The City of Calgary

Community Climate Risk Index

- ✓ Assess the degree of climate risk in each Calgary community
- ✓ Identify drivers of vulnerability to climate hazards

April 2024

Calgary's Climate Risk

"It doesn't matter how low-carbon your building is if it's going to come down during the first extreme climate event it faces."

Calgary's Climate Risk

The potential for adverse consequences from climate hazards On

- People
- Built infrastructure
- Natural environment

Calgary's Climate Risk

Extreme Heat

Wildfire smoke

Drought

River Flooding

Heavy Rainfall

Winter Storms

Severe Storms

Shifting Seasons

Why develop a Climate Risk Index?

Need:

Building and growing a climate resilient city
=
Incorporating climate risk considerations into city/community planning

Answers:

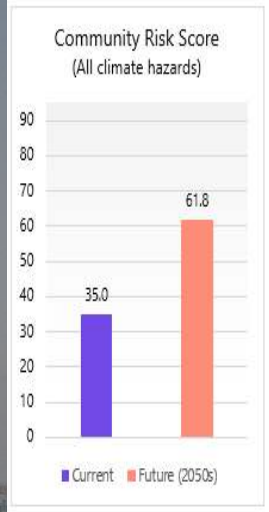
What is the **likelihood of climate hazards** occurring in Calgary, now and in the future?
Where in the city are we most **exposed** to certain climate hazards?
Where are we most **vulnerable** to certain climate hazards?
Why are we vulnerable?

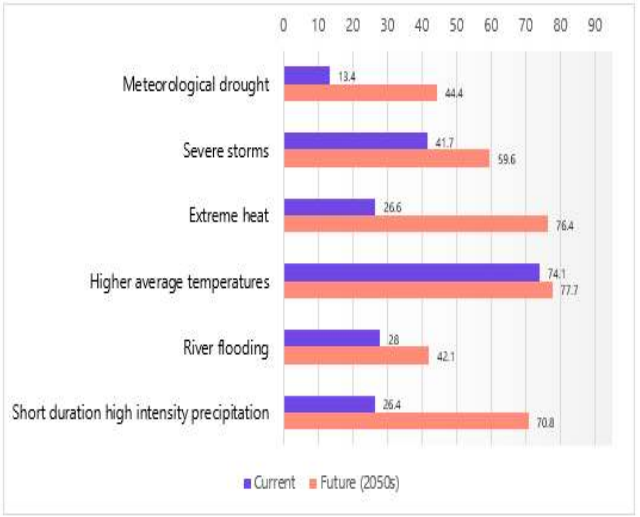
Outcomes:

→ *Identify **localized, targeted and equitable** climate resilience measures*
→ *Communicate climate risk to the organization and Calgarians*

Quick facts about Calgary's Community Climate Risk Index

(Hazard likelihood x Exposure x Vulnerability)





July 2021 – WSP produced an Excel based index

2021-present – Community Climate Risk profiles used for advocacy, planning, etc.:

- Climate Risk Index results
- Urban Heat Map
- Natural Assets Inventory
- Equity Index

November 2022 – Methodology update

2023-24 – Development of an interactive dashboard for City staff

2024 – Public summary

Quick facts about Calgary's Community Climate Risk Index

264
Developed communities

3
Systems. Social, built, natural

6
Climate hazards

Extreme heat
Higher average temperatures
Intense precipitation
Drought
River flooding
Severe storms

4
Assessments: Hazard likelihood, exposure, vulnerability, risk

32
Exposure and vulnerability indicators

Calgary

DEVELOPED COMMUNITIES

Search

- Belvedere
- Bonavista Downs
- Bowness
- Braeside
- Brentwood
- Bridgeland/Riverside
- Bridlewood
- Britannia
- Burns Industrial
- Calgary Internationa...
- Cambrian Heights
- Canada Olympic Park
- Canyon Meadows
- Capitol Hill
- Carrington
- Castleridge

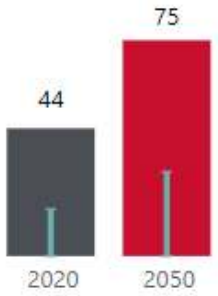
Intro | ? | ✉

Community Climate Risk Index | Urban Heat of Calgary

Community Summary | Indicators | Generate Reports | Methodology

All hazard risk | Ext. heat risk | Higher avg temp risk | Intense precipitation | Met. drought risk | River flood risk | Severe storms risk

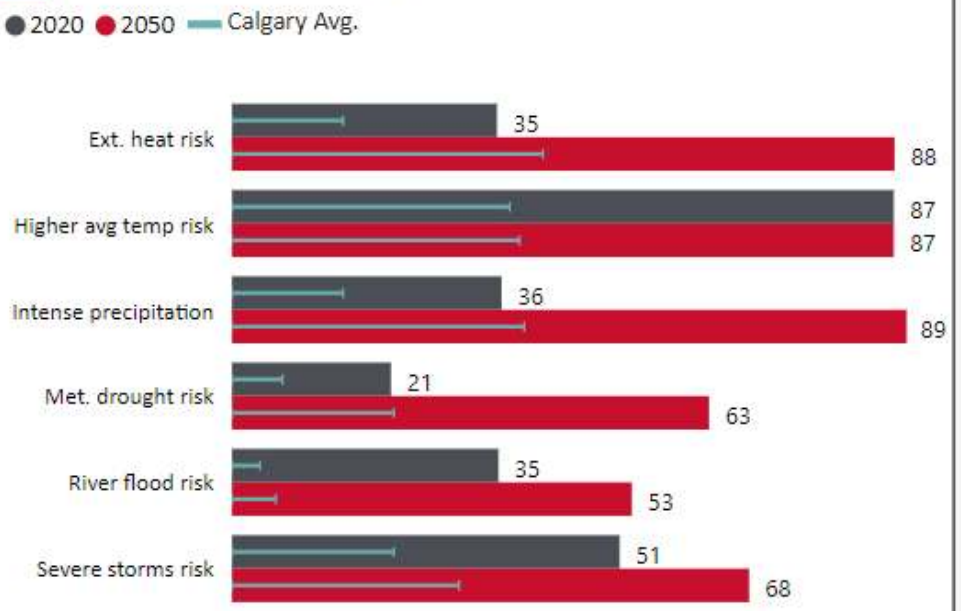
Risk Score for Bowness - All hazard risk -



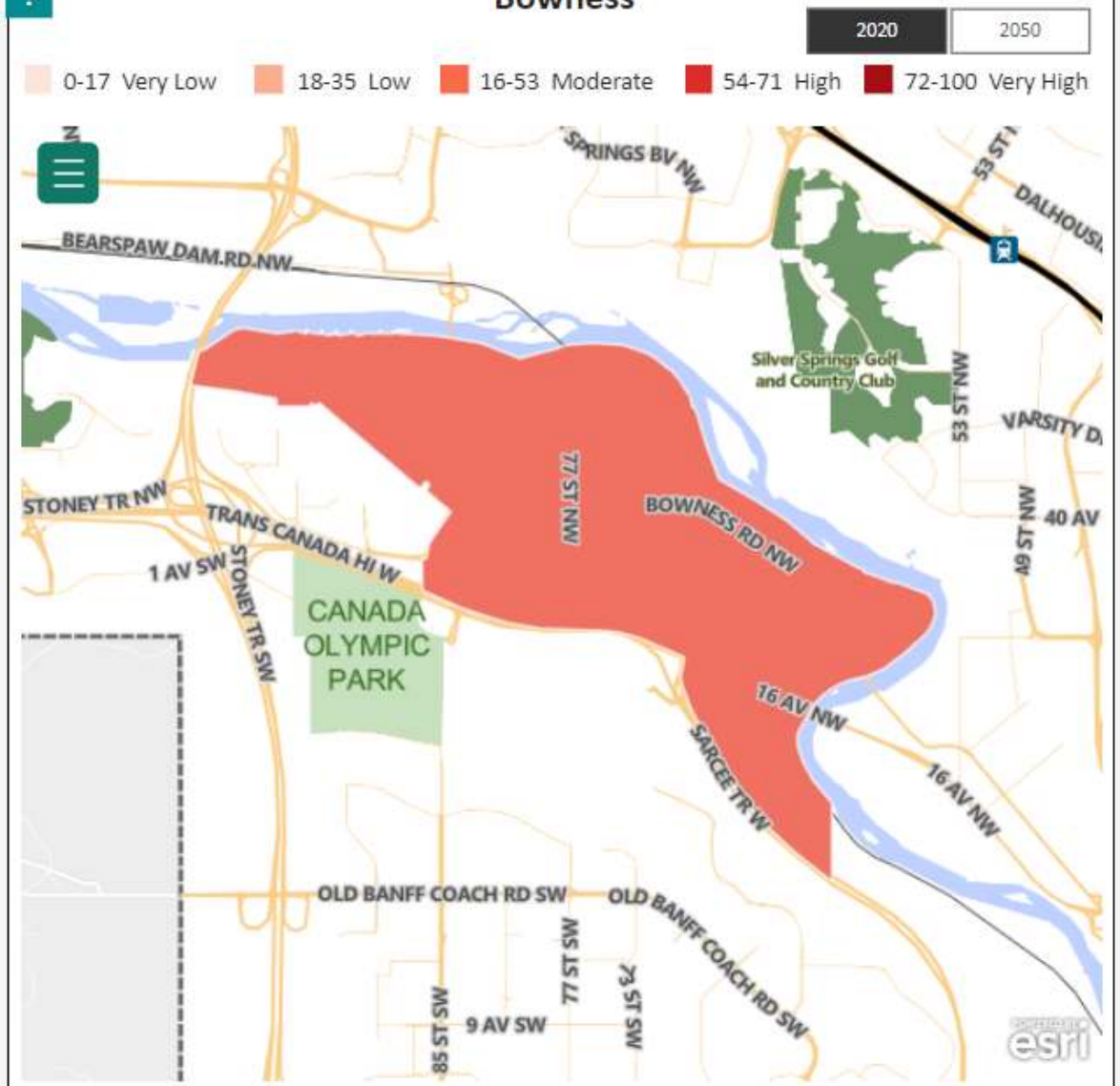
Top drivers of climate vulnerability for Bowness

- Unemployed
- Tree canopy
- Riparian health score
- Parks irrigation requirements
- One parent families
- Newcomers to community
- Low income over age 18
- Low income and aged 65+

Risk Score per Hazard for Bowness



Bowness



Example: Bowness

2020 risk:

Moderate

Highest risk:

Higher average temperatures

2050 risk:

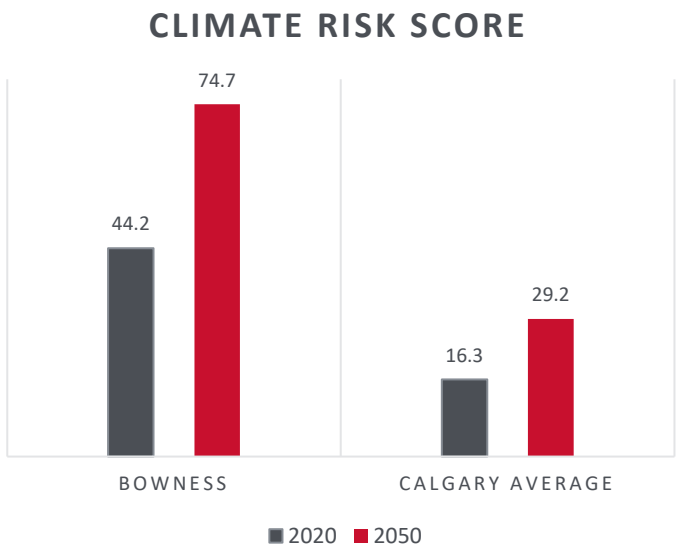
Very high

Highest risks:

Extreme heat,

Intense precipitation,

Higher average temperatures



Social

- Large population
- 20% of the population are elderly or youth
- 6% households are one parent families
- 20% of the population are newcomers to the community
- 15% have no certificate, diploma or degree
- 10% have low income
- 6% are unemployed

Built

- Over 1400 homes built before 1960
- Almost 400 homes in need of major repair

Natural

- Average public tree condition rating is relatively low compared to other communities
- Low riparian health scores
- Parks and fields require irrigation
- Large tree canopy (improves adaptive capacity to extreme heat, but also drives sensitivity to storms, higher average temperatures

Integrating technology

From spreadsheets to **dashboards**

From writing reports to **automation**

Policy

The CCRI has helped guide policies for the assets, places, and people who are most vulnerable.

Local Area Plans & policies:

Chinatown Area Redevelopment Plan, approved by council in 2022. This policy is explicitly a direct response to the Climate Risk Profile:

- 3.3.1.2 Policy b states: Encourage the provision of structures to shade and cool in development bounded by 2 Avenue S.E. and 4 Avenue S.E. and Centre Street S. and Macleod Trail S.E., where the temperatures are higher than other parts of the neighbourhood

Heritage LAP, passed first reading and going to Council in September for second and third readings.

- 2.4.3 Climate Mitigation and Adaptation policy. Onsite stormwater retention may be required to decrease the drainage release rate due to downstream pipe capacity constraints. A multi-faceted approach to support growth in this area may include the incentivizing of additional on-site storage on private lands in order to improve community flood resiliency in the face of a changing climate; ***based on the high stormwater risk for most communities in the profiles.***
- 3.2.7 Reduce Greenhouse Gas Emissions and Improve Community Resiliency: Policy a.ii. protect, maintain and enhance riparian areas along the water bodies to facilitate wildlife movement, biodiversity and ecological health while improving resilience to erosion, flooding and water quality impacts; ***specifically addresses the poor riparian health mentioned in the climate risk profiles.***

Limitations

- Not a map (not based on georeferenced data), therefore granularity is only at the community level
- Data availability limitations (not an exhaustive list of indicators, some data contain gaps and may be out of date, e.g. Census)
- Hazard analysis limitations (does not include wildfire smoke)
- Does not evaluate the financial consequences of climate hazards
- Does not include outdoor workers exposure and vulnerability
- Predicting future exposure and vulnerability is challenging
- Community climate risk scores are a snapshot in time, while climate risk is always evolving
- As a relative measure, the climate risk score does not assess risk against acceptable risk tolerance

Next steps

Gather qualitative information from equity deserving and vulnerable communities

Empower Calgarians – share information publicly

Continuous updates and improvement

Hazard-specific programs (geospatial analysis, planning policies, implementation)

Resources

Urban heat Map
https://www.calgary.ca/environment/climate/urban-heat-map.html

Climate ready Home Guide
https://www.calgary.ca/environment/climate/climate-ready-home-guide.html#hazards

What to do during extreme weather events
https://www.calgary.ca/emergencies/types.html

Calgary Equity Index
https://maps.calgary.ca/CalgaryEquityIndex/

Calgary's Climate Change Program
https://www.calgary.ca/environment/climate/climate-change.html

Questions

Extra slides

Risk calculation

Calculated for current and future (2050s) risk for each hazard

Results Highlights

- By the 2050s, if no significant action is undertaken, community risk scores are projected to increase by 78 per cent on average.
- By the 2050s, 68 communities will face moderate climate risk and 20 communities will face high climate risk relative to other Calgary communities.