

# Degrees of Resilience: Our Climate Adaptation Compass

## Strathcona County's Climate Resilience Plan

Planning & Development Services  
June 18, 2024



## Climate Change

Long-term shifts in the average climatic conditions in a region over a long period of time.

Involves both changes in average conditions and changes in variability of weather patterns.

Occurs naturally, currently amplified by human activities.

## Mitigation

The promotion of policy, regulatory and project-based measures that contribute to the stabilization or reduction of greenhouse gas concentrations in the atmosphere.

## Adaptation

Any initiatives or actions in response to actual or projected climate change impacts, which are intended to reduce the effects of climate change on built, natural and social systems.

# Climate Change Mitigation & Adaptation

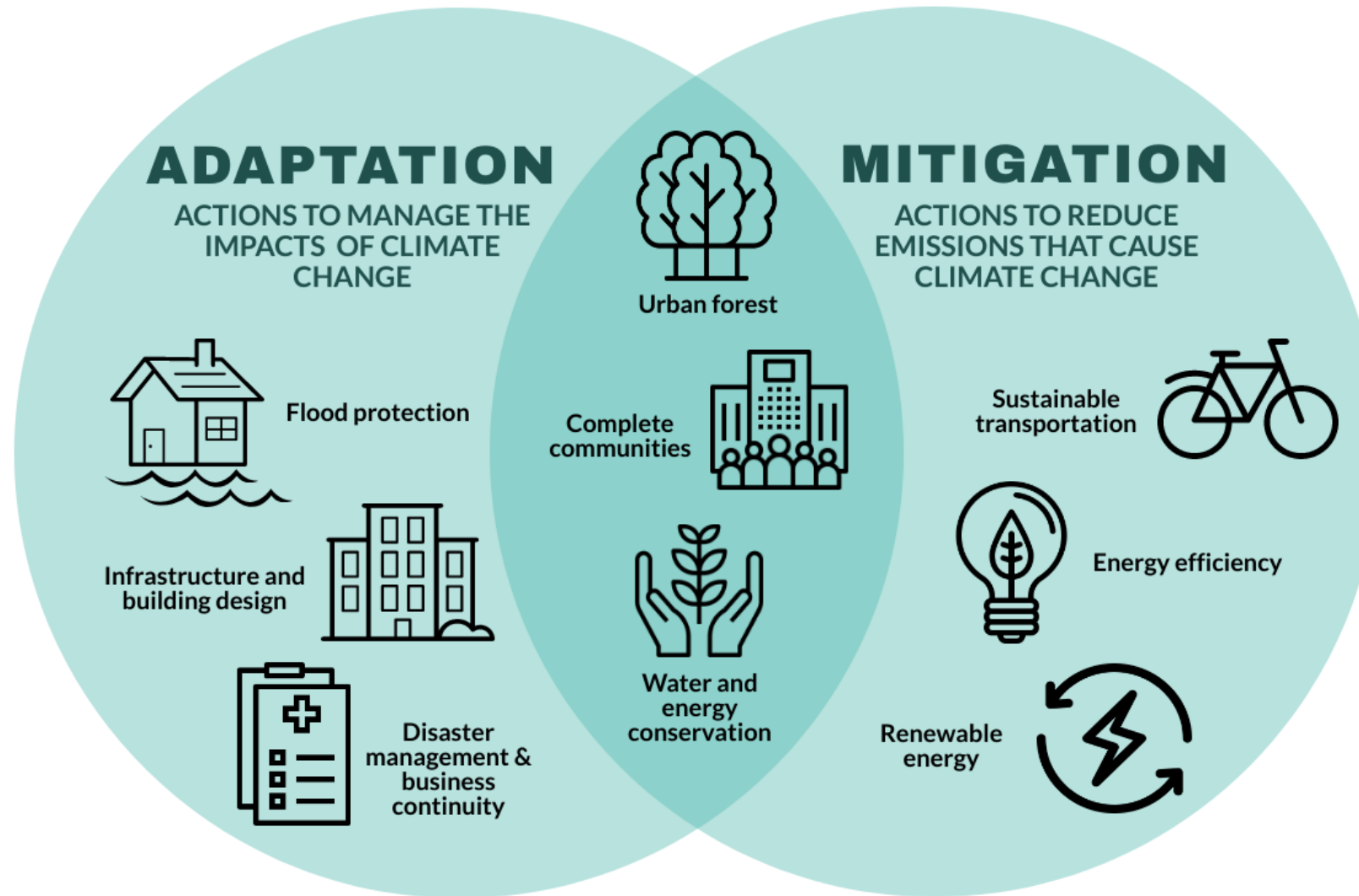


## Strathcona County Climate Resilience Capacity Building Program Work Plan

Municipal Climate Change Action  
Centre Grant Application  
November 17, 2022



# Adaptation vs Mitigation



# ICLEI Canada's BARC Framework

- The creation of the Adaptation Plan followed the guidance of ICLEI Canada's BARC framework.
- BARC offers a structured five-milestone approach tailored for communities to enhance their preparedness for climate change impacts.



# Project Team & Working Group

- ICLEI Canada & PDS leads
- Planning and Development Services; Emergency Services; Recreation, Parks and Culture; Transportation Engineering and Operations; Fleet and Facility Management; Financial and Strategic Services; Utilities; Communications; Family and Community Services; Transit; Intergovernmental Affairs, Business Excellence
- 28 staff representing 12 departments

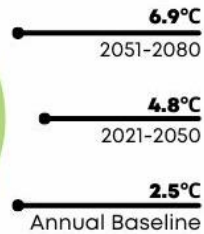
# Climate Science

## FUTURE CLIMATIC PROJECTIONS Strathcona County

March, 2023

### ANNUAL MEAN TEMPERATURES

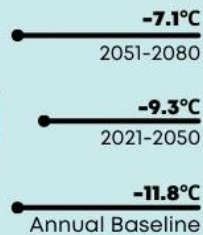
Mean temperatures are projected to increase annually and in every season.



### SEASONAL MEAN TEMPERATURES



Winter  
Dec - Feb



Spring  
Mar - May



Summer  
Jun - Aug



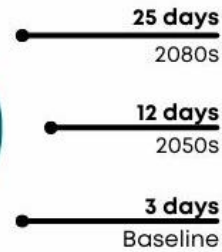
Fall  
Sep - Nov



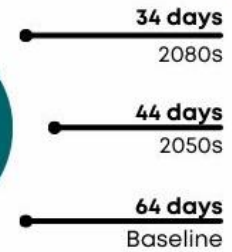
### TEMPERATURE EXTREMES



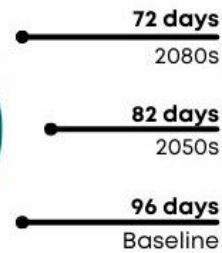
Days Above  
30°C



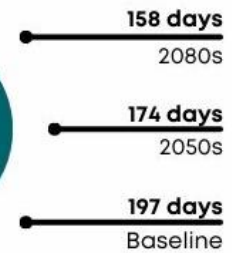
Days Below  
-15°C



Icing Days

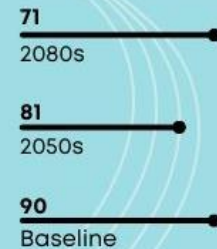


Frost Days



### ANNUAL MEAN FREEZE-THAW CYCLES

There will be a decrease in freeze-thaw cycles, where the daily maximum temperature is higher than 0°C and the daily minimum temperature is less than or equal to -1°C

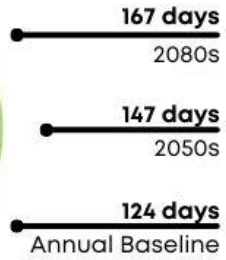


Baseline period: 1971 - 2000

Sources: Canadian Climate Data and Scenarios Network, Climate Atlas of Canada Tool.

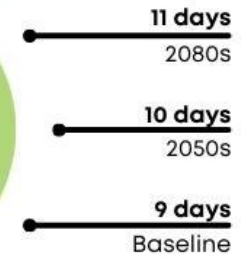
## GROWING SEASONS

First frost dates will be later, and last frost days will be earlier.



## HEAVY RAINFALL DAYS

Days with precipitation over 10 mm and 20 mm are considered Heavy Rainfall days, and are projected to increase. Data indicated is for days over 10 mm.



## ANNUAL MEAN PRECIPITATION

Annual precipitation is expected to increase. Winter and Spring are projected to get significantly wetter, with a slight decline in the Summer.

## SEASONAL MEAN PRECIPITATION



Winter  
Dec - Feb



Spring  
Mar - May



Summer  
Jun - Aug



Fall  
Sep - Nov



## PRECIPITATION EVENTS

Precipitation events in general are projected to become more intense and extreme.



- Frequency**  
 Precipitation will fall at a faster rate (mm/h)
- Intensity**  
 Shorter storms will have an increasingly high intensity
- Duration**  
 Return periods of heavy storm will shorten (increased frequency)



## WILDFIRES

Research shows that extreme wildfire risk in Western Canada has increased by a factor of 1.5 to 6 from climate change.

More large and high-intensity wildfires, such as that experienced in Fort McMurray, are expected under current climate change projections.

Baseline period: 1971 - 2000

THIS INFOGRAPHIC WAS CREATED BY ICLEI CANADA.

# Impact Statements

- Drawing on Strathcona County’s Climate Science Report, Impact Statements were the cornerstone for the Vulnerability and Risk Assessments, developed by addressing the following key questions:
  - ✓ What are the climatic changes?
  - ✓ What outcomes are these changes expected to bring?
  - ✓ What are the associated consequences of these outcomes?

Climatic Threat	Outcome and Consequence
Increase in extreme weather events	Damage to tree canopy increasing the number of hazardous trees/branches

In reviewing this information, the final impact statement for this example would read as follows:

*“Increase in extreme weather events (e.g. ice storms, windstorms, flooding, thunderstorms, freezing rain, hail storms, tornadoes, etc.) leading to more damage to the tree canopy, resulting in an increased number of hazardous trees/branches.”*



# Vulnerability & Risk Assessments

## Vulnerability

- Based on expected sensitivity and adaptive capacity to projected impacts
- Ranked Low, Medium, or High



**Low Vulnerability**

Not very/not at all vulnerable to harm arising from the impacts



**Medium Vulnerability**

Somewhat vulnerable to harm arising from the impact



**High Vulnerability**




Very vulnerable to harm arising from the impacts

## Risk

- Likelihood Score
  - 1 (very unlikely) to 5 (almost certain)
- Consequence Score
  - 1 (negligible) to 5 (catastrophic) for social, economic and environmental criteria

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

# Priority Climate Change Impacts

Icon	Impact Group
	<b>Natural Environment</b>
	<b>Socioeconomic system(s)</b>
	<b>Built Environment</b>

## High Ranking Impacts



**Impact 3:** Increase in average annual temperatures leading to a longer growing season, subsequent drought and increased weed control needs, as well as potential agricultural livestock/crop failure (i.e. disrupted growth cycles and growing regions of temperature- and moisture-sensitive plants/crops, more invasive species, etc.).

## Medium-High Ranking Impacts



**Impact 5:** Increased average annual temperatures leading to increased algal blooms and elevated lake, stormwater management facility, and wetland bacteria levels/counts, affecting water quality and potentially causing fish and invertebrate die-offs.

## Medium Ranking Impacts



**Impact 17:** Increased frequency and intensity of precipitation events leading to more overland flooding, resulting in greater runoff and sediment loading into streams and rivers and loss of wildlife habitat and ecosystem services.

## Medium-Low Ranking Impacts



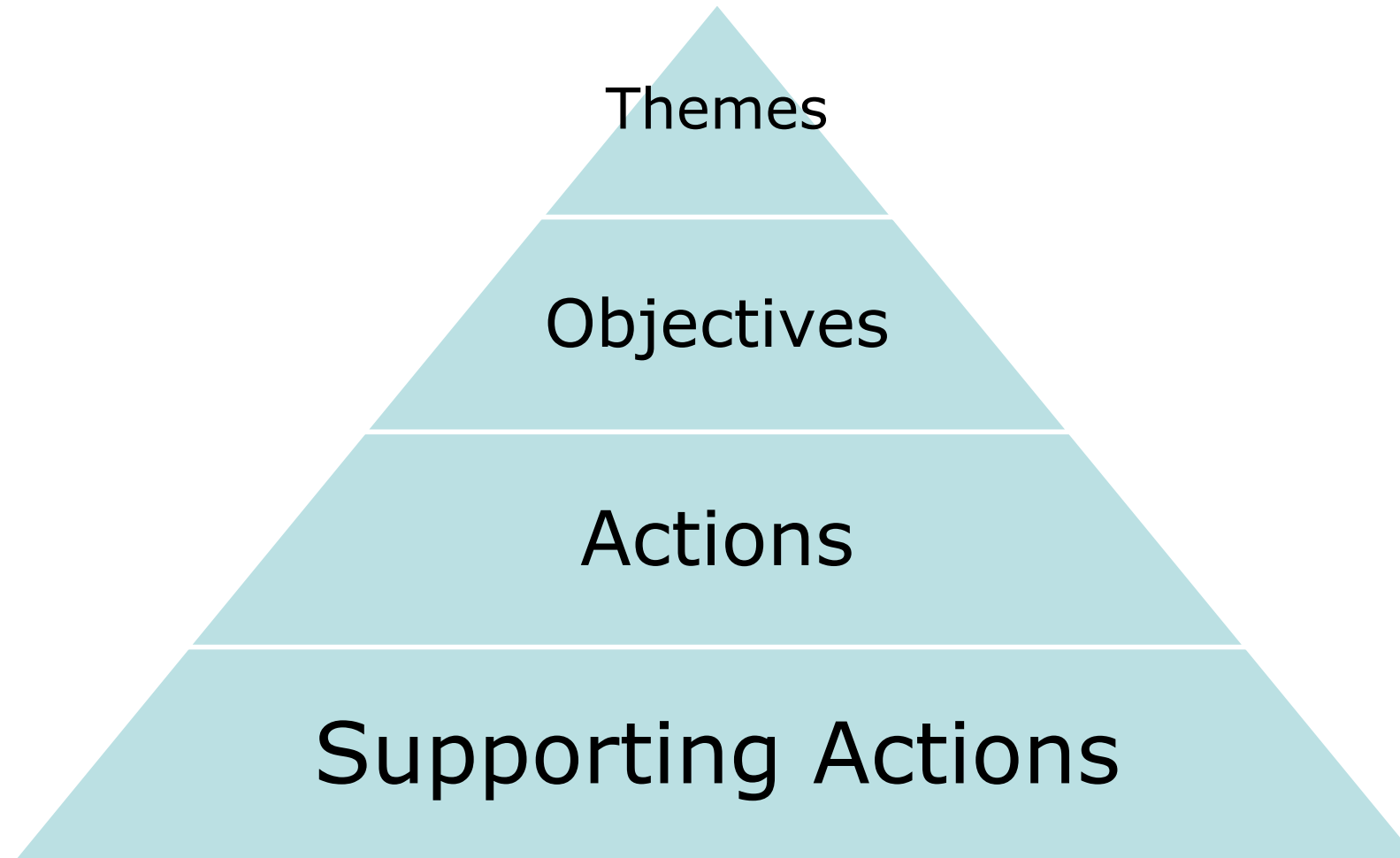
**Impact 8:** Increased frequency and duration of hot days (> 30 °C) resulting in heatwaves and reduced air quality leading to health and safety risks (e.g. heat stress, domestic violence/violent altercations, cardiovascular disorders, food-borne/water-borne illnesses, etc.) especially to vulnerable populations (e.g. outdoor workers, seniors, women, children, those with chronic health conditions, temporary foreign workers, those without air conditioning, etc.).

## Low Ranking Impacts



**Impact 20:** Increased frequency and intensity of precipitation events (especially in, winter and spring), freezing rain events, and ice loading resulting in flooding, leading to damage to County assets and infrastructure (i.e. stormwater management infrastructure and water treatment plants, sports fields, buildings, roads, pavements, bridges, culverts, trees, streetlights, signs, etc.) and associated maintenance requirements.

# Themes, Objectives, Actions





## Theme #1 – Built Environment



Focusing on the Built Environment within Strathcona County is essential for bolstering our resilience against climate change. This theme emphasizes the need for our infrastructure — from essential water systems and energy systems to roads and buildings — to be resilient to climate impacts through strategic design, construction, and maintenance. By enhancing the durability and adaptability of our built environment, the County is better prepared to face climate-related challenges, ensuring stability and safety for our residents and minimizing disruptions in critical services. This effort is a cornerstone in our journey towards a more sustainable, climate-resilient future.

**Objective #2** – Improve the resilience of energy infrastructure to weather-related disruptions.

### Action 2.1

Continue with completion and implementation of the County's Energy Management Plan

#### Supporting Actions:

-  **2.1.1:** Support additional staff capacity to facilitate completion of the plan.
-  **2.1.2:** Update and complete a full inventory of corporate carbon emissions and plan associated emission reduction monitoring.

Priority Climate Change Impacts addressed through Action

Impacts #1, 11, 31

# Climate Adaptation Compass

## Theme #1 - Built Environment

- Objective 1 – design, construction and maintain infrastructure that is resilience to climate-related risks and impacts
- Objective 2 – improve the resilience of energy infrastructure to weather-related disruptions
- Objective 3 – reduce transportation disruptions due to extreme weather events and improve the safety of travel on roads, sidewalks and trails
  - Actions and supporting actions address impacts #1,3,4,5,8,10,11,17,20,23,24,27,29,31,36

# Climate Adaptation Compass

## Theme #2 - People, Health & the Economy

- Objective 4 – minimize and management risks to public health and safety associated with impacts of wildfire, extreme weather and temperatures
- Objective 5 – improve community preparedness and resilience to respond to climate-related risks from wildfire, extreme weather and temperatures
- Objective 6 – create conditions to minimize health and safety risks to County staff working outdoors
- Objective 7 – minimize air quality and wildfire-related disruption to outdoor recreation, events and tourism
  - Actions and supporting actions address impacts #1,3,4,8,11,20,23,24,25,27,29,31,36

# Climate Adaptation Compass

## Theme #3 - Natural Environment & Agriculture

- Objective 8 – protect local water quality and quantity
- Objective 9 – monitor, maintain and improve the diversity and resiliency of urban trees and forests
- Objective 10 – monitor, plan for, and manage the increasing threat of invasive species (i.e., plants and wildlife)
- Objective 11 – improve and support agricultural resilience to climate change
  - Actions and supporting actions address impacts #3,4,5,10,17,20,27,36

# Climate Adaptation Compass

## Theme #4 - Resilient Governance

- Objective 12 – integrate climate change adaptation into operational, capital and strategic planning processes
- Objective 13 – identify project and program-specific and ongoing funding for climate resilience supportive projects/programs that take into account financial planning and priorities
  - Actions and supporting actions address all impacts



# Action Prioritization

Criteria	Score			
	1	2	3	4
Effectiveness/ Urgency	Minor contribution to management of risk; Not urgent	↔		Vital to effective management of risk and achievement of objectives; High urgency
Affordability	Requires significant budget for implementation	↔		Can be completed within planned budgets
Feasibility	Lack of human, legal, knowledge, technical or administrative capacity to implement	↔		Sufficient human, legal, knowledge, technical and administrative capacity to implement
Acceptability	Significant pushback likely from specific stakeholders, elected officials	↔		Supported by the majority of stakeholders, elected officials
Equity	Minimal improvement in the livelihood of equity-deserving groups*	↔		Provides clear and distinct benefits for equity-deserving groups*
Flexibility	Difficult to reverse, inflexible	↔		Easy to scale up or down, flexible, no-regret

- A total of 24 actions and associated supporting actions were shortlisted
- Project Team classified actions into three levels of priority:
  1. Urgent (i.e. it is in the County's best interest to complete this over the short-term,)
  2. High (i.e. it is in the County's best interest to complete this over the medium-term,)
  3. Medium (i.e. it is in the County's best interest to complete this over the long-term,).
- 14 'Urgent' priority actions, 8 'High' priority actions, and 2 'Medium' priority actions

# Implementation

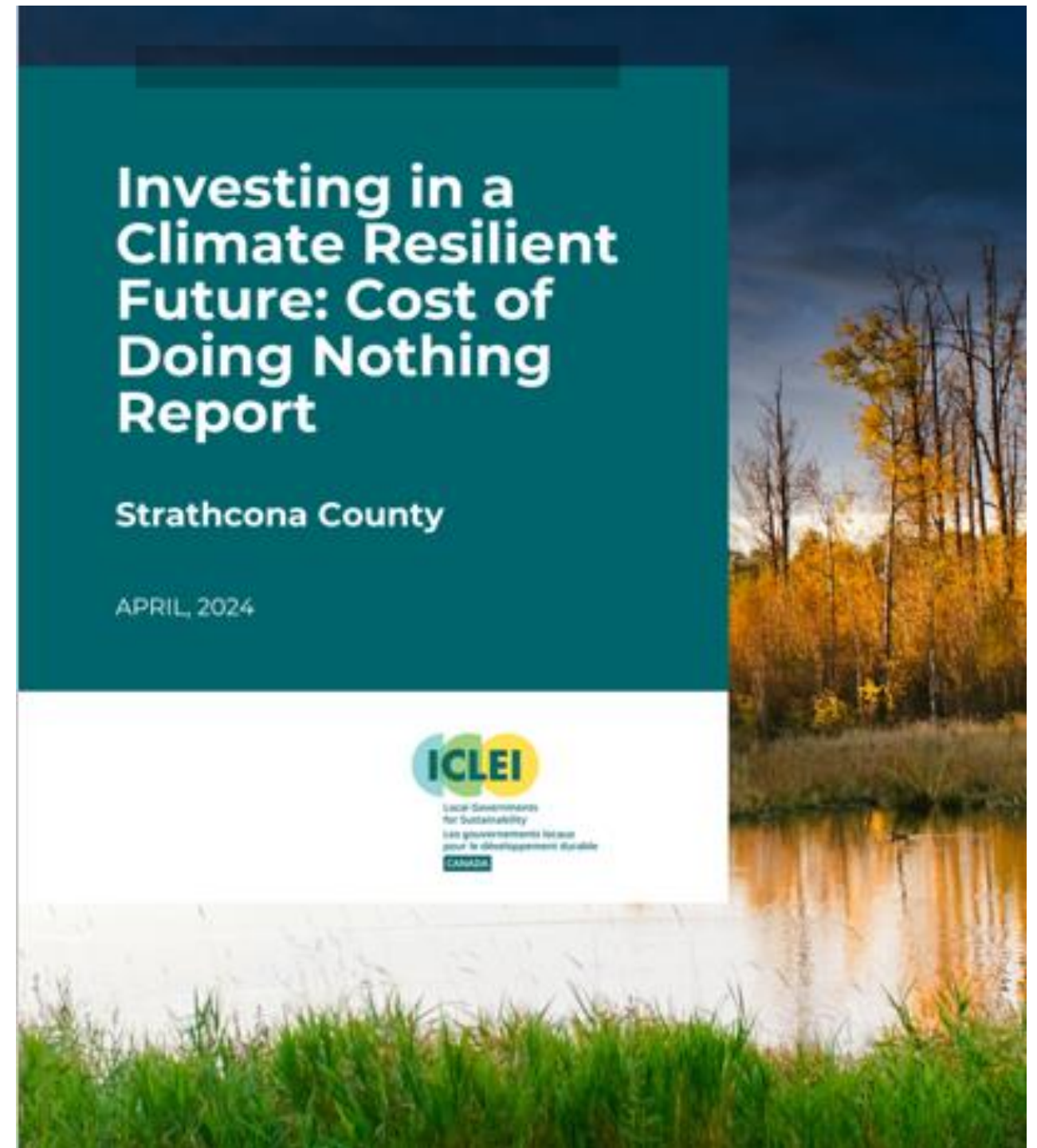
- A comprehensive and detailed implementation schedule is being developed through extensive consultation and review with the working group. The implementation schedule for each action will, at a minimum, outline:
  - Action and supporting actions
  - Action scope
  - Approximate timelines for implementation
  - Immediate, specific next step(s) that would need to happen to begin implementation.
  - Lead department(s) and supporting department(s)/organization(s)
  - Relevant current practices and existing initiatives to build upon
  - Action priority/urgency level
  - Monitoring metrics to evaluate progress
- The implementation schedule will be a living document, subject to changes due to new information, new adaptation priorities being identified, and new funding sources becoming available

# Monitoring & Evaluation

- It is expected that adjustments to the Plan will be necessary due to changes in federal and provincial legislation and regulations, continued/changing lived experience of climate change impacts, new insights, and any technological advancements
- By staying committed to this approach, we can ensure that the Plan remains effective and relevant. Flexibility is key, allowing us to adapt strategies without being limited by initial assumptions should any new opportunities arise

# Enclosure 2

- Complements the Plan to provide decision-makers with data to weigh the costs of action vs. inaction
- Identified climate hazards of focus for Strathcona County:
  - **extreme weather and precipitation**
  - **extreme heat**
  - **wildfires**
- Direct and indirect financial costs of climate-related events are substantial and growing
- Increase our understanding to enable prioritization of adaptive measures





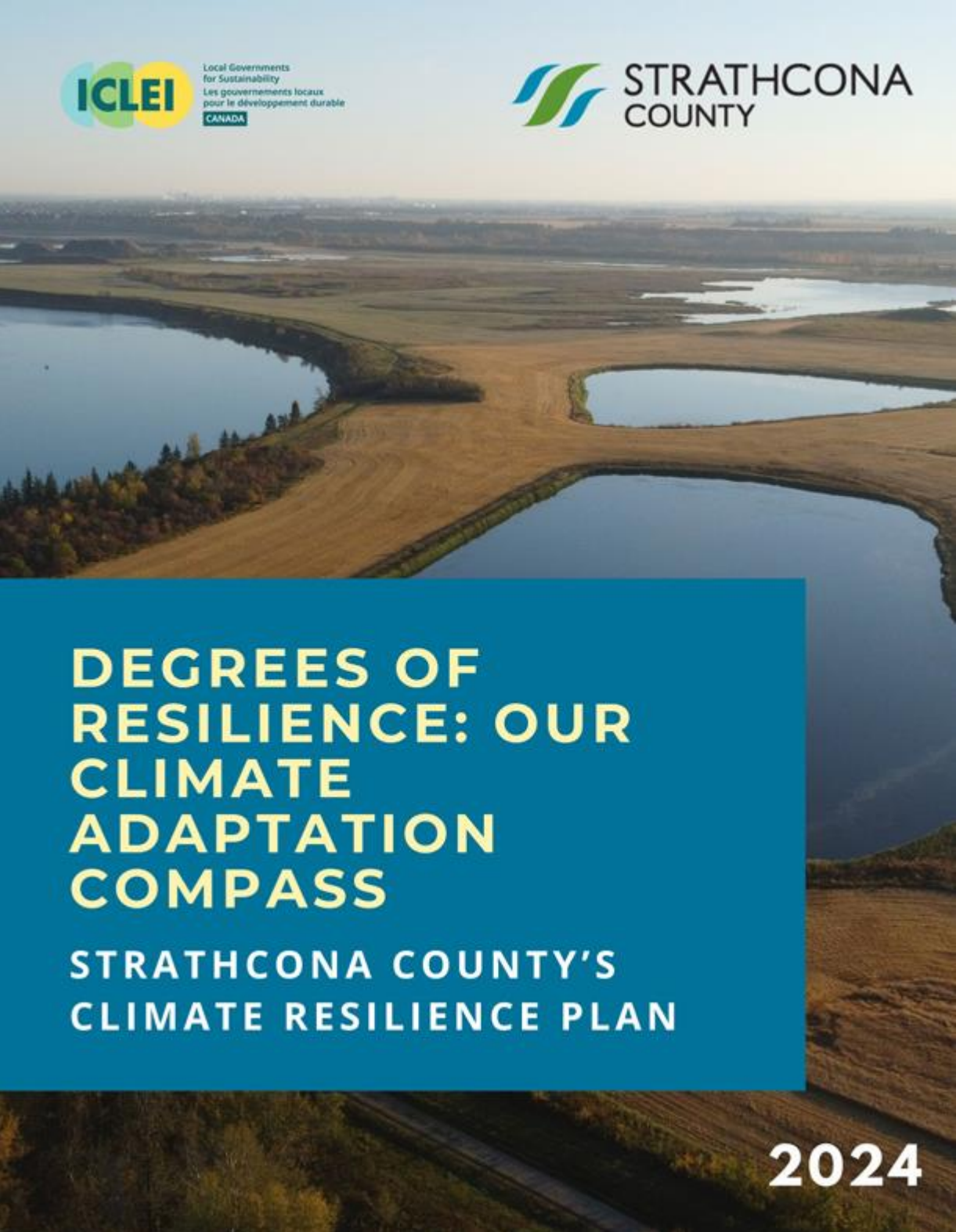
## Vision Statement

Strathcona County's Strategic Plan (2023-2026) sets out the vision of "becoming Canada's most liveable community." Drawing on our community vision along with contributions from the working group and their priority values for the Climate Resilience Plan, we are guided by the following Vision Statement:

*"Strathcona County is responding to the challenges of climate change so we can remain an inclusive, healthy, and resilient place to live for generations to come."*

# Next Steps

- Council approval Q3
- Fulfill MCCAC grant reporting in July
- Integrate with Environmental Framework
- Formalize Implementation Plan
- Formalize Monitoring & Evaluation
- Inform Business Planning



**DEGREES OF  
RESILIENCE: OUR  
CLIMATE  
ADAPTATION  
COMPASS**

STRATHCONA COUNTY'S  
CLIMATE RESILIENCE PLAN

**2024**

**Thank you!  
Questions?**