

ECOLOGY

Craig DeLong, MSc, RPBio

Research Ecologist, Northern Interior Forest Region, Prince George

Craig is a research ecologist with NIFR as well as an adjunct professor at UNBC. His current interests are natural disturbance dynamics at multiple scales, stand and plant succession, and natural disturbance as a template for forest management. The main goal of Craig's research is to maintain ecosystem integrity and function while reducing the cost of forest management through a better understanding of forest ecosystems.



Are Wildlife Tree Patches Working?

Craig and Rachel Botting are looking at bryophytes and lichens as bellwethers to determine how well wildlife tree patches (WTPs) are sustaining habitat and biodiversity. Ecologists have inventoried the bryophytes and macrolichens in a wide array of WTPs. The patches vary in size, the proportion of dead pine, and the time elapsed since first isolated by logging. The species richness of these plants is an indicator of whether biodiversity is being maintained within the WTPs. This assessment of WTP effectiveness is relevant for resource managers involved in layout of timber harvesting or concerned with maintaining biodiversity. Preliminary findings indicate that this WTP evaluation has substantial and wide-reaching operational implications. The results show that patch size has a major influence on species richness of mosses, liverworts and lichens. Patches of less than two hectares in size, which are the majority, support significantly fewer species. As time passes since logging, liverwort species are disappearing from WTPs, with marked changes noticeable after five years. Species richness also declines with increasing amounts of dead lodgepole pine in the patch. This suggests that logging operations should be leaving larger WTPs in clearcuts that contain at most 33% dead pine in order to effectively maintain biodiversity.

Rachel Botting and Craig DeLong. 2008. Research examines lichens and bryophytes on coarse woody debris. FORREX. 10(2): 3. (available on SharePoint site)

Life After MPB

Research plots established over a decade ago in lodgepole pine stands of the Vanderhoof Forest District are now being left unharvested to allow for monitoring of the natural ecological changes taking place after the MPB outbreak, and in some cases, also after wildfire. Known as the Beetle Ecosystem Monitoring Project, BEM for short, the study involves observing close to 50 permanent sample plots, each about five hectares in size. Data are being collected on the cover and species of all types of vegetation, and how these plants are changing after the overstorey died. This year's plot measurements concentrated on performance of understorey conifers, including height increments, to document their release after the loss of lodgepole pine canopy. The research provides information on the growth rate of understorey trees after heavy MPB infestation. This will inform forecasts of future timber supply and help in refining stocking standards. The study is also revealing how the ecology of SBS sites evolves after wide-spread

disturbance. That information is applicable to understanding the response of non-timber forest products such as huckleberries. On some plots, monitoring of terrestrial lichens complements other research projects on maintaining the Tweedsmuir-Entiako caribou population.

Heemskerk, B., C. DeLong, and T. Milner. A framework for documenting the effects of the Mountain pine beetle outbreak in sub-boreal forests of northern British Columbia (E.P. 1369): establishment report. B.C. Min. For. Range, Res. Br., Victoria, B.C. Tech. Rep. 046. (available on SharePoint site)

Maintaining Dead wood on the Managed Landscape

Craig is working with ecologists Ben Heemskerk (MFR Smithers), Ken Olaf Storaunet (Norwegian Forest and Landscape Institute) and Lori Daniels (UBC), and ecosystem modellers Andrew Fall (SFU) and Glen Sutherland (Cortex Consultants Inc.) in order to develop a model that can predict the effects of forest management activities on dead wood (snags and CWD) supply and their habitat value over time. They developed relationships between snag and CWD quantity, character, and habitat quality, and time since death and fall based on field measurements and dendroecology work in the lab. They are now building these relationships into a fine spatial resolution model that they developed that simulates harvesting and road building. Once completed, this model will help forecast dead wood supply in response to innovative forest practices in order to avoid the depletion of dead wood and organisms that use dead wood such as has occurred in Scandinavia. (available on SharePoint site)

Related publications

DeLong, S.C., G.D. Sutherland, L.D. Daniels, B. Heemskerk, and K.O. Storaunet. 2008. Temporal dynamics and development of snag habitats in wet spruce-fir stands in east-central British Columbia. *Forest Ecology and Management* 255: 3613-3620.

DeLong, S.C., L.D. Daniels, B. Heemskerk, and K.O. Storaunet. 2005. Temporal development of decaying log habitats in wet spruce-fir stands in east-central British Columbia. *Canadian Journal of Forest Research* 35: 2841-2850.

DeLong, S. C., S. A. Fall, and G. D. Sutherland. 2004. Estimating the impacts of harvest distribution on building of roads and stream crossings, and snag abundance. *Canadian Journal of Forest Research* 34: 323-331.

Craig's consultation activities:

- Advising consultants conducting ecosystem mapping and reviewing their plans and results for licensees conducting ecosystem mapping projects.
- Working with Ministries and licensees on the implementation of policy based on the Natural Disturbance Unit guidance he developed.
- Providing ongoing support to the development of new tree species selection guidance.
- Assisting licensees with the development of ecosystem based management required for certification.

Recent publications

Submitted

Botting, R. and C. DeLong. Submitted. Macrolichen and bryophyte responses to coarse woody debris characteristics in sub-boreal spruce forest.

Botting, R. and C. DeLong. Submitted. Will small forest patches and mountain pine beetle affected stands maintain species richness of macrolichens and bryophytes growing on decaying logs?

2009

Comeau, P. G., C. N. Filipescu, R. Kabzems, and S.C. DeLong. 2009. Growth of white spruce underplanted beneath spaced and unspaced aspen stands in northeastern B.C.—10 year results. *Forest Ecology and Management* 257: 1087–1094.

DeLong, S.C., G.D. Sutherland, L.D. Daniels, B. Heemskerk, and K.O. Storaunet. 2008. Temporal dynamics and development of snag habitats in wet spruce-fir stands in east-central British Columbia. *Forest Ecology and Management* 255: 3613-3620.

2007

DeLong, S.C. 2007. Implementation of natural disturbance-based management in northern British Columbia. *Forestry Chronicle* 83: 338-346.

DeLong, C. 2007. Relative impact of aspen competition and soil factors on the performance of lodgepole pine and hybrid white spruce in north-central British Columbia. Research Branch, Ministry of Forests and Range, Victoria, B.C. Technical Report 039.