

newsletter

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

Issue #7 – Winter 2011

Message from Dr. John Innes, Principal Investigator



I write this farewell message with a sense of accomplishment shared with all of the members of our multidisciplinary research team as well as a sense of sadness as our team disbands and members go on to other activities. This two-year project, founded on the concept that human, ecological, and economic resiliency will buoy the South Selkirk Region through climate change in the coming years, involved the work of three teams of dedicated scientists and advisors committed to a research vision that valued the experiences and voices of Aboriginal and non-Aboriginal community members equally. The results of this project have been accumulating throughout the last year, and knowledge transfer continues to take place this winter. One example of knowledge transfer was Drs. Howard Harshaw and Natasha Caverley's FORREX webinar co-presentation on the human dimensions of climate change in the South Selkirk.

This winter, team members have met with strategic partners to talk about next steps in adapting to climate change and will prepare and submit articles and reports that will form the basis for future decisions and policy. This last e-newsletter, a double issue, describes results from the Human Resiliency Dimension (HRD) Public Opinion Survey, undertaken by Dr. Harshaw; work by the Economic Resiliency Dimension – ECRD (Drs. Harshaw and Harry Nelson); and finally, next steps and recommendations in climate change adaptation for the South Selkirk Region.

To recap, our fall issue featured the work of Dr. Walt Klenner and the Ecological Resiliency Dimension (ERD) team. Some of the work this team is undertaking includes the use of innovative monitoring systems that help to track changes in ecosystems. The team's research will culminate in recommendations to foster resiliency in the study area under expected climate change scenarios.

Please join me in celebrating the near completion of the important work of the South Selkirk Climate Change Research Team.



The Columbia Spotted Frog typically lives in ponds, streams and along the edge of Kootenay Lake
Photo courtesy of the Fish & Wildlife Compensation Program

For information contact:

South Selkirk Climate Change Research Team
Forest Resources Management—University of British Columbia
2nd Floor—Forest Sciences Center #2045-2424 Main Mall
Vancouver, British Columbia V6T 1Z4
Phone: 604.822.6761 | Fax: 604.822.9106
Email: john.innes@ubc.ca | natasha@turtleislandconsulting.ca

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Dr. Howard Harshaw, Co-Team Leader of the South Selkirks Human Resiliency Dimension and Economic Resiliency Dimension

community members in the South Selkirks. Non-Aboriginal and professional forest managers had the option of responding to the public opinion survey by mail or internet, while Aboriginal community members responded to the survey in person, which was administered by two Aboriginal Advisors from the South Selkirks HRD team. The survey questions probed residents' socio-cultural values and their current and potential adaptation and mitigation behaviours. Moreover, the survey was designed to uncover what citizens were willing to forego or change (aka. tradeoff) in order to adapt to landscape modifications due to climate change.

The survey clearly identified several categories of questions for respondents that included, but were not limited to,

South Selkirks Public Opinion Survey: A Review

Preliminary results are now available from the quantitative public opinion survey on attitudes toward climate change in the South Selkirks, undertaken by Dr. Harshaw this summer and fall. These data complement the qualitative study completed by Dr. Caverley and will help to explain and interpret relationships between human resiliency and adaptation as a means of exploring how community members perceive and respond to climate change from social, cultural, ecological and economic perspectives.

The survey was developed in collaboration with the other Resiliency Dimension (RD) teams and the survey design was informed by a literature review, scenario output from South Selkirks landscape models and results from Dr. Caverley's qualitative study.

Surveys were sent to a sample of non-Aboriginal residents, professional forest managers and Aboriginal

- opinions and beliefs about forest management issues in BC
- what is important for communities to consider when responding to change
- possible local consequences of climate change
- opinions about different sources of information about climate change
- monitoring forest management outcomes
- participation in outdoor recreation activities
- personal connections to forests and forestry

In general, most respondents felt that climate changes are caused by both human activities and non-human changes in the environment. Many respondents had noticed climate effects and were concerned about them. While many survey respondents were planning to do something in response to climate change, the majority of participants (67% of mail/web respondents

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and 57.6% of Aboriginal respondents) felt that forest managers should be doing something in response to climate change. Data show a general trend toward concern (either “concerned” or “very concerned”) about a range of possible climate change consequences in the South Selkirk Region, including changes in distribution of plant and animal species and their habitats, frequent and longer droughts, severe and frequent insect outbreaks, and extreme weather events (e.g., heavy rain storms and less snowfall).

Much of the preliminary data reflect the principles of community resiliency already established in Dr. Caverley’s report: Residents of the South Selkirk region are aware of and responsive to climate change. Their continuing trust in experts and scientists shown in the preliminary statistics demonstrate that research groups such as the South Selkirk Climate Change Research team play a vital role in educating and supporting communities as they adapt to changes in their environments.

According to the preliminary results from the South Selkirk Public Opinion Survey, when asked about their trust of specific sources of information about climate change, respondents either “strongly trusted” or “somewhat trusted” scientists (84% trusted) and experts (68.3% trusted), while they either “somewhat distrusted” or “strongly distrusted” politicians (76.2% distrusted) and Government (64.5% distrusted).

In addition to the above, other sources of information about climate change listed according to “most trusted” to “least trusted” were

- Internet (56.2% trusted)
- Friends (55.8% trusted)
- National media (49% trusted)
- Local media (45.7% trusted)
- Local leaders (40% trusted)
- Religious/spiritual leaders (16.7% trusted)

Economic Resiliency Dimension: A Review of Forest Sector Transformation



Along with Dr. Harshaw, Dr. Harry Nelson is the Co-Team Leader of the South Selkirk Economic Resiliency Dimension (ECRD)

As the South Selkirk Climate Change Research Project winds down after two years, it is useful to review the original aims of the ECRD before reporting on its preliminary findings. At the inception of this project, the ECRD team asked “what economically-feasible forest management practices would be required to encourage resiliency while adapting to climate change?” The ECRD researchers aimed to investigate which economic factors influence resource users’ vulnerability to climate change and affect their capacity to adapt to those changes. The team anticipates that micro findings from lumber firms in the Kootenays will result in a macro framework that can be used to explore the economic impacts of climate change on forest resource-based communities and firms. Methods involved developing a baseline for economic conditions and reviewing trends in key indicators gathered from the Census, Statistics Canada, and provincial ministries. The researchers

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also carried out a literature review and conducted qualitative interviews.

Preliminary findings by Drs. Harshaw and Nelson are that new and existing forest operations have diversified and specialized in order to be more competitive. Their findings so far suggest that the forest industry, despite closure of mills, continues to be an active and important part of the regional economy, with no evidence of structural decline. The forest sector, however, is increasingly reliant on alternatives to “traditional” industrial forestry, for example, stumpage and value added measures. The forestry sector employs fewer workers and the tourism industry has yet to catch up: The transformation in coming years will involve a re-balancing of employment as a result of economic diversification in these traditionally forest-dependent communities.

According to Joseph and Krishnaswamy’s 2010 *BC Journal of Ecosystems and Management* article entitled, [“Factors of resiliency for forest communities in transition in British Columbia”](#), forest-dependent communities in BC that have made the most successful transformation to diversified economies are the ones that demonstrate what is generally known as “community resiliency.” Joseph and Krishnaswamy write that such resiliency is not a fixed quality, but a dynamic and changing property that can be “cultivated and constructed through conscious action” (p. 128) in order to maintain vigorous and sustainable economies.



Photo credit: Pat Field

They identified 15 “resiliency factors” that characterize such adaptability:

- Economic diversity
- Financial resources
- Natural resources
- Local control over enterprise
- Stakeholder-driven planning
- Smart transition programming
- Policy influence
- Good governance
- Human capital
- Social capital
- Attitude
- Community attractiveness
- Information
- Geography
- Health

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The initial findings by Drs. Harshaw and Nelson confirm that these qualities characterize the communities in the South Selkirks that are making the most successful transitions to the new resiliency-based economy. Their early research results are in line with discoveries made by the two other research teams (HRD and ERD): People, communities, economies, and ecology are inherently resilient, and the study of resiliency will enhance future sustainability, not only in the South Selkirks Region, but across Canada.

“Some forest-based communities are finding new ways to economically sustain themselves, and in some cases, are even thriving.” (Joseph & Krishnaswamy, 2010)

Resiliency Dimension Highlights

From October to December 2011, we carried out the following activities:

Ecological Monitoring. Laurie Kremsater continued her work on measuring abiotic indicators of climate change (e.g., temperature, snowmelt, precipitation, stream flow and wind) in the South Selkirks. By measuring these indicators, one can better determine the extent to which current monitoring and inventory programs are able to support current and future climate change analysis. Laurie's analyses aid in refining and developing technical approaches to measure climate change indicators and evaluate the extent to which these approaches are supported through existing data collection and inventory processes available in BC.

Climate Change Modeling. Dr. Klenner is currently finalizing his summary report entitled, “Stewardship practices to facilitate forest and range management in an era of uncertain climate.” Dr. Klenner's report is a synopsis of key climate change effects on terrestrial ecosystems and some of the management actions that can be implemented to address these likely changes. Key principles such as public consultation/dialogue, site specific application of practices, strategic landscape-level planning and prioritization, maintenance of connectivity, and management for a diversity of treatments at every stage of the forest or grassland management cycle are outlined as fundamental values for a climate change adaptation strategy for forests and grasslands.

Economic Resiliency. Dr. Harshaw refined and finalized the conceptual framework for examining past forestry-specific economic events and related factors in the context of climate change in the Kootenays Region. In conjunction with Dr. Nelson, Dr. Harshaw assessed past responses and related experiences from the traditional forest economy in relation to forest policy and market forces to better understand the adaptive capacity and resilience of lumber firms in the Kootenays Region.

Public Opinion Survey. Dr. Harshaw engaged in an initial analysis of the public opinion survey, which included non-Aboriginal, Aboriginal and professional forest manager samples in the South Selkirks. Dr. Harshaw is currently investigating the relationship between key variables (e.g., beliefs about sustainability, adaptation tradeoffs, vulnerabilities, forest management monitoring) to get a better understanding of what may be influencing people's

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attitudes and perceptions in the region. Steps to complete the work of the HRD team involve final data cleaning and full reporting of the descriptive statistics.

Collaboration. Through the ongoing collaboration with the West Kootenays (WK) Project Team, Dr. Harshaw was able to incorporate a forest manager sample as part of the public opinion survey. This professional sample was comprised of participants from the WK Project Team's climate change workshops.

Extension. In October 2011, Drs. Innes, Caverley, Harshaw and Klenner engaged in dialogue sessions with their South Selkirks strategic partners. Held in Vancouver and Cranbrook, BC, the dialogue sessions served as guided conversations to review the research findings and respond to questions about the project.

On November 10, 2011, Drs. Caverley and Harshaw made a co-presentation entitled, "Examining the human dimensions of climate change in the South Selkirks." The co-presentation was part of the [Human Dimensions in Natural Resource Management 2011-2012 FORREX Webinar Series](#). Many thanks to Dr. Ajit Krishnaswamy and FORREX for moderating this session and coordinating this extension opportunity.

In December 2011, Dr. Caverley's article "Indigenous perspectives on climate change adaptation" will be featured in UBC's [Branchlines](#).

Forthcoming Extension Opportunities

Presentations. In January 2012, Dr. Harshaw will be making a presentation entitled, "Human resiliency and climate change in the South Selkirks Region" as part of the [Great Northern Landscape Conservation Cooperative Webinar Series](#). Dr. Innes will provide introductory remarks about the South Selkirks Project as part of Dr. Harshaw's webinar presentation.

Training. In 2012, Drs. Caverley and Krishnaswamy will be finalizing a case study (and associated module) on the South Selkirks Project for inclusion in the *FORREX Social Science and Natural Resource Management (SSNRM) Curriculum*. The SSNRM curriculum is utilized by natural resource management professionals to aid them in their understanding of socio-economic topics such as public involvement and participatory research; use of social, economic and cultural indicators; and traditional ecological knowledge.

Technical reports. Final reports from the RD teams will be available in early 2012 on the [Future Forest Ecosystems Scientific Council website](#).

Articles. Articles about the RDs have or will be submitted to journals such as *Canadian Journal of Forest Research*, *Forest Ecology and Management*, *Forestry Chronicles*, *Journal of Ecosystems and Management*, *LINK*, *Native Journal*, *Native Studies Review* and *Society of Natural Resource Management*.

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Conclusions

While the economic state of the world has dominated news headlines over the past couple of years, climate change remains a critical issue. British Columbians are well aware of this thanks to the ravages of the Mountain Pine Beetle, yet interests are already moving on. It is not clear that we have learnt from the pine beetle infestation, or that people are aware that a range of other pests and diseases could further disrupt our forest sector.

There are some clear messages from the work that we have done in the South Selkirks:

- We are not doing enough monitoring and, as a result, we do not have a clear picture of the state of our resources.
- Even if we did know, the trust placed in different information sources is variable: 84% of people trust scientists, whereas 76% distrust politicians as a source of information.
- There is a lot of uncertainty about the future nature of climate change and about the effects that it will have, but this is not grounds for inaction. We have a number of strategies that we could be taking.
- For many, it will be necessary to find a new balance: Some things will have to be given up, others will be started. We will not be able to maintain the status quo.

- The people of BC are resilient and adaptable and we need to do everything we can to maintain these characteristics.

The future will undoubtedly be challenging, yet this project has shown that while there will be many changes, adaptation is possible given sufficient public will.

Acknowledgements

In closing, the South Selkirks Climate Change Research Project thanks BC Hydro and the Future Forests Ecosystem Scientific Council (FFESC) for funding our multidisciplinary research.

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Provincial Government: BC Hydro, Ministry of Environment, Ministry of Forests, Lands and Natural Resource Operations

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