

Elk River

FLOOD STRATEGY



WHY do we need an Elk River Flood Strategy?

After the 2013 flood, a group of Elk Valley local government officials and staff, industry representatives and community members met and reached consensus that we needed:

- A better understanding of the current and future conditions of the Elk River.
- A holistic flood strategy protecting residents, community infrastructure, as well as watershed function and wildlife.

“Find a balance between protecting people and land - rivers and riparian areas are needed for community, industry and tourism. The river is a resource too.”

- Elk Valley Resident,
Oral History Interview

Since Fall of 2013, the Elk River Watershed Alliance (ERA), the local community-based water group, took on the challenge of coordinating this project. ERA fundraised \$250,000 for the project, convened a team of experts, gathered community input and managed the deliverables for a holistic, watershed wide flood strategy.

PRINCIPLES of the Elk River Flood Strategy:

- Be proactive
- Collaborate and share resources between local governments and other stakeholders
- Think holistically on a watershed scale
- Identify actions to reduce flood risks and promote innovative flood mitigation solutions
- Increase watershed literacy with respect to floods
- Integrate with other initiatives and efforts

How did ERA collaborate on the development of the Elk River Flood Strategy?

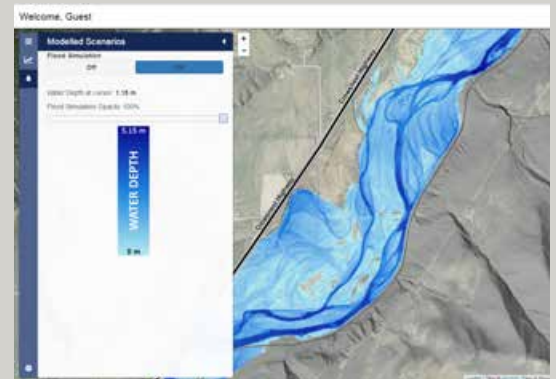
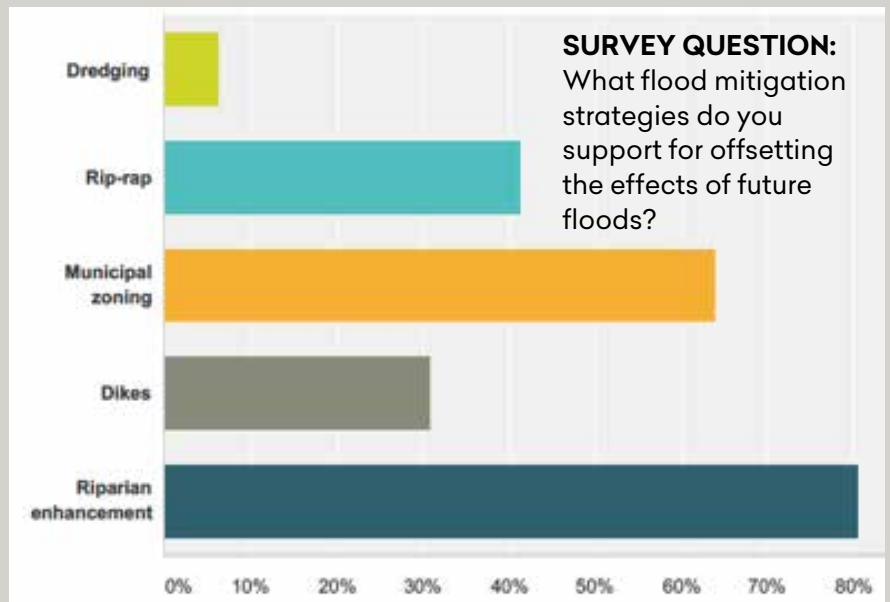
- Convene an expert team of engineers, biologists, hydrologist, environmental managers, municipal government experts to research and write the Strategy.
- Analyze what conditions result in flooding and how these are affected by land use and climate changes.
- Understand the interconnection between hydrology, ecology, and water quality and how changes to one element affect the others.
- Complete a literature review of the effects of flooding and flood mitigation on fish and wildlife.
- Simulate hydrological modeling to determine future scenarios evaluating streamflow response to land use and climate change.
- Develop a hydraulic model between Hosmer and Coal Creek to evaluate the inundation of water between different flood scenarios.
- Complete an overview of flood mitigation strategies that are both effective and preserve watershed function and diversity.
- Complete a historical review of Elk Valley flood history, resulting damage, and emergency response by using archived photos, newspapers (Ferne Free Press 1902-present), historical societies and archives, as well as eighteen oral history interviews with long time valley residents.
- Two community outreach educators attended 23 events (during Spring/Summer 2015) in Elkford, Sparwood, Fernie, Elko and the Ktunaxa nation reaching

“We need the wisdom and foresight to follow through with plans and stay with them. Elk Valley needs more dreamers!”

“Elk River is a dynamic force; in the end the river will win!”

“Flooding is a human construct; it's only a “flood” when it affects people/ infrastructure. We can't fight them, only adapt.”

over 1000 residents with flood education. This contact was a catalyst for 200 completed surveys assessing community perspective of flooding and support for flood solutions.



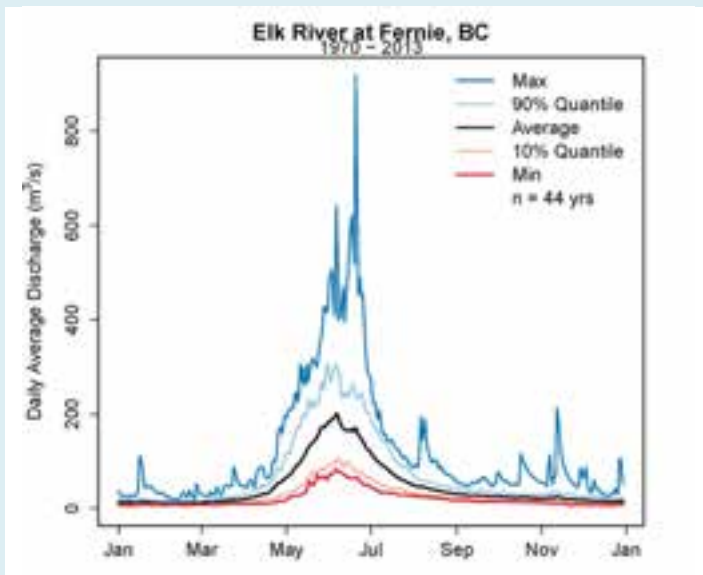
Example of the web-based flood inundation visualization tool developed as part of the Flood Solutions Strategy.
<http://elkriveralliance.watersimulation.ca>

- Hosted two community feedback workshops with 100 decision makers and community to check back about results, identify gaps and attempt to reach consensus on recommendations.
- Complete an analysis of flood planning and mitigation from the 1990s throughout the watershed in an effort to inventory the efforts of local governments and community to date.
- Prepare flood mitigation concept designs and associated cost-estimates to help prioritize flood risk sites in the RDEK Area A. Identify additional study requirements and seek matched funding for infrastructure improvements.

Findings and Highlights

KEY FLOOD FINDINGS:

- In reviewing the three largest floods on record (2013, 1995, 1974) flooding occurred almost exclusively during peak flow with extreme rainfall events coinciding with near-peak snowmelt.
- Although there has been an increase in spring rainfall and winter snowpack since 1970, this has not increased average streamflow.



Elk River at Fernie flow regime (1970-2013)

- Future streamflow simulation suggest that:
 - Climate change has an over-arching effect relative to land use change, and that runoff is expected to be earlier in the spring.
 - Higher snowpack in winter could result in higher spring streamflow on average
 - Land use changes result in slight streamflow increases in the spring and slight decreases during June.
 - There is definite increase in total May-June rainfall at both Fernie and Sparwood.
- Watersheds are both a source and a sink. Snowmelt and rainfall is not easily managed but storing of water in forests, riparian areas, wetlands and soils can reduce discharge velocity.
- When the riffle-pool channel morphology, gravel bar and large woody debris is stable, this provides very high fish value.

What could effective flood management in the Elk River watershed look like?

Recognizes that natural and human activity affects watershed function and can cause fragmentation and a loss of diversity, both of which can further reduce the watershed's resiliency to future disturbances.

“Local government should be responsible for zoning floodplains, and use their authority to say no to construction”



“People feel like more should be done as prevention rather than response. Do it right and do it before another flood happens.”

armouring (i.e. rip rap), although effective can work against natural processes to create stable sediment transportation and thus very high fish habitat.

- Communities in the watershed have municipal emergency response plans for flooding; they just need to be better communicated to citizens
- Proactive planning is required to assess flood risk, protect infrastructure and flood proof properties.



Wetland

Recommendations:

1. Continue to build on this flood strategy, using an integrated, collaborative and coordinated approach to flood management and mitigation.

- Adopt the Elk River Strategy as a first step toward an integrated Elk River Watershed Flood Management Plan.
- Form an Elk River Flood Management Committee.
- Limit development in the floodplain.
- Address community concerns about flood impacts from private land.
- Continue with hydraulic modeling in high priority areas in the Elk River Watershed.

2. Keep people safe from flood risks.

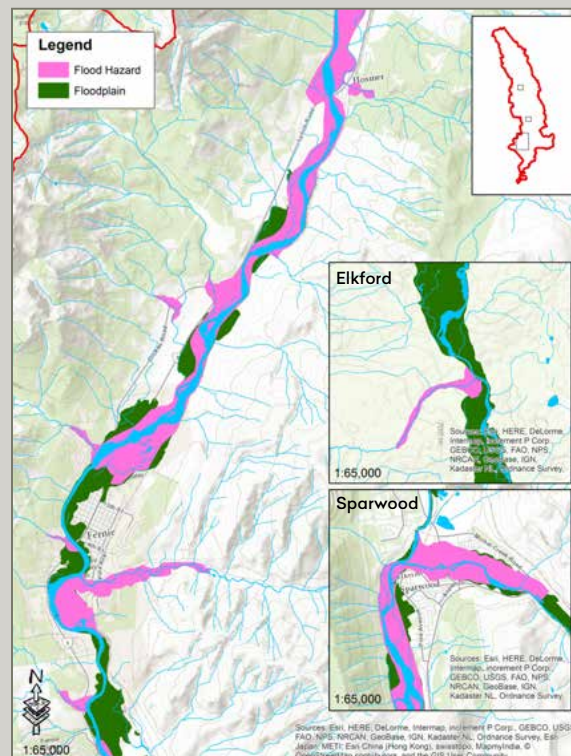
- Help homeowners prepare for future flood impacts.
- Continue to increase community watershed literacy about flooding.

3. Protect key infrastructure.

- Use tax resources wisely to increase watershed resilience and protect habitat. Avoid reactive 'quick fix/non-strategic' actions.
- Where diking and riprap are required, incorporate natural habitat elements to offset impacts to fish and wildlife habitat.
- Monitor and maintain existing flood infrastructure in good working condition to protect citizens.
- Restrict dredging, as the cost to the river ecology outweighs the perceived short-term benefits.
- Where possible, protect and re-establish riparian areas, wetlands and off-channel habitats.

4. Respect the natural function of the watershed to provide a buffer of resilience to climate change.

- Use information in this Strategy to guide flood management and mitigation decisions.
- Limit development in the erodible corridor (valley bottom) to the furthest extent possible, to maintain ecological function.
- Promote best flood management practices for developers and private landowners in flood prone areas and with municipalities regarding stormwater management, riparian protection, and erosion protection.
- Acknowledge that crisis in the watershed can oscillate between floods and droughts; therefore, plan for mitigation measures to address both extremes.



Flood Hazard and Floodplain mapping in Elkford, Sparwood, Hosmer and Fernie

The Elk River Alliance team of Lee-Anne Walker, Ayla Bennett, Marsha Clarke, Graham Preston and Chiara Cipriano wish to thank the following for their assistance in helping to produce the Elk River Flood Strategy.

FUNDERS

RDEK, CBT, Real Estate Foundation BC, Teck, Mitacs

CONTRIBUTING PARTNERS

ERA, University of Lethbridge, Teck, MacHydro, Lotic Environmental

SPECIAL THANKS TO OUR PEER REVIEWERS

Stella Swanson PhD/Aquatic Biologist, Jim Miller PEng (retired), Bruce Elson PEng (retired)

For more information about this Strategy see: www.elkriveralliance.ca

