
*Sea-to-Sky
Timber Harvesting & Processing Employment Survey*

*Final Report
August 8th, 2006*

Presented to the British Columbia Ministry of Agriculture and Lands

Prepared by:

*Pierce Lefebvre Consulting
3705 West 18th Ave.
Vancouver, B.C.
V6S 1B3
Tel: (604) 224-0648
Fax: (604) 224-5722
piercelef@telus.net*

Acknowledgements and Disclaimer

This study was initiated by the Strategic Land Policy Branch of the BC Ministry of Agriculture and Lands. Ministry staff provided management, data and report editing support for the project and we would like to thank Ian McLachlan and Glenn Farenholtz for their assistance. Also, we would like to thank the regional and district staff of the Ministry of Forests and Range for their help in providing general information on the forest licenses in the region.

Employment and harvest data supplied by forest licensees and contractors throughout the Sea-to-Sky region contributed to this study. We would like to express our sincere thanks to all the companies and their employees who expended considerable effort in completing the questionnaires. Without their help, this work would not have been possible.

In developing the industry employment estimates in this study, the consultants have made several assumptions in utilizing information gathered under the time and resource constraints imposed on this study. The assumptions are thought to be reasonable and suitable for the purposes of this analysis, but should not be relied upon for purposes other than conducting general socio-economic impact assessments.

About the Consultants

Pierce Lefebvre Consulting specializes in providing economic and management consulting services to its private and public sector clients. The company was formed in 1994 when Sylvie Lefebvre established the firm together with Claude Pierce, an economist who had been an independent consultant since 1990.

Sylvie Lefebvre is a professional economist and a Certified Management Consultant (CMC) with 24 years of consulting experience, including 12 years as principal of *Pierce Lefebvre Consulting*, 10 years at Price Waterhouse and prior to that, 2 years with a smaller B.C. consulting firm that specialized in the mining industry. Sylvie specializes in socio-economic assessments, and much of her 25 years of experience working in BC has been focused on the forest sector. She has conducted various studies that have involved the development and use of timber harvesting and processing employment coefficients. These include a study of woodflow and manufacturing facilities in coastal BC which was first conducted in 1996 for the BC Ministry of Forests and was updated in 1998 and 2003.

BC Sea-to-Sky Timber Harvesting & Processing Employment Survey

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Executive Summary

This report provides forest industry direct employment coefficients associated with the harvesting and processing of timber from the Sea-to-Sky region of BC (defined to include all of the Soo Timber Supply Area (TSA) and Timber Forest License (TFL) 38. The coefficients are based on a survey of forest licensees in the areas and timber harvest data from the Ministry of Forests and Range (MOFR). Similar studies have been conducted for Haida Gwaii / Queen Charlotte Islands (HG/QCI) (early 2005), and the North Coast and Central Coast (CC and NC) regions (early 2006).

Summary Of Findings

Survey data cover an estimated 68% of the total harvest volume for the Sea-to-Sky region over the three years under study, namely 2003, 2004 and 2005. This is based on timber harvest data provided by the companies that participated in the survey and estimates of the total harvest in the region.

The survey data show that timber harvesting in the Sea-to-Sky region generates 0.573 direct PY of harvesting and silviculture employment per 1,000 m³ of timber harvested in the region. The data also show that approximately 82% of the timber harvesting employees associated with the Sea-to-Sky timber harvest reside in the Sea-to-Sky region.

Sea-to-Sky Survey Results - PY of Direct Timber Harvesting Related Employment per 1,000 m ³ of Timber Harvested	3 year Average	
	PY per 1,000 m ³	% of Total
Harvesting/ Falling	0.233	40.6%
Planning & Administration	0.081	14.2%
Log Hauling / Trucking	0.104	18.2%
Barging / Towing	0.022	3.8%
Road Building	0.084	14.7%
Silviculture	0.045	7.9%
Other	0.003	0.6%
Total	0.573	100.0%
Direct Employment by Employee Residence:		
Vancouver Island	0.048	8.4%
Sea-to-Sky	0.467	81.5%
Lower Mainland	0.058	10.1%
Total	0.573	100.0%

The two most significant primary wood processing operations in terms of logs processed in the Sea-to-Sky region are: A J Forest Products Ltd., a small sawmill in Brackendale, just north of Squamish, and Continental Pole Ltd. / Continental Log Home Ltd. based in Pemberton. In addition, there are a number of timber framing operations and custom cutting operations that are considered part of the value-added sector, but some of these may also process very small volumes of raw logs, mainly as part of log home manufacturing. An estimated 44 full-time and part-time employees work in primary wood processing in the Sea-to-Sky region, representing 42 PY of employment.

Until recently, there was a pulp mill that employed 330 people (Western Pulp Ltd. Partnership) and an additional sawmill (Interfor) that employed 145 people, both located in Squamish. Both operations are now permanently closed.

The following table provides an estimate of the direct employment associated with the Sea-to-Sky timber harvest.

Estimated Direct Employment Associated with Annual Sea-to-Sky Harvest (PY) (Extrapolated to Total Industry)	3 Year Average	Other Data
Direct Harvesting Employment (3 year average from survey):		3 Year Average % of Total
Squamish	113	39.5%
Pemberton	24	8.4%
Other Sea-to-Sky Region	83	29.0%
North Vancouver Island	13	4.7%
Campbell River	24	8.4%
Lower Mainland	29	10.1%
Total Harvesting and Silviculture	287	100.0%
BC Primary Processing (Mainly Southern BC)		Coefficient per 1,000 m3 of Sea-to-Sky Timber Harvested
Wood Processing - Sea-to-Sky Region	42	0.085
Wood Processing - Mainly Southern BC	<u>172</u>	<u>0.344</u>
Wood Processing	214	0.428
Pulp & Paper Processing	88	0.176
Total Primary Processing	302	0.604
Total B.C. Direct Employment	589	1.177
ASSUMPTIONS		
Total Timber Harvest	500,351	
Exports % (based on survey)	0%	
Volume Processed in B.C.	500,351	
BC Employment Coefficients (PY per 1,000 m3)		
Harvesting and Silviculture (3 year average from survey)	0.573	
BC Primary Processing (Mainly Southern BC):		
Wood Processing	0.428	
Pulp and Paper	0.176	
Total	1.177	

Notes:

1. This table provides estimates of direct harvesting employment based on assumed total levels of timber harvest and employment coefficients per m3 of timber harvest derived from the survey data; the presentation of these estimates implies a degree of precision that does not exist but the represented precision is retained to maintain the integrity of the data and methodology.
2. The data assume a job is full-time (one PY) if the work year consistently lasts 8 to 12 months per year, or at least 180 days per year. Part-time employment data were collected and converted to PY of employment using 180 days per PY.
3. Excludes secondary paper manufacturing and value added wood processing sector; Source: based on Pierce Lefebvre Consulting et al., *Analysis of Woodflow in the Coast Forest Region, 2003*, and other data.

1 Introduction

This report presents the results of a survey to update forest industry employment coefficients for the BC Sea-to-Sky region (defined to include all of the Soo Timber Supply Area (TSA) and Timber Forest License (TFL) 38). Similar surveys were conducted for Haida Gwaii / Queen Charlotte Islands (HG/QCI) (early 2005), and the Central Coast and North Coast (CC/NC) regions (early 2006).

The methodology for the work was as follows:

- collect data on timber harvesting employment and harvest by management unit through a survey of timber licensees and logging contractors that operate in the Sea-to-Sky region;
- collect Ministry of Forests and Range (MOFR) timber harvest data for the Soo TSA and TFL 38;
- estimate local direct harvesting employment coefficients per thousand m³ of wood harvested from the employment and harvest survey data (2003 through 2005 averages);
- estimate BC's primary wood and pulp and paper processing employment that results from the Sea-to-Sky timber harvest (based on Pierce Lefebvre Consulting et al., *Analysis of Woodflow in the Coast Forest Region*, 2003 and other data); and
- summarize the results.

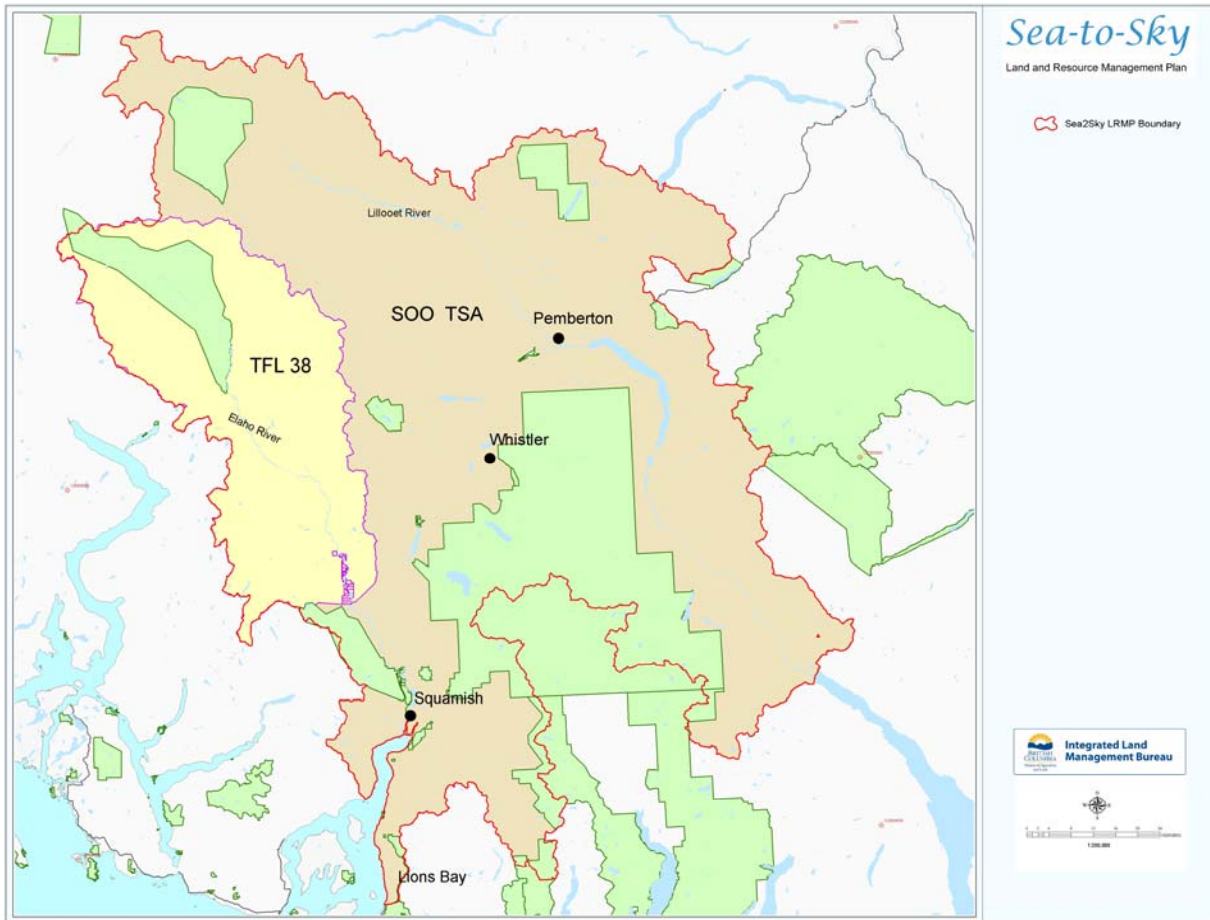
This survey considers the direct employment associated with harvesting and processing timber from the Sea-to-Sky region. Harvesting and processing timber from Sea-to-Sky also generates employment through suppliers of goods and services to the forest industry (indirect employment) and through the re-spending effects of the direct and indirect employees (the induced employment). Indirect and induced employment associated with the Sea-to-Sky harvest is not estimated as part of this survey.

The timber harvesting industry is becoming increasingly fragmented, with major licensees hiring contractors that specialize in one or more activities (e.g. stump to dump contractors, road building contractors, silviculture contractors, etc.). Interfor, for example, has divested its helicopter timber harvesting operations into a separate company, Helifor, which continues to harvest some of Interfor's timber licenses but also works for other licensees. The survey results represent a mix of data obtained from licensees and their contractors, often involving some extrapolation or interpolation of data. The study results represent the best information that could be obtained within the time and monetary budget of the project, and given the cooperation of the licensees and their contractors.

The following sections present key findings. The Appendices to the report include more detail on the Sea-to-Sky timber harvesting sector, as well as a list of key references.

A map of the region is presented on the following page.

Sea-to-Sky Region



Source: BC Ministry of Agriculture and Lands, 2006.

2 Survey Coverage of Timber Harvesting Sector

The consultants surveyed each forest licensee that is named in the Ministry of Forests and Range (MOFR) 2005 timber apportionment for the Sea-to-Sky region. These include International Forest Products (Interfor), Squamish Mills/Halray Logging, Western Forest Products, Terminal Forest products, and Richmond Plywood, as well as approximately five other smaller licensees. Licensees listed in the MOFR Apportionment are in some cases market loggers who obtain additional licenses from BC Timber Sales and employment in respect of that volume is also included in the survey.

All of the major timber licensees and a sample of their contractors, usually the larger contractors, participated in the survey and provided employment and harvest data. Some of the major licensees obtained and reported data from their contractors, but for others, the consultants collected information directly from contractors and combined the data with data received regarding licensee timber harvesting operations.

Of the 12 companies contacted to participate in the survey, only one medium size licensee, one very small forest licensee and one contractor did not supply data for the survey. Despite this high participation rate, the survey respondents represent only 61% of the total 2005 apportionment for the Soa TSA. Some of these licensees, however, also reported their harvest from market logging, which would be part of the BC Timber Sales (BCTS) apportionment and is not included as part of the 61% survey coverage by AAC apportionment.

Woodlot owners and the BCTS logging contractors that are not specifically named in the MOFR timber apportionment were not contacted to participate in the survey. These companies are typically much smaller and are harder to identify and survey. Since the main objective of the survey is to update forest industry employment coefficients expressed in terms of Person Years (PY) of employment per 1,000 m³ of timber harvested, it is not necessary to survey 100% of timber harvesting operations. Provided that harvesting employment data are collected for a reasonable proportion of the total harvest in the region, distributed across various license types, one can be reasonably confident that the resulting employment coefficients are representative of the regional average.

Survey data cover an estimated 68% of the total harvest volume for the Sea-to-Sky region over the three years under study, namely 2003, 2004 and 2005. This is based on timber harvest data by scale date provided by the companies that participated in the survey, as well as the harvest data reported in the MOFR Harvest Billing System for each of those three years. The 2003 and 2004 MOFR Harvest Billing System data, indicating 100% of the timber harvest, are by scale date and are therefore comparable to the data provided by survey participants. For 2005, however, the MOFR data are based on billing dates, as the 2005 MOFR data by scale date were not available at the time of writing this report. As a result, the 2005 MOFR Harvest Billing System data likely cover the timber harvested and scaled in the latter part of 2004 but exclude timber harvested and scaled in the latter part of 2005.

The survey coverage by volume harvested is highest for 2003 at 85% and it is lowest in 2005 at 52%. The timber harvest indicated by the MOFR Harvest Billing System is much greater than what was reported by the licensees in the survey, particularly in 2005, likely for the reasons explained below.

- Some logging contractors rely entirely on BC Timber Sales and their data are not included.
- The 2003 and 2004 timber harvest reported in the MOFR Harvest Billing System is based on reported volumes by scale date, but the 2005 timber harvest is based on billing dates.
- The scaled data provided by licensees for 2003 and 2004 may differ from the MOFR data due to timing and reporting differences.
- The major licensees have seen their licenses reduced in 2004 and 2005 as a result of the BC government's Forestry Revitalization Plan introduced in March 2003¹ and the re-allocation of 20% of existing long term forest tenures to BC Timber Sales, First Nations, and communities. The key objective of the timber re-allocation is to significantly increase the volume of timber to be sold by public auction and to establish a more market based stumpage system. The Forestry Revitalization Plan also removed a number of tenure requirements, including minimum cut requirements, utilization requirements, appurtenancy requirements, mill closure penalties, tenure transfer penalties, and limitations on consolidations and subdivisions of forest tenures.

Table 1 Estimated Survey Coverage

Survey Coverage - Total Harvest Reported (m3)	2003	2004	2005	3 Year Average
Survey:				
Soo TSA	133,887	338,232	195,936	222,685
TFL 38	53,105	182,941	115,714	117,253
Sub-Total	186,992	521,173	311,650	339,938
Estimated Total Harvest:				
Soo TSA	185,348	493,659	439,912	372,973
TFL 38	35,140	189,397	157,597	127,378
Sub-Total	220,488	683,056	597,509	500,351
Survey as a % of Total Harvest	84.8%	76.3%	52.2%	67.9%

Notes:

1. The survey data include the timber harvest reported by licensees and their contractors and represent data by scale date for each calendar year.
2. The estimated total harvest by sub-region is based on data provided by the Ministry of Forests and Range (MOFR) Harvest Billing System (provided by Glenn Farenholtz of BC MAL, January 23, 2006). The 2003 and 2004 MOFR harvest data are by scale date and the 2005 MOFR harvest data are by billing date.

3 Sea-to-Sky Timber Volumes and AAC

The following table summarizes the licensed volumes that comprise the Sea-to-Sky timber harvest. The Sea-to-Sky region has an AAC of 753,500 m³. Over the 2003 to 2005 period, the average timber harvest for the Sea-to-Sky region was approximately 500,000 m³ (based on MOFR Harvest Billing System data).

¹ Source: BC Ministry of Forests, *BC Heartlands Economic Strategy - Forests, The Forestry Revitalization Plan*, www.for.gov.bc.ca/mof/plan.

Table 2 Sea-to-Sky AAC and 3 Year Average Harvest

3 Year Average Estimated Harvest as a % of AAC by Type of License	AAC ¹	3 Year Average Harvest ²	3 Year Average Harvest as a % of AAC ³
Soo TSA	503,000	372,973	74%
TFL 38	250,500	127,378	51%
Total	753,500	500,351	66%

Notes:

1. The AAC by management unit is from the MOFR timber apportionment in effect in December 2005; Appendix 1 provides more detail by license.
2. The 3-year average harvest is from the MOFR Harvest Billing System (provided by Glenn Farenholtz of BC MAL, January 23, 2006). The 2003 and 2004 MOFR harvest data are by scale date and the 2005 MOFR harvest data are by billing date.
3. One would expect the AAC to differ from the harvest. In any given year, actual log production may be lower or higher than the AAC due to market conditions and cut-control requirements (under the BC Forest Act, license holders may postpone the harvest of a portion of their AAC to another year). Also, the AAC includes timber volumes scaled and harvested as well as recoverable waste, which in 2003 was estimated at 4% for the Coast Forest Region. (Pierce Lefebvre Consulting and D.A. Ruffle & Associates Ltd., *Analysis of Woodflow in the Coast Forest Region, BC Ministry of Sustainable Resource Management, 2003, page 10*).

4 Destination of Sea-to-Sky Timber Harvest

The survey participants reported that approximately 60% of the Sea-to-Sky harvest is sold on the Vancouver Log Market (VLM)². Logs sold on the VLM provide timber for wood manufacturing facilities in the Lower Mainland and on Vancouver Island. In addition, some 34% of the Sea-to-Sky harvest goes directly to mills in the Lower Mainland as many of the license holders such as Interfor, Richmond Plywood and Terminal Forest Products have wood manufacturing facilities in the Lower Mainland.

Table 3 Survey Results on Destination of Timber Harvest from the Sea-to-Sky Region

Sea-to-Sky Region Survey Results - Destination of Sea-to-Sky Timber Harvest	2003	2004	2005	3 Year Average
Total Reported Harvested Volumes (m3)	186,992	521,173	311,650	339,938
Percent of Total Volumes Harvested:				
Export Volume	0.0%	0.0%	0.0%	0.0%
BC Interior	1.1%	0.8%	1.1%	1.0%
Sea-to-Sky Region	1.0%	3.6%	6.7%	4.1%
Vancouver Island	0.0%	0.0%	0.0%	0.0%
Lower Mainland	34.5%	36.5%	30.9%	34.4%
Vancouver Log Market	<u>63.4%</u>	<u>59.0%</u>	<u>61.3%</u>	<u>60.5%</u>
TOTAL VOLUME	100.0%	100.0%	100.0%	100.0%

² The Vancouver Log Market describes the loose arrangements for selling, buying and trading logs in Coastal BC. Coastal companies trade logs on a day-to-day basis according to their mills' species, grade and size requirements, a trading pattern facilitated by the use of waterways for log distribution and storage.

For more information on the Vancouver Log Market, please refer to: Pierce Lefebvre Consulting and D.A. Ruffle & Associates Ltd., *Analysis of Woodflow in the Coast Forest Region, BC Ministry of Sustainable Resource Management (MSRM), 2003, pp. 4 & 5; available from:*

http://www.ilbc.leg.bc.ca/public/pubdocs/bcdocs/369529/Woodflow_Report.pdf

As shown on Table 3, the survey participants reported that during the period 2003 to 2005, none of the Sea-to-Sky timber harvest was directly exported unprocessed out of BC as “raw logs”, although some logs may have been exported after being sold on the Vancouver Log Market. The BC government restricts the export of unprocessed logs out of BC, although these restrictions have been relaxed in recent years in various northern regions as a result of market conditions.³

A very small portion of the Sea-to-Sky harvest (approximately 1%) is destined for the BC interior. This mainly consists of peeler logs for the Ainsworth mill in Lillooet, and small volumes of cedar sawlogs for specialty manufacturers based in the BC Interior.

The survey participants reported that on average each year, they directly sell approximately 14,000 m³ of the Sea-to-Sky timber harvest to local wood products manufacturing (4.1% of total timber harvest during the period 2003 to 2005). The survey participants represent approximately 67% of the total Sea-to-Sky timber harvest over the 3 years under study, and it is unknown whether the timber harvest contractors not included in the survey sell a greater or smaller percentage of their timber harvest to wood processing operations based in the Sea-to-Sky region.

5 Primary Wood Processing in Sea-to-Sky Region

The two most significant primary wood processing operations in terms of logs processed in the Sea-to-Sky region are:

- A J Forest Products Ltd., a small sawmill in Brackendale, just north of Squamish; and
- Continental Pole Ltd./ Continental Log Home Ltd. based in Pemberton.

Until recently, there was a pulp mill that employed 330 people (Western Pulp Ltd. Partnership) and an additional sawmill (Interfor) that employed 145 people, both located in Squamish. Both operations are now permanently closed.

In addition, there are a number of timber framing operations and custom cutting operations that are considered part of the value-added sector, but some of these may also process very small volumes of raw logs, mainly as part of log home manufacturing.

³In 2002, the B.C. government provided the right to export up to 35% of a licensee’s annual timber harvest from the North Coast Forest District (FD) and from portions of the Skeena-Stikine FD, with species restrictions on red cedar and cypress. Source: BC Ministry of Forests, *Notice to Exporters Concerning Order-In-Council (OIC) 121*, March 25, 2003; also, BC Ministry of Forests, *Updated Notice to Exporters and Major Tenure Holders Concerning Order-In-Council (OIC) #121*, April 28, 2003, available from: http://www.for.gov.bc.ca/ftp/het/external!/publish/Web/log_prices/OIC%20Restrictions.pdf.

Table 4 List of Primary Wood Processing Operations in Sea-to-Sky Region

List of Local Primary Wood Manufacturing Operations	Location	Product
AJ Forest Products Ltd.	Brackendale	Lumber and custom cutting
Continental Log Homes Ltd.	Pemberton	Log homes
Continental Poles Ltd.	Pemberton	Poles
Durfeld Log Construction	Whistler	Log homes and timber framing
Fraserwood Industries	Squamish	Mainly custom cutting and timber framing
McKay Custom Milling Ltd.	Squamish	Mainly custom cutting and timber framing

Three of the above primary wood processing operations were contacted as part of this survey and they provided data on log input and employment. The data show that the three primary processing operations that participated in the survey obtain approximately 20% of their log supply from the Sea-to-Sky region, or an average of 8,600 m3 per year. This is 5,400 m3 lower than the 14,000 m3 per annum reported in the previous section.

Table 5 Log Input for Primary Processing Operations in Sea-to-Sky Region

Log Input for Primary Processing Operations in Sea-to-Sky Region (Excludes Timber Framing and Value-Added Operations)	2003	2004	2005	3 Year Average	3 Year Average - % of Total
Log Input:					
Sea-to-Sky - own tenures	0	0	0	0	0.0%
Sea-to-Sky - other tenures	4,750	3,935	9,936	6,207	14.7%
Sea-to-Sky BCTS sales	0	7,321	0	2,440	5.8%
Other TSA: Sunshine Coast	0	656	0	219	0.5%
Other TSA: Vancouver Island	<u>33,250</u>	<u>33,250</u>	<u>33,250</u>	<u>33,250</u>	<u>78.9%</u>
Total Log Input:	38,000	45,162	43,186	42,116	100.0%

An estimated 44 full-time and part-time employees work in primary wood processing in the Sea-to-Sky region. Employees who work in processing mills which are based in the Sea-to-Sky region tend to reside in the local communities in which they work: 59% reside in Squamish (26 employees), 39% reside in Pemberton (17 employees), and only one employee resides in Whistler. This excludes employees in the timber framing and value-added manufacturing sector.

Table 6 Number of Employees in Primary Wood Processing in Sea-to-Sky Region

Number of Employees in Primary Wood Processing in Sea-to-Sky Region; Excludes Timber Framing and Value-Added Manufacturing	2003	2004	2005	Sea-to-Sky 3 Year Average	3 Year Average - % of Total
Employees by Residence Location:					
Squamish	26	26	26	26	59%
Whistler	1	1	1	1	2%
Pemberton	15	19	17	17	39%
Other in Sea-to-Sky	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0%</u>
Sub-Total Sea-to-Sky	42	46	44	44	100%
Number of Full-Time and Part-Time Jobs:					
Full-Time	39	42	41	41	92%
Part-Time	<u>3</u>	<u>4</u>	<u>3</u>	<u>3</u>	<u>8%</u>
Total	42	46	44	44	100%
Number of PY of Employment	41	44	43	42	
Jobs/PY of Wood Processing Employment	1.04	1.04	1.04	1.04	

Note: PY: a person year of employment is defined as a minimum of 180 days per year.

6 Timber Harvesting Employment Coefficients

The survey requested data on timber harvesting employment and timber harvest volumes. Table 7 on the following page summarizes the estimated timber harvesting employment coefficients per 1,000 m³ of timber harvested. The survey data show that timber harvesting in the Sea-to-Sky region generates 0.573 direct PY of harvesting and silviculture employment per 1,000 m³ of timber harvested in the region.

There are various factors that influence timber harvesting employment coefficients over time, in any particular year, or for any particular operation.

- The percentage of timber that is harvested through conventional methods vs. helicopter logging affects the types of timber harvesting jobs, and may affect the number of jobs involved. One of the licensees operating in the Sea-to-Sky region indicated that helicopter logging required more than 50% more jobs per 1,000 m³ harvested compared to conventional logging. One of the licensees contacted as part of a similar survey but for another sub-region of Coastal BC, reported that the total number of jobs per 1,000 m³ harvested for helicopter logging tends to be similar to conventional logging, but in helicopter logging, some of the road building and trucking jobs are replaced by heli-yrading jobs.
- The percentage of old growth vs. second growth timber affects the total number of jobs per 1,000 m³. Second growth timber may be more uniform in size and located on flatter terrain, which might result in more labour efficient harvesting methods. For example, most of the falling may be by feller buncher with little hand falling, and yrading may be hoe-chucking rather than grapple yrading.
- The timing of the harvest within the planning cycle is another factor affecting employment

coefficients. For example, a small licensee might conduct all of the harvest planning in one year and the actual harvesting in another. Using three-year averages likely smooths out some of these timing differences, but does not likely eliminate them completely.

The survey results reflect timber harvesting employment for the current mix of old growth and second growth, and the current mix of helicopter and conventional logging. The survey did not request data on the split between helicopter and conventional logging, or the split between old growth and second growth.

Table 7 also shows the direct timber harvesting employment per 1,000 m3 by employee residence. This information is calculated using the employment coefficients per 1,000 m3 of timber harvested and the survey results regarding where timber harvesting employees reside. The results show:

- approximately 82% of the timber harvesting employees associated with the Sea-to-Sky timber harvest reside in the Sea-to-Sky region; and
- timber harvesting employees associated with the Sea-to-Sky region timber harvest that do not reside in the Sea-to-Sky region reside on Vancouver Island (8%) and the Lower Mainland (10%).

Table 7 Direct Timber Harvesting Employment Coefficients for the Sea-to-Sky Region

Sea-to-Sky Survey Results - PY of Direct Harvesting Related Employment per 1,000 m3 of Timber Harvested	2003	2004	2005	3 Year Average	3 Year Average - % of Total
Harvesting/ Falling	0.218	0.275	0.171	0.233	40.6%
Planning & Administration	0.097	0.077	0.079	0.081	14.2%
Log Hauling / Trucking	0.129	0.083	0.125	0.104	18.2%
Barging / Towing	0.015	0.025	0.020	0.022	3.8%
Road Building	0.104	0.079	0.081	0.084	14.7%
Silviculture	0.053	0.043	0.045	0.045	7.9%
Other	0.001	0.002	0.004	0.003	0.6%
Total	0.617	0.585	0.524	0.573	100.0%
Direct Employment by Employee Residence:					
Vancouver Island	0.065	0.043	0.043	0.048	8.4%
Sea-to-Sky	0.498	0.468	0.443	0.467	81.5%
Lower Mainland	0.055	0.073	0.038	0.058	10.1%
Total	0.617	0.585	0.524	0.573	100.0%

Notes to Table 7:

1. The harvesting coefficients are derived from the survey of Sea-to-Sky licensees and are based on the timber harvest reported by survey participants (Table 1) and the associated survey results on PY of employment (Appendix 2).
2. Most licensees and their contractors included all log hauling and trucking as part of harvesting; harvesting also includes camp operations and heli-landing.
3. Timber harvesting employment includes logging, silviculture and road building operations. Road building is considered part of direct logging employment, based on discussions with Dr. Garry Horne, author of various BC Stats publications on employment multipliers. Dr. Horne writes: "If the logging firm hires another firm to build roads

(an establishment whose primary activity is road building), then this road construction would be considered as a separate activity from the timber cutting, and the employment involved would be considered direct construction jobs and construction multipliers would be applied. However, if the road building is carried out "in-house", as a relatively small part of the activities of a firm whose primary activity is logging, then the employment is considered part of direct logging." (Personal communication, Dr. Garry Horne, March 28, 2005). Applying the BC Stats employment multipliers (which essentially assume that some logging road builders are in the logging business while others are in the construction business) to our direct job estimates (which assume that all logging road builders are in the logging business) will likely lead to a slight over-estimate of indirect jobs.

- The silviculture coefficient may slightly understate the jobs involved in that sector as an increasing volume of timber is harvested under tenures where the company responsible for the harvesting is not responsible for reforestation. Companies harvesting timber under various forms of tenures such as Forest Licenses and Tree Farm Licenses continue to be responsible for reforestation, but companies that are awarded BC Timber Sales are typically not responsible for reforestation as BC Timber Sales retains that responsibility. For more on Timber Tenures, refer to: BC Ministry of Forests and Range, *Timber Tenures in BC – Managing Public Forests in the Public Interest*, 2006. <http://www.for.gov.bc.ca/hth/timten/documents/timber-tenures-2006.pdf>.

Table 8 Proportion of Timber Harvesting Employees by Residence Location

% of Employees by Residence Location - Includes only Timber Harvesting Employment Related to Sea-to-Sky Region Timber Harvest	2003	2004	2005	Sea-to-Sky 3 Year Average
Sea-To-Sky Region:				
Squamish	37%	41%	39%	39%
Whistler	12%	6%	9%	8%
Pemberton	29%	26%	33%	29%
Other in Sea-to-Sky	<u>3%</u>	<u>6%</u>	<u>3%</u>	<u>5%</u>
Sub-Total Sea-to-Sky	81%	80%	85%	82%
Vancouver Island:				
Port Hardy	1%	1%	1%	1%
Other North Vancouver Island	1%	1%	1%	1%
Campbell River	8%	6%	7%	7%
Other Vancouver Island	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>
Total Vancouver Island:	10%	7%	8%	8%
Lower Mainland	9%	13%	7%	10%
Total	100%	100%	100%	100%

The following table compares the data results for the Sea-to-Sky region on employment coefficients with the survey results from similar surveys conducted in early 2006 for the North Coast and Central Coast regions, and in early 2005 for the Haida Gwaii / Queen Charlotte Islands (HG/QCI) region. The table also compares the survey results with the employment coefficients used by MOFR as part of the socio-economic assessments conducted for the MOFR Timber Supply Reviews (TSR-1 conducted in the mid-1990s and TSR-2 conducted between 1999 and 2001).

Table 9 BC Coast Timber Harvesting Employment Coefficients for Various Years

Comparison of Timber Harvesting and Silviculture Employment Coefficients by Coastal Region - MOFR TSR-1 & TSR-2 and 2005/2006 Survey Results				
PY per 1,000 m3 of Timber Harvested	North Coast	Central Coast	HG/QCI	Sea-to-Sky Region
MOFR Coefficients - All BC Residents:				
MOFR Timber Supply Review (TSR-1; 1994/1995)	0.620	0.550	0.500	0.520
MOFR Timber Supply Review (TSR-2; 1999-2001)	0.350	0.495	0.510	0.590
MOFR TSA Coefficients - Local Residents:				
MOFR Timber Supply Review (TSR-2; 1999-2001)	0.120	0.150	0.250	0.420
2005/2006 Coefficients by Employee Residence (from Survey Results)				
HG/QCI	-	-	0.337	-
North Coast	0.206	0.011	0.025	-
Terrace/Kitimat/Northwest	0.206	0.007	-	-
Central Coast	0.008	0.025	-	-
Sea-to-Sky Region	-	-	-	0.467
Vancouver Island	0.261	0.385	0.104	0.048
Lower Mainland	0.051	0.050	0.052	0.058
Other BC	0.007	0.015	0.039	-
Total	0.738	0.493	0.557	0.573

Notes:

1. The employment coefficients highlighted in bold are comparable to the MOFR TSA (local resident) harvesting coefficient.
2. The Central Coast data for TSR-1 and TSR-2 represent a simple arithmetic average of the Kingcome TSA (mainland and Vancouver Island portions) and Mid-Coast TSA.
3. The 2005/06 survey results by employee residence for the Central Coast are not comparable to the Central Coast MOFR TSA coefficients, as the latter would also include employees who reside in the Vancouver Island portion of the Kingcome TSA.
4. The 2005/2006 survey results are based not only on data from the TSAs, but also from TFLs and TLs.
5. The HG/QCI data by employee residence are based on the total HG/QCI coefficients reported for local residents and non-residents as well the breakdown of full-time and part-time workers by employee residence.

Source:

- TSR-1 and TSR-2 Coefficients: MOFR Economics and Trade Branch, available from web site: http://www.for.gov.bc.ca/HET/tsr_sea/index.htm
- Pierce Lefebvre Consulting, *Haida Gwaii/Queen Charlotte Islands – Timber Harvest & Processing Employment Survey*, June 2005, available from: http://ilmbwww.gov.bc.ca/ilmb/lup/lrmp/coast/qci/docs/SEA_HG-QCI_employment_June20_05.pdf
- Pierce Lefebvre Consulting, *North Coast and Central Coast Timber Harvesting & Processing Employment Survey*, Final Report – August 8th, 2006.

7 Direct Employment Associated with Total Area Harvest

The following table provides an estimate of the direct employment associated with the Sea-to-Sky timber harvest.

Table 10 Total Direct Employment Associated with Sea-to-Sky Harvest

Estimated Direct Employment Associated with Annual Harvest (PY) (Extrapolated to Total Industry)	3 Year Average	Other Data
Direct Harvesting Employment (3 year average from survey):		3 Year Average % of Total
Squamish	113	39.5%
Pemberton	24	8.4%
Other Sea-to-Sky Region	83	29.0%
North Vancouver Island	13	4.7%
Campbell River	24	8.4%
Lower Mainland	29	10.1%
Total Harvesting and Silviculture	287	100.0%
BC Primary Processing (Mainly Southern BC)		Coefficient per 1,000 m3 of Sea-to-Sky Timber Harvested
Wood Processing - Sea-to-Sky Region	42	0.085
Wood Processing - Mainly Southern BC	<u>172</u>	<u>0.344</u>
Wood Processing	214	0.428
Pulp & Paper Processing	88	0.176
Total Primary Processing	302	0.604
Total B.C. Direct Employment	589	1.177
ASSUMPTIONS		
Total Timber Harvest	500,351	
Exports % (based on survey)	0%	
Volume Processed in B.C.	500,351	
BC Employment Coefficients (PY per 1,000 m3)		
Harvesting and Silviculture (3 year average from survey)	0.573	
BC Primary Processing (Mainly Southern BC):		
Wood Processing	0.428	
Pulp and Paper	0.176	
Total	1.177	

Notes:

1. This table provides estimates of direct harvesting employment based on assumed total levels of timber harvest and employment coefficients per m3 of timber harvest derived from the survey data; the presentation of these estimates implies a degree of precision that does not exist but the represented precision is retained to maintain the integrity of the data and methodology.
2. The data assume a job is full-time (one PY) if the work year consistently lasts 8 to 12 months per year, or at least 180 days per year. Part-time employment data were collected and converted to PY of employment using 180 days per PY.
3. Excludes secondary paper manufacturing and value added wood processing sector; Source: based on Pierce Lefebvre Consulting et al., *Analysis of Woodflow in the Coast Forest Region, 2003*, and other data (see below for more detail).

The employment data presented in Table 10 represent an estimate of total industry employment based on the survey employment data, and the 3-year average harvest using MOFR Harvest Billing System data by scale date for 2003 and 2004, and by billing date for 2005 (the 2005 MOFR data by scale date were not available at the time of writing this report). As noted earlier in the report, the 2005 MOFR Harvest Billing System data likely cover the timber harvest scaled in the latter part of 2004 but exclude timber scaled in the latter part of 2005.

The direct employment also includes an estimate of processing employment based on the processing coefficient derived from a 2003 study of woodflow for the Coast Forest Region⁴ and taking into account some of the major mills that have closed since that study was published. The total manufacturing employment was adjusted by excluding the employment associated with mills that are now permanently closed while holding the assumed timber supply constant. This may overstate the drop in employment as these estimates do not take into account that some of the remaining mills may have experienced increased employment to reflect the increased production.

The following table summarizes 1996 and 2003 processing employment coefficient data, as well as the revised estimates for 2006.

Table 11 Direct Employment Coefficients for the Coast Forest Region

Direct Employment Coefficients for the Coast Forest Region	Number of Person Years (PY) per 1,000 m ³ of Timber Harvested				PY per 1,000 m ³ of Timber Supply - Revised for Mill Closures
	of Fibre Consumed				
	1996	2003	1996	2003	2006
Harvesting and Silviculture	0.520	0.520			
Primary Processing:					
Sawmills	0.365	0.346	0.535	0.534	0.314
Shake & Shingle	0.054	0.041	1.096	0.863	0.041
Plywood and Veneer		0.046		0.803	0.046
Other	<u>0.034</u>	<u>0.028</u>	0.209	0.112	<u>0.028</u>
Sub-Total - Wood Products Processing	0.453	0.461			0.428
Primary Pulp and Paper	<u>0.240</u>	<u>0.206</u>	0.465	0.394	<u>0.176</u>
Sub-Total - Primary Processing	0.694	0.666			0.604
Secondary Pulp and Paper	0.063	0.067			
Total (Harvesting, Silviculture & Processing)	1.277	1.254			

Source: 1996 and 2003 data are from Pierce Lefebvre Consulting et al., *Analysis of Woodflow in the Coast Forest Region*, 2003; 2006 data are from 2003 coefficients updated to take into account the major mills that have been closed since 2003.

The major mills that have been closed since spring 2003 that are excluded in the revised coefficients are as follows:

⁴ Source: Pierce Lefebvre Consulting et al., *Analysis of Woodflow in the Coast Forest Region*, 2003

Table 12 Recent Mill Closures on BC Coast

List of Mills	2003 Employment	2006 Employment	Change	
Pulp and Paper Manufacturing:				
Western Pulp Ltd. Partnership	Port Alice	465	265	-200
Western Pulp Ltd. Partnership	Woodfibre/ Squamish	330	closed	-330
Total Pulp and Paper				-530
Wood Products Manufacturing:				
Western Forest Products	Silvertree	150	closed	-150
International Forest Products (Interfor)	Field Sawmill	100	closed	-100
International Forest Products (Interfor)	Squamish	145	closed	-145
Cascadia Forest Products	Island Phoenix Division	180	closed	-180
Total Wood Products				-575

Source: Various publications including: BC MOFR, *Major Primary Timber Processing Facilities in BC 2004*, July 2005, from: <http://www.for.gov.bc.ca/ftp/HET/external/publish/Web/Mill%20List/2004%20Mill%20List.pdf>.

As shown on Table 9, recent mill closures in Squamish include the Western Pulp Ltd. operation and Interfor's sawmill in Squamish (Empire Mills) resulting in approximately 475 lay-offs. As noted earlier, there are currently an estimated 44 PY of employment in primary wood manufacturing in the Sea-to-Sky region (excluding timber framing and secondary wood processing).

The 42 PY of employment at local mills represent 20% of the 214 PY of direct processing employment estimated to be generated by the total Sea-to-Sky timber harvest. If local mills relied only on the Sea-to-Sky timber harvest, the 42 PY of employment would represent 0.085 direct PY of local employment per 1,000 m³ of timber harvested in the Sea-to-Sky region (see Table 10).

8 Full-Time and Part-Time Employment

The survey of licensees requested data on the number of full-time jobs, the number of part-time jobs and the number of days per part-time job by category of timber harvesting employment. The following paragraphs explain how the survey differentiates between full-time and part-time employment, and discusses some of the factors that influence the number of jobs reported as part-time or full-time.

- The survey defines a full-time job (also referred to as Person Year (PY) of employment) as any job where employees worked more than 180 days in a year.
- Where full-time contractor employees did not work 180 days, these were reported by licensees as part-time employment, and the number of days of part-time employment were converted into PY using 180 days per year.
- Full time employees who also work on licenses in other regions outside the Sea-to-Sky were reported as part-time employees if they worked less than 180 days per year in the Sea-to-Sky region.

- Part-time workers who split their time between two licensees could be counted two or more times. This may be particularly relevant for silviculture workers where part-time work seems to be the most prevalent.
- While some logging contractors such as “stump to dump” contractors were included in the survey, smaller contractors such as silviculture contractors were not. As a result, silviculture jobs were typically estimated by the licensees, usually in terms of days of part-time employment.
- “Lurch logging”, the practice of hiring contractors for the duration of a specific logging operation or contract rather than having full-time jobs with major forest licensees, is increasingly common in Coastal BC and is being reflected in the survey results. Factors which are likely to continue the trend towards “lurch logging” include the fragmentation of the timber harvesting industry, the increasing influence of market logging, the allocation of BC Timber Sale licenses to First Nations and other communities that do not have a full-time workforce, and the practice of harvesting a BC Timber Sale over a short period of time, rather than spreading the harvesting activity evenly over the duration of the license period. There may also be broader factors at play, including technological changes resulting in increased labour specialization, for example heli-logging, and societal changes influencing where loggers chose to reside.
- The survey participants in the Sea-to-Sky region reported that their timber harvesting crews operate between 8 and 12 months per year.

Many of the licensees emphasized that normally their workforce is considered full-time, but that 2003 through 2005 were particularly difficult as a result of poor markets and uncertainty regarding the landbase. For these licensees, particularly for 2003, very few of the workers worked enough days to qualify as "full-time" employees using the 180 day definition of a full-time job (180 days is approximately 9 months of work). This resulted in a high ratio of part-time jobs relative to the number of full-time jobs.

The following table indicates the number of jobs associated with the PY of employment as reported in the survey. As shown on the table, on average over the three-year period, there are an estimated 1.5 times more jobs than there are PY of employment.

The table shows that on average every year, the Sea-to-Sky harvest generates some 287 PY of direct harvesting employment in BC, but the number of full-time and part-time jobs may be as much as 1.5 times greater than that, at approximately 433 jobs.

Table 13 Estimated Number of Jobs per PY of Direct Timber Harvesting Employment

Sea-to-Sky - Full-Time and Part-Time Jobs Per PY of Direct Timber Harvesting Employment	3 Year Average
Survey Results:	
Number of Full-Time Jobs	196
Number of Part-Time Jobs	<u>99</u>
Total Timber Harvesting Jobs	<u>294</u>
PY of Direct Timber Harvesting Employment	195
Jobs/PY of Direct Harvesting Employment	1.51
Extrapolated Data to Total Industry:	
PY of Direct Timber Harvesting Employment	287
Total Full-Time & Part-Time Jobs	433

Note: As noted in Section 8 of the report, there are various factors that influence the number of jobs reported as part-time or full-time.

Table 6 on the primary wood processing sector shows that virtually all wood processing jobs in the Sea-to-Sky region are full-time, mainly the result of the three mills that participated in the study reporting that they remained open an average of 229 days per year over the 2003 to 2005 period.

Appendices 1 and 2 provide more data on the Sea-to-Sky region timber harvest sector:

- Appendix 1 provides more detail on timber harvest and AAC by forest license; and
- Appendix 2 provides more detailed survey results of the timber harvesting operations in the Sea-to-Sky region.

Appendix 3 provides a list of selected references.

APPENDIX 1 SEA-TO-SKY FOREST LICENCES AND APPORTIONMENT

Sea-to-Sky Region Including Soo TSA and TFL 38							AAC	3 Year Average Harvest	3 Year Harvest as a % of AAC
Name of License Holder	Detail/ Location	Comment on AAC and Harvest Levels	Approx. Timber Harvest (m3)						
			2003	2004	2005				
SOO TSA									
Western Forest Products (WFP Ltd., WFP Western Lumber Ltd.)	A19216	All conventional; as per MOFR Apportionment in April 2006, this license is no longer in effect	2,689	68,003	79,090	58,466	49,927	85%	
International Forest Products	A19209	All conventional; license of 105,588 m3 was reduced in 2006 to 88,297 m3; harvest reported by licensee includes A19209 harvest as well as some market logging	68,996	162,652	21,357	105,588	84,335	80%	
Richmond Plywood	A20541	All conventional; 100% mainland; includes harvest for A20541 (AAC of 18,252 m3) and harvest for A75049 (AAC of 13,500 m3)	2,882	14,531	26,565	31,752	14,659	46%	
Squamish Mills Ltd. – Cascadia Forest Products	A19214		21,774	47,802	5,998	37,620	25,191	67%	
Squamish Mills Ltd.	Small Bus.	Small Business License	22,177	18,936	14,255	37,620	18,456	49%	
Terminal Forest Products Ltd.	A19215		22,028	58,670	52,282	59,780	44,327	74%	
Halray Logging Ltd.; Cascadia Forest Products	A19217		7,361	7,981	37,747	18,004	17,696	98%	
	A20481	Replaceable	288	1,281	0	8,048	523	6%	
C.R.B. Logging Co. Ltd.	A19218		7,232	19,262	17,164	19,626	14,553	74%	
Black Mount Logging Inc.	A20479		477	1,271	1,133	1,295	960	74%	
Gilham Poling Ltd.	A20480		1,920	4,646	0	1,633	2,189	134%	
Leblanc	A20482	Includes some market logging	4,000	10,000	8,000	5,600	7,333	131%	
Talbot	A20485	Includes some market logging	1,800	2,400	2,924	2,500	2,375	95%	
Sub-Total		Total Harvest is based on survey data and may include some market logging; apportionment is from MOFR; all above licenses including Richmond Plywood license A75049 are part of the total apportionment	163,624	417,434	266,515	387,532	282,525	73%	
Woodlots		per MOFR Apportionment; approximate level of harvest	1,658	4,416	3,936	4,500	3,337	74%	
Community Forest Agreements and Forest Service Reserve		per MOFR Apportionment; approximate level of harvest	190	505	450	515	382	74%	
BC Timber Sales and other		Equal to difference between survey results/estimates and total harvest reported by MOFR	19,876	71,303	169,011	110,453	86,730	79%	

Sea-to-Sky Region Including Soo TSA and TFL 38							AAC	3 Year Average Harvest	3 Year Harvest as a % of AAC
Name of License Holder	Detail/ Location	Comment on AAC and Harvest Levels	Approx. Timber Harvest (m3)						
			2003	2004	2005				
Sub-Total TSA – Forest Licenses		Total Sea-to-Sky harvest as reported by BC MOFR Harvest Billing System; Total AAC represents apportionment in effect in December 2005	185,348 (37% of AAC)	493,659 (98% of AAC)	439,912 (87% of AAC)	503,000	372,973	74%	
TREE FARM LICENSES (TFLs)									
International Forest Products	TFL 38	Total TFL 38 harvest as reported by licensee; AAC is effective December 2005; AAC dropped as a result of BC Government take-back program to 109,453 m3 and was then sold to the Squamish Nation (Northwest Squamish Forestry) in December 2005	53,105	182,941	115,714	208,276	117,253	56%	
TFL 38 - BC Timber Sales and Other	TFL 38	Effective December 2005; after take-back, TFL, BC Timber Sales and other now add to 141,047 m3; harvest data equal to difference between survey results and total reported by MOFR	-17,965	6,456	41,883	42,224	10,125	24%	
Sub-Total	TFL 38	Total TFL 38 harvest as reported by BC MOFR Harvest Billing System	35,140	189,397	157,597	250,500	127,378	51%	
TOTAL HARVEST		Total harvest as reported by BC MOFR Harvest Billing System (Soo TSA and TFL 38)	220,488	683,056	597,509	753,500	500,351	66%	
SURVEY COVERAGE:									
Soo TSA Survey Coverage		Excludes the three licensees (one medium-size and two small companies) that did not participate in the study	133,887	338,232	195,936	306,831 (61% of Total TSA AAC)	222,685		
Total TSA & TFL Survey Coverage			186,992	521,173	311,650	515,107	339,938		
Survey Volume as a % of Total Harvest			84.8%	76.3%	52.2%	68.4%	67.9%		

Notes:

- For some licensees, the harvest data are estimated based on the region's harvest reported by MOFR for the Soo TSA and the corresponding AAC. The timber harvest for the Soo TSA as reported by MOFR's billing system represents 37% of all commitments for 2003, 98% of commitments for 2004 and 87% of commitments for 2005.
 - The AAC in the table is from the MOFR apportionment in effect in December 2005; in 2003 and 2004, Canfor had a license for 40,623 m3 in the Soo TSA.
- Source: Total TSA harvest for 2003 and 2004 is by scale date while 2005 is the billed volume by billing date for 2005; data are from the MOFR Harvest Billing System (provided by Glenn Farenholtz of BC MAL, January 23rd, 2006). All other harvest data are from the Pierce Lefebvre Consulting survey of licensees that was conducted for this project.

APPENDIX 2 ADDITIONAL SURVEY RESULTS FOR SEA-TO-SKY REGION

The report provides data from a survey of timber harvesting operations in the Sea-to-Sky region. This appendix provides more detail on the survey results.

Sea-to-Sky Survey Results - Harvesting Employment - Person Years (PY)	2003	2004	2005
Harvesting/ Falling	41	143	53
Planning & Administration	18	40	25
Log Hauling / Trucking	24	43	39
Barging / Towing	3	13	6
Road Building	20	41	25
Silviculture	10	23	14
Other	0	1	1
Total	115	305	163

Note: Most licensees and their contractors included all log hauling and trucking as part of harvesting; harvesting also includes camp operations and heli-yrading.

Sea-to-Sky Survey Results - Full-Time & Part-Time Harvesting Employment	Full-Time Jobs			% Residing in Sea-to-Sky
	2003	2004	2005	
Harvesting/ Falling	40	137	47	88%
Planning & Administration	16	38	22	90%
Log Hauling / Trucking	23	40	35	90%
Barging / Towing	2	11	3	84%
Road Building	19	39	23	91%
Silviculture	5	14	8	67%
Other	19	25	22	94%
Total	123	305	159	89%
Sea-to-Sky Survey Results - Part-Time Employment	Part-Time Jobs			% Residing in Sea-to-Sky
	2003	2004	2005	
Harvesting/ Falling	6	15	13	59%
Planning & Administration	17	17	23	49%
Log Hauling / Trucking	8	11	12	79%
Barging / Towing	4	5	5	100%
Road Building	3	6	5	100%
Silviculture	45	51	42	67%
Other	1	3	3	100%
Total	84	107	104	68%

Note: Full time employees who did not work a minimum 180 days per year are counted as part-time; also, some companies whose employees also work outside the Sea-to-Sky region are counted as part-time workers.

APPENDIX 3 LIST OF KEY REFERENCES

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