

spring2014
Renew

in this issue:

- 2** New tool aims to improve wildfire response
- 3** Watershed project earns national award
- 9** Problem grizzly bears cause a fuss in gene pool



UNIVERSITY OF ALBERTA
DEPARTMENT OF
RENEWABLE RESOURCES



Leaders of the future

A message from the Chair


The Department of Renewable Resources is proud of its research and teaching in Conservation Biology, Forestry, Land Reclamation and Agronomy. As another school year comes to an end, we have 84 students completing their studies. We look forward to watching these students make a difference in the world by taking on the leadership roles expected of University of Alberta graduates.

We are focused on growing our programs to train even more leaders of the future. This year will see full implementation of course-based masters programs in Land Reclamation and Forestry. We expect these programs to be of interest to both Canadian and international students, attracting at least 25 students per year into each program. We are working closely with the Alberta Institute of Agrology and the College of Alberta Professional Foresters to develop streams that will allow graduates to qualify for registration into these professions.

I encourage you to explore the following stories that highlight just a portion of the activities going on in our department. I also welcome and invite your feedback about opportunities for partnerships and inquiries into our research and teaching programs.

Victor Lieffers, Chair

Vic.Lieffers@ualberta.ca



Province, Academics collaborate to improve wildfire response

A new project aims to reduce the risks associated with wildfires by understanding triggers that can be used to plan for, and respond to, wildfire events.

The project is called 'Code Red', and its intent is to use cutting-edge science and technologies to improve predictions of when and where wildfires are likely to challenge suppression efforts once established on the landscape. This intelligence will help government managers know when and where to allocate their limited resources to attain the best chance of minimizing the impacts of wildfires.

"This work is about harnessing the best, most up-to-date technologies and information so we can develop accurate, proactive plans" said Cordy Tymstra, Wildfire Science Coordinator with the Government of Alberta.

This targeted Government of Alberta project is being led by Dr. Mike Flannigan, Director for the Western Partnership for Wildland Fire Science, which is housed in the Department of Renewable Resources. To learn more about the partnership, visit: <http://www.ualberta.ca/~wcfws/>



UNIVERSITY OF ALBERTA
DEPARTMENT OF
RENEWABLE RESOURCES



Watershed project earns major national award

The Southern Rockies Watershed Project has captured a prestigious national water stewardship award presented by Canada's 13 premiers.

Dr. Uldis Silins and his team won the Excellence in Water Stewardship Award from the Council of the Federation, for outstanding achievement, innovative practice and leadership in the area of water stewardship. Silins and his research team were honoured for their work that documents the effects of wildfire on hydrology, water quality and stream ecology in the Southern Rockies region of Alberta. This work includes characterizing downstream impacts at larger watershed scales along with implications for drinking water treatment.

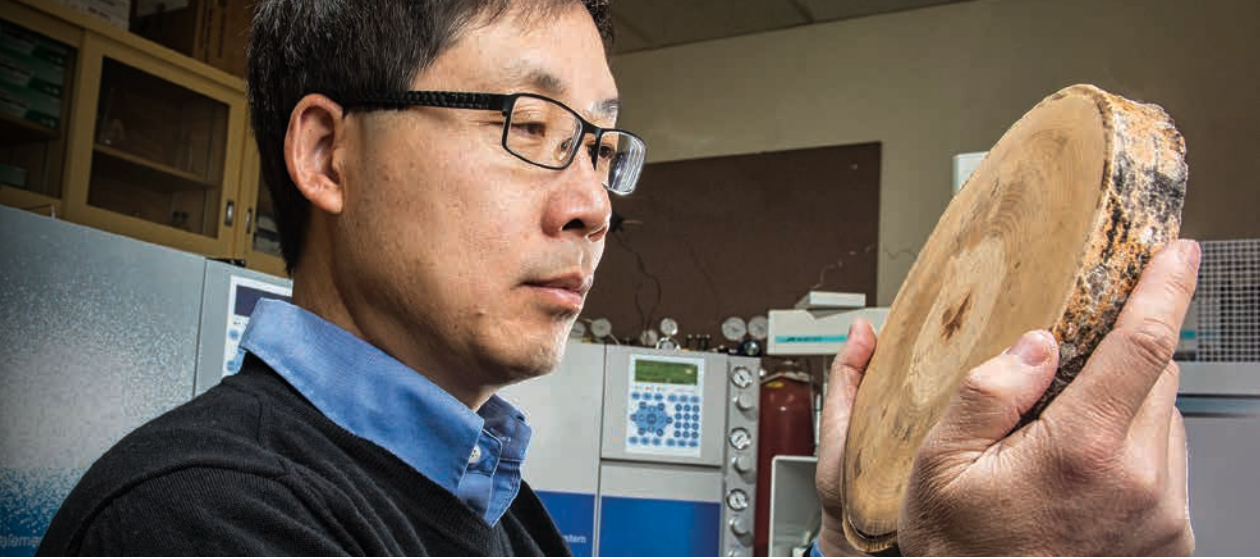
The project is recognized internationally as one of the leading studies of its kind, and has previously been described as "...the first major effort globally to provide a comprehensive assessment of forest disturbance impacts from source to tap".

The project is funded by the Government of Alberta, Alberta Innovates, Canadian Water Network, City of Calgary and other partners.

Students exchange ideas with forest industry

This April, a group of students had the undivided attention of forest industry professionals; and they took full advantage of it. It was all part of a new model of engagement between students and partners that seeks to increase the creativity, innovation and utility of research findings at the EMEND project (Ecosystem-based Management Emulating Natural Disturbances). Over the course of two days, students visited the operations of Daishowa-Marubeni International (DMI) in Peace River and Canfor in Grande Prairie to discuss potential applications of their research findings.

The engagement was part of an NSERC grant to the EMEND project in collaboration with DMI, Canfor and the Government of Alberta. To learn more, visit www.emendproject.org.



Layering in reclaimed soils restricts tree root growth

Layering of different soil materials may limit tree root growth on reclaimed oil sands mines, new research by Dr. Scott Chang suggests.

During oil sands reclamation, tailings sand or fine textured overburden is generally 'capped' with a mix of peat moss or forest floor mineral material. This capping creates soil layering which has been shown to restrict water movement into the deeper tailings sand or overburden layers – creating a barrier for water movement.

Chang's work has shown that this barrier is also having a significant effect on the growth of tree roots, limiting the amount of root biomass near the intersection of these soil layers. This reduction in root biomass may translate into lower growth rates for trees on these sites.

The findings have important implications for the future viability of trees on reclaimed oil sands mines.

"The trees are able to establish and succeed initially, but their tolerance to variation in moisture availability, and their ability to adapt to future climate change may be impacted when tree root growth is restricted by this soil layering" said Chang.

The study was supported by the Helmholtz-Alberta Initiative (HAI) and the Land Reclamation International Graduate School (LRIGS). Additional assistance was provided by CONRAD and Suncor.



UNIVERSITY OF ALBERTA
DEPARTMENT OF
RENEWABLE RESOURCES



LRIGS focuses on reclamation through an Aboriginal lens

Aboriginal perspectives recently took the spotlight when the Land Reclamation International Graduate School (LRIGS) hosted a lively, honest panel discussion on the University of Alberta campus on March 5, 2014. It was an experience that had a major impact.

The panel of four included an Aboriginal elder and three land reclamation practitioners. LRIGS student Jenna Abou Rizk said the panel discussion helped her “develop a greater appreciation for different perspectives” and how these can contribute positively to land reclamation goals and objectives.



Potential employers also saw value in the session. “Experiences like this are important in helping students become well rounded in their thinking and perspectives related to land reclamation” said Dan Kuchmak, a reclamation specialist with TransAlta.

The panel discussion is yet another example of how LRIGS is bringing multi-disciplinary perspectives to all of its trainees, industry, government and members of the general public. To learn more visit www.ualberta.ca/~lrigs/.



UNIVERSITY OF ALBERTA
DEPARTMENT OF
RENEWABLE RESOURCES



Manure additive a possible boost to Ag industry

A unique, new research project is investigating whether a manure additive may be the key to lower greenhouse gas emissions and increased productivity in the agriculture industry.

Dr. Guillermo Hernandez Ramirez is exploring whether nitrification inhibitors – compounds that keep nitrogen in a form accessible to plants – applied to manure from dairy and swine operations can help reduce emissions of a potent greenhouse gas, nitrous oxide. If the inhibitors work, they could reduce the need for additional fertilizer applications as more nitrogen would be available to the plants.

The potential implications are important economically and environmentally as greenhouse gas emissions from nitrous oxide are much more potent than carbon dioxide, with one tonne of nitrous oxide emissions being equivalent to 298 tonnes of carbon dioxide. Thus, if farmers are able to reduce their emissions of nitrous oxide, they will be able to sell emission credits for their efforts. The end result could be good for the pocket book, and the environment.

This project is funded by the Alberta Livestock and Meat Agency (ALMA), the Climate Change and Emissions Management Corporation (CCEMC) and Dow Agro Sciences.



Forestry student honoured with national award

Shayna Mason was three years into a career in the finance industry when she had a decision to make: accept a promotion or go back to school and pursue her passion in forestry. She made the decision to go back to school and has never looked back.

In a short period of time, Shayna has become an ambassador for forestry and an active contributor to the forestry community at the University of Alberta – and people are taking notice. She was recently awarded the prestigious Skills Award for Aboriginal Youth, presented by the Forest Products Association of Canada (FPAC).

“Shayna’s love of forestry and strong sense of responsibility to the Aboriginal community is testimony to the positive direction our industry is taking,” said David Lindsay, President and CEO of FPAC.

Shayna’s interest in forestry began with a summer tree planting job, and she is now in the final year of her forestry degree. She is an excellent example of the high quality, professional students that will become the next generation of Registered Professional Foresters and natural resource managers.



Preparing **students** to provide **solutions**

Student Profile:

Marie-Claude Roy – Ph.D. Candidate

For Marie-Claude Roy, choosing to do a degree in the Department of Renewable Resources was about working in an applied environment and helping address land management challenges through her research.

Roy has been working with Dr. Lee Foote and is now finalizing her thesis on the performance of reclaimed wetlands in the oil sands region of Alberta. She identified that reclaimed wetlands fail to resemble natural wetlands, even after 25 years, and that the addition of organic matter – in the form of a peat-mineral mix – can help increase the environmental performance of these reclaimed sites.

She also documented that natural wetlands exhibit a large amount of variation in water levels over time because of their hydrology. In contrast, reclaimed wetlands exhibit little variation over time – which has a direct impact on the species present. Through these findings, Roy has been able to highlight the importance of wetland hydrology in reclaimed wetlands and make recommendations to improve current practices.

Roy 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*.

Roy's work was funded by Albian Sands, CNRL, Imperial Oil, Shell, Suncor, Syncrude and Total E&P.

Problem grizzly bears cause a fuss in the gene pool



Imagine being picked up in the middle of the night and being dropped off in the middle of the boreal forest. You would probably feel a little out of place. But feeling out of place is a constant reality for ‘problem’ grizzly bears that are often moved to areas of the province that are different, very different, from where they were born. And it turns out, this change of scenery could be having a negative impact on the health of the grizzly bear population.

Understanding the genetic make-up of Alberta’s threatened grizzly bear population is a hot

topic. Recent studies have shown that grizzly bear genetics are closely linked to the specific regions in the province where they live. That is, grizzly bears living in Waterton National Park have distinct genetics from those living around Hinton. This apparent adaptation to the local environment could be linked to increased reproductive success in grizzly bear populations.

But Dr. Aaron Shafer, a research associate with Dr. Scott Nielsen, wanted to dive deeper into the question of grizzly bear genetics by investigating the role of ‘problem’ grizzly bears – those that





have come into conflict with humans and have been relocated. In many cases, 'problem' bears in the Crowsnest Pass area of the province are transported to areas near Hinton or even the Swan Hills. These regions have significantly different topography, habitats, and food availability. While the experience can certainly be stressful for the bears that are moved, those that survive and reproduce introduce their genetics into the local population. This means that genes which help a bear to be more successful in the Crowsnest Pass are now present in the Swan Hills, a habitat that is entirely different.

Credits:

Content: Matthew Pyper, Michel Proulx
Photos: CFS (p.2); Richard Siemens (p.4);
Emily Court (p.9)

The cause for concern is not only whether relocation is an effective tool for mitigating human-bear conflict, but also whether introduction of genetics from other areas of the province is having a negative impact on grizzly bear populations. This process is referred to as outbreeding depression – when a change in the genetic diversity of a population actually has negative consequences for the species.

“When conserving threatened species, we are normally concerned about reductions in genetic diversity. Rarely do we consider that an increase in genetic diversity could have negative consequences for a species” said Nielsen.

It's too early to say whether the observed effect is substantial enough to influence management of grizzly bears in the province, says Shafer. But at the very least, the study contributes another piece to the complex puzzle of grizzly bear management, and will encourage managers to consider the implications of moving problem bears into radically different habitat types and environments.

Funding for this work was provided by the Foothills Research Institute and Alberta Innovates – Bio Solutions.

spring2014
Renew

Department of Renewable Resources
University of Alberta
751 General Services Building
Edmonton, AB T6G 2H1
CANADA

Phone: 780-492-4413

Fax: 780-492-4323

www.rr.ualberta.ca



UNIVERSITY OF ALBERTA
DEPARTMENT OF
RENEWABLE RESOURCES