

Ottawa Citizen

Mapping the risk of floods a never-ending calculation; Politicians, public don't fully understand how the probability works, professor says

Tue Apr 30 2019

Page: A4

Section: City

Byline: Tom Spears

Source: Ottawa Citizen

Illustrations: Errol McGihon / Gary Lemieux surveys the berm of sandbags holding back the rising water behind his property on Lena Street in Arnprior on Monday.; / Slobodan Simonovic;

Floodplain maps are useful tools to show where there's too much risk to allow development, says an engineering professor who studies floods.

The problem: A lot of people don't understand them. And there is sometimes political pressure to ignore them.

On top of all that, risk estimates keep changing just as rivers themselves do.

Slobodan Simonovic belongs to a research group at Western University called the Institute for Catastrophic Loss Reduction, which looks for ways to reduce the effect of tornadoes, floods, earthquakes and other disasters.

(The group's work on the Three Little Pigs House, where they simulate tornado forces, led to results we covered after last fall's Dunrobin tornado.)

We asked Simonovic what the flood-risk numbers mean, how they change, and how they are sometimes misinterpreted. Does a one-in-100-year designation mean there will be a flood every 100 years? No. It means that in every year there is a one-in-100 chance of a big flood, he said. This could happen today or it could be decades away. And having one flood today does not mean it will take 100 years - or

any other long period - before the next one hits.

"I think especially the decision-makers and politicians are quite often manipulating the numbers but not fully understanding the meaning," he said. "The general public definitely do not fully understand. The idea of the probability of, say, a hundred-year flood is very misleading. It doesn't mean you have a flood every 100 years."

And just as flipping a coin can give you heads several times in a row, two extreme floods can happen close together. How do flood-risk estimates work? The whole process builds on statistical analysis of our long-term records of water flows, he said. But those records aren't always long enough.

"Using the historical flows, we are making a lot of assumptions" in calculating the risk, he said. "We have a relatively short interpretation period. In Canada very rarely do you have more than 50 or 60 years of observations.

"Within that 50 or 60 years, we don't get all the possible flows that can occur." Therefore, the final calculation of flood risk "may not be fully representative of what is happening within 100, within 200, within 500 years."

In particular, a relatively short period of records is likely to miss out on some of the more extreme events. Experiencing more extremes, like this year's levels, will reshape future risk estimates. Do risk estimates change? Yes, because new evidence is constantly coming in.

"Floodplain lines are dynamic.

The value is changing with more observations that you make," Simonovic said.

"Therefore, today it gives you 100-year flood lines that are different from 100-year flood lines established five years ago.

"Unfortunately the cost of re-evaluating or re-mapping the floodplain is pretty high and, therefore, we kind of skip over the fact that these lines are changing every year (or) with every flooding event."

Does everyone accept floodplain maps? And do cities always abide by them? They do during a flood and right afterward, he says, but this concern fades with time as people become more relaxed and pressure grows to allow waterfront development.

Simonovic did a study of the Red River in Manitoba after its disastrous 1997 flood for the International Joint Commission. At the time, he recalls the mayor of Thompson, south of Winnipeg, was all for it.

"You explain, you provide advice and we'll follow," the mayor told the experts. But a couple of years later, when the report came out and warned of future flooding, "the same person approached us and said: Maybe these words are too strong and you will discourage economic development."

He says negotiation over floodplain maps "is very common. The further away you are from the flood event, (the understanding) kind of disappears and other interests start dominating the discussion."

People also acquire rights by building in times before the flood risks are known, and this allows small clusters of cottages to expand into full-scale subdivisions. Hydro-Québec based a dam design on the flood risk over 1,000 years. How can they do that? Short answer: It's an estimate, and it's based on a lot of theory.

Engineers "use the short observation that we have, and we find theoretical probabilistic distribution, and then we extrapolate a theoretical curve up to some very rare event like 500 years, 1,000 years. Our colleagues in earthquake engineering are using (estimates of) millions of years.

"So these are basically statistical interpretations."

(Side note: Last week's flood on the Rouge River exceeded the 1,000-year figure.) Should we allow flood-damaged properties to be rebuilt in the same place? Simonovic argues that it just invites more damage in the future.

"To me that is a very serious problem and we have examples in Calgary in 2013, in British Columbia" and in Ottawa-Gatineau.

"That kind of practice needs to stop," he said. He approves of the Quebec policy of capping public funds for rebuilding (at \$100,000) while allowing \$200,000 for those who move out.

"It's kind of a slow process of buying out"

flooded property. Did climate change cause this flood? "I would have difficulty accepting that. Linking single events to a long-term change process is very hard." It's true that we have had an increase in both severe rainstorms and droughts that seem related to climate change, he added, but he's not ready to say that one specific storm or flood is caused by climate change.
tspears@postmedia.com
twitter.com/TomSpears1

© 2019 Postmedia Network Inc. All rights reserved.