



CALGARY

Reducing wildfire risk to protect Calgary's source water

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Source: Adobe Stock Photo

THE SCIENCE

Wildfires can lead to immediate and long-term impacts on the social, economic and ecological systems of communities. More specifically, they can affect the quality of drinking water sources, such as rivers, reservoirs and groundwater, and place an added financial burden on municipalities to operate water treatment during and following a major wildfire. Fires can remove vegetation and reduce the ability of soils to absorb water, leading to an increase in runoff that can transport ash, nutrients, sediments, heavy metals and toxins into streams, rivers and downstream reservoirs used for drinking water supplies. Wildfires can create changes in the water chemistry of nearby streams that often lead to higher concentrations of nutrients, sediment, metals, and dissolved organic carbon. These impacts can last months to years after a wildfire has been contained. While the effect of contaminants tends to diminish over time as the water moves downstream, there have been occurrences in southwestern Alberta where water quality impacts resulting from burned areas persisted for over eight years. This can lead to increased treatment costs. In some cases, emergency response agencies may use firefighting foams to control wildfires. These foams may contain perfluorinated chemicals, which may pose risks to water quality. The ability to anticipate and prepare for potential contamination risks of drinking water from wildfires is an important factor to consider for the successful implementation of preparedness plans and mitigation measures that ensure safe, reliable drinking water supplies is maintained.

THE TRIGGER

Calgary is located at the junction of the Bow and Elbow rivers which allows the city to get its entire drinking water supply from these two water sources. Less than one percent of the Bow and Elbow watersheds are situated within the city boundaries, while the rest is located up and downstream from Calgary, reaching all the way up to the headwaters in the Rocky Mountains. This watershed traverses different land use types including national and provincial parks and wildlands (which cover over 75 percent of land in the Bow River source watershed alone), First Nations reserves and other towns. Calgary is unique in being the first major city along the Bow and Elbow and having a large portion of the land upstream beyond the city protected. Hence, the water quality in the city is extremely high and Calgary is taking a proactive approach to keep it that way.

To better understand the risks to the city's source water quality, the City of Calgary commissioned a Source Watershed Risk Characterization Study with the objectives of mapping vulnerable areas in the source watershed and prioritizing risks. The study identified the risk of water contamination in the upper watershed as a result of a wildfire as one of two highest risks to source water quality.

THE APPROACH

The study reported that water quality impacts following a wildfire depend on the size and severity of the fire, as well as soil, slope, terrain, climate and other characteristics. As part of the study, the provincial fire probability map and watershed vulnerability map were combined with the general travel time zones to create

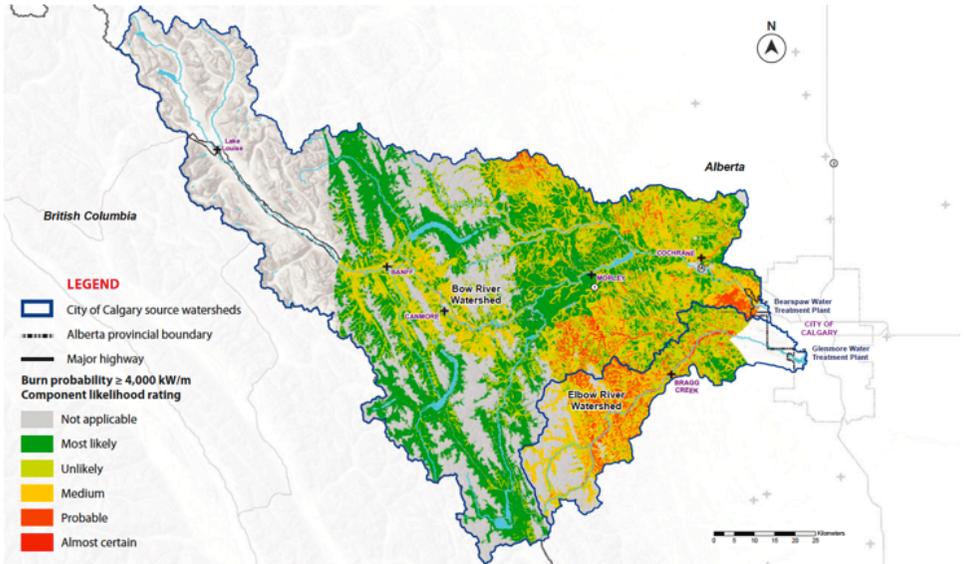


Figure 11: Wildfire Risk Visualization in the Bow and Elbow River Watersheds.
 (Source: City of Calgary)

Figure 11, which identifies areas where high burn probabilities coincide with high watershed vulnerability and shorter travel time distances downstream to Calgary's drinking water intakes. A list of potential water contaminants was also established along with a description of their current treatability.

The City developed a Source Water Protection Plan designed to prevent, reduce or mitigate key source water quality risks to drinking water. This plan includes a commitment to refine the wildfire management strategy with fire agencies in the source watersheds. A regional task force was convened to enhance collaboration on wildfire risk management and identify 11 wildfire-specific management strategies related to land use management, communications and emergency preparedness to help mitigate wildfire potential and impacts within high-risk areas. As part of this approach, the City has been building partnerships with the Province and Parks Canada who are leading wildfire suppression efforts in the area. Discussions with these groups ensure that water contamination risk is understood by those responsible for prioritizing how to approach forest firefighting. The City is committed to continuing to advance the collaborations needed to implement the management strategies and providing leadership and resources to advance the critical management strategies outlined in the regional task force report. In addition, the municipality is working with firefighting agencies operating in the source watershed to consider alternate fire retardants that minimize chemicals of concern in firefighting foams. Once this is established, the City will promote the results of their study and work collaboratively with the region to standardize the type of foams that can be used for fire suppression around the watersheds.

THE OUTCOME

The City of Calgary is still in the early stages of its wildfire risk reduction efforts. Calgary is committed to investing in wildfire management through its Source Water Protection Plan geared towards improving land use planning, promoting innovation in stormwater management to protect water quality, involving the community through education and research, and leveraging key partnerships for risk mitigation. The municipality invested in the creation of strong partnerships regionally and provincially to ensure consistent communication around risks for water contamination associated with wildfires and ensure successful implementation of the source water management strategies.

A WORD FROM CALGARY

When asked about her thoughts on the risk reduction initiatives being established in Calgary, Jen Pouliotte, Senior Watershed Planner for the City of Calgary, mentioned that Calgary has benefited strongly from its location, having two rivers to pull drinking water from. "The quality of our water is very high, but we know we can't stand on our heels and pat ourselves on the back for a job well done. Watersheds and wildfire risks are constantly evolving, and it is crucial to better understand our risk and take actions to reduce it", said Jen Pouliotte. The City of Calgary is hoping that the work being undertaken internally will benefit others in the region.