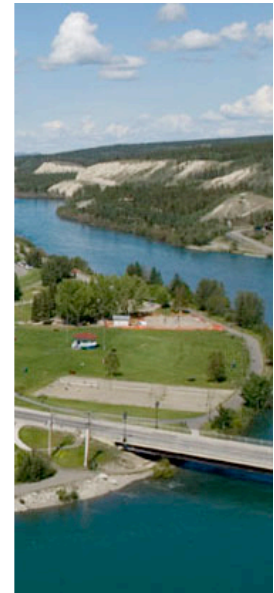
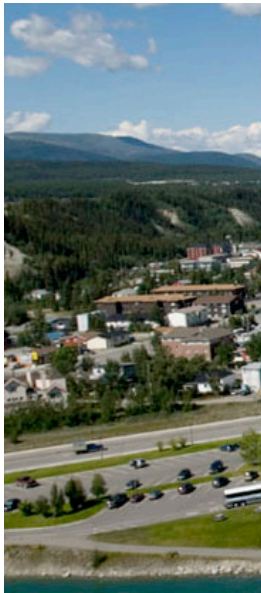


WhiteCAP Plan

Whitehorse Climate Change Adaptation Project



Plain Language Summary

WhiteCAP Plain Language Summary

Vision

The community of Whitehorse is preparing for climate change, including variability and uncertainty, by building capacity, knowledge, resilience and partnerships.

Adaptation proactively enhances the sustainable well-being of the community.

Introduction

WhiteCAP is the Whitehorse Community Climate Change Adaptation Project. It is a community wide project which looks at how much climate change we can expect, and how to prepare for the changes we anticipate (both good and bad).

WhiteCAP is an initiative led by the Northern Climate ExChange at the Yukon Research Centre. It is funded through the Northern Strategy Trust. Whitehorse is the second of three communities developing a community-based climate change adaptation plan: Dawson - Whitehorse - Mayo

As a community based project, the public was engaged at all phases through workshops and open houses. The City of Whitehorse, Government of Yukon, Ta'an Kwäch'än Council, Kwanlin Dün First Nation and Yukon Conservation Society provided guidance through a Local Advisory Committee. As well the work was reviewed by local experts and climate change scientists.

The WhiteCAP project ran from summer 2009 to 2011 culminating in a comprehensive plan and implementation of select pilot projects. This plain language summary highlights the key findings of the full plan.



This project has assisted Whitehorse to:

- Determine current and projected climate change;
- Identify impacts of climate change within the community, including vulnerabilities and potential opportunities;
- Assess community-specific adaptation options;
- Develop a plan of action to respond to the challenges and capitalize on the benefits;
- Increase community capacity to address climate change;
- Implement pilot actions; and
- Recommend a strategy for the path forward.

WhiteCAP Key Findings

1. Climate is changing in Whitehorse and more change is expected
2. Whitehorse is being impacted
3. There is enough information to make smart adaptation choices now
4. It is best to integrate climate change considerations into existing planning processes
5. Addressing climate change is a shared responsibility for all of Whitehorse

WhiteCAP Plain Language Summary

Key Finding 1

Climate is changing in Whitehorse and more change is expected

Climate Change and Whitehorse

Historically, Whitehorse has been warming, especially in the winters. We have warmed by +2 °C overall, and +4 °C in winters over the past 50 years .

More change is projected. Warming for Whitehorse is expected to be +3 °C to +4 °C over the next 40 years. Again winters are projected to warm more than other seasons.

Precipitation is anticipated to increase 14% to 22% by 2050. The frost free period for Whitehorse is expected to increase; rising from 150 days to 168-175 days by 2050.

Even modest changes in temperature and precipitation have complex side effects to freeze-thaw, wind, moisture, runoff and the broader environment including the forest surrounding Whitehorse.

Along with these projected trends, there is an expectation that the variability of weather will increase. In other words, weather will be less stable or regular and more dynamic.

This change will intensify our relationship with the climate, exposing our vulnerabilities and enhancing our opportunities. At the same time the community itself will be changing. Over the next 40 years the City is projected to grow by 50% or more.

It is important to prepare and plan now for the change we anticipate.

Climate Change

Whitehorse Climate Projections

Baseline (1961 to 1990)

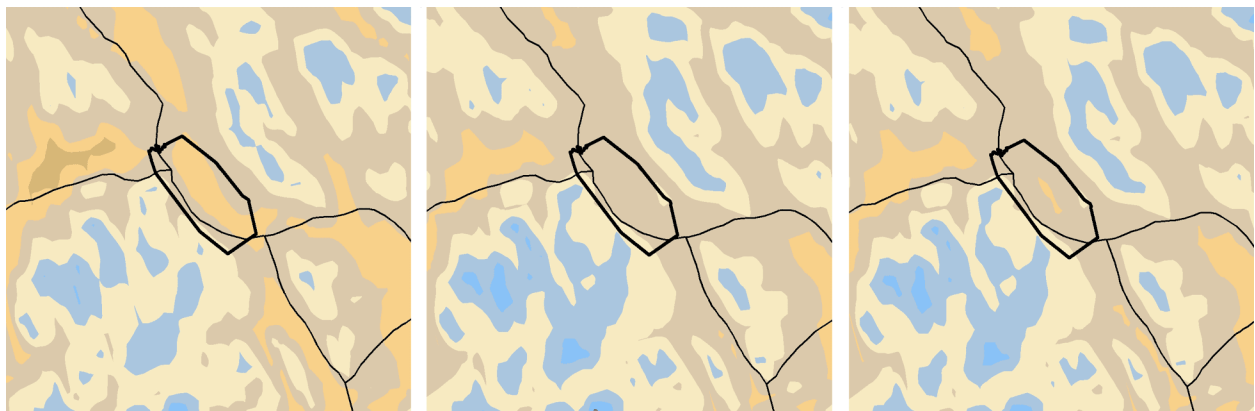
2030 Projection

2050 Projection



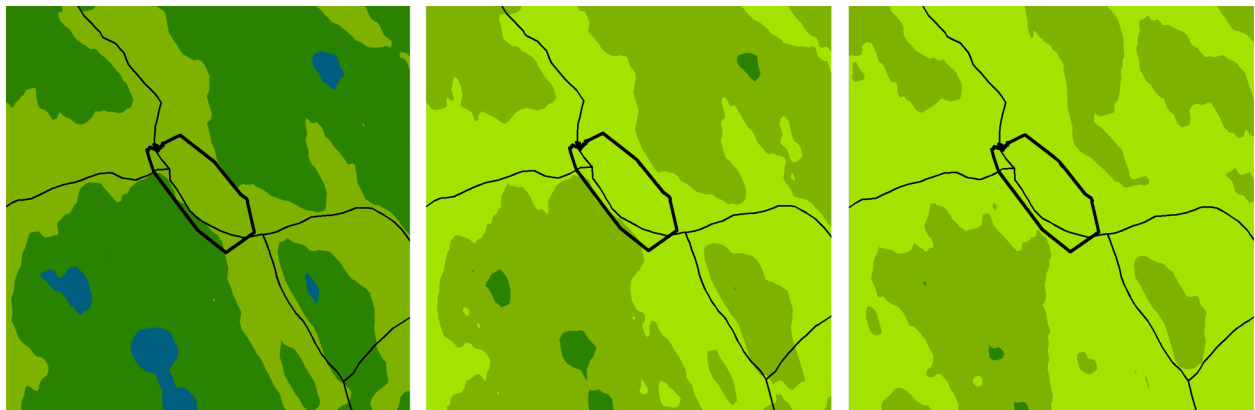
Mean Winter Temperature (°C)

■ -17.5 ■ -15 ■ -12.5 ■ -10 ■ -7.5



Total Annual Precipitation (mm)

■ 200 ■ 300 ■ 400 ■ 500 ■ 600 ■ 700 ■ 800



Warm Days (days average temp >0°C)

■ 137 to 155 ■ 156 to 177 ■ 178 to 197 ■ 198 to 226

Legend

— Road

□ Whitehorse City Boundary

These projections produced by SNAP (Scenarios Network for Alaska Planning at University of Alaska Fairbanks) are based on global climate models and the B1 modest emissions scenario.

WhiteCAP Plain Language Summary

Key Finding 2

Whitehorse is being impacted by climate change

Climate Change Impacts

Examples of climate change impacts include an increase in fire risk, concerns about snow loading, an increase in invasive species... the list of impacts is long.

Our biggest concerns are with hazards (fire and flood) and infrastructure. Environment, food security and energy security are also priority sectors.

Most of the impacts are negative yet out of challenges come opportunities. Agriculture is generally an opportunity.

Climate change is complex. Impacts result from the recent and projected trends in climate but also from changing intensity, frequency, variability, duration and critical thresholds

The community identified and discussed over 100 impacts. The impacts were assessed by considering how likely they were to occur, what their level of impact would be if they did occur and how much capacity the community has to respond.

From this exercise 22 impacts were designated as having high priority for Whitehorse.



High Priority Impacts

Opportunities	<ul style="list-style-type: none"> • Increased need for Whitehorse to serve as a hub - infrastructure expansion • Longer growing season, likely an opportunity for agriculture • Whitehorse emerges as a hub, supplying food to outlying communities through local agriculture • Large energy project (e.g. gas pipeline) may bring energy opportunity
Hazards	<ul style="list-style-type: none"> • Community vulnerability to forest fire increases due to heavy fuel load, lightning, drought, wind, etc. • Increased risk of catastrophic fire • Egress from subdivisions becomes a problem during emergency situations • Possibility of regional beetle infestation leading to more dead stands and increased risk of forest fire • FireSmart program ongoing for past decade, effectiveness is limited • Heavy increase in rural residential leads to an accompanying change in vulnerability • Increased risk of catastrophic flood and infrastructure failure (e.g. bridge)
Infrastructure	<ul style="list-style-type: none"> • Increased incidence of damage to powerlines e.g. from windthrown trees • Increase in multipliers - roads affect access which affects safety, etc. • Increased rate of leaching from unlined dump - hazardous waste requires special consideration • General strain on infrastructure as the result of age and pressure from growth and climate change • Increased cost to maintain roads due to shifting landscape conditions (erosion) • Integrity of spillways and dams affected by increase and variability in precipitation and flood events
Environment	<ul style="list-style-type: none"> • Evapotranspiration and groundwater recharge are critical and still uncertain • Introduction of pests/invasive species • Concern about change to water quality and increasing demand
Food Security	<ul style="list-style-type: none"> • Increased incidence of drought places more reliance on groundwater, may create concerns with irrigation
Energy Security	<ul style="list-style-type: none"> • Energy sector increasingly vulnerable to external forces (rising energy costs, expected carbon costs)

WhiteCAP Plain Language Summary

Key Finding 3

There is enough information to make smart adaptation choices now

Climate Change Adaptation

Adaptation is how we address the impacts of climate change. Mitigation is how we address the cause of climate change. WhiteCAP focusses on adaptation, but it was clear from our community engagement that we should always keep in mind both of these challenges.

Even a moderate onset of climate change, at the low end of the projections will create infrastructure and environmental challenges for Whitehorse. Regardless of the rate and severity of climate change, the community must prepare to address – and therefore plan for – coming challenges.

Adaptations, are assessed based on how well they address the high priority impacts, how well the adaptation benefits the community (broadly) and whether they build capacity.

Uncertainty remains and will always remain with anticipating future weather, climate and climate change. However uncertainty has been incorporated into the research to understand and manage it. We need to make the best decisions we can with the knowledge we have.

Where we lack critical information about impacts (e.g. evapotranspiration, or invasive species) then our first response is to call for observation and baselines to refine our knowledge.

High Priority Adaptations

- Opportunities
- Learn from other circumpolar countries
 - Create a strategy to capitalize on the potential increased need for Whitehorse to serve as a hub – incorporate trickle-down effect to communities (if Whitehorse cannot supply them then others are vulnerable)
 - Use agriculture to increase soil quality / quantity
 - Continue to expand on education opportunities for regional agriculture
 - Create and implement a Whitehorse/Territory-wide food security plan
 - Zone more agriculture land

High Priority Adaptations (continued)

- | | |
|-----------------|--|
| Hazards | <ul style="list-style-type: none"> • Create a strategy for harvesting salvage wood, such as from insect damage, as both an opportunity and a control measure • Incorporate fire considerations in all subdivision planning and zoning (such as no dead ends, fire breaks, aspen plantings, access to water and other holistic planning issues) • Maintain green spaces and/or strategic agriculture to reduce fire risk • Pass consequences of climate change on to other decision making groups involved in planning, design, engineering and establishing standards for subdivision development, road construction and infrastructure • Integrate climate change risk and impacts into emergency planning • Incorporate climate into infrastructure development currently in planning stages • Create zoning that reflects potential future changes in the landscape • Ensure critical buildings have resiliency including back-up systems (e.g. power for lighting/heating) in case of emergencies |
| Infrastructure | <ul style="list-style-type: none"> • Establish a multiyear municipal budget for dealing with climate change variability: for example roads and road clearing • Recommend development densification to allow for greater cost sharing of infrastructure • Educate the public to set a fair expectation for quality of service • Need to identify critical engineering thresholds, responsibilities and partnerships • Increase available warehousing (links to food storage) • Assess dependence of Whitehorse to highway and vulnerability of highway to climate change outside city limits • Assess storm drainage capacity/capability and design for extreme in future climate change projections when being replaced through maintenance schedules • Regional planning and all relevant planning needs to be revisited regularly to ensure climate change has been adequately integrated into decision-making • Generate standards/best practices for subdivision development for climate change |
| Environment | <ul style="list-style-type: none"> • Create an education program around water conservation • Look into a strategy to enforce the protection of riparian buffers |
| Food Security | <ul style="list-style-type: none"> • Investigate new and innovative ways to grow food |
| Energy Security | <ul style="list-style-type: none"> • Create an energy plan for Whitehorse (including comprehensive energy management) |

WhiteCAP Plain Language Summary

Key Finding 4

It is best to integrate climate change considerations into existing planning processes

WhiteCAP Strategy

Where planning processes are already in place, the best strategy is to mainstream adaptation planning - to integrate climate change considerations into the existing planning processes.

Key areas where mainstreaming can support climate change adaptation include increasing local resilience through emergency preparedness, sustainability planning, infrastructure development and effective land-use planning

Decision makers need to understand climate change projections, the risks of the impacts (including likelihood, severity, capacity) and how the challenges and opportunities overlap and / or intersect. In this way, adapting to climate change can strategically support growth and sustainability.



WhiteCAP Recommendations

1. Mainstream climate change into planning, especially emergency, land-use and infrastructure planning to reduce the exposure of the community to climate-related hazards
2. Integrate climate change into policy development and implementation
3. Continue work across jurisdictions within Whitehorse to develop effective partnerships and to learn from other jurisdictions (inter)nationally to assist with innovation
4. Continue to investigate how climate change will stress the natural and built environment around Whitehorse, through monitoring, threshold analysis, research and innovation
5. Explore the food needs and opportunities of agriculture of Whitehorse and Yukon
6. Work towards alternative energy production to increase our energy security and help curb greenhouse gas emissions of the community
7. Investigate avenues of adaptation through financial planning

WhiteCAP Plain Language Summary

Key Finding 5

Addressing climate change is a shared responsibility for all of Whitehorse

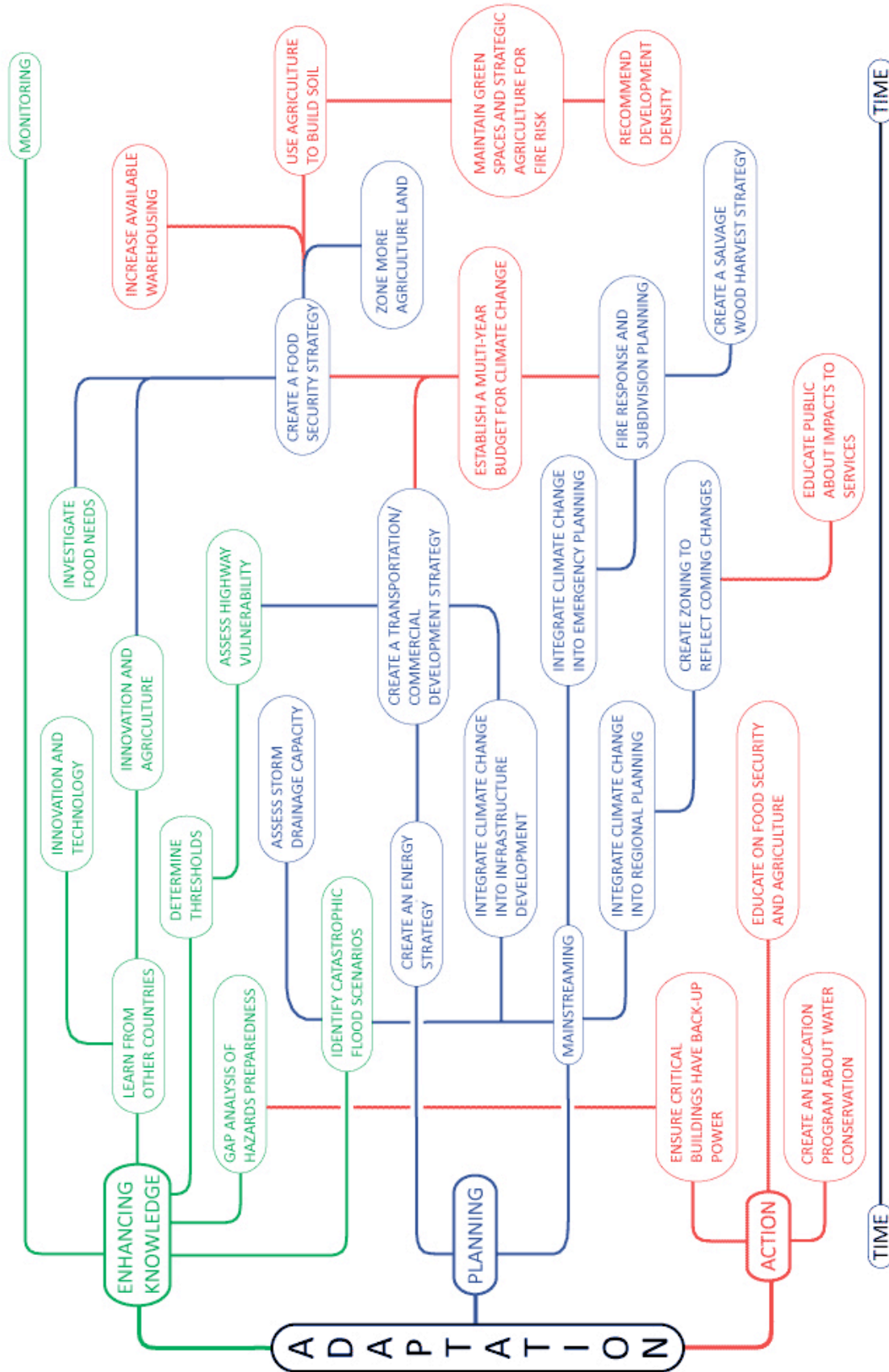
WhiteCAP Next Steps

WhiteCAP has been a community driven assessment of climate change impacts and adaptations. The plan provides a solid foundation of the risks and opportunities for Whitehorse. While the plan does make a series of recommendations, it is up to the decision makers within the community - the City of Whitehorse, Government of Yukon, Ta'an Kwäch'än Council, Kwanlin Dün First Nation and other community groups to decide upon the next steps.

Climate change crosses many sectors and jurisdictions and therefore we recognize the shared responsibility of government(s), business community, community members, etc. Partnerships will create stronger more lasting solutions.

Climate change is complex and our response to it will be dynamic. Through the WhiteCAP exercise, the community has identified the first steps we can take now and the challenges (or opportunities) we will have to build towards. At all stages the path forward will require that we reassess priorities based on refining our knowledge of climate change.

We should be planning for the long term and we need to begin now to address the challenges and opportunities that climate change brings.



WhiteCAP Plain Language Summary

When the public tries to think about climate change it often swings between thinking there is nothing we can do on the one hand, to expecting that after a two year community project like WhiteCAP, we should have already solved the problem.

Neither of these is close to a reasonable appraisal of the situation. It really suggests that public education remains a significant part of the overall challenge.

WhiteCAP Coordinator Report

As the Whitehorse Adaptation Coordinator, my summary of the WhiteCAP project is that it has been a solid piece of work. It has succeeded in engaging the community, in identifying significant concerns, in prioritizing responses and making some sound recommendations. It is a good first step in “preparing for climate change”.

Over the course of the project we gained a clearer understanding of climate change for Whitehorse. There remains some uncertainty, and we will need to continue to refine our information and thinking. However, our approach to develop a range of projections clearly showed that climate change is significant in all futures.

Typically it will be government (municipal, First Nation and Territorial) to make the decisions about how to proceed based on the groundwork of WhiteCAP. Our job has been to create a foundation in understanding the climate change challenge so that when we do make choices about how to proceed we will be as well informed as possible.

Without prescribing what choices government will make, it was clear from the WhiteCAP process that integrating within existing planning processes builds capacity without cost. Some adaptations benefit the community regardless of climate change impacts. These “no regret” choices will be another good starting point.

Through presentations and exchanges at conferences, it is clear that WhiteCAP and all of the Community Climate Change Adaptation research being led by the Northern Climate Exchange is held in high regard by the academic community and municipal leaders. Other jurisdictions that are now considering adaptation are looking to the Yukon as an example of how to proceed.

Coordinator Report

I would like to thank everyone that contributed to making the project successful and especially Dan Boyd, Shannon Clohosey, Simon Lapointe, John Meikle, Lewis Rifkind and Clive Sparks who together formed our Local Advisory Committee. The City of Whitehorse generously provided office space for the project allowing me to form a collegiality with City staff and strengthening the project overall. Thank you.

Sincerely,



John Streicker, P.Eng.

Whitehorse Community Adaptation Coordinator



More Information

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Northern Climate ExChange

independent information, shared understanding, action on climate change



TAKING ACTION ON CLIMATE CHANGE

