Final Report

BRITISH COLUMBIA FOREST SECTOR LABOUR MARKET & TRAINING NEEDS ANALYSIS

Prepared for:

BC Coastal Forest Industry
Labour Market Information Working Group

Prepared by:

LMI Insight and R.A. Malatest & Associates Ltd.

Contact:

Patrick McDonough
Phone (250) 595-8278
E-mail: mcdonough@telus.net

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Acknowledgements

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British Columbia Coastal Forest Industry Initiative Labour Market Partnership Proponents

Dwight Yochim RPF, LMPP Agreement Holder
2012-Present, Truck Loggers Association
British Columbia Community Forest Association
Kevin W. Davie
British Columbia Forest Safety Council
Peter Lineen 2011-2012
Interior Logging Association
Wayne Lintott
Province of British Columbia
2011-2012 Honourable Shirley Bond
Western Fallers Association
Dave 'Dazy' Weymar

Dave Lewis RPF, LMPP Agreement Holder
2011-2012, Truck Loggers Association
British Columbia Forest Safety Council
Reynold Hert 2012 - Present
Central Interior Logging Association CILA
MaryAnne Arcand
North West Logging Association
Bill Sauer
Province of British Columbia
2011-2012 Honourable Pat Bell
Western Silvicultural Contracting Association
John Betts

Overarching Principle
The Forest Workforce Initiative exists so that employers, employees, prospective employees, industry, government and small business owners have access to and use resources to ensure that people get employment and employers get the right skilled people at the right time to ensure that the Coastal Forest Industry is sustained.

Vision
British Columbia Coastal Forest employers get the skilled and trained employees that they need to sustain the industry and prospective employees get the education and training they need to be competitive and employed.

Mission
The Mission of the Workforce Initiative is to ensure that limited resources are allocated in a strategic way to ensure that employers get employees and that employees get the right education and training. Objectives are to:

1. Establish an integrated sectoral partnership, under the provincial Labour Market Partnership Program, to address existing and anticipated labour market needs for the Coastal Forest Industry cluster in British Columbia.
2. Support a British Columbia Forest Workforce Initiative at which all resources are shared and all organizations engaged in a common effort to present the Forest Industry as a fundamental work opportunity for British Columbian's.
3. Ensure that, on the demand side, those segments that are experiencing growth will have the right numbers of workers, with the right skills, in the right places and at the right time. On the supply side, the objective is to ensure that prospects and workers engaged in fluctuating demand cycles are assisted in transitioning to new jobs and sectors, and as much as possible remain in their communities and region.
4. Increase the numbers of aboriginal people, youth, women, and newcomers employed in the Coastal Forest Industry workforce.

The LMPP Steering Group included contributions from the following people:

Coastal Forest Workforce Initiative Steering Group Contributors

- **Dwight Yochim RPF, Steering Group Chair**
  2012-Present, The Truck Loggers Association
- Bill Sauer,
  North West Loggers Association
- Carmen Brown,
  BC Fallers Ltd.
- Don Banasky,
  Falltech Logging Ltd.
- MaryAnne Arcand,
  Central Interior Logging Association
- Monty Hussey,
  Tilt Contracting Ltd.
- Gail Brewer,
  Province of British Columbia FLNRO SIB
- Patrick Marshall, Chair,
  BC Coastal Forest Industry Initiative
  Capital EDC Economic Development Company
- Dave Lewis RPF, Steering Group Chair
  2011-2012, The Truck Loggers Association
- Brian Mulvihill,
  Finning [Canada] Ltd.
- Darrel Wong,
  Steelworkers 1-1937
- Mark Leitao,
  Island Timberlands Limited Partnership
- Matt Wealick,
  Chihlkwayuhk Forestry Limited Partnership
- Ralph Friedrich,
  Interfor Coastal Woodlands
- Tracy Black,
  Province of British Columbia

The Aboriginal Forest Industry Working Group included contributions from the following people:

Coastal Forest Industry Workforce Initiative Aboriginal Forest Industry Working Group

- **Matthew Wealick RPF, Working Group Chair**
  Chihlkwayuhk Forestry Limited Partnership
- Corby Lamb
  Capacity Forest Management Ltd.
- Greg Main
  Main Logging Ltd.
- Jim McGrath
  Tk'emlups Foresty Corporation
- Victor Godin
  Starting Over BC Consultants Ltd.
- Dave Martin
  AA Trading Ltd.
- Tracy Black,
  Province of British Columbia
- Michael Izen
  Michael Izen and Associates Ltd.
- Angeline S.B. Nyce RPF
  Davis LLP Legal Advisers
- Graham Lasure
  WD Moore Logging Company
- Jeremy Boyd
  Chehalis Band
- Larry Spencer
  Port Alberni
- Kenny Ansems
  Meyers Norris Penney
- Dwight Yochim RPF
  2012-Present, Truck Loggers Association
- Patrick Marshall, Chair,
  BC Coastal Forest Industry Initiative
  Capital EDC Economic Development Company
- Beverly O'Neill
  O'Neill Marketing and Consulting

The Hand Fallers Working Group included contributions from:

Coastal Forest Industry Workforce Initiative Hand Fallers Working Group

- **Carmen Wood, Working Group Chair**
  BC Fallers Ltd.
- Reynold Hert
  British Columbia Forest Safety Council
- Peter Sprout
  British Columbia Forest Safety Council
- Dave Weimer
  Western Fallers Association
- Tracy Black,
  Province of British Columbia
- Ted Gordon
  Contract Fallers Association of British Columbia
- Robert Moonen
  British Columbia Forest Safety Council
- Allison Thompson
  British Columbia Forest Safety Council
- Dwight Yochim RPF, Steering Group Chair
  2012-Present, Truck Loggers Association
- Patrick Marshall, Chair,
  Coastal Forest Industry Initiative
  Capital EDC Economic Development Company

The Labour Market Information Working Group included contributions from:

Coastal Forest Workforce Initiative Labour Market Information Working Group Contributors

- **Ralph Friedrich RPF, Working Group Chair**
  International Forest Products Inc.
- Carmen Brown,
  BC Fallers Ltd.
- Darrel Wong,
  Steelworkers 1-1937
- Jon Lok
  Strategic Forest Management Ltd.
- Tony Tanner
  Western Forest Products Inc.
- Reynold Hert
  British Columbia Forest Safety Council
- Cameron Woodbridge
  Province of British Columbia
- Tom Niemann
  Province of British Columbia
- George Lambert
  T-MAR Industries Ltd.
- Brian Mulvihill
  Finning (Canada) Ltd.
- Patrick Marshall, Chair,
  BC Coastal Forest Industry Initiative
  Capital EDC Economic Development Company
- Patrick McDonough
  LMI Insight Ltd. Victoria
- Bill Sauer,
  North West Loggers Association
- Corby Lamb
  Capacity Forest Management Ltd.
- Gail Brewer,
  Province of British Columbia FLNRO SIB
- Mark Leitao,
  Island Timberlands Limited Partnership
- Dwight Yochim RPF
  2012-Present, Truck Loggers Association
- Robert Moonen
  British Columbia Forest Safety Council
- Alexander Barnes
  Province of British Columbia
- Tracy Black,
  Province of British Columbia
- Tim Lloyd
  Forestech Equipment Ltd.
- Ed Peterson
  Petersen Safety Group
- Jim Girvan RPF
  M.D.T. Ltd.
- Robert A. Malatest
  R.A. Malatest & Associates Inc. Victoria

The Human Resource Strategy Working Group included contributions from:

Coastal Forest Workforce Initiative Labour Market Information Working Group Contributors

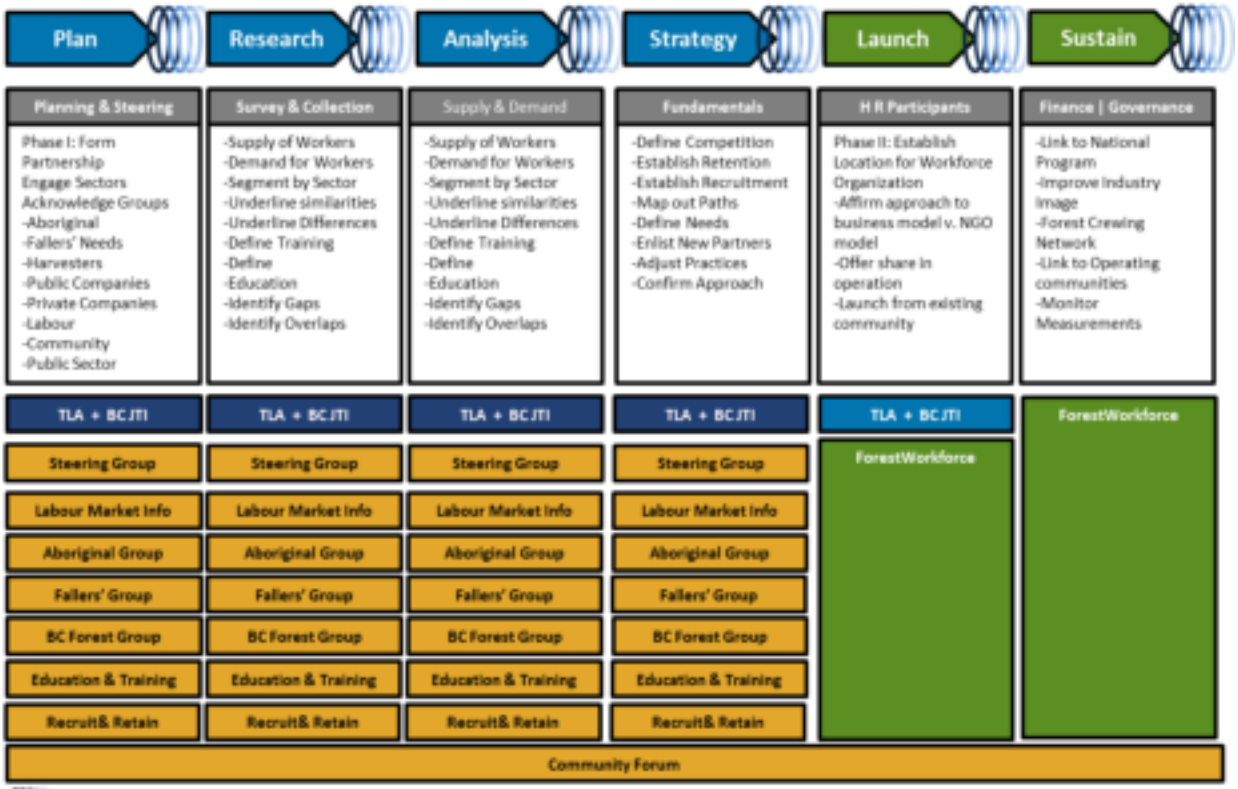
- Jan Marston, Working Group Chair
  TimberWest Forest Corporation
- Ralph Friedrich
  International Forest Corporation
- Gail Brewer,
  Province of British Columbia FLNRO SIB
- Tracy Black,
  Province of British Columbia
- Mike Cass
  Western Forest Corporation
- Mark Leitao
  Island Timberlands Limited Partnership
- Dwight Yochim RPF
  2012-Present, The Truck Loggers Association
- Patrick Marshall, Chair,
  Coastal Forest Industry Initiative
  Capital EDC Economic Development Company

The Labour Market Initiatives was supported by the following team of professionals:

Coastal Forest Workforce Initiative Agreement Holder Technical Advisory Group

- Dwight Yochim RPF
  Executive Director
  2012-Present, The Truck Loggers Association
- Stacie Woodall
  Member and Marketing Services
  The Truck Loggers Association
- Patrick Marshall, Chair,
  BC Coastal Forest Industry Initiative
  Capital EDC Economic Development Company
- Eric Pollard CGA
  Comptroller
  The Truck Loggers Association
- Brenda Martin
  Director of Communications
  The Truck Loggers Association

BC ForestWorkforce Labour Market Partnership Project [LMPP] Process



* Represents Forest Industry sectors and employer|employee filters and perspectives

Coastal Forest Industry Workforce Labour Market Partnership Project 2012

DWIGHT YOCHIM, RPF
EXECUTIVE DIRECTOR

The Truck Loggers Association
E-mail: dwight@tla.ca
Tel: (604) 684-4291 Extension 1
725 - 815 West Hastings Street Vancouver, BC, V6C 1B4 Canada
E-mail: contact@tla.ca
Tel: (604) 684-4291 | Fax: (604) 684-7134

Dwight was the National Director with the US WoodWorks program where he lead a dedicated team of engineers, architects and others promoting the virtues of wood. Prior to that he was the Director of Professional Practice and Forest Stewardship with the Association of BC Forest Professional. Prior to joining the association in 1995, Dwight was the provincial coordinator thru the University of BC for the BC Forestry Continuing Studies Network. He is a RPF who practiced forestry in Greater Vancouver's watersheds and is a volunteer search and rescue manager with Coquitlam Search and Rescue.

PATRICK N. MARSHALL BES SURP
Chair, BC Coastal Forest Workforce Initiative

BUSINESS AND ECONOMIC DEVELOPER
Capital EDC Economic Development Company
E-mail: patrick.marshall@capitaledc.com
Tel: [250] 595-8676
4341 Shelbourne Street, Victoria, BC, CANADA V8N3G4
E-Fax: [866] 827-1524

Patrick served as the Chairman of the Board of Directors for Small Business British Columbia, CEO of Ocean Industries British Columbia, General Manager of the Campbell River Economic Development Corporation Rivercorp, and served with distinction for more than 20 years in local government as a senior manager and economic developer. He is the recipient of the British Columbia Economic Developer of the Year 2007 honour from the Economic Developers Association of Canada and has received more than 25 Marketing Canada Awards for from the Economic Developers Association of Canada. He also serves as the voluntary Curator for the Coastal Community Network and Ocean Initiatives British Columbia.

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Executive Summary

This report was prepared for the BC Coastal Forest Industry Labour Market Partnership (LMP) Committee, with funding support provided through the Canada-BC Labour Market Agreement. In fall 2012, the Committee engaged the services of R.A. Malatest & Associates Ltd. and LMI Insight to conduct primary and secondary research and to deliver a labour market study upon which a human resource plan for the BC forest sector may be developed. This final report is the culmination of all research activities as required by the LMP committee.

Primary research activities undertaken for this study included a survey of employers, contractors and Aboriginal organizations operating within the BC forest industry, as well as consultations with forestry and logging operators, suppliers of forestry equipment and services to the industry, and representatives of the BC government with responsibility for forest management. Secondary research data was provided through Statistics Canada, Natural Resources Canada, BC Stats, BC Ministry of Forests, Lands & Natural Resource Operations, as well as provincial economic forecast data from the Ministry of Finance. A review of recent labour market forecast studies involving the BC forestry industry was conducted, as was an examination of post secondary education and training outcomes from programs in support of the BC forest industry.

The "forest industry" is traditionally defined through the North American Industry Classification System (NAICS) to include companies operating in forestry & logging (113), support activities for forestry (1153), wood products manufacturing (321) and pulp & paper manufacturing (322). The broader "forest sector" extends beyond this definition to include businesses, public agencies and other organizations that provide a range of goods and services to the forest sector. Direct spending by forest industry operators generates significant *indirect* employment in the broader forest sector, with many workers requiring training and education similar to that required by workers directly employed by the forest industry. Indirect employment impacts have been calculated using the income dependency model developed by BC Stats.

Scope of the primary research extended beyond the traditional definition of the "forest industry", encompassing all BC operations involved in forestry, logging, road building, multi-phase operators (e.g., mechanics) and pulp & paper manufacturers. Manufacturers of wood products were *excluded* from the primary research and forecast analysis, as this industry was the subject of a similar LMP research study conducted in 2012. For this study, results from primary and secondary research activities are analyzed by development region (8) and aggregated by the Coast and Interior forest regions. The two regions are unique in terms of climate, tree species, growing conditions and other factors such as the pine beetle infestation afflicting the Interior forest. However, operators in both regions require similarly skilled workers to harvest, process and manufacture forest products.

The results and findings from this labour market study provide a comprehensive look at the current and forecasted needs of the BC forest industry and broader forest sector through 2022. Information contained in this report may be used for human resource planning, development of education and training programs to strengthen the existing and future workforce, and to establish a framework for continuous improvement in forestry management and workforce development. The next phase of this workforce initiative involves the development of a human resource strategy for the Coastal forest industry scheduled for completion in early January, 2014. The implementation phase of the workforce strategy will occur later in 2014.

The following summarizes the key themes and challenges pertaining to the development of a sustainable forest sector workforce, and highlights the results of the primary research phase including industry workforce and occupational projections, and demand-supply gaps through 2022.

Key Themes Impacting Workforce Development

The overriding challenge facing the forest industry is replacing an aging workforce, as the need to replace retiring workers, and others who depart voluntarily, is significant and ongoing over the next 10 years. This challenge is made more difficult given the challenges attracting and recruiting youth to an industry that has been in decline for a number of years. Public perceptions of the industry are such that youth are not considering job or career opportunities in the industry, as the work is perceived as seasonal and uncertain, often in remote locations. The shift towards a "contract" workforce (versus an employed workforce) in forestry and logging over past several years has contributed to this perception.

Employment growth and projected job openings are significantly higher in the Interior than in Coastal operations, with much of the growth expected in the next five years. Some industry observers have suggested this might be an over-estimation owing to external risks to the industry's recovery and the potential for a reduction in the AAC. Conversely, it has also been suggested that growth projections for Coastal operations may be too "conservative" due to higher expectations for economic and industry growth over the next decade. Given current sources of labour, it would appear that the forest industry and the post secondary education and training system could not meet these requirements, especially in the short term. In order to meet demand, Interior (and Coastal) operators would need to recruit from among non-traditional sources of labour, including Aboriginal workers, new Canadians and female workers.

A key distinction between the Coast and Interior forest regions is the degree of mechanization employed by Interior logging operators. Coastal operators rely more heavily on hand fallers and buckers, whereas Interior operators rely more on machines to harvest and process timber. Skill and training requirements in logging operations are therefore quite different by region, complicating efforts for developing an industry-wide training strategy. Effective coordination between the two forest regions is a key requirement of workforce sustainability.

The lack of adequate public training programming in several forestry-specific "production" occupations, including logging machinery operators, pulp and paper machine operators and logging truck drivers, places training responsibility largely on employers, many of whom do not have the ability to train workers in these occupations. Most operators in forestry and logging are small employers or independent operators who cannot afford the time or cost associated with this level of skilled training. Presently, there is no clear mechanism within the structure of the existing workforce that would enable the training and development of the next generation of skilled production workers in forestry and logging operations.

In "professional" occupations, such as foresters and technologists, formal education programs exist in BC colleges and universities. Enrolments, however, have continued to fall in recent years with some programs now becoming inactive. Graduates of these programs are required by industry operators, regulatory agencies and other service providers, as they are essential to the effective management of the forest resource. Declining enrolments in forestry programming is symptomatic of an overall weakness in labour supply impacting all levels of forestry employment.

The forest sector relies on skilled trades workers, such as heavy duty mechanics and millwrights, to maintain and service equipment in forestry, logging and manufacturing operations. "Maintenance" workers are highly skilled, with most having completed an apprenticeship training program. They are also amongst the oldest cohort of workers in the forest sector and in high demand across the broader resource sector. During the prolonged industry downturn, forestry employers were not inclined to hire and train skilled trades workers, nor were they considering succession planning in the event of an economic rebound. Today forest sector employers are facing shortages of skilled trades workers, while facing fierce competition for recruits from other companies and industries in BC's and Canada's resource sector.

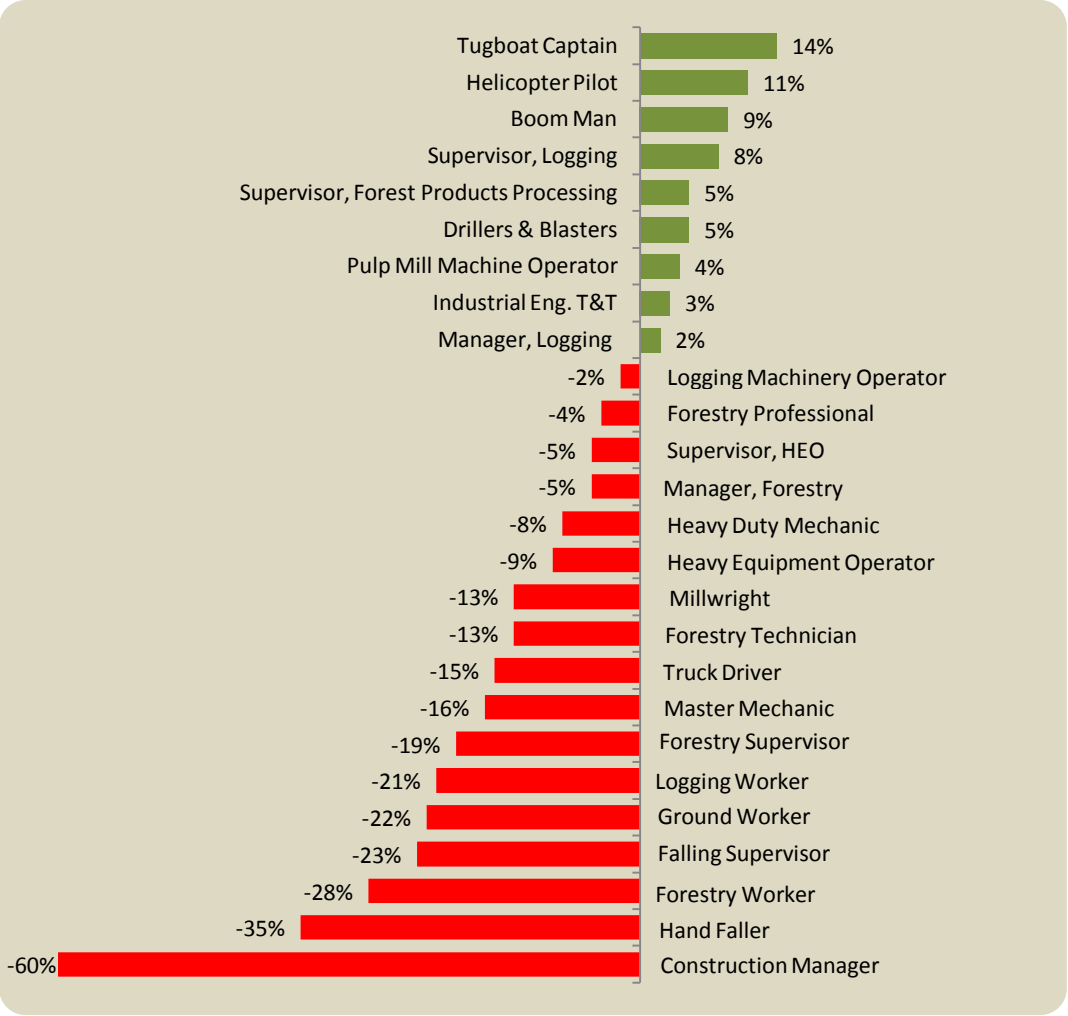
A distinction is made in this study between the traditional "forest industry" and the broader "forest sector". The forest industry directly employs workers in forestry and logging, support activities for forestry, and wood and paper manufacturing operations. The broader forest sector includes suppliers of equipment and services to the forest industry, while *indirectly* employing workers with similar skills and training as those in the forest industry. Labour market studies typically focus on forest industry workforce requirements, while overlooking the labour market needs of forest supply companies. This study estimates that *non-wage* spending by forest industry companies generates an additional 23% of indirect employment across all occupations in BC's forest communities.

The traditional definition of the forest industry also tends to underestimate the actual number of "workers in the woods". Workers in the woods include all workers involved in forestry, logging, road building, and transportation of forest products from the bush to the mill or other location (i.e., *stump to dump*). The limitations of the traditional forest industry definition are such that logging truck drivers are aggregated separately within the transportation sector, and that builders of logging roads are largely aggregated within the heavy and engineering construction sector. The concern of industry stakeholders with regards to the actual number of workers in the woods is to ensure they are fully considered in the industry's human resource development equation.

Demand-Supply Gap Analysis

A total of 26 priority occupations were identified by industry stakeholders as currently experiencing skills shortages or expected to in the coming years. The demand-supply gap analysis revealed the following:

- Industry demand in priority occupations is expected to grow by 26% over the next 10 years, compared to 8% growth in occupational supply (BC Labour Market Scenario Model).
- Demand-supply gaps are anticipated in priority occupations beginning in 2013 and increasing progressively each year through 2022.
- Six of the seven occupations projected to experience the most severe skills gaps over the next 10 years are forestry-specific occupations.
- The following graphic illustrates the projected annual skills surplus/gaps in each priority occupation through 2022.



HIGHLIGHTS >> INDUSTRY BASELINE & EMPLOYMENT FORECAST

Excluding wood product manufacturers – the industry employed 28,431 workers in 2012

- Employment was roughly evenly split between the Coast (51%) and Interior (49%) regions.
- Most workers were employed in a production capacity (70%).
- The current job vacancy rate for the industry was 5.8%, including 9.0% among Interior operators.
- Vacancies were highest in management/administrative occupations (8.7%).

Industry employment is projected to increase by 3,036 jobs between 2012 and 2022 – an overall increase of 10.7%

- Employment growth in the Interior region (19.7%) is projected to far outpace that for the Coast (2.1%).
- Growth for BC is expected to increase 5.2% over each of the next five year periods (1.1% annually).

- Growth is projected highest for workers employed in maintenance occupations (23%), followed by management/administration (10%) and production (9%).

More than 80% of job openings over the next 10 years will be due to retirements and other attrition

- Close to 16,000 job openings are projected in the forestry industry through 2022 – an average of 1,600 jobs each year.
- Annual job openings will average nearly 1,000 in production, 330 in management/ administration, and 250 in maintenance occupations each year.
- About 60% of total openings will occur in the Interior, and 40% in Coastal operations.
- 95% of job openings on the Coast will be due to attrition, compared to 70% in the Interior.

HIGHLIGHTS >> OCCUPATIONAL BASELINE & EMPLOYMENT FORECAST

A total of 16,354 workers were employed in priority occupations (26) in 2012

- Employment in priority occupations accounted for 58% of total industry employment.
- Logging companies accounted for the largest share of workers in priority occupations (63%).
- The actual distribution of occupational employment was 47% (Coast) and 53% (Interior).

The job vacancy rate in priority occupations was 9.3% - versus the industry average of 5.8%

- Vacancies in Interior operations (14.0%) were more than two times higher than in Coastal operations (6.9%).
- Forestry operators reported the highest vacancy rate (13.0%) throughout the industry.

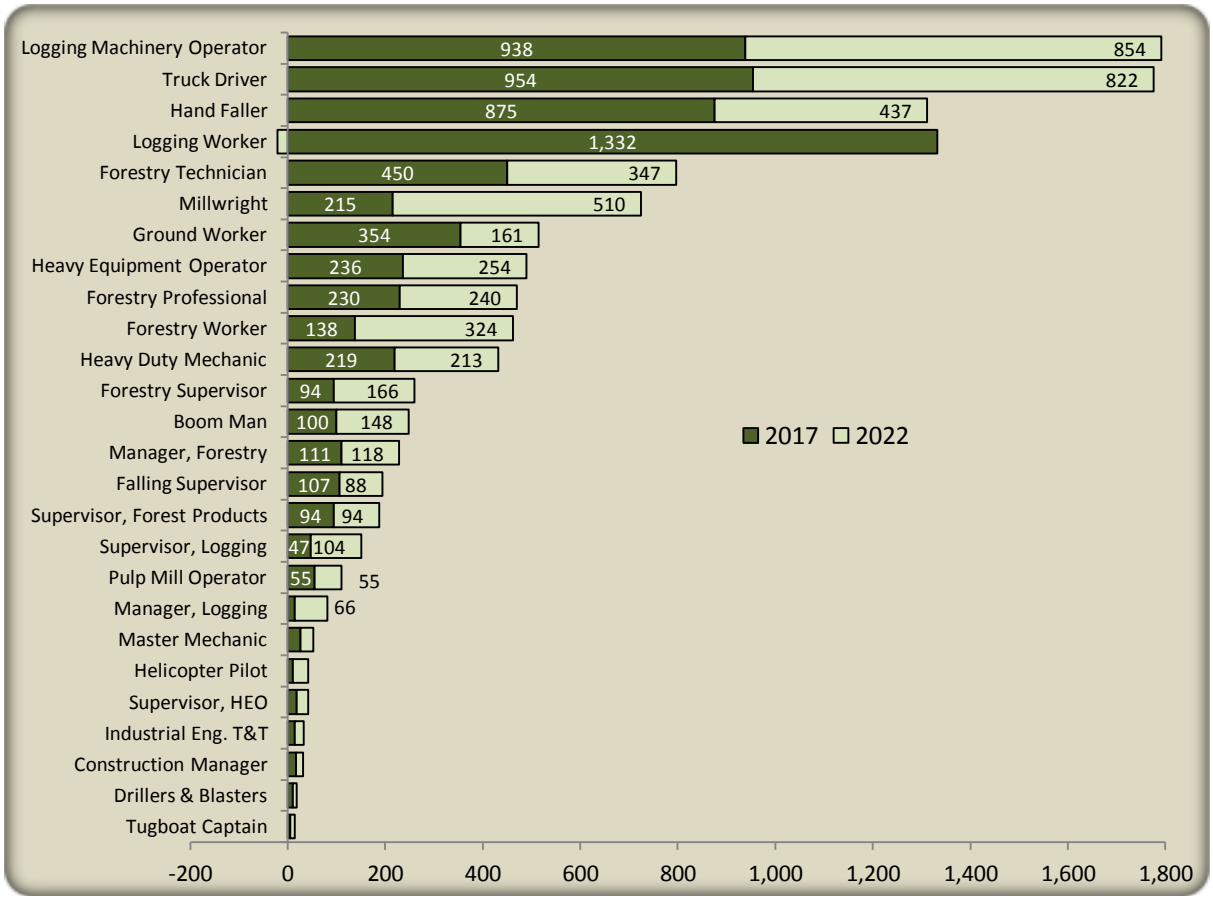
Employment in priority occupations is projected to increase 22% in the next 5 years – 4.4% annually

- Occupational employment growth over the next 10 years is projected at 26%, driven largely by expansion in the Interior.
- Interior operators anticipate occupational employment growth of 4.0% annually through 2022, compared to 1.0% annually in Coastal operations.
- Employment growth is projected across all operational phases – ranging from 2.0% annually in pulp and paper manufacturing to 3.3% annually in forestry operations.
- Occupational growth is projected highest among forestry workers (8.5%), hand fallers (6.4%), and forestry supervisors (6.2%).
- Negative growth is projected for tugboat captains (-1.0%) logging supervisors (-0.8%) and drillers & blasters (-0.2%).

Close to 12,000 job openings in priority occupations are projected over the next 10 years

- The projected number of job openings in priority occupations represents about three-quarters of the current workforce.
- The majority (63%) of job openings will be driven by replacement demand.
- Logging operations account for more than 60% of total job openings, followed by forestry operations at 19%.

- The actual demand for workers is projected highest for logging machinery operators (1,792), truck drivers (1,776), hand fallers (1,312), and logging workers (1,311) over the next 10 years.
- Actual job openings by priority occupation are illustrated below through 2017 and 2022.



HIGHLIGHTS > PRIMARY SURVEY RESEARCH

Sample dominated by operators in forestry and logging

- A total of 289 surveys were completed, including 160 by industry employers.
- Employed fallers and independent falling contractors accounted for 44% of the response, while First Nations and Aboriginal organizations accounted for less than 5%.
- The sample was dominated by operators in forestry (24%), logging (30%) and road building operations (18%).

Small operators dominate "cyclical" forest industry

- Half of all respondents indicated their companies generated less than $500,000 in annual revenues.
- More than 80% of companies employed less than 20 workers.
- June through November was identified as the busiest period for the industry.
- More than half of employers (56%) indicated that their company operates year round.

Experienced fallers working mostly part time

- Less than one-third (30%) of independent fallers indicated that they worked year round.
- The median age of independent and employed fallers was 51 years, of which 85% had at least 10 years experience.
- More than 2-in-5 fallers were qualified to work on slopes of 60 degrees or greater, and to fall trees over 60 inches in diameter.
- The estimated number of hand fallers in 2012 was 1,234 (excluding ground workers), of which 83 (7%) were registered in the faller certification program.

Employers in forestry operations more successful attracting younger workers

- The industry workforce is largely comprised of older workers, with 55% of workers at least 45 years of age and just 5% of workers 24 years of age or younger.
- About 70% of pulp and paper workers on the Coast and road builders in the Interior were at least 45 years of age.
- Close to one-third of workers in forestry operations (32%) were 34 years of age or younger.
- Forestry operators also employ the largest number of females within the forest industry.

The vast majority of employers indicated it was "difficult" hiring workers in priority occupations

- Truck drivers, millwrights and technicians & technologists were among the most difficult occupations to fill.
- Competition for workers was cited as the primary reason for hiring difficulties (41%), followed by remote work locations (31%) and a lack of long term/consistent employment (28%).

Employers rely most heavily on the local workforce and other forestry companies for new recruits

- A small percentage of Aboriginals (6%) and permanent immigrants (4%) comprise the industry workforce.
- A similar percentage of women (4%) work in the industry, most of whom are employed in forestry operations.
- Temporary foreign workers are used sparingly in forestry operations.

The forest industry has not done a good job attracting new recruits

- Employers are in "agreement" that the industry has not done a good job building its public image or promoting career opportunities to potential recruits.
- The current supply of skilled workers is "inadequate", and the province's industry training and apprenticeship system does not meet their needs.

A minority of employers have in place an HR development strategy

- One-in-five forest industry employers (19%) indicated that they have a strategy in place to promote recruitment and improve worker retention.
- Among those who do, 36% target youth, 28% target female, and 24% target Aboriginal recruits.
- Employers are particularly supportive of increased co-op/workplace opportunities and entry-level training specific to the forest industry.

First Nations / Aboriginal organizations expanding role in forest development

- Half of First Nations/Aboriginal organizations (5) indicated they have economic initiatives with local companies to promote forestry and logging development in their communities.
- Fewer than half of First Nations/Aboriginal organizations have programs in place to promote Aboriginal employment with local companies.
- Roughly half of "non-Aboriginal" employers felt that First Nations/Aboriginal organizations could help address their future workforce requirements.

SECTION 2: INTRODUCTION & PROJECT BACKGROUND

British Columbia is endowed with a rich forest resource with about two-thirds (60 million hectares) of the Province covered in forested land. BC forests contain more than half of the commercial timber in Canada. Almost all of the wood produced in BC is softwood and is used to make lumber, veneer, plywood, shakes, shingles, newsprint, and pulp and paper products. BC's forest resource represents one of the cornerstones of the provincial economy and helps make Canada the foremost timber-exporting nation in the world.

The management of the forest resource rests primarily with the provincial government, as close to 95% of the land base is Crown owned. While forestry operations are established throughout much of the province, the industry is generally separated into two forest regions – Coast and Interior with the Interior divided into northern and southern sub-regions. Coastal forests are characterized by older growth stands and a wet growing environment, reducing the chance of wildfires and promoting long term growth cycles. The coastal forest is basically coniferous species and represents one of the world's few remaining sources of clear fiber and large-size softwood lumber. Interior forests are subject to drier conditions and younger stands, as wildfires and other factors impact the age and growth of the resource. The infestation of the pine beetle is also limited to the Interior region, suggesting coastal operations may be better situated to capitalize on future market opportunities in the short and medium terms.

For more than a decade, the BC forest sector has experienced unparalleled change and uncertainty, resulting from a number of economic, social and environmental factors. The high value of the Canadian dollar *vis a vis* the industry's largest trading partner (United States), the collapse of the U.S. housing market since 2006 and continuing weakness in demand for lumber exports, significant reductions in demand for newsprint, and the emergence of low-cost global competitors in Asia and Latin America, have resulted in a significant number of plant and mill closures across BC, company bankruptcies, and the loss of 32,000 jobs – more than one-third of the industry workforce – since 2001.

While the ongoing crisis is real and substantive, many industry leaders remain optimistic about the future of the sector, pointing to an eventual rebound. In addition to a slow but gradual recovery in the U.S. market, coupled with moderate wood product price improvements, significant progress has been made in diversifying into new markets, particularly China and other Asian economies. China is now the second largest market for BC's wood exports with significant opportunities for future growth. New value-added products, such as those derived from biomass (e.g., bioenergy, bioproducts and biochemicals), are also opening up new markets for BC producers. Increased production of biomass products is expected to give the industry a significant boost in this highly competitive global marketplace.

BC's forest sector remains an important employer in many regions of the province, particularly in rural and remote communities. However, as the industry continues to rebound, there is a growing concern amongst stakeholders that the BC forest sector is facing a serious labour market imbalance. The current workforce is among the oldest within the provincial economy, as many younger members departed the sector for other opportunities during the depths of the industry downturn. Today fewer youth are considering employment in the sector, in part due to negative public perceptions of a sector still in decline, difficult working conditions often in remote locations, and better employment prospects in competing industries.

Skill shortages are expected to persist in BC's forest sector in the near and medium terms, largely due to projected retirements over the next decade and increased absorption of skilled and unskilled labour by competing industries. Particular occupations of concern include forestry professionals and skilled trades workers, both of which require significant education and training, experienced forestry and logging supervisors, as well as logging production workers needed to harvest and transport forest products from the bush to the mills. The success of the future workforce will depend largely on the industry's ability to encourage non-traditional workers, including resident youth, immigrants, Aboriginals and women, to consider (or reconsider) the BC forest sector as a viable career option, while supporting their investment in forestry related training and education.

Project Overview

In fall 2012, representatives of the Coastal forest industry and BC logging associations established a Labour Market Partnership (LMP) project to develop a human resource strategy for the BC forest sector. With funding support provided through the Canada-BC Labour Market Agreement, the LMP project is chaired by Patrick N. Marshall, Capital EDC Economic Development Company, with industry leadership provided by the following companies and organizations.

- BC Fallers Ltd
- Central Interior Logging Association
- Chihlkwayuhk Forestry Limited Partnership
- Island Timberlands Limited Partnership
- North West Loggers Association
- BC Ministry of Forests, Lands and Natural Resources Operations (ex officio)
- Falltech Logging Ltd
- Finning [Canada] Ltd
- Interfor Coastal Woodlands
- Steelworkers 1-1937
- The Truck Loggers Association
- Tilt Contracting Ltd.
- BC Ministry of Jobs, Tourism & Skills Training (ex officio)

The LMP Steering Committee (Committee) was mandated to:

1. *identify existing and anticipated labour market requirements for workers in the BC Forest Sector through 2022; and*
2. *develop a sustainable human resource strategy to attract, recruit and develop an adequate supply of workers to meet the future requirements of Coast and Interior forest sector operators.*

The outcomes of this study provide a comprehensive examination of the current and forecasted needs of the BC forest sector, as well as the occupational and training requirements over the next decade. The results may be used to inform the planning and development of training programs in support of the existing workforce; to assist in the allocation of public education and training resources in forestry related programs; and to support efforts to promote employment and career opportunities in the BC forest sector.

BC Forest Sector Definition

British Columbia's forest sector is made up of various private and public entities, including forestry & logging companies, manufacturers of wood and paper products, suppliers of commercial equipment and professional services, regulatory agencies and land use planners, forestry schools and colleges, research institutes and nongovernmental organizations.

The forest industry is the largest employer within the sector and the primary focus of this labour market study. A significant number of forestry practitioners also work outside of the forest industry in organizations whose work may or may not be *exclusively* forestry-related. As a result, identifying the boarder labour pool for the forest sector can be challenging. Below is a graphic of BC's forest sector, with only the forest industry fully encompassed within the forest sector.

BC Forest Sector

The "Forest Industry" is traditionally defined within the North American Industry Classification System (NAICS), encompassing establishments operating in Forestry & Logging (113), Support Activities for Forestry (1153), Wood Products Manufacturing (321), and Pulp & Paper Manufacturing (322). Workers employed or hired exclusively by forest industry operators are considered as being *directly* employed by the industry, while those working for organizations outside the forest industry are considered to be *indirectly* employed within the forest sector. While this research focuses primarily on direct employment in the forest industry, the study also examines indirect employment in the broader forest sector to capture employment and related contributions of these organizations.

Tabled below are the various industries that comprise the BC forest sector as defined by the North American Industry Classification System (NAICS). These definitions provide the framework for examining forest sector operations and their workforces throughout BC. Although wood product manufacturers are part of this study, they are not included in the survey research component, as this industry was the subject of a similar labour market study conducted in 2012. Results of the 2012 study

are, however, incorporated into this report where appropriate. Lastly, local trucking operators who transport logs and other forest products to the mills for processing and manufacturing are identified within the broader forest sector.

BC Forest Sector

Forest Industry (Direct)	Industries (NAICS)	Description
Forestry & Logging	• Forestry & Logging (113) – Logging (113311) – Contract Logging (113312) – Timber Tracts (1131)	Establishments primarily engaged in cutting, hauling and transporting timber (within logging limits).
Support Activities for Forestry	• Support Activities for Forestry & Agriculture (115) – Support Activities for Forestry (1153)	Establishments primarily engaged in performing support activities related to timber harvesting, hauling and forest resource management.
Forest Products Manufacturing	• Wood Product Manufacturing (321) – Sawmills & Wood Preservation (3211) – Veneer, Plywood & Engineered Wood (3212) – Other Wood Products (3219) • Paper Manufacturing (322) – Pulp, Paper & Paper Board Mills (3221) – Converted Paper Products Manufacturers (3222)	Establishments engaged in manufacturing solid wood products, including lumber, veneer, and plywood, as well as millwork, wood doors and windows, mobile homes and prefabricated wood manufacturing. Establishments engaged in manufacturing pulp and paper products, as well as manufactured paper products from purchased paper and paperboard.
Forest Sector (Indirect)	**Industries (NAICS)**	**Description**
Forest Products Transportation	• Forest Products Trucking – Local (484223)	Establishments primarily engaged in local trucking of forest products, including logs and wood chips, for processing and manufacturing.
Logging Road Construction	• Heavy & Civil Engineering Construction (237)	Establishments primarily engaged in constructing heavy and civil engineering works.
Commercial Equipment Suppliers	• Construction and forestry machinery, equipment and supplies (417210) • Construction, transportation, mining, and forestry machinery and equipment rental and leasing (53241)	Establishments that supply commercial equipment or rent/lease equipment (without operator).
Repair & Maintenance	• Commercial and industrial machinery and equipment repair and maintenance (8113)	Establishments that maintain and repair construction and forestry machinery and equipment.
Professional & Business Services	• Professional, Scientific & Technical (541) • Business to Business, electronic markets (419) • Insurance Carriers & Related (524)	Establishments primarily engaged in activities in which human capital is the major input. Establishments that provide financial and other business services.
Regulatory & Training	• Provincial Government (912) • Federal Government (911) • Aboriginal Public Administration (914) • Education & Training (6112, 6113, 6115)	Agencies involved in the regulation of the forest resource and provision of public and private training services.

Priority Occupations

Priority occupations are those identified by members of the Steering Committee as experiencing skills shortages now or expected in the coming years. Skills shortages may be driven by an ageing workforce, a lack of training and education programming in support of skilled workers, or competition for new talent from among competing industries. Priority occupations are the focus of the primary survey research involving employers and contractors within the BC forest sector.

Priority occupations are identified by their National Occupational Classification (NOC) code and organized by phase of production – specifically forestry, road building, logging & transportation, multi-phase operators, and pulp & paper manufacturing. The Steering Committee felt this framework was more applicable to their industry requirements than that provided through the North American Industry Classification System. Several occupations share the same 4-digit NOC (e.g., managers, supervisors, hand fallers and ground workers), though are treated separately for baseline and projection purposes. Since master mechanics and heavy duty mechanics perform work across several phases of production, these two occupations have been identified as "multi-phase" operators. In total, 26 priority occupations were identified (with Forestry Supervisor identified in both forestry and logging phases) by the LMP Steering Committee contained within 21 NOC codes.

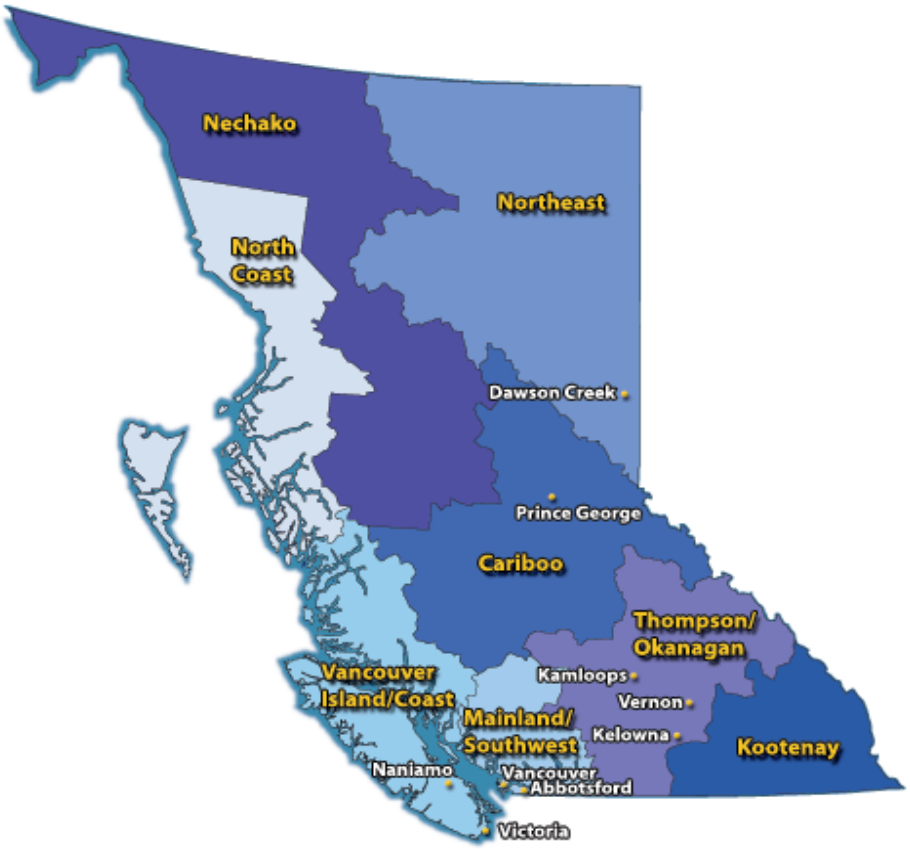
Production Phase	Priority Occupation (26)	Code	NOC Occupation (21)
Forestry	• Manager, Forestry Operations	0811	• Primary Production Manager*
	• Forestry Professional (e.g., registered professional forester)	2122	• Forestry Professional
	• Forestry Technologist & Technician (e.g., cruiser, surveyor, resource officer, fire suppression)	2223	• Forestry T & T
	• Supervisor, Forestry (e.g., forestry operations)	8211	• Supervisor, Forestry & Logging^
	• Forestry Worker (e.g., forest firefighter, burner, spacer, silviculture)	8422	• Silviculture & Forestry Worker
Road Building	• Construction Manager (e.g., project manager)	0711	• Construction Manager
	• Supervisor, Heavy Equipment Operators	7302	• Supervisor, HEO
	• Drillers & Blasters	7372	• Drillers & Blasters
	• Heavy Equipment Operator (e.g., backhoe, dozer, excavator, grader)	7521	• Heavy Equipment Operator
Logging	• Manager, Logging Operations	0811	• Primary Production Manager*
	• Supervisor, Logging (e.g., logging crew boss, yard supervisor, boom master, quality control)	8211	• Supervisor, Forestry & Logging^
	• Supervisor, Falling	8211	• Supervisor, Forestry & Logging^
	• Logging Machinery Operator (e.g., skidder, feller buncher, loader, processor, tower crane, yarder)	8241	• Logging Machinery Operator
	• Hand Faller	8421	• Chainsaw & Skidder Operator~
	• Ground Worker (i.e., bucker)	8421	• Chainsaw & Skidder Operator~
	• Logging Worker (chaser, choker setter, landing worker)	8616	• Logging & Forestry Labourer#
	• Boom Man	8616	• Logging & Forestry Labourer#
	• Helicopter Pilot	2271	• Helicopter Pilot
	• Tugboat Captain (e.g., boom boat operator)	2273	• Tugboat Captain
	• Logging Truck Drivers	7511	• Truck Driver
Multi-Phase Operators	• Master Mechanic (e.g., Supervisor, Mechanic Trades)	7301	• Master Mechanic
	• Heavy Duty Mechanic	7312	• Heavy Duty Mechanic
Pulp & Paper Manufacturing	• Industrial Engineering and Manufacturing Technologists & Technicians	2233	• Ind. Eng. and Mfg T & T
	• Supervisor, Forest Products Processing	9215	• Supervisor, Forest Products Processing
	• Pulp Mill Machine Operator	9432	• Pulp Mill Machine Operator
	• Maintenance Mechanic (e.g., Millwright)	7311	• Millwright

Coast & Interior Forest Regions

British Columbia's forest resource is generally divided into two regions – Coast and Interior – each unique in terms of climate and growing conditions, topography, timber diversity, and industry operation. Workforce data provided by employers and contractors in this study has been collected and aggregated by Development Region (8). Three of the province's eight development regions are contained within the Coast forest region, and five within the Interior forest region. While this geographic allocation may not exactly align with the Coast and Interior regions per the Ministry of Forests, Lands & Natural Resource Operations, they are a close approximation with some overlap mostly on the North Coast.

Coast Forest Region	Interior Forest Region
♦ Vancouver Island / Coast	♦ Nechako
♦ Mainland / Southwest	♦ Northeast
♦ North Coast	♦ Cariboo
	♦ Thompson-Okanagan
	♦ Kootenay

BC Economic Development Regions



Research Requirements & Methodology

The aim of the project was to complete a report that quantifies and defines the existing workforce and provides a detailed forecast of labour market demand in priority occupations over the next five (2017) and 10 years (2022). Having a comprehensive understanding of the industry workforce and an employment demand forecast over the next decade will inform the development of a human resource strategy to help attract, recruit and train the next generation of BC's forest sector workforce.

The project was conducted in six phases that reflect the project's requirements. The LMP Steering Committee helped facilitate the planning, administration and reporting functions throughout the project. The following outlines the methodologies used for meeting all research requirements.

Phase 1 – Profile of the BC Forest Industry

This industry profile examines various characteristics of establishments that comprise the BC forest industry and their performance in terms of production and contribution to the provincial economy. The analysis relies on data provided by the BC Ministry of Forests, Lands & Natural Resource Operations and Statistics Canada to examine historical economic trends impacting the forest industry and its workforce. The section includes an in-depth review of current forecasts for the BC economy, as provided by Central 1 Credit Union and other leading forecasters. The purpose of this review is to provide the economic and labour market circumstances in which the BC forest industry currently operates, as well as prospects for growth and inherent risks to the provincial economy over the next five years (2017).

Phase 2 – Forest Industry Workforce Profile

The workforce profile examines the forest industry workforce, including workers in forestry & logging, support activities for forestry, wood products manufacturing, and pulp & paper manufacturing. Employment and unemployment trends are provided for the Coast and Interior forest regions since 2006, as well as an analysis of worker productivity in timber harvesting, lumber, and pulp & paper production. Priority occupations, as identified by the LMP committee, are examined as of 2006 to serve as a benchmark and to support the development of the employment baseline (2012) and forecast estimates. The section includes a discussion of the various challenges currently impacting the forest industry workforce, and a review of education and training programs in support of the industry and an analysis of outcomes (enrolments, certificates) since 2006/07. Innovations in training programming and delivery with application to the forest industry are also presented. Data supporting this analysis comes from Statistics Canada Labour Force Survey and Census (2006), BC Ministry of Forests, Lands & Natural Resource Operations, BC Ministry of Advanced Education, the Industry Training Authority and recent industry literature.

Phase 3 – Review of Labour Market Forecasts

Labour market forecasts are prepared regularly by sector councils, industry partnerships, governments, and other organizations at the provincial and national level. In this section of the report, existing labour market information from a variety of sources is summarized to provide an overview of current labour market research and forecast information on BC's forest industry. A large part of the information is taken from recent labour market partnership reports prepared by LMI Insight and R.A. Malatest & Associates Ltd on behalf of BC's resource sector. In some cases, forecast information and results have been updated by the Consultant to reflect current conditions.

Phase 4 – Primary Survey Research

The survey of employers and contractors was implemented for the purpose of quantifying the industry workforce, providing a current demographic profile of the workforce, and identifying key labour market challenges and opportunities for the industry. The survey focused on 26 "priority" occupations employed within the various operational phases of production, including forestry, logging, road construction, multi-phase operators, and pulp & paper manufacturing. A key objective of the survey research was to gather workforce data to establish an employment baseline (2012) for both the industry and priority occupations, upon which projected employment and job openings could be forecasted through 2022. The results are provided by development region (8), forest region and phase of operation. Development of the survey sample was facilitated through the BC Forest Safety Council.

Phase 5 – Forest Sector Stakeholder Reports

BC's forest sector is comprised of a range of businesses and stakeholders that extend well beyond forest industry operations. Industry suppliers of forestry equipment, machinery and services are one of the key industry segments of the broader "forest sector". These suppliers generate significant additional (indirect) employment in forest communities, with many workers possessing the same skills and training as those directly employed by the forest industry. First Nations communities and Aboriginal organizations involved in forestry and economic development have become increasingly important operators, employers and developers of the forest resource. Also of interest to forestry and logging operators is the inclusion of workers who perform "work-in-the-woods" but whose presence is not considered within the traditional definition of the "forest industry". In particular, logging truck drivers responsible for hauling forest products from the bush to the mill are aggregated within the "forest products trucking" industry classification, which falls outside of the traditional forestry definition. Public agencies with responsibility for regulating and managing public forest lands are also important employers in the forest sector. This section of the report examines the workforce implications associated with various industry stakeholders that comprise the broader BC forest sector.

Phase 6 – Demand-Supply Gap Analysis

Phase 6 involved the development of a gap analysis that quantifies the difference between projected occupational demand as identified by employers and the projected supply based on occupational growth forecasts provided through the BC Labour Market Scenario Model (BCLMSM). This model provides supply (and demand) projections for individual occupations based on forecast economic and population data throughout BC.

SECTION 3: PROFILE OF THE BC FOREST INDUSTRY

The following section profiles the BC forest industry and its economic performance in recent years. The industry has undergone significant structural change over the last decade and more, as it attempts to remain competitive in the global economy. Data for this analysis has been provided by a variety of sources, including Statistics Canada and the BC Ministry of Forests, Lands & Natural Resource Operations, highlighting historical trends and issues pertinent to the industry and its workforce. Depending on data availability, the analysis compares and contrasts industry performance in the Coast and Interior regions.

3.1 Industry Overview

BC's forest industry is largely comprised of small businesses in forestry and logging operations, many of which are independent contractors with a small number of employees or none at all. Independent operators typically contract their services to forest tenure holders (or other contractors), mostly for the purpose of harvesting timber and hauling logs for processing and manufacturing. The work is specialized (i.e., tree falling, short-haul trucking), mostly seasonal and takes place on variable work sites, contributing to a high degree of irregular and part-time work. In contrast, regular and full-time employment is much higher among forest product manufacturers, as these businesses are mostly full-year operations in defined locations (i.e., mills, plant operations). These operational differences present unique workforce challenges for industry operators, particularly employers and independent contractors in forestry and logging operations.

3.1.1 Industry Establishments

The Business Register is the central repository of information on businesses in Canada and provides an inventory of business counts by industry. According to the Business Register, the total number of establishments operating in BC's forest industry in 2012 was 6,149, of which more than half (53%) were identified as employers and the remaining (47%) identified as either non-employers or indeterminate (i.e., without employee payrolls). Among forestry and logging establishments, 51% were identified as non-employers, as compared to 35% of manufacturing establishments, highlighting the structural differences between the forestry & logging and manufacturing workforces.

Logging establishments (contract and non-contract) accounted for a combined 56% of all forest industry establishments in 2012, roughly evenly split between employers and non-employers. Non-contract loggers are distinguished from contract loggers as companies that perform work exclusively for the same company or tenure holder (sometimes referred to as "dependent" operators). Several integrated forest operators in BC have adopted the contract model of employment, rather than maintaining direct employer-employee relationships. Although an important efficiency measure, this employment model has contributed to more irregular and part-time work, particularly among independent forestry and logging operations.

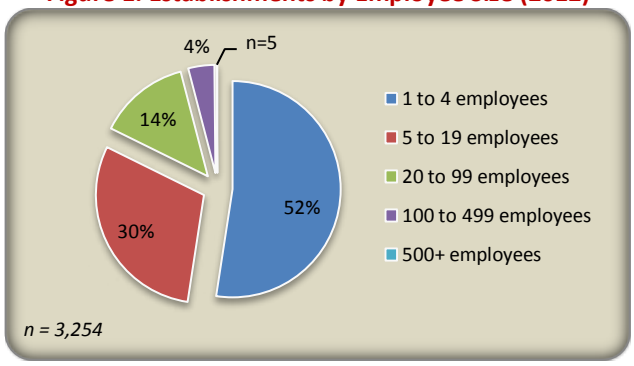
Table 1: Forest Industry Establishments (2012)

	Establishments					
Forest Industry	Total		Employers		Non-employers	
Logging (Contract)	2,384	39%	1,220	51%	1,164	49%
Logging (Non-contract)	1,017	17%	482	47%	535	53%
Support Activities for Forestry	1,368	22%	654	48%	714	52%
Wood Products Manufacturing	1,294	21%	838	65%	456	35%
Pulp & Paper Manufacturing	86	1%	60	70%	26	30%
Totals	**6,149**	**100%**	**3,254**	**53%**	**2,895**	**47%**

Source: Statistics Canada, Business Register (Table 551-003), December 2012

The vast majority of industry employers (82%) maintain workforces of fewer than 20 employees, including more than half (52%) with less than five employees and just five employers with more than 500 workers. The structural make-up of the forest industry, characterized by a large number of small employers and non-employers, heightens the challenge developing a coordinated and sustainable human resource strategy for the broader industry.

Figure 1: Establishments by Employee Size (2012)



Source: Business Register (Table 551-0003), December 2012

Further analysis shows that the average number of employees per establishment is very low in forestry and logging operations, and high among manufacturers, particularly pulp & paper manufacturers. It is generally acknowledged that workers in smaller operations are mostly trained on the job, and do not participate in formal training to the same degree as those employed by larger operations. In order to be effective, future training programs need to be tailored to both large and small employer types throughout the forest industry.

Table 2: Number of Employees / Establishment (2012)

Forest Industry	Establishments (Employers)	Employment (SEPH)[1]	Employees / Establishment
Logging (Contract + Non-contract)	1,702	11,239	7
Support Activities for Forestry	654	3,511	5
Wood Products Manufacturing	838	23,958	29
Pulp & Paper Manufacturing	60	7,776	130
Totals	**3,254**	**46,484**	**14**

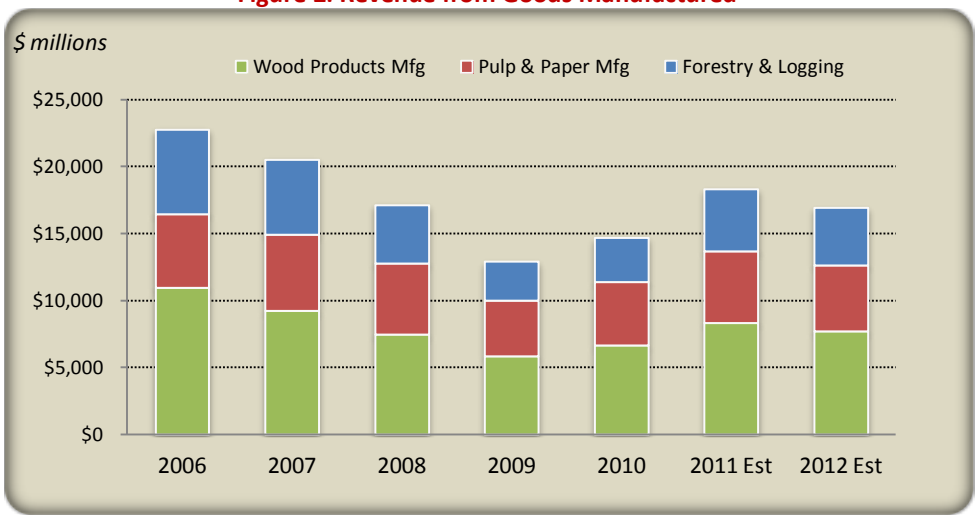
Source: Statistics Canada, Business Register; Survey of Employment, Payrolls & Hours

[1] The Survey of Employment, Payrolls & Hours (SEPH) is a monthly survey of employers focusing on employment, earnings, vacancies and hours worked. In contrast to the Labour Force Survey, SEPH underestimates total employment by excluding the self-employed (e.g., contractors) from its estimates.

3.1.2 Industry Revenue

Consistent with declines in harvest volume, industry revenue from all goods manufactured fell from $22.8 billion in 2006 to $12.9 billion in 2009, an overall decline of 43%. Forestry & logging producers experienced the largest decline (53%) between 2006 and 2009, followed by wood product manufacturers (47%) and pulp & paper manufacturers (24%). Overall product demand began to rebound in 2010 ($14.7 billion), with projected revenues estimated at $18.5 billion in 2011 and $17.1 billion in 2012.

Figure 2: Revenue from Goods Manufactured



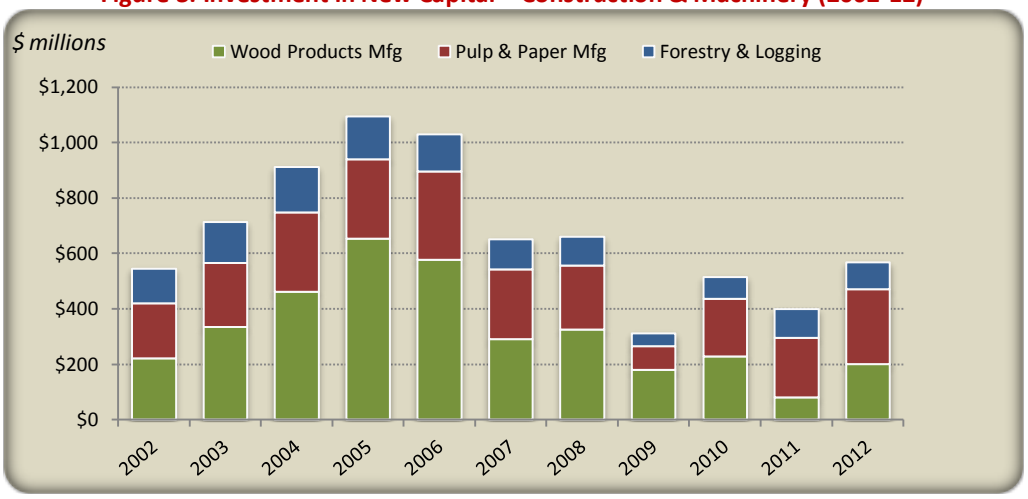
Statistics Canada, Annual Survey of Manufacturers & Loggers (2011)

3.1.3 Capital Investments

The BC forest industry invested heavily in new facilities, equipment and machinery over the last decade in an effort to boost productivity and remain competitive. Investment peaked at $1.1 billion in 2005, led by wood products manufacturers with $654 million invested in new capital. The onset of the global economic downturn saw investment across the forest industry fall considerably in the second half of the decade, hitting a low of $338 million in 2009.

As a result of new investment in capital and increasing mechanization in the production process, skill requirements of forest workers are changing and training has become increasingly important in preparing workers to meet these requirements. The level of mechanized harvesting in the Interior forest region far exceeds that of the Coast.

Figure 3: Investment in New Capital – Construction & Machinery (2002-12)



Statistics Canada. Capital and Repair Expenditures (Table 029-0005)

3.2 Forest Industry Production

The Interior region dominates forest industry production throughout the province, with only pulp and paper production more evenly divided between Coast and Interior operations. Harvest volumes in the Interior are about three times higher than the Coast based on similarly sized workforces. Much of the disparity in production can be attributed to more intensive mechanization in the harvesting and processing of Interior forests.

Mechanization in the harvesting and processing of the forest resource (on public lands) is employed far more extensively in the Interior than in Coastal operations. Manual harvesting and processing remains the dominant method on the Coast, whereas the use of hand fallers and ground workers (buckers) in the Interior is minimal. It is likely the pine beetle infestation in the Interior contributed to more intensive use of mechanization while the affected stands remained marketable. The adoption of increased mechanization on the Coast has also been impeded by limitations on the use of mechanical systems in sensitive forest environments, and more challenging terrain in which to operate. Private land owners on the Coast are less impacted by these factors, enabling greater mechanization and increased productivity than on public forest lands.

Table 3 below illustrates the degree to which mechanization is employed in timber harvesting and processing in Coastal and Interior operations (North and South). The data used in this analysis was sourced from the 2007 study prepared by FP Innovations[2]. Interior productivity (m^3/operator) is higher than Coastal operations – 19% in the South and 24% in the North. Note that productivity values include yarding, loading and trucking systems, in addition to harvesting and processing systems. The use of mechanization in these related systems is more evenly balanced between Coastal and Interior operations.

[2] FP Innovations (FERIC Division), *BC Forest Industry Workforce Review*, April 2007.

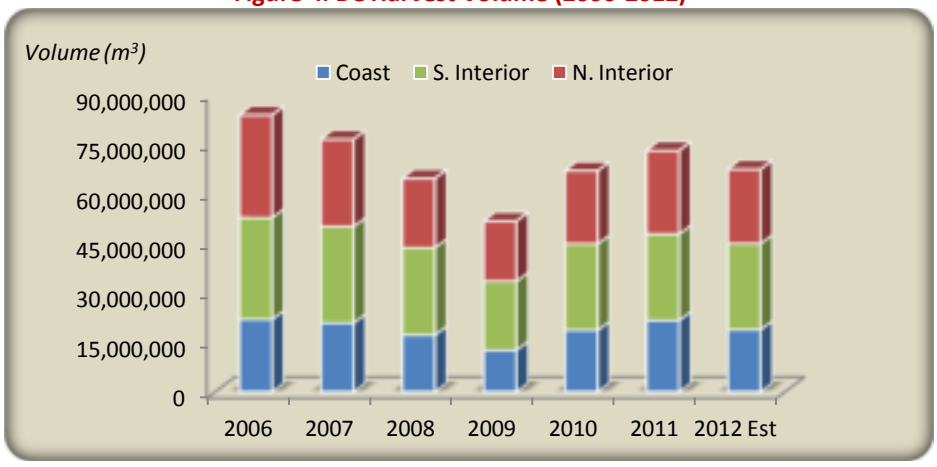
Table 3: Mechanization in Harvesting & Processing (2006)

Harvesting System	Coast	Interior – South	Interior – North
Manual (Hand Faller)	83%	8%	1%
Mechanical	17%	92%	99%
Processing System	**Coast**	**Interior (South**	**Interior - North**
Manual (Hand Bucker)	78%	6%	1%
Mechanical	22%	94%	99%
Productivity	**Coast**	**Interior (South**	**Interior - North**
m^3/operator	7,596	9,369	9,972
Productivity Gap	-	19%	24%

3.2.1 Harvest Volume

Harvest volume on both Crown and federal/private lands is highest in the Interior region (north and south), accounting for between 70% and 75% of the total harvest volume on an annual basis. Harvest volume declined sharply across the province between 2006 and 2009, falling to 51.6 million cubic metres in 2009 – the lowest level since 1995. Since 2009 harvest volume has rebounded, yet remains 20% below levels reached in 2006. Between 2006 and 2012, the impact of the decline was more severe in the Interior region where harvest volume fell 28%, more particularly in the north.

Figure 4: BC Harvest Volume (2006-2012)*

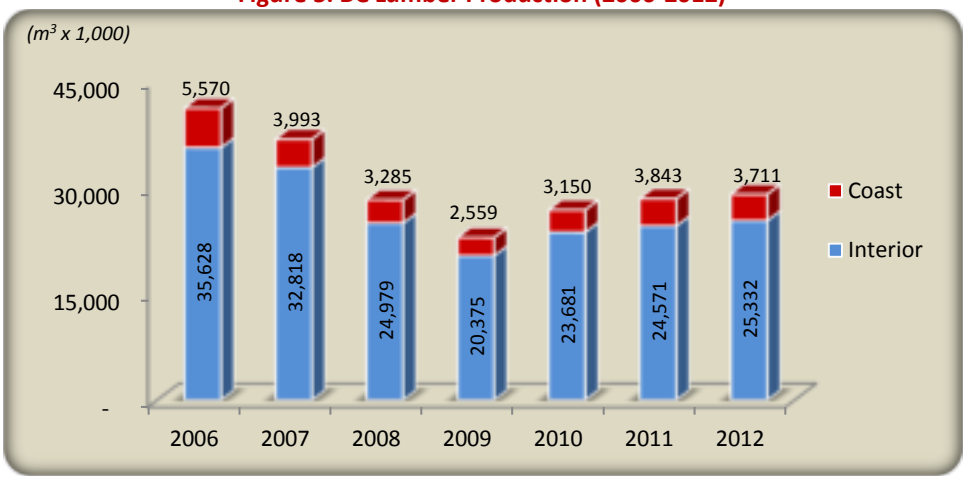


** MFLNRO. Volume Billed (all logs, special forest products, species and grades billed to crown, private and federal land including waste and reject, excluding xmas trees).*

3.2.2 Lumber Production

Lumber production is concentrated in the Interior region, where most sawmills are located. On average, the Interior produces close to 90% of BC lumber – the vast majority of which is derived from softwood timber. Total lumber production fell dramatically between 2006 and 2009 (44%), owing to lower forest product exports and collapse of the U.S. housing sector. Production levels have rebounded in recent years, yet remain significantly lower than pre-recession levels.

Figure 5: BC Lumber Production (2006-2012)



Statistics Canada, Lumber Production, Shipments and Stocks (Table 303-0064)

3.2.3 Pulp & Paper Production

Pulp and paper production in BC is more evenly divided between the Coast and Interior regions, with Interior operators producing, on average, more than 60% of BC pulp between 2006 and 2012. Following a precipitous decline through 2010, the economic picture for pulp and paper production has improved significantly in recent years, driven by higher international pulp prices and emerging markets for BC pulp and paper products. Coast manufacturers in particular appear to be experiencing a healthy rebound, with production up an estimated 44% since 2010.

Figure 6: BC Pulp & Paper Production (2006-2012 Est.)

Statistics Canada and BC Ministry of Forests, Lands & Natural Resource Operations

3.2.4 Implications for Workforce Development

The productivity gap between the Coast and Interior regions highlights the unique conditions of the two operating environments. In the Interior, operators need more workers capable of operating logging machinery, while more hand fallers and ground workers are needed to manually harvest the resource on the Coast. This is an important consideration in workforce development, particularly as training programs would be tailored to meet the unique requirements in each region. Coastal operators also

have an interest in improving worker productivity, and will continue to pursue options involving increased mechanization where appropriate. This, too, will impact workforce planning in the Coast and the need for newly trained logging machinery operators.

3.3 Contribution to the BC Economy

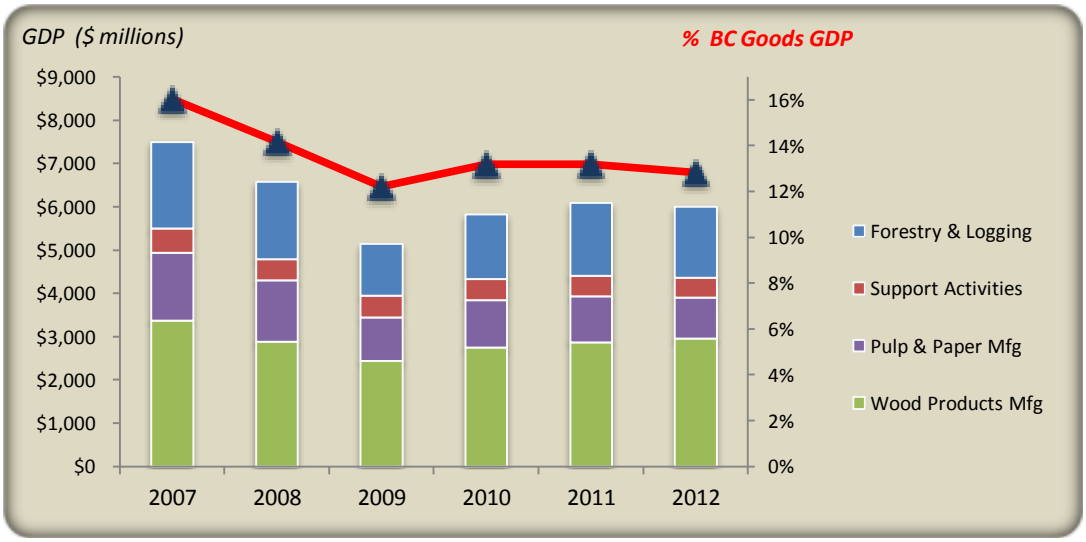
Forestry remains one of the most important natural resource industries in British Columbia. Forest products are the province's most important export commodity, accounting for as much as 46% of the total value of BC's international exports (2004). Dominance of forest exports has deteriorated in recent years to about 30%, as traditional export markets have declined and other resource commodities, including mining and energy, have increased.

3.3.1 Forest Industry GDP

The direct economic contribution of BC's forest industry, as measured by GDP, totaled $6.0 billion in 2012, representing 13% of the province's goods-producing GDP. Within the forest industry, wood product manufacturing accounted for 49% of total forest GDP in 2012, followed by forestry & logging (27%), pulp & paper manufacturing (16%), and support activities for forestry (8%).

Since 2007, BC's forest industry has experienced one of the most severe cyclical downturns in its history, prompted by a declining U.S. housing market, historically low lumber prices and a high Canadian dollar relative to major exporting countries. Forest industry GDP fell 31% between 2007 and 2009, before experiencing a rebound in 2010. Over the 2007-12 period, forest industry GDP was down by 20%, as compared to 0% growth for the province's total goods sector during this same period. Still, each cubic metre of wood harvested in BC contributed, on average, $94 to the provincial economy between 2007 and 2012.

Figure 7: BC Forest Industry GDP & Share of BC Goods Sector 2007-2011



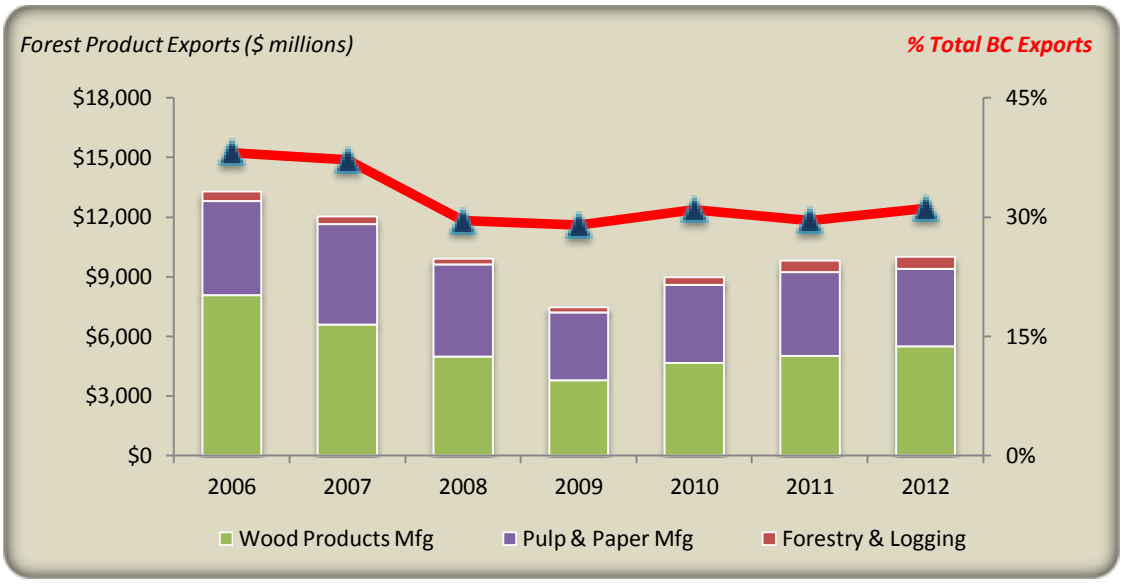
Statistics Canada. GDP at basic prices, Chained (2007) dollars, Table 379-0030

3.3.2 Forest Products Exports

As a share of BC exports, forest products now account for about 30% of the value of total BC exports, down sharply from the first half of the decade. Prices for most forest products remain depressed and demand weak due to poor economic conditions in BCs largest export market – the United States. After averaging $14.7 billion per year between 1996 and 2004, forest product exports fell to a 15-year low of $7.6 billion in 2009, before gradually recovering to just under $10 billion in 2012. The current rebound in exports has been driven largely by rising demand in China and other Asian markets.

Wood product exports were hit hardest between 2006 and 2012, declining from more than $8 billion in 2006 to $5.5 billion in 2012. Exports of pulp & paper products were less impacted during this period, declining 17% between 2006 and 2012. Although small relative to manufactured products, the value of forestry & logging exports increased 17% since 2006, reaching $594 million in 2012. Much of this resurgence may be attributed to an increase in log exports to China and other emerging economies.

Figure 8: Forest Product Exports & Share of Total BC Exports 2006-2012

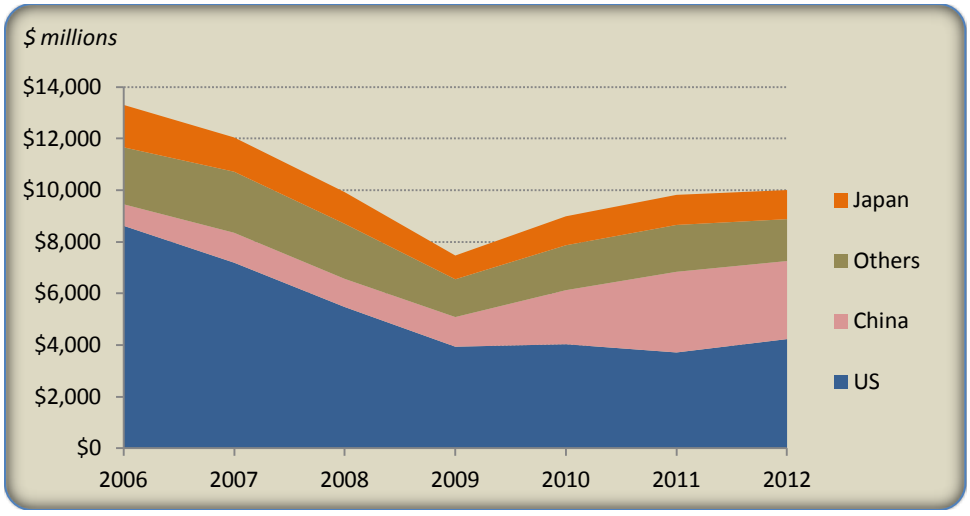


Statistics Canada. Trade Data Online; Economic Accounts

3.3.3 Forest Products Exports by Destination Country

Traditional export markets for BC forest products have remained depressed since the mid-2000s, with the total export value declining 25% between 2006 and 2012. In 2012 the U.S. accounted for 42% of BC forest product exports, down from 65% in 2006. Similarly, exports to Japan fell 31% over this period, accounting for 11% of BC export value in 2012. With U.S. market growth expected to remain tepid in the short and medium terms, market diversification has been the overriding priority for BC producers and manufacturers. China is now the province's second largest export market (30%), with forest product exports increasing from $833 million in 2006 to $3 billion in 2012 – up 263%.

Figure 9: Forest Product Exports by Country of Destination 2006-12

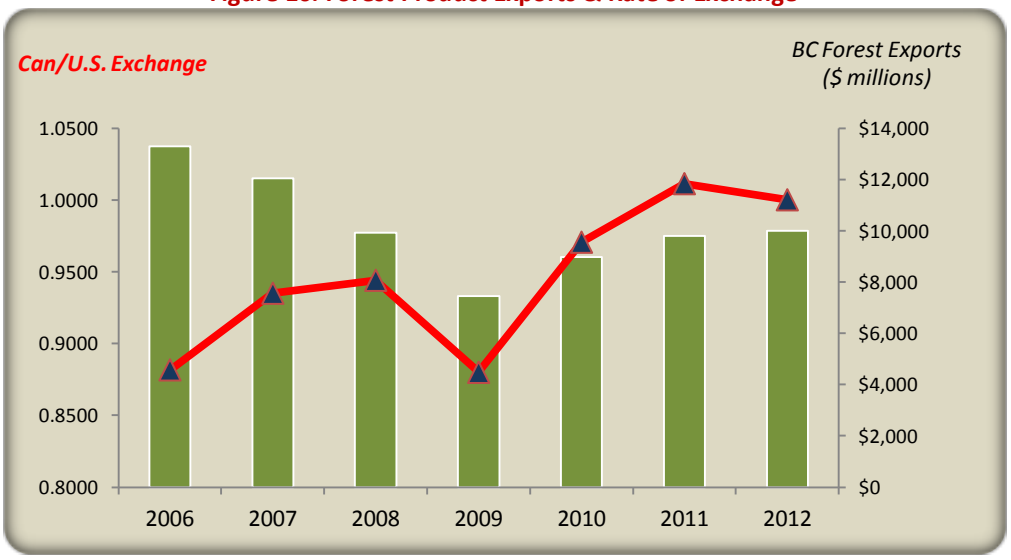


Statistics Canada, Trade Data Online

3.3.4 Forest Products Exports & the Canada-U.S. Exchange Rate

Canada's average annual exchange rate with the U.S. hit a low in 2002 when one Canadian dollar was worth 0.6367 American. With the exception of 2009, the value of the Canadian dollar has followed an upward trend, impacting the value of forest product exports. Between 2006 and 2008, a rising Canadian dollar coincided with a sharp decrease in export value as the U.S. market began to contract. Since 2009 the value of forest product exports has managed to increase, despite a rising Canadian dollar. Market diversification and the emergence of China as a key export destination for BC forest products is largely responsible for this recovery. The value of the Canadian dollar relative to the Chinese Yuan has also fallen more than 10% since 2006.

Figure 10: Forest Product Exports & Rate of Exchange



Bank of Canada (Annual average exchange rates); Statistics Canada (Trade Data Online)

3.4 Provincial Economic Outlook – 2017

The purpose of this review is to provide the economic conditions in which the BC forest industry currently operates and growth prospects for the provincial economy. The information is based on forecasts for the BC economy as provided by Central 1 Credit Union and other leading economic forecasters The review is supported by additional statistical analyses developed by the Consultant that provide current data and information relevant to the forest sector.

In February 2013, Central 1 Credit Union completed an economic analysis of the BC economy in advance of the release of the BC budget in May 2013. Led by Helmut Pastrick, chief economist and member of BC's independent Economic Forecast Council (EFC), the report covers the 2013-2017period and includes Gross Domestic Product (GDP), industry and labour market projections for the provincial economy. EFC members are surveyed twice a year to advise the BC Finance Minister prior to each year's budget. Government has also released its own economic forecast with Budget 2013, and is referenced in this review.

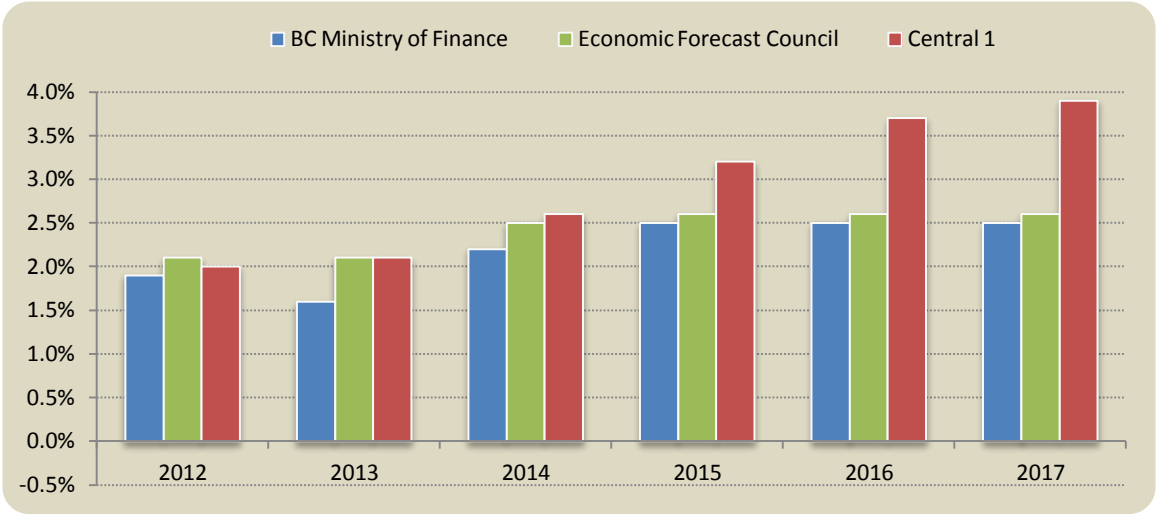
3.4.1 BC Economic Forecast

The Central 1 macroeconomic forecast is considered the *most likely* scenario and used as a basis for the BC forecast. Other scenarios are possible as a policy misstep or unexpected event could derail it. A scenario with a weaker U.S. economy and prolonged period of sub-par global growth, coupled with less robust commodity prices and lower domestic interest rates, is the next most likely outcome.

Real GDP is forecast to grow by 2.2% in 2013, following 2012's slowdown to 1.9%, before accelerating to 2.8% in 2014 and averaging 3.7% in 2015 to 2017. Slow growth conditions in 2012 will extend into 2013 but will transition to firmer growth later in 2013 and beyond. A growth up-shift in the U.S. economy during 2014 to 2017 will help lift BC's economy to higher growth rates after 2013. Other key players in the global economy will also perform better during that time and provide a boost to the province's exports and investment spending.

The BC Economic Forecast Council expects BC's economy to post 2.1 percent growth in 2013, down slightly from the 2.2 percent it predicted two months ago at its annual meeting. The council also slightly reduced its 2014 forecast to 2.5 percent, down from 2.6 percent. The forecast average for the 2015-17 period remains the same at 2.6 percent. Similarly, the BC Ministry of Finance forecast is slightly more conservative, with 2013 growth projected at 1.6% then increasing to an average of 2.4% over the 2014-17 period (Figure 11).

Figure 11: Real GDP Expenditure Growth Forecast – 2012-2017



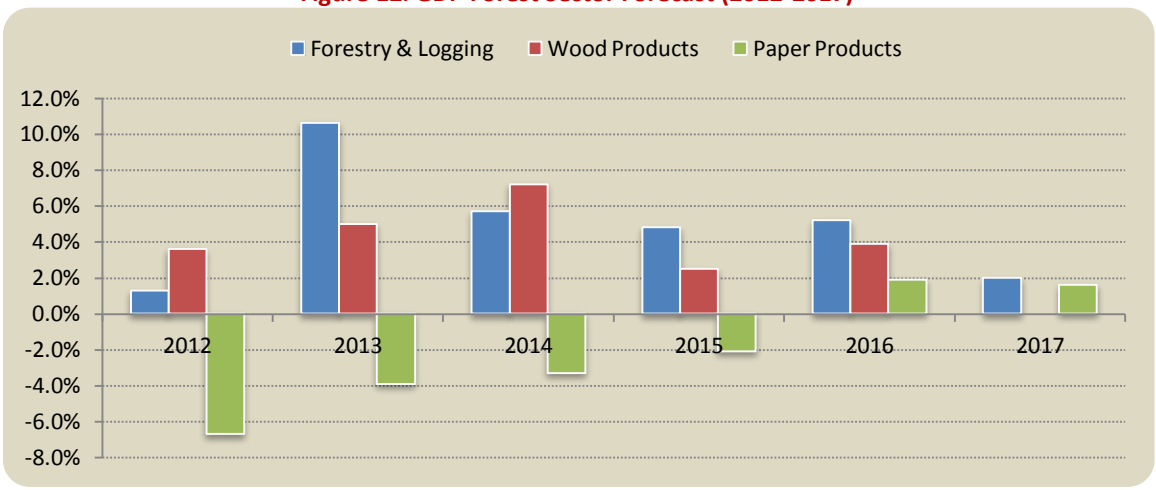
Source: Central 1 Credit Union, BC Ministry of Finance, Economic Forecast Council (2013)

3.4.2 Industry Forecast

Industries that are forecast to grow faster than the economy's overall rate are mining, forestry and wood products manufacturing, primary metal manufacturing and construction. Growth laggards include pulp and paper manufacturing, public administration, education, and accommodation-food services.

Forestry & logging and wood products manufacturing output is forecast to grow more than 20% between 2012 and 2017 driven by a recovery in U.S. housing starts. Expansion into China is expected to resume after its construction slowdown in 2012. The accelerated harvest of pine beetle trees is a contributing factor but this will begin to wane as supply constraints materialize. Annual growth in wood products manufacturing output will slow in 2017 and beyond. Pulp and paper manufacturing will fare poorly during this period – GDP output is predicted to contract in 2013 through 2015, following declines in 2011 and 2012. The outlook for the pulp sector is for ongoing weak pricing conditions and low production. The decade long decline in newsprint production fell to a new low in 2011, down more than 70% from 2001, but that appears to have ended in 2012.

Figure 12: GDP Forest Sector Forecast (2012-2017)



Source: Central 1 Credit Union (2013)

During the next five years, government decisions on large energy, pipeline, and mining projects will be made and will impact the provincial economy.

Mining

The mining industry has a positive five-year outlook tied to the faster growing global economy after 2013 and the development of new mines. Mount Milligan currently under construction and BC's first new mine in many years, is slated for full commercial production in 2014. The Northwest Transmission Line is scheduled to be completed in 2013 and will facilitate the development of new mining developments, such as Red Chris, Schaft Creek and others in the longer term. In other regions of the province several mine projects are in various stages of development, many of which need to address environmental and other issues before obtaining approval.

Natural Gas

Natural gas production was slightly lower in 2012 following record high output in 2011. Prices remained low and exports declined in 2012, along with sales of natural gas land rights. Pricing is expected to improve in 2013 according to both industry forecasts and the futures gas market. However, supply in the U.S. is rapidly expanding due to plentiful shale gas reserves. This could keep prices down especially if demand does not increase.

Oil & Gas

Oil and gas extraction will hold near recent levels this year and expand at a slightly faster pace in 2015 and beyond, when exports grow on higher U.S. demand. The large run up in output seen during the last two decades is subsiding. Liquefied natural gas (LNG) exports to Asia offer longer term growth potential as evidenced by the likely construction of an LNG plant on the North Coast to take advantage of higher prices in Asia.

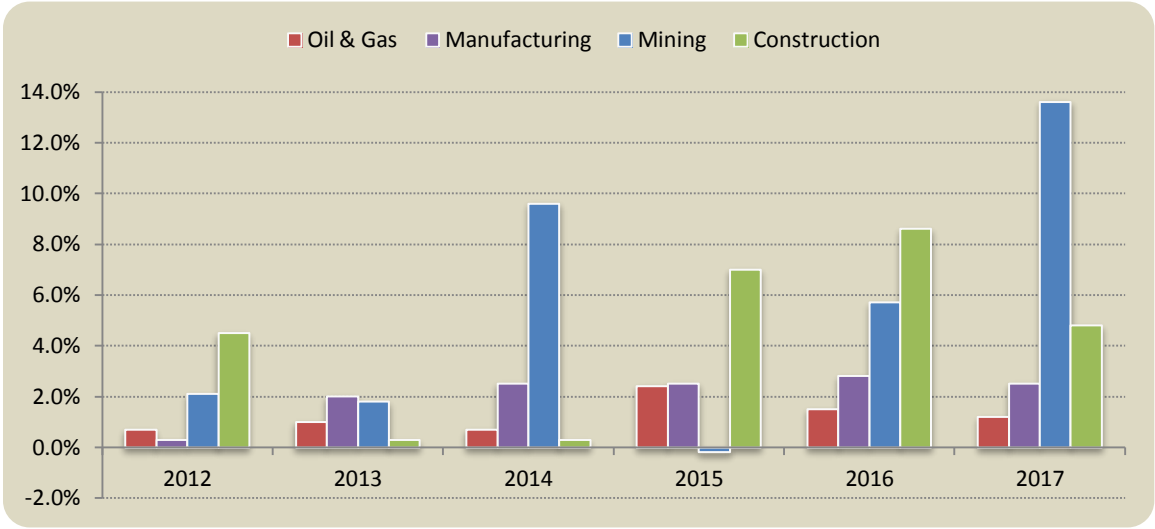
Primary Metals Manufacturing

Primary metals manufacturing will receive a significant boost in 2015 when the Rio Tinto Alcan modernization and expansion of the aluminum smelter in Kitimat is completed. Real GDP is expected to jump about 25% in 2015. The $3.3 billion investment will increase the smelter's capacity by 48%, generate several hundred construction jobs, and boost spending on machinery and equipment as well as non-residential industrial building construction.

Construction

Construction will expand at the fastest rate among domestic-oriented industries. While GDP is forecast to expand a modest 1% this year and next, it is expected to jump to nearly 6% annually in 2015 to 2017. New project investments will boost engineering and industrial building construction, while housing and government construction will decline in the near term. Non-residential construction will be the main growth driver in this industry, with moderate uplift from the residential sector in the later part of the five-year forecast.

Figure 13: Resource Sector Growth Forecast

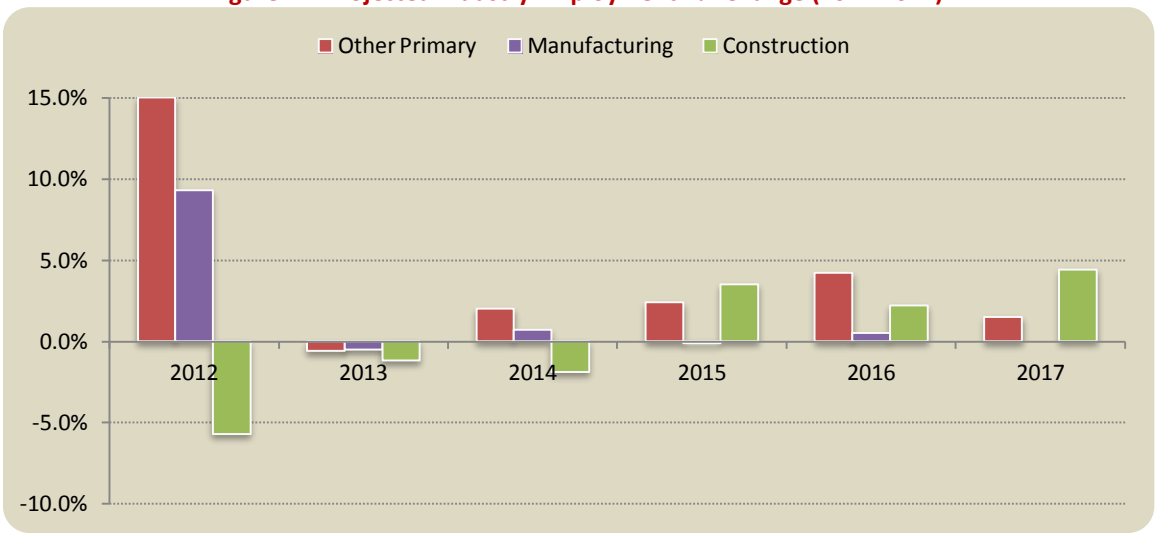


Source: Central 1 Credit Union (2013)

3.4.3 Employment Forecast

Employment growth will increasingly become constrained by lower labour force growth with aging demographics. This longer-term trend will be partially offset by the upcoming cyclical growth upturn inducing more labour force growth in response to more employment opportunities later in the forecast period. The labour force participation rate is expected to rise to 67% in 2017 from 65% in 2012. Should this not transpire, the unemployment rate could fall below 4% and result in upward pressure on wages and salaries.

Figure 14: Projected Industry Employment - % Change (2012-2017)



Source: Central 1 Credit Union (2013)

Unemployment will decline fairly steadily and fall below 5% in 2016, averaging 4% in 2017. The rather large decline in 2012 to 6.7% from 7.5% in 2011 is somewhat misleading since the labour force expanded at a slower pace and employment growth slowed during the year. Since mid-2012, no net

employment growth has occurred. This period extends into 2013 but is expected to end by mid-2013 with a positive trend into 2014.

3.5 Risks to the BC Forest Sector

As with any forecast, several economic and geopolitical risks could potentially undermine projections. In the case of the BC forest industry, the continued turnaround in the U.S. economy and sustained growth in the residential housing sector are perhaps the two most important external drivers to BC's forest economy. A number of other events must also occur to enable a sustained recovery of the provincial forest industry.

3.5.1 Slow Recovery in U.S. Economy

Economic conditions in the U.S. are improving and after four years of subpar economic recovery, pent-up consumer and business spending is set to unfold during the next five years. Whether BC's economy grows at a low or high pace is usually dependent on exports. In 2012, real exports are estimated to have expanded only 1.6% compared to 6.0% in 2010 and 5.1% in 2011. Looking ahead, prospects are slightly better in 2013 with a projected increase of nearly 3%, rising to nearly 5% in 2015. Without the anticipated upturn in U.S. growth during this period, BC's growth forecast would be lower at around 2.0% annually.

The faster growing U.S. economy after 2014 will give a considerable boost to BC exports of wood products. Historically, the U.S. has been the largest market for BC exports, largely softwood lumber exports for residential construction. The recent recession and downturn in the U.S. housing market has led to dramatic declines in the demand for wood products. There is also a risk that the U.S. and other major export economies may not perform as expected or an unforeseen external shock, such as the U.S. debt and the possibility of another liquidity crunch impacting growth and investment.

3.5.2 Diversification into Asian Markets

The decline in BC forest product exports to traditional markets has been buffered by increased exports to Asian markets, particularly China. China is now the second largest market for BC's solid wood exports with significant opportunities for future growth. BC lumber exports to China have grown significantly in recent years and are beginning to expand beyond low-grade timber to higher value products. Raw log exports to China have also experienced a major boost in recent years, helping to sustain coastal forest communities.

China's construction boom, however, is currently experiencing a slowdown consistent with weaker economic conditions impacting the global economy. While growth in China's economy will continue to outpace other leading economies, factors such as a rising currency (yuan) and higher tariffs on Chinese exports, could adversely affect trade conditions with BC and other western economies. Similarly, low cost wood and pulp manufacturers in China (and other developing economies) are now in direct competition with BC suppliers, affecting both primary and secondary manufacturers.

3.5.3 Canadian-U.S. Exchange Rate

The unprecedented appreciation of the Canadian-U.S. exchange rate since 2002 has had an adverse effect on the province's forest sector. The rising Canadian dollar impacts the bottom lines of primary

and secondary manufacturers, increasing the relative costs of production in BC. BC operators have responded by investing in new technology to improve productivity, while several less efficient operations have been closed or shut down.

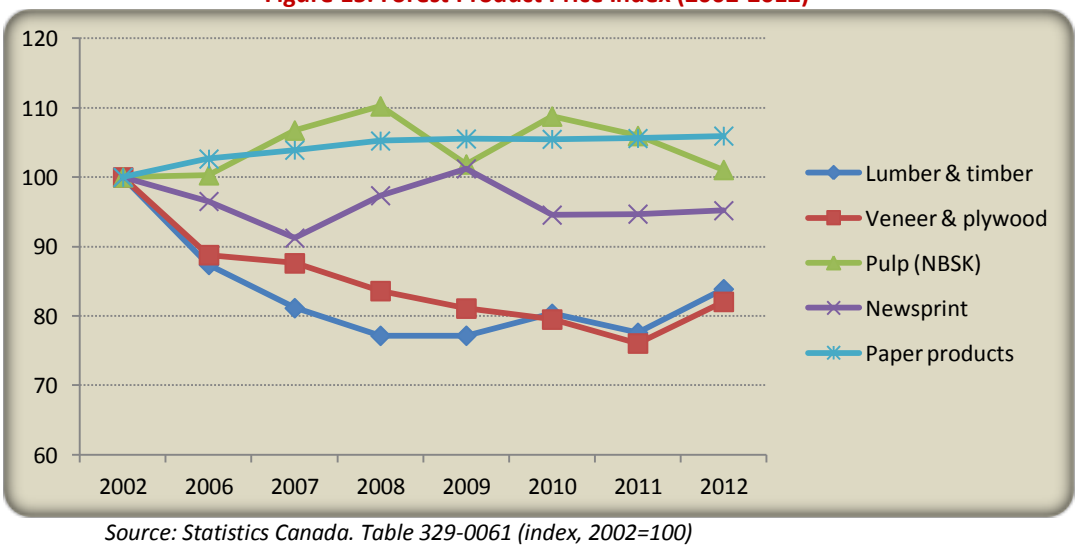
Recently, the Canadian dollar has stabilized at close to par with the U.S. dollar. With inflation in check and little upward pressure on interest rates, the expectation for the Canadian dollar is stable with price movement limited over the near and medium terms. Perhaps of greater concern over the longer term is downward pressure on the U.S. dollar owing to the country's burgeoning debt and deficit situation. Upward pressure on the Chinese currency could however make BC exports more attractive to emerging markets.

3.5.4 International Commodity Prices

With the possible exception of energy, the general slowdown in the global economy is expected to exert downward pressure on commodity prices in the near term. Since 2011, both lumber and veneer/plywood have experienced positive price movement, though prices of both categories remain well off their highs reached in 2002. Paper products are the only category to have experienced higher prices over the last decade, with newsprint down 5% and pulp virtually unchanged since 2002.

The rapid growth in capacity of low-cost offshore producers presents a major challenge to BC pulp, paper and wood product manufacturers. Maturing North American and Western European pulp and paper markets have shifted global demand for pulp and paper towards Asia and Latin America. Low-cost producers in these regions have responded to this shift with huge investments in new mill capacity and are now in direct competition with BC suppliers. At the same time lumber producers face challenges in both domestic and international markets from intensively managed timber plantations and suppliers from Eastern and Western Europe, Russia, South America and Asia.

Figure 15: Forest Product Price Index (2002-2012)

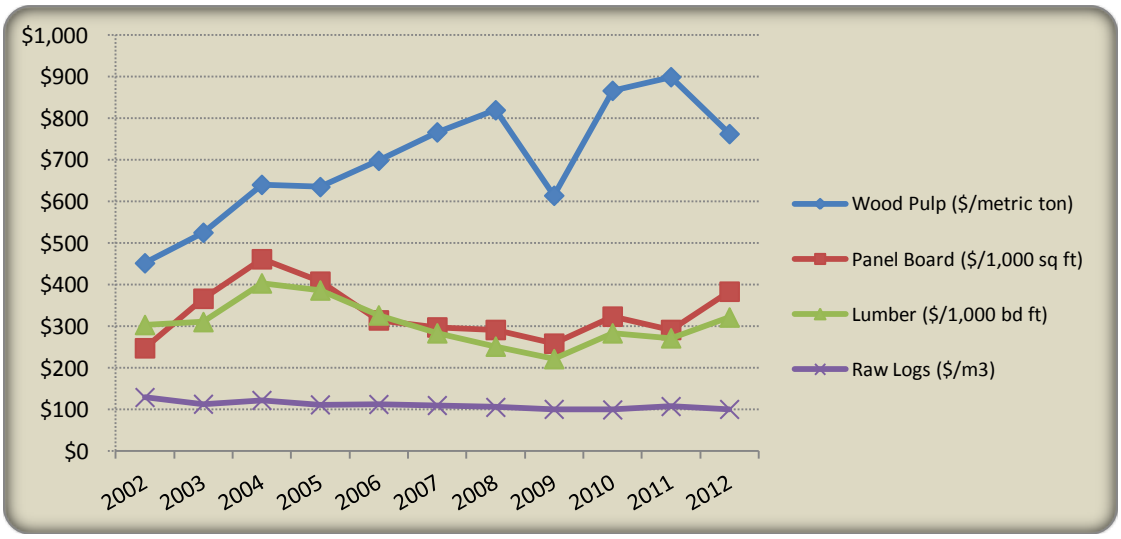


Source: Statistics Canada. Table 329-0061 (index, 2002=100)

In nominal terms, recent prices for lumber and panel boards have risen noticeably since 2009, in line with growing optimism in the U.S. housing market. U.S. housing starts in 2013 are expected to pass the one million mark for the first time in seven years, with a long term trend of 1.5 million starts annually.

Despite a drop in 2012, the price of international wood pulp (NBSK) is also up since 2009, helping BC manufacturers withstand the effects of a high Canadian dollar and international competition. Although raw log exports from BC have increased sharply in recent years, the actual value achieved per cubic metre has followed a downward trend since 2002 (down 22%).

Figure 16: Forest Product Prices (Nominal)
2002-2012



Source: Random Lengths (lumber, panel boards); World Bank Commodity Price Data (wood pulp); Statistics Canada, International Trade Statistics custom extract (raw logs)

3.5.5 Annual Allowable Cut

Timber supply has been an ongoing concern for the forest sector in BC and across Canada. The province determines an Annual Allowable Cut (AAC) for timber harvesting on Crown land in BC. The timber harvested from these lands accounts for approximately 90% of the volume of timber harvested in the province. The AAC is intended to allow long term sustainable harvesting of BC's forest resource, and is recalculated for each forest tenure in response to changes in available timber supply.

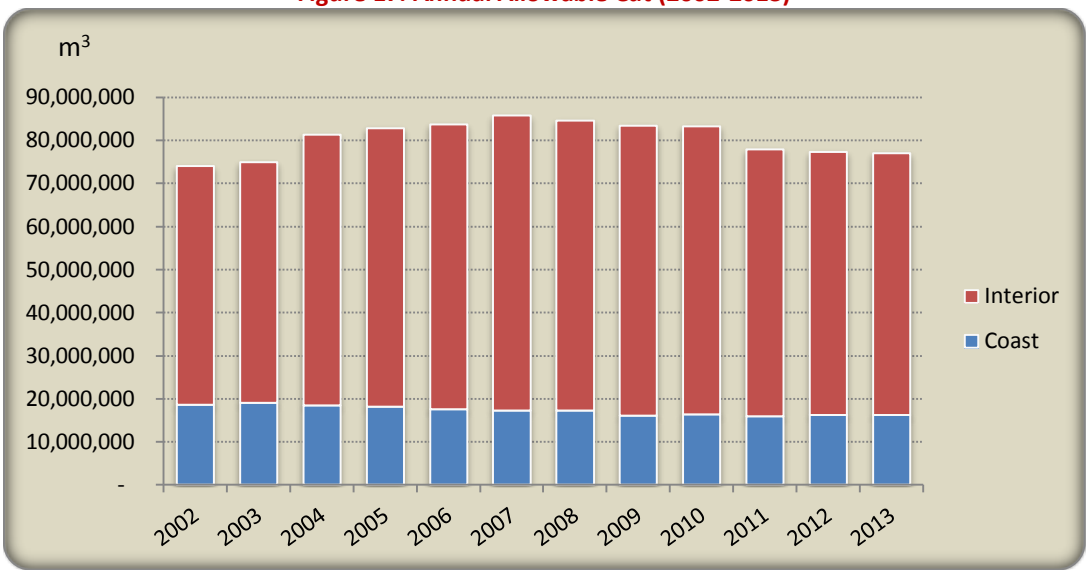
A major issue over the past decade has been the mountain pine beetle outbreak affecting lodgepole pine forests across much of the interior of the province. In many areas, most of the mature pine forests have been killed by the beetle outbreak. Trees killed by the pine beetle turn red and die, but can remain standing for many years. The wood from these beetle-killed trees can still be used in manufacturing operations, however, its usefulness declines over time.

In response to the outbreak, the AAC was increased in areas severely impacted by the mountain pine beetle to allow salvaging of the trees before they deteriorate. The provincial AAC increased by about 20% in BC's Interior region between 2004 and 2010, boosting the provincial allowance to more than 83 million cubic metres annually. Over the same period, the AAC for Coastal forests fell more than 10% and now stands at just over 16 million cubic metres annually.

The long term impacts of the pine beetle on timber supply include an eventual reduction in the provincial AAC, and the potential for a fibre shortage. This reduction in AAC will be almost exclusive to interior forests, with the coastal forests remaining largely unaffected. The precise timing of the

reduction in AAC depends partially on how long the beetle-killed timber remains salvageable, with estimates ranging from 5 to 20 years. Best estimates are that by 2025, the AAC will be reduced to between 60 and 65 million cubic metres/year and will continue at this level for several decades (BC Ministry of Forests, Lands & Natural Resource Operations).

Figure 17: Annual Allowable Cut (2002-2013)



Source: BC Ministry of Forests, Lands & Natural Resource Operations

3.6 Implications for Workforce Development

The protracted downturn in the BC forest sector raises important long term implications for the workforce. Overall employment has fallen significantly, with many workers having left the industry for opportunities in other sectors. The existing workforce has continued to age, while the hiring of new workers has been set back due a lack of economic and job opportunities. While replacing an ageing workforce may be the overriding priority, the prospects for moderate growth in the coming years and increased industry mechanization suggest a slightly expanded workforce characterized by higher levels of skill and knowledge.

Modifications to the AAC as planned by the BC Ministry of Forests, Lands & Natural Resource Operations will have a profound impact on future HR planning. This is of particular concern to Interior operators who will be directly impacted by a reduced AAC at some point over the next five to 10 years. It is difficult for industry to plan long term in this uncertain environment, and may result in more short term commitments to training and workforce development.

SECTION 4: FOREST INDUSTRY WORKFORCE PROFILE

This section of the report examines the forest industry workforce based on statistical data as provided through the Labour Force Survey (LFS), Annual Survey of Manufacturers & Loggers (ASML) and Census. The analysis encompasses the BC forest industry workforce, including workers directly employed (or self-employed) in forestry & logging, support activities for forestry, wood products manufacturing, and pulp & paper manufacturing. Historical employment trends and workforce demographics are examined between 2006 and 2012, as well as an analysis of worker productivity (i.e., output per worker) and a discussion of human resource and training challenges facing the industry. Where available, the analysis highlights workforce data by the Coast and Interior forest regions.

With the exception of support activities for forestry (NAICS 1153), the data used in this analysis is provided at the three-digit industry level as tabled below. While this is the generally accepted definition of the forest industry, the inclusion of certain sub-industries – manufacturers of other wood products (NAICS 3219) and converted paper products (NAICS 3222) – may serve to understate the actual relationship between "workers in the woods" (i.e., forestry, logging, support activity workers, and local truckers) and those in "primary manufacturing" facilities (i.e., sawmill, pulp & paper mill workers). Other wood products manufacturing facilities (e.g., millwork, doors and frames, mobile homes, prefabricated wood buildings) and converted paper products facilities (e.g., paperboard containers, paper bags, treated paper) are considered secondary or value-added manufacturers, distinct from primary manufacturing facilities. This distinction is especially important to employers and "workers in the woods", as the training and development needs of these workers has not traditionally received the same degree of attention among policy makers and training institutions as other forestry occupations.

"Forest Industry"

3-digit NAICS	4-digit NAICS
• Forest & Logging (113)	• Logging / Contract Logging (1133) • Timber Tracts (1131)
• Support Activities for Forestry & Agriculture (115)	• Support Activities for Forestry (1153)
• Wood Product Manufacturing (321)	• Sawmills & Wood Preservation (3211) • Veneer, Plywood & Engineered Wood (3212) • *Other Wood Products (3219)*
• Paper Manufacturing (322)	• Pulp, Paper & Paper Board Mills (3221) • *Converted Paper Products Manufacturers (3222)*

The following analysis does not include workers operating within the broader forest sector – that is, those *indirectly* employed as a result of non-wage spending by forest industry operators throughout the province (see Section 6.1).

4.1 Forest Industry Employment

The 2007-08 global economic downturn served to compound job losses in the industry that began in the earlier part of the decade. Increasing competition from low-cost international producers and outdated manufacturing and processing technologies contributed to the closure of several mill and plant operations throughout BC over the last decade. The forest industry has suffered significant job losses as

a result, with total employment falling from 80,100 workers in 2006 to 57,000 in 2012 – an overall decline of more than 23,000 jobs.

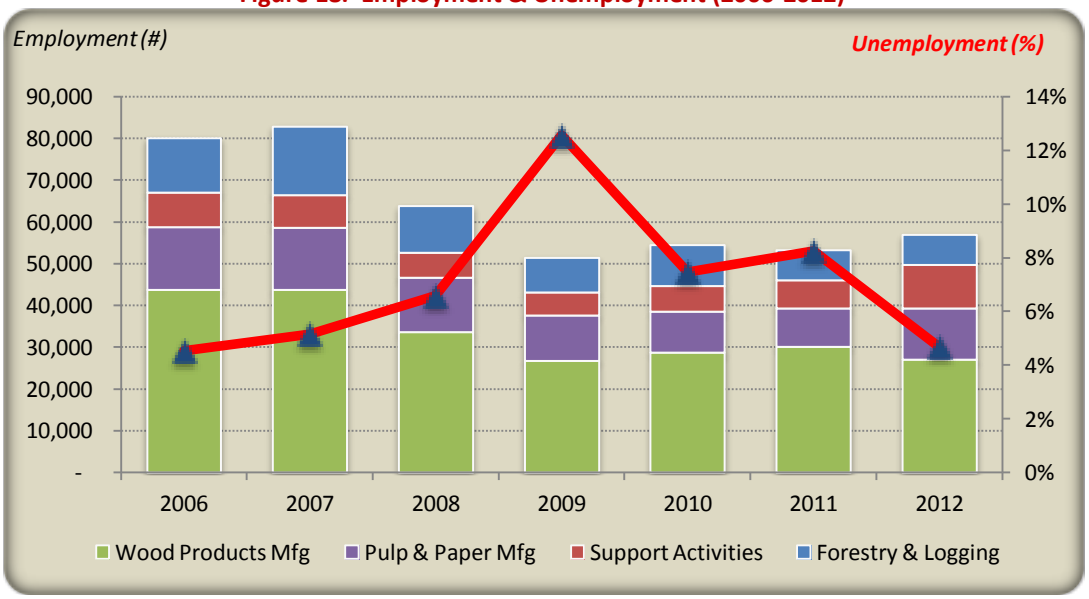
In 2012, wood products manufacturing accounted for the largest share of industry employment (47%), followed by pulp & paper manufacturing (22%), support activities for forestry (18%), and forestry & logging (13%). Based on this data aggregation, for every forestry and logging worker (i.e., those performing work in the woods), there are, on average, 2.2 workers employed in wood products and pulp & paper manufacturing (see Section 6.3 for further insight on this issue). Since 2006, support activities for forestry has been the only industry segment to experience positive employment growth within the forest industry – most of which occurred in 2012. Overall forest industry employment reached a low of 51,500 workers in 2009.

4.1.1 Employment & Unemployment

Despite the loss of jobs since 2006, unemployment remained relatively stable over this period, with the exception of 2009 when unemployment spiked to 13%. This suggests that many displaced workers, particularly those in wood product manufacturing, have been successful finding employment in other industries, such as mining, oil & gas, and other manufacturing, or have left the labour force voluntarily. In contrast, forestry & logging workers have faced higher levels of unemployment, as their skill sets are less transferable across other industries, and the work less regular than in manufacturing facilities.

Industry unemployment has fallen sharply since 2009, as employers began ramping up production to meet growing demand. With industry unemployment estimated at just below 5% in 2012, this would suggest that employers are facing a "tight" supply of labour to meet current requirments. Current unemployment among pulp & paper manufacturers is particularly low, with an estimated rate of just 1% in 2012. Without concerted efforts to expand the labour force in the near term, forest industry employers will continue to face a tight labour supply in the coming years and the possibility of rising wage costs in high demand occupations.

Figure 18: Employment & Unemployment (2006-2012)



Statistics Canada. Labour Force Survey (Custom tabulation)

4.1.2 Employment – Coast & Interior

Industry employment since 2006 has been generally higher in the Coast forest region than in the Interior, though in 2012 the industry employed about 28,500 workers in each region[3]. Employment by individual industry is fairly evenly distributed between the Coast and Interior regions, with the exception of pulp & paper manufacturing where employment is higher in coastal operations.

The majority of forest industry workers are employed in wood products manufacturing, with employment on average somewhat higher in the Interior region than the Coast. Close to 17,000 jobs were lost in wood products manufacturing between 2006 and 2012 – representing 74% of all forest industry jobs lost during this period. Forestry & logging workers were also hit hard, with employment falling 32% on the Coast and 59% in the Interior between 2006 and 2012. Workers in support activities for forestry fared better, with employment up 27% for both regions in 2012 particularly in the Interior region.

Figure 19: Forest Industry Employment – Coast 2006-12

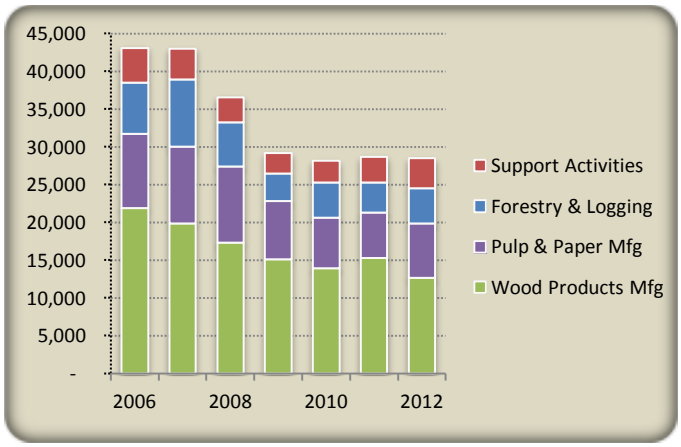
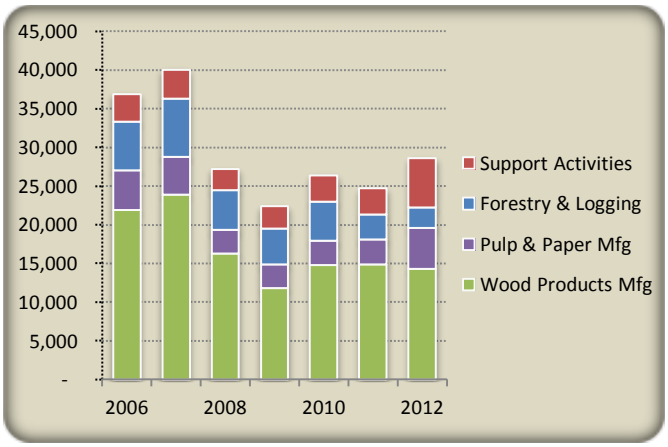


Figure 20: Forest Industry Employment – Interior 2006-12



Statistics Canada. Labour Force Survey (Custom tabulation); Coast region includes Nechako

4.2 Worker Productivity

Productivity improvements in the forest industry have been a central focus of operators over the last decade, as the industry attempts to remain competitive within the global economy. Significant investments have been made in technology and processing (Section 2.1.3), to improve output per worker and other productivity measures. In this analysis, labour productivity is measured by output per worker in forestry & logging (combined with support activities for forestry), wood products manufacturing and pulp & paper manufacturing. The results do not distinguish between those individuals working full-time or part-time throughout any given year.

[3] In this analysis, the Coast region includes Nechako development region.

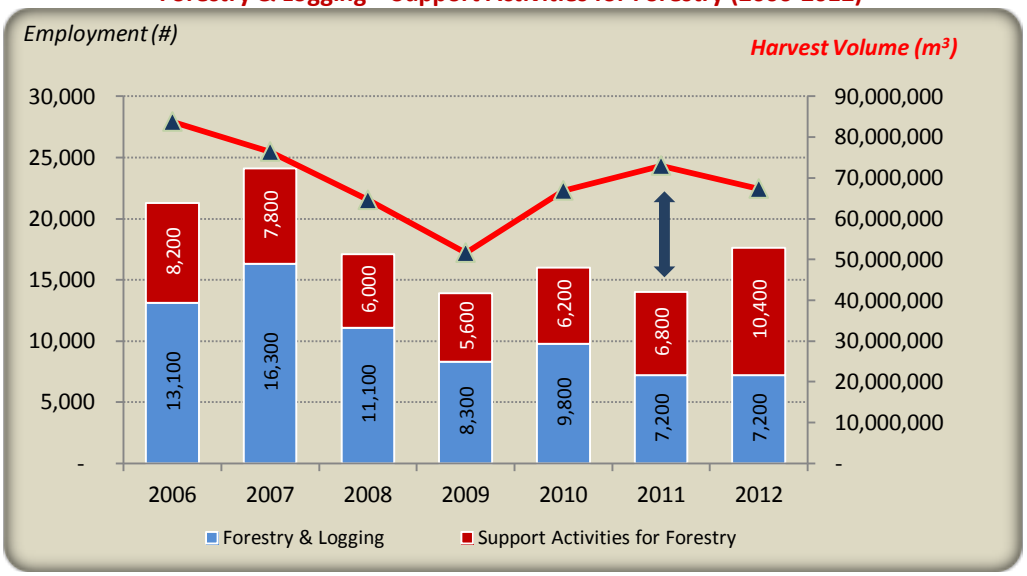
4.2.1 Harvest Volume – Forestry & Logging

Since the mid-2000s, employment in combined forestry & logging and support activities for forestry ranged from a high of 24,200 in 2007 to a low of 13,900 in 2009. In recent years employment has begun a modest rebound, reaching 17,700 workers in 2012. Most of this increase is attributed to rising employment in support activities for forestry over the past year.

The fall in employment between 2006 and 2009 was consistent with the decline in harvest volume during this period. Worker production, as measured by output (i.e., volume of timber harvested) per worker, averaged 3,649 cubic metres between 2006 and 2009, rising to an average of 4,407 cubic metres per worker over the last three years. Worker production was highest in 2011 when 73 million cubic metres of timber was harvested by a combined workforce of 14,000 workers.

While it is difficult to attribute a specific factor to improved productivity, increased mechanization in timber harvesting would have likely contributed to this outcome, particularly in the Interior where mechanized harvesting far exceeds that on the Coast. In addition, the existing forestry and logging workforce might have also found more regular, full-time work during this period, thereby enabling higher volumes of timber to be harvested. The apparent low productivity on the Coast may be a result of the transition into a second growth operating environment and the need for contractors to retain old-style equipment to deal with occasional old-growth harvesting requirements. This situation should improve as the benefits of increased mechanization become more available to coastal contractors.

Figure 21: Employment & Harvest Volume
Forestry & Logging + Support Activities for Forestry (2006-2012)



Source: Labour Force Survey & MFLNRO (Harvest Volumes)

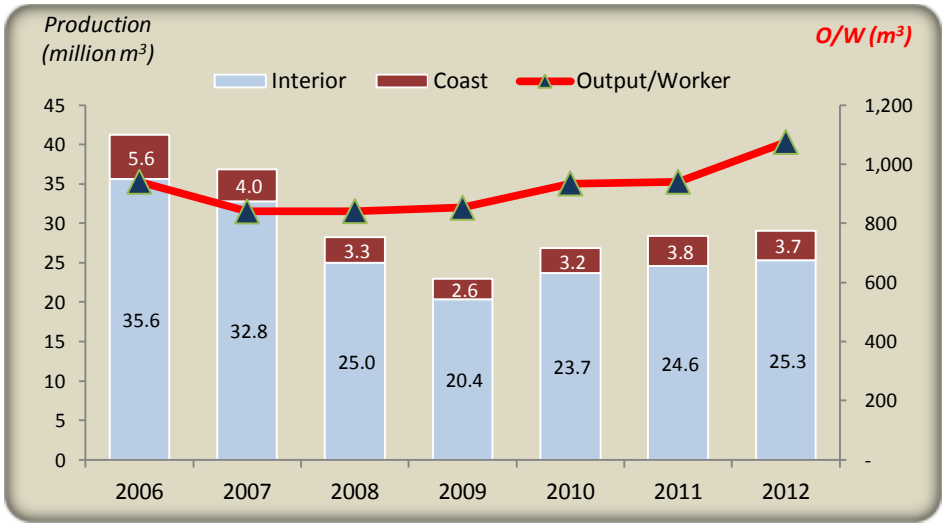
4.2.2 Lumber Production – Wood Products Manufacturing

Total lumber production in BC is dominated by Interior sawmills, where operators on average account for between 85% and 90% of provincial output. Lumber production in BC plummeted from 41.2 million cubic metres in 2006 to 22.9 million cubic metres in 2009 – a drop of 44%. Production has since

recovered to 29 million cubic metres in 2012, yet remains well below historical lumber production values.

Employment in wood products manufacturing followed a similar pattern over the same period, reaching a low of 23,000 workers in 2009. Output per worker over this period also fell from 941 cubic metres per worker in 2006 to 841 cubic metres in 2008, followed by a positive upward trend through 2012. As indicated previously (Section 3.1.2), manufacturers of wood products account for the largest share of the BC forest industry workforce, with employment roughly evenly distributed between Coast and Interior manufacturers. Figure 22, however, shows that lumber production in the Interior is multiple times higher than that of the Coast based on similarly-sized workforces. Although manufacturing operations, wood supply and other factors vary by forest region, it is difficult to explain the particular reasons contributing to such a wide variance in lumber production and worker productivity.

Figure 22: Lumber Production by Region & Output/Worker 2006-2012



Statistics Canada (Table 303-0064) Lumber production, shipments and stocks; LFS (Custom Tab)

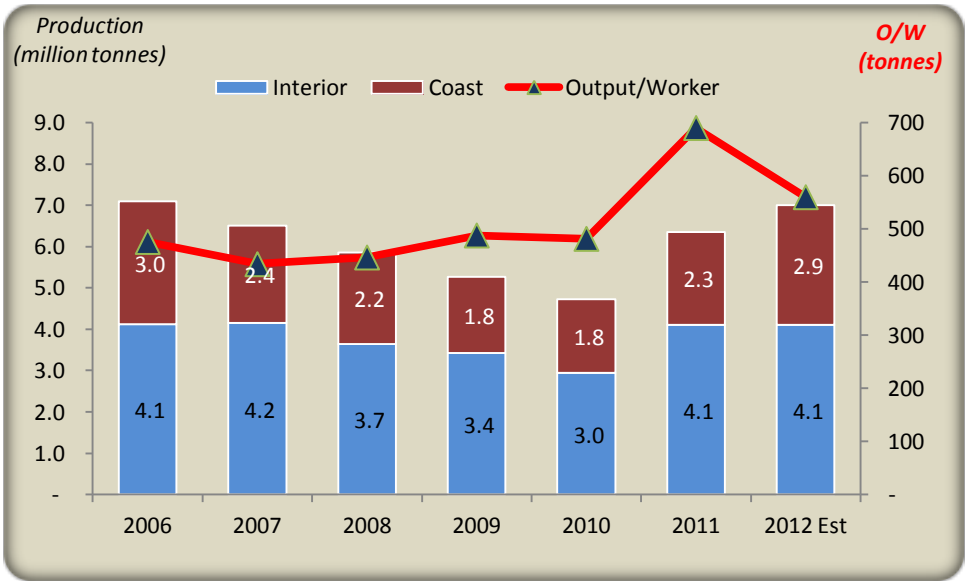
It should be noted that output per worker in lumber manufacturing facilities would increase considerably with the exclusion of workers employed by other wood product (secondary) manufacturers (NAICS 3219). Based on data provided through the Annual Survey of Manufacturers & Loggers, workers employed by manufacturers of other wood products represent, on average, 25% of the total wood products manufacturing workforce (NAICS 321). It would also reduce the ratio of mill workers to workers in the woods by a similar percentage.

4.2.3 Paper Production – Pulp & Paper Manufacturing

Pulp and paper manufacturers in BC (NAICS 322) have seen production drop from 7.1 million tonnes in 2006 to 4.8 million tonnes in 2010, followed by a sharp recovery beginning in 2011. On an annual basis, the Interior region accounts for more than 60% of pulp and paper production in BC. Total employment similarly declined from 14,900 workers in 2006 to 9,800 workers in 2010 – a drop of 34%. In 2012, total employment in pulp and paper manufacturing is estimated at 12,500 workers, including workers employed in converted paper products manufacturing facilities (NAICS 3222).

Output per worker has been increasing since 2007, averaging 511 tonnes between 2006 and 2012, then spiking to 690 tonnes in 2011. While the Coast region produces significantly less pulp and paper products than the Interior, Coast manufacturers account for, on average, more than two-thirds of all pulp and paper workers. This finding is similar to that regarding lumber producers, where Interior manufacturers produce the vast majority of lumber products yet employment is roughly evenly distributed between the Coast and Interior.

Figure 23: Pulp Production by Region & Output / Worker 2006-2012



Again it should be noted that the exclusion of workers employed by converted paper products manufacturers (NAICS 3222) would increase worker productivity in pulp and paper operations. On average, workers in converted paper products facilities represent fewer than 15% of the total pulp and paper workforce (NAICS 322). It would also reduce the ratio of mill workers to workers in the woods by a similar percentage (see Section 6.3).

4.3 Priority Occupations

The 26 priority occupations identified by the LMP Steering Committee are contained within 21 occupational codes at the four-digit National Occupational Classification (NOC) level. The total number of BC workers in these occupations in 2006 was 112,695, of which 24,380 (22%) were reported to be working in the forest industry (excluding workers in wood products manufacturing). The equivalent share of workers employed in each priority occupation in 2006 is therefore used to estimate baseline and projected employment through 2022 (Section 5.3). In cases where an NOC occupation encompasses more than one priority occupation (e.g., primary production manager, forestry & logging supervisor, chainsaw & skidder operator, logging & forestry labourer), their employment share of the NOC occupation is attributed based on their share as reported in the survey of employers and contractors (Section 5.3.1). The following section examines employment trends and demographic characteristics of each priority occupation as of 2006.

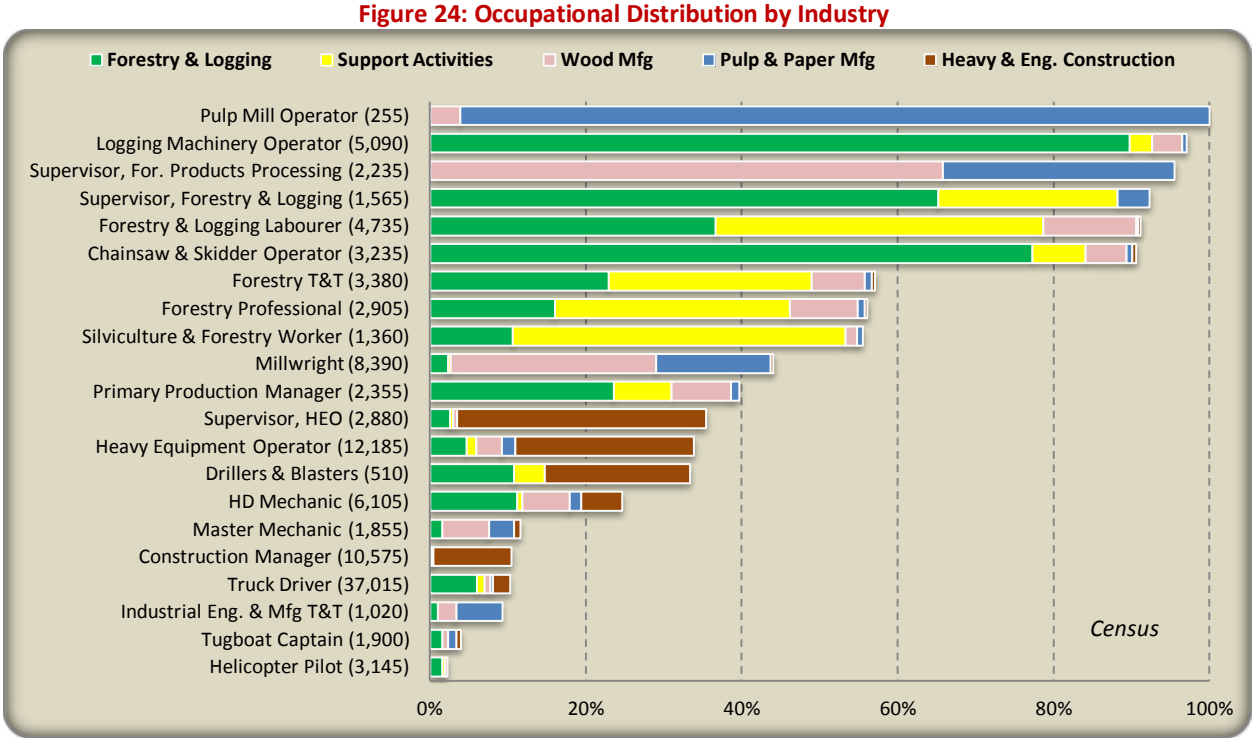
Table 4: Forest Industry Labour Force – Priority Occupations (2006)

NOC	Occupation	All BC (#)	BC Forest Industry (#)	%	Forestry & Logging (113)	Support Activities Agri. & Forestry (115)	Pulp & Paper Mfg (322)	% Priority Occupations
0811	Primary Production Manager (2)	2,355	756	32.1%	23.6%	7.4%	1.1%	3.1%
0711	Construction Manager	10,575	20	0.2%	0.1%	0.1%	0.0%	0.1%
2122	Forestry Professional	2,905	1,365	47.0%	16.0%	30.1%	0.9%	5.6%
2223	Forestry T & T	3,380	1,682	49.8%	22.9%	26.0%	0.9%	6.9%
2271	Helicopter Pilot	3,145	60	1.9%	1.6%	0.3%	0.0%	0.2%
2273	Tugboat Captain	1,900	52	2.7%	1.6%	0.0%	1.1%	0.2%
2233	Ind. Eng. and Mfg T & T	1,020	70	6.9%	1.0%	0.0%	5.9%	0.3%
7301	Master Mechanic	1,855	89	4.8%	1.6%	0.0%	3.2%	0.4%
7302	Supervisor, HEO	2,880	83	2.9%	2.6%	0.3%	0.0%	0.3%
7312	Heavy Duty Mechanic	6,105	819	13.4%	11.2%	0.7%	1.5%	3.4%
7311	Millwright	8,390	1,451	17.3%	2.3%	0.3%	14.7%	6.0%
7521	Heavy Equipment Operator	12,185	922	7.6%	4.7%	1.2%	1.7%	3.8%
7372	Drillers & Blasters	510	75	14.7%	10.8%	3.9%	0.0%	0.3%
7511	Truck Driver	37,015	2,690	7.3%	6.0%	1.0%	0.3%	11.0%
8211	Supervisor, Forestry & Logging (3)	1,565	1,381	88.2%	65.2%	23.0%	0.0%	5.7%
8421	Chainsaw & Skidder Operator (2)	3,235	2,747	84.9%	77.3%	6.8%	0.8%	11.3%
8616	Logging & Forestry Labourer (2)	4,735	3,732	78.8%	36.6%	42.0%	0.2%	15.3%
8241	Logging Machinery Operator	5,090	4,742	93.2%	89.8%	2.8%	0.6%	19.4%
8422	Silviculture & Forestry Worker	1,360	735	54.0%	10.7%	42.6%	0.7%	3.0%
9215	Supervisor, Forest Products Processing	2,235	666	29.8%	0.0%	0.0%	29.8%	2.7%
9432	Pulp Mill Operator	255	245	96.1%	0.0%	0.0%	96.1%	1.0%
Totals (% forest industry)		**112,695**	**24,380**	**21.6%**	**15,700 (14%)**	**5,870 (5%)**	**2,850 (3%)**	**100%**

4.3.1 Occupational Distribution by Industry

The forest industry directly employs a range of workers in priority occupations that also find employment in related (and competing) industries. Figure 24 illustrates the distribution of priority occupations across the forestry industry, as well as heavy and engineering construction to capture those workers employed by logging road builders (i.e., heavy equipment operators, HEO supervisors, drillers & blasters, construction managers). Occupations where more than 50% of workers operate in forest industries may be considered *unique* to the sector, whereas those with less than 50% may find employment in competing industries and sectors. Strategies to recruit and train new workers in unique occupations will necessarily differ from those occupations that cross industries and sectors.

Figure 24: Occupational Distribution by Industry

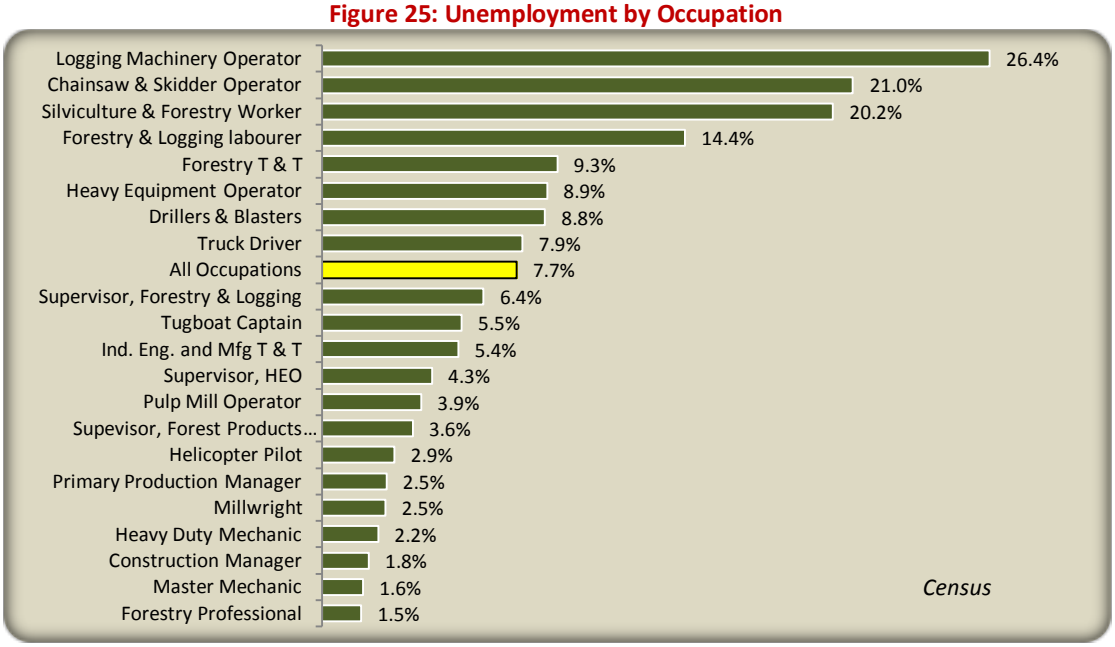


4.3.2 Occupational Unemployment

Unemployment in priority occupations was highest among logging machinery operators (26.4%) and lowest among forestry professionals (1.5%) in 2006. Occupations experiencing low levels of unemployment and chronic job vacancies can be an indication of a "tight" labour market, often caused by a mismatch between the demand for workers and the available skill sets in a particular location. Occupational unemployment in the forest industry below 4% might suggest an imbalanced labour market in particular locations.

Several occupations unique to the forest sector experienced high unemployment levels in 2006 (e.g., logging machinery operators, chainsaw operators, labourers), reflecting the state of the forest sector in the mid-2000s. Forestry professionals were an exception, which in part could be explained by a gradual decline of new entrants to this profession and high educational demands. Workers in occupations that cross industries (e.g., millwrights, mechanics) also experienced lower levels of unemployment in 2006, as demand for these skills is high across several industries.

Figure 25: Unemployment by Occupation

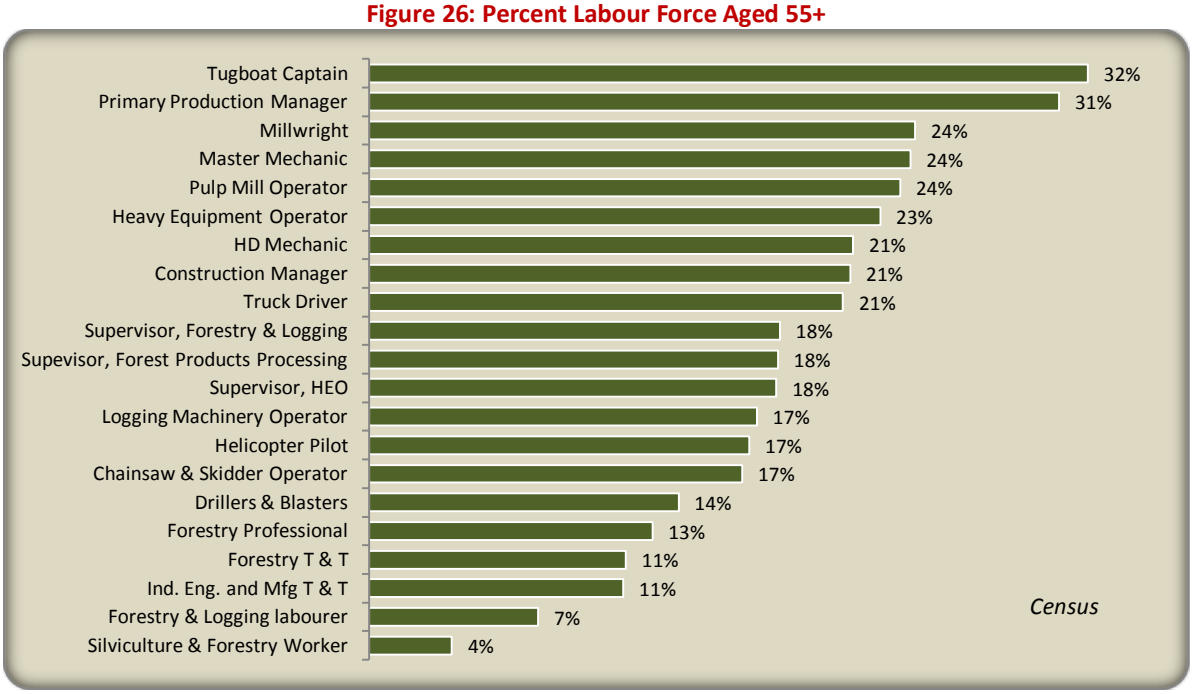


4.3.3 Occupational Labour Force Aged 55+

Even by 2006, the overriding challenge facing employers in BC's forest industry was replacing an ageing workforce in priority occupations. The economic decline of the industry over the last decade and more has contributed to hiring fewer younger workers, while many others have left the sector for work in competing industries. An ageing workforce is of particular concern in those occupations that require extensive training and education, which is both time consuming and costly. It is little surprise that skilled occupations containing a large percentage of older workers are often challenged by labour shortages, as evidenced by low unemployment (and high vacancy rates). For example, in 2006, 24% of millwrights were at least 55 years of age, and unemployment in this occupation stood at 2.5%.

In 2006, the percent of forestry workers aged 55+ was highest in forestry & logging and pulp & paper operations (both 19%). This contrasts with workers employed in wood products manufacturing and support activities for forestry, where the percent of workers aged 55+ was 16% and 12%, respectively. This would suggest that these two industry segments are more effective recruiting and maintaining a younger overall workforce. The percent of workers aged 55+ for all BC industries was 17% in 2006.

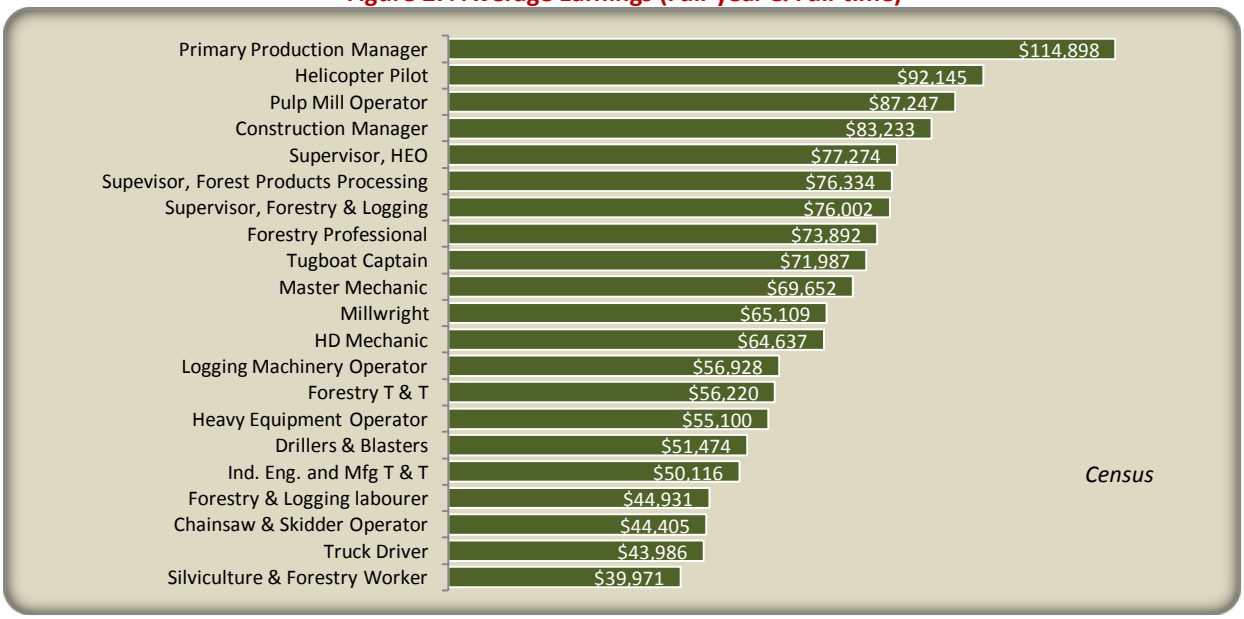
Figure 26: Percent Labour Force Aged 55+



4.3.4 Average Annual Earnings

The average income of workers in priority occupations was more than $66,000 in 2006, making forestry one of the higher paying industries in the province. However, competing industries such as mining and oil & gas provide their skilled workforce with better wage and benefit packages, helping to attract skilled workers to these sectors. As forest industry companies cannot compete with these sectors on wage packages, they must look at other incentives to attract workers, including work environment, life-work balance and stable employment opportunities.

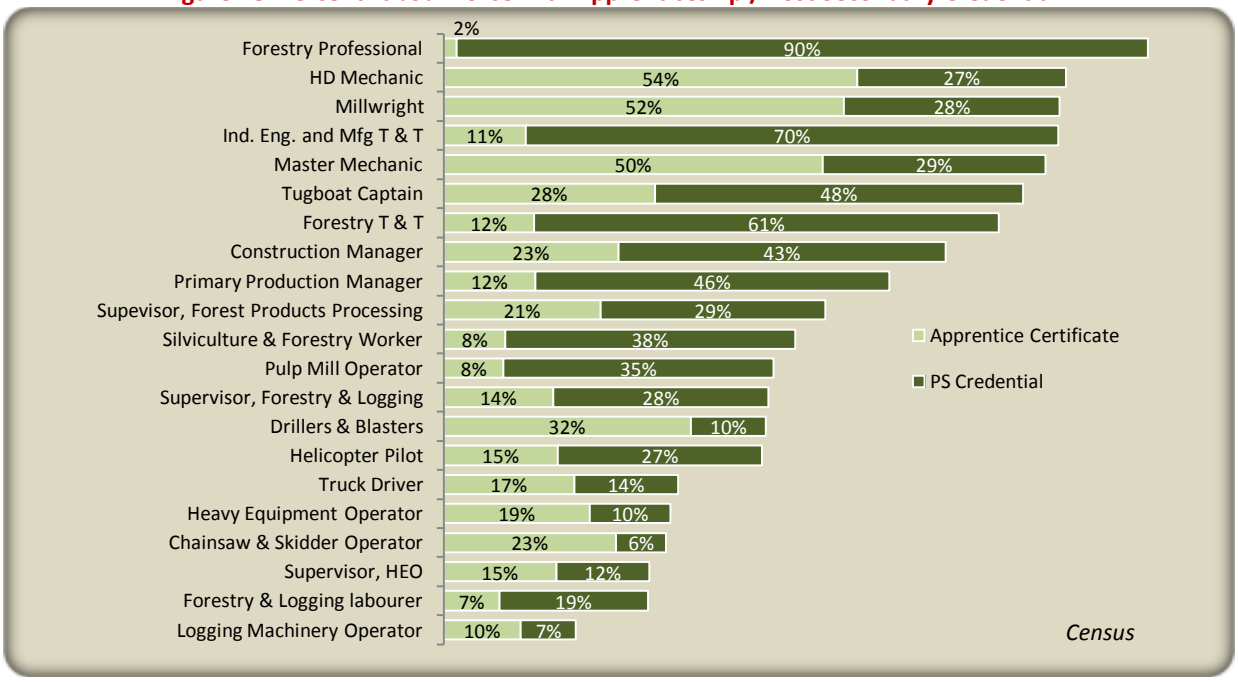
Figure 27: Average Earnings (Full-year & Full-time)



4.3.5 Education & Training

Priority occupations are generally characterized as higher skilled occupations that require some formal training and/or education to meet competency standards. Figure 28 shows the percentage of workers with an apprenticeship and/or post secondary education credential in 2006. Although formal training and certification is *not* a requirement for most priority occupations, it is evident that employers place a high level of importance on training and education. With the exception of forestry professionals which are *unique* to the forest sector, other occupations that require extensive formal training (such as mechanics, millwrights, technicians) are similarly in high demand in forestry, as well as competing industries. In priority occupations not supported by a formal public training program[4] (e.g., logging machinery operators), forestry and logging operators will remain challenged recruiting "suitable" workers capable of operating in a work environment that has become increasingly mechanized. Skills training similar to the heavy equipment operator program (as sponsored by the BC Road Builders & Heavy Construction Association) may serve as a model for the forest industry (see Section 3.5.1).

Figure 28: Percent Labour Force with Apprenticeship / Post Secondary Credential*



** Highest Level Certificate, Diploma or Degree*

[4] Note that Thompson Rivers University has developed a training program for logging machinery operators that is currently inactive (see Section 3.5.1).

4.4 Industry Workforce Challenges

British Columbia's forest sector has suffered dramatic job losses over the past decade and beyond, with the closure of many mills and operations having impacted the industry's ability to adequately recruit and retain workers to meet future requirements. Many workers who were previously employed in the forest industry have moved to other sectors, such as mining and oil & gas, where job and wage opportunities appear more attractive. With the forest industry experiencing a prolonged period of downsizing and restructuring, the existing workforce has aged leaving an insufficient supply of younger workers to replace experienced workers set to retire. And with BC's resource sector expected to further expand in the coming decade, competition for talent will continue to intensify from competing industries, exacerbating the challenge to attract skilled labour to the forest industry.

The following discussion frames many of the human resource issues and challenges facing employers and contractors as they attempt to replenish and rebuild the forest industry workforce. The information for this discussion comes from a variety of sources, including recent labour market partnership studies and industry reports pertaining to the BC forest sector (bibliography). Future strategies will attempt to address these issues within a framework of attracting, recruiting, retaining and training the future workforce. Most of these issues are the subject of further research through the primary survey of employers and contractors (section).

4.4.1 Aging Workforce

The forest industry has traditionally relied on an older workforce making it particularly vulnerable to the retirement wave. Retirement pressures are also expected to be strong in the broader forest sector that commonly employs forestry workers, such as government, education, and equipment supply companies. Potential labour shortages created by retirements will be exacerbated by weak labour supply caused by, amongst other things, competition for skilled workers from other industries and declining enrolment rates in post secondary forestry and related programs. In addition, as more journeypersons and mentors retire at an increasing rate, fewer will be available to support incoming apprentices and trainees. Labour demand in the sector over the next 10 years will be driven predominantly by retirements, with many forestry specific occupations experiencing higher than average retirement rates.

4.4.2 Skills Shortages

Despite anticipated weak supply, the forest industry is not expected to experience broad-based labour shortages in the future. However, forecasts using current data point to a widening labour market imbalance in select occupations in the coming decade. There are clear signs of shortages of highly trained workers requiring post secondary credentials, including professional, production management and skilled trade occupations. Labour pressure in these occupations will be driven by the large outflows of retirees rather than by the creation of new jobs.

Labour shortages in higher skilled occupations are likely to intensify as the forest sector continues to move towards increased product diversification (e.g., biomass), value-added manufacturing and mechanization in harvesting and manufacturing operations. In trade occupations that cross industry lines (e.g., millwrights, mechanics), forest sector employers will need to compete for new apprentices and journeypersons with companies in other resource industries. Occupations unique to manufacturing, such as pulp mill operators, already face extremely tight labour supply and are not supported by formal

training programming. Migrant workers from other jurisdictions will likely become increasingly important sources of labour to the industry.

4.4.3 Sources of Labour

Employers in the forest industry rely on various sources of labour, in addition to those trained and educated through public and private training institutions. Entry-level workers typically come from the local population, most of whom possess a secondary school certificate and gain experience on the job. As the youth cohort narrows within the broader population, many employers are finding it more difficult to recruit suitable entry-level workers out of high school, as many are choosing to work in other industries (and locations) following graduation. Overcoming negative public perceptions of the forest sector and attracting more workers from among underrepresented groups – including Aboriginals, immigrants and women – will be central to the development of a sustainable workforce.

Aboriginal Workers

Aboriginal representation in the forest industry workforce is higher than the provincial average, yet workers tend to be concentrated in lower-skilled, part-time and seasonal positions. They are less likely to be employed in management or professional occupations relative to non-Aboriginal employees. In terms of industry employment, forestry & logging operators generally employ the largest proportion of Aboriginal workers, while pulp and paper operators employ the smallest share.

With forest industry operations often located in more rural and remote regions of the province, Aboriginal communities are in a position to serve as an increasingly important source of labour to the industry. Apart from geographic factors, a number of other trends are contributing to the increasing importance of Aboriginal participation in the forest industry: the Aboriginal population is growing faster than the total population; the Aboriginal population is younger than the overall population; the rate of migration into urban centres is lower among the Aboriginal population than the non-Aboriginal rural population.

However, policies aimed at increasing Aboriginal workforce participation will only succeed if prospective workers have the right skills and education to do the job. Compared to the broader population, working age members of the Aboriginal population possess lower levels of educational attainment, including secondary school completion. Increased participation and completion of secondary and post secondary programming will be required to progress within a more technologically advanced forest industry. On a positive side, a higher proportion of Aboriginal workers (12.1%) had completed a trade program than non-Aboriginal workers (10.8%).

Youth Workers

The typical worker in the forest industry has completed some high school and works in a low-skill, entry-level occupation. Those who remain in the industry typically gain skills and experience on the job, and progress into more highly skilled occupations over time. Wood product manufacturers typically employ the largest share of younger workers (less than 25 years) in the forest industry, while the share of younger workers employed by forestry & logging and pulp operators is much smaller. Low barriers to entry make youth a natural source of labour for the forest industry, while the large number of part-time and seasonal jobs would seem attractive to younger workers out of high school.

As the number of available positions declined substantially over the last decade, few younger workers have either entered, or been retained in, the workforce. During labour downsizing, employees with the least seniority were often the first to be laid off, with many younger workers finding employment in other industries and locations. Given the industry's comparatively older workforce, employers are concerned that the relatively small proportion of younger workers is not be sufficient to replace retiring members of the workforce.

The industry is failing to attract young people and a number of factors are contributing to this trend. Outside forest-dependent communities, awareness about job opportunities in the forest industry among youth is limited. Secondary students in urban areas receive only indirect exposure to the forest industry through courses in science, outdoor education and woodworking classes. A national survey of high school students conducted by the Wood Manufacturing Council in 2006 showed that students have little knowledge or understanding of the industry and related career opportunities.

Migrant & Immigrant Workers

The large majority of the forest industry workforce is comprised of non-migrant workers from the local community. Among migrant workers, most come from other parts of BC while a smaller percentage is drawn from other parts of Canada and internationally. Within the forest industry, wood product manufacturers and forestry & logging operators employ the largest share of migrant workers, many of whom work in occupations that require higher levels of training and education. Pulp & paper manufacturers employ the fewest number of migrant workers, highlighting the importance of the local community as the primary source of labour to the forest industry.

Declining birth rates and an aging population would suggest that international migration will be the main driver of labour force growth in the coming years. However, recent immigrants tend to be attracted to and settle in large urban areas where there are more economic opportunities and well-established immigrant networks. While attracting more immigrants to the forest industry will be an essential strategy going forward, it is unlikely that recent immigrants will be a significant source of labour in the near term. The exception may be on the manufacturing side of the sector, where pre-established immigrant networks could be leveraged to help recruit recent immigrants.

4.4.4 Public Perceptions of the Forest Industry

Industry downsizing has had a negative impact on public perceptions of the industry, as potential recruits view the lack of employment stability as a reason to avoid work in the forest sector. The problem is compounded by the inability of post-secondary institutions to maintain enrolments in key forest related programs and by the failure of the industry itself to promote careers. Improved career pathways will help address these negative perceptions and facilitate the attraction and recruitment process for younger workers.

An industry's public image makes a strong impact on work and career decisions. The forest industry in recent years has been plagued with a negative image due to changing public values and structural shifts in the forest economy. Over the years, increased global awareness of environmental issues led to growing criticism of company practices in natural resource industries. The forest industry has often been portrayed as 'environmentally unfriendly', contributing to a noticeable shift in attitudes towards the industry and prospects for working in it. On top of this, the public has at various times been deluged

with negative economic news concerning trade disputes, mill closures and layoffs, contributing to the perception that forestry is a declining or "sunset" industry.

The seasonal or cyclical nature of the sector and a perceived lack of job stability also impacts career decisions. Within the sector, forestry and logging has the largest proportion of part-time, seasonal and contract employment throughout the resource sector. For many years, in an effort to improve efficiencies, licensees and forest tenure holders have slowly moved away from employer-employee relationships, while transferring most employer responsibilities to a contracted workforce. Today, logging contractors are dealing with a level of responsibility for planning, supervision and staffing not practiced in other industries, with several contractors insufficiently prepared to manage these tasks. And while higher than average wages may attract workers initially, the high degree of part-time and seasonal work may serve as a deterrent in the longer term.

4.5 Education & Training Challenge

Meeting future requirements in the industry is compounded by the fact that a number of occupations do not benefit from formal training programming (i.e., training gaps). With the exception of professional occupations (e.g., foresters, technologists, technicians) and apprenticeable trades (which serves the needs of multiple industries), the lack of sector-specific training forces employers to rely on in-house training and other sources of labour to meet workforce requirements. In part, larger operators (e.g., integrated forest companies) have responded by developing their own training development and upgrading programs, yet smaller forestry and logging companies are not normally in a position to offer such opportunities. Logging machinery operators highlight this challenge, as no public training programs are available for these operators[5], and private programs are often beyond the means of employers and trainees.

4.5.1 Program Inventory

Table 3 below provides an inventory of education and training programs in support of priority occupations in the BC forest industry[6]. The inventory includes related training programs (many of which are provided by the BC Forest Safety Council and private trainers) that largely support occupations that do not currently benefit from a formal public training program. Most workers in forestry occupations possess high school education, yet the preference among employers is for workers with higher levels of training and education. With the exception of regulated occupations (i.e., forestry professionals, technicians & technologists), most programs are *not* specific to forestry and cross multiple industries. Recent training developments targeting the needs of the forest industry include Thompson Rivers University's heavy equipment operator (forestry) and log truck driving program. This program was developed with industry stakeholders in an effort to help expand the supply of logging/harvesting machinery operators (the program is currently inactive). Individuals interested in heavy equipment operator training are obliged to register in related programs focused on heavy construction and road building (e.g., excavators, graders) or through an endorsement for logging machinery. Gaps in training will continue to impede the future development of a qualified forestry workforce.

[5] Thompson Rivers University developed a program for logging machinery operators (HEO-Forestry) that is currently inactive.
[6] Inventory does not include programs in support of wood products manufacturing.

Table 5: Inventory of Education & Training Programs

Occupation (NOC)	Education & Training (Preferred Qualification)	Training Providers	Forestry Specific (Yes/No)	Related Training / Certification
Manager, Forestry Operations (NOC 0811)	Degree (Forest Science, Engineering)	UBC, UNBC, TRU	Yes	
Forestry Professional (RPF) (NOC 2122)	Degree	UBC, UNBC, TRU	Yes	Registered Professional Forester (ABCFP [1])
Forestry Technologist & Technician (NOC 2223)	Diploma/Certificate (Forestry Technology)	BCIT, CNC, NVIT, VIU, Selkirk, SFU	Yes	Registered Forest Technologist (ABCFP [1])
Supervisor, Forestry (NOC 8211)	Diploma/Certificate (Forestry, Environmental, Resource, Geosciences)	BCIT, CNC, NVIT, VIU, Selkirk, SFU	No	Basic Forest Supervisor (BCFSC)
Forestry Worker (NOC 8422)	Certificate (Forestry Technician – NOC 2223) Contract Training (Reforestation / Forestry Boot Camp)	BCIT, CNC, NVIT, VIU, Selkirk, SFU COTR (Canada-BC LMA)	Yes	Basic Chainsaw, ATV, WHMIS, 1st Aid (BCFSC)
Construction Manager (NOC 0711)	Degree/Diploma (Engineering, Construction Technology)	UBC, SFU, UVIC, BCIT	No	
Supervisor, Heavy Equipment Operator (NOC 7217)	Trade Qualification (Industry Training Authority)	BC Colleges & Institutes	No	
Heavy Equipment Operator (NOC 7521)	Certificate of Qualification HEO (Logging Machinery Endorsement)[2] (Industry Training Authority)	CNC, VIU, NWCC, TRU, Private	No	BC Road Builders & Heavy Construction Association
Drillers & Blasters (NOC 7372)	Blaster's Certificate Drillers (see HEO)	Worksafe BC	No	
Manager, Logging Operations (NOC 0811)	Degree/Diploma (Forestry, Technology)	BC University, Colleges	No	
Supervisor, Logging (NOC 8211)	Diploma/Certificate (Forestry, Environmental, Resource, Geosciences)	BCIT, CNC, NVIT, VIU, Selkirk, SFU	No	Basic Forest Supervisor (BCFSC)
Supervisor, Falling (NOC 8211)	High School	-	-	Falling Supervisor (BCFSC)
Logging Machinery Operator (NOC 8241)	HEO – Forestry[3] (Industry Training Authority)	TRU (ILA) Private (O'Brien, CLAC)	Yes	
Hand Faller (NOC 8421)	High School	-	-	Faller Training (BCFSC)
Ground Worker (NOC 8421)	High School	-	-	Faller Training (BCFSC)
Logging Worker (NOC 8616)	High School Certificate (Woodland Harvesting)	- North Island College	- Yes	Safety Training (BCFSC) Western Forest Products (Worksafe BC)
Boom Man (NOC 8616)	High School	-	-	Safety Training (BCFSC)

Occupation (NOC)	Education & Training (Preferred Qualification)	Training Providers	Forestry Specific (Yes/No)	Related Training / Certification
Helicopter Pilot (NOC 2271)	License/Certificate (Aviation School)	Private	No	
Tugboat Captain (NOC 2273)	Deck Officer Certificate (Transport Canada)	BCIT	No	
Truck Driver (NOC 7411)	Logging Truck Driver Training (HEO) Forest Industry Readiness Skills Training (Log Truck, HEO)	TRU (ILA)[3], VIU Private (Taylor & CILA)	Yes Yes	
Master Mechanic (NOC 7216)	Trade Qualification (Apprenticeship)	BC Colleges & Institutes	No	
Heavy Duty Mechanic (NOC 7312)	Trade Qualification (Apprenticeship)	BC Colleges & Institutes (Public, Private)	No	
Industrial Engineering and Manufacturing Technologists & Technicians (NOC 2233)	Diploma/Certificate (Pulp & Paper Manufacturing)	BCIT, Camosun, Okanagan, NIC	No	Registered Professional Technologist (ASTTBC[4])
Supervisor, Forest Products Processing (NOC 9215)	Diploma/Certificate (Pulp & Paper Manufacturing)	BCIT, Camosun, Okanagan, NIC	No	Registered Professional Technologist (ASTTBC[4])
Pulp Mill Machine Operator (NOC 9432)	Diploma/Certificate (Pulp & Paper Manufacturing) Contract Training (Pulp Mill Orientation)	BCIT, Camosun, Okanagan, NIC COTR (Canada-BC LMA)	No Yes	
Maintenance Mechanic / Millwright (NOC 7311)	Trade Qualification (Apprenticeship)	BC Colleges & Institutes	No	

[1] Association of BC Forestry Professionals; [2] HEO endorsements in logging machinery operations can be facilitated through ITA; [3] HEO forestry and logging truck driver training currently inactive (TRU); [4] Applied Science Technologists & Technicians BC

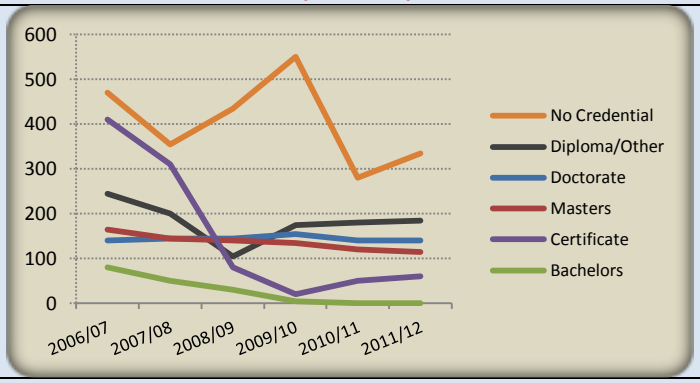
4.5.2 Training Outcomes

Post secondary education programs in support of forestry have felt the impact of an industry in transition. Enrolment in forestry schools and colleges has declined dramatically over the last several years, resulting in the deactivation of forestry related programs and a weakened supply of graduates for the sector. Although deactivation may not mean permanent termination, once teaching staff are dispersed the effect can take years to re-establish programming. These conditions are symptomatic of an overall weakness in labour supply impacting all levels of forestry employment.

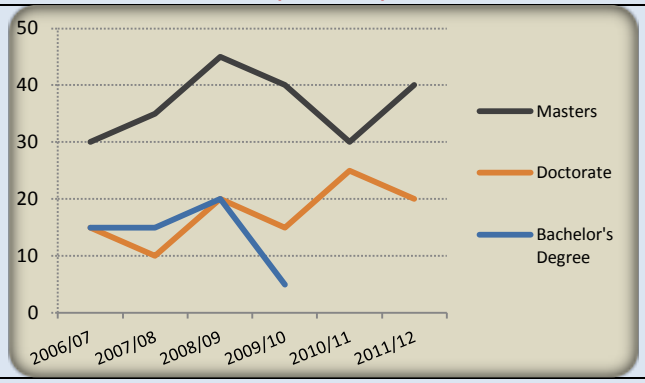
Illustrated below are the outcomes of various education and training programs in support of occupations in the forest industry. The data is organized according to the Classification of Instructional Programs (CIP) based on major field of study at the national and provincial level. CIP is a taxonomic structure that supports the tracking and reporting of fields of study (programs and courses) and completion activity (i.e., credentials). Data for the following fields of study was provided by the BC Ministry of Advanced Education.

CIP	Description (Post Secondary)	CIP	Description (Apprenticeship/Trades)
03.0501	Forestry, General Programming	47.0302	Heavy Equipment Maintenance Technology/Technician (e.g., HD Mechanic)
03.0506	Forest Resources Management	47.0303	Industrial Mechanics and Maintenance Technology (e.g., Millwright)
03.0510	Forest Resources Production/Management	49.0202	Construction/Heavy Equipment/Earthmoving Operation (e.g., HEO)
03.0511	Forest Technology/Technician	49.0205	Truck / Bus Driver/Commercial Vehicle Operator

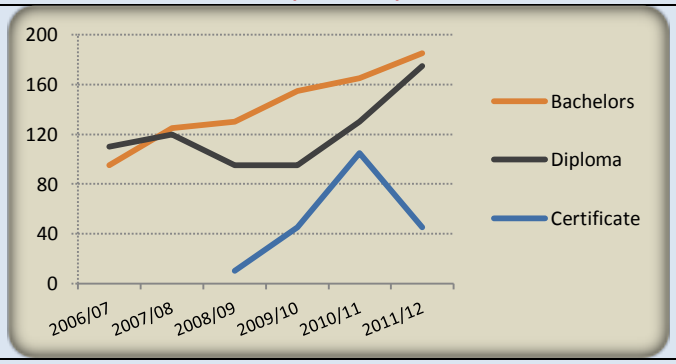
Headcount – Forestry, General Programming
2006/07 - 2011/12



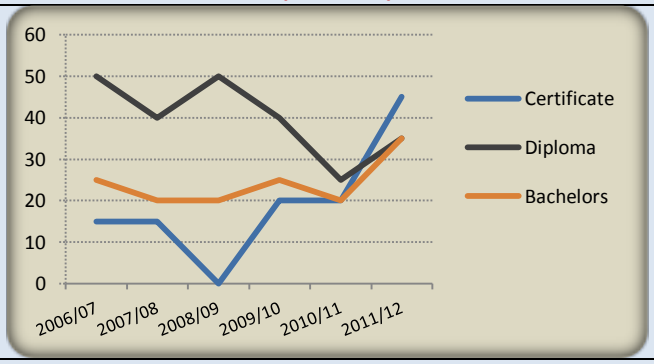
Credential – Forestry, General Programming
2006/07 - 2011/12



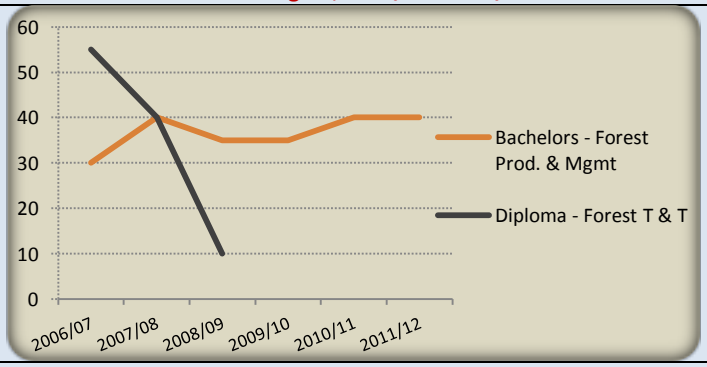
Headcount – Forest Resource Management
2006/07 - 2011/12



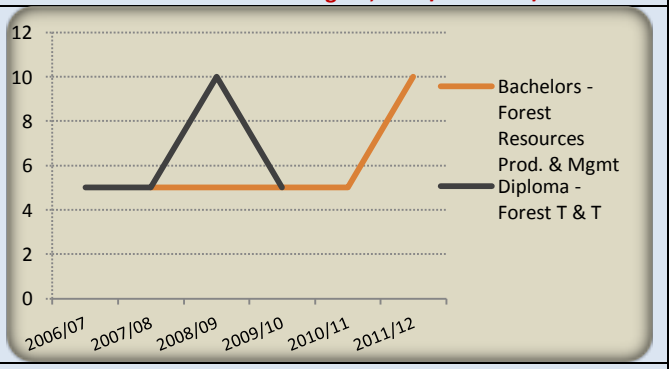
Credential – Forest Resource Management
2006/07 - 2011/12



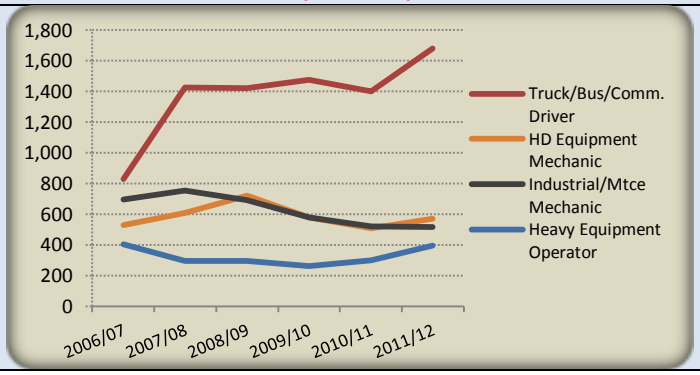
Headcount – Forest Production & Management + Forest Technicians & Technologists, 2006/07 - 2011/12



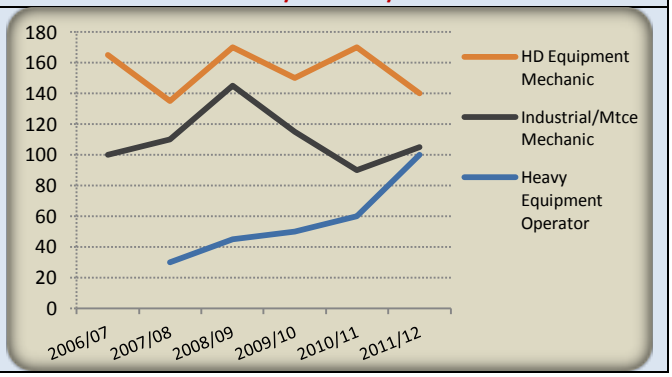
Credential – Forest Production & Management + Forest Technicians & Technologists, 2006/07 - 2011/12



Headcount – Select Trades
2006/07 - 2011/12



Credential – Select Trades
2006/07 - 2011/12



4.5.3 Summary Results

- With the exception of post graduate programming (masters, doctorates), enrolment in general forestry programs (e.g., professional foresters) has trended downwards since 2006-07, a trend that began several years earlier. Of particular importance, enrolment in bachelors programs actually dropped to zero in 2009/10, where it has remained over the last two years.

- Similarly, the number of graduates from bachelor programs has also been in decline over this period, while graduates from master and doctorate programs have remained steady. While this outcome appears paradoxical, post graduate students come from a variety of undergraduate programs, illustrating a shift towards more environmental based forestry programming (e.g., forest resource management).

- In contrast to forestry programming, enrolments in forest resource management have been increasing in recent years at the diploma and bachelors level. In terms of graduate outcomes, the number of credentials awarded has also shown resiliency at all program levels, including the certificate level. Again this would appear to reinforce a shift in academic programming away from general forestry programs and towards resource management.

- Since 2009/10, there have been no reported enrolments or graduates in forest technician and technologist programs in BC. These workers are essential to forestry operations as they frequently perform a range of regulatory functions under provincial legislation. Although the number of technicians and technologists employed in the industry is relatively small, labour shortages have already been identified for this occupation.

- With the exception of truck, bus and commercial drivers, enrolments in select trades training programs have been generally depressed since 2006/07. However, in recent years, both enrolments and number of completers have begun showing positive increases, particularly among heavy equipment operators, as well as drivers.

4.6 Innovations in Training & Program Delivery

Worker training, education and certification are important development strategies for the provincial forest industry. In particular, apprenticeship and industry training contribute not only to skills and knowledge development, but also improved quality of work, occupational health and safety performance, and recruitment and retention.

In April 2012, the Forest Products Sector Council released *Linking Innovation with Skills* to inform strategies to enhance and expand apprenticeship training and programming in support of forestry occupations. The report was based on research undertaken on apprenticeship, regulated occupations and certification across Canada, and included the identification of innovative training developments with possible application to the broader forest sector. Related research into Aboriginal training and

development initiatives currently ongoing will also inform future worker recruitment strategies for the forest sector[7].

4.6.1 Regional / Group Apprenticeship Training

The regional or group apprenticeship (RGA) model helps smaller firms in particular alleviate these concerns while implementing apprenticeship programs. Essentially, the model pools risk and training resources among a number of firms. Programs are customized to meet the specific needs of stakeholders—companies, labour organizations, educational institutions and others.

Typically an RGA organization sponsors apprentices on behalf of a group of employers. The apprentices are placed with member employers for the work portion of their training. Apprentices are also given the opportunity to rotate between different employers helping to expose workers to more learning experiences.

Host companies pay the wages and provide on-the-job work experience, but are spared most of the human-resource administration duties that are often a barrier to investment in apprenticeships. In the event of a downturn, host companies return apprentices to the RGA organization. Apprentices who do not work out for host employers can be handed back within a two or three week introductory period. The result is a more flexible and demand-led approach to apprentice employment, and a reduction in the risk to both employers and workers.

The RGA model could be adapted to Canada's forest sector to address some persistent challenges, specifically the costs, time, administrative burdens and long-term commitment that tend to discourage smaller firms from participating in apprenticeship training.

4.6.2 Mobile Apprenticeship Training Labs

Due to the remote locations of many employers in the forest sector, apprentices must often travel long distances and live in unfamiliar surroundings to complete their in-class training. Employees are uprooted from family and friends, and employers must often cover costs of travel and accommodation.

One solution is the use of mobile training labs to bring classrooms to remote communities traditionally beyond the reach of post-secondary institutions. In 2006, the Saskatchewan Institute of Applied Science and Technology launched a mobile training lab. Each lab is a tractor trailer unit that transforms into a 1,100 square-foot training facility with room for 12 students. The labs remain in a given location for the seven to 20 weeks required for training in such trades as industrial mechanics.

Aside from the cost savings to employers, the mobile units may help diminish the personal challenges students face while away from home, thereby increasing their likelihood of completing apprenticeship training. The close proximity of classroom training to home communities may be particularly appealing to women and Aboriginal people—both important sources of potential new recruits and both are currently underrepresented in the forest sector.

[7] Michael Izen & Associates.

4.6.3 Alberta Aboriginal Apprenticeship Project (AAAP)

The forest sector will increasingly need to seek out (as yet) untapped sources of labour to meet increasing demand in the future. The Alberta Aboriginal Apprenticeship Project (AAAP) may be one mechanism through which the sector can more fully engage a labour source of growing importance – Canada's Aboriginal peoples.

The AAAP's mandate is to help ensure Aboriginal people reach their full potential and become key players not only in Canada's skilled workforce, but also its economic development. The project supports community-based employment activities designed to help Aboriginal people become and find work as apprentices. AAAP candidates are identified by special committees made up of community members who are knowledgeable about the trades, Aboriginal culture and the challenges faced in completing apprenticeships. Qualified candidates are made available to employers for interviews, while committee members and project officers support the apprentices and employers to help overcome barriers.

The AAAP has been a great success, increasing the number of Aboriginal tradespeople and awareness among employers and Aboriginal groups about mutually beneficial opportunities in apprenticeship. A mechanism such as the AAAP would help establish good relations between forest sector employers and Aboriginal groups, while providing a support infrastructure to ensure all participants benefit from apprenticeships.

4.6.4 Worksite Essential-Skills Training in the Steel Industry

The Canadian Steel Trade and Employment Congress (CSTEC) recognized a shortage of candidates with the essential skills needed for apprenticeship training in the steel producing sector. In response, CSTEC teamed with the steel and mining firm Evraz, the Saskatchewan Institute of Applied Science and Technology (SIAST), the United Steelworkers of Canada and federal and provincial agencies to develop and implement an essential-skills improvement pilot program. The program aims to identify essential skills gaps and address them through classroom training.

Participating employees have enhanced their essential skills and improved their opportunities for further training and career development. Of interest, employees with increased essential skill levels report that they are more confident about their ability to perform their work. This may underscore expectations at Evraz that the company will experience increased productivity and improved occupational health and safety results as a result of the program.

The CSTEC model could be adapted to the forest sector. To do so, strong strategic partnerships would need to be formed among companies, educators, labour and government to ensure the training is both of high quality and relevant to the workplace.

4.6.5 Online Education & Training – Learn Now BC

Learn Now BC is a public education website that provides educational resources and curricula in support of the province's K-12 education system. The LearnNowBC.ca web portal is a single point of entry to information about distributed learning in British Columbia for students, parents and educators. Distributed Learning is a method of instruction that relies primarily on indirect communication between students and teachers, delivered over the internet and other electronic-based technologies, including

teleconferencing and correspondence.

Learn Now BC offers students the opportunity to combine traditional classrooms, textbooks and after-school study sessions with video lessons (modules) organized over the internet, with support from live online tutors and access to virtual libraries. Through collaborative arrangements between the Ministry of Education, service providers and provincial school districts, *Learn Now BC* provides a broad range of flexible educational programs and services to BC students.

Learn Now BC enables students to participate in formal education on a self-paced schedule and is accessible from any location. It particularly benefits individuals unable to attend a *bricks-and-mortar* institution, including those located in rural or remote locations, and members of the workforce needing to upgrade their education for career development purposes. The distributed learning model has proven successful with over 100,000 students already having completed courses through the *Learn Now BC* service. It is a model that could be duplicated or expanded to include post secondary education and training programming, including foundation training, industry training and formal education programming in support of individuals, workers and industry.

4.6.6 New Training Facilities – Old Mills

Old sawmills are gaining new life as training facilities to address skills shortages in the forest industry. In Prince George, Canfor is planning to convert its mothballed Rustad sawmill into a $10-million training centre for skilled workers, and in High Prairie, Alberta Tolko Industries has partnered with Northern Lakes College and the Alberta government in a $5.3-million program investment to train future trades workers. These facilities provide ideal sites for training new students and/or upgrading the skills of existing workers, while saving capital investment costs associated with the construction of new training facilities.

SECTION 5: REVIEW OF LABOUR MARKET FORECASTS

Labour market forecasts are prepared regularly by sector councils, industry partnerships, governments, and other organizations at the provincial and national level. In this section of the report, existing labour market information from a variety of sources is summarized to provide an overview of current labour market research and forecast information on BC's forest industry. A large part of the information is taken from recent labour market partnership reports prepared by R.A. Malatest & Associates Ltd. and LMI Insight on behalf of BC's resource sector. In some cases, forecast information and results have been updated by the Consultant to reflect current conditions.

Over the last decade BC's forest sector suffered dramatic job losses, with the closure of many mills having a serious impact on small, single-industry towns throughout the province. As a result, many workers previously employed in the forestry sector have moved to other industries, such as mining, oil & gas, and construction. While a return to previous employment levels is not expected in the near future, neither are significant further declines, with most predictions being for steady or marginally higher industry and employment growth over the next decade. The forestry sector has an aging workforce, with roughly half the workers being over 45 years of age, meaning that a significant number of replacement workers will be required just to account for attrition within the industry.

5.1 Renewing Canada's Greenest Workforce (2011)

The Forest Products Sector Council (FPSC) and the Conference Board of Canada (CBoC) produced a labour market intelligence report, *Renewing Canada's Greenest Workforce (2011)* which includes projected employment in the forest industry from 2009 through 2020. In the accompanying chart (Figure 30), these projections are presented for four scenarios based on varying assumptions related to the strength of the industry. Projections are available nationally and regionally, with the relevant region consisting of the province of BC. Taking into account workforce attrition (14,000 workers through 2020), the report predicts between 9,000 and 32,000 total job openings (growth + attrition) in the BC forestry sector through 2020.

Some of the occupations predicted to be in demand over the coming decade include:

- Process operators — including those working in sawmills and pulp/paper mills
- Harvesting and logging machinery operators
- Professional foresters and engineers
- Technologists and technicians
- Silviculture and forestry workers
- Supervisors and managers
- Skilled trades including millwrights, heavy duty mechanics, sawfilers and industrial electricians.

The four scenarios contained in the FPSC report range from:

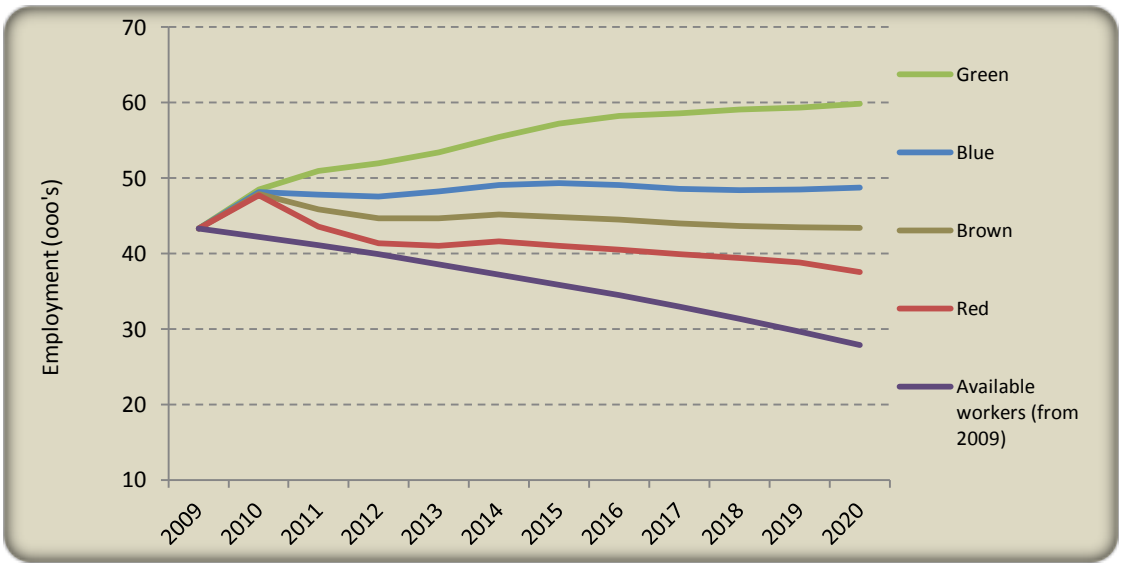
1. *Red* – pessimistic, worst case scenario, assuming little recovery in the U.S. economy;
2. *Brown* – mild recovery in U.S. housing starts and a much slower pace of economic recovery;
3. *Blue* – solid recovery in U.S. housing starts and a moderate expansion in export markets;

4. *Green* – most optimistic, assuming rapid U.S. economic growth accompanied by expanded markets and productivity.

Given the consensus economic forecasts, the brown and the blue projections were considered to be somewhat more likely, while the red and green projections provide respective bottom and top ranges to the forecast.

Figure 30 summarizes the total projected employment for all occupations across the entire BC forest industry for the four scenarios. The report cautions that the projected employment is very different for the Coast versus the Interior regions of the province, due to the impact of the mountain pine beetle on wood supply in the interior; however, results are not presented separately for these two regions.

Figure 29: Workforce Projections (2009 - 2020) – BC Forest Sector



5.2 Northern BC Resource Sector LMP (2012)

In summer 2011, the Northern BC Resource Sector Human Resources Committee contracted this consultant (LMI Insight and R.A. Malatest & Associates) to forecast workforce requirements for the Northern BC resource sector through 2020. The sector is expected to experience a period of significant expansion over the next 10 years and beyond, driven largely by new investment in mining and oil & gas, and supported by a number of major projects in energy, pipeline and infrastructure development. Forest industry growth is expected to significantly lag other industries within the BC resource sector over the forecast period.

The report examined the *demand* side of the labour market equation across four industries – forestry, mining, oil & gas, and construction (industrial/engineering) – within the Northern BC resource sector. This sector encompasses four provincial development regions, including Cariboo, North Coast, Nechako, and Northeast. Industry employment and replacement projections for each region were developed based on COPS BC Unique Scenario (2007-2017) and extrapolated through 2020. Projected growth and

attrition rates reflect the state of the BC forest industry in 2007. Baseline employment estimates (2010) by region were developed using Labour Force Survey data provided by BC Stats.

Note: For purposes of the BC Coastal Forestry LMP study, the Consultant has expanded the forecast analysis to include all BC, with the forest industry workforce examined by relevant industry and forest region (Coast & Interior). The Coast forest region includes Vancouver Island/Coast, Mainland/SW and North Coast, while the Interior includes Nechako, Northeast, Cariboo, Kootenay and Thompson/Okanagan.

Forecast Highlights – Industry Employment

- Based on this forecast, the BC forest sector workforce is projected to grow by 1% between 2010 and 2020, adding a total of 548 new jobs (55/year) over this 10-year horizon.
- Given the sector's age profile, the overriding challenge for employers will be replacing more than 12,000 workers eligible for retirement (or other attrition) during this period. Replacements account for 96% to total job openings through 2020.
- Employment growth in other resource industries is projected to be significantly higher than in forestry, resulting in increased competition for skilled labour throughout the resource sector.

Table 6: Projected Employment & Total Job Openings (2010-2020) / British Columbia

BC	Employment Projections			% Inc (2010-20)	Job Openings (2020)		
	2010 (Baseline)	2015	2020		Growth	Replacement	Total
F & L and Support	16,100	16,181	16,262	1%	162	3,562	3,723
Wood Products Mfg	28,700	28,844	28,988	1%	288	6,349	6,637
Pulp & Paper Mfg	9,790	9,839	9,888	1%	98	2,166	2,264
Forestry Subtotal	**54,590**	**54,863**	**55,138**	**1%**	**548 (4%)**	**12,076 (96%)**	**12,624 (100%)**
Oil & Gas	2,800	3,294	3,874	38%	1,074	740	1,814
Mining	11,500	13,658	16,222	41%	4,722	3,072	7,794
Services to Mining	8,300	9,763	11,484	38%	3,184	2,192	5,376
Utilities	14,000	16,468	19,370	38%	5,370	3,698	9,068
Ind. & Eng. Construction	31,052	31,363	31,678	2%	627	6,593	7,220
Totals	**122,242**	**129,409**	**137,766**	**13%**	**15,525**	**28,685**	**44,210**

Source: Labour Force Survey (BC Stats); COPS BC Unique Scenario (2007-2017)

In 2010, the BC forest industry workforce was somewhat larger in the Interior than on the Coast, with Coast employment estimated at more than 25,000 workers and Interior employment estimated at 29,500 workers. Coast operators employed more workers in pulp & paper manufacturing, while Interior operators employed more workers in forestry & logging and wood products manufacturing. On average, Coast operators should expect to fill 580 job openings each year between 2010 and 2020, while Interior operators should expect to fill 680 openings each year over the same period.

Table 7: Projected Employment & Total Job Openings (2010-2020) / Coast

Coast BC	Employment Projections			% Inc (2010-20)	Job Openings (2020)		
	2010 (Baseline)	2015	2020		Growth	Replacement	Total
F & L and Support	6,473	6,505	6,538	1%	65	1,432	1,497
Wood Products Mfg	11,707	11,766	11,825	1%	118	2,590	2,707
Paper Products Mfg	6,859	6,893	6,928	1%	69	1,517	1,586
Forestry Subtotal	**25,039**	**25,164**	**25,290**	**1%**	**252**	**5,539**	**5,790**
Oil & Gas	1,000	1,176	1,384	38%	384	336	720
Mining	3,211	3,813	4,529	41%	1,318	1,169	2,488
Services to Mining	2,033	2,391	2,813	38%	780	635	1,414
Utilities	10,609	12,479	14,678	38%	4,069	4,076	8,146
Ind. & Eng. Construction	23,678	23,916	24,156	2%	478	5,027	5,505
Totals	**65,569**	**68,940**	**72,850**	**11%**	**7,280**	**15,267**	**22,547**

Source: Labour Force Survey; COPS BC Unique Scenario (2007-2017)

Table 8: Projected Employment & Total Job Openings (2010-2020) / Interior

Interior BC	Employment Projections			% Inc (2010-20)	Job Openings (2020)		
	2010 (Baseline)	2015	2020		Growth	Replacement	Total
F & L and Support	9,627	9,676	9,724	1%	97	2,130	2,226
Wood Products Mfg	16,993	17,078	17,163	1%	171	3,759	3,930
Paper Products Mfg	2,931	2,946	2,961	1%	29	648	678
Forestry Subtotal	**29,551**	**29,700**	**29,848**	**1%**	**297**	**6,537**	**6,834**
Oil & Gas	1,800	2,117	2,490	38%	690	475	1,166
Mining	8,289	9,845	11,693	41%	3,404	2,214	5,618
Services to Mining	6,267	7,372	8,671	38%	2,404	1,655	4,059
Utilities	3,391	3,989	4,692	38%	1,301	896	2,196
Ind. & Eng. Construction	7,373	7,447	7,522	2%	149	1,565	1,714
Totals	**56,672**	**60,470**	**64,916**	**15%**	**8,244**	**13,418**	**21,663**

Source: Labour Force Survey; Census; COPS BC Unique Scenario 2007-2017

Northern BC industry stakeholders identified high demand occupations where skills shortages were anticipated to be particularly evident over the next decade. Most occupations fall within four major occupational categories: Natural & Applied Science; Trades, Transport & Equipment; Occupations Unique to Primary Industry; and Occupations Unique to Processing, Manufacturing & Utilities. Demand-supply forecasts and skills gaps were developed for each occupation through 2020 using supply and demand growth data provided through the BC Labour Market Scenario Model.

Note: For purposes of the BC Coastal Forestry LMP, this occupational forecast has been modified to include only those occupations relevant to the forest industry (15). The analysis is made available for all BC at the three-digit NOC level. As such, demand and supply forecast data is much higher than would otherwise be the case for forestry-specific occupations at the 4-digit NOC level.

Forecast Highlights – Occupational Employment

- Skills gaps are expected to emerge in *all* 15 occupations in the middle part of the decade, increasing each year beginning in 2016.
- Over the 10-year horizon, total occupational demand is expected to increase by 12%, and supply by 9%, resulting in a projected labour shortage.
- More than 67,000 job openings are projected over the 10-year horizon – 72% due to attrition and 28% due to job growth (expansion).

Table 9: Projected Occupational Skills Gaps & Total Job Openings (2010-2020)
BC Demand-Supply Outlook

NOC Occupation	Outlook	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total Openings 2010-20	
081 Managers in primary production (except agri.)	Demand	2,191	2,271	2,343	2,396	2,446	2,471	2,482	2,492	2,500	2,509	2,528	Expansion	337
	Supply	2,232	2,294	2,350	2,399	2,440	2,471	2,485	2,496	2,503	2,507	2,516	Attrition	1,000
	Surplus/Gap	41	22	7	3	-6	0	3	5	3	-2	-12	Total	1,337
071 Managers in construction and transportation	Demand	22,566	22,716	23,421	23,865	24,430	24,804	25,211	25,471	25,408	25,210	25,150	Expansion	2,585
	Supply	22,986	23,079	23,717	24,156	24,600	24,898	25,139	25,292	25,205	25,025	24,946	Attrition	8,737
	Surplus/Gap	421	363	296	291	170	94	-72	-179	-203	-186	-204	Total	11,321
212 Life science professionals	Demand	6,376	6,445	6,587	6,694	6,814	6,900	6,970	7,030	7,082	7,134	7,205	Expansion	829
	Supply	6,458	6,530	6,629	6,716	6,806	6,890	6,954	7,016	7,065	7,109	7,159	Attrition	1,810
	Surplus/Gap	82	85	42	22	-8	-10	-16	-14	-17	-26	-46	Total	2,638
222 Technical occupations in life sciences	Demand	8,082	8,206	8,386	8,523	8,673	8,772	8,844	8,901	8,949	8,998	9,068	Expansion	986
	Supply	8,193	8,309	8,435	8,544	8,656	8,755	8,825	8,886	8,931	8,968	9,012	Attrition	2,165
	Surplus/Gap	111	103	49	20	-17	-17	-20	-15	-18	-29	-56	Total	3,151
223 Technical occupations civil, mech. & ind. eng.	Demand	5,477	5,518	5,663	5,769	5,908	6,017	6,130	6,208	6,236	6,239	6,259	Expansion	782
	Supply	5,565	5,604	5,735	5,842	5,952	6,041	6,112	6,163	6,181	6,187	6,203	Attrition	1,562
	Surplus/Gap	88	85	72	73	44	24	-18	-45	-55	-52	-56	Total	2,344
721 Contractors and supervisors, trades & related	Demand	18,560	18,650	19,208	19,605	20,087	20,372	20,662	20,832	20,793	20,673	20,657	Expansion	2,097
	Supply	18,899	18,945	19,446	19,801	20,180	20,426	20,608	20,712	20,654	20,540	20,501	Attrition	6,935
	Surplus/Gap	339	295	238	197	93	54	-54	-120	-139	-132	-157	Total	9,032
731 Machinery & transp. equipment mechanic	Demand	22,762	22,919	23,490	23,914	24,396	24,676	24,926	25,099	25,176	25,216	25,303	Expansion	2,540
	Supply	23,130	23,255	23,693	24,056	24,427	24,703	24,881	25,014	25,071	25,096	25,130	Attrition	7,482
	Surplus/Gap	368	335	203	141	32	27	-45	-85	-105	-120	-173	Total	10,023
737 Crane operators, drillers and blasters	Demand	2,329	2,339	2,427	2,490	2,555	2,575	2,589	2,590	2,575	2,557	2,553	Expansion	224
	Supply	2,372	2,375	2,444	2,498	2,552	2,575	2,585	2,583	2,567	2,546	2,536	Attrition	653
	Surplus/Gap	42	36	17	8	-3	1	-5	-7	-8	-10	-18	Total	877
742 Heavy equipment operators	Demand	14,930	15,035	15,724	16,284	16,753	16,820	16,802	16,717	16,619	16,553	16,596	Expansion	1,666
	Supply	15,217	15,255	15,788	16,274	16,673	16,799	16,790	16,710	16,601	16,514	16,507	Attrition	4,695
	Surplus/Gap	287	220	64	-10	-80	-21	-12	-7	-18	-39	-89	Total	6,361
821 Supervisors, logging and forestry	Demand	1,526	1,558	1,608	1,646	1,693	1,713	1,711	1,706	1,702	1,701	1,719	Expansion	193
	Supply	1,546	1,575	1,610	1,637	1,677	1,704	1,710	1,711	1,708	1,704	1,713	Attrition	486
	Surplus/Gap	20	17	1	-9	-16	-10	-2	5	7	3	-6	Total	679
824 Logging machinery operators	Demand	3,800	3,885	4,028	4,136	4,242	4,284	4,266	4,246	4,232	4,233	4,284	Expansion	485
	Supply	3,857	3,924	4,023	4,104	4,195	4,259	4,266	4,265	4,255	4,244	4,268	Attrition	1,107
	Surplus/Gap	57	40	-5	-32	-47	-25	0	20	23	11	-17	Total	1,592
842 Logging and forestry workers	Demand	3,640	3,724	3,824	3,910	3,996	4,029	4,027	4,021	4,018	4,021	4,050	Expansion	409
	Supply	3,696	3,763	3,831	3,892	3,961	4,008	4,021	4,028	4,028	4,023	4,035	Attrition	847
	Surplus/Gap	56	40	6	-18	-35	-21	-6	7	10	2	-15	Total	1,256
861 Primary production labourers	Demand	29,607	30,124	30,803	31,394	32,032	32,469	32,844	33,132	33,345	33,525	33,747	Expansion	4,139
	Supply	30,077	30,529	31,072	31,571	32,054	32,468	32,750	32,992	33,175	33,341	33,513	Attrition	6,180
	Surplus/Gap	470	405	269	177	22	-1	-94	-141	-170	-184	-234	Total	10,320
921 Supervisors, processing occupations	Demand	4,866	4,834	4,948	5,030	5,140	5,203	5,260	5,300	5,327	5,348	5,368	Expansion	502
	Supply	4,937	4,912	4,990	5,060	5,147	5,211	5,253	5,286	5,308	5,324	5,331	Attrition	2,028
	Surplus/Gap	71	78	43	30	8	8	-7	-14	-19	-24	-37	Total	2,530
943 Machine operators in P&P and wood mfg.	Demand	10,011	9,939	10,218	10,399	10,607	10,684	10,738	10,773	10,801	10,834	10,870	Expansion	860
	Supply	10,141	10,086	10,269	10,408	10,577	10,675	10,728	10,769	10,795	10,811	10,808	Attrition	3,105
	Surplus/Gap	130	146	51	9	-31	-9	-10	-4	-7	-24	-62	Total	3,965
All BC	**Demand**	**156,722**	**158,164**	**162,679**	**166,053**	**169,771**	**171,788**	**173,464**	**174,519**	**174,762**	**174,750**	**175,357**	**Expansion**	**18,634**
	Supply	**159,307**	**160,435**	**164,032**	**166,957**	**169,895**	**171,882**	**173,108**	**173,925**	**174,045**	**173,940**	**174,176**	**Attrition**	**48,791**
	Surplus/Gap	**2,584**	**2,271**	**1,354**	**904**	**124**	**94**	**-356**	**-594**	**-716**	**-810**	**-1,181**	**Total**	**67,426**

5.3 BC Solid Wood LMP (2012)

This employment forecast was prepared on behalf of the Resource Training Organization and the Forestry Solid Wood Sector Human Resource Committee. The Committee was established in fall 2011 for the purpose of developing a human resource strategy to meet the current and future needs of BC's solid wood sector (2012-2016). This sector encompasses two sub-industries – Sawmills & Wood Preservation and Veneer, Plywood, & Engineered Wood. Data for this report was derived from a survey of 295 establishments operating within BC's solid wood sector. The majority of responding companies operate primarily in the sawmilling segment of the sector.

Report Highlights

As of spring 2012, BC's solid wood sector employed an estimated 20,678 workers, plus an additional 596 vacant positions. The sector workforce is dominated by sawmill machine operators and labourers in wood processing. Employers indicated concern with the supply of skilled workers (i.e., millwrights, heavy duty mechanics, and industrial electricians) and their ability to recruit qualified workers to locations in which they are needed. Employers in the northern regions of the province reported the greatest difficulty attracting an adequate supply of skilled trades workers.

Table 10: Baseline Employment & Current Vacancies
General Occupational Categories

	Baseline Employment (2012)		
Occupational Category	*Employment*	*Vacancies*	*Total*
Management / Administration	3,172	121	3,293
Production	14,033	279	14,311
Maintenance	3,474	196	3,669
Total	**20,678**	**596**	**21,273**

Employment in high demand (select) occupations was estimated at 18,983 workers based on the employer survey. Employers indicated that total employment in select occupations is projected to reach 20,591workers by 2016 – an average annual growth rate of 1.7%. This compares to an overall provincial growth rate of 1.4%[8]. Occupational growth is projected to be highest among Industrial Engineering, Manufacturing Technologists & Technicians (7.2% annually), followed by workers in the saw trades (3.4% annually).

[8] BC Labour Market Outlook 2010-2020

Table 11: Baseline & Projected Employment (2016)
Select Occupations – BC

	Baseline Employment		Projected Employment#		
Select Occupation (NOC)	2012	% BC Labour Force*	2016	% Increase	Avg Annual Growth (5 Yrs)
Manufacturing Manager (091)	542	5.2%	615	13.5%	2.7%
Supervisor, Forest Products (921)	1,204	24.5%	1,338	11.1%	2.2%
Industrial Engineering, Mfg T&T (223)	147	2.6%	200	36.1%	7.2%
Sawmill Machine Operator (943)	4,912	48.7%	5,226	6.4%	1.3%
Sawfiler / Benchman / Sawfitter (738)	625	14.9%	730	16.8%	3.4%
Industrial/Maintenance Mechanic (731)	1,485	6.4%	1,668	12.3%	2.5%
Industrial Electrician (724)	585	2.5%	662	13.2%	2.6%
Heavy Duty Equipment Mechanic (731)	455	2.0%	502	10.3%	2.1%
Lumber Grader (943)	532	5.3%	591	11.1%	2.2%
Labourers in Wood Processing (961)	7,322	25.4%	7,849	7.2%	1.4%
Other (Planer Mill Tech., Power Eng.)	1,174	--	1,210	3.1%	0.6%
Totals	**18,982**	**12.4%**	**20,591**	**8.5%**	**1.7%**

** Percent share of total projected supply (BC Labour Market Scenario Model); # Employer survey*

Based on economic growth and attrition, industry projections indicate more than 3,200 job openings in select occupations will be available by 2014 and a total of 6,350 openings through 2016 – representing one-third (33%) of the current workforce. Each year, employers can expect to hire close to 1,300 workers to meet employment demand (growth + replacements) over the next five years. Three-quarters of projected job openings are the result of retirements and other attrition, and 25% due to employment growth. Job openings are considered relatively high for all occupations, particularly Industrial Engineering, Manufacturing Technologists & Technicians (Table 7).

Table 12: Projected Job Openings
Select Occupations – British Columbia

		2012-14				2015-16				Total Openings		
Select Occupation (NOC)	2012	Retirees	Attrition	Growth	Openings	Retirees	Attrition	Growth	Openings	2012-16	% 2012	Avg Annual (5 years)
Manufacturing Manager (091)	542	24	13	21	58	40	23	51	114	172	32%	34
Supervisor, Forest Products (921)	1,204	66	40	49	155	108	45	85	238	393	33%	79
Industrial Eng., Mfg T&T (223)	146	13	6	17	36	13	8	37	58	94	64%	19
Sawmill Machine Operator (943)	4,912	221	229	162	612	236	242	153	631	1,243	25%	249
Sawfiler/Benchman/Sawfitter (738)	625	60	19	42	121	52	17	62	131	252	40%	50
Industrial Mtce Mechanic (731)	1,485	143	42	114	299	127	51	70	248	547	37%	109
Industrial Electrician (724)	585	49	15	56	120	45	17	21	83	203	35%	41
HD Equipment Mechanic (731)	455	44	10	32	86	34	12	16	62	148	33%	30
Lumber Grader (943)	531	27	10	35	72	30	14	26	70	142	27%	28
Labourers (961)	7,322	303	909	342	1,554	273	881	186	1,340	2,894	40%	579
Other (Planer Mill, Power Eng.)	1,174	63	21	14	98	128	19	23	170	268	23%	54
TOTAL	**18,982**	**1,013**	**1,314**	**884**	**3,211**	**1,086**	**1,329**	**730**	**3,145**	**6,356**	**33%**	**1,271**

Skills gaps were determined based on the difference between projected demand (employer survey) and supply of workers (BC Labour Market Scenario Model) for select occupations through 2016. The solid wood sector's share of projected occupational supply for all BC was calculated based on the share of sector workers employed in each occupation in 2012.

With the exception of labourers, skills gaps were identified for all select occupations at various times over the next five years. Current skills gaps were identified among manufacturing managers, supervisors, industrial engineering & manufacturing technicians & technologists, and saw trade workers (Table 13). Gaps become progressively wider as projected demand outstrips supply over the course of the forecast period.

Table 13: Projected Skills Gaps – Select Occupations 2012-16

Priority Occupation (NOC)	2012	Annual Outlook	2012	2013	2014	2015	2016
Manufacturing Manager (091)	542	Demand Growth (2.7%)	557	572	587	603	619
		Supply Share (5.2%)	545	553	564	574	581
		Surplus (Gap)	**(11)**	**(18)**	**(23)**	**(29)**	**(39)**
Supervisor, Forest Products (921)	1,204	Demand Growth (2.2%)	1,230	1,258	1,285	1,313	1,342
		Supply Share (24.5%)	1,223	1,240	1,261	1,277	1,287
		Surplus (Gap)	**(8)**	**(18)**	**(24)**	**(37)**	**(55)**
Industrial Engineering, Mfg T&T (223)	146	Demand Growth (7.2%)	157	168	180	193	207
		Supply Share (2.6%)	149	152	155	157	159
		Surplus (Gap)	**(7)**	**(16)**	**(25)**	**(36)**	**(48)**
Sawmill Machine Operator (943)	4,912	Demand Growth (1.3%)	4,976	5,041	5,106	5,172	5,240
		Supply Share (48.7%)	5,001	5,069	5,151	5,199	5,225
		Surplus (Gap)	**25**	**28**	**45**	**26**	**(15)**
Sawfiler / Benchman / Sawfitter (738)	625	Demand Growth (3.4%)	646	668	691	714	739
		Supply Share (14.9%)	637	648	659	669	676
		Surplus (Gap)	**(9)**	**(21)**	**(32)**	**(46)**	**(63)**
Industrial/Maintenance Mechanic (731)	1,485	Demand Growth (2.5%)	1,522	1,560	1,599	1,639	1,680
		Supply Share (6.4%)	1,516	1,540	1,563	1,581	1,592
		Surplus (Gap)	**(6)**	**(21)**	**(36)**	**(58)**	**(88)**
Industrial Electrician (724)	585	Demand Growth (2.6%)	600	616	632	648	665
		Supply Share (2.5%)	604	616	627	635	641
		Surplus (Gap)	**4**	**0**	**(4)**	**(13)**	**(24)**
Heavy Duty Equipment Mechanic (731)	455	Demand Growth (2.1%)	465	474	484	494	505
		Supply Share (2.0%)	474	481	489	494	498
		Surplus (Gap)	**9**	**7**	**4**	**(0)**	**(7)**
Lumber Grader (943)	531	Demand Growth (2.2%)	544	556	568	580	593
		Supply Share (5.3%)	544	552	561	566	569
		Surplus (Gap)	**1**	**(4)**	**(7)**	**(15)**	**(25)**
Labourers in Wood Processing (961)	7,322	Demand Growth (1.4%)	7,425	7,528	7,634	7,741	7,849
		Supply Share (25.4%)	7,437	7,548	7,686	7,791	7,866
		Surplus (Gap)	**13**	**20**	**52**	**51**	**17**
Other (Planer Mill Tech., Power Eng.)	1,174	-	-	-	-	-	-
		Demand Growth (1.7%)	**18,121**	**18,440**	**18,766**	**19,099**	**19,439**
		Supply Share (12.4%)	**18,211**	**18,498**	**18,815**	**19,049**	**19,207**
Totals	**18,982**	**Surplus (Gap)**	**91**	**58**	**49**	**(50)**	**(232)**

5.4 Northwest Transmission Line LMP (2009)

Northwest British Columbia is expected to experience significant economic development over the next decade. Construction of BC Hydro's Northwest Transmission Line (NTL) has begun and is expected to lead to other investment and economic development, as it increases accessibility to economical, reliable electricity in the region. To take full advantage of the business and employment opportunities associated with the construction of the NTL and other major projects planned for the region, BC Hydro in 2011 applied to the BC Labour Market Partnerships Program (Ministry of Jobs, Tourism and Innovation). The program provided BC Hydro with funding to strike a Labour Market Partnerships (LMP) steering committee to develop a Northwest BC human resource strategy.

The LMP steering committee commissioned research on the region's labour supply/demand projects under three growth scenarios – Conservative, Expected and Optimistic. The targeted region includes the area north of Kitimat to the Yukon border and west of the Hazeltons to the coast or Alaskan border. In addition, the research looked at the characteristics of the region's labour market, local post-secondary education and training, as well as industry human resources programs in place. The research projected labour demand for both the initial in-scope industries as well as those industries that require similarly trained workers including:

- Northwest Transmission Line (NTL)
- Power Generation
- Mining Expansion and Development
- Port and Industrial Development
- Pipeline

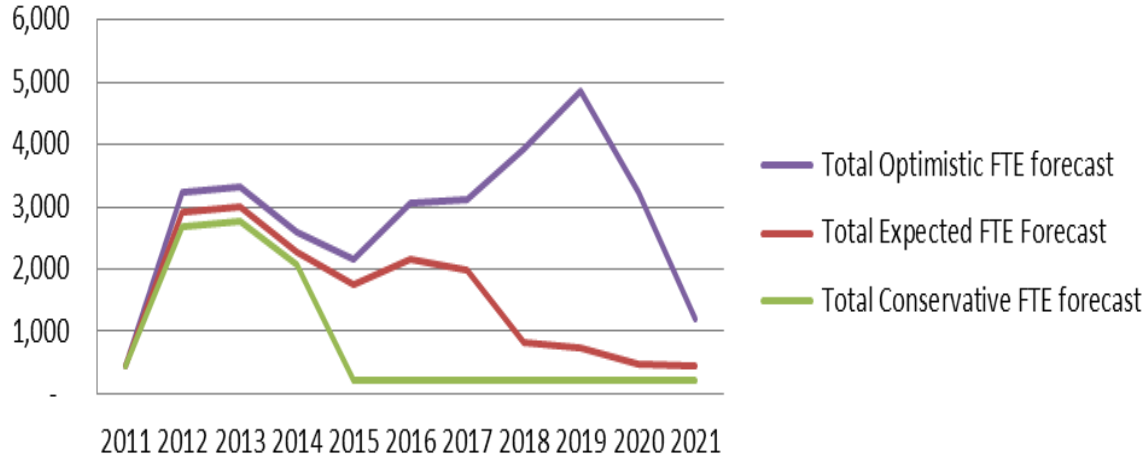
BC Hydro's NTL enables the building of other major projects by ensuring affordable and reliable electricity. In addition, other major projects planned for Northwest BC will not only generate jobs but will set the foundation for increased natural resource industry activity. The Kitimat Liquefied Natural Gas (LNG) plant and pipeline project, Prince Rupert Port Authority expansion and Northern Gateway Pipeline will provide Canada's minerals and oil and gas industries with access to Asian markets.

<u>Results</u>

There is a significant and immediate need for construction workers to support major project development. The immediate need for additional workers comes from the current and planned construction of approved major projects in Northwest BC, including the NTL, Forrest Kerr power project and Red Chris mine. Strong labour demand is also coming from other current or near-term projects listed in the Major Projects Inventory, including the Rio Tinto Alcan Modernization project, Kitimat LNG and pipeline project. Demand for construction workers is expected to increase as other major projects are approved and final investment decisions are made.

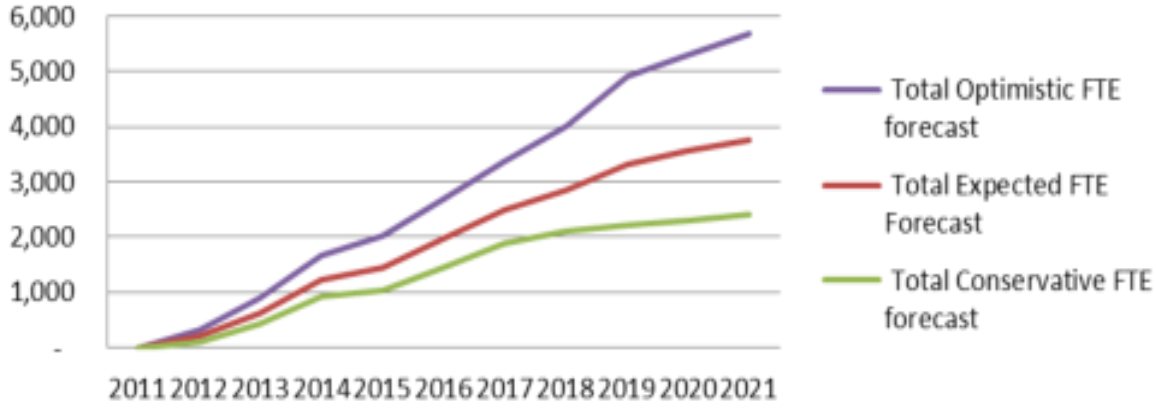
Figure 9 illustrates the projected construction employment growth under each of the three scenarios. The majority of the occupations required to support the construction and operations of Northwest BC's major projects are trades, transportation and equipment operations and related occupations. These occupations are expected to account for approximately 63% of new jobs.

Figure 30: Projected Employment – Construction 2011-2021



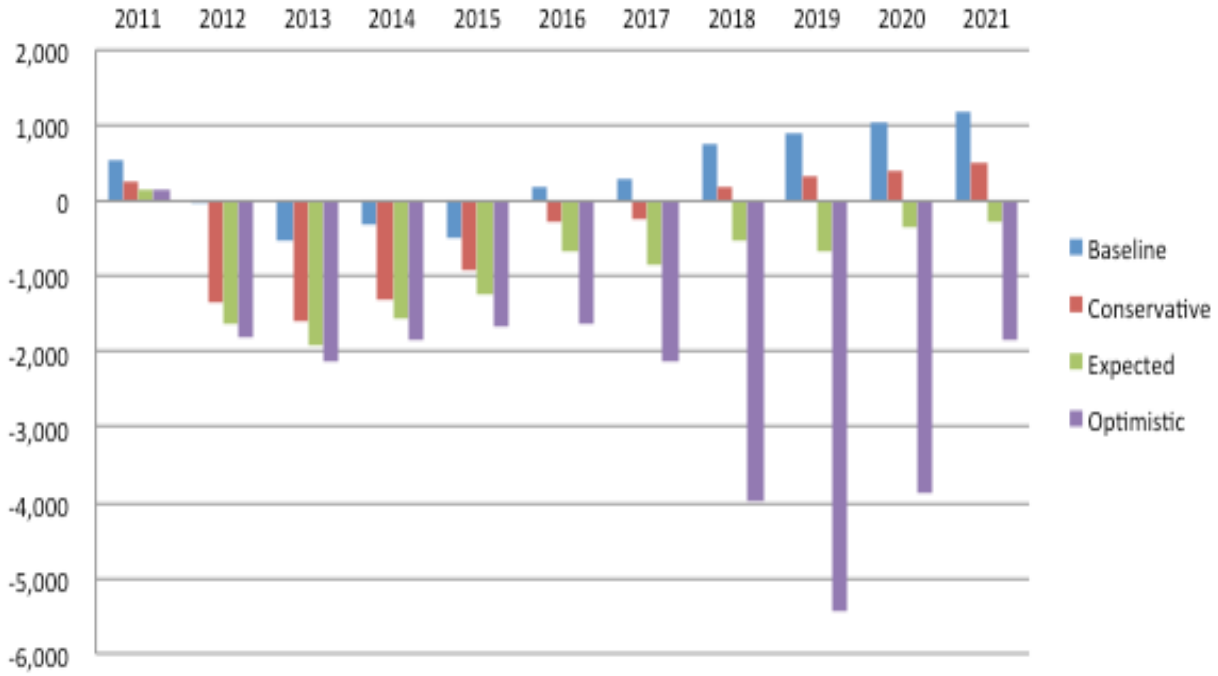
Demand for operations workers grows steadily under all scenarios. The need for operations workers comes gradually as major projects move from the construction phase to start-up/commissioning. Figure 10 illustrates increasing demand for operations workers to 2014 as current and near-term construction projects become operational. After 2015, demand for operations workers again grows significantly as the next wave of construction projects move into full operations – especially in the Optimistic scenario.

Figure 31: Demand Forecast – Operations



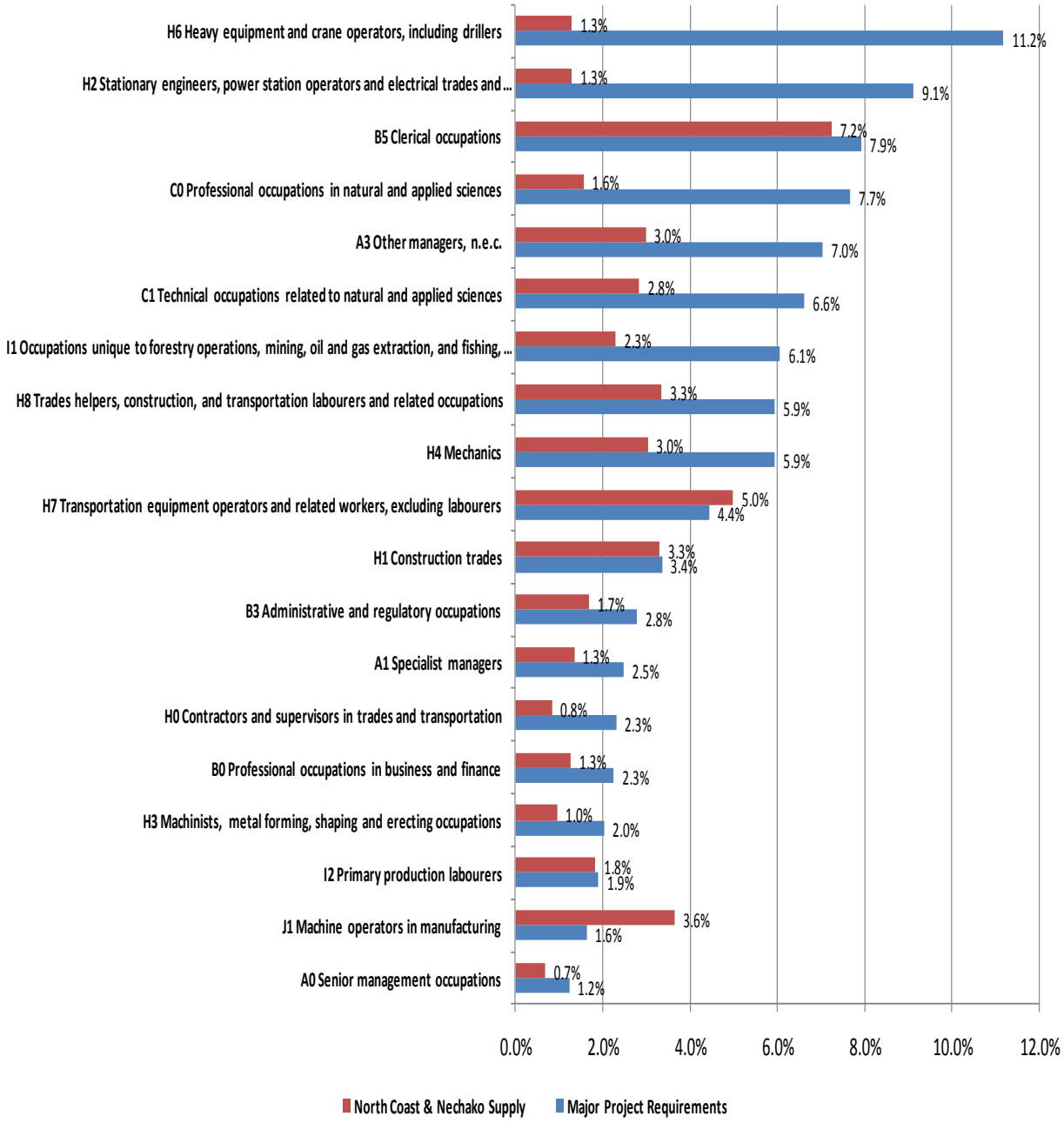
Northwest BC's labour supply/demand gaps are forecasted to begin in 2012 for all scenarios, as the local workforce cannot meet the demand created by increased construction and operations activity. The Northwest BC labour supply/demand gap analysis focused on occupations directly involved in the construction and operations of the region's major projects. In addition to the gaps created by the major projects, the analysis also takes into account labour demand generated within the region's existing industries due to increased activity and the need to replace retiring workers. This is identified as 'Baseline' in Figure 11.

Figure 32: FTE Supply/Demand Gap (Direct)



Regional labour supply/demand gaps for occupations hired directly for the construction and operations of major projects, as well as those hired to support the projects, are illustrated in Figure 12. With the exception of transportation equipment operators and manufacturing machine operators, gaps are projected for all other relevant occupations.

Figure 33: Potential Demand and Supply of Qualified Labour
Northwest BC Major Projects



5.5 Labour Market Forecast Summary

The labour market studies reviewed in this analysis employed different methodologies for determining future labour market requirements for the forest industry. The Forest Products Sector Council (FPSC) and the Conference Board of Canada (CBoC) surveyed employers operating in Canada's "forest industry" – including forestry & logging operators, support activities for forestry, and manufacturers of wood and paper products. Labour market forecasts were developed based on four industry growth scenarios between 2010 and 2020. The study sponsored by the Northern BC Resource Sector focused on the same forest industries (and other sectors) but adopted industry growth and attrition rates as developed through the COPS BC Unique Scenario (2007-2017) and extrapolated through 2020. In the case of the BC Solid Wood study, wood products manufacturers were surveyed to determine projected growth and attrition rates in select occupations through 2020. In examining the results of each study, projected job openings (i.e., employment growth and attrition) through 2020 are comparable, with the expectation of a "mild" to "solid" recovery in the forest industry in the coming years.

Renewing Canada's Greenest Workforce - Forest Products Sector Council & Conference Board of Canada

Forecast Scenario	Annual Growth	Annual Attrition	Total Job Openings 2010-2020	Annual Average (11 years)
Pessimistic (Red)	(455)	1,273	9,000	818
Mild Recovery (Brown)	0	1,273	14,000	1,273
Solid recovery (Blue)	545	1,273	20,000	1,818
Most optimistic (Green)	1,636	1,273	32,000	2,909

Northern BC Resource Sector LMP (RTO) – LMI Insight and R.A. Malatest & Associates

Industry Forecast	Annual Growth	Annual Attrition	Total Job Openings 2011-2020	Annual Average (10 years)
F & L and Support Activities	16	356	3,723	372
Wood Products Mfg	29	635	6,637	664
Pulp & Paper Mfg	10	217	2,264	226
Total	**55**	**1,208**	**12,624**	**1,262**

BC Solid Wood LMP (RTO) – LMI Insight and R.A. Malatest & Associates

Occupational Forecast	Annual Growth	Annual Attrition	Total Job Openings 2012-2016	Annual Average (5 years)
Manufacturing Manager	14	20	172	34
Supervisor, Forest Products	27	52	393	79
Industrial Eng., Mfg T&T	11	8	94	19
Sawmill Machine Operator	63	186	1,243	249
Sawfiler/Benchman/Sawfitter	21	30	252	50
Industrial Mechanic	37	73	547	109
Industrial Electrician	15	25	203	41
HD Equipment Mechanic	10	20	148	30
Lumber Grader	12	16	142	28
Labourers	106	473	2,894	579
Planer Mill, Power Engineer	7	46	268	54
Total	**323**	**948**	**6,356**	**1,271**

SECTION 6: SURVEY OF EMPLOYERS & CONTRACTORS

The survey of employers and contractors operating within BC's forest industry was implemented for the purpose of capturing labour market data to inform the development of a long term human resource strategy. The survey focused on 26 "priority" occupations employed within the various operational phases of production, including forestry, logging, road construction, multi-phase operators, and pulp & paper manufacturing.

Priority occupations are those identified by members of the LMP Steering Committee as experiencing skills shortages now or expected in the coming years. Two of these occupations (master mechanic, heavy duty mechanic) perform work across multiple phases and have therefore been aggregated separately within a "multi-phase" category. Occupations within forest products transportation (e.g., truck driver) have been included within logging operations. As forestry supervisors work in both forestry and logging operations, they have been identified within forestry operations only, though allocated proportionally within both phases for baseline and occupational projection purposes.

Priority Occupations

Production Phase	Occupation (26)	NOC
Forestry	• Manager, Forestry Operations	0811
	• Forestry Professional (e.g., registered professional forester)	2122
	• Forestry Technologist & Technician (e.g., cruiser, surveyor, resource officer, fire suppression)	2223
	• Supervisor, Forestry (e.g., forestry crew boss)	8211
	• Forestry Worker (e.g., forest firefighter, burner, thinner, spacer, silviculture)	8422
Road Building	• Construction Manager (e.g., project manager)	0711
	• Supervisor, Heavy Equipment Operators	7302
	• Drillers & Blasters	7372
	• Heavy Equipment Operator (e.g., backhoe, dozer, excavator, grader, loader)	7521
Logging	• Manager, Logging Operations	0811
	• Supervisor, Logging (e.g., logging crew boss, yard supervisor, boom master, quality control)	8211
	• Supervisor, Falling	8211
	• Logging Machinery Operator (e.g., skidder, feller buncher, loader, processor, tower crane, yarder)	8241
	• Hand Faller	8421
	• Ground Worker (i.e., bucker)	8421
	• Logging Worker (chaser, choker setter, landing worker)	8616
	• Boom Man	8616
	• Helicopter Pilot	2271
	• Tugboat Captain (e.g., boom boat operator)	2273
	• Logging Truck Drivers	7511
Multi-Phase Operators	• Master Mechanic (e.g., Supervisor, Mechanic Trades)	7301
	• Heavy Duty Mechanic (including helicopter mechanic)	7312
Pulp & Paper Manufacturing	• Industrial Engineering and Manufacturing Technologists & Technicians	2233
	• Supervisor, Forest Products Processing	9215
	• Pulp Mill Machine Operator	9432
	• Maintenance Mechanic (e.g., Millwright)	7311

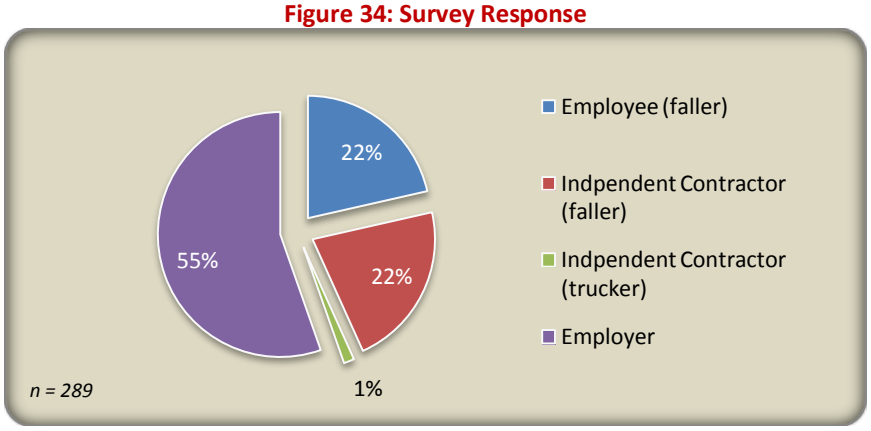
6.1 Survey Administration

The scope of the research was expanded to include industry employers and contractors operating *throughout* British Columbia – not only the Coastal forest region as originally considered. The decision to undertake a province-wide analysis was facilitated by the participation of the BC Forest Safety Council, which assumed responsibility for preparing the survey sample and distributing survey communication. BCFSC maintains a registry of SAFE companies operating in the BC forest sector and a database of hand fallers (active and inactive) certified through WCB regulation.

As of December 2012, the estimated number of registered SAFE companies was 2,660, with about one-third located in the Coastal forest region and two-thirds in the Interior. The estimated number of certified fallers in BC was just under 4,000 (2,200 active) in 2012, roughly equally distributed between the Coast and Interior. The survey sample, as provided by BCFSC, includes 700 SAFE companies (excluding independent operators) and 1,400 certified fallers, representing about one-third of forest industry establishments. The survey also encompassed First Nations organizations and Economic Development Corporations involved in forestry operations and development. The survey targeted 280 completed surveys from certified fallers and 140 completions from companies and contractors for an overall response target of 20%.

The survey was implemented in late January 2012 and remained in the field through March 2012. A total of 289 surveys were completed either by telephone, online or fax administration yielding a valid response of 12.5%. A total of 160 employers participated in the survey, most of which operate in more than one phase of forestry. Together, employed fallers and independent falling contractors accounted for 44% of the response. Just four independent truckers responded to the survey, limiting analysis of this segment of the forest industry. Section 6.3 does, however, examine the role of truck loggers in the transport of forest products from the woods to the mill.

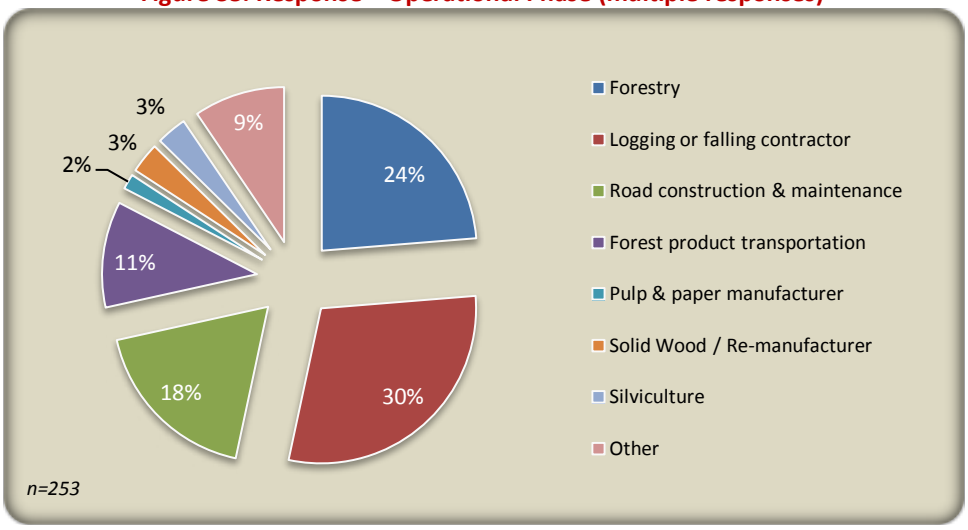
Figure 34: Survey Response



6.1.1 Response Characteristics

The response was dominated by employers and contractors in forestry, logging and road construction, many of which operate in multiple phases. Operators in solid wood, silviculture and other phases of production were excluded from the survey analysis.

Figure 35: Response – Operational Phase (multiple responses)



The large majority of responding organizations identified themselves as corporations or limited companies, followed by sole proprietorships. First Nations organizations and partnerships accounted for less than 5% of the response. As the forest industry is dominated by small and medium sized companies, half of the respondents indicated their companies generated less than $500,000 in 2012. Another 15% of respondents preferred not to indicate their company revenues.

Figure 36: Corporate Structure

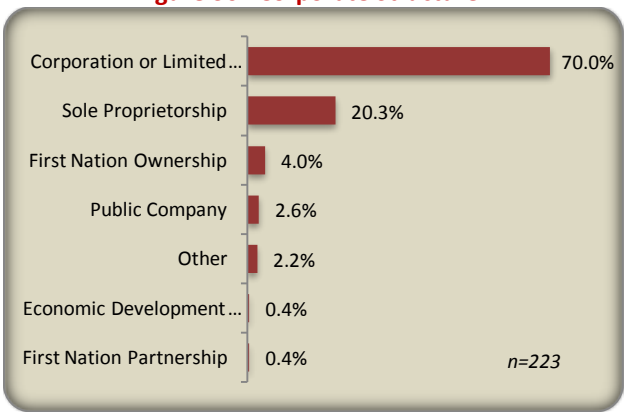
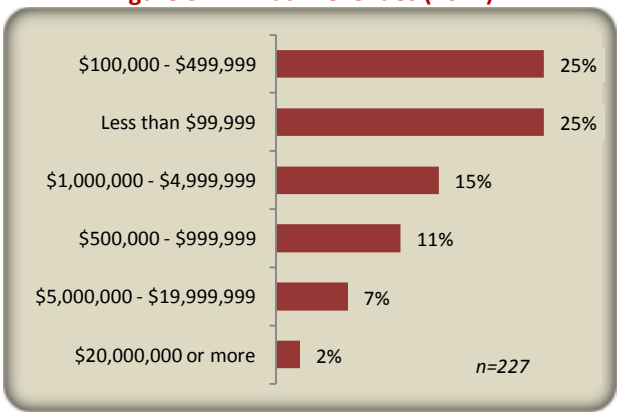


Figure 37: Annual Revenues (2012)



As the study encompasses the entire province, respondents were asked to indicate the Development Region (DR) in which their head office is located, as well as the region(s) in which they operate. Employers and contractors located on Vancouver Island/Coast accounted for the largest share of the response.

Figure 38: Head Office Location

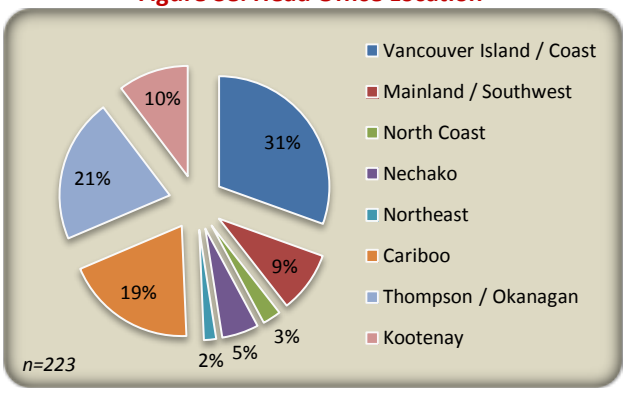
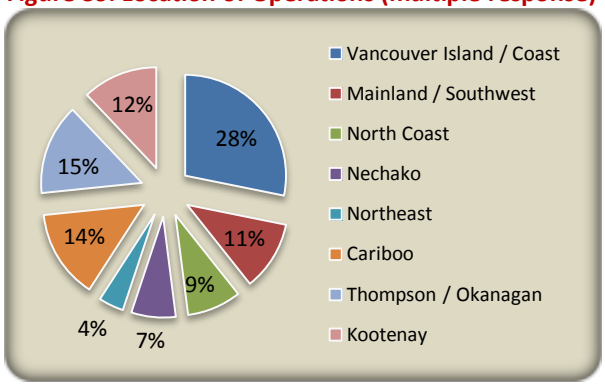


Figure 39: Location of Operations (multiple response)



The industry is dominated by smaller employers in forestry and logging, with the majority of respondents (83%) employing less than 20 workers, and 95% of companies with fewer than 100 workers. To gain a sense of the cyclical nature of the forest sector, respondents were asked to indicate the months in which they typically operate (multiple responses). June through November was identified as the busiest period for the industry, while more than half of employers (56%) indicated that their company operates year round.

Figure 40: Company by Employee Size

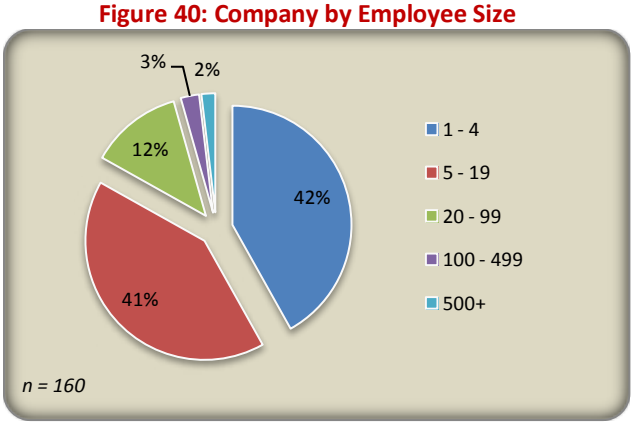
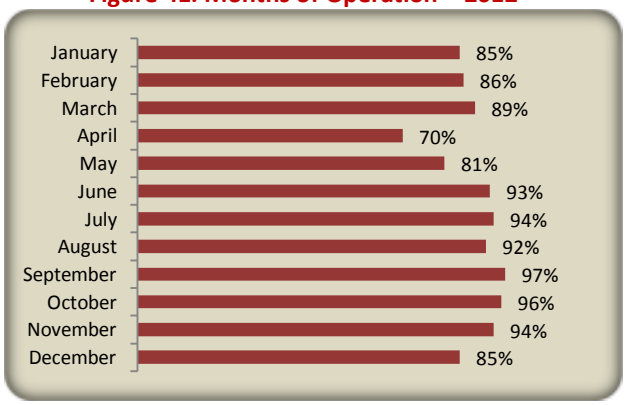
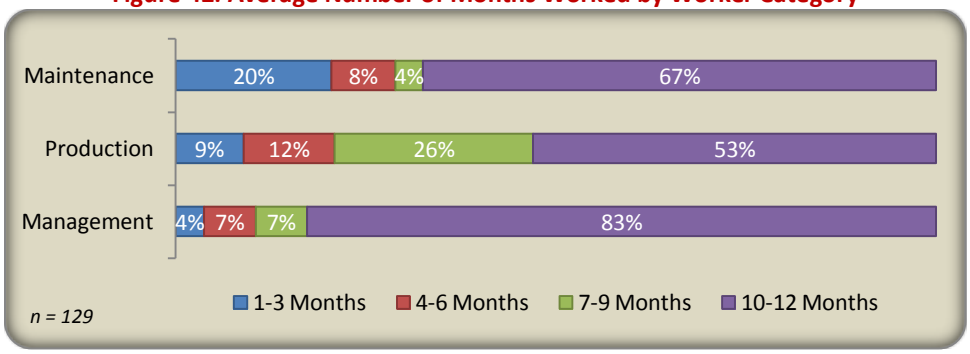


Figure 41: Months of Operation – 2012



The study examined months worked by the three main categories of worker employed in the industry – that is, management/administration, production and maintenance workers. Figure 42 below shows that 83% of management/administration workers are typically employed year round (12 months), while two-thirds of maintenance workers (67%) and just over half of production workers (53%) are employed year round. The "part-time" nature of production work (including for fallers and independent contractors) is an important consideration in human resource development.

Figure 42: Average Number of Months Worked by Worker Category



6.2 Industry Employment

A key objective of the survey research was to gather data to develop an employment baseline for the forest industry upon which human resource planning can be based. Data for this exercise has been collected by Development Regions (DR) and consolidated into the Coast and Interior forest regions. The Coast region encompasses Vancouver Island/Coast, Mainland/Southwest and the North Coast; the Interior region encompasses Nechako, Northeast, Cariboo, Thompson-Okanagan and Kootenay.

Based on survey results, total reported employment for the BC forest industry was 3,342 workers or 12% of the actual estimated workforce in 2012 (excluding solid wood employment). Vancouver Island/Coast accounted for more than half of total reported employment, followed by Mainland/SW at over 20%. For baseline and projection purposes, results are weighted to reflect actual employment levels by region as of 2010 (most recent regional data available).

Figure 43: Employment by DR – Reported

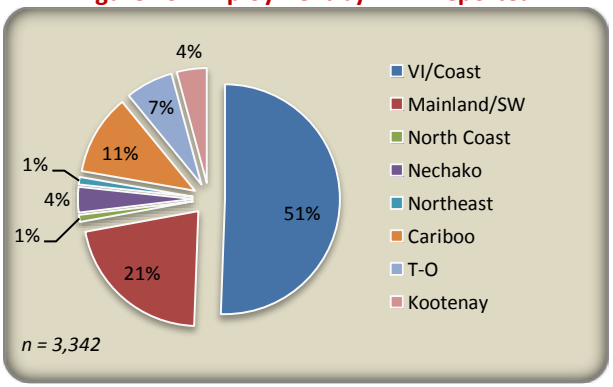
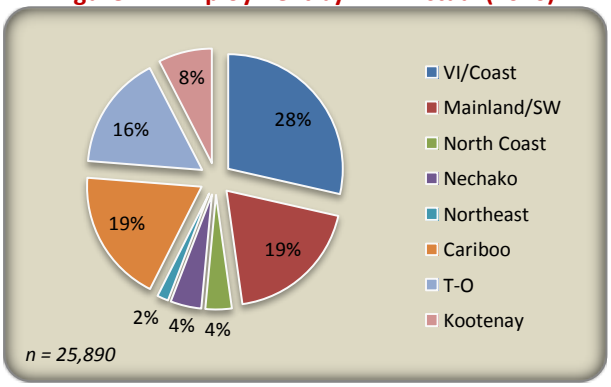


Figure 44: Employment by DR – Actual (2010)



6.2.1 Reported Employment (2012)

- Total reported employment was 3,342 workers, with the Coast accounting for 73% of the BC workforce.
- The majority (69%) of workers were employed in a production capacity.
- The job vacancy rate for BC was 5.8%, and 9.0% for the Interior region – almost double the rate for the Coast; vacancies were highest among management occupations (8.7%).
- By comparison, the overall vacancy rate for Canada's forest industry in 2011 was 1.3%[9], suggesting most jobs were being filled at this time.
- The total reported number of jobs (employment + vacancies) was 3,548.

Table 14: Reported Employment, Vacancies & Total Jobs (2012)

Reported Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Management / Administration	131	267	5	**403**	23	10	58	44	32	**167**	**570 (14%)**
Production	1,328	292	27	**1,647**	85	22	280	162	101	**650**	**2,297 (69%)**
Maintenance	231	161	1	**393**	12	3	41	17	9	**82**	**475 (17%)**
Regional Totals Distribution (%)	**1,690 (51%)**	**720 (22%)**	**33 (1%)**	**2,443 (73%)**	**120 (4%)**	**35 (1%)**	**379 (11%)**	**223 (7%)**	**142 (4%)**	**899 (27%)**	**3,342 (100%)**

Reported Vacancies	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Management / Administration	11	24	1	**36 (8.2%)**	12	0	0	5	1	**18 (9.7%)**	**54 (8.7%)**
Production	46	15	3	**64 (3.7%)**	1	4	18	24	16	**62 (8.7%)**	**126 (5.2%)**
Maintenance	13	3	1	**17 (4.1%)**	2	0	1	3	3	**9 (9.9%)**	**26 (5.2%)**
Regional Totals Vacancy Rate (%)	**71 (4.0%)**	**42 (5.5%)**	**5 (13.2%)**	**117 (4.6%)**	**15 (11.1%)**	**4 (10.3%)**	**19 (4.8%)**	**32 (12.5%)**	**20 (12.3%)**	**89 (9.0%)**	**206 (5.8%)**

Reported Total Jobs	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Management / Administration	142	291	6	**439**	35	10	58	49	33	**185**	**624 (18%)**
Production	1,374	307	30	**1,711**	86	26	298	186	117	**712**	**2,423 (68%)**
Maintenance	244	164	2	**410**	14	3	42	20	12	**91**	**501 (14%)**
Regional Totals Distribution (%)	**1,760 (50%)**	**762 (21%)**	**38 (1%)**	**2,560 (72%)**	**135 (4%)**	**39 (1%)**	**398 (11%)**	**255 (7%)**	**162 (5%)**	**988 (28%)**	**3,548 (100%)**

[9] Statistics Canada, Job Vacancy Rate by Sector (September, 2011)

6.2.2 Industry Baseline Estimate (2012)

The forest industry's 2012 baseline estimate (excluding wood product manufacturing workforce) has been developed using employment data by development region as provided by BC Stats in 2010. The regional distribution of employment as reported in the survey of employers and contractors was not representative of the forestry industry workforce. The share of employment by development region in 2012 is therefore considered equivalent to that in 2010.

Total industry employment for 2012 is estimated at 28,431 workers, based on average employment in forestry & logging, support activities and pulp & paper manufacturing between 2009 and 2012. The distribution of employment was 51% for the Coast and 49% for the Interior. The total number of industry jobs, including vacancies, is estimated at 30,182 workers in 2012. Vacancies rates for the Coast, Interior and BC regions are consistent with those reported in the survey of employers and contractors. However, rates by individual development region could not be accurately estimated due to small reported sample sizes. Estimated vacancies for 2012 have therefore been developed separately for the Coast, Interior and BC regions, such that the aggregate of the Coast and Interior regions will not equate to the total for all BC.

Table 15: Baseline Estimate (2012) – Employment, Vacancies & Total Jobs

Baseline Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC Total
Management / Administration	1,338	902	174	**2,414**	235	86	1,016	874	409	**2,620**	**5,034 (17%)**
Production	5,470	3,686	712	**9,868**	892	324	3,850	3,313	1,550	**9,929**	**19,797 (70%)**
Maintenance	1,307	881	170	**2,359**	112	41	481	414	194	**1,241**	**3,600 (13%)**
Regional Totals	**8,115**	**5,469**	**1,056**	**14,641**	**1,239**	**451**	**5,347**	**4,601**	**2,153**	**13,790**	**28,431**
Distribution (%)	**(29%)**	**(19%)**	**(4%)**	**(51%)**	**(4%)**	**(2%)**	**(19%)**	**(16%)**	**(8%)**	**(49%)**	**(100%)**

Baseline Vacancies (Rate)	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC Total
Management / Administration	-	-	-	**217 (8.2%)**	-	-	-	-	-	**276 (9.5%)**	**459 (8.4%)**
Production	-	-	-	**386 (3.8%)**	-	-	-	-	-	**949 (8.7%)**	**1,071 (5.1%)**
Maintenance	-	-	-	**103 (4.2%)**	-	-	-	-	-	**138 (10.0%)**	**221 (5.8%)**
Regional Totals	**338**	**318**	**160**	**706**	**154**	**52**	**270**	**656**	**301**	**1,363**	**1,751**
Regional Rate (%)	**(4.0%)**	**(5.5%)**	**(13.2%)**	**(4.6%)**	**(11.1%)**	**(10.3%)**	**(4.8%)**	**(12.5%)**	**(12.3%)**	**(9.0%)**	**(5.8%)**

Baseline Total Jobs	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC Total
Management / Administration	-	-	-	**2,631**	-	-	-	-	-	**2,896**	**5,493**
Production	-	-	-	**10,254**	-	-	-	-	-	**10,878**	**20,868**
Maintenance	-	-	-	**2,462**	-	-	-	-	-	**1,379**	**3,821**
Regional Totals	**8,453**	**5,787**	**1,216**	**15,347**	**1,393**	**503**	**5,617**	**5,257**	**2,454**	**15,153**	**30,182**
Distribution (%)	**(28%)**	**(19%)**	**(4%)**	**(51%)**	**(5%)**	**(2%)**	**(19%)**	**(17%)**	**(8%)**	**(50%)**	**(100%)**

6.2.3 Projected Industry Employment (2017 & 2022)

Employment projections are based on annual growth rates as reported through the survey of employers and contractors. Five-year projections are provided for the 2013-17 and 2018-22 horizons. Employment is projected to increase by 3,036 jobs between 2012 and 2022 – an overall increase of 10.7% or 1.1% annually. Industry employment growth in the Interior region (19.7%) is projected to far outpace that for the Coast (2.1%) over the 10-year horizon. Growth by worker category is projected highest among maintenance workers (23%) – particularly in the Interior region – followed by management/ administration (10%) and production (9%).

Growth Forecast (2013-2017)

- Total projected employment for 2017 is 29,914 workers, an increase of 5.2% (1.0% annually) over the five-year horizon.
- Employment growth in the Interior region is projected to increase 10.0%, compared to 0.7% in Coastal operations over the next five years.
- Employment growth is projected to be highest in the Cariboo region (14.3%) and lowest in the North Coast (-25.8%).
- Overall growth by worker category is projected highest among maintenance workers (10.4%, or 2.1% annually) and lowest among management/administration workers (2.9%, or 0.6% annually).

Table 16: Projected Employment & Growth Rates (2013-2017)

Projected Employment 2017	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Management / Administration	1,328	924	101	**2,436**	191	95	1,245	858	430	**2,744**	**5,180**
Production	5,471	3,774	523	**9,867**	1,030	337	4,218	3,563	1,714	**10,892**	**20,759**
Maintenance	1,363	901	160	**2,439**	105	67	650	459	248	**1,536**	**3,975**
Regional Totals	**8,163**	**5,599**	**784**	**14,742**	**1,326**	**500**	**6,113**	**4,880**	**2,393**	**15,172**	**29,914**
Distribution (%)	**(27%)**	**(19%)**	**(3%)**	**(49%)**	**(5%)**	**(2%)**	**(21%)**	**(17%)**	**(8%)**	**(51%)**	**(100%)**

Growth (%) 2013-17	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC (5 years)
Management / Administration	-0.7%	2.4%	-42.0%	**0.9%**	-18.7%	10.5%	22.5%	-1.8%	5.1%	**4.7%**	**2.9%**
Production	0.0%	2.4%	-26.5%	**0.0%**	15.5%	4.0%	9.6%	7.5%	10.6%	**9.7%**	**4.9%**
Maintenance	4.3%	2.3%	-5.9%	**3.4%**	-6.3%	63.4%	35.1%	10.9%	27.8%	**23.8%**	**10.4%**
Regional Growth Rates (%)	**0.6%**	**2.4%**	**-25.8%**	**0.7%**	**7.0%**	**10.6%**	**14.3%**	**6.1%**	**11.1%**	**10.0%**	**5.2%**

Growth Forecast (2018-2022)

- Total projected employment for 2022 is 31,467 workers, an increase of 5.2% (1.0% annually) from 2017.
- Overall employment growth for the Interior region is projected at 8.9%, and 1.4% for the Coast.
- Growth is projected highest in the North Coast development region (19.3%), reversing declines in the previous five-year period. Growth for the Kootenay region is projected to fall (-1.5%) over this same period.
- Overall growth by worker category is again projected highest among maintenance workers (11.4%), including 28% in Interior operations. Growth among management/administration workers is projected to increase by 6.8%, and by 3.6% for production workers over the five-year horizon.

Table 17: Projected Employment & Growth Rates (2018-2022)

Projected Employment 2022	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Management / Administration	1,394	912	118	**2,455**	198	115	1,470	965	443	**3,076**	**5,532**
Production	5,509	3,929	657	**10,025**	1,071	362	4,606	3,759	1,647	**11,480**	**21,506**
Maintenance	1,374	917	160	**2,468**	113	68	936	543	265	**1,961**	**4,428**
Regional Totals (%)	**8,278 (26%)**	**5,758 (18%)**	**935 (3%)**	**14,949 (48%)**	**1,382 (4%)**	**545 (2%)**	**7,012 (23%)**	**5,267 (17%)**	**2,355 (7%)**	**16,518 (52%)**	**31,467 (100%)**

Growth Rates 2018-22	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Management / Administration	5.0%	-1.3%	16.8%	**0.8%**	3.7%	21.1%	18.1%	12.5%	3.0%	**12.1%**	**6.8%**
Production	0.7%	4.1%	25.6%	**1.6%**	4.0%	7.4%	9.2%	5.5%	-3.9%	**5.4%**	**3.6%**
Maintenance	0.8%	1.8%	0.0%	**1.2%**	7.6%	1.5%	44.0%	18.3%	6.9%	**27.7%**	**11.4%**
Regional Growth	**1.4%**	**2.9%**	**19.3%**	**1.4%**	**4.2%**	**9.2%**	**14.7%**	**7.9%**	**-1.5%**	**8.9%**	**5.2%**

6.2.4 Projected Job Openings (2017 & 2022)

Projected job openings have been developed for each region over the 2013-17 and 2018-22 horizons, based on annual employment growth, retirements and other attrition, identified by employers and contractors. Overall, projections indicate that more than 80% of job openings through 2022 are due to retirements and other attrition.

Jobs Forecast (2017)

- Coast – total job openings through 2022 are projected at 6,440, representing 44% of baseline employment. This translates into 645 annual job openings over the 10-year horizon. The vast majority of job openings (95%) in Coastal operations are due to pending retirements and other attrition. In percentage terms, job openings are projected highest among management/ administration workers throughout the Coast.
- Interior – total job openings through 2022 are projected at 9,346, representing 68% of baseline employment. This translates into 935 annual job openings over the 10-year horizon. More than 70% of job openings are due to retirements and other attrition. In percentage terms, job openings are projected highest among maintenance workers in the Interior.
- British Columbia – total job openings through 2022 are projected at 15,786, representing 56% of baseline employment. This translates into close to 1,600 job openings each year over the 10-year horizon. 81% of job openings are based on retirements and other attrition. In relative terms, job openings are projected highest among management/administration workers and lowest among production workers.

Table 18: Projected Job Openings (2017 & 2022) – Coast

Coast	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Yearly Openings*
Management / Administration	2,414	228	239	22	489	381	297	19	697	1,186	49%	119
Production	9,868	1,168	654	-1	1,821	1,852	608	158	2,618	4,439	45%	444
Maintenance	2,359	180	129	80	389	266	131	29	426	815	35%	82
Coast Totals	**14,641**	**1,576**	**1,022**	**101**	**2,699**	**2,499**	**1,036**	**206**	**3,741**	**6,440**	**44%**	**644**
% Total Openings		**24%**	**16%**	**2%**	**42%**	**39%**	**16%**	**3%**	**58%**	**100%**	--	-

Table 19: Projected Job Openings (2017 & 2022) – Interior

Interior	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Yearly Openings*
Management / Administration	2,620	423	207	124	754	730	328	332	1,390	2,144	82%	214
Production	9,929	963	823	963	2,749	1,242	901	588	2,731	5,480	55%	548
Maintenance	1,241	212	205	295	712	283	302	425	1,010	1,722	139%	172
Interior Totals	**13,790**	**1,598**	**1,235**	**1,382**	**4,215**	**2,255**	**1,531**	**1,345**	**5,131**	**9,346**	**68%**	**935**
% Total Openings		**17%**	**13%**	**15%**	**45%**	**24%**	**16%**	**14%**	**55%**	**100%**	-	-

Table 20: Projected Job Openings (2017 & 2022) – BC

British Columbia	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Yearly Openings*
Management / Administration	5,034	651	446	146	1,243	1,111	625	351	2,087	3,330	66%	333
Production	19,797	2,131	1,477	962	4,570	3,094	1,509	746	5,349	9,919	50%	992
Maintenance	3,600	392	334	375	1,101	549	433	454	1,436	2,537	70%	254
BC Totals	**28,431**	**3,174**	**2,257**	**1,483**	**6,914**	**4,754**	**2,567**	**1,551**	**8,872**	**15,786**	**56%**	**1,579**
% Total Openings		**20%**	**14%**	**9%**	**44%**	**30%**	**16%**	**10%**	**56%**	**100%**		

6.3 Employment in Priority Occupations

As with the previous section covering industry employment, employers and contractors were asked to provide current and projected employment in priority occupations, upon which future projections could be made. Baseline estimates and projections have been developed for each occupation by region and phase of operation (i.e., forestry, logging, road building, multi-phase, and pulp & paper manufacturing). For projection purposes, results are weighted to reflect actual employment by region (2010) and occupation per the Census (2006). Total reported employment for the 26 priority occupations was 2,814 workers in 2012, representing 84% of reported industry employment (Section 5.2.1).

6.3.1 Occupational Employment – Reported

Reported employment by occupation was dominated by logging operations, accounting for more than half of the reported workforce (52%), followed by forestry operations (21%) and road building (13%). Logging operations also encompass the largest number of priority occupations at 11, tilting the results in this direction. By comparison, total employment in forestry & logging and support activities was a combined 62% in 2010.

Figure 45: Occupational Employment by Phase Reported

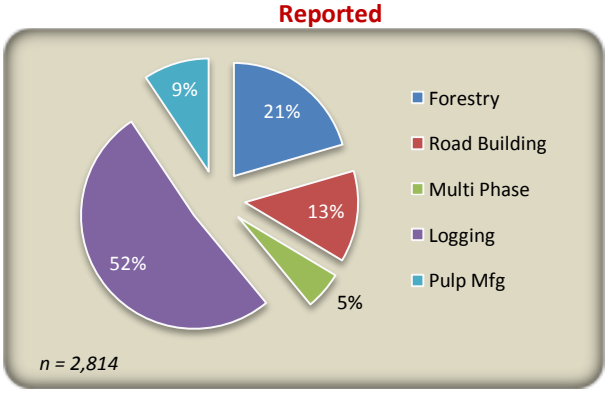
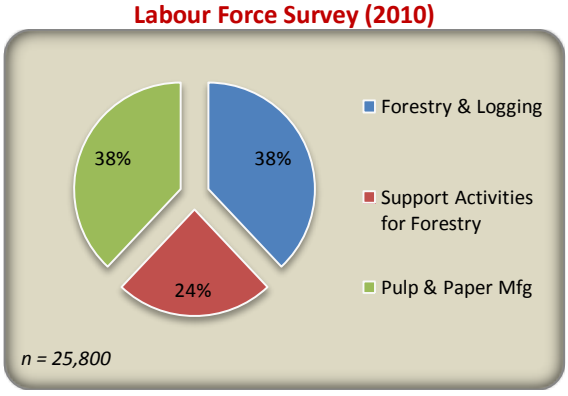


Figure 46: Total Employment by Industry Labour Force Survey (2010)



Regional occupational employment is dominated by Vancouver Island/Coast (58%), with the smaller regions (eg, North Coast, Northeast) being more representative of actual estimated employment (per LFS). For baseline and projection purposes, results are weighted according to regional distributions per the LFS – where the Coast region accounted for 46% of employment and the Interior 54% in 2010. With the exclusion of wood products manufacturing, the Coast accounted for 51% of employment and the Interior 49%. This regional distribution serves as the basis for both baseline and projected employment.

Figure 47: Occupational Employment by Region Reported

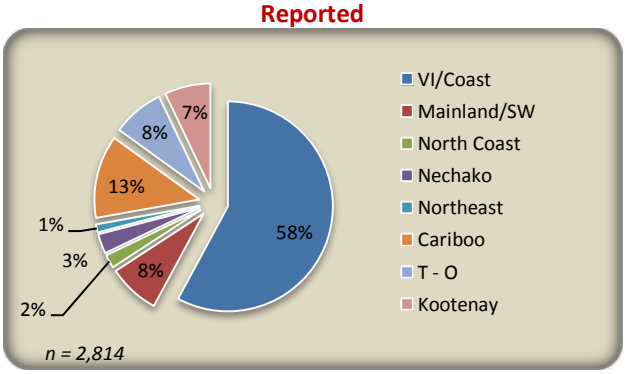


Figure 48: Industry Employment by Region Labour Force Survey (2010)

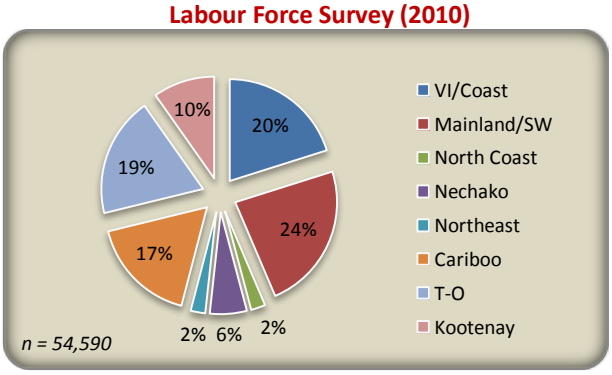


Table 20 identifies employment for each priority occupation as reported by employers and contractors. The Coast forest region accounted for 68% of reported employment and the Interior region 32%. This result contrasts with the broader employment distribution of 46% (Coast) and 54% (Interior) for priority occupations. Across each operational phase, logging employment accounted for the largest share of workers (52%) and multi-phase the lowest (5%). Reported employment from pulp & paper operators is largely limited to VI/Coast, impacting projection analysis for the Interior region in pulp and paper manufacturing.

Table 21: Occupational Employment by Phase and Region – Reported

Occupational Employment	VI/Coast	Mainland/ SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC	% Share
Manager, Forestry Operations	36	10	-	46	5	5	7	7	4	27	73	2.6%
Forestry Professional	96	44	-	139	13	14	11	32	7	77	216	7.7%
Forestry Technician	40	33	-	73	6	4	11	28	40	89	162	5.8%
Forestry Supervisor	10	8	-	18	5	1	18	8	11	43	61	2.2%
Forestry Worker	2	18	-	20	6	2	3	15	20	45	65	2.3%
Forestry	**184**	**112**	**-**	**296 (51%)**	**35**	**25**	**51**	**89**	**82**	**281 (49%)**	**577**	**21%**
Construction Manager	2	3	0	5	-	-	2	3	2	7	12	0.4%
Supervisor, HEO	14	11	0	25	-	4	6	6	6	22	47	1.7%
Drillers & Blasters	62	2	2	66	-	-	-	-	-	-	66	2.3%
HEO	108	12	8	128	5	5	65	20	20	115	243	8.6%
Road Building	**186**	**28**	**10**	**224 (61%)**	**5**	**9**	**73**	**29**	**28**	**144 (39%)**	**368**	**13%**
Master Mechanic	14	1	-	15	1	-	4	3	1	9	24	0.9%
HD Mechanic	100	4	1	106	3	-	14	4	2	23	129	4.6%
Multi-Phase	**115**	**5**	**1**	**121 (79%)**	**4**	**-**	**18**	**7**	**3**	**32 (21%)**	**153**	**5%**
Manager, Logging	18	4	-	22	1	-	3	6	7	17	39	1.4%
Supervisor, Logging	79	5	2	86	3	-	8	7	10	28	114	4.1%
Falling Supervisor	27	2	3	32	1	-	12	5	4	21	53	1.9%
Logging Machinery Operator	211	11	14	236	21	1	81	34	46	183	419	14.9%
Helicopter Pilot	2	2	-	4	-	-	-	0	-	0	4	0.1%
Hand Faller	184	16	2	201	3	0	6	27	8	44	245	8.7%
Ground Worker	69	16	5	90	3	-	19	6	2	30	120	4.3%
Logging Worker	165	15	16	196	-	-	-	2	2	4	199	7.1%
Boom Man	42	2	-	44	-	-	-	0	-	0	44	1.6%
Truck Driver	77	3	5	86	10	0	74	12	8	104	190	6.8%
Tugboat Captain	24	1	-	25	-	-	-	0	-	0	25	0.9%
Logging	**898**	**76**	**47**	**1,021 (70%)**	**42**	**1**	**203**	**99**	**86**	**431 (30%)**	**1,452**	**52%**
Industrial Engineering T&T	10	-	-	10	-	-	-	-	-	-	10	0.4%
Supervisor, Forest Products	16	3	-	19	-	-	-	-	-	-	19	0.7%
Pulp Mill Machine Operator	130	-	-	130	-	-	-	-	-	-	130	4.6%
Millwright	90	-	-	90	-	-	15	-	-	15	105	3.7%
Pulp & Paper	**246**	**3**	**-**	**249 (94%)**	**-**	**-**	**15**	**-**	**-**	**15 (6%)**	**264**	**9%**
Totals (%)	**1,629 (58%)**	**223 (8%)**	**59 (2%)**	**1,911 (68%)**	**86 (3%)**	**35 (1%)**	**360 (13%)**	**224 (8%)**	**199 (7%)**	**904 (32%)**	**2,814 (100%)**	**100%**

6.3.2 Vacancies – Reported

Job vacancies are an important indicator of labour supply conditions within the industry, and can be a sign of skills shortages in particular occupations especially when vacancies persist. In such cases, competition for workers is usually high, both within and across industries, with upward pressure on wages and benefits. Employers and contractors identified a total of 288 vacancies across all 26 occupations, of which 40% were located on VI/Coast and half within logging operations. Note that the survey response was dominated by logging operators on Vancouver Island/Coast.

Figure 49: Occupational Vacancies – Region Reported

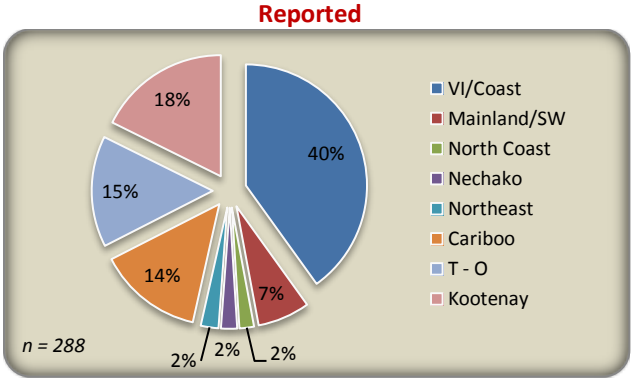
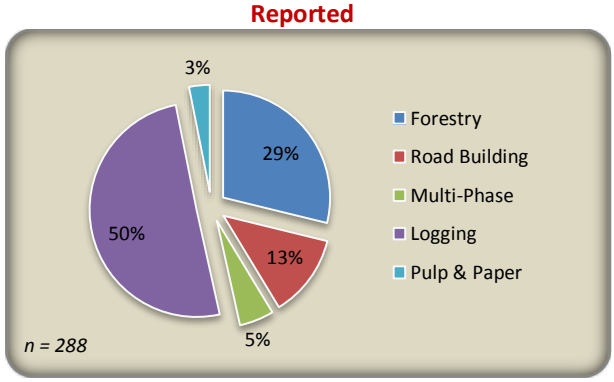
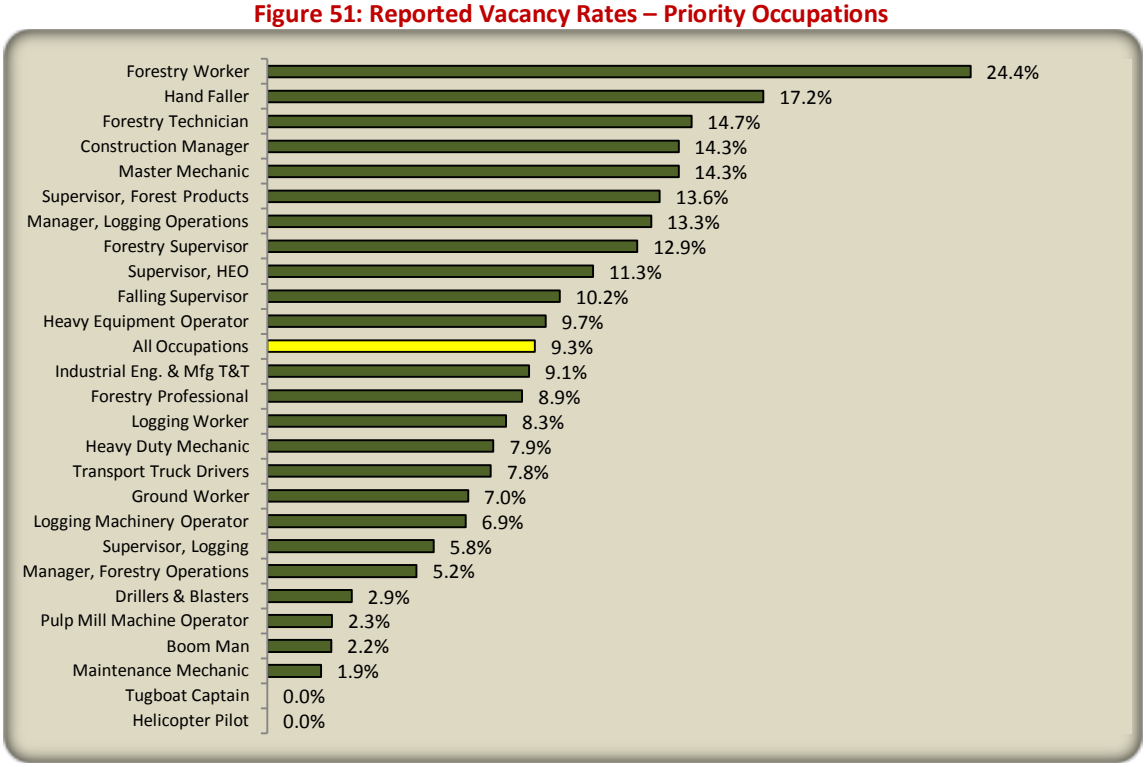


Figure 50: Occupational Vacancies – Phase Reported



The overall vacancy rate for BC was 9.3%, indicative of a general difficulty recruiting workers to fill jobs in priority occupations. As shown in Figure 51, forestry workers experienced the highest vacancy rate (24.4%) at this time – a job that typically does not require significant investment in education and training. Although maintenance mechanics (millwrights) are generally considered difficult to recruit, the low vacancy rate (1.9%) is only reflective of pulp and paper manufacturers, who are experiencing low levels of employment growth at this time. Reported vacancy rates in priority occupations are considered very high relative to the Canadian forest industry's overall vacancy rate of 1.3% in September, 2011 (Statistics Canada).

Figure 51: Reported Vacancy Rates – Priority Occupations



The reported number of vacancies was highest on Vancouver Island/Coast, reflecting the disproportionate share of employment reported in this region. Vacancies overall are roughly evenly distributed between the Coast (141) and Interior (147) regions, yet Interior employers report a far greater challenge filling job vacancies than their Coastal counterparts.

Table 22: Reported Vacancies (#) – Region & Phase

Reported Vacancies (Rate)	VI/Coast	Mainland/ SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry	12	6	-	**18**	3	7	10	22	22	**65**	**83**
Road Building	6	1	0	**7**	1	-	10	8	10	**29**	**36**
Multi-Phase	12	1	1	**14**	0	-	-	1	-	**1**	**15**
Logging	77	12	4	**93**	2	0	20	12	18	**52**	**145**
Pulp & Paper	8	1	-	**9**	-	-	-	-	-	**-**	**9**
Total Vacancies	**115**	**20**	**6**	**141**	**6**	**7**	**40**	**43**	**51**	**147**	**288**

Among BC operators, forestry companies face the highest vacancy rate (13%), and pulp and paper manufacturers the lowest (3%). Interior operators face a major recruitment challenge at this time, with a vacancy rate of 14.0% – more than double the Coast (6.9%). In the Kootenay region, one-in-five jobs are going unfilled at this time, with similar challenges in Thompson-Okanagan and Northeast. Forestry and road building companies in the Interior are particularly challenged filling vacant positions, while logging companies and others on the Coast face a shortage of master and heavy duty mechanics (multi-phase).

Table 23: Reported Vacancy Rates (%) – Region & Phase

Vacancy Rates (%)	VI/Coast	Mainland/ SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry	6%	5%	-	**6%**	8%	21%	17%	20%	21%	**19%**	**13%**
Road Building	3%	3%	3%	**3%**	17%	0%	12%	22%	27%	**17%**	**9%**
Multi-Phase	9%	10%	47%	**10%**	2%	-	0%	13%	0%	**3%**	**9%**
Logging	8%	14%	8%	**8%**	5%	2%	9%	11%	18%	**11%**	**9%**
Pulp & Paper	3%	25%	-	**3%**	-	-	-	-	-	**0%**	**3%**
Regional Vacancy Rates	**6.6%**	**8.3%**	**8.7%**	**6.9%**	**6.8%**	**16.3%**	**10.1%**	**16.0%**	**20.4%**	**14.0%**	**9.3%**

The total number of reported jobs (employment + vacancies) in priority occupations was 3,102, of which more than half (56%) were identified by companies operating on Vancouver Island/Coast.

Table 24: Reported Total Jobs (Employment + Vacancies) – Region & Phase

Total Jobs	VI/Coast	Mainland/ SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry	196	118	-	**314**	38	32	61	111	105	**346**	**660**
Road Building	192	29	11	**231**	6	9	83	37	38	**173**	**404**
Multi-Phase	127	5	3	**135**	4	-	18	8	3	**33**	**168**
Logging	975	87	51	**1,114**	44	1	223	111	105	**483**	**1,597**
Pulp & Paper	254	4	-	**258**	-	-	15	-	-	**15**	**273**
Totals (% Distribution)	**1,744 (56%)**	**243 (8%)**	**64 (2%)**	**2,052 (66%)**	**92 (3%)**	**42 (1%)**	**400 (13%)**	**267 (9%)**	**250 (8%)**	**1,050 (34%)**	**3,102 (100%)**

6.3.3 Occupational Baseline Estimate (2012)

Total forestry employment in the 26 priority occupations (excluding solid wood manufacturers) is estimated at 16,354 workers in 2012 – representing 58% of total industry employment (28,431). This contrasts with total *reported* employment in priority occupations, which accounted for 84% of total industry employment (Section 5.3.1). Census estimates were therefore used to develop the occupational baseline and projections, as survey results were not considered representative of all occupations or the broader industry.

The 2012 share of total employment is equivalent to that in 2006, where employment in priority occupations was 24,380 workers. Similarly, the share of employment *each* occupation represents in 2012 is also equivalent to that in 2006. The distribution of employment for each priority occupation between the Coast and Interior regions is 46%–54%, based on Labour Force Survey estimates (2010). Two exceptions to this assumption are tugboat captains and boom men who are predominantly employed (i.e., 70%) in the Coastal region.

Table 24 presents the occupational baseline for 2012. For illustrative purposes, the baseline estimate has been developed using the "reported" number of workers per the survey of employers and contractors, and the "actual" baseline per the 2006 Census. Baseline estimates (actual) are presented by forest region and operational phase.

Logging companies account for nearly two-thirds (63%) of total employment in priority occupations, followed by forestry operators (19%). Logging machinery operators and truck drivers account for 30% of all priority workers.

Table 25: Occupational Baseline Estimate (2012)

Priority Occupation	Baseline (Survey)			Baseline (Actual)				
	Reported Employment		Estimated Employment	2006 Employment		BC Estimate	Coast Estimate	Interior Estimate
	#	%	#	#	%	#	#	#
Manager, Forestry Operations	73	2.6%	424	491	2.0%	330	152	178
Forestry Professional	216	7.7%	1,255	1,365	5.6%	915	421	494
Forestry Technician	162	5.8%	941	1,682	6.9%	1,128	519	609
Forestry Supervisor	61	2.2%	355	373	1.5%	250	115	135
Forestry Worker	65	2.3%	378	735	3.0%	493	227	266
Forestry	**577**	**20.5%**	**3,353**	**4,645**	**19.1%**	**3,116**	**1,433**	**1,683**
Construction Manager	12	0.4%	70	44	0.2%	30	14	16
Supervisor, HEO	47	1.7%	273	83	0.3%	56	26	30
Drillers & Blasters	66	2.3%	384	75	0.3%	50	23	27
Heavy Equipment Operator	243	8.6%	1,412	892	3.7%	598	275	323
Road Building	**368**	**13.1%**	**2,139**	**1,094**	**4.5%**	**734**	**338**	**396**
Master Mechanic	24	0.9%	139	89	0.4%	60	27	32
HD Mechanic	129	4.6%	750	819	3.4%	549	253	296
Multi-Phase	**153**	**5.4%**	**889**	**907**	**3.7%**	**609**	**280**	**329**
Manager, Logging	39	1.4%	227	265	1.1%	177	82	96
Supervisor, Logging	114	4.1%	663	690	2.8%	463	213	250
Falling Supervisor	53	1.9%	308	318	1.3%	213	98	115
Logging Machinery Operator	419	14.9%	2,435	4,742	19.4%	3,181	1,463	1,718
Helicopter Pilot	4	0.1%	23	60	0.2%	41	19	22
Hand Faller	245	8.7%	1,424	1,840	7.5%	1,234	568	667
Ground Worker	120	4.3%	697	906	3.7%	608	280	328
Logging Worker	199	7.1%	1,157	3,045	12.5%	2,043	940	1,103
Boom Man^	44	1.6%	256	687	2.8%	461	322	138
Truck Driver	190	6.8%	1,104	2,690	11.0%	1,805	830	974
Tugboat Captain^	25	0.9%	145	52	0.2%	35	24	10
Logging	**1,452**	**51.6%**	**8,439**	**15,295**	**62.7%**	**10,260**	**4,838**	**5,421**
Industrial Engineering T&T	10	0.4%	58	70	0.3%	47	22	26
Supervisor, Forest Products	19	0.7%	110	666	2.7%	447	206	241
Pulp Mill Machine Operator	130	4.6%	756	245	1.0%	164	76	89
Millwright	105	3.7%	610	1,451	6.0%	973	448	526
Pulp	**264**	**9.4%**	**1,534**	**2,433**	**10.0%**	**1,632**	**751**	**881**
Totals	**2,814**	**100%**	**16,354**	**24,380**	**100%**	**16,350**	**7,640**	**8,710**
%			**100%**			**100%**	**47%**	**53%**

^ Coast estimate revised to 70%

6.3.4 Occupational Employment Projections (2017 & 2022)

Occupational employment projections are based on annual growth rates as reported by employers and contractors. Five-year projections and associated growth are provided for the 2017 and 2022 horizons by forest region and operational phase. Regional totals may not add up to BC totals due to rounding and extrapolation from small sample sizes.

Growth Forecast (Coast)

- Occupational employment for the Coast region is expected to increase by 10%, or 1.0% annually through 2022 – most of which will occur over the next five years (6%).
- Growth is expected to be highest in forestry occupations (2.1% annually), where employment among forestry supervisors and forestry workers is expected to increase by at least 10% each year through 2022.
- High demand occupations in logging include falling supervisors (7.8%) and hand fallers (5.6%). Zero employment growth is projected in pulp and paper occupations.
- The Coast forest region's share of total employment in priority occupations is projected to decline from 47% in 2012 to 40% by 2022. Employment growth in the Interior is projected to far outpace the Coast over the next decade, particularly over the next five years.

Table 26: Occupational Employment Projections – Coast (2013-2022)

Operational Phase	2012	2017	% Growth (5 Years)	2022	% Growth (10 Years)	Annual Average (10 Yr)
Forestry	1,433	1,449	1%	1,740	20%	2.1%
Road Building	338	371	10%	361	-3%	0.7%
Multi-Phase	280	304	8%	328	8%	1.7%
Logging	4,838	5,206	8%	5,252	1%	0.8%
Pulp & Paper	751	751	0%	751	0%	0.0%
Coast Totals % BC	**7,640 (47%)**	**8,080 (41%)**	**6%**	**8,432 (40%)**	**4%**	**1.0%**

See Appendix A for detailed occupational employment projections – Coast

Growth Forecast (Interior)

- Occupational employment in the Interior forest region is expected to increase by a total of 40% by 2022, or 4.0% annually over the next 10 years. The vast majority of growth (37%) is expected to occur over the next 5 years.
- Growth is projected across all operational phases, ranging from 3.1% annually in multi-phase operations to 4.4% in forestry.
- Over the next 10 years, occupational growth is projected highest among construction managers (8.6% annually), hand fallers (7.2% annually), and truck drivers (6.8% annually). Similarly, employment demand for logging workers is projected to nearly double (94%) in the next five years then fall by 57% through 2022.

- The Interior forest region's share of total industry employment in priority occupations is projected to grow to 60% by 2022. The industry will be particularly challenged meeting projected employment requirements over the next five years.

Table 27: Occupational Employment Projections – Interior (2013-2022)

Operational Phase	2012	2017	% Growth (5 Years)	2022	% Growth (10 Years)	Annual Average (10 Yr)
Forestry	1,683	2,243	33%	2,490	11%	4.4%
Road Building	396	493	24%	552	12%	3.6%
Multi-Phase	329	390	19%	439	13%	3.1%
Logging	5,421	7,748	43%	7,609	-2%	4.1%
Pulp & Paper	881	1,056	20%	1,232	17%	3.6%
Interior Totals (% BC Forestry)	**8,710 (53%)**	**11,930 (59%)**	**37%**	**12,321 (60%)**	**3%**	**4.0%**

See Appendix B for detailed occupational employment projections – Interior

Growth Forecast (BC)

- Occupational employment for BC is expected to increase by 26% by 2022, or 2.6% annually over the next 10 years. The majority of projected growth is expected to occur in the 2013-2017 period (22%), driven largely by expansion in the Interior.
- Growth is projected across all operational phases, ranging from 2.0% annually in pulp and paper manufacturing to 3.3% in forestry operations.
- Occupational growth is projected highest among forestry workers (8.5%), hand fallers (6.4%), and forestry supervisors (6.2%). Negative growth is projected for tugboat captains (-1.0%) logging supervisors (-0.8%) and drillers & blasters (-0.2%).
- Apart from millwrights, zero growth is projected in pulp & paper occupations (no data).

Table 28: Occupational Employment Projections – BC (2013-2022)

Operational Phase (BC)	2012	2017	% Growth (5 Years)	2022	% Growth (10 Years)	Annual Average (10 Yr)
Forestry	3,116	3,691	18%	4,229	15%	3.3%
Road Building	734	864	18%	912	6%	2.3%
Multi-Phase	609	694	14%	767	11%	2.5%
Logging	10,260	12,930	26%	12,846	-1%	2.5%
Pulp & Paper	1,632	1,807	11%	1,982	10%	2.0%
BC Totals	**16,350**	**19,986**	**22%**	**20,737**	**4%**	**2.6%**

See Appendix C for detailed occupational employment projections – BC

6.3.5 Projected Job Openings (2017 & 2022)

Projected job openings for priority occupations have been developed for each forest region over the 2013-17 and 2018-22 horizons, based on reported annual employment growth, retirements and attrition. In cases where growth and attrition rates were not reported by employers (i.e., pulp and paper occupations), corresponding rates in similar occupations were adopted.

Jobs Forecast (Coast)

- A total of 4,529 job openings are projected for the Coast forest region over the next 10 years, or 450 jobs annually through 2022.
- More than 80% of projected openings will be due to retirements and other attrition in coastal operations.
- Job openings are projected to be highest in multi-phase operations (7.3% annually) and lowest in pulp and paper manufacturing (3.7% annually).
- Annual job openings are projected highest for forestry and falling supervisors (both 13.7%), and lowest for millwrights (2.9%) and forestry professionals (2.7%).

Table 29: Projected Job Openings in Priority Occupations – Coast (2013-2022)

Coast	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Average (10 Yr)*
Forestry	1,433	39	181	15	236	183	129	291	603	839	59%	5.9%
Road Building	338	43	16	33	92	107	26	(10)	123	215	64%	6.4%
Multi-Phase	280	51	24	24	98	64	18	25	107	205	73%	7.3%
Logging	4,838	752	370	368	1,490	1,102	350	46	1,498	2,988	62%	6.2%
Pulp & Paper	751	92	22	-	114	135	32	-	167	281	37%	3.7%
Coast Totals	**7,640**	**977**	**613**	**441**	**2,031**	**1,591**	**555**	**352**	**2,497**	**4,529**	**59%**	**5.9%**
%		**22%**	**14%**	**10%**	**45%**	**35%**	**12%**	**8%**	**55%**	**100%**		

See Appendix D for detailed job openings in priority occupations – Coast

Jobs Forecast (Interior)

- A total of 7,287 job openings are projected for the Interior forest region over the next 10 years, an average of 730 jobs each year through 2022.
- In contrast with the Coast where projected jobs are driven primarily by replacement demand, half of job openings in the Interior are driven by employment growth, most of which will occur over the next five years. Employment growth is projected to fall sharply in the 2018-2022 period (5%), led by declining employment among logging workers.
- Job openings are projected to be above 8% each year in all phases of production, led by road builders at 9.3%.
- Annual job openings are among the highest for construction managers (12.9%), truck drivers (12.5%), and millwrights (11.3%).

Table 30: Projected Job Openings in Priority Occupations – Interior (2013-2022)

Interior	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Annual Average (10 Yr)*
Forestry	1,683	88	138	560	786	184	160	247	591	1,377	82%	8.2%
Road Building	396	52	41	97	190	71	48	59	177	367	93%	9.3%
Multi-Phase	329	68	16	61	145	80	4	49	133	279	85%	8.5%
Logging	5,421	407	560	2,326	3,293	651	685	(139)	1,197	4,491	83%	8.3%
Pulp & Paper	881	73	14	175	263	141	195	175	511	774	88%	8.8%
Interior Totals	**8,710**	**688**	**769**	**3,220**	**4,677**	**1,128**	**1,091**	**391**	**2,610**	**7,287**	**84%**	**8.4%**
(%)		**9%**	**11%**	**44%**	**64%**	**15%**	**15%**	**5%**	**36%**	**100%**		

See Appendix E for detailed job openings priority occupations – Interior

Jobs Forecast (BC)

- Close to 12,000 job openings in priority occupations are projected across BC over the next 10 years, representing 72% of 2012 occupational employment.
- The majority (63%) of job openings will be driven by job replacements.
- Logging operations account for more than 60% of total job openings, followed by forestry operations (19%).
- Annual job openings are projected to range from 6.8% in pulp and paper manufacturing to 8.0% in multi-phase operations.
- Annual job openings are projected highest for hand fallers (10.6%), construction managers (10.6%), forestry supervisors (10.4%) and truckers (9.8%), and lowest for logging supervisors (3.3%).

Table 31: Projected Job Openings in Priority Occupations – BC (2013-2022)

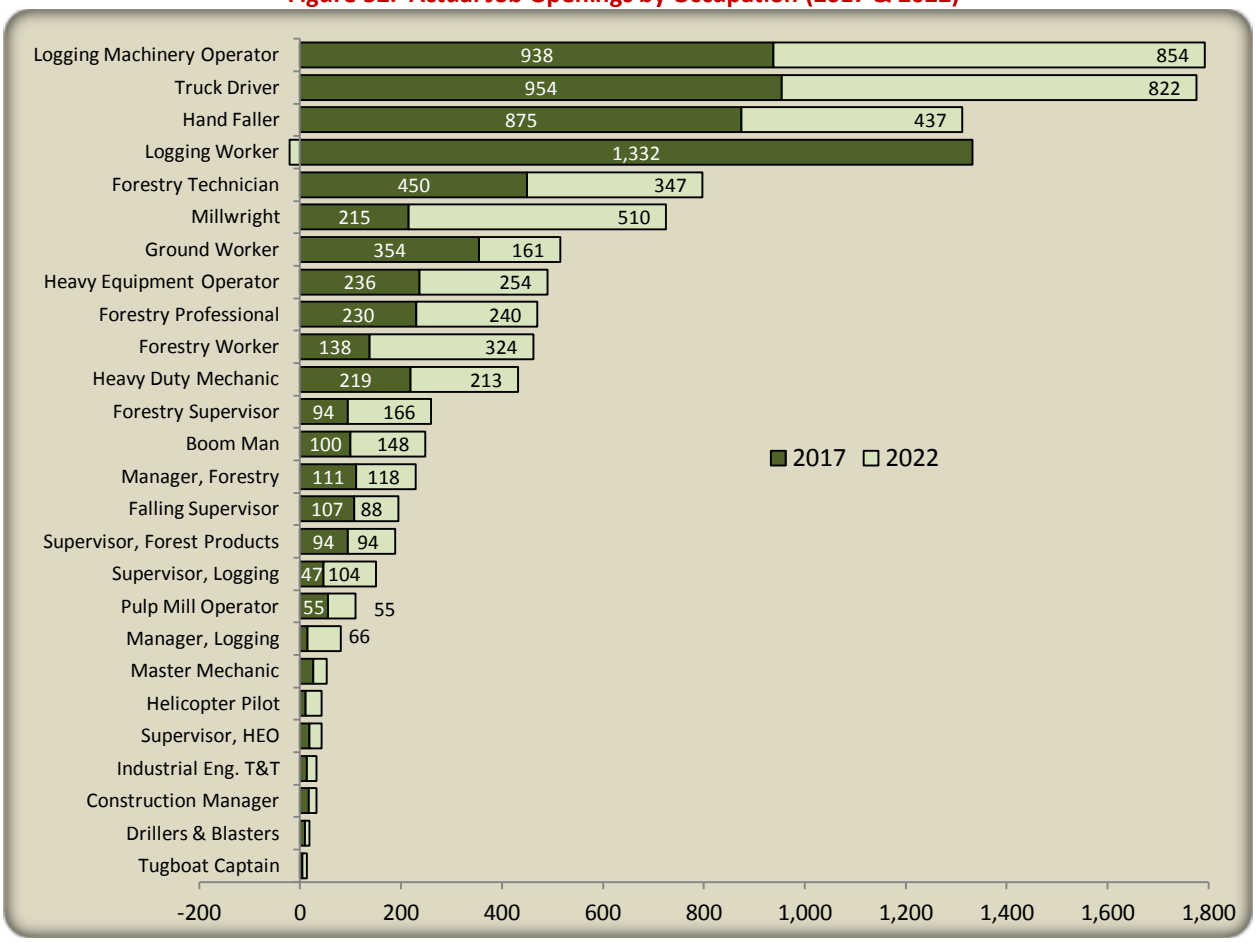
BC	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Annual Average (10 Yr)*
Forestry	3,116	129	319	575	1,023	367	289	538	1,194	2,217	71%	7.1%
Road Building	734	95	56	130	282	178	73	48	300	582	79%	7.9%
Multi-Phase	609	119	40	85	245	145	22	74	240	485	80%	8.0%
Logging	10,260	1,150	918	2,670	4,738	1,742	1,039	(84)	2,698	7,435	72%	7.2%
Pulp & Paper	1,632	166	38	175	378	276	228	175	679	1,057	65%	6.5%
BC Totals	**16,350**	**1,658**	**1,372**	**3,636**	**6,666**	**2,708**	**1,651**	**751**	**5,111**	**11,776**	**72%**	**7.2%**
%		**14%**	**12%**	**31%**	**57%**	**23%**	**14%**	**6%**	**43%**	**100%**		

See Appendix F for detailed job openings priority occupations – BC

6.3.6 Summary – Job Openings

The total demand (growth + attrition) for workers is projected highest for logging machinery operators (1,792), truck drivers (1,776), hand fallers (1,312), logging workers (1,311), and forestry technicians (797) over the next five and 10 years. Each of these occupations is unique to forestry and logging.

Figure 52: Actual Job Openings by Occupation (2017 & 2022)



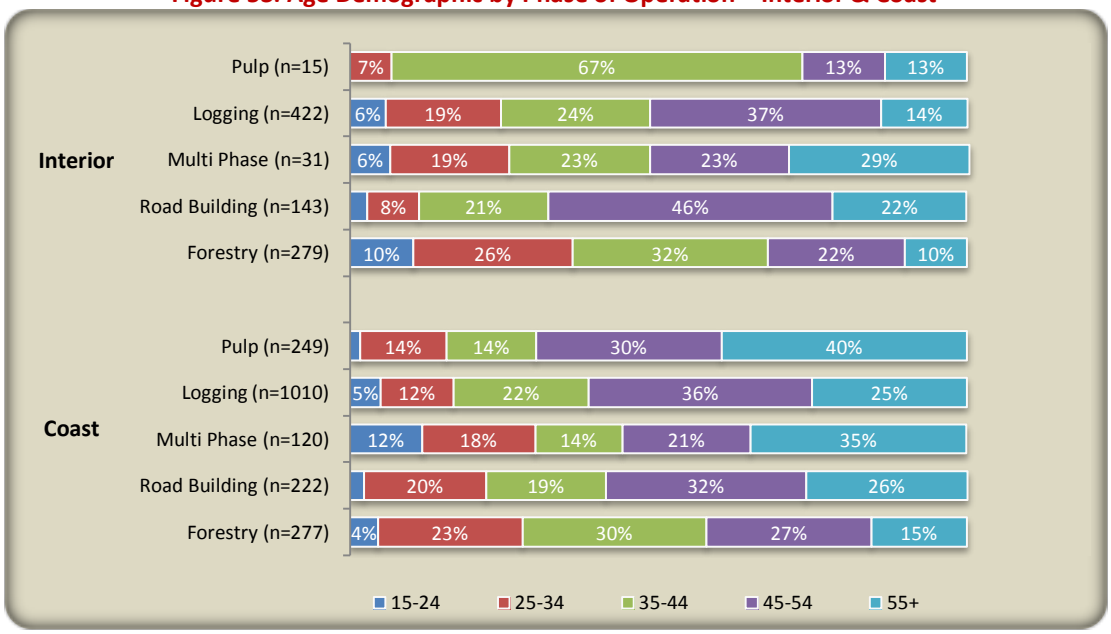
6.4 Workforce Characteristics

Employers and contractors were asked to provide details on their existing workforces (priority occupations) to help define the demographic, training and recruitment challenges facing employers. The industry is emerging from a protracted period of economic and employment stagnation, and now faces the challenge of rebuilding its workforce to help meet future requirements. The following section examines workforce demographics and human resource issues within the industry, and variations that that exist by forest region and phase of operation.

6.4.1 Age Demographic

The BC forest industry workforce is largely comprised of older workers, with 55% of workers at least 45 years of age and only 5% of workers under 24 years. Pulp and paper manufacturers on the Coast reported that 70% of their workforce is 45 years and older, including 40% that are at least 55 years. Logging road builders in the Interior are similarly challenged, as close to seven-in-ten workers are 45 years and older. Employers in forestry and multi-phase operations would appear to be more successful attracting a younger cohort of workers. The inability to attract younger workers to all operational phases exacerbates the replacement challenge facing the industry.

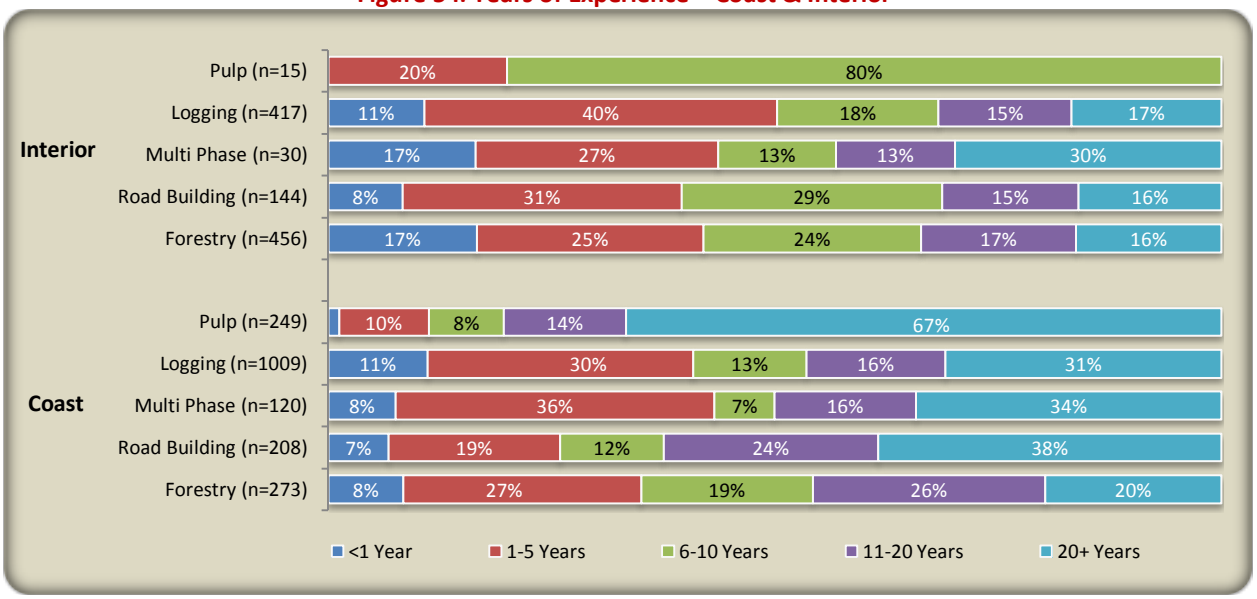
Figure 53: Age Demographic by Phase of Operation – Interior & Coast



6.4.2 Work Experience

An older workforce is typically experienced and capable of mentoring and training new entrants into the industry. Close to 30% of workers have more than 20 years experience working in BC's forest industry, and just 10% with less than one year of experience. Pulp and paper manufacturers on the Coast employ the most experienced workforce with more than four-in-five workers having at least 10 years of experience. All other phases of operation employ what appears as a healthy mix of experienced and less experienced workers.

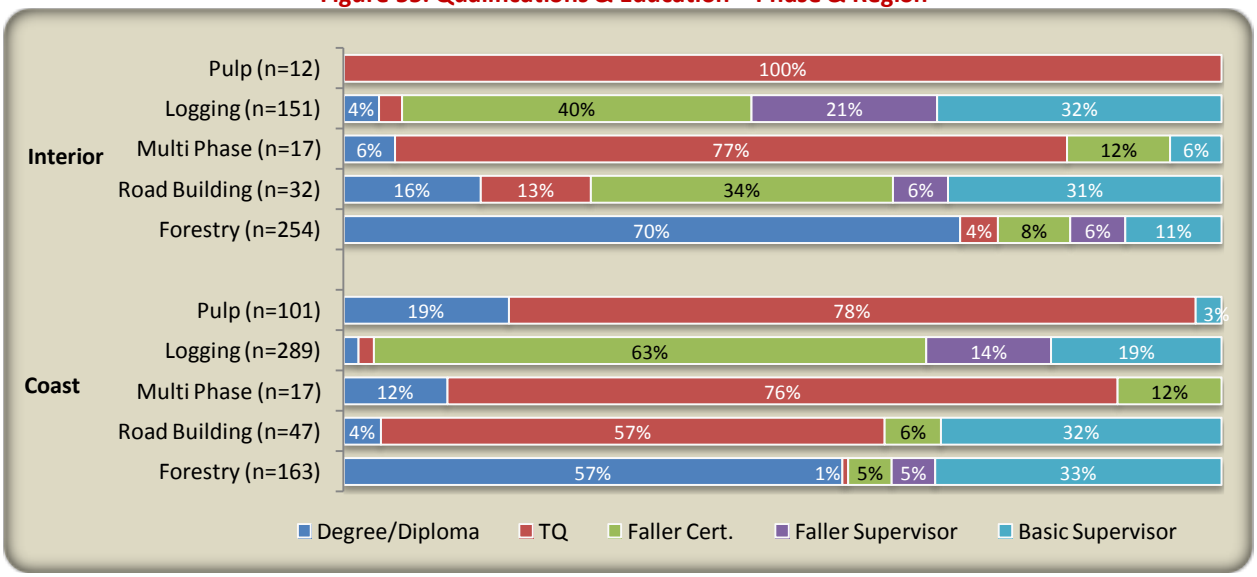
Figure 54: Years of Experience – Coast & Interior



6.4.3 Education & Training

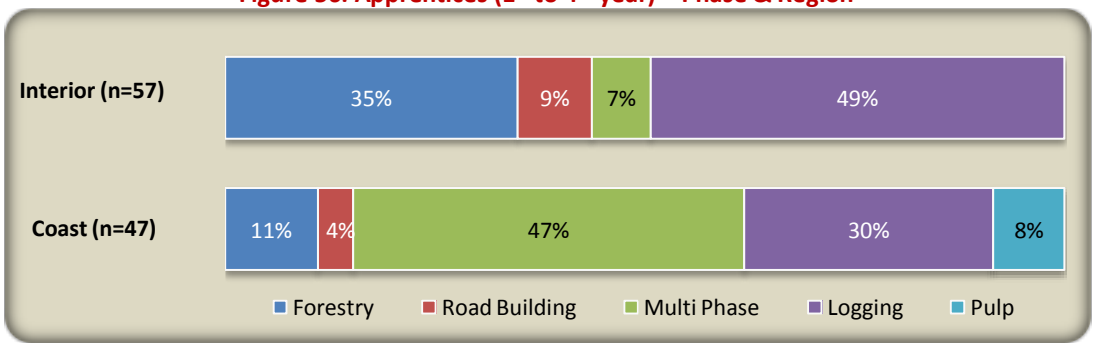
Workers in priority occupations possess a range of degrees, diplomas and certificates that assist workers in performing jobs safely and competently. Pulp and paper manufacturers, multi-phase operators and road builders employ a large number of workers with trade qualifications, while forestry workers in regulated occupations (professional foresters, technicians and technologists) possess degrees and/or diplomas. With the introduction of faller certification and related supervisory certification through the BC Forest Safety Council, more workers in logging operations are now certified to work and/or supervise to industry standards.

Figure 55: Qualifications & Education – Phase & Region



Employers and contractors indicated that they currently employ a total of 107 apprentices (3.7% of reported employment) in various trades, distributed fairly evenly between the Coast and the Interior. Logging operators employ the largest combined share of apprentices at this time, yet they did not indicate they employed qualified journeypersons (i.e., TQs as above). Similarly forestry operators throughout BC currently employ 25 apprentices. It is possible that some of these workers are graduates of entry level programs and recognized as first year apprentices. Although pulp and paper manufacturers rely quite heavily on skilled trades workers, they currently do not employ many apprentices (8% in the Coast).

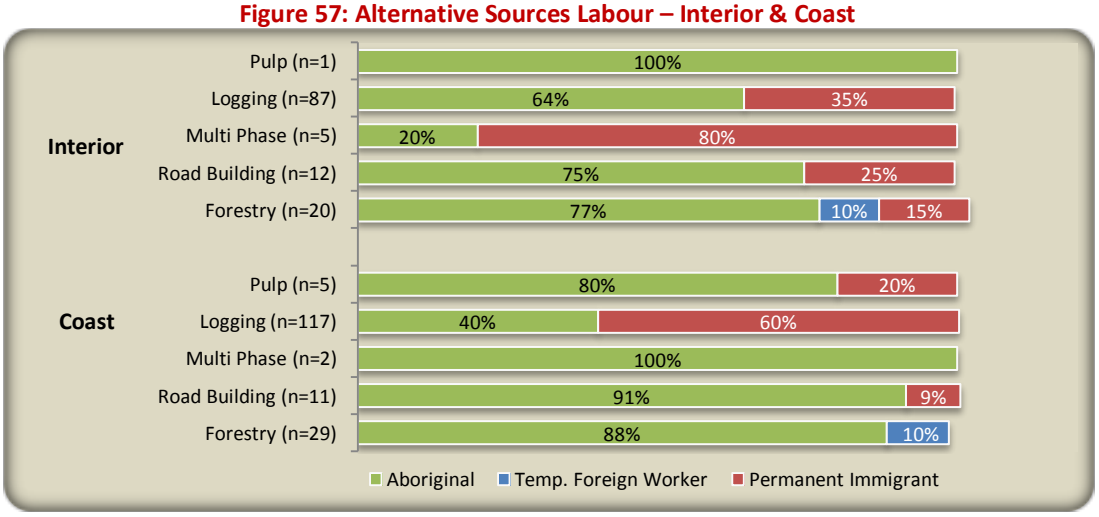
Figure 56: Apprentices (1st to 4th year) – Phase & Region



6.4.4 Alternative Sources of Labour

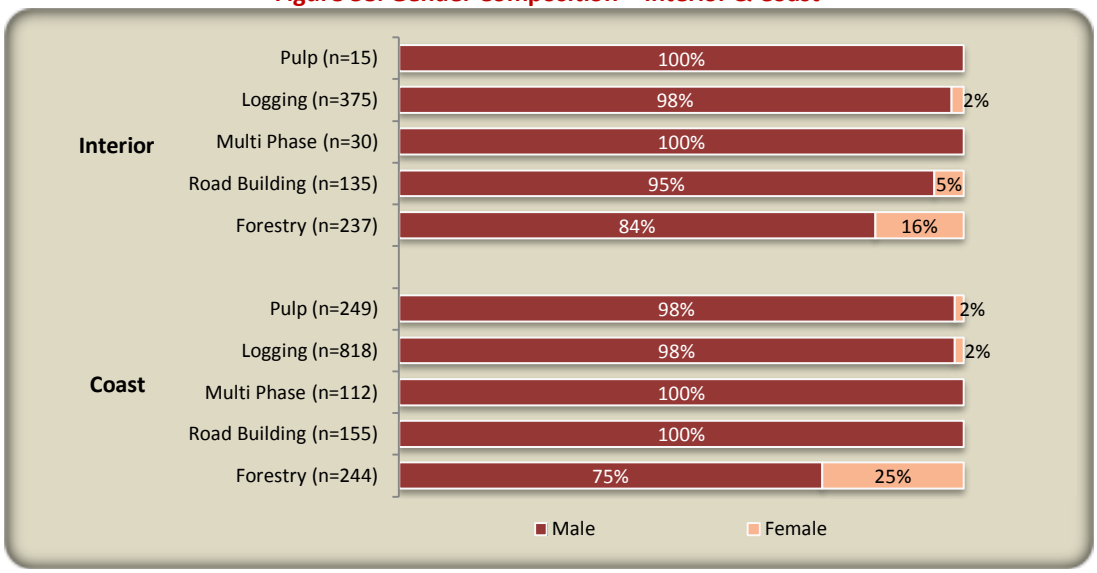
The majority of workers employed in the forest industry are typically recruited from the local workforce, including many high school completers in entry-level positions. Underrepresented groups, including Aboriginal, immigrant and female workers do not constitute a significant portion of the sector workforce. While the share of Aboriginal workers is growing, employers indicated that just 6% of the reported workforce (n=2,814) was Aboriginal and 4% permanent immigrants (note that many employers do not keep such records). Aboriginal workers are mostly employed in forestry and logging operations, while permanent immigrants are more concentrated in logging, particularly on the Coast. BC forest industry employers do not engage temporary foreign workers in a significant way at this time.

Figure 57: Alternative Sources Labour – Interior & Coast



Employers reported that women comprise 5% of the Coast workforce and 3% of the Interior workforce (n=130). The only phase of operation in which women have a significant role is in forestry (e.g., forestry worker), where women make up 25% of the Coast workforce and 16% of the Interior workforce. All other phases of operation are dominated by male workers.

Figure 58: Gender Composition – Interior & Coast



6.5 Independent Contractors & Employed Fallers

The forest industry in BC has undergone significant organizational and structural changes over the past several decades, as it attempts to compete and remain relevant in the global economy. One of the major decisions taken by government and industry back in the late 1980s was to enshrine in legislation "guaranteed" work for timber harvesters through long term tenure rites (usually 25 years). This enabled large tenure holders the ability to reduce or eliminate their own harvest workforces, while hiring them back on contract over the term of the tenure. It was described as the "evergreen" contract, as tenure holders had guaranteed access to a contract workforce capable of harvesting timber as required.

The outcome of this decision has resulted in a workforce now dominated by contractors responsible for all aspects of the timber harvest on public land. Initially it was seen as a financial boon to the harvest workforce, as the financial rewards were higher for contractors than for employed workers. In time, however, the benefits began to diminish as the contracted workforce faced fewer working days throughout the year, resulting in diminished financial reward and uncertainty of work. Today, this relationship between the contract workforce and forest tenure holders is seen as a major impediment to workforce stability amongst harvesting operators.

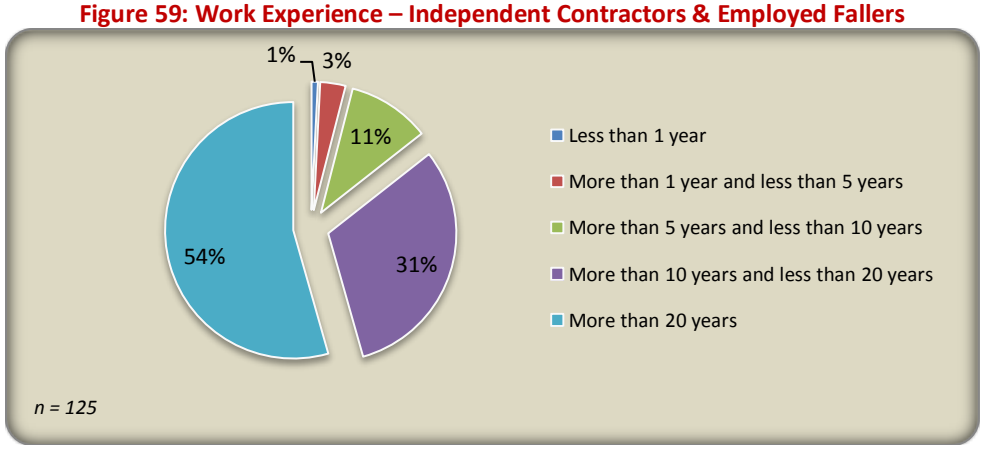
As part of the survey of employers and contractors, independent and employed fallers were invited to respond to questions specific to their work and operations. The survey response included 62 completions from independent falling contractors and 63 responses from employed fallers (n=125). The median age of this group was 51 years, highlighting the aging demographic and pending need to replace older workers with new entrants. The majority (95%) are active hand fallers, most of whom have been

certified by industry over the past decade. The vast majority of independent contractors (98%) are also SAFE certified companies through the BC Forest Safety Council.

6.5.1 Work Experience

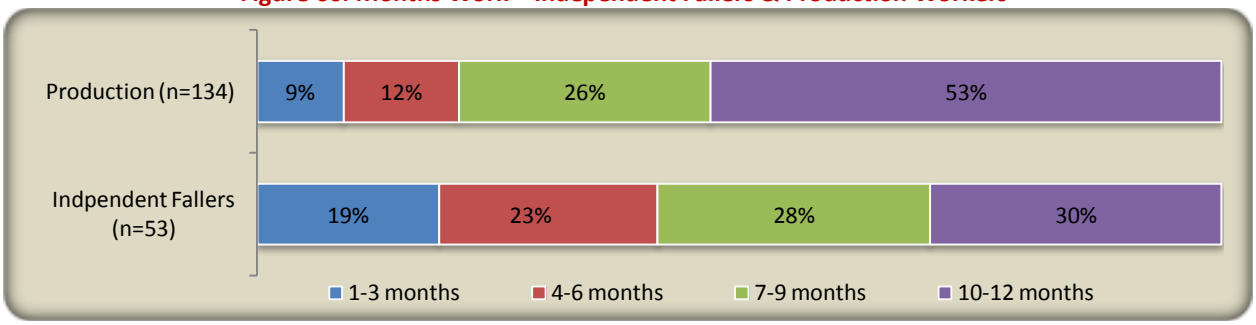
The vast majority (85%) of fallers have at least 10 years experience in the field, including 54% with over 20 years experience.

Figure 59: Work Experience – Independent Contractors & Employed Fallers



Less than one-third (30%) of independent fallers indicated that they worked year round, reflecting the inconsistent nature of the work. Compared to production workers employed throughout the forest sector (including employed fallers), more than half (53%) of these workers were employed year round.

Figure 60: Months Work – Independent Fallers & Production Workers



6.5.2 Qualifications in Tree Falling

The BC Forest Safety Council (BCFSC) sponsors various certification programs to ensure the work of fallers is performed safely and to industry standards. Since 2003, it is mandatory to be certified to perform work as a hand faller in British Columbia. Certified fallers are limited to working in conditions to which they are qualified, including slope of the terrain and tree size limits. Close to half (45%) of certified fallers who participated in the survey were qualified to work on slopes of 60° degrees or greater, while 44% were qualified to fall trees over 60 inches in diameter.

Figure 61: Maximum Slope Limit

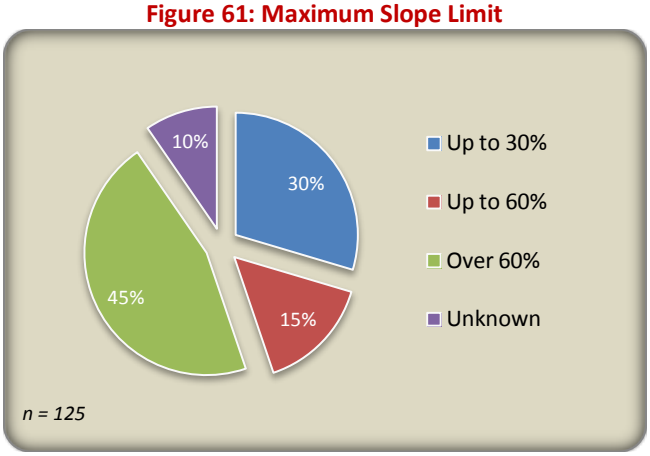
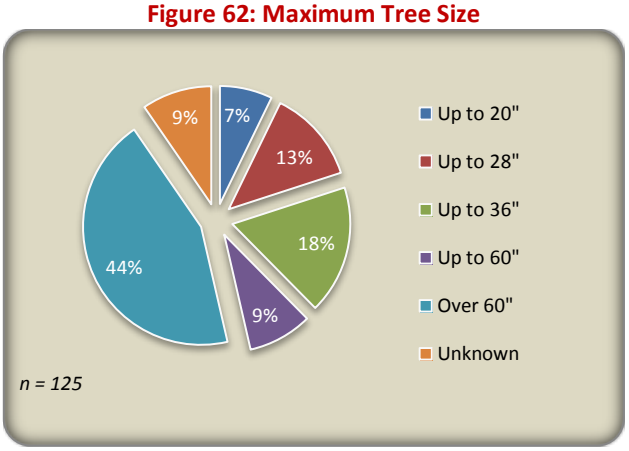


Figure 62: Maximum Tree Size

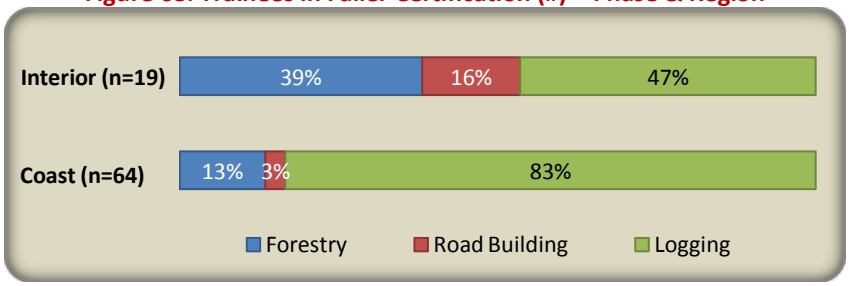


In addition to the hand faller program, the BCFSC sponsors other certification programs for supervisors, including the Basic Forest Supervisor Training and Falling Supervisor Training programs. Among the 125 independent and employed fallers surveyed, 31% indicated that they had completed the Basic Forest Supervisor Training program and 29% had completed the Falling Supervisor Training program.

6.5.3 Current Trainees

Age demographics among certified tree fallers highlight the importance of recruiting new entrants into the workforce. Employers from throughout the forest sector were asked to identify the number of workers currently registered in BCFSC programs. Employed hand fallers and ground workers made up about one-quarter (24%) of the reported occupational workforce (n=2,814). Employers indicated that 83 workers were currently registered in the faller certification program, including 64 in Coastal operations.

Figure 63: Trainees in Faller Certification (#) – Phase & Region



Another 56 workers were registered in BCFSC's Faller Supervisor program, with the majority of registrations coming from Coastal operations. Workers registered in the Basic Forest Supervisor totalled 112, with a significant number employed in forestry operations across the province. Workers employed in logging and forestry operations dominate registrations in both programs.

Figure 64: Faller Supervisor (#) – Phase & Region

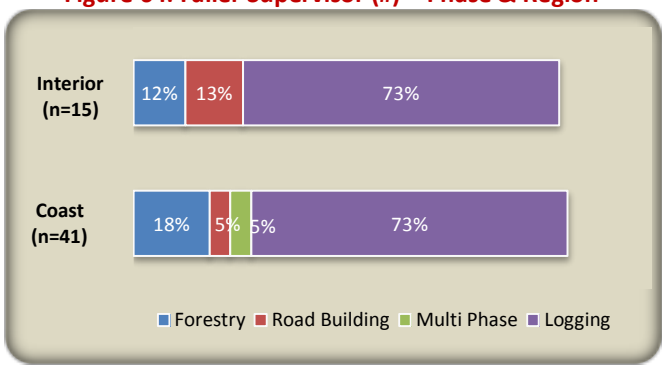
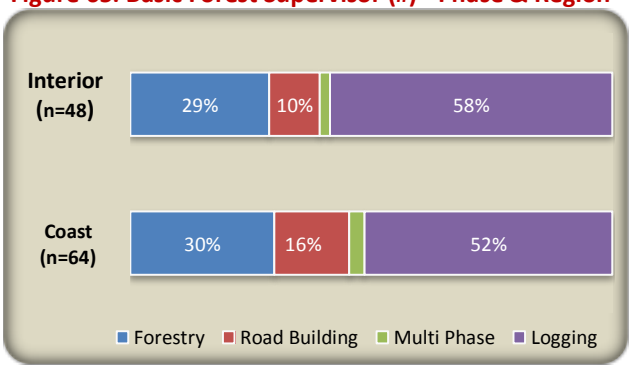


Figure 65: Basic Forest Supervisor (#) - Phase & Region



6.5.4 Implications for Workforce Development

Independent contractors and employed fallers are critical to the health of the forest industry as they are on the front lines of timber harvest and processing activities throughout the province. The work is dangerous, cyclical in nature and employment can be sporadic depending on economic and other conditions. Attracting competent and qualified new entrants to the workforce is essential to the sustainability of the industry.

The forest industry continues to take steps to ensure the safety of the harvest workforce with the introduction of mandatory certification for fallers, supervisors and others. While a necessary step, additional efforts will be needed to continuously promote recruitment of new hand fallers, supervisors, log truck haulers and others needed in the timber harvest process. This may require a change in the relationship between harvesting contractors and tenure holders that would help promote the forest industry as a safe and stable career option amongst youth and others.

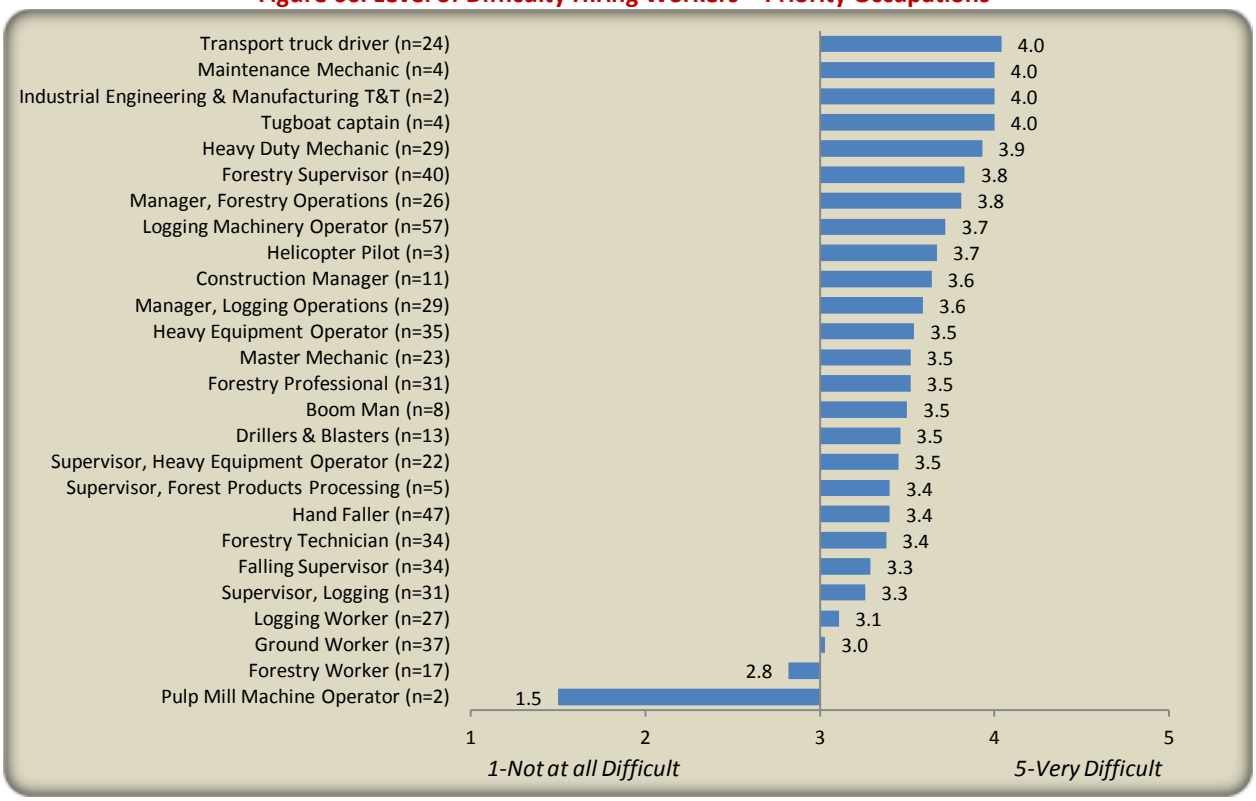
6.6 Human Resource & Training Challenges

Employers were asked to indicate their opinion on a scale of 1 to 5 (i.e., agreement or otherwise) on a series of questions related to the recruitment and training of workers in priority occupations. Based on aggregated results, a mean score is calculated where, for example, a score of 3 would suggest that 50% of respondents agree and 50% do not agree with a particular statement.

6.6.1 Difficulty Hiring New Workers

With the exception of pulp mill operators and forestry workers, the majority of employers indicated that it was difficult hiring workers in priority occupations, particularly truck drivers, millwrights and technicians & technologists, all of which require some formal training. Competition for workers from other industries was cited as the primary reason for hiring difficulties (41%), followed by remote work locations (31%) and a lack of long term/consistent employment (28%).

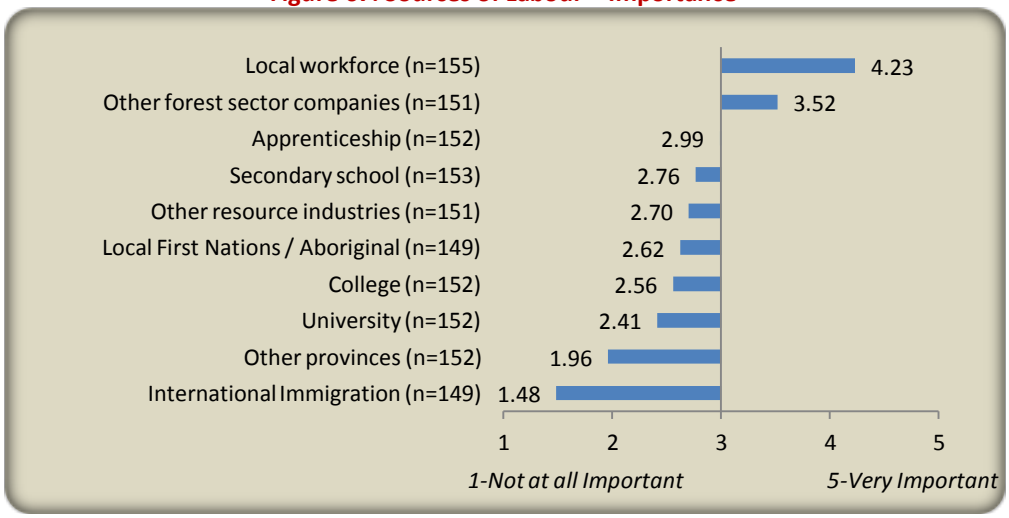
Figure 66: Level of Difficulty Hiring Workers – Priority Occupations



6.6.2 Sources of Labour

Forest sector employers rely most heavily on the local workforce and other forestry companies for new recruits. With a narrowing youth cohort and heightened competition for skilled workers from other companies and industries, employers will be compelled to explore alternative labour markets, including Aboriginal workers, immigrants and women to meet future requirements. Just over half (54%) of employers who responded to the survey indicated that current sources of labour adequately meet their needs.

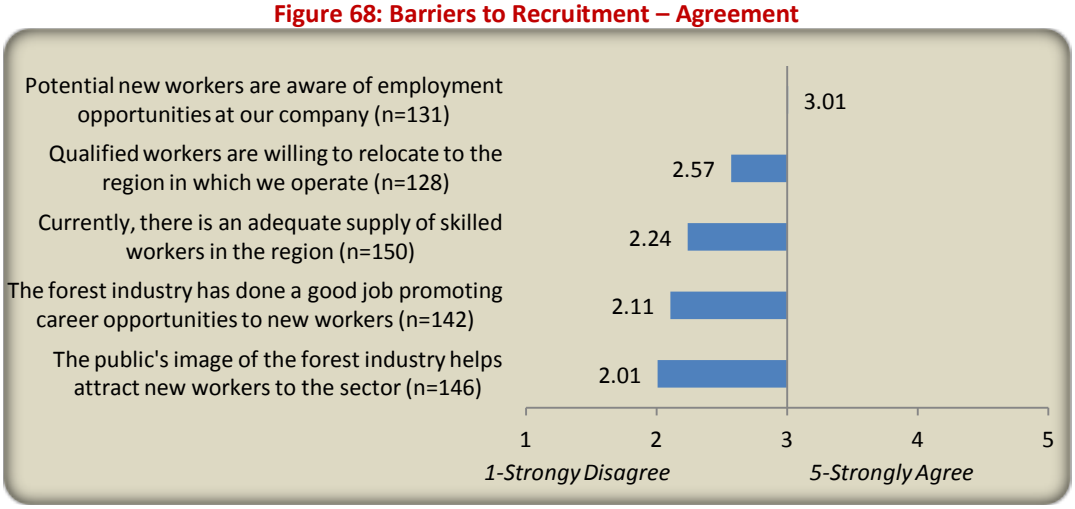
Figure 67: Sources of Labour – Importance



6.6.3 Barriers to Recruitment & Training

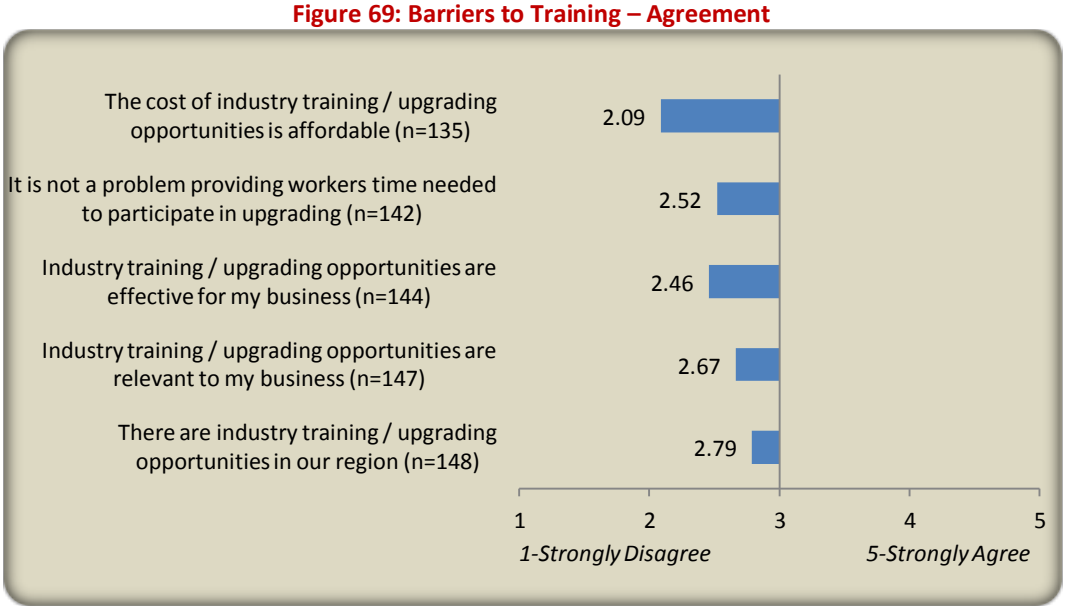
Difficulties attracting and recruiting new workers to the sector would appear to be somewhat industry-inflicted, as forestry continues to face an "image" problem amongst the general public. Employers are in agreement that the industry has not done a good job building its image or promoting career opportunities to potential new recruits. While many forestry operations are located in remote areas, so too are other resource operations (e.g., mining, oil & gas), which have been more successful attracting new recruits from various sources.

Figure 68: Barriers to Recruitment – Agreement



Forest industry employers are in general agreement that the province's industry training and apprenticeship system does not meet their needs. While training costs and time constraints are barriers for most small employers, the training opportunities currently available are neither effective nor relevant to most employers. This would suggest a general disconnect in training development between employers, training institutions and policy makers.

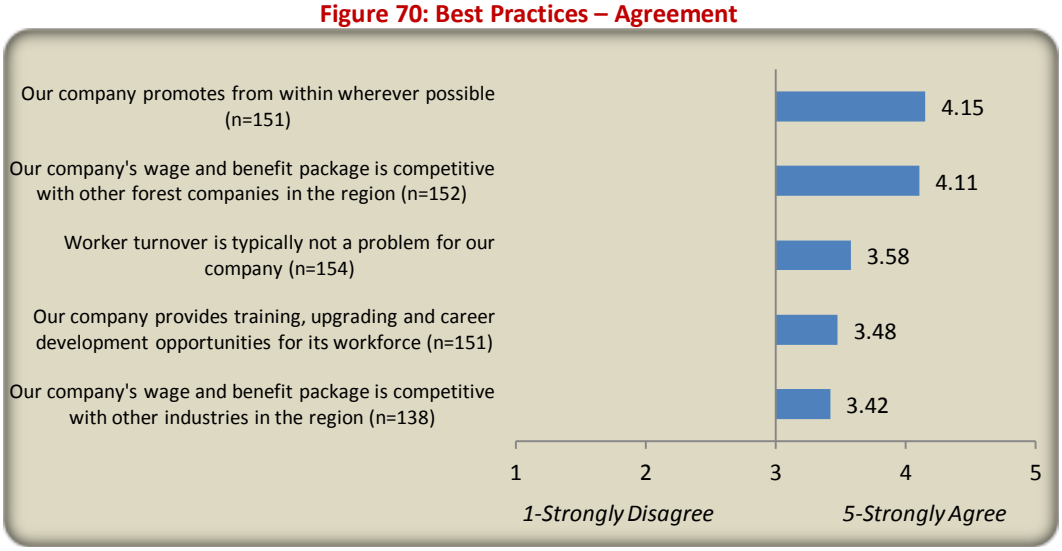
Figure 69: Barriers to Training – Agreement



6.6.4 Company Best Practices

Promoting workers from within the company and providing competitive wage and benefits packages are considered the two most important practices for recruiting and retaining workers. Worker turnover is not a major problem for most employers at this time, suggesting a stable work environment where the current workforce is not interested in pursuing other career opportunities. This is consistent with industries comprised largely of older and established workers.

Figure 70: Best Practices – Agreement



6.6.5 Human Resource Strategy

Having in place a human resource strategy is considered an important practice for most businesses, regardless of industry. However, just one-in-five (19%) forest sector employers indicated that they have a strategy in place to promote recruitment and retention of workers. Smaller companies are less inclined than larger companies to have an HR strategy. Among those companies with a strategy (n=53), 36% indicated that their strategy targeted youth, 28% targeted women and 24% targeted Aboriginal workers. Training requirements for new workers are not typically onerous as most of the actual training takes place on the job. High school graduates with a valid driver's license are the main prerequisites.

Figure 71: Human Resource Strategy – Target Groups

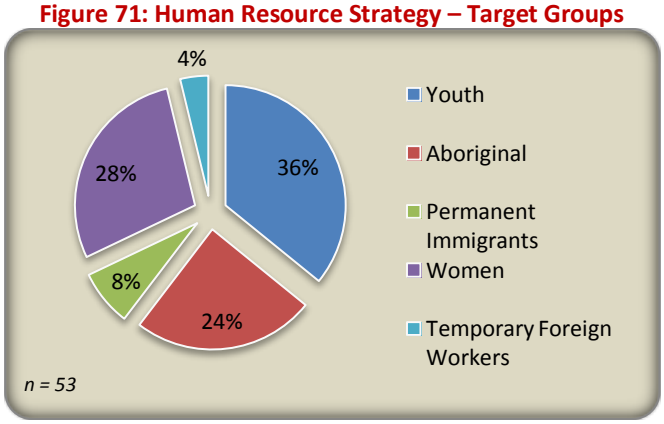
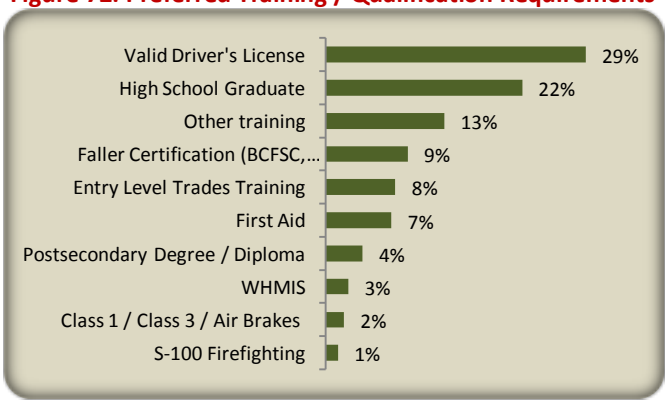
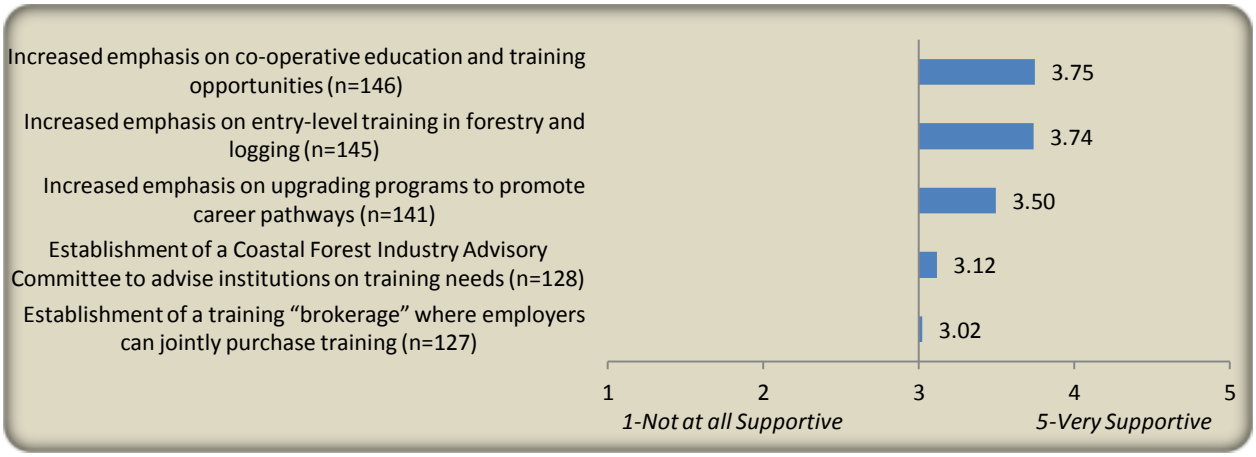


Figure 72: Preferred Training / Qualification Requirements



6.6.6 Concepts in Training

Employers were asked to indicate their level of support for various training concepts that could be pursued by the sector. Employers were generally supportive of most proposed concepts, with particular support for increased co-op opportunities and entry-level training specific to the forest industry. These concepts and other training innovations will be the focus of stakeholder consultations for the purpose of developing a forestry-based human resource strategy.



SECTION 7: "FOREST SECTOR" STAKEHOLDER REPORTS

BC's forest sector is comprised of a range of businesses and stakeholders that extend well beyond forest industry operations. Industry suppliers of forestry equipment, machinery and services are one of the key industry segments of the broader "forest sector". These suppliers generate significant additional (indirect) employment in forest communities throughout the province, while employing workers with similar skills and knowledge than those required directly in forestry operations. Indirect employment impacts in the forest sector are the subject of further analysis, as the overall demand for "forest sector" workers is estimated to be more than 20% higher when indirect employment is considered.

Other forest sector stakeholders with an interest in human resource development include First Nations communities and Aboriginal organizations involved in forestry and economic development. These organizations have become increasingly important operators and developers of the forest resource in BC. First Nations communities and Aboriginal organizations are interested in promoting forestry development, while providing Aboriginal workers with long term job opportunities. Other organizations with an interest in securing a stable supply of forestry workers are government agencies responsible for forest resource management. Many of the workers needed by these agencies are professional foresters, technicians and technologists to help plan and manage the forest resource – occupations that require extensive education and experience. As we have seen in previous analyses (Section 3.5), the supply of professional workers has been in decline in recent years, with the fall in program enrolments and graduate outcomes.

Also of interest to forestry and logging operations is the inclusion of workers who perform "work-in-the-woods" but whose presence is not considered within the traditional definition of the "forest industry" – that is, forestry & logging, support activities for forestry, and primary manufacturers of wood and paper products. In particular, local truckers responsible for hauling forest products from the bush to the mill are aggregated within the "forest products trucking" industry classification (NAICS 484223), which falls outside of the traditional forestry definition. Demand is high for these workers at this time, yet their exclusion from the forest industry analysis potentially undermines there importance in the development of a comprehensive human resource strategy for the industry. Similarly, workers such as heavy equipment operators, supervisors and construction managers involved in the construction and maintenance of logging roads are generally captured within the heavy & civil engineering construction classification (NAICS 237) and not necessarily within the forest industry definition. Consideration needs to given to these industry workforces that comprise the broader forest sector.

This section of the report examines the workforce implications associated with various industry stakeholders that comprise the broader BC forest sector. Information for this examination comes from a variety of sources, including indirect employment projections based on industry multipliers, survey response data from First Nations and Aboriginal organizations, and stakeholder supplied input on the broader forest sector.

7.1 Forestry Supply Companies – Indirect Employment

Suppliers of forestry equipment and services are key employers within BC's forest sector. Many of the workers employed by forestry supply companies possess similar training and skill requirements as those employed directly by forestry, logging and manufacturing operations. Machine operators, skilled mechanics and professional forestry consultants are some of the occupations also required by forestry supply companies.

In an effort to assess *indirect* employment impacts resulting from 'non-wage' forest sector spending, the consultant relied on employment ratios (i.e., multipliers) associated with direct employment in forestry, logging and manufacturing operations. Employment ratios have been developed by BC Stats as part of the province's Economic Dependency Model[10]. This model examines employment dependency by economic sector based on income flows in BC communities. For example, a pulp mill in the Kootenay region may employ 100 workers directly, yet as part of their business the company may also purchase equipment, materials and services from local suppliers generating additional (indirect) employment. This non-wage spending by forest companies generates significant indirect employment in the communities and regions in which they operate.

Tabled below are the employment ratios used to calculate indirect employment as a result of non-wage spending by forestry, logging and manufacturing operations in the province's eight development regions. These ratios represent the average of all individual forest community employment ratios within each development region (8). An employment ratio of 1.21 indicates that for every direct forest industry job there is an additional .21 indirect jobs generated within that region.

Regional Employment Ratios – BC Forest Sector

Development Region	Forestry & Logging	Pulp & Paper Manufacturing	Wood Product Manufacturing
Vancouver Island/Coast	1.21	1.59	1.27
Mainland/Southwest	1.22	1.63	1.30
North Coast	1.16	1.60	1.27
Nechako	1.15	1.47	1.26
Northeast	1.17	1.57	1.27
Cariboo	1.21	1.59	1.28
Thompson-Okanagan	1.21	1.61	1.29
Kootenay	1.18	1.57	1.28

Source: BC Stats

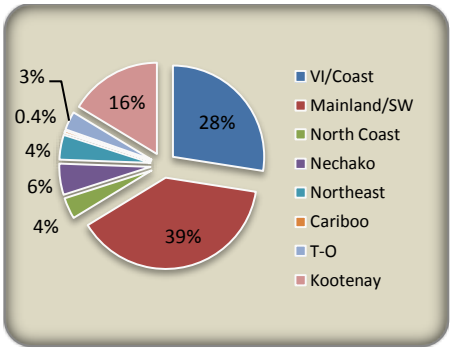
Figure 69 illustrates direct employment by industry and development region in the BC forest industry, which totaled 54,590 workers in 2010. The distribution of industry employment was based on Labour Force Survey estimates developed by BC Stats in 2010, and are used to develop direct and indirect employment estimates for 2012, 2017 and 2022 (Tables 28-30).

Direct employment in pulp & paper operations is concentrated mostly in the Coast region, where 71% of provincial workers are located. Employment in wood products manufacturing is more heavily weighted towards the Interior region, where 60% of sawmill/veneer workers are located. Forestry & logging employment reflects resource maintenance and harvesting activities throughout BC's forest regions. Forestry & logging workers accounted for about 30% of all direct forest industry employment in 2010.

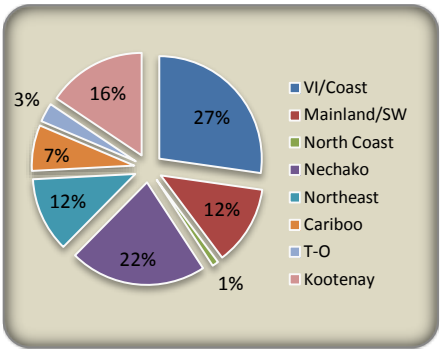
[10] BC Stats. BC Local Area Economic Dependencies (2009).

Figure 73: Employment Distribution by Forest Industry & Region (2010)

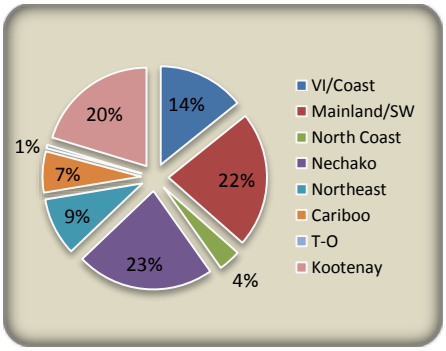
Pulp & Paper Manufacturing (n=9,970)



Wood Products Manufacturing (n=28,700)



Forestry & Logging (n=16,100)



7.1.1 Indirect Employment – 2012, 2017 & 2022

Tables 28-30 provide direct and indirect employment estimates for 2012 (baseline) and projected employment for 2017 and 2022. Baseline estimates for Wood Products Manufacturing were borrowed from the Solid Wood Labour Market Study conducted in 2012, with projections for 2017 and 2022 based on a reported annual growth rate of 1.7%[11].

Table 28: Direct & Indirect Employment Estimate (2012)

- In total, the BC forest sector generated nearly 64,000 direct and indirect jobs in 2012, of which 23% were indirect.
- This translates into an additional 14,737 indirect jobs, as a result of non-wage spending by forestry, logging and manufacturing operations.
- Industry operators located in the Coast generate more indirect employment (26%) than Interior operators (21%), owing to higher levels of non-wage spending by pulp & paper operations.

[11] Annual employment growth was projected at 1.7% for 2012-2016 and extrapolated through 2022 for this analysis.

Table 32: Direct & Indirect Employment – Baseline Estimate (2012)

2012 Direct Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry & Logging	2,515	3,942	651	**7,108**	4,008	1,680	1,194	99	3,591	**10,572**	**17,680**
Pulp & Paper	2,690	3,800	369	**6,859**	540	430	41	320	1,600	**2,931**	**10,751**
Solid Wood	5,634	2,594	207	**8,435**	4,467	2,435	1,493	620	3,228	**12,243**	**20,678**
Total Direct	**10,839**	**10,336**	**1,226**	**22,401**	**9,015**	**4,545**	**2,729**	**1,038**	**8,419**	**25,747**	**49,109**
2012 Indirect Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry & Logging	516	876	105	**1,497**	581	280	245	20	660	**1,786**	**3,283**
Pulp & Paper	1,594	2,383	220	**4,197**	254	243	24	194	905	**1,620**	**5,817**
Solid Wood	1,532	767	56	**2,355**	1139	649	422	177	896	**3,283**	**5,637**
Total Indirect	**3,641**	**4,026**	**381**	**8,048**	**1,974**	**1,172**	**691**	**391**	**2,461**	**6,689**	**14,737**
Total (Direct + Indirect)	14,480	14,362	1,607	30,449	10,989	5,717	3,420	1,429	10,880	32,436	63,846
% Indirect	*25%*	*28%*	*24%*	***26%***	*18%*	*21%*	*20%*	*27%*	*23%*	***21%***	***23%***

Table 29: Direct & Indirect Employment Projection (2017)

- Non-wage spending by forestry, logging and manufacturing operations is projected to generate 16,100 additional (indirect) jobs by 2017 – a net increase of more than 1,360 jobs from 2013.
- Employers can expect to add 136 jobs annually between 2013 and 2017 – or 1.8% annually.
- Total direct and indirect employment associated with BC's forest sector economy is projected at close to 68,000 jobs by 2017.

Table 33: Direct & Indirect Employment – Projected (2017)

2017 Direct Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry & Logging	2,596	4,070	672	**7,338**	4,138	1,735	1,233	102	3,707	**10,914**	**18,252**
Pulp & Paper	3,050	4,308	418	**7,776**	612	487	47	363	1,814	**3,323**	**11,099**
Solid Wood	6,113	2,814	225	**9,152**	4,847	2,642	1,620	672	3,502	**13,284**	**22,436**
Total Direct	**11,759**	**11,192**	**1,314**	**24,266**	**9,597**	**4,864**	**2,900**	**1,137**	**9,023**	**27,521**	**51,787**
2017 Indirect Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry & Logging	532	904	109	**1,545**	600	289	253	21	681	**1,844**	**3,390**
Pulp & Paper	1,807	2,702	249	**4,758**	288	275	27	220	1,026	**1,837**	**6,595**
Solid Wood	1,662	832	61	**2,555**	1,236	705	458	192	972	**3,561**	**6,116**
Total Indirect	**4,001**	**4,438**	**419**	**8,858**	**2,124**	**1,269**	**738**	**433**	**2,679**	**7,242**	**16,100**
Total (Direct + Indirect)	15,760	15,630	1,733	33,124	11,721	6,133	3,638	1,570	11,702	34,763	67,887
% Indirect	*25%*	*28%*	*24%*	***27%***	*18%*	*21%*	*20%*	*28%*	*23%*	***21%***	***24%***

Table 30: Direct & Indirect Employment Projection (2022)

- Non-wage spending by forestry, logging and manufacturing operations is projected to generate 17,000 additional (indirect) jobs by 2022– a net increase of 875 jobs since 2018.
- Employers can expect to add 88 jobs annually between 2018 and 2022 – or 1.1% annually.
- Total direct and indirect employment for the BC forest sector is projected at 71,700 jobs by 2022.

Table 34: Direct & Indirect Employment – Projected (2022)

2022 Direct Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry & Logging	2,688	4,215	696	**7,599**	4,285	1,796	1,277	106	3,839	**11,302**	**18,901**
Pulp & Paper	3,158	4,461	433	**8,052**	634	505	49	376	1,878	**3,442**	**11,494**
Solid Wood	6,633	3,053	244	**9,930**	5,259	2,867	1,758	729	3,800	**14,413**	**24,343**
Total Direct	**12,479**	**11,729**	**1,372**	**25,581**	**10,178**	**5,168**	**3,083**	**1,211**	**9,517**	**29,157**	**54,738**
2022 Indirect Employment	VI/ Coast	Mainland / SW	North Coast	Coast Region	Nechako	North East	Cariboo	Thomson Okanagan	Kootenay	Interior Region	BC
Forestry & Logging	551	937	113	1,600	621	299	262	22	705	**1,910**	**3,510**
Pulp & Paper	1,871	2,798	258	4,926	298	285	29	228	1,062	**1,903**	**6,829**
Solid Wood	1,803	902	66	2,772	1,341	765	497	208	1,055	**3,864**	**6,637**
Total Indirect	**4,226**	**4,637**	**437**	**9,299**	**2,260**	**1,349**	**787**	**458**	**2,822**	**7,677**	**16,976**
Total Direct + Indirect	16,705	16,366	1,809	34,880	12,438	6,517	3,870	1,669	12,339	36,834	71,714
% Indirect	*25%*	*28%*	*24%*	*27%*	*18%*	*21%*	*20%*	*27%*	*23%*	*21%*	*24%*

7.1.2 Projected Job Openings (Indirect) – 2017 & 2022

Given similar workforce characteristics with forest industry operators, suppliers of forestry equipment and services also face a significant challenge attracting and developing qualified workers to replace an ageing workforce. In 2006, close to half of the total workforce (46%) employed by wholesale suppliers of construction, mining and forestry equipment in BC were at least 45 years of age. Similarly, 49% of workers employed by specialized freight operators (most of which are logging truck drivers) were at least 45 years of age in 2006.

In order to estimate the projected number of indirect job openings for the BC forest sector economy, it was necessary to determine the annual replacement rate (i.e., retirements, other attrition) for each development region. The BC Labour Market Scenario Model has developed replacement rates for all occupations (3-digit NOC) between 2010 and 2020. These rates have been aggregated by development region and averaged over the 10-year period. Projected replacements are combined with projected employment growth for each region to determine the total number of job openings for 2017 and 2022 (Table 31). Regional replacements have been extrapolated through 2022 for this analysis.

Development Region	Replacement Rates 2010-2022
Vancouver Island/Coast	2.8%
Mainland/Southwest	2.5%
North Coast	2.8%
Nechako	2.8%
Northeast	2.4%
Cariboo	2.7%
Thompson-Okanagan	2.7%
Kootenay	2.8%
British Columbia	**2.6%**

Source: BC Labour Market Scenario (2010-2020)

This forecast is concerned with indirect job openings generated as a result of projected employment growth and replacement demand in BC's forest sector economy between 2013 and 2022. Projected job openings may occur across the full range of service producing industries and occupations, but are most likely to be concentrated in wholesale trade (heavy equipment & machinery), transportation (specialized freight trucking), professional scientific & technical services, as well as public administration.

Table 31: Project Job Openings (Indirect) – 2017 & 2022

- 3,448 indirect job openings are projected by 2017 and a total of 6,551 job openings through 2022 – representing 44% of baseline employment (2012).
- Employers can expect to fill more than 650 jobs annually over this 10-year horizon.
- Two-thirds (66%) of all job openings are the result of replacement demand.

Table 35: Projected Job Openings – Indirect (2017 & 2022)

Region	Baseline	Job Openings 2013-2017			Job Openings 2018-2022			Job Openings 2013-2022		
	2012	*Replacements*	*Growth*	*Total*	*Replacements*	*Growth*	*Total*	*Total*	*% 2012*	*Annual Avg (10 Yr)*
VI/Coast	3,641	540	360	900	579	225	804	1,704	47%	170
Mainland/SW	4,026	535	412	947	570	199	769	1,716	43%	172
North Coast	381	57	38	95	60	18	78	173	45%	17
Coast Region	**8,048**	**1,132**	**810**	**1,942**	**1,209**	**441**	**1,650**	**3,592**	**45%**	**359**
Nechako	1,974	289	150	439	309	136	445	884	45%	88
Northeast	1,172	148	97	245	158	80	238	483	41%	48
Nechako	691	97	47	144	104	49	153	297	43%	30
Cariboo	391	56	42	98	60	25	85	183	47%	18
Kootenay	2,461	363	218	581	387	143	530	1,111	45%	111
Interior Region	**6,689**	**953**	**553**	**1,506**	**1,018**	**435**	**1,453**	**2,959**	**44%**	**296**
BC (%)	**14,737**	**2,085 (60%)**	**1,363 (40%)**	**3,448 (100%)**	**2,227 (72%)**	**876 (28%)**	**3,103 (100%)**	**6,551**	**44%**	**655**

7.1.3 Implications for Workforce Development

Indirect employment generated through non-wage spending by forest industry operators is an important consideration for human resource planners in the forest sector. Many workers employed by industry supply companies possess similar skills and training as those directly employed by forest companies, including machine operators, mechanics and professional foresters. Equipment supply companies, like Finning, Wajax, Madill and Nicholson equipment, compete directly with forestry companies for skilled workers and operators. Coordinated workforce planning and training development involving forest companies and suppliers of equipment and services would help address training requirements for the broader forest sector.

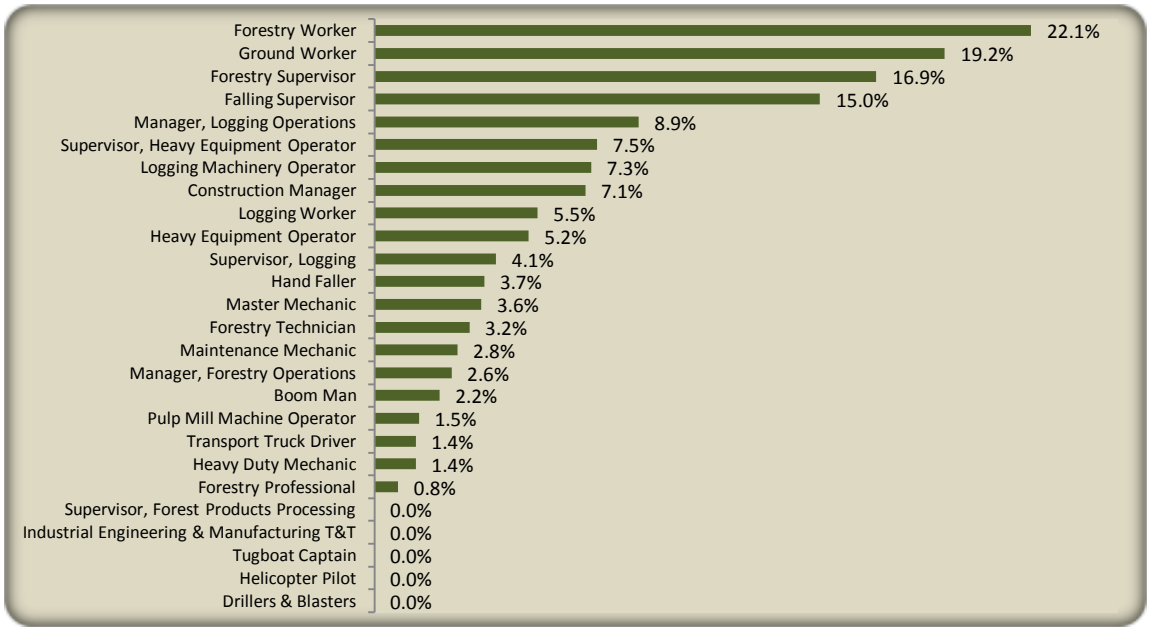
7.2 First Nations & Aboriginal Forest Sector Organizations

First Nations communities and Aboriginal organizations are important stakeholders in the management and stewardship of the forest resource. As part of this research study, committee representatives requested that the survey research include a series of questions specific to the interests of Aboriginal organizations involved in forestry developments in the Coast region. Of the 160 employers who responded to the survey, nine were identified as First Nations and one identified as an Aboriginal Development Corporation. Survey questions were designed for both Aboriginal and non-Aboriginal employers in the forest sector.

7.2.1 Aboriginal Employment

Survey results indicated a total of 171 Aboriginal workers – about 5% of the current reported workforce – were employed in a priority occupation (note that most employers do not keep formal records related to ethnicity or personal background). Aboriginal workers are mostly concentrated in forestry and logging operations, both at the production and supervisory level. As First Nations/Aboriginal forestry organizations continue to develop, their workforce requirements will more closely resemble that of any company involved in forestry, logging or integrated forest management.

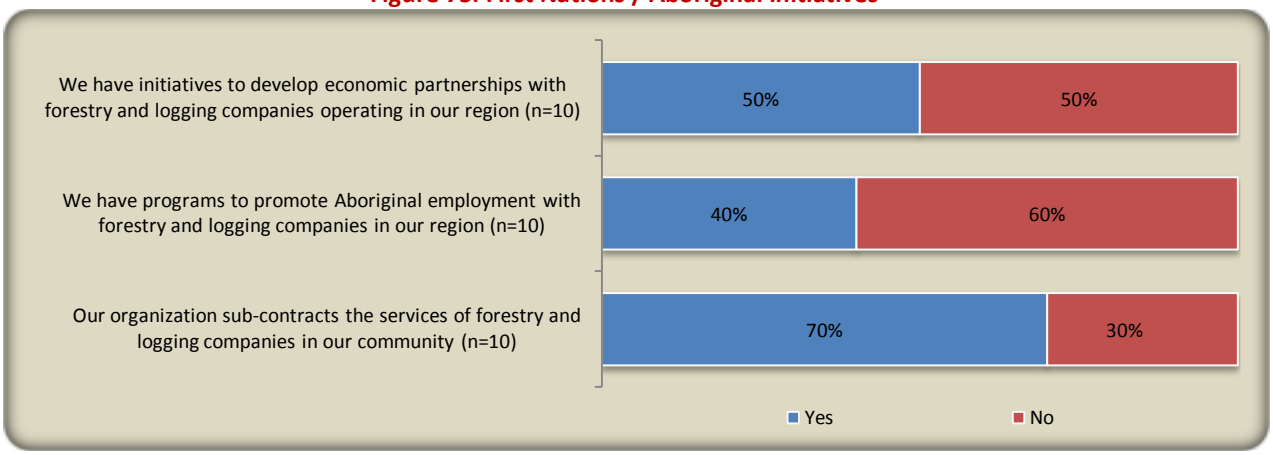
Figure 74: Percent Aboriginal Workers in Priority Occupations



7.2.2 First Nations / Aboriginal Initiatives in Forestry Development

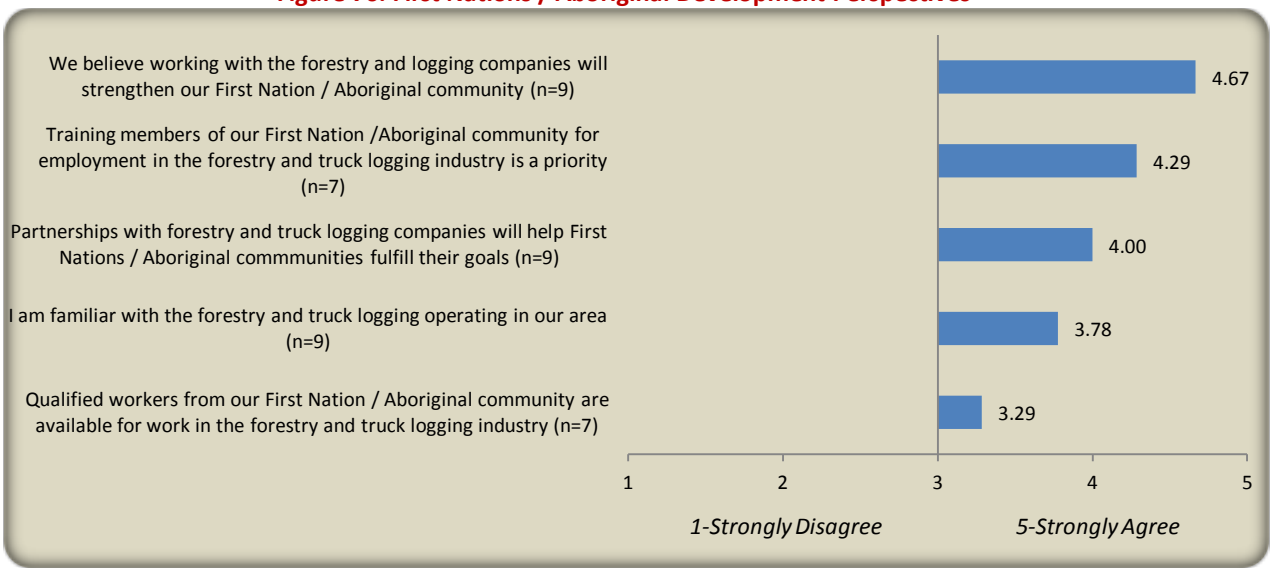
Efforts are underway to expand business opportunities for First Nations and Aboriginal communities to increase their participation in the management of the resource and to promote job opportunities for Aboriginal workers. Among those who responded to the survey, more than half of Aboriginal organizations indicated they have in place economic initiatives with local companies to promote forestry and logging development in their communities.

Figure 75: First Nations / Aboriginal Initiatives



In terms of sustainable forestry development, Aboriginal stakeholders strongly agreed that efforts to build partnerships with existing forestry and logging companies will strengthen their communities and help them fulfill their goals. Training members of the community to work in the forest sector is a top priority for First Nations / Aboriginal forestry development organizations.

Figure 76: First Nations / Aboriginal Development Perspectives

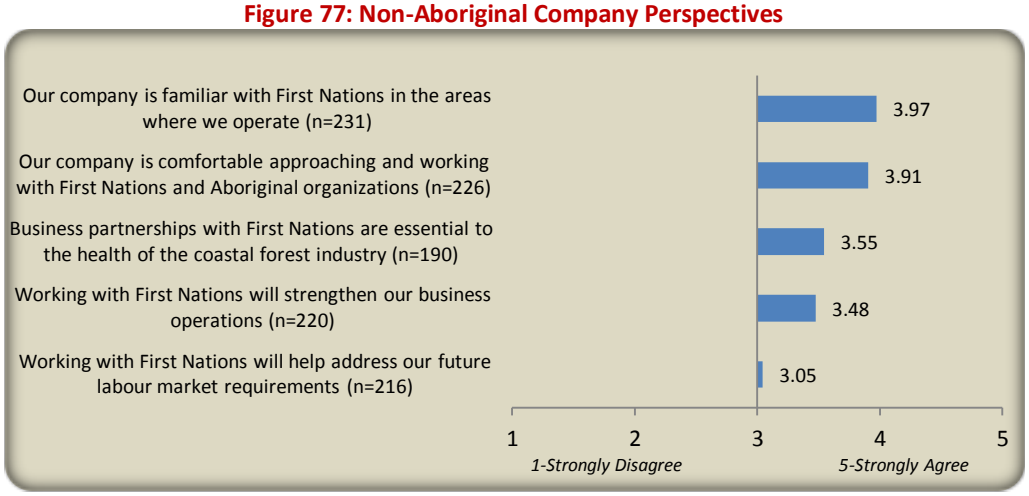


7.2.3 Non-Aboriginal Employers

Non-Aboriginal employers and contractors were also asked to comment as to their awareness and understanding of First Nations / Aboriginal initiatives with respect to partnership development in the forest industry. Most employers indicated they were comfortable establishing working relationships with First Nations / Aboriginal communities in their areas, and that such relationships could strengthen their business operations. Forest lands managed by First Nations / Aboriginal communities provide partnership opportunities with existing employers and operators. Employers were split as to whether

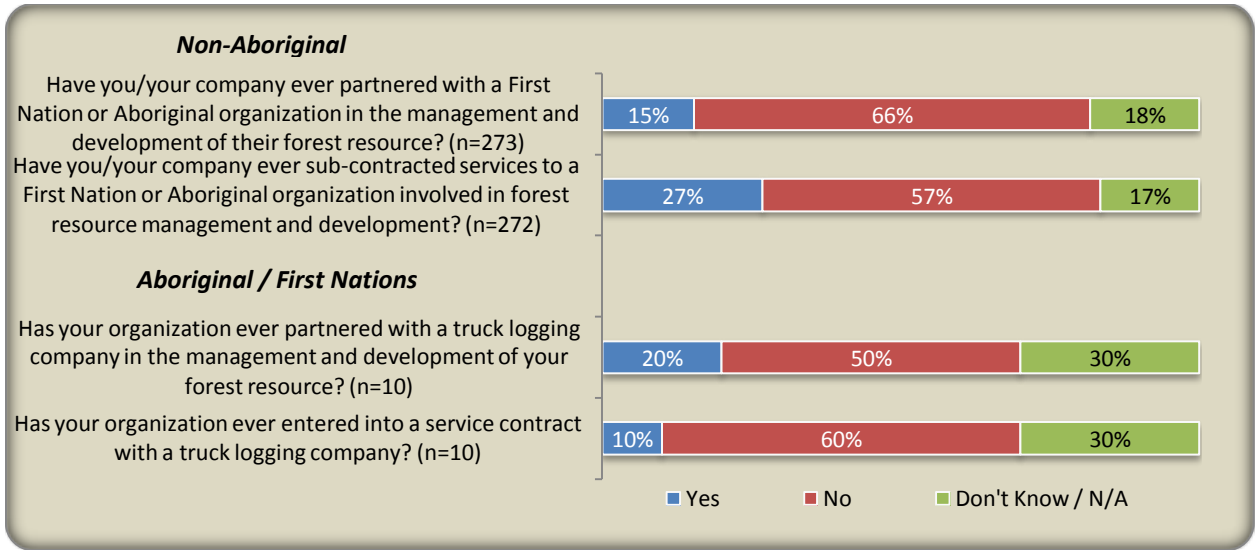
First Nations / Aboriginal communities could help them address their future labour market requirements.

Figure 77: Non-Aboriginal Company Perspectives



7.2.4 Emerging Partnership in the Forest Sector

Both First Nations / Aboriginal stakeholders and non-Aboriginal employers were asked to indicate whether their organization had ever partnered or worked together on a forest resource initiative. While business partnerships and contract relationships are becoming established, these results should serve as a baseline for measuring future partnership development among Aboriginal and non-Aboriginal forestry operators.



7.2.5 Implications for Workforce Development

First Nations and Aboriginal development organizations are taking an increasingly active role in the management and development of the forest resource. Over the past 20 years, the Province has entered

into numerous agreements with First Nations providing timber access rights for economic and community development purposes. First Nations now hold timber tenures throughout the province, have seen their share of the AAC increase to more than 10%, employ more Aboriginal workers in both Aboriginal and non-Aboriginal controlled companies, and have more training and education opportunities available to Aboriginals for advancement in the sector. These trends are expected to continue, increasing the need for skilled, professional and management workers from across BC's First Nations and Aboriginal communities.

7.3 "Workers in the Woods"

"Workers in the woods" refers to those workers and operators responsible for managing the forest resource, building roads, harvesting timber and hauling forest products from the bush to the mill for processing and manufacturing. They represent the *primary* forestry and logging workforce, supplying logs, chips and other forest products to manufacturers of lumber and pulp & paper. These workers and their representatives are a major impetus behind this labour market study.

The traditional definition of the forest industry based on the North American Industry Classification System encompasses operators in forestry & logging, support activities for forestry, and manufacturers of wood and paper products. However, it does not encompass other industries (and their workforces) that are integral to harvesting, processing and hauling of forest products from the bush to the mill or other locations. This is an important consideration for operators in forestry, logging and road building activities, as it tends to undermine industry employment estimates and the skills and training requirements of their workforces.

Using the traditional industry definition, the ratio of "workers in the woods" to mill workers is about 1 to 2.2 (see Section 3.1). Contained within this definition are certain sub-industries, including manufacturers of other wood products (NAICS 3219) and converted paper product manufacturers (NAICS 3222). These industries are, however, considered "secondary" or value-added manufacturers, distinct from primary manufacturing facilities, such as sawmills and paper mills, otherwise the direct consumers of primary forest products (i.e., logs, wood chips, other forest materials). These two secondary industries account for on average 25% of the wood products manufacturing workforce and 15% of the pulp and paper manufacturing workforce.

Some industry stakeholders, including members of the province's four logging associations (TLA, CILA, ILA, NWLA) believe the traditional definition of the forest industry is insufficient, believing secondary manufacturers should be excluded from the definition and that local forest product truckers (i.e., logging truck drivers) and logging road builders should be included. Truck drivers are integral to forestry and logging operations, yet are classified within the transportation industry (NAICS 484223). Similarly, many companies that build and maintain logging roads operate exclusively within the forest industry, yet are classified within the heavy and engineering construction industry. The importance of these companies to the forest industry cannot be overstated, with some industry observers suggesting they comprise as much as 15% to 20% of the "actual" forest industry workforce.

Tabled below is an illustrative analysis of the forest industry workforce as traditionally defined, versus the forestry and logging workforce as considered by stakeholders whose interest is companies and their workers operating in the woods. The analysis uses the estimated 2012 forest industry labour force of 57,000 workers based on the traditional NAICS definition. Workers in the woods include those operating in forestry & logging (113) and support activities for forestry (1153). Mill workers include

those in primary and secondary manufacturing operations (321 and 322). The forestry and logging workforce factors in the estimated number of truck drivers (n=1,982) and workers employed in road building operations (n=3,789) as identified in the survey of employers and contractors (see Section 5.3.3). These estimates would be considered conservative, as they only account for those workers in priority occupations within each industry. It is possible that the relationship between workers in the woods and primary mill workers is closer to 1 : 1.3 or lower.

Table 36: Traditional Forest Industry Workforce & "Workers in the Woods"

Worker Type	Traditional Forest Industry	Workforce 2012		Traditional Workforce *less* Secondary Manufacturing Workforce		"Workers in the Woods" *plus* Primary Mill Workers	
Workers in the Woods	Forest & Logging (113)	7,410	13%	7,410	15%	9,392 (incl. truck drivers)	17%
	Support Activities for Forestry (1153)	10,260	18%	10,260	21%	14,049 (incl. road builders)	26%
Mill Workers (Primary)	Sawmills & Wood Preservation (3211) Veneer, Plywood & Engineered Wood (3212)	20,093	35%	20,093	41%	20,093	37%
Mill Workers (Secondary)	Other Wood Products (3219)	6,698	12%	--	0%	--	0%
Mill Workers (Primary)	Pulp, Paper & Paper Board Mills (3221)	10,659	19%	10,659	22%	10,659	20%
Mill Workers (Secondary)	Converted Paper Products Manufacturers (3222)	1,881	3%	--	0%	--	0%
Totals		57,000	100%	48,422	100%	54,193	100%
Workers in the Woods : Mill Workers		**1 : 2.2**		**1 : 1.7**		**1 : 1.3**	

7.3.1 Implications for Workforce Development

The concern of stakeholders with regards to the actual number of workers in the woods is to ensure they are fully considered in the industry's human resource development equation. Many of the businesses in local forest products transportation and road building are independent operators with small workforces or none at all. They typically work on contract for large tenure holders, work that can be both short term and uncertain. These businesses and independent operators are often overlooked in workforce planning exercises, as public consultations tend towards larger operators with more time and resources to influence outcomes. Similar to independent fallers, formal training, skill development and stable work environments are human resource touchstones for truck drivers and road builders.

7.3.2 Workforce Profile – Forestry & Logging and Support Activities

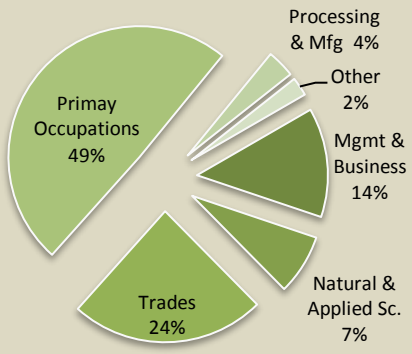
The following is a demographic profile of the forestry & logging and support activities workforces based on 2006 Census data. Given gaps in information on "workers in the woods", this profile provides a backdrop that can be used to help analyse and develop recruitment and retention strategies aimed at these workers.

Table 37: Labour Force Profile – Forestry & Logging and Support Activities for Forestry (2006)

Demographic (2006)	Forestry & Logging (113)	Support Activities for Forestry (1153)
Labour Force	21,445	7,440
Employed	17,550 (82%)	6,525 (88%)
Gender	Male – 86%	Male – 75%
Age 45+	51%	34%
Average Weeks Worked (all workers)	40.8	36.6
Average Annual Income (full-year, full-time)	$65,687	$51,172

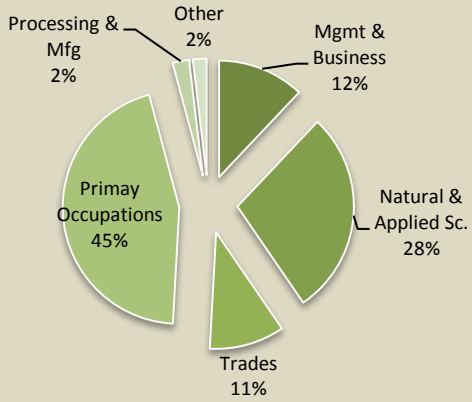
Labour Force by Major Occupation

Forestry & Logging



- Dominated by primary occupations
- High percentage of trade workers with apprenticeship training

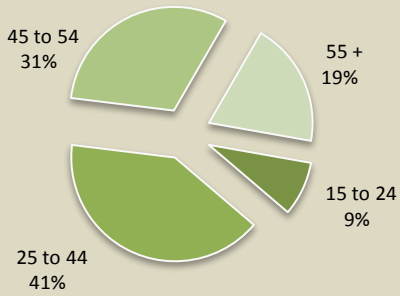
Support Activities for Forestry



- Dominated by primary occupations
- High percentage of technical/professional workers with formal PS training

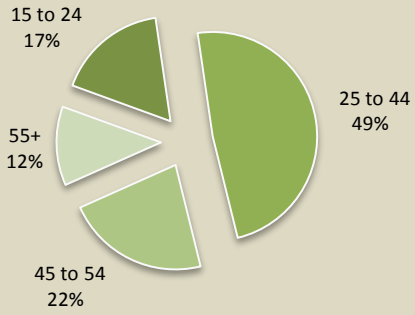
Age Profile

Forestry & Logging



- Older workforce, including 19% 55 years and older
- Challenge recruiting youth

Support Activities for Forestry

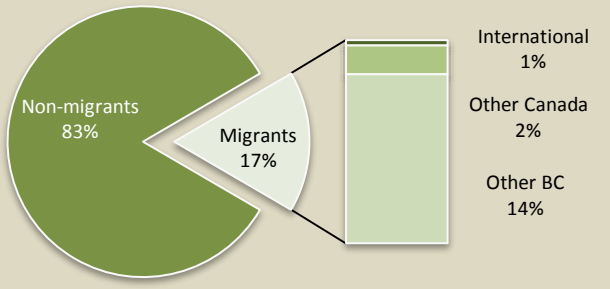


- Healthier supply of younger workers
- Less difficulty recruiting youth

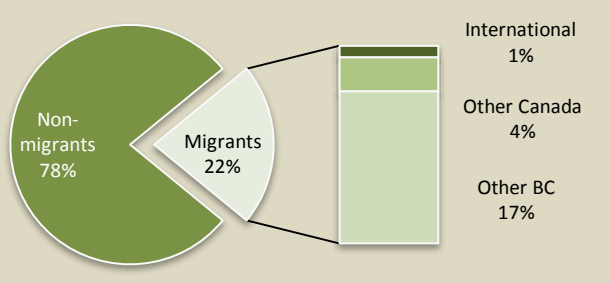
Migrant Workforce – Last 5 Years

Forestry & Logging

Support Activities for Forestry



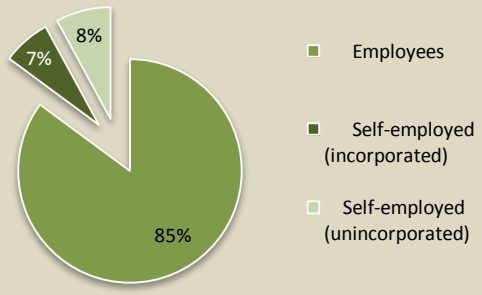
- Dominated by local workers (non-migrants)
- Challenge recruiting beyond BC



- Dominated by local workers (non-migrants)
- More workers willing to relocate

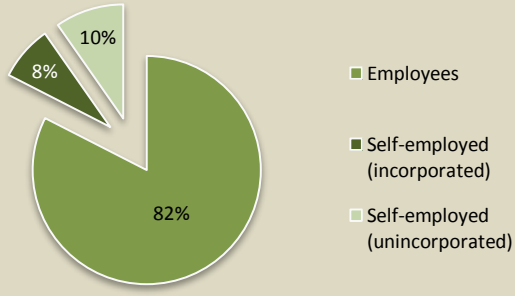
Labour Force by Class of Worker

Forestry & Logging



- The high proportion of employees may not reflect the role of "dependent" contractors in the industry

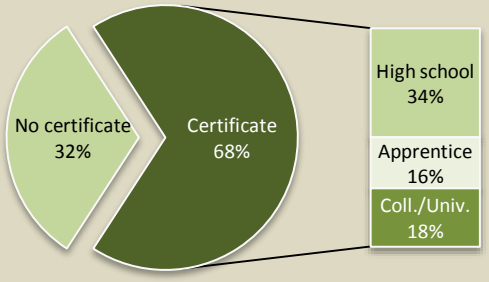
Support Activities for Forestry



- The high proportion of employees may not reflect the role of "dependent" contractors in the industry

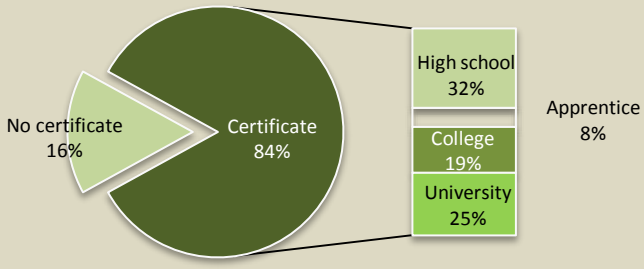
Educational Attainment - % Workers with Certificate

Forestry & Logging



- Large percentage of workforce with no certificate
- Important share of workforce with trade certificate

Support Activities for Forestry



- High percentage of workforce with PS certificate
- Education/training requirements more demanding

7.4 Regulatory Agencies

Part of the requirement as identified by the Committee was to examine forestry personnel from public agencies in the aggregation of the forest sector workforce. This group of workers largely possess higher levels of post secondary education and training, and are mostly responsible for forest resource management, planning and compliance functions. While the BC Ministry of Forests, Lands & Natural Resource Operations (MFLNRO) are important stakeholders in this study, they were not involved directly in the primary survey research, nor were federal or municipal agency officials. The following review is largely based on human resource information provided by the MFLNRO, as well as Census data encompassing professional foresters, forestry technicians & technologists, and silviculture & forestry workers.

In 2006, just over 2,000 forestry professionals, forestry technicians & technologists, and silviculture & forestry workers were operating in public agencies (all levels), representing 26% of the total provincial labour force (n=7,650) in these occupations. Close to 90% of these workers were employed by the provincial government, spread across several ministries responsible for natural resource and land management. Close to half (45%) of these workers were 45 years of age or older in 2006, with females representing a combined 20% of the labour force. Public agencies employ the largest share of female workers among the various industries that constitute the BC forest sector.

7.4.1 Implications for Workforce Development

Consistent with the declining fortunes of the BC forest industry over the last 20 years, the flow of new and qualified entrants into the regulatory segment of the forest sector has also fallen. As previously discussed in Section 3.5.2, post secondary education programs in support of forestry have felt the impact of this decline, with program enrolments and graduates of forestry schools falling dramatically over the last several years. This is a major challenge for public agencies, given mandatory requirements for post secondary education in many of these occupations.

In 2010, the MFLNRO conducted an internal study of the province's workforce and workplace requirements in occupations responsible for natural resource and land management. The study identified a total provincial workforce of about 5,000 – of which 40% are scheduled to retire by 2020, and an additional 15% will depart the workforce voluntarily. This represents a total replacement challenge of 55% between 2010 and 2020, or about 225 job openings annually over the 10-year horizon.

Considering just forestry professionals, forestry technicians & technologists, and silviculture & forestry workers employed in provincial agencies (est. 1,800), this would translate into a requirement of more than 80 jobs annually in these occupations alone. At current post secondary graduation rates of about 170 annually from among the province's four post secondary programs (see Section 3.5), the province would need to hire nearly half of all post secondary graduates each year to meet its replacement challenge. This is unlikely given similar demand requirements facing other forest sector employers – including forestry operators, research institutions and professional consulting organizations – who together employ about three-quarters (74%) of provincial workers in these three occupations.

As a result of this study, agency-specific and province-wide initiatives are underway in each of the resource sector agencies to address the replacement challenges related to the workforce and work environment.

SECTION 8: DEMAND-SUPPLY GAP ANALYSIS

The following occupational gap analysis is based on demand projections provided by industry and supply and demand projections provided through the BC Labour Market Scenario (BCLMSM). Developed by the BC Ministry of Jobs, Tourism & Skills Training, the model enables occupational supply and demand forecasts for jobs identified within the National Occupation Classification (NOC) system at the three-digit level. While the 26 priority occupations identified in this study are four-digit NOCs, the associated three-digit growth rates used for these projections are similar, if not identical in most cases. BCLMSM projections are used as a comparator against industry growth projections as determined through the survey of employers and contractors.

8.1 Gap Summary

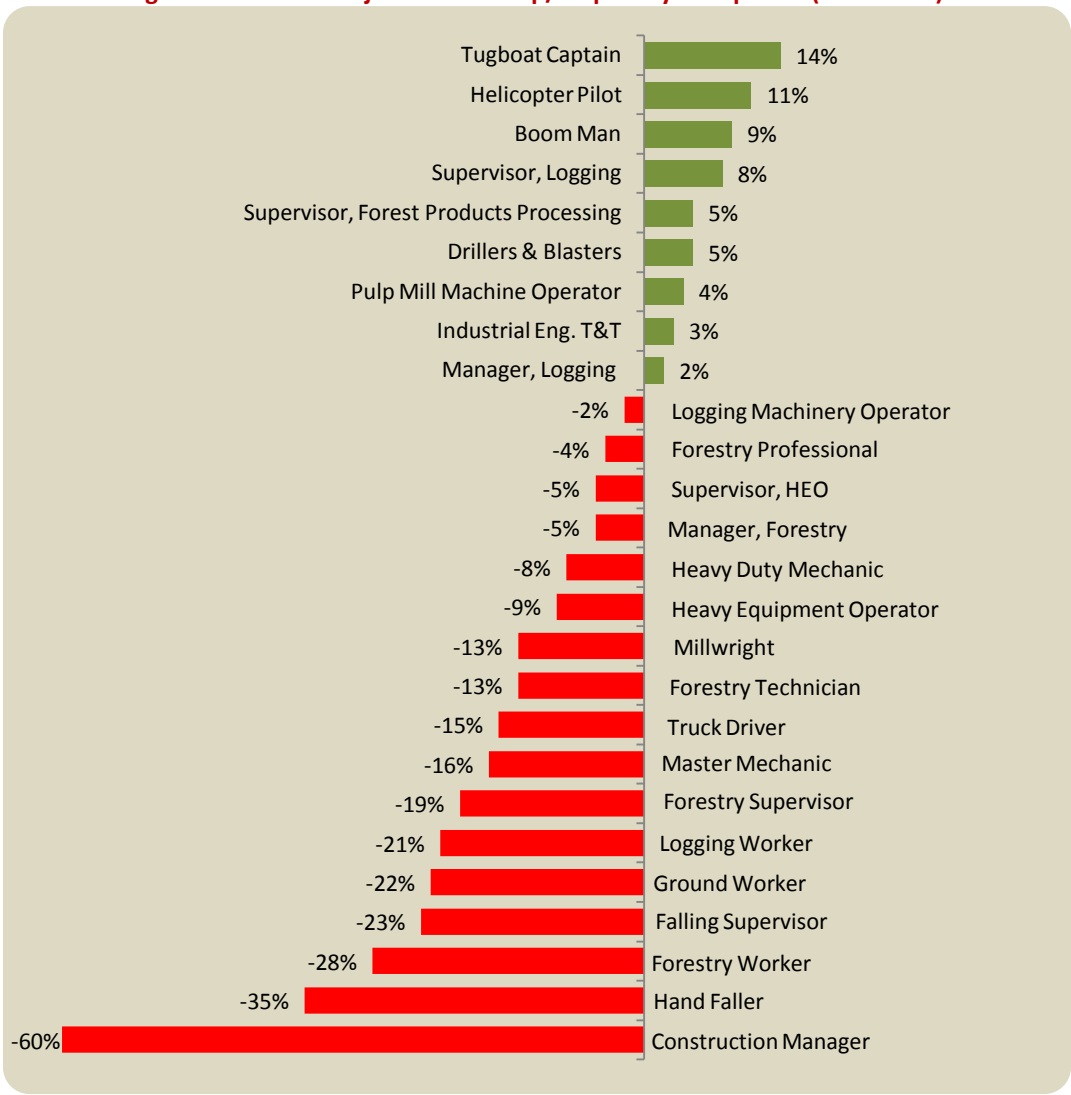
Annual labour surpluses or gaps are determined based on the difference between supply and demand projections for each occupation. The forecast includes the calculation of the *average* surplus/gap over the 2022 horizon, which projects average unemployment for each occupation over the 10 year forecast period. This metric is used to highlight occupations that are expected to face skills shortages over the next 10 years. The following rating system is used to assess the severity of projected skills shortages for each occupation. This rating system is subjective based on generally accepted criteria respecting skills shortages. A more rigorous system wound encompass factors beyond supply and demand, including long term vacancies, employment growth rate, unemployment rate, and real wage impacts.

Forecast	Baseline	All Priority Occupations										Change	Gap Average	Skill Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	# (%)	%	
Supply (BCLMSM)	16,801	17,084	17,384	17,603	17,700	17,769	17,801	17,822	17,893	18,038	18,185	1,384 (8%)		
Demand (Industry)	16,798	17,524	18,251	18,979	19,706	20,433	20,583	20,733	20,884	21,034	21,184	4,386 (26%)		
Surplus / (Gap)	3	(440)	(867)	(1,375)	(2,006)	(2,664)	(2,782)	(2,911)	(2,991)	(2,996)	(2,999)	(3,002)	-11%	Very High
Supply (BCLMSM)	16,801	17,084	17,384	17,603	17,700	17,769	17,801	17,822	17,893	18,038	18,185	1,384 (8%)		
Demand (BCLMSM)	16,717	17,069	17,443	17,636	17,725	17,780	17,817	17,862	17,994	17,994	17,994	1,277 (8%)		
Surplus / (Gap)	84	15	(60)	(33)	(25)	(12)	(16)	(40)	(102)	44	191	107	0.0%	Very High

- Industry demand in priority occupations is expected to grow by 26% over the next 10 years, compared to 8% projected growth in occupational supply per the BCLMSM.
- Employers can expect to experience skills shortages in priority occupations beginning in 2013 and progressively increasing each year through 2022.
- Supply-demand projections using BCLMSM forecast data indicate a more balanced labour market, where labour gaps are expected in 2014, then turning to a surplus position beginning in 2021.
- The skill shortage rating based on BCLMSM projections is also determined to be very high (less than 2%).
- Six of the seven occupations projected to experience the most severe skills gaps over the next 10 years are forestry-specific occupations.

Figure 78 below illustrates annual projected skill shortages by priority occupation.

Figure 78: Annual Projected Skills Gap/Surplus by Occupation (2013-2022)



8.2 Gap Analysis – Priority Occupations

Forecast	Baseline	Manager, Forestry										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	329	336	342	346	348	350	350	351	352	355	358	29		
Demand (Industry)	330	337	345	353	361	369	372	376	380	384	388	58		
Surplus / (Gap)	**(1)**	**(2)**	**(4)**	**(7)**	**(13)**	**(19)**	**(22)**	**(25)**	**(28)**	**(29)**	**(30)**	**(29)**	**-5%**	**Very High**
Supply (BCLMSM)	329	336	342	346	348	350	350	351	352	355	358	29		
Demand (BCLMSM)	328	335	342	346	347	349	350	351	354	354	354	26		
Surplus / (Gap)	**1**	**0**	**(1)**	**(0)**	**0**	**1**	**0**	**(0)**	**(2)**	**1**	**5**	**4**	**0.2%**	**Very High**

Forecast	Baseline	Forestry Professional										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	915	927	939	951	960	968	975	981	988	998	1,008	93		
Demand (Industry)	915	936	957	978	1,000	1,021	1,026	1,031	1,036	1,041	1,046	131		
Surplus / (Gap)	**(0)**	**(10)**	**(18)**	**(28)**	**(40)**	**(52)**	**(51)**	**(50)**	**(48)**	**(43)**	**(38)**	**(38)**	**-4%**	**Very High**
Supply (BCLMSM)	915	927	939	951	960	968	975	981	988	998	1,008	93		
Demand (BCLMSM)	909	924	940	952	962	970	977	985	994	994	994	85		
Surplus / (Gap)	**6**	**3**	**(1)**	**(1)**	**(2)**	**(2)**	**(2)**	**(4)**	**(6)**	**4**	**13**	**8**	**0.1%**	**Very High**

Forecast	Baseline	Forestry Technician & Technologist										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	1,130	1,145	1,160	1,173	1,182	1,191	1,197	1,202	1,208	1,218	1,228	98		
Demand (Industry)	1,128	1,182	1,235	1,289	1,342	1,396	1,412	1,428	1,444	1,460	1,476	348		
Surplus / (Gap)	**2**	**(37)**	**(75)**	**(115)**	**(160)**	**(205)**	**(215)**	**(226)**	**(236)**	**(242)**	**(248)**	**(250)**	**-13%**	**Very High**
Supply (BCLMSM)	1,130	1,145	1,160	1,173	1,182	1,191	1,197	1,202	1,208	1,218	1,228	98		
Demand (BCLMSM)	1,124	1,142	1,162	1,175	1,185	1,193	1,199	1,206	1,215	1,215	1,215	91		
Surplus / (Gap)	**7**	**3**	**(2)**	**(2)**	**(3)**	**(2)**	**(2)**	**(4)**	**(7)**	**3**	**13**	**7**	**0.0%**	**Very High**

Forecast	Baseline	Forestry Supervisor										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	250	254	260	264	265	265	265	264	265	268	270	20		
Demand (Industry)	250	259	268	276	285	294	316	339	361	384	406	156		
Surplus / (Gap)	**(0)**	**(5)**	**(8)**	**(12)**	**(20)**	**(29)**	**(52)**	**(75)**	**(96)**	**(116)**	**(136)**	**(136)**	**-19%**	**Very High**
Supply (BCLMSM)	250	254	260	264	265	265	265	264	265	268	270	20		
Demand (BCLMSM)	249	255	262	266	265	264	264	264	266	266	266	17		
Surplus / (Gap)	**0**	**(1)**	**(3)**	**(2)**	**(0)**	**1**	**1**	**1**	**(1)**	**1**	**3**	**3**	**0.0%**	**Very High**

Forecast	Baseline	Forestry Worker										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	494	502	511	517	519	520	520	519	520	524	527	33		
Demand (Industry)	493	517	541	565	589	613	673	733	793	853	913	420		
Surplus / (Gap)	**1**	**(15)**	**(30)**	**(48)**	**(70)**	**(93)**	**(153)**	**(214)**	**(272)**	**(329)**	**(386)**	**(387)**	**-28%**	**Very High**
Supply (BCLMSM)	494	502	511	517	519	520	520	519	520	524	527	33		
Demand (BCLMSM)	493	504	515	520	520	519	518	519	522	522	522	29		
Surplus / (Gap)	**1**	**(2)**	**(5)**	**(3)**	**(1)**	**1**	**1**	**0**	**(2)**	**2**	**5**	**4**	**0.0%**	**Very High**

Forecast	Baseline	Construction Manager										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	24	24	25	25	25	25	25	25	25	25	25	2		
Demand (Industry)	30	32	35	37	39	42	43	44	44	45	46	16		
Surplus / (Gap)	**(6)**	**(8)**	**(10)**	**(12)**	**(14)**	**(16)**	**(17)**	**(19)**	**(20)**	**(20)**	**(21)**	**(15)**	**-60%**	**Very High**
Supply (BCLMSM)	24	24	25	25	25	25	25	25	25	25	25	2		
Demand (BCLMSM)	23	24	24	25	25	25	25	25	25	25	25	2		
Surplus / (Gap)	**0**	**0**	**0**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**0**	**(0)**	**0.0%**	**Very High**

Forecast	Baseline	Supervisor, Heavy Equipment Operator										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	58	59	61	61	62	62	62	62	62	62	62	4		
Demand (Industry)	56	58	60	62	64	66	67	67	68	69	70	14		
Surplus / (Gap)	**2**	**2**	**1**	**(0)**	**(2)**	**(4)**	**(5)**	**(6)**	**(7)**	**(7)**	**(8)**	**(10)**	**-5%**	**Very High**
Supply (BCLMSM)	58	59	61	61	62	62	62	62	62	62	62	4		
Demand (BCLMSM)	58	59	60	61	62	62	62	62	62	62	62	4		
Surplus / (Gap)	**1**	**1**	**0**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**0**	**(0)**	**0.0%**	**Very High**

Forecast	Baseline	Drillers & Blasters										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	51	52	54	54	54	54	54	53	53	53	54	2		
Demand (Industry)	50	51	51	51	52	52	51	51	50	50	50	(0)		
Surplus / (Gap)	**1**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**4**	**3**	**5%**	**Stable**
Supply (BCLMSM)	51	52	54	54	54	54	54	53	53	53	54	2		
Demand (BCLMSM)	51	52	54	54	54	54	54	54	54	54	54	3		
Surplus / (Gap)	**0**	**0**	**(0)**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**0**	**(0)**	**-0.1%**	**Very High**

Forecast	Baseline	Heavy Equipment Operator										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	600	618	634	638	638	635	631	628	627	631	634	34		
Demand (Industry)	598	619	641	662	683	705	713	722	730	738	747	149		
Surplus / (Gap)	**2**	**(1)**	**(7)**	**(24)**	**(45)**	**(70)**	**(82)**	**(94)**	**(103)**	**(107)**	**(112)**	**(114)**	**-9%**	**Very High**
Supply (BCLMSM)	600	618	634	638	638	635	631	628	627	631	634	34		
Demand (BCLMSM)	598	619	637	639	638	635	632	629	631	631	631	33		
Surplus / (Gap)	**2**	**(0)**	**(3)**	**(1)**	**(0)**	**(0)**	**(1)**	**(1)**	**(3)**	**0**	**4**	**1**	**-0.1%**	**Very High**

Forecast	Baseline	Master Mechanic										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	58	59	61	61	62	62	62	62	62	62	62	4		
Demand (Industry)	60	62	65	67	70	72	74	76	78	79	81	21		
Surplus / (Gap)	**(2)**	**(3)**	**(4)**	**(6)**	**(8)**	**(10)**	**(12)**	**(14)**	**(16)**	**(17)**	**(19)**	**(17)**	**-16%**	**Very High**
Supply (BCLMSM)	58	59	61	61	62	62	62	62	62	62	62	4		
Demand (BCLMSM)	58	59	60	61	62	62	62	62	62	62	62	4		
Surplus / (Gap)	**1**	**1**	**0**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**0**	**(0)**	**0.0%**	**Very High**

Forecast	Baseline	Heavy Duty Mechanic										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	545	553	562	568	572	575	577	577	578	582	587	42		
Demand (Industry)	549	564	578	593	607	622	635	647	660	673	686	137		
Surplus / (Gap)	**(4)**	**(10)**	**(16)**	**(24)**	**(35)**	**(46)**	**(58)**	**(70)**	**(82)**	**(91)**	**(99)**	**(95)**	**-8%**	**Very High**
Supply (BCLMSM)	545	553	562	568	572	575	577	577	578	582	587	42		
Demand (BCLMSM)	540	550	561	568	573	577	579	580	582	582	582	42		
Surplus / (Gap)	**5**	**3**	**1**	**1**	**(1)**	**(2)**	**(2)**	**(3)**	**(4)**	**0**	**5**	**0**	**0.0%**	**Very High**

Forecast	Baseline	Manager, Logging										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	179	182	185	188	189	190	190	191	191	193	195	16		
Demand (Industry)	177	178	179	180	181	181	184	187	189	192	195	18		
Surplus / (Gap)	**2**	**4**	**6**	**8**	**8**	**8**	**6**	**4**	**2**	**1**	**(0)**	**(2)**	**2%**	**High**
Supply (BCLMSM)	179	182	185	188	189	190	190	191	191	193	195	16		
Demand (BCLMSM)	178	182	186	188	189	189	190	191	192	192	192	14		
Surplus / (Gap)	**1**	**0**	**(0)**	**(0)**	**0**	**0**	**0**	**(0)**	**(1)**	**1**	**2**	**2**	**0.2%**	**Very High**

Forecast	Baseline	Supervisor, Logging										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	464	471	483	491	492	493	492	491	493	497	501	38		
Demand (Industry)	463	461	460	458	456	455	449	443	437	431	425	(38)		
Surplus / (Gap)	**1**	**10**	**23**	**33**	**36**	**38**	**43**	**48**	**57**	**67**	**77**	**76**	**8%**	**Low**
Supply (BCLMSM)	464	471	483	491	492	493	492	491	493	497	501	38		
Demand (BCLMSM)	463	474	488	493	493	491	490	490	495	495	495	32		
Surplus / (Gap)	**0**	**(3)**	**(5)**	**(3)**	**(1)**	**1**	**2**	**1**	**(2)**	**2**	**6**	**6**	**0.0%**	**Very High**

Forecast	Baseline	Falling Supervisor										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	212	216	221	225	226	226	225	225	226	228	230	17		
Demand (Industry)	213	229	245	261	278	294	297	301	304	308	311	98		
Surplus / (Gap)	**(1)**	**(13)**	**(24)**	**(37)**	**(52)**	**(68)**	**(72)**	**(76)**	**(78)**	**(80)**	**(82)**	**(81)**	**-23%**	**Very High**
Supply (BCLMSM)	212	216	221	225	226	226	225	225	226	228	230	17		
Demand (BCLMSM)	212	217	223	226	226	225	225	225	227	227	227	15		
Surplus / (Gap)	**0**	**(1)**	**(2)**	**(1)**	**(0)**	**1**	**1**	**0**	**(1)**	**1**	**3**	**3**	**0.0%**	**Very High**

Forecast	Baseline	Logging Machine Operator										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	3,183	3,246	3,318	3,369	3,374	3,374	3,366	3,357	3,376	3,401	3,427	244		
Demand (Industry)	3,181	3,243	3,304	3,366	3,428	3,490	3,505	3,519	3,534	3,548	3,563	382		
Surplus / (Gap)	**2**	**3**	**14**	**2**	**(54)**	**(116)**	**(139)**	**(162)**	**(158)**	**(147)**	**(136)**	**(137)**	**-2%**	**Very High**
Supply (BCLMSM)	3,183	3,246	3,318	3,369	3,374	3,374	3,366	3,357	3,376	3,401	3,427	244		
Demand (BCLMSM)	3,186	3,271	3,355	3,388	3,374	3,358	3,347	3,348	3,389	3,389	3,389	203		
Surplus / (Gap)	**(4)**	**(25)**	**(37)**	**(20)**	**0**	**15**	**18**	**9**	**(13)**	**12**	**38**	**42**	**0.0%**	**Very High**

Forecast	Baseline	Helicopter Pilot										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	43	44	44	45	45	46	46	46	47	47	47	4		
Demand (Industry)	41	41	41	41	41	41	41	41	41	41	41	(0)		
Surplus / (Gap)	**2**	**3**	**4**	**4**	**5**	**5**	**5**	**6**	**6**	**6**	**7**	**4**	**11%**	**Low**
Supply (BCLMSM)	43	44	44	45	45	46	46	46	47	47	47	4		
Demand (BCLMSM)	43	44	44	45	45	46	46	47	47	47	47	4		
Surplus / (Gap)	**0**	**0**	**0**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**0**	**1**	**0**	**0.1%**	**Very High**

Forecast	Baseline	Tugboat Captain										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	36	37	37	37	38	38	38	39	39	39	40	3		
Demand (Industry)	35	34	34	33	33	32	32	32	32	31	31	(4)		
Surplus / (Gap)	**1**	**2**	**3**	**4**	**5**	**6**	**6**	**7**	**7**	**8**	**8**	**(1)**	**14%**	**Low**
Supply (BCLMSM)	36	37	37	37	38	38	38	39	39	39	40	3		
Demand (BCLMSM)	36	36	37	37	38	38	39	39	39	39	39	3		
Surplus / (Gap)	**0**	**0**	**0**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**0**	**0**	**0**	**0.1%**	**Very High**

Forecast	Baseline	Hand Faller										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	1,233	1,253	1,275	1,290	1,295	1,297	1,297	1,296	1,299	1,308	1,317	83		
Demand (Industry)	1,234	1,364	1,493	1,622	1,751	1,880	1,910	1,940	1,969	1,999	2,029	795		
Surplus / (Gap)	**(1)**	**(111)**	**(217)**	**(331)**	**(456)**	**(583)**	**(613)**	**(644)**	**(670)**	**(691)**	**(712)**	**(712)**	**-35%**	**Very High**
Supply (BCLMSM)	1,233	1,253	1,275	1,290	1,295	1,297	1,297	1,296	1,299	1,308	1,317	83		
Demand (BCLMSM)	1,231	1,259	1,287	1,297	1,297	1,295	1,294	1,295	1,304	1,304	1,304	73		
Surplus / (Gap)	**2**	**(6)**	**(11)**	**(7)**	**(2)**	**2**	**3**	**1**	**(5)**	**4**	**13**	**11**	**0.0%**	**Very High**

Forecast	Baseline	Ground Worker										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	609	619	630	637	639	641	640	640	642	646	650	41		
Demand (Industry)	608	653	699	744	789	834	839	843	847	851	855	247		
Surplus / (Gap)	**1**	**(35)**	**(69)**	**(107)**	**(150)**	**(194)**	**(198)**	**(203)**	**(205)**	**(205)**	**(205)**	**(206)**	**-22%**	**Very High**
Supply (BCLMSM)	609	619	630	637	639	641	640	640	642	646	650	41		
Demand (BCLMSM)	608	622	635	641	640	639	639	639	644	644	644	36		
Surplus / (Gap)	**1**	**(3)**	**(6)**	**(3)**	**(1)**	**1**	**2**	**0**	**(2)**	**2**	**6**	**5**	**0.0%**	**Very High**

Forecast	Baseline	Logging Worker										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	2,051	2,084	2,116	2,143	2,162	2,177	2,190	2,201	2,212	2,234	2,256	205		
Demand (Industry)	2,043	2,252	2,462	2,671	2,881	3,091	2,962	2,833	2,704	2,575	2,446	403		
Surplus / (Gap)	**8**	**(168)**	**(346)**	**(528)**	**(719)**	**(913)**	**(772)**	**(632)**	**(492)**	**(341)**	**(190)**	**(198)**	**-21%**	**Very High**
Supply (BCLMSM)	2,051	2,084	2,116	2,143	2,162	2,177	2,190	2,201	2,212	2,234	2,256	205		
Demand (BCLMSM)	2,033	2,072	2,114	2,143	2,168	2,187	2,201	2,213	2,227	2,227	2,227	194		
Surplus / (Gap)	**18**	**12**	**1**	**(0)**	**(6)**	**(9)**	**(11)**	**(12)**	**(15)**	**6**	**28**	**10**	**0.1%**	**Very High**

Forecast	Baseline	Boom Man										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	466	474	481	487	491	495	498	500	503	508	513	47		
Demand (Industry)	461	452	443	434	425	416	429	443	456	470	483	22		
Surplus / (Gap)	**5**	**22**	**38**	**53**	**67**	**79**	**68**	**57**	**47**	**38**	**30**	**24**	**9%**	**Low**
Supply (BCLMSM)	466	474	481	487	491	495	498	500	503	508	513	47		
Demand (BCLMSM)	462	471	480	487	493	497	500	503	506	506	506	44		
Surplus / (Gap)	**4**	**3**	**0**	**(0)**	**(1)**	**(2)**	**(3)**	**(3)**	**(4)**	**1**	**6**	**2**	**0.1%**	**Very High**

Forecast	Baseline	Truck Driver										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	1,791	1,818	1,842	1,862	1,875	1,887	1,896	1,905	1,913	1,930	1,946	155		
Demand (Industry)	1,805	1,887	1,969	2,052	2,134	2,216	2,266	2,317	2,367	2,417	2,468	663		
Surplus / (Gap)	**(14)**	**(69)**	**(127)**	**(189)**	**(259)**	**(329)**	**(370)**	**(412)**	**(454)**	**(487)**	**(521)**	**(507)**	**-15%**	**Very High**
Supply (BCLMSM)	1,791	1,818	1,842	1,862	1,875	1,887	1,896	1,905	1,913	1,930	1,946	155		
Demand (BCLMSM)	1,771	1,799	1,832	1,856	1,879	1,897	1,909	1,918	1,929	1,929	1,929	158		
Surplus / (Gap)	**20**	**18**	**10**	**6**	**(4)**	**(10)**	**(13)**	**(13)**	**(16)**	**1**	**17**	**(3)**	**0.1%**	**Very High**

Forecast	Baseline	Industrial Engineering and Manufacturing Technologist & Technician										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	46	47	48	48	49	49	49	49	50	50	51	5		
Demand (Industry)	47	47	47	47	47	47	47	47	47	47	47	0		
Surplus / (Gap)	**(1)**	**(1)**	**0**	**1**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**4**	**3%**	**High**
Supply (BCLMSM)	46	47	48	48	49	49	49	49	50	50	51	5		
Demand (BCLMSM)	45	46	47	48	49	50	50	50	50	50	50	5		
Surplus / (Gap)	**1**	**1**	**0**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**0**	**1**	**(0)**	**0.1%**	**Very High**

Forecast	Baseline	Supervisor, Forest Products Processing										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	449	455	463	469	473	476	478	479	480	484	488	39		
Demand (Industry)	447	447	447	447	447	447	447	447	447	447	447	(0)		
Surplus / (Gap)	**2**	**8**	**16**	**22**	**26**	**29**	**31**	**32**	**33**	**37**	**41**	**39**	**5%**	**Stable**
Supply (BCLMSM)	449	455	463	469	473	476	478	479	480	484	488	39		
Demand (BCLMSM)	445	453	463	468	473	477	479	481	483	483	483	38		
Surplus / (Gap)	**4**	**3**	**1**	**1**	**(1)**	**(1)**	**(2)**	**(2)**	**(3)**	**1**	**5**	**1**	**0.1%**	**Very High**

Forecast	Baseline	Pulp Mill Machine Operator										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	164	167	169	171	172	172	173	173	173	174	175	11		
Demand (Industry)	164	164	164	164	164	164	164	164	164	164	164	0		
Surplus / (Gap)	**0**	**2**	**5**	**6**	**7**	**8**	**8**	**9**	**9**	**10**	**11**	**11**	**4%**	**Stable**
Supply (BCLMSM)	164	167	169	171	172	172	173	173	173	174	175	11		
Demand (BCLMSM)	163	166	170	171	172	172	173	173	174	174	174	10		
Surplus / (Gap)	**1**	**0**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**(0)**	**(1)**	**0**	**1**	**0**	**0.0%**	**Very High**

Forecast	Baseline	Millwright										Change	Gap Average	Shortage Rating
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	#	%	
Supply (BCLMSM)	971	986	1,002	1,013	1,020	1,026	1,028	1,029	1,030	1,038	1,046	75		
Demand (Industry)	973	1,008	1,043	1,078	1,114	1,149	1,184	1,219	1,254	1,289	1,324	351		
Surplus / (Gap)	**(2)**	**(22)**	**(42)**	**(66)**	**(93)**	**(123)**	**(156)**	**(190)**	**(223)**	**(251)**	**(278)**	**(276)**	**-13%**	**Very High**
Supply (BCLMSM)	971	986	1,002	1,013	1,020	1,026	1,028	1,029	1,030	1,038	1,046	75		
Demand (BCLMSM)	963	980	1,000	1,012	1,022	1,029	1,032	1,034	1,037	1,037	1,037	74		
Surplus / (Gap)	**8**	**6**	**1**	**1**	**(2)**	**(3)**	**(4)**	**(5)**	**(7)**	**1**	**9**	**0**	**0.0%**	**Very High**

SECTION 9: CONCLUSIONS & STRATEGIC RECOMMENDATIONS

British Columbia's forest sector continues to undergo a period of economic and structural change that began more than two decades ago. Traditional markets for BC forest products are changing, new products are emerging in the form of biomass, social attitudes towards forestry and logging continue to evolve, and the means by which forest products are now harvested and manufactured are raising the skill and knowledge requirements of the industry workforce at all levels. Together these factors point to the need for a "rebuilding" of the workforce that would sustain the forest industry well into the next decade and beyond.

Throughout the restructuring period, the industry workforce has been in decline with many skilled workers having left the industry and fewer new hires to ensure effective succession planning. Today, as the industry shows signs of a resurgence, employers now face the challenge of replenishing an aging and experienced workforce, with younger talent from a pool of workers that is both shrinking in size and in high demand from competing industries and sectors. This challenge is exacerbated by the fact that the forest industry continues to be perceived by the public as an industry in decline, and that job and career opportunities are better in competing sectors, like mining, oil & gas and construction.

Human resources issues are competitiveness issues and time is not on the side of forest industry employers. The demand for new workers is immediate, and without a comprehensive plan to replace existing workers or meet growth requirements, the industry faces the prospect of falling behind its competitors within the global forest economy. The BC forest industry has implemented numerous strategies to improve productivity over the years, yet without a sustainable supply of qualified workers to execute these strategies, these efforts may never be fully realized.

Human resource leadership must come from those with an interest in ensuring the long term viability of the forest sector in BC, including industry, government, labour, training and community leaders. Each has a stake in managing and preserving the forest resource for future generations, including those operating on private lands. This would suggest having in place a coordinated industry approach that aligns human resource objectives with economic objectives. Successful HR planning requires a degree of certainty that the forestry economy is stabilizing and that opportunities for industry and employment growth are positive. Based on current economic and industry growth forecasts, it would appear that BC's forest industry is now moving in this direction. Greater certainty will follow once the provincial government confirms its long term plan (25 years) for the Annual Allowable Cut.

The next step in the planning process is the development of a human resource strategy for the industry, based on the results of this study and other information as applicable, including labour market studies currently ongoing in the pulp and silviculture industries. The goal of the strategy is to develop a plan that attempts to address the long term requirements of forestry, logging (including log hauling), road building, and primary and secondary manufacturers of wood, paper and other products. Such a plan must be forward looking while taking into account the requirements of an industry that is changing. Future human resource planning based solely on existing processes, technologies, products and productivity will inevitably fail, unless it can capture future needs as driven by changing markets, operations, technology and other factors.

The following recommendations are framed as the basis for discussion among stakeholders during upcoming consultations on a human resource strategy. It anticipates comprehensive representation

from the forest industry (including silviculture), the broader forest sector, government, labour, public and private trainers, and members of Aboriginal and forest communities.

STRATEGIC RECOMMENDATIONS

1. Establish an industry-wide committee responsible for human resource planning and development in the Coastal region. The mandate of the committee would be to validate the long term needs of industry and to coordinate the development of a long term human resource strategy for the forest sector. Strategies to address the needs of the forestry and logging industries (i.e., workers in the woods) and primary and secondary manufacturers (i.e., mill workers) would reflect their unique differences and occupational composition. Strategies should be developed to help address important structural issues for the sector, including the high degree of seasonal and part-time work among forestry and logging operators. Committee representation would include all forest sector stakeholders.

2. Following completion of the strategy, establish a permanent organization (e.g., BC Forest Sector Workforce Council) responsible for implementation and ongoing workforce development. The organization would be modeled on a similar industry body established by the BC Shipbuilding and Repair industry in 2012 (Industrial Marine Training & Applied Research Centre), supported by industry and government, and facilitated through the BC Resource Training Organization or related Industry Training Organization. The organization would be overseen by a representative board of directors. Included in its mandate would be ongoing coordination with industry, government and post secondary colleges & institutes; ongoing collection of labour market information and training program quality; and development and maintenance of a database of employers, independent contractors, business organizations and other stakeholders operating in the forest sector.

3. Develop an industry marketing strategy to address the negative public image and myths associated with the BC forest sector. Focus the strategy on youth and adults, emphasizing the positive social and environmental steps the industry has taken making forestry the “greenest” industry in the resource sector. Coordinate with government to demonstrate the long term viability of the forest sector and opportunities for entry-level and career employment.

4. Develop an integrated “career path” strategy that demonstrates how workers in entry-level positions can graduate towards jobs in supervision, management, sales and marketing, and other occupational categories. Coordinate with industry and training providers as to the requirements needed for career progression within the forest sector. Coordinate with high schools in both rural and urban communities to promote career paths in forestry. Consider introducing an industry program at the secondary school level focused on forestry and logging, similar to the *WoodLINKS* program in support of wood products manufacturing, currently offered in various high schools throughout the province.

5. Work with public training providers (e.g., Vancouver Island University, Thompson Rivers University) to develop an entry-level trades training program focusing on forestry and logging. Introduce students to forestry operations, including silviculture, and the knowledge and skills required for tree planting, thinning, spacing, grading, fire fighting and other forestry related tasks. Introduce students to logging operations, and the knowledge and skills required to manually and mechanically harvest the resource, process and transport forest products. Demonstrate career paths and build workplace opportunities into the program while promoting new recruits to the industry. Develop online program delivery to enable province wide participation in the program using a platform similar to Learn Now BC. Educate students as to how they may become certified fallers through the BC Forest Safety Council, and how they may become qualified in other forestry and logging occupations.

6. In professional forestry occupations (e.g., professional forester, forestry technicians & technologists), develop strategies to attract new students to these programs. Coordinate with universities and colleges that provide the programming and accrediting agencies, outlining the sector's long term needs and plan for promoting the program to eligible students from BC and other jurisdictions. Industry, government and training providers must take a more coordinated approach to support the long term viability of the programming.

7. In occupations unique to the logging industry (e.g., logging machinery operator, logging truck drivers), explore potential for re-activating the operator program as developed by the Interior Logging Association and Thompson Rivers University. Demonstrate the long term demand requirements for these workers, while expanding cooperation with other logging associations, including the Truck Loggers Association, Central Interior Logging Association and Northwest Logging Association to help ensure full program participation. Develop opportunities that make it easier and more cost-effective to attract trainees to participate in the program from around the province, and other jurisdictions.

8. In occupations that cross industry lines (e.g., apprentice occupations), coordinate training plans with logging operators, mill operators, equipment supply companies (e.g., Nicholson, Finning), as well as other resource companies that require similar trades workers, such as millwrights, mechanics and heavy equipment operators, in resource communities. Explore the potential for adopting regional or group apprenticeships (RGA) among forest industry operators that help pool training risks and provide smaller firms greater opportunities to participate in apprenticeship training. Training sponsorship could be coordinated through the BC Forest Sector Workforce Council (Recommendation 2).

9. Develop strategies to promote recruitment from among alternative sources of labour, including new Canadians, female workers, and Aboriginal workers[12]. Examine other models in resource industries that have successfully managed to train and recruit workers from among these underrepresented groups (e.g., Alberta Aboriginal Apprenticeship Project, Essential Skills). Work with silviculture operators for the purpose of informing/identifying seasonal workers (e.g., tree planters) interested in pursuing longer term opportunities in forestry and logging. Explore the potential of the federal Temporary Foreign Worker program to help address short term labour shortages in skilled occupations. Established immigrant networks may be leveraged to help recruit recent immigrants, particularly in wood products manufacturing.

[12] Note that additional strategies to promote Aboriginal employment in the forest industry will be articulated in a related research initiative led by Michael Izen & Associates on behalf of the BC Coastal Forestry Workforce Initiative.

Appendices

Appendix A – Occupational Employment Growth – Coast Region (per Table 26)

	Baseline	Projected	% Growth	Projected	% Growth	Annual Growth
Occupational Projection	**2012**	**2017**	**2013-17**	**2022**	**2018-22**	**2013-2022**
Manager, Forestry Operations	152	152	0%	159	5%	0.5%
Forestry Professional	421	402	-4%	380	-5%	-1.0%
Forestry Technician	519	537	3%	498	-8%	-0.4%
Forestry Supervisor	115	127	10%	230	90%	10.0%
Forestry Worker	227	231	2%	474	107%	10.9%
Forestry	**1,433**	**1,449**	**1%**	**1,740**	**20%**	**2.1%**
Construction Manager	14	16	20%	16	0%	2.0%
Supervisor, HEO	26	28	8%	28	0%	0.8%
Drillers & Blasters	23	24	3%	22	-7%	-0.3%
Heavy Equipment Operators	275	303	10%	294	-3%	0.7%
Road Building	**338**	**371**	**10%**	**361**	**-3%**	**0.7%**
Master Mechanic	27	33	19%	31	-6%	1.3%
HD Mechanic	253	271	7%	297	10%	1.8%
Multi-Phase	**280**	**304**	**8%**	**328**	**8%**	**1.7%**
Manager, Logging	82	86	5%	93	9%	1.4%
Supervisor, Logging	213	213	0%	201	-6%	-0.6%
Falling Supervisor	98	162	65%	174	12%	7.8%
Logging Machinery Operator	1,463	1,518	4%	1,468	-3%	0.0%
Helicopter Pilot	19	19	0%	19	0%	0.0%
Hand Faller	568	795	40%	883	15%	5.6%
Ground Worker	280	333	19%	311	-8%	1.1%
Logging Worker	940	948	1%	933	-2%	-0.1%
Boom Man^	322	256	-21%	315	18%	-0.2%
Truck Driver	830	855	3%	835	-2%	0.1%
Tugboat Captain^	24	22	-9%	21	-4%	-1.3%
Logging	**4,838**	**5,206**	**8%**	**5,252**	**1%**	**0.8%**
Industrial Engineering T&T	22	22	0%	22	0%	0.0%
Supervisor, Forest Products	206	206	0%	206	0%	0.0%
Pulp Mill Machine Operator	76	76	0%	76	0%	0.0%
Millwright	448	448	0%	448	0%	0.0%
Pulp	**751**	**751**	**0%**	**751**	**0%**	**0.0%**
Coast Totals (% BC Forestry)	**7,640 (47%)**	**8,080 (41%)**	**6%**	**8,432 (40%)**	**4%**	**1.0%**

Appendix B – Occupational Employment Growth – Interior Region (per Table 27)

	Baseline	Projected	% Growth	Projected	% Growth	Annual Growth
Occupational Projection	**2012**	**2017**	**2013-17**	**2022**	**2018-22**	**2013-2022**
Manager, Forestry Operations	178	216	21%	228	7%	2.8%
Forestry Professional	494	619	25%	668	10%	3.5%
Forestry Technician	609	859	41%	979	20%	6.1%
Forestry Supervisor	135	167	24%	176	7%	3.0%
Forestry Worker	266	381	43%	439	22%	6.5%
Forestry	**1,683**	**2,243**	**33%**	**2,490**	**11%**	**4.4%**
Construction Manager	16	25	57%	30	29%	8.6%
Supervisor, HEO	30	38	27%	42	14%	4.1%
Drillers & Blasters	27	28	3%	27	-3%	0.0%
Heavy Equipment Operators	323	402	24%	452	16%	4.0%
Road Building	**396**	**493**	**24%**	**552**	**12%**	**3.6%**
Master Mechanic	32	39	22%	50	33%	5.6%
HD Mechanic	296	350	18%	389	13%	3.1%
Multi-Phase	**329**	**390**	**19%**	**439**	**13%**	**3.1%**
Manager, Logging	96	96	0%	101	6%	0.6%
Supervisor, Logging	250	242	-3%	224	-7%	-1.1%
Falling Supervisor	115	132	15%	138	5%	2.0%
Logging Machinery Operator	1,718	**1,972**	15%	**2,095**	7%	2.2%
Helicopter Pilot	22	22	0%	22	0%	0.0%
Hand Faller	667	1,085	63%	1,146	9%	7.2%
Ground Worker	328	501	53%	545	13%	6.6%
Logging Worker	1,103	2,143	94%	1,513	-57%	3.7%
Boom Man^	138	184	33%	184	0%	3.3%
Truck Driver	974	1,361	40%	1,633	28%	6.8%
Tugboat Captain^	10	10	0%	10	0%	0.0%
Logging	**5,421**	**7,748**	**43%**	**7,609**	**-2%**	**4.1%**
Industrial Engineering T&T	26	26	0%	26	0%	0.0%
Supervisor, Forest Products	241	241	0%	241	0%	0.0%
Pulp Mill Machine Operator	89	89	0%	89	0%	0.0%
Millwright	526	701	33%	876	33%	6.7%
Pulp	**881**	**1,056**	**20%**	**1,232**	**17%**	**3.6%**
Interior Totals (% BC Forestry)	**8,710 (53%)**	**11,930 (59%)**	**37%**	**12,321 (60%)**	**3%**	**4.0%**

Appendix C – Occupational Employment Growth – BC (per Table 28)

	Baseline	Projected	% Growth	Projected	% Growth	Annual Growth
Occupational Projection	**2012**	**2017**	**2013-17**	**2022**	**2018-22**	**2013-2022**
Manager, Forestry Operations	330	369	12%	388	6%	1.8%
Forestry Professional	915	1,021	11%	1,046	3%	1.4%
Forestry Technician	1,128	1,396	24%	1,476	7%	3.1%
Forestry Supervisor	250	294	18%	406	45%	6.2%
Forestry Worker	493	613	24%	913	61%	8.5%
Forestry	**3,116**	**3,691**	**18%**	**4,229**	**15%**	**3.3%**
Construction Manager	30	42	40%	46	15%	5.6%
Supervisor, HEO	56	66	18%	70	7%	2.6%
Drillers & Blasters	50	52	3%	50	-5%	-0.2%
Heavy Equipment Operators	598	705	18%	747	7%	2.5%
Road Building	**734**	**864**	**18%**	**912**	**6%**	**2.3%**
Master Mechanic	60	72	21%	81	15%	3.6%
HD Mechanic	549	622	13%	686	12%	2.5%
Multi-Phase	**609**	**694**	**14%**	**767**	**11%**	**2.5%**
Manager, Logging	177	181	2%	195	7%	1.0%
Supervisor, Logging	463	455	-2%	425	-6%	-0.8%
Falling Supervisor	213	294	38%	311	8%	4.6%
Logging Machinery Operator	3,181	3,490	10%	3,563	2%	1.2%
Helicopter Pilot	41	41	0%	41	0%	0.0%
Hand Faller	1,234	1,880	52%	2,029	12%	6.4%
Ground Worker	608	834	37%	855	3%	4.1%
Logging Worker	2,043	3,091	51%	2,446	-32%	2.0%
Boom Man^	461	416	-10%	483	15%	0.5%
Truck Driver	1,805	2,216	23%	2,468	14%	3.7%
Tugboat Captain^	35	32	-7%	31	-3%	-1.0%
Logging	**10,260**	**12,930**	**26%**	**12,846**	**-1%**	**2.5%**
Industrial Engineering T&T	47	47	0%	47	0%	0.0%
Supervisor, Forest Products	447	447	0%	447	0%	0.0%
Pulp Mill Machine Operator	164	164	0%	164	0%	0.0%
Millwright	973	1,149	18%	1,324	18%	3.6%
Pulp	**1,632**	**1,807**	**11%**	**1,982**	**10%**	**2.0%**
BC Totals (% BC Forestry)	**16,350 (100%)**	**19,986 (100%)**	**22%**	**20,737 (100%)**	**4%**	**2.6%**

Appendix D – Projected Job Openings Priority Occupations – Coast (per Table 29)

Coast	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Average (10 Yr)*
Manager, Forestry	152	20	6	-	27	33	7	7	48	74	49%	4.9%
Forestry Professional	421	12	43	(19)	36	58	43	(23)	78	114	27%	2.7%
Forestry Technician	519	8	108	18	134	79	73	(39)	112	246	47%	4.7%
Forestry Supervisor	115	-	24	12	36	13	6	103	122	158	138%	13.8%
Forestry Worker	227	-	-	4	4	-	-	243	243	247	109%	10.9%
Forestry	**1,433**	**39**	**181**	**15**	**236**	**183**	**129**	**291**	**603**	**839**	**59%**	**5.9%**
Construction Manager	14	-	-	3	3	8	-	-	8	11	80%	8.0%
Supervisor, HEO	26	3	2	2	7	5	4	-	9	16	64%	6.4%
Drillers & Blasters	23	5	3	1	9	8	2	(2)	9	18	77%	7.7%
HEO	275	34	11	28	73	86	19	(9)	97	170	62%	6.2%
Road Building	**338**	**43**	**16**	**33**	**92**	**107**	**26**	**(10)**	**123**	**215**	**64%**	**6.4%**
Master Mechanic	27	5	-	5	11	9	2	(2)	9	20	73%	7.3%
Heavy Duty Mechanic	253	45	24	18	88	55	16	26	98	185	73%	7.3%
Multi-Phase	**280**	**51**	**24**	**24**	**98**	**64**	**18**	**25**	**107**	**205**	**73%**	**7.3%**
Manager, Logging	82	11	-	4	15	15	4	7	26	41	50%	5.0%
Supervisor, Logging	213	3	17	-	20	42	20	(12)	50	69	33%	3.3%
Falling Supervisor	98	15	-	64	79	34	9	12	55	134	137%	13.7%
Logging Machinery Operator	1,463	253	93	55	401	421	68	(50)	439	840	57%	5.7%
Helicopter Pilot	19	-	4	-	4	9	4	-	13	18	96%	9.6%
Hand Faller	568	81	23	228	332	152	25	88	264	596	105%	10.5%
Ground Worker	280	47	25	53	124	49	34	(22)	62	186	67%	6.7%
Logging Worker	940	125	81	8	213	144	86	(15)	215	428	46%	4.6%
Boom Man	322	51	22	(67)	6	29	15	59	103	109	34%	3.4%
Truck Drivers	830	164	103	25	292	203	84	(20)	267	559	67%	6.7%
Tugboat Captain	24	2	2	(2)	2	5	1	(1)	5	7	28%	2.8%
Logging	**4,838**	**752**	**370**	**368**	**1,490**	**1,102**	**350**	**46**	**1,498**	**2,988**	**62%**	**6.2%**
Industrial Eng. T&T	22	6	-	-	6	4	4	-	9	15	71%	7.1%
Supervisor, Forest Products	206	32	11	-	43	32	11	-	43	87	42%	4.2%
Pulp Mill Machine Operator	76	23	2	-	25	23	2	-	25	50	66%	6.6%
Millwright	448	30	10	-	40	75	15	-	90	129	29%	2.9%
Pulp & Paper	**751**	**92**	**22**	**-**	**114**	**135**	**32**	**-**	**167**	**281**	**37%**	**3.7%**
Coast Totals	**7,640**	**977**	**613**	**441**	**2,031**	**1,591**	**555**	**352**	**2,497**	**4,529**	**59%**	**5.9%**
%		**22%**	**14%**	**10%**	**45%**	**35%**	**12%**	**8%**	**55%**	**100%**		

Appendix E – Projected Job Openings Priority Occupations – Interior (per Table 30)

Interior	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Average (10 Yr)*
Manager, Forestry	178	39	6	38	84	45	12	12	69	153	86%	8.6%
Forestry Professional	494	7	63	125	195	64	50	49	163	357	72%	7.2%
Forestry Technician	609	26	40	250	316	48	67	120	235	551	90%	9.0%
Forestry Supervisor	135	16	10	32	58	22	13	9	44	102	76%	7.6%
Forestry Worker	266	-	18	115	133	6	18	57	81	214	80%	8.0%
Forestry	**1,683**	**88**	**138**	**560**	**786**	**184**	**160**	**247**	**591**	**1,377**	**82%**	**8.2%**
Construction Manager	16	5	-	9	14	2	-	5	7	21	129%	12.9%
Supervisor, HEO	30	3	1	8	12	7	3	4	14	26	86%	8.6%
Drillers & Blasters	27	-	-	1	1	-	-	(1)	(1)	-	0%	0.0%
HEO	323	45	39	79	163	62	45	51	157	320	99%	9.9%
Road Building	**396**	**52**	**41**	**97**	**190**	**71**	**48**	**59**	**177**	**367**	**93%**	**9.3%**
Master Mechanic	32	4	4	7	14	4	4	11	18	32	100%	10.0%
Heavy Duty Mechanic	296	65	13	54	131	77	-	39	115	247	83%	8.3%
Multi-Phase	**329**	**68**	**16**	**61**	**145**	**80**	**4**	**49**	**133**	**279**	**85%**	**8.5%**
Manager, Logging	96	-	-	-	-	29	5	5	39	39	41%	4.1%
Supervisor, Logging	250	27	9	(9)	27	54	18	(18)	54	81	32%	3.2%
Falling Supervisor	115	6	6	17	28	27	-	6	33	61	53%	5.3%
Logging Machinery Operator	1,718	133	151	255	538	170	122	122	414	953	55%	5.5%
Helicopter Pilot	22	-	5	-	5	11	5	-	17	22	100%	10.0%
Hand Faller	667	48	78	418	544	50	61	61	172	716	107%	10.7%
Ground Worker	328	11	44	173	229	44	11	43	99	327	100%	10.0%
Logging Worker	1,103	-	79	1,040	1,119	-	394	(630)	(236)	883	80%	8.0%
Boom Man	138	46	46	46	137	46	-	-	46	183	132%	13.2%
Truck Drivers	974	131	143	386	661	215	68	272	555	1,216	125%	12.5%
Tugboat Captain	10	5	-	-	5	5	-	-	5	10	100%	10.0%
Logging	**5,421**	**407**	**560**	**2,326**	**3,293**	**651**	**685**	**(139)**	**1,197**	**4,491**	**83%**	**8.3%**
Industrial Eng. T&T	26	8	-	-	8	5	5	-	10	18	70%	7.0%
Supervisor, Forest Products Processing	241	38	13	-	51	38	13	-	51	102	42%	4.2%
Pulp Mill Machine Operator	89	27	2	-	29	27	2	-	29	58	65%	6.5%
Millwright	526	-	-	175	175	70	175	175	421	596	113%	11.3%
Pulp & Paper	**881**	**73**	**14**	**175**	**263**	**141**	**195**	**175**	**511**	**774**	**88%**	**8.8%**
Interior Totals	**8,710**	**688**	**769**	**3,220**	**4,677**	**1,128**	**1,091**	**391**	**2,610**	**7,287**	**84%**	**8.4%**
(%)		**9%**	**11%**	**44%**	**64%**	**15%**	**15%**	**5%**	**36%**	**100%**		

Appendix F – Projected Job Openings Priority Occupations – BC (per Table 31)

BC	2012	2013 – 2017				2018 – 2022				2013 – 2022		
	Baseline	*Retirees*	*Attrition*	*Growth*	*Openings*	*Retirees*	*Attrition*	*Growth*	*Openings*	*Total Openings*	*% 2012*	*Average (10 Yr)*
Manager, Forestry	330	59	13	39	111	79	19	19	118	229	69%	6.9%
Forestry Professional	915	19	106	105	230	121	93	25	240	470	51%	5.1%
Forestry Technician	1,128	35	148	267	450	126	140	81	347	797	71%	7.1%
Forestry Supervisor	250	16	34	44	94	35	19	112	166	260	104%	10.4%
Forestry Worker	493	-	18	120	138	6	18	300	324	462	94%	9.4%
Forestry	**3,116**	**129**	**319**	**575**	**1,023**	**367**	**289**	**538**	**1,194**	**2,217**	**71%**	**7.1%**
Construction Manager	30	5	-	12	17	11	-	5	15	32	106%	10.6%
Supervisor, HEO	56	6	3	10	19	12	7	4	23	42	76%	7.6%
Drillers & Blasters	50	5	3	2	10	8	2	(2)	8	18	36%	3.6%
HEO	598	79	50	107	236	148	64	42	254	490	82%	8.2%
Road Building	**734**	**95**	**56**	**130**	**282**	**178**	**73**	**48**	**300**	**582**	**79%**	**7.9%**
Master Mechanic	60	9	4	13	26	13	5	9	27	53	89%	8.9%
Heavy Duty Mechanic	549	110	37	73	219	132	16	65	213	432	79%	7.9%
Multi-Phase	**609**	**119**	**40**	**85**	**245**	**145**	**22**	**74**	**240**	**485**	**80%**	**8.0%**
Manager, Logging	177	11	-	4	15	43	9	13	66	81	46%	4.6%
Supervisor, Logging	463	29	27	(9)	47	96	38	(30)	104	151	33%	3.3%
Falling Supervisor	213	21	6	81	107	61	9	18	88	195	92%	9.2%
Logging Machinery Operator	3,181	386	243	309	938	591	191	72	854	1,792	56%	5.6%
Helicopter Pilot	41	-	11	-	11	20	11	-	31	41	102%	10.2%
Hand Faller	1,234	129	100	646	875	202	87	149	437	1,312	106%	10.6%
Ground Worker	608	58	69	226	354	94	46	21	161	514	85%	8.5%
Logging Worker	2,043	125	160	1,048	1,332	144	479	(645)	(21)	1,311	64%	6.4%
Boom Man	461	89	55	(45)	100	64	17	67	148	248	54%	5.4%
Truck Drivers	1,805	296	246	412	954	418	152	251	822	1,776	98%	9.8%
Tugboat Captain	35	5	2	(2)	5	9	1	(1)	9	14	41%	4.1%
Logging	**10,260**	**1,150**	**918**	**2,670**	**4,738**	**1,742**	**1,039**	**(84)**	**2,698**	**7,435**	**72%**	**7.2%**
Industrial Eng. T&T	47	14	-	-	14	10	10	-	19	33	70%	7.0%
Supervisor, Forest Products Processing	447	71	24	-	94	71	24	-	94	188	42%	4.2%
Pulp Mill Machine Operator	164	51	4	-	55	51	4	-	55	110	67%	6.7%
Millwright	973	30	10	175	215	145	190	175	510	725	75%	7.5%
Pulp & Paper	**1,632**	**166**	**38**	**175**	**378**	**276**	**228**	**175**	**679**	**1,057**	**65%**	**6.5%**
BC Totals	**16,350**	**1,658**	**1,372**	**3,636**	**6,666**	**2,708**	**1,651**	**751**	**5,111**	**11,776**	**72%**	**7.2%**
%		**14%**	**12%**	**31%**	**57%**	**23%**	**14%**	**6%**	**43%**	**100%**		

Blank