



Masters student continues wetland reclamation research near Peace River

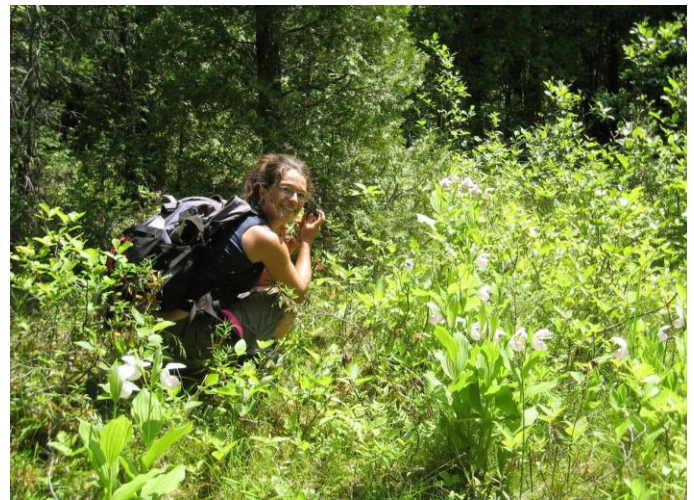
This past summer, a Masters student from Quebec has been adding her dedication and skills to the *novanaIT* Boreal Research Institute's reclamation program.

Part of a NAIT partnership with the University of Laval, Marie-Eve Gauthier is seeking answers to some core questions on the restoration of peatland and fen on abandoned well sites. She is working under the supervision of Dr. Leonie Nadeau, senior faculty researcher with NAIT, and Dr. Line Rochefort, professor, University of Laval.

The Boreal Reclamation Program was launched in 2008 by the *novanaIT* Boreal Research Institute to develop an applied research platform for reclaiming forested lands disturbed by such activities as well sites, access roads, pipelines and borrow pits. The research is centered at Shell's in-situ Peace River complex, about 50 kilometres northeast of the town of Peace River.

While there is a strong upland component to the research, the basis of the wetland component is a harvested peatland restoration protocol, developed by Laval. Much of the Boreal Reclamation Program wetland research is on fen, and the focus of the restoration plan is to promote the right ecological conditions for returning the area to a fen ecosystem.

The protocol calls for spreading harvested sphagnum moss onto an organic base, protecting the harvested propagules with a layer of straw, and a reduction of drainage for water retention. Dr. Nadeau and Ms. Gauthier have been studying such parameters as the type of material for spreading and whether an organic base is necessary.



Marie-Eve Gauthier at a wetland location near St-Simon, Quebec

Data collection, such as measuring richness and abundance of species in each treatment will be a major activity at the research site.

Their work will play an important role in developing cost-effective methods for restoring peatlands on in-situ well sites in Alberta's boreal forest.

Addressing gaps in re-vegetating well sites in peatland ecosystems

While there is a growing body of applied knowledge for restoring oil sands' peatlands, these processes are unique in terms of total hectares, soil salinity and extent of disturbance.



Marie Eve studying a bog on the south shore of the St. Lawrence.

The restoration of in-situ well sites on boreal wetlands is still in its infancy in Alberta. The Boreal Reclamation Program is designed to address that gap.

There are some serious challenges. While well pad construction can be done in several ways, most often it involves excavating up to 40 cm of peat and replacing it with layers of fill from an upland area. These layers are compacted, and a mineral soil cap is added. Where peat deposits are deep, no peat is removed. A drainage composite is laid directly onto the peat surface, followed by a geo-textile material. A cap is then placed in compacted layers on the geo-textile material, graded and covered with gravel.

Alberta Government and Cumulative Environmental Management Association see the critical importance of reclamation and restoration of wetlands. Both industry and government recognize the function of wetlands in filtering, distributing and retaining water to the surrounding areas, and the complex interaction of climate, hydrology, geology and ecology.

Leaving man-made structure in peatlands has a major impact on the hydrology of the area and reduces wetlands' ability to store carbon.

A core aim of the Boreal Reclamation Program is to mobilize research partnerships and to engage post graduate and NAIT students in their career path.

The basis for the peatland component of the *novaNAIT* Boreal Research Institute's boreal reclamation program is a harvested peatland restoration protocol, developed by Université Laval.

Much of the Boreal Reclamation Program's wetland research is on fen, and the focus of the restoration plan is to promote the right ecological conditions for returning the area to a fen ecosystem.

Over her two summers of work, 2010 and 2011, Ms. Gauthier will be relying on the data for her Master's thesis. Line Rochefort, a specialist in peatland restoration, has had a focus in Alberta on oil sands mining.

The partnership between Laval and NAIT is a two way benefit. The *novaNAIT* Boreal Research Institute will gain a world class peatland specialist and an MSc. student, while Laval gains another Alberta partnership for in-situ peatland restoration.

The use of LiDAR for sustainable forest management in Alberta

Seminar held May 13 at Northern Alberta Forestry and Construction Show

LiDAR first came to the attention of forest managers in Alberta about a decade ago, and since then has developed into a cost-effective land management tool. LiDAR (light detection and ranging) is the optical analog of radar, using instead intense pulses of light to scan a landscape and accurately determine height of the ground surface and the 3-dimensional position of objects on it.

Processing this digital information can tell us a great deal about a landscape and the size and structure of the forest growing on it. The very narrow beam width and line width of the laser make it possible to probe the atmosphere with exceptional sensitivity and resolution.

Over the past three years the Alberta government has acquired LiDAR imaging for most of the foothills forests and much of the boreal as well.

Industry is also picking up the benefits of LiDAR, with early adopters, such as Sundre Forest Products, having nearly a decade of experience. Today, nearly every major forestry company has some familiarity with LiDAR, or is using it in some aspect of their operations.

LiDAR availability in Alberta was presented at a workshop, May 13 at the Northern Alberta Forestry and Construction Show in Grande Prairie. Attended by about 85 people from forestry, government and the energy sector, it was hosted by the Alberta Forest Extension (AFEX) network in partnership with NRCAN – Canadian Wood Fibre Centre.

The workshop addressed currently available forest engineering applications of LiDAR, and showed how planning problems can be resolved using government LiDAR data and other datasets. The workshop also demonstrated the benefits of enhanced forest inventory, wet areas mapping and LiDAR for opportunities in sustainable forest management.

Mike Wulder, research scientist with the Pacific Forestry Centre, noted LiDAR potential for enhancing current forest inventories to include estimation of biomass and vegetation heights when used in conjunction with Alberta Vegetation Inventory data.

Brian Sawyer, GIS analyst Alberta Sustainable Resource Development (ASRD), said that the Alberta government plans for amalgamation of LiDAR imaging with existing elevation models. ASRD will likely play a role in establishing provincial data acquisition and analysis standards, he said.

Barry White of Alberta Sustainable Resource Development (ASRD) presented his department's partnership with the University of New Brunswick to carry out Wet Areas Mapping across the 17 million hectares of Alberta's forested landscape. This innovative and cost effective approach is being picked up by industry and government, for accurately predicting the location of small or intermittent water bodies. Its uses range from road planning to ecological classification. Daniel Chicoine of Incremental Forest Technologies showed how his company can reduce silviculture costs significantly with this technology.

Operational experiences with LiDAR included a presentation by Jay Mills of Jeodosy GIS on data processing with LiDAR and some of the newly developed desktop tools.

Doug Pitt, Canadian Wood Fibre Centre, showed how enhancing forest inventory tools can support value chain optimization. This process allows managers to better describe potential products in the forest, in order to respond to market needs. Several promising technologies include using LiDAR to determine stand structure, and multispectral imaging to recognize individual tree crowns.

In his wrap up, Jim Stewart of the Canadian Forest Service remarked on the many different uses for LiDAR and its potential for improving forest management. A key factor in realizing this potential is the sharing of knowledge and experience at workshops like this one, he said.

The LiDAR seminar was co-hosted by the Canadian Forest Service and AFEX, which is a partnership of Woodlands Operations Learning Foundation, novaNAIT Boreal Research Institute and FP Innovations.



Barry White, ASRD, informed participants of a wet areas mapping initiative in Alberta, a partnership between his department and the University of New Brunswick.

PARTNERS

Advanced Education and Technology
 Alberta Employment and Immigration
 Alberta Innovates – Bio Solutions
 Alberta Sustainable Resource Development
 Canadian Forest Products Ltd
 Daishowa-Marubeni International Ltd
 EMEND
 FPInnovations – Forest Operations Division

Manning Forestry Research Fund
 NAIT
 Shell Canada Ltd
 University of Alberta
 Université Laval
 Weberville Regional Model Forest
 Woodland Operations Learning Foundation

novaNAIT Boreal Research Institute
 NAIT Peace River Campus
 Bag 3500
 Peace River, AB T8S 1V90
www.nait.ca/borealresearchinstitute
 Phone: 780.618.2623
 Hugh Seaton, Manager
hseaton@nait.ca