

Hydrology

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John's interests lie in the interdisciplinary application of hydrology and biology to forest management and fish-forestry interaction. His research activities have focussed on small stream riparian zones and their effective management, fine sediment transport and storage, as well as the implications of the mountain pine beetle infestation on site hydrology and riparian zone conditions.



2008 Projects

1) The mountain pine beetle infestation and small stream ecology: riparian zones water quality, and fish habitat implications (CFS Project 7.28)

This project investigates the influence of the mountain pine beetle (MPB) infestation and salvage harvesting on small streams, their riparian zones, and their air and water temperature (Vanderhoof Forest District). It targets small streams (<2m bankfull width) because they are the most prominent stream type within a watershed and they influence many ecological characteristics of larger downstream channel segments. Little to state now other than data analysis is currently underway. Many thanks go to Phillip Krauskopf, Warren Grafton, Irene Hart, and Johanna Wick for all their efforts on this project. Project collaborators include Dave Maloney and Peter Tschaplinski.

2) The Bowron River Watershed: A landscape level assessment of the post beetle change in riparian function (CFS Project 7.03)

Streams and riparian areas in the Bowron River watershed were assessed to determine their functioning condition using a routine riparian evaluation protocol (FREP) 25-30 years after large-scale salvage harvesting. Findings indicate that a regeneration time of ~30 yrs was largely insufficient for riparian vegetation recovery. Increased retention around small streams is recommended. Many thanks go to Lisa Nordin and Phillip Krauskopf for their monumental efforts to complete this work. The project leader was Dave Maloney and collaborators included Peter Tschaplinski and Dan Hogan. For more detail see SharePoint site for link to project website and publications.

3) The Prince George Small Streams Project

This is a long-term interdisciplinary project to assess the effectiveness of the Prince George District Manager's Policy to maintain small stream and riparian zone function (< 1.5m bank-full width) following harvesting. This project identified that small stream riparian retention should be focussed within 10m of the stream. It also improved our knowledge about the natural ecological functions of small streams in the central interior forests of BC. Collaborators include Dave Maloney, Erland Maclsaac (DFO), and Pierre Beaudry (Pierre Beaudry & Associates). For more detail see SharePoint site for link to project website, the small streams course, and publications.

4) Hydrologic Effects of Mountain Pine Beetle Infestation and Salvage Harvesting Operations (CFS Project 8.26)

Forestry stakeholders in the Vanderhoof Forest District have reported an increase in ground water storage. They report a replacement of summer ground (dry firm soil) with winter ground (wetter less firm soil) upon which forestry equipment operation is difficult or impossible before freeze-up. This project was developed to identify a set of risk indicators to predict the risk of summer ground loss at the watershed level within the Vanderhoof Forest District and others. Many thanks go to Phillip Krauskopf, Maria Saraiva, Amy Barnes, and Megan Campbell for their efforts on this project. Co-investigator was Stephane Dube.

5) Marine derived nutrient cycling in Pacific salmon streams through flocculation

This is John's Ph.D. work at the University of Northern British Columbia which looks at the interaction of spawning salmon, their post-spawning carcasses and cohesive sediment delivery of salmon derived nutrients to the streambed through flocculation and advective flow. The project verified that flocs play a role in delivering the salmon derived nutrients necessary to sustain Pacific salmon and their natal watersheds.

Recent & Pending PG Hydrology Group Publications:

Rex, J. F. and E. L. Petticrew. 2008. Delivery of marine-derived nutrients to streambeds by Pacific salmon. *Nature Geoscience* **1**(12):840:843.

Nordin, L. J., **J. F. Rex**, D.A. Maloney and P. J. Tschaplinski. 2008. Standardized Approaches in Effectiveness Monitoring Programs and Regional Relevance: Lessons from the Bowron River Watershed Riparian Evaluation Project. *Can. J. For. Res.* **38**: 3130-3150.

Nordin, L. J. The Bowron River watershed: A synoptic assessment of stream and riparian condition 20-30 years after logging. B.C. Min. For. Range, Res. Br., Victoria, BC, Extension Note 86.

Winkler, R, **J. Rex**, P. Teti, D. Maloney, and T. Redding. Mountain Pine Beetle, Forest Practices, and Watershed Management. B.C. Min. For. Range, Res. Br., Victoria, BC, Extension Note 88.

Rex, J. F. and D. A. Maloney. *In Process* The Prince George Small Streams Project: A 5-Year Synthesis Report, B.C. Min For. Range. Res. Br., Victoria, B.C. Special Report Series

Rex, J. F., D. A. Maloney, and P. Krauskopf. *In Process*. Variable-retention riparian harvesting effects on riparian air and water temperature of headwater streams in the interior of British Columbia. *Pending Submission to Canadian Journal of Forest Research*