



Preserving Our Lifeline

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the waters of the bow river basin*

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FLOOD - The Other "F" Word?

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Gordon Lightfoot, the icon of Canadian folk music, intones, "When the skies of November turn gloomy" as a warning to ships plying the waters of Lake Superior. In land-locked and water-short southern Alberta, Lightfoot's words don't have the same cachet, but recent storm events have begun to sensitize us ...

The floods of 1995, 2002, 2005 and now 2013 have made us start to search the skies of May and June for signs of impending doom. Spring rain used to fill our prairie souls with joy; now the same rain, especially when it persists for days, fills us with a sense of dread.

With these recent experiences we've started to look at a flood as the other "F" word. Are we justified in thinking of this phenomenon in such harsh terms?



Bow River in flood, downtown Calgary, June 2013. Photo: Kathryn Hull.

Is it possible to have more than one "flood of the century?" Given that we've seen four major events in 18 years, a term like "flood of the century" seems meaningless, more of a joke than a measurement to the next big event. What we need to understand about a 100-year return interval is not that a major flood will only happen once in that period, but rather there is a one percent chance of it happening in any year. So it is possible that we can experience recurring large floods, one after another.

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Why are large floods occurring more frequently? Maybe we need to recognize that greater levels of uncertainty and extreme variability are the new normal for us.

Floods happen and they tend to recur in a predictable nature as the accumulated snow of winter meets the rising air temperature of spring. Water transforms from a solid state to a liquid one faster than the Earth can absorb it. That’s especially evident when heavy rain accompanies or follows snowmelt. Surplus water swells thousands of tiny drainages and coalesces in small streams. Those hundreds of small streams feed larger creeks and rivers, as gravity pulls water from higher elevations lower.

A crest of water rolls downstream, filling the channel and often spilling into adjoining low-lying areas. Most of these “floods” go by and we hardly notice, short of some brownish water that can thwart the efforts of anglers and possibly a mild taste of chlorine in the tap water.

What all floods have in common, the average and the not so average, is that measured over the year, they represent the time of greatest volume, highest speed and most energy. All of these features are important to consider when trying to understand flood dynamics.

Volume is the easiest one to observe; there is simply a lot more water. That water has to fit somewhere and when the volume exceeds the capacity of the channel (the area between the banks) it climbs out of the restriction into the low lying area called the floodplain. It’s a rather clever adaptation to periodic bursts of water



Bowness Park, Calgary, June 2013. Photo: Andrea Czarnecki

and provides a river with a safety valve to temporarily store its excess water, outside of the channel.

Because rivers only use floodplains on infrequent occasions we tend to forget they exist and what role they provide. Like house insurance, we hope we will never need it, but without it we shoulder tremendous risk. It’s worthwhile taking a little windshield tour after floodwaters have receded to remind ourselves of the outer boundaries of the floodplain. The accumulated flood flotsam and jetsam are the silent messages of the river, telling us where it needs to be after the gales of June come slashing.

Speed and energy are inextricably linked. Water is a heavy substance, a cubic meter of it weighing almost as much as a Toyota Corolla. If you’ve ever been “bombed” by some trickster with a pail of water, you have instant understanding of the shock of an innocuous liquid hitting with such power.

Unlike the pail of water, a river’s volume keeps pounding away, and as the speed increases so does the power of that water. A mere doubling of the velocity of the water quadruples its ability to erode; that’s a lot of aqueous Toyota Corollas with a lot more horsepower. When the energy of a flood comes rushing down the channel it can be alarming – pounding, grinding and carving away at the bank as it goes.

This is the point where the safety valve of the floodplain becomes apparent, slowing the water down as it escapes the channel. It also helps to have a floodplain bristling with natural infrastructure like trees and shrubs, because they blunt the force of that rushing water: slower water, less energy.

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The problem is that floodplains are such inviting places. They lure us with their flat nature, their pleasant umbrella of trees and proximity to water.

The river doesn't use them much so why don't we develop them? To put this into perspective, Deerfoot Trail through Calgary has very little traffic on it at 2:00 am. But very little traffic doesn't mean it's a good place to pitch your tent. A periodically dry floodplain is no different.

When we forget how land and water function and interact, great consternation erupts from us when the river decides to reoccupy its land. Rivers become enemies, invaders; they need to be controlled, straightjacketed and made mindful of our developments. It's a wonder that in our pursuit of saving ourselves from rivers, we never seem to think long term about protecting rivers from ourselves.

We resort to engineering solutions, like channelization, berms, dikes, riprap and straightening, to keep the river off "our" land. Most of these "solutions" to mitigate flood effects are really just transferral devices that move the problems to downstream neighbours. Sometimes those solutions work, or they seem to for a while and then a larger flood tests them and finds the weak spots. To watch a river work in flood times—probing, pushing, attacking and outflanking its man-made "solutions"—is an exercise in military maneuvering that most generals would envy.

There is an axiom, rarely heeded, that says in the tension between water and

land, water always wins. Water always wins! A river holds a mortgage on the shore; it will foreclose in the fullness of time, irrespective of our puny efforts to stall the debt with our engineering schemes for deferral.

It might be instructive to look at one of the longest running flood control and mitigation experiments in North America, an initiative of the world-renowned US Army Corps of Engineers for the Mississippi River and its tributaries. For almost 200 years they have engaged in an engineering contest with water. It has included humongous dams on the Missouri River, capable of holding several years worth of water, a massive set of levees paralleling the Mississippi River to prevent floodplains from being flooded, floodwalls (the "concrete solution"), spillways to periodically divert excess flows and "channel improvements" (read: "dredging").

In spite of this, recurring floods have routinely overtopped levees inundating farms, fields, towns and homes. In the spirit of full cost accounting, these control and mitigation solutions have probably dramatically increased financial losses, not reduced them, because people felt it was safe to build, develop, farm and live in the floodplain.

The US Army Corps has had to resort to blasting open levees, allowing flood waters to reoccupy the floodplain, to save downstream businesses and people. Now, in the fullness of time and experience the Corps says "Whenever possible the best way to manage floods is within a natural floodplain" (Wall Street Journal, 9 May 2011: <http://online.wsj.com/news/articles/SB1000142405274870386>

4204576311493351900976). Their strategy now includes allowing more flooding to occur and discouraging development on floodplains to reduce risk and economic losses. Imagine that!

Mark Twain apparently recognized this natural truth as early as 1883 when he wrote about the Mississippi: "Ten thousand River Commissions, with the mines of the world at their back, cannot tame that lawless stream, cannot curb it or confine it, cannot say to it, Go here, or Go there, and make it obey...cannot bar its path with an obstruction which it will not tear down, dance over, and laugh at" (Life on the Mississippi, 1883).

This is cold (maybe wet) comfort to many who live on floodplains. Everyone can agree that floods, especially the big ones, can be frightening, devastating and the reactions to them emotionally charged. The reality is the threats and the losses are largely of our own making, notably regarding development in floodplains and routinely rebuilding to the same standards after floods recede, while ignoring our watershed-scale industrial impacts. It has led to a raging debate over flood mitigation and costs.

A partial solution might include thinking about not only the volume of water in a flood but also how fast it is delivered to your front door. Water from snowmelt and rainfall used to take longer to get downstream. A survey of our watershed will likely show that collectively we've cleared,

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cultivated, logged, built roads, paved over portions, removed the meanders of streams, blown the beaver dams and drained the wetlands of a great deal of the landscape upstream from us.

It's now a short and speedy run for water to find a basement near you. Flooding isn't simply a river issue; it is one of larger scale that occurs across the watershed. Many watersheds have lost the capacity to slow down, hold, absorb and store runoff. In effect, we've assisted gravity in the upper portion of the watershed with our land use footprint and resource extraction, then tried to fight gravity downstream with engineered structures. That's a losing proposition.

Our efforts might be better placed, working at a larger scale, with all of our watershed neighbours. What we cannot change, like the reality of an altered climate, we need at least to recognize, and learn to adapt to greater variability, especially in river flows. There is no "get out of floods free" card; they will still occur but we may be able to moderate their impacts on us.

Let's manage our watersheds by maintaining cover, allowing water to soak in and be stored in riparian areas and in the uplands, especially in our headwater forests. We can improve watershed management by restoring wetlands and letting floodplains do what nature designed them to do. If we recognize that roads, trails and land clearing (like logging, paving or cropping) speed up and deliver water faster to those downstream, we might start to reverse the extent of our footprint.

These are all things we have control over and we have the capacity to change how they contribute to flooding. In terms of full cost accounting, investment in better watershed management might net us a less costly, long-term response to flood risk. It is a different way to look at flood mitigation. But, to paraphrase the man's prayer recited by members of Red Green's Possum Lodge—"We're watershed residents, we can change, if we have to, we guess." And just as Red Green knows that hard times in life bring valuable lessons, we should also remember the beneficial aspects of natural floods and stop referring to them as a bad word.

Oh, and let's not build anything else on the floodplain. If we continue to, Gordon may be inclined to pen another classic, maybe called "The Wreck of the Alberta Landscape." It will be a hit when the skies of May and June turn gloomy.

A Fond Farewell to Mac Hickley



This past November saw the departure of Mac Hickley from Calgary River Valleys. Mac has decided to take on a new and exciting challenge with the Land Use Secretariat in Edmonton. He will be using his superlative and finely-honed planning skills to aid in the continuing roll out of regional land-use plans.

Here at the BRBC we have enjoyed the privilege of working with Mac for a number of years. During that period, Mac has proven himself to be a reliable and wise stalwart of a number of BRBC projects and committees. He particularly distinguished himself through his service to both the Legislation and Policy Committee and the Stakeholder Engagement Committee.

The hallmark of Mac's efforts is his thoughtfulness and keenly analytical mind. I have learned through (pleasant) experience that if you ask Mac to review a document, you will get it back very quickly and thoroughly reviewed. Mac's quiet demeanour precluded him from ever hijacking a discussion. However, when he did speak, it was a certainty that he would reveal a deliciously intelligent gem. Sometimes, with sufficient prompting, he might also turn his logical and systematic thinking to the role of "devil's advocate." He could be counted on to ferret out the well-hidden, yet subtly important flaws, in an otherwise perfect treatise.

We are going to miss Mac, although he really isn't far away, and we wish him well. Rumour has it that when Mac is done sorting out the Government of Alberta, he may turn his attentions to the less taxing job of reorganizing the United Nations.

"May you have the hindsight to know where you've been
the foresight to know where you're going
and the insight to know when you've gone too far."

- Mark Bennett

REVIEW: RBC Blue Water Project Report

Claudette Lacombe, Umbel Communications

If you are one of the many people working to address today's local, national or international water issues, there are two reasons to read the RBC (Royal Bank of Canada) Blue Water Project 5-Year Report released last spring.

The first reason is it gives readers encouragement through the sheer volume of people, organizations and programs focused on these issues while it pats RBC on the back for all it accomplished with this program over the past five years.

RBC deserves the pat, mind you, for funding over 500 organizations and over 2,000 programs. That's a lot of people working to resolve water issues at home and abroad. The ingenuity and determination shown by these groups is phenomenal.

The second reason is to discover in detail the kind of projects that receive money from RBC, particularly because the fund intends to take a new direction over the next five years.

The RBC Blue Water Project funds programs under the headings Youth, First Nations, People in Crisis, Home and Property Owners, Farmers, Outdoor Adventurers, Galleries, Science Centres and Museums, Catalysts and Collaborators. They use these titles in the report with several examples under each, describing exactly what they mean.

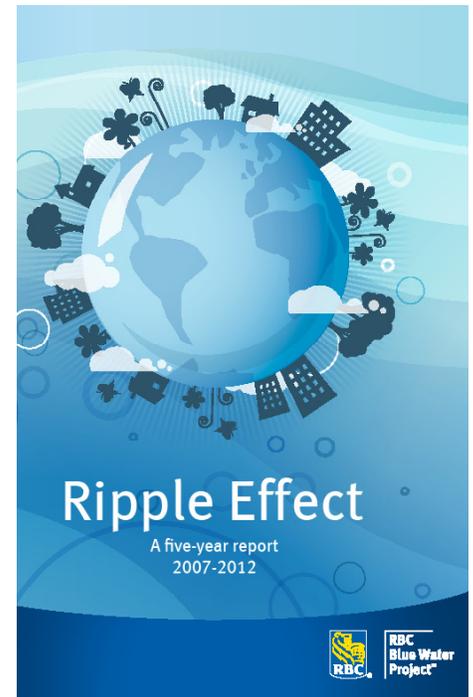
If you work with an organization or have a program that could benefit from some RBC Blue Water Project funds, you could use this document to guide your grant request.

For instance, Learning for a Sustainable Future (<http://www.lsf-1st.ca/en>) is one of the organizations that received RBC funding. It is a non-profit Canadian organization created to integrate sustainability into Canada's education system.

The University of Calgary tapped into the fund for its online portal that makes public its groundwater management findings. According to the RBC, this initiative “educated 700 homeowners and 1,300 school children about their impact on local groundwater and surface water levels and the importance of monitoring water levels.”

The Bow River Basin Council shows up under the Catalysts heading where the report has this to say, “Bow River Basin Council is a change-making organization vigilant in its mission to protect and improve the water quality of the Bow River, and they're now facing a new threat - increased development in the region. With funding from the RBC Blue Water Project, the Council created sophisticated computer models to illustrate what the river will look like if best environmental practices are incorporated into development plans - and the problems that may await if they are ignored.”

If you are a small business owner or entrepreneur, the report includes information about RBC's willingness to work with venture capitalists creating emerging water technologies. In this section, the report highlights Switchable Solutions that developed a unique, energy-



efficient and environmentally friendly solvent technology for extracting bitumen from the oil sands.

Right at the back of the report, just when you think you're done with it, it outlines a new direction for the next five years – that would be now.

“Moving forward, we'll work to protect and restore urban waterways by funding projects that improve control and management of stormwater or rainwater, raise awareness about or use low-impact design or natural systems to control stormwater or rainwater, and encourage more efficient use of water,” in RBC's own words.

To read the full report, visit <http://www.rbc.com/community-sustainability/environment/rbc-blue-water/about/index.html> and click on the Ripple Effect link to a pdf of the report.

The City of Calgary Riparian Strategy

Mike Dempster, The City of Calgary

The City of Calgary is moving forward with a formal strategy pinpointing the protection and restoration of valuable riparian areas ...

"It's something that I think people should be excited about," says project leader, Norma Posada. "We're getting started with the planning and hope to have targets, indicators and an implementation plan in place by the end of this year."

The "Riparian Strategy: Sustaining Healthy Rivers and Communities," is an extension of a riparian health assessment program that began in 2007. The City's intent is to develop tools and policies to protect areas within Calgary's boundaries.

As part of the riparian health assessments, consultants studied 25 per cent of riparian areas and most of the stream banks along the Elbow and Bow rivers, Nose Creek, and West Nose Creek. Numerous areas assessed were found to be in an "unhealthy" state or "healthy but with problems."

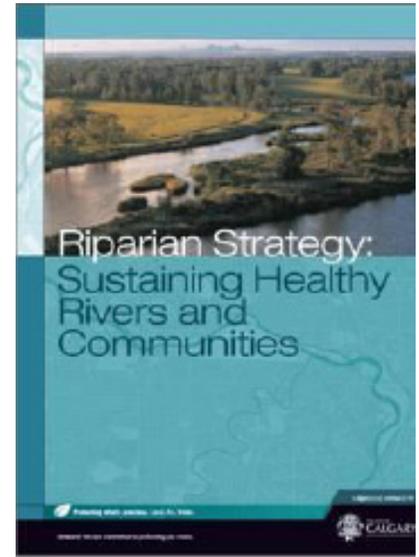
Last summer, The City elevated its commitment. The Standing Policy Committee on Utilities and Corporate Services endorsed Water Resources' report on the Riparian Strategy: Sustaining Healthy Rivers and Communities.

"The City of Calgary has recognized the importance of these areas for a long time and undertaken many

initiatives but we felt we needed a more coordinated approach," says Posada, who coordinated the development of the Riparian Strategy with participation from Parks and Land Use Planning & Policy, and with input from four of The City's watershed stewardship partners: Bow River Basin Council, Elbow River Watershed Partnership, Nose Creek Watershed Partnership and Calgary River Valleys.

Key strengths of the strategy include the following:

- It points to some of Water Resources' key drivers: protecting water quality for Calgary and downstream communities; explaining how lands that border creeks and rivers connect to upland areas and act as natural filtering systems for contaminants and nutrients; and supporting healthy, functioning riparian areas that improve water quality by trapping and storing sediment, and recharging aquifers through slow release.
- It speaks to the importance of riparian areas as being among the most "biologically diverse and productive places on the planet;" as natural areas and open spaces that provide plant, fish and animal populations with critical habitat to survive in human-dominated landscapes; and as key wildlife corridors during yearly migrations.
- It addresses the future, including concerns relating to Calgary's population growth; water



demand and pollution; and the ability of riparian areas to "naturally moderate climate change impacts such as floods and droughts."

Understanding the many benefits and seeing the degradation some areas have suffered because of past planning decisions creates a sense of urgency. Posada says, "Now is the time to act, to prevent more damage."

Whatever the cause, whether through residential, industrial or recreational land uses, riparian functions have been impaired through human activity. Concerns include the erosion along stream banks, extensive presence of invasive species and large areas of bare, hard ground with little or no vegetation.

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“One of the most interesting things that resulted in developing the strategy was the recognition that there are so many competing land uses in these areas,” Posada says.

“It’s a complex issue, something The City of Calgary can’t solve alone. There’s a balancing act. Without the involvement of communities and the general public, we are not going to be successful. We have to work together.”

Mike Murray, Bow River Basin Council program manager, says The City has been successful in creating effective policies in the past. “We’re excited, it’s a step in the right direction and I think there’s much to be done. The City has identified a lot of areas that could use some work.”

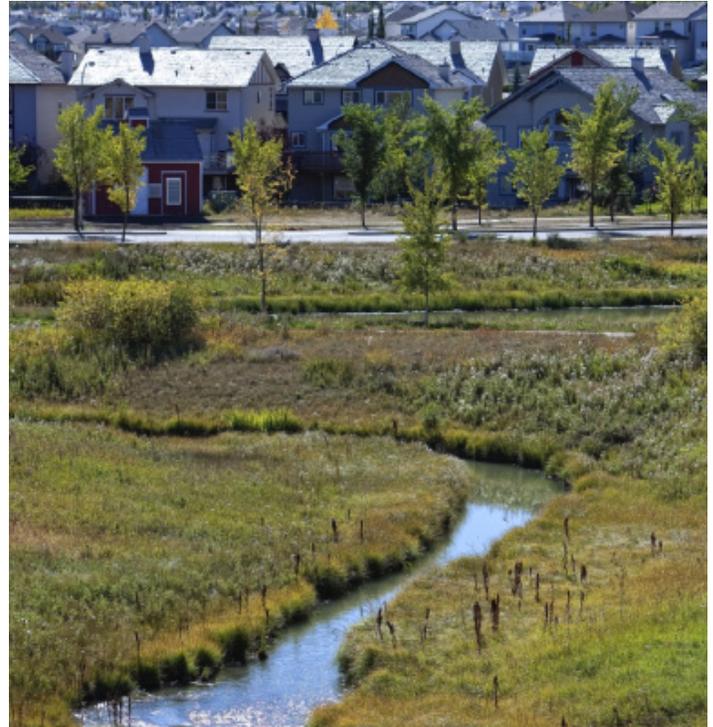
Murray expects that efforts in some riparian areas will enjoy early success while others may take much longer. And, although the strategy includes an eye to educating the general population, he wonders about changing the perspective of those competing land-use interests.

“Education is important,” he says. “I believe it is. But I don’t think education works as fast as we would like it to. It can take generations. But the benefits to having a healthy riparian area are becoming more obvious . . . so it’s one of those things, whether it’s easy or not, we have to go there.”

Posada is optimistic. The first step is developing indicators and targets to measure progress toward the strategy’s objectives. Next is the creation of an implementation plan – not just for Water Resources, but for business units and departments across the municipal corporation. She says, “This will include action items, timelines and assigned roles and responsibilities for different business units.”

A detailed engagement plan is also required. “As we implement the strategy we will move to a broader base including communities and the private sector, consultants and other levels of government.”

The strategy was developed based on an integrated watershed management approach. To be effective, it must align with all levels of government, including the watershed, regional, provincial and federal levels.



Typical riparian area in the City of Calgary. Photo: The City of Calgary

For example, Posada says other watershed stewardship groups also have projects to protect riparian areas. There is a responsibility to work together to avoid duplicating efforts and address gaps where possible.

More work, she adds, may be required to study the impact of last June’s flooding. Some post-flood observational field work showed riparian areas previously deemed to be healthy had maintained their integrity more than unhealthy areas.

More assessments may be required later this year, to re-visit baseline information on priority sites and determine if further action is needed.

“I think the flood reinforced or confirmed our understanding that the healthier these areas are, the more they are able to withstand flood damage.” It’s one more reason Posada and participants are eagerly moving into a new era – one that recognizes the value of riparian areas and the importance of maintaining and restoring their long-term health.

March 12th 9:30 - 15:30
**BRBC Quarterly Educational
and Networking Forum**

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TransAlta Auditorium
110 - 12th Avenue SW Calgary

Contact Information

*BRBC 2014 Casino
Thank You!*

The Bow River Basin Council successfully held its second fundraising casino on January 29th and 30th. These casinos are significant sources of revenue and would not be possible without the support of dedicated volunteers. Last month, some of you not only volunteered your time but also helped in recruiting additional volunteers. The BRBC is grateful to all of you who responded to our calls with incredible enthusiasm, dedication and generosity.

*Thank you very much for your
continued support!*

FORUM SPEAKERS

Susan Ryan
River Valleys Forum
Weather and Our Watershed

Andre Corbould
GOA Flood Task Force
Update and Discussion

Megan Van Ham
WaterSMART
River Modeling Results/Updates

Richard Philips
Bow River Irrigation District
Irrigation District License Applications

Danah Duke
Miistakis Institute
Citizen Science

Gord Lehn
Spray Lakes Sawmills
Headwaters Management in the Bow
River Basin

... and more!

For details and to register, visit:
<https://www.eventbrite.ca/e/brbc-march-quarterly-forum-march-12-tickets-10069007673>

The opinions expressed in the articles in this newsletter are those of the author/s and do not necessarily reflect the views of the BRBC.

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... the next BRBC newsletter will be released in
June

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