British Columbia Silviculture Sector Labour Population and Activity Study – Draft Report

Survey data collection and draft report prepared by the Western Silviculture Contractors’ Association with assistance from B.A. Blackwell & Associates Ltd.

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Cover photo credits, clockwise from top left: Pierre Tremblay, Bruce MacKinnon, Jo Graber.
Executive Summary

The Western Silviculture Contractors’ Association (WSCA) obtained funding from the Ministry of Forests, Lands and Natural Resource Operations (MFLRNO) to: create a silvicultural contractor database and to conduct a survey of silvicultural contractors in British Columbia (BC) in order to further the understanding of the sector. The compiled results will be used together with results from other studies as part of a larger collaboration between the WSCA, BC Forest Safety Council, the Labour Market Partnership Program, and WorkSafeBC to improve safety, training and other human resource related practices and standards in the silviculture sector. B.A. Blackwell & Associates Ltd. were subcontracted to assist with the survey design, data collection and reporting. The purpose of this document is to report and provide critical analysis of the results of the silvicultural contractor survey.

Contractor Population

A contractor database was established and 194 contractors were confirmed as currently operating in BC. Another 65 contractors could not be confirmed, though the contact information appeared correct and 143 contractors could not be confirmed and the accuracy of their contact information is uncertain. There were 106 contractors within the initial database that have confirmed they are no longer operating as silvicultural contractors and another four that could not be confirmed, but with inaccurate contact information. The survey population was limited to those 194 contractors confirmed in operation; 84 responded to the survey.

Survey Results

The majority of respondents were small companies employing 1 – 5 persons annually; 77% of the contractors employed less than 50 persons. The average number of employees per contractor was 47 in 2010 and 2011, and 45 in 2009. Once extrapolated over the contractor population, the results suggest that the total silvicultural workforce in BC is approximately 9,500, of which 46% are seasonal workers, 33% are short-term workers, and 21% are core personnel acting in positions above labourer. Planting companies employ the largest number of the workforce (an estimated 6,300 employees). Considering the number of unconfirmed contractors, it is likely that the number of total silvicultural workers is under-estimated. In four areas of work core personnel comprise more than 40% of the employees: mechanical brushing, survey/layout, fire suppression, and beetle-probing.

Though worker diversification is common in the sector, the degree of diversification depends on the type of work. The average across the sector is 21%. Fuel treatment and planting, which account for the most employment, have the lowest level of worker diversification.
Labour availability is not currently a challenge for more than 75% of the contractors. For the 23% of respondents that reported a labour shortage, the majority of the shortages occurred in planting and mechanical weeding. Anecdotally, it was found that there is a shortage of qualified and experienced workers, but there is not a shortage of applicants.

The proportion of contract cost spent on payroll ranged from 75% for pile-burning to 15% for cone-picking. The average across the sector was 52%. A higher than average proportion of contract costs for fire suppression and beetle probing was spent on payroll (>60%), while a lower than average proportion was reported for fuel treatment, surveys/layout, and chemical brushing.

Estimates of economic activity were calculated by deriving a dollar per productivity unit and by estimating employment associated with production units. The estimated direct economic impact in dollars of BC’s silvicultural sector is $135 million. The estimated employment by production units varies greatly depending on the area of work. For those areas measured in hectares, the estimated employment per thousand hectares in order from greatest to smallest is: fuel management (340), vegetation management (184), spacing/thinning (120), mechanical brushing (115), beetle probing (30) pile burning (28), chemical brushing (1.4), and survey/layout (1.3). There are approximately 18 associated planting jobs for every 1,000,000 seedlings, 4.5 associated fire suppression jobs for every fire day, and 31 cone-picking jobs for every 1,000 hectoliters.

**Conclusion**

The survey results help fill some knowledge gaps in the silviculture sector, as well as to confirm some generally held beliefs. However, it is apparent that the silviculture sector envelopes a broad range and number of types of work and types of contracting companies, from large, labour-intensive planting companies, to independent owner-operators of highly specialized activities (i.e. sheep vegetation management and helicopter forest health diagnostics) with no employees, to contractors whose hiring practices, contract value, and primary area of work vary widely from year to year, depending on a variety of economic factors. Though the variation creates some challenges to generalizing the survey results across the entire population, the survey provided some valuable information that may be used alone or in conjunction with other silviculture sector studies to gain a better understanding of the silviculture sector and help create a strategy on sector-related labour practices and human resource strategies.
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1 Introduction

Silviculture is one of British Columbia’s (BC’s) leading industries and is composed primarily of small and medium sized companies. Silviculture across our Province includes activities such as tree planting, brushing, spacing/thinning, cone picking, fuel management, fire suppression, prescribed burning, pile burning, pruning, beetle probing and surveying. Though the silviculture sector is a well-established part of the forest industry, there are uncertainties regarding the labour force in terms of its size, makeup, primary source of business and the economic value that the contracting labour force generates in BC.

The Western Silvicultural Contractors Association (WSCA) has represented the silvicultural contracting industry since 1984 on subjects including forest policy, industry regulation, and health and safety to federal and provincial governments (WSCA 2012). The WSCA obtained funding to conduct a survey of silvicultural contractors in BC to further our understanding of the sector. B.A. Blackwell & Associates Ltd. were subcontracted to assist with the survey data collection and reporting. The survey was funded by the Ministry of Forests, Lands and Natural Resource Operations (MFLRNO). The objectives of the survey were to:

- Establish a comprehensive contractor database;
- Establish silvicultural worker and contractor baseline at the year 2011 for future studies and surveys;
- Establish total number of silvicultural workers in the labour force, number of workers in each silvicultural area of work, and number of workers overlapping into two or more areas of work for the last three years (2009 – 2011);
- Determine total dollars spent in the silviculture sector;
- Determine the proportion of total dollars spent on worker wages; and
- Determine the number of jobs created per X unit of productivity (e.g., seedlings, hectares, hectolitres, fire days etc.) per silvicultural area of work.

The compiled information will be used in collaboration among the WSCA, BC Forest Safety Council, Labour Market Partnership Program and WorkSafe BC to develop strategies to improve safety, training, and other human resource-related practices and standards in the silviculture sector.

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1 Size is according to the WorkSafeBC definition of employer size by classification unit. Size is determined by Person Years (PY) calculated for the employer. Large: ≥100 PY, Medium: between 20 and 99.99 PY, Small: between 0.01 and 19.99 PY. PY is an estimate of the number of persons working all year on either a full or part time basis based on gross payrolls submitted.
sector. Additionally, a database of employment numbers and economic impact in each of the key areas of identified silviculture practices will be compiled, a summary of all information collected by written and digital communication will be tracked, and a final report with complete survey results and critical analysis will be submitted upon project closing.

2 Methods

2.1 Survey Methodology

The survey executed was a needs assessment census survey. The population was defined as those companies or individuals who self-identified as a silvicultural contractor in the areas of planting, chemical brushing, mechanical brushing, spacing/thinning, cone picking, surveys/layout, fuel management, fire suppression, prescribed burning, pile burning, pruning, beetle probing, right of way vegetation management, or other silvicultural areas of work as defined by the contractor. The population was further limited to those contractors that had completed contract work in the last three years (2009, 2010 or 2011) and who could be confirmed as a business in operation through phone communications, emails, internet research, personal knowledge, survey response, or other confirming methods such as voicemail recordings or proof of recent contract completion.

The contractor population was established through collection of various government agency and crown corporation databases, internet research, and personal knowledge (previous contacts). Those agencies from which contractor information data were requested are shown in Table 1. Contact information and confirmation of status (silvicultural contractor, not a silvicultural contractor, or unconfirmed) was updated through a series of phone calls, emails, polling personal contacts, and internet research. According to WorkSafeBC registrations, the contractor population is greater than the confirmed population that was used for the purpose of the survey2 (Appendix D). It is believed that the discrepancy is a partially due to coverage error introduced from inability to contact and confirm a portion of the contracting community and partially can be explained by redundancies in the WorkSafeBC contractor count. It is most likely that the coverage error impacts those contractors without a full-time office and associated staff. The affected contractors may work out of their house, not staff an office year round, or only operate in years that contracts are awarded. It is possible that the survey underestimates both the number and economic impact of these types of contractors due to the challenges in identifying, confirming, and contacting them (Appendix A). Redundancies in the count of WorkSafeBC contractors occur because contractors

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2 As reported by David Campbell, Senior Research Analyst Business Information and Analysis, WorksafeBC in the report Employer Turnover in Silviculture for Classification Units 703002, 703005, and 703016. 2012.
working in more than one classification unit (CU) register separately in each CU in which they operate.

Table 1. Summary of silvicultural contractor contact information requests.

<table>
<thead>
<tr>
<th>Contractor Information Requested</th>
<th>Contractor Information Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. Blackwell &amp; Associates Ltd.</td>
<td>√</td>
</tr>
<tr>
<td>BC Forest Safety Council*</td>
<td>X</td>
</tr>
<tr>
<td>BC Hydro*</td>
<td>X</td>
</tr>
<tr>
<td>BC Timber Sales</td>
<td>√</td>
</tr>
<tr>
<td>MFLNRO Forest Practices and Investment Branch</td>
<td>√</td>
</tr>
<tr>
<td>MFLNRO Land Based Investment Strategy</td>
<td>√</td>
</tr>
<tr>
<td>MFLNRO Wildfire Management Branch*</td>
<td>√</td>
</tr>
<tr>
<td>WorkSafeBC*</td>
<td>√</td>
</tr>
<tr>
<td>Western Silvicultural Contractors’ Association</td>
<td>√</td>
</tr>
</tbody>
</table>

The survey instrument was designed to employ as many techniques to increase the response rate as possible within time and budget constraints, and to avoid those pitfalls known to decrease response rate. The techniques used included: pre-notification of the intent to survey; delivering the survey and reminders at the least busy time for the respondents; assuring confidentiality; offer of incentive; limiting survey length; providing clear instructions; providing navigation aids; and, appealing to the benefits of the results to the respondents (Archer 2008). Details of survey methodology can be found in Appendix A.

2.2 Silvicultural Contractor Database

A comprehensive database of silvicultural contractors was built from the sources listed in Table 1 and was updated and augmented through phone calls, internet research and publicly available databases such as Integrated Vegetation Management Association of BC, planter job-seeking websites, other contractor websites and the Job Opportunities Program completed projects list. All correspondence was tracked and the following information is available in the database:

- Company name (and alternate name)
- Contact name
- Telephone number
- Email address
- Phone number
• Contractor status (confirmed as a silvicultural contractor, unconfirmed, not a silvicultural contractor)
• Documentation of phone contact
• Level of certainty regarding contact information
• Documentation of email contact
• Response status (Completed, Did not complete)
• Mailing address

3 Survey Results and Discussion

This section provides an overview of the survey response and the highlights of the survey results related to area of work, employment, and economic impact. Wherever possible, the survey results are generalized to the population. The survey supported reasonable estimates of the following key information:

• Silvicultural worker and contractor baseline at the year 2011 for future studies and surveys;
• Total number, type, level of diversification, and availability of silvicultural workers in the labour force;
• The proportion of total dollars spent on worker wages; and
• The number of jobs created per X unit of productivity (e.g., seedlings, hectares, hectolitres, fire days etc.) per silvicultural area of work.

In addition to the above items, this survey had an objective of estimating total dollars spent in the silviculture sector. Survey responses to questions on contract value were insufficient to provide a direct estimate of this value. However, an estimate is provided based on an indirect calculation using a combination of survey results and other available data from past studies.

3.1 Overview of Survey Response

A summary of the survey recipients and survey completion is listed in Table 2. The general attributes of the survey respondents are summarized in Table 3.

<table>
<thead>
<tr>
<th>Survey Population</th>
<th>Responded to Survey</th>
<th>Completed Survey</th>
<th>Partially Completed Survey</th>
<th>No Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>194</td>
<td>95</td>
<td>84</td>
<td>11</td>
<td>99</td>
</tr>
</tbody>
</table>
### Table 3. Summary of respondent attributes.

<table>
<thead>
<tr>
<th>Areas of Work</th>
<th>Respondents that Submitted Data</th>
<th>2011 Employees (Average Across Respondents)</th>
<th>Proportion of 2011 Work by Coast/Interior</th>
<th>Average Value of 2011 Contracts per Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Core Seasonal Short-term</td>
<td>Coasta l Interior Mixed</td>
<td></td>
</tr>
<tr>
<td>Planting</td>
<td>32</td>
<td>9 46 41</td>
<td>14% 60% 26%</td>
<td>$1,647,865</td>
</tr>
<tr>
<td>Mechanical Brush/Weed</td>
<td>18</td>
<td>10 8 5</td>
<td>9% 68% 25%</td>
<td>$128,222</td>
</tr>
<tr>
<td>Chemical Brush/Weed</td>
<td>8</td>
<td>5 10 4</td>
<td>56% 33% 11%</td>
<td>$102,500</td>
</tr>
<tr>
<td>Space/Thin</td>
<td>9</td>
<td>2 5 4</td>
<td>10% 70% 20%</td>
<td>$147,364</td>
</tr>
<tr>
<td>Cone Picking</td>
<td>4</td>
<td>3 13 11</td>
<td>0% 83% 17%</td>
<td>No values</td>
</tr>
<tr>
<td>Survey/Layout</td>
<td>14</td>
<td>4 3 1</td>
<td>16% 79% 0%</td>
<td>$300,556</td>
</tr>
<tr>
<td>Fuel Treatment</td>
<td>12</td>
<td>3 8 7</td>
<td>0% 100% 0%</td>
<td>$343,750</td>
</tr>
<tr>
<td>Fire Suppression</td>
<td>10</td>
<td>6 4 4</td>
<td>11% 78% 11%</td>
<td>$11,000</td>
</tr>
<tr>
<td>Prescribed Burning</td>
<td>1</td>
<td></td>
<td></td>
<td>No values</td>
</tr>
<tr>
<td>Pile Burning</td>
<td>5</td>
<td>2 4 3</td>
<td>36% 64% 0%</td>
<td>$40,833</td>
</tr>
<tr>
<td>Pruning</td>
<td>1</td>
<td></td>
<td></td>
<td>No values</td>
</tr>
<tr>
<td>Beetle Probing</td>
<td>1</td>
<td>2 1 2</td>
<td>No values</td>
<td>$32,667</td>
</tr>
<tr>
<td>ROW Vegetation Management</td>
<td>3</td>
<td>3 6 2</td>
<td>71% 14% 15%</td>
<td>No values</td>
</tr>
<tr>
<td>Other*</td>
<td>18</td>
<td>3 4 7</td>
<td>16% 63% 16%</td>
<td>$260,000</td>
</tr>
</tbody>
</table>

*Other areas of work were defined by the contractors as danger tree assessment/falling, professional forest management, planting administration, sheep vegetation management, mechanical site preparation, forest health surveys and diagnostics, sinocast cone placement maintenance and removal, seedling nursery, fall and burn, ecosystem restoration and training.

### 3.2 Type of Work Being Performed by Contractors

One third of the responding contractors’ primary silvicultural area of work was planting, followed by surveying/layout (13.1%), mechanical brushing/weeding (9.5%) and fuel management (9.5%) (Figure 1). Activity areas are summarized in Figure 2. No contractors identified themselves primarily as prescribed burning, pile burning or pruning contractors although some do operate in these areas.
Figure 1. Results to question 7: “What is your company’s primary area of work?”

Figure 2 shows trends in contractor involvement in different types of silviculture work. Approximately 38% of the responding companies planted, 19% mechanically brushed/weeded, and 16% implemented fuel treatments or did silvicultural surveys/layout. The number of contractors working in each particular work area fluctuated from 2009 – 2011. In 2011, there were less planting and mechanical brushing/weeding companies, whereas there were more companies engaging in fuel management, fire suppression, and right of way vegetation management. There was also an increase from 2010 to 2011 in companies operating in prescribed burning, pruning, and beetle probing, though it should be noted that there were a small number of responses for those areas of work. The number of survey/layout companies stayed constant over the three year period (24).
Contractors identified alternate areas of silviculture in which they operate (classified by the option ‘Other’ in the survey) and which were not included as explicit options in the survey. They include: danger tree assessment and falling, nursery, ecosystem restoration, training, development of vegetation management programs for sawmills, sinocast cone placement/maintenance/removal, and other forest management activities such as mechanical site preparation, forest health diagnostics/prescriptions and sheep vegetation management.

### 3.2.1 Contractor diversification

The survey results provide insight into the amount of diversification within the contractor community (Table 4 and Figure 3). In 2011, 56% of respondents worked in two or more silvicultural areas of work with 10% of companies working in four separate work areas. Within the 44% of companies that only operated in one type of silviculture work, there was no dominant activity type, though chemical brushing, spacing/thinning, and pile burning were never the sole
activity of any contractor. In terms of employment however, planting made up the majority of the 24% of jobs provided by employers who operate in only one type of work. This discrepancy is due to the large workforce employed by undiversified planting contractors.

Table 4. Number of silvicultural areas of work undertaken by each contractor in 2011.

<table>
<thead>
<tr>
<th>Number of Silviculture Work Areas</th>
<th>Number of Companies Working in that Many Areas of Work</th>
<th>Proportion of Companies Working in that Many Areas of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>36</td>
<td>44%</td>
</tr>
<tr>
<td>Two</td>
<td>28</td>
<td>35%</td>
</tr>
<tr>
<td>Three</td>
<td>9</td>
<td>11%</td>
</tr>
<tr>
<td>Four</td>
<td>8</td>
<td>10%</td>
</tr>
</tbody>
</table>

Figure 3: Details on the component of the silviculture contractor community that operated in only one type of work in 2011.
Figure 4 shows the proportion of respondents’ work that was conducted on the coast in 2011. Weighted by the number of employees in each type of work, the overall average for this sample is 21%. The averages by area of work are weighted on the amount of activity reported by the respondents in 2011.

Figure 4. Proportion of each type of work that was conducted on the Coast in 2011, as opposed to the interior of BC. Proportion calculated by productivity units according to area of work (i.e. hectares, seedlings, etc).

3.3 Employment

3.3.1 Size of Workforce

Table 5 provides an overview of employment in the major work areas of the silviculture sector. The more detailed classification of silvicultural types of work used throughout the rest of this study have been aggregated into Workers Compensation Board (WCB) classification units. These results were derived from survey questions on the number of personnel employed in individual types of silviculture work. Survey respondents provided estimates on the number of workers that engaged in two or more types of work, which allowed us to avoid double-counting of employees.

The total estimated employment in the 2011 silviculture workforce is 9,495 people. Tree planting comprised the vast majority of these jobs, but 88% of jobs in this sector were in seasonal or short-
term employment. Overall, the workforce is comprised of 21% core personnel, 46% seasonal personnel, and 33% short term personnel.

**Table 5:** Estimated employment in the BC Silviculture sector, based on the number of people employed in each type of silviculture work. Types of work have been aggregated into WCB classification units.

<table>
<thead>
<tr>
<th>WCB Classification Unit</th>
<th># of jobs in 2011</th>
<th>Core Personnel</th>
<th>Seasonal Personnel* (3 - 9 months/yr)</th>
<th>Short-term Personnel* (&lt;3 months/yr)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>703016 Tree Planting or Cone Picking</td>
<td>733</td>
<td>3,145</td>
<td>2,253</td>
<td>6,130</td>
<td></td>
</tr>
<tr>
<td>703002 Brushing, Weeding, Thinning, Spacing</td>
<td>835</td>
<td>898</td>
<td>577</td>
<td>2,310</td>
<td></td>
</tr>
<tr>
<td>703005 Forest Fire Fighting</td>
<td>137</td>
<td>61</td>
<td>55</td>
<td>252</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>301</td>
<td>255</td>
<td>246</td>
<td>802</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,006</strong></td>
<td><strong>4,359</strong></td>
<td><strong>3,130</strong></td>
<td><strong>9,495</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Seasonal and short-term personnel figures have been adjusted downward based on reported rates of employment in other silvicultural areas of work.

The majority of respondents were relatively small companies, with the greatest number of respondents employing 1 – 5 silvicultural employees annually and although the number of employed per company fluctuated annually, approximately 77% of the responding companies employ less than 50 each year (Figure 5). The average number of workers per responding contractor in 2010 and 2011 was 47. The average in 2009 was 45.
Figure 5. Frequency distribution of number of employees by count of company for the years 2009 - 2011.

The estimate of the BC silviculture contractor workforce is broken down by area of work and worker type in Figure 6. For the purpose of the survey, silvicultural employees were defined as core personnel, seasonal (3-9 months/yr) and short term (<3 months/yr). 'Core Personnel' are defined as supervisors, project managers, or other annually returning key personnel in senior positions. On average, silviculture jobs are 19% core personnel, 47% seasonal, and 34% short term.
Figure 6. Estimated number of workers in each type of work, and the proportion of this workforce that is core, seasonal and short-term personnel.
3.3.2 Payroll Proportion of Contract costs

Figure 7 reports the proportion of contract costs spent on payroll for the year 2011 in each type of work. Averages within each type of work are calculated by weighting the survey response by the production level for that type of work by each respondent. The overall average for the silviculture sector, weighted on number of employees, is 52%.

![Figure 7. Proportion of contract costs spent on payroll in each type of work.](image)

3.3.3 Worker Diversification

The degree to which silviculture workers in one type of work are also in other types of silviculture work is indicated in Figure 8. Many of the types of work have a high degree of worker diversification. However, planting and fuel treatment, which account for most of the employment in the silviculture sector, have low rates of diversification. The average rate of worker diversification reported by the survey over the sector as a whole is 21%.
3.3.4 Labour Availability

More than 75% of the responding contractors reported that they did not experience a labour shortage in 2011 (Figure 9). The average number of job applications received by a contractor was 93, approximately double the average number of employees (47) (Figure 10). Of the 23% of responding companies that reported a labour shortage in 2011, they were primarily observed in planting (50%), followed by surveying/layout (35%) (Figure 11). There was no recorded labour shortage for cone picking, prescribed burning or pile burning. Anecdotally, comments from contractors were that there is a shortage of “qualified” or “experienced” labourers and the majority of employees were hired from the pool of returning employees or from word of mouth advertisement and references.