UBC Okanagan Climate Adaptation, Resilience & Biodiversity Strategy

April 2023

Rudi Ballard
Stephen Jordan
Hussein Elhagehassan

PARC
PLANNING AN ADAPTIVE AND RESILIENT CAMPUS

THE UNIVERSITY OF BRITISH COLUMBIA

UBC SCARP

LAND ACKNOWLEDGMENT

The PARC Team would like to acknowledge that the UBC Okanagan Campus resides on the traditional, ancestral, and unceded territory of the Syilx Okanagan Peoples.

As the Climate Adaptation, Resilience and Biodiversity Strategy contains recommendation for land-use planning and ecological management, the Team would like to further acknowledge that the Syilx Okanagan Peoples have managed these lands effectively and harmoniously, since time immemorial. PARC intends to embed Indigenous voices and traditional ecological knowledge within the Strategy, and supports UBCO's pledge to support Indngeouns students, culture and scholarship alongside this pledge of our own.

CONTENTS

EXECUTIVE SUMMARY

UBC Okanagan's Climate Adaptation, Resilience, and Biodiversity Strategy provides a roadmap of actions that fortifies the campus's ecosystem, infrastructure and communities to be resilient and adaptive to future climate risks, and showcases UBCO as an institutional leader in climate action.

The climate crisis is the biggest threat facing humanity today, and there is a growing need to address climate change within all levels of the decision-making process. Across the Okanagan, the impacts of climate change are becoming more frequent and more severe. Over the past few years, the region has experienced record breaking wildfire seasons, extreme heat events, drought conditions, and damaging flooding. In 2019, the University of British Columbia declared a climate emergency and supported UBC Okanagan's development of the Climate Action Plan (2030) for the Kelowna-based campus. A priority action from this plan was the development of a Climate Adaptation, Resilience and Biodiversity (CARB) Strategy.

The CARB Strategy has been developed through an 8 month planning process using a combination of extensive research of best practices in climate adaptation and resilience planning, along with in-depth engagement with the general campus population and a group of carefully selected stakeholders.

The CARB Strategy is broken down into the **4 pathways, 12 overarching priority areas and 57 actions** that aim to adapt the built form and infrastructure on campus, increase the resilience of campus communities, and strengthen campus biodiversity against the threats of climate change.

The Strategy will also act as an umbrella plan, highlighting and bringing together actions laid out across a variety of UBCO plans, policies and guidelines that all aim to increase the resilience of the campus to the impacts of climate change, and provide the opportunity to achieve co-benefits in both mitigation and adaptation.

As part of the next steps in the CARB Strategy process, it is recommended that a robust implementation strategy be developed through continued engagement with the Strategic Stakeholder Group (SSG) and broader UBCO community.

PARC
PLANNING AN ADAPTIVE AND RESILIENT CAMPUS

CARB STRATEGY
ACTIONS FLOWCHART

Happy and Healthy Campus Community

Strengthening community resilience in the face of extreme weather events and climate emergencies; particularly as it relates to wildfire, extreme heat, and flooding

- Develop a campus extreme heat response strategy that identifies key campus facilities for use as emergency cooling centres (and associated operational and communication procedures)
- Create a climate preparedness toolkit for UBCO students, staff and faculty (eg procedures, community resources, and support)
- Plan for food security during climate events (through initiative such as Land to Table/Local Procurement)

Protect and enhance campus environments, both natural and constructed, that contribute to community wellbeing

- Undertake a campus policy review to identify strengths and opportunities related to the connection between campus environments and wellbeing
- Support the development of walking trail networks, and associated wayfinding resources, across the campus
- Maintain low impact design (LID) rainwater management features to ensure their optimal performance and aesthetic amenity
- Update relevant UBCO policies, plans and guidelines to ensure the use of the campus lands and environment (trails, human activity) is sensitive to natural landscape and wildlife habitat and movement corridors
- Update relevant UBCO policies, plans and design guidelines to incorporate climate resilient hardscape and softscape public realm requirements to minimize heat impacts and achieve co-benefits
- Design and implement public realm projects that encourage interaction and socializing to build campus community
- Ensure relevant UBCO policies, plans and guidelines manage development and use to protect and enhance natural landscapes and wildlife habitat and movement corridors
- Advance policy for protection of campus environment, acknowledging that our environment reduces stress felt during and after climate events, and climate change anxiety

Centre Syilx knowledge and equity to continue commitment to reconciliation and protection for climate vulnerable campus communities

- Encourage and increase the sharing of Syilx knowledge regarding the respect, and management, of local ecosystems and biodiversity, and environmental care
- Prioritize the integration of Syilx culture and values into all decision-making related to campus landscapes
- Conduct a campus-wide vulnerability assessment to identify climate vulnerable communities and potential risks during extreme weather events, with the goal of creating support systems for populations at risk

Adaptive Built Form & Infrastructure

Ensure alignment of UBCO plans with provincial climate-resilient standards and codes

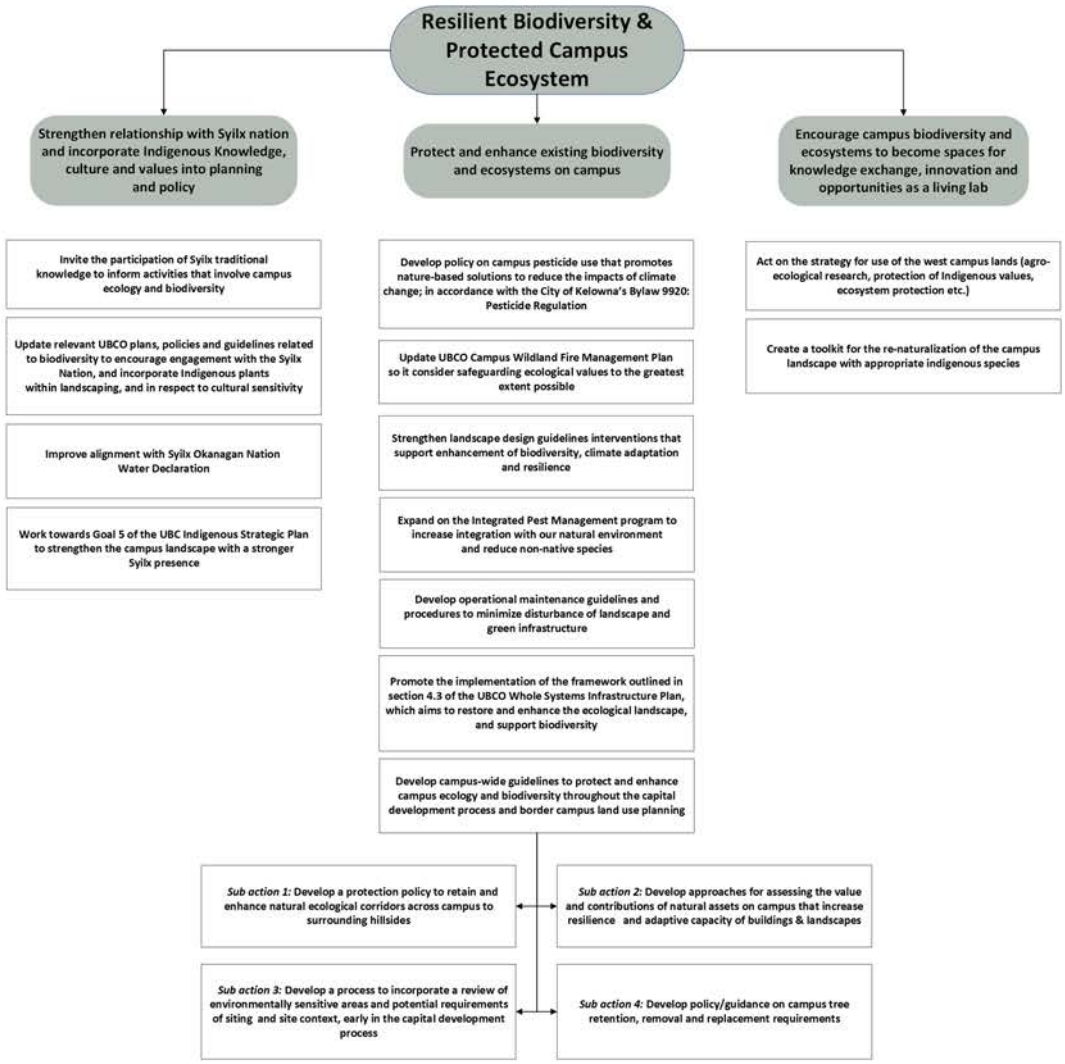
- Update Climate Ready Requirements for UBC Buildings to align with Provincial policy directions
- Review climate resilient measures for post secondary capital projects as per the BC governments project submission requirement to reduce GHG emission by 50% (CAP 2030, BC Gov)
- Identify and plan for potential provincial policy requirements for public sector organizations that may require support for community-level climate response (e.g. designated cooling centres, muster stations, evacuation routes)

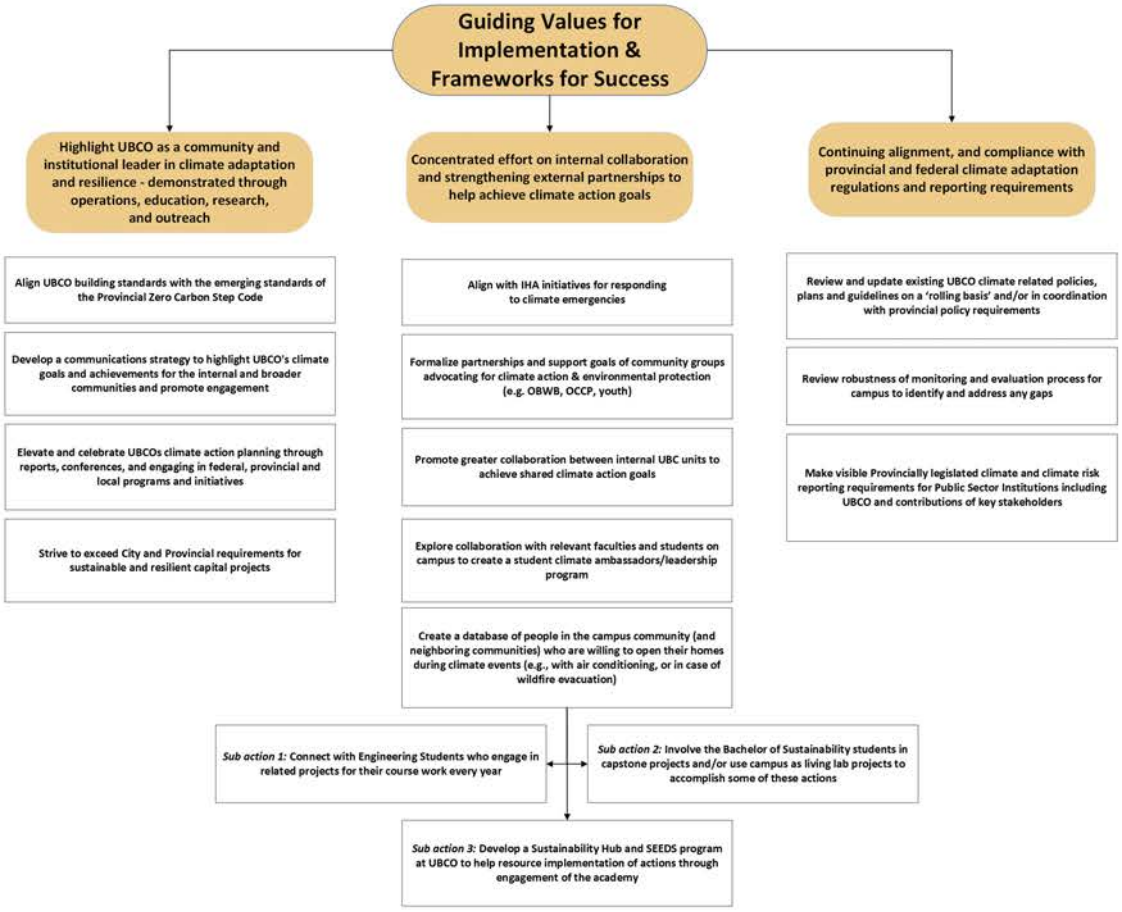
Increase and improve the adaptive capacity of buildings, infrastructure, and landscaping to pertinent climate hazards (flood, extreme heat, wildfire)

- Create plans to address the infrastructure risk(s) identified in the Campus-Wide Multi-Hazard Assessment (MHA)
- Integrate climate ready requirements for new buildings and major renewals into the UBC Technical Guidelines
- Implement actions identified in the CAP 2030 that relate to buildings and the Academic District Energy System, which provide co-benefits in terms of adaptation and resilience
- Review and update existing UBCO policies that address climate adaptation in response to future campus growth (e.g. IRMP, Design Guidelines)
- Plan for resiliency of the campus electrical distribution system by supporting greater adoption and utilization of renewable energy, particularly solar
- Consider a pilot program to test Sustainable Sites Guidelines on campus
- Develop cost effective design measures that strengthen the thermal comfort of campus buildings
- Enhance campus tree canopy to reduce the urban heat island effect and support passive cooling of buildings
- Seek and implement best practices in green infrastructure on campus to mitigate urban heat island effect, improve water quality and support the natural hydrological cycle

Develop and enhance active, sustainable, and safe modes of transportation both on campus and between campus and surrounding community

- Engage with neighbouring municipalities to extend, enhance, and improve all-season safety of active transportation routes
- Work towards actions in the UBCO Transportation Plan in collaboration with the City of Kelowna and BC Transit to improve on and off campus active transportation routes, transit frequency, and carpooling initiatives
- Promote cycling by improving safety of active travel routes, and security of bike storage on campus
- Undertake a safety audit of existing pedestrian routes that considers ways to improve safety and lighting
- Engage throughout the campus, with students, faculty and staff (eg Friday's for the future youth group) regarding ways to improve public transit and active transportation options
- Communicate closures, assist in provision/knowledge of alternative transportation methods


Resilient Biodiversity & Protected Campus Ecosystem
Strengthen relationship with Syilx nation and incorporate Indigenous Knowledge, culture and values into planning and policy
Protect and enhance existing biodiversity and ecosystems on campus
Encourage campus biodiversity and ecosystems to become spaces for knowledge exchange, innovation and opportunities as a living lab
Invite the participation of Syilx traditional knowledge to inform activities that involve campus ecology and biodiversity
Update relevant UBCO plans, policies and guidelines related to biodiversity to encourage engagement with the Syilx Nation, and incorporate Indigenous plants within landscaping, and in respect to cultural sensitivity
Improve alignment with Syilx Okanagan Nation Water Declaration
Work towards Goal 5 of the UBC Indigenous Strategic Plan to strengthen the campus landscape with a stronger Syilx presence
Develop policy on campus pesticide use that promotes nature-based solutions to reduce the impacts of climate change; in accordance with the City of Kelowna's Bylaw 9920: Pesticide Regulation
Update UBCO Campus Wildland Fire Management Plan so it consider safeguarding ecological values to the greatest extent possible
Strengthen landscape design guidelines interventions that support enhancement of biodiversity, climate adaptation and resilience
Expand on the Integrated Pest Management program to increase integration with our natural environment and reduce non-native species
Develop operational maintenance guidelines and procedures to minimize disturbance of landscape and green infrastructure
Promote the implementation of the framework outlined in section 4.3 of the UBCO Whole Systems Infrastructure Plan, which aims to restore and enhance the ecological landscape, and support biodiversity
Develop campus-wide guidelines to protect and enhance campus ecology and biodiversity throughout the capital development process and border campus land use planning
Act on the strategy for use of the west campus lands (agro-ecological research, protection of Indigenous values, ecosystem protection etc.)
Create a toolkit for the re-naturalization of the campus landscape with appropriate indigenous species
Sub action 1: Develop a protection policy to retain and enhance natural ecological corridors across campus to surrounding hillsides
Sub action 2: Develop approaches for assessing the value and contributions of natural assets on campus that increase resilience and adaptive capacity of buildings & landscapes
Sub action 3: Develop a process to incorporate a review of environmentally sensitive areas and potential requirements of siting and site context, early in the capital development process
Sub action 4: Develop policy/guidance on campus tree retention, removal and replacement requirements


Guiding Values for Implementation & Frameworks for Success
Highlight UBCO as a community and institutional leader in climate adaptation and resilience - demonstrated through operations, education, research, and outreach
Concentrated effort on internal collaboration and strengthening external partnerships to help achieve climate action goals
Continuing alignment, and compliance with provincial and federal climate adaptation regulations and reporting requirements
Align UBCO building standards with the emerging standards of the Provincial Zero Carbon Step Code
Develop a communications strategy to highlight UBCO's climate goals and achievements for the internal and broader communities and promote engagement
Elevate and celebrate UBCOs climate action planning through reports, conferences, and engaging in federal, provincial and local programs and initiatives
Strive to exceed City and Provincial requirements for sustainable and resilient capital projects
Align with IHA initiatives for responding to climate emergencies
Formalize partnerships and support goals of community groups advocating for climate action & environmental protection (e.g. OBWB, OCCP, youth)
Promote greater collaboration between internal UBC units to achieve shared climate action goals
Explore collaboration with relevant faculties and students on campus to create a student climate ambassadors/leadership program
Create a database of people in the campus community (and neighboring communities) who are willing to open their homes during climate events (e.g., with air conditioning, or in case of wildfire evacuation)
Review and update existing UBCO climate related policies, plans and guidelines on a 'rolling basis' and/or in coordination with provincial policy requirements
Review robustness of monitoring and evaluation process for campus to identify and address any gaps
Make visible Provincially legislated climate and climate risk reporting requirements for Public Sector Institutions including UBCO and contributions of key stakeholders
Sub action 1: Connect with Engineering Students who engage in related projects for their course work every year
Sub action 2: Involve the Bachelor of Sustainability students in capstone projects and/or use campus as living lab projects to accomplish some of these actions
Sub action 3: Develop a Sustainability Hub and SEEDS program at UBCO to help resource implementation of actions through engagement of the academy

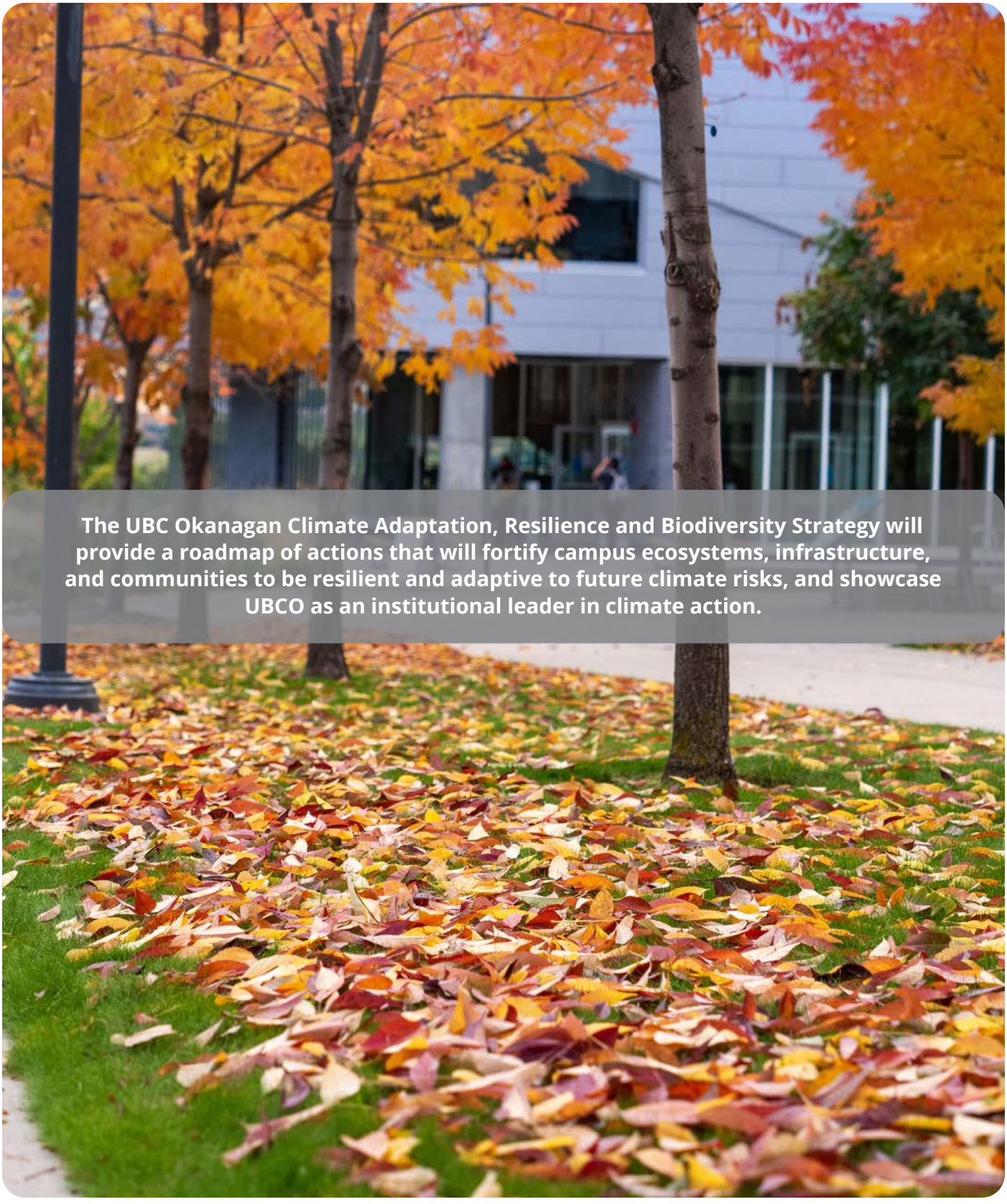
STATEMENT OF POSITIONALITY

Prior to this strategy, the PARC Team would like to acknowledge our own positionality in this work as it pertains to equity, climate justice, and settler politics. All three team members currently live and practice academia on the traditional, ancestral and unceded territory of the Coast Salish people; the Musqueam, Squamish (Skwxwú7mesh) and Tseil-Waututh (Selilwitulh). However, this project occurs on the traditional and unceded territory of the Syilx (Okanagan) Peoples, of which none of the team members reside on.

Each of our backgrounds inform our personal values, views and understandings of the work we are carrying out; in the context of such a multi-faceted project we find it essential to acknowledge that which has shaped us and may contribute to gaps in our knowledge. Rudi is white female settler, Stephen is a white, 1st generation immigrant settler, and Hussein is a 2nd generation immigrant settler; all three team members benefit from the continual colonial dispossession that has shaped this country and are privileged to be able to obtain an education that grants them the opportunity to consult on projects such as this.

The Team seeks to embed Indigenous Ecological Knowledge and approach this work through a climate justice and social equity lens as a means to best account for our own privilege and biases, whilst recognizing that we will never have the context and lived experience of many whom this project will affect.

OUR VISION



The UBC Okanagan Climate Adaptation, Resilience and Biodiversity Strategy will provide a roadmap of actions that will fortify campus ecosystems, infrastructure, and communities to be resilient and adaptive to future climate risks, and showcase UBCO as an institutional leader in climate action.

INTRODUCTION

Laid out as a short term action of UBC Okanagan's Climate Action Plan 2030 (CAP 2030), is the development of a Climate Adaptation, Resilience and Biodiversity (CARB) Strategy that tackles the impacts of climate change that are already being experienced, and are projected to increase in frequency and severity over the coming decades. The CARB Strategy addresses these impacts by identifying a range of tangible actions which will increase the adaptive capacity of the built form and infrastructure on campus, increase the resilience of campus communities, and protect and enhance campus biodiversity and ecosystems. In addition to identifying actions and setting targets, the Strategy will act as an 'umbrella' plan that unifies and highlights other UBCO policies and initiatives that relate to climate adaptation and resilience, creating a comprehensive overall approach to climate action.

Current Landscape of Climate Change

Ever-expanding scientific research shows that anthropogenic climate change is having detrimental effects on our planet. The most recent IPCC report, released in 2022, has warned that with greenhouse gas (GHG) emissions increasing at the current rate, global warming will reach 1.5°C above pre-industrial levels between 2030 and 2052. This level of warming will cause long-term changes to global climate systems, and increases the risk of negative feedback loops which can further speed up warming. There are growing commitments coming from all levels of government and decision-makers to address the climate emergency. Traditionally, climate action planning has focused on mitigation - reducing emissions and removing GHGs from the atmosphere.This is an important tactic to slow down and eventually reverse climate change. More recently, however, there is also a strong need to consider adapting to the the impacts of climate change that we are already facing. In BC, these impacts are being experienced with the increase in extreme weather events, and are progressing faster than previous research predicted. We must address these impacts by adapting all aspects of our communities, and increasing our resilience in the face of the climate emergency. Current scientific expertise shows that there is a need to incorporate both mitigation and adaptation into overall climate action policy.

Climate Change in BC and the Okanagan Region

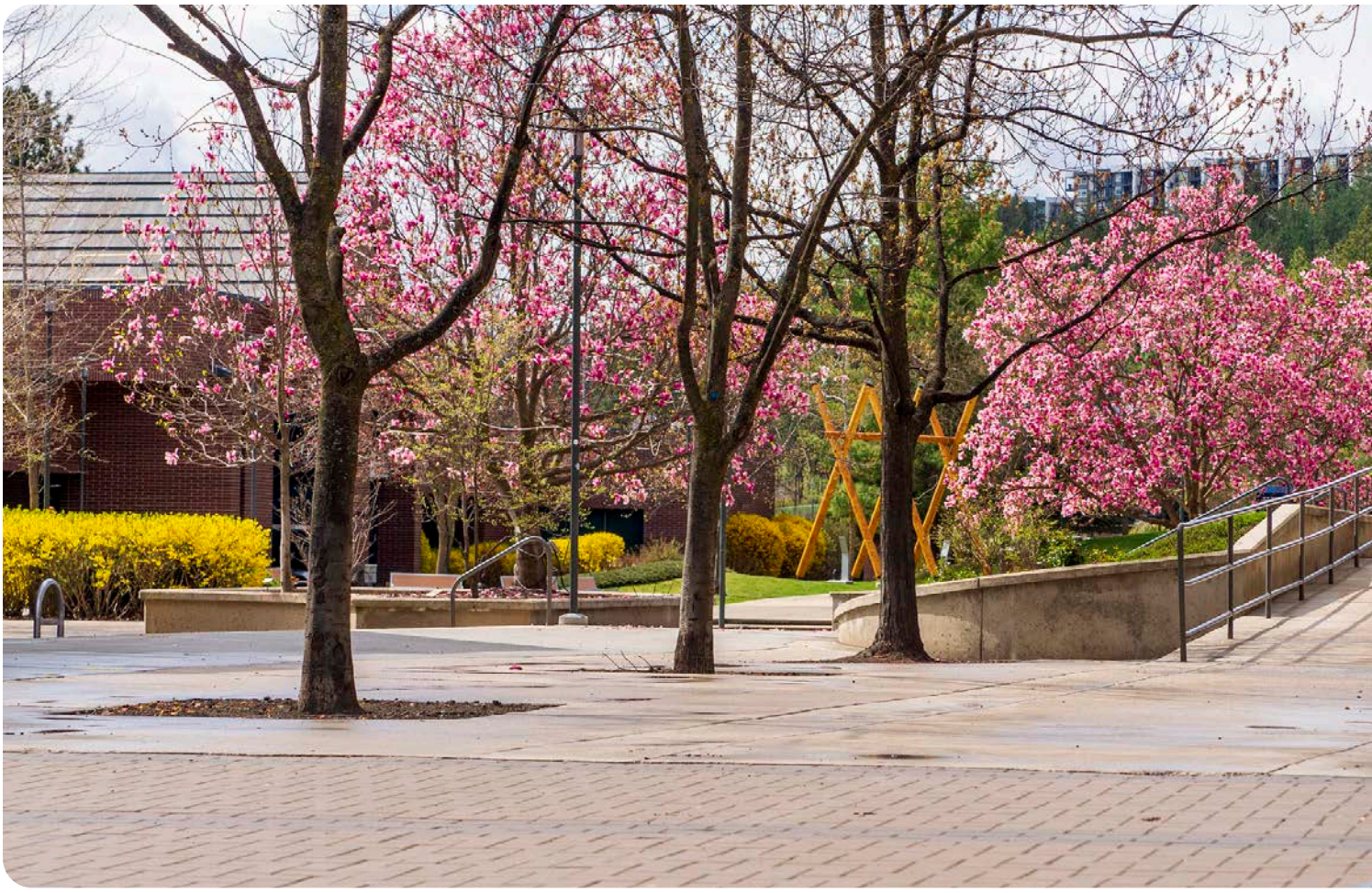
The impacts of climate change are already being felt by communities across British Columbia. Changes in temperature and precipitation patterns mean that in just the last three years, extreme heat events, wildfires, and flooding have caused more than 600 deaths, major damage to essential infrastructure, loss of livelihoods, destruction of ecosystems and placed sizable strains on local biodiversity.

The cost of climate disasters to the economy of BC, in 2021 alone, is estimated to be over $17 billion.
In the Okanagan region: year-round temperatures will increase, with summers becoming significantly hotter; levels of precipitation will vary more, with intense rainfall events during the spring and fall seasons - increasing the potential for flooding and landslides; and summer precipitation levels will decline - resulting in more frequent and intense wildfires and summertime drought. Different levels of government have mandated direction for adaptation planning, but adaptation policy is not just about increasing resilience to climate change impacts - there are also opportunities for environmental health, financial gains, and a wide range of community benefits.

The CARB Strategy

For UBCO, the Climate Adaptation, Resilience, and Biodiversity (CARB) Strategy will adapt the built campus, increase resilience, and strengthen biodiversity in the wake of more frequent and intense climate disasters. However, it also has great potential for improving the physical spaces on campus, enhancing the well-being of all those who use the campus, and promoting the rich biodiversity that we share our campus with.

The Strategy creates opportunities to provide regional guidance and inspiration for local governments and organizations in the Okanagan who are also working towards climate adaptation plans, and to be a leader in University and Public Sector Institution (PSO) climate adaptation planning.



BACKGROUND

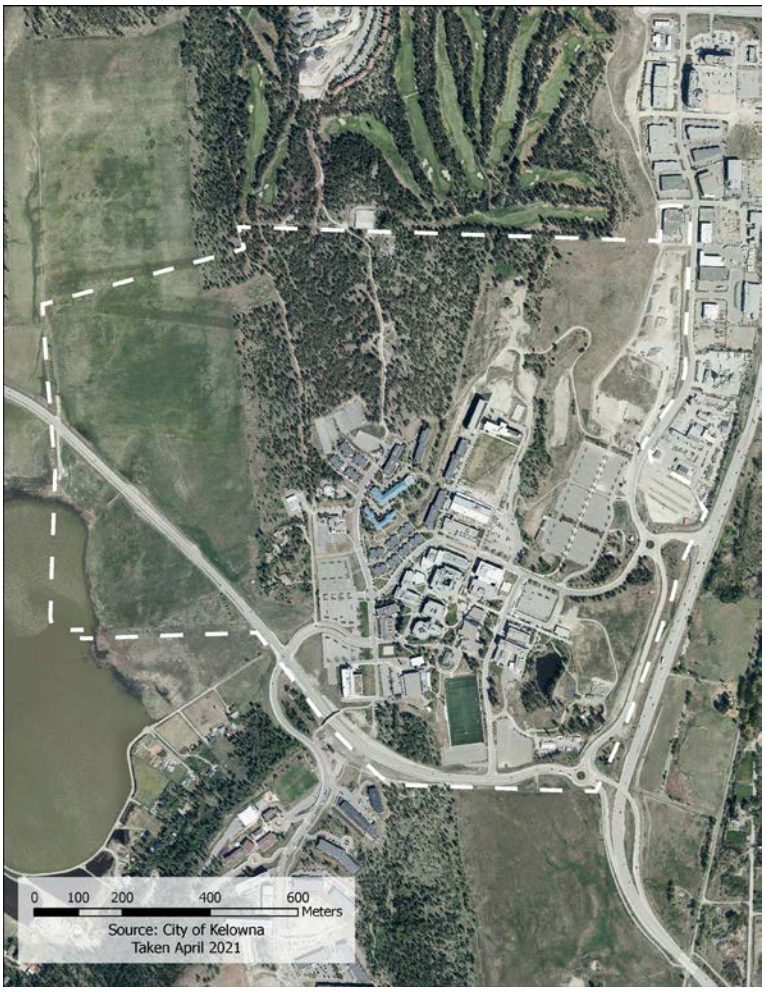
BY INCORPORATING BOTH MITIGATION AND ADAPTATION MEASURES INTO OUR CLIMATE ACTION PLANNING, WE AIM TO 'AVOID THE UNMANAGEABLE AND MANAGE THE UNAVOIDABLE' - IPCC 2007

UBCO Context

UBCO's campus is located in the City of Kelowna, it occupies approximately 151 hectares of land and has over 11,000 full-time students, with around 18% living on campus. The campus is composed of diverse landscapes of ponderosa pine woodlands, open grasslands, and low-lying areas that are utilized for stormwater retention. 25% of the campus has been identified as environmentally sensitive and is home to multiple at-risk plant and animal species. Additionally, the University owns a 103-hectare property adjacent to the western boundary of campus that is part of the Agricultural Land Reserve (ALR). There is significant development planned for the north end of the campus over the upcoming years, to accommodate the anticipated increase in students, faculty, and staff at UBCO.

The University holds a great deal of autonomy within its own planning and development processes; however it is still subject to a number of jurisdictional boundaries. As the campus is designated its own unique zoning district under the City of Kelowna bylaws (CD-20: Comprehensive University Zone), it must abide by city bylaws, permits, and approval processes. Additional factors external to the University, such as rights-of-way for gas lines and water mains, and the proximity to the Kelowna International Airport, increase planning complexities and set limitations to aspects of development like location and building height.

Given the campus's cross jurisdictions with the City of Kelowna, BC Hydro, the Ministry of Transportation, and Transport Canada, high level collaboration, discussion and reviews are necessary when planning future development and growth. It is crucial to acknowledge the reciprocal role and benefits between the campus and neighboring communities.



Ariael view of UBCO campus lands, 2021

Regional Climate Projections

In 2020, the Regional Districts of North Okanagan, Central Okanagan, and Okanagan-Similkameen partnered with the Pacific Climate Impacts Consortium and Pinna Sustainability to create a report on the future climate projections of the Okanagan region. The report is a valuable source of information that can be used to inform local and regional planning policy in the Okanagan. The methodologies used to develop climate projections for the region were based on technical expertise and utilized sophisticated climate modeling. The most significant climate changes outlined in the report are listed below:

- Warmer year-round temperatures
- Significantly hotter summers
- Increased precipitation across all seasons, except summer
- Less summer precipitation levels
- Potential for stronger storms
- Shifting seasons
- Longer growing season

These changes will have many impacts on the region. Hotter, drier summers increase the potential for extreme heat events, drought conditions, and more intense wildfire seasons. Increased precipitation and stronger storms mean a higher risk of flooding and landslides. Shifting seasons and longer growing seasons can lead to the stronger establishment of invasive species. It is imperative that decision-makers throughout the Okanagan consider these projections when developing policy and planning for the future. Mitigating GHG emissions will play an important role in tackling the intensity of local climate change impacts; but increasing resilience and adaptive capacity will better prepare communities, buildings and infrastructure, and biodiversity and ecosystems to these impacts.

Climate Indices	Baseline	2050s	2080s
Days above 30°C	7	18	35
Change in hottest day (°C)	30.7°C	4.5°C hotter	7.1°C hotter
Average winter low temp (°C)	-0.7°C	3.1°C warmer	5°C warmer
Average summer precipitation	156mm	134mm (-14%)	122mm (-22%)
Average autumn precipitation (mm)	181mm	199mm (+10%)	215mm (+19%)

Table 1: Summary of climate projections for the Okanagan Region

Climate Action at UBCO

Since 2015, UBC Okanagan has developed several plans, strategies and assessments that address climate change, to various extents. UBCO documents that work towards climate action guide the sustainable growth of the campus through a whole systems approach and a recognition for policies that promote both climate mitigation and adaptation through initiatives and design.
The Climate Action Plan 2030 is focused on GHG mitigation and sets operational and extended emissions reduction targets aligned with the Paris Agreement 2030 target to limit global warming to 1.5 degrees C, toward net positive performance in operational energy and carbon by 2050.
A priority action area of the CAP 2030 was the development of this CARB Strategy, creating an initiative to address adaptation and increasing resilience to climate impacts, and strengthening biodiversity. These two documents, working in tandem, help ensure that both mitigation and adaptation are being adequately addressed, promoting a comprehensive approach to climate action planning on campus.

- **The Whole Systems Infrastructure Plan (2019)** is a core document in setting objectives for future growth and development of the campus and incorporates climate action by aiming to increase future resilience to different aspects of campus such as energy, carbon, water, and biodiversity.
- **The 2017 Integrated Rainwater Management Plan** was created to guide the control and capture of rainwater through low impact development (LID) strategies. Minimum rainwater requirements modelled to incorporate future climate projections help make the campus more resilient to the increasing threat of flooding associated with the changing climate.
- **The Multi Hazards Assessment 2022** was conducted to identify and prioritize the main hazards, weaknesses, and vulnerabilities facing critical campus infrastructure on the UBC Okanagan campus. Risks to campus infrastructure associated with wildfire, extreme heat and flooding were identified and analyzed based on parameters such as likelihood, severity, and effectiveness of existing controls. This assessment has formed the basis of the CARB Strategy's climate impact focus areas.

Climate action at UBCO can be seen across policy areas and at all levels. Some plans and strategies directly address climate action, whether through mitigation or adaptation, while some have other priorities but include aspects that strive for a more climate resilient campus in terms of communities, buildings and infrastructure, and biodiversity. The CARB Strategy will act as an umbrella document that will produce actions for adaptation and resilience which are unique to it, yet also highlight and expand on existing initiatives.

Best Practices in Climate Adaptation

As part of the background research for this strategy, a thorough assessment of academic literature, case studies and best practices in Climate Adaptation planning was conducted. Analysis shows that less than half of post secondary institutions have any form of climate action policy, and of those that do, most focus on emissions reductions and mitigation strategies, rather than actions to address resilience. In terms of case studies at a government level, there are more examples of adaptation, but mitigation is still generally the focus. In general, it is very common for adaptation policy to lean towards adapting built form and infrastructure, with less emphasis on increasing resilience of communities and biodiversity. In terms of the actual adaptation plans, success can be found in strategies that develop actions through stakeholder engagement, and organizing actions through refinement of overarching goals and priority areas. A more detailed summary of this assessment can be found in Appendix B.

Climate Adaptation refers to a range of actions, policy initiatives, and activities that aim to reduce the severity and the impacts of anthropogenic climate change.

Federal and Provincial Climate Policy

At the federal level, several documents have guided Canada-wide GHG emission reduction targets and climate adaptation policies. As impacts from climate change continue to grow in frequency and severity, the federal government has outlined a unified path for healthier communities, enhanced biodiversity and conservation, resilient infrastructure and a resilient economy. The draft version of the National Adaptation Strategy (NAS) was released to provide a "roadmap for whole-of-society action" organized into the below target areas:

- Disaster Resilience
- Health & Wellbeing
- Nature & Biodiversity
- Infrastructure
- Economy & Workers

The Government of Canada Adaptation Action Plan was released in conjunction with this strategy to outline how the government contributes to achieving the targets, goals and objectives outlined in NAS. Coordinated partnerships to achieve these are to be organized through a joint federal-provincial-territorial group under the Canadian Council of Ministers of the Environment (CCME). We can anticipate further guidance from provincial representatives regarding post-secondary institution compliance in the near future.

At the provincial level, three documents work to guide PSO's climate adaptation and mitigation targets. The BC Energy Step Code is intended to assist in net-zero new construction through a series of steps that go above and beyond the requirements of the BC Building Code. Although the Code is optional within local governments, it is set to be made mandatory or a similar mandatory act pertaining to efficiency on new buildings.

The CleanBC Climate Preparedness and Adaptation Strategy provides a broad range of actions to address BC's climate impacts and build resilience province-wide. This strategy uses a holistic approach that includes nature-based solutions, Indigenous Ecological Knowledge and an equity lens to focus on four key areas relating to infrastructure, communities, ecosystems, and partnerships.
While CleanBC puts forth the importance of emissions reductions, this strategy also emphasizes vulnerability reduction and resilience enhancement to protect all species communities. In addition, the province intends to align the actions with the federal government's National Adaptation Strategy released in late 2022.

The third document that has guided province-wide climate mitigation targets is the Clean BC Roadmap to 2030. This roadmap outlines a plan to achieve 100% of the Province's emissions targets through targeted supports, new regulations and policy. Some of these actions include increased clean fuel requirements, support for mode-shift towards active transportation and public transit, and requirements for zero carbon new buildings. As with the Climate Preparedness and Adaptation Strategy and the federal government's NAS, the actions outlined here plan to be aligned with actions at the federal and municipal level.

HOW WE DID IT

Project Approach

The CARB Strategy has been built on the foundation formed by years of previous work at UBCO, primarily drawing from the university's Climate Action Plan 2030. The methodology utilizes case studies, provincial climate action resources, and site-specific expert knowledge through an Integrated Assessment lens to formulate the overall Strategy.

The Strategy used a four-phased approach, detailed below to focus different elements of the work to a timeline. These being:

- Phase I: Research,
- Phase II: Engagement,
- Phase III: Synthesis, and
- Phase IV: Report Writing

Due to the breadth of which effective climate adaptation planning and policy draws upon, and subsequently affects through its implementation, an Integrated Assessment framework, inclusive of stakeholder engagement, was deployed to ensure the Strategy would be comprehensive. This IA methodology utilized both a top-down and bottom-up technique, by identifying likely climate impacts and hazards, and jointly identifying UBCO's vulnerable demographics and areas. The framework was applied throughout each of the four phases of the Strategy.

Phase 1

The initial phase of the Strategy's development began with a dedicated period of research regarding climate action policies relevant to UBCO, pertinent literature, and a range of case studies. The objective of Phase I was to garner an understanding of best practices in adaptation and resilience planning, in respect to the scale and jurisdictional powers of a post-secondary campus.Within the ongoing research and analysis of this first phase, a 'four pathway approach' was selected as the overarching structure of the Strategy.

Phase 2

The secondary phase of development was devoted to community and stakeholder engagement to provide context and site-specific expertise to inform the Strategy. The PARC Team began by conducting engagement with the general campus community regarding their climate concerns and where they saw room for progress or improvement within UBCO policy. The responses from this session, completed in early November, served as a guide for the project team throughout the development of the four pathways. Following this, the PARC Team embarked on a series of engagement sessions centered on gathering expert knowledge and insight from pre-identified strategic stakeholders. Two working sessions were conducted, in early December and early February, both 90 minutes in length and conducted remotely, via Zoom. The first of these working sessions was devoted to the brainstorming of potential Priority areas within each Pathway. The second working session then developed potential Action Items from the previously established Priority areas.

Phase 3
The tertiary phase of development towards the completed CARB Strategy involved a data synthesis period in which information gathered during all previous phases was conglomerated and filtered.

Within Phase 3, the PARC Team also reached out for individual interviews with stakeholders to further facilitate information gathering and feedback, particularly in regards to Syilx knowledge and in respect to the student-body perspective.

Phase 4
The final phase of development was a dedicated window in which this report was finalized through collaboration by the PARC Team and UBCO Core Group's feedback. Through best practice research, the strategy decided upon 4 overarching objective areas, or pathways, for the campus - encompassing campus communities; built form and infrastructure; campus ecosystems and biodiversity; and a final pathway to promote successful implementation. Then, through analysis of engagement activities, 3 priority areas from each pathway were decided upon - aspects of the university that represent a goal to strive for, related to climate adaptation. From each priority area, a list of actions was identified - measures that help move the campus towards its climate resilience goals. This method of starting from 4 broad, all-encompassing goals and moving towards specific, well-defined actions, ensures that nothing is overlooked.

Photos of the PARC team visit to the UBC Okanagan campus to conduct community engagement and attend a campus tour

Engagement Process

Throughout the development of UBCO's Climate Adaptation, Resilience and Biodiversity Strategy, strategic stakeholder and campus community engagement was completed to gain a more well-rounded understanding of UBCO's strengths, opportunities and areas for action. From November 2022 to February 2023, an in-person campus engagement, two facilitated workshops, and a series of individual stakeholder meetings were held by the PARC Team to gain perspectives from the entire UBCO community on critical elements of the Strategy.

The PARC Team sought to include a diverse set of outlooks, particularly in regard to the fact that none of the Team members have ever lived, worked, or played on UBCO's geographic territory. Feedback and evaluations from a selected group of Strategic Stakeholders, composed of UBCO campus staff, ultimately facilitated the finalized Priority Areas and individual Action Items. While comments from students during an on-campus engagement session assisted the decision-making towards the four Pathways. For a detailed breakdown of each conducted engagement activity, please refer to Appendix A.

Engagement Process Timeline

Breakdown of engagement touchpoints across the planning process

Guiding Frameworks

The effects of climate change itself, alongside the effects from action items within the CARB Strategy, have the potential to dramatically affect diverse populations in a multitude of ways. As a means to avoid an inequitable outcome by any of the Strategy's priorities or actions, a Gender-based Analysis Plus (GBA+) framework was applied throughout each phase. GBA+ is a framework centered on intersectionality; recognizing that individuals' various identities, such as sex, gender, ethnicity, age and/or ability, may all overlap and lead to vulnerability within climate events.

The PARC Team wanted to ensure that no action item recommended through the Strategy would exacerbate the already complex nature of being a member of a marginalized population. The team utilized two key techniques to deploy this framework. In Phase 1, the team sought out to gain an understanding of the demographics of the campus student population via UBCO acquired data and on campus personnel familiar with this information. While UBCO is home to a wide array of individuals – each with their own unique identity – two themes emerged:

- The mean age of undergraduate students, of which UBCO is predominantly composed of, is 20 years old. The majority of the student body is young, both in age and life experience, with 72% of students admitted directly from highschool.
- UBCO is a "commuter campus", with a large portion of the student body living off-campus and using some form of personal or public transit to access the facilities each day

The need to incorporate equity into the priority areas and actions brainstorming sessions was emphasised to participants, and later refinement of actions were rigorously assessed to ensure actions did not have a negative impact on the equity of campus communities. Also addressed was the need to ensure actions did not negatively impact local Indigenous culture and values. After group brainstorming sessions, the team had two one-on-one interviews with a faculty member who specializes in traditional ecological knowledge, assessing actions and also identifying additional actions that promote Syilx traditions and values.

GBA+ in Climate Change Response

As an intersectional tool, GBA+ helps reach beyond stereotypical representations of marginalized populations and offers steps towards building more equitable responses to climate change through policies, programs, and services (Province of BC, 2021).

THE CARB STRATEGY

Through best practice research, the strategy decided upon 4 overarching objective areas, or Pathways, for the campus - encompassing campus communities; built form and infrastructure; campus ecosystems and biodiversity; and a final pathway to promote successful implementation. Then, through analysis of engagement activities, 3 Priority Areas from each Pathway were identified - these being aspects of the university that represent a goal to strive for, related to climate adaptation. From each Priority Area, a list of actions was identified - measures that help move the campus towards its climate resilience goals. This method of starting from 4 broad, all-encompassing goals and moving towards specific, well-defined actions ensures a comprehensive approach and minimizes potential gaps.

PATHWAY	DESCRIPTION
Healthy and Happy Campus Communities	This pathway relates to the human population and the social element of campus. People are vulnerable to the impacts of climate change, with extreme weather events taking a toll not only on physical health, but on mental well-being too. This pathway will identify priority areas and actions that promote increases in the resilience of campus communities.
Adaptive Built Form and Infrastructure	Buildings and infrastructure, and their capacity to adapt and become stronger in the face of extreme climate events, play an important role in overall adaptation strategies. Increasing the resilience of buildings can also benefit the previous Pathway, as well designed, climate controlled buildings offer a place of refuge during heatwaves and other climate events. By adapting buildings, there are many opportunities for co-benefits of mitigation and adaptation, and a primary example can be seen in the low-carbon passive house recently built on campus.
Resilient Biodiversity and Protected Campus Ecosystems	Biodiversity and the different ecosystems in the Okanagan Region are at great risk from the impacts of climate change. Ecosystems are shifting in some places, and becoming degraded in others. As a quarter of campus ecosystems and biodiversity is designated as environmentally sensitive, it is essential to identify measures that will protect and strengthen the nature on campus.
Guiding Values for Implementation and Frameworks for Success	This Pathway is intended to inspire actions that will support implementation and ensure that guiding principles and vision goals are being successfully adhered to in all other pathways. This Pathway will aim to strengthen partnerships across internal campus departments, as well as external relations.

4 Pathways, 12 Priority Areas, 57 Actions

4 Pathways

Within Phase I of the Strategy's development, the PARC Team analyzed, reviewed and contrasted various literature and a multitude of relevant case studies to provide a contextual foundation for the final CARB Strategy. Through this research and discussion between the PARC Team and UBCO Core Group, a four pathway approach to the final strategy structure was decided upon. The intention of the four pathways was to begin with a broad scope that led to narrow, refined action items; ensuring minimal gaps in the final results via this process.

Given the geographic and jurisdictional context of UBCO, the identification of the four pathways was influenced by the recently released British Columbia Climate Preparedness and Adaptation Strategy (2022-2025). The pathways have been listed throughout the Strategy in the numerical order seen below, however the numeracy does not reflect any hierarchical order.

12 Priority Areas

Through engagement with the Strategic Stakeholder group, three priority areas for each pathway were defined. These 12 priority areas are considered best-case scenarios to strive for within each pathway.

57 Actions

Through extensive engagement with the Strategic Stakeholder group, analysis of engagement with the general campus community, and assessment of the background research, the 57 actions represent the wide variety of measures that will help the campus achieve priorities and overarching goals. Some actions are resource-based, some are collaboration items, some are policy recommendations. Actions vary based on the responsible department or external organisation, cost and timeline, but all actions are tangible initiatives that increase the adaptive capacity and resilience of campus communities, built form, and biodiversity to the threats of climate change impacts.

HEALTHY & HAPPY CAMPUS COMMUNITIES

Priority Area 1.1: Strengthening community resilience in the face of extreme weather events and climate emergencies; particularly as it relates to wildfire, extreme heat, and flooding
Action 1.1.1: Develop a campus extreme heat response strategy that identifies key campus facilities for use as emergency cooling centres (and associated operational and communication procedures)
Action 1.1.2: Create a climate preparedness toolkit for UBCO students, staff and faculty (eg procedures, community resources, and support)
Action 1.1.3: Plan for food security during climate events (through initiative such as Land to Table/Local Procurement)

Priority Area 1.2: Protect and enhance campus environments, both natural and constructed, that contribute to community wellbeing
Action 1.2.1: Undertake a campus policy review to identify strengths and opportunities related to the connection between campus environments and wellbeing
Action 1.2.2: Support the development of walking trail networks, and associated wayfinding resources, across the campus
Action 1.2.3: Maintain low impact design (LID) rainwater management features to ensure their optimal performance and aesthetic amenity
Action 1.2.4: Update relevant UBCO policies, plans and guidelines to ensure the use of the campus lands and environment (trails, human activity) is sensitive to natural landscape and wildlife habitat and movement corridors
Action 1.2.5: Update relevant UBCO policies, plans and design guidelines to incorporate climate resilient hardscape and softscape public realm requirements to minimize heat impacts and achieve co-benefits
Action 1.2.6: Design and implement public realm projects that encourage interaction and socializing to build campus community
Action 1.2.7: Ensure relevant UBCO policies, plans and guidelines manage development and use to protect and enhance natural landscapes and wildlife habitat and movement corridors
Action 1.2.8: Advance policy for protection of campus environment, acknowledging that our environment reduces stress felt during and after climate events, and climate change anxiety

Priority Area 1.3: Centre Syilx knowledge and equity to continue commitment to reconciliation and protection for climate vulnerable campus communities
Action 1.3.1:Encourage and increase the sharing of Syilx knowledge regarding the respect, and management, of local ecosystems and biodiversity, and environmental care
Action 1.3.2: Prioritize the integration of Sylix culture and values into all decisionmaking related to campus landscapes
Action 1.3.3: Conduct a campus-wide vulnerability assessment to identify climate vulnerable communities and potential risks during extreme weather events, with the goal of creating support systems for populations at risk

ADAPTIVE BUILT FORM & INFRASTRUCTURE

Priority Area 2.1: Increase and improve the adaptive capacity of buildings, infrastructure, and landscaping to pertinent climate hazards (flood, extreme heat, wildfire)
Action 2.1.1: Create plans to address the infrastructure risk(s) identified in the Campus-Wide Multi-Hazard Assessment (MHA)
Action 2.1.2: Integrate climate ready requirements for new buildings and major renewals into the UBC Technical Guidelines
Action 2.1.3: Implement actions identified in the CAP 2030 that relate to buildings and the Academic District Energy System, which provide co-benefits in terms of adaptation and resilience
Action 2.1.4: Review and update existing UBCO policies that address climate adaptation in response to future campus growth (e.g. IRMP, Design Guidelines)
Action 2.1.5: Plan for resiliency of the campus electrical distribution system by supporting greater adoption and utilization of renewable energy, particularly solar
Action 2.1.6: Consider a pilot program to test Sustainable Sites Guidelines on campus
Action 2.1.7: Develop cost effective design measures that strengthen the thermal comfort of campus buildings
Action 2.1.8: Enhance campus tree canopy to reduce the urban heat island effect and support passive cooling of buildings
Action 2.1.9: Seek and implement best practices in green infrastructure on campus to mitigate urban heat island effect, improve water quality and support the natural hydrological cycle

Priority Area 2.2: Ensure alignment of UBCO plans with provincial climate-resilient standards and codes
Action 2.2.1: Update Climate Ready Requirements for UBC Buildings to align with Provincial policy directions
Action 2.2.2: Review climate resilient measures for post secondary capital projects as per the BC governments project submission requirement to reduce GHG emission by 50% (CAP 2030, BC Gov)
Action 2.2.3: Identify and plan for potential provincial policy requirements for public sector organizations that may require support for community-level climate response (e.g. designated cooling centres, muster stations, evacuation routes)

Priority Area 2.3: Develop and enhance active, sustainable, and safe modes of transportation both on campus and between campus and surrounding community
Action 2.3.1: Engage with neighbouring municipalities to extend, enhance, and improve all-season safety of active transportation routes
Action 2.3.2: Work towards actions in the UBCO Transportation Plan in collaboration with the City of Kelowna and BC Transit to improve on and off campus active transportation routes, transit frequency, and carpooling initiatives
Action 2.3.3: Promote cycling by improving safety of active travel routes, and security of bike storage on campus
Action 2.3.4: Undertake a safety audit of existing pedestrian routes that considers ways to improve safety and lighting
Action 2.3.5: Engage throughout the campus, with students, faculty and staff (eg Friday's for the future youth group) regarding ways to improve public transit and active transportation options
Action 2.3.6: Communicate closures, assist in provision/knowledge of alternative transportation methods

RESILIENT BIODIVERSITY & PROTECTED CAMPUS ECOSYSTEM

Priority Area 3.1: Strengthen relationship with Syilx nation and incorporate Indigenous Knowledge, culture and values into planning and policy
Action 3.1.1: Invite the participation of Syilx traditional knowledge to inform activities that involve campus ecology and biodiversity
Action 3.1.2: Update relevant UBCO plans, policies and guidelines related to biodiversity to encourage engagement with the Syilx Nation, and incorporate Indigenous plants within landscaping, and in respect to cultural sensitivity
Action 3.1.3: Improve alignment with Syilx Okanagan Nation Water Declaration
Action 3.1.4: Work towards Goal 5 of the UBC Indigenous Strategic Plan to strengthen the campus landscape with a stronger Syilx presence

Priority Area 3.2: Protect and enhance existing biodiversity and ecosystems on campus
Action 3.2.1: Develop policy on campus pesticide use that promotes nature-based solutions to reduce the impacts of climate change; in accordance with the City of Kelowna's Bylaw 9920: Pesticide Regulation
Action 3.2.2: Update UBCO Campus Wildland Fire Management Plan so it consider safeguarding ecological values to the greatest extent possible
Action 3.2.3: Strengthen landscape design guidelines interventions that support enhancement of biodiversity, climate adaptation and resilience
Action 3.2.4: Expand on the Integrated Pest Management program to increase integration with our natural environment and reduce non-native species
Action 3.2.5: Develop operational maintenance guidelines and procedures to minimize disturbance of landscape and green infrastructure
Action 3.2.6: Promote the implementation of the framework outlined in section 4.3 of the UBCO Whole Systems Infrastructure Plan, which aims to restore and enhance the ecological landscape, and support biodiversity
Action 3.2.7: Develop campus-wide guidelines to protect and enhance campus ecology and biodiversity throughout the capital development process and border campus land use planning
• Sub action 1: Develop a protection policy to retain and enhance natural ecological corridors across campus to surrounding hillsides
• Sub action 2: Develop approaches for assessing the value and contributions of natural assets on campus that increase resilience and adaptive capacity of buildings & landscapes
• Sub action 3: Develop a process to incorporate a review of environmentally sensitive areas and potential requirements of siting and site context, early in the capital development process
• Sub action 4: Develop policy/guidance on campus tree retention, removal and replacement requirements

Priority Area 3.3: Encourage campus biodiversity and ecosystems to become spaces for knowledge exchange, innovation and opportunities as a living lab
Action 3.3.1:Act on the strategy for use of the west campus lands (agro-ecological research, protection of Indigenous values, ecosystem protection etc.)
Action 3.3.2: Create a toolkit for the re-naturalization of the campus landscape with appropriate indigenous species

GUIDING VALUES FOR IMPLEMENTATION & FRAMEWORKS FOR SUCCESS

Priority Area 4.1: Highlight UBCO as a community and institutional leader in climate adaptation and resilience - demonstrated through operations, education, research, and outreach
Action 4.1.1: Align UBCO building standards with the emerging standards of the Provincial Zero Carbon Step Code
Action 4.1.2: Develop a communications strategy to highlight UBCO's climate goals and achievements for the internal and broader communities and promote engagement
Action 4.1.3: Elevate and celebrate UBCOs climate action planning through reports, conferences, and engaging in federal, provincial and local programs and initiatives
Action 4.1.4: Strive to exceed City and Provincial requirements for sustainable and resilient capital projects

Priority Area 4.2: Concentrated effort on internal collaboration and strengthening external partnerships to help achieve climate action goals
Action 4.2.1: Align with IHA initiatives for responding to climate emergencies
Action 4.2.2: Formalize partnerships and support goals of community groups advocating for climate action & environmental protection (e.g. OBWB, OCCP, youth)
Action 4.2.3: Promote greater collaboration between internal UBC units to achieve shared climate action goals
Action 4.2.4: Explore collaboration with relevant faculties and students on campus to create a student climate ambassadors/leadership program
Action 4.2.5: Create a database of people in the campus community (and neighboring communities) who are willing to open their homes during climate events (e.g., with air conditioning, or in case of wildfire evacuation)
• Sub action 1: Connect with Engineering Students who engage in related projects for their course work every year
• Sub action 2: Involve the Bachelor of Sustainability students in capstone projects and/or use campus as living lab projects to accomplish some of these actions
• Sub action 3: Develop a Sustainability Hub and SEEDS program at UBCO to help resource implementation of actions through engagement of the academy

Priority Area 4.3: Continuing alignment, and compliance with provincial and federal climate adaptation regulations and reporting requirements
Action 4.3.1: Review and update existing UBCO climate related policies, plans and guidelines on a 'rolling basis' and/or in coordination with provincial policy requirements
Action 4.3.2:Review robustness of monitoring and evaluation process for campus to identify and address any gaps
Action 4.3.3: Make visible Provincially legislated climate and climate risk reporting requirements for Public Sector Institutions including UBCO and contributions of key stakeholders


UBC

TOWARDS SUCCESS

Implementation

The CARB Strategy has been successful in developing a list of actions that will help address the impacts of climate change on campus. However, actions alone will not help the campus adapt and become more resilient - effective implementation is necessary. This strategy has laid the groundwork for implementation with the creation of a Strategic Stakeholder Group and a list of Priority Areas and well-defined Actions.

While outside the scope of this strategy, it is recommended that UBCO develop an Implementation Schedule to complement the CARB Strategy. This document can focus on identifying what is needed to carry out actions from the CARB Strategy, how to allocate resources, how to successfully garner partnerships with organizations outside of UBCO's jurisdiction, and additional feasibility factors. The Implementation Schedule can outline relevant policy areas for actions, estimated cost, and level of effort. We recommend the Implementation Schedule work as a living document, to be refined and reassessed as various actions are carried out.

Monitoring

An important part of the adaptation and resilience planning process is the idea of ongoing monitoring and review as actions are being implemented. This creates an opportunity to identify lessons learned, and challenges that can occur during the implementation phase. It also enables the reflection and consideration of actions, and if they are in fact working towards adaptation and resilience. If they are not, the insights can be used for future amendments of the CARB Strategy.

Monitoring and reviewing will allow UBCO to determine whether actions set forth in the CARB Strategy are producing the desired results, and can be a good way to highlight the success of the strategy at achieving its initial goals. For best practice in monitoring and review, it is recommended that the CARB Strategy is formally reviewed at regular intervals. This can be achieved through the creation of a Monitoring and Evaluation framework which will keep up to speed with implementation of actions, and where priorities should be made. With a Monitoring and Evaluation Framework working in tandem with an Implementation Schedule, it can be ensured that future versions of CARB Strategies can build on achievements and address challenges. Monitoring and review should also take into consideration future scientific reports related to climate change, for example the IPCC, as new data may alter regional climate projections and priority areas. Consideration should also be made for the changing landscape of reporting requirements from different levels of government.

CONCLUSION

The Climate Adaptation, Resilience and Biodiversity Strategy was developed to work in tandem with the Climate Action Plan 2030, and to serve as an 'umbrella strategy' to highlight current initiatives that address adaptation and resilience on campus.

Through extensive research of academic literature, case studies and best practices, and with in-depth engagement of the general campus population and a group of expert stakeholders, a list of actions have been developed. These actions, addressing priority areas that come from four overarching pathways, create a comprehensive strategy that aims to increase the adaptive capacity of campus buildings and infrastructure, increase the resilience of campus communities, and protect and strengthen campus biodiversity and ecosystems to the ever-growing threat of climate change impacts - many of which the Okanagan region is already experiencing on a near annual basis.

The next step for this strategy will be the development of an Implementation Schedule that will lay the groundwork for successful and efficient adoption of actions, and a Monitoring and Review Framework that will evaluate actions throughout and after implementation, highlighting successes and noting challenges that can be used to guide future adaptation and resilience strategies for UBCO.

With such limited examples of adaptation planning at the university and public sector organizations, it is hoped that the CARB Strategy can be used to motivate similar plans, and can be seen as a leader in adaptation and resilience planning in the Okanagan region.

APPENDICES

Appendix A: Engagement Summary Report

Introduction:

As part of the development of UBCO's Climate Adaptation, Resilience and Biodiversity Strategy, strategic stakeholder engagement was completed to gain a more complete understanding of UBCO's strengths, opportunities and areas for action. Between November 2022 and February 2023, an in-person campus engagement, two facilitated workshops, and a series of individual stakeholder meetings were held to gain perspectives from the entire campus community on this Strategy.

Below is a summary of the PARC team's engagement thus far, including goals, key results and outcomes from each engagement.

In-Person Campus Community Engagement: November 3rd, 2022

During a site visit to the UBC Okanagan campus on November 3rd, 2022, the PARC Team designated two hours to a tabling session in the Fipke Centre to engage the campus community. This location was dedicated as an engagement space by UBCO Campus Planning staff due to its high traffic area and proximity to students. To collect a wide range of information, qualitative feedback was recorded by note-taking during conversations as well as a sticky-note activity for short and succinct answers to our questions. Two questions were queried to students and passers-by:

- What climate impact(s) are you most concerned about?
- How can we as a campus adapt better to the climate emergency?

In total we received 32 contacts which ranged from quick interactions to complete 5-10 minute conversations. The majority of contacts were students, with 3-4 individuals identifying as staff members. Below is a brief overview of the responses to our two questions.

1. What Climate Impact(S) Are You Most Concerned About
    - Wildfires and flooding, Air quality and heat waves, Global warming and deforestation, Sustainable energy transition, Food shortagesGeneral:
2. How Can We As A Campus Adapt Better To The Climate Emergency
    - General: Reducing GHG emissions, Start using solar panels around campus
    - More sustainable modes of transportation, More developed transit system, Electric buses
    - Increase recycling and composting programs on Campus, Discount parking for carpooling, Campus weather alert system, Collaboration with Syilx Nation
    - Maintaining + adding tree cover on campus, Using native and drought resistant plants

Strategic Stakeholder Group Workshop 1: December 12th, 2022

The first Strategic Stakeholder Group (SSG) Workshop was held via Zoom at the end of 2022, for an hour and a half long session. It was the first time the PARC Team and the UBCO Core Group were joined by the identified members of the SSG and it was intended as a time for introductions to the team and CARB Strategy, the work that had been done so far, and as an opportunity to explore possible Priorities within each of the identified Pathways.

The Workshop utilized Google Jamboard as a means of collaboration, in order for all members of the SSG to see and brainstorm on ideas for Priority areas under each Pathway, which had been previously identified and vetted by PARC and the UBCO Core Group. Each Pathway was designated 20 minutes of brainstorming time, in which SSG participants were encouraged to discuss and ask questions audibly, send think pieces in written form via Zoom chat, or to quietly place their own thought pieces on a 'sticky' on the Jamboard.

Within the four pathways, the following number of responses were garnered from the Jamboard:

- Healthy and happy campus communities: 22 written responses
- Adaptive built form and infrastructure: 19 written responses
- Resilient biodiversity and protected campus ecosystems: 27 written responses
- Guiding values for implementation and framework for success: 17 written responses

Individual Interview: Adrienne Vedan January 20th, 2023

Following the first Strategic Stakeholder Workshop, which one of the members of the SSG was unable to attend, the PARC Team, joined by UBCO's Ben Johnson held an hour-long meeting with Adrienne Vedan, the Senior Advisor and Deputy Vice-Chancellor of Indigenous Affairs. The PARC Team has intentionally attempted to embed Indigenous knowledge and particularly, Syx knowledge, into the entire CARB Strategy and as such, deemed it highly important that Adrienne's opinions were heard prior to Workshop 2.

At this stage, the PARC Team had refined the Priorities gained through Workshop 1 and provided Adrienne with both the raw data (through the un-edited Google Jamboard), and the edited information (via Word document). The conversation involved going through the edited information with Adrienne, primarily to assess if there were any knowledge gaps, wordsmithing or further incorporation of Syilx values and viewpoints that could be inserted at this point in the Strategy. Additionally, this interview allowed the space for the PARC Team to ask a number of questions pertaining to UBCO and Syilx Nation's current working relationship and gain an understanding of "captikwɬ", the traditional knowledge and values held by the Syilx peoples.

Strategic Stakeholder Group Workshop 2: Thursday, February 2nd

The second Strategic Stakeholder Group (SSG) Workshop was held via Zoom at the beginning of 2023, for another hour and a half long session. With the PARC Team, UBCO Core Group and SSG having previously built a rapport, the majority of the session was spent brainstorming potential Action Items for each Priority within the Pathways.

The Workshop utilized Google Jamboard as a means of collaboration, and for consistency in the process, to allow for SSG members to place Actions within or across multiple Priorities. The SSG participants were again encouraged to discuss and ask questions audibly, send think pieces in written form via Zoom chat, or to quietly place their own thought pieces on a 'sticky' on the Jamboard. Notable themes during this second Workshop was the quieter nature of many members, although the number of responses were still high.

The following is a summary of the responses from Workshop 2, sorted by Pathway and Priority:

Pathway 1: Healthy and happy campus communities:

- Priority 1: Strengthening community resilience in the face of extreme weather events and climate emergencies; particularly as it relates to wildfire, extreme heat, and flooding - 11 responses
- Priority 2: Protect and enhance campus environments, both natural and constructed, that contribute to community wellbeing - 13 responses
- Priority 3: Centre Syilx knowledge and equity to continue commitment to reconciliation and protection for climate vulnerable campus communities - 5 responses

Pathway 2: Adaptive built form and infrastructure:

- Priority 1: Increase and improve the adaptive capacity of buildings, infrastructure, and landscaping to pertinent climate hazards (flood, extreme heat, wildfire) - 8 respsonses
- Priority 2: Ensure alignment of UBCO plans with provincial climate-resilient standards and codes - 5 responses
- Priority 3: Develop and enhance active, sustainable, and safe modes of transportation both on campus and between campus and surrounding community - 11 responses

Pathway 3: Resilient biodiversity and protected campus ecosystems:

- Priority 1: Strengthen relationship with Syilx nation and incorporate Indigenous knowledge, culture and values into planning and policy - 2 responses
- Priority 2: Protect and enhance existing biodiversity and ecosystems on campus - 11 responses
- Priority 3: Encourage campus biodiversity and ecosystems to become spaces for knowledge exchange, innovation and opportunities as a living lab - 5 responses

Pathway 4: Guiding values for implementation and framework for success:

- Priority 1: Highlight UBCO as a community and institutional leader in climate adaptation and resilience - demonstrated through operations, education, research, and outreach - 9 responses
- Priority 2: Concentrated effort on internal collaboration and strengthening external partnerships to help achieve climate action goals - 7 responses
- Priority 3: Continuing alignment, and compliance with provincial and federal climate adaptation regulations and reporting requirements - 5 responses

Appendix B: Summary of Literature and Case Study Review

As part of the early development of the CARB Strategy, a thorough analysis of relevant climate adaptation literature, policy frameworks, case studies and best practices was conducted to create a foundation upon which the final Strategy is formulated. The prevalence of literature related to climate adaptation and resilience planning in academia and research is growing. However, much of this research is based on climate action in various levels of government, with less literature related to climate action at the university level, or similar public sector institutions.

Within the limited number of academic journal articles based on climate planning in post-secondary institutions in Canada, the findings show that over half have no form of climate action policy, and those that do focus primarily on mitigation of emissions rather than adaptive capacity. Similarly, through examining case studies at the university level (Dalhousie, Arizona State, Temple University, Central Community College), it was found that actions for mitigation are given far higher priority than actions for increasing resilience. For the plans that did incorporate climate adaptation, it was often the case that actions focused on the built form and infrastructure on campus and lacked consideration of campus communities and biodiversity.

At the level of local government, plans specific to climate adaptation were assessed (City of Kelowna, Okanagan Region, District of Ucluelet, City of Barrie). While specific parameters of scope, goals, and frameworks often varied, a common approach for adaptation strategies is to identify a set of priority areas (i.e., ideal scenarios related to climate adaptation), and from these areas identify actions to help achieve goals (i.e., measures to help get a district to where it needs to be in terms of an identified priority area). A high number of adaptation strategies conduct a risk assessment within the development process, to provide information on the biggest climate threats to the area and the communities most vulnerable to these threats. While a comprehensive risk assessment was outside the scope of the CARB Strategy, background information of risks were taken from the recent UBCO Multi Hazard Assessment (2022). Another common theme in adaptation strategies is the use of community and/or expert-knowledge stakeholder engagement to discuss priority areas and actions. This method allows the utilization of best practice and research and adds local perspectives and context.

To summarize, one of the most prevalent observations that can be seen through background research is that current climate action for universities leans more towards mitigation planning, though this is changing, and that generally public sector organizations tend to lag behind climate adaptation planning at the municipal level. However, studies show that there are major benefits in universities framing themselves as leaders in climate adaptation - increasing resilience to campus communities, buildings and infrastructure, and biodiversity while also educating all those who pass through the university, and becoming examples of best practice that can help guide adaptation and resilience plans. The bottom-up framework is important, and it seems the most successful plans begin with overarching objectives and from there refine goals to produce very specific actions and sub-actions. Similarly, the most comprehensive plans rely heavily on engagement to help define actions. Climate projections and climate risk assessments can inform what needs to be addressed, but utilizing the knowledge of expert stakeholders can help identify the specific actions required to tackle these threats.

Appendix C: UBCO CARB Strategy Structure Plan

PARC
PLANNING AN ADAPTIVE AND RESILIENT CAMPUS

UBC Okanagan Climate Adaptation, Resilience and Biodiversity Strategy Structure Plan

Consultants

Core Team

Student consultants from UBC's School of Community and Regional Planning

Hussein Elhagehassan, PARC Team
Stephen Jordan, PARC Team
Rudi Ballard, PARC Team

University of British Columbia

Whole Systems Steering Committee Membership

Rob Einarson (UBCO AVP Finance and Operations (Co-Chair)
Michael White (C&CP Associate Vice President (Co-Chair)
Ben Johnson (UBCO, Director, Campus Planning)
Shelley Kayfish (UBCO, Director, Campus Ops & Risk Mgmt.)
Aaron Mogerman (UBCO Director, Infrastructure Development)
Shannon Dunn (UBCO, Director, Business Operations)
Manon Harvey (UBCO, Director, Integrated Planning & Chief Budget Officer)
John Metras (Infrastructure Development, Associate Vice President Facilities)
John Madden (C&CP, Director, Sustainability & Engineering)
Gerry McGeough (C&CP, Director, Planning and Design)
Leanne Bilodeau (UBCO, Associate Director, Sustainability Operations, Campus Planning)
Erika Lachance (UBCO, Department Support Services Assistant II, Campus Planning)

Working Group

Ongoing participation in project management and guidance. Regular bi-weekly meeting and participation in Strategic Stakeholder Workshops.

Ben Johnson, UBCO, Director, Campus Planning
Abigail Riley, UBCO, Associate Director, Campus Planning
Leanne Bilodeau, UBCO, Associate Director, Sustainability Operations, Campus Planning

External Stakeholders

Members of the UBC Community to be engaged on an as-needed basis

Mary Ann Olson-Russello, Ecoscape Environmental Consultants Ltd.
Aaron Coelho, Project Lead, Climate Change, Hazard and Risk Assessment, Urban Systems
Chris Ray, Champion of the Environment, City of Kelowna
Tracy Guidi, Sustainability Coordinator, City of Kelowna
Glen Shkurhan, P.Eng., Partner, Urban Systems

Stakeholders

UBCO Strategic Stakeholder Group

Ben Johnson, Director, Office of Campus Planning
Melissa Feddersen, Student Wellness
Abigail Riley, Associate Director, Campus Planning
Leanne Bilodeau, Associate Director, Sustainability Operations
Roger Bizzotto, Associate Director, Facilities Management
Derek Mahoney, Manager, Landscape and Building Maintenance
Cherie Michels, Advisor, Health Safety and Environment
Colin Richardson, Associate Director, Energy Team
Adrienne Vedan, Senior Advisor, Deputy Vice-Chancellor on Indigenous Affairs
Shelley Kayfish, Director, Campus Operations and Risk Management
Aaron Mogerman, Director, Infrastructure Development
Steve Brodrick, Associate Director, Student Housing & Hospitality Services
Dr. Lael Parrot, Associate Professor, Dean, IKBFASS

Additional Stakeholders

Additional content and input on an as-needed basis

Manon Harvey, Director, Integrated Planning and Chief Budget Officer
Jamie Armer, Custodial and Waste Management, Facilities Management
Guy Guttman, Building Operations and Management, SHHS
John Madden, Director, Sustainability and Engineering (UBCV)
Penny Martyn, Manager Green Buildings (UBCV)
Renee Lussier, Landscape Architect – Planner (UBCV)
Brett Liljefors, Urban Designer/Architect (UBCV)
Dr. Jeannette Armstrong, Associate Professor IKBFASS
Dr. Mary Stockdale, Adjunct Professor, Geography, IKBFASS
Craig Shirra, UBC Properties Trust

REFERENCES

• Adaptive Mitigation: Integrated Building Adaptation and Mitigations Assessment (IBAMA) Framework. (2020). Pacific Institute for Climate Solutions. https://pics.uvic.ca/projects/adaptive-mitigation-framework-assessing-climate-change-solutions-urban-multifamily

• BC Climate Action Legislation information, Government of British Columbia: https://www2.gov.bc.ca/gov/content/environment/climate-change/planning-and-action/legislation#:~:text=Climate%20Change%20Accountability%20Act,reduce%20emissions%20 16%25%20by%202025

• BC Energy Step Code (2017), Buildings and Safety Standards Branch, Government of Brit ish Columbia: https://energystepcode.ca/

• Canadian Net-zero Emissions Accountability Act (2021), Government of Canada: https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050/canadian-net-zero-emissions-accountability-act.html

• Carbon Tax Act - Carbon Tax Regulation. Government of British Columbia - https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/125_2008

• City Resilience Framework. (2010). The Rockefeller Foundation. https://www.rockefellerfoundation.org/report/city-resilience-framework/

• Clean Energy Act (2010), Government of British Columbia: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/10022_01

• CleanBC Roadmap to 2030 (2021), Government of British Columbia: https://www2.gov. bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030. pdf

• Climate Change Accountability Act (2007), Government of British Columbia: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/00_07042_01

• Climate Change, Intersectionality, and GBA+ in British Columbia Summary Report (2021). Province of British Columbia. Retrieved from: https://www2.gov.bc.ca/assets/gov/environment/climate-change/adaptation/resources/climate_change__gba_in_bc_summary_report.pdf

• Climate Projections for the Okanagan (2020): https://www.rdos.bc.ca/assets/PLAN NING/AreaX/2020/ClimateProjections/FinalReport.pdf

• Community Climate Action Plan (2018), City of Kelowna: https://www.kelowna.ca/sites/files/1/docs/related/community_climate_action_plan_june_2018_final.pdf

• Energy Efficiency Act (1996), Government of British Columbia: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/00_96114_01

• Environmental Management Act (2003), Government of British Columbia: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/03053_00_multi

• Grenhouse Gas Industrial Reporting and Control Act (2014), Government of British Columbia: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/14029_01

• Häußler and Haupt (2021) Climate change adaptation networks for small and medium s ized cities. SN Social Sciences, vol 1, article 262.

• Henderson, J., Bieler, A., McKenzie, M. (2017) Climate Change and the Canadian Higher Education System: An Institutional Policy Analysis, Canadian Journal of Higher Educa tion, Vol 47, No 1, pp1-26

• IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001.

• National Adaptation Strategy of Canada - draft for comments (2022), Government of Canada: https://www.canada.ca/en/services/environment/weather/climatechange/c limate-plan/national-adaptation-strategy/full-strategy.html#toc18

• Okanagan Campus Design Guidelines (2019) The University of British Columbia Okanagan Campus: https://campusplanning.ok.ubc.ca/wp-content/uploads/ sites/64/2020/04/2019-01-10-UBCO-Design-Guidelines-R19-v4_FINAL-1.pdf

• Owen et al (2013) Beyond reduction: climate change adaptation planning for universities and colleges, International journal of sustainability in higher education, vol 14, iss 2

• Regional Adaptation Strategies: Okanagan (2016) Climate Change Adaptation Pro gramme. Investment Agriculture Foundation: https://bcclimatechangeadaptation.ca/ wp-content/uploads/2022/Resources/RegionalStrategies-Okanagan.pdfThurton, D. (2022) Canada unveils new climate adaptation strategy with more than $1-billion com mitment. CBC News, Nov 24th, 2022.

• Second Nature: Planning for Resilience. (2022). Second Nature. https://secondnature.org/ climate-action-guidance/planning-for-resilience/

• The Paris Agreement. (2022). UNFCCC: United Nations Framework Convention on Climate Change. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris agreement

• UBC Green Building Action Plan (2018) The University of British Columbia. Retrieved from: https://planning.ubc.ca/sustainability/sustainability-action-plans/green-building-action plan

• UBC Okanagan Campus Plan (2015). The University of British Columbia Okanagan Campus. Retrieved from: https://campusplanning.ok.ubc.ca/policies-plans/plans guidelines/campus-plan-2015/

• West Coast Climate Action Network: https://westcoastclimateaction.ca/

• Whole Systems Infrastructure Plan (2016) The University of British Columbia Okanagan Campus. Retrieved from: https://sustain.ok.ubc.ca/policies/whole-systems plan/#:~:text=The%20UBC%20Okanagan%20Whole%20Systems,using%20a%20 whole%20systems%20approach.

• Zero-Emission Vehicles Act (2019), Government of British Comumbia: https://www. bclaws.gov.bc.ca/civix/document/id/complete/statreg/19029