



## Technology & Innovation

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### Ranching and Carbon Sequestration

By EduTransfer Design Associates and Haywire Creative

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Several research projects under the BC Future Forest Ecosystems Scientific Council (FFESC) are focusing on the adaptation of the forest and range management framework to climate change. "As part of a larger FFESC project, we are looking at possible ways of altering

grazing management to increase carbon sequestration and to help ranchers realize the benefits," says Dr. Lauch Fraser, Professor and Canada Research Chair in Community and Ecosystem Ecology, Thompson Rivers University in Kamloops, BC.

Fraser and his team have been conducting research on climate change in the Lac Du Bois Grasslands Park near Kamloops, which is a 15,000 hectare provincial park with a long history of managed grazing. This natural grasslands park is a unique grassland area with several different grassland types that occur throughout the grassland system based on a fairly sharp elevation change. Fraser is exploring the capacity of temperate grasslands such as these in the Park to sequester carbon.

"BC is in a fairly unique position because we have a carbon tax, which is linked into the Pacific Carbon Trust," explains Fraser. Pacific Carbon Trust is a BC Crown corporation with a mandate and commitment to deliver real and permanent greenhouse gas reductions. "This means there is the potential to trade carbon on the market. Most of the money that has changed hands so far is for increasing efficiencies in the fossil fuels industry, but there is potential for changes in range management."

However, Fraser notes that getting range management practices recognized for carbon storage is a bit tricky, because many of the carbon trading systems want to see real changes. "The tricky part is convincing policy makers that the ranching industry and the way ranchers are using the land is positive and is conducive to carbon storage potential," says Fraser. "We are advocating that on-going good range management has the potential to also store carbon. And we want to reward those managers who have good systems and are using best management practices."

#### Grazing Management and Carbon Sequestration

Fraser and his graduate student started the grazing management study in 2010 looking at the potential of the grasslands in the Lac Du Bois Grasslands Park for storing carbon. "We've looked at some promising work done by Dr. Franzluebbbers, an Ecologist with the USDA, and some of his long-term studies that suggest modern grazing is beneficial to soil building processes and can elevate carbon sequestration," explains Fraser. ".Our research and experience also shows that grazing does have the potential to actually improve pasture quality through soil building processes and through efficiency of carbon storage or sequestration. The potential depends on the grassland type and that is something we need to understand better."

"Grazing management has the potential to improve pasture quality through soil building processes and through efficiency of carbon sequestration," says Dr. Lauch Fraser."

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In the study, Fraser is comparing high elevation grasslands, which are expected to have higher soil carbon content, with low elevation grasslands. "We're also conducting experiments to alter the temperature and precipitation to determine their effects on the potential for carbon sequestration," says Fraser. "In one experiment, we have warmed these plots using open top chambers across the elevation gradient. In another, we are experimenting with altering rainfall by covering treatment plots with rain shade shelters and adding water through hand watering. Grazing is simulated by clipping biomass in the plots."

Various tools are being used to measure carbon in the soil, soil respiration and other factors, and the interaction of all of the variables. Fraser is trying to track carbon dynamics and how the various treatments affect the carbon cycle. "We're still in the early stages of the project, but preliminary data does show that low productivity soils have low amounts of carbon in the soil, and high productivity soils have higher levels of carbon," explains Fraser. "And as expected, the upper level of the soil or the top 15 cm has more carbon. However, our overall objective is to understand how the watering treatments and clipping influences the carbon pools, which ultimately will relate back to carbon offsets and carbon trading."

Fraser and his graduate student expect to complete this project by summer 2012 and will have more results by then. "We have ongoing projects as part of a long-term project and are trying to make the links from these smaller scale studies to the larger scale. This is challenging, so we are using some GIS models to look at the larger scale and to map land use that has the potential for carbon storage."

The research results will provide information for future discussions with policy makers and Pacific Carbon Trust to see the benefit to grazing management for carbon storage. "I have been in discussions with the BC Cattlemen's Association to try to make some of those links," says Fraser. "They are certainly interested and we are hoping to make some progress on this. Hopefully in the future ranchers using good management practices can benefit from carbon sequestration and the sale of carbon credits."

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