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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.

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?

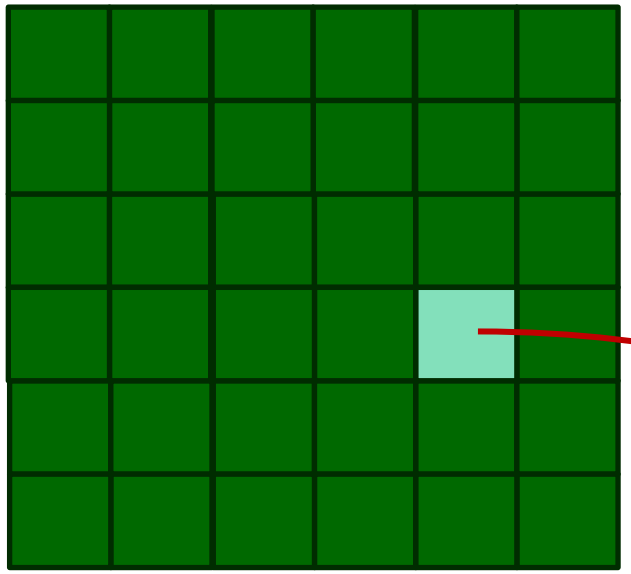
A Point of Reference

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

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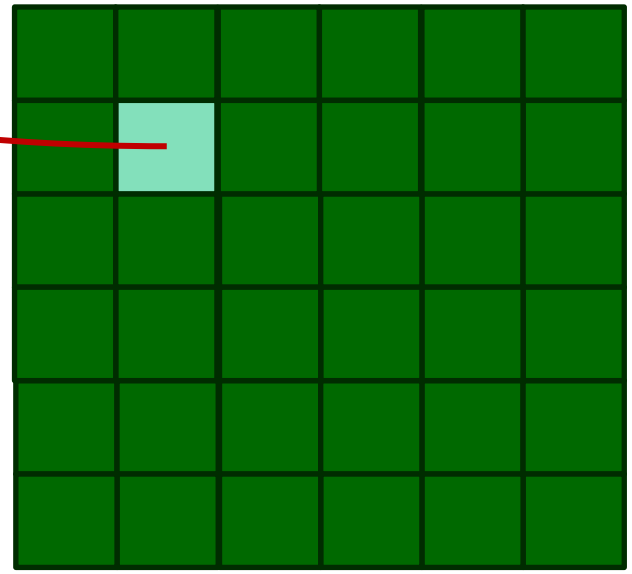


2025 Flood Risk Map

Let’s Apply This Logic to North America

Image: Wikipedia

Data for both the past 20 years and 2050

Temperature

Precipitation → **Flood risk**

Elevation

Environment and Climate Change Canada
Environnement et Changement climatique Canada

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Hardest Step: Flood Data

There is no comprehensive historical flood database of North America

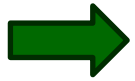
#	Start Date	End Date	Country	Area (km²)	Main Cause	Fatalities	Displaced	Severity	Flood impact index
5451	2023-07-22	2023-07-22	Canada	23,775	Heavy rain	0	0	1.0	4.4
5220	2022-05-09	2022-05-10	Canada	3,500	Rain and snowmelt	0	1,000	1.0	3.8
5219	2022-05-07	2022-05-11	Canada	80	Ice jam/break-up	0	250	1.0	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

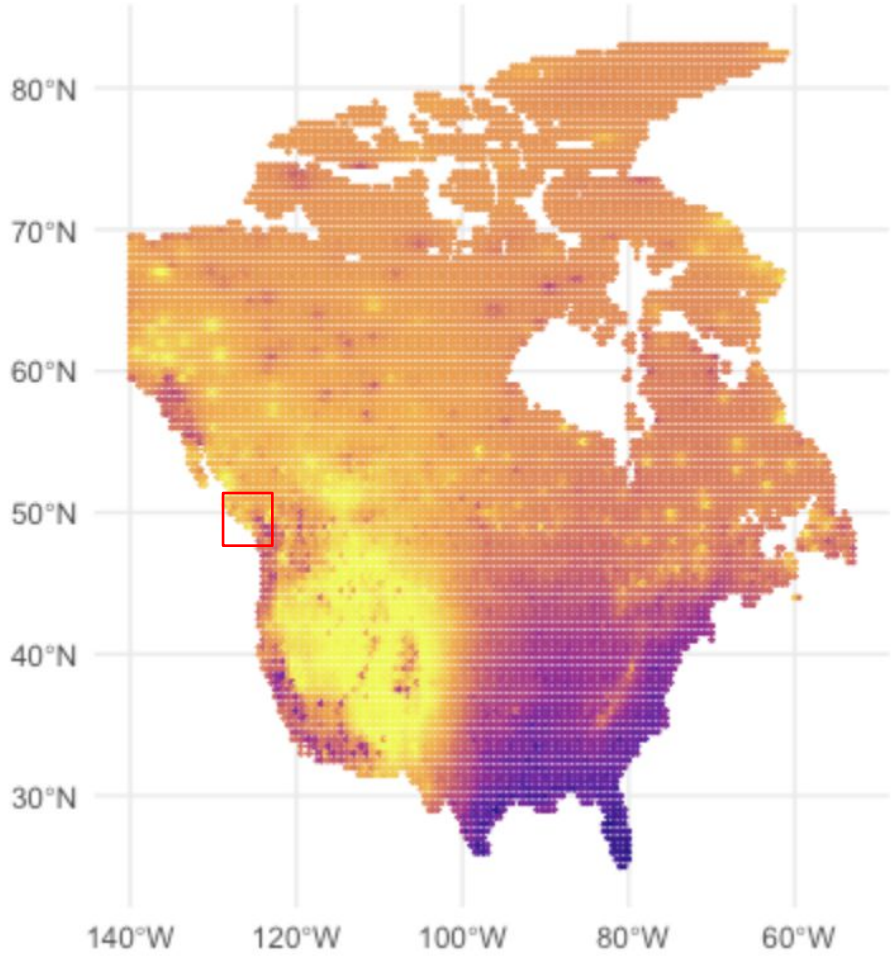
Same relationships between climate variables and flooding hold true in the near future.

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?

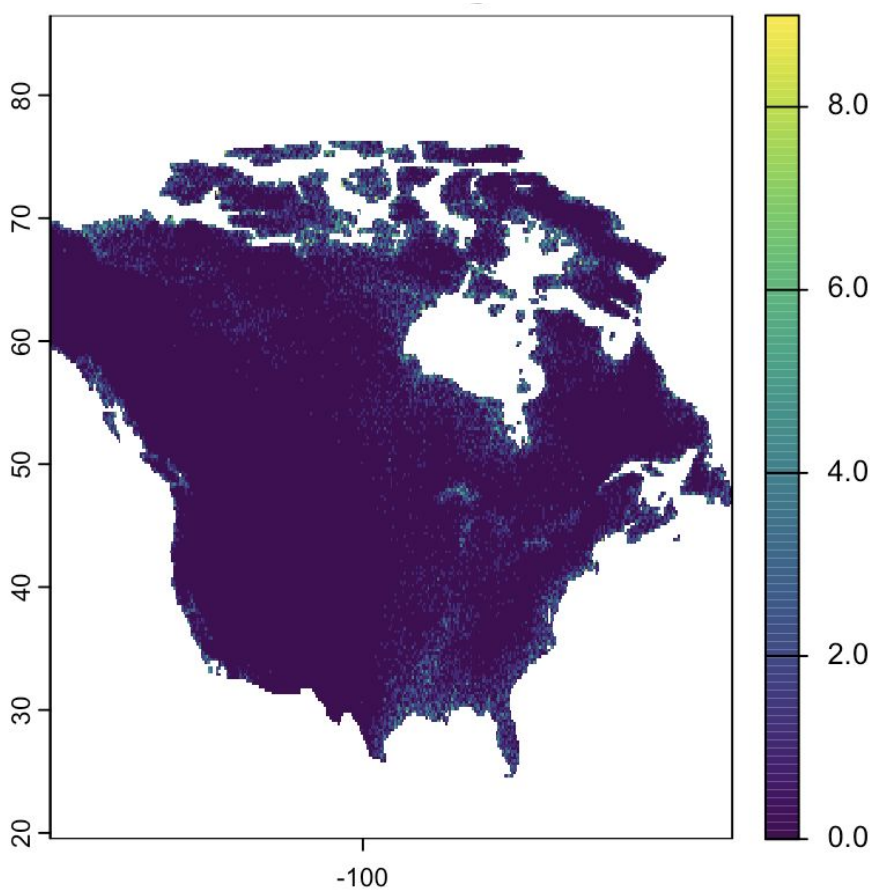
Image: Wikipedia

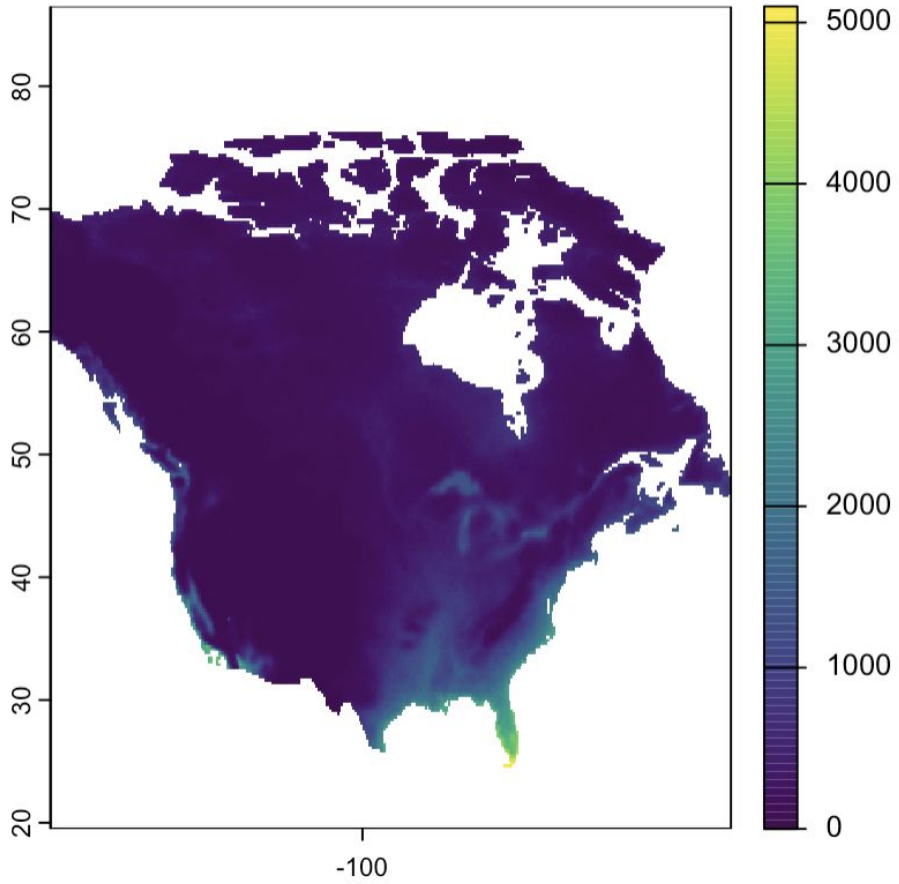
Ocean City, Maryland

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

Probability of Flooding

+

Human Cost

A Clearer Point of Reference

Image: Storyset.com

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

Image: Storyset.com

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

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