

CFS Activities Relevant to ABoVE

(Maximum 2 page)

1. Project Title
Impacts of climate change on heart rot of aspen caused by <i>Phellinus tremulae</i>
2. Investigators (include email). a) Project Lead; b) CFS collaborators, c) external collaborators (individuals/institutions)
a) Tod Ramsfield (Tod.Ramsfield@Canada.ca). b) Ted Hogg, Juha Metsaranta, Colin Myrholm, Brad Tomm (email: firstname.lastname@Canada.ca)
3. Project Description (200 words maximum)
Trembling aspen (<i>Populus tremuloides</i>) can be infected by the heart rot pathogen <i>Phellinus tremulae</i> , which results in losses due to cull, fall down and impacts carbon sequestration. Across the CIPHA network, the average infection level of <i>P. tremulae</i> was 15.3% and ranged between 0 and 45.3% within the plots. In laboratory experiments we have observed variability in decay rates of different isolates of the pathogen as well as variation in the optimum temperature for growth and decay. We have also assessed sporulation of the pathogen under various climatic conditions. These data provide information that can be used for scenario modelling to understand the impact of this pathogen under climate change.
4. Timelines and current funding (level and source)
Manuscript submitted by 31 March 2017. Current funding 0.00.
5. Reference (1-2 key publication, website)
Hogg, E.H., and Michaelian, M. 2015. Factors affecting fall down rates of dead aspen (<i>Populus tremuloides</i>) biomass following severe drought in west-central Canada. <i>Global Change Biology</i> 21: 1968 – 1979. Ramsfield, T., Myrholm, C., and Hogg, T. 2014. Understanding the interactions between climate change, heart rot, and carbon sequestration in <i>Populus tremuloides</i> in the boreal forest. <i>International Forestry Review</i> 16(5): 183.

6. ABoVE question being mainly addressed (please highlight)

1. How are environmental changes affecting critical ecosystem services - natural and cultural resources, human health, infrastructure, and climate regulation - and how are **human societies** responding?

2. What processes are contributing to changes in **disturbance** regimes and what are the impacts of these changes?

3. What processes are controlling changes in the distribution and properties of **permafrost** and what are the impacts of these changes?

4. What are the causes and consequences of changes in the **hydrologic system**, specifically the amount, temporal distribution, and discharge of surface and subsurface water?

5. How are **flora and fauna** responding to changes in biotic and abiotic conditions, and what are the impacts on ecosystem structure and function?

6. How are the magnitudes, fates, and land atmosphere exchanges of **carbon** pools responding to environmental change, and what are the biogeochemical mechanisms driving these changes?

7. Linkages with ABoVE:

- a. Data being collected/generated
- b. Expected key benefits and potential challenges from collaborating with ABoVE
- c. Ongoing and / or interest in future involvement in ABoVE

I need to have a better understanding of the ABoVE research programme before I can address linkages; however, I believe the following information could be provided by the ABoVE programme:

Aspen has a wide geographic distribution in the boreal forest and it is important for carbon sequestration. The impact of *P. tremulae* increases with age; therefore, knowing the age class distribution of Aspen across the landscape can help to understand the impact of this pathogen. We would also like to know if the distribution of the pathogen matches the distribution of aspen, or if the northern boundary of the fungus does not reach the northern extent of the distribution of aspen.