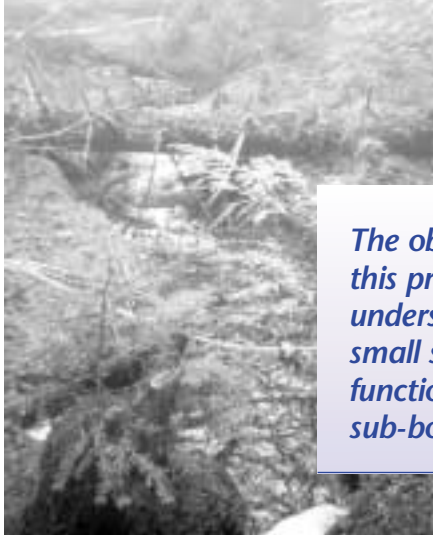


Research

# Riparian function and management of small streams



*The objectives of this project are to understand natural small stream (S4) functions in sub-boreal forests.*

**Dave Maloney and Leisbet Beaudry**

A multi-agency Riparian Study Team in the Prince George Forest District is assessing the District Manager’s policy (PGFD-DM) for “Maintaining the Biological and Physical Attributes of S4, Small Fish-bearing Streams.” The team will determine whether those who harvest under this policy have maintained critical ecological attributes for healthy fish habitat.

The goals of this Small Stream Riparian Study are to:

- > increase understanding of natural functions of small streams in different sub-boreal forest types;
- > identify specific knowledge gaps in the management of small streams;
- > identify critical components that maintain stream productivity and protect other stream values in

small streams and adjacent riparian areas in sub-boreal forests;

- > identify key indicators of sustainable riparian forest management;
- > assess current riparian management practices at study sites harvested under the minimum PGFD-DM small stream policy (effective 2001);
- > assess new best management practices by using innovative prescriptions on streams the team will monitor; and
- > compare different riparian management practices and their effects on aquatic ecosystems.

The Riparian Study Team members are: Dave Maloney from the Ministry of Forests, Regional

Research; Leisbet and Pierre Beaudry from P. Beaudry and Associates Ltd.; Erland MacIsaac, Herb Herunter, and Lianne Germaine from Department of

Fisheries and Oceans, Science Branch; and Canadian Forest Products Ltd.

Using an active adaptive management approach, the team can learn from its actions, improve management, and accommodate change. This approach allows the team to adjust objectives and actions to reflect new information and to achieve desired outcomes. Initially, the team will establish an understanding of natural small stream functions in sub-boreal forests. It will then look at changes in the natural stream functions caused by various forest harvesting practices in the riparian area.

In his recent comments on the Small Stream Riparian Study, Pierre Beaudry suggests that the team’s approach “will improve our understanding of the important roles, processes, and attributes of small streams in a watershed context, aid in the development of riparian and stream indicators for sustainable forest management, and adaptively test alternative riparian management strategies.”

The Riparian Study Team has selected a variety of study streams located in

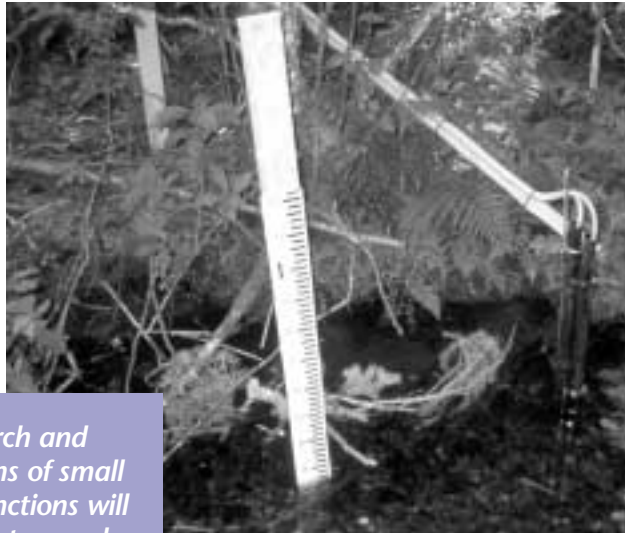


geographically distinct forest types. The initial objectives are to quantify the natural temporal, geographic, and spatial characteristics of these streams, and to compare variations in their vegetation, local climate, and terrain. The team has based its experimental design on a model that Schwarz (1998) describes as Before-after-control-impact paired design (BACI-P). This design has at least two types of sampling (before and after impact) in both treatment and control areas. For each stream (both treatment and control), the team members will measure the following biological and environmental variables over space and time:

- > water temperatures and discharge
- > channel morphometrics
- > substrate composition
- > erosion sources
- > litterfall, shade, and solar radiation exposure
- > benthic invertebrates
- > periphyton biomass
- > nutrients and water chemistry
- > fish population surveys
- > woody debris
- > downstream export of nutrients and organic material
- > downstream invertebrate drift

The team members have already collected measurements for the two years prior to harvest. This has helped them to capture and understand the natural variations in stream function. This winter (2003), harvest will occur at two of the sites, and the team will take measurements at the streams after harvesting in the cutblocks is complete. Further harvesting will occur next winter, and adaptive management will allow the team to suggest refinements following this year's measurements.

In 2001, the Riparian Study Team refined methods to monitor natural stream functions and established paired plots in several locations to collect baseline data. Three sites are currently the focus of intensive



*The research and descriptions of small stream functions will assist foresters and riparian managers to refine harvesting practices.*

ecosystem monitoring: 1) Bowron-SBSvk, 2) Tagai-SBSdw2, and 3) Chuchinka-SBSwk1.

These sites will be harvested to the minimum standards in the Prince George Forest District, District Manager Policy. The intent of this prescription is to determine if the minimum standards are sufficient to protect critical small stream functions. Canfor Ltd. foresters harvested the Bowron site in January 2003. The company's personnel at Tagai are laying out the site this winter and have scheduled the area for harvest in winter 2003-2004. They have already laid out the Chuchinka site and Canfor plans to harvest there in 2003.

The next phase of the project is to identify additional study sites within Canfor's operating area. Once the assessment team has collected pre-harvest data on additional streams, they will use these to test innovative riparian management practices based on knowledge gained from the first sites. Canfor Ltd. will control the prescriptions and layout of these "research blocks" in an effort to

provide optimal conditions for the experimental designs.

As part of their efforts to increase our understanding of the critical components of small-stream ecology in sub-boreal forests, this Prince George District Riparian Study Team will describe and quantify natural small-stream functions as fully as possible. Members will then disseminate project results to operational foresters and practitioners in several ways. They plan, for example, to produce operational summaries and scientific reports, and to organize field

workshops. Extending information in these ways will assist foresters and riparian managers to refine their harvesting practices, thereby protecting critical small stream functions. ~

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**Reference**

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