

Forest Sciences Project Y09-2200:

**Assessing ecosystem vulnerability to climate change from the tree-
to stand- to landscape-level**

Modelling Climate Change Impacts in British Columbia's Forest Ecosystems: a holistic approach to understanding ecosystem vulnerability

FFEI Seminar Abstract
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By:

Dr. Craig Nitschke, Dr. Rasmus Astrup, and Dr. John L. Innes

Bulkley Valley Research Centre
Smithers, British Columbia

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Understanding where vulnerabilities lie and when climatic thresholds are reached are important areas of knowledge that must be used to manage the risks associated directly or indirectly with climatic change. Ecosystems are complex systems that form the basic units of nature on earth and are created from the interaction between the biotic and abiotic components of its environment. Changes in any biotic or abiotic process can alter the stable dynamic equilibrium that exists between structure and function leading to the creation of new ecosystems. Climate change is a stressor that will directly or indirectly influence these processes which in turn will affect the structure and functioning of ecosystems. This means that climate change may have a significant impact on the natural disturbance regimes, ecosystems, and biodiversity that we currently base our management on. For these reasons, it is important to identify the potential impacts of climatic change on the ecological processes related to forest management. Understanding which vulnerabilities exist, and where, is thus a logical step in reducing the uncertainty and risk associated with ecological systems, particularly under the stress of climatic change. This is also an important step if we are to determine where and what adaptation and mitigation strategies are to be incorporated into long-term forest planning. Spatial and temporal assessments of landscape vulnerability can be used as determinants for providing guidance on how to manage for the risks associated with climatic change by removing some of the uncertainty on how ecosystems will respond. In order to achieve this, we explore the use of meta-modelling to conduct holistic analyses of ecosystem vulnerability to determine the impact climatic change on ecological processes and structure. Two case studies are highlighted, one completed, in the south-central British Columbia and one, on going, in the northwest region of the province (FSP Y09-2200). The results of the case studies suggest that climate change will have large impacts on disturbance regimes and on tree species which in turn will impact ecological resilience and biodiversity over time. The results highlight the need to undertake management actions that are based on an understanding of ecosystem vulnerabilities to reduce climate change impacts. To address this need, we propose a proactive management framework that could be used to reduce climate change impacts in an ecologically and economically feasible way.

Presentation can be accessed at:

http://www.for.gov.bc.ca/ftp/HTI/external!/publish/Climate%20Change/Seminar_Series/Archive/Nitschke_Feb5_09/