



PHOTO: KEVIN SHEPIT

Risk-based adaptation and community planning in Elkford, British Columbia

A small community can efficiently address adaptation through existing planning processes.



The District of Elkford is a small community (population 2500) in the Rocky Mountains of south-eastern British Columbia. Historically, Elkford has dealt with several climate-related hazards, including flooding, drought and wildfires. A changing climate serves as a magnifier of all of these risks.

In 2008, Elkford, with the support of the Columbia Basin Trust, a provincial crown corporation, developed a local Adaptation Strategy that assesses the risks posed by climate change and identifies corresponding adaptation actions. The Adaptation Strategy was developed concurrently with a revision to Elkford's Official Community Plan (OCP), allowing the two to be fully integrated, a first in British Columbia. A Community Advisory Committee provided guidance and ensured community priorities were reflected throughout the process.

BACKGROUND WORK

Foundational analysis of existing information on climate change impacts and projections was used to develop impact pathways (or risk scenarios) that identify physical and ecological impacts of climate change and associated socioeconomic impacts on the community. The Pacific Climate Impacts Consortium (PCIC) provided regional climate change model projections for precipitation and temperature changes for the year 2080. An extensive literature search was conducted to identify climate change impacts to human and ecological systems in the Elkford region. A public survey, individual meetings with community members, open house discussions, and input from municipal staff were used to engage and consult local

CLIMATE CHANGE AS A RISK MAGNIFIER

In Elkford,

- Drier and warmer summers make forests more susceptible to wildfires and insect infestations.
- Receding glaciers, declining snowpack and shifts in the timing and amount of precipitation limit the water supply during the peak summer demand period.
- Increased winter rain and changes in forest hydrology due to pine beetle infestation increase the risk of flooding.

residents about the climate change impacts of greatest concern to the community and the relevance of those impacts to municipal plans and operations.

RISK ASSESSMENT

A risk assessment was conducted to identify and classify climate-related risks to the community and determine potential adaptation actions. The methods for assessing risks were adopted from multiple sources, broadly following the framework for risk management described in the Canadian standard *Risk Management: Guideline for Decision Makers* (CAN/CSA Q850-97). The critical step in



FLOODING AND WILDFIRE RISK

Elkford’s water supply wells and sewage treatment plant and lagoon are located within the floodplain. As well as causing damage to low-lying homes, a large flood could potentially overtop the existing dike infrastructure and inundate the sewage lagoons, contaminating river water and aquifers that supply potable water to the community.

Wildfires are a natural element that sustain and nourish the forests in the Elkford region; the local natural burn cycle for large-scale crown fires is about 125 years. The last major crown fires in the Elkford region, which completely destroyed the nearby town of Fernie, occurred in 1904 and 1908. The build-up of forest fuel – including the recent large number of dead trees due to the pine beetle infestation – is a major threat to public safety in Elkford.

Elkford’s risk assessment process was a one-day facilitated workshop involving municipal staff, councillors, the mayor and the Community Advisory Committee.

The risk evaluation framework used by the planning team includes examination of vulnerability (exposure, sensitivity and adaptive capacity) as a necessary precursor to evaluation of risk (a function of vulnerability and probability). Elkford used the probability of occurrence of each impact over the 20-year period covered by the OCP. Probability is based on historic occurrence, climate trends and, to the degree possible, climate projections. After a risk level was established, the community as a whole had to determine what level of risk it was willing to accept (risk tolerance).

ACTION PLANNING

For each climate change issue of concern to the community, adaptation goals and objectives were identified and adaptation actions formulated. The Adaptation Strategy defined four overarching goals, nine objectives and 26 actions. These were integrated directly into the OCP, which was adopted by council in May 2010. Consideration of climate change in all decision making is one of the OCP’s 11 guiding principles. Adaptation is included throughout the document. For example, the OCP sets out a Wildfire Protection Zone that requires that developers submit fire hazard and risk assessments conducted by certified professionals before a development permit can be issued. The OCP also calls for the development of a community evacuation plan in the event of an extreme wildfire or flooding event.

District staff are now updating Elkford’s development regulations and bylaws. The Zoning and Subdivision Servicing (Infrastructure) bylaws are viewed as particularly important in enhancing resilience to climate change. For example, the new flood plain development bylaw

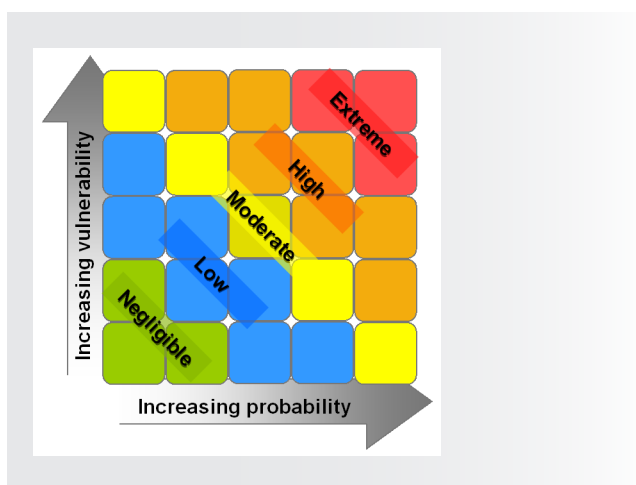
may include increased set-back requirements to reduce flood risks. In addition, council has requested funding from the provincial government to raise the local dike, which protects homes, businesses and critical municipal infrastructure in low-lying areas of the community. Elkford is facing various challenges as it updates bylaws and regulations, including those related to the limited availability of detailed projections of future climate change impacts and precedents of considering only historic data in infrastructure design.

RISK EVALUATION FRAMEWORK

The project team filled in the following tables for each climate-related issue of concern to the community, based on the findings of their literature review and stakeholder workshop discussions.

SENSITIVITY & EXPOSURE	Current and expected risk
	Expected climate and non-climatic changes
ADAPTIVE CAPACITY	Potential adaptation actions
	Barriers
RISK EVALUATION CRITERIA	1. Degree of sensitivity (low, medium, high)
	2. Adaptive capacity (low, medium, high)
	3. Probability of occurrence in a 20-year planning period (unlikely to occurs frequently)
Overall risk (negligible to extreme)	

RISK EVALUATION MATRIX



LESSONS LEARNED

The community has identified several lessons learned that are being shared to assist other communities that are undertaking similar adaptation plans and strategies.

These include

- the benefits of modifying existing adaptation risk assessment and decision-support tools and processes, rather than developing something completely new
- the critical role of public engagement in the planning process
- the value of placing initial focus on “no-regrets” actions, a policy or measure that provides net social and/or economic benefits regardless of future climate changes
- the importance of integrating adaptation into a community’s existing planning policy and regulations
- that community plans, including those for upgrading and new infrastructure, require forward-looking information in addition to historical information
- that effective strategies can include a range of actions that complement each other in the achievement of a defined goal, rather than defining adaptation “options” that require choosing between actions

In Elkford, the process of assessing risk and incorporating the findings into the OCP took about one year and cost just over C\$31,000 (plus significant volunteer time). This case study highlights the ability of a small community to efficiently enhance resilience to climate change by integrating results of a simple risk-based assessment of vulnerability into standard community planning processes.

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This case study is one in an ongoing series prepared by the Climate Change Impacts and Adaptation Division, Natural Resources Canada. The series illustrates a range of climate change impacts and adaptation responses from communities across Canada.

Watch for updates at adaptation.nrcan.gc.ca.

ADDITIONAL INFORMATION

Black, R. A., Bruce, J. P. and Egener, M. (2010). *Adapting to Climate Change: A Risk-based Guide for Local Governments in British Columbia*. Ottawa, Ont.: Summit Enterprises International Inc. http://adaptation.nrcan.gc.ca/projdb/pdf/212_e.pdf and http://adaptation.nrcan.gc.ca/projdb/pdf/213_e.pdf, [accessed May 4, 2011].

Gorecki, K., Walsh, M., and Zukiwsky, J. (2010). District of Elkford: Climate Change Adaptation Strategy; for District of Elkford, British Columbia. <http://www.elkford.ca/include/get.php?nodeid=93>, [accessed May 6, 2011].

ICLEI Canada. (2010). *Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation*. Toronto, Ont.: ICLEI Canada. <http://www.iclei.org/index.php?id=11710>, [accessed May 4, 2011].

Lemmen, D. S., Warren, F. J., Lacroix, J. and Bush, E. (Eds.). (2008). *From Impacts to Adaptation: Canada in a Changing Climate 2007*. Ottawa, Ont.: Government of Canada. http://adaptation.nrcan.gc.ca/assess/2007/index_e.php, [accessed May 6, 2011].

Snover, A.K., L. Whitely Binder, J. Lopez, E. Willmott, J. Kay, D. Howell, and J. Simmonds. (2007). *Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments*. In association with and published by ICLEI – Local Governments for Sustainability, Oakland, CA. <http://ces.washington.edu/cig/fpt/guidebook.shtml#downloading>, [accessed May 5, 2011].

District of Elkford (2010). District of Elkford Official Community Plan Bylaw No. 710, 2010 Schedule “A,” for District of Elkford, British Columbia. http://www.elkford.ca/official_community_plan, [accessed May 4, 2011].

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Aussi disponible en français sous le titre : Planification communautaire et adaptation aux facteurs de risque à Elkford, en Colombie-Britannique

Cat No. M174-7/2011E (Print)
ISBN 978-1-100-18926-0

Cat No. M174-7/2011E-PDF (Online)
ISBN 978-1-100-18927-7

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