MANAGING GRASSLANDS FOR CARBON

Valuing Natural Capital in the Grasslands of British Columbia

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Protecting grasslands is not only about protecting the biological value of grasslands, but also about conserving the abundant economic and cultural values grasslands provide. British Columbia's ranching community is one of the premier industries in the province, and if ranches decline or fail there will be a negative impact on local economies and lifestyles; not to mention the loss of important Natural Capital associated with rangelands. Land management activities must maintain productivity and biodiversity on rangelands in the face of increased intensity and frequency of droughts and storms while ensuring long-term revenue sources to ranchers so that these ranches and our grasslands remain ecologically and economically viable.

WHAT IS NATURAL CAPITAL?

Natural Capital are the services grasslands provide humans; they are the things humans value about nature. Natural Capital can be either ecological processes or pools of biological material. Pools of Natural Capital can be simply the amount of forage provided by grasslands for cattle, the diversity of animal and plant communities living in an area, or the carbon stored in rich grassland soils. Natural Capital can be the services provided by grasslands. Grassland wetlands can provide clean drinking water or store water for flood control. Grasslands can provide valuable recreational areas, provide places for spiritual retreat, or they could clean our atmosphere of pollution or carbon dioxide. In short, Natural Capital is often, but not necessarily, the things people would be willing to pay grasslands to do.

HOW DO GRASSLANDS STORE CARBON?

Carbon is Natural Capital. Grasslands store carbon through photosynthesis of carbon dioxide and energy by plants, and this plant material is either stored as green material, litter, wood, or soil organic carbon. Some carbon pools like woody vegetation or soil carbon can store carbon for long periods of time; others like green plants or litter are less stable, releasing their carbon to the atmosphere or other pools quickly. The rate at which carbon is incorporated into each pool is the carbon sequestration rate. By monitoring how the size of carbon pools changes or the rate of sequestration into each pool changes with activities like cattle grazing, we can determine if we are gaining or loosing Natural Capital in grasslands.

Grazing management is an important tool in controlling carbon sequestration. Different stocking rates and turnout times are suitable in different grassland types and can increase carbon storage if managed appropriately. Grazing typically alters the composition and growth of plant communities and this changes sequestration. Ranching practices can also enhance plant and animal diversity. Losses of carbon storage with the conversion of grasslands to farmlands (and urban areas) are well documented.

Figure 1: Cowboys moving cattle in the grasslands of Lac du Bois Protected Area, near Kamloops BC.

CAN WE SELL NATURAL CAPITAL?

YES! Carbon offsets are credits for the reduction in greenhouse gas emissions, and can operate similar to stock or bonds. Credits can be sold by ranchers to emission trading markets like the Pacific Carbon Trust (a BC Crown Corporation); on traditional equity or bond markets; to individual companies that are interested in establishing carbon neutrality or conservation interests in their businesses; or can be financed by government incentive programs. The Pacific Carbon Trust advertises the purchase carbon offsets by the provincial government at $25/tonne CO_2e, but current market prices[1] range from $4/tonne $C0_2e$ to $40/tonne $C0_2e$. We estimate that carbon stores could be as high as 15.8 Mg/ha in the Thompson-Nicola region, and that appropriate grassland management may increase current carbon pools by 1.3 Mg/ha over a 5 year period[2]. One Mg of carbon is roughly equivalent to one tonne carbon dioxide equivalent (CO_2e)

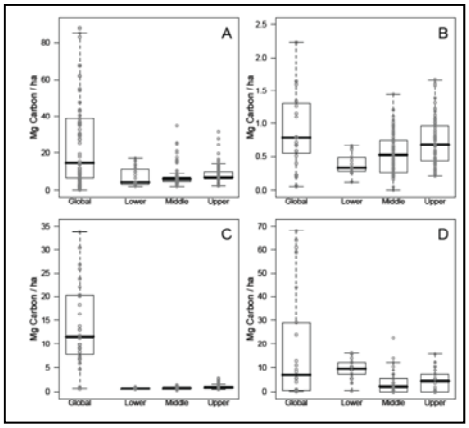

Figure 2: Comparison of the four carbon pools A) Soil, B) Litter, C) Roots, and D) Woody in the three grassland types of Lac du Bois Protected Area to global grassland data compiled from peer-reviewed scientific literature[2].

[1]Greig and Bull 2011. BC Journal of Ecosystems and Management. 12(3): 35-54

[2]Harrower et al 2012. Unpublished Report for Grasslands Conservation Council.

HOW CAN WE SELL CARBON?

Two key components are needed before we can sell carbon offsets from the grasslands of British Columbia:

Scientific Research

In order to develop markets and establish protocols we need to know:

- How plant communities respond to grazing under different stocking rates and turnout times.
- The amount of carbon, nitrous oxides, and methane inputs and emissions that arise from ranching activities.
- The potential impacts to ecosystem function, biodiversity, water and air quality, and wildlife of managing grasslands purely for carbon storage.

Carbon Market Development

A financial market for carbon needs a number of key infrastructure investments. These follow similar categories to markets for forested systems[1] and include:

- Identification of markets to purchase grassland carbon including emissions trading systems, bonds, single buyers, etc.
- Outlines of cost-benefit curves showing ranchers any loss or benefit to adopting a carbon management scheme.
- Market framework identifying key middlemen, aggregators, insurance brokers, and accountants with skills, financial capital, and risk tolerance to make the market work.
- Verification, validation, and monitoring framework that can provide transparent and independent certification of offsets.

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