Socio-Economic Analysis in support of the Haida Gwaii Timber Supply Review

Executive Summary

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* The references cited in this Executive Summary are itemized in the full report.

Executive Summary

1.1 Introduction

Under the authority of Section 3(3) of the *Haida Gwaii Reconciliation Act*, the Haida Gwaii Management Council (HGMC) initiated a Timber Supply Review (TSR) for the Haida Gwaii Management Area (HGMA). The HGMA is defined in Section 1(1) of the *Haida Gwaii Reconciliation Act* as all of Haida Gwaii except for private lands, Indian Reserves (IRs) and municipalities.

The purpose of this socio-economic analysis report within the timber supply review process is to:

- assemble and present recent historical information and data on the Haida Gwaii forest sector, including its position within the overall Haida Gwaii economy; and
- analyze the effects of certain key timber supply related matters on Haida Gwaii current and future social and economic conditions.

This socio-economic analysis is divided into two parts. The first part is a situation analysis that looks at the recent socio-economic experience of the Haida Gwaii forest sector and as such the time period of the past decade 2008-2017 is primarily referenced in this section. The second part of the report examines several key issues that have influenced the socio-economic performance of the Haida Gwaii forest sector and are likely to be important issues going forward as well.

1.2 Situation Analysis

HAIDA GWAII POPULATION

Declining population, -12.8% over the 2006-2016 period

Based on Census of Canada data, the 2016 population of Haida Gwaii was 4,198, a 12.8% decrease over the 2006 population of 4,812, and a 28.0% decrease over the 1996 population. By comparison, the overall population of BC rose by 12.2% over the 2006-2016 period.

The five main communities by population in 2016 are Queen Charlotte (852), Skidegate (Higaagilda) (837), Masset (793), Old Massett (Gaw) (555), and Port Clements (282); these communities account for about 80% of the overall population on Haida Gwaii. The remaining 20% of the population inhabits other areas of Haida Gwaii including the unincorporated communities of Tlell, rural Graham Island, and Sandspit. Skidegate was the only Haida Gwaii community or area that registered a population gain for the 2006-2016 period. The main reason for the Haida Gwaii population decline is that out-migration from the islands has greatly exceeded its in-migration. For the 2006-2016 period, Haida Gwaii had a small natural population increase (i.e. births exceeding deaths).

Almost half of the Haida Gwaii population identifies as Aboriginal/Indigenous

In 2016, an estimated 47.5% of the Haida Gwaii population identified as an Aboriginal/Indigenous person. The Aboriginal/Indigenous population of Haida Gwaii was an estimated 1,915 in 2016, a 1.6 % increase over the 2006 Indigenous population of 1,885. Although demonstrating a positive trend, the Haida Gwaii Indigenous population increase of 1.6% trailed, by a large margin, the 38% increase in the overall BC Aboriginal/Indigenous population during the 2006-2016 period.

HAIDA GWAII LABOUR FORCE

Shrinking labour supply

The islands resident labour force decreased from an estimated 2,830 workers to 2,290 workers over the 2006-2016 period, a decline of 19.1%.[1]

Aging population and labour supply

The median age of the Haida Gwaii population increased from 39.7 years to 45.1 years over the 2006-2016 period, By comparison, the estimated 2006 median age on the islands was similar to that of the province (40.8 years) whereas by 2016, the estimated Haida Gwaii median age (45.0) was higher than the BC median of 43.0 years.

[1] This labour force data is from the Census of Canada and based on "place of residence", i.e. these workers constitute the labour force members who had their usual place of residence (i.e. permanent residence) on Haida Gwaii at the times of Census enumeration.

People aged 25 to 54 years old are considered of core working-age because of their strong attachment to the labour market. The estimated number and percentage share of persons residing on Haida Gwaii in the prime working age group of 25 to 54 years declined from 2,217 (45.7%) in 2006 to 1,669 (39.0%) in 2016.

The resident labour forces of each of Haida Gwaii's main economic sectors, forestry, tourism and public services, have contracted

Haida Gwaii's economy is narrowly focused on forestry (mainly logging), tourism (mainly sport fishing, Haida culture and Haida Gwaii ecological experiences) and public services, including elementary and high school education, health care and government administration. The resident labour force in 2016 totalled 2,290 workers, a 19.1% decline from the 2006 total of 2,830. Worker numbers in the tourism and forestry sectors declined over the 2006-2016 period, 9.4% and 10.8%, respectively, but by a lesser amount than in the public services sector and in the overall local economy. Table ES-1 presents Haida Gwaii's labour force numbers and percentage shares by major sector for 2016 and 2006.[2]

Table ES-1: Haida Gwaii Labour Force, 2016 and 2006[3]

Sector	2016 #	2016 %[4]	2006 #	2006 %	% change 2016 vs 2006
Tourism	387	16.9	427	15.1	-9.4%
Forestry	290	12.7	325	11.5	-10.8%
Public Services	640	27.9	795	28.1	-19.5%
Other Sectors	973	42.5	1,283	45.3	-24.2%
Total	2,290	100	2,830	100	-19.1%

Source: Statistics Canada 2007 and 2017; unpublished runs of Statistics Canada 2006 and 2016 labour force data supplied to BC Stats; and author's calculations

Data challenges in estimating Haida Gwaii economic activity

The preceding table focused on the resident labour force. Both the forestry and tourism sectors on Haida Gwaii have historically utilized non-resident workers who either reside seasonally or long distance commute for periods or one or more weeks to Haida Gwaii. Generally, less data and information are available on this group of workers but a survey conducted for this timber supply review indicates that the on islands resident share of Haida Gwaii forestry employment has risen in recent years. This shift appears to be largely due to

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[2] This labour force data are from the Census of Canada and is based on "place of residence", i.e. the workers who constitute the labour force members who had their usual place of residence (i.e. permanent residence) on Haida Gwaii.

[3] The labour force question relates to the individual's job held during the week of Sunday, May 1 to Saturday, May 7, 2016. However, if the person did not work during that week but had worked at some time since January 1, 2015, the information relates to the job held longest during that period. Employment at Haida Gwaii resorts is higher in the summer months than in May but the framing of the question captures workers who may not be working in May but who will likely be working in a month or so.

[4] The percentage share shown in this table is the percentage or share of the total labour force. In the 2009 BC Stats reports, the percentage or share of only the "basic sector" is shown, i.e. forestry's percentage/share of the basic sector.

the efforts of Haida Gwaii headquartered Taan Forest Products Ltd. (Taan) to utilize Haida Gwaii resident workers and contractors. Fishing resort lodges (an estimated 16 in 2018) have collectively been an important factor in the Haida Gwaii tourism sector since the 1990s but they have relied as a group on a significant number of off islands seasonal and full-time workers. A new study (expected to report in 2019) may show a greater reliance on local workers at these lodges, in part due to Haida Gwaii-headquartered Haida Enterprise Corporation's (HaiCo's) entrance into the fishing lodge sector and its efforts to hire Haida Gwaii resident workers for its lodges.[5]

FACTORS DRIVING HAIDA GWAII TIMBER HARVESTING

The basic economic activity that underpins the overall performance of the Haida Gwaii forestry sector, whether considered on an annual or a decade basis, is local timber harvesting

Three factors have had the greatest influence on the timber harvesting performance of the Haida Gwaii forestry sector, two factors on the timber supply side and one factor on the timber demand side.

Demand for wood products in external markets drives Haida Gwaii forest sector economic activities

External market demand for softwoods products (including logs) that matches with the Haida Gwaii log supply profile is a critical factor pushing forward Haida Gwaii forest sector economic activities. Demand conditions in two markets drive the overall commercial harvest on Haida Gwaii Management Area (HGMA) lands. The key longstanding market factor is US housing market demand for cedar wood products and the newer market factor is the demand in China for whitewood logs for input into the manufacture in China of lower value structural wood products, such as cement form materials.

On the supply side, a primary influence on timber harvesting levels has been the regulated Annual Allowable Cuts (AACs) for the Haida Gwaii Management Area (HGMA) and the Haida Gwaii Timber Supply Area (TSA) and Timber Forest Licences (TFLs), which have set the upper limits on the potential total timber harvest in these Haida Gwaii timber harvesting management units. The other very important supply side factor has been the commercially operable volume of Old Growth western redcedar on HGMA lands and on private lands. This factor is directly tied to the cost of timber harvesting and transport on Haida Gwaii.

The intersection of the regulated Haida Gwaii timber supply AACs and the commercially operable western redcedar volumes with the demand for Haida Gwaii timber has driven Haida Gwaii timber harvesting volumes, which has fed through to effects on Haida Gwaii forest sector employment and employment income, log prices, sales revenues and stumpage and goods and services purchasing activity. Shifts in one or more of the three cited key

[5] The Marine Plan Partnership for the North Pacific Coast (MaPP) has a research project underway that is expected to include a survey of Haida Gwaii fishing lodge operators, which will provide an up-to-date estimate of total employment and its characteristics in this key part of the Haida Gwaii tourism sector.

supply and demand factors soon result in distinct economic effects in the Haida Gwaii forest sector and the overall Haida Gwaii economy.

Rising Vancouver Log Market prices reflect strong lumber market demand conditions in the US house building and home renovation markets

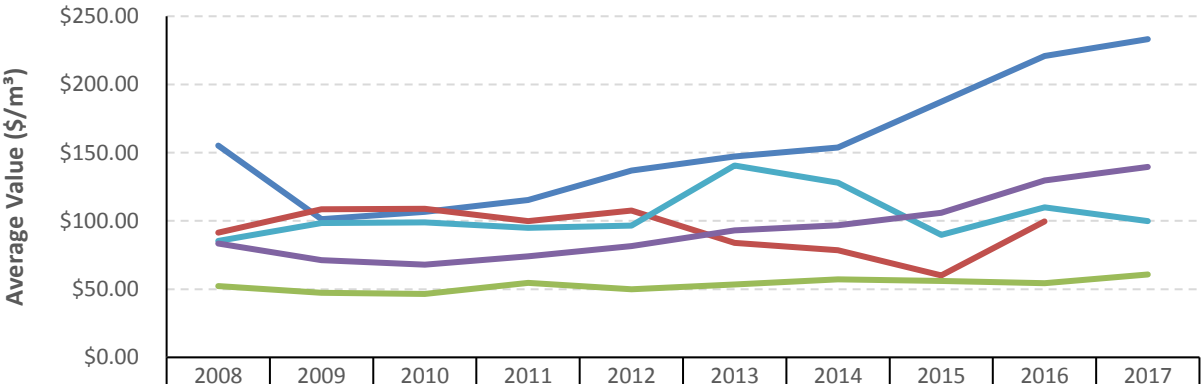
Log prices reflect demand conditions for the wood-based end use products that incorporate the logs extracted from coastal BC forests. The annual average price of western redcedar (Old Growth) logs on the Vancouver Log Market (VLM)[6], taking into consideration all log grades, climbed from a low of $101 in 2009 to $233 in 2017, a more than doubling of the 2009 average price when demand conditions in the US housing market were at a low ebb because of the 2008 financial crisis.

Trends in the US housing market are the main factor that feeds back into the demand for Haida Gwaii cedar timber. In BC, about 75% of the province's cedar lumber exports are directed to the US, 95% of its cedar siding exports go to the US and 95% of cedar shake and shingle exports are US-bound (Gregory, McBeath and Filipescu 2018).

Hemlock log prices were largely stagnant over the 2008-2017 and well below Haida Gwaii per m^3 harvest and transport costs. VLM prices for Sitka spruce logs have been relatively strong (taking into consideration all log grades), peaking at about $140/$m^3$ in 2013. These log price trends largely reflect conditions in key log and wood product markets and demonstrate that commercial viability of timber harvesting on Haida Gwaii is substantively determined by the amount of cedar and/or spruce in stands. Figure ES-1 shows the recent trend in cedar, spruce and hemlock Old Growth log prices on the VLM.

[6] In BC, the functioning log marketplace is organized on a coast-wide basis. Implementation of the BC Government's Forest Revitalization Plan starting in 2003 reinforced this coast-wide marketplace, which facilitates price and quality competition for Haida Gwaii timber along with the timber of other coastal TSAs, TFLs and private lands. Transactions of logs between non-related, Coastal BC-based forest industry parties, such as between a market logger and a wood processing facility, occur within the Vancouver Log Market (VLM), which is a longstanding but informal institution that does not have a centrally organized administrative structure. The selling, buying and trading of logs between entities occurs throughout coastal BC, including Haida Gwaii, but log prices are typically adjusted as necessary to reflect transport costs to the Howe Sound-Fraser River area.

Figure ES-1: Old Growth Log Average Price by Species ($/m³)[7], Vancouver Log Market, 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cedar	$155.28	$101.29	$106.69	$115.23	$137.00	$147.23	$153.91	$187.26	$220.98	$233.21
Cypress	$91.33	$108.65	$108.89	$99.91	$107.64	$83.83	$78.44	$60.07	$99.60	
Hemlock	$52.24	$47.21	$46.49	$54.48	$50.00	$53.38	$57.10	$55.94	$54.28	$60.75
Spruce	$85.35	$98.48	$99.02	$95.02	$96.66	$140.62	$127.95	$89.82	$109.89	$99.94
All	$83.34	$71.19	$67.94	$74.00	$81.50	$92.99	$96.76	$106.01	$129.54	$139.58

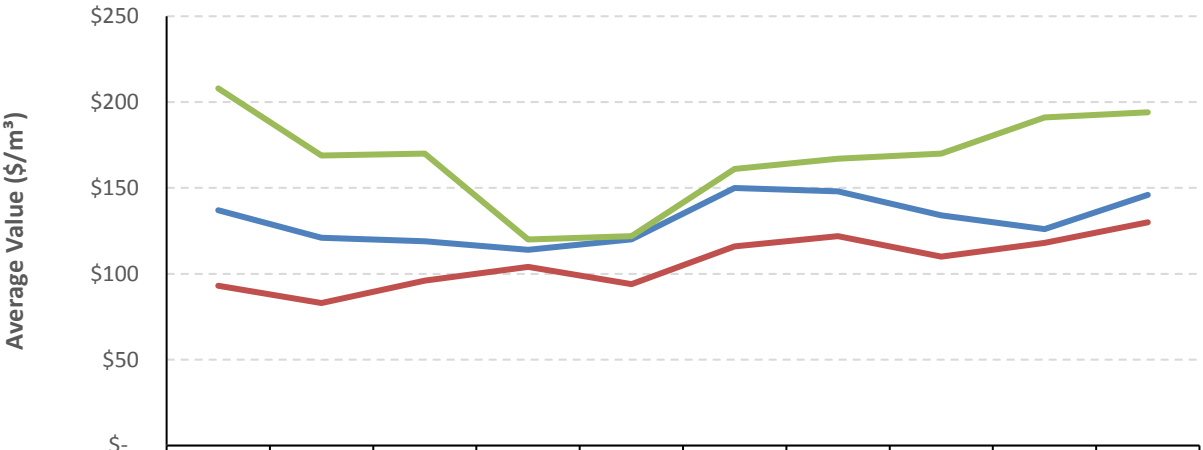
Source: Timber Pricing Branch BC MFLNR 2018 and author's calculations

Export log prices, driven by wood product demand conditions in China (hemlock), Japan (spruce) and the US (western redcedar), have generally exceeded VLM log prices

Figure ES-2 shows the recent trend in and levels of average annual prices of BC export logs by species that are sourced from Haida Gwaii.

[7] All dollar amounts in this report are reported in current Canadian dollars unless otherwise noted.

Figure ES-2: BC Export Log Average Price by Species ($/m³), 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Spruce	$137	$121	$119	$114	$120	$150	$148	$134	$126	$146
Hemlock	$93	$83	$96	$104	$94	$116	$122	$110	$118	$130
Cedar	$208	$169	$170	$120	$122	$161	$167	$170	$191	$194

Source: BC Stats and author's calculations

The higher prices in export markets for hemlock and spruce logs than the prices for these species in the Vancouver Log Market have been a key factor in the diversion of an increasing portion of the Haida Gwaii log harvest from domestic markets over to buyers in China, Japan and South Korea.

HAIDA GWAII AACS AND APPORTIONMENT

From an economic perspective, the HGMC determined AAC sets a maximum allowed annual timber harvesting level for HGMA lands

Table ES-3 shows recent AACs for Haida Gwaii management units TSA 25, TFL 58, and TFL 60. The sum of the Haida Gwaii management unit AACs determined in 2012 was 931,000 m³, a decline of 47.5% from the previous total AAC of 1,772,616 m³. The four woodlot licences contribute an additional 9,293 m³ of AAC.

Table ES-3: Recent AACs for Haida Gwaii Management Units (m³)

Management Unit	AAC determined in 2012 (m³)	Prior AAC (m³)	% change in AAC
TSA 25	512,000	869,748	-41.1%
TFL 58	79,000	100,000	-21.0%
TFL 60	340,000	802,868	-57.7%
All Units	931,000	1,772,616	-47.5%

Source: Sutherland 2012

Haida Gwaii based ownership of Haida Gwaii tenures has greatly increased in recent years

Haida Gwaii-headquartered Taan Forest Products Ltd. is the holder of the TFL 60 tenure, which has an AAC of 340,000 m^3 and is predominantly located on Graham Island with smaller portions located on Moresby Island and on Louise Island. Taan completed the acquisition of the TFL 60 tenure (then called TFL 39 Block 6) from Western Forest Products (WFP) in June 2012 (Taan Forest 2016). Taan also holds a non-replaceable forest licence-First Nations (an area based forest licence to cut), which was obtained in 2010, and accounts for TSA 25's second largest volume apportionment with an AAC commitment of 120,000 m^3.[8] In addition, Taan manages. jointly with BCTS. a volume of 14,210 m^3.[9] These Taan controlled volumes account for approximately 50% of the sum of the Haida Gwaii management unit AACs, a total of 474,210 m^3.

Table ES-4 presents the current AAC apportionment and commitments for TSA 25.

Table ES-4: TSA 25 AAC Apportionment and Commitments (m^3 & % of TSA 25 AAC)

Form of Agreement	m^3	% of AAC
Replaceable Forest Licences	213,632	41.7
Husby Forest Products Ltd. (A16869)	192,044	37.5
A&A Trading (Haida Gwaii) Ltd. (A16870)	13,632	2.7
Dawson Harbour Logging Ltd. (A75084)	7,956	1.6
Non-Replaceable Forest Licences	14,210	2.8
BCTS Partnership (Taan Forest Products)	14,210	2.8
Non-Replaceable Forest Licence – First Nations	120,000	23.4
Haida Tenure (Taan Forest Products)	120,000	23.4
BCTS Timber Sale Licence/ Licence to Cut	81,658	15.9
Community Forest Agreement	80,000	15.6
Forest Service Reserve	2,500	0.5
Total Allowable Annual Cut	512,000	100.0

Source: BC MFLNR 2018b

[8] This tenure is administered as a forest licence to cut (FLTC). Discussions have been underway between the BC Government and Haida Nation associated parties for the conversion of the Taan held FLTC and TFL 60 into an area-based First Nations Woodland Licence, and the arrangements to establish this new licence are expected to be soon finalized.

[9] Joint planning on harvest planning roadbuilding and auctioning.

HGMA TIMBER HARVEST

The average annual harvest of 831,172 m³ over the 5-year 2013-17 period, which coincides with the April 2012 HGMC determination, shows a shortfall of about 10% relative to the HGMA AAC

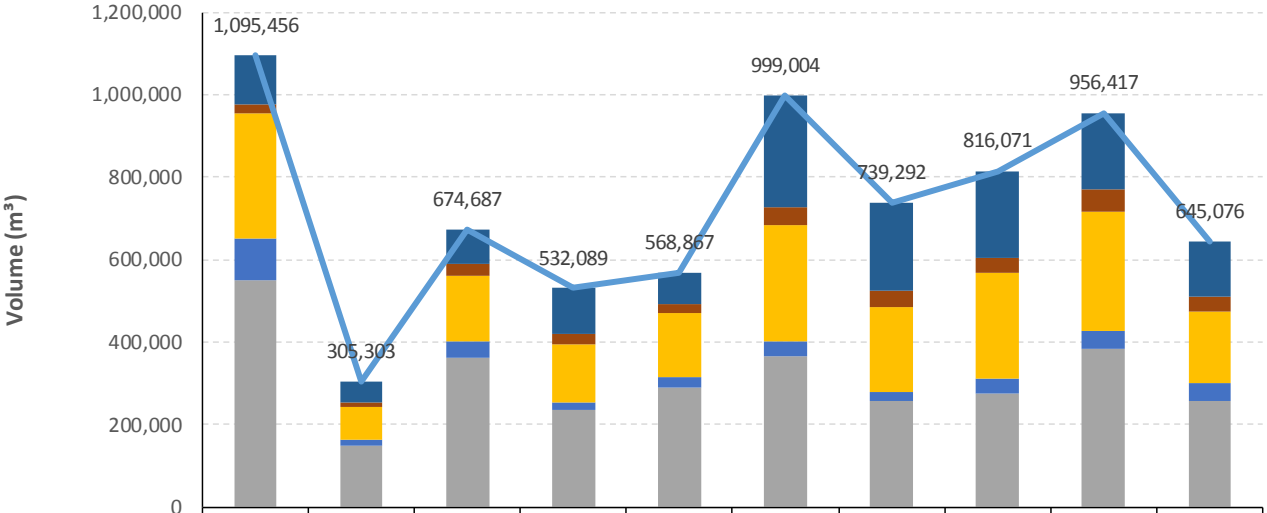
Although the available timber supply for annual harvesting was in the 1.2–1.8 million m^3 range over the 2000–2012 period, the amount of timber harvested by commercial operators and supplied into domestic and international markets fell well short of these levels due to target market demand conditions, cost constraints, and administrative and policy parameters on the Haida Gwaii timber supply side.

The most recent 3-year 2015-17 annual average harvest in the HGMA, 805,854 m^3, exceeded the 10-year 2008-2017 annual average of 733,226 m^3 but was under the 5-year 2013-2017 annual average harvest of 831,172 m^3 because of the harvest volume dip in 2017 to 645,076 m^3.

During the 10-year 2003-2012 period prior to the initial AAC determination of the HGMC, the Haida Gwaii annual timber harvest averaged approximately 780,000 m^3, well below the cumulative total of the then current Haida Gwaii AACs and below the average annual harvest for the 5-year 2013-2017 period.

Over the 2008-2017 decade, the harvest of red and yellow cedar annually averaged approximately 351,000 m^3, accounting for an almost half share (47.8%) of the total HGMA harvest. Over the 5-year 2013-2017 period, the cedar share of the HGMA total harvest was lower (41.4%) compared to the 10-year average share. Historically, stands with substantial percentage shares of Old Growth western redcedar volumes have formed a substantial portion of the commercially operable timber harvesting landbase of Haida Gwaii. This accessible local cedar supply in combination with the strong and large scale demand for cedar logs and cedar wood products in Canadian, US and international markets over the past couple of decades have resulted in attractive prices for cedar logs and wood products and substantial cedar timber harvests on both HGMA lands and Haida Gwaii private lands. Figure ES-3 outlines in a graph and a table the HGMA billed harvest volume by species over the 10-year 2008-17 period.

Figure ES-3: HGMA Timber Harvest Volume by Species (m^3), 2008 - 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Spruce	118,455	51,192	85,031	112,329	75,143	270,736	214,499	212,189	187,211	134,050
Other Species	20,394	9,989	29,083	24,286	23,739	44,403	39,024	36,984	51,329	37,436
Hemlock	304,876	79,393	160,100	142,452	153,689	282,740	207,896	255,562	290,507	171,455
Cypress	101,987	16,471	36,380	17,978	25,343	35,601	18,517	34,197	43,522	44,462
Red Cedar	549,744	148,258	364,093	235,045	290,953	365,525	259,356	277,140	383,848	257,673
Total	1,095,456	305,303	674,687	532,089	568,867	999,004	739,292	816,071	956,417	645,076

Source: Harvest Billing System 2018 and author's calculations

The percentage shares by species of the HGMA harvest for the 2008-2017 period are presented in Table ES-5.

Table ES-5: HGMA Timber Harvest Share by Species (%), 2008 - 2017

Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	10-year average
Red Cedar	50.2%	48.6%	54.0%	44.2%	51.1%	36.6%	35.1%	34.0%	40.1%	39.9%	42.7%
Yellow cedar (Cypress)	9.3%	5.4%	5.4%	3.4%	4.5%	3.6%	2.5%	4.2%	4.6%	6.9%	5.1%
Hemlock	27.8%	26.0%	23.7%	26.8%	27.0%	28.3%	28.1%	31.3%	30.4%	26.6%	27.9%
Spruce	10.8%	16.8%	12.6%	21.1%	13.2%	27.1%	29.0%	26.0%	19.6%	20.8%	19.9%
Other	1.9%	3.3%	4.3%	4.6%	4.2%	4.4%	5.3%	4.5%	5.4%	5.8%	4.3%

Source: Harvest Billing System 2018 and author's calculations

LOG EXPORTS

As throughout coastal BC, the log export volume from Haida Gwaii has increased markedly over the past decade

The volume and share of the timber harvest on HGMA lands that was exported climbed from 61,552 m^3 and a 9.1% share of the HGMA lands harvest in 2010 to 267,873 m^3 and a

41.5% share in 2017. Lower value whitewood species accounted for the vast majority of coastal BC export logs because the Government of BC limits the award of export permits for cedar logs to ceremonial or religious uses (incorporation into construction of a religious temple for example). No red or yellow cedar logs harvested on HGMA lands over the 2010-2017 period were given a Government of BC export permit; the HGMA lands harvest that was exported was comprised of whitewood logs.

From the supply side, the main factor influencing Haida Gwaii log exports has been the BC Government order-in-council (OIC) that effectively allows for exporting of Haida Gwaii whitewood logs harvested on BC public lands and BC private lands in any current year equivalent to 35% of the prior year's total harvest volume (excluding waste volumes) from these BC lands. This OIC came into force in 2010 and is part of the longstanding log export regulation systems at the federal and BC government levels.

Another supply side factor was the sale of the private lands portion of TFL 39 Block 6, approximately 10,000 ha, in 2004 by WFP to BC Investment Management Corporation.

FORESTRY RESIDUES

To date, commercially viable market opportunities for Haida Gwaii logging and wood processing residues have proven to be limited but residue utilization initiatives for Haida Gwaii are in the planning stages

Avoidable logging wastes associated with HGMA harvests accounted for about 960,000 m^3 of fibre over the 2008-2017 decade, an annual average of about 96,000 m^3 and 13% of the Haida Gwaii TSA and TFL harvests (HBS 2018 and author's calculations).[10] The Haida Gwaii level of residues is less than the 19% level of avoidable wastes for the overall coastal BC region. Several small Haida Gwaii forestry enterprises have salvage harvest agreements with major tenure holders and/or access small scale salvage licences (for example: Tree Surgeon, Watchman, North Pacific Timber, Maximum Cedar, Against the Grain and Silva).

Plenty of local interest and determination has been shown in recent years to improve Haida Gwaii forestry residues utilization and new efforts have been discussed and a few moved to the planning level.

- A 2012 renewable energy REOFI process for Haida Gwaii was terminated by BC Hydro but HaiCo subsequently submitted biomass fueled generation proposals to BC Hydro
- Taan/HaiCo has conducted business planning for a Haida Gwaii wood processing facility that would incorporate a biomass fueled cogeneration unit
- A fibre recovery tenure on Haida Gwaii was awarded but has not been utilized to date

[10] Avoidable waste volumes are counted as harvest volume against licensee AACs.

- Two small community biomass fueled energy systems on Haida Gwaii currently use externally sourced wood pellets
- A wood fibre briquette making plant at Masset was opened in 2015 but shuttered soon thereafter
- Directing hemlock from Haida Gwaii to southwest BC pulp mills presents cost challenges but pulp log prices are increasing due to sawmill residue constraints in the BC Interior
- Saltwater constraints are generally present for use of coastal log residues in the manufacture of pellets

FOREST SECTOR EMPLOYMENT TRENDS

Both timber harvesting and wood processing employment of Haida Gwaii residents declined since the early 2000s

Estimated Haida Gwaii timber harvesting employment, based on surveys of Haida Gwaii industry participants, shows a decline in the 2015-17 period over the 2002-04 period due to a lower average harvest, greater log export volume and higher logging productivity in the more recent period. Haida Gwaii residents had a higher share of Haida Gwaii direct harvesting employment however in the more recent 2015-17 period, an estimated 81% vs 60% in 2002-04. Table ES-6 compares average annual Haida Gwaii harvests, harvesting employment co-efficients, and harvesting employment for these two time periods.

Table ES-6: Haida Gwaii Timber Harvesting Employment Metrics, 2015-2017 and 2002-2004

Metric	2015-2017	2002-2004
Average annual harvest (m^3)	805,854	1,037,193
Haida Gwaii employment co-efficient (PYs/'000 m^3 of harvested timber)	0.335	0.337
BC employment co-efficient (PYs/'000 m^3 of harvested timber)	0.414	0.557
Haida Gwaii employment (PYs) [11]	270	349
BC employment (PYs)	392	578

Source: survey of HGMA tenure holders, BC MFLNR 2018; Pierce and Lefebvre Consulting 2005; and author's calculations

Timber processing activity and associated employment has historically been relatively low on Haida Gwaii and dropped in recent years

The estimated total amount of Haida Gwaii timber that was processed on the islands was small (5%) in 2002-2004 by comparison to the Haida Gwaii volume processed elsewhere. In the 2015-2017 period, the portion of the Haida Gwaii harvest annually processed on the islands was yet smaller, an estimated 0.6%. The main factor in the further reduction of wood

[11] Employment is stated in person-years (PYs), which is defined as one person working the equivalent of one full year, which is defined as 180 days of work. A person working for 90 days accounts for 0.5 PYs. Full-time equivalents (FTEs) is a term that is used inter-changeably with PYs.

processing activity and associated employment on Haida Gwaii is the combination of adverse operational and financial challenges faced by Haida Gwaii Forest Products (formerly Abfam), which has a small sawmill in Port Clements. This facility was shuttered in 2017 but discussions have taken place between the owners and potential investors about renovating and re-opening this Port Clements mill.

The portion of the Haida Gwaii harvest processed in BC and controlled by Haida Gwaii focused operations did increase significantly, however, due mainly to Taan's establishment of a custom cut program, which was an addition to the well-established custom cut programs of O'Brien & Fuerst and Husby Forest Products Ltd.[12] The custom cut programs of these Haida Gwaii focused harvesting operators accounted for the majority of the Haida Gwaii logs that stayed in BC for processing (and supported associated mill employment in southwest BC).

During the 2015-2017 period, the annual average direct employment on Haida Gwaii based on harvesting and processing HGMA timber was an estimated 285 PYs, and the majority of this direct employment, 270 PYs (95%), was in harvesting activities including log transport

In terms of total employment on Haida Gwaii, which also includes an estimate of the employment supported by forestry firms purchasing goods and services and the employment supported by forest sector connected households locally buying goods and services, the average annual employment impact of the local forest sector on Haida Gwaii was an estimated 414 PYs during the 2015-2017 period.

The employment effects connected to harvesting and processing Haida Gwaii timber more than double when they are considered on a province-wide basis

During the 2015-2017 period, the estimated annual average direct employment in the province based on harvesting and processing HGMA timber was 622 PYs and the total employment effect was an estimated annual average of 1,244 PYs. Although Haida Gwaii resident workers accounted for the largest share of harvesting direct employment (81%), on islands workers held less than half of the total (harvesting and processing) direct employment (43%) because of the small amount of wood processing activity on Haida Gwaii.

HAIDA GWAII TIMBER HARVESTING OPERATING COSTS

Haida Gwaii is a high cost logging location competing in a global market

The higher Haida Gwaii harvesting and transport costs are due to the difficult terrain in certain Haida Gwaii harvesting locations, the cost of barging logs from Haida Gwaii to

[12] Custom cutting programs on coastal BC are based on market logging or log trading operations renting capacity and services at southwest BC sawmills in order to process their harvested logs (mainly cedar logs), to sell the resulting lumber products to wholesalers and retailers in Canada, the U.S. and internationally and to gain a financial return on the sale of wood products manufactured from their harvested logs. Custom cut programs are an alternative to owning and operating wood processing facilities.

Lower Mainland and Vancouver Island timber processing facilities, EBM requirements associated with on islands timber harvesting and use of the FSC certification system (by Taan).

A wide range of logging costs is evident on Haida Gwaii but harvesting of Old Growth timber versus 2nd Growth timber and their associated terrain characteristics is the main point of on islands cost differentiation in recent years and will remain so over the next couple of decades. In the researched examples, helicopter logging is the most expensive ($172/m^3), followed by cable logging of Old Growth timber ($96/m^3). Mechanized falling and yarding of 2nd Growth timber presents as the lowest cost harvesting system on Haida Gwaii ($79/m^3).[13]

[13] The shown costs are representative estimates and are not average costs based upon a survey of costs of harvesting a sample of Haida Gwaii timber stands. Cost estimates include layout/planning, road construction, felling, skidding/yarding, processing, trucking, and barging, sorting, scaling, and log storage. In general, timber harvesting costs on Haida Gwaii vary by terrain, equipment used, timber types, past development, and geographic location (which affects travel time, difficulty of access, and camp requirements).

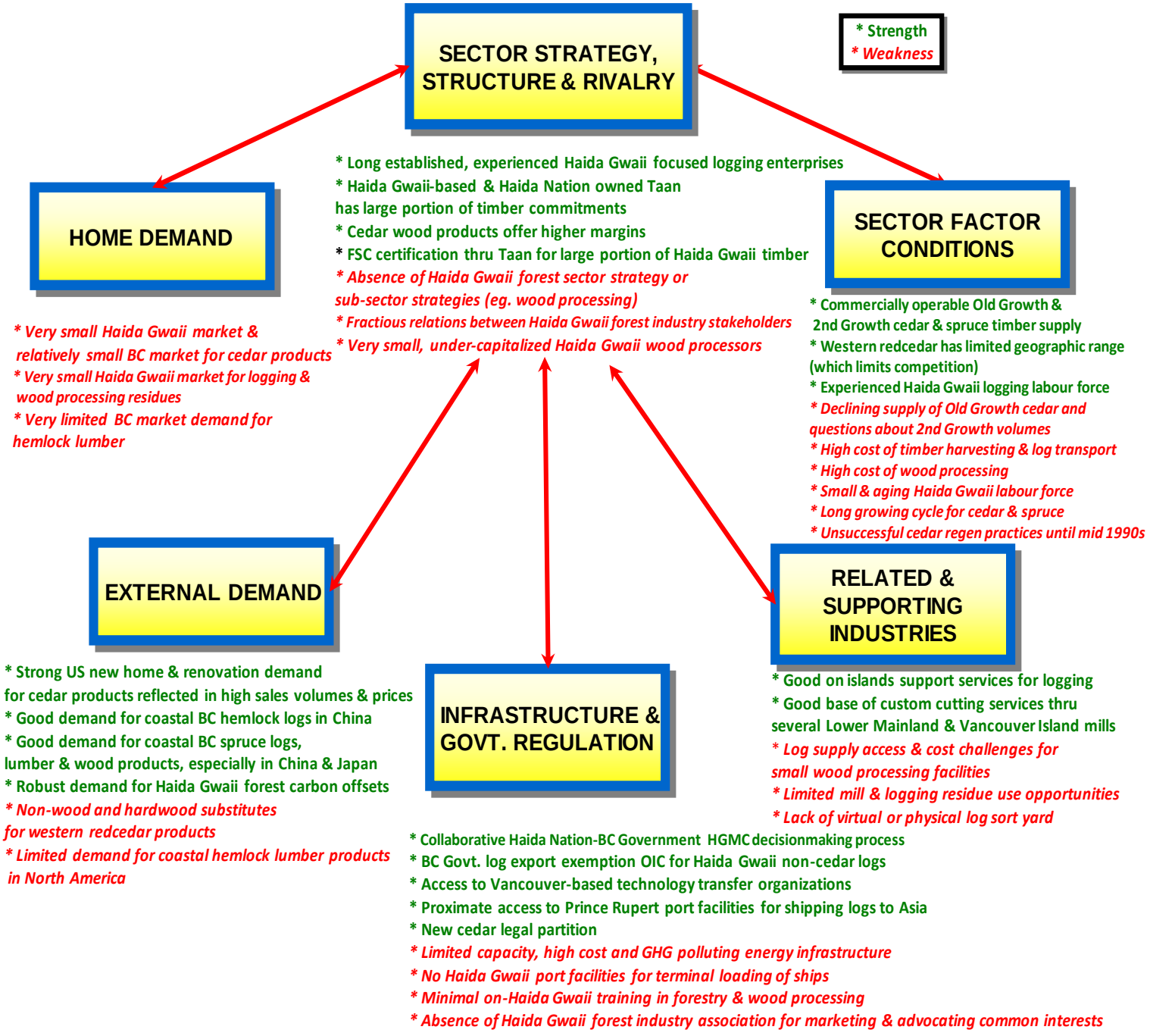
1.3 Key Issues Going Forward

The RFP for this socio-economic report included a Part II in which six questions were framed around issues that look forward at potential effects on the Haida Gwaii forest sector or potential effects of the local forest sector on Haida Gwaii communities and peoples. The six questions were as follows.

- [What is the] Role of cedar as an ongoing economic mainstay (i.e., sustainable supply of economic cedar)?
- What elements of community stability are dependent on timber supply?
- What contribution does wood provide to local versus regional/provincial markets?
- What are the variables and thresholds for second growth forests being economically viable?
- What are the barriers or enablers of fibre flow to local producers? Which barriers have the largest impact on the health of the islands economy?
- What is required (levels of harvest) to provide a security of investment for operators?

Figure ES-1 summarizes the Haida Gwaii forest sector situation analysis and sets much of the context for this review "going forward" issues.

Figure ES-1: Summary of strengths and weaknesses of Haida Gwaii Forest Sector

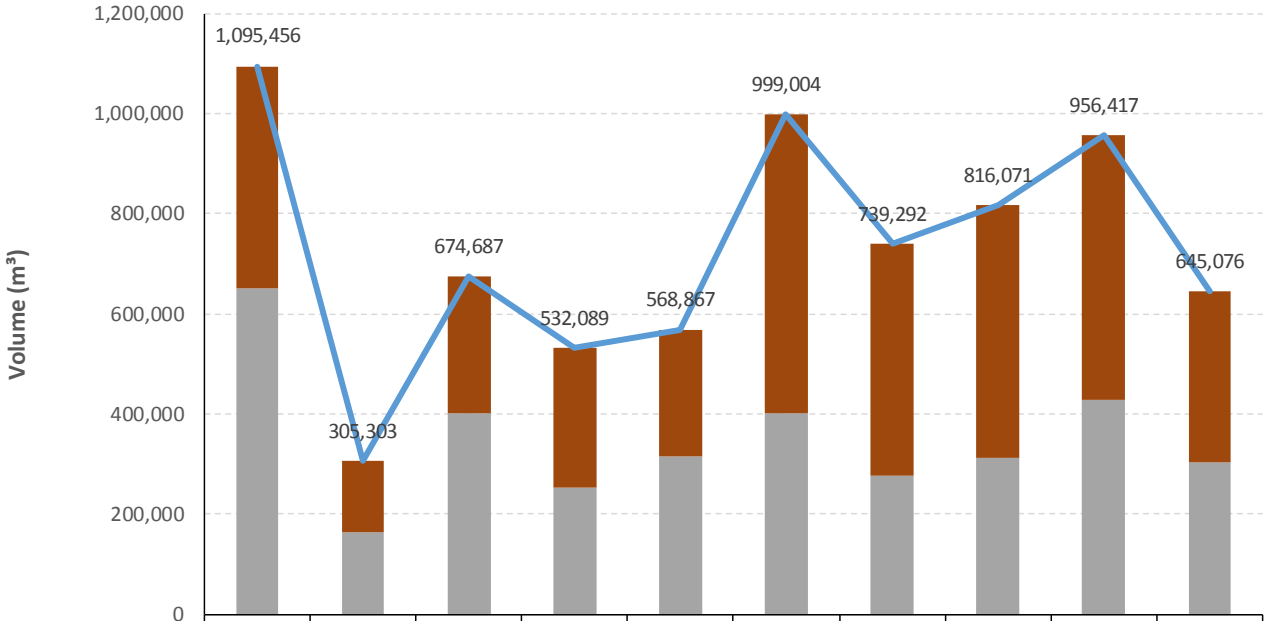


ROLE OF CEDAR

Harvesting cedar has been the "straw that stirs the drink" for the Haida Gwaii forest sector since the mid-1990s. The limited global supplies of western redcedar and yellow cedar are manufactured into specialty or niche products sought by buyers who appreciate cedar's structural, visual and durability qualities. Cedar timber's manufacture into consumer-oriented products is a key distinguishing feature from other coastal BC softwood species that are primarily used for internal (not visible) structural purposes. A question in the RFP for this socio-economic project was [What is the] role of cedar as an ongoing economic mainstay (i.e. sustainable supply of economic cedar)?

The annual average cedar harvest on HGMA lands over the 10-year 2008-2017 period was approximately 351,000 m^3, approximately 48% of the annual average total harvest. Cedar's share of the HGMA harvest ranged from approximately 38% to 60% over this decade. The annual average for the 5-year 2013-2017 period was slightly lower, about 344,000 m^3. Figure ES-4 summarizes the harvest of cedar versus the harvest of other species on Haida Gwaii over the 2008-2017 decade.

Figure ES-4: HGMA cedar harvest versus harvest of other species (m^3), 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Other Species	443,725	140,574	274,215	279,066	252,571	597,878	461,419	504,735	529,047	342,941
Cedar	651,731	164,729	400,472	253,023	316,296	401,125	277,873	311,336	427,370	302,135
Total	1,095,456	305,303	674,687	532,089	568,867	999,004	739,292	816,071	956,417	645,076

Source: Harvest Billing System 2018 and author's calculations

In a weak or limited whitewoods export log situation, cedar largely carries the commercial operability of logging in TSA 25 and TFL 60. A substantive decrease in the prices for cedar logs and/or the available supply for commercial harvesting would deeply challenge the financial viability of timber harvesting on Haida Gwaii due to the the relatively high cost of harvesting on and transport from Haida Gwaii.

The Technical Working Group for the current timber supply review has put forward an analysis base case timber supply projection that incorporates applicable forest management rules for the HGMA, including the Haida Gwaii LUOO, and a non-declining timber supply flow over a 400 year projection period. The analysis base case annual timber supply for the HGMA is 842,781 m^3 until the 10th decade whereupon the annual timber supply is projected to increase to 926,000 m^3 and remains at that level in subsequent decades.

This HGMA base case projection incorporated a declining flow timber supply projection for cedar, the target starting point of which was the maximum cedar harvest level from the previous chief forester AAC determinations. The annual timber supply volume of cedar in the base case starts (in the 1st decade) at 277,000 m^3, steeply declines to an annual volume of 122,000 m^3 by the 4th decade and then increases and stabilizes to approximately 176,000 m^3 by the 8th decade.[14]

The base case annual cedar volume projection starts slightly lower than the average annual cedar harvest (for the 2008-2017 period) of approximately 351,000 m^3 and lower than the sum of the maximum cedar harvest levels expressed by the chief forester of 360,000 m^3. Within 30 years, the base case annual cedar volume projection shows a cedar harvest level of about 147,000 m^3, which would be almost the same harvest as that experienced in only one year, 2009, in the past 10. This level would likely be in place for about 10 years, and then drop further yet.

These projections (notably the projected steep declines in cedar volumes and increasing share of hemlock in the HGMA timber supply in the next few decades) and the anticipated increase in market values per m^3 due to the shrinking supply of Old Growth Coastal BC timber indicate that policy and administrative approaches for the management of cedar timber supply over time will be an important consideration for the HGMC and the Chief Forester in HGMA related AAC determinations now and well into the future. At a high level, the current and near term timber stock and supply situation of TFL 58 provides a glimpse into the timber stock and supply situation in 30 years of the other Haida Gwaii management units. Relative to

[14] If a long run average yield (LRAY) approach was taken to projecting cedar timber supply in the HGMA base case then the cedar volume projection would be an average 146,371 m^3 (Technical Working Group 2019). (Technical Working Group 2019).

TSA 25 and TFL 60, TFL 58 currently has a lower share of cedar and a higher share of managed stands in its timber stock and supply.

COMMUNITY STABILITY AND TIMBER SUPPLY

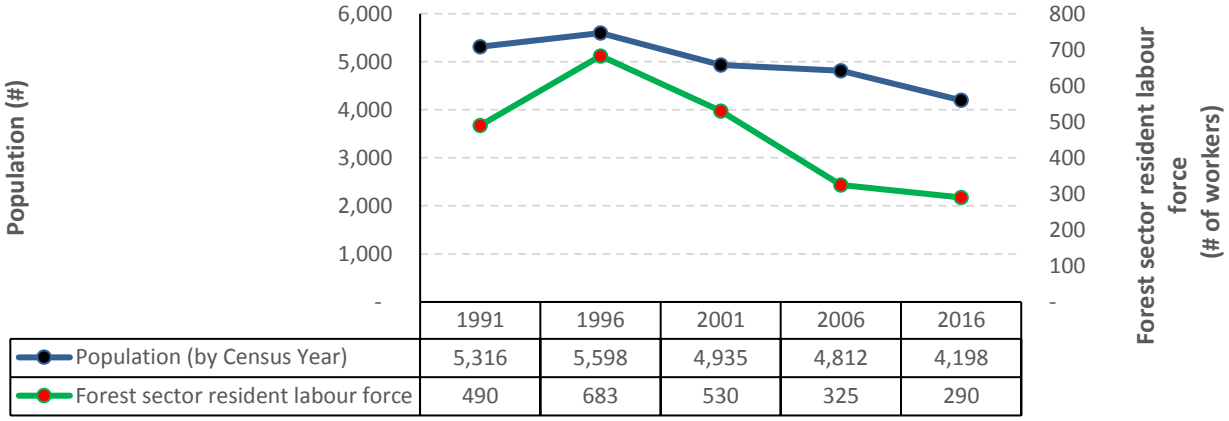
A question in the RFP for this socio-economic project was "What elements of community stability are dependent on timber supply?"

The forest sector employees residing on the islands create both a demand for public services in health, municipal infrastructure, schools and recreation but also contribute to a residential tax base and a critical mass or base of residents who can support the public services of small organized communities. These forest worker households also contribute to creating a customer and client base sufficient to support a small but reasonably broad range of retail and professional services, food and beverage businesses and even public services, such as public schools, spread across the Haida Gwaii communities.

Forest sector related employment is the main pathway through which the forest sector has direct effects on community stability on Haida Gwaii. As forest sector employment contracts some affected individuals and families permanently leave Haida Gwaii to seek or accept new employment resulting in local population decline and shrinkage in the residential tax base and fewer residents to support on islands community activities and to patronize local retailers and public services, such as schools.

Figure ES-5 shows the direct correlation between Haida Gwaii's population levels and the number of local workers employed in the Haida Gwaii forest sector. Both Haida Gwaii's population and the Haida Gwaii forest sector have declined for the shown years since 1996. The decrease in population has not been as sharp in percentage terms as for the forest sector labour force because a portion of the terminated forest sector workers either retire or switch to work in another sector on Haida Gwaii rather than move elsewhere.

Figure ES-5: Trend Comparison of Haida Population and Forest Sector Resident Labour Force by Census Year



	1991	1996	2001	2006	2016
Population (by Census Year)	5,316	5,598	4,935	4,812	4,198
Forest sector resident labour force	490	683	530	325	290

Source: Census of Canada

CONTRIBUTIONS OF HAIDA GWAII WOOD TO HAIDA GWAII, BC AND INTERNATIONAL MARKETS

From a wood products market perspective, the Haida Gwaii situation is consistent and in accord, in a broad sense, with other areas of BC in that the vast majority of Haida Gwaii timber fibre is ultimately sold into international markets. The local Haida Gwaii demand for wood products, especially cedar products, is vibrant in that wood is the focus of local structural and exterior building materials, but the local marketplace is nevertheless very small. In the case of Haida Gwaii, the vast majority of its timber is sold either as cedar lumber products into the US or as whitewood logs into China and a few other Asian countries.

A question in the RFP for this socio-economic project was "What contribution does wood provide to local versus regional/provincial markets?"

A distinct characteristic of the Haida Gwaii situation is that very little Haida Gwaii timber is milled on Haida Gwaii into wood products but a large portion of the processing of Haida Gwaii timber is controlled by Haida Gwaii focused enterprises. Both Husby and O'Brien & Fuerst have long had established custom cutting programs whereby they have maintained control of the processing and marketing of their Haida Gwaii timber through rental of capacity at Lower Mainland mills and log trades. Taan, which now controls the largest share of the HGMA AACs (approximately 50%), has created a custom cutting program using Lower Mainland sawmills over the past few years. The volume and share of the Haida Gwaii timber harvest that is directed through the custom cut programs of Husby, O'Brien & Fuerst and Taan varies on a year to year basis due to several supply and demand factors, including

the proportion of cedar in the total harvest, but in broad terms, the HGMA lands harvest share processed in Lower Mainland mills through the custom cut programs of these three enterprises amounts to about 40% in the past few years.

From the supply side, the main factor influencing Haida Gwaii log exports has been the 2010 BC Government order-in-council (OIC) that effectively allows for exporting of Haida Gwaii whitewood logs harvested on BC Crown lands and BC private lands in any current year equivalent to 35% of the prior year's total harvest volume (excluding waste volumes) from these BC lands.

Since the 2010 introduction of the Haida Gwaii exemption order, whitewood log exports from Haida Gwaii to Asian destinations have greatly increased, driven by the considerable gap in whitewood log prices between offshore and Coastal BC markets, and here the Haida Gwaii logs are processed into, mainly, structural lumber products. All current parties holding major Haida Gwaii tenures are whitewood log exporters. In January 2019, the BC Government extended the Haida Gwaii log export OIC but only until July 31, 2019 and communicated that a plan or strategy to address BC log export policy and TSL bidding is forthcoming. An elimination of this Haida Gwaii OIC would not change log demand conditions in Chinese, South Korean and Japanese markets but would negatively alter the commercial viability of harvesting stands on Haida Gwaii with low cedar and/or spruce components. The matter of log exports and Coastal BC log processing is exceedingly complex and its dimensions and characteristics vary along the BC Coast. Definitive conclusions aren't yet possible about potential effects to the Haida Gwaii forest sector since the contents of the BC Government's log export policy changes are not known at this juncture but the Haida Gwaii case should be looked upon as highly sensitive to alterations in the current OIC given the relatively high cost structure of harvesting and transport of Haida Gwaii timber.

SECOND GROWTH FORESTS ECONOMIC VIABILITY

Second Growth timber on Haida Gwaii presents different challenges for the local forest sector on both cost and revenue sides of the financial ledger. A question in the RFP for the socio-economic project focused on Second Growth forests, "What are the variables and thresholds for second growth forests being economically viable?"

Considerable experience has already developed on Haida Gwaii with both harvesting and marketing Second Growth forests. Within an overall coastal BC context, the BC Government and forest industry organizations, such as FPInnovations, have led research and policy-making on challenges, opportunities and strategies to understand and address the shift from harvesting and processing Old Growth timber to Second Growth timber throughout the BC Coast.[15]

[15] The "BC Coastal Forest Sector Hem-Fir Initiative" is possibly the most well-known effort, see http://www.bccoastalinitiative.ca/index.html. This program included a "Coastal Cedar Focus".

On the cost side, in general, harvesting Second Growth stands presents cost advantages. Based on Haida Gwaii examples, the harvest and transport cost for a Second Growth focused logging system is estimated as approximately $\$79/m^3$, which is about 80% of the estimated $\$96/m^3$ cost for an Old Growth focused harvesting system. Specific stands will vary in their costs based on stand volume, terrain, location proximity to a forest road, etc. but this comparison conveys the relative cost advantage presented by harvesting Haida Gwaii Second Growth stands.

The lower per m^3 harvesting cost would largely be captured at the expense of employment as more mechanized harvesting and less road and bridge development would reduce labour requirements. A transition to more mechanized harvesting also reinforces a movement towards larger development volumes to spread out the new overhead capital costs.

On the other side of the ledger, Second Growth cedar logs capture a lower price in the Vancouver Log Market than Old Growth cedar logs. Using 2015-2017 average log prices for comparison purposes, Second Growth logs captured a price in the Vancouver Log Market that was about 82% of the recent average prices for Old Growth cedar logs.

We focus here on log costs and prices but milling cost, lumber recovery rates and wood products (including types that can be manufactured, product quality and wholesale and retail price) vary by use of Second Growth and Old Growth logs as the fibre input. A thorough understanding of many of these Second Growth cedar lumber product issues is an important matter needing additional research and development. FP Innovations undertook a couple of short research exercises on a few Second Growth cedar lumber product issues and the researchers concluded that additional research is needed, "A comprehensive research task force approach is recommended to provide definitive answers to questions and contradictions obscuring a clear understanding of the properties and potential of second-growth redcedar. The task force should be similar to those undertaken on the coast for Douglas-fir and western hemlock." (Middelton and Munro 2013).

TIMBER FLOW TO LOCAL PRODUCERS

A longstanding concern on Haida Gwaii, but also a general concern in several other areas of the province, has been the challenges that small- and medium-sized mills face in acquiring timber to process into wood products. For example, a Canadian Forest Service study issued in 2000 observed that "The key hurdle identified by local QCI manufacturers is a lack of consistent fibre supply. This is the message repeated in virtually all of the reports done on the QCI forest sector. Local processors contend that if wood supply problems could be resolved, they could cope with other challenges…" (Wilson and Stennes 2000). Fibre supply access challenges for micro and small mills are still very much a top of mind issue based on the interviews with small scale Haida Gwaii forestry enterprises undertaken for this project. A question that was raised in the RFP for this socio-economic study was as follows, "What are

the barriers or enablers of fibre flow to local producers? Which barriers have the largest impact on the health of the islands economy?"

The barriers of fibre flow to local wood processors that were identified in the interviews conducted for this socio-economic project were the following.

- Market-based log pricing asked by licensees.
- Payment conditions for acquiring logs from licensees.
- Absence of secure, long-term fibre access arrangements for small scale processors.
- Lack of BCTS Category 2 program auctions on Haida Gwaii for local enterprises with micro- or small-scale wood processing operations.
- Financial challenges of Haida Gwaii small scale wood processors to successfully compete in BCTS TSL and Category 2 program auctions.
- No Haida Gwaii log sort operation to direct fibre to local processors along the lines of the monumental cedar log sort operated by the Ministry.
- No organized notification of available fibre via a website or other means.

The matter of access and cost of fibre for Haida Gwaii wood processors was also raised in the 2015 [Haida Gwaii] Forestry Strategy Forum and its background discussion paper, which also pointed out a few other matters that also have substantial effects for the competitiveness of small scale wood processing on Haida Gwaii, "The lack of a stable, vibrant manufacturing sector is usually attributed to the lack of long-term availability of a supply of high quality logs, the inability to secure capital and lines of credit, the small local market, the lack of a stable trained work force, energy and waste issues, and the lack of information about, and access to, off-island markets." (Moore Resource Management 2015a).

At a minimum, the log availability issue could be quickly addressed in part by using current (and fairly modest) website capabilities to set up a "virtual log sort yard" for Haida Gwaii. On a longer term basis, consideration ought to be given to developing a Haida Gwaii strategy focused on log supply to local micro mills and small wood processors.

TIMBER HARVEST NEEDS FOR FINANCIAL SUSTAINABILITY

A question was posed in this project's RFP about the level of annual average timber harvest in relation to investment security, "What are required (levels of harvest) to provide a security of investment for [harvest] operators?". This question is often discussed throughout the BC forest industry because of the substantial capital and workforce investments that are required to sustain operations over a time period in which investments can be recouped along with a suitable profit in line with the financial risk assumed by the enterprises.

In terms of the level of annual harvest that would be desirable to financially sustain a market logging enterprise on Haida Gwaii, the responses from Haida Gwaii forest sector participants

who were interviewed varied between an annual average of 75,000 m^3 and 100,000 m^3. Location of harvesting, specifically terrain conditions, and stand species and age composition, would be important influencers on the amount of desirable operable volume in the Haida Gwaii context but this 75-100,000 m^3 range is a good basis for consideration of the average annual volume that's needed to sustain a viable market logging enterprise over the long term.