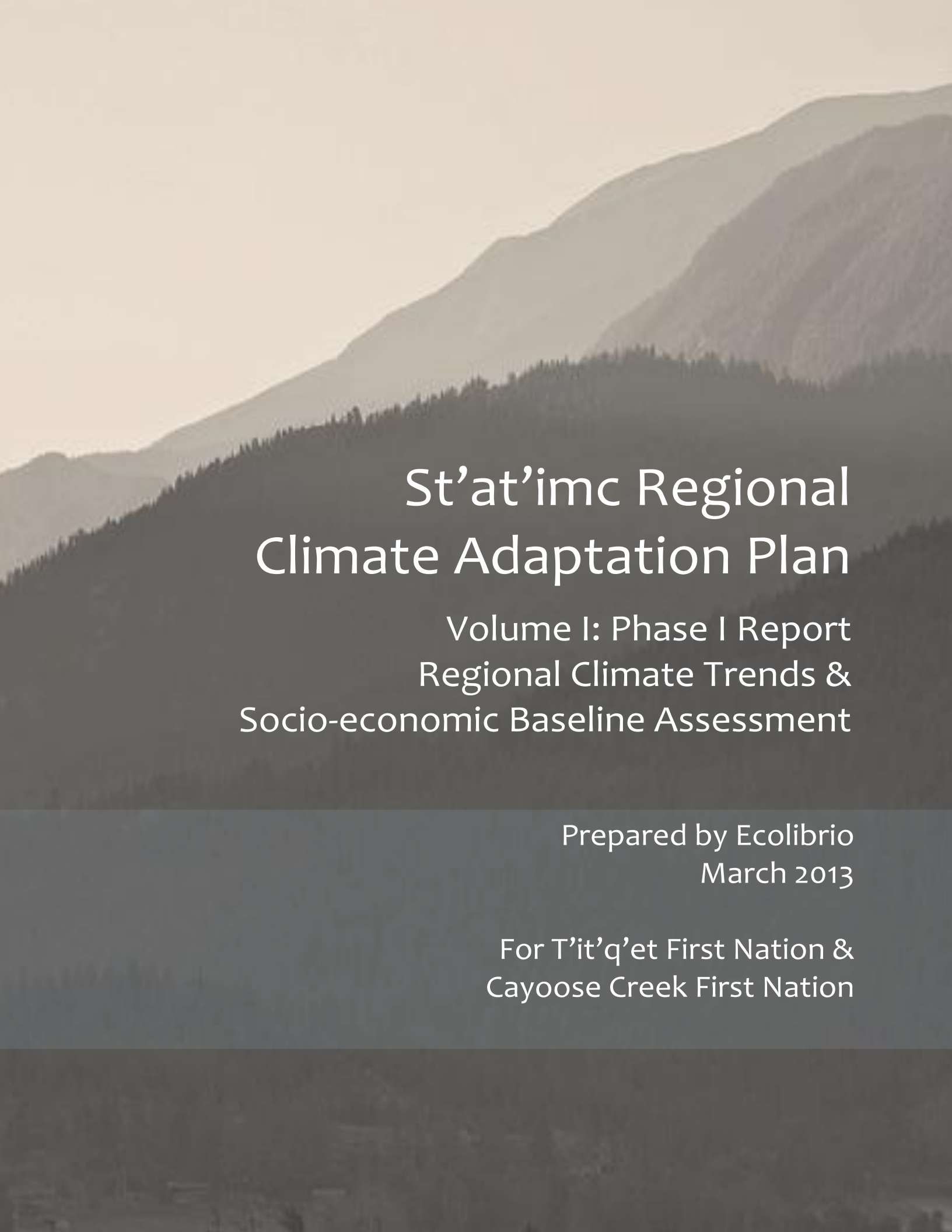

St'at'imc Regional Climate Adaptation Plan

Volume I: Phase I Report
Regional Climate Trends & Socio-economic Baseline Assessment

Prepared by Ecolibrio
March 2013

For T'it'q'et First Nation &
Cayoose Creek First Nation

Submitted to: T’it’q’et First Nation and
Cayoose Creek First Nation

Prepared by: Ecolibrio

Funded by: Aboriginal Affairs and Northern Development Canada,
Climate Change Adaptation Program

Aboriginal Affairs and
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Acknowledgments

The project team would like to acknowledge those community members, Band staff and Councillors from both communities who gave their time to participate in focus groups and surveys and provide valuable community information. We would also like to thank T’it’q’et Chief Kevin Whitney, Cayoose Creek Chief Michelle Edwards and their Councils for their guidance and valuable input as well as T’it’q’et Administrator Wendy Phair, who initiated the project and facilitated key contacts and meetings. And most importantly we would like to acknowledge the great support provided by the local project coordinators: Bonnie Adolph of Cayoose Creek Band and Susannah Tedesco and Tamara Napoleon of T’it’q’et Band. Their efforts at providing overall project direction, facilitation, and research were essential to the success of this first phase of the project.

Executive Summary

The Importance of Climate Change

Climate change may be the defining issue of our generation. Since the Industrial Revolution, the mean surface temperature of Earth has increased an average 0.6° C (Celsius) due to the accumulation of greenhouse gasses (GHGs) in the atmosphere.[1] Historically, the Earth is accustomed to experiencing wide-spread severe environmental change and has always been able to adapt to these changes accordingly. Yet, the difference now is the *speed* and *scale* of the warming that is currently occurring. Most of this change has occurred within the past 30 to 40 years, and the rate of increase is accelerating. These rising temperatures will have significant impacts at a global scale, and at regional and local levels. As a result, climate change will increasingly impact the productivity, diversity, and functionality of many complex, interrelated environmental and socio-economic systems.

Climate Change in the Upper St'at'imc Territory

The climate of the Upper St'at'imc is highly variable depending on the altitude, longitude, and latitude. In general, the eastern portion of the area is dry and hot in the summer, indeed one of the hottest places in Canada, and dry and cold in the winter. The western portion, on the other hand, is wetter and cooler throughout the year. Climate change is expected to accentuate both of these characteristics over the next century. Indeed as local First Nation residents and scientists have observed, the changes have already begun. According to the ClimateWNA model HadGEM A1B Run1 estimates, the following precipitation and temperature trends can be expected in the Upper St'at'imc and Lillooet area over the next century:

Table i: Summary of Climate Change Forecasts in Lillooet Upper St'at'imc Territory

Climate Changes to 2080	Lillooet	Upper St'at'imc (T-S)
A general warming trend	+2.4 to 5.2 °C	+2.4 to 5.1 °C
Warming across all seasons (lowest in winter - highest in summer)	+3.8 to 7.3 °C	+3.1 to 7.1 °C
More frost free days per year	From 206 to 263	From 120 to 200
A general drying trend to 2050 and then marginally wetter to 2080	-7% to 2050 +5% to 2080	-4% to 2050 +6% to 2080
More precipitation in the autumn, winter and spring.	+9.6%	+10%
Less precipitation in summer	-45%	-44%
Less precipitation as rain	-9%	-38%

These figures are uncertain but other modeled scenarios suggest similar trends: a general warming trend, more frost free days, summer experiencing disproportionate warming, more precipitation in spring, winter and autumn but less precipitation as snow during these seasons, and finally less precipitation in general in the summer.

Socio-economic Baseline

It is important to know how resilient or adaptive a socio-economic system is today in order to estimate how it might respond to climate changes in the future. This was the primary focus of the socio-economic baseline in Phase 1 of the project. The snapshot presented of T'it'q'et and Cayoose Creek First Nations is complex. The communities have many common and some divergent conditions and behaviours in terms of how they cope with today's (and yesterday's) pressures. As with all communities, there are strengths and weaknesses with respect to current adaptive capacity but it must be said that these two communities are remarkably resilient given where they are now and the on-going and historic pressures that they have faced. This resilient nature and growing confidence in their capacity will likely provide a good foundation to begin their climate adaptation process in the future.

Like all First Nations in Canada, T'it'q'et and Cayoose Creek have experienced colonization, epidemics, the imposition of the reserve system, and residential schools, continued encroachment by outside interests intent on controlling their traditional territory and resources, displacement by the BC Hydro dams, and the decline of the local forestry-based economy due to market fluctuations and the Mountain Pine Beetle epidemic. These pressures have left the communities struggling at times, causing unemployment or out-migration of youth and young families for jobs and education, as well as physical and mental health challenges and economic hardship for those that remain. Nonetheless, the people are determined to not only survive, but rather thrive. Indeed, community attachment and pride of place in both communities seems to be on the rise. Initiatives such as the Split Rock Environmental in Cayoose Creek, and the Ucwalmicw Society in T'it'q'et, are bringing local and traditional knowledge of the lands back to the community, while also engaging youth and building local environmental and horticultural capacity.

Table ii: Summary of Socio-economic Conditions in T'it'q'et and Cayoose Creek

Socio-economic Indicator	Summary Description
Demographics	The population is growing slightly slower than the provincial on-reserve average but aging faster than the provincial average.
Community attachment & Social Cohesion	The population has a fairly strong attachment to their communities and strong social cohesion, but that attachment is increasingly being eroded by outmigration for employment and social cohesion is increasingly becoming family focused and less community focused.
Attitude to Change	The communities have a fairly positive attitude towards change, especially among the youth, but some environmental changes are causing concern among older members and some changes are causing people to leave or act negatively.
Economy & Livelihoods	The Lillooet economy has been hard hit by the downturn in the forest sector. Unemployment and social assistance claims appears to be trending downward but mainly due to outmigration. There is very little enterprise on reserves and very limited credit and insurance among unemployed members. The communities are responding by exploring growth and diversification opportunities.
Skills & Education	The communities have a diverse set of skills and education, including traditional skills but many members with higher education leave due to lack of employment opportunities. There is a basic but sound education infrastructure and some incentives for pursuing post-secondary education.

Health	Both communities have access to a basic but relatively good district health care infrastructure but emergency and acute care is limited. Health concerns in the communities include: diabetes, respiratory issues, addiction and depression. Overall community health seems to be improving with education and changes in diet and lifestyle.
Agriculture & Food Security	There is very little or no commercial agriculture in either T'it'q'et or Cayoose Creek although there is some subsistence gardening of fruits and vegetables and haying and growing interest in expanding production. Split Rock Nursery and Ucwalmicw Centre are key resources to move this forward although water access is a key limiting factor. Traditional harvesting and preserving of wild foods and medicines is still an important part of the culture and an important contributor to household food security in both communities.
Shelter & Infrastructure	Housing has some climate related short-comings and is in short supply in T'it'q'et but is fairly sound. Housing is in poor condition and in relatively low demand in Cayoose Creek. Public buildings are in good general condition in both communities. Infrastructure in both communities is fairly sound although water systems have no back-up options and little capacity for fire protection. Geological conditions make road integrity challenging to maintain and both communities are vulnerable to erosion and flooding.
Emergency Preparedness	Both communities face risk of wild fires but Cayoose Creek IR1 is particularly vulnerable to flooding due to its proximity to the Fraser and Seton rivers and the BC Hydro diversion canal. T'it'q'et is fairly well prepared, trained, and equipped for emergencies; whereas Cayoose Creek is probably under-resourced. Both communities are tied into the Town of Lillooet's emergency response system although it unclear how well integrated they are.
Governance	Both communities perceive their local governance to be generally more transparent, responsive, and accountable than in the past. The financial capacity of T'it'q'et to manage its affair appears to be adequate. Cayoose Creek is somewhat constrained by its short-term debt commitments but long-term commitments from BCHydro may increase their financial stability.

The members of T'it'q'et and Cayoose Creek continue to have a relatively strong attachment to their communities, particularly their immediate families. They have a relatively positive attitude towards change, even if they do have fears for the socio-economic and environmental changes they see unfolding. They have a small and ageing population—Cayoose Creek is the smallest of the St'at'imc communities, and T'it'q'et is the third smallest—but a relatively diverse skill set, and a sound, albeit basic, education infrastructure. They may face some chronic health issues—including diabetes, respiratory diseases, and some issues with addiction and depression—but they are attempting to correct these issues through dietary and lifestyle changes with the support of a fairly strong local healthcare system. Although, their Band governments are under-resourced and perhaps financially stressed (particularly in the case of Cayoose Creek), there is a perception among the community that their Band governments are improving with respect to transparency, accountability, and responsiveness, and that current planning and partnerships for services and economic diversification will improve their quality of life.

Many of T'it'q'et and Cayoose Creek members continue to fish, hunt, and collect food in keeping with their traditional culture and as a way of strengthening their household food security. Although there is little to no commercial agriculture on the Reserve lands of either community, T'it'q'et has begun to revive its vegetable and fruit gardening traditions with the support of the Ucwalmicw Society, and Cayoose Creek is exploring these

activities as well, while expanding their native plant restoration work through Split Rock Environmental. While both communities have arable land for these activities, it is limited, and both communities are constrained by a lack of access to water (despite being surrounded by lakes and rivers).

Housing has some climate-related short-comings in T'it'q'et, and is in short supply but is fairly sound. Housing is in poor condition and consequently in low demand in Cayoose Creek. Infrastructure and public buildings in both communities are fairly sound although water systems have no back-up options and little capacity for fire protection. Geological conditions in both communities make road integrity challenging to maintain and vulnerable to erosion and flooding.

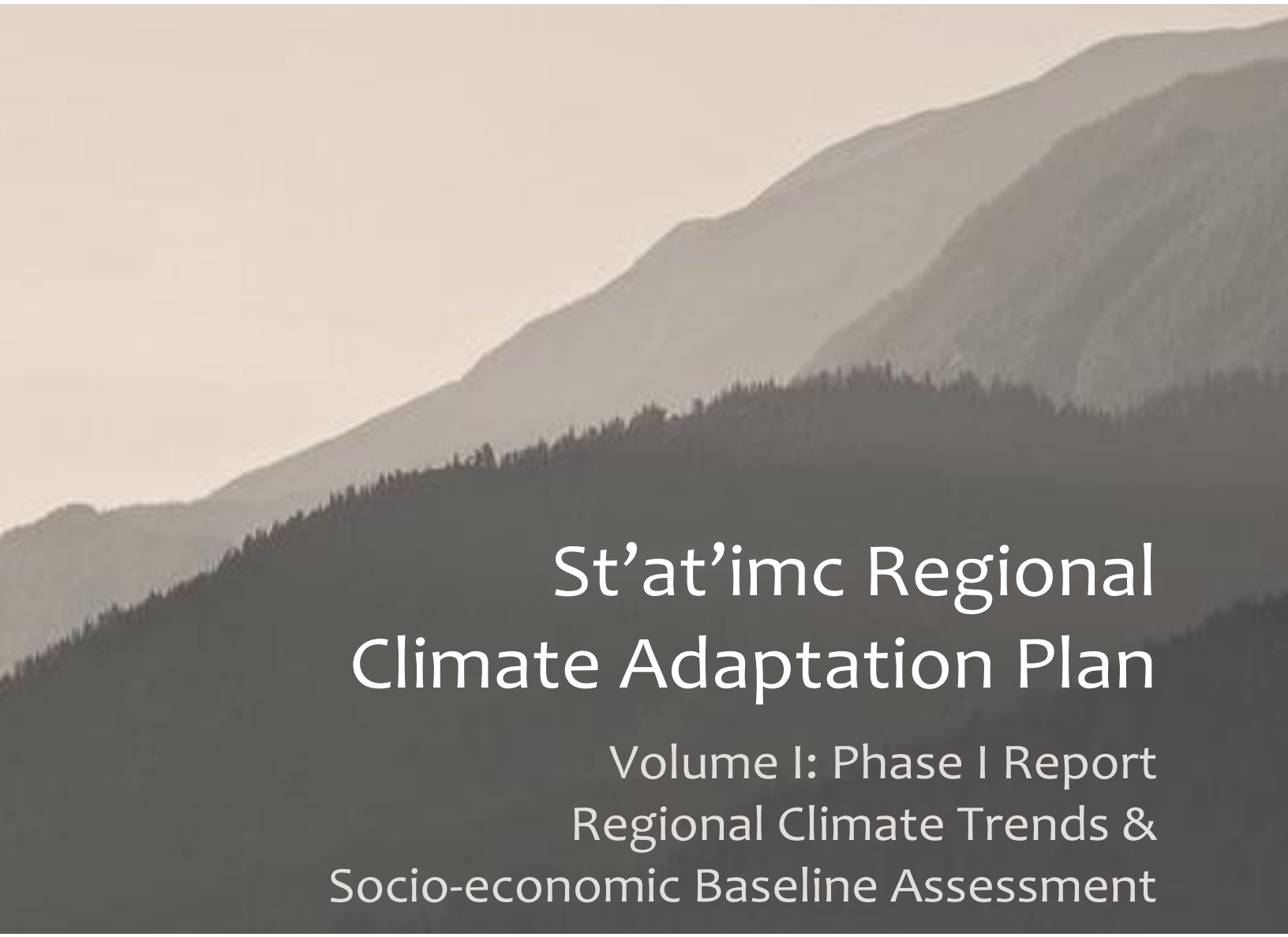
Both T'it'q'et and Cayoose Creek face severe risk of wild fires, as demonstrated by the 2009 forest fire, and Cayoose Creek IR1 is particularly vulnerable to flooding due to its proximity to the Fraser and Seton rivers and the BC Hydro Seton Dam diversion canal. T'it'q'et is fairly well prepared, trained, and equipped for emergencies; whereas Cayoose Creek is probably under-resourced and trained. Both communities are tied into the Town of Lillooet's emergency response system, although it unclear how well integrated they are. In the event of an emergency, the local hospital has very limited capacity to deal with acute care issues, and many community members have relatively limited financial resources to make major or prolonged household expenditures that may be required in an emergency situation.

Community Vision for Development

Adaptation doesn't happen in a vacuum; it needs to be driven by common values and aspirations as well as available resources and circumstances.

Although the T'it'q'et and Cayoose Creek are different communities facing different challenges and at are various stages of planning and development, they share many of the same values and visions for sustainable development. In general, the two communities aspire to:

- Be self-governing and self-sufficient;
- Have a strong sense of identity, proudly practicing their language and culture;
- Live in a safe and respectful community;
- Have a thriving economy and local government; and
- Live in a healthy environment, where natural resources are honoured and used in an environmentally sound way.



St’at’imc Regional Climate Adaptation Plan

Volume I: Phase I Report
Regional Climate Trends & Socio-economic Baseline Assessment

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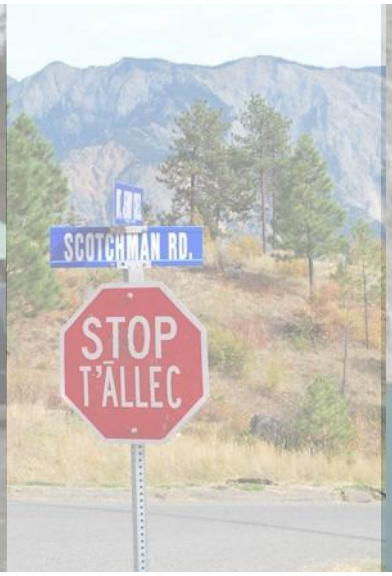
Chapter 1: Introduction, Background and Methodology



Introduction

What is Climate Change Adaptation?

According to Natural Resources Canada (NRCAN), climate change adaptation refers to "actions that reduce the negative impact of climate change, while taking advantage of potential opportunities. It involves adjusting policies and actions because of observed or expected changes in climate" (Richardson, 2010[1]). Climate change adaptation planning is therefore the process by which a defined community or population comes to understand how the local climate has and will change, and the nature (including timeline and severity) of the impacts that arise from those changes, be they positive or negative.

From the perspective of this project, planning is merely the first step in adaptation. Adapting to climate change is a multifaceted, collaborative process that begins with an understanding of risk and adaptive capacity, and ultimately leads to the implementation of activities that mitigate risk and foster resiliency while building upon local assets.

Figure 1: Key Adaptation Terminology

Impact: The effects of climate change on natural and human systems. (IPCC, 2007[2])

Risk: The threat posed by a change. Climate change risk is a function of the magnitude of individual hazards and/or change and the degree of vulnerability of a system. (ICIMOD, 2009[3])

Adaptation: Adjustment of a system in response to actual or expected climactic stimuli or their effects, which moderates harm or exploits beneficial opportunities. (ICIMOD, 2009[3])

Adaptive Capacity: The ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. (IPCC, 2007[2])

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. (IPCC, 2007[2])

Resilience: The ability of a community to resist, absorb, and recover from the effects of hazards in a timely and efficient manner, preserving or restoring its essential basic structures, functions, and identity. (IPCC, 2007[2])

Why is Climate Adaptation Important?

Climate change is arguably the most significant *known* threat to face our generation, and one of the most complex threats that humanity has ever had to address. Climate change poses a variety of risks—some clear, knowable and immediate; others indirect, unknowable and with unclear timelines. One thing that is for certain is that every community on Earth will be directly or indirectly impacted by climate change in the decades to come. The distribution of climate change impacts among communities is however unequal. Some communities and specific demographics—and often those that already face severe socio-economic and environmental challenges, such as the poor, women, youth, elderly, minorities, indigenous peoples —will disproportionally face

1 Richardson, G. (2010). Adapting to climate change: An introduction for Canadian municipalities. Ottawa, ON: Natural Resources Canada.
2 Intergovernmental Panel on Climate Change. (2007). Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Glossary).
3 International Centre for Integrated Mountain Development. (2009). Local Responses to Too Much and Too Little Water in the Greater Himalayan Region. International Centre for Integrated Mountain Development: Kathmandu, Nepal.

the brunt of the negative impacts. This is because climate change will exacerbate these communities' and groups' vulnerabilities.

In Canada, Aboriginal communities will face disproportionate negative impacts of climate change (Ford, Berrang-Ford, King, & Furgal, 2010[4]) for a variety of historical, political, economic, geographic, and cultural reasons. While climate change is not a new phenomenon, nor is adaptation to external change new for Aboriginal communities, the speed and scale with which changes will occur is unprecedented.

Moreover, climate change will likely exacerbate challenges already faced by Aboriginal and resource dependent communities such as Cayoose Creek and T'it'q'et. The added stress placed on governance, food, resource, and cultural systems will in turn complicate the communities' aspirations for self-government and sustainable development.

There is therefore an urgent need to understand the local and regional implications of climate change in terms of ecological and socio-economic vulnerabilities, and to *plan to adapt* through capacity building and effective stakeholder engagement and communication.

Ultimately, climate change adaptation is about creating *resilient communities*, capable of addressing and reacting to any and all external changes, be they ecological, economic, political, social, or otherwise.

Background

Project Rationale

This report is Phase I of what is intended to be a three-phase climate change adaptation planning process among the Upper St'at'imc communities of T'it'q'et and Cayoose Creek. The purpose of the project is to understand the local and regional implications of climate change on these communities and their combined Traditional Territory, and to devise adaptation strategies to reduce systematic vulnerabilities that they may be facing.

Figure 2: Project Objectives

The objectives of this project are to:

- ***Understand forecasted climatic changes in our traditional territory.***
- ***Understand resulting impacts on the resource system and socio-economy.***
- ***Understand what measures can be taken to reduce our vulnerability and enhance our adaptive capacity.***

Phase I of the project took place between August 2012 and March 2013, and involved assessing climate trends and models and generating a socio-economic baseline for each community. If funding is approved, Phase II will begin April 2013, and will involve the development of regional ecological baseline as well as a regional assessment of socio-economic and ecological vulnerabilities to climate change. If funding is approved for Phase III, it will begin April 2014 and will involve the identification of adaptation priorities and their subsequent integration into community and regional planning.

4 Ford, J.D., Berrang-Ford, L., King, M. & Furgal, C. (2010). "Vulnerability of Aboriginal health systems in Canada to climate change." Global Environmental Change, 20(4), 668-80.

Leadership, administrative staff, and community members at both T'it'q'et and Cayoose Creek initiated this project in response to recent climate concerns and concerns for the future. Impacts from climate change are already being witnessed including: habitat loss due to the incursion of the Mountain Pine beetle epidemic and resulting wild fires, erosion and flooding; changing location and abundance of traditional edible and medicinal plants and wildlife, necessitating changes in hunting and collecting practices; and changes in water temperature and water flows on the Fraser and Seton Rivers, impacting spawning grounds and traditional fishing practices. If these impacts are going to continue or worsen, the community would like to know what their options are for mitigating and adapting to them. While the communities are relatively healthy and getting stronger, they are still healing from the effects of colonization, epidemics, residential schools, and displacement by the BC Hydro dams, as well as coping as best as possible with the recent downturn in the forest industry and the early impacts of climate change. These impacts have left the T'it'q'et and Cayoose Creek communities somewhat anxious about their future but also determined to face it on their own terms. They envision a future, which is grounded in a renewed culture, greater authority over their traditional resources, ecologically responsible land use, and sustainable prosperity for future generations.


Cayoose Creek Community Meeting

Methodology

Framework for Assessment

The overall methodology employed during this project uses an integrated approach, informed by both ecosystem and socio-economic analyses, traditional and scientific knowledge and local engagement and secondary research. In so doing, we draw upon a variety of vulnerability and adaptation methodologies including: the First Nation planning approach developed by the Centre for Indigenous Environmental Resources (CIER), the *WEHAB+* approach used by the Tyndall Centre, and an ecosystem-based vulnerability approach developed by the International Union for Conservation of Nature (IUCN).

The methodology employed in this project was developed by and has previously been used by Ecolibrio (lead project consultants) to conduct climate change adaptation planning in four other First Nation communities in British Columbia (Xeni Gwet'in, Ahousaht, Heshquiaht, and Tla-o-qui-aht) over the last three years. Together, these chosen methodologies provide the background to analyze vulnerability and adaptive capacity at the community and regional level.

Tools and Methods

Phase I was focused on generating a climate baseline and modeling future climate trends as well as assessing baseline socio-economic adaptive capacity in both communities. The chosen methodology weaves together traditional, local, and scientific knowledge to create a knowledge base firmly grounded in lived-experience and the latest climate science.

Climate trends were established using 30 years of historical data from the nearest weather stations (e.g., temperature, precipitation, and growing days) to determine historical norms and trends. Climate forecasts were

modeled using ClimateWNA, and supplemented with information from recent Intergovernmental Panel on Climate Change (IPCC) and Pacific Climate Impacts Consortium (PCIC) publications.

The socio-economic baseline was developed through key informant interviews and focus groups with Band staff and leadership, community members as well as through a review of recent community statistics, plans, and studies. Once collated and summarized, the baseline data was then confirmed through the St'at'imc Regional Climate Change Adaptation Steering Committee, comprised of representatives from each of the participating communities, and at community and staff meetings to determine its accuracy. Interviews and focus groups helped to build awareness and support for this project among community members and served to confirm scientific data regarding historical climatic changes (e.g., temperature, precipitation amount and form, etc.) and resolve conflicting opinions. Data for the socio-economic baseline was gathered through interviews and focus groups with Band staff, local experts, community members, and Elders, and through literature review, review of planning documents from the Bands and the Tribal Council, and publically available census data (BC Stats and AANDC).

Agriculture and food security data were augmented with a thorough review of existing planning documents provided by Landscope Consulting (a local agriculture planning firm) and interviews with Split Rock Nursery Environmental and Ucwalmicw Center. Infrastructure analysis was supplemented with AANDC asset files (ACRES reports) provided by each of the communities and consultations with the Public Works department at the District of Lillooet.

Table 1: Key Tools & Methods

Key Activity	Tools
Climate Trends and Models	Weather Station Data, ClimateWNA
Socio-economic Assessment	Interview and focus groups with key informants, literature review.
Agriculture Assessment	Literature review, interviews with local experts (e.g., Split Rock Environmental and Ucwalmicw Center).
Infrastructure Assessment	Literature review (e.g., ACRES, archival data), site visits, interviews with Band staff and District Public Works.

References

Ford, J.D., Berrang-Ford, L., King, M. & Furgal, C. (2010). "Vulnerability of Aboriginal health systems in Canada to climate change." *Global Environmental Change*, *20*(4), 668-80.

Intergovernmental Panel on Climate Change. (2007). Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Glossary). URL: ipcc.ch/pdf/glossary/ar4-wg2.pdf [February 27, 2013].

International Centre for Integrated Mountain Development. (2009). *Local Responses to Too Much and Too Little Water in the Greater Himalayan Region*. International Centre for Integrated Mountain Development: Kathmandu, Nepal.

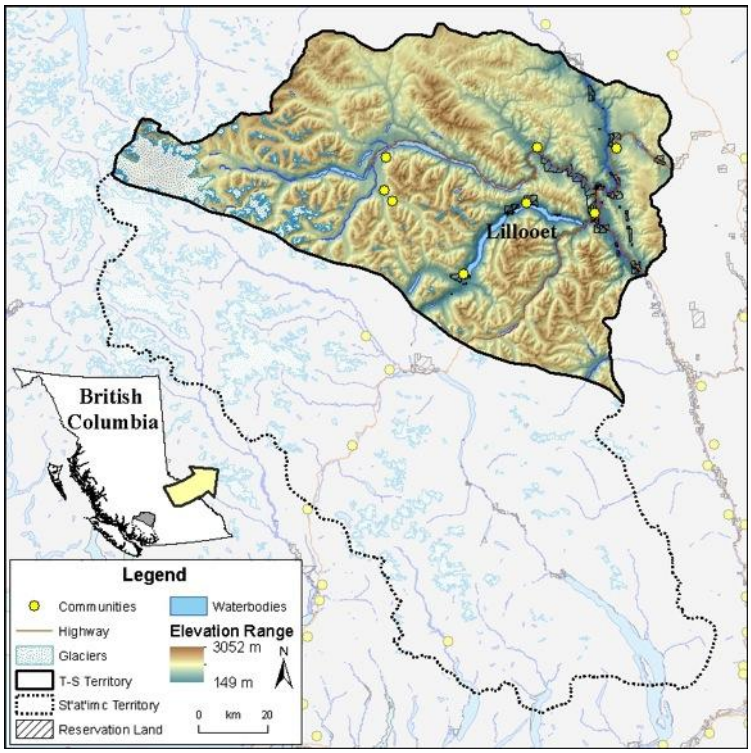
Richardson, G. (2010). *Adapting to climate change: An introduction for Canadian municipalities*. Ottawa, ON: Natural Resources Canada.

Chapter 2: Climate Trends and Projections in Lillooet and Upper St’at’imc Territory

Study Area

The T'it'q'et and Cayoose Creek traditional territories roughly overlap the same region; therefore, we hereafter refer to the T'it'q'et and Cayoose Creek traditional territories simply as the T-S territory[5]. The T-S territory (9630 km^2) lies in the northern portion of the St'at'imc traditional territory (22010 km^2) in southwestern British Columbia (Figure 3). The T-S territory is a diverse landscape that contains the Lillooet Icefield and other glaciers in the Coast Mountains Range in the west and numerous low-lying valleys scattered in the southeast. The largest community, Lillooet, is situated along the Fraser River adjacent to the T'it'q'et and Cayoose Creek communities. The regional topography has a large influence on the spatial patterns of climate and is important to consider in the following analyses.

Figure 3: T'it'q'et & Cayoose Creek Traditional Territory



Methods

For our analyses we used ClimateWNA (V. 4.70)[6] software and geographic information systems (GIS) to extract numerical data and create visual maps of historical climate and projected future climate. ClimateWNA offers high-resolution spatial climate data (historical and future projections) within a defined spatial location within western North America.

Geographically we focused our analyses on two regions. First, the entire T-S territory[7], and second, the town site of Lillooet (50°41'10.5" N, 121°56'11.94" W). Temporally, we focused our climate analyses on four time periods: 1) the average for the historic period of 1971-2000 which will be considered as a 'normal' baseline and reference; 2) the projected future 2020s (2010-2039); 3) the projected future 2050s (2040-2069), and; 4) the projected future 2080s (2070-2099).

Predictions of future climate are generally influenced by design of the climate model and the assumptions made about future greenhouse gas emissions (GHGs). For this study, we ran three scenarios, a combination of models and GHGs assumptions, as recommended by Murdock and Spittlehouse (2011) as means to show a possible range of climate futures. Generally, each scenario tends to result in a particular type of outcome. For instance: run one (HadGEM A1B) projects a hotter and drier future; run two (HadCM3 B1) projects a slightly warmer and wet future, and; run three (CGCM3 A2) projects a warmer and very wet future.[8]
ClimateWNA allows the user to extract up to 19 climate variables; however, we focused our analyses on temperature, number of frost-free days, frost-free period, precipitation, and type of precipitation. The reported

5 In Appendix A, see two maps of the two traditional territories.
6http://www.genetics.forestry.ubc.ca/cfcg/ClimateWNA/ClimateWNA.html
7 Data was extracted at a 1 km2 resolution then averaged for the entire region.
8 See Appendix A for scenario details.

climate data is averaged over annual and seasonal time frames. Annual data refers to the yearly 12-month average (Jan—Dec) and seasonal averages refer to three-month averages: winter (Dec—Feb), spring (Mar—May), summer (June—Aug), and autumn (Sept—Nov).

Results

To keep the results clear and brief, we decided to focus our attention on the future climate scenario projected by run one (HadGEM A1B). The probability of this scenario is equal to other scenarios. Run one was simply chosen as it is considered to be the worse case of the three scenarios because it projects the warmest and driest climate in the future. For comparative reasons, results from the other two projected climate scenarios (i.e., CGCM3 A2 and HadCM3 B1) are included in Appendix A and in some of the graphs below. Future climate is uncertain and that is why we provide a range of possible outcomes.

The historic baseline climate data, 1971-2000, is considered to be representative of contemporary climate, and is used to contrast the climate projected by future scenarios for the three future time frames. Similarly, climate data for Lillooet is provided to contrast the spatially averaged climate data for the T-S territory.

Temperature

For the reference period, 1971 - 2000, the mean annual temperature (MAT) in Lillooet is 7.3°C which is much higher than the spatial average of 1.5°C for the T-S territory (Table 2). Figure 4 shows the MAT across the T-S territory and it is evident that it is strongly correlated with regional topography. For instance, regions of higher elevation (e.g., mountain tops) have a colder MAT in comparison to regions of lower elevation (e.g., valleys). Figure 5 shows the projected MAT for the climate scenarios, which are all projected to increase in the future. Specifically for Lillooet, run one projects MAT to be as much as 5.2°C warmer than the reference period by the 2080s. A similar warming trend is projected for the entire T-S territory (Figure 6).

Table 2: Projected Temperature Related Variables for T-S Territory and Lillooet

		Mean Annual Tempearture (MAT)		Number of Frost-Free Days		Frost Free Period	
Model/Scenario	Timeframe	T-S	Lillooet	T-S	Lillooet	T-S	Lillooet
	1971-2000	1.5	7.3	117	206	67	146
Run One (HadGEM A1B)	2020	2.8	8.7	145	221	98	168
Run One	2050	5.0	10.8	175	242	138	189
Run One	2080	6.6	12.5	194	263	151	200

Figure 3: MAT for period 1971-2000 within T-S territory

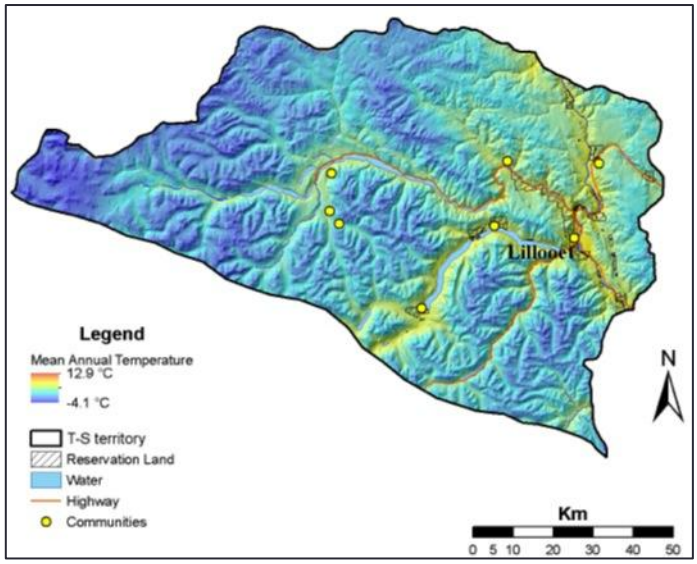


Figure 5: MAT for Lillooet (upper lines) and T-S Territory (lower lines) for baseline period and future projections scenarios

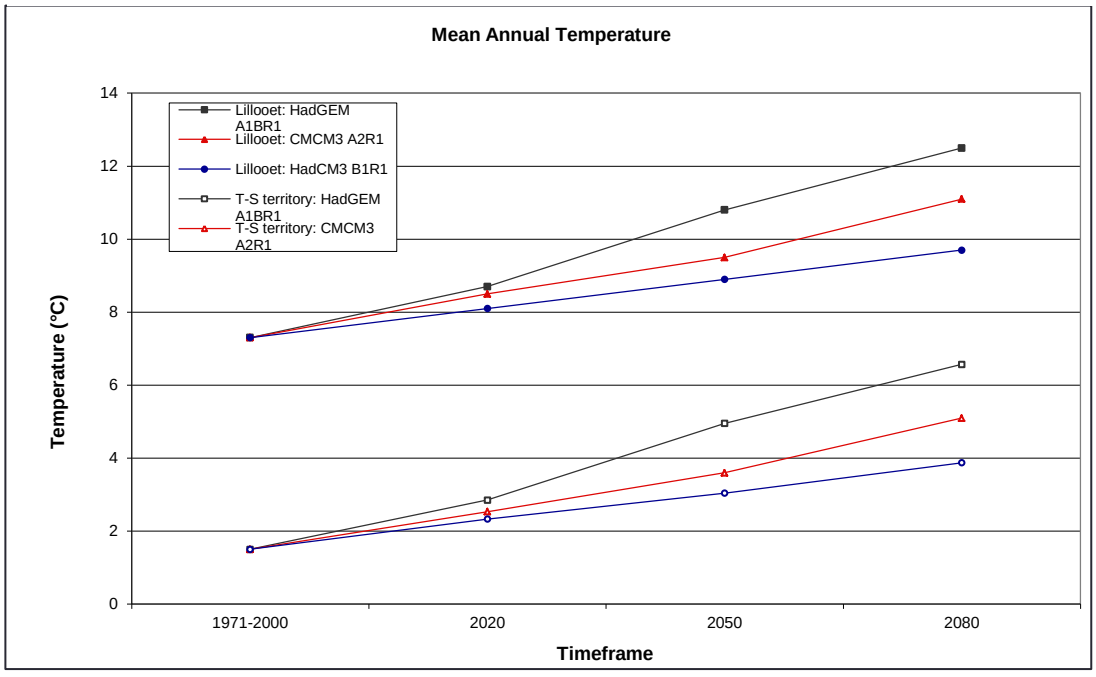
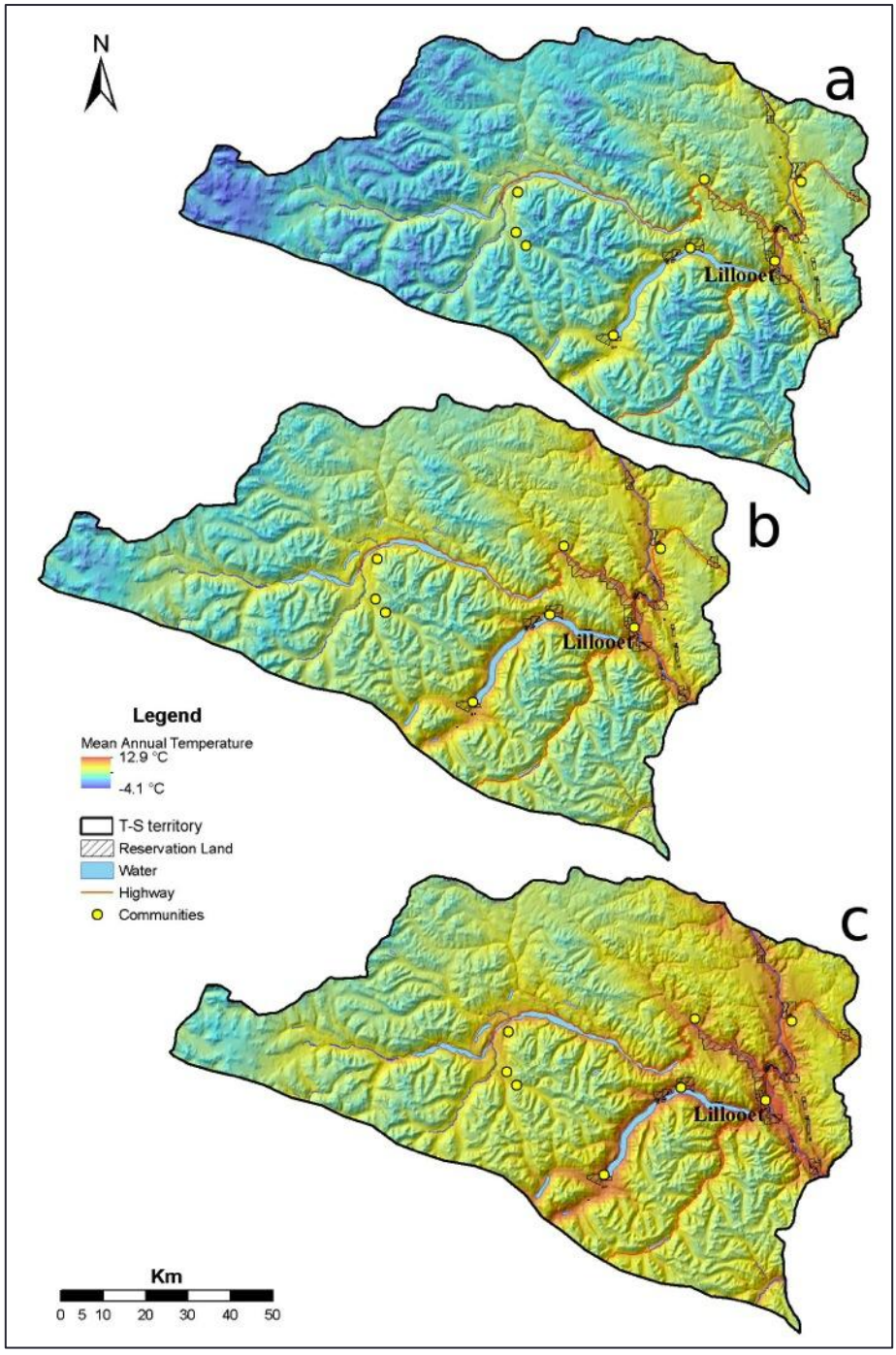


Figure 4: MAT projected for Run One scenario for three time frames: (a) 2020s, (b) 2050s, (c) 2080s.

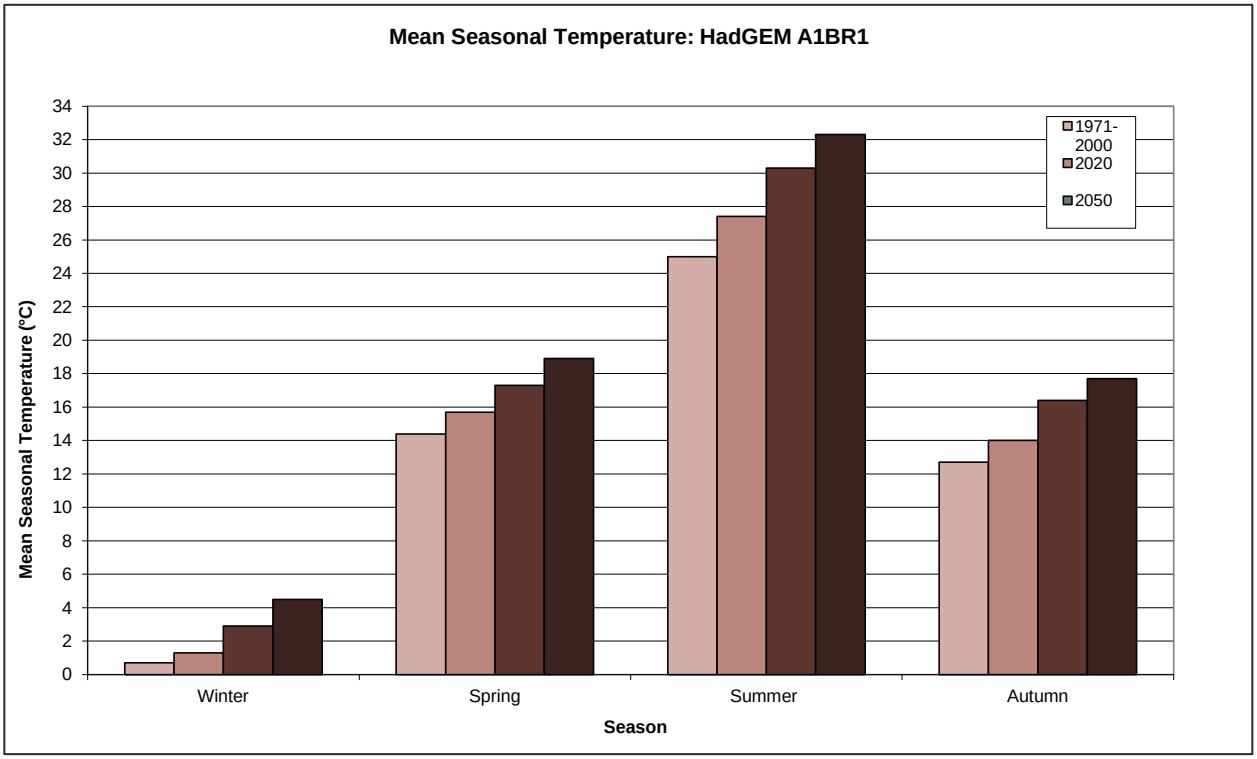


Throughout the seasons the run one projects a warming trend for Lillooet where the largest amount of warming occurs in the summer season (~27%) and the least amount of warming occurs in the winter (~ 18%; Table 3/Figure 7). Similarly for the T-S territory, most of the warming occurs in the summer season (~35%) and the least amount of warming occurs in the winter (~18%). As mean temperatures are projected to increase, we can expect other temperature dependant variables to increase as well. For instance, in Lillooet the number of frost free days (NFFD) is projected to increase from 206 days to as much as 263 days (an increase of 28%) by 2080s. Likewise, the frost free period (FFP) is projected to increase from 146 days to as much as 200 days (an increase of 37%), by 2080s[9] (Figure 8).

Table 3 Baseline and Projected Mean Seasonal Temperatures for Lillooet and the T-S territory

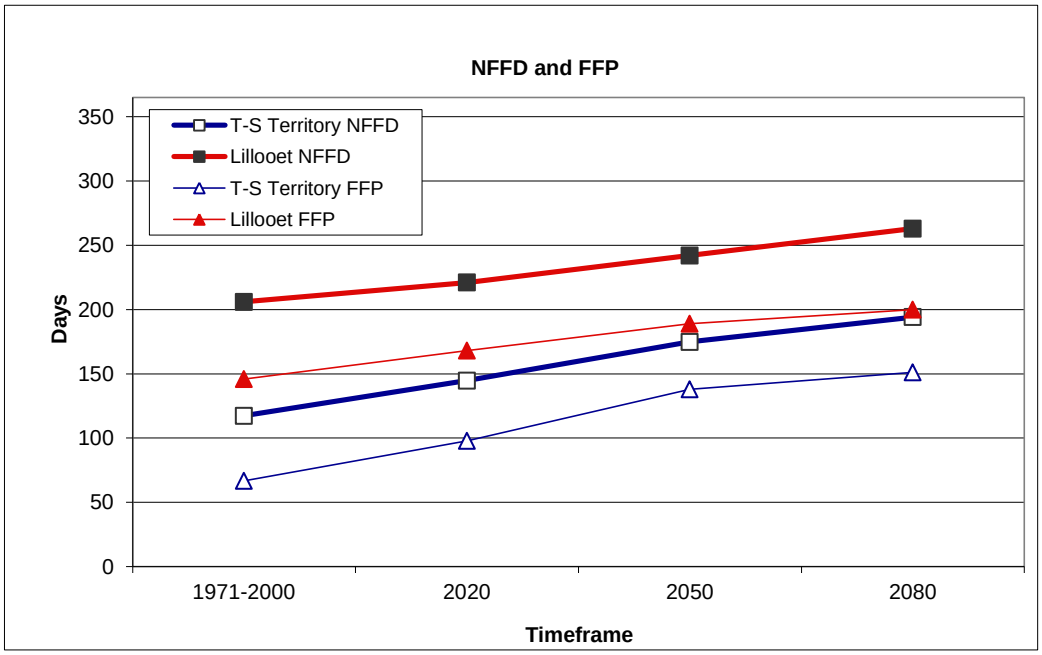
Model/ Scenario	Timeframe	Mean Seasonal Temperature (°C)							
		T-S Territory				Lillooet			
		Wt	Sp	Sm	At	Wt	Sp	Sm	At
	1971-2000	-2.7	6.7	17.0	6.8	0.7	14.4	25.0	12.7
HadGEM A1BR1	2020	-2.1	8.0	19.3	8.1	1.3	15.7	27.4	14
	2050	-0.6	9.6	22.1	10.5	2.9	17.3	30.3	16.4
	2080	1.0	11.2	24.1	11.8	4.5	18.9	32.3	17.7

Figure 7: Mean seasonal temperature for Lillooet for period 1971-2000 and future projections for run one scenario.



9 NFFD and FFP values are available in Appendix A. NFFD is the total number of days in a year where the daily temperature does not go below 0°C. FFP is similar to NFFD and is defined as the number of consecutive days in a year where the daily temperature does not go below 0°C (i.e., number of days between the last spring frost and the first fall frost).

Figure 8: Number of Frost Free Days (NFFD) and Frost Free Period (FFP) for Lillooet and the T-S territory for period 1971-2000, and future projections for run one scenario



Precipitation

The mean annual precipitation (MAP) for the reference period, 1971-2000, in the T-S territory is 974 mm, which is nearly three times wetter than the average of 356 mm experienced in Lillooet (Table 4/Figure 9). Precipitation rates tend to increase with elevation, so the spatial average of precipitation across the T-S territory is significantly higher than Lillooet because it takes into account the high precipitation rates seen in the Coast Mountains. For the same reason, Lillooet is drier because it is at a low elevation in the valley and situated in the Coast Mountains' rain shadow (Figure 10). The run one scenario projects Lillooet to become slightly drier for the 2020s and 2050s, but then marginally wetter by 2080s (Table 4/Figure 9). The projection of MAP for the T-S territory shows a similar trend to that of Lillooet, mostly differentiating by a higher degree of precipitation (Figure 9). Notably, the western portion of the territory sees the largest increase in precipitation, whereas the eastern portion of the territory sees marginal or negative changes in precipitation through time (Figure 11).

Table 4: Precipitation related variables for historical and projected timeframes.

Model/ Scenario	Timeframe	MAP (mm)[a]		PAR (mm)[b]		PAS (mm)[c]		PAS (%)[c]	
		T-S	Lillooet	T-S	Lillooet	T-S	Lillooet	T-S	Lillooet
	1971-2000	974	356	383	270	591	86	61	24
HadGEM A1BR1	2020	**964**	**344**	422	270	**543**	**74**	56	22
	2050	**934**	**331**	470	279	**464**	**52**	50	16
	2080	986	**347**	605	314	**381**	**33**	39	10

Note: Bolded values denote trends that are projected to become drier than the baseline data; A: Mean Annual Precipitation; B: Precipitation as rain; C: Precipitation as snow.

Figure 9: Mean annual precipitation for Lillooet (lower) and T-S territory (upper) for period 1971-2000 and future scenarios

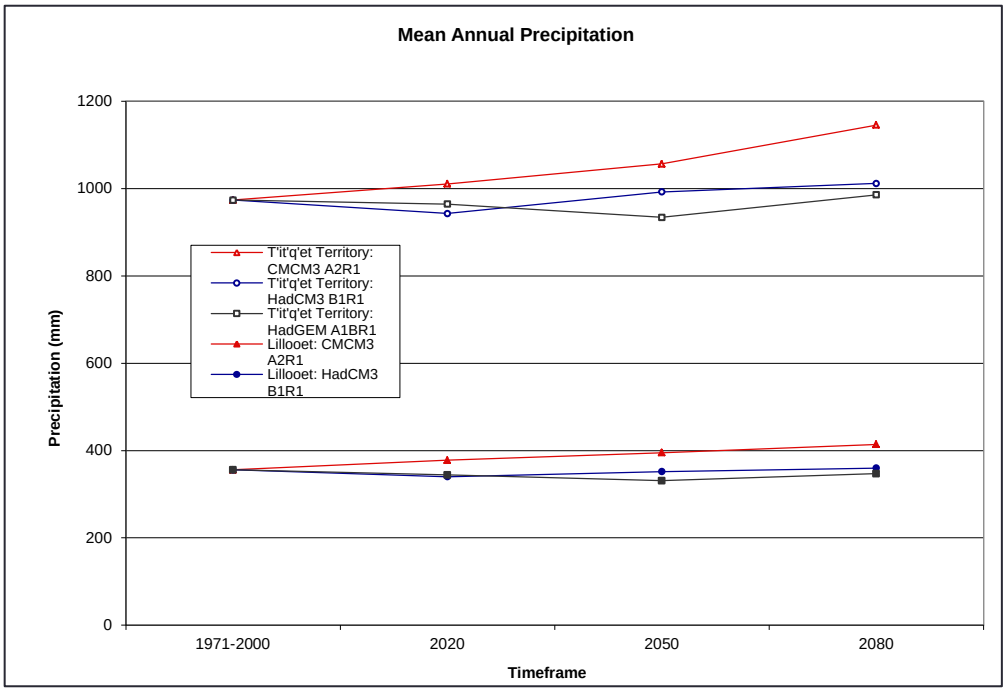


Figure 10: Mean annual precipitation for reference period 1971-2000 in T-S Territory

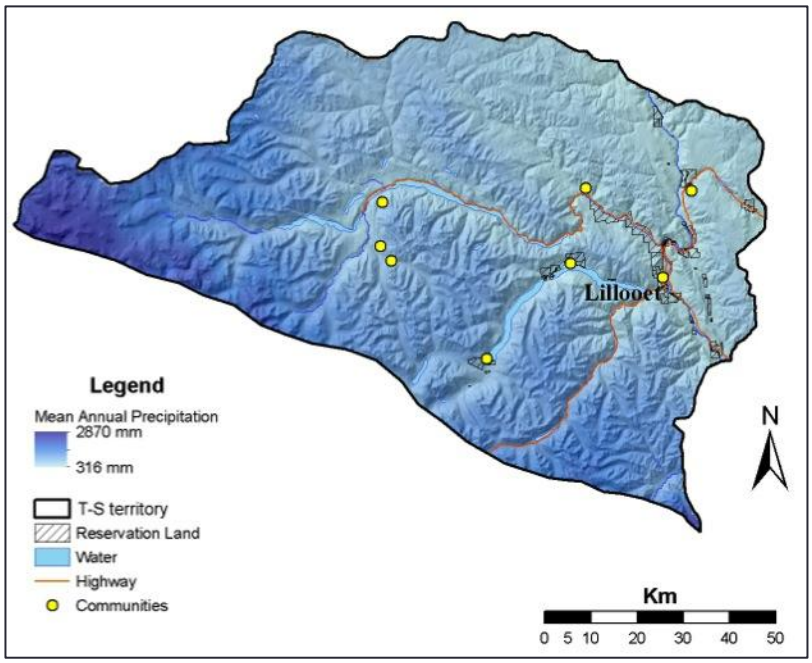
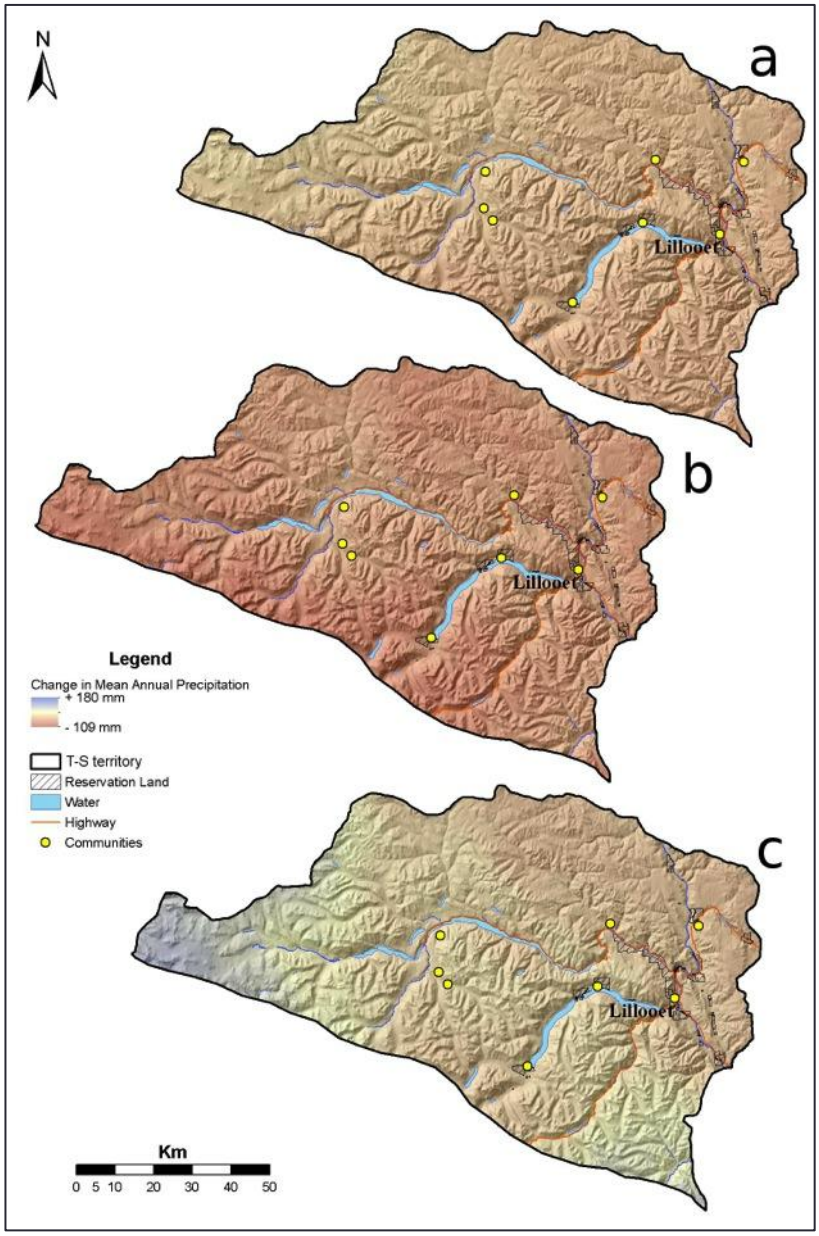


Figure 11: Mean annual precipitation projected for run one scenario for time frames: (a) 2020s, (b) 2050s, (c) 2080s.



Future mean precipitation trends vary between seasons. That is, the run one scenario projects the autumn, winter, and spring seasons to become wetter, and the summer season to become drier. Specifically for Lillooet, the scenario projects summer precipitation to decrease by 38mm (45%) by 2080 (Table 5/Figure 12).

For the reference period, 1971-2000, the portion of MAP in the form of snow is 24% (86 mm) and 61% (591 mm) for Lillooet and the T-S Territory, respectively (Figure 13). As time progresses the scenario projects the portion of MAP in the form of snow to decrease to 9% (33 mm) and 38% (381 mm) by 2080s for Lillooet and the T-S territory, respectively (Figure 13).

Table 5: Historical and Projected Mean seasonal precipitation for Lillooet and the T-S territory

Model/ Scenario	Timeframe	Mean Seasonal Precipitation (mm)							
		T-S Territory				Lillooet			
		Wt	Sp	Sm	At	Wt	Sp	Sm	At
	1971-2000	354	169	158	292	113	63	85	95
HadGEM A1BR1	2020	**351**	172	**134**	308	**112**	64	**72**	96
	2050	**350**	177	**97**	310	114	67	**52**	98
	2080	363	195	**88**	340	118	74	**47**	108

Note: **Bolded** values denote trends that are projected to become drier than the baseline data.

Figure 12: Historical and Future Mean seasonal precipitation for Lillooet

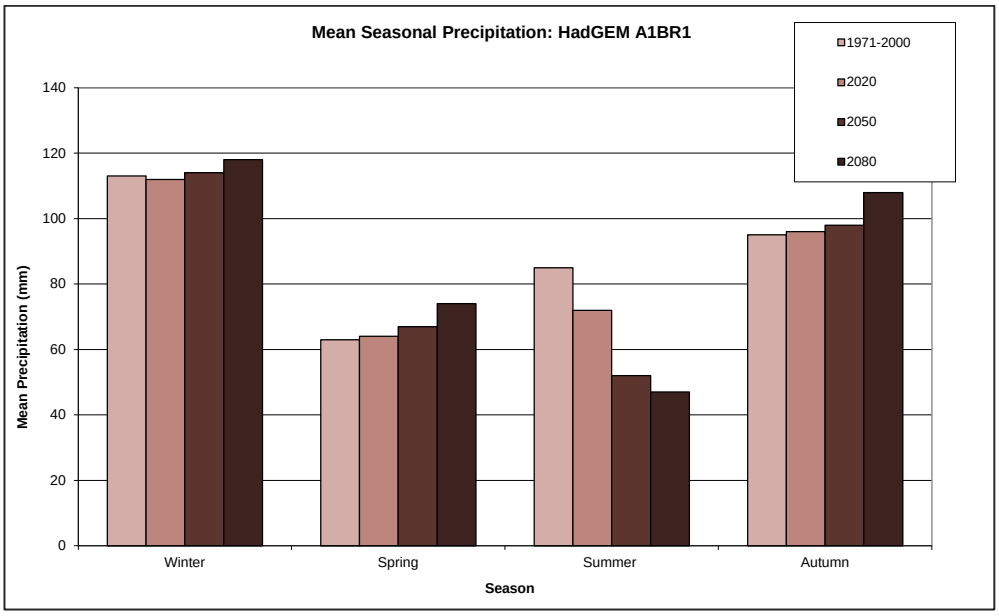
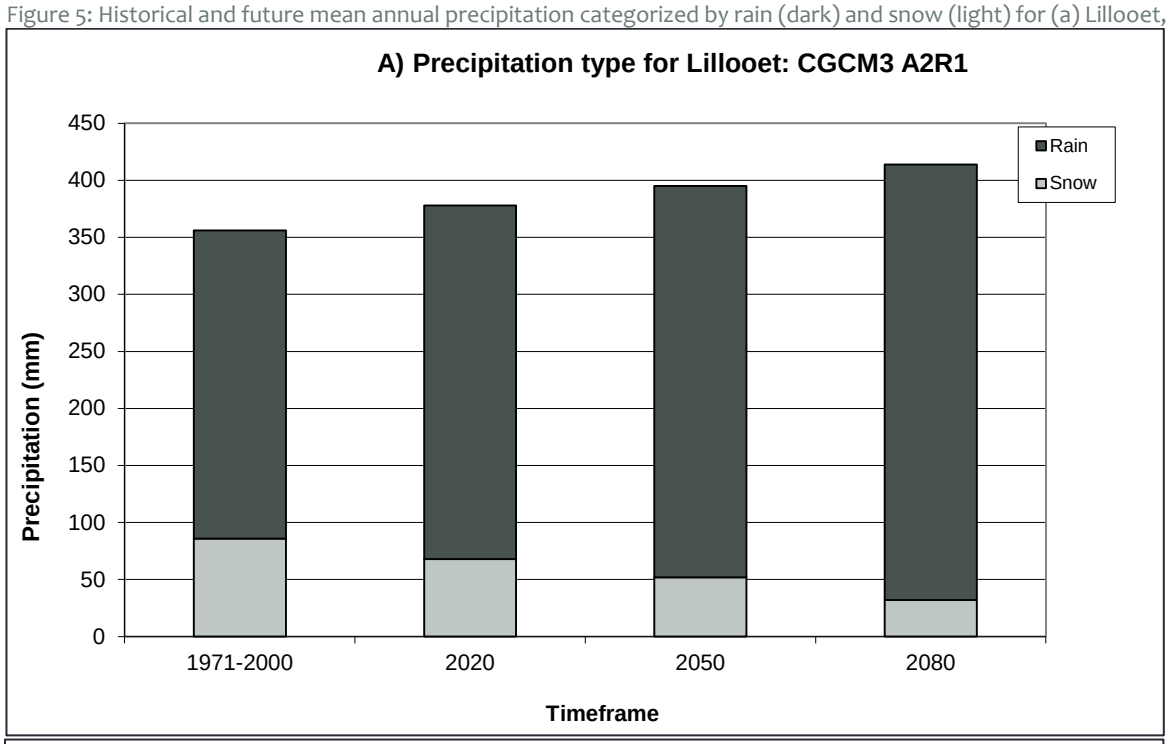
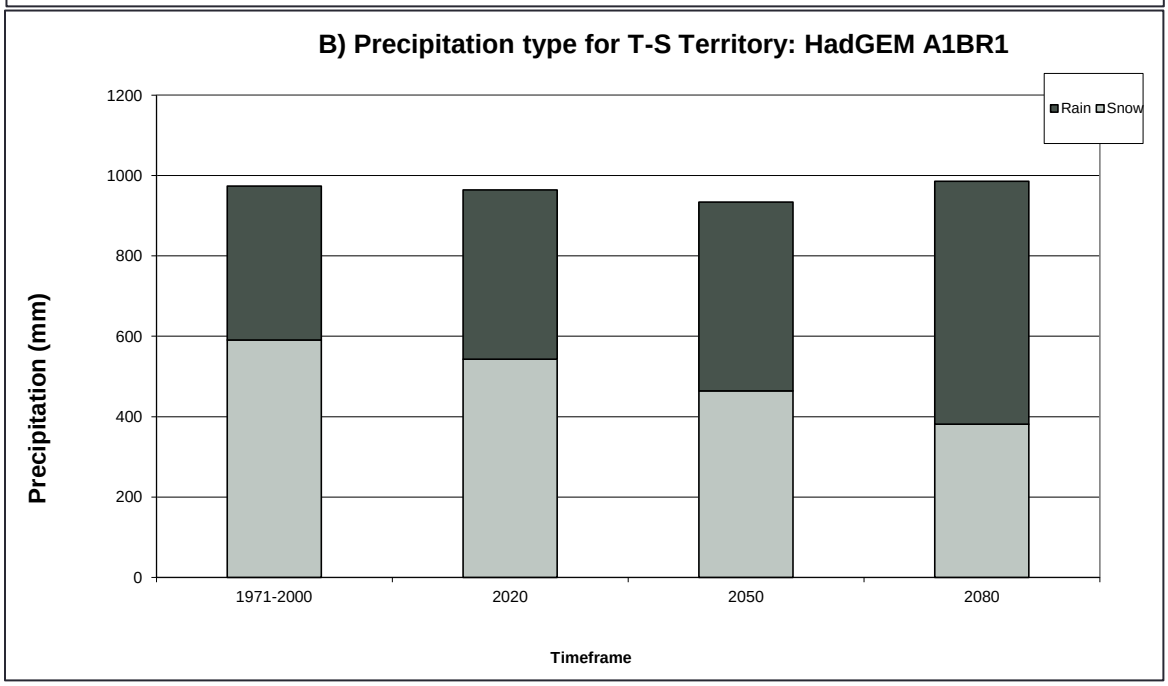


Figure 5: Historical and future mean annual precipitation categorized by rain (dark) and snow (light) for (a) Lillooet, and (b) the T-S territory





Trends and Scenarios

There are common climatic trends shown for all three scenarios, which will be discussed further in the context of the Lillooet data. All three models suggest that temperatures will increase; however, the amount of warming remains uncertain (2.4—5.2 ˚C). All three scenarios are in agreement that the summer months will warm

proportionally more than the other three seasons (approx. 30 % of the warming). Depending on the scenario, the winter or spring months will experience the least amount of warming (7—18% of the warming). The common warming trend among the scenarios translates to an increase Number of Frost Free Days (NFFD) from 206 days to 236—273 days. More importantly for agriculture, the Frost Free Period (FFP) is also expected to increase from 146 days to 185—207 days. As for precipitation, there is no decisive trend. Depending on the scenario, annual precipitation will either increase or decrease by marginal amounts. Throughout the seasons there are slight differences among the scenarios in terms of the change in precipitation between each timeframe. Generally, the winter, spring, and autumn months will experience more precipitation and the summer months will receive less precipitation. As a result of the increase of mean winter temperature, a smaller proportion of precipitation will fall as snow.

Summary

Historical climate and future climate projections were provided using ClimateWNA modeling. From the projected HadGEM A1B (run one) scenario results, Lillooet and the T-S territory will likely experience an increase in mean annual temperature and a decrease in annual precipitation in the future. Throughout the seasons, summer will experience the biggest change in climate where it will likely become disproportionately hotter and drier. In contrast, winter could become warmer and marginally wetter. Due to the increase of mean temperature throughout winter, a smaller proportion of precipitation will fall as snow.

There is natural uncertainty in all the climate projections and the provided results should be read cautiously. Naturally, projections for time periods further into the future have more uncertainty. In addition, projections of temperature are more reliable than projections of precipitation due to the natural variability (in terms of distribution, amounts, and timing) that precipitation displays on the landscape.

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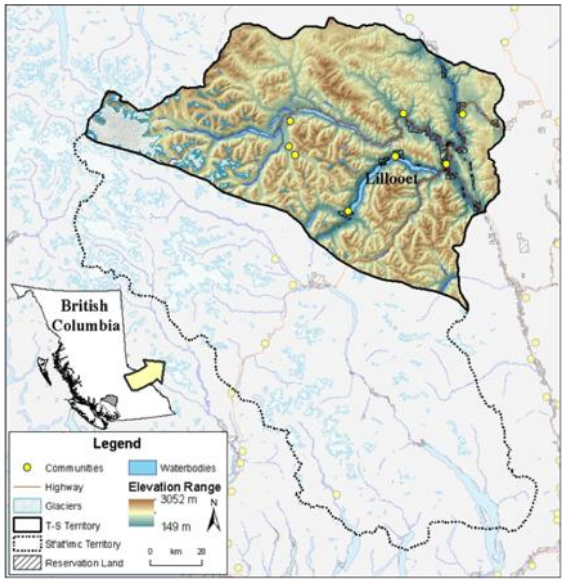
Wang, T., Hamann, A., Spittlehouse, D., and Murdock, T. N. (2012). ClimateWNA—High-Resolution Spatial Climate Data for Western North America. *Journal of Applied Meteorology and Climatology*, 61: 16-29. URL:

Chapter 3: Socio-economic Baseline in the Upper St’at’imc Territory

Geographic Boundaries and Relative Location

The study area of this project is located in South-Central British Columbia in an area known to the T'it'q'et and Cayoose Creek First Nations as the Upper St'at'imc Traditional Territory, which incorporates the two First Nations' respective Areas of Responsibility (See Figure 14). The area surrounds the Town site of Lillooet at the confluence of the Fraser River and Cayoosh Creek (a tributary of Seton River) and extends north to Churn Creek and Hat Creek Valley, northwest to the headwaters of Bridge River, east towards the Big Slide and west to the headwaters of Lillooet River and Lillooet Mountain.

Figure 14: Upper St'at'imc Traditional Territory

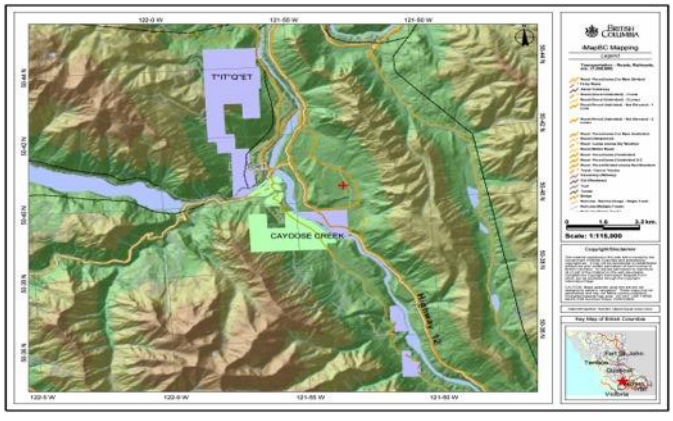


The area lies at the southern end of the Chilcotin Ranges of the Coast Mountains, straddling a very wet environment to the west and very dry environment to the east, making the area very diverse in flora and fauna. The actual reserve lands of T'it'q'et and Cayoose Creek First Nations are concentrated around the benchlands of Lillooet, located at the eastern portion of the Territory, approximately 250 km from Vancouver and 170 km from Kamloops (see Figure 14).

T'it'q'et First Nation (formerly known as Lillooet Indian Band) is comprised of seven reserves with a total area of nearly 1500 hectares, however the vast majority of on-reserve T'it'q'etemc live on the main reserve (Lillooet 1A) on a bench at the base of Mt. Mclean overlooking the Town site of Lillooet and Cayoose Creek. Cayoose Creek First Nation (traditionally known as Sekw'el'was), is comprised of three reserves with a total area of slightly more than 720 hectares, with the majority of the on-reserve population at the main reserve (Cayoosh Creek 1) located East of Seton Lake and above the Duffey Lake Road (Highway 99) as it enters the Town site of Lillooet.

Socio-economic Context

Figure 15: Relative locations of T'it'q'et and Cayoose Creek reserve lands



The Socio-economic state of a community or region is an indicator of how resilient or adaptive it is to change, including climate change. No socio-economy is naturally static, but generally the more healthy and diverse the system is, the easier or quicker it can bounce back after it is pressured, and continue to function. Hence, in terms of climate change adaptation planning, it is important to know how resilient or adaptive a socio-economic system is today in order to estimate how it might respond to climate changes in the future. The assessment of current socio-economic conditions today provides a baseline for future analysis.

This baseline assessment of T'it'q'et and Cayoose Creek focuses on 10 fundamental social, economic, and administrative characteristics: 1) demographics, 2) community attachment and social cohesion, 3) attitudes

towards change, 4) economy and livelihoods, 5) skills and education, 6) shelter and infrastructure, 7) health, 8) agriculture and food security, 9) emergency preparedness, and 10) governance. The purpose of providing a socio-economic baseline is to allow each community to assess their adaptive capacity presently and in the face of forecasted climate change impacts. What follows is an overview of each of the nine characteristics, as well as a brief summary of what they mean for community adaptive capacity as a whole.

Demographics

The population is growing slightly slower than the provincial on-reserve average but aging faster than the provincial average.

According to the most recent figures from T'it'q'et administration (2012), the community is the third smallest of the Upper Lillooet Bands with a total population of 391. Of those 391 members, 187 live on reserve, while the remaining 204 live off reserve (mostly in the Lower Mainland)[10]. According to Statistics Canada (2006), the population of T'it'q'et grew by 9% between 1996 and 2006. The growth rate during the 10-year period between 1996-2006 was approximately half of the provincial on-reserve trend of 20%, although relatively consistent with the overall provincial growth rate of 10.4%.

The community reports that it has experienced similar aging trends to the population in the surrounding Squamish-Lillooet Regional District (P'egp'íg'lha Council, 2012[11]). In 2006 the median age in the community was 34, compared to 28 just four years prior. According to AANDC figures, in 2001, 4% of the community was over the age of 65. This number jumped to 10% in 2006. At the same time, the population has seen a relative decline in its under-20 population: from 38% in 2001 to 34% in 2006. When compared to other on-reserve Aboriginal populations in BC in 2006, T'it'q'et had a substantially higher relative population between the ages of 55 and 64, and a slightly higher relative population over the age of 65 (14% and 10% in T'it'q'et, respectively, compared to 8% and 7%). These demographic trends are likely due largely to youth and young families leaving the Valley for locations where there are better employment prospects (see Community Attachment and Economy sections).


Grandmother and daughter, Cayoose Creek

There is substantially less demographic census data available for Cayoose Creek. There are currently 196 Cayoose Creek members, 70 of whom live on-reserve and 126 who live elsewhere (mostly in the Lower Mainland, Vancouver Island and Kamloops), making it the smallest of the Upper Lillooet Bands. What we do know from census data is that between 2001 and 2006 the community experienced -12.5% annual growth, while between 2006 and 2012 the population grew by more than 7% annually. Census data also shows that in 2001, the median age was 28, approximately 10% of the population was over 65, and 35% was under the age of 20.

10 As of October, 2012, AANDC reports a total population of 409: 182 living on reserve, 211 living off the reserve, and the balance living on other reserves.
11 P'egp'íg'lha Council. (2012). 2011 Strategic Economic Action Plan. Prepared by Carden Consulting.

Using anecdotal evidence we get a better sense of more recent community population trends. Community members report that over at least the past decade the main trend has been for youth to leave the community to go to school or training programs and then to find work, with very few moving back, and older members aging in place.

Table 6: T'it'q'et and Cayoose Creek Demographic Data

Indicator	T'it'q'et	Cayoose Creek
Total Population 2012	391 (AANDC reports 409)	196 (AANDC reports 195)
On-reserve Population 2012	187 (AANDC reports 182)	70 (AANDC reports 74)
Population Growth Rates	0% (1996-2001) 2% (2001-2006) 10.5% (2006-2012)	 -12.5% (2001-2006) 7.6% (2006-2012)
Population Under 65	225 (using AANDC 2006 figures)	75 (using AANDC 2001 figures)

Source: AANDC (2013[12])

Community Attachment and Social Cohesion

The populations have a fairly strong attachment to their communities and strong social cohesion, but that attachment is increasingly being eroded by outmigration for employment and social cohesion is increasingly becoming family focused and less community focused.

Community attachment and social cohesion tell us about the relationship between community members and the physical and social space where they live. Community attachment refers to the strength of bond between individuals and their community, while social cohesion refers to the strength of bond amongst and between community members (on and off-reserve). Community attachment is measured by assessing members' interest in community affairs, attendance at community meetings, and level of engagement among off-reserve members. Social cohesion is assessed by analyzing community members' support networks, ability to rely on others, and volunteerism.

In T'it'q'et, there is a general sense that members are interested in community affairs, however only a small, albeit diverse (between the ages of 20 and 70), group of people regularly attends community meetings (approx. 20% of on-reserve population). Focus group participants and interviewees attribute the low levels of attendance to individual's reluctance to voice concerns publicly, lack of free time, and in some cases, feelings of futility that concerns will go unaddressed.

Trends in mobility are hard to track, however we know that more than half of community members live off reserve. Anecdotally, much of this out-migration is attributed to lack of economic opportunities on reserve and within the District (which is not surprising considering Lillooet's Labour Market Region has experienced significant slowdown in the forestry sector and has the slowest forecasted growth of any region in the province for the next decade). High off-reserve population numbers can also be attributed to lack of on-reserve housing. Community members who do live outside of the community generally live in the Lower Mainland, while a few are living and working in Alberta. Looking forward, it is hard to suggest what direction mobility trends will go. This is

12 Aboriginal Affairs and Northern Development Canada (AANDC). (2013). First Nation Community Profiles.

because while there are still limited economic opportunities in the community and region and few youth are leaving the community to pursue post-secondary training (as demonstrated by the decline in the proportion of the community with post-secondary training, from 45-55% between 1996 and 2006, to 32% in 2012).

Table 7: T'it'q'et and Cayoose Creek Social Cohesion

Indicator	T'it'q'et	Cayoose Creek
Food Sharing	Shifting to Family only sharing from wider community sharing in the past	Shifting to Family only sharing from wider community sharing in the past
Emergency Response	Band Gov't, source of information and financial support. Families, a source of information and on-the-ground support. Some negative behaviour including home theft, vandalism and abuse of fuel subsidies.	Band Gov't, source of information and financial support. Families, a source of information and on-the-ground support.

Source: Focus group sessions and interviews, 2012 & 2013

In terms of social cohesion, resource sharing in T'it'q'et is reportedly on the decline. While community members continue to share animal meat with family members and Elders, generally speaking, food sharing is not as common as it historically once was. Focus group participants noted on numerous occasions that when they were younger, families had an "open-door and open-kitchen" policy—if they were cooking, everyone was invited in to come and eat. Today, doors are locked (partly due to fears over theft and vandalism) and community members are reportedly much more individualistic. Focus group participants suggest that people tend to look after themselves and their families, and are less willing to share with non-family members—some respondents even went so far to say that some community members take advantage of emergency situations to exploit others (for example there were reports of people entering the homes of evacuated families to look for valuables during the 2009 fire). This change in behaviour, particularly with regards to food sharing, is partially attributed to the increasingly expensive cost of living (especially food), but as well to a larger cultural shift away from collectivism. This shift is witnessed in other habitual activities such as chopping wood, shovelling snow, and home renovations/construction, which used to bring people together in the spirit of community and volunteerism, but seem to have all but disappeared. One focus group participant suggested that this shift also relates to the "urbanization" of First Nations peoples more generally through the reserve system.

As noted elsewhere, in 2009, T'it'q'etemc had a very near miss with a massive fire that destroyed great tracts of forest within their traditional territory. How people responded to that fire, and how they indicate they would respond in future emergencies, gives us another indication of social cohesion. In 2009 is seems that community members relied heavily on the Band Office for information and resources. Community members called the Office for information about the evacuation order and resources once in Kamloops (the evacuation center), and the Band provided fuel and social assistance to families who could not afford to get to Kamloops. Some older community members also reported getting information from on-reserve family members. Looking forward, it is likely that community members will act in the same way, particularly given the success of their recent emergency response—i.e., younger family members will actively seek information and resources from the Band, while older family members will wait to be contacted. Moreover, while some community members noted that their sons and daughters have moved away to find work (e.g., Alberta), given that most off-reserve members still live relatively close by (e.g., Fraser Valley, Vancouver), it is feasible that their on-reserve relatives could rely on them for resources in a time of need.

Table 8: T'it'q'et and Cayoose Creek Community Attachment

Indicator	T'it'q'et	Cayoose Creek
Public Engagement	20% attendance at community meetings	25% attendance at community meetings
Community Mobility	Approx. 50% live off reserve	Approx. 50% live off reserve
Volunteerism and Committee Participation	Easy to find volunteers for events. Hard to find non-paid volunteers for committees.	Hard to find non-paid volunteers for events and committees. Most of the volunteering is done by Band staff.

Source: Focus group sessions and interviews, 2012 & 2013

In Cayoose Creek, interviewees report that there is growing sense of community attachment, at least in terms of interest in community affairs. With the arrival of the new Chief and Council and the increasing transparency of Band activities, coupled with the use of information communication technologies to reach out to off-reserve members, community members feel that they increasingly have a voice in community affairs. While only about 25% of community members (including youth, adults and Elders) regularly attend meetings, there is a sense that this number is increasing over time and that more youth are showing interest. The low attendance rate is attributed to busy schedules and lack of interest.

A relatively large proportion of members do not live on reserve (roughly 65%), however there appears to be a lingering sense of community attachment. Similar to T'it'q'et, younger community members in Cayoose Creek have had to leave the community and the District to find work to support their families (typically moving to the Fraser Valley, Vancouver Island, Alberta, and Kamloops). Interviewees report that some off-reserve members continue to take part in community affairs, particularly when they deem decisions to be of great importance (in some cases participating in community meetings through web conferencing). And there have been cases of off-reserve adults returning to Cayoose Creek to raise their children near family and friends. Another sense of community attachment in Cayoose Creek in recent years is Split Rock Environmental, the Band-owned native plant nursery and environmental restoration company. Split Rock trains and employs a handful of young community members year-round and has generated restoration and monitoring contracts from the Provincial government and BC Hydro.

Split Rock Environmental has been a growing source of community pride in Cayoose Creek

In terms of social cohesion, there is a sense that family-centered support networks dominate. Whether with regards to access to emergency food, financial and non-financial resources, or information, community members prefer to turn to their immediate family members (i.e., children and siblings), then to institutional resources (e.g., Band office, Tribal Police, Salvation Army, Food Bank), and finally to neighbours. While family-centered support networks are preferred in Cayoose Creek (similar to T'it'q'et), the majority of interviewees are quick to note that community members are still willing to help one another out if the need arises, for example volunteering in emergency situations or providing support after a death in the community.

The communities have very limited capacity in terms of post-secondary education services and therefore many members interested in this education must leave the community, at least temporarily, usually for Kamloops or the Lower Mainland. This trend is likely to continue

in the future but perhaps to a lesser extent as First Nation youth find it increasingly difficult to cope with education costs.[13]

High off-reserve population figures can also be attributed to a lack of on-reserve housing. Respondents have indicated many family members would like to return to the community but don't do so because there is no housing to be had on the reserve. Currently there are 54 people on waitlist for housing in T'it'q'et and four people on waitlist in Cayoose. Others respondents indicate that some community members live off reserve to get a change of context[14].

Attitudes towards Change

The communities have a fairly positive attitude towards change, especially among the youth, but some environmental changes are causing concern among older members and some changes are causing people to leave or act negatively.

In recent memory there are numerous stories of adaptation among the T'it'q'etemc. There are acute environmental emergencies like the 1971 and 2009 forest fires, the former of which burned down nearly the entire community, and the latter destroying nearly one million hectares of forests and causing the evacuation of the community to Kamloops, as well as economic emergencies like the 2008 closure of the Ainsworth Mill, the community's then largest employer. There are also examples of more slow-onset environmental, socio-cultural, political and economic changes in the community such as changes to:

- Wildlife and plant life location and behaviour within the traditional territory (e.g., changing location of mule deer, increased encounters with bears, coyotes and cougars; changing location of sage brush with drying of the environment; changes to fish runs);
- The governance structure of the community (e.g., introduction of the Family Council System; changing guidelines regarding the familial relationships between council members [in the past, councillors couldn't be related]);
- Gender roles within the community (e.g., women have more choice about where they live once married; more young girls and women fishing);
- The nature of the local economy (e.g., downturn in the forestry industry);
- Lack of interest among youth in "traditional training" (e.g., manhood and womanhood training)
- Increase in cost of living; and,
- Demographics (e.g., aging population and related health needs).

When focus group participants were asked about attitudes or philosophies regarding change in their cultural stories, very little was offered. When community members' were asked about their general attitude towards change and ability to adapt, opinions were mixed.

One group of opinions suggests that community members are optimistic, community-centered and can be highly adaptive when confronted with change (e.g., moving to find work elsewhere, increasing their dependence on wild, locally cultivated foodstuffs to reduce household costs, evacuating in the event of a wildfire etc.). The second group of opinions, which was more in the minority, suggest that when confronted with change or

13 According to Cayoose Creek staff post-secondary costs are rising and bursaries and scholarships are not keeping up with these costs.
14 According to one councilor, people leave to see different things and to learn and/or to remove themselves from family or community politics or social issues.

hardship some people in the community simply leave or some become even more individualistic, resorting to desperate negative behaviours such as theft and vandalism.

Because Cayoose Creek and T'it'q'et are located so close together, they share traditional territories, and their members work in the same sectors, members there report a similar mixture of acute environmental, infrastructural, and economic emergencies (e.g., 1971 and 2009 fires, the closure of the Ainsworth Mill). Moreover, the slow on-set environmental, socio-cultural, and economic changes that community members have experienced are likewise similar, including:

- More encounters with wildlife (e.g., bears and coyotes);
- Changes in seasonal temperatures (drier summers, less snow in winters);
- Changes in nature of the local economy;
- Increase in cost of living;
- Changes to local diet (more reliance on unhealthy store-bought food; however, recently this and the increasing cost of food have seemingly spurred a resurgence in interest in local food cultivation and traditional activities like hunting);
- Changes to the Fraser River (including: smaller fish size, warmer temperatures, less predictable fish runs); and,
- Decreased ability to rely on the natural "cues" in the environment (e.g., Tsaken blossoms, appearance of horse image in mountainside) to dictate traditional activities such as fishing and processing.

There are increasing numbers of humans—wildlife interactions in T'it'q'et and Cayoose Creek

Similarly, focus group participants had little to share in terms of attitudes or philosophies regarding change in their cultural stories. However some respondents noted that such stories are important and should be shared within families. When asked about attitudes towards change in the community and ability to adapt, respondents reported that in general community members are flexible, adaptable and open to change—evidenced by the community's response to the closure of the Ainsworth Mill in which the Band supported people getting retrained. Youth were seen as particularly adaptable, while older community members were portrayed as anxious about change and less flexible.

Table 9: T'it'q'et and Cayoose Creek Community Attitudes to Change

Indicator	T'it'q'et	Cayoose Creek
Attitudes to Change	Mixed–Many are open to change and are adaptable. Many new initiatives to improve the community. Some simply leave or act out negatively.	Most members see change as positive, and are adaptable (esp. youth). Older members are perceived to be afraid of change and not as adaptable.

Source: Focus group sessions and interviews, 2012& 2013

Ultimately both communities have had an immense amount of negative change forced on them over the last century (e.g. colonization, imposition of the reserve system, residential schools, resource depletion, the hydro-electric dam, and economic booms and busts). By the fact that they are still surviving with their communities intact and are growing is a credit to their adaptability. Where they are currently in terms of development and amenities in their communities is not where they wish to remain, but both T'it'q'et and Cayoose Creek are making strides to adapt further and pursue their visions for healthy and vibrant communities. This is evidenced by both communities on-going development of Comprehensive Community Plans [CCP], as well as new planning and

investments in health, economic development, forestry, infrastructure, land use planning, training, and of course climate adaptation.

Economy and Livelihoods

The Lillooet economy has been hard hit by the downturn in forest sector. Unemployment and social assistance claims appears to be trending downward but mainly due to outmigration. There is very little enterprise on reserves and very limited credit and insurance among unemployed members. The communities are responding by exploring growth and diversification opportunities.

Employment Income and Trends

According to the T'it'q'et Economic Action Plan (2012), the region's recent economic history has been quite challenging (Work BC, 2013[15]). The cumulative impact of the 2008—2009 economic recession, labeled the "worst global recession… since the Great Depression (Roubini, 2009[16])," and the impact on BC's lumber exports, as well as the 2008 closure of the Ainsworth Mill (formerly the area's largest source of employment) and the closure of several BC Government offices was devastating for both T'it'q'et and Cayoose—so intimately were people's livelihoods connected to a robust forestry sector (and related services such as trades, transportation and hospitality)[17].

Table 10: T'it'q'et & Cayoose Creek Employment Trends

	T'it'q'et			Cayoose Creek		
Year	Participation Rate	Employment Rate	Unemployment Rate	Participation Rate	Employment Rate	Unemployment Rate
2001	71%	53%	25%	60%	40%	33.3%
2006	59%	44%	30%	No data	No data	No data

Source: AANDC (2013)

Prior to these events however, the 2006 census data already hinted at growing unemployment among males in T'it'q'et (and likely in Cayoose Creek although we have no census data to support), particularly in resource sectors, agriculture, construction and trade professions (P'egp'íg'lha Council, 2012[18]). Women in T'it'q'et, however, experienced employment growth in government and management professions. This is reflected in the current employment make-up of T'it'q'et, which sees the Band Office as the main employer (mainly women) with forestry following closely behind. The situation in Cayoose Creek is similar with the Band Office as the main employer (mostly women) followed by local industry (67%), and manufacturing and construction (16%), including employers such as Aspen Planers and Split Rock Environmental.

15 Work BC. (2013). British Columbia Labour Market Outlook: 2010-2020.
16 Roubini, N. (2009). A Global Breakdown of the Recession in 2009. Forbes.com.
17 Ainsworth had been the main employer in T'it'q'et, and Aspen Planers continues to be the largest employer in Sekw'el'wás.
18 P'egp'íg'lha Council. (2012). 2011 Strategic Economic Action Plan. Prepared by Carden Consulting.

Table 11: T'it'q'et Unemployment Trends by Gender

Year	Female Unemployment	Male Employment
2001	20%	27%
2006	18%	31%

Source: AANDC (2013)

In 2006, the average annual earnings in T'it'q'et are reported as $22,811, with government transfers making up roughly 25% (AANDC, 2013) of the income. There is no data from Cayoose Creek regarding average earnings and government transfers, however given the similarities of the two communities they are likely similar. We also have anecdotal evidence from both communities noting that the number of Social Assistance claimants has decreased in recent years as older members become pensioners and younger members leave the communities to find work elsewhere.

In 2012, anecdotal evidence suggests that the unemployment rate may actually be declining, as it is increasingly difficult to find people to fill short-term or long-term positions in the community. Anecdotally, this appears to be due to the fact that the participation rate has dropped further and more eligible workers have left the community in search of work.

Employment growth is forecasted to shift sectors in the coming years (Work BC, 2013[19]; BC Stats, 2011[20]; P'egp'íg'lha Council, 2012[21]). Specifically, health service professions (such as nurses, physicians, dentists and veterinarians), are anticipated to make-up much of the region's new labour growth through 2020 (Work BC, 2013[22]). According to key informants, this trend has a great deal to do with a growing elderly population and a declining number of young families in the region.

Economic Development

Like many First Nation and small resource-based communities in BC, the main challenge that T'it'q'et and Cayoose Creek face is economic growth and diversification.

T'it'q'et and Cayoose Creek have a few private enterprises on their reserves but these are not major employers of their members. Those that do exist include a couple of sole-proprietorships in forestry services, environmental monitoring and services. Off the reserve, T'it'q'et Economic Development Authority (TEDA) currently manages property in the Town of Lillooet (rented to the St'at'imc Tribal Police), the Retasket Lodge and RV Park as well as a Geomatics business. T'it'q'et also has leased mill sites (joint agreement with Cayoose Creek) and is in the process of planning a pellet mill operation for these sites. TEDA also maintains a strong working relationship with the District of Lillooet as well as the other St'at'imc Bands, and there are a number of collaborative opportunities being analyzed at the moment, including: a cultural tourism venture, agriculture development, and financial services.

19 Work BC. (2013). British Columbia Labour Market Outlook: 2010-2020.
20 BC Stats. (2011). British Columbia Trade Occupations Outlook: November 2011.
21 P'egp'íg'lha Council. (2012). 2011 Strategic Economic Action Plan. Prepared by Carden Consulting.

22 Work BC. (2013). British Columbia Labour Market Outlook: 2010-2020.

There are a small number of economic interests located on reserve in Cayoose Creek, including a gas station (owned by a community member), two food services companies, a machining company, and Split Rock Environmental (Band-owned).

Table 12: T'it'q'et and Cayoose Creek Economic Development

Indicator	T'it'q'et	Cayoose Creek
Enterprises	• 2 Sole proprietorships in forestry services & environmental monitoring • TEDA – Landlord for several buildings (Retasket Lodge/RV Park, Tribal Police Station) and manager of GIS business. • Co-Leased Mill Sites	• Landlord for several properties leased to businesses (2 restaurants and 1 machining company) • Band owns and manages Split Rock Nursery • Co-Leased Mill Sites
Development Planning	• Greenhouse development • Energy Planning (wind & solar) • Cultural tourism • Financial services (in conjunction with other St'at'imc Communities)	• Cultural and Agri-tourism • Further diversification of Split Rock Environmental • Economic Development Strategy Completed in 2009 • Will host small business workshops • BC Hydro settlement includes funding for future business development through Cayoose Creek Dev. Corp.

Source: Focus group sessions and interviews, 2012 & 2013

Credit and Insurance

Credit and insurance are important safety nets in times of crisis or growth but are not equally accessible to all First Nations on reserve. Although, no data is available on the number of loans outstanding or the credit rating of community members, it is indicated by respondents that individuals with good credit and/or steady employment and a Band Government guarantee can access home mortgages from the banks relatively easily. Personal or business loans are harder to access but are possible with proven cash flow.

During the 2009 wildfire, community members who were evacuated depended on their Band governments, for example, for fuel stipends and social assistance to pay for relocation costs, as well as their own savings if they had any. There was no indication that credit or insurance was used. The Band Governments also have access to credit through the First Nations Finance Authority for infrastructure, housing and business development as well as for short-term cash flow issues. AANDC also provides grants for emergency response and post emergency remediation in the event of a state of emergency, although the flow of funds can be slow and bureaucratic depending on the circumstances.

Table 13: T'it'q'et and Cayoose Creek Credit and Insurance

Indicator	T'it'q'et	Cayoose Creek
Credit	• Mortgages on-reserve accessible to individuals with good credit, regular job and Band guarantee. • Business loans need proven cash flow and 25% equity • Band Government has access to loans via First Nation Finance Authority and emergency grants via AANDC	• Mortgages on-reserve accessible to individuals with good credit, regular job and Band guarantee. • Band Government has access to loans via First Nation Finance Authority and emergency grants via AANDC

Insurance	• All Band owned buildings, including Band housing, are insured. Many renters do not have rental insurance for personal belongings. • Most homeowners have home insurance or mortgage insurance • TEDA has insurance on rental properties • Band staff have short-term disability and life insurance coverage. Most other members do not.	• Band-owned units have insurance. Most homeowners have insurance. Elders' house insurance paid for by Band. • Hard to get insurance for homes with wood stoves • Band staff have optional disability and life insurance coverage • Cayoose Creek Dev. Corp. has liability insurance for Split Rock Environmental. • Privately held on-reserve contracting company has commercial liability insurance

Source: Focus group sessions and interviews, 2012 & 2013

The Band Councils are required to hold insurance on all of their functioning public buildings and Band owned houses. This appears to be the case in T'it'q'et and Cayoose Creek. Insurance coverage on individually owned houses on reserve is the responsibility of the homeowner. In T'it'q'et most homeowners have home or mortgage insurance but most renters do not have rental insurance to cover their personal belongings. In Cayoose Creek, the Band pays for insurance for band-owned and social housing units (including coverage for fire, flood, and theft), and for Elders living in privately owned homes. Band staff members note that the majority of residents who own their own homes have insurance.
TEDA also holds insurance on its off-reserve properties in Lillooet. Cayoose Creek Development Corporation has liability insurance for Split Rock Environmental.

Band Government staff in both communities are covered for short-term disability and death but it is unknown how many non-staff members have disability or life insurance.

Skills and Education

The communities have a diverse set of skills and education, including traditional skills. There is a basic but sound education infrastructure and some incentives for pursuing post-secondary education. Many members leave for higher education but only some come back due to lack of employment opportunities.

The baseline assessment for skills and education is based on the presence of people in each community with academic, trades, and informal skills training (e.g., chainsaw operation, hunting, camping, food preservation), as well as the presence and use of education infrastructure.

According to T'it'q'et 2006 Census Data, of the working-age population (25-64), 25% had a high school diploma as their highest level of education, 8% had completed training in the trades, 21% a college-level education, and 16% a university-level education. The Census data also shows that between 1996 and 2006, the percentage of the population with some post-secondary education (including trades) has remained fairly constant at 45-55%[23]. Although according to anecdotal evidence, interest in post-secondary education among youth is on the decline

23 There is a keen interest in T'it'q'et to develop education capacity that ultimately promotes self-government: "The community has expressed its desire to expand and coordinate the daycare, pre-school, primary and secondary school curriculums to include additional language and cultural courses that will support self-government, human development and economic development efforts. Greater parent and community participation in the education of T'it'q'et young people is sought at all levels" (CCP 2000, p. 48).

and may suggest why this number has dropped to roughly 32% as of 2012. In Cayoose Creek, of the on-reserve population under the age of 60, roughly 90% have a high school diploma and roughly 50% have completed some post-secondary education[24].

There is a great deal of diversity in both communities with regards to post-secondary training (as opposed to trades), particularly given their relatively small size. In T'it'q'et, members' post-secondary training includes: Kinesiology, Education (including Early Childhood Education and Indigenous Language), Archaeology, Engineering, Economics, Criminal Justice, Police Science, Computer Science, Business Management, and Finance. There is similar diversity in post-secondary training in Cayoose Creek, including: Fisheries, Environment, Forestry, Social Sciences, and Health Care.


Cayoose Elementary School, Lillooet

The types of trades present in T'it'q'et include: Forestry Technician, Nursing, Environmental Assessment, Cooking, Heavy Equipment Operation, Carpentry, Welding, Millwright, Mechanic, Danger Tree Falling, GPS, Flagging and Traffic Management, First Aid, and Firefighting (P'egp'iglha Council, 2012). In Cayoose Creek they include: Heavy Equipment Operation, Firefighting, Flagging, Roofing, Carpentry, and Machine Operation.

There are a number of education opportunities available to people in both communities (academic and trades). For example Thompson Rivers University (TRU) regional campus in Lillooet offers courses on "Business and Office Skills, Computers, First Aid, Personal Development, Tourism and Trades and Technology" (Thompson Rivers University, 2012[25]). T'it'q'et additionally has partnership with NVIT who offers courses on economic development in the community, and the Education department is working to expand course offerings in the areas of trades and environmental sciences. Given the relative location of T'it'q'et and Cayoose Creek, community members can access programs in neighbouring communities (such as Merritt and Kamloops) without needing to travel too far. Cayoose Creek also has a 20-year training agreement in place with BC Hydro slated to begin soon.

Funds are available through AANDC for prospective students wishing to pursue post-secondary education (if they have a high school diploma), however funds are not available through AADNC for individuals wanting to go into trades. In the latter case, staff suggests that prospective students would work with the Band Administration (Education, Economic Development and Social Development coordinators), the Lillooet-based Aboriginal Employment Centre, and other partners such as Service Canada, Interior Salish Employment & Training Society (ISETS), First Nations Employment Steering Committee (FNESC) to find appropriate funds and support, as needed.

Because of the relative concentration of population (First Nation and Non) in the area, there is a fairly sound education infrastructure available in Lillooet. The town has two public elementary schools, a public and private secondary school, as well as an adult learning center, all operated by School District 74. T'it'q'et also operates a daycare and pre-school on-reserve and the Upper St'at'imc have a cultural society that teaches the St'at'imc language.

24 There is no census data on education for Sekw'el'wás to establish trends.
25 Thompson Rivers University. (2012). Lillooet & Lytton.

In terms of more informal or more traditional skills, such as knowledge of hunting, fishing, wildcrafting, food preparation/preservation, camping, chainsaw operation, vehicle operation—skills which are vital in emergency situations—it is reported that in T'it'q'et less than 50% of community members have them[26], and in Cayoose Creek around half of community members maintain these skills (although it was noted during interviews that a much higher percentage of community members benefit from these skills, for example, through food sharing).

Table 14: T'it'q'et and Cayoose Creek Skill and Education Levels

Indicator	T'it'q'et	Cayoose Creek
High School Completion	2006 – 25%	2012 – approx. 90% (under the age of 60)
Post-secondary Completion	1996 – 45% 2001 – 55% 2006 – 45% 2012 – 32%	2012 – approx. 50% (under the age of 60)
Informal Skills[1]	Less than 50%	Approx. 50%
Types of Technical Training	Forestry Technician, Environmental Assessment, Cooking, Heavy Equipment Operation, Carpentry, Welding, Millwright, Mechanic, Danger Tree Falling, GPS, Flagging and Traffic Management, First Aid, and Firefighting	Heavy Equipment Operation, Firefighting, Flagging, Roofing, Carpentry, and Machine Operation.
Types of Academic Training	Kinesiology, Early Childhood Education, Nursing, Archaeology, Engineering, Economics, Criminal Justice, Police Science, Computer Science, Business Management, and Finance	Fisheries, Environment, Forestry, Social Sciences, and Health Care

Source: Focus group sessions and interviews, 2012 & 2013

Table 15: T'it'q'et and Cayoose Creek Skill and Education Infrastructure

Type	Description
Primary & Secondary	• T'it'q'et daycare and pre-school • George M. Murray Elementary • Cayoose Elementary • Lillooet Secondary • Fountainview Academy (private Christian secondary school) • Lillooet Adult Learning Centre (Literacy & high school equivalency) • Upper St'at'imc Language, Cultural and Education Society (St'at'imc language and cultural training)
Post-Secondary	• Thompson Rivers University (TRU) Lillooet Training and Education Centre (primarily technical/practical training) • Nicola Valley Institute of Technology (NVIT) (an aboriginal post-secondary offering primarily technical/practical training for First Nations)

Source: District of Lillooet (2008a)

26 It is also reported that individuals are more likely to have these skills if they have parents or grandparents who have them.

Support for education and training is available to First Nation students in T'it'q'et and Cayoose Creek, although it is relatively biased towards academic education and it appears to be declining relative to the cost of education. Funds are available through AANDC to students (with a high school diploma) for academic stream education. For trades training, applicants need to have graduated grade 12 (or Dogwood), and the program has to be at least 12 months in duration. For trades training, staff indicate that prospective students can work with the Band Administration (Education, Economic Development and Social Development coordinators) and other employment advocacy groups to find appropriate funds and support[27].

Health

T'it'q'et and Cayoose Creek have access to a basic but relatively good health care infrastructure but emergency and acute care is limited. Health concerns in the communities include: diabetes, respiratory issues, addiction and depression. Overall community health seems to be improving with education and changes in diet and lifestyle.

The health baseline assesses the present state and trends in physical and mental health issues in the communities and health infrastructure.

Given the concentration of population around the Town of Lillooet, both T'it'q'et and Cayoose *both* benefit from a basic but relatively good health infrastructure, including:

Table 16: T'it'q'et, Cayoose Creek, and Area Health Infrastructure

Type	Description
Primary & Secondary Care	• 5 doctors • 1 public health nurse • First Nations and Inuit Health Centre[28] with 2 community health nurses • Health Coordinator in T'it'q'et and Cayoose Creek • Regional hospital (six beds) with capacity to do emergency surgeries and provide maternal care
Seniors Care	• 1 long-term/residential care facility (22 beds) • 1 assisted-living facility (10 units)

Source: District of Lillooet (2008b); T'it'q'et and Cayoose Creek Health Departments

As indicated in the above Table, there are five doctors based in Lillooet (including a surgeon and an anaesthesiologist), one public health nurse (Interior Health), two community health nurses (Health Canada; one of whom is First Nations and from the area). Each community also has a Health Coordinator who works with outpatients and coordinates community and public health programming, related to: immunizations, nutrition and diet, medication and chronic disease monitoring and management, screening and awareness-raising (e.g., heart disease, TB), and general health and wellness.

27 Such as, the Aboriginal Employment Centre, Service Canada, New Relationship Trust, Interior Salish Employment & Training Society (ISETS), First Nations Employment Steering Committee (FNESC).

28 A new community health centre is presently being built in T'it'q'et and should be completed by 2014.

There is a small regional hospital (six beds) with the capacity to do emergency surgeries (major surgeries take place in Vancouver or Kamloops) and give maternal care, as well as a First Nations and Inuit Health Centre operated by Health Canada[29]. The Health Centre offers the following services through Community Health Nurses: immunizations and communicable disease control, childbirth education, health promotion and illness prevention, family and community nursing, school and community outreach, and environmental health prevention and education.

There is also a 22-bed long-term care facility and a 10-unit assisted living facility for disabled and/or seniors care. In addition, there are medical imaging, laboratory, dietician, mental health, addiction,[30]and dental care services in the Town of Lillooet.

In terms of emergency response, the local health infrastructure is not equipped to handle more than a few acute or emergency patients at a time. If there were a major emergency, patients would be transported to hospitals further afield (e.g., Kamloops and Merritt - both less than 200km away) by ambulance, since there is no helicopter landing-pad at the Lillooet Hospital. The transportation of patients in such a situation is coordinated by Interior Health/BC Ambulances.


Lillooet Hospital

Both T'it'q'et and Cayoose Creek have a community Health Coordinators, responsible for providing the following services to members: home visits to elderly, chronically ill, disabled and acutely ill patients; wound care management; medication monitoring, administration, and education; palliative care; supervision of personal care aides and family support workers; diabetes management; ostomy care; and, general health education/promotion.

Health Concerns

By and large T'it'q'et and Cayoose are both ageing communities and with this trend comes corresponding health concerns.

The T'it'q'et Health Coordinator notes that the most significant physical health concerns in her community are Type II Diabetes, Arthritis, and Respiratory Illnesses such as Asthma. She suggests that trends in physical health are hard to track given both the improvement of diagnostics and the increasing effectiveness of health promotion/screening campaigns. The physical health concerns are attributed to limited physical activity and diet[31]. The Health Coordinator also reports that there has been a concerted effort to improve community members' diets, and that in the past 10 years significant progress has been made.

29 The Centre serves First Nations communities throughout the region
30 The closest treatment centre is in Kamloops.
31 Diet is said to have improved significantly over the past 10 years or so, after concerted effort on the part of health care practitioners (including incorporating "diabetes friendly" meals into all catering contracts).

Table 17: T'it'q'et and Cayoose Creek Main Health Concerns

Indicator	T'it'q'et	Cayoose Creek
Physical Health Concerns	• Type II diabetes & obesity • Arthritis • Respiratory Illnesses (asthma) • Addiction (prescription drugs & alcohol) - minor	• Type II diabetes & obesity • Respiratory Illnesses (asthma) • Addiction (prescription drugs & alcohol)
Mental Health Concerns	• Depression & Anxiety • Anxiety	• Depression (esp. members 50+ yrs.)

Source: T'it'q'et and Cayoose Creek Health Coordinators; focus group sessions and interviews, 2012 & 2013

The most significant mental health concerns in T'it'q'et are depression and anxiety. These are attributed to the lasting impacts of Residential Schools, workplace injury, trauma, and lateral violence, and can manifest in the form of domestic violence and addiction. Most individuals who are experiencing mental health concerns are currently receiving treatment, including counselling. There have been a few cases of pharmaceutical abuse in the community in recent memory, which have been attributed to over-prescription on the part of health care practitioners. There is also some illegal drug use in the community, however it is "not considered a problem". The Health Coordinator also indicates that some of the older community members are relatively passive with regard to their own health management, expecting the "Avon nurse" to act on their behalf. This is a carry-over from the old health system, which leaders in the community hope will change with the advent of the new T'it'q'et Health Centre and community management of health programming[32].

According to the Cayoose Health Coordinator, the main physical health concerns in Cayoose relate to diet and physical activity (diabetes, obesity, respiratory illness). The main cause is reportedly lack of education around appropriate diet and nutrition, and reluctance to proactively bring physical health care concerns to practitioners. Addiction to prescription drugs and alcohol is present, although there some discrepancy on how big an issue it is. Depression among the population over the age of 50 appears to be the most significant mental health issue.

Agriculture & Food Security

There is very little or no commercial agriculture in either T'it'q'et or Cayoose Creek although there is some subsistence gardening of fruits and vegetables and haying and growing interest in expanding production. Split Rock Nursery and Ucwalmicw Centre are key resources to move this forward although water access is a key limiting factor. Traditional harvesting and preserving of wild foods and medicines is still an important part of the culture and an important contributor to household food security in both communities.

Agriculture

The T'it'q'et and Cayoose Creek Reserve lands lie in a semi-arid environment on steep and rocky terrain or on dry Fraser River benchlands. Most of the agricultural potential on the reserves is located on the benchlands, which are comprised of fine sandy soils subject to high evapotraspiration. Together with a relatively favourable climate at the lower elevations, there is potential for small-scale, community-based agriculture in both communities.

32 Community Health Plan is being updated currently, prior to hand over of community health programming

Examples of potentially successful crops might be grown in the area include: hardy apples, strawberries, raspberries beans, asparagus, tomatoes, lettuce, potatoes, corn, carrots, beets, radishes, peas, onions, leeks, spinach, cauliflower, cabbage, broccoli, turnips, brussels sprouts, swiss chard, cereal grains, and forage crops. Small portions of the land might also support cucumbers, melons, and peppers.

Water access and cost of irrigation is a key limiting factor to agricultural development on the Reserves (despite an abundance of surface and ground water in the district), as is tenure, financial capital and expertise.

There is very little commercial agriculture activity on T'it'q'et or Cayoose Reserve lands, other than the Split Rock nursery on Cayoose IR1[33] and leasehold vegetable farming by a non-First Nation on T'it'q'et IR1B. There are also vegetable gardens, orchards and greenhouses on T'it'q'et Reserve lands and an orchard and several family garden in Cayoose Creek but these are for subsistence not commercial purposes (see Food Security below). There is also some haying on several T'it'q'et reserves to feed livestock (horses) but nothing commercial.

There is interest in T'it'q'et and Cayoose Creek in exploring both commercial and subsistence greenhouse and agroforestry development opportunities on Reserve lands. Cayoose Creek has recently launched a study to examine alley-cropping, integrated riparian management and edible forest gardening / farming (see Map 2 for location in Appendix B). T'it'q'et is interested in exploring commercial greenhouse production on IR1 and IR4 and agroforestry on its land above IR1. This information will be integrated into a new regional agriculture strategy being undertaken by the Ministry of Agriculture and the Regional District.

Crown lands outside the Reserves offer a potential opportunity for agricultural expansion for both communities in the future but this is not pursed at this time[34].

The following tables provide a general land description, a climatic capability classification for agricultural land use, the basic irrigation situation, and current and or historic commercial agricultural use. Specific Soil Capability Classification for each reserve is excluded due to the lack of data to support a classification (with the exception of T'it'q'et Reserve IR #4). Only sections of land suitable for agricultural production are encompassed in the tables below, (i.e., excessively steep and rocky terrain are excluded).

33 Split Rock Environmental is a Cayoose Creek-owned environmental consulting company established in 2008. It focuses on a native plant nursery, environmental services, eco-cultural restoration, value-added products, and community food security. The nursery actively occupies an 864 square meter space, comprised of one greenhouse and two shade houses. Over the next two years, it plans to double in size by adding an extra heated greenhouse as well as an additional shade house. It sells native seeds and operates a small commercial compost operation. Propagation focuses on native plant species and plays a large role in supporting local ecological restoration projects.

34 The Lillooet Land Arability Study was conducted on regional Crown land in 2005. Although the land assessed was exclusive of reserve land, adjacent Crown land is included in the study and, with permission from the Ministry of Agriculture and Lands, could be used to further inform this assessment in the future. The BC Ministry of Agriculture and Lands is also collaborating with the Squamish – Lillooet Regional District (SLRD) and the District of Lillooet (DoL) to create an Agriculture Area Plan for Area B and the DoL. The process is being driven by an Agricultural Advisory Committee (AAC).

Table 18: T'it'q'et Agricultural Land Profile

Reserve	Land Description	Climate Capability Class	Irrigation	Current / Historic Use
T'it'q'et (Main Reserve; IR #1)	• Ponderosa Pine—Bunchgrass Zone • 364 ha • 9 ha of potential suitable agricultural land • Map 2	• Zoned for Agriculture** • Climatic Capability Class: • Class 1b-E*** with irrigation • Suitable for higher value crops with irrigation	• Shortage of sufficient water supply for agricultural expansion • Tyee Jimmy Creek license • Existing springs provide irrigation • New drip irrigation in orchard • Band is exploring Spring near Marriage Rock	• Community Garden (C/H): • 0.4 ha (C) • Community orchard (C) • Greenhouse (C) • Extensive vegetable farming (H) • Hay production occurs on gentler sloped sides (C/H) on upper section
Lillooet (IR #1A)	• Ponderosa Pine—Bunchgrass Zone / Interior Douglas Fir Zone* • 797 ha	• Not zoned for Agriculture • Designated as a Forestry Zone	• Not irrigated	• Jointly held with the Bridge River Band
Speipiukw Riley Creek, Napoleon Ranch (IR #1B)	• Ponderosa Pine—Bunchgrass Zone* • 31 ha	• Small area zoned for Agriculture** • Climatic Capability Class: • Class 1b-E*** with irrigation • Suitable for higher value crops *with irrigation*	• Infrastructure and water license on Riley Creek	• Hay production occurs on gentler sloped sides (C/H) • Currently, land is being leased for high value vegetable production with a Lower Mainland farmer
Txwin'ek -- Texas Creek (IR #2)	• Ponderosa Pine—Bunchgrass Zone* • 90 ha	• Zoned for Agriculture** • Climatic Capability Class: • Class 1b-E*** with irrigation	• Water license on Towincock Creek	• Hay production occurs on gentler sloped sides (C/H)
Skweisut -- Hickson Flat, Napoleon Ranch (IR #3)	- Ponderosa Pine – Bunchgrass Zone* - 42 ha Steep terrain	- Zoned for Agriculture** - Climatic Capability Class: • Class 1b-E*** with irrigation • Suitable for higher value crops	• Needs expansion of irrigation capacity	- Hay production occurs on gentler sloped sides (C/H)
Qwixen -- McCartney Flats (IR #4)	- Ponderosa Pine – Bunchgrass Zone - 171 ha total Approximately 70 ha	- Zoned for Agriculture** - Climatic Capability Class: Class 1b****(*with irrigation,*	- No agricultural irrigation - Shortage of sufficient water supply for agricultural expansion** - Current springs no longer	- Tobacco (H) - Tomatoes (H) - Grazing and forage production (C/H)

	potential for agriculture	*highest in Lillooet)* - Soil capacity rated 5M (2x) – minor limitations e.g., terrain, stoniness, and shallowness Significant agricultural potential *with irrigation*	-	producing ample water - The band has water rights on Brown Creek; and is investigating a well source for a gravity fed system - Fraser River pumping feasibility study conducted	
Sk'emqin - -Seton Lake (IR #5)	Negotiating Land	- Current reserve not zoned for agriculture Current reserve has little or no agricultural potential	NA		NA

Notes: *This is based on the basic Biogeoclimatic (BEC) classification system and does not include subclasses and variants; ** T'it'q'et Land Use Plan (2002) designates part of this land for agriculture; ***Class 1b-E, Climatic Capability Classification (this land has no significant production limitations [Class 1b] although it suggests that cold winter temperatures may be a limiting factor [subclass E] for some perennial crops [the freeze free period is greater than 150 days; growing degree days above 5C is 1780 to 2059]; ****Class 1b (based on the Climate Capability Classification for Agriculture in BC): This land has no significant production limitations (Class 1b). The freeze free period is greater than 150 days; growing degree days above 5C is 1780 to 2059
(H): Historic use; (C): Current Use.

Table 19: Cayoose Creek Agricultural Land Profile

Reserve Name	Land Description	Climate Capability Class	Irrigation	Current / Historic Agricultural Use
IR#1	• Ponderosa Pine—Bunchgrass Zone* • 116 ha total • Series of terraces • Low terraces, which occasionally flood; small pockets of soil suitable for gardening • 2 small areas set aside for future agricultural activity • Small terraces: 10 ha	• Zoned for Agriculture** • Climatic Capability Class: 1a-F*** when irrigated • Low terraces, which occasionally flood; small pockets of soil suitable for gardening • Higher terraces are suitable for intensive agriculture (e.g., vegetable) and agroforestry production with adequate irrigation	• Lower terraces sometimes flooded • Well, existing reservoir (Copeland Brook) and distribution system present opportunities for adequate water supply for small scale development • Expensive to irrigate on a per acre basis	• Numerous old orchards (H) present • Tobacco (H) • Beans (H) • Potatoes (H) • Grains (H) • Grazing and forage production (C/H)
IR#2/ IR#2A (Pasilqua)	• Interior Douglas Fir Zone* • Pasilqua: 4 small fields (approximately larger than 1 ha each) • Blue Hill: 2 areas (10-12 ha each) • Additional area	• Zoned for Agriculture ** • Climatic Capability Class: Class 1a-F*** *when irrigated* • Better soils could be used for higher value crops: orchard or cash crop production (e.g., tomatoes, corn,	• Numerous springs available, both developed and undeveloped • Several springs occur on first usable bench ~250m above river • Pasilqua has water access, and could be irrigated by pumping existing springs	• Smallholder agriculture and forestry (H) • Grazing and forage production (C) • Agroforestry site near

	designated by Split Rock in 2013 for Agroforestry (approx. 19 ha)	etc.) • Most soils are very rocky and less suitable • Blue Hill: Suitable for grazing and forage production	• Blue Hill: Requires establishing small irrigation systems on hillside springs	Blue Hill (see Map 3) is being developed to facilitate production of berries, herbs, wild onions (and other bulbs) within forest

*This is based on the basic Biogeoclimatic (BEC) classification system and does not include subclasses and variants.
**Cayoose Creek Physical Development Plan (1994) designates part of this land for agriculture
***Class 1a-F, Climatic Capability Classification (based on the Climate Capability Classification for Agriculture in BC): This land has no significant production limitations (Class 1a) although an occurrence of minimum temperatures near freezing has potential to adversely affect plant growth during the growing season (subclass F). The freeze free period is 120 to 150 days; growing degree days is 1505 -1779.
(H): Historic use; (C): Current Use

Food Security

The concept of Food Security relates to the affordability, access, quality, and cultural appropriateness of food within a given community or food system. For the purposes of this analysis we focus our analysis on local food infrastructure, engagement trends in the local food system, and local food sources.

In recent years there has been growing interest in T'it'q'et and Cayoose Creek in food security, linked both to cultivation but also to traditional wild foods restoration and harvesting.

Cultivation

In T'it'q'et a core group of people have been working hard to increase the community's food security. The community counts on significant "food infrastructure", which includes: a community garden, orchard, smokehouse and root cellar, all of which are coordinated by the Ucwalmicw Centre Society[35] (based on the main reserve)[36]. Aside from providing community members and Elders with fresh organic produce year-round, the community's food infrastructure also provides opportunities for people (and particularly youth, who can take part in internships through the Ucwalmicw Centre) to engage in the local food system and reconnect with the land[37]. The resurgence in local food cultivation builds on older community members' childhood experiences of working in gardens with their parents during their summer break from Residential School. As many as 40% of community members actively garden (or benefit from local gardens)—either through the Ucwalmicw Centre's garden and orchard or their own household gardens. Factors inhibiting a greater resurgence in gardening are

35 The Ucwalmicw Centre also "offers counselling services in the areas of drug and alcohol abuse, sexual abuse, violence and suicide" (T'it'q'et, 2000, p. 38).
36 There is also a community Seed Bank in the town of Lillooet.
37 The Ucwalmicw Center supports many community driven agricultural initiatives, including a community garden, orchard, greenhouse, and root cellar. It is also organizing a college accredited horticulture course through Thompson Rivers University (TRU). This program is in development and will represent substantial agricultural capacity building and skills training opportunities.

stable access to water (some community members express difficulty accessing reliable water in the summer and the price of seed/seedlings (which used to be provided to community members by the Band).

With respect to gardening in Cayoose, while there is increasing interest gardening[38] and roughly 15% of households currently cultivate gardens, poor conditions (e.g., rocky soil, changing climate) impact people's ability to grow, and the limited community infrastructure (e.g. one private orchard shared with community members) limits opportunities for collaboration and sharing (purchasing inputs, weeding, processing). Split Rock Nursery however, a commercial nursery owned by the Cayoose Creek Band has the capacity to supply native plant species for restoration work and local gardens.

Both communities additionally can utilize resources based in the town of Lillooet, such as a local seed bank (Lillooet Seed Savers) and the summer Farmers' Market.

Table 20: T'it'q'et, Cayoose Creek, and Area Food Infrastructure & Engagement in Food System

Indicator	T'it'q'et	Cayoose Creek (households)
Cultivation Infrastructure	• Community Garden • Orchard • Greenhouse • Smokehouse • Root cellar • Ucwalmicw Centre Society (cultivation programming) • Lillooet Seed Savers • Lillooet Farmers' Market	• Private Orchard • Split Rock Nursery • Lillooet Seed Savers • Lillooet Farmers' Market
Activity	• 10-40% involved in gardening • 1 leasehold vegetable farmer (non-FN) • 50-75% fish • 30-50% hunt • 30-50% collect	• 15% maintain household gardens. • Split Rock Nursery • 90% fish • 75% hunt • 25% collect

Source: Focus group sessions and interviews, 2012 & 2013

The community of Lillooet also has pertinent projects and utilities that may be used collaboratively. Lillooet Food Matters is a local initiative that could inform as well as benefit from climate change adaptation planning. They currently operate Seedy Saturday, which facilitates local seed sharing, and are developing a Lillooet Seed Bank and Library of locally adapted seeds. These examples are listed here to demonstrate the necessity for collaboration and open communication over time and across boundaries to ultimately benefit agricultural planning and inform climate adaptation initiatives.

Wild Foods

Wild foods remain culturally important sources of nourishment and medicine in T'it'q'et and Cayoose Creek, and community members report that fishers, hunters, and collectors continue to share their bounty with family members and Elders who are unable to fish or hunt themselves. In fact, it was noted more than once during

38 One of the main instigators of the resurgence in local cultivation is concerns about the quality of store-bought foods in terms of contamination and genetically modified foods.

interviews/focus groups that virtually every household has either fish or game meat in the freezer courtesy of one or more fishers, hunters, or collectors in the family.

Approximately 30-50% of T'it'q'et members and 25% of Cayoose members participate in gathering wild plants in the region. The types of roots, plants and berries that they collect tends to cycle over time (e.g., currently, a lot of people are picking Saskatoon, Soap and Huckleberries). Community members suggest that while collecting seems to be on the rise, it fluctuates depending on family commitments. One other factor impacting collecting seems to be availability and access to collection sites. A massive forest fire in 2009 and the general decline of the forestry industry in the region meant that people have to go further afield to access some wild foods, and they can no longer "hitch" rides with local logging truck drivers to preferred picking sites.


T'it'q'et Community Member Harvesting Plants

Approximately, 30-50% of T'it'q'et members and 75% Cayoose Creek households hunt on a seasonal basis (of whom the majority are under the age of 45). While there seems to be more "talk" about hunting, particularly among younger male adults, there is a lack of certainty as to whether hunting is coming back or if the numbers of hunters is on the decline. There is much more clarity around fishing, and fish protein continues to be a mainstay in the local diet of T'it'q'et and Cayoose members—despite commonly expressed concerns around the quality of the water in the Fraser River and elsewhere. Between 50-75% of members in T'it'q'et and 90% of households in Cayoose Creek actively fish (numbers which have been fairly constant), providing food for the majority of households in the communities. It is also reported also that more younger girls/women are taking up fishing.

The rate of activity in local cultivation and wild food harvesting appears to be as much to do with perceived high cost of commercial foods, as it is culture. Community members indicate that they garden or collect wild foods because their families have done it in the past but they also do so to offset the costs of store-bought food in Lillooet, which they perceive as expensive. Despite perceptions, a majority of community members in T'it'q'et and Cayoose communities continue to rely on local grocery stores (in Lillooet) and bulk food stores (in Kamloops) for the majority of their foodstuffs.

In terms of the food quality, community members expressed some concern about the levels of contamination in the Fraser River and Seton Lake and the impacts on fish. There is also some concern around the quality and health of food from grocery stores. Concerns appear to have had little impact on household fishing and purchasing behaviours but they have impacted the purchasing practices of the Band office in terms of what foods are supplied during meetings.

Shelter and Infrastructure

Housing has some climate-related short-comings and is in short supply in T'it'q'et but is fairly sound. Housing is in poor condition but demand is low in Cayoose Creek. Public buildings and infrastructure are in good general condition in both communities, although water systems have no back-up options and little capacity for fire protection. Geology makes road integrity challenging to maintain and both communities are vulnerable to erosion and flooding.

Housing

In T'it'q'et, there are 106 housing units[39]. Of these, 56 are CMHC homes while the rest (50) are Band-owned, rental units, or other (of the remaining 50, 21 are rental, 44 are rental/purchase, and 11 are occupied by non-T'it'q'et members). Overall, housing in T'it'q'et is deemed to be in "adequate condition".

There is reportedly substantial variation in upkeep and maintenance of on-reserve housing. The T'it'q'et Housing Coordinator reports that Band-owned units are regularly inspected (once per year by Band staff and every 2-3 years by CMHC), while privately owned homes do not have regular inspections and often fall into disrepair[40]. Band staff members, however, are available to assist homeowners who have concerns, and new homeowners are provided with resources to help them understand the maintenance needs of their homes. According to the coordinator, the main issues with the current social housing stock are: leaks, decking (issues with "duradeck"), stair treads wearing, weather stripping coming detached (attributed to high wind speeds), and drafty windows. Given the aging local population, accessibility of housing is also considered an increasingly important issue; at present, nine individuals with mobility or other health issues are living in housing that is not considered "accessible". There are currently 54[41] individuals on a housing waiting list in T'it'q'et, however there are only plans to build four homes per year in each of the next two years[42].

The housing situation in Cayoose is much more precarious. There are a total of 32 housing units in the community: 4 are privately owned (these are homes that were constructed and financed by owners independently of the band); 13 are CMHC-built homes (5 of which are rental units in a five-plex); 5 are INAC-built homes; and 9 units are old social housing units with mortgages that have since been paid off (6 have been given to the families who lived in them since construction). Almost all of the homes in the community are in very poor condition, and many suffer from issues with mould, weak foundation and poor water drainage. There is a great need in the community to improve housing conditions however there are no current development plans.

In Cayoose Creek a part-time housing manager has recently been hired. At the time of writing she had yet to draft a maintenance schedule. The housing manager reports that community housing is inappropriate for both the local climate as well as cultural use. There is currently a housing waiting list of 4 people.

Both communities' housing infrastructure face challenges with the current climate, including:

39 Note: duplexes are considered one unit; nine of the band-owned units are market rentals; and, there are approximately 3-5 non-members living in T'it'q'et.
40 When individuals purchase homes they are given a suggested maintenance schedule.
41 The housing coordinator reports that of the 54 people on the waiting list, roughly 30 are currently living off-reserve and are unlikely to immediately move back should they be offered housing, leaving some 20 people.
42 After the eight serviced lots are built on, there are no immediate plans to develop other lands on the main reserve or on others until such time that water is available.

- Higher heat conditions are causing decks and window frames to wear out fast
- Existing roofing materials (asphalt shingles) are not doing well against the strong winter winds and very hot summers (shingles are curling). The material should be more reflective of the summer sun and more rigid to sustain the winds.
- Roof overhangs should be wider to deal with the summer heat (let less direct sunlight into windows and onto the house walls)
- Air conditioning is needed in all homes due to intense summer heat
- Some houses need to be equipped with ramps or lifts for elders and members with disabilities
- Some large Band homes have only 1 or 2 people living in them, because their children are gone ("empty nests") and need to be converted into duplexes to accommodate more people
- All homes should be equipped with a wood stove to reduce heating costs and in case of power outages

Table 21: T'it'q'et Housing

# of Current Units	Condition	Maintenance	# of Units Deficient
104	Adequate	Regular	54

Source: T'it'q'et Housing Department

Table 22: Cayoose Creek Housing

# of Current Units	Condition	Maintenance	Waiting List
32	Poor to Very Poor	Almost none	4 people on waiting list

Source: Cayoose Creek Housing Department

Public Buildings

In T'it'q'et, most of the Nations' public buildings are located within the community of Lillooet 1, and were constructed between 1973 and 2000. [43] There are 6 public buildings, (not including storage, water treatment, water distribution-related buildings) that provide services for membership, as summarized in Table 13. The current condition of buildings reflects ongoing and diligent maintenance. The computer room/electrical room in the Band Office requires venting to relieve heat build-up and the Cultural Centre has some fire code deficiencies but generally all but the storage buildings, are worthy of periodic maintenance (structures have estimated lives exceeding 10 years but generally 25 to 30 years remaining life).

Table 23: T'it'q'et Public Buildings

Public Building	Description	Current Vulnerability	Est. Remaining Life
Band Office	1995 construction, cedar siding, metal roof	Computer room prone to heat build-up	25 years – condition 8 on a scale of 1 to 10, 10 high
Preschool	1999 construction	Well maintained	30 years – condition 9 on a scale of 1 to 10
Daycare Facility	2000 construction	Install panic hardware, canopy on west side of building for shade	30 years – condition 9 on a scale of 1 to 10
Cultural Centre	1994 constrcuction	Some fire code deficiencies	30 years – condition 8 on a scale of 1 to 10
Community Centre	1973 construction (former school)	Could benefit from improved ventilation	10 years – condition 5 on a scale of 1 to 10

43 Genivar, 2011, INAC 2010-2011 Asset Condition Rating System (ACRS) Buildings and Infrastructure, pages 23-29

Community Hall	1973 construction	Assembly hall function may justify structural review or review of evacuation procedure	10 years – condition 5 on a scale of 1 to 10

Source: 2011 ACRS Building and Infrastructure report prepared by Genivar

In addition, there is a water pumphouse at the Lillooet 1 (reserve), a water treatment/pump house at Seton Lake 5 (reserve), a water treatment/pump house at McCartney's Flat 4 (reserve) and water pumphouse at Towinock 2 (reserve). With the exception of the Towinock 2 pumphouse, which is a small wood-framed buildings requiring some maintenance, all structures are well maintained and in serviceable condition.

T'it'q'et has three storage facilities at Lillooet 1, and one at McCartney's Flat 4 of which only 3 appear worthy of periodic maintenance; the "Tin shed" storage warehouse built in 1980 is vulnerable to high winds and is missing sections of its roof and functional doors on both ends of the building. The two Quansit hut metal storage buildings (1 at Lillooet 1 and 1 at McCartney's Flat 4) have an estimated life span of 15 years and the brick garage, which may require re-roofing, has an estimated life span of 3 years.

The Cayoose Creek public buildings (see Table 16) include the band office, Split Rock Environmental office and greenhouses at Cayoosh Creek 1. It is understood that these buildings are in good condition and are maintained by operating and maintenance staff. The water pumphouses at Cayoosh Creek 1 and Pashilqua 2 are well maintained and are in serviceable condition.

Table 24: Cayoosh Creek 1 Public Buildings

Public Building	Description	Current Vulnerability	Est. Remaining Life
Band Office	1990+/- construction, cedar siding, metal roof	Well maintained, some air leakage at windows	30 years – condition 8 on a scale of 1 to 10, 10 high
Split Rock Environmental	Unknown Manufactured Building construction	Building materials susceptible to heat deterioration	20 years – condition 7 on a scale of 1 to 10

Source: Anecdotal information – ACRS report would contain detailed information

The periodic inspection of these buildings required by AANDC requirements for the Capital Asset Inventory System (CAIS) provides a means to prioritize improvements, particularly those that impact public safety (such as fire doors and panic hardware on exit doors). The most recent ACRS report lists current deficiencies in detail, together with cost estimates for most replacement items; this information provides baseline data to assess the current capacity of operating and maintenance (O&M) personnel, to prioritize and undertake necessary repairs. CAIS and ACRS information should be reviewed and upgraded to include all buildings that may provide a public function, as part of an integrated risk management strategy. Given consideration of public building condition within the context of listed climate change impacts (refer Housing), it may be prudent for each Nation to consider expanding upon its own building inspection and maintenance / repair capacity.

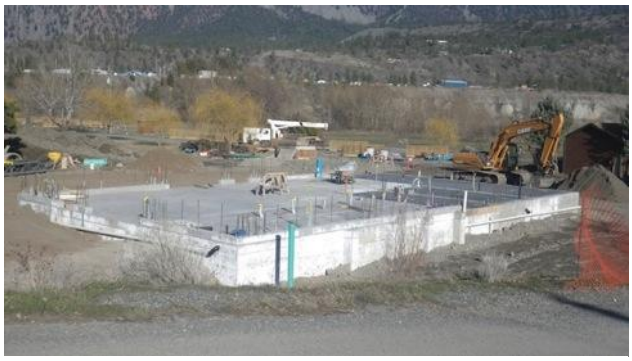
Infrastructure

Infrastructure for T'it'q'et and Cayoose Creek communities includes water supply and distribution equipment and access roads, both of which are critical for community health and safety. There is also functional sewage disposal, energy supply (from BC Hydro) for heat and power, telecommunications and storm water collection facilities (culverts and ditches) within each community; these infrastructure components appear less problematic or vulnerable under current conditions than water supply/distribution and access road infrastructure.

The local Lillooet geology reflects large-scale disturbances in recent history (within 1000 to 1400 years ago) that have left marginally stable slopes in some locations affecting roads, and extensive terrace deposits and underground water courses that affect water supply availability. A basic understanding of the local geology, therefore, provides a useful context for identifying vulnerability of infrastructure under current conditions.

The T'it'q'et reserves at Lillooet 1, Towinock 2, McCartney's Flat 4, and Seton Lake 5 are all equipped with water supply and distribution infrastructure. A description of individual system components including age, condition, and functional capacity under current conditions is tabulated below; additional information, photographs, and drawings are included as Appendix C. T'it'q'et residents at Kilchult 3 and Riley Creek 1B operate private water systems supplied by creeks mandated by appropriate Water Licences.

At Lillooet 1, potable water is supplied to the community from the District of Lillooet, via a Pressure Reducing Valve (PRV) station located on Mountview Road. The T'it'q'et O&M staff regularly liaise with District Public Works staff but could cooperate more fully in the maintenance of the PRV station, since its proper function is critical to the security of the water distribution system that services the main T'it'q'et community.


New District water system under construction

The District of Lillooet currently blends water from three water supply sources; Town Creek, Dickie Creek, and depending on time of year, a well located at the Recreation Centre. During spring runoff conditions, the turbidity in Town Creek and Dickie Creek surface water increases dramatically forcing the District Public Works to let water flow past the intake works and draw more heavily on the groundwater, as they try to balance water demands with the relatively limited supply that can be realized from the Recreation Centre well.[44] Former wells referred to as Conway Park #1 and #2 are not utilized since Arsenic levels in the water exceed Canadian Drinking Water Guidelines. The supply of water containing sediment (turbidity) frustrates the District's ability to disinfect the water supply (water is provided under Boil Water Advisory) but also introduces sediment into the distribution system and the elevated storage reservoir at Lillooet 1. The increased amount of sediment in water piping increases maintenance requirements on the Variable Frequency Drive (VFD) pumps in the community booster pumphouse and all associated PRV equipment and flow-control valves. Malfunction of the District PRV station on Mountview Road could either restrict flow to the Lillooet 1 distribution system or could over-pressure the system resulting in localized water piping failures, particularly at service connections to buildings.

As a result of the local geology, water piping leaks may be very difficult to locate, since lost water can flow underground along preferred paths. This was experienced in 2011-12 when water diversion in the Town Creek

44 True Consulting Group, April 2008, District of Lillooet Master Water Design Plan, pages 13-16

watershed upslope at Lillooet 1 infiltrated the ground but re-appeared further down-gradient as seepage emerging from escarpment slopes along Mountview Road.

As the Town Creek and Dickie Creek watersheds are substantially located on T'it'q'et land, and historically the T'it'q'et have maintained Water Licences on volumes available from Jimmy Diversion (Dickie Creek directed into Town Creek Watershed), there is an opportunity for partnership arrangements between T'it'q'et and the District pertaining to future water supply improvements. These improvements could investigate ways to reduce sediment load in the collected surface water, through watershed re-vegetation and creation of temporary storage. Re-vegetation of the watershed poses a large challenge, particularly due to the frequent recurrence of fires that denude the slopes exacerbating land sliding and erosion that elevate sediment delivery into Town Creek. The T'it'q'et community have supported a District initiative to develop a new water treatment plant to supply additional treated water acquired from new wells drilled in vicinity of Seton River / Cayoosh Creek.[45]

The T'it'q'et distribution system that pumps water from the lower community level up to an elevated in-ground storage reservoir that develops the gravity pressure zone for the Upper bench subdivision of Lillooet 1 reserve is inefficient, considering a gravity supply from the Town Creek watershed appears feasible. Future discussions surrounding water supply sources appear necessary, in the context of watershed restoration, fire suppression considerations, and future agricultural water supply requirements. The current deficiency in the level of fire protection within Lillooet 1 could be alleviated by such a gravity connection and additionally connecting the existing Lillooet 1 distribution system back into the District's water system where it is available along a new road constructed beside the Lillooet Secondary School on Columbia Street.

The fire in 2009 substantially denuded the Town Creek watershed, which has reduced both storage capacity and time of concentration for rainfall / snowmelt water to flow from the top end of the watershed to its main outlet point above Lillooet. This fire highlighted the on-going and increasing risk of forest fire in the Lillooet area, as well as the need for fire suppression preparedness and emergency water supplies. It also highlighted a vulnerability to flooding that currently affects both Lillooet 1 reserve and the District. Currently, the District is upgrading the capacity of their storm drainage collection system to route floodwaters through town, in a race to avoid the widespread flooding that resulted from the spring freshet in May 2012.[46]

Water supplies in Towinock 2 and McCartney's Flat 4 rely on groundwater wells of sufficient capacity to meet current community demands for domestic water, but the water is un-treated and periodically must be consumed under Boil Water Advisory conditions. Fire protection considerations, however, suggest an ongoing need to review the security of water supply (since groundwater levels fluctuate through the year) and alternative means to supply water to the potential sources of fire, either originating as house fires or brush/forest fires. Water supply at Seton 5 is from Seton Lake with modern treatment (ultra violet disinfection) and chlorination facilities available for supply of potable water. All T'it'q'et water supply, treatment, distribution and storage facilities appear well maintained by qualified O&M personnel. Historic water rights in the Lillooet Region offer the opportunity to revisit alternate water supply sources for emergency water supplies or agricultural requirements.

45 True Consulting Group 2011, District of Lillooet Water System Source Replacement Detailed Project Description
46 The Bridge River Lillooet News, May 2012; http://www.lillooetnews.net/article/20120523/LILLOOET0101/305239994/-1/LILLOOET/town-creek-flooding-expected-to-peak-next-week

Table 25: T'it'q'et water supply / distribution Infrastructure

Infrastructure Component	Description	Current Vulnerability	Est. Remaining Life
Lillooet 1 Water Distribution Piping (lower community)	1682 lineal metres of 150mm and 200mm diameter pipe constructed 1995	PRV at Mountview Road could malfunction causing pipe connection failures	PRV station 20 - 40 years depending on maintenance
Lillooet 1 Water Distribution Piping (upper bench)	3462 lineal metres of 150mm and 100 mm diameter pipe constructed 1994	Size of pipe and reservoir storage insufficient for adequate fire protection	VFD pump impellors may last <10 years due to abrasion, 370,000L concrete reservoir 50 years – piping 80 years
Towinock 2	Pumphouse (spring), reservoir and 535 lineal metres of piping (1986-1988) irrigation water	No water treatment, insufficient storage for adequate fire protection	15 years on well, 20 years pumphouse, 50 years concrete reservoir, 60 years piping
Towinock 2	1 well, 5000 litre concrete reservoir and 715 metres of piping (1999) and 1 well and 270 metres of piping (2003)	No water treatment, insufficient storage in underground reservoir for adequate fire protection	40 years well, 40 years pumphouse, 70 years piping, 50 years reservoir ; 45 years well, 70 years piping
McCartney's Flat 4 (6 mile subdivision)	1 well, 30,000 Igallon concrete reservoir, treatment building (1989) and 575 metres of piping (1981)	Water disinfected (UV treatment inactive) insufficient storage for adequate fire protection	35 years well, 20 years treatment building, 35 years reservoir, 50 years piping
McCartney's Flat 4 (East of Hwy 12)	Submersible pump in concrete chamber (spring), 3500 litre concrete reservoir, 517 metres piping (1998)	Water supplied under Boil Water Advisory, insufficient storage for adequate fire protection	5 years gravity intake and chamber, 5 years reservoir, 30 years piping
Seton Lake	Concrete treatment plant building (1989) 132 metres piping	Insufficient storage for fire protection, no draughting equipment to draw from lake apparent	20 years pumphouse and chlorinator, 30 years lift station, 30 years piping

Source: 2011 ACRS Building and Infrastructure report prepared by Genivar

The Cayoose Creek reserves at Cayoosh Creek 1 and Pashilqua 2 are also equipped with water supply and distribution infrastructure.[47] At Cayoosh Creek 1, un-treated water (that contains arsenic within allowable federal limits for drinking water) is supplied from a single well to an elevated water reservoir that establishes the pressure zone for the community and sufficient volume and pressure is available for 1 hour fire protection (2 hour protection to supply a typical fire pumper truck is the normal Fire Underwriter Survey standard for minimum fire

47 Neegan Burnside Ltd, 2012, Cayoose Creek National Assessment of First Nations Water and Wastewater Systems

protection).[48] A second well has been drilled near Split Rock nursery, but has not been connected to the water distribution system. Pashilqua 2 reserve utilizes a groundwater supply fed from surface runoff (drawn from an infiltration gallery) that is pumped into an elevated reservoir that furnishes adequate volumes for domestic water demands currently, but is reported to be marginally adequate to sustain future domestic demands.

Table 26: Cayoose Creek water supply / distribution Infrastructure

Infrastructure Component	Description	Current Vulnerability	Est. Remaining Life
Cayoosh Creek 1	Well (1980) and pumphouse (1985), 280,000 litre underground concrete reservoir and 2875 lineal metres of 150mm and 200mm diameter pipe constructed 1988	Well water is not treated or disinfected and contains arsenic, available reservoir storage provides +/ 1 hour fire protection. Well is located within 1:200 year floodplain of Seton River/Cayoosh Creek	30 years well and pumphouse, 40 years reservoir, 60 years piping
Pashilqua 2	Infiltration gallery, control building (1990), 133,000 litre underground concrete reservoir and 3210 lineal metres of 300mm cast iron (section for chlorine contact time) 150mm and 100 mm diameter pipe constructed 1990	Water disinfected (sodium hypochlorite) insufficient storage for adequate fire protection, unknown capacity of infiltration gallery and reservoir capacity is deficient of 2019 projected demand	30 years lift station at infiltration gallery, 23 years control building, 45 years reservoir, 60 years piping (65 years piping for Blue Hill road piping constructed in 1997)

Source: 2010 National Assessment and ACRS Infrastructure report prepared by Neegan Burnside

Although water supplies for both Nations appear currently adequate, fire suppression capabilities rely heavily on existing Service Agreements with the District of Lillooet Fire Protection Services, which in most cases require revisioning. Opportunities exist to update fire suppression equipment, equipment storage sheds, and capability to draught water from accessible surface water supplies (Seton Lake, Cayoosh Creek, Fraser River, BC Hydro Seton Canal) or alternate emergency water supplies (wells or streams) to consider ways to increase the complement of available resources in times of fire emergency.

T'it'q'et reservation Lillooet 1 discharges collected wastewater from their sanitary sewage infrastructure (3905 lineal metres of piping constructed 1999-2004) into the District sewer system under a Municipal Type Servicing Agreement (MTSA). All other T'it'q'et and Cayoose Creek communities rely on septic tank treatment and dispersal to in-ground disposal fields (septic fields). As the ground conditions in the Lillooet area are very amenable to this form of treatment, these existing systems function quite adequately. At Lillooet 1, a propane-fuelled generator will evacuate the sewage lift station during periods of power interruption.

48 CGI Group Inc., 1999, Water Supply for Public Fire Protection; http://www.scm-rms.ca/docs/Fire%20Underwriters%20Survey%20-%201999%20Water%20Supply%20for%20Public%20Fire%20Protection.pdf

Power to T'it'q'et and Cayoose Creek communities is delivered by BC Hydro via overhead lines and maintenance of poles, transformers, and distribution lines is carried out by BC Hydro and their authorized contractors. There appears to be no back-up power on either the T'it'q'et or Cayoose Creek water supply systems.

As the local geology in the Lillooet region includes marginally stable areas that are susceptible to slope movement under adverse rainfall conditions, both T'it'q'et and Cayoose Creek maintain community access road systems that contain sections where periodic maintenance costs could become restrictive. As capabilities to complete construction activities within each community increase, development of road maintenance capacity would benefit the security of the communities relying on these road systems, particularly during periods of emergency.

Table 27: T'it'q'et access road Infrastructure

Infrastructure Component	Description	Current Vulnerability	Est. Remaining Life
Lillooet 1	6630 lineal metres of paved road, 350 metres of gravel access road to reservoir site	Crack sealing required for paved road some areas	10 years pavement, 40 years gravel base , 20 years on gravel road to reservoir site
Towinock 2	300 lineal metres of gravel road access west of Texas Creek Road to Well #2	Needs gravel placement and grading	20 years gravel road
Towinock 2	600 lineal metres of gravel road access to reservoir from Texas Creek Road (1999)	Cutslope prone to sloughing, needs gravel placement	15 years gravel road
McCartney's Flat 4 (6 mile subdivision)	310 lineal metres of surface treated road (1990-1991) construction	Needs surface repairs and re-sealing	10 year (Fraser Crescent) and 20 year life expectancy
McCartney's Flat 4 (East of Hwy 12)	43 lineal metres of gravel road	Cutslope prone to sloughing, needs gravel placement	20 year gravel road
Seton Lake	270 lineal metres of paved road (1993)	Timber retaining wall at upslope road side needs replacement, pavement needs crack sealing	15 years pavement 40 years gravel base

Source: 2011 ACRS Building and Infrastructure report prepared by Genivar

Specific to the Cayoose Creek reserve located downslope of the Seton Canal that delivers water for BC power generation in Lillooet, there is a perceived vulnerability of flooding should the canal structure become structurally compromised. This could occur if there was a sudden water level increase in Seton Lake that overwhelmed BC Hydro's ability to manage the influent water volume at the canal entrance, or if the canal itself was to leak or breach from a structural failure. It is understood that vulnerable sections of the canal have been identified and monitoring equipment is in place to detect leakage; this represents an opportunity through the Bridge River

Water Use Plan to increase capacity for canal maintenance, monitoring and emergency planning for Cayoose Creek membership.[49]

Table 28: Cayoose Creek access road Infrastructure

Infrastructure Component	Description	Current Vulnerability	Estimated Remaining Life
Cayoosh Creek 1	Approx. 800 lineal metres of gravel road south of Hwy 99 and 300 lineal metres of gravel road north of Hwy 99	Needs gravel, ditching and grading	20 years gravel road
Pashilqua 2	20 – 25 km paved road (Blue Hill Road) and 25-30 km gravel access road to pumphouse and reservoir	Cutslope prone to slope failure and ditch obstruction, pavement needs crack sealing, gravel access needs grading and gravel	15 years pavement, 40 years gravel base, 20 years gravel road

Source: 2010 National Assessment and ACRS Infrastructure report prepared by Neegan Burnside

49 BC Hydro, 2011, Bridge River Power Development Water Use Plan; http://www.env.gov.bc.ca/wsd/plan_protect_sustain/water_use_planning/cabinet/bridge_river_wup_17Dec2010 .pdf

Emergency Preparedness

Both communities face risk of wild fires but Cayoose Creek IR1 is particularly vulnerable to flooding due to its proximity to the Fraser and Seton rivers and the BC Hydro diversion canal. T'it'q'et is fairly well prepared, trained, and equipped for emergencies; whereas Cayoose Creek is probably under-resourced. Both communities are tied into the Town of Lillooet's emergency response system although it unclear how well integrated they are.

The emergency preparedness baseline focuses on the presence of plans, trained emergency response personnel and equipment; previous experience with emergency management; relations with neighbouring communities to access resources; and, the presence and use of emergency communication tools.

Given their relative proximity to one another, T'it'q'et and Cayoose face similar natural hazards, specifically wildfire and flooding—the exception being a potential flood downstream at the BC Hydro facility on Seton Lake, which would have a far more serious and immediate impact on Cayoose Creek members.

Both communities recently experienced a wildfire (2009), which caused the evacuation of the main reserve at T'it'q'et and the partial evacuation of Cayoose, and burnt nearly one million hectares of forest. That experience spurred both communities to formalize emergency planning activities and to engage in proactive risk reduction.

Both communities maintain strong relationships with one another, with neighbouring First Nations communities and with the District of Lillooet, and express confidence in their ability to count on one another to provide/share resources, manpower and equipment should the need arise.

Table 29: T'it'q'et and Cayoose Creek Emergency Preparedness Infrastructure, Planning & Activities

Indicator	T'it'q'et	Cayoose Creek
Infrastructure	• Emergency Coordinator (Chief) • Firefighting Crew • Two vehicles • Household Emergency Kits • A mix of practical skills in community to help	• Emergency Coordinator (Chief) • Backhoe • Household Emergency Kits • Emergency Food and Shelter Supplies • A mix of practical skills in community to help • Some emergency resources stored at Band office
Planning & Activities	• Emergency Preparedness Plan (2009) • Occasional training of core staff • Fuel load management above community via Beetle Kill Removal Crew • Climate Change Adaptation Planning (current)	• Emergency Preparedness Plan (update in process) • Occasional training of core staff • Fuel load management above community via Beetle Kill Removal Crew • Climate Change Adaptation Planning (current)

Source: T'it'q'et and Cayoose Creek Infrastructure, Public Works, & Emergency Preparedness Departments/Coordinators

T'it'q'et has an emergency preparedness plan (EPP) that was last updated after the 2009 forest fire. Prior to 2009 the emergency response was more *ad hoc* and less community-driven. The plan essentially covers any type of emergency situation (from fire, flood, earthquake, epidemic and train derailment, to a single house fire). While a plan is in place on paper, it has yet to be ratified by Council and all of the emergency response positions (apart form the Emergency Social Services Director) have yet to be formally assigned[50].

The community continues to take steps to proactively reduce both human and environmental risk, including distributing basic emergency kits to households (blankets, flashlights, batteries, water etc.) and reducing forest fuel with a pine beetle-kill removal crew.

In terms of equipment and human resources, T'it'q'et has a forest firefighting crew and two fire fighting vehicles (a "10 pack"), maintenance staff and vehicles, as well as community members with diverse skills sets that could be readily applied to assist during an emergency, including: chainsaw and power saw operation, traffic control, flagging, plumbing, heavy equipment operator, GPS, WHMIS, occupational first aid and danger tree fallers (P'egp'íg'lha Council, 2012; See also Skill Levels and Education section). A core group of T'it'q'et staff receives regular emergency response training. T'it'q'et has a fire services agreement with the District of Lillooet.

The 2009 forest fire tested both communities' emergency preparedness resources

The Cayoose Emergency Preparedness Plan is currently being revised. Like T'it'q'et, their EPP covers (from fire, flood, earthquake, epidemic and train derailment, to a single house fire), laying out the response coordination process, as well as roles and responsibilities. Roles and responsibilities are defined, however only the public works staff member receives training (he is a volunteer firefighter in Lillooet). While T'it'q'et had the opportunity to implement their EPP in 2009, Cayoose did not.

Cayoose Creek has taken steps to proactively reduce risk by disbursing emergency kits to households (including supplies and instructions should the community need to be evacuated), and the Band has acquired emergency food and shelter resources in the event of an emergency requiring the evacuation of members (the evacuation center is the Band Office; there is enough food to feed 100 people for three days). Cayoose also participates in forest fuel management activities by trimming pine beetle-kill. Cayoose Creek has 3-4 fire hydrants dispersed throughout the community but likely only 1-hour worth of water from its reservoir. There is additionally an agreement with the District of Lillooet for fire services, however this agreement is not well communicated.

In terms of human resources and equipment in Cayoose Creek, there are quite a few community members with firefighting training (F-100 and F-85), as well as chainsaw operators, and flaggers; the community also has a backhoe, pick-up truck, and dump truck. There is currently on-going emergency preparedness training in Cayoose.

Both communities have access to the Internet, landline and cellphones, and short-wave radio; however, based on previous experience with emergency response, the communities report that the most effective (though not necessarily most efficient) method of mass communication is word-of-mouth.

50 Additional positions have yet to be filled because of a shortage in funding. Vacant positions include: Emergency Coordinator, Emergency Operations Director, and Financial and Logistics Planner.

Table 30: T'it'q'et and Cayoose Creek Communication Technology Presence & Use

Indicator	T'it'q'et	Cayoose Creek
Short-wave Radio	Band Office	No
Community Members with access to Internet	98%	75%
Community Members with Cellphones	87% (adults)	50% (total population)

Source: T'it'q'et & Cayoose Creek Administration

Governance

Both communities perceive their local governance to be generally more transparent, responsive, and accountable than in the past. The financial capacity of T'it'q'et to manage its affair appears to be adequate. Cayoose Creek is somewhat constrained by its short-term debt commitments but long-term commitments from BC Hydro may increase their financial stability.

Assessing the quality of governance in a community is a highly subjective process that can trigger historical and present biases. While it is important to minimize subjectivity and potential bias when assessing governance in a community, subjectivity can be useful. In this case, people's perceptions, tell us a lot about the efficiency and effectiveness of local government operations. However, community members' perceptions do not tell us everything.

For the purposes of this assessment, governance is measured using four indicators 1) transparency, 2) responsiveness, 3) accountability, and 4) financial capacity. Transparency refers to how open and honest the Band is with community members. Responsiveness refers to the ability of the Band to make decisions in the best interest of the majority of members. Accountability refers to the ability of community members to hold the Band responsible for decisions. Financial capacity refers to the financial ability of the Band government to address community needs (including planning and acting on short and long-term emergencies, threats and opportunities).

The first three indicators were assessed during focus groups, wherein participants were asked to comment on (and where possible provide examples) the perceived level of transparency, responsiveness, and accountability of the Band government (including Chief, Council and staff), and trends over the past 20 years. Financial capacity was determined in a more objective manner, through consultation with Band staff (Band Manager and Chief in T'it'q'et, and Chief in Cayoose), who were asked to comment on the ability of the Band to manage their finances and initiate planning activities.

Table 31: T'it'q'et and Cayoose Creek Self-Assessment of Governance

Indicator	T'it'q'et	Cayoose Creek
Transparency	• More transparent than past • Increasingly consulting Elders • Processes in place for most major decisions • No restrictions re multiple family members on Council	• Much more transparent than past (more inclusive)
Responsiveness	• More responsive than past, esp. with establishment of P'egp'iglha family council	• Much more responsive (although stretched in terms of staffing)
Accountability	• More accountable than past, esp. with establishment of P'egp'iglha family council and higher education among staff, Councillors and the community	• Staff are more approachable than in past • Community meetings are more open and scheduling has been adjusted to increase turn-out (including the use of web conferencing)
Financial Capacity	• Stronger planning for short and long-term needs • Ability to obtain funds for new projects • Have access to the First Nation Finance Authority for short and long-term loans, if necessary • Perhaps need better controls for evacuation spending in the future[1]	• Improving, esp. with new BC Hydro trusts in place and longer-term trusts in the works. • Band has short-term debt on social housing (rental arrears) – considered a big financial constraint.

Source: Focus group sessions and interviews, 2012 & 2013

The level of governance in T'it'q'et is reportedly strong. In terms of transparency, community members note that in recent years successive Chiefs and Councils have increasingly sought to incorporate Elders into the decision-making process, which has increased the overall perceived level of transparency. There is however some concern that the close relationships between Councillors and staff may influence decision-making. For example, focus group participants provided examples of times past when Chief and Councillors could not be related, in contrast to now. Given that there is a relatively small group of engaged community members who show up to all community meetings (roughly 20% or 40 people), it is unclear whether concerns are grounded in scepticism or if there are specific examples of inappropriate behaviour. Community members note that overall, the Band's operations have become more transparent over time.

Focus group participants note that the arrival of the P'egp'iglha family council system (where in all 10 families in the community have representation) has increased the responsiveness of decision-making by ensuring that all families are involved in the process, not just the large ones. However it was suggested that many community members (predominantly those who do not regularly attend community meetings) still have a sense of futility when it comes to the Band and its ability to look after their best interests. Accountability also appears to be improving over time, particularly with the establishment of P'egp'iglha family council and the higher level of education among staff, the Councillors and the community in general.
The financial capacity of the Band to plan for the near and long-term is strong, demonstrated by the positive response to the 2009 forest fire wherein the Band was able to financially support community members in the

evacuation process before emergency funds were provided by AANDC or FNESE (e.g., providing money to people who could not afford the gasoline needed to drive to the evacuation center in Kamloops), and by the community's ability to fund on-going economic development planning and implementation (e.g., property acquisition, planning processes, enterprise development).

In Cayoose, governance has reportedly improved drastically in recent memory. Particularly with the election of the current Chief and Council, is was noted numerous times during the focus group and interviews with key stakeholders that level of transparency, responsiveness, and accountability have all improved. Previously, decisions were made by Chief and Council "behind closed doors" and with little to no input from the community. Community members expressed that previously they had no confidence that the Band could take care of them or that it looked out for everyone. Instead, community members preferred to "take care of themselves" than "ask the band for help". There is a feeling now that Chief and Council actively engages and incorporates community members into planning and decision-making. This has resulted in more trust and confidence.

Financial capacity has also increased over time. Particularly after the closure of the Ainsworth mill in 2008, the Band and community members were in very difficult financial shape. The Band however took on a deficit and invested in community members' re-training and provided additional financial assistance to households as needed—demonstrating short-term financial capacity. Since then, the community has negotiated a long-term benefits agreement with BC Hydro (Seton Lake Dam) that will provide greater financial stability. At present 25 and 50-year trusts are in place with clearly defined social, economic, cultural and environmental benefits for the community, and Chief and Council are seeking the creation of more long-term benefits agreements (100 and 200-year trusts) that would ensure future generations have security.

Summary

In summary, the information above provides a socio-economic snapshot of T'it'q'et and Cayoose Creek First Nations in terms of: 1) demographics, 2) community attachment and social cohesion, 3) attitudes toward change, 4) economy and livelihoods, 5) skills and education, 6) shelter and infrastructure, 7) health, 8) agriculture and food security, 9) emergency preparedness, and 10) governance. This profile presents a complex picture of many common and some divergent conditions and behaviours in terms of adaptive capacity to current pressures. Like all First Nations in Canada, T'it'q'et and Cayoose Creek have experienced significant historical injustices and also faced economic hardships associated with the decline in forestry sector. These pressures have left the communities struggling at times but the people are determined to not only survive, but rather to thrive. Indeed, community attachment, confidence in Band government, planning for development, capacity building and pride of place in both communities seems to be on the rise. This resilient nature and a growing confidence in their abilities will likely provide a good foundation to begin their climate adaptation process in the future.

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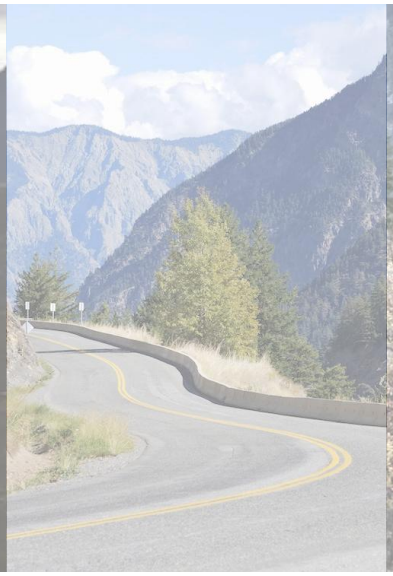
Chapter 4: Community Vision


Visioning

Below is a brief discussion of T'it'q'et and Cayoose Creek's community visions for sustainable development. These visions are very important in the adaptation planning process since they guide the process towards where the communities ultimately want it to be. Adaptation, after all, doesn't happen in a vacuum; it needs to be driven by common values and aspirations as well as available resources and circumstances.

Although T'it'q'et and Cayoose Creek are different communities facing different challenges and at are various stages of planning and development, they share many of the same values and visions for sustainable development. Below are the individual visions that T'it'q'et and Cayoose Creek have recently developed. In general, the two communities aspire to:

- Be self-governing and self-sufficient;
- Have a strong sense of identity, proudly practicing their language and culture;
- Live in a safe and respectful community;
- Have a thriving economy and local government; and,
- Live in a healthy environment, where natural resources are honoured and used in an environmentally sound way.

T'it'q'et Community Dreams & Visions[51]

The T'it'q'et community identified their vision for community development as follows:

- ***Self-Sustaining***: that T'it'q'et will be a self-governing, self-sustaining and independent community.

- ***Language, Culture, & Heritage***: that the P'egp'iglha clan will live fully and proudly within their culture and heritage, practicing our language and culture with a clear and strong sense of identity.

- ***A Healthy & Thriving Community*:** that the people and communities of the P'egp'iglha clan have the programming, services, infrastructure, capacity, and opportunities to develop and maintain our communities.

- ***Healthy Environment:*** that the traditional territories of the P'egp'ighla Clan and the St'at'imc Nation are protected, preserved and honoured, and our natural resources are utilized in an environmentally sound and sustainable manner.

Cayoose Community Vision[52]

The Cayoose Creek community identified their vision for community development as follows:

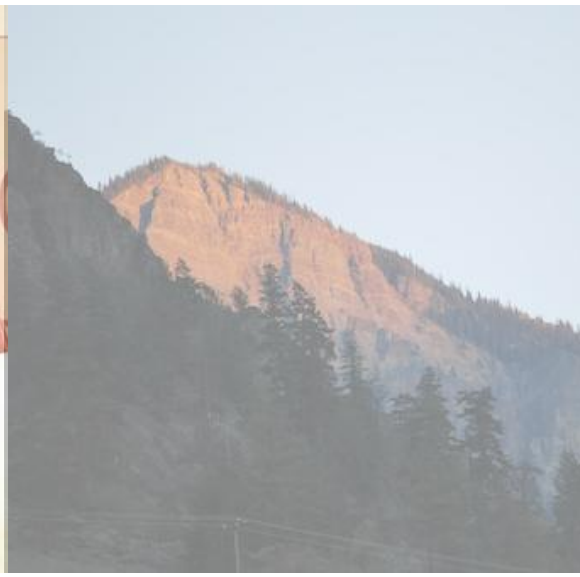
51 Excerpt from the Comprehensive Community Plan visioning process in T'it'q'et during 2013. The visions were composed by a joint Council comprised of the P'egp'lha Council, the Elder's Council, Youth Council, and the elected Chief & Council during a one day visioning workshop in 2013.
52 Provided by Chief Michelle Edwards. The vision statement was part of a Comprehensive Community Plan visioning process the community engaged in early in 2013.

Cayoose is a proud, unified and self-sufficient community that is committed to improving the quality of life for all members now and in the future by:

- Building a thriving, sustainable economy;
- Respecting the land by maintaining their stewardship role;
- Honouring their culture by speaking Ucwalmicw and practicing their traditions;
- Providing a safe community in which members are physically, mentally and emotionally healthy;
- Promoting education;
- Providing strong leadership through accountable government; and,
- Treating all members with respect, compassion and equality

Chapter 5: Summary





Phase I Summary

This report summarizes the findings of Phase I of the Upper St'at'imc Regional Climate Adaptation Plan. Thus far, the project has attempted to raise awareness of the potential climate changes in store for the T'it'q'et and Cayoose Creek First Nations, which may include:

- A general 2.5 °C to 5.2 °C warming trend across all seasons (lowest in winter - highest in summer);
- More frost free days per year;
- A general drying trend to 2050 and then marginally wetter to 2080;
- More precipitation in the autumn, winter and spring;
- Less precipitation in the summer; and,
- Less snow as precipitation.

Phase 1 also attempted to learn from the communities about the state of their socio-economy and their current adaptive capacity. What we have learned is that the communities have many common and some divergent conditions across the 10 socio-economic indicators and that despite significant historical injustices and economic hardships, the people are determined to not only survive, but to thrive. Indeed, community attachment, confidence in Band government, planning for development, capacity building, and pride of place in both communities seems to be on the rise. This resilient nature and a growing confidence in their abilities will likely provide a good foundation to begin what could be a rather challenging climate adaptation process in the future.

Next Steps

In continuing with the adaptation planning process and the desire to raise adaptive capacity of the communities, the next steps for the project (Phase II 2013/14) will be to:

1. Determine the current state of key natural resources that the communities depend upon for survival and quality of life;
2. Explore the potential biophysical impacts of projected climate changes in the Upper St'at'imc territory; and,
3. Assess the natural resource and socio-economic vulnerability to projected climate changes in the area.

These tasks are planned to begin in April 2013 and reach completion by March 2014, pending funding from AANDC's Climate Change Adaptation Program. The information generated from these activities will then feed into Phase III 2014/15 of the project, which will develop strategies for T'it'q'et and Cayoose Creek to begin the climate adaptation process.