

# City of Terrace: Local Area Economics: 1991-2016

Prepared for:  
**Greg Knox**  
Executive Director  
[gregk@skeenawild.org](mailto:gregk@skeenawild.org)  
SkeenaWild Conservation Trust  
Unit 103-4622 Greig Avenue, Terrace, BC, V8G 1M9

Prepared by:  
**Hannes Edinger**  
[hannes@bigriveranalytics.com](mailto:hannes@bigriveranalytics.com)  
250.635.8653  
Big River Analytics Ltd.  
4795 Merkle Rd. Terrace, BC V8G 0B5

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# Executive Summary

This report provides an overview and synthesis of a presentation delivered to Terrace City Council on May 24th, 2018. Information presented in this report is derived from research intended to develop an understanding of economic drivers in local Northwest BC (NWBC) communities. Similar reports and presentations will be available for the City of Prince Rupert, the Regional District of Kitimat Stikine, the North Coast Regional District and the District of Kitimat.

Commissioned in 2017, this project is part of a wider initiative undertaken by SkeenaWild related to responsible development. This project was envisaged as a first step to help SkeenaWild develop a deeper understanding of the economic dynamics of our communities in Northwest BC and to explore whether the data support anecdotal observations of how our local economies might be changing.

Our goals with this research are to understand how our local economy has been changing over the past 25 years, which economic sectors are driving the economy and what opportunities the region has for economic development and sustainable growth going forward.

This research also aims determine whether the data align with observed perceptions of local residents: has Terrace become the kind of community that people choose because of the lifestyle it can afford them, or does the historic “industrial boom-and-bust town” narrative still best describe our community?

Our review determined that existing analysis does not answer these questions: existing analysis is only able to produce estimates for highly aggregated industries and at too large a geography. Therefore, it was necessary to conduct an in-depth look at the sectoral composition of Terrace through the lens of employment-by-sector over time from 1991-2016.

An analysis of data from 1991-2016 shows the unwinding of a large forestry sector resulting in total job losses in excess of 2,200 between 1991 and 2011. Between 2011 and 2016 we find that the community is growing for the first time in twenty years, with employment increased in 2016 compared to 2011. The three drivers of this growth are: construction, tourism, and professional and scientific services. After 20 years of decline, Terrace is growing again. Two of these three sectors (construction and professional and scientific services) can likely attribute some growth to industrial activity; however, all three sectors contribute significantly to net basic income (as described in Figure 5). Alternatively, industrial-scale forestry – the historic economic driver – contributed less to net basic income because it requires wholesale liquidation of natural capital to generate basic income. As a result of this diversified growth, Terrace has a wealthier and more resilient economy than it would have otherwise. Encouraging the growth of economic sectors that generate basic income without large costs will continue to serve Terrace’s economic sustainability.

Migration patterns to Terrace and the wider region are interesting in that the growth originates almost exclusively from the 20- to 35-year-old age cohorts. In-migration of young people and growth of economic sectors over the past 5 years aligns with local anecdotal observations that there is a significant contingent of young professionals choosing Terrace as a place to live due to the tremendous outdoor recreation and lifestyle opportunities it offers, and to the relatively affordable price of housing.

# 1. Introduction

This report provides an overview and synthesis of a presentation delivered to Terrace City Council on May 24th, 2018. Information presented in this report is derived from a broader research project intended to develop an understanding of the economic drivers of local Northwest BC (NWBC) communities. Similar reports and presentations are available for the City of Prince Rupert, the Regional District of Kitimat Stikine, the North Coast Regional District, the District of Kitimat, and the town of Smithers.

Commissioned by SkeenaWild in 2017, this project is part of a wider initiative undertaken by SkeenaWild related to responsible development. This project was envisaged as a first step to help SkeenaWild develop a deeper understanding of the economic dynamics of our communities in NWBC, and to explore whether the data support anecdotal observations of how our local economies might be changing.

Specifically, for the first time in a long time, the community is growing: an influx of younger people who are professionals, entrepreneurs, and everything in between are moving to Terrace. Many of these young people are “lifestyle” or “amenity” migrants, usually deeply devoted to one or more of the outdoor pursuits for which Terrace is a destination. They’re steelheaders, backcountry skiers or snowboarders, kayakers, climbers, wind-surfers, mountain bikers, jet boaters, hunters, hikers and mushroom enthusiasts. We also notice that the influx of people in Terrace during the build-up in 2015 is related to work prospects on the Rio Tinto Alcan upgrade and the Northern Transmission Line, or to speculation on an imminent LNG Canada (LNG) decision.

Our goals with this research are to understand how our local economy has changed over the past 25 years, which economic sectors are driving the economy and what opportunities the region has for economic development and sustainable growth going forward.

We are also trying to understand whether the data align with what many locals say they are observing: has Terrace become the kind of community that people choose because of the lifestyle it can afford them, or does the historic “industrial boom-and-bust town” narrative still best describe our community?

## 2. Background & Methods

Located on the banks of the Skeena River in NWBC, Terrace incorporated as a City in 1987; though the region has been occupied by Tsimshian First Nations for millennia. Terrace is the geographic centre of NWBC and as a result it serves as the regional hub providing goods and services to other regional communities and industrial developments. Terrace started as a sawmill town and until fairly recently, forestry has been the regional economic driver with large-scale logging, sawmilling, and pulp and paper manufacturing all taking place within the region. Starting in 2011 and 2012 after enduring a long unwinding of its local forestry sector, Terrace saw an uptick in economic activity as a result of the development of the Northwest Transmission Line (NTL), the Rio Tinto Alcan (RTA) upgrade, and increasing interest among amenity migrants looking for some of the finest recreational opportunities in British Columbia (BC). Since 2015, many of the area's large-scale development proponents have withdrawn their proposals, and through much of 2016 economic activity declined. Presently in mid-2018, a final investment decision on a large LNG export terminal in nearby Kitimat is anticipated and is yet again fueling speculation on an industrial boom.

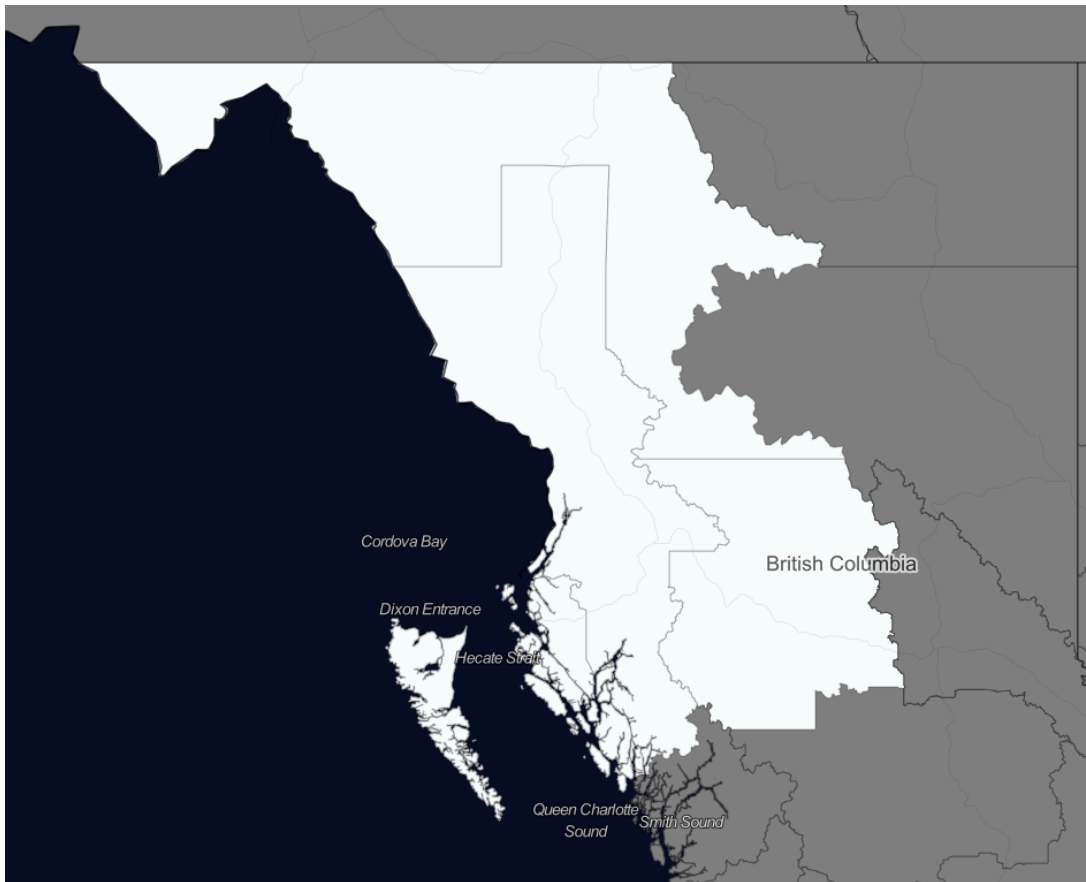
### 2.1 Why can't we just use existing analysis?

As a result of the significant interest in the region by proponents of large-scale resource development projects, the data available for Terrace and NWBC has been scrutinized repeatedly through socioeconomic impact assessments conducted as part of the environmental assessment process for these large-scale project proposals<sup>1</sup>. These studies generally provide some analysis involving a high-level time series analysis of employment among industrial sectors. Unfortunately, these reports usually employ the Labour Force Survey (LFS) which, due to a limited sample size in NWBC, can only provide highly aggregated estimates from a very large geographical area. Figure 1 shows the level of geography at which the LFS reports estimates for NWBC.

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<sup>1</sup> For example: <https://www.ceaa-acee.gc.ca/050/documents/p80034/99768E.pdf>

Figure 1: Northwest + Nechako, geographic level at which monthly Labour Force Survey (LFS) estimates are available



The level of geography at which LFS estimates are available doesn't allow us to draw any conclusions locally within any of the communities making up NWBC. Further, the level of aggregation at which estimates are provided is limiting in terms of our ability to understand, in any sort of detail, how our economy might be changing over time. For example, Figure 2 presents a table from the socioeconomic impact assessment conducted by ResCan on behalf of Pretivm's BruceJack mine at the level of aggregation used to report employment in different industrial classifications. Suppose we were interested in dynamics in the forestry sector; how could we possibly draw any conclusions given its aggregation with fishing, mining, and oil and gas?

Figure 2: Example of a table utilizing LFS data for the North Coast region

**Table 4.2-5. Employment, North Coast Development Region (2006 to 2011)**

Job Creation (000)	2006	2007	2008	2009	2010	2011	5-year (2006-11)	1-year (2010-11)
Agriculture	1.5	-	-	-	-	-	-1.5	-
Natural resources (forestry, fishing, mining, oil and gas)	3.0	2.8	3.5	2.5	3.3	2.4	-0.6	-0.9
Utilities	-	-	-	-	-	-	-	-
Construction	3.0	2.3	2.6	2.9	2.1	3.4	0.4	1.3
Manufacturing	6.2	7.1	7.0	6.3	5.5	4.8	-1.4	-0.7
<b>Goods Producing Sector</b>	<b>13.8</b>	<b>13.6</b>	<b>13.6</b>	<b>12.4</b>	<b>11.4</b>	<b>11.3</b>	<b>-2.5</b>	<b>-0.1</b>
Services-producing Sector	29.0	28.4	31.2	29.1	29.0	32.0	3.0	3.0
Total employment	42.8	42.00	44.8	41.5	40.4	43.3	0.5	2.9

Source: ICABC (2012).

"-" indicates data suppressed as these industries are estimated to have under 1,500 persons employed, limiting the reliability for job creation statistics to be generated.

These limitations, in terms of geography and aggregation, are so severe that it was necessary to explore alternative sources of information that allow us to dig deeper to develop an understanding of local area economic dynamics.

## 2.2 Our Approach

The Census of the Population is a quinquennial census conducted by Statistics Canada that has two parts: the short form, which includes a short list of questions sent to every household in Canada, and a long form, which is actually a random sample-based survey (not a census) with a much longer set of questions, including most of the questions that are of interest to this project. The Census is intended to provide a snapshot (cross-section) in time capable of describing Canada's population in meaningful terms. Income, languages, demographics, labour, occupations, industrial sectors, immigration and Aboriginal identity are examples of the types of dimensions along which the Census describes the Canadian population every five years. Because the Census isn't intended to show how the population changes over time beyond usually comparing the current estimates to those from the previous enumeration, the classification systems employed, the wording, and even entire questions are sometimes added or dropped from the Census questionnaire. As a result of these temporal inconsistencies it is a tremendous challenge to build a time-series of data across multiple enumerations. Difficulty aside, this task was necessary to allow for examination of local area economic dynamics in any sort of detail within communities in NWBC. The single largest challenge for this project was related to the switch in 1997 from the 1982 Standard Industrial Classification System (SIC) to the 1997 North American Industrial Classification System (NAICS). Fortunately, while no official concordance tables are available between the 1982 SIC and the 1997 NAICS, estimates in 2001 were produced using both the 1982 SIC and the 1997 NAICS. As a result, we were able to calibrate our industrial sector estimates such that information prior to the 2001 Census is reasonably comparable to information after the 2001 Census. We produced detailed



employment by industrial sector estimates for several communities in NWBC starting in 1991 and terminating with the most recent Census enumeration in 2016, in an effort to understand how these economies have changed over this 25-year time horizon.

## 2.3 Local area economic dependencies theory

### 2.3.1 Background and Models

At the core of our inquiry is a desire to understand the linkages between different sectors of local economies in NWBC. Is it true that forestry, mining, and other extractive industries somehow form the “base” of the local economy from which all other employment is derived? This line of inquiry is explored in detail in the 2009 report by BC Stats: “British Columbia Local Area Economic Dependencies: 2006.” Drawing on 2006 Census data, author Garry Horne proposes a model that can be used to understand income flows in a regional economy. Figure 3 depicts Horne’s (2009) model. In order to understand the flow diagram, let’s define the following terms and concepts:

The premise of the income flow diagram is that relevant components of a regional economy can be represented by two types of income flows: basic and non-basic, which are themselves defined by their source. Basic income can be thought of as “export” income that forms the base of an economy. It is income that flows into the region from:

- Jobs that export raw or manufactured goods (e.g. logs being sent to Asia; aluminum exports; lumber exports).
- Jobs that export services (e.g. a consultant based in NWBC whose client base is national; a pipefitter that lives in NWBC but works in Alberta; a lawyer whose client base extends beyond NWBC; a web developer in NWBC serving international clients).
- Jobs producing goods and services for the tourist sector (e.g. fishing guides; hotels and accommodations).
- Jobs in the public sector funded by provincial or federal governments (e.g. healthcare workers; teachers).

From the standpoint of operationalizing an analysis of those jobs listed above using Statistics Canada data, we can categorize those jobs generating basic income as originating in 10 sectors defined in the North American Industrial Classification System (NAICS):

1. Forestry and associated manufacturing
2. Mining and associated manufacturing, including Oil & Gas
3. Fishing and Trapping and associated manufacturing
4. Agriculture and Food and Beverage Manufacturing
5. Tourism
6. High Technology
7. Public Sector
8. Construction

## 9. Film Production and Sound Recording

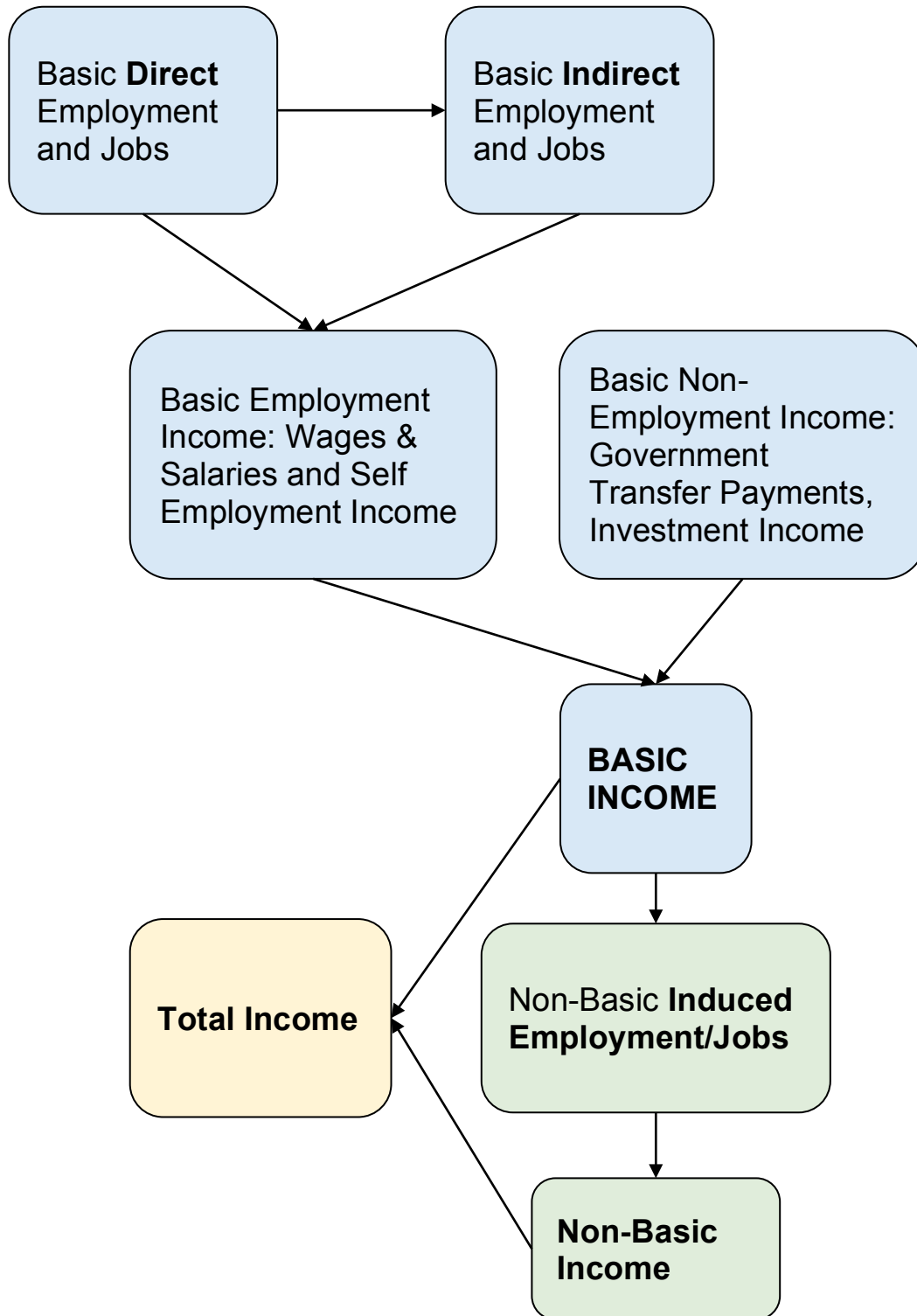
Non-employment income (government transfers) is also included as a source of basic income.

Non-basic income originates in jobs that are induced locally; consider jobs like barbers and hairdressers, dry cleaners, or some retail jobs. Clearly some businesses generate both basic and non-basic income<sup>2</sup>: for example when a restaurant prepares a meal for a tourist they would be generating basic income, whereas when the same meal is prepared for a local they would be generating non-basic income.

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<sup>2</sup> The extent to which some businesses create basic and non-basic income is one of the major problems encountered in estimating local area income dependencies.

Figure 3: Regional Economy Income Flow Diagram



Source: BC Stats: British Columbia Local Area Economic Dependencies: 2006.

Figure 3 makes the most sense when we follow the flow of the diagram starting with total income. Total income comprises all basic income and non-basic income. Non-basic income is induced (created by) basic income through demand for local goods and services by workers spending their income in the local economy. Basic income can have multiple sources, but it is useful to think of basic income as those dollars entering a region from outside and the business-to-business activity that results. This conceptual model is simplistic, and the real dynamics of a regional economy are more complex. However, for the purposes of our inquiry, this model serves as a useful way to begin understanding how regional economies work.

According to our model, all non-basic income is induced by – and ultimately created by – the demand of those workers with basic income. This is simplistic, because workers in non-basic sectors also create demand for non-basic goods and services; however the model would argue that without any basic income there would be no non-basic sectors, and in-turn, no demand for non-basic goods and services that originates with non-basic workers. Given this directionality our model predicts that regions with large amounts of basic income will tend to be wealthy, and regions with very little basic income will tend to be poor.

Figure 3 includes some additional terminology and complexity that often appears in economic impact assessments: direct, indirect, and induced jobs. Direct jobs are those that are directly attributable to the activity generating basic income. Consider a logging example: the activity generating basic income is logging, the direct jobs include loggers, machine operators, truck drivers, and other jobs directly involved in the activity generating basic income. The indirect jobs associated with the logging operation would be those created in the businesses that serve the logging operation: for example, the welding and mechanic shop that services the machinery, the tire shop, and the accountant that manages payroll. Both the direct and indirect jobs generate basic income. The induced jobs attributable to the logging operation are the downstream jobs that are generated by the consumer demand for local goods and services: retail, haircuts, restaurants, movie theatres, etc. Jobs induced by local consumer demand generate non-basic income.

In their decisions to support or reject proposed local developments, regional governments tend, either implicitly or explicitly, to think in terms of the economic model proposed in Figure 3. This was made especially explicit in a famous case in Ontario, *KVP Co. Ltd. v. McKie* (1949), which first established that governments could allow pollution even when it violated the property rights of affected landowners if it helped to preserve employment. The respondents in the case owned land on the Spanish River in Ontario, which was being polluted by emissions from a pulp and paper mill owned by Kalamazoo Vegetable Parchment Company (KVP). Five property owners sued KVP and received damages and an injunction preventing the mill from operating so long as it continued to pollute the river, affecting the character or quality of the water. KVP appealed the ruling based on the argument that the social benefit of the jobs its mill created should trump

the preservation of the character of the river; one manager quipped, “What are a few fish compared with what we are doing for the country?”<sup>3</sup>

When KVP’s appeal failed, the Ontario government amended the *Lakes and Rivers Improvement Act* to allow judges to refuse an injunction if the social goods of employment outweighed the harm of pollution.<sup>4</sup> When judges still refused to lift the injunction on KVP, Ontario passed a law dissolving the injunction and making the reduction of pollution a matter for arbitration while allowing the plant to continue operating<sup>5</sup>. The debate in the legislature made explicit the prioritization of jobs over halting pollution when the Attorney General stated, “We are just not interested in preserving the quality of the water on the river as far as it is possible, as we are in preserving the means of employment for these people.”<sup>6</sup>

The most obvious contemporary example of this now long-established emphasis by governments on regional employment was the 2015 approval of the Petronas Pacific Northwest LNG exporting facility, which was cancelled in July of 2017, in spite of its large expected environmental costs. The project was expected to affect eelgrass beds crucial to the survival of juvenile salmon<sup>7</sup> in the Skeena Estuary. In her announcement of the project, Premier Christy Clark emphasized its job creation potential, stating “These agreements set the stage for a potential \$36-billion investment in northern B.C.... It will be a key driver of jobs in every corner of our province.”<sup>8</sup>, and emphasized the potential of the development of LNG export terminals along the B.C. coast to create up to 100,000 jobs.<sup>9</sup>

In 2007, the government approved the Kitimat LNG Terminal Office project for LNG import, also citing the importance of the creation of 700 local jobs in construction and 50 in operation of the facility<sup>10</sup>. The fact that less than ten years later the government was approving export facilities, along with the uncertain economic returns of projects like the Petronas Pacific Northwest exporting facility, emphasizes the need for a thorough environmental assessment since the return on economic investments can be far more fleeting and uncertain than their environmental impact.

As a result of this common mental model, regional governments often favour development of local industries and projects that will generate significant amounts of basic income over projects that would generate less basic income, regardless of other aspects of the project. The problem

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<sup>3</sup> *Sudbury Daily Star*, November 23, 1948, quoted in Brubaker, Elizabeth (1995), *Property Rights in Defence of Nature*, Environment Probe. Toronto. 74.

<sup>4</sup> *An Act to amend the Lakes and Rivers Improvement Act*, section 39 (1)(a). Ontario, 1949. Quoted in Brubaker, 1995, p. 74.

<sup>5</sup> *The KVP Company Limited Act*. Ontario, 1950.

<sup>6</sup> *Debates, op. Cit.*, February 24, 1950 A-5. Ontario. Quoted in Brubaker, 1995, p. 77.

<sup>7</sup> Brent Jang, May 18, 2015, *Controversial LNG energy project faces environmental review*, The Globe and Mail,

<sup>8</sup> Dirk Meissner, Wednesday, May 20, 2015, B.C., *Petronas sign deal toward proposed LNG project*, CTV News

<sup>9</sup> Meissner 2015.

<sup>10</sup> *Kitimat LNG Terminal Project Assessment Report and Comprehensive Study Report*. April 13, 2006. Environmental Assessment Office, Transport Canada, Environment Canada and Indian Affairs Canada. Available online at: <http://www.ceaa-acee.gc.ca/050/documents/14504/14504E.pdf>

with this line of thinking is that the model proposed in Figure 3 only considers the basic income benefits of projects, completely ignoring the costs. As a result of neglecting the costs associated with projects, large, industrial projects that will generate significant amounts of basic income tend to find favour over projects that might generate smaller amounts of basic income, but at a lower cost, with those charged with encouraging economic development. The model proposed in Figure 3 is incomplete and missing a critical determinant of what makes local economies wealthy: the costs associated with generating income.

### 2.3.2 Full Cost Environmental Accounting

*There is a dangerous asymmetry today in the way we measure, and hence, the way we think about, the value of natural resources. Man-made assets – buildings and equipment, for example – are valued as productive capital and are written off against the value of production as they depreciate. This practice recognizes that a consumption level maintained by drawing down the stock of capital exceeds the sustainable level of income. Natural resource assets are not so valued, and their loss entails no debit charge against current income that would account for the decrease in potential future production. A country could exhaust its mineral resources, cut down its forests, erode its soils, pollute its aquifers, and hunt its wildlife to extinction, but measured income would not be affected as these assets disappeared.*

**Repetto, et al. (1989)**

Economists, including prominent Nobel Laureates like Robert Solow, have developed high-level, abstract theories of sustainability that rest on a series of strong assumptions. While these assumptions are useful in the development of economic theory, a practical policy perspective must address the most unrealistic assumptions in these theories of sustainability before they can be brought into practice. There are many assumptions that economists make when analyzing a theoretical sustainable economy, but two key components are especially pertinent for us: getting the prices “right” and accounting for the stock of natural capital<sup>11</sup>. These two components are critical to theoretical sustainability, and so we focus our efforts on addressing and incorporating them into our understanding of local economies.

A long list of economist’s assumptions can make getting the prices right seem simple, but in the real world it is a complex problem around which the whole economy revolves. To economists, the “right price” usually refers to a market price in a given transaction that equals the total social and environmental cost of that same transaction. This is the rationale for carbon pricing. The price paid for gasoline by private individuals balances their demand with the many variables suppliers face but doesn’t account for the carbon emitted into the atmosphere. Since atmospheric carbon contributes to global climate change, which itself stands to impose major costs on society, a well-designed carbon price can help to address these costs. As a policy

<sup>11</sup> From the World Natural Capital Forum: “Natural capital is the world’s stock of natural resources, which includes geology, soils, air, water and all living organisms. Some natural capital assets provide people with free goods and services, often called ecosystem services. Two of these (clean water and fertile soil) underpin our economy and society and make human life possible.”

response, governments impose carbon taxes or cap-and-trade programs to more closely approximate the “right price” for consumers and to ensure resources are gathered to address social and environmental costs.

Although it can be easy to understand intuitively the social costs of many goods, it is difficult to calculate the exact magnitude of the difference between social and private prices, or indeed, whether even the private price is what the economist believes it should be. Most goods and services are therefore produced and sold for prices that are likely to deviate from the social price, even if just by a little bit. Entire multinational companies, such as TRUCOST, are devoted to estimating the difference between private and social prices for governments and businesses to gain insights that help guide policy decisions. Figure 4 is a graphic produced by TRUCOST that examines the difference between the private and social costs associated with a few consumer goods.

One area of the environmental economics literature on sustainability is full cost accounting<sup>12</sup>. Full cost accounting has had many incarnations in different fields. We present the Triple Bottom Line (3BL) accounting framework for our analysis of local economies. The fundamental premise of 3BL accounting is an accounting framework that incorporates the ideas we’ve just presented: that there are social and environmental costs and benefits created by human enterprise (government and private) that go beyond what’s captured in profit and loss, and these environmental and social costs and benefits must become part of our overall accounting framework to capture the full impacts of human enterprise.

The recent sale by the City of Terrace of forested lands south of Terrace to private investors hoping to develop the land to build manufacturing facilities provides a good example of when full-cost accounting may contribute to a better understanding of costs beyond profit and loss. The City will profit if the sale price of the land exceeds the value they initially paid for it, but the 3BL accounting framework requires consideration of environmental and social costs of converting a productive pine mushroom forest frequented by locals into a waste-producing industrial facility. The sale of the lands may still be profitable, but incorporating the environmental and social cost outcomes of the sale show that the benefit to the City is potentially lower than the strictly monetary profitability of the sale.

Statistics Canada acknowledges the importance of natural resources to a country’s economic health and prepares tables on natural resource stock accounts, which estimate both the quantity and monetary value of natural resources in a country<sup>13</sup>. These measures are obviously imperfect – since by definition they cannot account for undiscovered resources and the price of

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<sup>12</sup> Also called “green accounting”, “triple bottom line accounting”. “full cost environmental accounting”

<sup>13</sup> Statistics Canada uses the Canadian System of Environmental-Economic Accounting, Canada’s implementation of the United Nations System of Environmental-Economic Accounting. For more information, see “Methodological Guide: Canadian System of Environmental-Economic Accounting” at <http://www.statcan.gc.ca/pub/16-509-x/16-509-x2016001-eng.htm>

goods can dramatically shift the monetary value of the stock – but their estimation reflects the desire to capture this important variable<sup>14</sup>.

Incorporating natural capital stocks into economic indicators can have a large effect on the measured strength of an economy. In particular, in a resource-rich country like Canada, fluctuations in the price of natural resources are important to understanding the total wealth and economic strength of the country<sup>15</sup>, while physical stocks of resources are important for understanding an important sector of future economic activity.

The World Bank also measures natural resources and natural capital's contribution to GDP through its World Development Indicators environmental tables, including not only the rents from oil, natural gas, coal, minerals, and forestry<sup>16</sup>, but also freshwater reserves, deforestation and biodiversity, and cultivable land<sup>17</sup>.

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<sup>14</sup> For more information about environmental and resource accounts, see "About the environmental and resource accounts" at <https://www.statcan.gc.ca/eng/nea/about/env>; and "Canada's Quarterly National Resource Wealth" at <http://www.statcan.gc.ca/pub/16-002-x/2017001/article/14825-eng.htm>

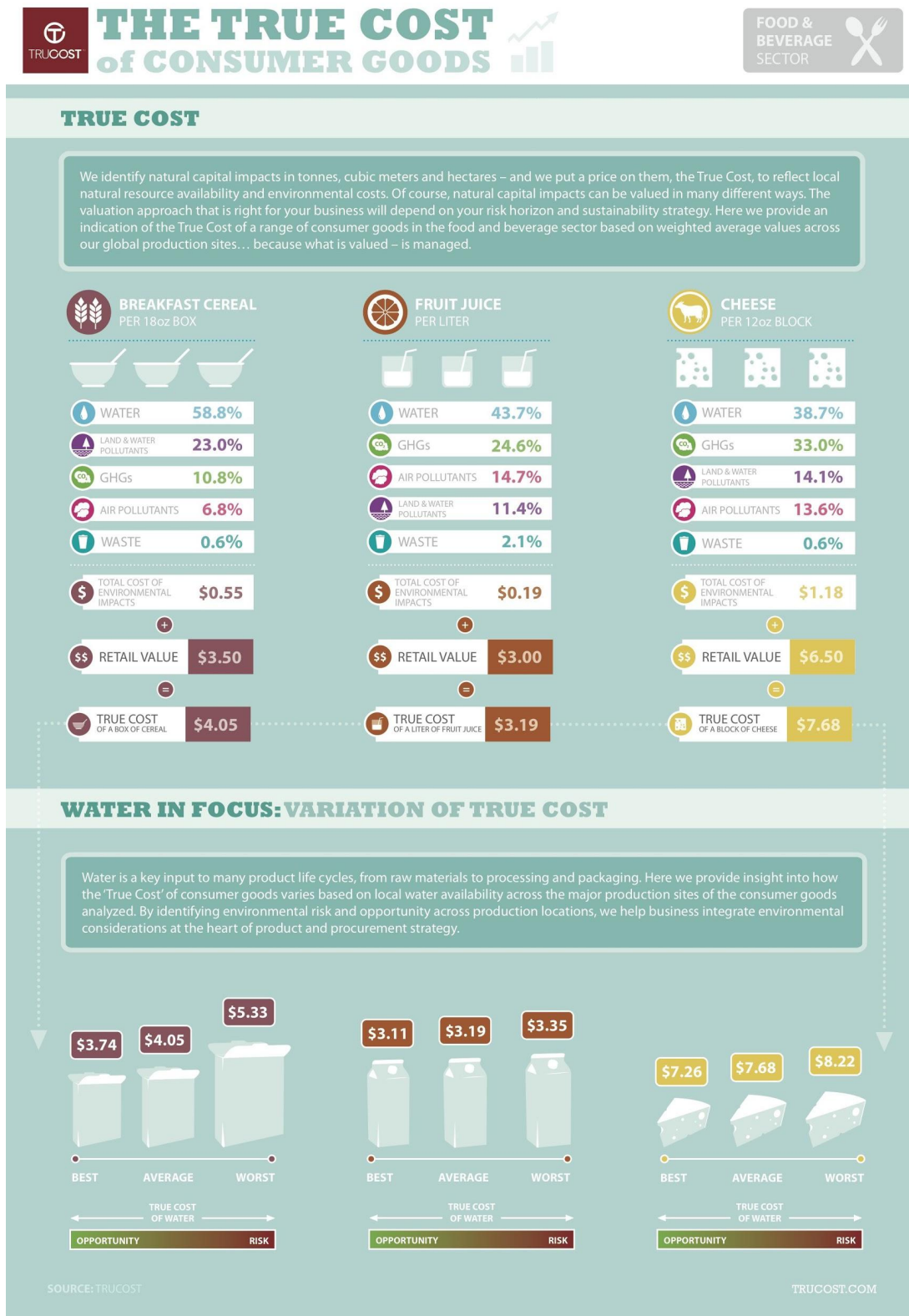
<sup>15</sup> "Canada's Quarterly National Resource Wealth" provides an illustration of the impact of resource fluctuations on Canada's overall stock of wealth.

<sup>16</sup> World Development Indicators: Contribution of natural resources to gross domestic product. The World Bank. <http://wdi.worldbank.org/table/3.14>

<sup>17</sup> World Development Indicators: Environment. The World Bank. <http://wdi.worldbank.org/tables>



Figure 4: An examination of the private and public cost of consumer goods. TRUCOST



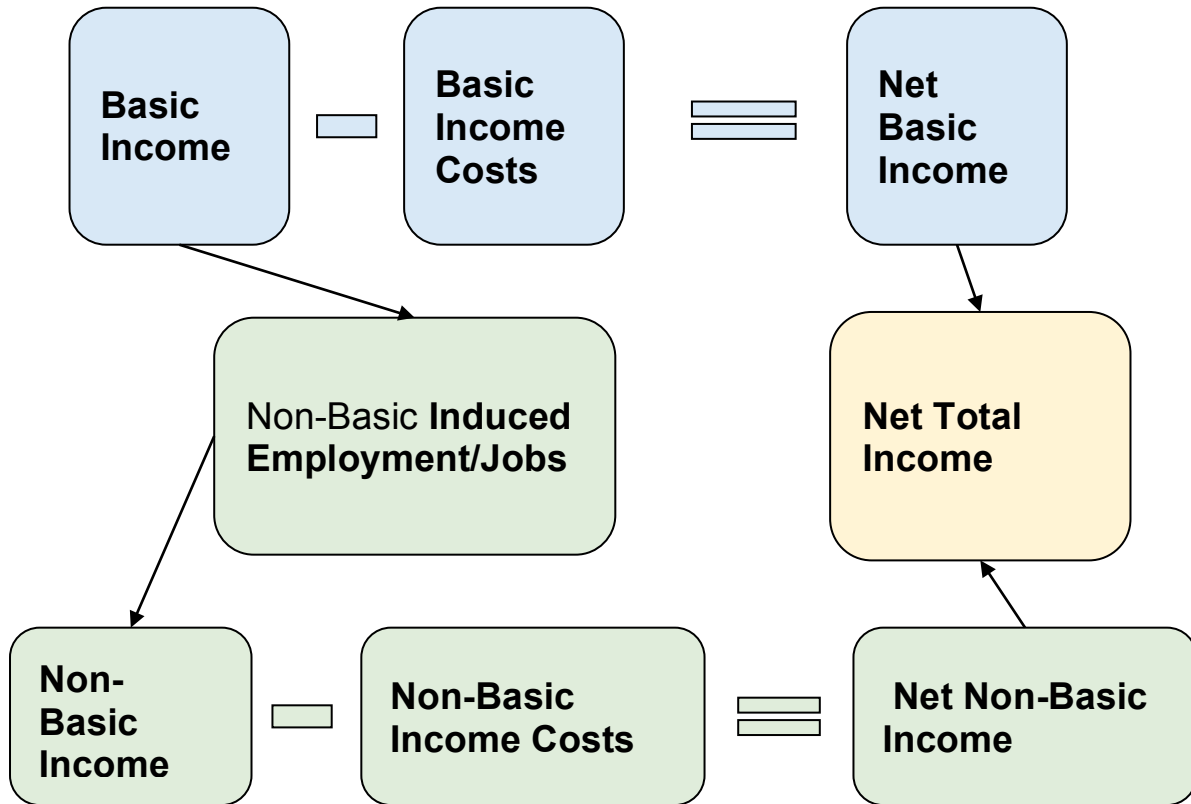
### 2.3.3 Extending the Regional Economy Model

In order to ensure we capture the environmental and social costs associated with the creation of basic income and non-basic income, let's introduce a few new concepts and add a layer of complexity to our model of a regional economy. Figure 5 presents our updated model that includes a few new concepts:

1. Basic costs – costs borne by the region as a result of generating basic income (e.g. loss of natural capital; social costs associated with development).
2. Net basic income – basic income minus basic costs.
3. Non-basic costs – costs borne by the region as a result of the addition of jobs that generate non-basic income (e.g. loss of natural capital; social costs).
4. Net non-basic income – non-basic income minus non-basic costs.
5. Net total income – net basic income plus net non-basic income.

Figure 5 replaces the bottom half of Figure 3 to include the concepts defined above. We've gone from only counting basic income and non-basic income to include the social and environmental costs associated with the generation of both types of income. By considering the costs associated with basic income in particular, we can be confident that regions that maximize net basic income will be wealthier than regions that maximize basic income.

Figure 5: Extension to Regional Economy Income Flow Diagram



Source: Big River Analytics Ltd.

*“When considering the costs borne in the region in terms of the liquidation or destruction of natural capital, the conclusions drawn about which projects should be encouraged begins to shift”*

This model can be extended to whole companies or project proposals with more careful consideration of the costs and benefits of respective projects. When considering the costs borne in the region in terms of the liquidation or destruction of natural capital, the conclusions drawn about which projects should be encouraged begins to shift. The types of projects being proposed in NWBC are complex and a simple

evaluation is insufficient to draw a firm conclusion as to whether or not support for the project is warranted.

In summary, we have developed a model to describe the dynamics of a regional economy that is based on two types of income: basic and non-basic income. Basic income is generated when goods or services are created within a region and those goods or services are paid for by people or organizations from outside the region. This type of income forms the economic “base” of a region, and basic income creates the demand in a region for non-basic goods and services. Non-basic goods and services are those that are paid for by people or organizations within the

region. We then extend our model of a regional economy to account for the environmental and social costs associated with generating basic and non-basic income using the 3BL framework. This extension to the model brings us to the conclusion that the wealthiest regions would tend to maximize basic income which include environmental and social costs. Our theoretical model of within-region economic dynamics is a useful way to understand which type of economic activity we ought to be undertaking (activity that generates large amounts of basic income) and which type of economic activity we ought to avoid (activity that generates large amounts of environmental and social costs) in order to become a wealthy region.

*Statisticians are trying to adjust measures of national wealth for pollution and depleted resources. This turns out to be all but impossible.*

Like any theoretical framework, problems tend to arise when we consider the real-world application of the framework. There are no real-world projects or developments that generate only benefits and no costs, or only costs and no benefits. Real-world projects generate both benefits and costs in varying quantities and respective projects must be evaluated based on their

net benefits. According to our framework, a 3BL cost-benefit analysis that can uncover the true benefits and costs of all projects should be conducted and the degree of social and political support awarded to each project should be in line with their contribution to net basic income. However, while the benefits tend to be easier to estimate (and they aren't easy to estimate), estimating the environmental and social costs associated with a project proposal is very costly and difficult. As a result, conducting cost-benefit analyses for all proposed projects is unfeasible. What *is* feasible is to simply acknowledge that net-benefits are what make communities wealthy and the environmental and social impacts of projects must be considered. Terrace's economic history has created a cultural emphasis on industrial development for the region that, in some instances, is likely of little net-benefit once all the environmental and social considerations are accounted for. We expect this is starting to change – many people are choosing to come to Terrace not for an industrial job but to enjoy the tremendous natural capital that still exists.

The environmental and social costs of some development projects can begin to define regional economies: regions that have sacrificed environmental and social capital in favour of development will tend to attract migrants only interested in benefitting from industrial development through employment. For example communities like Fort St. John and Fort McMurray rely on industrial development to attract and retain migrants despite facing environmental and social challenges, whereas communities like Nelson and more recently Tofino rely on their environmental and social capital to attract and retain migrants. Terrace doesn't fit easily into either camp: historically the region has relied on extractive industries to form the backbone of the economy, but more recently people moving to Terrace are attracted to the environmental and social capital through the recreational opportunities and the network of young outdoor enthusiasts that have established roots in the community.

## 2.4 Data limitations

While relying on the Census provides tremendous benefits in terms of the detail in which we're able to explore local area economies, a downside to relying on the Census is the fact that it is conducted so infrequently. Entire economic events can begin and end between Census enumerations, never to show up in the data. For example, in Terrace and Kitimat, the most recent uptick in economic activity took place between 2012 and 2015, with a significant drop-off in 2016. Given that the National Household Survey (NHS) was enumerated in 2011 and the Census (which returned to the long-form) was enumerated in 2016, much of that build-up was missed in the official statistics originating in the Census. Because our analysis relies primarily on the NHS and long-form Census, it's important to keep in mind that while we're presenting the information as a time-series these are really snapshots that are taken once every five years and the smooth transitions depicted in our charts, while useful for analysis over longer time horizons, may belie economic events that have taken place between Census enumerations.

### 3. Results

This section presents the results of an analysis of Census and NHS data for the Census Agglomeration (CA) of Terrace. The boundaries of the CA are different than Terrace’s city limits: they include Thornhill and parts of the development south of the Skeena. The Terrace CA boundary is presented in Figure 6.

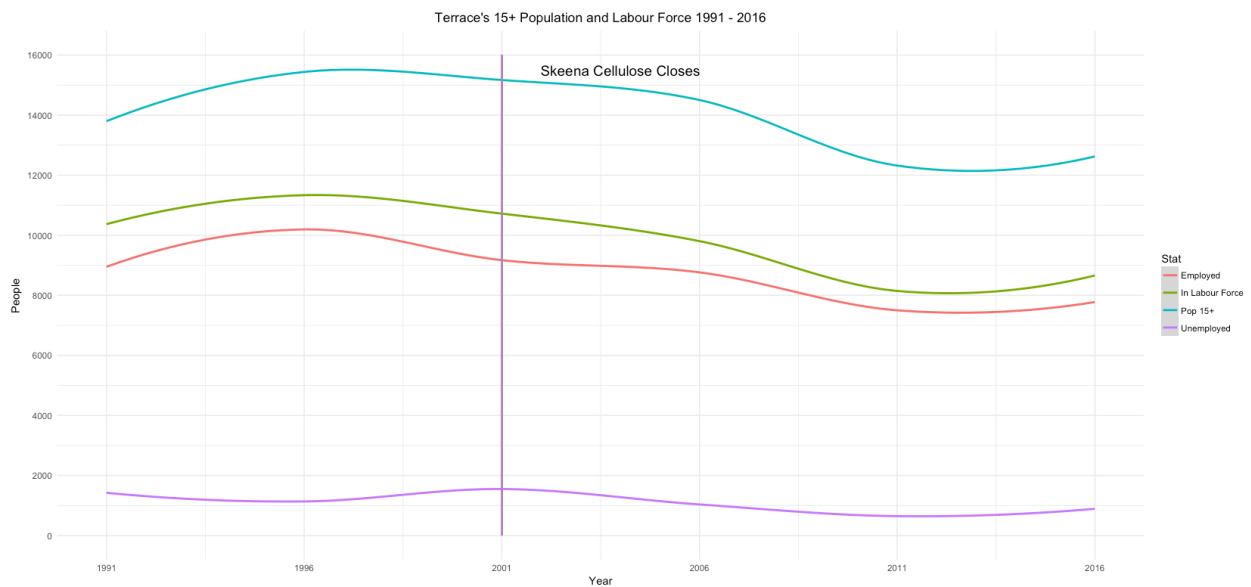
Figure 6: Terrace Census Agglomeration



### 3.1 Labour Force Statistics

Figure 7, the first in a series of figures depicting Terrace’s labour force over the past 25 years, shows labour force statistics for the Terrace Census Area from 1991 to 2016. The top light blue line represents the population aged 15+ (which is a measure of the working age population) and the second from top line in green represents the labour force; the difference between those two lines represents retired people, students, or people who are otherwise unattached to the labour force (including discouraged workers). The next line down in red represents the employed population. The vertical distance between the labour force and the employed population is the unemployed population – also represented by the purple line at the bottom of the figure. We can use these four statistics to develop a narrative: our peak working age population was achieved in 1996, largely driven by expansions in the forestry sector. By 2001, with Skeena Cell closing and a general decline in the forestry sector, the number of unemployed people either directly or indirectly involved in the forestry sector increases. Over the next ten years those people who are out of work leave the community, and in 2011 we see a low point – people who lost their jobs and couldn’t find new ones have left, and unemployment is relatively stable as a result. Between 2011 and 2016, for the first time in 20 years, we see the beginnings of a turnaround. The population is increasing and jobs are being created (albeit at a slightly slower pace than the labour force so unemployment has also increased slightly, but overall the trajectory is upward).

Figure 7: Labour Force Statistics, Terrace, 1991 - 2016



## 3.2 Sectors & Employment Over Time

Figure 8 breaks apart the labour force depicted in Figure 7 into its constituent sectors in terms of employment. The height (y-axis) in Figure 8 equals the height of the employed population (green line) in Figure 7. Figure 8 provides additional detail and shows the unwinding of the relatively large forestry sector from the early to mid-90's and the most recent growth seen in our community.

Forestry has seen the most marked decline over our reference period, going from 1,510 jobs in 1991 down to 310 in 2011, a reduction of roughly 80%. We know that, as a basic income generating sector, forestry would have sustained other jobs in the non-basic sector. Given that interdependency, how much of the total decline (2200 jobs between 1991 and 2011) is attributable to forestry? BC Stats has provided dependency ratios (essentially an estimate of the spin-off employment attributable to a basic sector) for the Terrace area between 1991 and 2006: for forestry, that ratio is approximately 1.4. That means that we'd expect to see a loss of 400 spinoff jobs for every 1000 lost in the forestry sector. In the case of Terrace, the dependency ratio implies that we can attribute the decline in forestry to a total loss of approximately 1,680 jobs, including those lost directly in forestry and associated spinoff jobs. Of the total 2200 jobs lost in Terrace between 1991 and 2011, 76% are directly or indirectly attributable to the decline in forestry. This implies that 24% of job losses over the same period originated from a reduction in other basic industries in the region and their respective non-basic spinoff employment effects, but the dominant force driving the labour market change in Terrace between 1991 and 2011 was a reduction in the forestry sector.

That makes for a powerful narrative in terms of Terrace's dependence on forestry as a local economic driver – but using the same rates today, how dependent on forestry are we now? In 2016 there were 295 people employed in the forestry sector. Using the high end of the impact ratio (1.4) we can attribute a total of 413 jobs in Terrace to the forestry sector. Clearly forestry is still important, but certainly not driving the local economy.



Figure 8: Employment by basic income sector, Terrace, 1991 - 2016

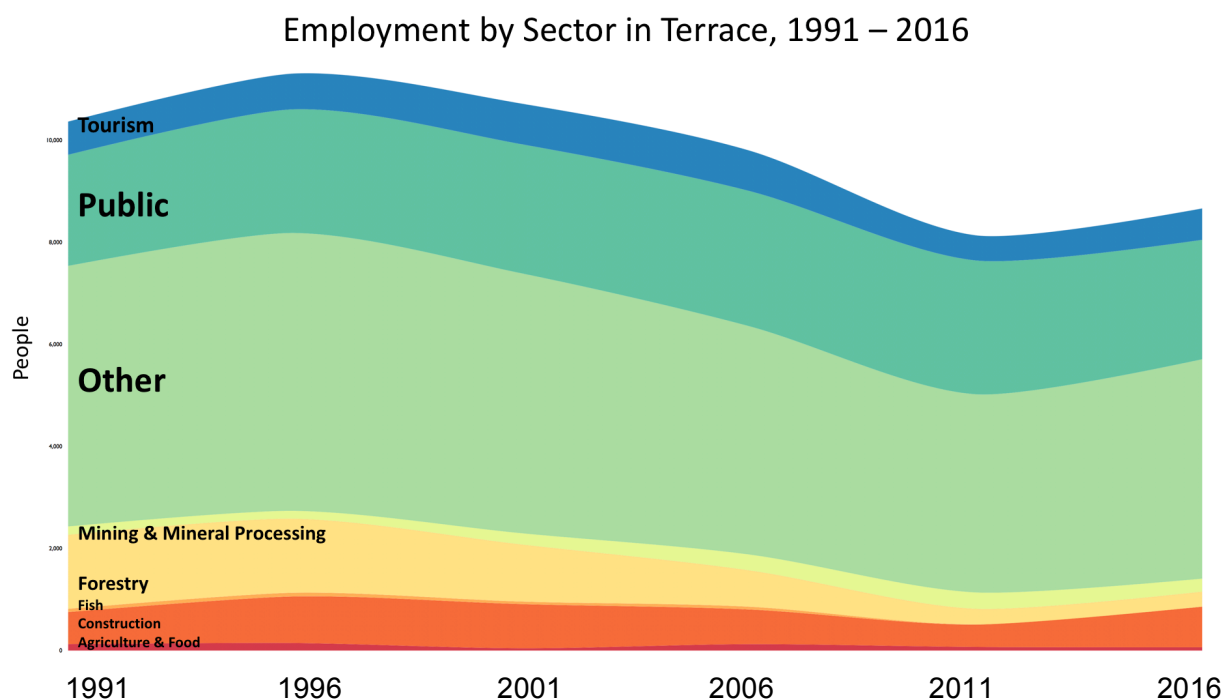
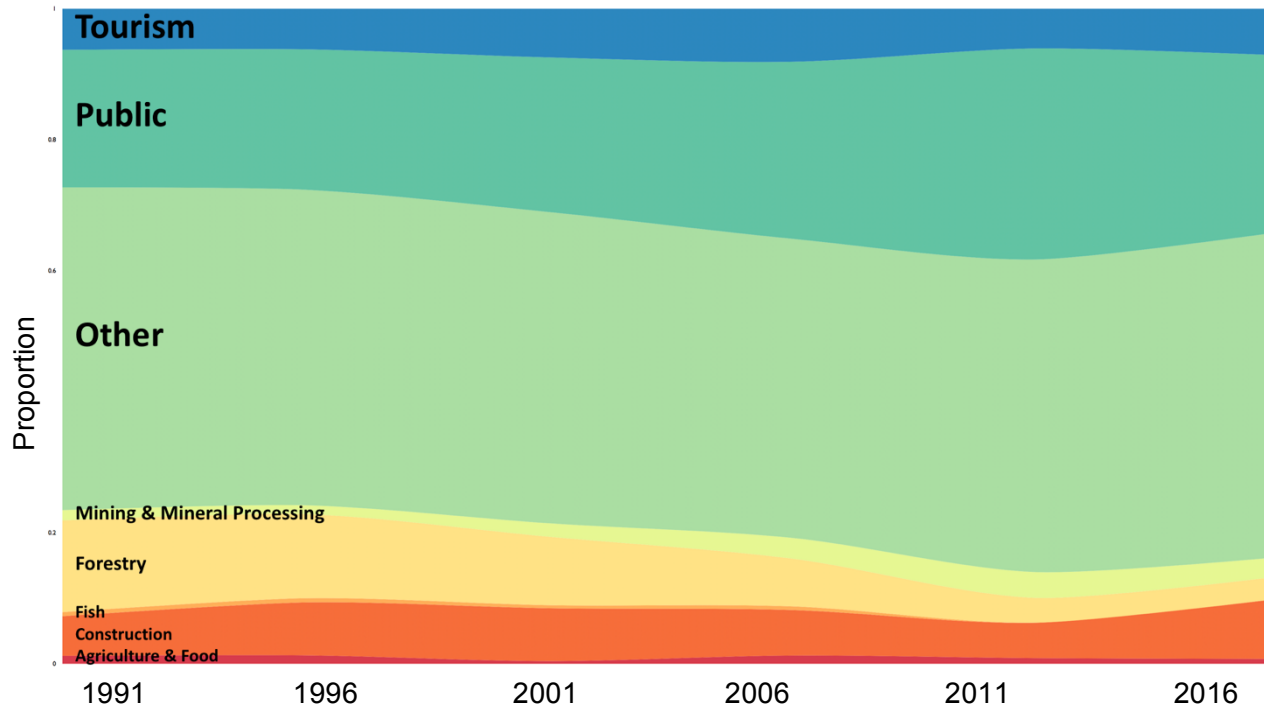


Figure 8 includes the composition of the growth depicted between 2011 and 2016. The most recent uptick in terms of the labour force in Terrace is attributable to construction, tourism and the black box “Other” category, which includes non-basic employment.

- As a proportion of the overall labour force, tourism has remained relatively stable, retracting a bit in 2011 after the great recession in 2008 (a phenomenon experienced in many places) and then rebounding a bit in 2016.
- The public sector remained stable, expanding slightly in 2011 – it being more resilient to periods of economic decline than other sectors – and then retracting in 2016.
- All other employment including non-basic employment has remained stable, expanding slightly in 2016.
- Mining and mineral processing, which for Terrace mostly means those Terracites that work at Rio Tinto Alcan in Kitimat, has been growing in terms of its relative proportion of the labour force, though has declined slightly since 2011.
- Fishing and agriculture are tiny components of the economy overall and construction has remained stable, though we’ve seen a marked increase between 2011 and 2016.

Figure 9 presents the same information as Figure 8; however, sectors have been normalized so they represent a percentage of the total labour force.

Figure 9: Employment in basic income sectors as a proportion of all basic income employment, Terrace, 1991-2016



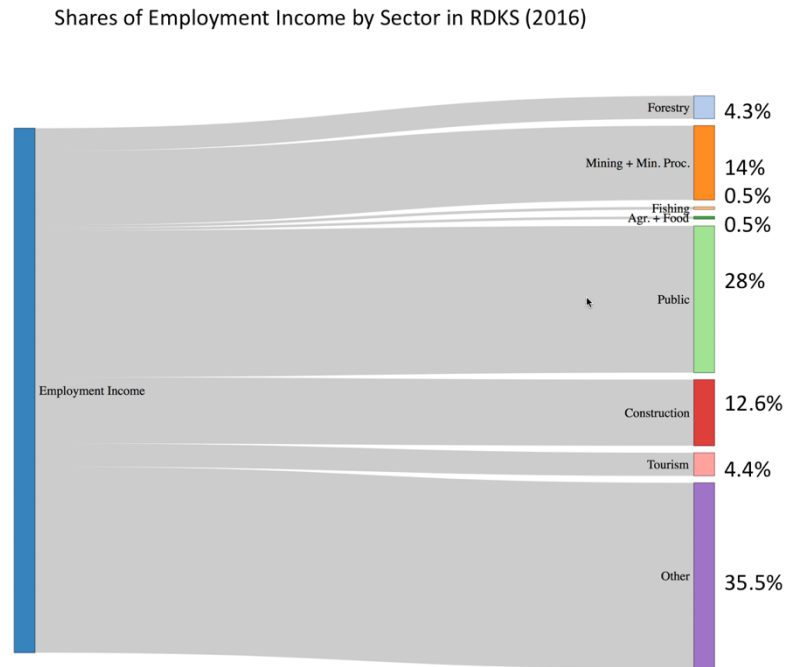
### 3.3 Employment, Income & Broader Geographies

In the previous section we used employment as a proxy for basic income in order to simplify our analysis and keep our units of measurement (jobs) intuitive, instead of the more complex measure of basic income. An objection to using employment as a proxy for basic income is that different sectors have different average wages: for example, forestry jobs tends to pay better than jobs in the tourism sector, so if we compare employment in these two sectors we're not necessarily getting at the relative importance of the sectors in terms of basic income. In this section, we show that employment is a useful proxy for basic income and the importance of the respective sectors is well-approximated in the approach we've taken. Further, we expand the geography to include all of the Regional District of Kitimat Stikine (RDKS) in case individual employment differs systematically based on where individuals live around Terrace.

Figure 10 presents the respective shares of basic income (employment multiplied by average income) for each of our sectors. Notably, mining and mineral processing is significantly higher than in our employment charts. This larger overall share is attributable to two factors: the inclusion of Kitimat in our wider geography (capturing significant proportion of the population in Kitimat that work at the Rio Tinto Alcan smelter) and the fact the mining and mineral processing

jobs tend to pay more than other sectors. Apart from that, the comparison using employment roughly approximates our comparison using basic income. Also note that basic income from forestry is roughly equal to the basic income generated by the tourism sector in all of RDKS after accounting for the wage differential between the respective sectors.

Figure 10: Shares of employment income by basic income sectors, RDKS (2016)



### 3.4 Growth Sectors

In this section we examine the three primary growth sectors in terms of employment in Terrace between 2011 and 2016: construction, tourism, and professional and scientific services.

#### 3.4.1 Construction

Figure 11 shows the value of building permits over time from 2007-2017. The increase that we see in the employment data is clearly reflected in this chart. Residential permits are represented in blue, industrial in dark green, commercial in light green, and government in yellow. Despite the downturn in 2016, the data remain consistent with our observations from the Census. Note that because Census day is in May, the data presented here are annualized – so even if many construction jobs disappeared over 2016, it’s likely that they were still present on Census day 2016. The recent resurgence in 2017 is being driven by residential, commercial and government permits, with very few industrial permits.

Figure 11: The value and type building permits in Terrace, 2011-2016

## Growth Sectors: Construction ↑ 355 Jobs (2011 – 2016)

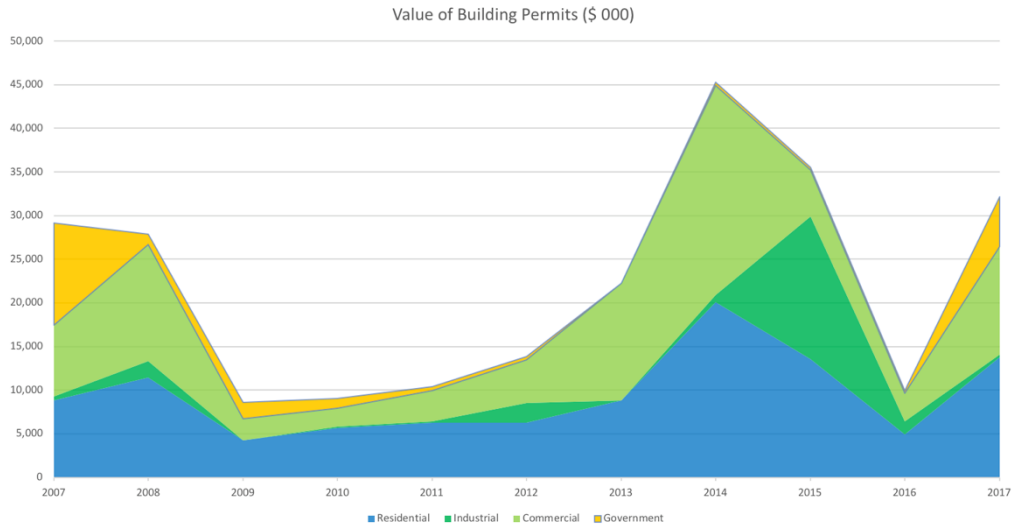
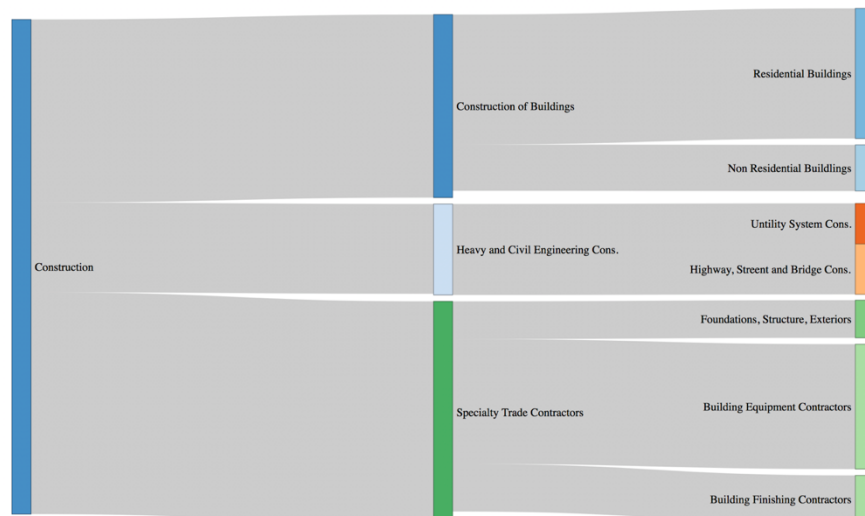


Figure 12 delves deeper into the construction Census data, breaking down all new construction jobs in Terrace in 2016 into a few categories to see if they match our observations in terms of building permits. The vast majority of new jobs were in the construction of buildings and specialty trade, which is consistent with the building permit data. Since 2013, with a lull in 2015-2016, people in Terrace are building homes and businesses at a rate that outpaces the previous decade.

Figure 12: Detailed breakdown of net jobs created in the construction sector, Terrace, (2011-2016)

## Growth Sectors: Construction +355 Jobs (2011 – 2016)



### 3.4.2 Tourism

Employment attributable to tourism in Terrace includes approximately 700 jobs in 2016. An uptick in tourism, as observed in the Census data, is consistent with recent work done by the Bulkley Valley Regional District (BVRD) and the Skeena Angling Guide Association (SAGA).

- A BVRD tourism study found a 25% increase in the value of tourism between 2008 and 2015. Since many of the same people choose Terrace as BVRD for their destination, this finding supports our observation of tourism being a growth industry in Terrace and RDKS more broadly.
- The 2018 SAGA report that examined guided angling in and around the Terrace area found that over 190 local jobs are created or supported by guided angling alone.
  - Guided angling generates \$10.6 million in terms of domestic output (2016).
  - There has been an increase of 63 jobs attributable to guided angling alone between 2013 and 2016.
- RDKS and partner communities are currently conducting a tourism survey (August 2018). The results from this project can be examined against this finding in Fall of 2018.

Note that using NAICS codes to estimate tourism isn't ideal, and it's possible that some of the tourism impact we're measuring is attributable to industrial activity. Without doing a value of tourism study, it's not possible to know from the data the origin of visitors or their purpose for

visiting Terrace. That being said, the approach we've used to estimate tourism is the same approach employed by BC Stats. Additionally, while tourism employment is almost double the employment in forestry in Terrace now, once we account for wage differentials, tourism and forestry both contribute a similar amount in terms of basic income to the community.

### 3.4.3 Other & Professional and Scientific Services

The "Other" category increased on net by 415 jobs. In an effort to unpack the "Other" category, we present the largest increases within the category at the 3-digit (a fairly detailed categorization) level in Table 1. Much of the increase in "food services and drinking places" is accounted for in tourism, so the first relevant growth category in Table 1 is "Professional, scientific and technical services". We can drill down to the 4-digit level to find out which sub-subsectors are present in that category.

Table 1: Ranking of largest growth subsectors in the "Other" category

Rank	Industry	2011 Employment	2016 Employment	Growth
1	722 Food services and drinking places	576	740	164
2	541 Professional, scientific and technical services	348	455	107
3	441 Motor vehicle and part dealers	136	210	74
4	721 Accommodations services	98	170	72
5	446 Health and personal care stores	43	100	57
6	488 Support activities for transportation	65	115	45
7	221 Utilities	65	110	45

Table 2 presents a detailed look at "Professional, scientific and technical services" at the 4-digit level to find out which sub-subsectors are present in that category.

Table 2: 4-digit NAICS representation of “Professional, scientific and technical services”

Industry	2011	2016	Growth
541 Professional, scientific and technical services	348	455	107
5411 Legal services	33	45	12
5412 Accounting, tax preparation, bookkeeping and payroll services	49	80	31
5413 Architectural, engineering and related services	92	140	48
5414 Specialized design services	0	0	0
5415 Computer systems design and related services	33	45	12
5416 Management, scientific and technical consulting services	65	80	15
5417 Scientific research and development services	0	20	20
5418 Advertising, public relations, and related services	0	30	30
5419 Other professional, scientific and technical services	49	25	-24

What’s interesting to note is that many of these sub-subsectors in “Professional, scientific and technical services” will be serving clients outside of Terrace, thereby generating basic income and acting as an economic driver. The types of jobs that create basic income are changing to include information and technology jobs like those in Table 2; for Terrace, this is a critical sector in terms of our economic growth.

### 3.4.4 Growth Summary

After 20 years of decline, Terrace is growing again. There are three sectors that are driving that renewed growth: construction, tourism, and professional and scientific services. Two of these three sectors (construction and professional and scientific services) can probably attribute some of their growth to industrial activity, however, all three sectors certainly contribute significantly to net basic income (as described in Figure 5) whereas industrial-scale forestry, the historic economic driver, would have contributed less to net basic income because it requires the wholesale liquidation of natural capital to generate basic income. As a result of this diversified growth Terrace has a wealthier, more resilient economy than it would have otherwise, and encouraging the growth of basic income sectors that generate basic income without large costs will continue to serve Terrace’s economic sustainability. Further, some of the jobs that are growing in Terrace are expected to be more resilient to the significant changes anticipated in terms of automation. Management, scientific and technical services ranked second lowest in terms of the percentage of employment at high risk of automation behind only computer systems design services in a recent CD Howe Institute report on automation<sup>18</sup>. Traditional extractive industries tend to be much more susceptible to automation attributable to technological changes. This is most acutely apparent locally in the modernization of the Rio

<sup>18</sup>[https://www.cdhowe.org/sites/default/files/attachments/research\\_papers/mixed/Update\\_Commentary%20472%20web.pdf](https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/Update_Commentary%20472%20web.pdf)

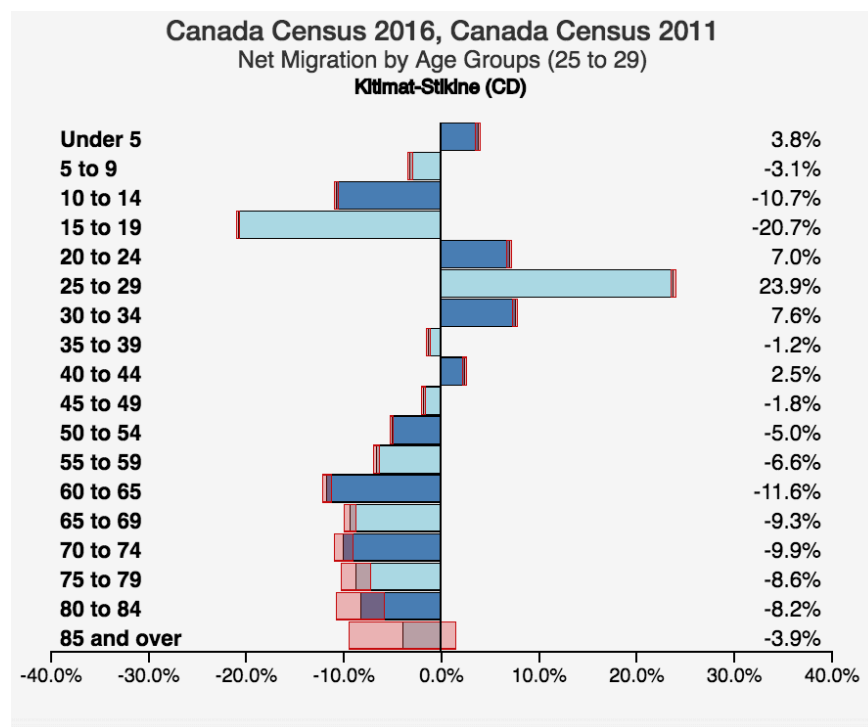


Tinto Alcan aluminum smelter. The old smelter employed over 2,000 people in the 1970's, whereas the current operation employs around 1,000 people.

### 3.5 Migration

Figure 13 shows net migration by age group between 2011 and 2016, after we account for the number of people who have moved away and died in each age category. What's striking is the over-representation of 20- to 34-year-olds. Almost all net movers to Terrace between 2011 to 2016 were 20- to 34-years-old – exactly the cohort that has been anecdotally observed to be moving to Terrace in significant numbers. This migration pattern is consistent with parts of the lower interior (Fernie, Nelson, Kimberly, Revelstoke) and the sea-to-sky corridor (Squamish, Whistler, Pemberton, Sunshine Coast). Based on observations, conversations and their notable presence in town, we believe these migrants are here to enjoy the recreational opportunities that Terrace has to offer – the same reasons this demographic chooses the lower interior and the sea-to-sky corridor.

Figure 13: Net migration to RDKS between 2011 and 2016

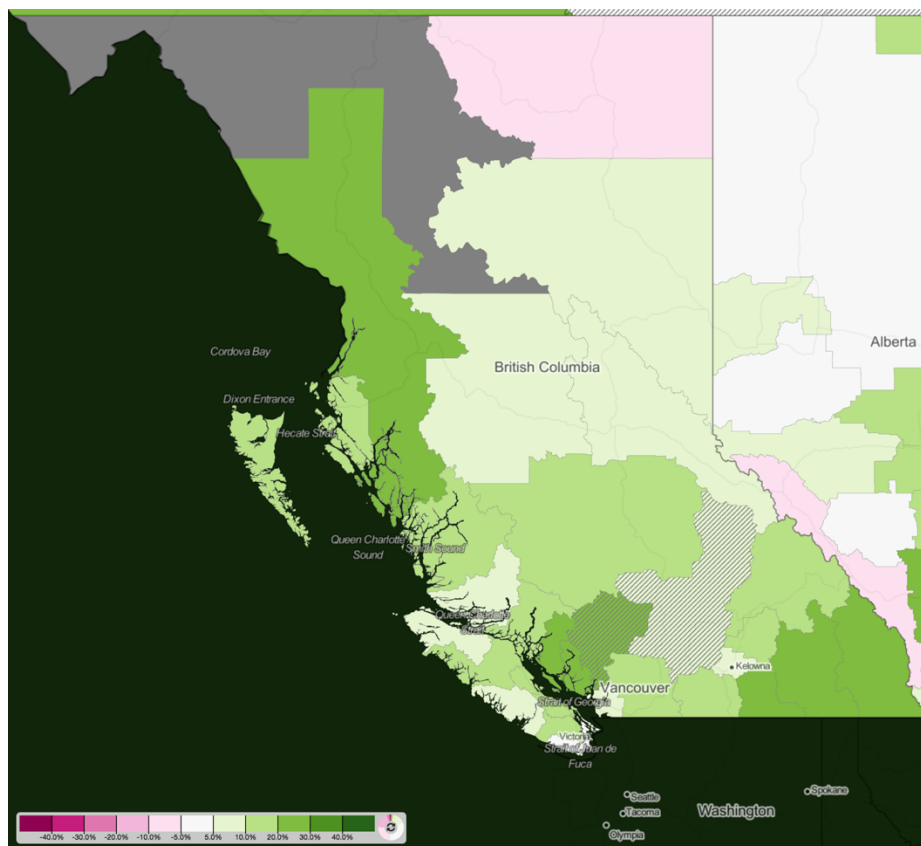


Source: Censumapper.ca (2011 and 2016 Census)

Figure 14 provides an overview of within-region net migration of the 25- to 29-year-old age cohort among regional districts in BC. Specifically, darker green polygons represent higher net in-migration within the 25 to 29-year age cohort.



Figure 14: Provincial distribution of net migration of people aged 25 to 29 by within-region net migration. Darker green implies positive net migration.



Source: Censusmapper.ca (2011 and 2016 Census)

## 4. Conclusion

Terrace’s economy, particularly for the early period we’ve examined (1991-2001) in this report, was undeniably driven by resource extraction, primarily in the forestry sector. Since then, Terrace endured a painful decade of unwinding its dependence on forestry and it lost a significant proportion of its workforce and population as direct, indirect, and spinoff jobs left the community. Since 2011, however, we’ve seen and felt growth in the community, and renewed energy in the economy. Forestry has rebounded slightly, but certainly not enough to account for the renewed growth: construction, tourism, and professional and scientific services are driving the observed employment growth. Additionally, these growth sectors have lower environmental and social costs than extractive industries which means Terrace is enjoying the benefits of growth with fewer negative side-effects. Young people are moving to Terrace: it remains relatively inexpensive, and yet it offers the same recreational opportunities driving migration in other parts of BC, like the sea-to-sky corridor and the lower interior. Terrace has a competitive advantage in attracting young, talented professionals choosing where they want to live to start and grow businesses, careers, and families.