

Chapter 10

Climate Change and Institutional Capacity in an ‘Arctic Gateway’ City: A CAVIAR Case Study of Whitehorse

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Abstract Throughout the north, the majority of residents live in sub-Arctic administrative centres south of the Arctic Circle. These ‘Arctic Gateways’ are critical administrative and service centres through which pass most goods and services to and from the Arctic. Although not Arctic communities in the strict sense, they still must deal with issues of environmental change such as melting permafrost, and threats from flooding and forest fires. While doing so, they also must cope with expanding economic development, tourism, and growing demands for services throughout the Arctic region. Findings are presented from a CAVIAR case study of adaption and vulnerability of one such ‘Arctic Gateway’ carried out in partnership with the staff and Council of the City of Whitehorse, Yukon Territory. The study is based on extensive, in-depth interviews with elected officials and senior and operational staff of the City of Whitehorse, as well as with representatives of the Yukon Territory Government (YTG), First Nations, inter-governmental bodies, and NGOs responsible for administrative and resource management throughout southern Yukon. We explore key decision processes, institutional linkages and relationships within the civic government structure of the City of Whitehorse as well as with other jurisdictions and levels of government, including two First Nations upon whose traditional territory the City is situated. We find that existing adaptive strategies regarding climate change reside frequently in the processes of decision-making, planning and organizational culture as they are applied in the context of other changes facing the City and Yukon Territory. Thus, we explore the processes by which policies, decisions and adaptive responses take shape in both routine and uncommon or surprise situations around key areas of civic concern related to infrastructure, public health and safety, land-use planning, emergency preparedness and the environment. The case study is linked to the City’s ongoing Integrated Community Sustainability Planning process which

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provides the temporal basis for exploration of future changes and exposure-sensitivities as defined by various governance institutions. The focus on the application of governance as process and context provides a glimpse of the potential (institutional) capacity of Whitehorse to manage and cope with complex social-ecological changes taking place in the north now and in the future.

Keywords Whitehorse · Institutions · Governance · Gateway cities · Sustainability

10.1 Introduction: CAVIAR and Institutional Capacity

Invariably, images of the Arctic invoke the natural environment. The first peoples to live and succeed in northern regions did so by developing cultures and livelihoods closely linked with the patterns of nature and guided by the rhythm of ecological processes. The contemporary social landscape of the North is, however, predominantly urban. That is, most people living in northern regions of Canada and Alaska, as well as northern Europe, reside in small to medium sized cities and towns. These urban centres are the ‘gateways’ to the North for southern sojourners interested in resource extraction and tourism. Simultaneously they are ‘gateways’ to the south through which needed goods and services most frequently pass. What we find is that for the City of Whitehorse the most critical exposure-sensitivities arise from its relative isolation and dependence on the flow of fuel, goods and services from the south. The primary adaptive strategy under these conditions is to manage, and where possible reduce, this dependence through actions framed locally as sustainability.

Most Northern research on adaptation and vulnerability, especially in Canada, is concerned with smaller communities with populations of a few hundred inhabitants and focused at the household level on the processes by which people secure their livelihoods. In contrast, our study in partnership with the City of Whitehorse is a deliberate effort to look at a larger community and to examine current and future exposure-sensitivities, adaptive strategies and adaptive capacities in a heterogeneous urban setting. The application of the CAVIAR framework in this context shifts the focus from household livelihood strategies to processes of governance. First, while many Whitehorse residents have a strong affinity for the ‘wilderness’ and the image (if not the reality) of ‘living in a frontier town’ where at least some portion of household livelihood may be obtained from the land, most City folk work for a pay-cheque and buy the majority of their food at the supermarket. Second, the conditions of city life that are susceptible to disturbance are closely tied to the delivery of services, the maintenance of infrastructure and the viability of the local economy. Key exposure-sensitivities, therefore, lie in the delivery, safety and maintenance of services that range from garbage collection, sewage, water and the fire department to transportation, urban planning, and servicing the built

environment. The stressors to which these exposure-sensitivities relate are a melee of social, economic, and environmental factors. The threat of climate change seems not to be imminent to City managers and yet increasingly potential impacts are being considered in a variety of planning contexts. Third, adaptive capacity in the urban environment resides largely with the elected officials and professional staff responsible for managing and maintaining civic services and functions. These are the persons who are charged with the task of ensuring that the challenges of exposure-sensitivities are met and overcome, whether that involves maintenance and emergency preparedness of City infrastructure or finding ways to manage their dependence on imported goods and fuel. On their shoulders rests the decisions that remain primarily at a household level in most smaller communities.

Our study of Whitehorse is thus a study of the decision processes, governance structures, and pathways of action taken by local planners, service managers and administrators to maintain civic functions and deal with changing conditions. Exposure-sensitivity, adaptive strategies and adaptive capacity in Whitehorse is very closely linked to the organizational and governance functions of the civic bureaucracy including both elected government and civic administration. Thus, by focusing on governance institutions at the civic and territorial level and on the social interactive processes that occur within them we find that adaptive capacity in the urban context flows primarily from what we call 'institutional capacity'. Institutions are a vital part of society's response and management of the diverse and varied effects of environmental change, especially as it interacts with and compounds other social and economic stressors (Adger 2003; Agrawal 2008; Berkes 2003; O'Riordan and Jordan 1999). Institutions, specifically governance institutions, are a vital component of adaptive capacity at the local level but also in coordinating and facilitating adaptations across scales (Vincent 2007; Young et al., 2008). Institutions provide pathways for local communities to access external resources from higher levels of governance and enable the distribution and implementation of such resources and services to constituents (Agrawal 2008). In other words institutions enable adaptation.

To facilitate our focus on institutions and on institutional capacity in particular, in this case study we investigate the elements of the CAVIAR framework (current and future exposure-sensitivities, adaptive strategies and adaptive capacity) in the City of Whitehorse through the lens of *new institutional analysis* (NIA) (cf. Hall and Taylor 1996; Portes 2006). On the one hand we ask what are the institutional dimensions of key exposure-sensitivities and on the other, and perhaps most importantly, in what ways do the institutions of Whitehorse enhance or retard the City's capacity to respond to and manage change. In so doing we concentrate on governance institutions within the City administration itself as well as in terms of its relationship(s) and interactions with other levels of government, First Nations and elements of the non-government and business sectors. In the process we hope to address how institutional capacity may be created through organizational structure and the interactive processes of governance (Yukon Bureau of Statistics 2010).

10.2 New Institutional Analysis (NIA)

During the final quarter of the 20th Century the accumulating evidence of global environmental change and recognition of increasing needs to both mitigate and manage the effects of human action on the biophysical world led to the emergence of the now almost ubiquitous concept of sustainability. The Brundtland Commission, in an oft quoted passage declared that, ‘The real world of interlocked economic and ecological systems will not change; the policies and *institutions* concerned must’ (WCED 1987, 9 emphasis added). This focus on institutions as the essential element of sustainability was partly responsible for a resurgence of theoretical and empirical work on institutions in the context of governance and management of global environmental change (ACIA 2005; Brinton and Nee 1998; IPCC 2007; O’Riordan and Jordan 1999; Portes 2006; Roland 2004). *New institutionalism* or *new institutional analysis* (NIA) first emerged in the 1960 and 1970s at a time when most explanations of the processes of social change and organization were dominated either by a focus on social structure or as the result of individual choice and action (Hall and Taylor 1996; Hotimsky et al. 2006). In this context, most analysis of institutions treated them as little more than a set of cultural norms that, in developing societies, served largely to constrain needed changes. That is, institutions were often regarded as little more than anarchistic holdovers of earlier cultural forms (Hall and Taylor 1996).

In contrast, through the last two decades of the twentieth century, there was a growing emphasis in economics, political science, history and sociology to see institutions from a more active, and inherently positive, perspective (Hall and Taylor 1996; Hotimsky et al. 2006). From this ‘new’ institutional perspective, institutions were seen as linking social organization and human action in important ways. In this context, a sharp distinction was made between organizations and institutions, emphasizing that institutions were largely the cultural and normative context in which behaviour within organizations was formed and both formally and informally regulated. Individual actions within organizations could be examined as inhibited or facilitated by the institutionally proscribed and/or expected norms of organizations. That is, institutions were seen not only as *resulting from* behaviour, but also as *shapers of* behaviour (Hallett and Ventresca 2006; Portes 2006). Behaviour in organizations could now be examined in terms of whether the institutional normative relations allowed actors to be flexible in response to new challenges, or constrained them to face new situations in largely prescribed ways that allowed little flexibility and social innovation. By the end of the millennium new institutionalist perspectives were increasingly influential in diverse fields concerned with social-ecological interactions, from explaining the human causes of global environmental change, to providing viable options for resolving the seemingly intractable challenges of managing the commons, and identifying options for societal response (Dietz et al. 2003; Hotimsky et al. 2006; Ostrom

2005; Young et al. 2008). In 2009 institutional scholarship received international recognition with the award of the Nobel Prize for economics to Elinor Ostrom for a body of work with many links to new institutionalist thinking and perspectives.

While it would be a mistake to think of new institutional analysis as a unified body of theory (Hall and Taylor 1996) the linkages between the strands of historical, rational choice and sociological institutionalism compliment more than they contradict each other (Brinton and Nee 1998; Hall and Taylor 1996; North 1990; O'Riordan and Jordan 1999). That said, our investigation of governance institutions in Whitehorse aligns primarily with sociological institutionalism, a reflection of our preference for a broad definition of institutions and a focus on the interplay between institutions, culture and individual behaviour (Brinton and Nee 2001; Hall and Taylor 1996).

Institutions include the accepted practices and procedures which facilitate and legitimate action, frequently described as, 'the rules of the game' which provide common ground for enacting (North 1990). They provide a symbolic blueprint for organization including sets of written and informal rules which govern relationships between individuals and groups (Portes 2006) which hold society together and enable it to adapt (Adger 2003; O'Riordan and Jordan 1999). Clearly institutions are not static rather, like other elements of society and culture, they are subject to dynamic processes including the influence of individual and collective action over time (Hallett and Ventresca 2006). We assume that adaptive capacity is realized through (Adger 2003), grounded in and constrained by (Berkes 2003) governance institutions and therefore, that in the context of changing conditions institutional flexibility is a desirable feature. Flexible institutions enable the modification of environmental governance in order to minimize situations of risk to economic livelihood and human well being (Hotimsky et al. 2006), and in this respect enhance adaptive capacity. New institutional analysis provides a conceptual approach to examine both the processes and structures of governance institutions within the City of Whitehorse and within other social institutions with which the City interacts including the Yukon Territorial Government (YTG), local First Nations and Non-governmental organizations (NGO's).

In order to elucidate the concept of institutional capacity in the City of Whitehorse and relate this to the overarching framework of the CAVIAR project we focus on the features and attributes of specific institutional forms and how these might facilitate or block effective responses to change or risks. We begin in the following section with a sketch, or institutional mapping, of the origins and current characteristics of key bureaucracies, and agencies which provide the organizational home for relevant governance institutions. Subsequent sections are organized around the core elements of the CAVIAR framework and we conclude with a discussion in which we attempt to synthesize the challenges and issues of governance in Whitehorse in the context of changing social, economic and environmental conditions.

A Brief Note About the Whitehorse Case Study Research Design and Method

We have attempted to operationalize the concepts presented in this paper through a series of meetings, interviews and conversations we have held with a wide range of individuals from both within and outside of the civil service of the City of Whitehorse and the Yukon Territorial Government. The core interviews were completed with elected and un-elected civic officials from various departments and levels of responsibility within the public administration of the City. Several interviews were also conducted with members of the Territorial government with responsibilities ranging from resource management and environment to water, emergency preparedness, infrastructure, community and economic development. Additional interviews were carried out with representatives from the non-government and private sectors. These interviews were guided by a schedule of questions designed to explore (i) workplace role, relations and organizational culture, (ii) decision making processes in both routine and non-routine contexts-including consideration of both formal and informal rules, protocols and practices which lie behind decisions and (iii) issues of capacity in relation to both current and anticipated challenges related to socio-economic and environmental change.

In addition to formal interviews we have had informal meetings with federal government representatives, former employees of the City and YTG and representatives of two aboriginal communities within whose traditional territory and treaty lands the City falls. These informal meetings provided background knowledge and understanding and helped us to identify themes and frame questions for the interview schedule. Additional context, background and clarification of institutional structure, rules and protocols was gleaned from a review of numerous supporting documents made available to us by respondents including various government reports, planning and policy documents, environmental and economic reports. Finally, we also participated in two City led planning processes including a large Integrated Community Sustainability Planning conference and a smaller expert workshop to develop community based climate change scenarios designed to feed into a broader community climate adaptation planning process.

10.3 The City of Whitehorse: Community and Governance

The City of Whitehorse is situated in the southern portion of Yukon Territory along the banks of the Yukon River a short distance downstream (north) of the former White Horse rapids from which the City took its name.¹ The City straddles the traditional territory of the Kwanlin Dün, the ‘people

¹These once iconic rapids now lie behind the Whitehorse Dam, beneath the still waters of Schwatka Lake. To the north the City is bounded by Lake Laberge made famous in the poetry of Robert Service.

of the rapids' and the Ta'an Kwäch'än, 'people of the flat lake place'. In its early colonial history the City functioned primarily as a service centre, especially during the Klondike Gold Rush of the late 1890s when it was a major staging ground and replenishment destination for miners bound for the gold fields around Dawson City. Whitehorse became the capital of Yukon in 1953 (Fig. 10.1).

Today the City of approximately 26,000 residents is home to three-quarters of all Yukoners. In many respects Whitehorse sits uncomfortably between being urban but not like cities in the south and being northern but unlike the rest of the 'real' Yukon. The residents of Whitehorse are both dependent on and accustomed to many of the urban attributes and services typically associated with cities in the south. A very large portion of the workforce is employed in the public sector which provides a level of income and security befitting a 'middle-class', professional city, although Whitehorse residents might bridle at the

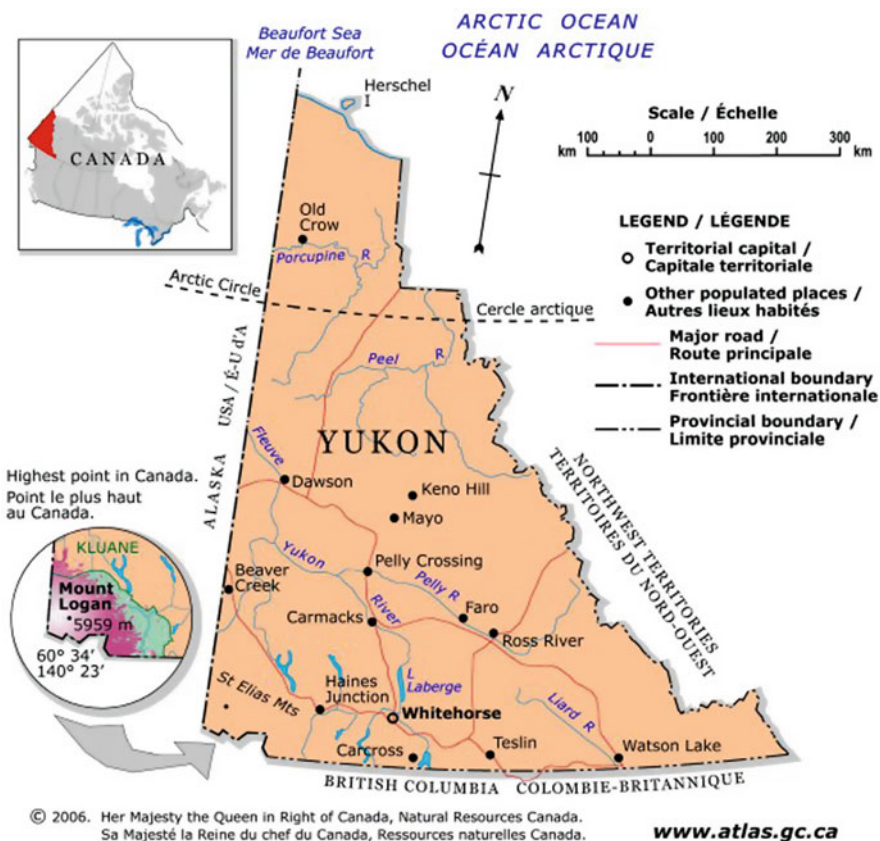


Fig. 10.1 Yukon Territory showing location of City of Whitehorse. Source: Atlas of Canada 2006. Accessed online, April 27, 2010. URL: <http://atlas.nrcan.gc.ca/site/english/maps/reference/provinceterritories/yukonterritory/referencemap> image view

'yuppy' connotations of such a label.² There is a vibrant arts community and non-government sector, hip coffee houses dot the down town core while big box stores and familiar corporate logos underline the City's gateway function between north and south. Demographically the City is young although in line with demographic trends across the country the median age is increasing over time. Relative to other cities in Canada there is a high rate of turn-over in the population especially among young and middle aged professionals, although several interviewees suggested that this might be changing.

With a land base of roughly 415 km² Whitehorse is, per capita the largest city in Canada. This expansive urban land base has precipitated development of exceptionally large lots, often with sizable tracts of wooded area in between. These so-called 'country residential' subdivisions help define Whitehorse as a 'wilderness city', where the spirit of the frontier, a mentality of independence and living close to nature, merges with values and expectations of urban life. Lately there is an increasing desire, especially on the part of City planners, to pursue 'infill' development of some of the large tracts of green space in between subdivisions. This movement toward denser urban planning stands in stark contrast to the almost iconic status of 'country residential' lots and exemplifies the tension between apparently contradictory pro-environmental cultures in Whitehorse (Fig. 10.2).

The City is incorporated under the municipal Act of Yukon Territory and has a typical governance structure comprised of an elected mayor and council and a professional administration. It is organized into two functional areas, Administrative Services and Operations, each headed by a director reporting to a senior bureaucrat: the City Manager. The administration side manages City's finances, human resources and some community service functions such as bylaw enforcement. Operations handles the physical functions of the City including engineering, planning, maintenance, parks and recreation, and the fire department. Recently senior staff have been looking at reorganizing the City by (re)creating a third director's position to help manage the City's increasing size and complexity.

An investigation of the institutional capacity of Whitehorse would be incomplete without an understanding of institutional structures and processes at the Territorial level. Interaction and relations between the City and the Territory are intensified by the presence of 11 of the Territory's 19 electoral ridings overlapping or falling within the City limits. Eleven MLA's (Member Legislative Assembly) in representing their constituents have direct personal and political interest in the affairs of the City. The Legislative Assembly is situated in Whitehorse and the Territorial government is also a major property owner of City lands. Interests and objectives between City and Territory are clearly intertwined and influence how civic governance institutions change and develop over time. The institutional environment has been

² At the time of writing employment statistics for the City were not available, however, a monthly report produced by the Yukon Bureau of Statistics for the Territory as a whole provides a useful proxy. Public sector employment in the Territory is substantial and over the past fifteen years has been increasing from 37% of total employed to almost 42% of the labour force in 2009 (Yukon Bureau of Statistics 2009).

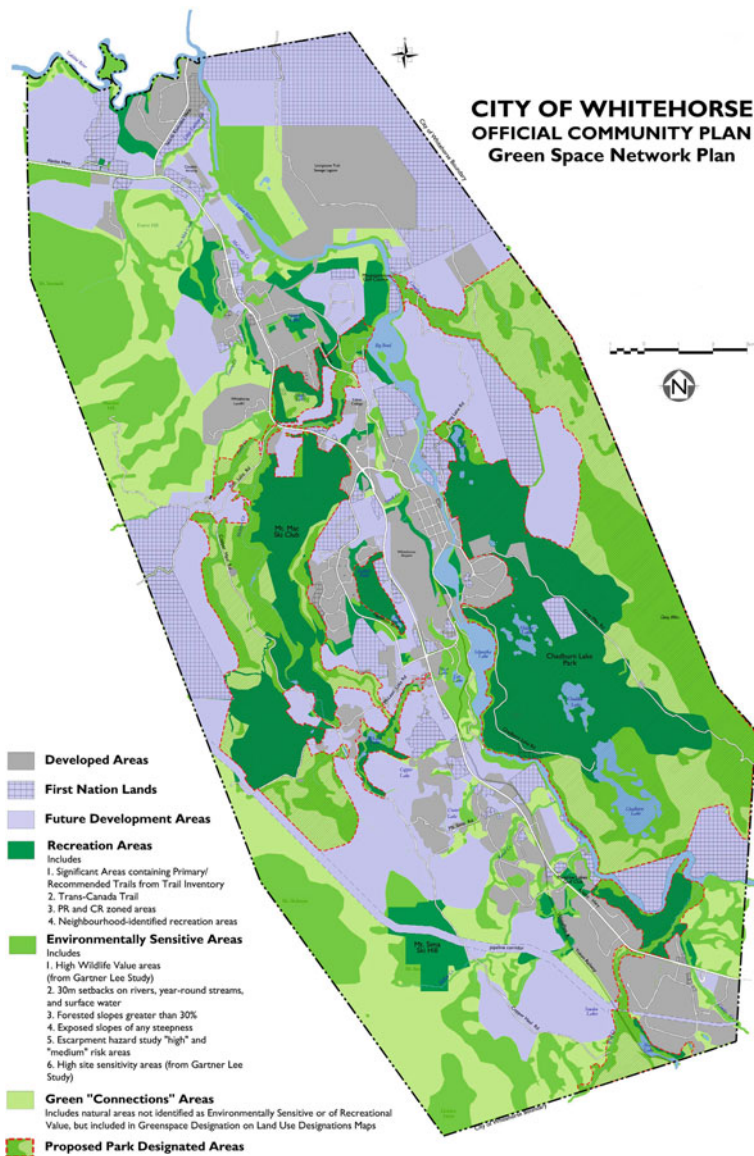


Fig. 10.2 City of Whitehorse. *Source:* City of Whitehorse Official Community Plan 2002. Accessed online, April 27, 2010. URL: <http://ww3.whitehorse.ca/Planning/OCP/2007%20OCP%20web.pdf>

especially fluid in recent decades due to the transformation of Territorial governance through the process of devolution. This formal shifting of responsibility for governance of Yukon from the federal to a nascent Territorial government is a key feature of contemporary institutional fluidity and change.

Up until the 1970s Yukon was governed by a Commissioner appointed by the Department of Indian and Northern Affairs (DIAND). Over time the local political and economic elite in Yukon grew weary of the quasi-colonial relationship with the appointed Commissioner and the remote federal interests he represented. By the late 1970s the political and institutional basis for a devolution of power was in place and subsequently initiated by an Act of Parliament of the Joe Clark government in 1979 (MacDonald 2008). Throughout the 1980 and 1990s extensive negotiation centred on the transfer of federal responsibilities, especially with respect to natural resource management and revenue sharing. These were formalized through a number of agreements and amendments to the Yukon Act which have led gradually to the emergence of new governance institutions and capacity in the Territory.

During this same period, Yukon First Nations were actively and increasingly engaged in negotiating self-government and settling outstanding land claims (MacDonald 2008). In 1993 the Umbrella Final Agreement (UFA) was signed between the main representative of Yukon First Nations (the Council of Yukon First Nations, CYSN) and the federal and territorial governments. The UFA sets out the framework for individual First Nations to negotiate final land claims settlement agreements. In 1998 the first formal agreement on resource revenue sharing, the Yukon Oil and Gas Accord (YOGA) came in to effect and later that year the Devolution Protocol Accord was instituted. The latter, signed between Yukon First Nations, YTG and the federal government provided the formal process for the transfer of control over natural resources, public lands, and water. These powers were solidified through amendment of the Yukon Act (2002) which established several key pieces of legislation including the Yukon Environmental Assessment Act (Government of Canada 2002; MacDonald 2008).

The process of devolution continues to unfold in the Yukon, as individuals and organizations attempt to understand and implement new powers and responsibilities. Despite its large population in comparison to other Yukon communities and distinctly different relationship with the Territorial government, Whitehorse is governed by the same legislation, the Yukon Municipal Act. As will be seen below this creates both opportunities and barriers for the City in how it manages its own affairs, how it operates within the broader context of the territory, and how it copes with and responds to change.

10.4 Exposure-Sensitivities in a Subarctic Urban Context: Past, Present, Future

The exposure-sensitivities of a subarctic city such as Whitehorse are often the outcome of a combination of biophysical and human conditions. In this case study of Whitehorse the focus on governance institutions provides a window into how

the City experiences exposure-sensitivities, especially from the perspective of those in various positions of responsibility for City lands, resources, infrastructure and services. The vulnerabilities that arise from, or are linked to, the impacts of climate change are best understood in the context of a more fundamental set of conditions that shape the City's vulnerability to change and stress. Two of these fundamental conditions are linked to the City's relatively remote geographic location while a third relates to Yukon's economic history.

From the perspective of City managers and others the City's location is *the* key underlying attribute of how vulnerability is understood and responded to. First, the City is dependent on imported commodities and energy which are vital to support the way of life of the citizenry and the many functions and services delivered by the City. This exposure-sensitivity stems directly from the relative isolation of Whitehorse from the south of Canada. Major distribution centres such as Vancouver, British Columbia and Calgary, Alberta are well over 2,000 kilometres away along what for large stretches are only two lane highways. Other than air transport the only alternative link to the south is westward along the Alaska Highway through the coastal town of Skagway.³ The dependence of contemporary goods movement on truck transportation means that Whitehorse is exposed and sensitive to disruption of road transport links to the south, but also to closures along the major east-west linkages between Vancouver and Calgary/Edmonton. Disruptions as far away as Rogers Pass in British Columbia have been felt in only a few short days in Whitehorse as supplies of certain goods, especially perishables that arrive almost daily, dwindle rapidly. Some officials in Whitehorse note that the existence of the port in Skagway reduces somewhat the City's vulnerability to such interruptions. A potentially greater threat is the exposure of Whitehorse to fuel shortages during the winter months in particular when Yukon River levels are too low to enable the Whitehorse hydro power facility to produce enough electricity to meet City requirements. The City depends on large diesel generators to provide supplementary and emergency power supplies to augment the dam. Currently the territorial government which operates the dam only has the capacity to keep enough fuel on hand to keep the generators running for a few days in the event of a complete failure of the dam.

The second exposure-sensitivity arising from the City's remoteness is the increased expense associated with any good or service brought in from the South. City and YTG officials argue that the additional cost burden is significant and influences the decision-making calculus in both the public and private sectors. For example, the 'cost' of being dependent upon southern imports is a key feature of discussions of long term, community sustainability planning. City managers see strong linkages between dependence on imported energy, the

³ The historic jump off point for thousands of miners bound for the Yukon during the Klondike gold rush of the 1890s. Skagway now boasts a deep-water port built to accommodate large cruise ships drawn by the rich cultural and natural history of the area.

vulnerability this creates in terms of both cost and security of supply and adaptive strategies that feature conservation and efficiency measures.

A third condition that shapes the City's vulnerability to change and stress is Yukon's economic history which has been punctuated by the boom and bust cycles of resource development. As recently as the 1990s, Yukon has experienced abrupt declines in population, usually as a result of mine closures. Whilst these closures obviously have their most profound effect on the particular mining town in question, there are numerous direct and indirect impacts on Whitehorse where many support services and mining related subcontractor businesses and suppliers are located. The most recent period of growth that Whitehorse has experienced in the last decade has given some residents reason for quiet optimism that the era of extreme boom and bust may be behind. Although a careful analysis of whether or not this might be the case is beyond the scope of the current case study our interviews suggest three primary reasons behind this sentiment. First, such optimism is based on the perception that devolution has brought with it an expansion and potential stabilization of civil service jobs. The transfer of jurisdictions from DIAND to YTG saw many former federal employees keep their jobs, even their job titles and offices. Many reporting structures remained in place and, at least to begin with, changed only in name. Previously federal public sector jobs were susceptible to high rates of turn-over as people sought different career advancement opportunities within the federal civil service. Although with the transfer of most of these federal jobs to the Territorial government employee movement is now less likely to take people out of the Territory the loss of skilled people remains a challenge for the City. Governance institutions, as noted above, are more than the organizational structures and regulatory frameworks which hold up the bureaucracy and keep the public sector operating. Institutional memory resides primarily in the minds of individual actors. As such, City leaders are acutely aware of the vulnerability that is created when a key person is drawn away by an opportunity in the south. The second reason that some Whitehorse residents believe that economic cycles in the territory are likely to be less severe in the future is linked to the diversification of the Territory's economic base, principally in connection to the expansion of the tourism industry. Third, it has been widely speculated that a warmer Arctic may offer a host of economic development opportunities most notably in resource extraction and marine transportation (ACIA 2005). Milder conditions are conducive to a longer and more manageable mineral exploration season and according to some may be at least partially responsible for the recent upswing in resource development activity. More exploration is assumed to lead to more mine development and a net positive benefit for jobs and the economy in Yukon. In fact some interviewees claimed that one potential challenge to which Whitehorse will be exposed is to manage increased growth and development in the future, not only from increased mining activity but also potentially from expansion in forestry and agriculture opportunities or in the event that Whitehorse becomes a desirable destination for climate refugees from other parts of the globe.

Other exposure-sensitivities in and around the City of Whitehorse that are or may be linked to the impacts of climate change include City infrastructure and maintenance procedures, water supply, quality and management, and emergency or disaster risk and response (Lipovsky and Huscroft 2007). Many of the specific direct and indirect climate impacts of potential concern have been summarized recently in large assessment reports such as the Arctic Climate Impact Assessment (ACIA 2005) and the Northern chapter of the federal report, 'From Impacts to Adaptation: Canada in a Changing Climate' (Furgal and Prowse 2008). The City has also recently commissioned a summary report of past trends and projected changes in the hydro-climatology of the Whitehorse region (Werner and Murdock 2008) which takes a more focused look at specific climate effects on the City and its immediate environs. According to these studies, several parts of the city are at some risk of flooding from heavy precipitation, or from the formation of ice dams on the Yukon River during winter warm spells. This has occurred recently, although no clear connection with climate change has been confirmed. Conversely warming continues to cause shrinking of the glaciers and ice fields that feed the headwaters of the Yukon River which may ultimately effect hydroelectric potential for the city and possibly diminish energy security in the future (Church and Clague 2009; Janowicz 1994). 'Rural residential' areas both within and immediately adjacent to the city are often not on city water system and will be vulnerable to impacts on domestic water supply from various factors including climate change. The built environment, especially critical infrastructure such as roads and the Whitehorse International Airport are at risk of higher repair and maintenance costs from the damage and wear that arises from more frequent freeze-thaw cycles that accompany milder winters. City maintenance managers also report increased costs associated with removal of heavier, wetter snow and greater road salt usage.

The large tracts of urban and semi-urban forest land within and immediately adjacent to Whitehorse City limits means heightened exposure and sensitivity to the risk of forest fire and other vegetation and ecosystem impacts such as changing wildlife patterns, invasive species and pest outbreaks. Wild fire risk in particular is a public health and safety issue as well as a threat to property, infrastructure and recreation opportunities. The fire season in the Whitehorse region is expected to increase on the order of five to eight weeks according to some climate models (Werner and Murdock 2008). Pest outbreaks greatly increase the availability of fuel such as has occurred with the current outbreak of spruce bark beetle which has affected tens of thousands of hectares of spruce forest to the west of Whitehorse in the area of Haines Junction and the traditional territory of the Champagne Aishihik First Nation (Ogden and Innes 2008). Finally, the orientation of the City along the Yukon River valley and in relation to prevailing winds and weather patterns further heightens the City's exposure to wild fires.

The context of exposure-sensitivities in the City is dominated by the unique urban culture of Whitehorse which combines elements of southern, urban lifestyle expectations with the desire to live close to nature in what we refer to as a gentrified wilderness setting. The context for understanding exposures-sensitivities

that face Whitehorse, according to many of the respondents in this case study, are the risks and vulnerabilities related to isolation and the heightened tension this creates between the need for self sufficiency, the high cost of fuel and both the heavy dependence on and high (urban, cultural) expectations of availability of commodities and services which emanate from the south. There are numerous exposure-sensitivities that will challenge future leaders and citizens of the City of Whitehorse. Many of these challenges relate to the City's unique and prominent role in the Territory at large (e.g. urbanization pressures, managing development and sustainability expectations among an informed and active populace, managing potential economic boom and associated environmental stewardship demands and expectations associated with anticipated resurgence of the mining industry), others relate to environmental changes related to projected changes in climate and relate principally to infrastructure safety and maintenance, water and water management, landscape hazards, energy and increasing costs. No matter the nature or scale of specific types of exposure-sensitivities that the City will face there is sure to be a variety of them and in turn, this will elicit an equal if not greater variety of responses.

10.5 Sustainability as a Context for Adaptive Strategies and Capacity

Under the broad and inclusive definition of exposure-sensitivities taken in the CAVIAR approach adaptive strategies are part of the established practice of local government, adapting and responding to change is simply part of good governance. In this study it is important to start with the understanding that the City of Whitehorse has always been engaged in the ongoing task of developing and implementing adaptive strategies, that is, managing and responding to natural hazards, economic cycles, social and environmental change. Adaptive strategies have taken place in the past, are actively engaged in the present and will take place in the future. While it is difficult to point to specific instances and be able to say with certainty that a particular action was an adaptive response to an impact of climate change it is possible to see examples of adaptive strategies in various actions and plans. In most cases such strategies are embedded in broader responses to what are frequently multidimensional problems. For example, the exposure-sensitivity of Whitehorse to wild fire discussed above will likely increase with climate change and in some respects is already heightened in those parts of the southern Yukon affected by the spruce bark beetle (Ogden and Innes 2008). 'FireSmart' practices which already exist and are encouraged by government officials, involve such measures as clearing vegetation from building perimeters and limiting the buildup of brush, deadfall and other sources of fuel on both private and public property. Certainly these steps would reduce fire risk but 'fire-smarting' is expensive and the responsibility of the property owner so tends to be carried out on an ad hoc basis. On City

property the practice is carried out only as needed and must be balanced off against other priorities. The Forestry Department of the Yukon Government, with a much larger forest land-base to manage, understandably has a more comprehensive approach and responsibility for forest management, including fire management. There has also been a long-standing interest primarily in the southern region of the Territory, to develop a forest industry. Although the small size of trees and long distance to markets have generally limited the viability of this idea. Recently however, the volume of dead and dying timber affected by the bark beetle has added an extra incentive to manage fuel build up in sensitive areas, for example near to parks or housing subdivisions. Although currently there does not appear to be much in the way of formal emergency preparation or other adaptive strategies to contend with the increased threat of forest fire officials in both the City and Territorial governments report excellent communication lines and informal cooperation and coordination procedures.

Transportation infrastructure is similarly an area of ongoing planning, engineering, maintenance and budgetary concern for the City. At the moment the strategies for dealing with increased snow removal and road salting needs are made at the operational level, using existing resources. Snow removal and road clearing for example, can raise a number of issues that challenge the capacity of the City to adapt. Heavier snowfall means more frequent road clearing and increased build up of snow banks along roads, especially in front of driveways. It also means higher costs. Whitehorse has not typically received a large accumulation of snow in winter meaning that roads could be ploughed and snow left along the sides to melt in the spring. Citizens have been expected to clear the banks of snow from their own driveways; however, this becomes more difficult or impossible for some property owners under heavy snowfall. If too much snow accumulates along the sides of city streets it must be collected and trucked away at considerable expense. Environmental regulations prohibit dumping snow in rivers or water ways so storage is also an issue. A seemingly mundane issue quickly compounds to put a strain on physical and financial resources available to infrastructure maintenance.

In discussions with various managers, planners and administrators climate change was not generally identified as an immediate threat or risk for which there could be specific planning. There is awareness of the issue and many within both the City and Territorial government expressed interest in and a need to learn more about what sorts of climate change impacts might be relevant to their particular area of responsibility. The more substantive finding from this research, however, is that the response to both general vulnerabilities and to specific climate change impacts are more closely identified with reduction in fossil fuel dependency and general sustainability preparedness. In the urban context of Whitehorse adaptation and mitigation are not considered discreet categories of response to climate change. Rather, interviewees consistently conflated adaptive strategies and mitigation under the banner of sustainable development. One of the principal goals of sustainability for City managers is to reduce the level of dependence on fossil fuels, whether for vehicles, power

generation or heat which is imported from the south at considerable cost. In this sense, sustainability has economic security and environmental benefits, both of which are, at least implicitly, adaptive strategies to the most notable exposure-sensitivity identified in the preceding section, that is, isolation and dependence on imported fuel and other goods and services. Adaptive strategies in the context of exposure-sensitivities and related risks are centred primarily on ensuring strategic preparedness in the face of sudden shortage and reducing fuel costs. When asked for specific examples of climate change responses interviewees referred to steps taken to ensure that all existing and new buildings and equipment were fuel efficient and 'as sustainable as possible'. These were described as 'the right thing to do for the environment' but also as adaptive strategies to contain costs and address vulnerabilities from climate change and remoteness. Similarly, an ongoing project to replace existing traffic lights with energy efficient light emitting diode technology (LEDs) is a strategy to save energy and money, seen on one level as a mitigative measure (i.e. energy demand) and on another as an adaptive strategy to reduce operation and maintenance costs for the City.

City Administrators are generally confident that they have sufficient human, social and economic resources to manage most of the anticipated impacts of climate change, at least in the short term. Current adaptations are primarily spontaneous and unplanned although the administration and citizens of Whitehorse are proactive about sustainability and already focused on climate change issues. The City has embarked on a comprehensive planning process to create a sustainable development strategy that includes greenhouse gas emissions reductions and some climate change risk management. The latter is also being considered in a community adaptation planning process which seeks to engage local stakeholders, including citizens, community organizations and local government to develop community-based, qualitative scenarios of the future under different conditions of socio-economic and environmental change, including identification of key climate change risks and adaptive strategies. Institutional adaptive strategies and capacity therefore, are a combination of institutional structure and interactive processes that facilitate response. These include a culture of awareness, a recognition that something is (or could be) affected and are characterized by the social processes that allow response. Principal among these is the strong desire to be sustainable which has emanated from the confluence of changing social values and political leadership and opportunity afforded by funding available through federal gas tax money to carry out sustainability planning. In the context of sustainability, mitigation of climate change by reducing dependence on fossil fuels through efficiency, conservation and alternative sources of energy is seen as the most pressing and viable response. This also ends up being the key adaptive strategy to the vulnerabilities that arise from the City's dependence on imported goods, services and fuel. In other words, because of its isolation and fossil fuel dependency, a focus on mitigation reduces costs related to fuel consumption, which results effectively in a strategy to address both general vulnerability and climate change vulnerability.

Another key adaptive strategy example – what local planners identify as sustainability in practice – is the City's approach to urban planning, in particular its emphasis on strategic increases in density and location considered by staff and elected officials to be not only sustainable, but 'mitigative, strategic, cost-effective and adaptive'. For some time now the City planning department has been a strong advocate of so called 'infill development' where new subdivisions are planned deliberately to fall within green spaces between existing developments. This makes sense from the City's perspective on a number of levels as 'densification' is regarded as a key strategy to reduce costs around the installation, delivery and upkeep of City infrastructure and services. As such it is a current adaptive strategy that will also enhance the future adaptive capacity of the City.

The City's forward thinking and proactive approach to development is an outcome of recent transformations in the civic institutions of governance which have come about as a result of two relatively recent developments in how the City approaches its mandate. First, over the past 10-15 years leadership within the City administration has sought to rework bureaucratic processes and procedures, in part to control rising costs at a time when the City's population was in decline.⁴ Driven by senior civic bureaucrats the organizational structure and culture of the City was transformed through the introduction of a more strategic, planning-based and policy-driven model of decision-making. Formerly City affairs were governed in a more ad hoc manner with numerous and largely unaccountable citizen committees and a limited long term planning horizon. The changes that were brought in formalized the separation of elected and non-elected officials and helped to rationalize many dimensions of civic governance in Whitehorse. Although, there was some initial resistance within the populace to the loss of a more personalized form of governance where social capital and relationships had more influence on local decision making (Matthews 2003), interviewees both within and outside the City administration saw this 'professionalization' of civic structures and processes as a positive development and maturation of governance institutions which changed the culture of the way things were done. The catalyst for institutional change in this case was leadership, but institutional processes seem to have changed quite readily, perhaps in part due to the highly fluid institutional and governance environment of Yukon and Whitehorse that has existed during the ongoing period of devolution.

A second, and more recent transformative development is the opening up of many planning and decision-making processes through a rapid and dramatic increase in community outreach and consultation in numerous types of planning and decision-making forums. The City has a vocal and active citizenry, which has now been afforded opportunities and formalized processes for input into numerous planning decisions through the use of 'charrettes', focus groups and workshops. For example the administration and operation of the City is

⁴In the wake of the closure of the Faro mine in 1997 (Yukon Bureau of Statistics 2009).

increasingly guided by the City's Official Community Plan (OCP) which is currently undergoing its second five-year review with extensive public input. The City has also undertaken an Integrated Community Sustainability Plan (ICSP) process that went through several stages of public involvement including a three day 'charrette' which engaged almost 200 people including City officials, residents and a variety of stakeholders and experts with a in an interactive three day visioning and planning exercise to help inform the development of the City's Strategic Sustainability Plan. While these processes are still subject to criticism from citizens for either not being accessible enough or for tending to attract and therefore represent the views of special interests, the same people or groups, according to many interviewees the process is sufficiently open and inclusive that non-participation is considered a matter of choice and not exclusion.

In both cases the formal and the informal 'rules of engagement' have changed. Planning and decision-making processes are more structured, some would argue more bureaucratic, but at the same time more democratic and less prone to corruption. Management and staff see the City's public service as competent, professional and forward looking. The City employees that we interviewed were almost universally confident and optimistic about the capabilities and proficiencies of themselves, their departments and the City administration as a whole. In other words, the view of most City officials and managers is that Whitehorse has a high degree of adaptive capacity and as a result is well positioned to cope with and manage specific vulnerabilities.

These processes of institutional change, which are more often theorized than observed, have taken place in Whitehorse as a result of both intended and unintended decisions and interactions. Whatever the suite of future challenges and risks that face the City of Whitehorse, it is clear from interviews and participation in several public events that the capacity to respond and effectively manage these challenges is considered by residents and leadership alike to be quite strong. Many of the assumed attributes or 'determinants' of adaptive capacity appear to be in place: financial, human, technological and social capital resources. Furthermore, the structures and processes that define current governance institutions in the City appear flexible and able to adapt to change. Institutional flexibility is increasingly identified as a critical attribute of adaptive capacity (Hotimsky et al. 2006), especially in the context of anticipated social, ecological and economic changes expected under long-term climate change. This study also illustrates the importance of transformational responses such as the explicit pursuit of achieving sustainability as both a feature and a goal of institutional capacity. Whether or not sustainability is too vague as a policy or planning goal it facilitates an explicit conversation about climate change adaptation and mitigation and allows for their formal inclusion into long range planning. Given that planning, especially in an urban development and management context is a vital step toward developing future adaptive capacity, the emphasis on sustainability as a development goal is strongly linked to the development of adaptive capacity. In Whitehorse there appears to be widespread support for and commitment to sustainability within

the civic bureaucracy and among large segments of the population, regardless of the impetus for the pursuit of sustainability. Yet the complex cultural values about wilderness combined with the complex governance relationships among the four levels of government (City, Territorial, First Nation, and Federal) suggest potential challenges that will be the focus of the final section of this chapter.

10.6 Conclusion: The Challenge of Governance in a Gentrified Wilderness

It is not lost on many residents of Whitehorse that the local economy and the livelihoods and lifestyles it supports originate with government. Indeed many residents and employees of the City recognize that the current commitment to sustainability planning and practice in the City depends heavily on the infusion of funds from Federal Gas Tax money made available for that purpose. There are few illusions that many proactive initiatives, especially those concerned with sustainability would be far less ambitious with out 'extra' resources (i.e. beyond what could be generated by the local tax base). But the fundamental place of governance in the cultural and institutional fabric of the City goes beyond funding for programmes and special projects. The process of devolution and the directives and jurisdictions laid out in the Umbrella Final Agreement have transformed the institutional landscape of the Territory in general and the City of Whitehorse in particular. During this process of devolving federal powers and responsibilities to the Territorial government and the people of Yukon and the parallel process of First Nations' self government, the public service has (perhaps inevitably) expanded. Whereas once most federal employees in Whitehorse operated in a professional backwater, thousands of kilometres from 'head office', as YTG employees they are now at the centre of policy and decision-making. Furthermore, the number of well-paid, government jobs in the City has supported the emergence of a large, professional middle class, which plays a prominent role in shaping local debate, an increasing feature of which is the gentrification of wilderness or natural space within City limits and the emerging culture of sustainability.

Whether in conversation, meetings or formal interviews residents of Whitehorse consistently describe their community as a unique place to live, where the spirit of the frontier, a mentality of independence and living close to nature, merges with values and expectations of urban life, dubbed here the 'wilderness city'. Most residents of Whitehorse value the wilderness character of their City which is both surrounded by nature and permeated by large tracts of green space within City limits: the city in nature and nature in the city. Whitehorse's large land base has traditionally allowed for exceptionally large lots, often with sizable tracts of wooded area in between. These so-called 'country residential' lots, iconic features of the gentrified wilderness, exemplify the tension between

different pro-environmental cultures in Whitehorse. On the one hand the City is committed, both philosophically and strategically to sustainability as a planning and development goal. From their point of view, therefore, residential 'in-fill' or densification is a key strategy of both cost-efficient and environmentally sustainable planning as noted in the previous section. Nevertheless, while residents increasingly demand more sustainable and cost-effective urban management, there are many who strongly (and paradoxically) oppose increasing housing density in their neighbourhoods. Many interviewees spoke eloquently of the need for sustainability to both mitigate the causes of climate change and enhance the adaptive capacity of their city at the same time that they defended the ideal of the wilderness city experience. The internal values tension between the culture of living in (or at least close to) nature, and the desire to have a low impact on nature plays out in the conflict between the stated goals of the City's 'Strategic Sustainability Plan' that emphasizes the need for more compact and 'efficient' urban development and lifestyles and the desire of citizens to live in and maintain the perceived values and characteristics of the wilderness city. From the perspective of City administrators exposure-sensitivities and adaptive capacity in the future will hinge very much on how this tension is resolved. The governance institutions of the City appear well positioned in terms of structure and set to handle the challenges but it is the relationship with other levels of governance that will pose challenges.

This challenge of governance in a wilderness city, where the ideal of a gentrified wilderness is in tension with the goals of urban sustainability, is embedded in a complex political landscape in which institutional goals overlap and the residents of Whitehorse are potentially 'over' governed. Whitehorse administrators argue that their responses regarding the environment have changed, not so much because of changes in the environment as because of changing social understandings of how people should treat the environment. As noted, sustainability is both a social and a strategic goal. Governance institutions at the territorial level reflect a similar transition whereby the environment is increasingly acknowledged as not only something that people want to take care of but as something that needs protecting. At the same time, however, strong political and economic imperatives influence how governance institutions at the territorial level implement such environmental values. The territorial government, especially the current administration, is strongly oriented to natural resource development as an important dimension of securing the Territory's economic future. The reach of the City's institutions is limited and its aspirations for sustainability must take place within and take account of the philosophical and strategic orientation of the Territory.

To the many people in the City and Territorial governments and others we met with and interviewed in this study the impacts of climate change seem neither self-evident nor imminent. Nevertheless, the prospect of climate change adds to the uncertainty of the future for Whitehorse as it does for most communities in the north. The CAVIAR approach highlights the fact that community vulnerability and adaptation to climate change is best understood

as a social and environmental problem that may be, indeed often is, embedded in a melee of other problems. For larger centres, for gateway cities such as Whitehorse, people in government whose responsibility it is to manage the planning and implementation of governance upon which community life and civil society is based, are at the forefront of navigating what challenges the future holds. The process of devolution has challenged the people of Whitehorse, and Yukon more generally, to embrace change. Similarly, governance institutions have exhibited sufficient flexibility in the face of relatively large changes in both the political and economic landscape in recent decades. The greater vulnerability for Whitehorse in the future lies well outside city limits and indeed well beyond Territorial boundaries. Whether or not the institutional capacity of the City is flexible enough to cope with an uncertain future and the more extreme predictions for a changing climate remains to be seen. For the near term, the City's proactive approach to planning and focus on sustainability as a strategy for self-reliance, energy efficiency and cost control is both practical and adaptive.

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