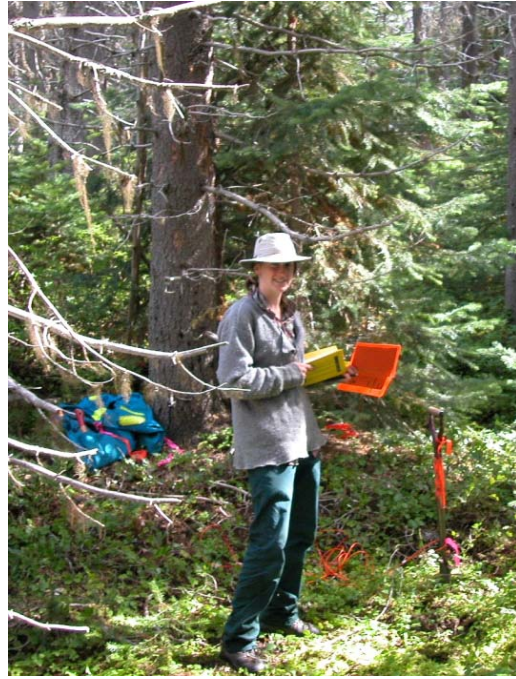


# ECOLOGY AND SILVICULTURE RESEARCH

**Erin Hall**, BSc, RPF

Assistant Research Ecologist/Silviculturist, NIFR, Smithers

I began working in the research section of the MOFR in Smithers in 2003. I work primarily with Allen Banner in ecology and Dave Coates in silviculture and enjoy the breadth of experiences and perspectives this brings to my position. Working in the Regional Services Centre provides the opportunity to collaborate and conduct interdisciplinary work with a large team including Karen McKeown, Ben Heemskerck (now Research Branch), Phil LePage, Will MacKenzie (Research Branch), Ken White, Bill Borrett and Erin Havard. Prior to the MoFR, I spent several years working for various forestry consultants, with field work taking me across northern B.C. from Fort St. John to the Nass, the Chilcotin to Fort Nelson and Aleza Lake. Through this work I



gained an appreciation of the diversity and complexity of our forest ecosystems, management approaches, landscapes and communities. My research interests include understanding adult tree neighbourhood dynamics, juvenile tree growth dynamics, and a variety of complex stand dynamics questions including post-MPB regeneration and non-clearcut silvicultural strategies in northern BC forests. Ecology research interests include exploring ecological recovery processes in the ICH and SBS and successional dynamics.

## **Stand Dynamics and Modelling**

Understanding stand dynamics and the ability to accurately model complex forest development is becoming increasingly important in British Columbia's forests. The mountain pine beetle and alternative harvesting and silvicultural systems result in a landscape with increasingly complex forests. An understanding of regeneration patterns and stand dynamics including growth and mortality are key to modelling stand development in order to answer a variety of management questions including those regarding future timber supply and habitat values. Dave Coates is one of the leading researchers involved with the development of SORTIE-ND, an ecological modelling program that has been designed to predict stand dynamics based upon the growth of individual trees. Working with Dave, I have been involved with a number of projects that work towards understanding stand dynamics and further refine the model for its application to forests in northwest B.C.

Recent projects have included revisiting EP 591, a research trial initiated in 1962 in mixed lodgepole pine and spruce stands between Smithers and Burns Lake. This trial was originally established to compare the performance of spruce trees that were planted on site from seed, planted as seedlings, and naturally regenerating in partially-cut stands

with variable densities of overstory pine retention. In addition to providing extensive information regarding spruce growth under varying densities of overstory canopy, as the pine canopy is killed by the mountain pine beetle (MPB), these sites will reveal how spruce respond to the loss of overhead canopy. We have also conducted a study assessing natural regeneration and existing secondary structure under MPB attacked stands and juvenile growth and allometry under varying light conditions. In addition to field studies used to parameterize SORTIE, I am currently involved with a project evaluating and validating SORTIE-ND for predicting timber supply.

### **Ecosystem Recovery**

Ecosystem recovery work was initiated in coastal forests to address a need to understand how quickly disturbed forests recover the rich biodiversity and structural diversity found in old-growth forests. This was largely driven by the implementation of Ecosystem-based Management. Since I've been working with the ecology program, the ecosystem recovery work has been expanded to other ecosystems including the SBS between Smithers and Fort St. James and the ICH in the Kispiox area. The studies examine various aspects of terrestrial vegetation, epiphytic lichen and moss communities, stand structure, soil characteristics including soil faunal communities, snags and coarse woody debris, along with growth and yield parameters in the second-growth stands.

This research provides detailed information on the ecological characteristics contained in second-growth and old-growth stands. The results of the ecosystem recovery projects enable land managers to more precisely consider the ecological and habitat contributions of second-growth stands. The studies have revealed that second-growth stands do harbour considerable diversity and make substantial recovery towards old-growth levels of diversity within 100 years. Full recovery, however, takes much longer, and thus forest rotation ages of 100 years are unlikely to sustain on the landscape the degree of diversity contained in old-growth forests. In addition, although levels of diversity are high in some second-growth stands the communities differ.

### **Stocking Standards and Species Selection**

Currently we manage species at the stand level with limited landscape planning frameworks for species selection. We also manage to averages at the stand level; averages that vary little across the landscape. This results in most plantations being managed towards similar target stand conditions. Given the changing climate, the variety of current forest health outbreaks, and the increasing uncertainty of the future environment, the importance of managing for resilient forests through complexity is becoming increasingly apparent. A key step toward a shift in management is to adjust our stocking standards and species selection guidelines to enable landscape level management of species and stand density. We are currently undertaking a pilot project as part of the provincial Tree Species Selection Project, Landscape Level Species Strategy. The goal of this strategy is to ensure that BC's future forests provide a diversity of well-adapted, healthy, resilient stands across the landscape that will fulfill the needs of future generations. This includes increasing the diversity of species, species mixes, and stand densities at both the stand and landscape levels. The purpose of the pilot project is to develop a procedure to establish landscape-level tree species distribution guidelines and to provide draft landscape-level tree species selection targets for a portion of the Kispiox TSA. The first step in this process is an assessment of the current natural and second growth stand seral stage composition of the landscape (young, mature, and old-growth stand species composition).

## Extension

- SORTIE-ND modelling for a variety of clients to answer management and research questions.
- Assisted instructing at the Bulkley Valley Research Centre SORTIE-ND Workshop
- Walk in the Woods tour for elementary students and Natural Resource Management Camp for high school students.

## Recent Publications and Extension Products

Heemskerk, B., **E. Hall**, A. Banner, P. LePage, K. McKeown, and K. White. 2007. Ecosystem Recovery: How have forests of the north-western Interior Cedar Hemlock zone responded to past disturbances? for: BC's Inland Rainforest – Conservation and Community; Conference held at UNBC, May, 2008. (PowerPoint presentation and abstract)

Banner, A., P. LePage, B. Heemskerk, K. McKeown, K. White, and **E. Hall**. 2007. Ecosystem Recovery -What is it and how long does it really take? for: Complex Stands Research and Management Conference; BV Research Centre conference held in Smithers. (poster presentation)

Astrup, R., K.D. Coates, **E. Hall**. 2008. Recruitment limitation in forests: Lessons from an unprecedented mountain pine beetle epidemic. *Forest Ecology and Management*, 256: 1743-1750.

Astrup, R., K. D. Coates and **E. Hall**. 2008. Finding the appropriate level of complexity for a simulation model: An example with a forest growth model. *Forest Ecology and Management*. 256: 1659-1665.

**Hall, E.** 2007. SORTIE-ND workshop: running basic simulations. For: Complex Stands Research and Management Conference and SORTIE-ND Workshop; BV Research Centre conference held in Smithers. (powerpoint presentation)