

# COMMITTEE REPORT



**Date:** September 8, 2022

**RIM No.** 1210-21

**To:** Agricultural Advisory Committee (AAC)

**From:** Policy & Planning Department (TG)

**Application:** Climate Resilient Kelowna Strategy      **Owner:** City of Kelowna

**Subject:** Climate Vulnerability and Risk for Agriculture

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## 1.0 Purpose

To obtain the Agricultural Advisory Committee's input on the agricultural sector's vulnerability and risks due to climate change and to identify opportunities for agriculture to become more resilient to a changing climate as outlined in the report from the Policy and Planning Department, dated September 8, 2022.

## 2.0 Proposal

### 2.1 Background

The *Climate Projections for the Okanagan Region*<sup>1</sup> report released in 2020 provides insight into how a changing climate could impact our community. Forecasted climate shifts of hotter, drier summers; intense weather; and more precipitation, are already starting to be experienced. These changes in climate will impact Kelowna's citizens, ecosystems, agriculture, infrastructure, and the economy. For example, in 2017, unprecedented flooding of Okanagan Lake and local tributaries, followed by devastating wildfires impacted 3,200 people and caused \$10.7 million in damages to City infrastructure, millions more to private property, and far-reaching financial impacts in the tourism and agricultural sectors. The summer of 2021 saw a record-breaking heat wave followed by six Central Okanagan wildfires that resulted in a loss of over 70 homes. The fires and accompanying smoke and restrictions impacted health, tourism, agriculture and other aspects of the local economy. These "unprecedented" events are expected more frequently in the future.

In 2018 Council endorsed *Kelowna's Community Climate Action Plan*<sup>2</sup> (CCAP), a five-year strategy that identified actions to reduce Kelowna's community greenhouse gas (GHG) emissions 4, 25 and 80 per cent below 2007 levels by 2023. With this strategy nearing its end of life, the City is in the process of developing a *Climate Resilient Kelowna Strategy*. The new strategy will identify actions to mitigate community GHG emissions, and it will also identify actions to help the community adapt and build resiliency to extreme

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<sup>1</sup> Regional District North Okanagan, Regional District of Central Okanagan, Regional District Okanagan-Similkameen and Pinna Sustainability, 2020. *Climate Projections for the Okanagan Region*.

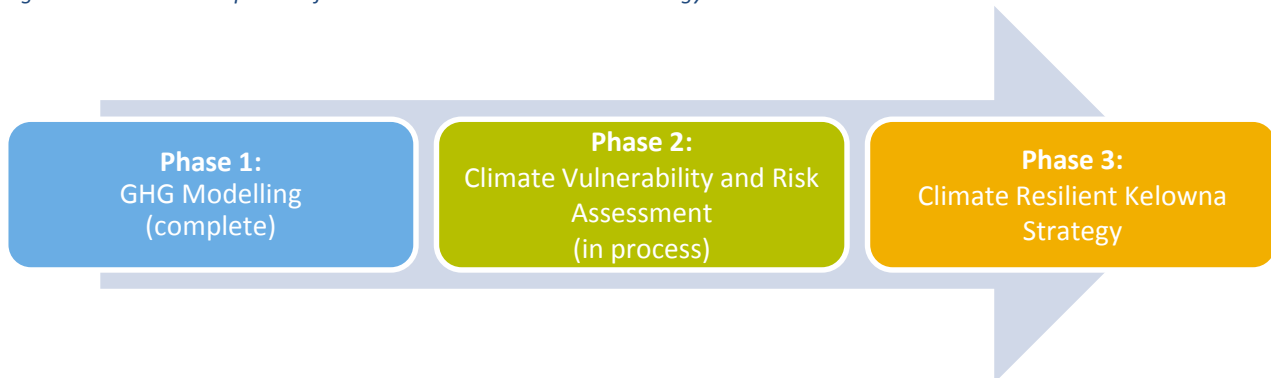
[https://www.rdco.com/en/environment/resources/Documents/2020---OK\\_Climate\\_Projections\\_Report\\_Final.pdf](https://www.rdco.com/en/environment/resources/Documents/2020---OK_Climate_Projections_Report_Final.pdf)

<sup>2</sup> City of Kelowna, 2018. *Kelowna's Community Climate Action Plan*.

[https://www.kelowna.ca/sites/files/1/docs/community/community\\_climate\\_action\\_plan\\_june\\_2018\\_final.pdf](https://www.kelowna.ca/sites/files/1/docs/community/community_climate_action_plan_june_2018_final.pdf)

heat, more intense and hotter fires, increasing water shortages, more smoke days, and flooding. The strategy is being developed over three phases:

Figure 1: Phased development of the Climate Resilient Kelowna Strategy



Phase 1 and 2 build the technical foundations of the strategy. Phase 1, which was recently completed, modelled how the community could reduce its share of GHG emissions to align with senior government reduction targets and the Intergovernmental Panel on Climate Change (IPCC) 1.5 degrees Celsius pathway. At the conclusion of Phase 1, Council directed staff to update Kelowna’s GHG emissions reduction targets to 40 percent below 2007 levels by 2030, and achieve net zero emissions by 2050.

Phase 2, the Climate Vulnerability and Risk Assessment, is currently in progress and will examine the climate changes Kelowna is exposed to, the community’s sensitivity to these changes, potential impacts, and the local capacity to adapt. Climate change effects on natural, built, social and economic systems will be considered to identify priority directions. This innovative step will also inform other City long-term decision plans such as the 2040 Infrastructure Plan.

Phase 3 is a culmination of the first two phases to develop a *Climate Resilient Kelowna Strategy* and is expected to be complete in mid-2023. Informed by public and stakeholder engagement, the strategy will identify actions to reduce community GHG emissions and help the community adapt and build resiliency against major climate impacts. An equity lens will be applied to this process to ensure that as the strategy is developed, it considers a just distribution of resources to alleviate unequal burdens created by climate change, providing fair opportunities to those most impacted.

Recognizing the upcoming municipal election and the corresponding dissolution of committees of Council and the elapsed time before a new AAC could be struck, staff would like to take the opportunity to gather input from this AAC to be considered in the development of the *Climate Resilient Kelowna Strategy*.

## 2.2 Climate Vulnerability and Risk for Agriculture

The Climate Vulnerability and Risk Assessment will model the community’s vulnerability and risk due to primary local climate hazards such as flooding, wildfire and extreme heat. Further, the assessment will qualitatively document other climate hazards such as wildfire smoke, pests and extreme weather. These align with previous work completed through the BC Agriculture & Food Climate Action Initiative’s *Regional Adaptation Strategies Update: Okanagan*<sup>3</sup>, which identified four priority impact areas of climate change in the Okanagan as:

<sup>3</sup> BC Agriculture & Food Climate Action Initiative, 2018. *Regional Adaptation Strategies Update: Okanagan*.

<https://bcclimatechangeadaptation.ca/wp-content/uploads/2022/Resources/RegionalStrategies-Okanagan-2018-update-report.pdf>

- Warmer and drier summer conditions;
- Changes to pest populations (insects, diseases, weeds and invasive species);
- Increase in extreme precipitation events; and
- Increasing wildfire risk

Climate change will have a range of impacts on local agriculture. Understanding how these changes are already impacting agricultural practices would be beneficial to supplement Phase 2 of the project. As provided in Schedule B, work completed by the BC Agriculture & Food Climate Action Initiative summarizes anticipated future impacts on agriculture due to projected climate changes. While this table is applicable to the entire Okanagan Valley, it would also be beneficial to understand if any of the projected climate hazards and their associated impacts are of higher concern to the future of various agricultural industries in Kelowna.

### **2.3 Making agriculture resilient to climate change**

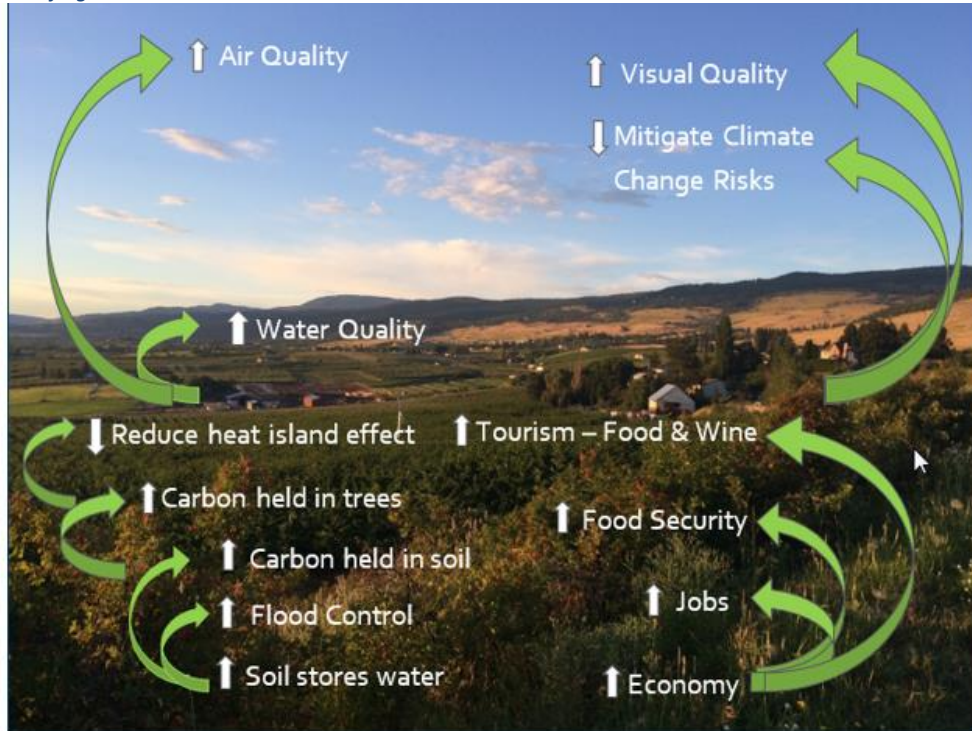
The responsibility of being climate resilient lies with everyone. Federal and provincial plans such as *Canada's 2030 Emissions Reduction Plan*, *CleanBC Roadmap to 2030* and BC's *Climate Preparedness and Adaptation Strategy* will support Kelowna's emission reduction and climate adaptation efforts, but local action is essential. Our community's collective success in addressing climate change will require action from everybody: residents, businesses, community organizations, institutions, local governments, and senior levels of government.

Engagement during Phase 3 will help identify what the community is willing to do to mitigate and prepare for climate change. It will also help identify what role the City can play in supporting the transition to a climate resilient community. Agriculture plays a major role in our community and understanding the opportunities and challenges the agricultural sector will face in adapting to climate change can help inform the implementation framework for the *Climate Resilient Kelowna Strategy*.

### **3.0 Conclusion and Next Steps**

The predicted changes in climate poses risk to agriculture due to hazards such as wildfire, pests, and drought. These changes in climate may also provide opportunities such as a longer growing season at higher elevations. Ensuring agriculture is resilient to these changes not only provides benefits to the sector, but as illustrated in Figure 2 below, will also support climate resilience in the broader community, as agricultural land can attenuate stormwater, mitigate wildfire, reduce heat island effect and increase local food security.

Figure 2: Functions of agricultural land



Building on the input received from the AAC, staff will continue to reach out and encourage the agricultural community to provide input during the public and stakeholder engagement sessions planned for Phase 3. The engagement input, together with the Phase 1 and Phase 2 technical studies will inform the *Climate Resilient Kelowna Strategy* which is anticipated to be complete mid-2023.

**Report prepared by:** Tracy Guidi, Sustainability Coordinator

**Reviewed by:** Danielle Noble-Brandt, Policy & Planning Department Manager

**Approved for Inclusion:** Dean Strachan, Community Planning & Development Manager

**Attachments:**

Schedule A – Climate and Agriculture Related Policies

Schedule B – Potential Agricultural Impacts Due to Climate Change

# SCHEDULE A – Climate and Agriculture Related Policies



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## 1.1 Imagine Kelowna

- Goal: Protect agricultural land and promote sustainable farming.
- Goal: Take action and be resilient in the face of climate change.

## 1.2 2040 Official Community Plan (OCP)

- **Pillar: Protect agriculture.** Agriculture has played a crucial role in Kelowna's economy for generations and is a big part of Kelowna's identity. Local food production is also becoming even more important in the face of a changing climate. As such, protecting agricultural lands is a key goal of Imagine Kelowna. The Official Community Plan supports this critical component of our economy, identity and food security by limiting urban growth into agricultural lands and supporting their viability.
- **Pillar: Take action on climate.** Through Imagine Kelowna, residents have spoken clearly that action needs to be taken to not only reduce the community's greenhouse gas emissions but also to become a more resilient community in the face of a changing climate. To take action, the Official Community Plan focuses growth in a way that is more compact, energy-efficient and better prepared to adapt to events like floods, wildfires, drought and other climate change impacts.
- **Objective 8.1** Protect and preserve agricultural land and its capability
- **Policy 12.1.12 Climate Resilient Land Use Planning.** Build climate resiliency through land use design by:
  - Protecting natural areas and habitats
  - Increasing park space and tree canopy coverage
  - Focusing growth in connected, walkable, Urban Centres and Core Area;
  - Providing diverse transportation options to shift away from car-centric culture; and
  - Reducing energy consumption by constructing energy efficient buildings and neighbourhoods.
- **Policy 12.3.3. Climate Action Incentives.** Encourage and incentivize citizens and local businesses to adopt mitigation and adaptation strategies to make our local economy resilient to a changing climate.
- **Policy 12.11.1 Reduce Vulnerability.** Determine the climate change vulnerability of existing natural and engineered assets so resiliency efforts can be prioritized.

## 1.3 Kelowna's Agriculture Plan (2017)

- **Goal 5:** Build resilience in communities against rising costs of food and risks from climate change.
- **Action 2b:** Include agriculture in municipal climate change strategies and plans

# SCHEDULE B – Potential Agricultural Impacts Due to Climate Change

Projected climate effect	Potential Agricultural Impacts
<p><b>Warmer &amp; drier summers:</b></p> <ul style="list-style-type: none"> <li>• More frequent and extended dry periods in summer</li> <li>• Lower summer stream flow levels (more rapid and earlier spring melt)</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in water supply availability</li> <li>• Increase in irrigation demand and draw down of water storage</li> <li>• Impacts to crop yields and quality (particularly nonirrigated crops)</li> <li>• Increase in plant stress/damage</li> <li>• Impacts to livestock health/productivity</li> <li>• Changes to timing and use of rangelands for grazing cattle</li> <li>• Increase in costs associated with water (e.g., water supply infrastructure)</li> </ul>
<p><b>Extreme precipitation events:</b></p> <ul style="list-style-type: none"> <li>• Increase in runoff</li> <li>• Potential for more rain-driven flood events</li> <li>• Increase in excess moisture</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in risk of soil erosion and landslides</li> <li>• Damage to riparian areas (e.g., erosion, washouts, silting)</li> <li>• Damage to infrastructure (e.g., dams)</li> <li>• Increase in site-specific flood risk and drainage issues</li> <li>• Reduced windows for crop development and seasonal tasks (pollination, planting, germination and harvesting)</li> <li>• Negative impact on crop productivity and quality</li> <li>• Increase in crop damage and losses (e.g., hail storms)</li> </ul>
<p><b>Changing crop suitability ranges:</b></p> <ul style="list-style-type: none"> <li>• Changing seasonal conditions</li> <li>• Changing production windows</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in suitability of late maturing varieties and decrease in suitability of early maturing varieties</li> <li>• Expansion or relocation of some operations northward and to higher elevations</li> <li>• Changes to irrigation needs and possible land use competition</li> <li>• Inconsistent yield and quality of previously suitable crops</li> <li>• Difficulty in identifying suitable varieties for crops with long time horizons as change continues (e.g., tree fruit) Potential opportunities:</li> <li>• Increase in suitability for new varieties and new crops</li> <li>• Opportunity for season extension and additional harvest of certain crops</li> </ul>
<p><b>Changes in pests, diseases, invasive species:</b></p> <ul style="list-style-type: none"> <li>• Increasing winter survival rates</li> <li>• Increasing number of cycles in a year</li> <li>• Introduction of new pests and diseases</li> <li>• Changing range/ distribution of pests, diseases and invasive species</li> </ul>	<ul style="list-style-type: none"> <li>• More frequent and increased damage to crops</li> <li>• Impacts to livestock health due to pests/diseases</li> <li>• Reduction in forage quality</li> <li>• Increase in costs for management of pests, diseases, invasive species</li> <li>• Less effective pest models (i.e., pest models calibrated for past climate)</li> </ul>
<p><b>Increase in extreme heat events:</b></p> <ul style="list-style-type: none"> <li>• Increasing number (and frequency) of consecutive warm and hot days</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in irrigation demand</li> <li>• Reduction in productivity, size and quality of some crops</li> <li>• Increase in crop damage and loss</li> <li>• Increase in some pest and disease damage</li> <li>• Pressure on cooling and storage technologies/ infrastructure (particularly at harvest)</li> <li>• Impacts to livestock health and productivity</li> </ul>

Projected climate effect	Potential Agricultural Impacts
<b>Increasing variability:</b> <ul style="list-style-type: none"> <li>• Fluctuating and unpredictable seasonal conditions</li> <li>• Increased uncertainty of frost risk timing (spring/fall)</li> </ul>	<ul style="list-style-type: none"> <li>• Damage to crops and increase in susceptibility to disease</li> <li>• Reduction in productivity and quality</li> <li>• Earlier season for all agricultural activities</li> <li>• Changing labour needs (timing/volume)</li> </ul>
<b>Increasing wildfire risk:</b> <ul style="list-style-type: none"> <li>• More frequent and intensive wildfire events</li> </ul>	<ul style="list-style-type: none"> <li>• Damage and losses to agricultural assets and infrastructure</li> <li>• Loss of production and decrease in quality (e.g., due to smoke)</li> <li>• Impacts on livestock health</li> <li>• Reduction in agri-tourism</li> <li>• Increasing costs associated with preparing for, managing and responding to wildfire</li> <li>• Impacts on agricultural water supply (competing use for fighting fires)</li> </ul>
<b>Changing ecosystems &amp; wildlife populations/ distribution</b>	<ul style="list-style-type: none"> <li>• Increase in pressure on agricultural lands from distribution of deer, elk, wild sheep and other species</li> <li>• Impacts to grazing areas in northern Okanagan from wolf populations</li> <li>• Increasing challenge with maintaining environmental flows (and potential impacts on agricultural water)</li> </ul>

Source: BC Agriculture & Food Climate Action Initiative, 2018. *Regional Adaptation Strategies Update: Okanagan.* <https://bcclimatechangeadaptation.ca/wp-content/uploads/2022/Resources/RegionalStrategies-Okanagan-2018-update-report.pdf>