think that is what the author actually means here. So “Quantifying the biophysical potential of carbon mitigation for Canada’s forest sector” is also a better choice. Just try not using words like “biophysical climate change potential”. That is too big and the current paper is about carbon.

In the introduction, the author needs to review related work and give more emphasis on contribution and significance of this research. The current introduction provides very little information on this.

Methodology part is too long and hard to follow. It should be more concise and better organized. Adding necessary figures to illustrate relationship between management strategies, scenario designs and its parameters can make things clearer. Parameters can be listed in a table with their reference and short description but doesn’t need to explain all of them in the text. If possible, the methodology should be made shortened and more condensed.

Discussion is bit too long. It seems the author want to include many things but this make the discussion lack of focus. Also, the order/logic of the discussion is obscure (perhaps it can be improved by using sub sections). My suggestions are: consistent comparisons with similar work can be moved to strengthen introduction (e.g. P457 L19-), inconsistencies and the reasons are more suitable in discussion; key uncertainties related to results are essential but some technical uncertainties about methodology and design are less important, so it doesn’t need to go too much detail; some contents are not directly relevant to the subject and can be shortened; some contents are repeated; the practical implications of different management strategies are very important and should be emphasized (such as effect of strategy portfolio; trade-off between long-term and short term mitigation goal).

Minor comments: P443 L10: reference mismatch. Is Nabuurs et al., 2007 refers to G. J. Nabuurs et al., in *Climate Change 2007: Mitigation*, B. Metz et al., Eds. (Cambridge

C778

Univ. Press, Cambridge, 2007)?

P445 L19: How to separate managed forest from natural forest? So natural forest has been excluded from the analysis?

P448 L4-9 There are several concurrent activities for Better Utilization in the description, but why not all of them appear in Table 1? For example, stopping burning of harvest residue in situ is not included in the changed parameters. And what are the differences between Residue recovered (

P451 L1: Are there overlaps between F and P at given time for? Because trees would have F before it is harvested, and there is regrowth as well.

P451 Sec 2.5: If any sensitivity tests related to the assumed parameters had been taken? Or if the results are sensitive to the choice of parameter as there are so many assumptions.

When discussing the results, it is better to reference some mitigation goal of Canada or current emission, so the readers can have a better awareness to what the numbers actually means.

P455 L14-15: How to determine the portion of HWP consumption for domestic and foreign markets?

Figure 5. It is better to use symbols that are more distinguishable. Foreign energy cannot be seen from the chart.

Forest also releases other GHGs (N<sub>2</sub>O, CH<sub>4</sub>). Are these included in the model? If not, it is better to mention them in the text because they are also important for mitigation.

---

Interactive comment on Biogeosciences Discuss., 11, 441, 2014.