

CFS Activities Relevant to ABoVE

(Maximum 2 page)

1. Project Title
Interdisciplinary assessment of drought interactions with forest health, growth and mortality under a changing climate
2. Investigators (include email). a) Project Lead; b) CFS collaborators, c) external collaborators (individuals/institutions)
a) Ted Hogg (ted.hogg@canada.ca) b) Mike Michaelian, Trisha Hook, Ron Hall, Roger Brett, Tod Ramsfield, Jag Bhatti, Juha Metsaranta, Martin Girardin (LFC), Catherine Ste-Marie, and many others c) CIPHA study: Alberta Agriculture & Forestry (AAF), Saskatchewan Environment; collaborator on ABoVE project led by Scott Goetz (Woods Hole)
3. Project Description (200 words maximum)
<p>Drought poses a climate change threat to forests in west-central Canada and globally. This component is aimed at improving scientific knowledge on how climate change and its interactions with forest insects and fungi affect forest ecosystem dynamics across multiple scales through plot-based measurements, tree-ring analysis and remote sensing. Key to the work is the application of user-friendly indicators of soil moisture for historical analyses and near-real time mapping of drought severity.</p> <p>Specific ongoing research includes:</p> <p>CIPHA study: initiated in 2000; assessment of multi-year impacts of drought on growth and mortality of aspen forests through proposed re-measurement with tree-ring analysis of 150 plots across western Canada (NWT to Manitoba) in 2016</p> <p>Tree-ring analysis of drought-affected stands across Alberta (2014-2015), as part of white spruce study with AAF and proposed research with Parks Canada</p> <p>Also collaborating on several studies of recent climate-related impacts (tree-ring analysis and plot-based measurements) both nationally (NFI) and in GNWT (Hall, Bhatti and others).</p> <p>Tools used in research include: mapping of drought indicators (CMI and SMI), user-friendly method for assessing tree ring cross-dating quality, and approaches for mapping tree growth anomalies at regional to national scales.</p>

4. Timelines and current funding (level and source)
<p>CIPHA study: initiated 2000 (ongoing); Alberta white spruce study: initiated 2014 NFI tree-ring study: involvement since 2012; proposed new study (GNWT & Parks)</p> <p>Current funding: \$15,000 (A-base, 2016-2017)</p>
5. Reference (1-2 key publication, website)
<p>Hogg, E.H., Barr, A.G., Black, T.A. 2013. A simple soil moisture index for representing multi-year drought impacts on aspen productivity in the western Canadian Interior. <i>Agric. For. Meteorol.</i> 178-179: 173-182.</p> <p>Michaelian, M., Hogg, E.H., Hall, R.J., and Arsenault, E. 2011. Massive mortality of aspen following severe drought along the southern edge of the Canadian boreal forest. <i>Global Change Biol.</i> 17: 2084-2094</p> <p>http://www.nrcan.gc.ca/forests/climate-change/impacts/13119</p>
6. ABoVE question being mainly addressed (please highlight)
<p>5. How are flora and fauna responding to changes in biotic and abiotic conditions, and what are the impacts on ecosystem structure and function? Primary focus</p> <p>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? Secondary focus</p>
7. Linkages with ABoVE:
<ul style="list-style-type: none"> 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
<p>a) Data sets on forest productivity, health and mortality from ground plot networks and tree-ring analysis; historical interpolations of drought indicators (CMI and SMI) using BioSIM</p> <p>b) Benefits include i) the opportunity to validate and determine causes of forest ecosystem “greening” and “browning” through linkage of remote sensing observations with annual ground-based measurements; and ii) opportunity to extend our current knowledge of climate-related impacts on Canada’s protected and northern forests</p> <p>Challenges include travel restrictions and onerous administrative procedures that impede our scientific enthusiasm and our ability to collaborate effectively.</p> <p>c) Significant interest but have a strong preference for informal, science-based collaborations with minimal administrative requirements. Also note that I may be retiring within 2-3 years and thus there is a need to bring in new scientific staff to continue collaborations during the proposed multi-year period of ABoVE.</p>