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Renew

in this issue:

Forests, fire and your kitchen tap

New tool maps species at provincial scale

Recovering more water from oil sands tailings

UNIVERSITY OF ALBERTA
DEPARTMENT OF
RENEWABLE RESOURCES

Who are we?

A message from the Chair

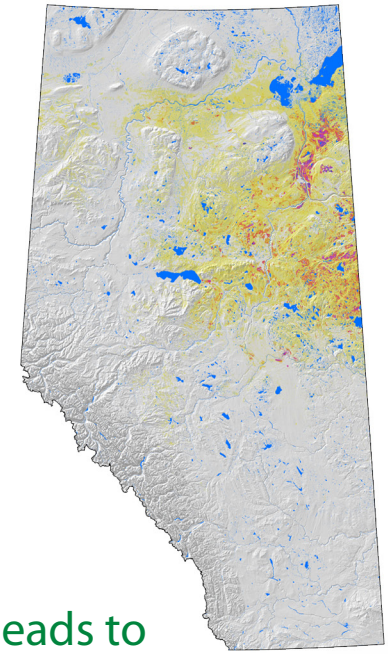
In the Department of Renewable Resources, we're working on solutions for some of the world's most pressing land-use and management challenges.

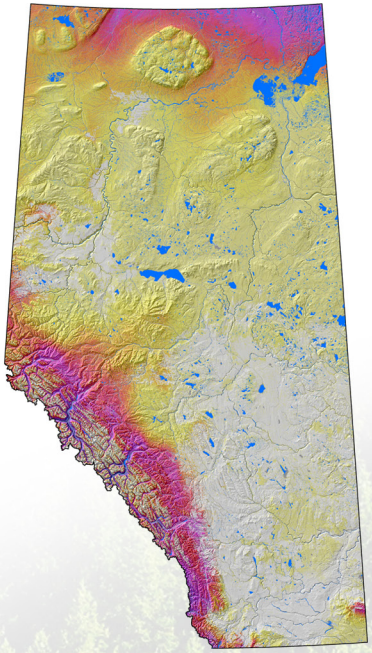
With 34 talented scientists in the fields of land reclamation and restoration, forest ecology and management, water, conservation biology and the soil sciences - our diversity is our strength. Our external research funding of nine million dollars this year is a testament to the value our partners place on our research programs. In addition to the variety of tools and applications we produce, we also generate over 140 peer-reviewed publications in some of the top scientific journals each year. We exemplify robust, basic and applied academic research.

We also view our commitment to teaching and educating the next generation of resource scientists and managers as vitally important. With over 400 students in our undergraduate programs and 140 students in our graduate programs, we've trained thousands of graduates now in the workforce.

The following stories profile just a portion of the great work in our Department. I welcome your feedback on opportunities for partnerships and to discuss how we can best address your research questions.

Victor Lieffers, Chair
Vic.Lieffers@ualberta.ca





Research leads to conservation **tool** for province

Conserving biodiversity is a key goal of sustainable development, but conserving species is rather difficult if we don't even know where they live. Dr. Scott Nielsen and colleagues are helping to overcome this obstacle with an innovative new tool, the Alberta Species Conservation Atlas. Nielsen says the tool can be used to predict and map where rare species – those species that are often restricted to small patches of habitat – are likely to be found.

The tool capitalizes on data from the Alberta Conservation Information Management System, which collects data from expert observers across the province. This data is then pooled together with models of climate, topography and moisture regimes to predict where habitat for rare species is likely to occur.

The applications of the tool are endless and include the identification of priority sites for conservation offsets, avoidance and restoration. Such information is invaluable for companies looking to map critical habitat on leases, conservation groups that are looking to ensure representation of habitat in conservation areas or government planners seeking to implement the conservation goals of Alberta's Land-use Framework.

The tool currently capitalizes on data from over 300 species of plants and butterflies and plans are in place to expand this to include over 500 species of plants, vertebrates and invertebrates. To learn more about the project and its partners go to: www.ace-lab.org/asca.htm.

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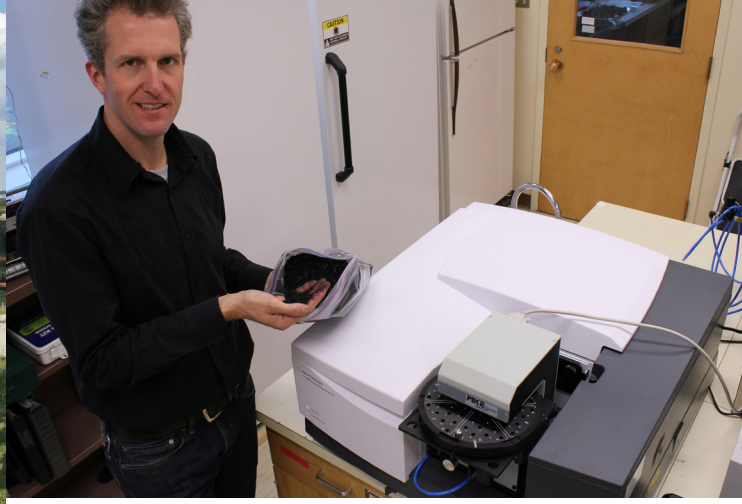
Researchers head to **Germany** for reclamation insights

Participants with the Helmholtz-Alberta Initiative (HAI) and the Land Reclamation International Graduate School (LRIGS) recently packed their bags and headed to Germany to exchange ideas about land reclamation. Twenty-two researchers and graduate students from Renewable Resources and a suite of German scientists participated in the trip, which included the 2nd annual HAI Science Forum and a 10 day tour of German reclamation sites. The trip was part of an international collaboration designed to generate new advances in land reclamation.



High-tech lab opens doors to explore use of **Biochar** in reclamation

Dr. Derek Mackenzie knows that if you play with fire, you might get burned, but for him, it's all in a day's work. His research looks at using 'biochar' - a product made through the burning of 'waste' products like wood, manure and straw – to enhance revegetation on reclaimed mines.

Thanks to a $628,000 grant from the Canadian Foundation for Innovation, his lab is now equipped with a variety of high-tech equipment that is sure to open up new opportunities for partnerships. 'Biochar' is already being studied on a reclaimed coal mine in Alberta, and Mackenzie hopes to extend his research to reclaimed oil sands mine sites. To learn more about Dr. Mackenzie's research go to: www.tinyurl.com/RenRBioChar

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Cenovus draws on Renewable Resources expertise to develop restoration program

Ambitious plans require precise information and that's just what Cenovus sought during a recent tour of their Foster Creek oil sands project. Dr. Vic Lieffers and Dr. Ellen Macdonald were invited to share their expertise with officials from the energy company on a major seismic line restoration program. "It was a unique opportunity to draw in a variety of experts, and to help frame our thinking" said Michael Cody RPF and Sr. Environmental Advisor, who arranged the tour.

The group discussed revegetation on difficult jack pine sites, reforestation challenges in lowland sites and a variety of other issues faced on the restoration project. Having academic researchers on site was a great way to obtain "unbiased ideas that really resonated with company officials," said Cody. Learnings from the day will be used to guide future restoration projects as Cenovus finalizes plans to restore 50 km of seismic lines within key Woodland Caribou habitat this winter.

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Oil sands companies harnessing knowledge of **foresters**

With the dramatic increase in oil sands exploration in recent years, leading companies are capitalizing on the knowledge of foresters to improve their business and increase efficiencies. Terry Forkheim (Statoil) says the benefits to oil sands companies are wide ranging. Whether it is a forester's knowledge of landscape planning, efficient handling of salvaged wood or their ability to work effectively with regulators, Forkheim sees numerous advantages.

Amanda Horning-Sadler, 2009 forestry graduate, has had the opportunity to directly contribute her knowledge as an employee with Syncrude Canada. Through her work, she has helped develop new approaches to reclamation of oil sands mines. To see a video of Horning-Sadler's experience go to: www.tinyurl.com/renrforestry

Student discovers 7 new species in boreal forest

Charlene Wood recently discovered seven new species of beetles in the boreal forest approximately 95 km NW of Peace River, AB. Most of the species are mere millimeters in size, and may have simply been overlooked in past research projects. Despite their small size, Wood says the species play a big role within decomposing logs- forming part of a complex web of species that depend on each other for survival.

Wood's work also resulted in several implications for deadwood management in the boreal forest which is of great value to forestry companies. The work was part of Wood's Master of Science research at the Ecosystem-based Management Emulating Natural Disturbance (EMEND) research site- a partnership between industry, government and academics.

New partnership seeks to understand linkage between forest fires and drinking water

Wildfires are a critical and natural part of our forests, but have you ever considered how they might impact the water that comes from your tap? A new partnership housed in the Department of Renewable Resources is helping to answer this pressing question.

The project aims to build a tool, the first of its kind, which will be able to predict where forest fires are likely to occur, how intense those fires will be and what impacts these fires will have on the quantity and quality of water supplies to downstream communities. "The project is a collaborative effort bringing together scientists and practitioners that study fire, water and economics" said Dr. Uldis Silins, the project's principal investigator.

The project will have a broad reach as over 88 per cent of Alberta's population depends on water from forested regions of the province. The program brings together some of the top scientists in Canada and is funded by the Canadian Water Network in partnership with the Government of Alberta – Environment and Sustainable Resource Development, and Alberta Innovates – Energy and Environment Solutions.

Forestry students bring home **National championship**

The U of A Forestry students have reclaimed the National Quiz Bowl Championship at the Canadian Institute of Forestry Conference and AGM in Quebec City (Sept 17-22, 2012). The quiz bowl is a head-to-head competition where students from across Canada compete by answering academic and practical questions about all areas of forestry. Winning has always been a point of pride for our students who have won the championship three out of the seven years that the Canadian Institute of Forestry has hosted the competition.

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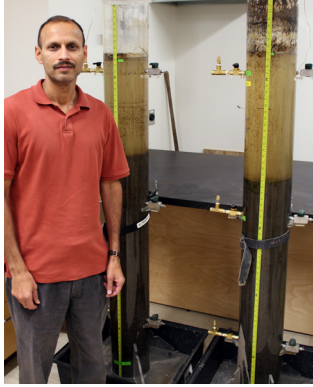

Discovery increases amount of water recovered from tailings ponds

As Alberta faces increasing pressure to reduce the footprint of oil sands development, Dr. Tariq Siddique may have discovered a hidden gem. Siddique has found that by growing microbes that are already present within tailings ponds, the amount of water recovered can be increased by up to 40 per cent.

Traditionally it could take decades to fully separate the water from oil sands tailings. Siddique has discovered that microorganisms in tailings ponds degrade hydrocarbons from residual solvents and leftover bitumen, which rids tailings of these contaminants. If the microorganisms are fed so more of them are present, the rate at which the contaminants are consumed increases greatly. This process results in increased water recovery and increased rate at which the tailings settle in the ponds.

It's not all rosy, however, as methane – a greenhouse gas – is a by-product of the reaction, but Siddique is suggesting ways to capture that methane and use it as an energy source. Siddique's work has so far been demonstrated in a laboratory setting, and he hopes to develop a pilot project to test his work in a field setting.

Preparing students to provide solutions

Student Profile: Simon Slater – M.Sc.

For Simon Slater, choosing to do a degree in the Department of Renewable Resources was about tackling an applied challenge with real world implications for the province's Woodland Caribou. He recently achieved this goal and now has a Master of Science degree and a pile of experience to show for his work with Dr. Fiona Schmiegelow.

Slater studied the Red Rock Prairie Creek herd – located northwest of Grande Cache. The herd traditionally occupies high alpine slopes of the Rocky Mountains in the summer to avoid predators and then migrates to the lower, warmer foothills area for the winter. But Slater documented that over time the herd has slowly withdrawn from their traditional winter range in the lower foothills, spending more of the year in the high alpine slopes.

The implications for caribou management are still being fleshed out, but Slater suggests the change in behaviour is a result of increasing development pressures in the foothills. He also notes that food availability is limited in the high alpine slopes, which could have negative consequences for Woodland Caribou survival and reproduction.

Simon is an excellent example of how our research programs are helping to train the next generation of resource managers. In this way, we are preparing students to provide solutions.

Two new researchers added to Renewables Resources suite of experts

Conservation Ecology expert Dr. Mark Poesch and Soil Science expert Dr. Guillermo Hernandez Ramirez joined the department's staff this past summer.

Poesch's research focuses on understanding mechanisms of biodiversity conservation, with a particular focus on freshwater ecosystems. He received his Ph.D at the University of Toronto and recently worked as a post-doctoral researcher at the Canadian Centre for Inland Waters, Fisheries and Oceans Canada. Collaboration is at the heart of Poesch's work and he has successfully engaged with stakeholders from government, NGOs, industry and the general public. He looks forward to exploring new opportunities here in Alberta.

Hernandez Ramirez's research focuses on understanding carbon and nitrogen dynamics within agricultural ecosystems. Specific areas of expertise include greenhouse gas mitigation, carbon sequestration and climate change adaptation. Born in Panama, his global expertise has been developed through work in Costa Rica, USA, New Zealand and now Canada. He is excited to learn about local management practices in Alberta and develop partnerships to enhance our knowledge of soil processes and carbon neutral systems.

Knowledge Exchange Program- From Science to Sustainability

> **New synthesis publication:** ***Managing Woody Materials on Industrial Sites***

By Tim Vinge and Matthew Pyper

This document summarizes opportunities for using woody materials in reclamation and identifies science-based thresholds to help achieve reclamation goals.

> **Save the date:** The Department of Renewable Resources in partnership with the Oil Sands Research and Information Network (OSRIN) is hosting a workshop: 'Resiliency in Reclaimed Landscapes' January 22nd, 2013, Edmonton, AB.

> **Watch for More Information:**

International Boreal Forest Research Association (IBFRA) Conference 2013- Boreal at Risk: From Boreal Science to Public Policy.

For copies of the report listed, or for more information email Matthew Pyper: mpyper@ualberta.ca

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