

Legacy Forest Visions

A newsletter on the science and sustainable management of all forest values

LINKING NUTRIENT-BASED AQUATIC ECOLOGY AND BIODIVERSITY IN SMALL STREAMS AND STANDING WATER BODIES WITH INTENSIVE FOREST MANAGEMENT

Harvesting activities in the watersheds of northern lakes and rivers can impact aquatic ecosystems, drinking water supplies and recreation opportunities, yet few studies have looked at how boreal surface waters respond to logging or other terrestrial disturbances. Our study examines long-term (five years or more) impacts of timber harvesting on stream water quality and biodiversity in the Dog River-Matawin Forest (D-M Forest). As part of The Legacy Forest, our project will contribute, along with other studies on soil nutrient dynamics, terrestrial vertebrate responses, land use conflicts and recreational planning, towards a scientific foundation for refining boreal forest management policy.

During June-October 2003, we searched for five watersheds (two to be harvested, three as reference) suitable for this empirical study. Headwater streams with small watersheds (<10 km²) can be more easily subjected to intensive harvesting (removal of >50% of forest cover

by area) and should show significant response to disturbance within 1-2 years. Potential streams in the D-M Forest were first located on topographic and GIS-generated maps, then visited either by ground or by air. We needed stream sites with well-defined channels, sand/cobble/boulder substrate and a narrow riparian zone (< 20 m wide), all within 100 m of good road access.

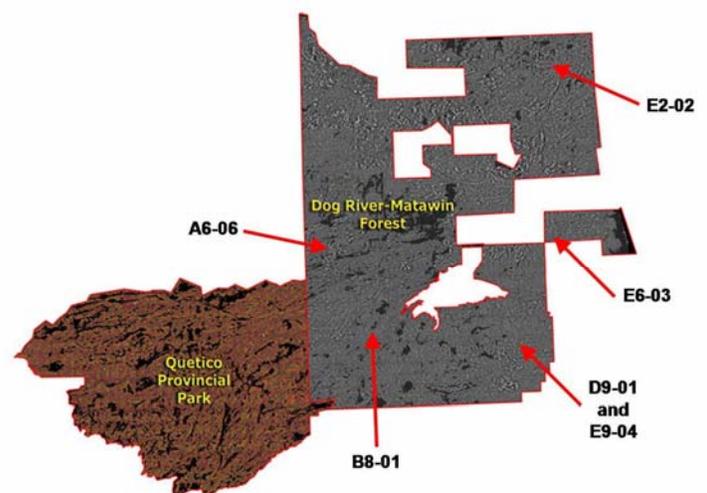
Over 120 streams were ground-truthed in the D-M Forest from June to October 2003. We settled on six streams (five study streams and one alternate; Fig. 1) that met all or most of our criteria:

- The streams D9-01 and E9-04 are tributaries of Sackville Creek and are especially attractive for a harvest/reference comparison, since they are adjacent to each other and thus should have similar bedrock, soils, vegetation cover, precipitation, etc. The watersheds of D9-01 and E9-04 are 12.2 and 1.6 km², respectively, and channel flow within D9-01 was roughly ten times the volume

of E9-04.

- The watershed of B8-01 has experienced harvesting as recently as winter 2002/2003, but the total area disturbed is relatively small (~15%) and there is fair to good road access for our proposed flow control installation site.
- The watershed of A6-06 is relatively undisturbed (<10% by area) and our proposed site flows over a small nub of exposed bedrock, which will be useful as a stable base for a flow control structure. However, the site is remote and the present trail access will either have to be improved, or an alternative access of ~100 m extended from another trail nearby.

Fig. 1. Approximate locations of the six proposed study streams within the Dog River-Matawin Forest, northwestern Ontario.



- Stream E6-03 was ranked fifth on our list because it has the largest proportion of existing disturbance in its watershed (~30%) and the ground access route, via logging trails in a cut-block in the northern portion of the watershed, is circuitous and overgrown in places. On the positive side, the southern slopes of the stream channel are relatively steep with mature stands of trembling aspen and white spruce.

- Finally, stream E2-02 has relatively low harvest disturbance but it appeared from our ground visits that much of the channel is dominated by marshlands and beaver activity, and it is located the farthest from our analysis facilities at Lakehead University.

Our main priority for this winter (2003-2004) is to complete the construction and installation of five V-notch weir structures. Our design specifications include a projected "life expectancy" of 20 years and the capacity to carry flow from a storm event of a ten-year return period. Installation of the five flow structures will proceed in January and continue until the end of March 2004. We have applied to the OMNR and DFO for the necessary stream-work permits, which at present are pending approvals. Our study sites will be fully instrumented and ready to begin monitoring the spring runoff event expected in April 2004.

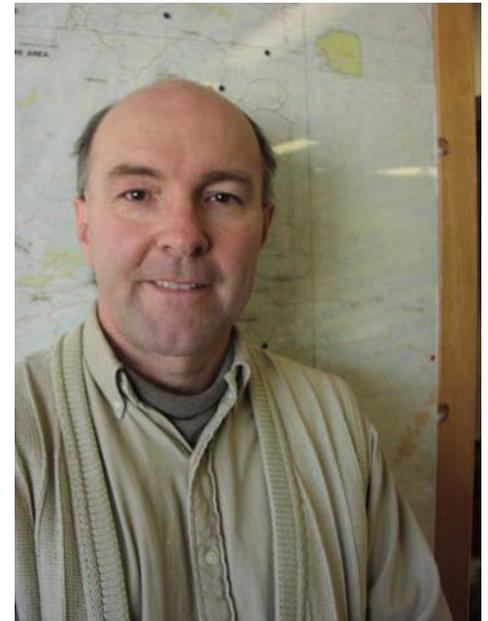
In 2004, our group will look into developing a consortium of similar experimental stream projects, such as FORWARD, the Experimental Lakes Area, and the Turkey Lakes Experimental Area in Canada, Hubbard Brook (NH), and projects in northern Minnesota, to compare results and to co-operate in securing long-term funding from the forest industry and government agencies. The ELA and Turkey Lakes projects in particular are valuable sources of long-term data and expertise on surface waters on the Boreal Shield of northwestern Ontario. Also, researchers from l'Université de Montréal are considering working with us to monitor aquatic bioindicator (i.e., invertebrates, attached algae) responses to intensive silviculture.

We would like to thank The Living Legacy Trust, NSERC, CFI, CRC, Lakehead University, Bowater Forest Products Division, Fisheries and Oceans Canada, and Ontario Ministry of Natural Resources for financial and in-kind support.

Ellie Prepas, Canada Research Chair in Sustainable Water Management, Faculty of Forestry and the Forest Environment, Lakehead University.



PRESENTING...



Robin Reilly, Quetico Provincial Park Superintendent.

Robin has been with Quetico Park for three years. Prior to that he worked with Parks in the Northwest Territories and with National Parks.

He has a Master's Degree in Planning, in Landscape Architecture and in Administration. He is keen on cross-country skiing and paddling. Robin is married and has two children and three dogs.

Robin would like to see Quetico Park used for environmental research that would improve the management of the park and the surrounding lands.

GROWTH INTERCEPT METHODS FOR JACK PINE

The Legacy Forest now has a growth and yield component initiated by Dr. Jian Wang, Associate Professor of the Faculty of Forestry and the Forest Environment at Lakehead University. The project is entitled, "Growth intercept model for jack pine plantations in central Ontario."

Jack pine is the most widely distributed pine in Canada and is an economically important species in Ontario. The serotinous cones of jack pine ensure rapid regeneration following wildfire and fully stocked, even-aged stands are particularly common for frequently burned areas such as glaciofluvial sands and shallow to bedrock soils.

Jack pine occupies approximately 14.9% of Ontario's boreal forest area, second only to spruce. The volume of managed jack pine forests in Ontario is estimated at 600 million m³. Annual harvests of jack pine reach nearly 6 million cubic m³ in 1998/1999. Jack pine has also been planted extensively throughout north central Ontario. In 1999/2000, the annual jack pine planting program consisted of 92,956 hectares.

Information on the growth of these young jack pine plantations, in relation to site condition, is limited. The result is a lack of information on site quality and yield predictions for these plantations. This lack of site quality estimation tools

make it difficult to compare the growth and yield of jack pine plantations with other species or just with naturally originated jack pine stands.

To bridge this gap in growth and yield data set, Dr. Wang plans to accomplish the following:

- Develop a set of growth intercept models for mature naturally regenerated jack pine stands using existing data from north central Ontario;
- Validate whether the growth intercept (GI) model developed from naturally regenerated mature jack pine stands can predict growth intercept rates for young (younger than 40 years) jack pine plantations; and,



- If required, develop a field program to acquire stem analysis data on jack pine plantations to develop a growth intercept model. If the growth intercept models developed from existing site index data sets for natural jack pine stands can be used to accurately predict height growth of young jack pine plantations, we can rely on these GI models. Otherwise, more stem analysis data will have to be collected from young jack pine plantations to develop new, more suitable GI models and tables.

GI models for jack pine are required for growth and yield

predictions and management planning in the province. The desire to carry out more intensive silviculture also requires more information on site productivity of the planting area in order to make sound investment decisions. GI models and tables are very useful management and decision-making tools. With the right growth information on young plantations we can assign a proper site index to each plantation on a management unit.

Dr. Wang feels this will probably have an immediate positive effect on wood supply, as site productivity classes are currently assigned based on the past natural forest stand conditions. It cannot be assumed that height growth of plantations follows the same pattern of naturally regenerated forest stands. Experience from British Columbia has shown that on the west coast, Douglas-fir plantations have higher site index compared to the original, natural (or old growth) forest stands. The information has already had a significant impact on the calculation of the annual allowable cut (AAC) in British Columbia.

The first deliverable products will be growth intercept models and tables developed based on existing stem analysis data from natural, mature jack pine stands. In an interim report, the process and results will be summarized for the OMNR and industry experts to review.

- Genevieve Wiens

EVENTS

Meeting with Bird Studies Canada - October 9, 2003

Ulf Runesson met with Dr. Ryan Zimmerling, Bird Studies Canada. Dr. Zimmerling presented data from his study: *Evaluating the impact of forestry on bird communities in northern Ontario: towards an adaptive management program*. The data will be entered into the warehouse.

Legacy Forest Presentation October 23, 2003

Genevieve Wiens gave a presentation on "What is the Legacy Forest" for the Faculty of Forestry and the Forest Environment's Forestry Seminar Series. The presentation was well attended by Faculty members, students and other members of the University community.

FedNor Presentation November 3, 2003

Representatives from FedNor's Thunder Bay office met with the Faculty of Forestry and the Forest Environment to discuss possible projects eligible for funding. Wiens gave a presentation outlining a project to locate and develop the traditional canoe routes that exist on the Dog River-Matawin Forest.

On December 10th, Wiens traveled to Atikokan to meet with Atikokan's mayor, Atikokan Economic Development Corporation reps, Fran Duke from FedNor, Paul Pepe from the Ministry of Northern Development and Mines, and members of Lac Des Milles Lac and Seine

River First Nations. Parties interested in moving forward with the project formed a committee to write a proposal and apply for funding.

Modeling Workshop Planning Committee Meeting November 7, 2003

To maximize Ontario Ministry of Natural Resources attendance, the Planning Committee decided to postpone the workshop until next fiscal year. The workshop will be held in the new Advanced Technology and Academic Centre building at Lakehead University from May 3 - 5, 2004. A draft agenda will be available in early January, 2004. For more information, contact Genevieve Wiens at 343-8585 or genevieve.wiens@lakeheadu.ca

Steering Committee Meeting November 17, 2003

The Legacy Forest Steering Committee met on November 17, 2003. The committee received updates concerning future funding, the metadata warehouse and Dr. Prepas' water study.

Ivey Foundation Teleconference - November 24, 2003

Although our proposal was not accepted by the Richard Ivey Foundation, they invited the Legacy Forest to reapply in February, 2004. Burkhard Mausberg, Program Manager, requested a teleconference to get a better understanding of our ideas and the type of work we would accomplish with a grant. Reino Pulkki, Ulf Runesson, Kevin Crowe, Jim Faught, Robin Reilly, and Genevieve Wiens

participated in the teleconference, outlining future direction for the Legacy Forest. Wiens will continue the dialogue with the Ivey Foundation and submit a letter of intent in February.

Dog River-Matawin Forest Management Plan Information Centre - December 3 - 4, 2003

The Dog River-Matawin Forest Management Plan Information Centre was held in Thunder Bay on December 3, 2003 at the Airline Travelodge Hotel. On December 4, 2003, a second Open House was held at the Upsala Community Centre.

The Legacy Forest participated in the Information Centre. A display was presented outlining the mission and vision of the Legacy Forest and the research projects it supports. Genevieve Wiens attended both Information Centres and answered many probing questions concerning the Legacy Forest. Clearly, the public is very interested in our research project and the future of intensive forest management in northwestern Ontario.



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