

newsletter

Climate Change Adaptation Research
for Forest and Rangeland Ecosystems
Resiliency Implications at the Landscape Level

Issue #3 – Fall 2010

Message from the Principal Investigator

Our last issue highlighted the Human Resiliency Dimension (HRD) in the South Selkirks Climate Change Research Project and reported on how the HRD team, following tenets from the positive psychology movement, is building on the ability of individuals and communities in this region to adapt to climate change. In this issue, we will focus on the Ecological Resiliency Dimension (ERD). While the philosophy that underpins this project is that social, economic and ecological systems are inextricably linked, it is nonetheless important to understand each dimension alone in relation to climate change adaptation. In general, Ecological Resiliency is a term often associated with the behaviour of ecological systems in relation to human or natural origin. It often infers a return to a condition that is somewhat similar to the pre-disturbance condition, or a condition that has key features that resemble the former condition. As with all of our teams, the ERD team is comprised of members with diverse backgrounds that reflect many sources of knowledge. The ERD team is monitoring the environment in various ways and exploring which climate change adaptation practices will encourage resiliency while enhancing conservation values of ecosystems in the South Selkirks. Monitoring, a key concept in understanding Ecological Resiliency, utilizes complementary methods that are vital to our research study. The team is integrating ecological knowledge from both traditional indigenous sources and Western science perspectives in order to come up with a full range of possibilities to address resiliency.

-Dr. John Innes, Principal Investigator



South Selkirks Mountain Caribou Herd
Photo Credit: Roland Meyer

Monitoring: The Key to Ecological Resiliency and Climate Change Adaptation

The aim of the ERD team is to bring together the knowledge and tools of diverse strategic partners – governments, universities, private industry, Métis and Ktunaxa Nations, and the Nature Conservancy of Canada – to monitor disturbances in forests, ranges, streams, wildlife and plants and to plan best practices to maximize ecological adaptation to climate change. *Monitoring* is a key concept in understanding ecological resiliency. According to Margie Eddington, leader of a joint UBC/BC Government project developing a monitoring strategy for the forest and range environment in the context of climate change adaptation, “regular and systematic measurement (aka. monitoring) is really the only means for understanding what changes are actually taking place and for gathering data that can be used to anticipate, respond and adapt to them.” Strategic partners have employed various tools to observe and measure how climate change impacts nature. The following are

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sketches of four different yet complementary tools for monitoring ecological change in the South Selkirks.



Snow capped peaks of Darkwoods as seen across Kootenay Lake from the Creston Valley Wildlife Management Area
Photo Credit: M.A. Beaucher

Sketch #1. Kalesnikoff Lumber Company uses the Biogeoclimatic Ecosystem Classification (BEC) system to provide an ecological framework to forestry management activities in the region. BEC is a comprehensive, multi-level classification system that describes biogeoclimatic (zonal) units to aid in land management planning, wildlife habitat management and broader ecosystem management. For example, BEC can inform decision-making on watersheds for domestic and community consumption, timber harvest levels and species-at-risk protection.

“By participating in the South Selkirks Climate Change Project, we are gaining further insights on the need to take a multifaceted perspective on climate change adaptation in order to encourage healthy ecosystems, healthy communities and healthy diversified economies which will set the context for how Kalesnikoff Lumber can continue its operations 100 years from now.”

-Stan Hadikin, RPF
Forestry Manager, Kalesnikoff Lumber Co. Ltd.

Sketch #2. ERD Team Leader, Dr. Walt Klenner (BC Ministry of Forests & Range) describes how the team uses a simulation tool to project various scenarios – a form of hypothetical “monitoring”: “Through our work on Ecological Resiliency in the South Selkirks Climate Change Research Study, we are using scientific approaches such as Tool for Exploratory Landscape Scenario Analysis (TELSA) to inform policy and planning decision-makers on proposed management solutions that aid in diminishing the severity of the disturbances we (as a society) imposed on forested and grassland ecosystems.” The TELSAs model helps resource managers explore interactions between vegetation succession, natural disturbances and management decisions over large spatial and temporal scales by projecting ecological scenarios. “Our present work” says Dr. Klenner “involves reviewing these relationships from the literature and utilizing this information to develop land management options that facilitate rather than compromise the inherent climate change resistant characteristics of ecosystems in the South Selkirks Region.”

“By encouraging the development of widely accepted landscape level strategies through the use of map-based tools, scientists can enhance their ability to work alongside natural resource managers to establish a permeable landscape to allow ecosystems to reconfigure in relation to climate change.”

-Dr. Tory Stevens
Protected Areas Ecologist (Terrestrial), BC Ministry of Environment

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Sketch #3. The Métis and Ktunaxa Nations have monitored the environment over centuries, and continue to utilize Traditional Ecological Knowledge as a tool to monitor and respond to climate change and other disturbances to the land. For example, Mark Carlson, Region 4 BC Métis Assembly of Natural Resources (BCMANR) Captain and Kootenays Métis Citizen, uses Métis Traditional Knowledge passed on to him by his father and Elders to monitor and adjust patterns of hunting moose and deer in the Kootenays as the region undergoes climate change. Carlson reminds us that indigenous knowledge is a rich source of information about Ecological Resiliency, as it provides us with “behavioural and geographic information about the land, water and local species to effectively hunt and gather at different times and in different places for sustenance purposes while ensuring that flora and fauna regeneration occurs for future generations.”

“The land is extremely resilient and will take care of itself. It is our collective role not to control the land but rather to manage the degree of human interface with the land – specifically, how communities influence, shape and fit with the land in which they live. Climate change-effects such as extreme weather events (landslides and wildfires) create operational and related infrastructure challenges for local municipalities and the Ktunaxa Nation in terms of designing, monitoring and preserving our connection to the land and water systems in the South Selkirk Region. Therefore, there is a bigger need, now more than ever, to design decision-making tools that bring together scientists and Elders in recommending effective practices in adapting to and monitoring disturbances associated with climate change.”

-Garry Merkel, RPF
Chair – Columbia Basin Trust, Negotiator – Ktunaxa Nation Council, and Member of the Tahltan Nation

Sketch #4. While monitoring provides early warning of emerging problems that may require human intervention, monitoring also records the environment’s built-in resiliency, thus helping planners to maximize this potential. Four examples of Ecological Resiliency in action are (a) plant communities that are able to reorganize in relation to new climatic regimes because productive populations are widespread and connected; (b) animal populations that are large and productive enough to allow for dispersal and colonization of potential new areas of suitable habitat; (c) genetic diversity that is sufficient to allow adaptation to new habitats as they form; and (d) stream systems that respond well in high flow situations. The Nature Conservancy of Canada has been managing the Darkwoods Property in the South Selkirks by monitoring and using that information to enhance and increase such resiliencies.

“Through our monitoring, conservation research and planning activities, NCC endeavours to maintain or restore the range of natural variation of populations (e.g., caribou), habitat attributes (e.g., old-forest related attributes), ecosystems (e.g., dry Interior Cedar Hemlock zone) and processes (e.g., stream flow and sediment regimes) that should make these systems more resilient to persist on existing sites and/or enable them to shift with climate changes in the region.”

-Sara Howard, MRM
Aquatic Ecologist, Nature Conservancy of Canada (NCC) – BC Region

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Old Growth Cedar and Devils Club on Darkwoods
Photo Credit: Tim Ennis

Resiliency Dimension Highlights

From July to September 2010, we carried out the following activities

Public Opinion Survey. Dr. Howie Harshaw engaged in questionnaire development, pilot testing and protocol development to finalize the survey for administration in Fall 2010. Many thanks to the South Selkirks HRD team and other members of the broader research team in refining the questionnaire.

Ecological Modeling. The ERD team acquired data layers (e.g., forest cover, past disturbances and harvesting) for the study area. A literature review is currently underway of natural disturbances in relation to climate change and the Tree and Climate Assessment (TACA) model was assessed for its utility in evaluating the effects of climate change on post disturbance (natural and human-related) ecosystem response.

Collaboration. Dr. Klenner liaised with the West Kootenays (WK) Project Team and the NCC – BC Region to discuss the landscape modeling approach

being utilized for the study area. These discussions ensure that the climate change management scenarios that will be prepared in Winter 2010 align with common data sources from the WK Project and NCC to aid in landscape projections for the South Selkirks Region.

Moving Forward

In the next quarter (October – December 2010), the South Selkirks Project Team will be carrying out the following activities:

Public Opinion Survey. Dr. Harshaw will administer the survey to Aboriginal communities (Ktunaxa Nation and Métis Nation BC – Kootenays), the general public from municipalities and surrounding communities in the South Selkirks Region, and General Managers in the Kootenays Forestry Sector. After administering the survey, Dr. Harshaw will engage in data entry and initial analyses of the survey results.

Ecological Modeling. The ERD team will implement the climate change management scenarios in the landscape models. The scenarios will outline potential ecological consequences in the South Selkirks Region to inform the research team's recommendations on climate change adaptation.

Collaboration. As part of the Public Opinion Survey, Dr. Harshaw will work with the WK Project Team to survey forestry managers. Dr. Klenner will work with the WK Project Team and NCC to identify synergies amongst these study teams regarding landscape projections, climate change scenarios and interactions between ecological modeling indicators and socio-economic indicators in the Kootenays Region.

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