

**Mining a Better Future:
Approaching Economic Growth and Sustainable
Communities in Context of Mining in Nunavut**

by

Nadav Goelman

B.A. (Professional Communications), Royal Roads University, 2010

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Approval

Name: Nadav Goelman
Degree: Master of Public Policy
Title of Thesis: Mining a Better Future: Approaching Economic Growth and Sustainable Communities in Context of Mining in Nunavut
Examining Committee: **Chair:** Dominique M. Gross
Professor, School of Public Policy, SFU

Nancy Olewiler
Senior Supervisor
Professor

Doug McArthur
Supervisor
Professor

Maureen Maloney
Internal Examiner
Professor
School of Public Policy

Date Defended/Approved: March 5, 2014

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Abstract

Resource development near isolated communities in Nunavut exacerbates preexisting social problems that are insufficiently ameliorated by the policy frameworks addressing them. Data from Baker Lake shows rising crime rates correlating with the mine's arrival; and failure to ameliorate stagnant, declining education outcomes. The current framework of policy is comprised of loosely coordinated efforts by the federal and territorial governments. Supplemental community-driven research was found to identify additional interventions that garner renewed local support and heightened efficacy. Economic modeling of estimated costs and benefits of these interventions within three alternatives: a local, regional, or territorial rollout, revealed plausible net benefits at various discount rates. Additional qualitative evidence of pros and cons for each alternative supported recommendation of up to three local pilot project(s) to assess efficacy of these interventions to mitigate, ameliorate, and prevent the negative side effects of resource development in Nunavut, and remove barriers to equitable sustainable economic growth.

Keywords: Nunavut; Economics; Communities; Sustainability; Mining; Education

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Executive Summary

Policy in Nunavut takes inspiration from Canada's Northern Strategy, which states its second objective as the pursuit of Social and Economic Development. To that end government has sought to remove barriers and mitigate substantial opportunity costs of investment in the territory. In 2012, Nunavut's public sector and public service spending contributed almost 60 percent of the jurisdiction's GDP. Mining is the only substantial industry (15% of 2012 GDP), which is attributable to Nunavut's singular operating gold mine. The Meadowbank gold mine is located 70 km from Baker Lake, a hamlet of 1,900 people (92% Inuit). There has been sustained interest in the impacts that mining has had on Baker Lake to help forecast impacts likely to occur in other communities as new mines open. Current exploration suggests, and my study assumes, that as many as eleven mines may begin operating across Nunavut in coming years. Socio-economic data and qualitative data comparing Baker Lake to its neighbours show cause for concern. Analysis shows that while employment, income, and rate of social assistance have shown improvement, crime has risen sharply, and educational attainments have failed to improve. ***The policy problem is that resource development near isolated communities exacerbates pre-existing social problems, and it creates new problems, that are insufficiently ameliorated by the policy framework addressing them.***

The study examines the policy problem with a mixed methods research methodology including:

1. A qualitative framework gaps analysis of systems supporting Baker Lake to improve public health, crime, employment, and education outcomes to assess the appropriateness of the current policy framework in Nunavut, and to identify concrete policy alternatives addressing the policy problem;
2. A quantitative exercise modeling estimated costs and benefits to people and impacts on the gross domestic product that rise out of the identified policy alternatives; and
3. Qualitative semi-structured and unstructured anonymous interviews, conversations, and consultations, with private sector representatives, public sector professionals, expert academics, and Inuit people.

Preliminary findings from the frameworks analysis pointed to a need for substantive community-driven development of culturally sensitive programs to enhance community buy-in and promote policy efficacy.

Two recent studies undertaken in Baker Lake examine the community held concerns about resource development and locally desired interventions to address them. These studies identify more than sixty potential policy options. I illustratively screened and consolidated these options into policy portfolios with elements including:

- Inuit run culturally developed women's shelters and alcohol drug treatment centres;
- Inuit and Inuktitut instruction in schools;
- Youth and elders centres with fitness and cultural recreational activities;
- New mining trades programs; and
- Inuit-impact benefit agreement negotiation classes.

Estimating the costs of these and other portfolio options required I make assumptions with respect to their size and scale in terms of salaries, building costs, and program administration expenses. These costs were then illustratively scaled up to estimate financial implications for the three policy alternatives in my research including:

1. One to Three Pilot Project(s);
2. A Regional Investment; and
3. A Territorial Approach.

I assess selection and scale of the alternatives based on my previous assumption that mining will accelerate across Nunavut, to all three regions, impacting many of the territory's 27 communities.

Quantitatively estimating the benefits of these portfolios is challenging because they may be wide reaching if effective. To obtain a quantitative estimate of the net benefits to Nunavut from the alternatives, I used a proxy approach, which looked specifically at the role of educational attainment in the community. I argue that the policy initiatives will contribute to improved parental support for education and societal conditions needed for education attainment. I employed the findings from a Centre for the Study of Livings Standards study (2007) that measured the incremental impact of increased Aboriginal educational attainment on the gross domestic product (GDP). With

these estimates I estimated the incremental impact of each policy on GDP at the municipal and regional level. Comparison of the present value of the incremental benefits of improved education against the present value of the incremental costs of more heavily investing in the programs, personnel, and infrastructure requested by the communities in local, regional, and territorial alternatives show that there is a net benefit for all three alternatives, except when economic growth is at the lowest level plausible under the different scenarios examined.

My estimates of the net benefits are conservative, by definition, because they ignore societal gains from improved public health and reduced costs of incarceration expected from lower crime rates.

Literature, the frameworks analysis, the economic model of benefits and costs, and interviews, conversations, and consultations all inform my analysis of the three alternatives in terms of their economic efficiency, cost, equitability, human development, administration, and stakeholder acceptability criteria. I remove human development from consideration because all three alternatives are assumed to internalize community-driven policy and so achieve this criterion. I also remove economic efficiency because it would not apply to the pilot project, and all three alternatives offer potential net benefits, and so they all achieve this criterion equally as well.

Final comparative analysis of the alternatives showed that one to three Pilot Project(s) would be the least costly, most administratively viable, and least resisted politically. However, it was also found to be inequitable because the pilot program needs to select specific communities; not all communities where potential large scale resource development may occur. The “Region Investment” level took the middle ground. Its cost and administration implications were substantial, with seven communities in Kivalliq, and there remain complex equity concerns both within the region and between regions. Alternative Three, the Territorial Approach is the most equitable in theory, as all 27 communities would be drawn into policy development roles. This does not mean that all receive the same net benefits. In addition, the costs and administrative complexities at this scale are very large, making it unlikely that a program could be implemented quickly. With a view that incremental policy change is most pragmatic and needed immediately,

I recommend alternative one: at least one, but preferably three, community-driven policy pilot projects be undertaken with coordinated support from territorial and government departments.

Local policy researchers should be hired to liaise with Community and Government Services, which would disseminate directions to respective federal and territorial departments.

Limitations of my study exist, but do not detract from my overall conclusions. Although I did not go to or engage Baker Lake in my research, I base my findings on very recent research that did. I attended a conference that facilitated consultations and interviews with Inuit people, the private sector, the public sector, and the academic community. While I do not estimate all benefits and costs that arise from my policies, the benefits not estimated (e.g., better health, less crime) are likely to be substantial and exceed the costs. In terms of implementation, there are capacities and personnel already in place in many communities, but I infer that incremental resources are required to address the continuing policy problem. Lastly, what about lessons learned from best practices from mining experiences in other jurisdictions? I did not include specific details because my assessment of the summary lesson is that communities typically need additional resources, programs, and time to increase the human and physical capacity of the region to accommodate extensive natural resource development. The scale of the additional investment is dependent on the community's initial conditions and their institutional capacity. My research aims to show the need to increase the capacity across Nunavut to improve the wellbeing of its residents with the advent of large-scale natural resource development.

Chapter 1. Introduction: Setting the Precedent

The Prime Minister's 2010 Speech from the Throne announced renewal of Canada's Northern Strategy with intent: "*to realize the potential of Canada's North for northerners and all Canadians*". Ottawa then reiterated its commitment to the Strategy in Throne Speeches in 2011 and again in 2013.

Canada's Northern Strategy is largely rhetorical policy intended to inspire and give direction to federal action, and inaction, pertaining to the three northern territories. It is not the intent of my project to evaluate the Strategy itself, however, but to draw from it the inspiration and license needed to explore northern solutions to northern problems. To this end I first acknowledge the Strategy's four foundational pillars. They are:

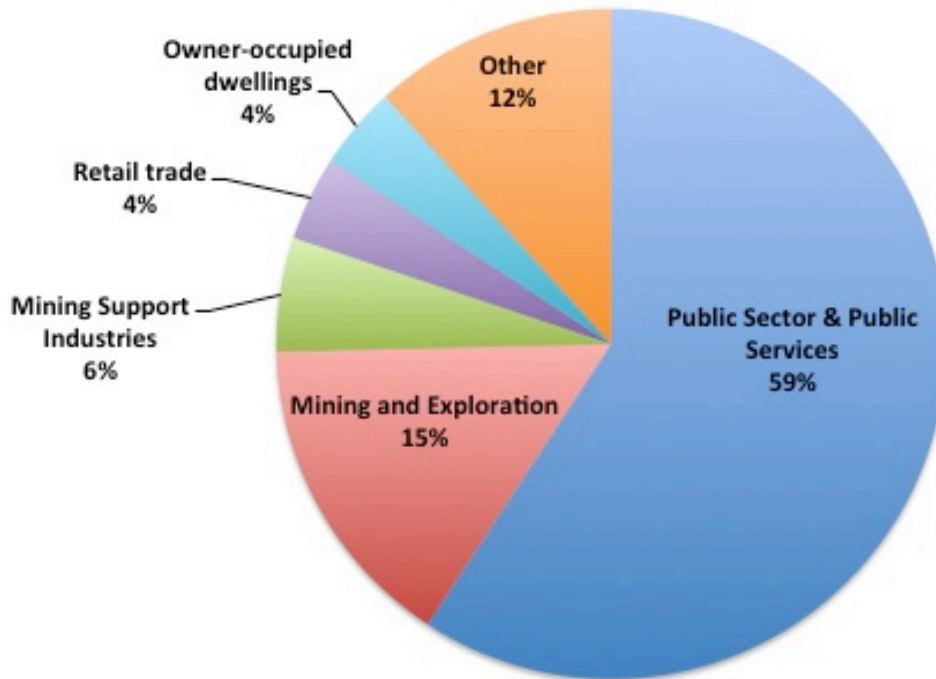
1. Exercising Our Arctic Sovereignty
2. Promoting Social and Economic Development
3. Protecting Our Environmental Heritage
4. Improving and Devolving Northern Governance

While the pillars are broad, they are indisputably parallel to many of the aspirational societal objectives pursued by all policy, and in every government. Safety and security; efficient, effective economies; human and cultural development; environmental sustainability and protection; and equality, equity, and fairness, are all fundamental societal goals, and for all of its shortcomings, Canada's Northern Strategy sets precedent for assertive policy contributing to them. This Capstone draws principally from pillar two.

In Nunavut public sector administration and public services, and mining are the largest contributors to the territory's gross domestic product (Nunavut Bureau of Statistics, 2012). As shown in Figure 1.1 below, I aggregated the various public services costs and estimate they contributed over 55 percent of the \$1.7 billion GDP (Nunavut Bureau of Statistics, 2012). Nunavut's single operating mine (the Meadowbank gold mine) contributes essentially all of the territories only substantive industry. The mine and

industries that support it i.e. warehousing, commercial transportation etc. contribute approximately 15 and 5 percent of GDP respectively (Nunavut Bureau of Statistics, 2012).

Figure 1.1: Nunavut Real GDP by Industry, 2012 - \$1.7 billion



Nunavut Bureau of Statistics (2012)

If trends continue, as my study assumes they will, up to ten additional mines will begin operating in Nunavut over the next decade (NWT & Nunavut Chamber of Mines, 2014).¹ Governments, motivated by interests to achieve this economic growth have sought to remove obstacles and reduce marginal costs to invest in the region, in part by improving the quality and quantity of services delivered to northern communities. To this end governments try to support communities' adjustment to resource development through a framework of community infrastructure grants for roads, waste treatment plants, cultural/recreation projects, and others (Infrastructure Canada, 2011); funding for mining trades training programs for mining trades (Clouthier, 2013), and small adjustments in education curricula (Peterson, 2012, p. 85). In the current framework

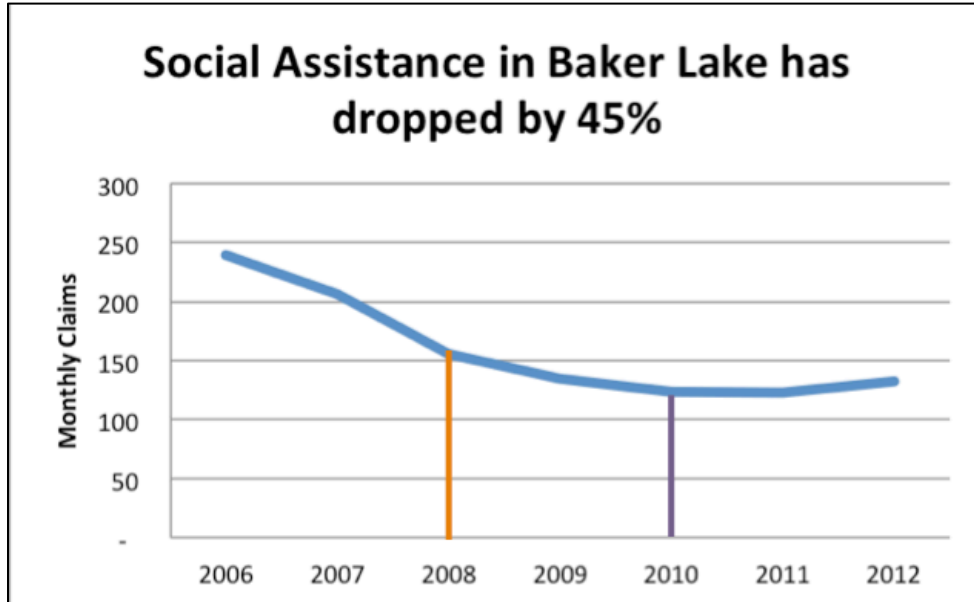
¹ See Figure 1.1 for a map of potential mines and Appendix A (table A.1) for more information.

numerous departments at both levels of government pursue these kinds of measures concurrently, but largely independently. Measuring the efficacy of the status quo is nowhere more important or evident than in the hamlet of Baker Lake, the community closest to Meadowbank.

Baker Lake is just 70 kilometers from Nunavut's only producing mine, it provides almost 70 percent of the Inuit labour force (Agnico Eagle Mines, 2013, p. 41), it is the only community connected to Meadowbank by road, and it is also situated most closely to Kiggavik, a proposed uranium mine site. I believe that Baker Lake's experience is an important test of the current community support for a resource development policy framework in Nunavut. I assess the impact of mining development by measuring change in numerous socio-economic and demographic indicators between 2006 and 2012 to incorporate two census years (2006 and 2011), the mine's construction period (2008-2010) and the first two years of the mine's operation (2010 to 2012). There is evidence that the current policy framework has not sufficiently offset the negative side effects of resource development, nor has it ameliorated pre-existing concerns in affected communities. Figures 1.1 through 1.6 illustrate first what are considered the positive impacts the mine is having on Baker Lake relative to Nunavut and/or the Kivalliq region.

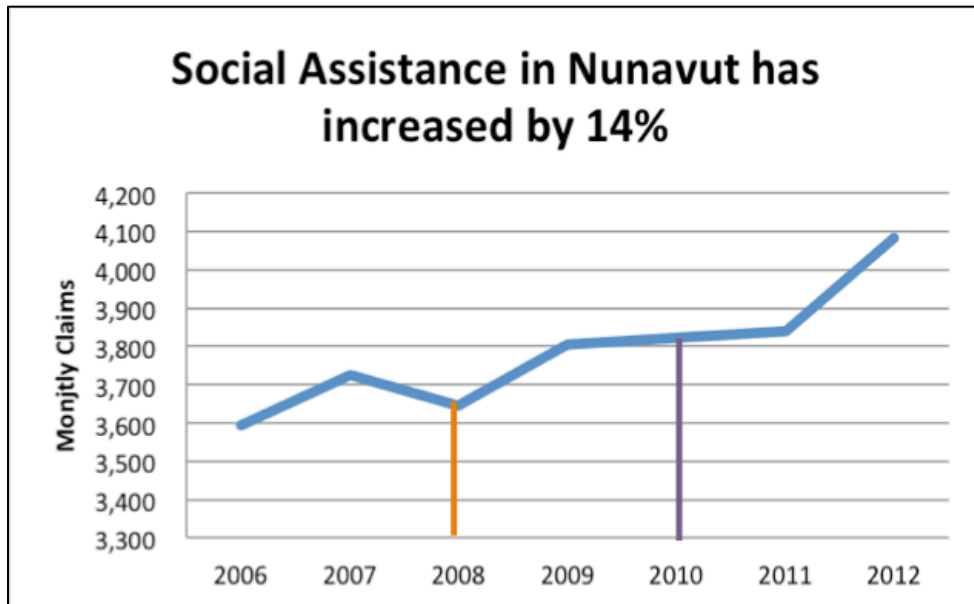
Positive Indicators

Figure 1.1: Social Assistance in Baker Lake



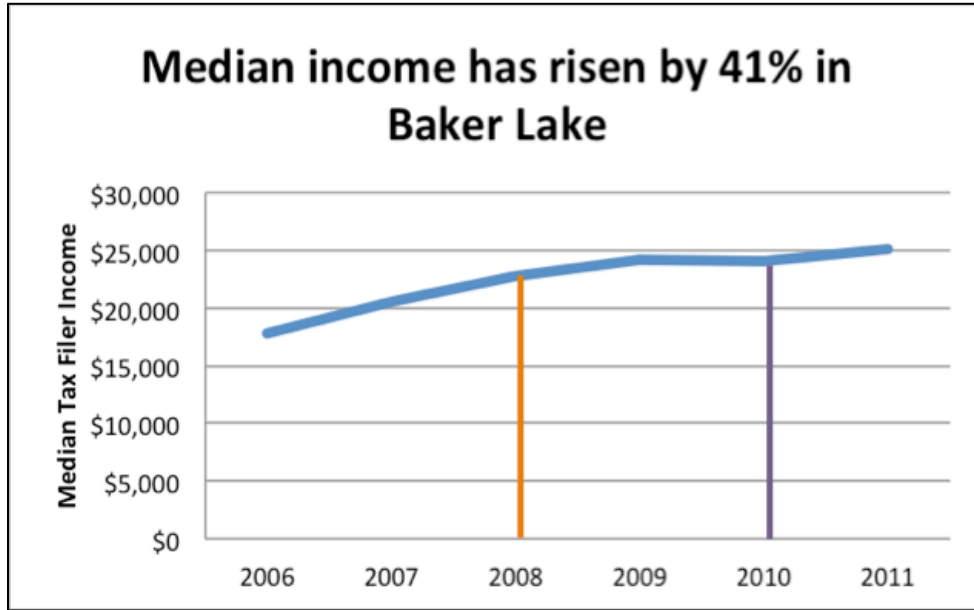
Nunavut Bureau of Statistics data table: Nunavut Social Assistance Average Monthly Caseload, 2000 to 2012

Figure 1.2: Social Assistance in Nunavut



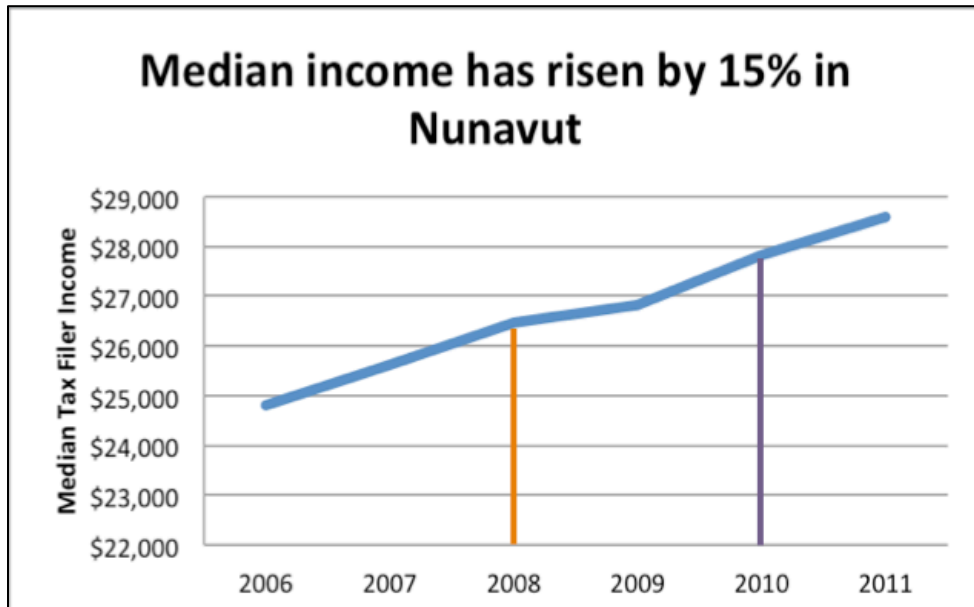
Nunavut Bureau of Statistics data table: Nunavut Social Assistance Average Monthly Caseload, 2000 to 2012

Figure 1.3: Median income in Baker Lake



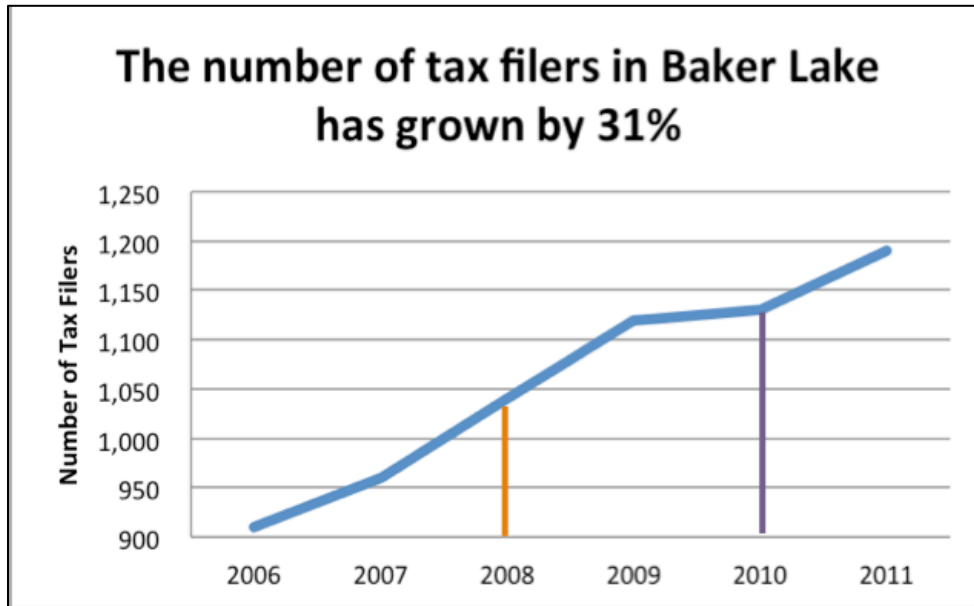
Nunavut Bureau of Statistics data table: Median Total Income of Taxfilers with Income, for Nunavut, Regions and Communities, 1999 to 2011

Figure 1.4: Median income in Nunavut



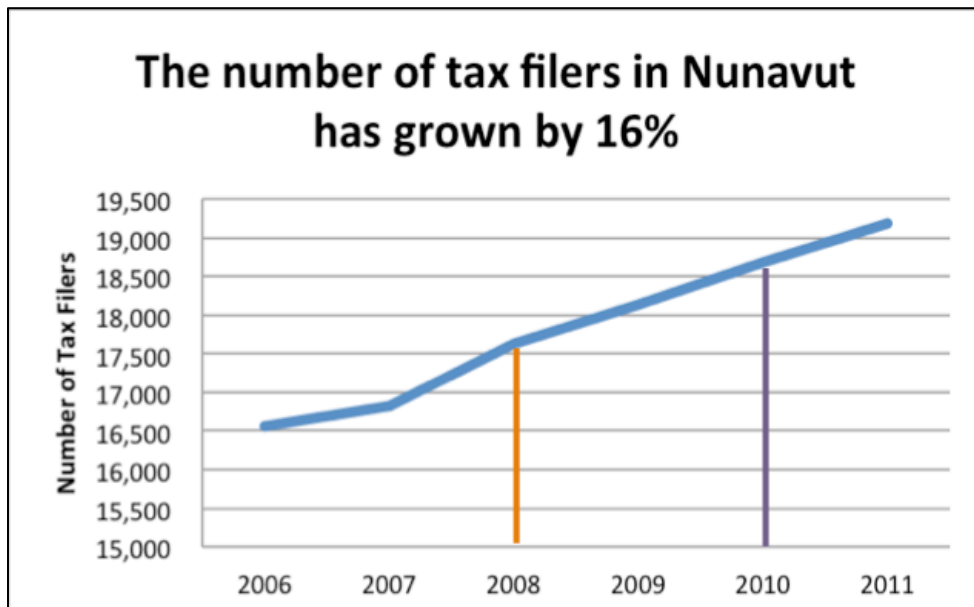
Nunavut Bureau of Statistics data table: Nunavut Median Total Income of Taxfilers with Income by Region and Community, 1999 to 2010

Figure 1.5: Tax filers in Baker Lake



Nunavut Bureau of Statistics data table: Number of Taxfilers and Population for Nunavut, Regions and Communities, 2004 to 2011

Figure 1.6: Tax filers in Nunavut

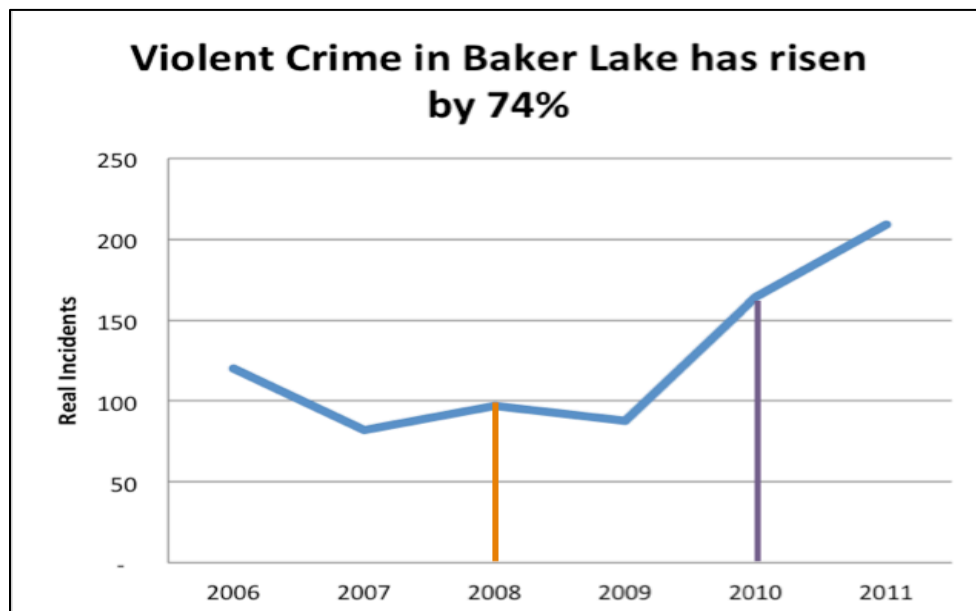


Nunavut Bureau of Statistics data table: Number of Taxfilers and Population for Nunavut, Regions and Communities, 2004 to 2011

The data above speak to positive impacts of mining in Baker Lake. Closer analysis shows of Figures 1.1 and 1.3 show that the positive changes plateau in 2009. From this I conclude that the relationship between mining and positive outcomes in Baker Lake's economy is weaker than expected. That said, the relationships between mining and emergent social problems in Baker Lake are clear. These relationships are explained in Figures 1.7 through 1.12.

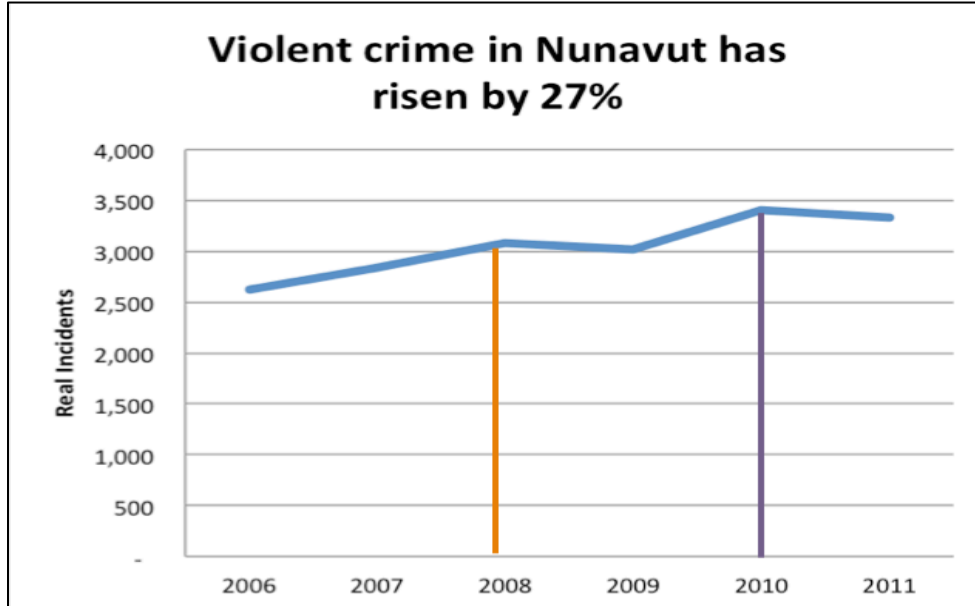
Problematic Indicators

Figure 1.7: Violent crime in Baker Lake



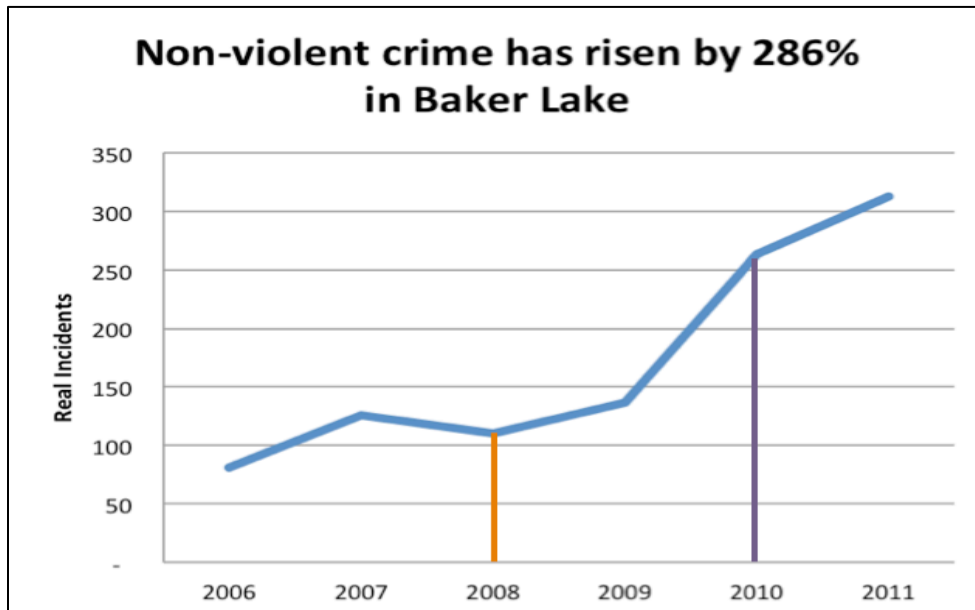
Nunavut Bureau of Statistics data table: Number of Violent Crimes for Nunavut by Region and Community, 1999 to 2011

Figure 1.8: Violent crime in Nunavut



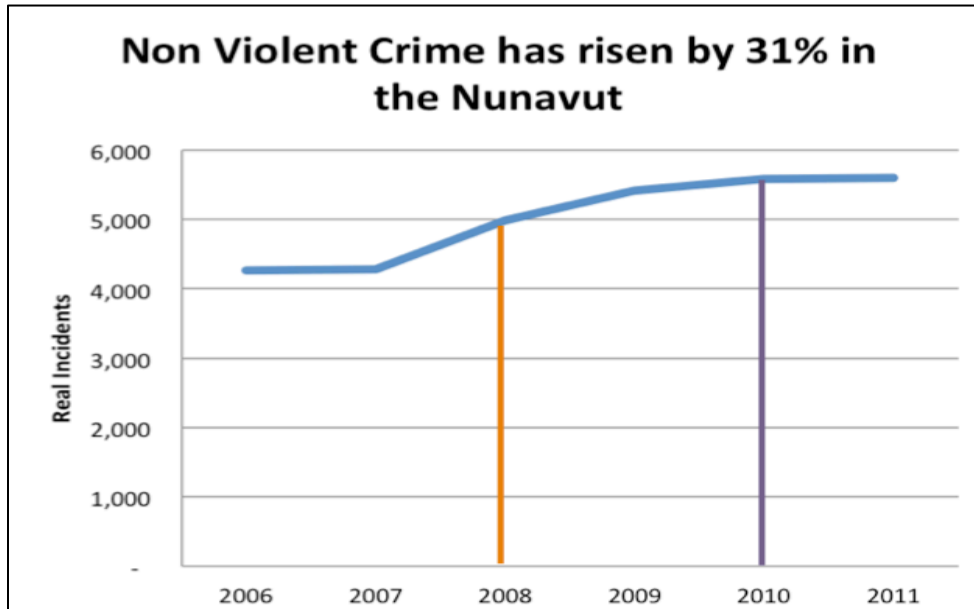
Nunavut Bureau of Statistics data table: Number of Violent Crimes for Nunavut by Region and Community, 1999 to 2011

Figure 1.9: Non-violent crime in Baker Lake



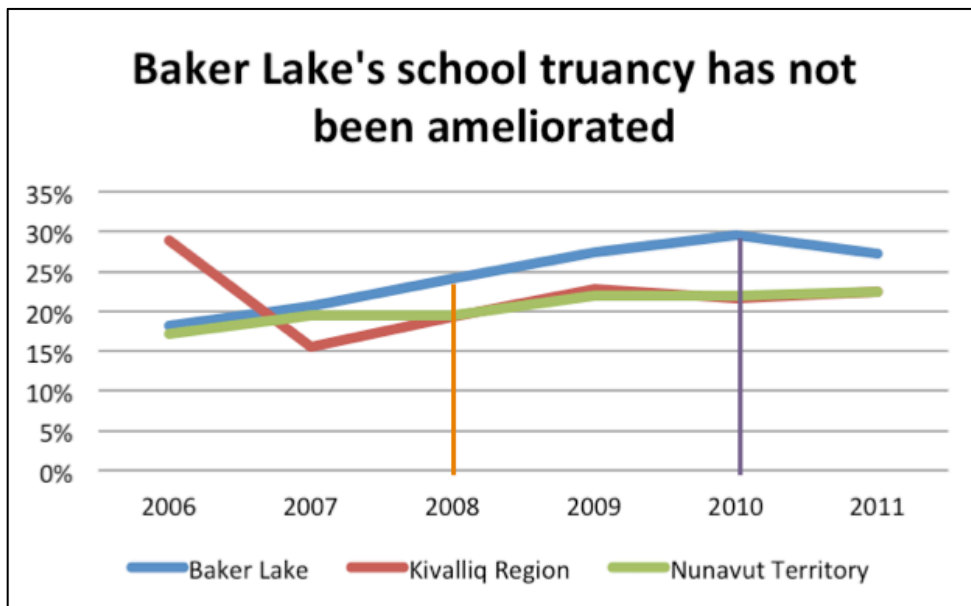
Nunavut Bureau of Statistics data table: Number of Non-Violent Crimes for Nunavut by Region and Community, 1999 to 2011

Figure 1.10: Non-violent crime in Nunavut



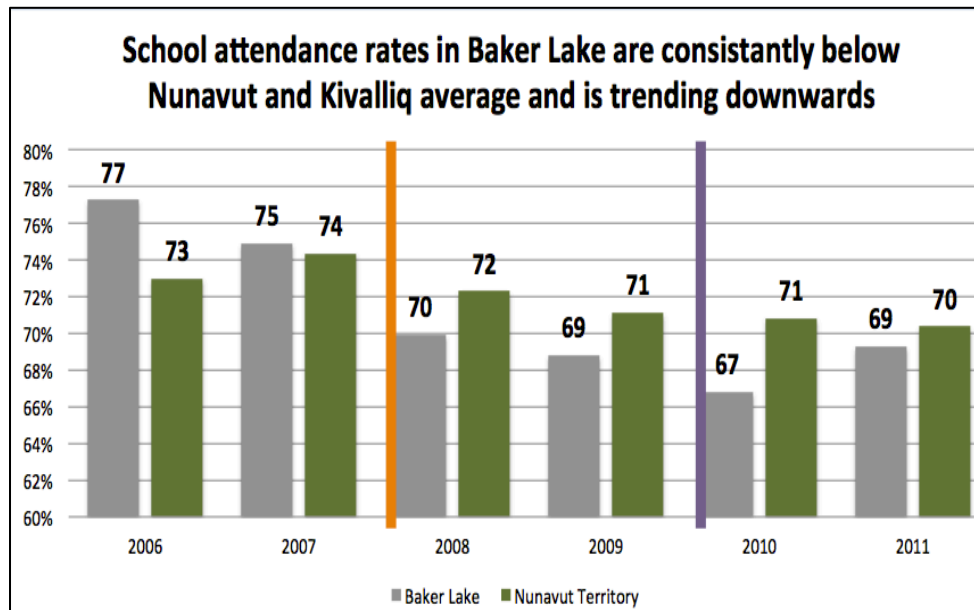
Nunavut Bureau of Statistics data table: Number of Non-Violent Crimes for Nunavut by Region and Community, 1999 to 2011

Figure 1.11: Comparing School Truancy for Baker Lake, Kivalliq, and Nunavut



Nunavut Bureau of Statistics data table: Nunavut Public School Truancy Rate, 2001-2002 to 2010-2011

Figure 1.12: Comparing school attendance for Baker Lake, Kivalliq, and Nunavut



Nunavut Bureau of Statistics data table: Nunavut Public School Attendance Rate, 2001-2002 to 2010-2011

This data substantiates my argument that the framework approach to community preparedness for economic development is variably effective. Furthermore, I perceive a need to consider the impacts of mining on Baker Lake from the perspectives of people who live there, and of the private firms that operate there. A draft Community Wellness study commissioned and published in AEM's 2012 Annual Report, Authored by Dr. Ben Bradshaw of the University of Guelph, hosts a qualitative interim report entitled: *"Developing Community Wellness Indicators in the Hamlet of Baker Lake"*.² Study findings illustrated in Table 1.1 highlight concerns held by local residents, which directly and/or indirectly arise out of mining operations that I argue underpin many of the socio-economic problems already discussed. Private sector perspectives then follow just prior to my articulation of the overall thesis of my study.

² The combined works of Bradshaw (2013) and Peterson (2012) offer the most current analysis of potential solutions to problems from inside Baker Lake and underpin my policy alternatives.

Table 1.1: Qualitative Indicators

Theme	Concern
Education	<p>Both parents...working at the mine...children miss school and do not eat properly</p> <p>Legacy of residential schools leaves many with negative views of formal education</p> <p>Lack of motivation to pursue schooling because you can work at the mine</p> <p>Some youth drop out of school due to low self-esteem; rising truancy</p> <p>Low opportunity to travel for post-secondary education</p>
Employment	<p>Low job retention at Meadowbank; no resources for single mothers wanting to work</p> <p>Difficulty with 2-week work structure and 12 hour shifts</p> <p>Inability to speak Inuktitut at the mine due to “safety” reasons</p> <p>Most work is untrained and entry level labour jobs that create low self-esteem</p> <p>Little assurance of transferable skills when mine closes</p> <p>Fear of sexual harassment prevent women from seeking or keeping employment</p> <p>Not enough people pursuing training in non-mining related fields</p> <p>Barriers to leaving the community to pursue training opportunities i.e., child care</p> <p>Concerns of benefit capture from mining; residents not receiving enough training to work</p>
Economic Development	<p>Baker Lake isn’t prepared to benefit from more mining</p> <p>Local economy is now totally dependent on the mine and will fall apart when it closes</p> <p>Lack of staff available for other jobs in town; few permanent opportunities for work</p>
Public Health and Safety	<p>Insufficient community facilities/equipment for physical exercise</p> <p>Rates of diabetes, tuberculosis, cancer</p> <p>Lack of self-esteem; and stigmas around seeking counseling</p> <p>Availability/accessibility of country foods; over-consumption of junk food/fast food</p> <p>Contamination of country foods; affordability of fresh foods for purchase</p> <p>Drug and alcohol dependency; incidents and attempts of suicide</p> <p>Levels of crime: vandalism, theft, break and enter; incidents of reckless driving</p> <p>Levels of garbage throughout the community</p> <p>Rates alcohol and drug induced violence, vandalism, vehicle accidents</p> <p>Youth staying out too late</p>
Culture/Human Development	<p>Lost family values from absent family members working at the mine</p> <p>Availability of daycare for children with parents needing to work</p> <p>Dependency on television and the erosion of local arts/culture</p>
Capacity	<p>Insufficient capacity of the Hamlet...to plan for the future...struggling to “keep up”</p>

Private Sector Concerns

Agnico Eagle Mines, owner of mine, also has concerns regarding the status quo, because Inuit staffing has been, and continues to be problematic. Denis Gourd, Agnico Eagle's Nunavut General Manager spoke to the 2012 Nunavut Mining Symposium. He argued publicly that the poor quality of Nunavut's labour force is one of the firm's most substantial problems. He said, "The most dramatic situation we have at Meadowbank is absenteeism and the turnover we have within our Inuit workforce (Nunavut and NWT Chamber of Mines, 2013, p. 4)"; and pleaded for support saying that: "There are way too many expectations from the RIAs [regional Inuit associations] and the hamlets. We cannot replace the government (Bell, 2012)." Documentary evidence corroborating his concerns is readily available. The mine's employee turnover amongst it's Inuit personnel, for example, was 67 percent in 2012 (Agnico Eagle Mines, 2013, p. 23).³⁴

1.1. The Policy Problem

If trends continue it is plausible that the problems observed in Baker Lake may occur in other communities like Pond Inlet, Rankin Inlet, and perhaps others that will soon host mines of their own. If these problems are not addressed through an examination and revision of the current framework the public interest will not be served because:

The policy problem is that resource development near isolated communities exacerbates preexisting social problems, and it creates new problems, that are insufficiently ameliorated by the policy framework addressing them.

³ Note that turnover at all mines can be very high initially. That said, Gourd's comments indicate to me that these statistics are, in fact, significant and above regular allowances in resource industries.

⁴ Of the 210 Inuit workers lost in 2012, 63 resigned, 11 were dismissed, and 136 were temporary workers choosing not to return, or who were asked not to (Agnico Eagle Mines, 2013, p. 23).

1.2. Research Objective

The objective of my research is: *to find policy solutions that support Inuit communities experiencing, what I have found, are evident and undesirable side effects of accelerating mining developments in Nunavut.*

1.3. Capstone Overview: Rationale & Terminology

This Capstone examines, models, and proposes alternatives for policy makers pursuing sustainable community in Nunavut in the context of expanding economic development. I explain my rationale study's exclusive use of the Meadowbank case study and define five key terms used in this research below.

1.3.1. Case Study Rationale

I base my findings on the Meadowbank case study because it is the best contemporary indicator of mining's impacts for Nunavut specifically. My rationale is that it is 1) the only operational mine in Nunavut; 2) the first mine in Nunavut in four decades, and so I want to examine the problem anew; 3) setting new precedent, the first of up to eleven mines opening in Nunavut in coming years; and 4) it operates in a relatively unique context found in Nunavut, i.e. mining in very isolated locations but with significant impact on specific nearby Inuit communities.

Without space or intent to provide a comprehensive overview of historical case studies of mining efforts in the north and its impacts on people, I considered their overall lessons. A broad survey of mines in Canada suggests that in the majority of cases, one observes negative side effects for communities nearby. I believe this common experience derives from economic assumptions, applicable for Meadowbank as well, that mining jobs increase opportunity costs, dramatically so for isolated communities, for education, cultural undertakings, family maintenance etc. This in turn speaks to Keynesian assumptions that communities' local economies need time to equilibrate to the realities of mining, and warrant government intervention to facilitate and expedite that effort. These lessons reinforce my argument that while the experience of Baker

Lake is not surprising, and should in fact have been anticipated, the need to provide increased support to Nunavut's hamlets in this time of rapid economic change is genuine.

1.3.2. *Defining Key Language*

My study relies on compound ideas, assumptions, and inferences to substantiate its recommendations. Terminology used is explained as the study progresses, but I define key language below to facilitate easier understanding of the narrative.

Policy Framework: the aggregate policy process addressing the policy problem.

Framework Gap: the policy space to be filled to improve the framework's efficacy.

Supplementary Framework: the overall approach identified to fill the framework gap.

Portfolio Options: the individual elements of policy portfolios that illustratively model the supplementary framework.

Policy Alternatives: the three choices of implementation magnitude for the policy portfolios that I use to model the supplementary framework.

Chapter 2. Policy Context: Surveying the Terrain

Nunavut's 27 communities are spread across a region roughly the size of Western Europe; they are home to fewer than 36 thousand residents; and they have no road connections to any of their neighbours (Kunuk & Stevens, 2003, p. 6). Contemporary Nunavummiut are recognized as having survived immense cultural upheavals as their communities adapt to the demands of the modern market economy. Indeed the pace of change and the challenges faced by the government in Canada's youngest most isolated jurisdiction are unparalleled.

Chapter 2 highlights the urgency of the policy problem. I first discuss the magnitude of mineral exploration in Nunavut and its implications for mining across the territory. Secondly, I examine the resource development investment climate in the north and some of the efforts made by government to streamline various regulatory processes that help reduce the marginal costs of mining. Finally I briefly reflect on the questions of enhanced human capital in the Inuit labour force writ large. Chapter 3 investigates the jurisdictional delegation of powers that govern, fund, and administer the current framework of policies, programs, grants, and personnel mandated to mitigate and prevent undesirable side effects of resource development.

2.1. The Magnitude of Mining in Nunavut

Meadowbank is just the first of many mines and other forms of resource development in Nunavut. While Meadowbank is the single operating mine today, it has set the standard for ten more potential mines. The pace of exploration and the large number of extraction projects in varying states of environmental assessment suggest the scale and rate of development will continue to accelerate. In section 2.1.1 I provide a cursory background of Meadowbank and its owner Agnico Eagle. Figures 2.1 and 2.2 illustrate that we have only scratched the surface of resource development in Nunavut.

2.1.1. Agnico Eagle Mines (AEM) & Meadowbank

AEM is based in Toronto, Ontario. It operates the Meadowbank mine and has in excess of 30 years of experience mining gold and silver in Quebec and Nunavut. AEM complies with its 2011 Impact Benefit Agreement, signed with the Kivalliq Inuit Association, representing the Hamlet and community of Baker Lake, and its 2007 Development-Partnership Agreement, signed by the Government of Nunavut. In my view, AEM has shown good faith within these agreements as demonstrated by Table 2.1, which lists some of the efforts Agnico Eagle has made to satisfy its obligations to Baker Lake as of 2010 (Agnico Eagle Mines, 2010, pp. 1-48).⁵

Table 2.1: Kinds of AEM cultural and philanthropic actions in Baker Lake

• Protection of archeologically important sites;	• Offering contracts to local businesses
• Training/education Inuit community members	• Mitigating damage to wildlife and ecosystems
• Prioritization of employment of local Inuit	• Contributing to community infrastructure
• Transportation of Inuit from their homes to work	• Supporting diversification of local industry

Meadowbank Mine

Initially explored by Cumberland Resources, AEM purchased a 100 percent stake in the project in 2007. AEM's website states that its second quarter gold production in 2013 was 92 thousand ounces, while its annual objective is to export 360 thousand ounces of gold (Agnico Eagle, 2013, n. page). Three years into its mine life, Meadowbank is expected to continue production through 2018. It currently employs 678 people.

2.1.2. One Mine Today, Eleven Mines Tomorrow

As is clear from the figures below, the implications of resource development from eleven mines will soon be felt across the full breadth of Nunavut, and therefore require

⁵ These are quantified and qualified in the full report available at: <http://ftp.nirb.ca/03-monitoring/03MN107-MEADOWBANK%20GOLD%20MINE/03-ANNUAL%20REPORTS/02-PROPONENT/2010/01-REPORT/Report%20to%20NIRB/110923-03MN107-Appendix%20E1-SEMC-DPA-IT4E.pdf>

assertive measures to ensure community preparedness for them. For more information regarding individual projects see the Table A.1.

Figure 2.1: Map showing Meadowbank, Nunavut's only operating mine



Published in the January edition of Northern Mining News, the NWT & Nunavut Chamber of Mines' periodical, used with permission.

Figure 2.2: Map showing Nunavut's eleven potential mines



Published in the January edition of Northern Mining News, the NWT & Nunavut Chamber of Mines' periodical, used with permission.

2.2. Marginal Costs and the Investment Climate in Nunavut

Canadian objectives for economic development over time motivate policies that maintain and promote favourable investment climates⁶. This is essential in that mining firms' willingness to invest will depend on potential for economic profits that fluctuate dramatically because of their sensitivity to changes in global commodities' demand. While long run forecasts remain optimistic about Canadian mineral and metal prices, even a short-term drop in demand can disrupt development. Cooling commodity prices in 2013 contributed to sluggish annual economic growth of just 0.5 percent in Nunavut,

⁶ The Policy Potential Index measures mining investment policy between regions. Nunavut placed 36th out of 79 jurisdictions (Rhéaume & Caron-Vuotari, 2013, p. 8).

that translated into diminished mining exploration expected in the territory (Conference Board of Canada, 2013). For policy makers, it is important to remember that mining company investments and profits are dependent on 1) efficient, predictable, and consistent regulatory systems that reduce administrative bureaucratic barriers to investment, and 2) the cost of conducting business in the region. The former assertion is supported by 2013 Conference Board findings stating that the greatest deterrents to mining in Canada are regulatory duplication, complexity, overlap, and time-consumption (Rhéaume & Caron-Vuotari, 2013, p. 21). Parallel efforts in the Northwest Territories to integrate environmental assessments, sometimes called “one-project/one assessment” (Canadian Environmental Agency, 2013), and the finalization of the 2013 Land and Resources Devolution Agreement, are intended to achieve this precisely. The latter assertion is significant because the marginal costs of surveying, planning, building, staffing, and operating mines are higher in Arctic latitudes than for any other, and even then are often higher in northern Canada because of the lack of basic infrastructure.

These obstacles have not gone unnoticed. While significant gains have been made through the efforts of organizations like the Canadian Economic Development Agency and others working to improve and expedite regulatory regimes in Nunavut, there remain significant questions regarding avenues by which to reduce costs for mining companies. There is little question that healthy communities, sufficiently supported, contribute to this pursuit, which prompts recognition of another implicit objective addressed in this study which is: to equitably, effectively, and efficiently integrate Inuit youth into the territorial and national economies.

2.3. Building Human Capital in the Inuit Labour Force

Although generally beyond the scope of this study, but worthy of brief mention, are long-term imperatives within the Canadian labour market to achieve greater participation and productivity amongst all Aboriginal people. Mining has been applauded by government (CBC News, 2013) and the private sector (Ragsdale, 2013), and also by many Nunavummiut (Taptuna, 2014), though not all (Boyd, 2013), from across the territory, for its creation of job opportunities as shown in Chapter 1. With a population median age in the mid-20s as compared to the mid-40s amongst non-Aboriginals, it is

plain to see the desirability of training and accessing what many regard as Canada's greatest untapped reservoir of domestic labour.

The current policy framework includes federal and territorial investments in human capital and supplementary requirements that private sector firms train and hire locally to increase participation and productivity in the economy, which they do. As of this report, Meadowbank mine has 226 Inuit employees of which 68 percent (154) come Baker Lake (Agnico Eagle Mines, 2013, p. 39). Agnico Eagle also offers ongoing training to all employees on an ongoing basis (Agnico Eagle Mines, 2013, p. 48). Across the region the policy resulted in nearly 500 Nunavummiut working in mining related fields in Nunavut in 2011 earning roughly \$50 million in gross wages (Department of Finance, 2012, p. 24). To further support development of human capital across the north the Prime Minister announced a \$5.6 million, four year, funding plan, the Centre for Northern Innovation in Mining in Whitehorse, Yukon (CBC News, 2013) during his 2013 Northern Tour. He also announced a \$5.8 million investment, through a new Aboriginal mining grant, in the Mine Training Society (Clouthier, 2013) targeted towards the Mining the Future project to train 400 Aboriginal miners in the Northwest Territories (BHP Billiton EKATI, Rio Tinto Diavik Diamond Mines, and De Beers, 2013, p. 9). My argument is not that these measures are incorrect, ill-intentioned, or poorly allocated, but rather that the evidence emerging from Baker Lake proves that they are insufficient. That is, despite best efforts within the current framework, the policy problem remains.

Chapter 3. Policy Makers & Stakeholders

In this chapter I identify departments, agencies, and functions at the federal, territorial, and municipal levels that contribute to the policy framework in question. I also include a concise profile of the hamlet of Baker Lake.

Disclaiming Jurisdictional Delegation of Powers

The federal government has devolved “province like powers” to the three territorial administrations through a series of legislated changes. Legislation includes the Yukon Act (2002), the Northwest Territories Act (1985), the Yukon Umbrella Agreement (1990), the Northwest Territories Lands and Resources Devolution Agreement (2013), the Nunavut Land Claims Agreement (1993), the Nunavut Act (1993). It should be noted, however, that until a territory achieves the full status of a province, the land, its peoples, communities, services, economy etc., remain fundamentally federal responsibilities. Sections 91 and 92 of the British North America Act (1867) do not apply constitutionally.

3.1. Federal Jurisdiction

The departments of Aboriginal Affairs and Northern Development Canada (AANDC) and the Canadian Northern Economic Development Agency, are among those with mandates contributing to Canada’s Northern Strategy as described in the introduction. Their combined mandates concern land management, land devolution, treaty negotiation, promotion of resource development, and removal of barriers to economic growth among others and are thus key actors in examining the current policy framework in Nunavut. Infrastructure Canada, Natural Resources Canada, Environment Canada, and Employment and Social Development Canada (formerly Human Resources and Skills Development Canada) also have principle roles. These departments host numerous programs aimed at improving and supporting economic growth and/or communities’ capacity to adapt and enhance qualities of life in Nunavut. A non-

exhaustive list of programs and grants that target economic development and community preparedness is below.

Table 3.1: Sample list of current federal programs

Mandates, Program, Grant, Funding	Department
<ul style="list-style-type: none"> • University and College Entrance Preparation Program • Youth Employment Strategy Program • Aboriginal Representative Organization Program • Governance Capacity Building and Accountability Program • Family Violence Fund • Environmental Capacity Development Initiative 	Aboriginal Affairs and Northern Development Canada ⁷
<ul style="list-style-type: none"> • Aboriginal Economic Development • Strategic Investments in Northern Economic Development • Community Infrastructure Improvement Fund • Economic Development Initiative 	Canadian Northern Economic Development Agency ⁸
<ul style="list-style-type: none"> • Gas Tax Fund • Provincial-Territorial Base Fund • Infrastructure Stimulus Fund 	Infrastructure Canada ⁹

It is noteworthy that federal transfer payments to the Government of Nunavut needed to provide services to the region were \$1.32 billion in 2012-2013 (Finance Canada, 2013), which equals 88 percent of the territory's 2012 public sector spending (\$1.49 billion) (Nunavut Bureau of Statistics, 2012). Beyond transfer payments the federal government continues to manage unemployment Insurance; operation of the army, navy, air force and coast guard; public taxation; construction of major infrastructure, housing, health care; public safety (police), and education.

⁷ <https://www.aadnc-aandc.gc.ca/eng/1100100027777/1100100027781>

⁸ <http://www.cannor.gc.ca/eng/1368816240563/1368816262134>

⁹ <http://www.infrastructure.gc.ca/regions/nu/nu-prof-eng.html>

3.2. Territorial Jurisdiction

Departments with relevant mandates are: Community and Government Services, Economic Development and Transportation, Education, Environment, Executive and Intergovernmental Affairs, Health, Culture and Heritage, and Family Services. The Nunavut Land Claims Agreement (1993) gave rise to semi-autonomous agencies that advise decision makers concerning land use i.e. mining's implications for people, communities and the environment. The system's chief members include:

Table 3.2: Territorial regulatory agencies

Nunavut General Monitoring Plan (NGMP)	Nunavut Planning Commission (NPC)	Nunavut Impact Review Board (NIRB)
<p>The NGMP monitors socio-demographic and socio-economic forecasting and presents findings to the Minister of Aboriginal Affairs and Northern Development Canada. The Minister has authority to review and permit developments. NGMP is a partnership between the Governments of Nunavut and Canada, and also with Nunavut Planning Commission and Nunavut Tunngavik Inc. (Nunavut General Monitoring Plan, 2013).</p>	<p>The NCP is an independent but public institution responsible for coordination between federal and territorial government, <i>designated Inuit organizations</i>, and others. It has responsibility for drafting and submitting land management policy to the Government of Nunavut for approval (Nunavut Planning Commission, 2014).</p>	<p>NIRB was created under the Nunavut Land Claims Agreement and is a public, multijurisdictional organization with membership from the governments of Canada and Nunavut, and from designated Inuit organizations e.g. the Kivalliq Inuit Association. Its mandate is to review and recommend policy pertaining to projects' social impacts, land impacts, and land management licenses and permits. NIRB reports to territorial and federal ministries (Nunavut Impact Review Board, (No Year).</p>
Nunavut Water Board (NWB)	Nunavut Wildlife Management Board (NWMB)	Nunavut Surface Rights Tribunal (NSRT)
<p>The NWB holds a mandate regarding management, use, and regulation of inland waters in addition to pursuing conservation measures ensuring optimal benefits for residents of Nunavut. The NWB collaborates with its regulatory and community partners e.g. hunter/trapper organizations (Nunavut Water Board, (No Year).</p>	<p>As the main regulator of wildlife management with the Nunavut Settlement Area the NWMB oversees all issues of access to wildlife both on land and in the marine coastal areas of the territory. It reports Nunavut's minister of the Environment.</p>	<p>The Nunavut Land Claims Agreement and the Nunavut Waters and Nunavut Surface Rights Tribunal Act (2002) transferred ownership resource rights to the Inuit.</p>

Figure 3.1 below shows surface and sub-surface Inuit land ownership, managed by the Nunavut Surface Rights Tribunal described in Table 3.2, near Baker Lake. The dark shading denotes surface and subsurface rights, and the pale shading denotes only surface rights (Nunavut Tunngavik Incorporated, 2012).

Figure 3.1: Map of Inuit Surface and Subsurface Resource Rights (2012) 10



Cropped from a 2012 map published by Nunavut Tunngavik Inc, used with permission.

¹⁰ See the whole map: http://www.ntilands.com/docs/iolmap2012_web.pdf

3.3. Municipal Jurisdiction

Municipal governments are the local hamlet offices that provide public services in communities that are, or will be, affected by resource development. The hamlet most impacted today is undoubtedly Baker Lake, while Rankin Inlet and Pond Inlet may soon be as well because of their proximity to the Meliadine and Mary River mine sites respectively. As the front line government, the hamlet manages day-to-day waste removal, vandalism, recreation, housing, community infrastructure, cultural development etc. The government of Nunavut staff directory lists almost 90 personnel in Baker Lake from the various departments.

The Hamlet of Baker Lake

Baker Lake is in the Kivalliq, also called Keewatin, region of Nunavut. I want to acknowledge the traditional Inuktitut title Baker Lake is *Qamani'tuaq* (Hamlet of Baker Lake, 2011). The community was founded when the federal government relocated groups of Inuit to the town site in the 1950s to more effectively deliver services to the region as wildlife populations dropped causing widespread hunger (Hamlet of Baker Lake, 2011). The “Big Three” firms in Baker Lake i.e. those contributing most substantially to the hamlet’s economy outside of Meadowbank, are Baker Lake Construction and Supply, Arctic Fuel, and Peter’s Expediting Ltd (Peterson, 2012, p. 40).

Table 3.3. Demographic profile of Baker Lake

Baker Lake Community Profile (2011 Census & 2011 Nunavut Housing Survey)	
Population	1,872
2006-2011 Population Change	8
Median age of the population	23
Total number of census families in private households	445
Size of census family: 2 persons	130
Size of census family: 3 persons	100
Size of census family: 4 persons	75
Size of census family: 5 or more persons	145
Average number of persons per census family	4
Total population in private households by Aboriginal identity	1,865
Aboriginal identity	1,745
First Nations (North American Indian) single identity	15
Métis single identity	-
Inuk (Inuit) single identity	1,715
Multiple Aboriginal identities	10
Aboriginal identities not included elsewhere	-
Non-Aboriginal identity	120
Total population in private households by non-official languages spoken	1,535
Inuktitut	1,520
Total population aged 15 years and over by highest certificate, diploma or degree	1,270
No certificate, diploma or degree	850
High school diploma or equivalent	170
Postsecondary certificate, diploma or degree	250
Total population aged 15 years and over by labour force status	1,270
In the labour force	790
Employed	640
Unemployed	150
Not in the labour force	480
Participation rate	62.2%
Employment rate	50.4%
Unemployment rate	19%

Selected Statistics Canada data: NHS Aboriginal Population Profile, Baker Lake, HAM, Nunavut, 2011

3.4. Regional & Aboriginal Interests

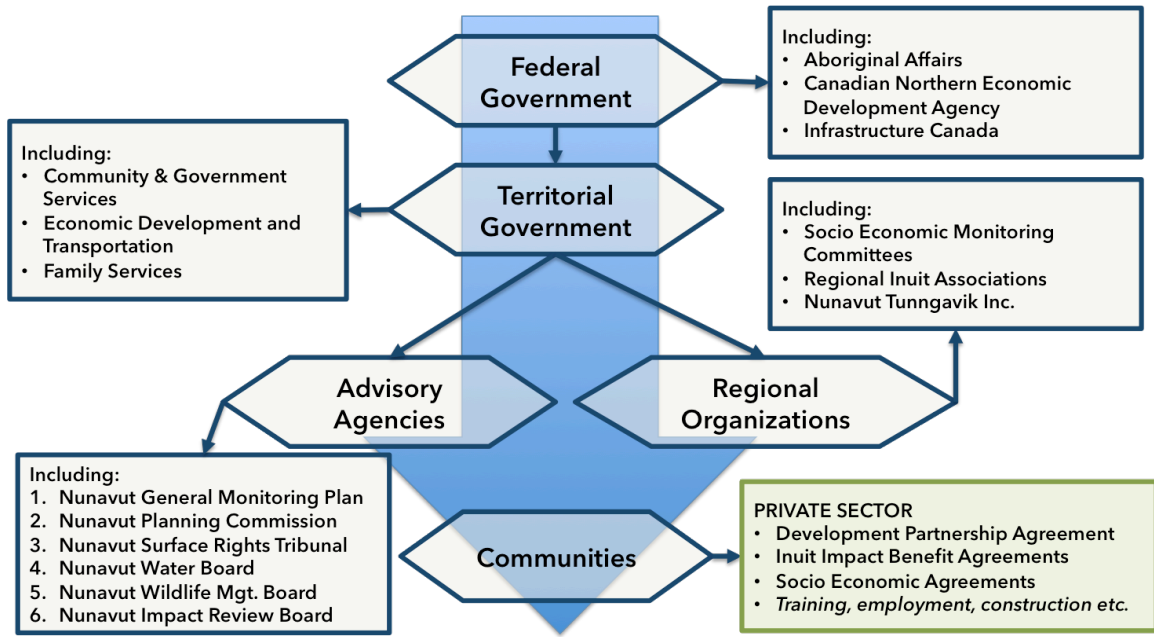
The preeminent Aboriginal organizations are Nunavut Tunngavik Inc., and the various Regional Inuit Associations (RIA). The relevant RIA is the Kivalliq Inuit Association.

Table 3.4: Regional and Aboriginal decision makers and stakeholders

Nunavut Tunngavik Inc. (NTI)	Kivalliq Inuit Association (KIA)	Kivalliq Socio Economic Monitoring Committee
<p>The NTI is mandated to pursue delivery on the government promises made in the Nunavut Land Claims Agreement. Priorities are land and water management, and wild life protection; it also coordinates Inuit responsibilities with federal and territorial government obligations (Nunavut Tunngavik Incorporated, (No Year). Its 1997 Mining Policy states that:</p> <p>“NTI will support and promote the development of mineral resources in Nunavut if there are significant long-term social and economic benefits for the Inuit of Nunavut, and is consistent with protection of the eco-systemic integrity of the Nunavut Settlement Area.” (Nunavut Tunngavik Incorporated, 1997, p. 2)</p>	<p>The KIA lobbies on behalf of Inuit interests within the Kivalliq region. It signed the 2011 Impact Benefit Agreement with AEM on behalf of the town of Baker Lake and other communities nearby. According to its “About KIA” webpage its mission is to:</p> <ul style="list-style-type: none"> • Preserve Inuit heritage, culture and language; • Manage Inuit owned lands in the region and provide information to and consult with land claims beneficiaries on land use; and to • Protect Arctic Wildlife and the environment, thereby preserving traditional uses for current and future generations. 	<p>The socio-economic monitoring committees’ ensure project efficient, accurate, and regionally focused compliance with all monitoring efforts required by the NIRB. They send data to the Department of Economic Development and Transportation for consolidation and dissemination to communities. (Government of Nunavut , 2013, p. 9)</p>

The policy framework is dependent on individual efforts of numerous departments in two levels of government. Their various decisions must reflect input from at least six semi-autonomous advisory agencies and also those of the numerous national, regional, and Inuit advocacy organizations. At the bottom of the framework are Nunavut’s isolated communities who must negotiate and solicit support from the framework with limited and often overextended resources. The policy framework is understandably bureaucratic but has proven insufficient in its capacity to ameliorate and mitigate problems in Baker Lake rising out of resource development. Figure 3.2 broadly illustrates the shape of the policy framework, as it exists today.

Figure 3.2: The Current Policy Framework



Chapter 4. Research Methodology

I undertook a mixed qualitative and quantitative methodology. I employed semi-structured interviews and consultative conversations with subject matter specialists; active attendance at a relevant national policy conference; a framework gaps analysis through literature; and a benefit-cost economic modelling exercise.

4.1. Interviews, Conversations & Conferences

Eight semi-structured interviews were carried out in person and over the phone with key informants with expertise covering the areas identified as concerns for the region. The goal was to obtain perspectives on the issues, costs, benefits and trade-offs for identified policy solutions. Objectives were to identify barriers, opportunities, motivations and other considerations impacting framework amendment options and the effects of resource development on Nunavut's communities. Semi-structured interviews and consultative conversations featuring broad topical areas of discussion were used to permit flexible discussion and two-way communication. Different kinds of experts were sought to provide an array of opinions and perspectives on the policy problem including: policy makers, academics, Aboriginal people, and members of the private sector.

From December 9th to 13th, 2013, I attended the ArcticNet policy conference in Halifax. The event is the national forum for Canada's most preeminent Arctic scholars, public servants, private sector representatives, and Aboriginal community members to gather and discuss recent findings, collaborations, research challenges, and policy problems. While in attendance I attended every talk, panel discussion, plenary, workshop, film, and Inuit cultural event under themes including community adaptation, economic development, community involvement in research, research engagement in the North, infrastructure needs, food security, self-governance, public health, and others. While there I spoke to several dozen students, academics, and more importantly,

Inuvialuit people, from the western Arctic, and Inuit people, from all over Nunavut, Nunavik (Quebec), and Nunatsiavut (Labrador). I also spoke to public servants, politicians, and members of the private sector. While discussions were unstructured and anonymous, I sought to discuss a wide range of issues pertaining to the policy problem in my study and obtain perspective on the issues and priorities as held by Inuit people in Nunavut specifically.

The findings of my interviews and un-structured conversations have been incorporated into all levels of policy options analysis discussed later, but will be referred to only in their aggregate to guarantee confidentiality.

4.2. Framework Gap Analysis through Literature

I reviewed academic literature to identify and understand the prevalent issues for Baker Lake and Nunavut writ large in order to reveal gaps in the current framework that could be filled as a means to address the policy problem. This inquiry was completed in two stages and constitutes the entirety of Chapter 5 of this study. In stage one I collected and summarized the most recent and relevant literature available that addressed key elements underpinning the policy problem. In stage two I examined, in detail, the methods and findings of two studies examining the impacts of mining on Baker Lake as perceived by residents of the community, and which articulate concrete opportunities for policy change that locals seek to ameliorate the negative effects of resource development.

4.3. Benefit-Cost Economic Modelling

In Chapter 6 I quantify the potential economic gains society should hope to observe should the policies I recommend prove effective. I first applied the findings and assumptions of a Canadian Centre for Living Standards study to current forecasts of growth in Nunavut's gross domestic product. Secondly, I assembled a series of assumptions regarding the financial implications of various policy options to estimate their respective costs. With these I applied a sensitivity analysis using a range of

discount rates against low, medium and high cost iterations of certain policy options to identify scenarios where the benefits of proposed changes in framework surpassed its costs.

Chapter 5. Framework Gap Analysis

Government has, and continues to make enormous investments in economic development and human capital in Nunavut, and yet the facts show that communities and individuals remain at risk. I believe there is a gap to be filled in the framework used to improve the state of affairs Nunavut. In this chapter I investigate the literature to identify the nature, the origin, and the necessary means of mitigating the impact of this framework gap. Once the broad approach needed to improve the framework is identified I will have gained entry into the policy analysis process with a clearer sense of where renewed efforts need to be made. This in turn facilitates identification of broader implementation alternatives and also the needed evaluation criteria and measures that address their relative strengths and weaknesses. Only by distilling the nature of the gap within the current policy framework can I ultimately make a recommendation addressing it. I begin with section 5.1, an inquiry into the most important individual facets of the policy problem, which catalyze into an approach able to fill the framework gap. This approach becomes a framework that I recommend in section 5.2. I continue in section 5.3 to examine findings, lessons, and opportunities from two recent studies completed within Baker Lake that give ultimately give rise to specific alternatives themselves.

5.1. Elements of the Gap: Sorting out the Pieces

The underlying elements most relevant to the policy problem were made clear in Chapter 1 and include education, employment, health, and crime. Each of these must be addressed to enhance communities' experiences with mining. To summarize, sections 5.11 through 5.14 highlight that individual outcomes depend on completed high school education, physical, mental, and cultural health, and also on the potential for employment. These in turn depend on adult employment training, mental health support and treatment facilities. Their success is further contingent on sustained availability of teachers, administrators, and others that are qualified and supported with professional

development opportunities for Inuktitut and English/French bilingual Inuit staff. Effective policy in Nunavut will be policy that is identified by and therefore supported by individual communities. These policies will be holistic in their delivery of programs, personnel, and needed community infrastructure; they will be culturally sensitive, staffed by local residents, and built to enhance overall capacity.

5.1.1. Education & Capacity

School attendance, truancy, graduation, opportunities for post-secondary education, and enhancement of capacity at all levels were among concerns held by residents of Baker Lake. The key ingredients of improved educational outcomes and the capacities needed to achieve it evidently require ongoing professional development and continuing training for Inuit teachers and administrators; long-term predictable funding; securing parental support for education; culturally sensitive curricula, and viable employment prospects for graduating students. These requirements are supported in the literary evidence below.

Aylward (2009), Aylward, (2010), Ayres (2012), Berger (2009), and Lees, Burgess, & Walton, (2010) examine the strengths and shortfalls of education delivery in Northern Canada, and in Nunavut specifically. Berger (2009) said:

Schooling in Nunavut is in crisis...Inuit have lacked control over schooling for the entire history of schooling in the eastern Arctic...for schooling to work well for Indigenous and minority students, culturally sensitive curriculum, and pedagogy are needed, and communities must feel ownership of schooling (Berger P. , 2009, p. 73).

Creation of sustainable high quality education in Inuit settings has encountered numerous logistical obstacles, chief among them the remote location of the communities themselves, and therefore the high marginal cost of training and professional development for teachers and administrators (Lees, Burgess, & Walton, 2010) (Berger, 2009). Despite its challenges, however, the need to improve capacity and education continues to drive efforts to learn more about the keys to successful schooling in Nunavut, all of which depend on increased long-term sustained funding (Lees, Burgess, & Walton, 2010) (Berger, 2009).

Broader capacity within community, education outcomes for the members of that community, and the capacity needed to provide that education go hand-in-hand (Lees, Burgess, & Walton, 2010). The term capacity building in education has been applied to encompass the investments in the system ranging from redesign of training for teachers and school boards, and also the “creation of professional learning communities inside and outside school (Lees, Burgess, & Walton, 2010). Furthermore, components of improved capacity needed to provide meaningful education are the development of professional abilities and leadership capacity for parents, educators, policy makers, and other supportive community members; and the parallel but independent academic capacity for students throughout the system (Lees, Burgess, & Walton, 2010) (Berger, 2009) (Ayres, 2012).

Increasing capacity for education administrators, teachers and community members would require multi-cultural collaborative co-principal-ships comprised of Inuit and non-Inuit professionals (Lees, Burgess, & Walton, 2010). Also, the pressing need for qualified high-calibre administrators, which surpasses the supply of trained educators, have led to calls for recruitment of qualified administrators and teachers from outside the schooling system, but who have leadership and visionary acumen that can be brought to bear (Lees, Burgess, & Walton, 2010). Regardless of being Inuit or non-Inuit, or of being a teacher or an administrator, there is a profound need for mentorship relationships and programs to help professionals arriving from elsewhere to adjust to life in Nunavut and to expose all education professionals to the skill sets of others in the system (Alward, 2009) (Aylward, 2010) (Lees, Burgess, & Walton, 2010). Perhaps most important of all is increasing the numbers of Inuit teachers in Inuit schools (Aylward, 2010) (Ayres, 2012) (Berger, 2009). Lees, Burgess, & Walton (2010) quote Cherubini (2008) and Schwab (2001) saying respectively that “teachers, Aboriginal teachers, are key to improving Aboriginal education and by extension the communities they live in”; and “the impact of Indigenous staff on student self-esteem is almost incalculable...There is no greater sign of respect for Indigenous culture that the presence of Indigenous staff” (Lees, Burgess, & Walton, 2010) (Berger, 2009). One suggestion is that Inuit students with early signs of teaching acumen be identified and encouraged, from early in secondary school, to consider careers in education; and another is to provide Inuit teachers and school support staff with training programs permitting them to acquire credentials remotely and

incrementally while remaining in their home community (Lees, Burgess, & Walton, 2010) (Ayres, 2012).

Parental engagement and support of education has been difficult because of parents' memories of "poor and sometimes abusive experiences" of school (Berger, 2009) (Alward, 2009) (Ayres, 2012), but it is understood that parental support is essential for widespread success of education. Support from parents is dependent on the degree that Inuit language, bilingualism and Inuit Traditional Knowledge, known as *Inuit Qaujimaqatuqangit* (IQ), is infused into a curriculum (Berger, 2009) (Alward, 2009) (Aylward, 2010) (Ayres, 2012). To be successful, an Inuit inspired curriculum, referred to as *Inuuqatigiit*, needs be assembled through rigorous meaningful consultation and collaboration with local Inuit elders and community members (Alward, 2009). Goals of *Inuuqatigiit* include the retention and renewal of Inuit language and cultural practise (Aylward, 2010). If achieved this should help mitigate some parents' unwillingness to exercise authority to ensure students' attendance and preparedness for school, which can be contrary to the high cultural value placed on individual autonomy (Berger, 2009). Parental support also appears contingent on perceived employment opportunities from education upon graduation. Hence, it is imperative to provide meaningful employment opportunities to youth in Nunavut if there is to be sustained incentive for parents to push their children to study (Berger, 2009).

5.1.2. Employment

Despite growth in employment in Baker Lake since operations at Meadowbank began, there remain concerns regarding long-term job creation, retention, and training for Inuit youth. Fundamental improvement of employment prospects will revolve around the ameliorating education deficits and creation of meaningful local job opportunities to incentivise individual agency in school, as described above. However, additional culturally-sensitive emphasis is needed to ameliorate explicit and implicit racism in the public and private sectors of Nunavut, improve the states of Inuktitut, and English and/or French literacy, and improved availability of higher education/vocational training in Nunavut.

The Nunavut Literacy Council's 2007 report: *Barriers to Youth Employment in Nunavut: A Research Report and Action Plan* identified barriers to employment, and recommends use of policy to ensure the private sector provide Inuit training opportunities, adult education, professional development, credentialing, and local labour force employment quotas (Nunavut Literacy Council, 2007, p. 17). The table in section 2.1.1 shows that these recommendations have largely been incorporated into existing Inuit Impact Benefit and Development-Partnership agreement processes in the current round of development in Nunavut. Key barriers that government still needs to address as identified in the study are expanded on below.

Racism and colonialism and their effects

Creation of Nunavut and the passing of the Nunavut Land Claims Agreement have contributed immensely towards Inuit self-determination. Cultural emotional scarring from protracted efforts to Europeanize Inuit people still remain (Nunavut Literacy Council, 2007, p. 3). Policies aimed at bringing nomadic family groups off the land to settle in hamlets were often coercive and sometimes violent, and have not been forgotten (Nunavut Literacy Council, 2007, p. 3). This legacy, made worse by lived experiences in the residential school system, has resulted in substantial disparity in socio-economic and employment outcomes in Nunavut (Nunavut Literacy Council, 2007, p. 3). The situation today, where large numbers of administrative, educational, government, and other high-level personnel are Caucasians from southern Canada, or further abroad, subtly reinforces local perceptions of ongoing oppression (Nunavut Literacy Council, 2007, p. 3).

Inuit language and traditional learning style

The government of Nunavut has made it a priority to ensure that Inuktitut is “the working language” in the territory (Nunavut Literacy Council, 2007, p. 4). To this end bilingualism in Inuktitut or Inuinnaqtun (two Inuit languages) and English or French is a growing imperative for successful Inuit workers (Nunavut Literacy Council, 2007, p. 5). Employers increasingly seek staff that can read and write in at least two languages so as to communicate with the public in Nunavut and with the private sector based in the south (Nunavut Literacy Council, 2007, p. 5). Bilingualism is no simple feat. Written Inuit languages are a modern invention that is less pervasive than its spoken counterpart,

something that is further complicated by Inuktitut dialectic variation in pronunciation and spelling. This necessitates use of English among young people and in most professional and administrative settings, and therefore the rise of preponderantly unilingual cohorts of people who fluently speak, read, and write either Inuktitut i.e. elders, or English i.e. youth, but seldom both (Nunavut Literacy Council, 2007, p. 5). I argue that this is evidence of linguistic structural unemployment in Nunavut in that the language skills in the labour force do not match the skills demanded of the regional economy. Given findings in the education section, I infer that literacy too would be best addressed inclusively and within communities.

Limitations within the School System

Beyond the scope of this study, are barriers to employment result from limitations within Nunavut's school system including limited opportunities within Nunavut communities to attend the Arctic College system; student learning disabilities (sometimes resultant from fetal alcohol syndrome); and the already acknowledged lack of English and Inuktitut literacy skills (Nunavut Literacy Council, 2007, pp. 7-13).

5.1.3. Physical & Mental Health

Incidence of cancer, tuberculosis, diabetes, substance abuse, depression, suicide, and unhealthy dietary practises were among concerns of Baker Lake residents. These complications are not unique to Baker Lake, and given that these socio-economic problems include pre-existing poverty, violence, unemployment, overcrowding, food insecurity, and substance abuse (Cameron, 2011) (Owens, et al., 2012) (Young & Chatwood, 2011) they will need resolution within a greater policy framework helping communities that are, or will, feel the impacts of accelerating mining effort. Evidence below argues that holistic community-driven research, culturally inspired, predictably funded, Inuit staffed, health and mental health resources and capacity will be at the core of ameliorating these concerns.

Findings from the three reports: the *State of the Knowledge: Inuit Public Health, 2011*, the *Inuit Health Survey 2007-2008: Nunavut Community and Personal Wellness*, and the *Nunavut Report on Comparable Health Indicators 2011*, and from papers by Owens et al. (2012) and Young and Chatwood (2011) elaborate on these.

Fetal alcohol spectrum disorder, respiratory disease, cardiovascular disease, and sexually transmitted illnesses (chlamydia and gonorrhoea), remain prevalent and may be on the rise (Cameron, 2011) (Owens, et al., 2012) (Young & Chatwood, 2011). These and other health and mental health concerns, specifically issues of suicide and substance abuse, are the highest priority for Inuit people (Cameron, 2011). Many environmental stressors in Nunavut's communities (overcrowding, unemployment, rapid cultural change etc.) often motivate excessive consumption of drugs and alcohol (Cameron, 2011) (Nunavut Tunngavik Incorporated, 2012).

Difficulties with mental health stem from factors such as loss of culture, lack of recognition, poverty, housing issues, violence, abuse, addictions, and intergenerational trauma related to residential schooling and institutionalization for tuberculosis (Cameron, 2011, p. 25).

To address this, Nunavut will require a holistic and community-based approach to public health that includes all community members at every level of decision-making, and which internalizes *Inuit Qaujimagatuqangit* (Inuit Traditional Knowledge) in its formulation (Cameron, 2011). Development of culturally sensitive Inuit health and wellness indicators to properly inform decision makers is essential for sustainable, effective, and equitable physical mental public health (Cameron, 2011). Calls have been made to reinforce gains made by the Inuit action plan for mental health, the *Allianait*, with a Canadian national suicide prevention strategy and for increased sustained funding for the National Aboriginal Suicide Prevention Strategy (Cameron, 2011).

There are substantial challenges to these reforms. Severe deficits of staff and professional training in remote communities result in high rates of burnout and turnover, and the lack of culturally driven mental and physical health programs reduces propensities for existing programs' efficacy (Cameron, 2011). The absence of reliable longitudinal public health data from Nunavut means that decision makers often perceive an insufficiency of information needed push policy reform forward, which leaves most efforts mired in bureaucracy (Cameron, 2011). Substantial increases in Inuit capacity are required to integrate local, territorial, and federal health care services, and also to collect, analyze, and interpret data to buttress funding proposals for health care services in individual communities (Cameron, 2011).

5.1.4. Crime

Crime rates and severity of criminal activities in Nunavut are significantly higher than for any other jurisdiction. Interview data related that, at its root, crime is a symptom of 1) apparent failures to address the physical and mental health, employment, education, and capacity concerns articulated in the previous parts of this chapter; 2) increased volumes of disposable income in communities with large numbers of people working at mines i.e. Baker Lake; and 3) rapid and painful colonization processes and cultural loss that is still in living memory of many Nunavummiut, including legacies of residential schools, which can motivate distrust and disengagement from even the most well intentioned policy. Assuming this is correct the policy must ensure it targets the underlying elements as a means to ameliorate crime.

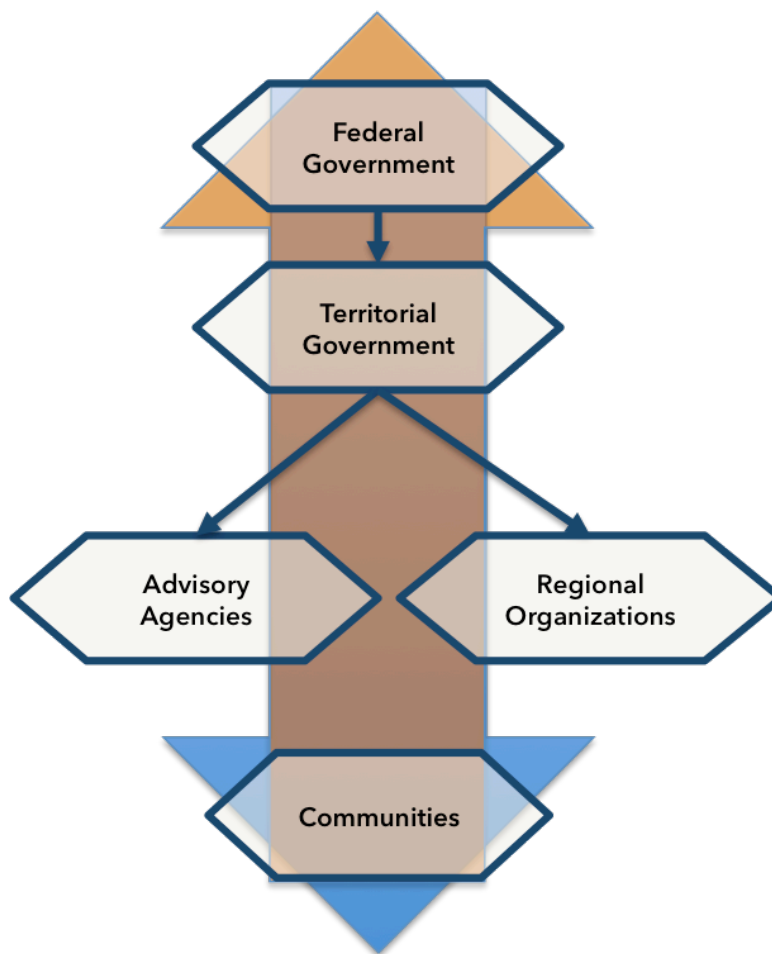
5.2. A Community-Driven Supplementary Framework

Chapter 3 examined the current framework used by decision makers to provide services intended to ensure communities benefit and adapt in healthy ways to the realities of resource developments. Not surprisingly, is that the framework is fundamentally a top-down endeavour beginning in Ottawa, administered by Iqaluit, advised by territorial semi-autonomous agencies, and monitored by regional organizations. This framework is institutionally entrenched in Canadian governance and it would not be plausible to recommend dismantling it, even though it has proven insufficient to address the policy problem. Chapter 4 highlighted the interconnectedness of the problems and repeatedly reference local solutions as needed to resolve them.

The indicators presented in Chapter 3 and information in this chapter provides evidence that the current framework has not been sufficient to address the myriad of social and economic problems in individual Nunavut communities. I therefore recommend exploration of a community-based bottom-up approach to augment the existing top-down framework. The principle need is to engage community members in meaningful dialogue about the concerns that they have, and the ways in which they should be dealt with. By weighting the interests of individual communities more heavily, there will be increased propensities for policy presented through cultural lenses that

should result greater community member buy-in and aggregate systemic efficacy. If successful we will have improved overall wellbeing and hopefully increase propensities for parental support for education etc. This approach would supplement the top-down efforts already underway and would be implemented by the relevant departments, as they currently exist. I am not recommending fundamental changes in the structure of government, but rather an incremental change in the weighting of priorities where decisions are made.

Figure 5.1: Illustration of a Bottom-Up Framework



5.3. Progress & Opportunities as Described in Baker Lake

To deepen understanding of the needs of communities and how a community-driven supplementary framework could be implemented, I examine in detail two recent

studies, undertaken in Baker Lake, that built on one another (Peterson, 2012 and Bradshaw, 2013). These studies provide the basis for my policy analysis.

5.3.1. *Community Experiences of Mining in Baker Lake, Nunavut*

Peterson's study illustrates a more complex portrait of the community experience with the Meadowbank mine than was provided in the introduction. The study stated its intent to move beyond "generalized community-level experience (p. 4)" and it aimed to identify opportunities for policy and programming that fills niches in the community that may otherwise be overlooked. It did this with a methodology comprised of 27 in-depth two-part interviews and 11 focus groups of 3 to 6 participants all of whom were local residents. Focus group participants were drawn from Baker Lake community subgroups such as young mothers, youth, teachers, and business owners (p.62). Research was obtained over the course of a two-month field season in the community. In both methodologies part one asked interviewees and/or focus group participants to provide biographical histories of their life to determine both the prominent elements of the individual life stories and the relative importance of those elements as held by the individual. Part two asked participants about their direct or indirect experiences with the Meadowbank gold mine, and to consider their hopes and expectations for their community on a five to ten year horizon. The study had three chief objectives, which were to:

1. Develop a conceptual model of the determinants of individual experiences with mining in Baker Lake through review of scholarly context;
2. Empirically assess the diversity of experiences with mining in Baker Lake by collecting individual and group understandings of how mining has changed their community, for better or worse; and to
3. Translate the results into usable information for the community.

(Peterson, 2012, p. 8)

The study acknowledged that experiences of mining in Baker Lake vary from group to group, but that benefits from mining are not distributed evenly with businesses owners thriving more greatly than many others. Peterson found that ongoing challenges for Baker Lake are made worse by prospects of the Kiggavik mine project that will likely open nearby. Residents harbour doubts about capacity of their infrastructure,

institutions, and personnel to manage both mines concurrently, and are concerned about the future of their community. Peterson’s recommendations substantiate the need to address the underlying elements of social problems and community support systems in light of expanding resource development. They emphasise education and training, enhancement of community infrastructure, and increased investment in local human capital as a means to increase capacity and improve propensities for community benefit from current and future mining projects (p.130).

Results were grouped into thematic areas as they relate to views of mining near Baker Lake. Her findings corroborate the policy problem, but also speak to policy opportunities, expanded on in the second study, which facilitate my transition into the analysis of the options themselves. I summarized her findings under their original headings in Tables 5.1-5.3 below:

Table 5.1: Perceptions of Employment, Mine Schedules, and Income and Spending

Employment	Scheduling	Income and Spending
New employment opportunities have had greater impact for those out of work rather than for those already skilled and employed within the community (p.68)	Two-week schedules complicate previously existing challenges for any given family (p.71)	Higher wages and increased employment has meant that families and individuals have had to learn how to better plan for increased income.
Despite enthusiasm about availability of work there are complaints about the quality of work e.g. janitorial work (p.68).	Exhaustion and/or reckless spending for workers coming home after a shift are regular occurrences (p.71)	For some the income has provided an improved diet, and affordability of hunting and consumer goods (p.75).
Reluctance by Inuit workers to show assertiveness at work may be a cause for lower levels of training and promotion at the mine (p.69)	Childcare becomes very challenging when both parents leave for the mine at the same time; family and friends with are often called upon to help (p.71-72)	For others the income has resulted in increased incidence of substance abuse and gambling (p.78)
Workers at the mine have improved access to mental health care (p.70).	The Baker Lake daycare can only accommodate 20 children (p.73)	Some families have been able to begin paying down debt and begin trying to save (p.77).
Some Inuit workers are frustrated that they are required to speak English and have sometimes been reprimanded for speaking Inuktitut (p.70)	Benefit of working diminished from extreme exhaustion; workers are unable to participate in family and community activities.	Higher wages and increased employment has meant that families and individuals have had to learn how to better plan for increased income.

Employment	Scheduling	Income and Spending
Family members working two-week schedules have given rise to increased gossip and distrust for some spouses/partners in the community.	Two-week schedules complicate previously existing challenges for any given family (p.71)	For some the new income has provided for increased quality of diet, and affordability of hunting equipment and other consumer goods (p.75).
New employment opportunities have had greater impact for those otherwise out of work rather than for those already skilled and employed within the community (p.68)	Exhaustion and/or reckless spending for workers coming home after a shift are regular occurrences (p.71)	For others the income has resulted in increased incidence of substance abuse and gambling (p.78)

Table 5.2: Perceptions of Small Business, Education, Housing & infrastructure

Small Business	Education	Housing & Infrastructure
The “Big Three” businesses have profited from Meadowbank contracts/local spending (p.80).	Schools have tried to include more high school courses relevant to mining (p.85).	The housing shortage in Baker Lake surpasses that of the territorial average (p. 95).
Smaller businesses (hotels, restaurants, and supply stores) have also benefited (p.81).	The high school is trying to implement a co-op employment program for its students (p.85).	Pre-existing overcrowding has been exacerbated by influx of new people seeking jobs (p.96).
Concern remains about commerce in Baker Lake when the mine closes (p.82)	There is an ongoing need to hire more Inuktitut speaking teachers (p.86).	Domestic abuse, child neglect, substance abuse, and other problems arise from extreme overcrowding (p.96).
Diversification of the economy requires a level of entrepreneurship that many do not have (p.83).	Concern remains about lacking parental support for education; priorities for some parents are on family activities and on traditional learning rather than on European style schooling (p.86).	Year-round childcare with expanded capacity is needed (p.96).
	Schooling is becoming a greater priority for the community as residents internalize enhanced opportunities derived from high school graduation (p.88).	Overcrowding inhibits cultural and family gatherings and erodes opportunities for human development in Baker Lake (p.97).
	There is little funding for post-secondary education in fields other than mining (p.92).	Insufficient childcare prohibits entering, or remaining, in the labour force (p.97).
	Training in the community	The housing shortage in Baker

Small Business	Education	Housing & Infrastructure
	should have begun before the mine began operations; this may have permitted greater benefit transfer to the community (p.92).	Lake surpasses that of the territorial average (p. 95).

Table 5.3: Perceptions of Crime, Land, Culture, and Self-Control

Crime and Social Issues	Land, Language and Youth	Self-Control/Empowerment
It is unclear if the rise in crime is a result of increased individual substance abuse, or increased numbers of individuals abusing substances i.e. a by-product of population growth (p. 98).	General concern remains about the health of the environment around Baker Lake e.g. contaminants, fuel spills, tailing ponds, reclamation (p.102-103).	Consultation and community involvement in decision making around mining in Baker Lake is essential for community wellbeing (p.113).
It is unclear if and why substance abuse has increased since the arrival of Meadowbank (p.98).	Ninety percent of the community still harvests caribou on semi-regular or regular basis to fulfill its dietary needs (p.103).	Residents appreciate the philanthropy demonstrated by AEM i.e. donation of a baseball field, contributions to community feasts, gifts of consumer goods to families, and logistical support for elders to travel to ancestral homes (p. 115).
Regulations limiting quantities of purchased alcohol in Baker Lake imply that any increased consumption is the result of increased numbers of people making purchases, increased volume of individuals' purchases, increased levels of local bootlegging, or increased import by southern workers who sell alcohol to locals (p.98-99).	Changes in migration patterns for caribou have been observed since the arrival of Meadowbank (p.105).	More community infrastructure is needed e.g. paved roads, and recreational facilities, and some believe the mine should pay for their construction (p.116).
Increased personal income is thought to underpin any increase in legal and illegal alcohol purchases (p.98).	Increased income has permitted increased affordability of hunting (p.106).	There is confusion about the state of royalties and their management by the Kivalliq Inuit Association (p.120).
It may be that employment and training opportunities for locals from Meadowbank may mitigate propensities to consume alcohol (p.100).	Language retention and promotion is a priority; youth now need to know Inuktitut to graduate high school (p. 108).	Quality and frequency of communication between the Kivalliq Inuit Association, the Hamlet of Baker Lake, and Agnico-Eagle are perceived to be insufficient and inefficient (p. 119).

Crime and Social Issues	Land, Language and Youth	Self-Control/Empowerment
It is unclear if the rise in crime is a result of increased individual substance abuse, or increased numbers of individuals abusing substances i.e. a by-product of population growth (p. 98).	There is not enough funding to make cultural programs in schools more effective and interesting for youth (p.109).	Consultation and community involvement in decision making around mining in Baker Lake is essential for community wellbeing (p.113).
It is unclear if and why substance abuse has increased since the arrival of Meadowbank (p.98).		

5.3.2. *Developing Community Wellness Indicators in the Hamlet of Baker Lake*

Bradshaw’s study (2013) is significant because it builds on Peterson’s findings, qualitatively reconfirms the policy problem, as identified by residents of Baker Lake, and concretely identifies locally acceptable policy interventions addressing the problem. I have used his study to model the kinds of programs, personnel, and community infrastructure that could help ameliorate social problems in Baker Lake within the bottom-up framework.

To highlight its robustness this section begins with a brief outline of this study’s methodology, and then presents the full array of programs and policies that were identified by the community. With these in hand I move into later chapters to categorize, screen, and consolidate the list into portfolios of intervention options. I then apply sensitivity analyses to estimate the portfolio’s costs, and compare them against their potential benefits.

Methodology

Bradshaw’s study, which is reportedly still awaiting final community approval, will be completed in three stages, two of which are now complete. Stage One of the community-based study included two focus groups, one of women and another of youth, that totalled 15 participants, and a further 45 semi-structured interviews of local elders, young adults, hamlet administrators, Meadowbank employees, community leaders, and others (p.3). Stage Two was the assessment and identification of “wellness indicators” distilled from the findings from Stage One of the study and from the findings in

Peterson’s study discussed in the previous section. Stage Three has not yet begun, but refers to a longitudinal household survey based on finalized “wellness indicators” to measure changes in Baker Lake wellness over time.

Bradshaw’s organized his Stage One and Two findings into ten key domains of community wellness including:

Table 5.4: Ten key domains of community wellness

Culture and community practices	Community health
Environmental health	Family, children, and youth
Community dynamics and social life	Community services and infrastructure
Education and training	Economy and employment
Community governance	Self-control

The study’s list of opportunities was categorized further into Values, Concerns, and also Opportunities, which I organize into the tables below. In some circumstances I’ve included opportunities implied or referred to indirectly though not outright. I also reorganize the opportunities for parallelism with societal and government objectives. These were education, cultural development, employment and economic development, public health, safety, and food security, community infrastructure, and local capacity. See Tables 5.5-5.9 below for details.

Table 5.5: Opportunities to improve levels of education

Education	
Opportunities	<ol style="list-style-type: none"> 1. Enhanced Inuktitut teaching in school balanced with a strong English curriculum 2. Parental involvement in education 3. Home economics courses 4. Prenatal nutrition programs 5. A high school guidance counsellor 6. Student exchanges across Nunavut and abroad 7. Online coursework

Education	
Opportunities	<p>8. Addictions counselling classes</p> <p>9. Budgeting and financial planning courses</p>

Table 5.6: Opportunities to improve cultural development

Cultural Development	
Opportunities	<p>10. Adult participation in land-based activities each season (hunting, fishing, food gathering)</p> <p>11. Child/youth participation in land-based activities each season (hunting, fishing, food gathering)</p> <p>12. An elder's cabin on the land: a place for community members and elders to come together; more opportunities to socialize with elders and learn traditional skills</p> <p>13. Oral history projects with elders in Baker Lake</p> <p>14. Spiritual support groups in town bring people together in the community</p> <p>15. Community clean-ups of garbage on the land and in town</p> <p>16. Marriage counselling opportunities and workshops on coping with these issues: how to build trust and open communication</p> <p>17. An in-town support group for families of employees working at Meadowbank</p> <p>18. A permanent child and youth outreach worker</p> <p>19. A youth centre</p> <p>20. A community wellness and resource centre</p> <p>21. Renewed capacity in the Hamlet office to answer questions and involve youth and other residents in decision-making</p> <p>22. An expanded daycare program</p>

Table 5.7: Opportunities to improve employment/economic development

Employment & Economic Development	
Opportunities	<p>23. A community/employment outreach worker who can help write proposals for funding/decision making</p> <p>24. New channels of communication between the community and Meadowbank</p> <p>25. Promoting carpentry and other trades</p> <p>26. Socio-economic impact training for mining</p> <p>27. Inuit Impact-Benefit Agreement negotiation classes</p> <p>28. Training programs for mining operations</p> <p>29. Funding for training institutions working with mining companies</p> <p>30. Workshops dealing with rumours and gossip in the workplace</p> <p>31. Workshops dealing with sexual harassment</p> <p>32. Cross-cultural workplace orientations</p> <p>33. Need for more industries and new business development in town; people would like to see coffee shops, restaurants, clothing stores, local outfitters to encourage tourism</p>

Table 5.8: Opportunities to improve public health, safety, and food security

Public Health, Safety and Food Security	
Opportunities	<p>34. Organized community-wide seasonal recreation activities for adults and youth</p> <p>35. Access to more information about how things we take in our bodies (food, alcohol, drugs) affect individuals and their families; better understanding of illness/disease cause and prevention</p> <p>36. More people using aides available to quit tobacco use</p> <p>37. Creating a culture around oral health i.e., toothbrush programs</p> <p>38. Need more research done on environmental contaminants and the ways they affect physical health</p> <p>39. More communication and workshops on physical health</p>

Public Health, Safety and Food Security	
Opportunities	<p>40. Improved access to free condoms</p> <p>41. A Nunavut drug and alcohol treatment facility that is run by Inuit for Inuit</p> <p>42. A permanent Inuk mental health counsellor</p> <p>43. Community workshops, programs, and events on suicide prevention, i.e. BLAST; ASSIST; building coping skills and support within the family and community</p> <p>44. Independent research on animal populations, harvested food quality, and impacts from industrialization and climate change</p> <p>45. Independent research on contaminant levels around Baker Lake</p> <p>46. Cooking skills classes (traditional and non-traditional)</p> <p>47. More training of young people how to hunt and other land-based skills; more community organized hunts and caches to share these foods</p> <p>48. A town curfew</p> <p>49. Female bylaw officers</p> <p>50. A women's shelter that is run by Inuit for Inuit</p> <p>51. More RCMP officers</p> <p>52. More fitness equipment</p> <p>53. A community ambulance</p> <p>54. A water and sewage treatment enhancements</p> <p>55. Funding for community hunts and new hunting equipment</p> <p>56. Increased garbage pickup</p>

Table 5.9: Opportunities to improve other community infrastructure

Other Community Infrastructure	
Opportunities	<p>57. More paved roads</p> <p>58. More 3-4 bedroom houses</p>

I grouped the detailed lists of policy directions identified by Bradshaw (2013) into policy relevant categories to facilitate my modeling of a bottom-up framework and assessment of its costs and benefits.

Chapter 6. Creating Framework Portfolios

A portfolio approach is most capable of responding to the diverse recommendations articulated in community-based assessments like those examined previously. They contribute to the holistic culturally infused resolution of the many interconnected concerns in Baker Lake. The objective of my analysis is to examine interventions requested by the community. While the broader literature identifies a host of other policy directions such as infrastructure development, literacy programs, and more Arctic College campuses, I focus on the initiatives specifically requested by participants in Peterson (2012) and Bradshaw (2013).

Screening of the list of opportunities above is vital as it is not possible to analyze each of the 58 opportunities above individually within this study. Even upon cursory examination it is clear that many can be combined, while others are so essential as to not require further analysis. In section 6.1, I explain the process I used to screen, prioritize, and portfolio the options. Section 6.2 lays out 1) the categories I applied to the options within the portfolios, 2) the assumptions I used to cost the portfolios, and 3) the estimates of the portfolios' first year and long-term 20-year budgetary implications. Variation between portfolios pertains to their relative magnitude and scale, as captured by administrative complexities, financial cost, economic benefits, and other criteria I examine in Chapter 7.

6.1. Screening and Prioritizing Portfolio Options

Screening the options reduces the overall number of options to be analyzed to a more manageable number. First I screened out options that relate to growth in the physical size and rate of population growth in Baker Lake because I view these as essential for implementation, and should be undertaken. Hence it is not necessary to

assess them further. These essential portfolio options are regarded as “fixing the windows” as include:

1. Construction of more three and four bedroom homes;
2. Construction of more paved roads;
3. Provision of an ambulance/medical transport vehicle;
4. Water treatment and solid waste management facilities; and
5. Increased garbage pickup.

Portfolio options that address ways to help the community adapt to resource development are also vital. These should be regarded as priorities within all policy portfolios. As discussed later, there is a clear and present need for increased administrative and financial support for the hamlet if it wants to provide services to Baker Lake in light of the challenges posed to it from Meadowbank. This set of initiatives include:

1. Funding for support groups for families of employees working at the mine;
2. Increased collaboration between government and industry on trades training;
3. Socio-economic impact training class regarding resource development;
4. A daycare centre to support parents working at the mine;
5. Inuit Impact-Benefit Agreement negotiation classes;
6. Funding and equipment for community hunts to support families of mine employees;
7. Funding for training institutions to coordinate with mining companies;
8. Workshops dealing with rumours and gossip in the workplace;
9. Workshops dealing with sexual harassment in the workplace;
10. Cross-cultural workplace orientations in the workplace;
11. Renewed incentives to complete education with increased long-term employment opportunities beyond the mine i.e. training in capacity for more industries and new business development in town (coffee shops, restaurants, clothing stores, local outfitters, and tourism).

6.2. Assembling and Costing the Portfolios

I consolidate and re-categorize the fifty-three remaining portfolio options into portfolio categories, which precedes my cost estimates and associated assumptions that constitute sections 6.2.1 and 6.2.2.

6.2.1. Portfolio Categories

The portfolio categories are: 1) *programming* (see Appendix B) i.e. workshops and seminars for adult education, cultural support, and professional development; and also primary, and secondary education curriculum change; 2) *infrastructure and logistics* i.e. recreational, mental health and addictions treatment facilities, hunting equipment, elder space and childcare spaces; and 3) *personnel* i.e. administrative, health care, education, counselling, public safety, and daycare.

6.2.2. Assumptions

To facilitate estimates of cost and administration I conducted web research of job postings, construction costs, physical size of infrastructure, and administrative costs for the elements of each policy opportunity. I assembled three illustrative potential policy portfolios, each with increasing levels of elements from each of the three portfolio categories. I detail each of the three options in sections 8.1-8.3. I compile their relative cost and discounted their sums at five, seven, and nine percent over a 20-year period to observe the present value of their respective financial implications. In anticipation of later analysis of the scale of policy implementation beyond Baker Lake I project the same portfolio costs by factors of seven (the number of communities in the Kivalliq region) and by twenty seven (the number of communities in Nunavut). In chapter 7, I examine potential economic benefits derived from effective implementation of community adaptation policy. Table 6.1 below illustrates the relative cost for three potential policy portfolios for Baker Lake, Kivalliq, and Nunavut over the 20-year horizon. There is substantial range, but therefore also implied flexibility, in costs of implementing the programs identified by Baker Lake. Depending on the portfolio¹¹ total estimated costs at the hamlet, regional, and territorial levels translate, over time, into present value costs of \$20 to \$46, \$123 to \$192, and \$478 to \$1,128 million respectively¹².

¹¹ See table 9.1

¹² Individual portfolio elements are elaborated on in section 9.2.1

Table 6.1: Present value of portfolio costs

Forecast Costs (\$ Millions)				
Discount Rate	Scale	Least Expensive	Medium Expensive	Most Expensive
5%	Baker Lake	\$28	\$37	\$46
	Kivalliq	\$163	\$212	\$292
	Nunavut	\$631	\$820	\$1,128
7%	Baker Lake	\$23	\$30	\$38
	Kivalliq	\$141	\$184	\$253
	Nunavut	\$546	\$710	\$976
9%	Baker Lake	\$20	\$25	\$31
	Kivalliq	\$123	\$162	\$222
	Nunavut	\$478	\$623	\$856

Having completed these estimates of implementation cost to taxpayers I forecast the benefits of these programs in terms of incremental contribution to the gross domestic product to determine if or when societal benefit begins to equal or exceed these policies' costs.

6.3. Forecasting Benefits of the Portfolios

The Centre for the Study of Living Standards (2007) examined the nature and implications of improved education on poverty, crime, and public health; and estimated the incremental economic benefit to Canada of ameliorating the gap in high school graduation rates between Aboriginal and non-Aboriginal Canadians. The study undertook a complex sensitivity analysis of ten scenarios of incremental contribution to economic growth depending on varying levels of efficacy in improving education outcomes over the 2001 to 2017 period. In addition to estimating impacts on GDP, the study also examined impacts on labour force productivity and participation.

I have added a number of my own additional assumptions to facilitate compatibility with my project. Section 6.3.1 below outlines:

1. Assumptions I made to rationalize the use of the Centre for the Study of Living Standards' study to forecast the benefits of the proposed approach to holistic community resilience policy;
2. Specific scenarios from the study that I have drafted for my project;
3. Assumptions I made to adapt the scenarios for improved fit in my analysis; and the
4. Forecast benefits of the program depending on degree of improved levels of education outcomes.

6.3.1. *Using the Centre for the Study of Living Standards' study*

Below are four assumptions underpinning my use of the Centre for the Study of Living Standards study to forecast the benefits of my programming recommendation.

1. Improved high school graduation is assumed to be a proxy measure of improved public health, nutrition, employment opportunities, or post-secondary educational opportunities; or reduced levels of residential over-crowding, violent and non-violent crime, or substance abuse.
2. Improved high school graduation in Nunavut will be the result of community support and commitment ensuring student attendance and preparedness to learn.
3. Community support in education will be the result of improved community engagement in policy development (section 5.2). That is, inclusive decision making in the school curriculum, improved and diversified employment opportunities resulting from high school graduation, and sustained holistic investment in locally demanded programs, personnel, and infrastructure;

Assumptions one through three imply that:

4. Societal benefits of community-driven policy can be modelled using graduation outcomes as a proxy for broader social impacts as modelled in the Centre for the Study of Living Standards study (2007).

6.3.2. *Centre for the Study of Living Standards' Scenarios*

The study examined ten scenarios with respect to estimating potential growth in the economy. They vary in their individual assumptions and are summarized in Table 6.2 below.

Table 6.2: Economic modeling scenarios

Scenario		Additional Annual Output Growth Over Base Scenario 1	Additional Annual Employment Growth Over Base Scenario 1	Additional Annual Productivity Growth Over Base Scenario 1
Base Scenarios	1	0.000	0.000	0.000
	2	0.045	0.023	0.022
Half Education Gap Is Eliminated	3	0.016	0.012	0.003
	4	0.027	0.033	-0.006
	5	0.049	0.012	0.036
	6	0.064	0.033	0.030
All Education Gap Is Eliminated	7	0.032	0.025	0.006
	8	0.042	0.043	-0.002
	9	0.068	0.025	0.042
	10	0.081	0.043	0.037

Adapted from the original table on page 81

In Base Scenario One education, employment, and productivity continue at constant rates with no change (p. 79). Base Scenario Two implies the highest estimate of growth in the economy with no improvement in education (p.80). The remaining scenarios perform a sensitivity analysis estimating different levels of growth depending on their specific assumptions. Of these, scenarios three and six, and seven and ten represent high and low estimates of incremental improvement on the economic variables depending on the degree to which the education gap is ameliorated. Therefore I infer that these four scenarios describe the high and low level forecast changes in corresponding variables for Baker Lake, Kivalliq, and Nunavut.

6.3.3. Supplementary Modeling Assumptions

Below I outline eight additional assumptions I made to adapt the model used in Centre for the Study of Living Standards' study.

1. 2001-2017 incremental improvements modelled in the original study are accurate and constant over time.

2. Relative economic growth in communities, regions, and territories will be approximately equal to changes forecast in the national economy.
3. Scenarios three and six forecast incremental growth where half the gap in education attainment is ameliorated.
4. Taking the average of scenarios three and six permits a forecast of medium incremental improvement where half the gap in education attainment is ameliorated.
5. Scenarios seven and ten forecast incremental growth where the entire gap in education attainment is ameliorated.
6. Taking the average of scenarios seven and ten permits a forecast of medium incremental improvement where the entire gap in education attainment is ameliorated.
7. Gross domestic product of Kivalliq and Baker Lake will be estimated using per capita ratios of their populations to that of the territory.
8. If trends continue, change in given economic variables will grow at constant rates.

Measuring Baseline Graduation Rates

To measure supplementary framework efficacy using graduation rates as a proxy I established a baseline. Statistics Canada's 2014 report: *Education indicators in Canada: An international perspective, 2013* states that: 1) Canadian average high school completions rates were 89 percent; and 2) Nunavut's completion rate is 54 percent (Statistics Canada, 2014). In context this means ameliorating half, or all of, the education gap implies increasing graduation rates by 17.5 or 35 percent respectively. While this may appear significant, if applied to Baker Lake's 2011 real graduations in real terms, the change would only reflect a rise from 12 graduates to 14 or 16 respectively. Conversely, while these small real changes may appear insignificant, if applied to the Kivalliq region 2011 graduation in real terms, the change would reflect a rise in graduates from 85 to 100 or 115. If scaled up across the territory the real change in 2011 could have resulted in as many as 81 new graduates in that year alone (309 up from 228). These numbers quantify the potential gain to communities across Nunavut in terms of capacity and preparedness for economic growth and ongoing social change.

6.3.4. Forecast Improvements in Economic Variables

Figure 6.2 above estimates incremental improvement for three economic variables: output, employment, and individual productivity. These illustrate different but important benefits for Nunavummiut. Due to constraints of this research, however, I elected to concentrate on the first of the three, economic output, i.e. gross domestic

product, only because of its aggregate measurement of wellbeing. The methodology applied below should be applied to each of the three variables for a more rigorous analysis of the economic benefit of ameliorating the education gap in Nunavut.

Modeling Methodology

Tables 6.3-6.7 measure potential economic benefits for Baker Lake, Kivalliq, and Nunavut if 1) trends continue, where growth continues at a constant rate equal to the averages taken between 2006 and 2011; 2) half of the education gap is ameliorated, where scenarios three, six, and a Medium based on the average of these is applied over and above that if trends continue; 3) the entire education gap is ameliorated, where scenarios seven, ten, and a Medium based on the average of these is applied over and above that if trends continue. See Appendix C (Table C.1) for an example detailing the applied modelling methodology.

Table 6.3: Present value of current rate of economic growth

	If Trends Continue (\$ Millions)					
	Overall Change	AVG Nom Growth	Forecast GDP	PV Gross GDP Over 20 Years		
				5%	7%	9%
Baker Lake	19%	3.8%	\$108	\$1,346	\$1,144	\$986
Kivalliq	19%	3.8%	\$521	\$6,498	\$5,524	\$4,760
Nunavut	18%	3.6%	\$1,821	\$22,692	\$19,290	\$16,622

Table 6.3 shows overall growth in GDP in Nunavut between 2008 and 2012, allocated regionally and locally on per capita basis, and divided over five years. I added the growth rate to 2012's GDP¹³ to forecast the present value of this rate of growth over 20 years. That is, the value today of current levels of growth over time.

¹³ \$104 million, \$502 million, and \$1.75 billion for Baker Lake, Kivalliq, and Nunavut respectively

Table 6.4: Low Efficacy with Half of education gap ameliorated – Gross

	Half of Education Gap is Ameliorated w/ Low-End Efficacy (1.6%) (\$ Millions)					
	Annual Change	Suppl' Change	Suppl' Forecast GDP	PV Gross GDP Over 20 Years		
				5%	7%	9%
Baker Lake	3.8%	5.4%	\$110	\$1,367	\$1,162	\$1,001
Kivalliq	3.8%	5.4%	\$529	\$6,598	\$5,609	\$4,833
Nunavut	3.6%	5.2%	\$1,849	\$23,043	\$19,588	\$16,879

Table 6.4 forecasts the impact of ameliorating half the education gap on the economy assuming the lowest level of efficacy (1.6 percent). I add 1.6% to 3.8% (5.4%) meaning that Baker Lake would have had a \$110 million GDP, rather than \$108 million (Table 6.3). When discounted the present value of this rate of growth over 20 years is between \$1 and \$1.3 billion.

Table 6.5: Low Efficacy w/ Half of education gap ameliorated – Incremental

	Half of Education Gap is Ameliorated with Low-End Efficacy (1.6%) (\$ Millions)					
	Suppl' Change	Suppl' Forecast GDP	Incrim. GDP	PV Incremental GDP Over 20 Years		
				5%	7%	9%
Baker Lake	5.40%	\$110	\$2	\$21	\$18	\$15
Kivalliq	5.40%	\$529	\$8	\$100	\$85	\$73
Nunavut	5.20%	\$1,849	\$28	\$350	\$298	\$257

Table 6.5 illustrates the incremental value of the change to the economy over and above that which would have been if trends continued as shown in Table 6.3. I subtract the gross change from current trends, \$110 million – \$108 million = \$2 million, and discount their incremental gains. For Baker Lake the incremental benefits range from \$15 to \$21 million dollars.

Findings tables from my parallel analysis for the other scenarios, where half or the entire education gap is ameliorated, and where efficacy is low (as shown above), mediums, and high, are in Appendix C.

Table 6.6 shows the “best-case scenario” where the entire education gap is ameliorated and is highly effective in positively impacting the gross domestic product.

Table 6.6: High Efficacy w/ Entire education gap ameliorated – Incremental

	Entire Education Gap is Ameliorated with High-End Efficacy (8.1%) (\$ Millions)					
	Suppl' Change	Suppl' Forecast GDP	Incrim. GDP	PV Incremental GDP Over 20 Years		
				5%	7%	9%
Baker Lake	11.90%	\$116	\$8	\$105	\$89	\$77
Kivalliq	11.90%	\$562	\$41	\$507	\$431	\$371
Nunavut	11.70%	\$1,963	\$142	\$1,774	\$1,508	\$1,300

Findings

Tables 6.4 through 6.6 illustrate that the potential for incremental economic benefits from ameliorating the education gap are substantial if heightened policy efficacy is achieved. I identified scenarios with net benefits by comparing the incremental benefits from each outcome above against the discounted costs of the portfolios (Table 6.1). This sensitivity analysis showed potential net benefits at every level of efficacy, at every discount rate, regardless of whether half or the entire education gap is ameliorated, with one exception. In the worst-case scenario (Table 6.4), which assumes low-range economic improvement with just half the education gap ameliorated. The postulated result is a net loss at all discount rates, regardless of local, regional, and territorial delivery.

These results are illustrative because they cannot possibly measure all the costs and benefits; I have been careful to use as detailed estimates as possible and feel that I have not grossly misestimated either the costs or the benefits enough to lead to different conclusions. The estimated gains are conservative as there are likely additional societal benefits from reductions in costs to taxpayers resulting indirectly from improved education outcomes, for example, from lower levels of crime and healthcare costs.

The calculations help assess the efficacy of the portfolios with different combinations leading to 1.6 to 8.1 percent incremental growth of GDP. Note as well that the scale of their implementation i.e. local, regional, or territorial has a significant impact,

as would be expected. These three scales provide the basis for policy alternatives examined in the remainder of this study. Analysis of the alternatives' approach respective pros and cons answers the ultimate question that is: which alternative best serves the public interest? To answer this question, Chapter 7 examines the criteria and measurement tools that draw out variation in the implications of the alternatives detailed in Chapter 8. Chapter 9 outlines my recommendation in three components. Chapters 10, 11, and 12, respectively offer my conclusion, acknowledgements of this study's limitations, and a personal reflection on my motives and lived experiences inspiring my interest in this topic.

Chapter 7. Criteria and Measures

This chapter maps out the comparative criteria and real and proxy measures that structure analysis of the policy alternatives that are described fully in Chapter 8.

7.1. Criteria

In the introduction I identified societal public interest objectives that denote the principle criteria I used to compare the pros and cons of the policy alternatives. The list of criteria and their definitions are:

1. Economic efficiency: the degree to which gross domestic product is incrementally enhanced
2. Equity: the degree to which Inuit communities are invested in equally irrespective of whether or not they are direct beneficiaries of resource development; and
3. Human and Cultural Development: the degree to which capacity and self-determination is built within Inuit communities.
4. Administrative complexity: the degree to which the option implies substantive changes/challenges for current administrative organization and expertise.
5. Acceptability within the federal and territorial political agendas: the degree to which the option aligns with platforms of federal and territorial governments.
6. Acceptability to the private sector: the degree to which the option is acceptable to the Agnico Eagle, Baffinland, Areva, and other resource development firms.
7. Cost: the degree to which public spending will be most mitigated

7.2. Measures

Assessing the policy's efficacy over time will require measurement against predetermined baselines. This effort is complicated by the myriad interconnected objectives and elements intrinsic to this study. Measures of efficacy include socio-economic indicators including gross domestic product, labour force outcomes, personal income, social assistance, school truancy, and secondary school graduation rates, which are gathered administratively, through the census or National Household Survey. Qualitative measures will also be available in Community Wellness reports and other longitudinal studies and surveys previously recommended in the literature.

As made clear in assumptions in section 6.3.1 I infer that improved secondary school education outcomes will be the result of aggregate improvement in community resilience, support, parental engagement, cultural integration, public health, and post-secondary professional and academic opportunity etc. I then inferred these would have observable positive economic impacts. Therefore I conclude that improved graduation rates from high school are a valid proxy measure for overall efficacy of this policy approach.

Chapter 8. Policy Alternatives: Small to Large

The policy portfolios I built and modeled translate in the three alternatives that represent escalating levels of magnitude with respect to the bottom-up framework already recommended. Each alternative is identified and compared in terms of relative strengths and weaknesses in relation to the stated criteria. See in Appendix D, Table D.1, for a comparative matrix illustrating the alternatives' trade-offs.

The three options described in depth and compared below are: a local pilot project, a regional program, or a territorial program. While the options vary in scale, and therefore in their respective implications concerning the evaluations criteria, they all will require targeted collaboration from the federal, territorial, regional, and private sectors. Teachers for example would be salaried by the territory, police by Ottawa; infrastructure would be developed through public-private partnerships where possible; programs and curricula would be developed with pervasive local Inuit inclusion; and to the greatest extent possible all program personnel would be trained and drawn from local Inuit labour pools.

Screening out Two Criteria

Criteria one, efficiency, and six, human and cultural development, are not carried forward in analysis. Efficiency was omitted because there is potential net benefit for all three alternatives and so offers little comparative value. Human and Cultural Development was removed because I assume this achieved with development of capacity through community-driven research, which is expected from all three alternatives as well. Please note that, hereafter, I use the terms “framework” and “supplementary framework” interchangeably.

8.1. Alternative One: The Pilot Project

Comments in interviews confirmed the literature suggestion that the essence of community support is a policy framework focusing at individual community's needs. Scaling the alternatives for a community-driven supplementary framework from smallest to largest begins with a pilot project in one, or perhaps in a number of individual communities. The principal advantage of a pilot project is that it is an experiment, an opportunity to test this new methodology for policy development before rolling it out to a larger jurisdiction. In this case administrators would be able to develop functions needed to ensure the framework's efficiency, accountability, transparency, and efficacy, and to develop the local capacity means needed to achieve these ends. The pilot project would likely need to take place over a number of years. Determination of the exact number of years is beyond my scope of analysis. I assume that community-driven research in the given community would be funded by government and undertaken in a manner that is participatory and inclusive of local researchers, elders, youth, parents, and others. The results of these studies will be compiled into "Wellness" reports highlighting concerns, and produce opportunities and measures that address those concerns. All programs, infrastructure, and personnel would be placed within the individual community. In the potential policy portfolio in Table 8.1 I include low, medium, and high cost variations featuring:

Table 8.1: Components of a potential community driven policy portfolio

A youth and 20-piece fitness centre	2-4 health centre staff
An inpatient alcohol drug treatment/women's centre	2-3 high school counsellors
An "elders" cabin/day care facility	1-2 mental health counsellor(s)
5-15 percent increase in equipment for community hunts (rifles, GPS, skidoos)	1 marriage counselor
6-24 adult education workshops per year	3-5 school teacher/administrators
2 female bylaw officers	2-4 day care workers
1-3 RCMP officer(s)	2-4 hamlet administrators.

Relative Strengths

- At the minimum scale of the options, the associated administrative complexities of undertaking needed community research will be relatively smallest. Coordination of infrastructure development i.e. construction of a needed day care facility, and of credentialing of new personnel and programming for example would only be required within the individual community.
- Lowest financial costs are another relative strength of the pilot project relative to its alternatives. The present value of its costs over 20 years of \$20-\$46 million should be sufficient to staff, develop programs, and to build and maintain the new infrastructure.
- The private sector is likely to support any policy aimed at improving the environment in which they work. This Alternative would be most explicitly supported by the private sector if it were undertaken in a community, like Baker Lake, that provides services to the resource development industry.
- As a pilot project this option poses the fewest bureaucratic and political obstacles in terms of federal and territorial agendas and so can be inferred to be of relatively highest acceptability within the public sector.

Relative Weaknesses

- There are 27 communities in Nunavut, many of which do not have currently explored resource development opportunities. Were just one pilot project undertaken in a single community there will be inequities for other communities who do not get the equal infrastructure, programming and personnel support. A sub-alternative with potential to mitigate some of the real and perceived inequity between hamlets is to undertake a number of pilot projects in different regions simultaneously.

8.2. Alternative Two: The Regional Investment

There are three regions in Nunavut: Kivalliq, emphasized in this study, the Qikiqtaaluk (Baffin) region, which houses Iqaluit, and the Kitikmeot Region. The needs of the three will vary substantially. Qikiqtaaluk is the largest of the three spanning from northern Quebec to the northern top of Ellesmere Island. Kivalliq has Nunavut's second

and third largest communities (Arviat and Rankin Inlet) and the majority of the territory’s presently explored mineral extraction opportunities. Kitikmeot is the least populated of the three regions, but is expecting the new Canadian High Arctic Research Station (CHARS), an administrative and scientific centre, to be built on its northern coastline in Cambridge Bay.

Approaching the supplementary framework from a regional perspective presents its own advantages and disadvantages. While community-driven research must still underpin the programs, personnel, and infrastructure needed to enhance community resilience as a means to fortify long-term economic growth there would likely be a need to concentrate some resources in regional centres to avoid redundancy and enhance overall efficacy. In this light, there would have to be a research done at the community level and again at the regional level to ascertain the correct allocation of resources. In Table 8.2 my potential regional policy portfolio for Kivalliq’s seven communities include:

Table 8.2: of a potential regionally driven policy portfolio

7 youth and 20-piece fitness centres	14-28 health centre staff
7 inpatient alcohol drug treatment/women’s centres	14-21 high school counselors
7 “elders” cabins/day care facilities	7-21 mental health counselors
5-15 percent increase in equipment for community hunts (rifles, GPS, skidoos) for 7 communities	7 marriage counselors
6-24 adult education workshops per year for 7 communities	21-35 school teacher/administrators
14 female bylaw officers	14-28 day care workers
7-21 RCMP officers	14-28 hamlet administrators

Relatively Moderate

- The present value of costs of the implementing the portfolio above is between \$123 and \$292 million over 20 years, which is relative more than for Alternative one, but much lower than for Alternative three.
- Implementing regional programming may allay some equitability concerns within the Kivalliq region because it promises investment of personnel, programming, and infrastructure to each.

- The private sector would generally support this Alternative for its aggregate effect on their working conditions.

Relative Weaknesses

- Even as the mid-scale option, the associated administrative complexities of undertaking needed community research will be substantial, far greater than for the pilot project. That is, coordination of programming and delivery of services with regional, federal, and territorial partners for the seven communities in Kivalliq for example represent administrative complexities that warrant caution.
- While this option reduces equity concerns within the region, it is likely to exacerbate inequities existing between Kivalliq and its neighbours. That is, the unfairness of renewed energies and investments of human capital and capacity may be seen to occur in Kivalliq only because of its mineral deposits.
- The need to coordinate allocation of resources within the region may aggravate relations between the various communities who were described in interviews as competing for resources and influence in regional political discourse. Therefore acceptability of this option within regional and territorial circles may be variable.

8.3. Alternative Three: The Territorial Approach

Some interviews suggested Nunavut should pick an economic trajectory, to pursue it on a territorial scale, and to support it with territorial programming and services. It is clear that a resource development economic trajectory has been chosen. Nonetheless the longer it takes for communities and individuals in Nunavut to begin to perceive real benefit in terms of aggregate capacity, self-determination, poverty reduction, education, health, employment etc. the longer it will take to stabilize the future of Nunavut's, and indeed Canada's, economic objectives.

This policy alternative describes the largest-scale incremental change in the decision-making framework in Nunavut where federal and territorial departments more heavily weight community-driven policy in the territory. Decisions impacting communities will be further decentralized and deferred to community based researchers within

individual communities. Calls from community elders, professionals, administrators, and others participating in each reach in the 27 communities' will be weighted accordingly and implemented by policy makers at various levels of government. In Table 8.3 the potential policy portfolio I created for the 27 communities in the territory included:

Table 8.3: of a potential territorially driven policy portfolio

27 youth and 20-piece fitness centres	54-108 health centre staff
27 inpatient alcohol drug treatment/women's centres	54-81 high school counselors
27 "elders" cabins/day care facilities	27-54 mental health counselors
5-15 percent increase in equipment for community hunts (rifles, GPS, skidoos) for 27 communities	27 marriage counselors
6-24 adult education workshops per year for 27 communities	81-135 school teacher/administrators
54 female bylaw officers	54-108 day care workers
27-81 RCMP officers	54-108 hamlet administrators

Relative Strengths

- By investing in community resilience in each of Nunavut's communities regardless of resource development opportunities this approach can be said to be most equitable across the territory.
- The private sector would generally accept this Alternative as well for the same reasons as those in Alternative Two.

Relative Weaknesses

- On the territorial scale the present value of the costs for the portfolios may be very large ranging between \$478 million and \$1.1 billion.
- Administratively this approach may require an enormous redistribution of internal resources in order to facilitate the needed community driven research, and to coordinate the federal and territorial departments involved in the implementation and of the policy portfolios. There would likely be sharing of resources, programming, personnel, and infrastructure in the end, which may ultimately reduce over effectiveness of the Alternative. That is, it may revert to its top-down orientation and achieve little in the long run.

- This approach constitutes a substantial deviation in the approach to community development, and a large increase in public spending in the territory in a period leading up to the next federal election. The administration in Ottawa has made clear its objective to balance its budget and contain public spending. Simultaneously, the territorial government's relations with its regional partners and communities may become strained. Comments made in interviews suggested that past attempts made by communities to develop their own programming have resulted in resentment and withdrawn material support from Iqaluit. Present here also will be the same risk of political infighting between communities regarding allocation resources. Thus, resultant political barriers at numerous levels of the public sector may prove significant.

Chapter 9. Recommendations

9.1. Fixing Windows

Baker Lake and others communities in Nunavut are growing. In tandem, existing infrastructure like housing is ageing, in disrepair, and in short supply. Section 6.1 provided the example of Baker Lake, which is in need of more houses, paved roads, water treatment plants, an ambulance, and increased garbage pickup as a result of its growing population. It may also require policy measures such as the implementation of a youth curfew to deal with social issues. I recommend that resources be committed to provide these investments and policies while acknowledging the need to investigate further the specific implications of each.

9.2. Selecting from the Alternatives

Cooperation and integration between federal, territorial, and of course municipal decision makers will be essential if the portfolios of community-driven policy are to be delivered. This is no small feat. There are implications for numerous territorial and federal departments, and there will likely be a steep learning curve for communities participating in this endeavour. Clear delegation of responsibilities for individual departments will be essential for efficient, assertive, and coordinated response to the changes in approach to community development prescribed in this project. Furthermore, because this study proposes a level of community inclusion in policy that is untested, financially expensive, administratively challenging, and politically difficult, it is vital to remain pragmatic and conservative in expectations and implementations. It is also important to recognize that these options are not mutually exclusive over time. In this light:

I recommend alternative one: at least one, but preferably three, community-driven policy pilot projects be undertaken with coordinated support from territorial and government departments.

9.2.1. Immediate Action Plan

I recommend the following steps be taken:

- The Community and Government Services department, in the Government of Nunavut, be assigned the immediate action plan. Its task should begin by immediately forming a working group to coordinate with the territorial departments of: Family Services, Economic Development and Transportation, Health, Education, Executive and Intergovernmental Affairs, Culture and Heritage, and the Municipal Training Corporation; and with federal departments of: Aboriginal Affairs and Northern Development Canada, the Royal Canadian Mounted Police, the Canadian Northern Economic Development Agency, and others as necessary; and with the Hamlet office of Baker Lake, and/or other community(s) chosen to host the pilot project.
- The working group shortlists communities in each of Nunavut's three regions that are at three different levels of natural resource development. This shortlist will permit undertaking three simultaneous pilot projects, which will permit measurement of the approach's efficacy in addressing the impacts of mining in a mitigation context (Baker Lake because of Meadowbank), a prevention context (Pond Inlet because of the potential Mary River mine), and a general context (any community without resource development opportunities). The working group establish, train and assign a "research aid", who may or may not function with existing community institutions i.e. community wellness committees, to live on a semi-permanent or permanent basis in the pilot project community to help facilitate researchers in the community to assess their needs where they are not known, or to review and update community research where it already exists. These personnel must be Inuit, and hired from within the community if possible, or, if not, hired in consultation with the community to ensure the community members are included and supportive of the selection of their research aid.
- The essential task of the research aid will be to undertake inclusive new research to confirm portfolio elements needed and work with local administrators to build capacity to assemble and deliver concrete task items to the various government departments. The aid's task will go further to track baseline and ongoing metrics of health care and crime and justice that will permit longitudinal estimates of cost reduction to tax payers in these and other areas as the pilot project(s) progress.

Figure 9.1 illustrates the framework model recommended, and Table 9.1, outlines how the costs (assumed prices are adjusted for inflation) and delegated responsibilities for the potential portfolio's components break down for Baker Lake.

Figure 9.1: Illustration of the Recommended Framework Model

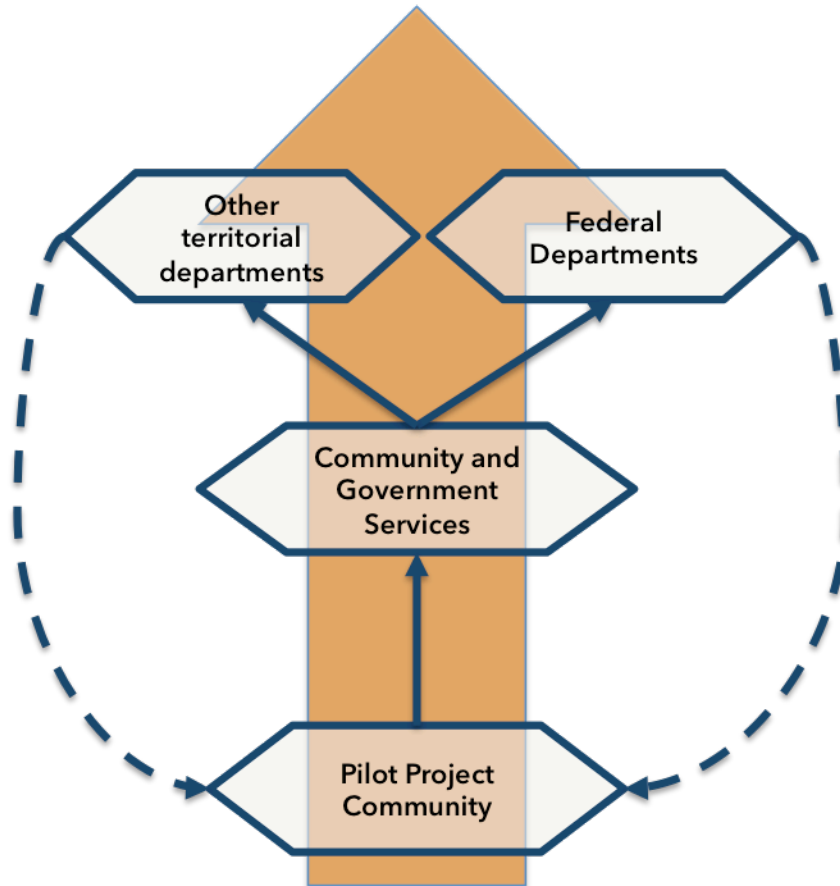


Table 9.1 Departmental Responsibilities & Budget Implications

Portfolio Element	Government Jurisdiction	Responsible Department (s)	Estimated Annual Cost
Coordination of Community Driven Research	Municipal; Territorial; Federal	Community and Government Services; Executive and Intergovernmental Affairs; AANDC; CANNOR	N/A
Personnel per pilot project¹⁴			
2-4 female bylaw officers	Municipal; Territorial	Municipal Training Organization	\$200k
1-3 RCMP officers	Municipal; Federal	Royal Canadian Mounted Police	\$82k-\$246k
2-4 health centre staff	Municipal; Territorial	Health	\$200k-\$400k
2-3 high school counselors	Municipal; Territorial	Education	\$200k-\$300k
1-2 mental health counselors	Municipal; Territorial	Health	\$114k-\$228k (included in facility cost)
1 marriage counselor	Municipal; Territorial	Family Services	\$100k (included in facility cost)
3-5 school teachers/administrators	Municipal; Territorial	Education	\$300k-\$500k
2-4 day care workers	Municipal; Territorial	Family Services	\$180k-\$360k
2-4 hamlet administrators	Municipal; Territorial	Municipal Training Organization; Community and Government Services	\$200k-\$400k
Infrastructure/Logistics per pilot project			
Youth centre and gym	Municipal; Territorial	Community and Government Services	\$150k-\$200k ¹⁵
Women's shelter and alcohol drug treatment centre	Municipal; Territorial	Community and Government Services; Health; Family Services	\$300k-\$700k ¹⁶

¹⁴ Salaries are based on formal wage scales in government, job postings from equivalent positions in Nunavut, or double the offered salaries from job postings of equivalent positions in southern Canada.

¹⁵ Based on construction and equipment costs for a 20-piece 150 square foot gym.

Portfolio Element	Government Jurisdiction	Responsible Department (s)	Estimated Annual Cost
Elder's cabin and day care	Municipal; Territorial	Community and Government Services; Family Services; Culture and Heritage	\$20k-\$60K ¹⁷
Community Hunting Equipment (rifles, GPS, Skidoos)	Municipal; Territorial	Community and Government Services; Health; Culture and Heritage; Transportation	\$200k-\$600k ¹⁸ (one-time purchase)
Programming per pilot project			
Community hunting/fishing events	Municipal; Territorial	Community and Government Services; Health; Culture and Heritage; Economic Development and Transportation	Included in cost of hunting equipment
6-24 adult education workshops (See appendix B for workshop/academic curricula)	Municipal; Territorial	Community and Government Services; Health; Education; Culture and Heritage; Economic Development and Transportation Family Services; Municipal Training Organization	\$15k-\$60k ¹⁹
Primary and secondary school curricula (See appendix B for workshop/academic curricula)	Municipal; Territorial	Community and Government Services; Health; Education; Culture and Heritage; Economic Development and Transportation Family Services; Municipal Training Organization	Included in cost of personnel
Total Costs Year 1			\$2.1m-\$4.1m
Total Costs Ongoing			\$1.7m-\$3m
Present Value of Costs (20 years)			\$20m-\$46m

Note that the costs in Table 9.1 are for one pilot project and would need to be factored by the number of pilot projects. Even then, we might only expect annual costs in

¹⁶ Based on approximate cost of purchase space for a 10-bed clinic/shelter (≈\$300k annually) and 21-bed clinic/shelter (≈\$700k based annually) including mental health and marriage counselor personnel.

¹⁷ Based on \$200/square foot construction costs for a 100,200, or 300 square foot structure.

¹⁸ Based on retail prices of base model hunting rifles, skidoos, and GPS equipment as found online and then based on 5%, 10% and 15% increase relative to estimated numbers of harvesters in Baker Lake→71% of 510 household have harvesters ≈360 individuals.

¹⁹ Based on ≈\$2,500 per workshop including flight to Baker Lake from Iqaluit and including hotel, venue, administration, and stipend.

range of the \$6-\$12 million in this scenario. The benefits to the communities may be profound, and if proven effective and rolled out across the region more broadly, it will ensure numerous elements of the public interest are enhanced. This should include long-term building of capacity, labour force productivity, and national economic growth.

Chapter 10. Conclusion

This study focuses on Nunavut, but its implications pertain to the entirety of the northern territories, and likely to many mining communities across Canada. Baker Lake is an example of where proactive policies were not in place, so action there needs to mitigate the current set of problems. There is still time for proactive policies with respect to Pond Inlet and Rankin Inlet and others that are slated for natural resource development. Federal and territorial Policy makers must take a proactive, not a reactive, approach, learning from the experience of Meadowbank, to protect and support communities as mining continues to expand. Without an inclusive community-driven policy framework that invests in improving the quality of life and diversification local economies, the depression typically emerging in boom-bust industries like mining will be all the more painful.

It is vital for government to take steps, beyond streamlining environmental review processes and general funding for training and local infrastructure. The community-driven approach I recommend will help create an environment more conducive to building a northern community of trained credentialed workers with capacity to transform their world and promote regional independence and healthy growth of Nunavut's economy.

Despite the challenges of development in Nunavut, successes and milestones have been achieved. Evidence shows that employment and incomes have improved in communities close to the territory's only operating mine. Many hope these benefits carry on beyond the life of current project through the continued development of Nunavut's other mines. These benefits are owed in large part to the private sectors' fulfillment of its agreements with local communities. My view is that Agnico Eagle has performed admirably and philanthropically in Baker Lake and across Kivalliq. Some suggest that the private sector could and should do more i.e. changing work scheduling from two-

week shifts to one-week shifts;²⁰ or drafting workers on an equitable basis from across the territory.²¹ While these actions may have an impact on the quality of life in the region, I take the view that it is prerogative of government, not of industry, to provide the depth of services needed in Nunavut to mitigate social problems created by economic expansion.

Evidence illustrates that economic gains can come at high cost to communities in terms of exacerbating crime and dis-incentivising education. The prevalence of these problems implies that communities remain insufficiently supported to adapt to and benefit from long-term economic development. Recall that Canada's Northern Strategy demands government pursue economic development and also social development. It is possible that if a new policy framework is not implemented, if these problems are not abated, efforts to achieve the entirety of the Strategy's second objective may fail.

The framework gap literature supports the argument that building the human capital and capacity needed to underpin community preparedness essential for economic growth is contingent on improving the states of health, education, recreation, infrastructure and other deficits discussed in the study. These in turn were found to be highly interconnected and need to be addressed in an integrated fashion built from the bottom-up i.e. the inclusion of individual community members in the decision-making process to secure higher levels of community support for the policies and programs. Community-driven research should be given greater voice in the policies affecting their communities.

The necessary precedents exist. Territorial governance in Nunavut has long aspired for robust decentralized government, and the core departmental capacities in Nunavut's government are already in place. Additionally, there is a growing body of literature and prevalence of community-driven participatory action research taking place in communities all over Nunavut, and so best practices for the kinds of studies

²⁰ My interviewees noted that this suggestion was offered and rejected by workers at the mine who argued one-week shifts were more exhausting at the end of the day than two-week shifts. There was too much travel that was adversely affected by extreme weather.

²¹ It may be that this is another means to address some equity concerns as well, but this is outside the scope of this study.

recommended in this report already exist. Organizations like the Health, Environment, and Indigenous Communities Research Group at Trent University demonstrate best practices in building relationships and inroads with Aboriginal communities all over the North and may be considered as consultants in the future.

Addressing the needs identified in Baker Lake will be complex, expensive, and protracted, but the potential gains of effectively providing the needed supports can result in incremental economic benefits that exceed costs by hundreds of millions of dollars over time. Achieving social gains for Nunavummiut is essential because long-term sustainable economic growth is made possible only by addressing needs for local capacity, education, health, and all the determinants of wellbeing.

10.1. Future Research

There are two research questions that were beyond the scope of this study, but important to help inform policy discussions in the future.

The first is to examine potential for creation of a comprehensive heritage fund in Nunavut derived from a share of non-renewable resource net income to enable the government to guarantee sustainable funding for investment in legacy infrastructure and long-term economic development in the territory. Although Nunavut's Department of Culture and Heritage offers grants and contributes funds to preserve and promote local culture and language, the territory has yet to approach this opportunity with comparable attention to that of the Northwest Territories.²²

The second is to consider the implications to Nunavut, and the rest of the north, with respect to pursuit of an economic agenda that focuses on occupations predominately employing men, particularly younger men. This is inequitable for women, school-age youth, and physically incapable adults of both genders who may find it challenging to secure meaningful employment. More research should be undertaken to

²² See, for example, Today's Resources, Tomorrow's Legacy: NWT Heritage Fund Public Consultation (2010)

examine the impacts of resource development on these groups and to explore means to promote their greater inclusion in the labour force.

Chapter 11. Limitations & Qualifications

The goal of this chapter is to acknowledge the limitations of my study and the ways I attempted to address them.

Despite my best efforts to recognize and advocate the necessity of undertaking policy research within a participatory community driven context, I did not have the ability (time and funds) within the eight month period allocated to this project to achieve this goal. To address this I have:

1. Ensured that I obtained all territorial licenses needed to undertake this research;
2. Interviewed or conversed with as many Nunavummiut as possible;
3. Attended the ArcticNet conference's seminars, plenaries, and panel discussions featuring content relevant to this study; and
4. Treated my findings as explorative or heuristic, and recommended in-depth consultation and primary research to refine the portfolios before implementation.

There are limitations inherent in the statistics used to quantitatively substantiate the policy problem. Baker Lake is a community with less than two-thousand inhabitants, which is a population that some would argue is too small to be of statistical value in terms of accuracy and predictability. These concerns do not detract from my findings because:

1. Many of the indicators I have used in this study i.e. crime rates and school truancy are administrative statistics, not survey results;
2. Communities in Nunavut are enumerated by professional interviewers, which result in 100 percent enumeration and in the case of Baker Lake, an almost 70 percent completion rate. For the remaining 30 percent of the population there was some level of non-response that may mean totally incomplete or partially incomplete. This suggests a very high level of sampling within the hamlet and therefore a reasonable level of validity given the population size;
3. I have avoided comparing Baker Lake to other small individual communities because small real changes can cause statistical anomalies. Instead I have compared the trends seen in Baker Lake to those of the region and territory to show relative changes.

I have not accounted for a very significant problem prevalent across the north, which is the persistent struggle to find, attract and retain qualified staff needed to fill numerous existing positions let alone the hundreds of personnel my analysis has found may be needed. I believe this will require time and energy to resolve. The community is growing, their needs are expanding, the public service will have to grow and learn as well.

I have not analyzed existing capacities of the dozens of territorial personnel already in Baker Lake and elsewhere. Communities have “community wellness workers” and committees of community members struggling to improve conditions on the ground. I perceive their efforts to be well intentioned, effective, and do not suggest that they be undermined, but rather augmented with the enhanced support in my findings to improve their overall impact.

In the course of my research it was brought to my attention that there was a smaller than desired sample of participants in the Community Wellness Report featured in this project. To address this I have treated its results as illustrative and as the basis for which policy might model the recommended approach to sustainable communities in context of surging economic development.

It is beyond my scope to cover past case studies of mining in the north. There are examples of development from around the country and around the world that show varying degrees of negative and positive impacts on communities. The unique attributes of life in Nunavut as compared to other regions made it very difficult to find applicable lessons that could be applied within this research. Mining experts referred me to case studies in Alaska and in Scandinavia for example, where positive experiences are observed in regional communities. Generally speaking, heightened levels of infrastructure and/or previous/ongoing investment in human capital, either from military service or by other means, were clearly responsible for much of the difference in experience.

Despite attempting to be conservative in my estimates, I may have underestimated or overestimated financial and social costs and benefits of the recommendation. One concern is that I considered all programming, personnel, and

infrastructure investments as being incremental, i.e. over and above all that already in place. I then estimate benefit to the economy based on the overall impact on education graduation gaps, which is more accurately the result of the gross costs of existing and incremental policy. Therefore the costs are understated. Offsetting this, I did not explore potential benefits from reductions in cost resulting from: improved long-term physical and mental health, ameliorated crime and incarceration rates, less social assistance, dropping rental subsidies, and others. Therefore the benefits are also understated. I used the best estimates I could muster with the means available to substantiate every assumption made in my costing and modeling exercises. I maintain that they are sufficiently accurate to support the recommendations made in this study.

Chapter 12. About the Author

I am a master's of public policy student in the School of Public Policy at Simon Fraser University. I was born in Vancouver. My academic background prior to policy research is in marketing and communications. This study was an independent original piece of desktop research undertaken over the final eight months of my graduate degree.

Although time and funding did not permit my going to Nunavut to engage communities and people on the ground I have done field research in Nunavut in the past. In 2011 I was employed by Statistics Canada as a Northern Enumerator. As described in the study it was our mandate to travel to and within Nunavut's communities, and indeed throughout the north, to engage and interview residents for the Census and the National Household Survey. I would also argue that our unwritten objectives included relationship building on behalf of the Government of Canada, and the employment of local people e.g. language guides, accommodation rentals, food purchases, taxi use etc.

In this role I spent a several months in Iqaluit, Hall Beach, Rankin Inlet, Igloolik, Whale Cove, and Fort Smith (NWT); I also worked in numerous Métis settlements and First Nations reservations in the High Prairie, Gift Lake region of northern Alberta. I estimate that I enumerated more than two thousand Aboriginal people in my tenure. This experience was formative for me and was the specific incentive for my entry into public policy graduate studies.

I began working for the Canadian Polar Commission in summer 2013 where I help analyze various northern policy issues. The department sent me to Yellowknife for two weeks to conduct research. The trip allowed me to build relationships with senior public servants who suggested that I research this topic. I hope and plan to share this study with these and other public servants, with Inuit people, and with other researchers working on complementary studies.

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Appendix A.

Mines and Potential Mines in Nunavut

This table appeared in the NWT & Nunavut Chamber of Mines January 2014 newsletter. It was resized and reformatted but unedited. It was used with permission.

Table A.1: Existing and Potential Mining Projects in Nunavut

Project	Owner(s)	Commodity	Description	Status
Meadowbank Gold Mine	Agnico-Eagle Mines	Gold	In operation since 2010. Open pit mine located in the Kivalliq Region, 300 km west of Hudson Bay and 70 km N of Baker Lake. Mine jobs: 450	Payable gold production for 2012 totalled 366,030 oz. Mine life extended to 2018. Est. expenditures for 2013 - \$83M.
Mary River	Baffinland Iron Mines	Iron	Proposed open pit mine with railway and port; 936 km N of Iqaluit with 5 known deposits. Estimated construction jobs: 3,500- 5,000. Estimated mine jobs: 715	Comments on FEIS Addendum due by October 18, 2013; Technical hearings scheduled for November, 2013. On Sept 9, Baffinland and Qikiqtani Inuit Sign Mary River IIBA. Sept 13, Construction decision made. Sept 25, Baffinland Announces First Charter from Kitchener- Waterloo, to Mary River. Sealift to site completed Oct 7.
Kiggavik	AREVA Resources	Uranium	Proposed uranium mine 80 km W of Baker Lake. Estimated Construction jobs: 750 Estimated mine jobs: 600	AREVA to submit final EIS as September 30, 2014, with final public hearings in 2015.
Meliadine Gold	Agnico-Eagle Mines	Gold	Possible gold mine, 6 deposits, the largest of which is the Tiriganiaq deposit, 25 km NE of Rankin Inlet. Estimated construction jobs: 1000 Estimated mine jobs: 700	Technical review comments on DEIS due November 22, 2013; Est. expenditures for development and exploration for 2013 - \$90M.

Project	Owner(s)	Commodity	Description	Status
Hackett River	GlencoreXstrata	Zinc, Silver, Copper, Lead	Proposed open pit mine. One of largest undeveloped VMS massive sulphide deposits in the world. 104 km SSW of Bathurst Inlet. Estimated construction jobs: 800 Estimated mine jobs: 500	Pre-feasibility Study initiated in September, 2012; Submission of DEIS scheduled for Q3, 2013. GlencoreXstrata is taking lead on advancing the Bathurst Inlet Road & Port project, with Sabina.
Back River	Sabina Gold & Silver Corp.	Gold	Approximately 60KM from Hackett River; adjacent to the Wishbone Greenstone belt. Consists of the George and Goose Lake deposits and holds significant gold resources. Estimated construction jobs: 1,600. Estimated mine jobs: 900	Plans to file DEIS by end of 2013. PFS expected to be complete by the end of Q3, 2013.
Izok Corridor Project (with High Lake & Hood River deposits)	MMG Resources Inc.	Copper, Zinc, Gold, Silver	High Lake is 1710 hectare, copper-zinc-silver-gold property, 190 km ESE of Kugluktuk. Izok is high-grade zinc-copper-lead-silver deposit, 255 km SW of Kugluktuk. Estimated construction jobs: 1,140. Estimated mine jobs: 710	MMG examining alternative designs to reduce costs, add value, and improve economic viability of the project, and will provide revised project description to NIRB by December, 2013.
Roche Bay	Advanced Exploration Inc.	Iron	Over 500 mt of Indicated Resources within 6 km of a natural deep water harbour at Roche Bay. Estimated construction jobs: 450 Estimated mine jobs: 370 - 380	Positive Feasibility Study August 10, 2012. Announced opportunities for infrastructure support in construction of LNG power plant & port facility, February 5, 2013.
Chidiak	Peregrine Diamonds Ltd.	Diamonds	Located 180 km S of Pangnirtung. Contains 61 known diamond-hosting formations.	Feb 11 news release: Peregrine Announces Appointment of Herman Grütter and Dave Skelton to Key Roles in Preparation for Resource Definition Programs at Chidiak

Project	Owner(s)	Commodity	Description	Status
Doris North/ Hope Bay	TMAC Resources	Gold	Proposed gold mines 130 km S of Cambridge Bay; covers the majority of the Hope Bay Greenstone Belt. Estimated mine jobs: 300	NIRB recommends approval of Type A Water License renewal for 10-year period on August 16, 2013.
Angilak	Kivalliq Energy Corp.	Uranium	340,268 acre property located SW of Baker Lake; Hosts the high-grade Lac 50 Trend deposit; 43.3 Mlb inferred resource at 0.69% U308.	Kivalliq acquired property in 2008. 87,500 m on exploration and resource drilling to date. 2013 drill program planned.

Appendix B.

Adult Workshop, Seminar, and School Curriculum Content Needed

Theme	Specific Content
Personal hygiene	Dental care and toothbrush access
Mental Health	Suicide prevention
	Addictions
	Sexual harassment
	Inuit healing
Traditional Culture	Oral history
	Inuktitut language
	Arts: e.g. clothing, art, throat singing, rummy, dancing, carving, felt work, sewing, music, Inuit games
Wellbeing	Hunting
	Cooking
	Home economics
	Mining trades
	Personal and family finance
	Interfamilial and interco-worker relationship management
	Inter-cultural engagement
	Parental support
Physical health	Prenatal health
	Dietary health
	Condom use and access
	Risks of smoking
	Sexually transmitted diseases
	Exposure to chemicals and pollution

Appendix C.

Discounting Methodology Supplements

Discounting Example:

Baker Lake with low efficacy and amelioration of half the education gap.

If trends continue:

I added the average nominal growth rate of 5.4 percent to 2012 nominal GDP estimates to forecast the benefits of the next year, which I discounted at five, seven, and nine percent. This forecasts low, medium, and high estimates of the present value of the current rate of nominal growth in the economy over 20 years.

Avg. nominal growth in GDP

$$\frac{.19(\text{overall percent change in GDP})}{5 (\text{number of years } 2007 - 2012)} = 0.038$$

Forecast GDP if trends continue

$$\$104 \text{ million (2012 real GDP)} \times 1.038 = \$108 \text{ million}$$

Present values of benefits of this rate of growth, if trends continue, over 20 years at 5%, 7%, and 9% will range from \$986 million to \$1.3 billion.

If policy programs ameliorate half of the education gap with low efficacy in economic growth:

Supplemented Change in GDP if efficacy is low and just 50 percent of education gap is ameliorated

$$\$104 \times 1 + (.038 + .016) = \$110 \text{ million}$$

Incremental benefit to GDP beyond those if trends continue

$$\$110 \text{ million} - \$108 \text{ million} = \$2 \text{ million}$$

The present value of incremental benefits over those if trends continue, over 20 years at 5%, 7%, and 9%, will range from \$15 to \$21 million.

Additional Data Tables not included in the Main Body: Gross and Incremental Changes to GDP Contingent on Levels of Efficacy

Gross Changes with Half Education Gap Ameliorated:

Table C.1: Medium Efficacy

	Half of Education Gap is Ameliorated w/ Medium Efficacy (4%) (\$ Millions)					
	Annual Change	Suppl' Change	Suppl' Forecast GDP	PV Gross GDP Over 20 Years		
				5%	7%	9%
Baker Lake	3.8%	7.8%	\$112	\$1,398	\$1,188	\$1,024
Kivalliq	3.8%	7.8%	\$542	\$6,749	\$5,737	\$4,943
Nunavut	3.6%	7.6%	\$1,891	\$23,568	\$20,035	\$17,264

Table C.2: High Efficacy

	Half of Education Gap is Ameliorated w/ High-End Efficacy (6.4%) (\$ Millions)					
	Annual Change	Suppl' Change	Suppl' Forecast GDP	PV Gross GDP Over 20 Years		
				5%	7%	9%
Baker Lake	3.8%	10.2%	\$115	\$1,429	\$1,215	\$1,047
Kivalliq	3.8%	10.2%	\$554	\$6,899	\$5,865	\$5,053
Nunavut	3.6%	10.0%	\$1,933	\$24,094	\$20,482	\$17,649

Gross Changes with Entire Education Gap Ameliorated:

Table C.3: Low Efficacy

	Entire Education Gap is Ameliorated w/ Low-End Efficacy (3.2%) (\$ Millions)					
	Annual Change	Suppl' Change	Suppl' Forecast GDP	PV Gross GDP Over 20 Years		
				5%	7%	9%
Baker Lake	3.8%	7.0%	\$111	\$1,388	\$1,180	\$1,016
Kivalliq	3.8%	7.0%	\$538	\$6,699	\$5,694	\$4,907
Nunavut	3.6%	6.8%	\$1,877	\$23,393	\$19,886	\$17,135

Table C.4: Medium Efficacy

	Entire Education Gap is Ameliorated w/ Medium Efficacy (5.5%) (\$ Millions)					
	Annual Change	Suppl' Change	Suppl' Forecast GDP	PV Gross GDP Over 20 Years		
				5%	7%	9%
Baker Lake	3.80%	9.30%	\$114	\$1,417	\$1,205	\$1,038
Kivalliq	3.80%	9.30%	\$549	\$6,843	\$5,817	\$5,012
Nunavut	3.60%	9.10%	\$1,918	\$23,897	\$20,314	\$17,504

Table C.5: High Efficacy

	Entire Education Gap is Ameliorated with High-End Efficacy (8.1%) (\$ Millions)					
	Annual Change	Suppl' Change	Suppl' Forecast GDP	PV Gross GDP Over 20 Years		
				5%	7%	9%
Baker Lake	3.80%	11.90%	\$116	\$1,451	\$1,234	\$1,063
Kivalliq	3.80%	11.90%	\$562	\$7,005	\$5,955	\$5,131
Nunavut	3.60%	11.70%	\$1,963	\$24,466	\$20,799	\$17,922

Incremental Changes with Half Education Gap Ameliorated:**Table C.6: Medium Efficacy w/ Half of education gap ameliorated – Incremental**

	Half of Education Gap is Ameliorated with Medium Efficacy (4%) (\$ Millions)					
	Suppl' Change	Suppl' Forecast GDP	Increm. GDP	PV Incremental GDP Over 20 Years		
				5%	7%	9%
Baker Lake	7.80%	\$112	\$4	\$52	\$44	\$38
Kivalliq	7.80%	\$542	\$20	\$250	\$213	\$183
Nunavut	7.60%	\$1,891	\$70	\$876	\$745	\$642

Table C.7: High Efficacy w/ Half of education gap ameliorated – Incremental

	Half of Education Gap is Ameliorated with High-End Efficacy (6.4%) (\$ Millions)					
	Suppl' Change	Suppl' Forecast GDP	Increm. GDP	PV Incremental GDP Over 20 Years		
				5%	7%	9%
Baker Lake	10.20%	\$115	\$7	\$83	\$71	\$61
Kivalliq	10.20%	\$554	\$32	\$401	\$341	\$293
Nunavut	10.00%	\$1,933	\$112	\$1,402	\$1,192	\$1,027

Incremental Changes with Entire Education Gap Ameliorated:

Table C.8: Low Efficacy w/ Entire education gap ameliorated – Incremental

	Entire Education Gap is Ameliorated with Low-End Efficacy (3.2%) (\$ Millions)					
	Suppl' Change	Suppl' Forecast GDP	Increm. GDP	PV Incremental GDP Over 20 Years		
				5%	7%	9%
Baker Lake	7.00%	\$111	\$3	\$41	\$35	\$30
Kivalliq	7.00%	\$538	\$16	\$200	\$170	\$147
Nunavut	6.80%	\$1,877	\$56	\$701	\$596	\$513

Table C.9: Medium Efficacy w/ Entire education gap ameliorated – Incremental

	Entire Education Gap is Ameliorated with Medium Efficacy (5.5%) (\$ Millions)					
	Suppl' Change	Suppl' Forecast GDP	Increm. GDP	PV Incremental GDP Over 20 Years		
				5%	7%	9%
Baker Lake	9.30%	\$114	\$6	\$71	\$61	\$52
Kivalliq	9.30%	\$549	\$28	\$344	\$293	\$252
Nunavut	9.10%	\$1,918	\$97	\$1,205	\$1,024	\$882

Appendix D.

Multi-Criteria Alternatives Analysis

Table D.1: Multi-Criteria Comparative Matrix and Legend

	Criteria			
Alternative	Equity	Admin	Political	Private Sec.
Pilot (s)	Moderate	Moderate	Highest	Highest
Regional	Moderate	High	Moderate	Moderate
Territorial	Potentially High	Highest	Lowest	Moderate

	Legend				
	Efficiency	Equity	Admin	Political	Private Sec.
Definition	<p>Incremental benefits exceed costs for at least the lowest cost portfolios in context of lowest levels of efficacy</p> <p>Potential NB denotes plausible benefits exceeding costs if efficacy is high and costs are contained</p> <p>N/A denotes not applicable; only for the pilot project where the criterion is disregarded b/c the Alternative is an experiment</p>	<p>Potentially high denotes all communities being equally invested in regardless of resource endowment</p> <p>Moderate denotes some equitability concerns either within a region or across the territory.</p>	<p>High/highest denote substantial and difficult reallocations of personnel and resources</p> <p>Moderate denotes substantial, but locally contained, reallocations of personnel and resources</p>	<p>Highest denotes greatest overall acceptability in the public sector, given change may be undesired nonetheless.</p> <p>Moderate denotes caution and apprehension regarding the scale of change</p> <p>Lowest denotes explicit and public resistance from institutional and political sphere.</p>	<p>Highest denotes appreciation and openness to supporting efforts in communities that support mining operations.</p> <p>Moderate denotes general, but passive, support for development of human and physical capital around the territory.</p>