



COLUMBIA BASIN TRUST

COMMUNITIES ADAPTING TO
CLIMATE CHANGE INITIATIVE

DISTRICT OF ELKFORD
CASE STUDY



CASE STUDY: DISTRICT OF ELKFORD

About the Case Study

In 2008 Columbia Basin Trust (CBT) selected the District of Elkford to participate in a one-year community learning, engagement and planning process on climate change adaptation.

Elkford's interest in the initiative resulted from a desire to see implications of future climatic changes incorporated into their new Official Community Plan (OCP). At the time, Elkford was the first community in British Columbia to integrate climate change adaptation in an OCP.

Elkford's process consisted of seven steps. Each phase was completed by the climate change consulting team, except the final step, which was led by Elkford. They are as follows:

1. Examine potential precipitation and temperature changes;
2. Investigate climate change impacts;
3. Develop risk scenarios (impact pathways);
4. Identify community adaptation priorities;
5. Undertake vulnerability and risk assessments;
6. Create an action plan; and
7. Implement, monitor and adjust.

Community Context

Elkford has a population of 2,463 people (2006 Census) and is located in the southern Rocky Mountains in the southeast corner of British Columbia. Branded as "Wild at Heart," the community is surrounded by stunning mountains, lakes, rivers and year-round recreation opportunities. It was established as a mining town in 1971, and the economy is strongly tied to the resource extraction industry, primarily coal mining, but is currently experiencing growth in the tourism industry and recreational property investment.

Climate-Related Changes

The Pacific Climate Impacts Consortium (PCIC) prepared a historical climate analysis and future climate projections to inform local understanding of how Elkford's climate has changed and how it may continue to change in the future.¹

¹ Arelia T. Werner, Brenna M. Paterson & Harpreet K. Jaswal, "Analytical Summary: Past Trends and Future Projections for the Kimberley and Elkford Region – DRAFT", Pacific Climate Impacts Consortium, October 2008. The analysis remains in draft form as of the preparation of this report; completion is expected later in 2009.

Summary of Climate-Related Changes

Temperatures in the Elkford area have warmed about one to one and a half degrees Celsius over the last century, and are forecast by PCIC to warm by an additional two to three degrees by the year 2050.

Precipitation in the Elkford area has seen a slight increase over the last 100 years, with a clear trend to less precipitation in the form of snow. In the future, Elkford is predicted to have a zero to five per cent increase in precipitation overall but up to 20-25 per cent more precipitation in the winter by 2050. As temperatures increase, winter precipitation is more likely to fall as rain, rather than snow.

Stream flows have also been changing, with peak spring flows shifting into April/May from May/June since the 1950s. Future projections for stream flows predict earlier spring freshets with lower peak volumes and a more sustained duration, and lower stream flows in late summer and early fall.

Snowpack is expected to reduce by zero to 15 per cent. Over the course of the project, local residents and stakeholders were asked to identify climate changes that they have observed. Examples include: warmer winters, longer gardening season (can grow vegetation they couldn't grow before), water level at the horse pasture south of town has dramatically decreased in 29 years, snowfalls have increased intensity and come later in the year and prevailing wind direction has changed.

Community Impacts and Vulnerabilities

The climate change adaptation research team, with community input, determined three priority areas—wildfire, flooding and water supply—to be most vulnerable to future climatic changes in the Elkford context

Wildfire

Studies from across Canada have shown that future climatic changes will likely increase:

- The total area burned by wildfires²;
- The total length of the fire season³; and
- The proportion of critical fire weather days.⁴

“Whether the reason is global climate change, or normal weather cycles, it would be prudent for British Columbians to prepare for the probability of more hot, dry summer weather.”

–Firestorm 2003:
Provincial Review

² Flannigan et al., 2005: Future area burned in Canada

³ Benton, 2003: Potential changes in forest cover and fire danger in the Columbia Basin

⁴ Williamson et al., 2008: Assessing potential biophysical and socio-economic impacts of climate change on forest-based communities

Changes in wildfire regimes may increase risks to Elkford, but also provide opportunities. Potential opportunities of increased fires and burned landscapes include:

- Economic benefits from wood salvage and harvesting of burned and pine beetle impacted forests;
- Harvesting of non-timber forest products (e.g. berries, mushrooms); and
- Increased hunting opportunities.

Water Availability and Flooding

Timing of the spring runoff will likely shift earlier in the spring, as historical stream flow data for the Elk River indicates a trend towards earlier peak flow. Mountain pine beetle kill, wildfires, and increased winter rain events decreased capacity for water retention within the ecosystem, so the frequency and severity of flooding events is likely to increase.

Smaller glaciers, declining snowpack, shifts in timing and amount of precipitation and prolonged drought will increasingly limit water supply during periods of peak demand.⁵ With regard to flooding, Elkford's sewage operations are on the boundary of two of the three water wells and within the 200-year flood-line.

Surface water and groundwater aquifers will be affected by climate changes. It is expected that future reductions in stream flow will have negative effects on both groundwater recharge and discharge rates.⁶ The implications of these climatic changes could place a stress on water use in Elkford.

Although there will be impacts on water supply, some water-related opportunities may be observed with projected climatic changes in Elkford. These include reduced winter snow removal costs, prolonged summer tourism and recreation and reduced snow shoveling for residents.

⁵ Natural Resources Canada (NRCAN) (2007) - From Impacts to Adaptation: Canada in a Changing Climate.
http://adaptation.nrcan.gc.ca/assess/2007/index_e.php

⁶ Ibid.

Summary of Elkford’s Vulnerabilities

Wildfire Risks	Flooding Risks	Water Quality and Availability
Wildfire enters district boundary	Flooding of buildings or lands	Decreased water quality
Smoke alert from nearby wildfires	Damage to bridge integrity	Decreased water availability
Evacuation of whole or part of community	Storm water management stress	Decreased aquifer recharge rate
Road and highway closure (Hwy 43)	Death/injury to river recreation users	Decreased watershed health and integrity
Backcountry/ forest closures due to high fire risk	Pumphouse floods and compromises water supply	Increased turbidity of river water
Damage to infrastructure and homes		Increased cost of water treatment due to health regulation
Loss of life from wildfires		
Closure of mine due to fire risk (for at least one day)		
Lawsuit against Elkford for fire damage		

Adaptation Actions

The consulting team developed adaptation goals, objectives and 25 strategies.

The following table summarizes the goals, objectives and high-urgency strategies that should be initiated within two years of Elkford’s climate change adaptation plan.

Goal	Objective	High Urgency Strategy Recommendation (0-2 year implementation)
<p>Resilient FireSmart community</p>	<p>Reduce the likelihood of wildfires penetrating the wildland/urban interface</p>	<p>Implement wildfire fuel reduction program Park and trail development</p>
	<p>Reduce the vulnerability of new developments to wildfire</p>	<p>Fire hazard development permit area in Official Community Plan Update subdivision and servicing bylaw Update zoning bylaw</p>
	<p>Fire resilient homes and buildings</p>	<p>Update building bylaw</p>
	<p>Prepared for wildfire emergencies and evacuations</p>	<p>Community evacuation plan</p>
	<p>Enhance regional forest management and wildfire planning</p>	
<p>Prepares for and mitigates flood risk</p>	<p>Reduce the vulnerability of infrastructure to flooding</p>	<p>Protect key infrastructure located within or near the floodplain from flooding Update the Elk River and Boivin Creek development permit area bylaws Update Road Design Standards: Require water retention or on-site stormwater management techniques</p>
	<p>Manage the land to enhance water retention</p>	<p>Adapt development cost charges for development of greenspace in flood prone zones</p>
<p>Understand and manage water supply</p>	<p>Encourage water conservation and demand reduction</p>	<p>Adapt municipal building bylaw to require low-flow plumbing fixtures for all new buildings Update subdivision servicing bylaws: Implement low impact development standards for new developments</p>
	<p>Understand the nature and characteristics of the Elkford’s water supply</p>	
<p>Climate change adaptation is considered in future planning decisions</p>	<p>Future land use planning, and development decisions consider climate change adaptation</p>	<p>Integrate strategies throughout the Official Community Plan</p>

For More Information about the Communities Adapting to Climate Change Initiative:

Website: www.cbt.org/climatechange

Email: adaptation@cbt.org

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Duration of project: One year

Project budget: \$31, 218 (with an additional 85 in-kind hours from the consulting team)