spring 2013

Renew

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UNIVERSITY OF ALBERTA
DEPARTMENT OF
RENEWABLE RESOURCES

Education – it's our passion

A message from the Chair

In the Department of Renewable Resources we take great pride in educating the next generation of natural resource managers and researchers. This spring, we will celebrate the graduation of 74 undergraduate students from our Faculty's Environmental and Conservation Sciences (ENCS) and Forestry programs, along with 13 graduate students.

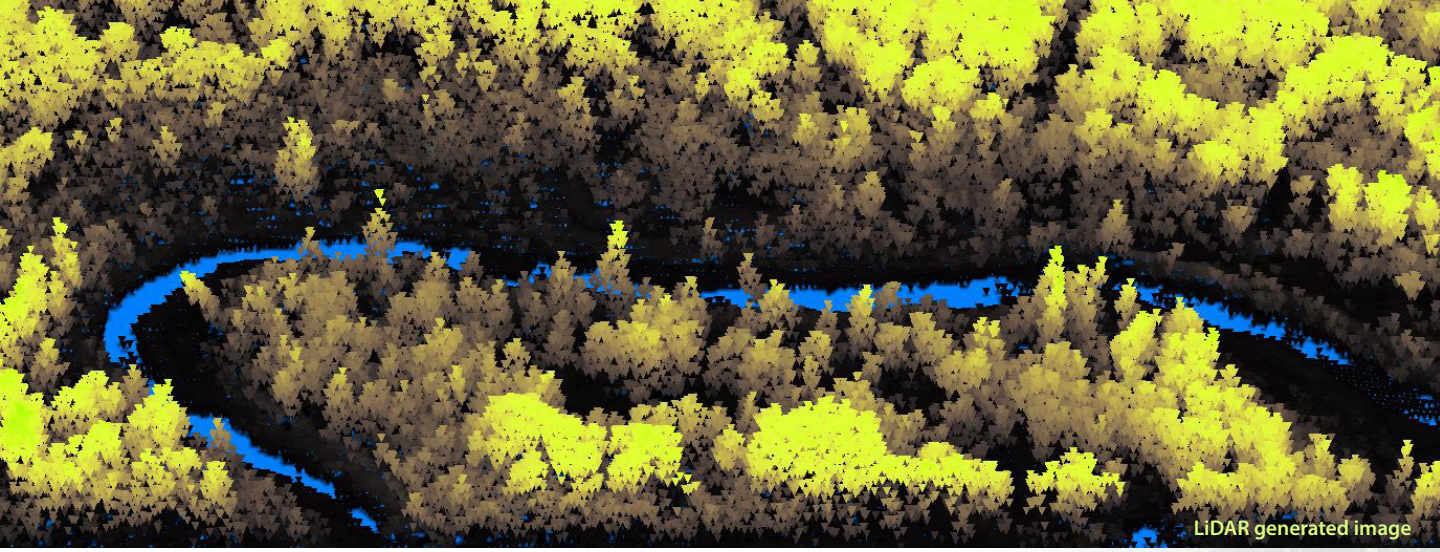
These students have acquired specializations ranging from forestry, to conservation biology, to land reclamation and sustainable agriculture. And while each student may have a different career goal, there is no doubt they are now equipped with a multi-disciplinary education which will help them respond to today's challenges and create tomorrow's opportunities.

It is important that we recognize the achievements of these students. We hope you will soon have a chance to meet some of these talented graduates as they enter the job market and the workforce, quite possibly within your own organizations.

The professors and staff of the Department of Renewable Resources take pride in the success of our students, and the leadership of our alumni.

Congratulations to our Class of 2013.

Victor Lieffers, Chair
Vic.Lieffers@ualberta.ca


LiDAR generated image

Forestry researchers bring high-tech **solutions** to an age old problem

It started out as a hunch. Dr. Mike Bokalo suspected that large discrepancies between forest inventory models and the amount of wood actually harvested could be resolved using LiDAR imagery to detect small but frequent forest gaps – areas where trees were absent, or much smaller than the surrounding forest. Turns out, that is exactly what his data is telling him.

The new technique capitalizes on Alberta's growing repository of hi-resolution LiDAR imagery to detect natural gaps within large tracts of forest. Dr. Phil Comeau, Dr. Mike Bokalo and their team of graduate students then use this information to develop revised model estimates of forest stand volumes. Early results suggest these estimates are more accurate than past modeling efforts.

It's a key discovery for industry and government who are constantly looking for opportunities to capitalize on new, more efficient technologies.

Dr. Barry White, with the Government of Alberta, says this is a clear example of researchers in Renewable Resources being part of the solution with respect to developing planning and inventory tools that capitalize on the extensive LiDAR data available in Alberta.

Comeau and Bokalo are now looking to build on this work by determining why these gaps exist, and how they can use this and other information to model site productivity at a much finer resolution and with more reliability than was possible with older technology. They are grateful to Alberta Environment and Sustainable Resource Development for their support.

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Redesigned MF and MAg graduate **degrees** target **working professionals**

Professionals and recent graduates have a new option to obtain advanced credentials. Our redesigned Master of Forestry (MF) and Master of Agriculture (MAg) degrees are for individuals with a university degree looking for more specialized training in the fields of forestry, agriculture or land reclamation. Flexibility is built into the degrees, enabling individuals to choose from a wide range of courses in forestry, fire science, soil science, land reclamation and conservation biology. A capstone project is also included which allows students to pursue a specific topic of interest in more detail. The program is designed to be completed in 12 months of full-time study. It can also be completed on a part-time basis. To learn more visit www.rr.ualberta.ca/en/GraduateProgram.aspx .

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High pH soils require the right species

Addressing reclamation challenges associated with high pH soils is no simple task, but planting the right species and ensuring enough iron is available appears to be a good start.

Dr. Janusz Zwiazek, and his graduate student Feng Xu, have been investigating the response of a variety of boreal forest plants to pH levels ranging from five (typical boreal forest) up to nine (high pH reclaimed soils). Early results suggest that species such as white spruce, paper birch, and dogwood show a high tolerance to pH and grow better than any of the 12 other species tested, even under the highest pH conditions. Ensuring enough iron is available also enhances the survival of plants at these high pH levels.

Although the work has been based in the lab, the findings provide important insights for dealing with high pH soils often associated with oil sands reclamation. The research was funded by Suncor, Syncrude, CNRL and Shell Canada.

Long-term forestry **experiment** receives **$1.7 million** dollar grant

It's not often that scientific research projects are still going strong after 14 years. But when they are, it demonstrates that the insights being generated remain invaluable to the project partners. It is this recognition that helped the EMEND project (Ecosystem-based Management Emulating Natural Disturbance) secure a 5 year, $1.7 million dollar research grant.

The funding comes as a Collaborative Research and Development Grant from the Natural Sciences and Engineering Research Council of Canada, matching funding from Daishowa-Marubeni International Ltd. and in-kind support from Canadian Forest Products Ltd. The research involves eight academic staff from the Department of Renewable Resources and will support up to 12 graduate research projects exploring topics as diverse as bird community response to variable retention harvesting, to tradeoffs between biodiversity conservation and forest productivity.

The diverse projects share a common thread in evaluating the Canadian Council of Forest Ministers' criteria defining sustainable forest management in Canada. The EMEND partnership involves the University of Alberta, the Canadian Forestry Service, Alberta Environment and Sustainable Resource Development, the Foothills Research Institute and Alberta's forest industry. To learn more about EMEND visit www.emendproject.org.

Practitioners help shape **land reclamation** graduate school

Finding solutions to global land reclamation challenges requires a multidisciplinary mindset and the ability to engage a diversity of stakeholders. That's the message reclamation practitioners conveyed at a recent workshop hosted by the Land Reclamation International Graduate School (LRIGS) at the University of Alberta.

The message was part of a day-long workshop where over 50 participants from government, consulting, industry, First Nations and academia were invited to contribute ideas for LRIGS programs. Participants were tasked with answering four key questions: What are your research needs? What knowledge and skill sets should LRIGS graduates possess? How can LRIGS best work and interact with you? What can you do to help support LRIGS?

Dr. M. Anne Naeth, Director of LRIGS, stated that this was an opportunity "to get practitioners excited about LRIGS, show them this is their school and ask how we can best operate to meet their needs." Michal Guzowski, LRIGS Coordinator, said "There was a clear message from participants that land reclamation is a diverse, eclectic discipline and graduates need to be able to understand the multi-disciplinary realities that practitioners face."

Additional key messages from the workshop are being summarized and will be used as a springboard for future initiatives and direction, keeping in line with the LRIGS commitment to be a school built by, and for, reclamation practitioners.

Currently 22 professors from the Departments of Renewable Resources, Resource Economics and Environmental Sociology, and Biological Sciences are engaged in LRIGS. To learn more visit: www.ualberta.ca/~lrigs.

Conserving the iconic whitebark **pine**

It hasn't been easy for the endangered whitebark pine. White pine blister rust, mountain pine beetles, climate change and fire exclusion are all contributing to its decline. However, Dr. Ellen Macdonald and Dr. Joyce Gould believe that by better understanding conditions which promote whitebark pine regeneration, we can conserve this iconic species.

The whitebark pine is a rather unique species – its cones do not open by themselves and its seed dispersal depends almost exclusively on a single bird species, the Clark's nutcracker. Nutcrackers collect seeds and store them in mature whitebark pine stands, openings within stands and at sites in close proximity to mature stands. Seeds that nutcrackers fail to retrieve contribute to whitebark pine regeneration. Thus, a core goal of the study is to determine which sites best promote whitebark pine regeneration and where trees remain the healthiest.

A second goal of Macdonald and Gould's work is to better understand the role of fire on whitebark pine regeneration. It was traditionally thought that whitebark pine depends on forest fire to eliminate competing vegetation and help seedlings establish successfully. However, recent studies have called this assumption into question and additional work is required to fully understand the importance of fire to the whitebark pine.

The study is taking place in the Willmore Wilderness Area and Jasper National Park – home to the northernmost populations of whitebark pine and some of the healthiest populations in Alberta. The whitebark pine is considered a keystone species as it provides habitat and food for a variety of species, including grizzly bears. Students will be collecting data this summer with conclusions expected in 2014.

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New tool helps foresters evaluate risks in the face of **climate change**

Foresters looking to get a jump on climate change just received a helping hand from research that has developed guidelines for planting trees.

The maps, developed by Dr. Laura Gray – a post-doctoral fellow in the Department of Renewable Resources, provide projections of climatically suitable habitat for 15 tree species based on climate predictions for the 2020s, 2050s and 2080s.

"The information helps forest managers have more confidence in their decisions on what and where to plant. It allows them to more accurately assess the climatic risk," said Gray, who co-authored the study with Dr. Andreas Hamann.

The study addresses concerns that many populations of wide-ranging tree species which are adapted to local growing conditions, may now or in the future actually lag behind their optimal growing environment due to changing temperature and precipitation conditions.

What is staggering about their findings is that many tree populations already lag behind their optimal habitat by approximately 130km in latitude or 60m in elevation. For the 2020's, their models predict that trees will lag behind their optimal climate conditions by up to 310km in latitude and 140m in elevation. To help address these challenges, Gray and Hamann are currently developing tools that match seed sources with appropriate habitat for planting.

The study was funded by the Natural Sciences and Engineering Research Council of Canada, the Alberta Forest Research Institute, and industry partners Alberta-Pacific Forest Industries, Ainsworth Engineered Canada LP, Daishowa-Marubeni International Ltd., Western Boreal Aspen Corporation, and Weyerhaeuser Company Ltd.

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Preparing students to provide solutions

Student Profile: Holly Stover – M.Sc.

For Holly Stover, pursuing a graduate degree in the Department of Renewable Resources taught her to look at challenges from multiple perspectives and helped her become a stronger, more competent leader. It also allowed her to fulfill her curiosity about the ecology of native grasslands.

Stover worked in the foothills fescue grasslands of Waterton Lakes National Park under the supervision of Dr. M. Anne Naeth. Her passion for ecological restoration led her to explore methods to reduce non-native plant species and methods to recolonize native species on recently disturbed sites.

Stover found that the most ecologically effective revegetation method in the foothills fescue grasslands is transplanting native species grown from seed collected in the wild. Her work has contributed to decision support tools which can be used to evaluate techniques for controlling non-native plant species.

Holly is an excellent example of how our graduate research programs are training the next generation of resource managers and researchers. In this way, we are *preparing students to provide solutions*.

Curiosity, passion nets researcher **prestigious** soil science **award**

It's often said we must first seek to understand, then to be understood. It's this philosophy that is at the core of Dr. William Shotyk's approach to science and what has netted him the most prestigious soil science award in the world.

Shotyk's work looks at the impacts of heavy metals on the environment, with a particular emphasis placed on understanding the soil-water interface. But instead of taking a point-in-time look at contaminants in the environment, he focuses on first understanding the natural cycle of these contaminants over time – in some cases looking at the past 15,000 years. He then looks at recent changes in the environment to elucidate the all-important question of "what impact humans are having on the environment."

In addition to this, Shotyk seeks to understand the environment from as many angles as possible. That's why his current projects include petroleum geochemists, medical researchers and conservation biologists, amongst many others. It's all in an effort to understand the environment as comprehensively as possible, before he attempts to decipher the potential impacts of human development.

Shotyk is the University of Alberta inaugural Bocock Chair in Agriculture and the Environment and was recently awarded the Philippe Duchaufour Medal by the Soil System Science Division of the European Geosciences Union. The award is sometimes called the Soil Science Nobel Prize.

He joined the Department of Renewable Resources in 2012 and is excited to be working alongside what he terms "a world class group of soil scientists, foresters, conservation biologists and land reclamation experts".

News and Announcements

> International Boreal Forest Research Association (IBFRA) Conference:
Boreal Forests at Risk: From Boreal Science to Public Policy, October 7-10, 2013.
To register go to: http://tinyurl.com/IBFRA

> New synthesis publication:
A visual guide to handling woody materials for forested land reclamation
By Matthew Pyper and Tim Vinge
This document provides a visual guide to operators wishing to use woody materials in their reclamation programs. To download a copy visit: http://tinyurl.com/CWMVisual

> Save the date: Forest Industry Lecture November 7, 2013:
Dr. Ken Raffa, Professor, Department of Entomology at the University of Wisconsin-Madison will be our next Forest Industry Lecture Series (FILS) Speaker.

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