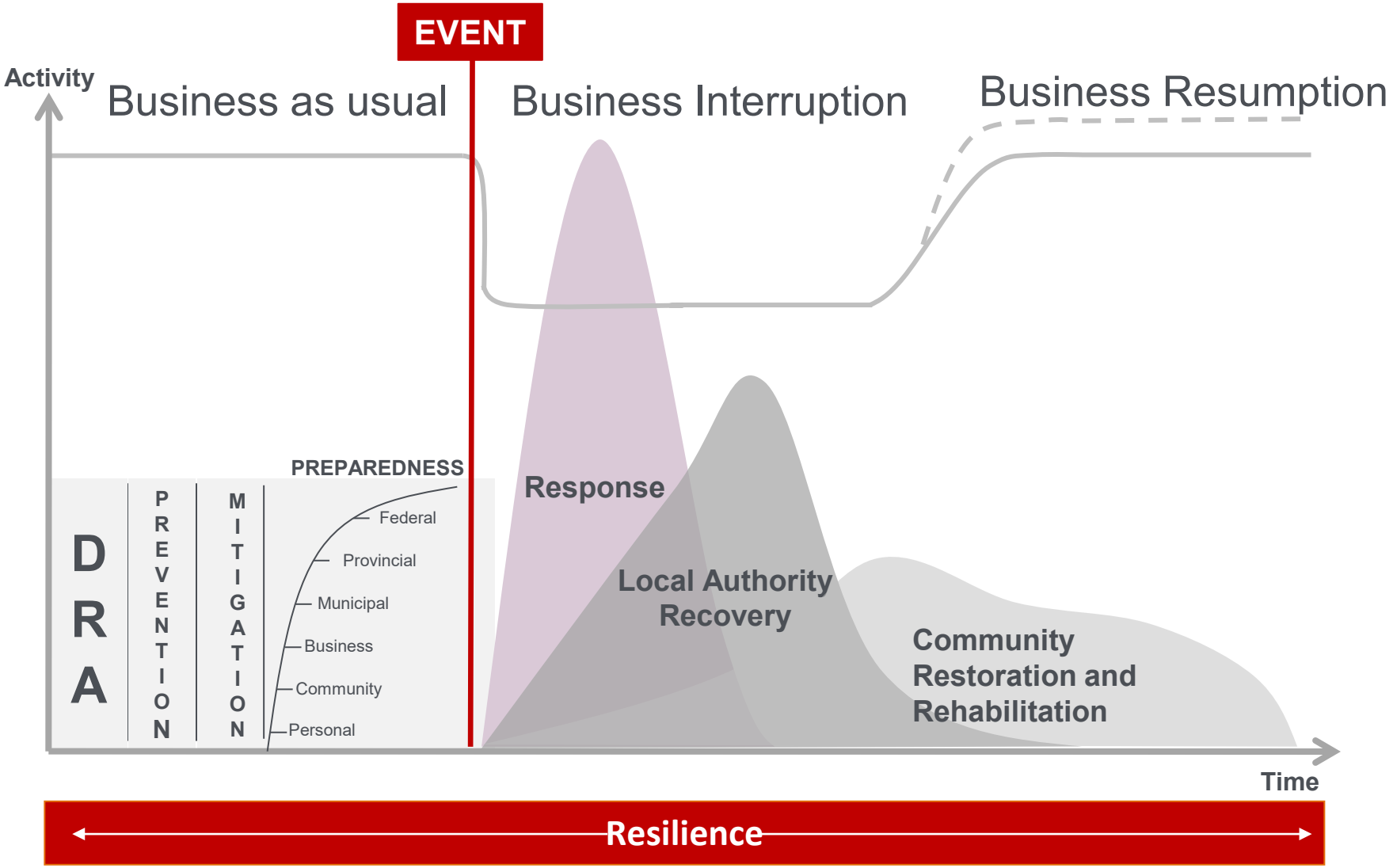
2023 May 4

Status of Emergency Preparedness
Focus on risk: Heat-related risks

Recommendation

That the Emergency Management Committee recommend that Council receive this report for the Corporate Record.


EVENT
Activity
Business as usual
Business Interruption
Business Resumption
PREPAREDNESS
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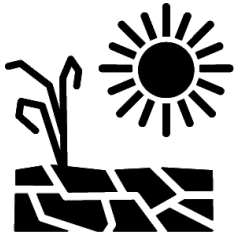
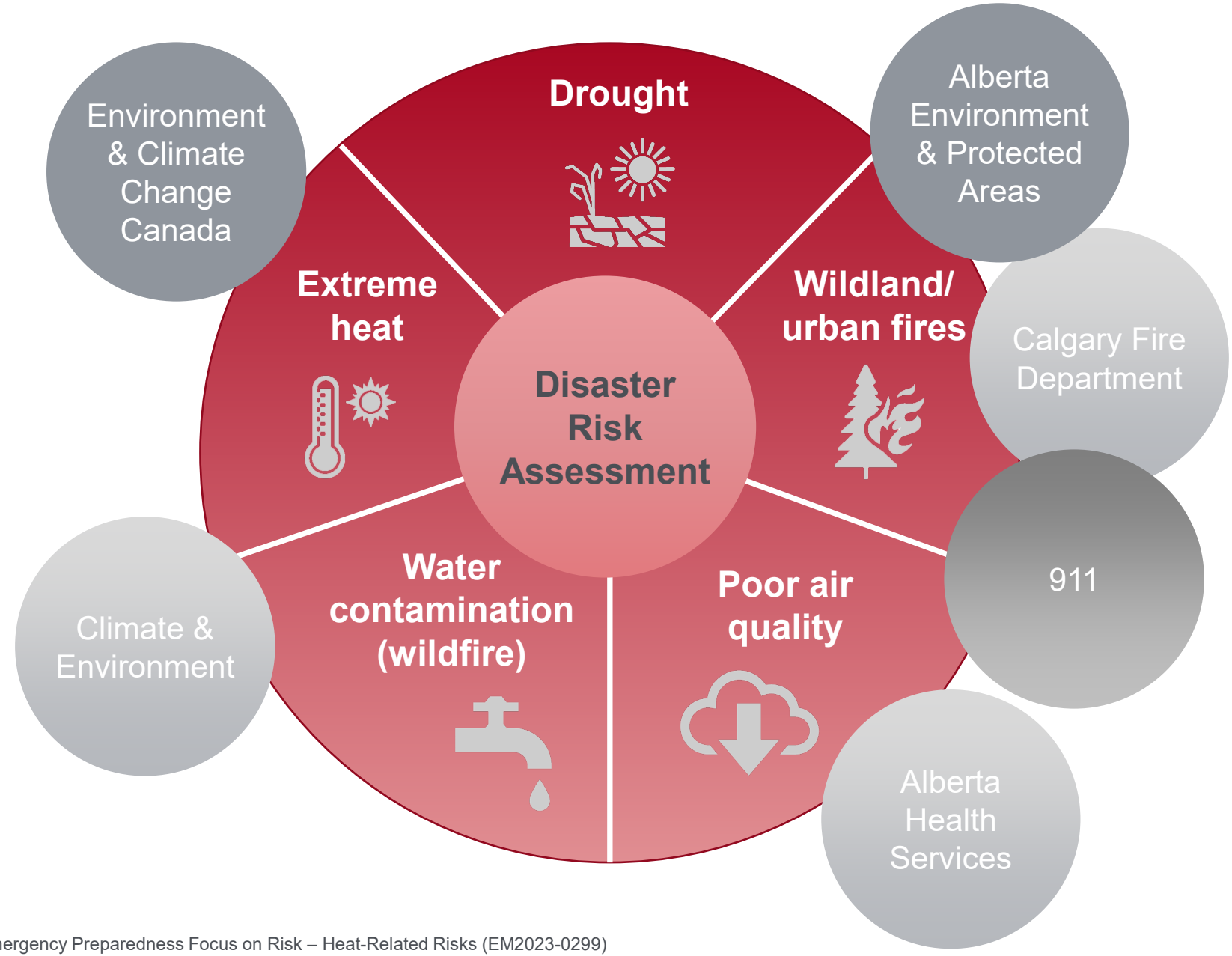
A
PREVENTION
MITIGATION
Federal
Provincial
Municipal
Business
Community
Personal
Response
Local Authority Recovery
Community Restoration and Rehabilitation
Time
Resilience

Heat-related risk profiles





	Hydrological drought	Water contamination due to wildfire	Extreme heat	Wildland/ urban fires	Poor air quality
Risk level	High	High	Medium	Medium	Medium
Consequence	Major	Major	Moderate	Moderate	Minor
Risk trend	Increasing	Increasing	Increasing	Increasing	Increasing
Likelihood	Rare	Unlikely	Likely	Unlikely	Likely

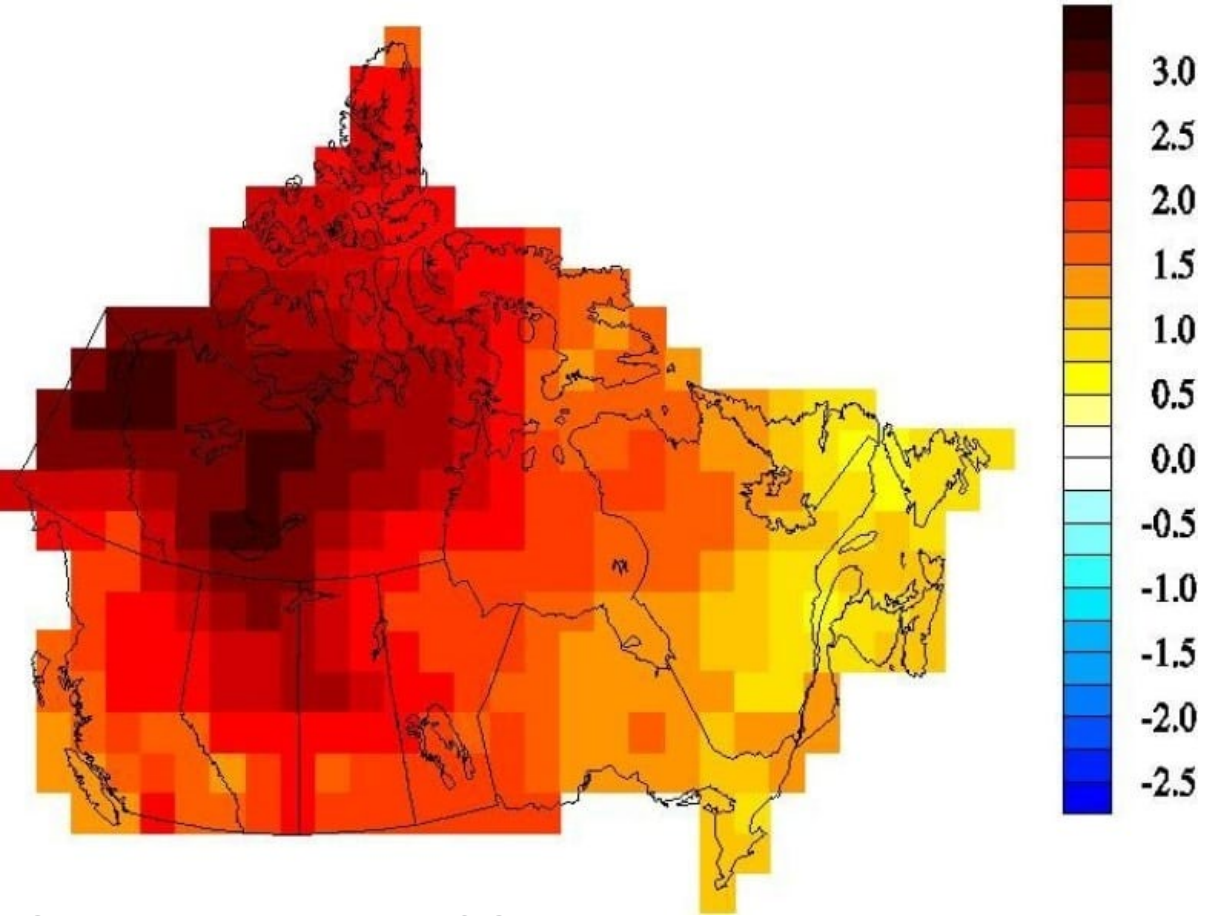

Drought
Extreme heat
Wildland/ urban fires
Water contamination (wildfire)
Poor air quality
Disaster Risk Assessment
Environment & Climate Change Canada
Alberta Environment & Protected Areas
Calgary Fire Department
911
Alberta Health Services
Climate & Environment

Common objective, different focus

	Climate & Environment	Emergency Management
Objective	Reduce vulnerability & increase societal resilience	
Focus	Future focus & addressing uncertainty	Present focus & addressing existing/emerging risk
Scope	Weather & climate-related hazards	Natural, technological, & human-induced hazards
Scale	Longer timelines (decades)	Shorter timelines (years)
Accountabilities	Corporate direction on policies to plan & build climate-resilient & sustainable city	Community and Corporate coordination to plan, prepare, mitigate, respond, & recover from emergencies

Environment & Climate Change Canada

Climate change in Western Canada



Colour-coded map of Canada depicting temperature trends from 1948 to 2012
(Environment and Climate Change Canada – Canada's Changing Climate Report)

- Both past and future warming in Canada is about double the magnitude of global warming.
- In Canada, the effects of warming include:
  - More extreme heat
  - Less extreme cold
  - Longer growing seasons
  - Shorter snow and ice seasons
  - Earlier spring peak streamflow
- Precipitation is projected to increase for most of Canada, on average, although summer rainfall may decrease in some areas.

Hotter Calgary summer temperatures

- A warmer climate will intensify some weather extremes in the future. Extreme hot temperatures will become more frequent and more intense, resulting in:
  - Increased severity of heatwaves
  - Increased drought and wildfire risks
- 15 of the last 20 summers in Calgary have been warmer than average.

Calgary Average Summer Temperature		
2003	16.4	
2004	15.2	
2005	14.2	
2006	16.3	
2007	15.9	
2008	15.5	
2009	15.4	
2010	14.9	
2011	15.4	
2012	16.5	
2013	14.0	
2014	16.1	
2015	16.8	6th hottest
2016	16.1	
2017	16.8	9th hottest
2018	16.0	
2019	15.0	
2020	15.7	
2021	17.7	#1 Hottest Ever
2022	17.0	4th hottest
1971-2000 Average: 15.2°C		
(Records began in 1882)		

June-July 2021 heat wave

- 7 days in a row above 30 degrees
- Highest June temperature of all time
- 2nd hottest temperature in Calgary of all time

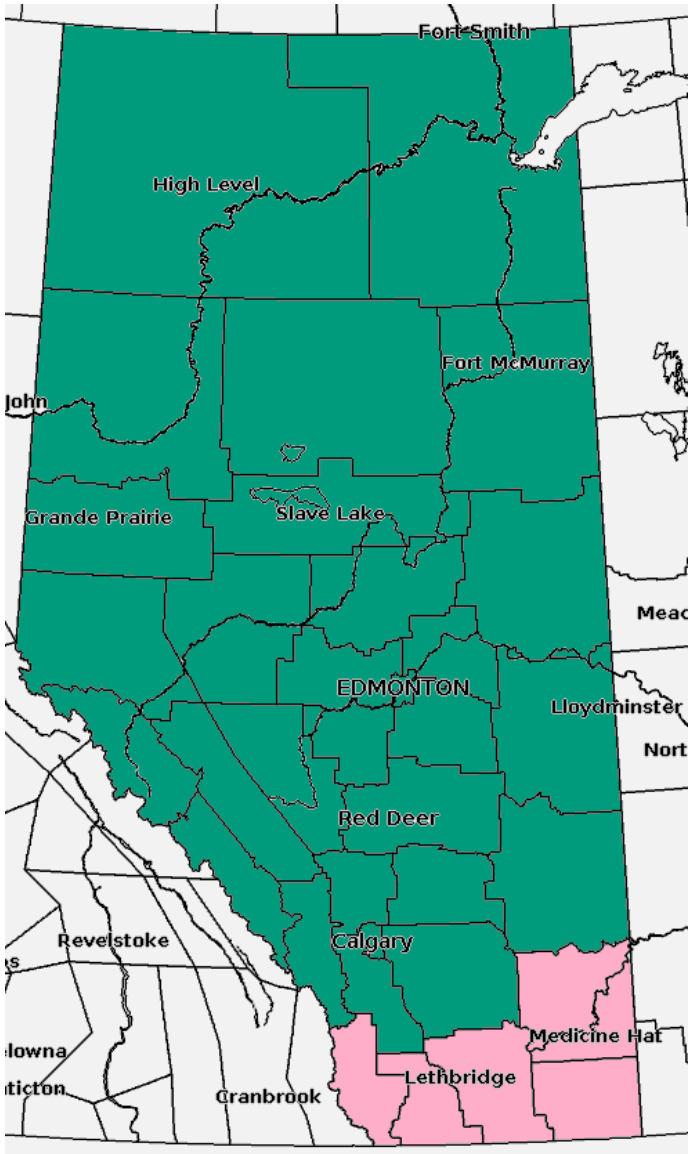
Impacts in Alberta:

- Responsible for an estimated 66 deaths
- Record high for summertime energy consumption
- Water demands 1.5 times higher than average

2021 Heatwave	
June 25:	25°C
June 26:	30°C
June 27:	30°C
June 28:	35°C
June 29:	36°C
June 30:	36°C
July 1:	36°C
July 2:	30°C

ECCC Extreme Heat Warning Program

- Extreme Heat warnings issued for Alberta when daytime highs are forecast to reach 29 degrees for two consecutive days, with overnight lows of 14 or greater.
  - Criteria slightly higher in extreme southern Alberta
- We issue an early notification to Alberta Health and Alberta Health Services in advance of Extreme Heat Events.
- AHS enacts their Extreme Temperature Alert Protocol based on our notifications.



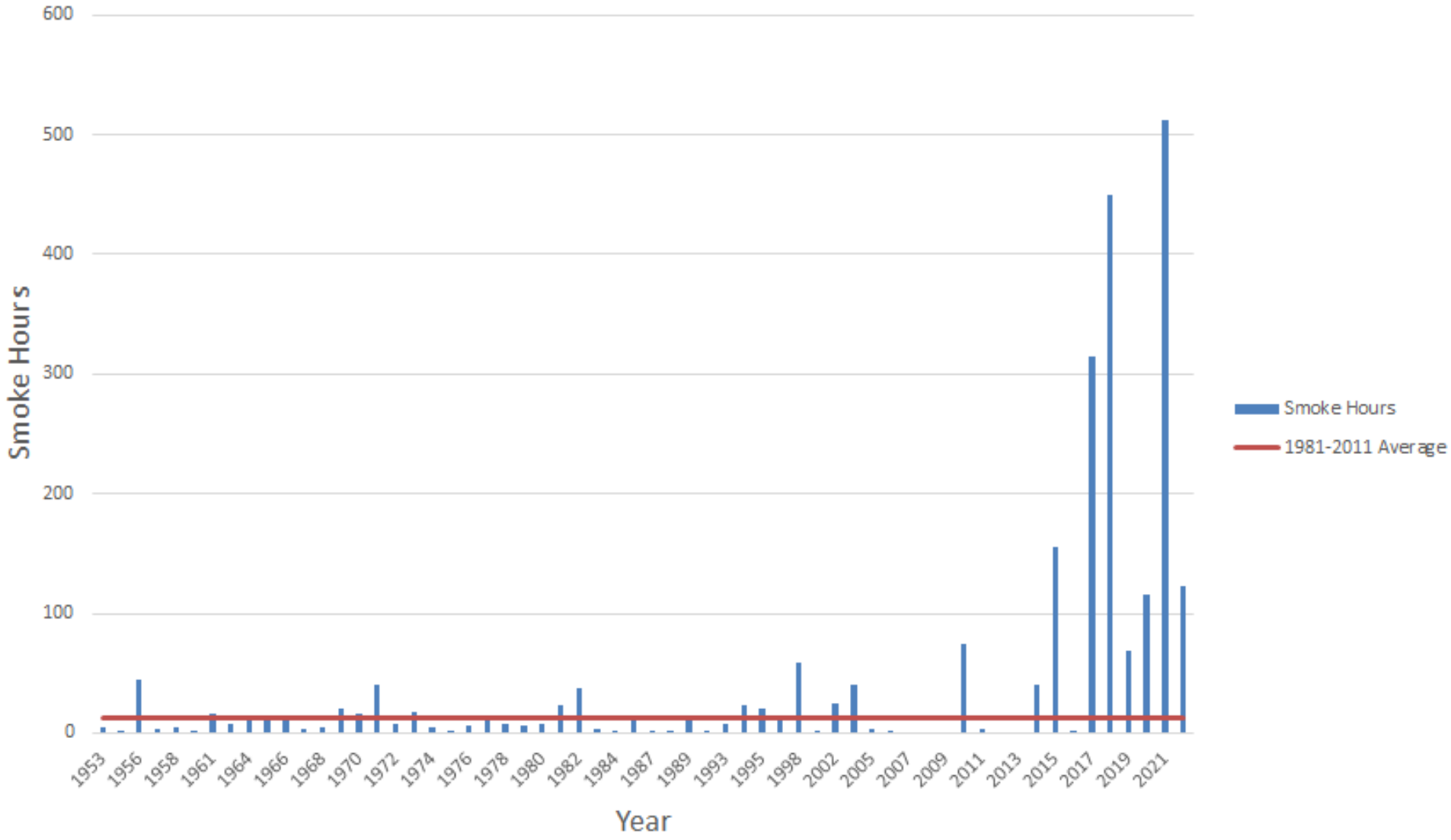
Tmax>= 29°C and Tmin >= 14°C

Tmax>= 32°C and Tmin >= 16°C

“The future is smoky.”

U of A Wildfire Researcher Dr. Mike Flannigan

Smoke hours for Calgary: 1953-2022



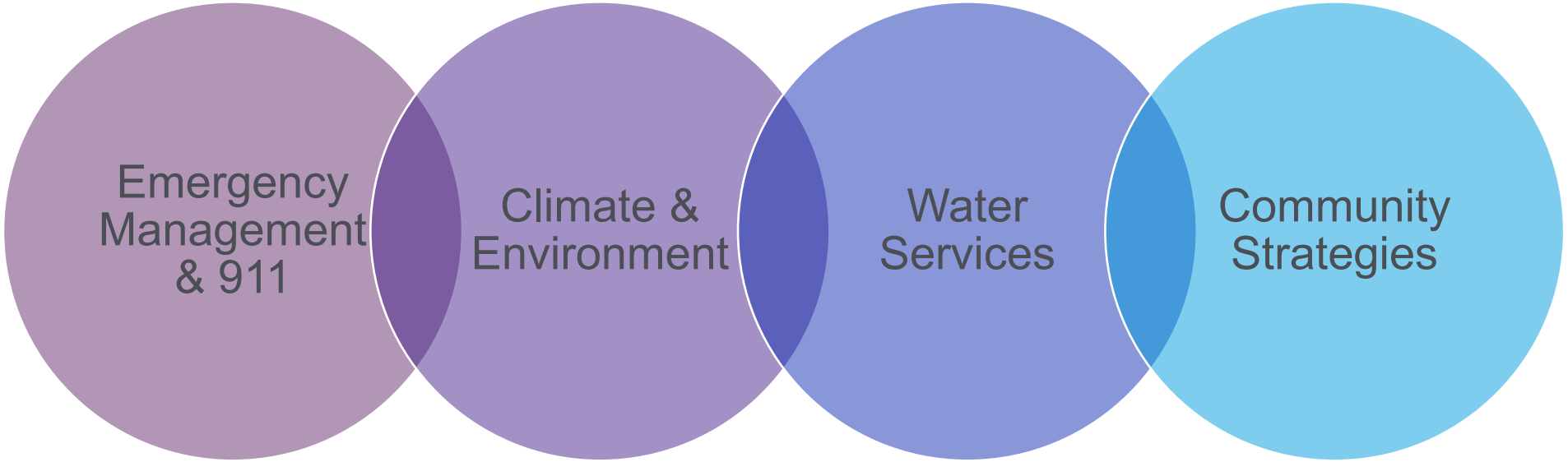
ECCC seasonal forecast

- Despite a cold start to spring, temperatures have now returned to normal.
- Forecast for May, June, and July is for temperatures to be average to slightly above average.

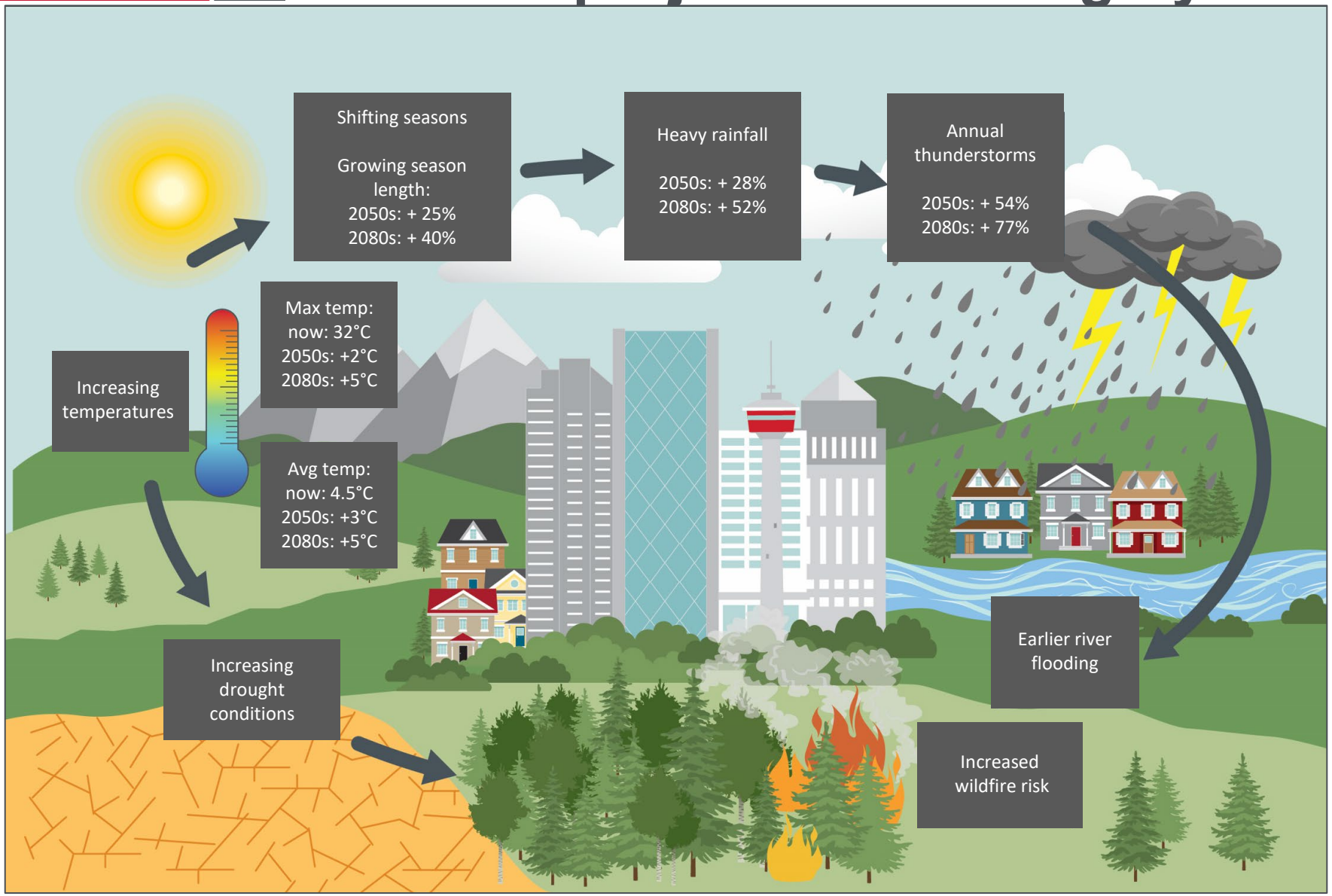
Climate & Environment

Collaborative approach

Within The City, various business units bring their expertise together and work collaboratively to identify disaster and climate risk and implement proactive risk management and climate adaptation strategies.



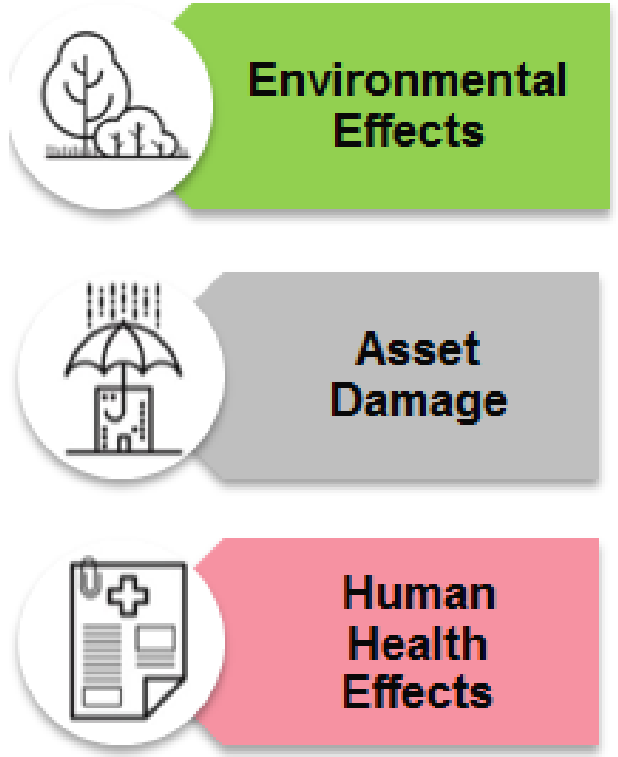
Climate projections in Calgary



- Projections are based on a 30-year climatic period
- RCP 8.5 scenario
- Climate change is a risk multiplier

Climate change: Calgary's increasing hazards

- Extreme heat
- Drought
- Shifting seasons (higher average temperatures)
- Wildfires and smoke (more frequent and intense)
- Damaging storms (SHDI, high winds, hail)
- Winter storms
- River flooding



Summer projections: hotter, drier, longer

	Historic	2050s	2080s
Mean daily max. temp.	21.4°C	25.1°C	27.8°C
Hot days (≥29°C)	6 days	28 days	49 days
Dry days*	37 days	50 days	58 days

Future summers could be deadly unless building codes adjust for rising temperatures

Since B.C.'s heat dome of 2021, experts have pressured authorities to set the bar higher for construction

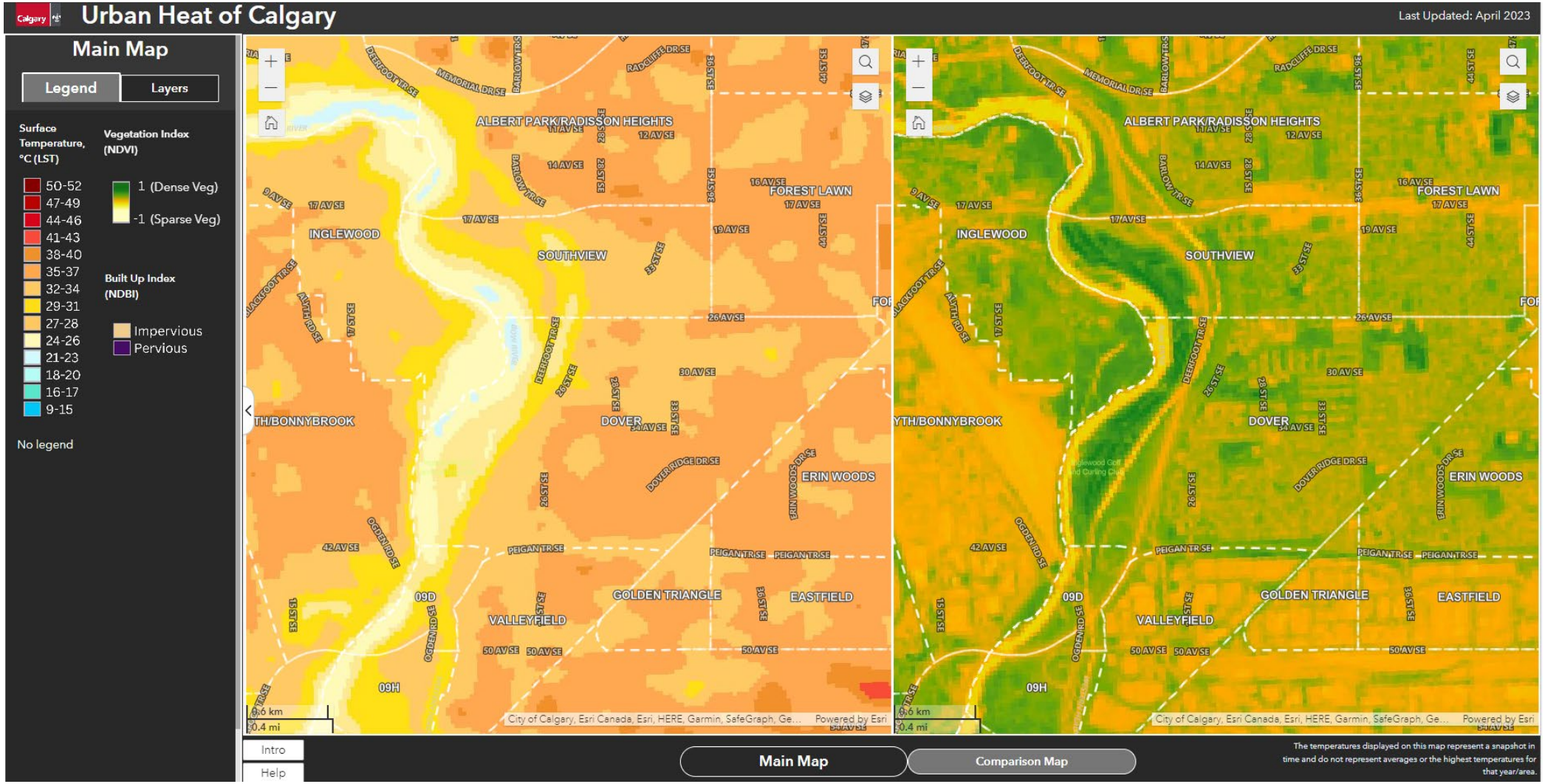
HA TU THANH
KATHRYN BLAZE BAUM

Roberta Lalonde lived by herself in a condo building for people over 55 when the deadliest weather event in Canadian history began in British Columbia on June 25, 2021.

For a week, high atmospheric pressure trapped the hot air underneath, creating a phenomenon known as a heat dome. Outdoors, with the humidity, it felt like 44 degrees Celsius. Indoors, it could be just as bad, and Ms. Lalonde struggled. Like most other B.C. dwellings, her unit in Chilliwack didn't have air conditioning.

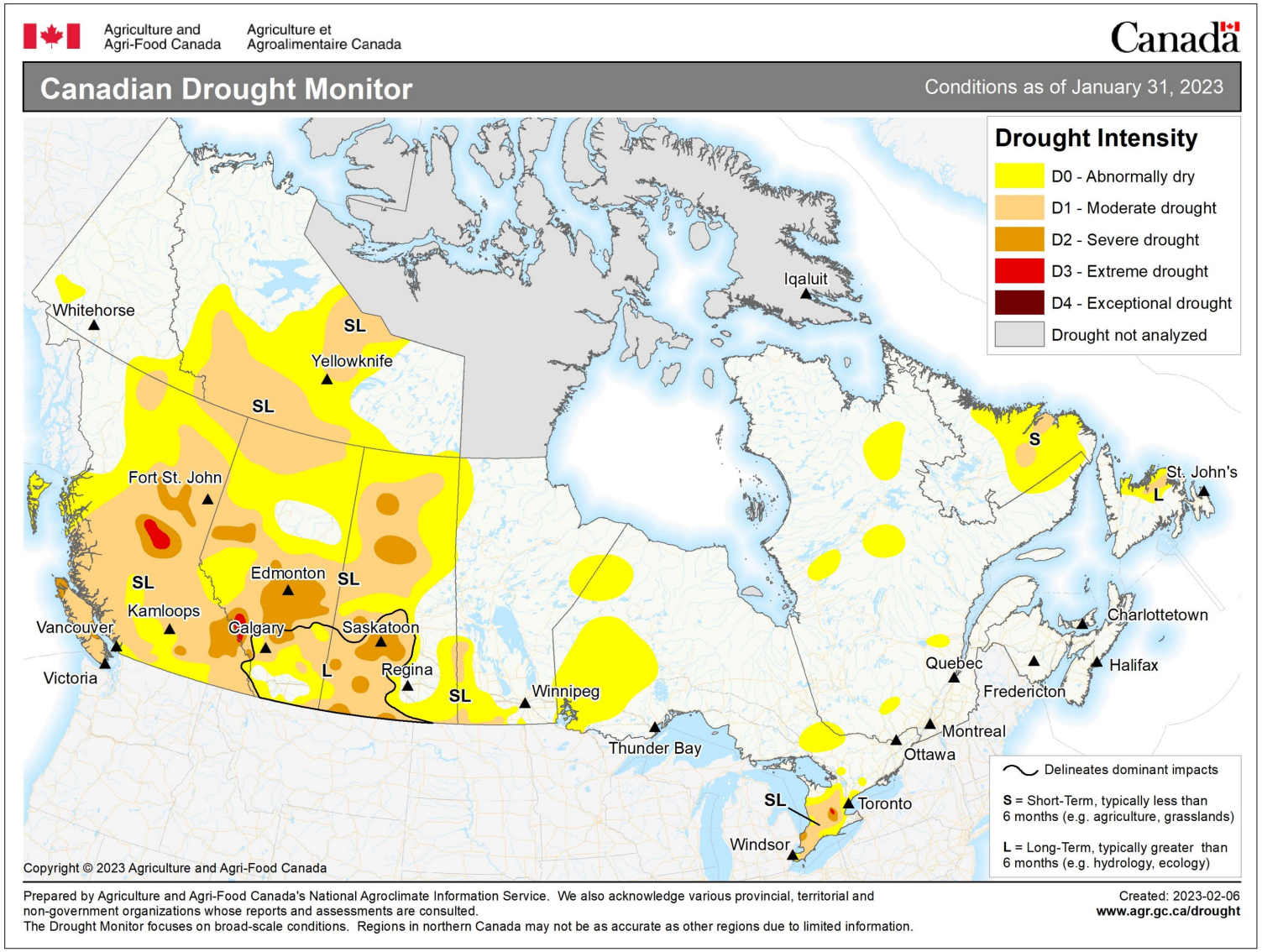
After her family didn't hear from her for several days, a relative found the 74-year-old lifeless in her bed, while a couple of pedestal fans still ran in the condo. Her death certificate says she died on June 27.

Urban Heat Dashboard



- Highly paved area; warmest areas
- Waterbodies and green spaces; coolest areas

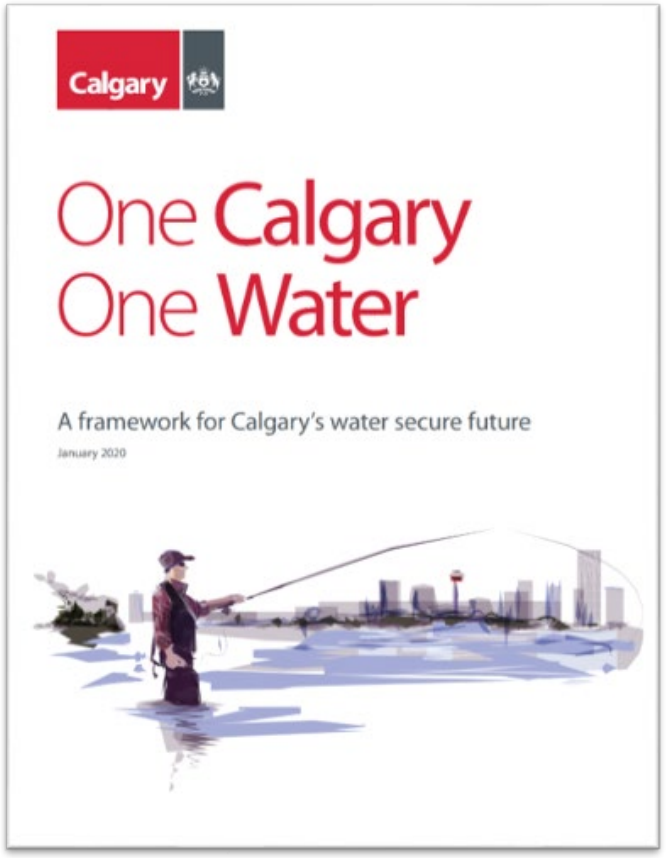
Drought

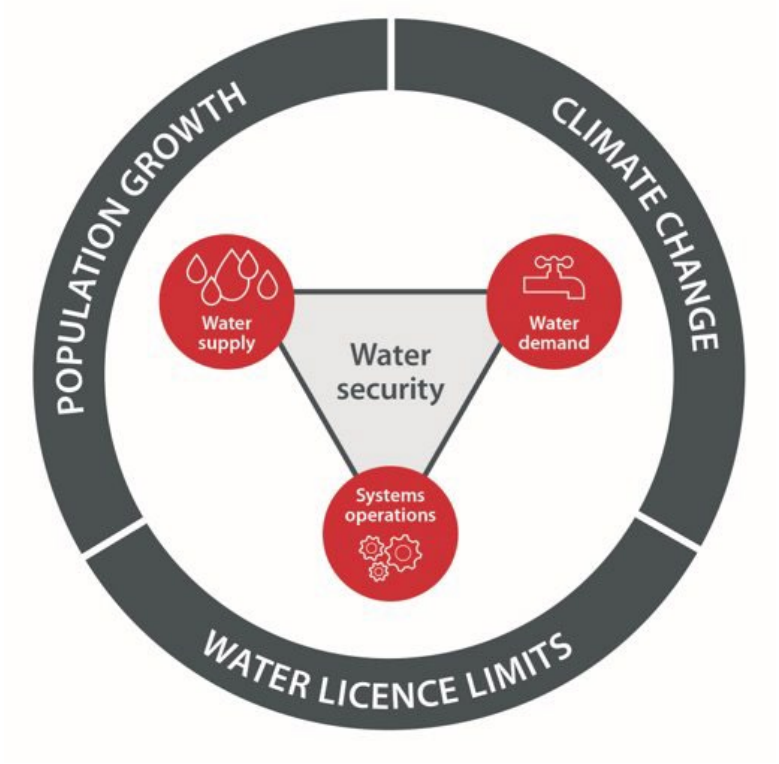


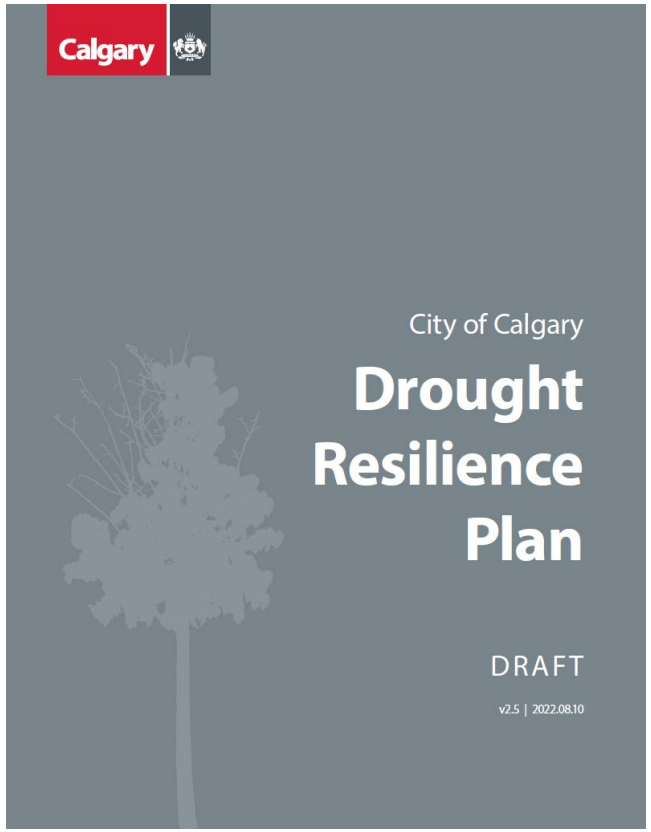
https://agriculture.canada.ca/en/agricultural-production/weather/canadian-drought-monitor/current-drought-conditions

"Dust Storm At Pearce, Alberta. - November, 1942" from the Galt Museum & Archives. Image used with permission.

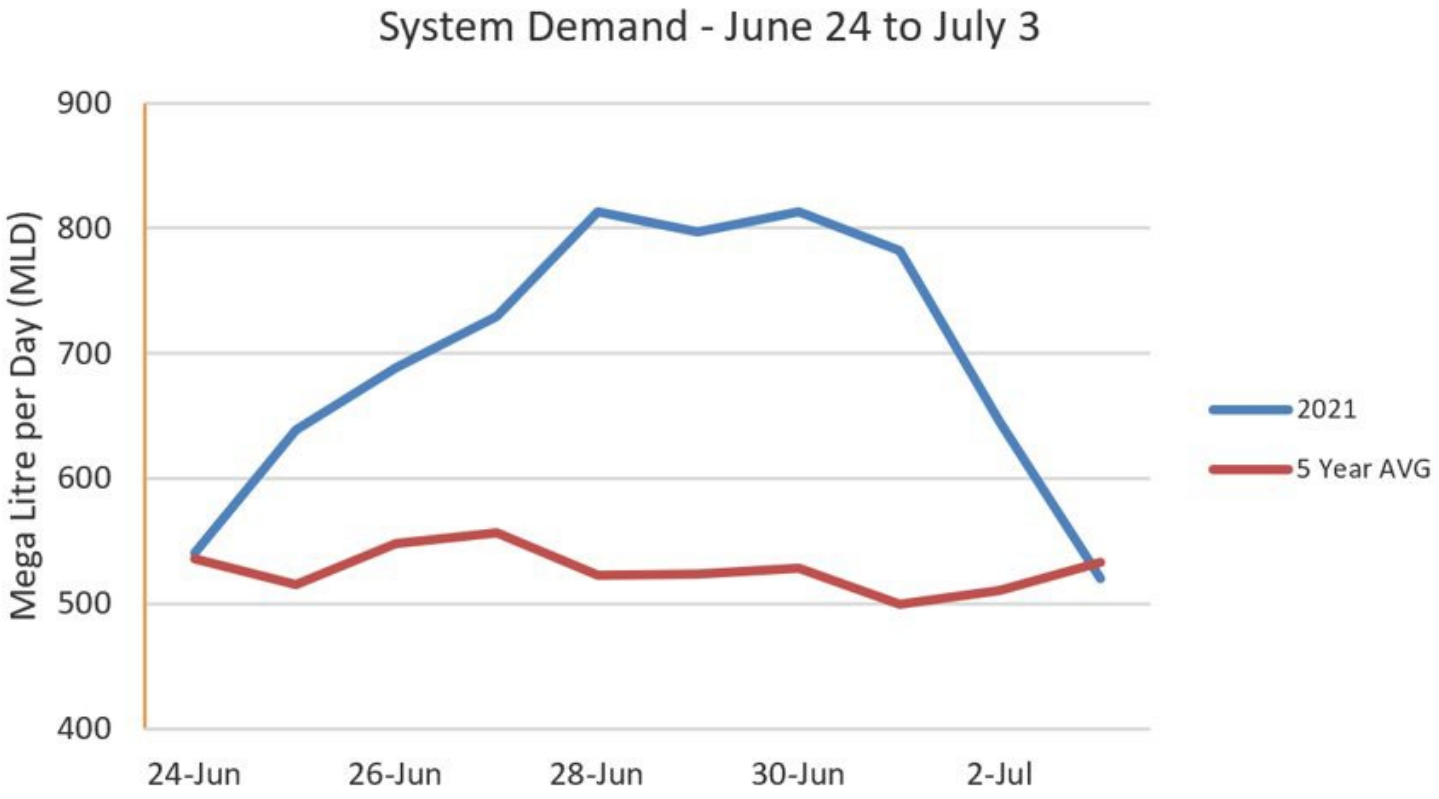
Water security + drought resilience



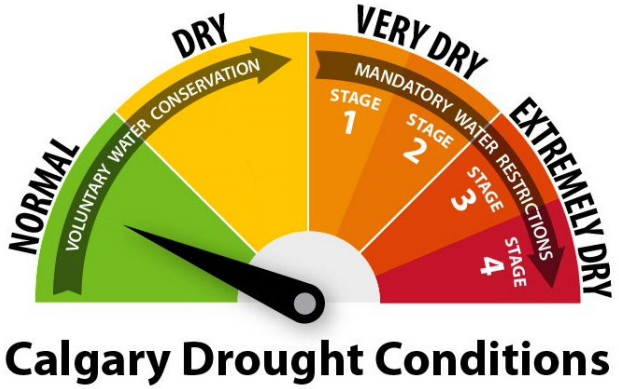




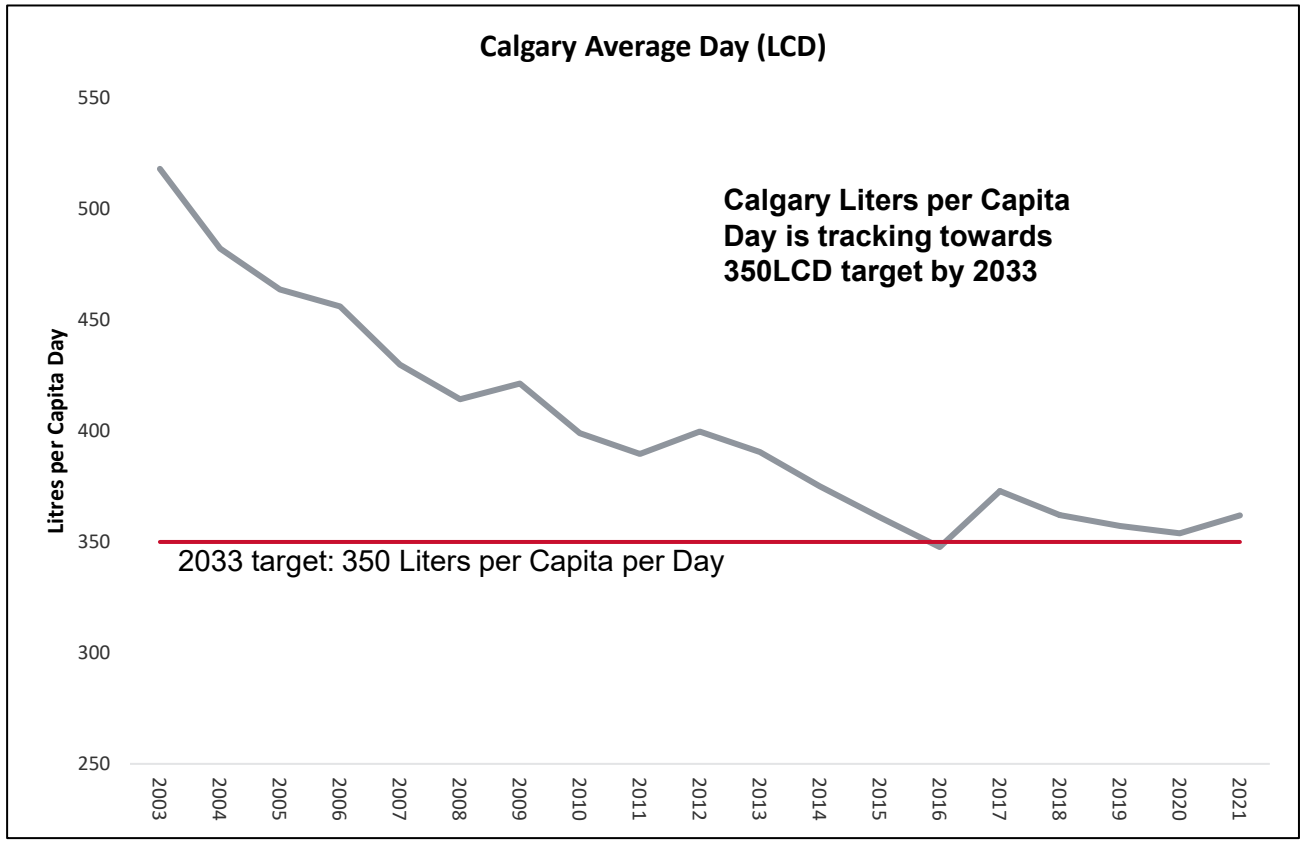
Impacts – water demand increases



Mitigating drought water shortages

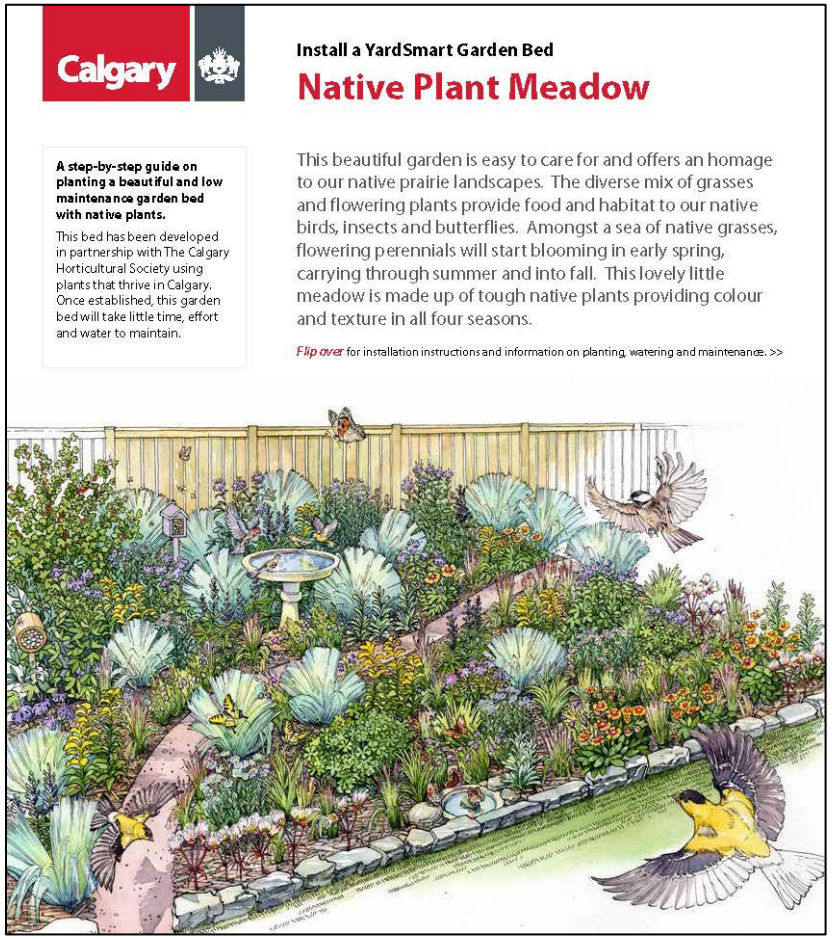


Calgary Drought Conditions



YardSmart program

In the face of the pressures brought on by a changing climate and a growing city, a water efficient YardSmart yard helps keep our rivers & our community, healthy & resilient.


Calgary

Install a YardSmart Garden Bed

Native Plant Meadow

A step-by-step guide on planting a beautiful and low maintenance garden bed with native plants.

This bed has been developed in partnership with The Calgary Horticultural Society using plants that thrive in Calgary. Once established, this garden bed will take little time, effort and water to maintain.

This beautiful garden is easy to care for and offers an homage to our native prairie landscapes. The diverse mix of grasses and flowering plants provide food and habitat to our native birds, insects and butterflies. Amongst a sea of native grasses, flowering perennials will start blooming in early spring, carrying through summer and into fall. This lovely little meadow is made up of tough native plants providing colour and texture in all four seasons.

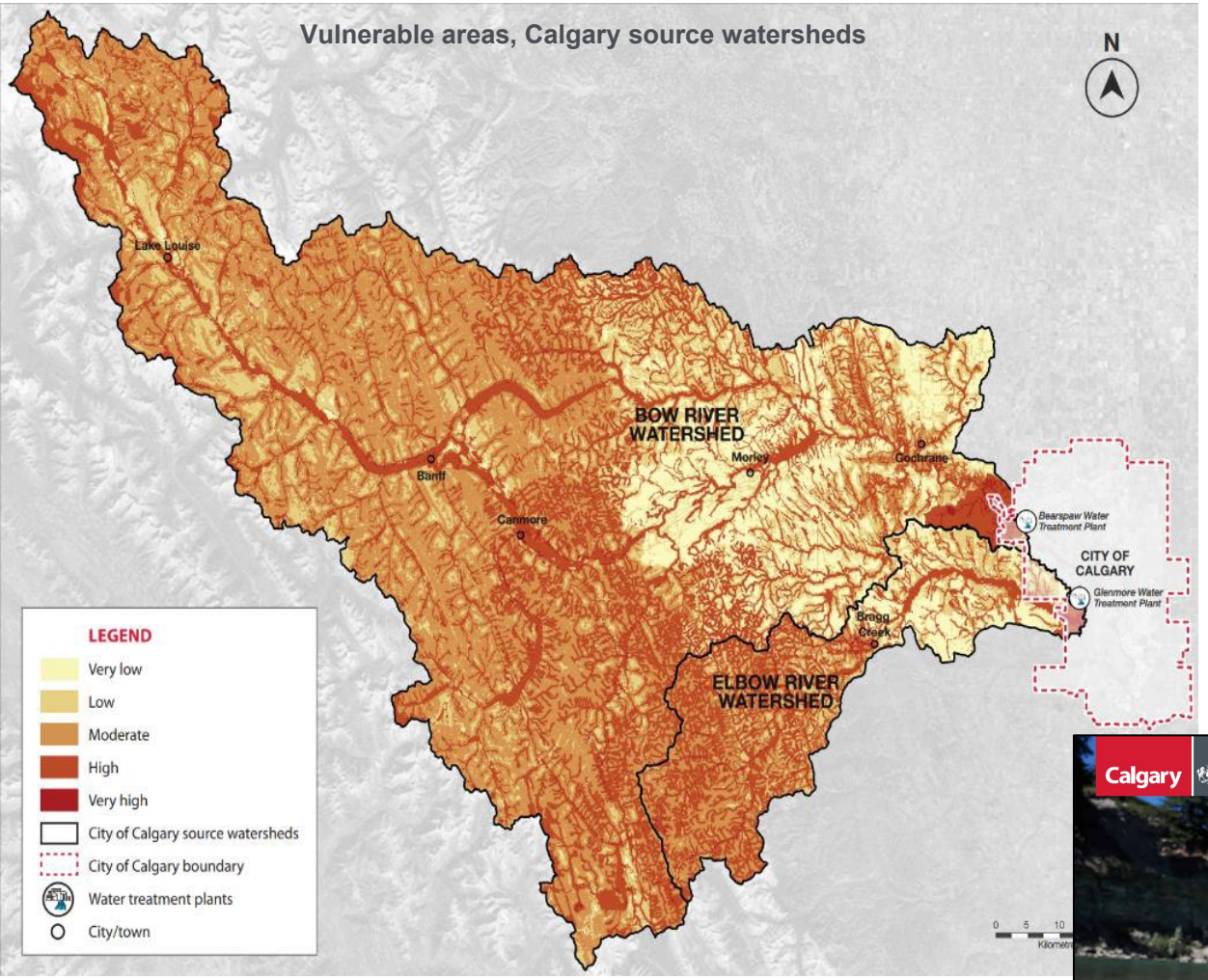
Flip over for installation instructions and information on planting, watering and maintenance. >>

YardSmart provides tips on designing a yard that is:

- Suited to Calgary's unique climate
- Adapted to climate change
- Builds resilience to drought
- Stays beautiful for longer
- Improves water quality
- Improves biodiversity & habitat for pollinators

www.calgary.ca/YardSmart

Wildfire risk and the source watershed



Cameron Falls, Waterton Park, AB: Pristine vs. Post-2017 Wildfire

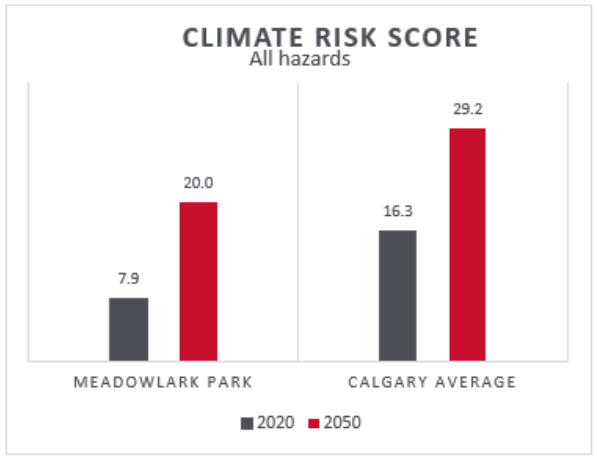
Community Climate Risk Index & community profiles

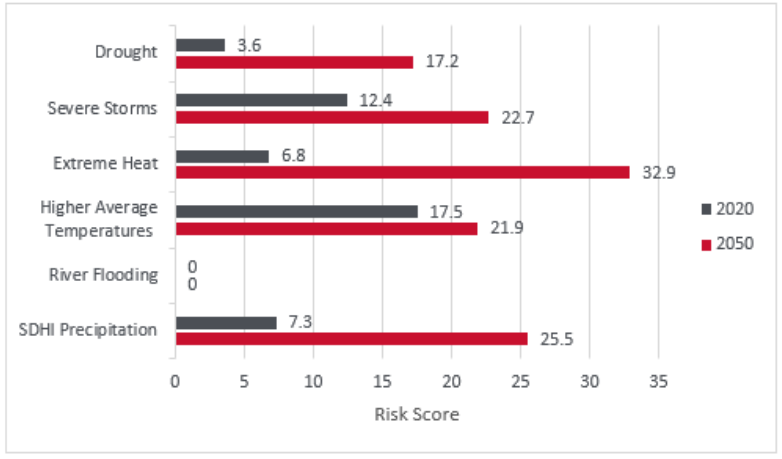
Community: **Meadowlark Park**

Climate Risk (2020): 7.9 – Very low
Climate Risk (2050): 20.0 – Low

Top Hazard 2020: Higher Average Temperatures

Top Hazard 2050: Extreme Heat





System	All hazard exposure (2020)	All hazard exposure (2050)	All hazard vulnerability
Social	Very low	Moderate	Moderate
Built	Moderate	Moderate	High
Natural	Very low	Very low	Very low
All systems	Very low	Low	Low
System with highest score	Built	Social	Built

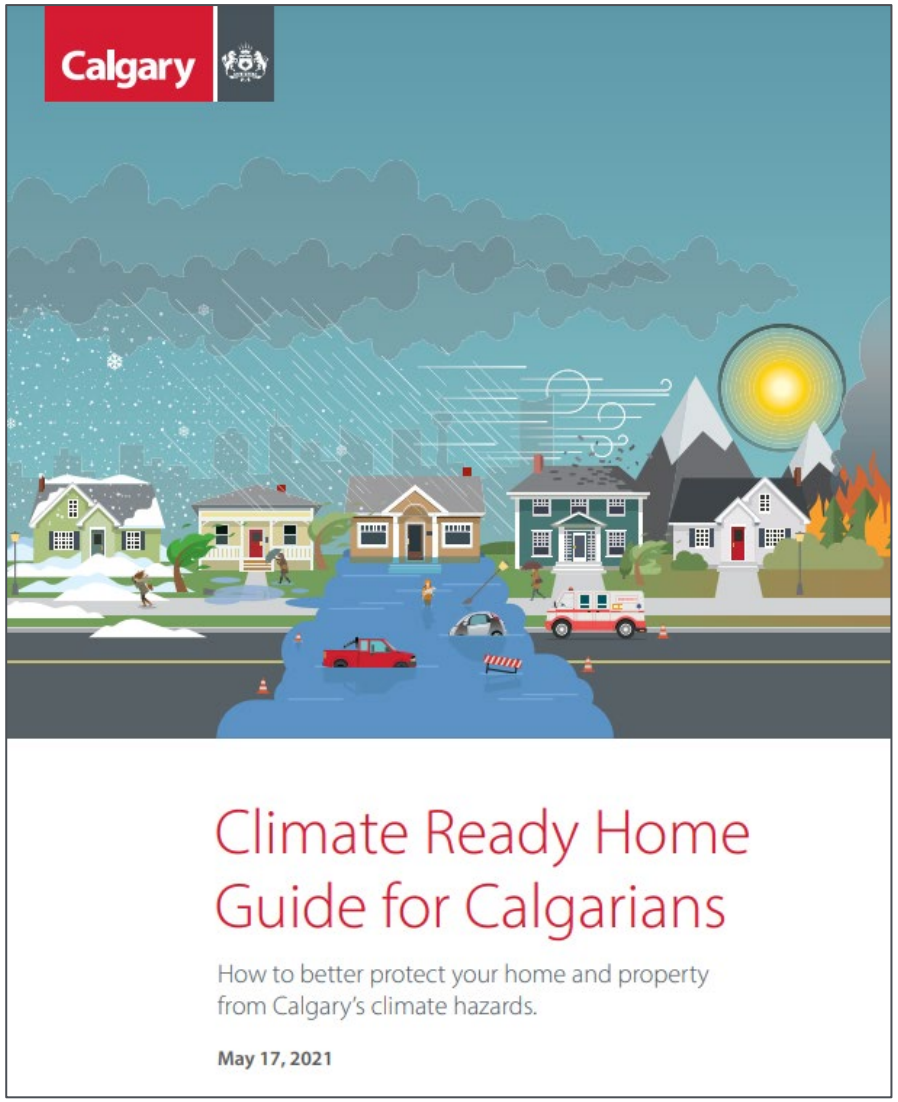
Hazard with highest exposure rating (2020): Severe Storms, Higher Average Temperatures

Hazard with highest exposure rating (2050): Extreme Heat

Hazard with the highest vulnerability score: Extreme Heat

- The Community Climate Risk Index is a relative ranking system for climate risk across all communities in Calgary.
- Climate risk is calculated by assessing the exposure and vulnerability to six climate hazards that will greatly impact Calgary.

Climate Ready Home Program



- Climate-Ready Home Guide
- One-pagers on critical actions, based on cost
- Virtual climate resilient home
- Home evaluation program
- Incentives program

How to reduce extreme heat impacts

Below are some of the most impactful measures to reduce extreme heat impacts to you and your home.

Expand all

+ Roof and Attic
+ Exterior walls and siding
+ Windows and doors
+ Landscaping and yard
+ Ventilation and cooling

Emergency Management & 911

911 as an early detection system

Heat-related calls to 911 increase

- First point of contact for all emergency services
- Increase in:
  - Medical-related calls for heat-related illness (EMS and CFD)
  - Wildland/grass fire calls (CFD and Regional Fire Partners)
  - Outside smoke investigations due to wildland fires (CFD)

Connecting to community

- Working with Distress Centre and DOAP team on medical interventions for vulnerable populations
- Vulnerable individuals more likely to experience heat-related stress, anxiety, and mental health concerns
- Evaluating expanding support programs to other vulnerable individuals (e.g., low-income seniors)
- Sharing information about available resources without need to engage law enforcement

911 prepared for increased heat-related calls

Calgary 911 response

- Activate Significant Event Management Plan
- Activate Tactical Operations Center
- Strategic planning for long-term event management

Early coordination with CEMA

- Combined situational awareness
- Share public messaging such as cooling centers, shelter locations
- Coordination with other CEMA Members

External collaboration

- Operations planning with Police and Fire to maintain sustained high call volumes
- Communication and coordination with AHS EMS
- Alternate Service Plans if sustained/long-term event is impacting response times

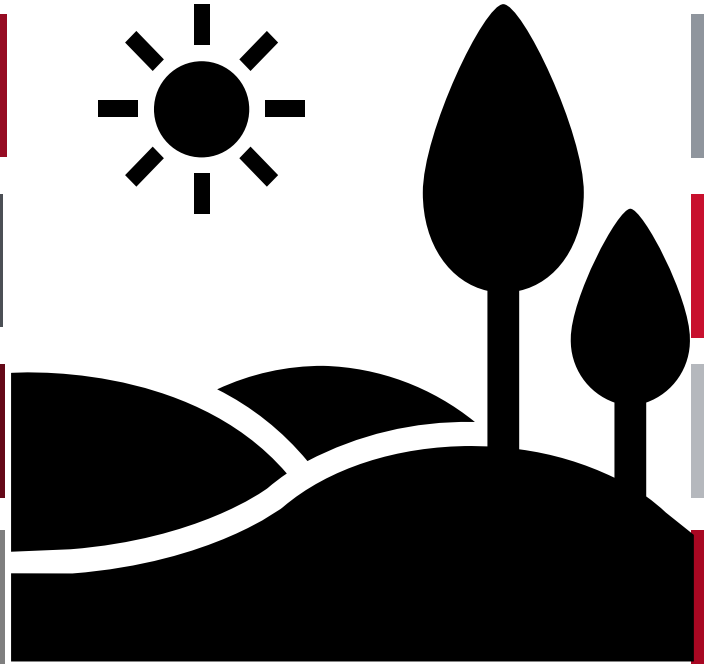
Emergency management

Preparedness & Response

- Community awareness and education
- Partnerships
  - Alberta Environment & Protected Spaces
  - Alberta Health Services
  - Calgary Fire Department
  - Non-profit liaison
- City of Calgary Extreme Heat Plan
  - Cooling station maps

Collaboration is key

- Federal and provincial climate strategies
- City of Calgary Climate Strategy
- City of Calgary Disaster Risk Assessment
- Agency member adaptation and mitigation actions



- Community education and preparedness
- Incident Response Plans
- 911 connection to social agencies
- Emergency event management and coordination

Recommendation

That the Emergency Management Committee recommend that Council receive this report for the Corporate Record.