

An aerial night view of the Vancouver waterfront, featuring a marina with numerous boats, a bridge, and modern high-rise buildings. The entire image is overlaid with a semi-transparent teal color.

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Vancouver, Robson Square | March 2-3

Find Your City

Using Climate Analogues to Explore Flood Risk in 2050



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The Problem

It's hard to picture what flood risk would look like in your city in the next 30 years.



The screenshot shows the website header for British Columbia ClimateReadyBC. The navigation menu includes: Hazards & mapping tools, Focus areas and values, Data, Funding, Resources, and About. The main heading is "The British Columbia Disaster and Climate Risk and Resilience Assessment". Below the heading is a photograph of a mountain range. To the right of the photo is a list of six hazards and their impacts, and a paragraph describing the collaborative effort behind the assessment.

BRITISH COLUMBIA ClimateReadyBC

Hazards & mapping tools ▾ Focus areas and values ▾ Data Funding Resources About

The British Columbia Disaster and Climate Risk and Resilience Assessment

The British Columbia Disaster and Climate Risk and Resilience Assessment includes comprehensive information on:

- Six hazards: riverine flood, coastal flood, extreme heat, wildfire, drought and water scarcity, and earthquake.
- How hazards will be influenced by climate change.
- How hazards may impact things we value: natural environment, built environment, economy, governance, health and wellbeing, and society, cultures and relationality.
- How hazards may impact certain groups of people differently than others.
- What governments, organizations and people can do to reduce risks and recover stronger.

More than 200 subject matter experts and organizations including First Nations and Indigenous organizations, academic and technical institutions, local governments, non-governmental organizations and community groups collaborated with the Province on the DCRRRA and B.C. Hazard Insights Tool.

In the Face of Flood Risk

Financial Decisions

What investments are safe in this city in 2050 while acknowledging both transitional and physical risks?

Business Decisions

Which locations and supply chain networks face rising risk?

Planning Decisions

Where to build, protect or retreat?

A Point of Reference



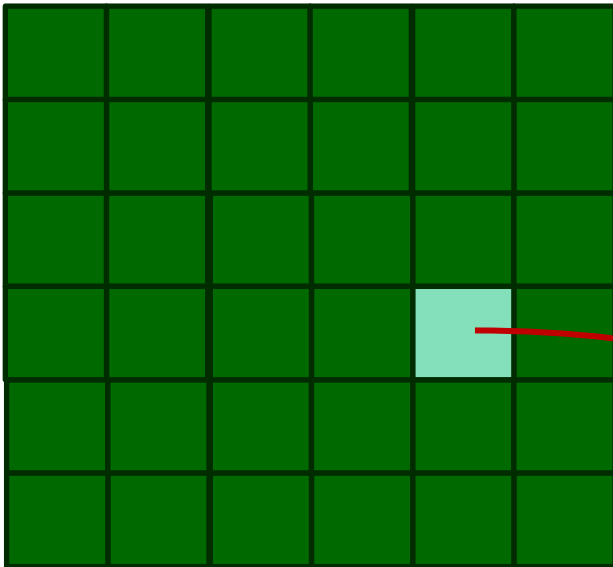
Image: Miami Beach



Image: International Traveller

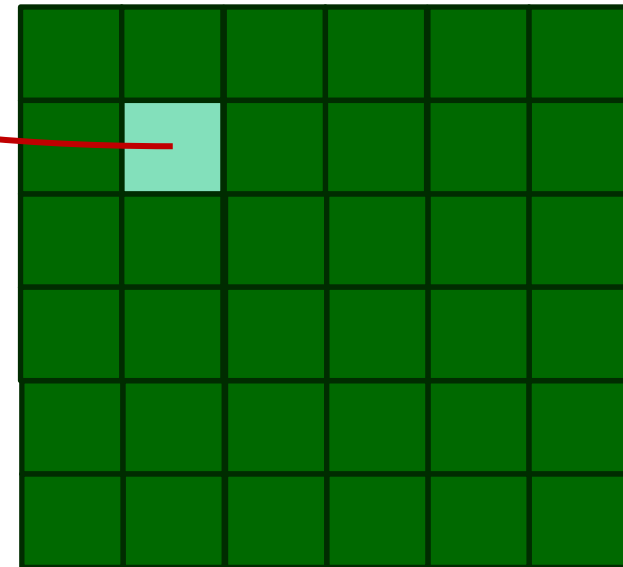
Looking at the Future by Studying the Present

2050 Flood Risk Map



0.5 probability of getting a flood

0.5 probability of getting a flood



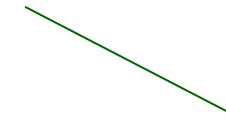
2025 Flood Risk Map

Let's Apply This Logic to North America



Data for both the past 20 years and 2050

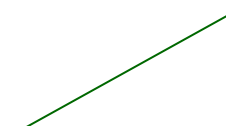
Temperature



Precipitation



Elevation

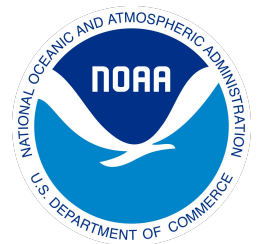


Flood risk



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada



Hardest Step: Flood Data

There is no comprehensive historical flood database of North America

#	Start Date	End Date	Country	Area (km ²)	Main Cause	Fatalities	Displaced	Severity	Flood impact index
5451	2023-07-22	2023-07-22	Canada	23,775	Heavy rain	0	0	1.0	4.4
5220	2022-05-09	2022-05-10	Canada	3,500	Rain and snowmelt	0	1,000	1.0	3.8
5219	2022-05-07	2022-05-11	Canada	80	Ice jam/break-up	0	250	1.0	2.6
5213	2022-04-28	2022-05-02	Canada	2,030	Ice jam/break-up	0	1,000	1.0	4.0



Flood Observatory

My Ingredients for a Flood Risk Model

500+ Monitoring
Stations



20 Years of Flood
Data



**Teach
model to
recognize
what
triggers a
flood in the
past 20
years.**

Enter Machine Learning

How do we find flood risk for North America – both in 2025 and in 2050?

1

Train

Historical effects of temperature, precipitation and elevation on flooding.

2

Assume

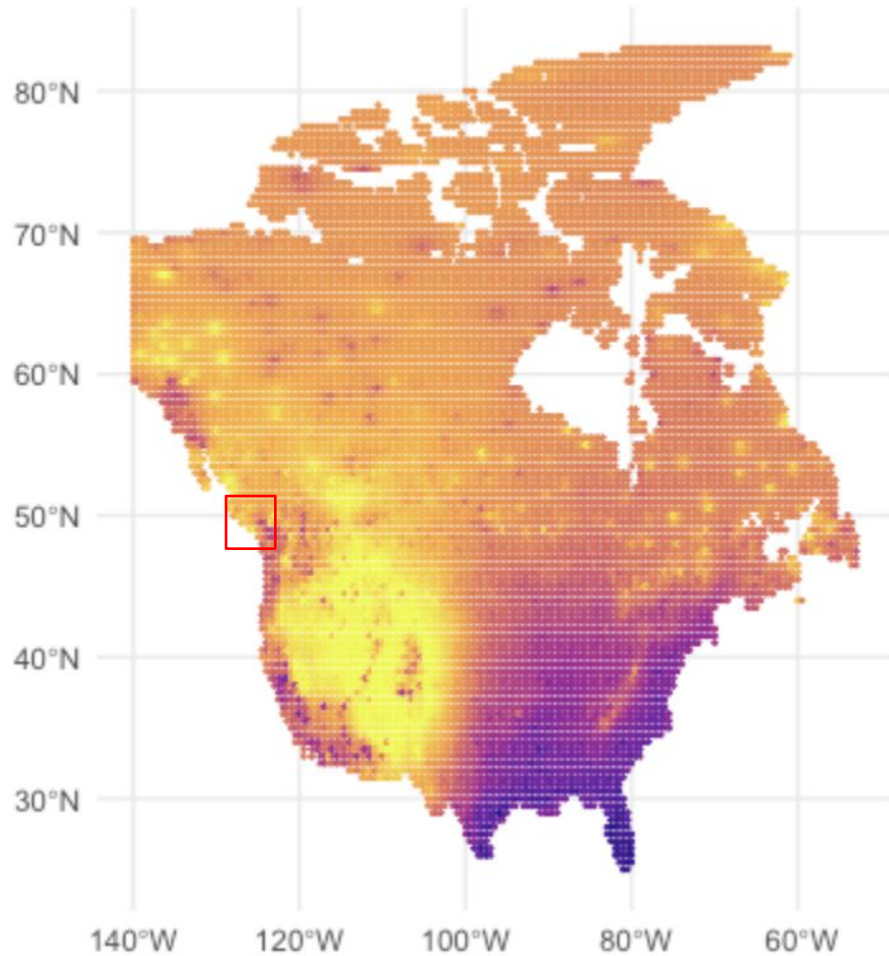
Same relationships between climate variables and flooding hold true in the near future.

3

Predict

Compute flood risk for everywhere in North America in 2025 and 2050.

Vancouver in 2050



**Probability of a
flood event: 0.38**

**Calculated via trained ML with
2050 climate projections**

Which City, in 2025, Looks Like Vancouver in 2050?



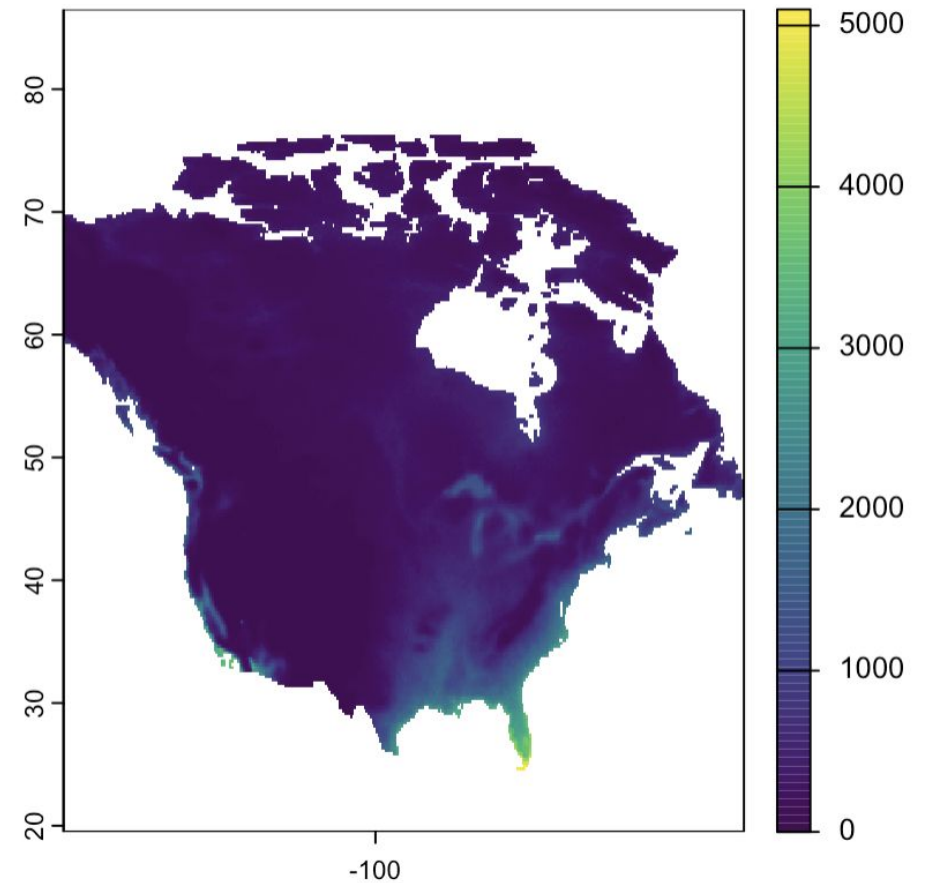
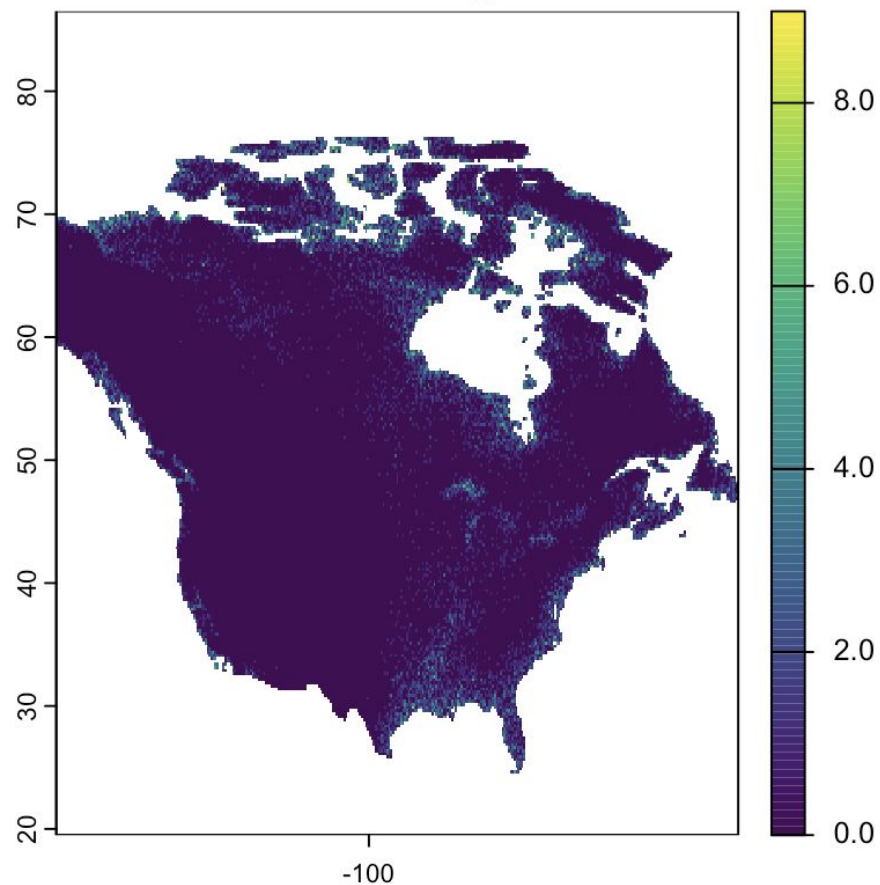
Image: Wikipedia

Ocean City, Maryland

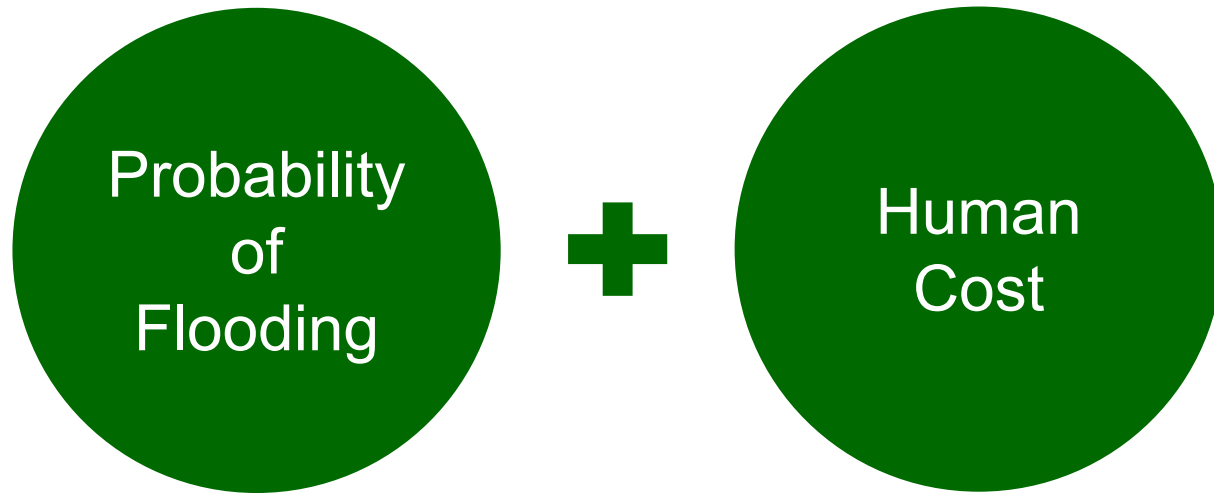
**Probability of a
flood event: 0.41**

Beyond Just Flood Probability

Risk also includes lives lost and amount of people displaced of their homes.



A Richer Picture of Flood Risk



A Clearer Point of Reference



Who Benefits?



Image: Storyset.com

Urban planners can reference the adaptation design of the analogue city.

Businesses can assess potential supply chain and location risks.

Homebuyers can make smarter decisions about where to live.

Policymakers have a real-world example of what works, and what doesn't.

From Risk to Resilience

By studying what works in the analogue city today, we can design a more resilient future for our own communities.

Thank you!



Questions and Feedback



Thank you to our Sponsors



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for Climate Solutions



Wawanesa