

# Climatology

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## 2008 Projects:

### **Radiation balance change in Mountain Pine Beetle affected stands (DVA, DMK, DPG)**

Changes to the canopies of mountain pine beetle (MPB) attacked forests are likely to affect snow melt and summer evaporation due to the changes in the amount of solar and longwave radiation below the canopies. This will also affect the light available for natural regeneration under the dead stands. Measurements in MPB attacked stands using hemispherical photography can determine the radiation transmissivity and view factors of forest canopies and the impacts to stand hydrology and natural regeneration. Collaborators: Dave Spittlehouse and UBC.

### **Permafrost and rock temperature monitoring (DFN, DPC, DSS)**

As pressures on timber supply increase in the wake of the post MPB-fall-down, boreal regions may become more important for timber extraction. Yet some of our boreal forests are experiencing accelerated landsliding. Some of this relates to permafrost degradation. A monitoring project has been established collecting information about low and high elevation permafrost locations, climate conditions, air, soil, and rock temperatures, and snow depth. In northern mountains, deteriorating permafrost has already caused slope instabilities, resulting in landslides. Thawing permafrost may as well be creating large land slumps in northeastern BC. The unusual melting of winter roads that is hampering vehicle access to northern areas can also be traced to reductions in permafrost. Tracking permafrost changes is a first step towards anticipating and preparing for these events. Collaborators: Marten Geertsema, University of Ottawa, and University of Zurich.

### **Microclimate conditions and pine foliar diseases (DPG, DVA, DND)**

Forest health assessments by MFR Northern Interior Region staff are monitoring levels of pine foliar diseases. Microclimate monitoring, including temperature, relative humidity, pressure, wind speed, wind direction, rainfall, solar radiation, and leaf wetness, has been established in sites where these diseases are being studied. The goal of the research is to increase our knowledge of the type of microclimate conditions that affect disease levels and potentially develop climate thresholds of disease severity. Collaborators: Richard Reich, Deanna Danskin.

## Climate trends in NIFR

During the period 1886-2006, the Northern Interior Forests Region has experienced an increase in annual precipitation of 5.4%, mean annual temperature of 1.0°C, extreme maximum temperature of 0.4°C, and extreme minimum temperature of 2.5°C. Climate trends analysis using information from Environment Canada weather stations has been conducted in northern BC, breaking it down into 15 macro-climate regions. Overall, the north is experiencing increasing temperatures, dominated by minimum and winter temperature increases; and increasing precipitation, dominated in the summer. Exceptions are decreasing winter precipitation and decreasing spring maximum temperatures. This baseline information is important to climate change and forestry impact studies.

## Climate Change and Watershed Hydrology

The climate of British Columbia is changing, and with these changes come many adjustments in watershed hydrology and ultimately in our use of water-related resources. For example, declining snowpacks are a concern because they affect many aspects of water resources, from instream flows for fish to community water supplies to soil moisture, groundwater, and aquifer recharge. Because British Columbia is hydrologically diverse, the local responses to the anticipated changes in precipitation and temperature will differ. The following publications address what might happen in the future by summarizing historical temperature and precipitation trends and future climate scenarios for British Columbia (Part I), and discussing eight broad hydrologic implications of climate change in British Columbia (Part II). Extension note 87 is a summary of Parts I and II.

## Recent Publications

- Pike, R.G., D.L. Spittlehouse, K.E. Bennett, **V.N. Egginton**, P.J. Tschaplinski, T.Q. Murdock, and A.T. Werner. 2008a. Climate Change and Watershed Hydrology: Part I – Recent and Projected Changes in British Columbia. Streamline 11(2): 1-8.
- Pike, R.G., D.L. Spittlehouse, K.E. Bennett, **V.N. Egginton**, P.J. Tschaplinski, T.Q. Murdock, and A.T. Werner. 2008b. Climate Change and Watershed Hydrology: Part II – Hydrologic Implications for British Columbia. Streamline 11(2): 8-35.
- Pike, R.G., D.L. Spittlehouse, K.E. Bennett, **V.N. Egginton**, P.J. Tschaplinski, T.Q. Murdock, and A.T. Werner. 2008c. A Summary of Climate Change Effects on Watershed Hydrology. B.C. Min. For. Range, Res. Br., Victoria, BC, Extension Note 87.