Queen Charlotte Timber Supply Area
Socio-Economic Analysis

December 1994

Economics and Trade Branch
British Columbia Ministry of Forests

QUEEN CHARLOTTE TIMBER SUPPLY AREA SOCIO-ECONOMIC ANALYSIS

Prepared by
Mike Mullins
and
Sinclair Tedder

Economics and Trade Branch
British Columbia Ministry of Forests
November, 1994

EXECUTIVE SUMMARY

- The purpose of this report is to (a) describe the economy, physical environment and land use issues within the Queen Charlotte Islands[1] (QCI), and (b) assess the socio-economic and environmental implications of changing the current Timber Supply Area timber harvest level. It forms one of four reports being prepared for the Queen Charlotte Timber Supply Area as part of the Ministry of Forests' province-wide timber supply review.

- The effects of changing timber harvest levels fall into five categories. Two involve quantitative estimates (employment/employment income, and government revenues), while the other three are qualitative discussions (community, First Nations, and environment).

- Readers are asked to note the following points:

1. Three timber harvest forecasts were chosen to present a range of possible economic, social and environmental effects. These harvest forecasts are for discussion purposes only and do not suggest a preferred Allowable Annual Cut (AAC) level, nor will they be the only options considered in the AAC determination.

2. With respect to the economic impacts (employment and government revenues), readers should be aware of two assumptions:

(a) Impacts are presented as if they would occur concurrently with a change in the harvest level - the analysis does not reflect time lags between harvest reductions and employment losses.
(b) The projection of future economic activity is based on current conditions. The probability that these conditions will hold in the medium to long-term is low. For example, future changes in technology, productivity and markets could alter current employment/harvest coefficients.

3. The study assumes that the current timber harvesting land base and forest management practices would not change in future. The study does not consider the implications of comprehensive land claims negotiations, land use planning processes (i.e., Land and Resource Management Plans, Protected Areas Strategy, and Local Resource Use Plans), or the implementation of new guidelines (B.C. Forest Practices Code) to protect biodiversity and riparian areas.

[1]The Islands are also known as Haida Gwaii to the Haida people. Where appropriate, Haida Gwaii will be used to describe the Islands.

Profile of Queen Charlotte Islands / Haida Gwaii TSA

- The Queen Charlotte Timber Supply Area (TSA) is found on the Queen Charlotte Islands, which are located off the mid-west coast of British Columbia. The TSA is one of eight in the Vancouver Forest Region. It encompasses 464 827 hectares, but comprises only 46 percent of the Islands' total land base (see Figure 2.1)

Environmental Setting

Ecosystems

- The Islands are divided almost equally among three ecosections: Queen Charlotte Lowlands, Skidegate Plateau, and Windward Queen Charlotte Mountains.
- The TSA is located primarily on Graham Island within the Lowlands and Windward Mountains ecosections, with a small portion on the north-west side of Moresby Island.
- The Coastal Western Hemlock biogeoclimatic zone occupies the majority of all three ecosections.

Land Base

- As of 1993, the Islands' land base (approximately 1.0 million hectares) was allocated 46 percent to the TSA, 32 percent to Tree Farm Licences, and 22 percent to parks and ecological reserves.

Issues and Concerns

- Maintenance of biodiversity outside of protected areas. Current forest management practices tend to eliminate or reduce the duration of early and late forest stages, possibly eliminating ecological processes, and species that are dependent upon them.

Communities and Economic Activities

Population

- The QCI is sparsely populated with a density of less than one person per square kilometre.
- In 1991, the population of the QCI was 5 316. The population of the Islands in 1971 was 4 371. Between 1971 and 1981 the population grew 29 percent to 5 626, largely as a result of the opening of a Canadian Forces Station at Masset in the mid-1970s. Since 1981, the population has decreased by almost 6 percent. The majority of this decrease has occurred within the forestry dependent communities on Moresby Island, such as Sewell Inlet, and was a result of several factors including reductions to the timber harvesting land base as a result of the establishment of the Gwaii Haanas National Park Reserve (1988), and technological change in timber harvesting.

Economy

- The region's economy relies on forestry, government services, and to a lesser extent, fishing. Logging, timber processing, and forestry related construction and transportation activities (TFLs and the TSA), account for approximately thirty percent of the Islands' employment base.

Communities

- Graham Island has three principle areas of settlement: Masset/Old Masset, Port Clements/Tlell and Queen Charlotte City/Skidegate. Moresby Island has one main settlement area, Sandspit. As of 1991, these areas accounted for 40, 15, 29 and 14 percent of the Islands' total population, respectively.
- Forestry is the major employer in Port Clements/Tlell and Sandspit. The economy of Masset/Old Masset is dependent on the government sector, in particular the Canadian Forces Station. Queen Charlotte City/Skidegate has the most diversified local economy on the Islands with government, forestry, fishing, and tourism.

Issues and Concerns

- By 1997, downsizing at Canadian Forces Station Masset may eliminate between 80 and 85 percent of its current staffing levels. The Station currently contributes upwards of 50 percent of the community's income base, and provides grants in lieu of taxes that account for close to 50 percent of Masset Village's revenues.
- Approximately 60 000 cubic metres were processed annually by two local mills under Temporary Opportunity Wood Licences, which expired in June, 1994. This amounts to approximately 12 percent of the TSA's annual harvest. In the context of the Islands' total annual harvest (TFLs and TSA), the amount of timber processed locally is less than 3 percent. Community representatives believe that local employment and community stability can best be maintained and enhanced through increased timber processing on the Islands.

Haida Nation

Overview

- The two Haida communities on Haida Gwaii are Old Masset Village and Skidegate. Haida villages are also located in southwest Alaska, and populations are found in urban settings in Canada and the United States. As of 1991, the combined population of Old Masset Village and Skidegate was 1 100, representing 21 percent of the Islands' total population.

Overview

- The Islands' forests have always been important to the Haida. Recent studies have documented traditional Haida forestry activities throughout Haida Gwaii.
- Today, forestry activity employs, on a seasonal basis, between 15 to 20 percent of the Haida labour force living on the Islands. The Haida regard forestry (logging, silviculture, and processing activities) as being essential to their future.

Issues and Concerns

- The Haida claim the entire Haida Gwaii land base as their traditional territory. In 1993, they submitted a letter of intent to enter into comprehensive land claim negotiations with the governments of British Columbia and Canada.
- The Council of the Haida Nation (CHN) identified four broad concerns with respect to forestry: (1) logging practices, (2) the rate of harvest, (3) off-Islands control over the forestry sector, and (4) the amount of area left in a natural condition.
- In 1993, the CHN requested a moratorium on forestry development activities within 14 areas on Haida Gwaii (see Figure 2.7) until treaty negotiations are concluded. The two areas affecting the TSA are Duu Guusd on Graham Island and Kootenay Inlet on Moresby Island.

Queen Charlotte TSA Forestry Operations

Timber Harvesting Land Base

- Under current management practices, approximately 64 000 hectares (14%) of the TSA land base is available for long-term timber supply

Allowable Annual Cut

- The current AAC is 514 335 cubic metres, and is apportioned between Forest Licences (70 percent), the Small Business Forest Enterprise Program (16 percent), Temporary Opportunity Wood Licences (12 percent) and Woodlot Licences (2 percent).

Forestry Operations

- At the TSA level, the current AAC supports 149 person years[2] (PYs) of direct harvest dependent[3] employment, and $4.3 million of associated employment income (after-tax). This in turn generates a further 72 PYs of indirect and induced[4] employment and close to $1.6 million in related employment incomes. Total direct, indirect

[2]A person year is a measure of one year of full-time employment.

[3] Harvest dependent activity includes harvesting, processing, and basic silviculture, and is assumed to change concurrently and in the same direction as changes in the harvest.

[4]Indirect impacts are the result of direct businesses purchasing goods and services, while induced impacts are the result of direct employees spending their incomes.

and induced direct harvest dependent employment and employment income is 221 PYs, and $5.9 million, respectively.

A further 29 harvest related[5] PYs and $0.67 million in employment income are also associated with the TSA and accrue to local residents.

- At the provincial level, the current TSA harvest supports 669 PYs of direct harvest dependent employment, and $20.5 million of associated after-tax employment income. Total direct, indirect and induced employment and employment income is 1 672 PYs and $40.2 million, respectively.
  Harvest related direct, indirect and induced employment and employment income adds 65 PYs and $1.4 million to these totals.
- Forestry operations associated with the current harvest level generate approximately $27.1 million in government revenues - $16.8 million in provincial revenues, and $10.3 million in federal revenues.
- Approximately 12 percent (60 000 cubic metres) of the annual timber harvested from the TSA is exported from British Columbia under a north coast market logger Order in Council (OIC). The volumes of timber approved under this type of application have been decreasing in recent years, and will likely continue to decline.
- The predominant merchantable species include western hemlock, western red cedar and Sitka spruce.

Timber Harvest Forecasts

Long-term Harvest Level

- The timber supply analysis estimates the long-term harvest level (LTHL) to be 248 000 cubic metres, which represents a 52 percent reduction from the current AAC. All three harvest forecasts achieve the LTHL in Decade 18. See Figure ES.1.

Base Harvest Forecast

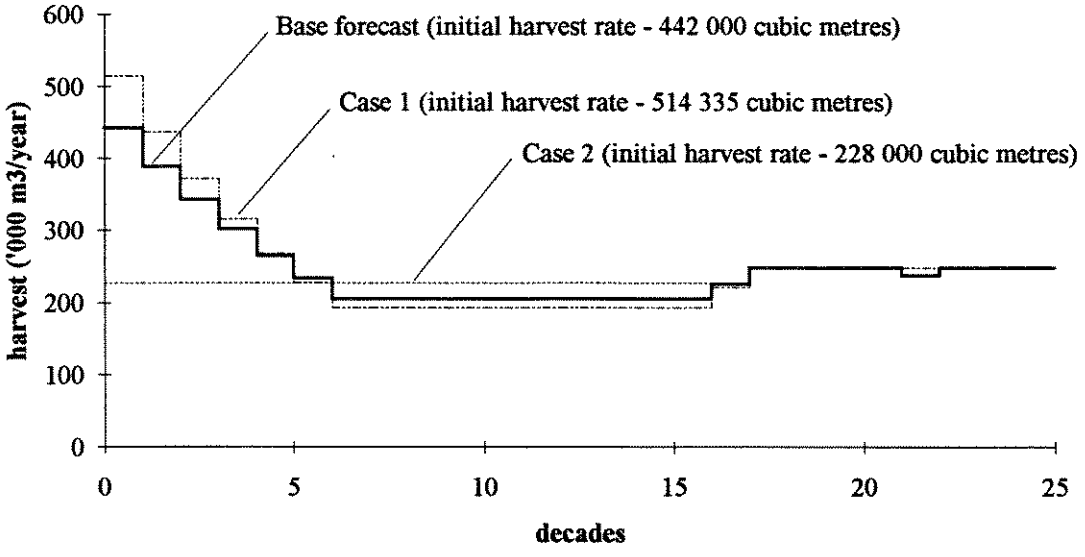
- This forecast immediately lowers the current AAC by 14 percent to 442 000 cubic metres. This would be followed by a further 12 percent reduction per decade for six decades to about 205 000 cubic metres per year, a level 17 percent below the LTHL. This drop below the LTHL lasts for ten decades and would be necessary to avoid more severe timber supply shortfalls. By Decade 18, the harvest rate would increase to the LTHL

[5] Harvest related activity includes the Forest Service and incremental silviculture, and is not tightly correlated with the harvest level, thus is assumed to remain constant.

Alternative Initial Harvest Forecasts

- The Case 1 timber harvest forecast would maintain the current AAC for the first decade. To avoid a future timber supply shortfall, beginning in Decade 2, the harvest would have to decline by 15 percent per decade (versus 12 percent in the base harvest forecast) in Decades 2 through 6. Between Decades 7 to 16 the harvest would settle at 194 000 cubic metres, before beginning its rise to the LTHL.
- The Case 2 timber harvest forecast would achieve a constant (or non-declining) supply of timber over the forecast period by implementing an immediate 58 percent reduction from the current harvest level to 228 000 cubic metres. The harvest then rises gradually between Decades 16 and 18 to the LTHL.

Figure ES.1
Queen Charlotte TSA Harvest Forecasts



Implications of Timber Harvest Forecasts

Economic Impacts

Base Harvest Forecast

- A summary of TSA and provincial forestry related employment, employment income, and government revenue associated with the base harvest forecast is provided in Table ES.1.

Table ES.1
Queen Charlotte TSA
Employment, Employment Income and Government Revenues for Selected Decades Under the Base Harvest Forecast

	Current		Short Term Decade 1		Short Term Decade 2		Medium Term Decade 7		Long Term Decade 18	
Harvest Level (000s m^3)	**514**		**442**		**389**		**205**		**248**	
• % of the Current Level			86%		76%		40%		48%	
	PYs	Income ($ millions)	PYs	Income ($ millions)	PYs	Income ($ millions)	PYs	Income ($ millions)	PYs	Income ($ millions)
TSA Employment & Income										
Direct Harvest Dependent	149	$4.3	128	$3.7	113	$3.2	59	$1.7	72	$2.1
Indirect (indirect & induced)	72	$1.6	62	$1.3	54	$1.2	29	$0.6	35	$0.7
Total Harvest Dependent [1]	221	$5.9	190	$5.0	167	$4.4	88	$2.3	107	$2.8
• *Cummulative Difference*			*-31*	*-$0.83*	*-54*	*-$1.43*	*-133*	*-$3.6*	*-114*	*-$3.1*
Prov'l Employment & Income										
Direct Harvest Dependent	669	$20.5	575	$17.6	506	$15.5	267	$8.2	323	$9.9
Indirect (indirect & induced)	1 004	$19.7	863	$16.9	759	$14.9	401	$7.9	484	$9.5
Total Harvest Dependent [1]	1 672	$40.2	1 438	$34.5	1 265	$30.4	668	$16.1	807	$19.4
• *Cummulative Difference*			*-234*	*-$5.7*	*-407*	*-$9.8*	*-1 004*	*-$24.1*	*-865*	*-$20.8*
Government Revenues										
Provincial		$16.8		$14.3		$12.6		$6.6		$8.1
Federal		$10.3		$8.9		$7.8		$4.2		$5.0
Total Government Revenues		$27.1		$23.2		$20.4		$10.8		$13.1
• *Cummulative Difference*				*-$3.9*		*-$6.7*		*-$16.3*		*-$14.0*

1 Harvest dependent employment includes harvesting, processing and basic silviculture activities, but excludes Forest Service and incremental silviculture employment.

Alternative Initial Harvest Forecasts

- Case 1 has no immediate impact on current levels of employment, employment income, or government revenue. Reductions would begin in
decade 2, and by Decade 6 would exceed those realised under the base harvest forecast.
- Under Case 2, the immediate decline in the harvest would cause direct provincial employment and income to lower to 296 PYs and $9.1 million respectively - a loss of 373 PYs and $11.4 million, and 279 PYs and $9.1 million below the base harvest forecast's Decade 1 levels. Total provincial forestry income and employment under Case 2 would be 932 PYs and $22.2 million below the current level, and 741 PYs and $18.1 million below the base harvest forecast. Provincial and federal government revenues would be similarly reduced under Case 2 - $15.0 million lower than the current level, and $11.2 million lower than the base forecast in Decade 1.

Impacts on Other Economic Sectors

- Tourism is currently a minor economic activity on the Islands and is geared to existing parks, or areas within the TFLs (e.g. Yakoun River). The TSA timber harvesting land base constitutes only 6 percent of the total QCI land area. For these reasons, tourism impacts are assumed to be minor under any of the harvest forecasts.

Social and Environmental Implications

Community

- In the first decade, PY reductions under the base harvest forecast equate to approximately 2 percent of the Islands' current total employment base. If the Islands' two mills close, the number of job losses would double. Under Case 2, the number of job losses would increase significantly, amounting to approximately 7 percent of the Islands' current total employment base.
- TSA forestry related job losses, combined with job losses resulting from Canadian Forces Station downsizing would place pressure on the Islands' existing social services infrastructure. At present, the Islands ability to respond to mental health problems is limited, as are the opportunities for skills upgrading and retraining.
- Resources and opportunities which may assist Islands communities to cope with job losses include the Forest Renewal Plan, Gwaii Trust (Islands planning society), the potential for forestry-related value-added cottage industries, and the South Moresby Forest Replacement Account.

Haida Nation

- The CHN advocates for an immediate 50 percent reduction to the Islands' total AAC (TSA and TFL). The base harvest forecast reduces the TSA harvest level by 60 percent, but over a 60 year period. Of the three forecasts examined, the Case 2 harvest forecast, which immediately reduces the harvest level by 58 percent, best meets CHN's interests.
- Within the TSA, the Haida are primarily involved in silviculture activities. The Forest Renewal Plan may help mitigate harvest reduction pressures on these activities.
- Duu Guusd and the Tlell River watershed comprise close to 40 percent of the gross operable mature timber within the TSA. CHN requests for a timber harvesting moratorium in these areas poses a serious challenge for the Forest Service. Removal of this area from the timber harvesting land base would make it difficult to meet AAC targets, as well as adhere to existing forest management guidelines. The CHN has stated that a decision by the Forest Service to allow timber harvesting to proceed within these areas would have serious implications vis-a-vis Haida and British Columbia relations.

Environment

- Each of the timber harvesting forecasts would provide some degree of environmental improvement over the continuation of harvesting operations at the current AAC level. However, all forecasts are based on the same assumptions with respect to environmental considerations in the TSA - they differ only in the timing of the harvest reductions.
- Harvesting of mature forest stands would occur most rapidly under the Case 1 and base harvest forecasts. The age class distribution of the forest would narrow and populations of species that depend on mature forest may decline, while those dependent on a wide range of habitat types and/or immature forest may increase in numbers.
- The lower initial harvest rate under case 2 would allow greater flexibility in future land use planning and would assist the Forest Service in addressing the CHN's moratorium request for Duu Guusd and the Tlell River watershed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

1.1 Background

The British Columbia Forest Service is conducting a provincial timber supply review to assist the Chief Forester in setting allowable annual cut (AAC) levels. The review examines the amount of timber available for harvesting in timber supply areas (TSAs) if current management practices continue. Four documents are being prepared for each of the province's 36 TSAs. Two technical documents, a Timber Supply Analysis and a Socio-Economic Assessment, provide information on timber supply, and the social, environmental, and economic implications of changing timber harvest levels. A Discussion Paper summarises the technical information and provides a focus for public discussion of issues surrounding timber harvest levels. A fourth report describes the rationale behind the Chief Forester's AAC decision.

This report, the *Queen Charlotte TSA Socio-Economic Analysis*, describes the economy, physical environment, and land use issues within the Queen Charlotte Islands, and the socio-economic and environmental implications of changing the current Queen Charlotte TSA timber harvest level. For simplicity, we refer to the region, known variously as the "Queen Charlotte Islands" or "Haida Gwaii", as the QCI, or Islands throughout this report. Where appropriate, the Islands will be referred to as Haida Gwaii. The focus of the study is the AAC of the Queen Charlotte TSA (presently 514 335 cubic metres), which represents only a portion of the total timber harvesting conducted on the Islands (total estimated annual harvest rate of 2.1 million cubic metres per year). The remaining 1.6 million cubic metres per year are harvested from three Tree Farm Licences located on the Islands.

1.2 Approach

The *Queen Charlotte TSA Timber Supply Analysis* report was released in June, 1994. This report focuses on the base timber harvesting forecast[1] developed by the Timber Supply Analysis. Other harvesting forecasts are also examined, but discussion about their social, economic and environmental implications is limited to the short-term. This report, therefore, demonstrates a range of implications associated with different harvest levels. Note that the timber harvesting forecasts discussed in this study are not meant to suggest a preferred AAC level, nor will they be the only options considered in the final AAC determination.

---

[1] A timber harvesting forecast represents the flow of potential timber harvests over time. It measures the maximum timber supply that can be realised, over time, for a specified land base and set of management assumptions. It is a result of forest planning models and is affected by the size and productivity of the land base, the current growing stock, and management objectives, constraints and assumptions. The base timber harvest forecast represents the flow of potential timber harvests that best meets the following criteria: (a) begins as close to the current AAC as possible, and (b) declines/increases to the long-term harvest level at a gradual rate of change.

The report follows a multiple accounts approach, which focuses on a range of values derived from the forest ecosystem, and recognises the need to consider a variety of factors when examining options for forest land management. The objective of multiple accounts analysis is to present the implications of alternatives in terms of these factors.

The report organises the effects of changing timber harvest levels into five categories, two of which are quantitative in nature (economic), while the other three are qualitative discussions (social and environmental).

Economic Impacts

1	*Employment and Income*	• identifies direct and indirect/induced effects on TSA and provincial employment and employment income over the short, and long-term.
2	*Government Revenues*	• identifies impacts on government revenues derived from the timber resource.

Social and Environmental Implications

3	*Community*	• discusses possible effects on local residents/families who lose their jobs, and pressures they may place on existing social services infrastructure; • discusses local community adaptive capacity, and opportunities for mitigation.
4	*First Nations*	• discusses possible effects on local aboriginal communities, and identifies potential areas of conflict with aboriginal cultural values and political aspirations.
5	*Environment*	• discusses possible effects on forest ecosystems.

Another objective of the report is to provide an overview of the entire Islands - to describe the environmental and socio-economic setting, and highlight some of the environmental, community and Haida concerns and issues with respect to current forest management practices. A Land and Resource Management Plan (LRMP) process is scheduled to commence within the next few years. This process will examine land use alternatives and resource management practices for the entire Islands. The socio-economic report can serve as a useful starting point for this LRMP process, including providing a methodological and empirical reference for future socio-economic analysis.

Information presented in this report was collected over a two month period and involved discussions with a broad cross-section of individuals and organisations (see Appendix 2

for a list of contacts), and included a review of a wide range of published and unpublished data sources (see Appendix 3 for a list of references).

1.3 Report Structure

The report is organised into six Chapters. Chapter two describes the environment, communities, and economy of the QCI. In chapter three, the report narrows its focus to the forestry sector and the Queen Charlotte TSA. It reviews the timber harvesting land base and the guidelines that direct forest management, identifies the level of employment associated with the current AAC level, and describes the timber harvesting forecasts against which the current situation is compared. Chapters four, five, six, and seven examine the economic, social, and environmental implications of the timber harvesting forecasts. Chapter eight presents a summary and conclusion. Appendices include a glossary, list of contacts, references, and a discussion of impact assessment methodology.

PROFILE OF THE QUEEN CHARLOTTE ISLANDS

2.1 Introduction

The Queen Charlotte Islands (known as Haida Gwaii by the Haida people) is an archipelago of 150 Pacific Ocean islands located along the mid-west coast of British Columbia (see Figure 2.1). The Islands form a triangular shape approximately 250 kilometres long and 80 kilometres wide and comprises a total land area of just over one million hectares. The archipelago is separated from the mainland of British Columbia and the southern United States border of Alaska by two main bodies of water - Hecate strait to the east, which stretches between 80 and 110 kilometres towards the British Columbia coast, and Dixon entrance to the north, which stretches approximately 60 kilometres towards Alaska.

The focus of this study is the Queen Charlotte Timber Supply Area (TSA), one of eight TSAs within the Vancouver Forest Region. The TSA, located predominantly on Graham Island, represents only a portion of the Islands' land base (see Table 2.1). This chapter profiles the entire archipelago, and provides an overall context for the study.

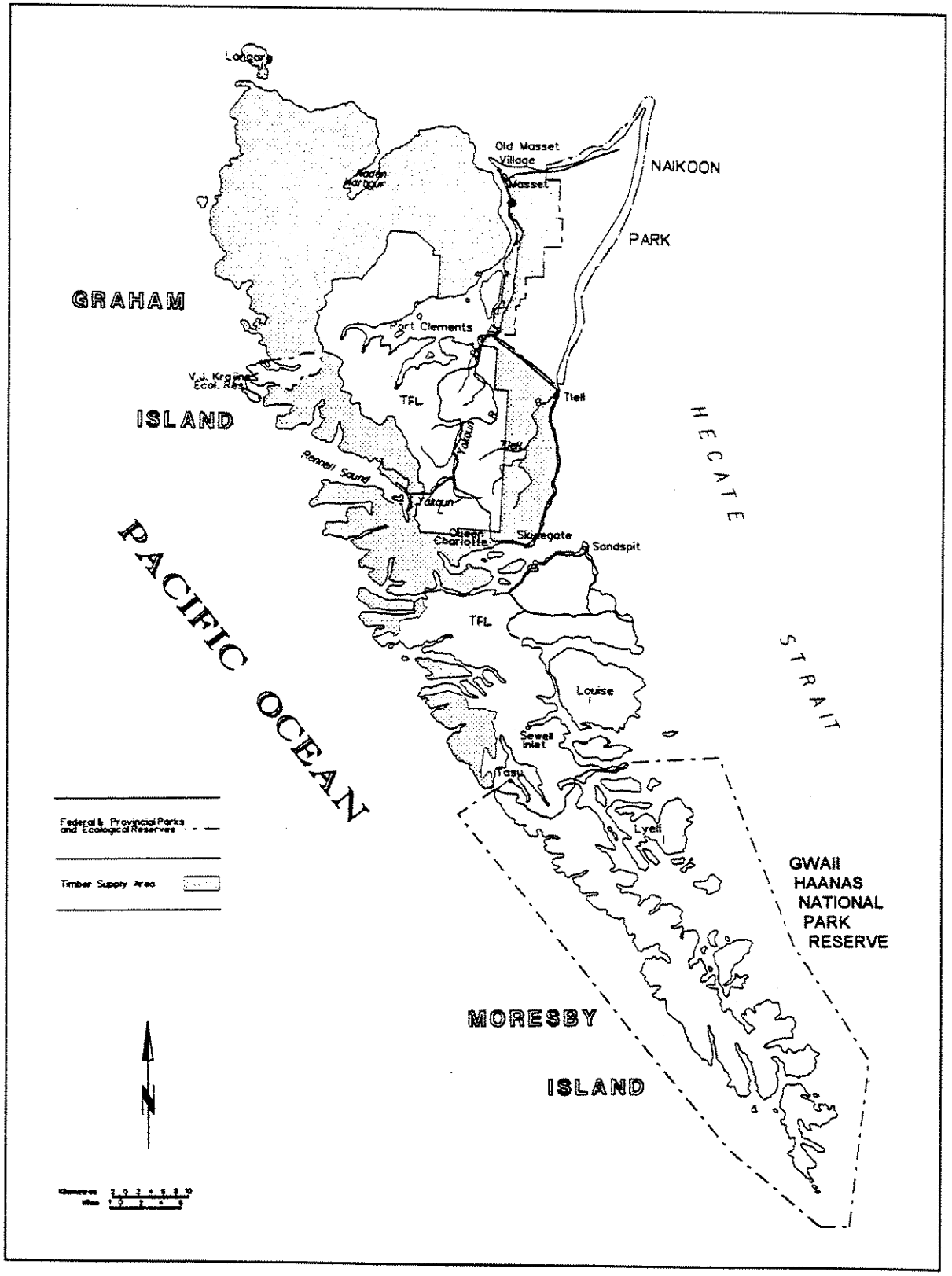
Table 2.1
Queen Charlotte Islands
Land Area, 1993

Land Use Category	Total Area Hectares	% of Total
1. Tree Farm Licence (TFL) Areas	324 305	32 %
2. Timber Supply Area (TSA)	464 827	46 %
Total TFL/TSA Land Base	784 640	78 %
3. Parks and Protected Areas	229 041	22 %
Total QCI/HG Land Base	1 013 681	100 %

Source: Ministry of Forests, Queen Charlotte Forest District

The QCI represents a miniature version of coastal British Columbia, with jagged mountain peaks, deep fjords, temperate rain forests, sub alpine tundra, and salmon spawning streams. The ecology of the Islands, however, is in many respects considered unique. At least 39 species and subspecies of plants and animals are unique to the Islands.

Figure 2.1
Queen Charlotte Islands
Location Map: Land Use and Communities



Haida Gwaii ("or islands of the people") is the ancestral home of the Haida people. The Haida claim the entire land base as their traditional territory. In 1993, they entered into treaty negotiations with the governments of British Columbia and Canada.

The archipelago is sparsely populated with a population density of less than one person per square kilometre. The majority of the population live on the two largest islands - Graham Island and Moresby Island. Graham Island, the most northerly of the two main islands has three principle areas of settlement: Masset/Old Masset, Port Clements/Tlell, Queen Charlotte City/Skidegate. Sandspit is the main area of settlement on Moresby Island.

The economy of the Islands is based on resource extraction (forestry and fishing) and government. Since the early 1970s, the Canadian Forces Station (CFS) at Masset has provided a source of economic diversity. Tourism is believed to have significant potential over the long-term.

Two upcoming events have significant implications for the future of the Islands: (1) downsizing of CFS Masset by 1997, and (2) the commencement of treaty negotiations between the Council of the Haida Nation and the governments of British Columbia and Canada. The scope of this study, however, provides the opportunity for only a cursory discussion of these issues.

2.2 Environmental Setting

The purpose of this section is to briefly describe the ecology of the QCI, identify the portion of the land base currently protected as parks or ecological reserves, and highlight major concerns and issues.

Two environmental classification systems have been developed to describe the ecosystems within the province: the Ecoregion Classification system adopted by the Ministry of Environment, Lands and Parks, and the Biogeoclimatic Ecosystem Classification used by the Ministry of Forests. The Ecoregion Classification stratifies the province's terrestrial and marine ecosystems into discrete geographical units at five different levels. The three lowest levels, ecoprovinces, ecoregions and ecosections, are progressively more detailed and narrow in scope and relate segments of the province to one another. They describe areas of similar climate, physiography, hydrology, vegetation and wildlife potential[1]. The Biogeoclimatic Classification focuses on the province's terrestrial ecosystems and incorporates primarily climate, soil, and vegetative data. Vegetation is emphasized because it is considered to be the best integrator of the combined influence of a variety of environmental factors affecting a site, and because floristic criteria can be determined to differentiate units[2].

[1] For an explanation of the ecosystem classification system see Campbell et al (1990), or Demarchi (1993).

[2] For an explanation of the biogeoclimatic classification system see Meidinger and Pojar (1991).

2.2.1 *Overview*

The Islands are comprised of three distinct types of terrestrial ecosections according to the Ecoregion classification of British Columbia: (1) Queen Charlotte Lowlands, (2) Skidegate Plateau, and (3) Windward Queen Charlotte Mountains. Figure 2.2 identifies the location of ecosection boundaries, existing protected areas, and undeveloped watersheds.

The land base is divided almost equally between the three ecosections: Queen Charlotte Lowlands 32 percent, Skidegate Plateau 32 percent, and the Windward Queen Charlotte Mountains 36 percent. The Timber Supply Area (TSA) is found primarily within the Lowlands and Windward Mountains ecosections. Only a small portion of the Skidegate Plateau, the ecosection comprising the Islands' prime areas of commercially operable forest, is TSA (areas around Eden Lake and Queen Charlotte City). The majority of this ecosection is under TFL.

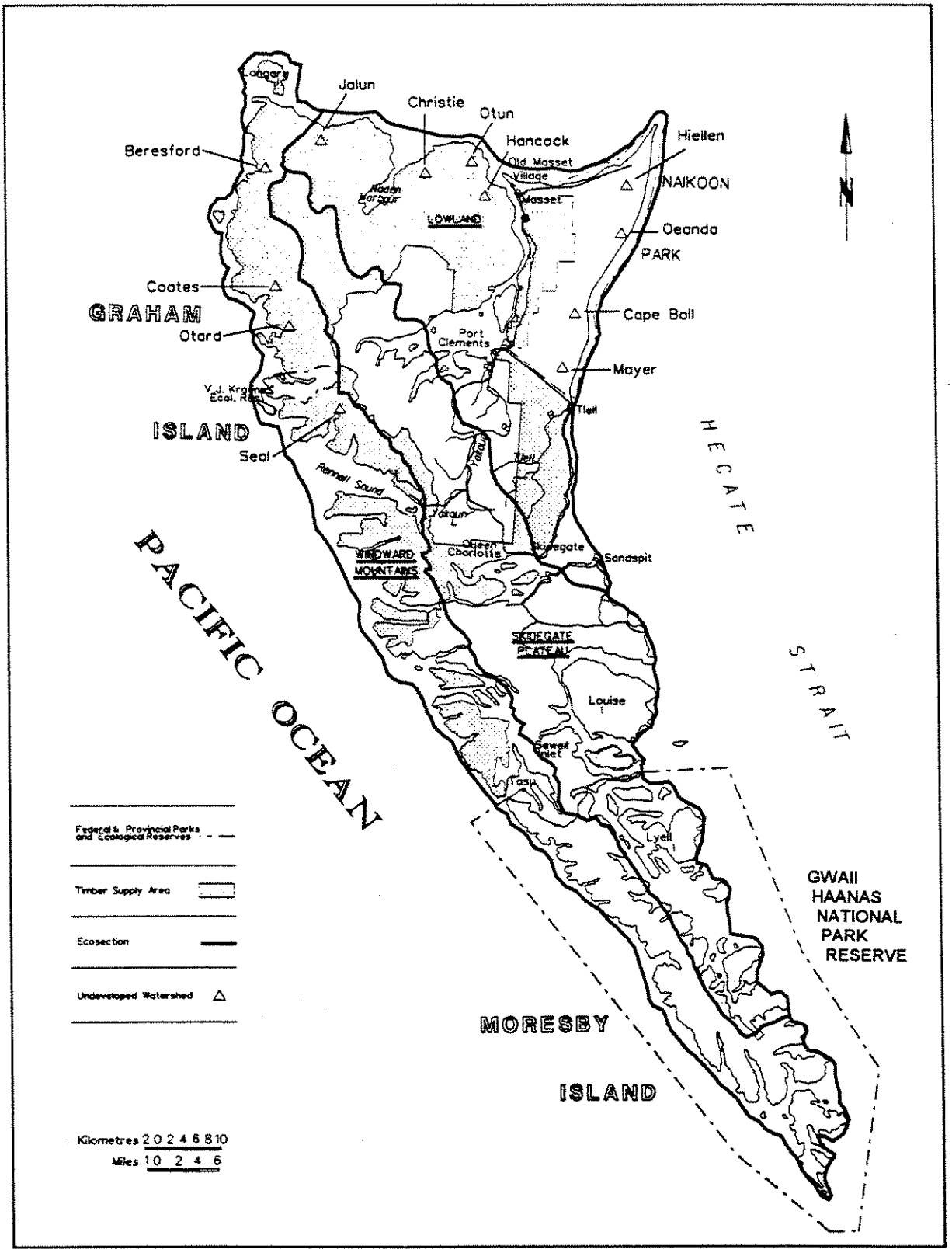
Two parks are located on the QCI: Gwaii Haanas National Park Reserve on the south end of Moresby Island, and Naikoon Provincial Park on the north-east side of Graham Island. In addition to the parks, Graham Island contains a number of small ecological reserves. In total, these protected areas comprise approximately 23 percent of the Islands' land base. Table 2.2 identifies the existing protected areas by ecosection.

Table 2.2
Queen Charlotte Islands Land Base
Protected Areas by Ecosection, 1994

EcoSection	Total Area 000s Ha	Existing Protected Areas (000s hectares)					% Total Area Protected
		Gwaii Haanas	Naikoon	Vladimir Krajina	Other	Total Parks & Reserves	
Windward Mtns	365	111		8		119	33 %
Skidegate Plateau	324	37				37	11 %
Lowlands	324		68		5	73	23 %
Total QCI/HG	1 013	148	68	8	5	229	23 %

Source: Prince Rupert Regional Protected Areas Team, Queen Charlotte Islands Gap Analysis, Draft (1994).

Figure 2.2
Queen Charlotte Islands Ecosections,
Existing Protected Areas and Undeveloped Watersheds (>5,000 ha)



Of the 30 primary watersheds (drainages greater than 5,000 hectares) on the QCI, 11 (less than 40 percent) remain undeveloped[3]. Four of these undeveloped watersheds (Beresford, Coates, Otard, and Seal) are located within the Windward Mountains ecosection portion of the TSA; seven (Hancock, Cape Ball, Christie, Hiellen, Jalun, Oeanda, and Otun) are found within the Lowlands ecosection and are split almost equally between the TSA, and Naikoon provincial park. All 12 watersheds within the Skidegate Plateau ecosection have been developed. (Ministry of Forests, 1992a; Moore, 1991)

Description of the QCI Terrestrial Ecosections and Biogeoclimatic Zones[4]:

Topography:

- The Windward ecosection encompasses the Queen Charlotte Mountains and reaches a maximum elevation of 1 200 metres. The outer coastline is characterised by steep cliffs, pinnacles, headlands and occasional beaches. No large lakes are found within this ecosection, although numerous small cirque-basin lakes and kettles occur from sea-level to the alpine.
- The Skidegate Plateau includes the partially dissected slopes, table-topped hills, and flat ridges leeward of the Queen Charlotte Mountains. It rises from sea level on the west and east coasts to about 840 metres in the western part. Most of the plateau is above 300 metres. The Plateau contains a few long, linear lakes (Eden Lake, Ian Lake, Skidegate Lake and Yakoun Lake). Small cirque-basin lakes and kettles are more numerous, but not widespread.
- The Lowland ecosection is an area of low relief, poor drainage, and extensive muskeg and wetland. It encompasses the majority of the northeastern half of Graham Island and a small portion of Moresby Island around Sandspit. Most of the Lowland is below 160 metres in elevation. A remarkable feature of this ecosection is the long, wide sand beach that extends along the north and east coastlines of both Graham and Moresby Islands. Strong winds have produced sand dunes which extend inland for several hundred metres in many places. Two long lakes (Marian Lake and Mayer Lake), along with numerous smaller ones, occur within the Lowlands.
- The large turbid glacial rivers typical of the Coast are absent from the QCI. Watersheds throughout the archipelago are typically small, with short main stem lengths, often with waterfalls close to the ocean, preventing upstream access by anadromous fish[5]. Most rivers in the Skidegate Plateau and Lowlands ecosections drain eastward, while those in the Windward area drain westward. Deltas and salt marshes occur only at a few protected river outlets.

[3] Undeveloped means that no more than two percent of the area has been developed by human activity, and in watersheds greater than 10,000 hectares, no more than 200 hectares. This includes developments such as logging, powerlines, pipelines, mines, and roads.

[4] Information sources used in compiling this section included Meidinger et al (1991), Banner et al (1983) and RPAT (1994).

[5] Type of fish that ascend rivers from the sea for the purpose of breeding, i.e., salmon species.

Temperature and precipitation:

- The climate throughout the Islands is cool, temperate and oceanic, with a high frequency of cloud cover and fog. The warmest month is August with a mean temperature between 14 and 15 degrees Celsius. The coldest month is January with a mean ranging just above freezing to 4 degrees Celsius. The frost-free period ranges from 158 days around Masset to 266 days at Cape St. James, where the influence of the ocean is strongest. This is one of the longest frost free periods in Canada. (Banner et al, 1983).
- The outer coast (Windward ecosection) is the wettest part of the archipelago with average rainfalls ranging upwards of 425 centimetres per year. The leeward location of the Plateau and Lowland ecosections results in reduced precipitation: approximately the same as that experienced in Vancouver, and less than one third of that experienced on the outer coast.

Presence of unique flora and fauna:

- At least 39 species and subspecies of plants and animals are unique to the Islands. One theory asserts that the Cordilleran Ice Sheet (Pleistocene glacial period, approximately 16 000 years ago) did not extend over the entire archipelago (RPAT, 1994 Draft). Instead, scientists believe that the Islands supported independent glaciers and mountain ice caps. As a result, the area is believed to have been a refuge during the last glacial period. The high degree of endemism[6] documented in crustaceans, insects, seed plants, mosses, birds and mammals supports this hypothesis. Another possible explanation is the Islands' general isolation from the mainland.

Vegetation:

- The Coastal Western Hemlock (CWH) biogeoclimatic zone occupies the majority of all three ecosections (upwards of 90 percent of the total area). It is recognised as being the most productive forest zone in Canada (Meidinger et al, 1991: 110).
- Coniferous forest dominates the CWH zone on the QCI. Major tree species are western hemlock, western red-cedar, Sitka spruce, and yellow cedar or cypress. Shore pine, western yew, and mountain hemlock are minor species. Old-growth, climatic late seral forests comprised of variable mixtures of western hemlock, red-cedar, and Sitka spruce dominate much of the landscape on the Skidegate Plateau and southeastern portion of the Windward ecosections. Yellow cedar becomes an important component of climax forests at upper elevations. The most productive forest communities occur on recently deposited alluvial materials adjacent to streams and rivers. Large, tall, widely spaced Sitka spruce dominate in these alluvial "meadow forests". Less vigorous spruce stands also occur on the stabilized sand dunes behind marine beaches and also on rocky marine headlands exposed to salt spray. Vigorous spruce-hemlock mixtures occur at lower elevations on steep, freely drained slopes, while similar forests with a yellow-cedar component occur at higher elevations. Dry forested habitats are relatively uncommon, restricted mainly to ridgetops and upper slopes on the small islands off the northeast coast of Moresby Island, i.e., Lyell Island.

[6] Restricted or peculiar to a locality or region.

Western red-cedar and western hemlock dominate the climax forests in these habitats. Low productivity forests develop mainly on poorly drained, flat terrain, and are found within the eastern portion of the Skidegate Plateau and the Lowlands ecosections. Scrubby red-cedar and western hemlock types are common within this area.

- The CWH zone also includes other forest ecosystems, namely deciduous forest, wetlands, and maritime communities. Deciduous forests are not widespread. Stands of red alder are best developed along river floodplains and also in some logged-over areas. They also occur along sea beaches and lake margins. All of the major classes of wetlands recognized in Canada (bog, fen, marsh, swamp, and shallow open water)[7] occur within the CWH zone, and are found mainly within the Lowlands ecosection. Raised bogs are the most common wetland ecosystem and cover extensive areas of this ecosection. They result from the gradual and continual build-up of acidic *Sphagnum* peat in basins or depressions, are typically a few metres deep, with the upper peat layer strongly acidic and low in nutrients. Shore pine are characteristic tree species, and occur as shrubs or stunted trees. Several non-forested plant communities unique to habitats of land-ocean interface also occur. They include sand and shingle beach communities (best developed along northern and eastern Graham Island), rock and cliff communities, salt water marshes and mudflats. Two major types of forested seacoast ecosystems occur: spruce-reedgrass forests, common on rocky headlands subjected to salt spray, and spruce-*Stockesilla* beach/dune forests, common behind the extensive sand beaches of Graham Island. (Banner et al, 1983)
- In general, the vegetation associated with the CWH zone is a mosaic of poor forest and bog in the lowland areas, with productive forests restricted to moderate to steep slopes and flood plains. The major tree species are western hemlock, western red-cedar, Sitka spruce, yellow-cedar, shore pine, and red alder. The absence of amabilis fir, and the widespread occurrence of Sitka spruce, distinguishes these forests from those found elsewhere on the coast. Characteristic understory species are salal, deerfern, cordilleran bunchberry, false lily-of -the-valley, fern-leaved goldenthread and skunk cabbage.
- The Mountain Hemlock and Alpine Tundra biogeoclimatic zones are also represented in small amounts within the Windward and Skidegate Plateau ecosections. In the Mountain Hemlock zone, mountain hemlock is the dominant tree specie along with yellow-cedar. Western hemlock, western red cedar and Sitka spruce are minor species within this zone. Alpine-like vegetation is found in areas of elevation above 800 metres. Herb meadows, alpine heath and rocky steep lands make up the three broad

[7] Fens are wetlands comprised of accumulations of well to moderately decomposed non-*Sphagnic* peats. Fen waters derive from groundwater and runoff from adjacent mineral uplands. As a result, fens are far less acidic and more mineral rich than are bogs. They are infrequent on the QCI. Marshes are areas permanently or seasonally inundated with nutrient-rich water, and support extensive herbaceous vegetation. Sedge marshes, versus freshwater marshes, are the most common type found in the QCI. Swamps are wooded wetlands dominated by 25 percent or greater cover of trees or tall shrubs, and characterized by periodic flooding. Swamps, like fens, are rich in materials and nutrients, but tend to better aerated, due to the water movement. Conifer swamps are common on the QCI but tend to be localized and never dominate the landscape as do bogs. Shallow open water wetlands comprise permanent, shallow (less than two meters), standing or flowing water that lacks extensive emergent vegetation. (Banner et al, 1983: 57-62)

types of ecosystems of high elevation alpine areas on the Islands. The rocky steep lands, especially those over calcareous rock, provide habitat for many of the Islands' endemic, rare and disjunct species.

- In addition to common, widespread coastal, boreal and montane plant species, the Islands also contains species that are at or near the southern or northern limits of their range, or have disjunct populations whose nearest relatives occur thousands of kilometres away. The greatest diversity of flora species are found in the rain shadow areas on southeastern Graham and northeastern Moresby Islands where there is the greatest diversity of habitats. One notable centre of species diversity is the subalpine-alpine area bounded by Mount Moresby, the Mosquito Mountains, and Takakia Lake. Among the unique plants found on the QCI are four species of moss, one liverwort, and six species of flowering plants.

Fauna:

- The Islands are home to 11 unique subspecies of mammals. The largest of these is the black bear. Dawson caribou did exist on the Islands, until becoming extinct at the turn of the century. Important from an evolutionary perspective are the unique forms of Deer mice - a different kind of deer mouse can be found on almost every island. Other unique subspecies include the Charlotte ermine, pine martin, and dusky shrew.
- An abundance of seabirds nest in the archipelago because of the diversity and availability of suitable habitats, abundance of nearby food, and the lack of disturbance during nesting periods. The Islands include the only confirmed nesting site for horned puffins in Canada, rare nesting sites for common murres, and 30 percent and 10 percent, respectively, of the world's populations of ancient murrelets and Cassin's auklets. Before the introduction of rats and racoons, the Islands' seabird colonies lacked any significant ground based predators.
- Three sub-species of birds have been identified as nesting exclusively on the islands: Queen Charlotte northern saw-whet owl, Queen Charlotte hairy woodpecker, and Queen Charlotte Steller's jay. In addition, the pine grosbeak is found only on Vancouver Island and the QCI, while the song sparrow is found only on the QCI and islands in Alaska. The Islands also contain relatively high populations of peregrine falcon and bald eagle. Trumpeter swans winter on the Islands, particularly at Tlell and near Masset, while sandhill cranes use the same habitat for nesting.
- Rivers and creeks support stocks of anadromous and resident fish. Species include coho, sockeye, steelhead, chum and pink salmon, cutthroat trout, and Dolly Varden. Chinook salmon are found only in the Yakoun River. One other fish specie of scientific interest is the stickleback, which shows unusual variability from lake to lake.

Introduced species:

- A number of introduced species have become established over the years: Sitka black-tailed deer, racoon, beaver, red squirrel, tree frog, and three kinds of rats have established themselves throughout the Islands, while rocky mountain elk have become established in the Tlell watershed.

2.2.2 *Issues and Concerns*

Habitat and species concerns on the Islands relate primarily to (a) logging activities, and (b) the introduction of species.

Logging Activities:

- Clearcut logging has to date been most extensive within the Skidegate Plateau ecosection in the north Moresby Island area, and the Yakoun Valley on Graham Island. A large proportion of the old growth[8] cedar and hemlock forests and alluvial spruce stands have been harvested. The other two ecosections have been less affected. However, old growth forests adjacent to Rennell Sound on Graham Island, and adjacent to Tasu Sound on Moresby Island have also been significantly modified by harvesting operations.
- The 12 percent Protected Areas Strategy target for the Islands is almost realised through existing protected areas[9]. Protected areas maintain biodiversity[10] by conserving representative examples of ecosystems. This alone, however, is insufficient to maintain viable populations of all plants and animals (Ministry of Forests et al, n.d.). In order to maintain ecosystems and species across their historical ranges it is essential to promote biodiversity in managed forests outside of protected areas. The focus is on managing habitats, because it is not possible to manage for all species individually. At present, however, inadequate information is available to forest managers to set habitat objectives. In particular, management efforts are hampered by poor habitat inventories, and limited understanding of habitat requirements for many species.
- Several plant and wildlife species have been identified as being at risk of extirpation

---

[8] Old-growth forests have a major ecological role in contributing to the maintenance of biological diversity and forest productivity. Old-growth is defined as ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development and may be typically distinguished from younger growth by several of the following attributes: large trees for species and site, wide variation in tree sizes and spacing, accumulations of large-size dead standing and fallen trees, decadence in the form of broken or deformed tops and root decay, multiple canopy layers, and canopy gaps and understory patchiness. (Fenger and Harcombe, 1991).

[9] The goals of the Protected Areas Strategy (B.C., 1993) are (1) to protect viable representative examples of the province, representative of the major terrestrial, marine and freshwater ecosystems, the characteristic habitats, hydrology and landforms, and the characteristic backcountry recreational and cultural heritage values of each ecosection; and (2) to protect special natural, cultural heritage and recreational features of the province. The 12 percent target is actually applied at the biogeoclimatic level within each ecosection. The biogeoclimatic zone/ecosection combinations currently under represented include Wet Hypermaritime Coastal Western Hemlock ecosystem (variant 2) within the Windward Queen Charlotte Mountains, and Skidegate Plateau ecosections, and the Wet Hypermaritime Mountain Hemlock ecosystem (variant 1) within the Skidegate Plateau ecosection (RPAT, 1994).

[10] Biodiversity is an umbrella term for the full variety of life - the breadth of the gene pool, the richness of species, the array of ecosystems and the processes that maintain this variety. It is usually considered at three levels: genetic diversity, species diversity, and ecosystem diversity. Genetic diversity is a concept of variability with a taxonomic unit (i.e. species, subspecies) as measured by the variation in genes. Species diversity relates to the variety of living organisms in a given area, and includes both the number of species and their population of living organisms. Ecosystem diversity relates to the diversity and health of ecological complexes in which species occur. Ecosystems provide natural cycles of nutrients, of water, of oxygen and carbon dioxide, and of other chemicals. (Fenger and Harcombe, 1991).

within the province. Table 2.3 identifies those 'at risk' bird and mammal species also dependent on old-growth forest habitat. Other wildlife species, such as the common murre, ancient murrelet, and Cassin's auklet are also considered at risk in British Columbia, but are excluded because they are not forest dependent. Similarly, plant species considered 'at risk' provincially have not been identified because they are generally found in areas, such as bogs, beaches, and alpine areas, not impacted by timber harvesting operations.

- Current forest management practices result in the reduction of old-growth forest ecosystems and the removal of important structural components generally associated with older forests, such as snags and moss platforms on decadent trees. Resource managers are concerned about the ability of managed second growth forest to substitute the various critical elements of habitat now contributed by old-growth. The Ministry of Forests and the Ministry of Environment Lands and Parks (1992) have been working together to develop guidelines to assist forest managers to incorporate the conservation of biodiversity into forest management planning on British Columbia's coast. These guidelines address planning at both the landscape unit level (watershed or series of watersheds between 5,000 and 50,000 hectares in size), and the stand level, and will be incorporated into the new Forest Practices Code[11].

[11] The province of British Columbia is also developing and initiating other protection tools and planning mechanisms to help maintain the quality and biological productivity of the resource base. These include the Environment Protection Act, the Environmental Assessment Act, the Fish, Wildlife and Endangered Species Act, the new Water Act, and sub-regional Land and Resource Management Planning.

Table 2.3
Queen Charlotte Islands
At-Risk Old-Growth Forest Dependent Wildlife Species, 1994

	RISK STATUS [1]		OLD-GROWTH DEPENDENCE RATING [2]	
	Prov'l	**Global Ranking**	**Forest**	**Attribute**
Birds				
Queen Charlotte Goshawk	RED	(1-2) Imperilled Sub-species		X
Marbled Murrelet	BLUE	(3-4) Rare	X	
Queen Charlotte Saw-Whet Owl	BLUE	(3) Rare Sub-species		X
Queen Charlotte Steller's Jay [3]	BLUE	(3) Rare Sub-species		
Queen Charlotte Hairy Woodpecker	BLUE	(3) Rare Sub-species		X
Islands Pine Grosbeak [4]	BLUE	(3) Rare Sub-species		
Great Blue Heron	BLUE	(5) Common		X
Bald Eagle	BLUE	(4) Frequent		X
Peale's Peregrine Falcon	BLUE	(3) Rare Sub-species		X
Mammals				
Queen Charlotte Ermine	RED	(2) Imperilled sub-species		X
Keen's Long-Eared Myotis	RED	(3) Rare sub-species		X

Notes:

1 The Ministry of Environment, Lands and Parks has identified two groups of wildlife species they consider 'at risk' within the province: (1) *Red* list species considered endangered/threatened, or candidates for these designations, and (2) *Blue* list species considered vulnerable. The global ranking is based on the status of a species throughout its entire range. The status of a species is indicated on a scale of five: (1) *Critically Imperilled* (5 or fewer occurrences), (2) *Imperilled* (6-20 occurrences), (3) Rare (21-100 occurrences), (4) *Frequent* (greater than 100 occurrences), and (5) *Common* (demonstrably ineradicable under present conditions).

2 Red and Blue list species are further described by their dependence on old-growth forest. Species specifically dependent on intact old-growth forests (watershed level) are referred to as "forest dependent". Species dependent on attributes of old-growth forests, such as large diametre trees, snags or coarse woody debris are referred to as "attribute dependent" (Fenger and Harcombe, 1991).

3 Prefers mature coniferous forests, but will use other successional stages of coniferous forest, and deciduous forests.

4 Frequents open coniferous forests with large trees in the vicinity of wet meadows, streams and lakes.

Sources: B.C. Conservation Data Centre, Ministry of Environment, Lands and Parks, Wildlife Branch, Victoria; Ministry of Forests, Queen Charlotte Forest District; Fenger and Harcombe, 1991.

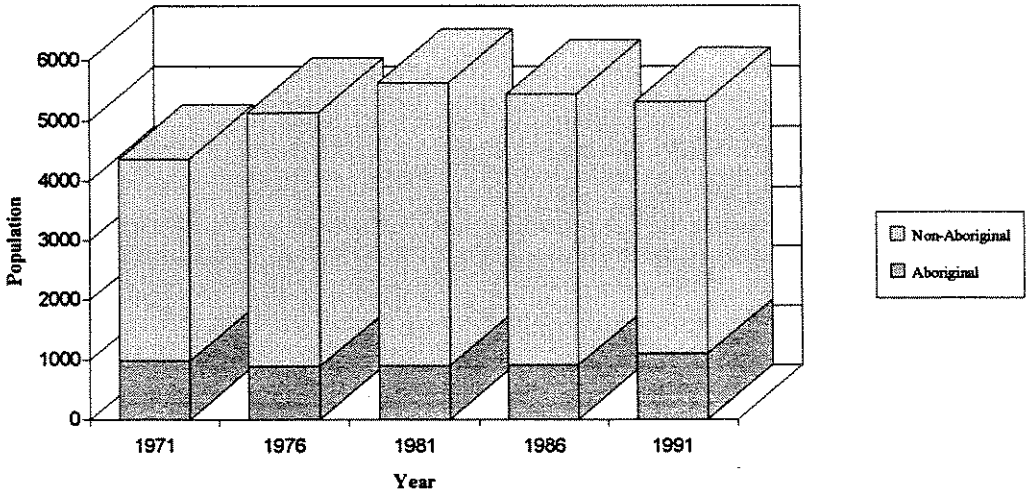
2.3 Socio-Economic Overview

The purpose of this section is to briefly describe the Islands' communities and economy. Discussion focuses on population trends, employment opportunities by settlement area, services available to assist community members in job transition, popular recreation activities and tourist attractions, and the forestry sector. General and forestry-related concerns and issues of the communities are also outlined.

2.3.1 *Population*

The population of the QCI in 1991 was 5 316. Over the past 20 years the Islands' population has experienced significant growth (+22 percent). However, this trend masks a more complex demographic pattern (see Table 2.4).

Figure 2.3
Queen Charlotte Islands
Population Trend, 1971-1991



- Total population peaked in 1981 at 5 626. The high growth rate (+29 percent) over the ten year period 1971 to 1981 was attributable to the opening of a Canadian Forces Station at Masset in mid-1970s, and an enhanced provincial government presence in Queen Charlotte City.
- Since 1981, the total population has been declining; a 3 percent decrease between 1981 and 1986, and a 2 percent decrease between 1986 and 1991. The majority of this decrease occurred within the forestry dependent communities on Moresby Island, such as Sewell Inlet. The decrease is a result of several factors, most

notably reductions to the timber harvesting land base through the establishment of Gwaii Haanas National Park Reserve[12].

Table 2.4
Queen Charlotte Islands
Population by Community, 1971 - 1991

Community	1971	1976	1981	1986	1991	% Change 1971-81	% Change 1981-86	% Change 1986-91
GRAHAM ISLAND								
Masset	975	1 563	1 569	1 529	1 476	+61%	-3%	-4%
Old Masset Village	679	629	580	567	632	-15%	-2%	+11%
Masset/Old Masset Village	1 654	2 192	2 149	2 096	2 108	+30%	-3%	+1%
Port Clements	539	564	530	539	483	-2%	+2%	-10%
Tlell and Environs	83	183	275	515	413	+231%	+87%	-20%
Pt Clements/Tlell	622	747	805	1,054	896	+29%	+31%	-15%
Queen Charlotte City [1]	727	797	1 070	1 090	1 079	+47%	+2%	-1%
Skidegate	308	259	322	338	469	+5%	+5%	+39%
Q.C. City/Skidegate	1 035	1 056	1 392	1 428	1 548	+35%	+3%	+8%
Total Graham Island	3 311	3 995	4 346	4 578	4 552	+31%	+5%	-1%
MORESBY ISLAND								
Sandspit	459	598	755	600	734	+64%	-21%	+22%
Other Moresby Island [2]	601	545	525	265	30	-13%	-50%	-89%
Sandspit/Moresby Island	1 060	1 143	1 280	865	764	+21%	-32%	-12%
Total QCI Population	4 371	5 138	5 626	5 443	5 316	+29%	-3%	-2%
Northwest B.C. [3]	59 625	61 380	66 423	62 544	65 822	+11%	-6%	+5%
Province of B.C. (millions)	2.25	2.55	2.84	3.02	3.37	+26%	+6%	+12%

Notes: 1 Includes Skidegate Landing and South Graham Island
2 Includes Tasu, Sewell Inlet
3 Includes Skeena-Queen Charlotte and Kitimat-Stikine Regional Districts

Sources: Skeena-Queen Charlotte Regional District; Statistics Canada Census

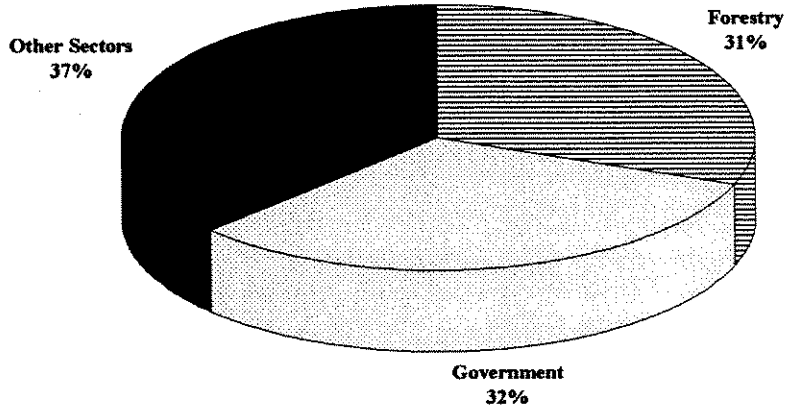
[12] The establishment of Gwaii Haanas National Park Reserve resulted in the removal of land from TFL 24 belonging to Western Forest Products, and termination of five Timber Licences owned by MacMillan Bloedel. Western Forest Products had its annual cut reduced 73 percent from 432,000 cubic metres to 115,000 cubic metres, while MacMillan Bloedel lost approximately 500,000 cubic metres in total.

- The Haida population as a proportion of the Islands' total population has remained relatively constant over the period 1971 to 1991 (around 21 percent). Haida communities declined in population between 1971 and 1981, but rebounded in the last ten years, primarily as a result of Bill C-31[13], which restored status and membership rights to aboriginal women and their children who had lost their status, as a result of marriage to non-aboriginal men.

2.3.2 *Economy*

The Islands' economy depends primarily on the forestry sector and government services (see Figure 2.4). Logging, forestry manufacturing, and construction and transportation activities related to forestry account for approximately 31 percent (772 jobs) of the Islands' employment. Government services represent a further 32 percent (792 jobs) of employment. Government services include a wide range of activities: the Canadian Forces station at Masset, federal and provincial departments and ministries, municipal governments, Haida government, health care services and hospitals, and education facilities. Together, these two sectors account for almost two thirds of the jobs on the QCI.

Figure 2.4
Queen Charlotte Islands
Key Employment Sectors, 1991



[13] Amendment to the Indian Act made in 1985. Revisions included removal of discriminatory clauses, restoration of status and membership rights to aboriginal people who had lost status because of such clauses, and increased Indian band control over their own membership affairs. Bill C31 has had a major impact on the number of Registered Indians within British Columbia, and on the level of government services provided to First Nations.

Other important sectors include Retail and Wholesale (279 jobs), Accommodation, Food and Beverage (201 jobs), General Transportation and Storage (133 jobs), Fishing (133 jobs), and General Construction (60 jobs).

Table 2.5 provides an overview of the maximum and minimum number of jobs by industry, according to the *Business Directory/Labour Market Profile - Haida Gwaii/Queen Charlotte Islands, 1991*, produced by the Skeena-Queen Charlotte Regional District (1992). These maximum and minimum estimates reflect the seasonal nature of some jobs and part-time variations.

Table 2.5
Queen Charlotte Islands
Summary of Employment by Sector, 1991

(Number of Employees)	Employees		% of Total
	Maximum	Minimum	(Max)
Forestry			
Logging	670	504	27%
Transportation & Construction	46	11	2%
Forest Manufacturing	56	46	2%
Total Forestry	772	561	31%
Government			
Government Services	551	501	22%
Education Services	173	66	7%
Health Services	68	58	3%
Total Government	792	625	32%
Retailers and Wholesalers	279	169	11%
Accommodation, Food & Beverage	201	119	8%
Gen. Transportation & Storage	133	86	6%
Fishing	78	10	3%
Other [1]	227	130	9%
Total	2 482	1 700	100%

Notes: 1 Other includes: Communications and Utilities, Financial Institutions, Business Services, Agriculture, General Construction, and Miscellaneous other.
Source: Skeena-Queen Charlotte Regional District, 1992

2.3.3 *Communities*

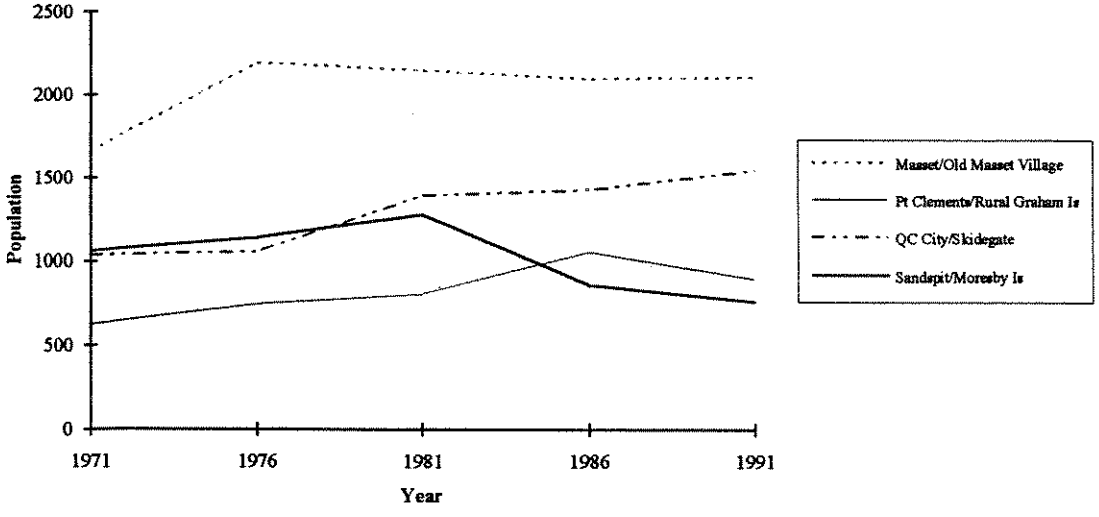
Four broad settlement areas are used here in to order to facilitate discussion:

- Masset (Masset and Old Masset Village),
- Port Clements Village and surrounding area including Tlell,
- Queen Charlotte City and Skidegate,
- Sandspit/ South Moresby Island.

The Graham Island settlement areas - Masset, Port Clements and Queen Charlotte City/Skidegate - are connected by Highway 16, the only major highway on the Islands. B.C. Ferries Corporation operates a service between Prince Rupert and Skidegate three days a week. The Islands' major airport is located at Sandspit, on Moresby Island, and is a half hour ferry ride from Skidegate. Both Masset (airport) and Queen Charlotte City (float plane) also have daily air service to Prince Rupert.

Figure 2.5 illustrates how the population of the Islands' major settlement areas have changed over the past twenty years. All settlement areas experienced an increase in their populations over the period 1971 to 1981. Since 1981, population change within the Graham Island communities of Masset/Old Masset Village and Queen Charlotte City/Skidegate has been either slightly positive, or flat. However, the more directly dependent forestry communities of Port Clements/Rural Graham Island and Sandspit/Moresby Island have experienced population declines.

Figure 2.5
Queen Charlotte Islands
Population by Settlement Area, 1971 - 1991



Masset/Old Masset Village

The village of Masset and the Haida community of Old Masset are located on the northern portion of Graham Island. Old Masset village is built on Indian reserve land and is situated approximately 2 kilometres north of Masset. Together, these two communities account for almost 40 percent of the Islands' population (1991). Over the last ten years the Masset area has experienced a slight decrease in population (-1 percent).

The Canadian Armed Forces Station (CFS) is the primary employer with approximately 35 percent of the Masset area's labour force directly employed by the federal Department of National Defence. In 1993, CFS Masset employed approximately 300 staff (240 military and 60 civilian) and had a total payroll of $14.5 million. In addition to wages, the federal government spends a further $3 million annually operating the Station. CFS Masset also makes a significant contribution to the area in other ways by staffing and operating a 13 bed, general care, maternity and emergency care hospital, and providing recreation facilities such as a recreation centre, swimming pool, bowling alley, nine-hole golf course, curling rink, and squash court. Other community services in the area include health and welfare services, an elementary and secondary school, and banking services.

Other important sectors in the local economy include fishing and forestry. The Islands are recognised as one of the most productive fishing regions on British Columbia's coast. The area north of Masset, one of three fishing zones around the area, attracts both local, as well as off-Islands' (Vancouver, Vancouver Island and Prince Rupert) boats during peak seasons. Herring, halibut, and salmon seasons are usually between March and September, and a few local people are employed year round fishing for crabs, shrimps, prawns, and ground fish. The two fish processing plants in Masset operate intermittently with the largest of the two, B.C. Packers, offering only a few weeks employment annually processing razor clams for the bait market in the United States. Forestry activities include a small sawmill involved in log home construction (QCI Sawmills), silviculture (Huksta Forestry), cedar shake production, and small cottage-style production (carving and cedar boxes). A few local residents also work in the forestry sector in Port Clements for MacMillan Bloedel Ltd. and Abfam Enterprises Ltd.

Selected Major Employers[14] - Masset Area, 1991	Number of Jobs (max)
• **Government/Defence**: Canadian Forces Station Masset	300
• **Government**: Old Masset Village Council (Haida), Village of Masset (10) RCMP (9), Canada Post (4)	81
• **Government/Education**: School District #50 (primary and secondary school)	70
• **Fishing**: seasonal - B.C. Packers (50), CBI Fisheries (16)	66
• **Retail**: Delma's Co-op	40
• **Forestry**: Huksta Forestry (30), QCI Sawmills (8)	38
• **Accommodation, Food & Beverage**: Singing Surf Motel, Villager Cafe (7)	32
• **Government/Health**: QCI Health Care	30

[14] Source: Skeena-Queen Charlotte Regional District (1992).

Port Clements/Tlell

The Village of Port Clements is located on the shores of Stewart Bay on Masset Inlet. Tlell, the other major community within this area is situated at the mouth of the Tlell River. The area's population peaked in 1986 and has since declined by 15 percent. As of 1991, the area accounts for approximately 17 percent of the Islands' population.

Forestry is the area's primary employer. MacMillan Bloedel Ltd. provides approximately 60 percent of the jobs within the area. There are also several small businesses based out of Port Clements involved in logging, sawmilling, and forestry related construction and transportation activities. Approximately 70 percent of the area's labour force is directly employed in the forest sector.

Community services in this area are limited. Area residents must go to either Masset or Queen Charlotte City to do their banking, access health and welfare services, and attend high school.

Selected Major Employers[15] - Port Clements/Tlell Area, 1991	Jobs (max)
• **Forestry/Logging**: MacMillan Bloedel (285), O'Brien and Fuerst Logging Ltd (20)	305
• **Forestry/Manufacturing**: Abfam Enterprises Ltd	30
• **Forestry/Other**: D&E Towing and Salvage (12), Resource Management Services (6)	18
• **Retail**: Bayview Market	14
• **Government/Education**: School District #50 (primary school)	13
• **Accom. Food & Beverage**: Yakoun Inn and Pub (8), Tlell River House (5)	13

Queen Charlotte City/Skidegate

The unincorporated villages of Queen Charlotte City and Skidegate are located on the south east end of Graham Island. Skidegate is built on Indian reserve land and is situated approximately 4 kilometres east of Queen Charlotte City. Together, these two communities account for 29 percent of the Islands' population (1991). This area's population has experienced moderate growth over the past decade.

Government services, forestry, and fishing are the major economic sectors in this area accounting for 31, 20 and 7 percent of the local labour force, respectively. The majority of federal and provincial departments and ministries have their offices in Queen Charlotte City: Fisheries and Oceans, Parks Canada, R.C.M.P., B.C. Environment, Lands and Parks, B.C. Forest Service, and B.C. Social Services and Housing. In addition, the Skidigate Band has its government offices in Skidegate. Similar to Port Clements, MacMillan Bloedel Ltd. is the major forestry employer within the area. Slarktooth Logging, a local logging contractor, also employs a significant number of local people. Local forestry processing in the Queen Charlotte City/Skidegate area is limited to a small cedar shake

[15] Source: Skeena-Queen Charlotte Regional District (1992).

mill. Areas to the east and west, similar to the area north of Masset, provide for productive fishing. B.C. Packers operates a floating barge near Skidegate Landing that purchases and transports local fish catches to mainland processing plants. Local fish processing is limited to Sunn Pacific Seafood in Skidegate which operates intermittently. Most recently, it was leased by Japanese interests to process sea urchins.

The area's social and recreational services include primary and senior secondary schools (kindergarten through grade 12), Northwest Community college, which uses the school facilities and offers grade 12 equivalency, up-grade and general interest courses, a 21 bed acute and long term care hospital, dental clinic, museum, and community halls, in both Queen Charlotte City and Skidegate. The area also has banking services and is home to the Islands' newspaper (*QCI Observer*).

Selected Major Employers[16] - Q.C. City/Skidegate, 1991	Number of Jobs (max)
• **Forestry/Logging**: MacMillan Bloedel (90), Slarktooth Logging (30)	120
• **Government**: Skidegate Band Council (50), B.C. Ministry of Forests (29), Parks Canada (10), Social Services (8)	97
• **Government/Education**: School District #50 (primary and secondary school)	57
• **Government/Health**: Q.C. Island Hospital	50
• **Accom. Food & Beverage**: Misty Harbour Inn and Restaurant (12), Claudette's Place (10), Sea Raven Resort (3), Hecate Inn (2)	27
• **Retail**: Christie Bay Enterprises (11), City Centre Stores (11)	22
• **Forestry/Other**: various contractors	16
• **Fishing**: seasonal - B.C. Packers	12

Sandspit/Moresby Island

Sandspit is an unincorporated community located on the Northeast tip of Moresby Island, 14 kilometres from the ferry landing at Alliford Bay. Moresby Island's population peaked in the early 1980s. At that time, approximately 60 percent of the area's population lived in Sandspit, with the remainder residing in small isolated communities further south. Since then, Moresby Island's population has declined by approximately 40 percent, primarily as a result of the closure of the mine at Tasu, and timber harvesting reductions as a result of the establishment of the Gwaii Haanas National Park Reserve The decline in population has come at the expense of the Island's outlying settlements (Tasu and Sewell Inlet). As of 1991, the Sandspit/Moresby Island area had 764 residents, comprising 14 percent of the Islands' population.

The forestry sector is the primary employer within the Sandspit/Moresby Island area accounting for approximately 45 percent of local employment. The major employers are TimberWest Forest Ltd. and MacMillan Bloedel Ltd. Western Forest Products also has

[16] Source: Skeena-Queen Charlotte Regional District (1992).

operations on Moresby Island, but the majority of its personnel, except for some local contractors, are off-island residents. Several small local contractors bid on Small Business timber sales, and provide services to the major licensees.

Community services in this area are limited. Sandspit has an elementary school, community centre and golf course, but local residents must go to Queen Charlotte City for banking services, to access health and welfare services, and to attend secondary school.

Selected Major Employers[17] - Sandspit/Moresby Island, 1991	Number of Jobs (max)
• **Forestry/Logging**: TimberWest (110), MacMillan Bloedel (75)	185
• **Accom. Food & Beverage**: Sandspit Inn	40
• **Government**: Transport Canada (30), Parks Canada (7)	37
• **Forestry/Other**: various contractors	25
• **Transportation**: Time Air (13), Air B.C.(6), Vancouver Island Helicopters (5)	24
• **Government/Education**: School District #50 (primary school)	18

Community Characteristics

This section describes the Islands in terms of several indicators: unemployment, average family income levels, degree of economic diversity, mobility, and education levels attained, as well as local opportunities for training and career planning (see Table 2.6).

In general, unemployment levels (1991, 1986) are lower than for the rest of the Northwest Region of B.C., although average family income levels are below that of the rest of the Region.

Horne and Robson (1993), in their study *British Columbia Community Economic Dependencies*, characterise the QCI as having a relatively diverse economy relying predominantly on forestry and government services, but also on fishing. They identify a diversity index of 65 for the Islands. The index represents the degree to which the local economy is spread across twelve basic economic sectors[18]. An index of 100 means that each basic sector is of equal importance to the local economy. The higher the index, the more diversified the local economy; the more diversified the economy, the more stable it would likely be during economic downturns. Relative to other areas within the Northwest Region of British Columbia, the QCI falls into the middle ground between Prince Rupert, with a diversity index of 76, and the Kitimat-Terrace and Stikine areas at 63 and 39, respectively.

---

[17] Source: Skeena-Queen Charlotte Regional District (1992).

[18] The Horne and Robson (1993) study uses the economic base technique to determine the area's sources of income. See Appendix 4 for a fuller discussion of the economic base technique. The study identifies twelve basic sectors: (1) Forestry, (2) Mining, (3) Fishing and Trapping, (4) Agriculture, (5) (Tourism) Accommodation and Food Services, (6) Health and Education, (7) Other Industries, such as government, manufacturing, transportation and construction, (8) Unemployment Insurance, (9) Pension, (10) Investment, (11) Other Transfer Payments, and (12) Social Assistance Payments.

Most of the Islands' communities over the past five years (1986 - 1991) have exhibited a considerable degree of resident continuity. Upwards of 70 percent of families within the Haida communities have either lived within the same house, or within the same community during the last five years. Queen Charlotte City, and to a lesser extent the forestry-based communities of Port Clements and Sandspit, have also demonstrated a stable core of residents. The exception is the Village of Masset, which has seen a turnover of 60 percent in its residents over the five year period 1986 to 1991. This is a direct result of the Department of National Defence's policy of posting its staff and their families to Canadian Forces Stations and Bases for two to four year periods.

Formal education levels of the Islands' labour force are comparable to other non-metropolitan areas within British Columbia. The Haida, however, have lower education levels than the Islands' non-aboriginal population. Approximately 45 percent of the Haida population 15 years and older have some education beyond high school, while 35 percent do not have a high school diploma.

Local training and career planning courses for enhancing and learning skills and for facilitating the transition to other careers are currently limited. The two main sources of skills training are the Canada Employment Centres (CEC) and the British Columbia Ministry of Social Services (MSS). The CEC has offices in Prince Rupert and Terrace, and it funds outreach workers in Old Masset and Skidegate. The MSS maintains an office in Queen Charlotte City, and has a staff person based in Masset. Combined, the two agencies offer, and/or fund, a limited number of general employment development programs:

- Project-based Training - CEC
  Classroom and on-the-job training programs are available to assist people in finding long-term, full-time employment. In 1994, the CEC funded a 25 week course in Office Procedures for 16 participants. The course ran in Queen Charlotte City by the Northwest Community College. The course included classroom study as well as two, two week work terms. The CEC funded a similar course in 1993 for people in the tourism industry.

- Job Development - CEC
  This is a program for people who have been unemployed for a period longer than three months, or who face significant barriers to employment. It provides funding for an employee's salary (up to 60 percent), and training. Most recently, employers in Queen Charlotte City and Masset have used this program to employ and train workers in cedar shake production and silviculture.

Table 2.6
Queen Charlotte Islands
Selected Demographic Information by Community

	Masset	Port Clements	Q.C. City	Sandspit	Old Masset	Skidegate	Total QCI	Northwest B.C. [1]
Total Population (1991)	1 476	483	1 079	734	632	469	5 316	65 822
% change since 1981	-6%	-9%	+1%	-3%	+9%	+46%	-6%	-1%
Age Structure (1991)								
% under 15 yrs	27%	23%	24%	30%	31%	22%	26%	
% 15 to 34 yrs	39%	35%	32%	30%	37%	35%	35%	
% 35 to 44 yrs	18%	18%	22%	22%	11%	12%	18%	
% 45 to 54 yrs	8%	13%	11%	10%	8%	10%	10%	
% 55 and over	8%	11%	11%	8%	13%	21%	11%	
Mobility (1991)								
% pop. same house/community last 5 yrs	40%	54%	62%	56%	75%	69%	59%	
Education (highest level attained)[2]								
% pop. without high school certificate	38%	36%	35%	35%	76%	59%	42%	42%
% pop. with high school certificate only	16%	16%	21%	21%	9%	9%	12%	13%
% pop. with training beyond high school	46%	46%	54%	54%	15%	32%	46%	45%
Unemployment								
1991 - % of labor force 15 yrs and older	6%	5%	5%	7%	35%	24%	10%	15%
1986 - % of labor force 15 yrs and older	13%	10%	12%	10%	48%	34%	15%	18%
Average Income by Census Family								
1991	$50 541	$52 472	$49 642	$47 283	$24 978	$42 199	$46 212	$53 233
1986	$37 497	$32 832	$45 970	$40 908	$18 256	$34 922	$36 075	$40 240

Note: 1 Includes Skeena-Queen Charlotte and Kitimat-Stikine Regional Districts.
2 For population 15 years and older, 1991; Highest education levels attained for Queen Charlotte City and Sandspit represent an average for Sub-division B.

Source: Statistics Canada Census

- Self-Employment Assistance - CEC
  This program entitles people to receive unemployment benefits and access training while starting up their own businesses. The program is intended to promote the start-up of new businesses. It was not operational in 1993, but is expected to commence again in the near future.

- Workplace Based Training - CEC
  This program provides assistance to employers within industries undergoing change. The CEC provides funding for training and salaries to assist an employer to train their existing staff to become skilled in new activities. This program has yet to be used on the QCI.

- Regionally Initiated Special Employment (RISE) - MSS
  This is the MSS's main training program, and is targeted at individuals who are on income assistance. It is tailored to the demands of local employers. The majority of placements on the QCI have been in tourism-related activities.

A number of barriers to the success of these programs include the Islands' location, small community populations, distances between communities, and a limited local economic base to provide a varied and growing demand for skills.

Economic Development Planning

In 1988, in response to the establishment of the Gwaii Haanas national park reserve, the federal and provincial government introduced a $50 million Regional Economic Development Initiative (REDI) for the QCI. Two initiatives evolved from this fund: the Gwaii Trust Interim Planning Society (GTIPS), which administers $38 million of the fund, and the South Moresby Forestry Replacement Account, which administers the remaining $12 million and a further $12 million provided by the provincial government.

One intention of the REDI funds was to develop the Islands as a 'world-class' tourism destination, based on the heritage resources of the South Moresby area, to diversify the regional economy, and to ease the adjustment from logging to tourism (Canada Parks Service, 1988)[19]. Part of the money was earmarked for construction of tourism facilities adjacent to the park, a small craft harbour near Sandspit, and visitor reception and information centres in Sandspit and Queen Charlotte City. The balance of the funding was to be directed towards initiatives such as improved transport facilities, cultural and other tourism enhancement outside the park, and support to small business development. The first step in implementing the Initiative was the preparation of a tourism development plan.

[19] Gwaii Haanas (South Moresby) national park reserve was established in July, 1988 after fourteen years of intense conflict. A $108 million South Moresby Agreement was concluded between the federal and provincial governments that specified the creation of the park reserve, a forest replacement account, compensation for the logging companies affected, a Parks Canada office, and a Regional Economic Development Initiative.

In 1991, after some initial work guided by federal and provincial government officials, the planning process was handed over to the Islands' communities (through GTIPS) to develop an 'on-Island' strategy. As of 1994, the tourism development plan has yet to be completed, and the majority of the Initiative's funding has not been spent. The community-oriented planning process has been hampered by inexperienced staff, differences in the values, visions and personalities of community (aboriginal and non-aboriginal) representatives involved, and the lack of a community-based tourism planning model. The Islands' communities have rejected the concept of a 'world class' destination and have opted for more limited growth in visitors. GTIPS now sees its mandate as enhancing the Islands through infrastructure improvement, thereby stimulating local business, and as a result making the Islands a more pleasant place to visit.

The South Moresby Forest Replacement Account (SMRFA) is a $24 million interest bearing fund intended to help mitigate the economic impact resulting from the designation of the south Moresby Island park. The fund is administered by the Ministry of Forests and the Canadian Forest Service. The SMRFA is a multi-year forestry enhancement fund that focuses on forestry related research and development, inventory, incremental silviculture, and public education. Since 1988, an estimated 150 person years of direct forestry employment have been supported by this account.

2.3.4 *Recreation and Tourism*

Outdoor recreation activities are highly valued by local residents. The Islands' parks, publicly owned forest land and surrounding waters, also draw a small, but steady number of tourists. For the purposes of this study, recreational and tourist use of resource values on the QCI has been organised into three broad categories: angling, hunting and trapping[20], and back country experiences (including activities such as camping, cultural history sightseeing, kayaking and hiking). Note that the angling and hunting information excludes Haida use, because the Haida food fishery and hunting activities are not tracked by provincial fish and wildlife database systems. Both activities, the food fishery in particular, are important elements of the Haida culture and economy.

Angling

Freshwater sports fishing for steelhead, coho, dolly varden, and cutthroat trout is a popular local pastime. Although local residents partake in the majority of the freshwater angling, the Islands' streams and rivers also attract anglers from other parts of British Columbia and other provinces, and outside Canada.

Eight of the Islands' streams have been designated as Class II waters by the Ministry of Environment (1992). The classified waters system was introduced in 1990 in an effort to protect unique fishing opportunities within the province. A Class II designation requires non-residents of British Columbia to fish with a licensed angling guide. Residents of

[20] Trapping, hunting and angling also provide direct economic benefits to local participants through the sale of pelts (trapping), or use as food (hunting and angling).

British Columbia require only a Non-Guided Classified Waters Licence to fish the Islands' Class II waters. The popularity and productivity of the streams is attested to by the fact that they represent 20 percent of the province's Class II waters. A total quota of 530 angler days has been issued on QCI Class II waters to ten angling guides. Use of the quota by guides tends to vary from year to year averaging between 50 to 100 percent of the quota.

The QCI is recognised as one of the premier Steelhead angling locations in British Columbia. According to the *Steelhead Harvest Analysis* (Ministry of Environment, 1994a), the Yakoun River is the most fished water on the Islands, accounting for between 50 to 70 percent of the total annual Steelhead angler days over the past decade. Of the five major angling waters on the Islands, only two are found within the TSA: Tlell River, and the Honna River, which empties into Skidegate Inlet at Queen Charlotte City.

Table 2.7
Queen Charlottes
Freshwater Angling (Steelhead Harvest Analysis), 1984/85 to 1992/93

	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total Estimated Angler Days	5 730	3 825	6 925	4 281	5 163	4 168	3 725	5 981	3 320
Major Waters Fished 1									
- Yakoun River	51 %	56%	58%	51%	70%	68%	61%	46%	67%
- Tlell River	8%	8%	6%	11%	9%	10%	14%	10%	-
- Copper Creek	11%	8%	10%	9%	2%	6%	-	2%	11%
- Pallant Creek	6%	4%	3%	12%	7%	3%	13%	10%	4%
- Mamin River	9%	9%	6%	4%	6%	4%	2%	5%	6%
- Honna River	4%	4%	8%	6%	2%	2%	3%	3%	3%
- Deena River	5%	6%	4%	4%	1%	3%	2%	4%	4%
- Other 2	5%	5%	5%	2%	3%	4%	5%	4%	4%

Notes: 1 Represents estimated angler days on a water as a percentage of the total estimated angler days. All major waters fished are designated as Class II waters, and all but one (Tlell) are located in the Skidegate Plateau ecosection.

2 Represents 17 rivers and creeks, including one Class II water (Datlamen Creek).

Source: *Steelhead Harvest Analysis, 1984/85 to 1992/93, Skeena Region*, Ministry of Environment (1994a)

Fisheries managers consider the fish habitat on the Islands to be in relatively good condition with no particular site having a major problem. This is supported by the findings of a recent evaluation (Trip Biological Consultants, 1994) of Coastal Fisheries Forestry Guidelines. Of all the coastal forest districts inspected, the QCI had the lowest

percentage of Class II stream reaches impacted by logging (8.3 percent). Unclassified stream reaches were more frequently impacted than the Class II waters. The major factors responsible for stream impacts were inappropriate actions by forestry operations within Streamside Management Zones (leave strips, buffer strips or machine-free zones intended to protect the integrity of stream banks), poor debris cleanup, poor falling and yarding, and altered drainage patterns.

Despite a lack of major problems on the Islands, fisheries managers remain concerned about the Islands' fish habitat and steelhead populations. Minor streamside impacts due to logging are believed to be cumulative over time. The pressure on the local steelhead populations comes not only from habitat degradation, but also from the recreational and Haida food fishery, incidental catch in the commercial fishery, and declining ocean productivity. At present, anglers are permitted to keep a portion of their Steelhead catch.

Saltwater sports fishing has become a popular tourist activity on the Islands over the past decade. Currently, approximately nine lodges cater to this activity, as well as freshwater angling. Saltwater sports fishing is centred on the north coast of Graham Island around Langara Island and Naden Harbour, and is shut down over the winter. Except for the Tlell River House, the lodges are owned and operated from the lower mainland (Vancouver, Victoria, and Nanaimo). To date, the sports fishing industry has had a limited impact on the local economy.

Hunting and Trapping

Hunting on the Islands is focused on three species: Sitka Black-tailed Deer, Black Bear, and Elk (Ministry of Environment, 1994b). There is also hunting for small game, such as Blue Grouse. Elk hunting occurs in the Tlell watershed, whereas deer and bear hunting occurs throughout the Islands.

Black Bear is the major hunting attraction and draws hunters from other Canadian provinces, the United States and Europe. Non-British Columbia residents require a licensed guide-outfitter. Two guide-outfitters operate on the Islands: one on Graham Island, the other on Moresby Island. Since 1990, approximately 43 percent of the hunter effort for Black Bear has been by non-residents.

Deer hunting on the QCI is the most popular hunting activity with between 700 and 800 British Columbia residents participating annually over the period 1987 to 1992. Almost half of this hunter effort was by Islands' residents, representing approximately 10 percent of the total QCI population 15 years and older (based on 1991 population). Elk hunting attracts fewer hunters than deer, but is dominated by the QCI residents.

Trapping provides minor economic activity for a small number of local residents. A total of 73 traplines are registered on the Islands, of which only 25 percent have been active over the past decade, and only two have operated consistently over this period (Ministry of Environment, 1994c). Two thirds of the trapping has occurred on Graham Island.

Three species - Marten, Racoon, and Beaver - comprise 70 percent of the wild fur catch on the Islands over the period 1986 - 1992. Marten, alone, accounts for 54 percent of the total overall catch.

Table 2.8
Queen Charlotte Islands
Hunter Effort and Place of Residence, 1983 - 1993

	Number Hunters per year 1			Hunter Residence % of Number of Hunters 1991-92			
	Low	High	Avg	QCI/ HG	North west	Other B.C.	Outside B.C.
Sitka Black-tailed Deer	685	840	743	49%	32%	19%	-
Black Bear	33	136	62	23%	26%	8%	43%
Elk	17	34	26	81%	17%	2%	-

Note: 1 Statistics for species based on different periods: Deer 1987-1992; Bear 1983-1992; and Elk 1983-1992.

Source: *Hunter Harvest and Effort Database, Skeena Region*, Ministry of Environment (1994c).

Back Country Experiences

Naikoon provincial park, Gwaii Haanas National Park Reserve, Forest Service/Forest Licensee camp sites, and road/water access to many parts of the archipelago offer local residents and tourists a variety of spectacular back country opportunities.

The parks are the key attractions on the Islands and complement each other well. Naikoon has two campgrounds, both of which are popular with tourists throughout the summer months. In addition to camping, the park's primary attractions include clam digging, beach combing and driving, and hiking. Naikoon is also well used by Islands' residents throughout the year. It hosts a number of community events, such as the Graham Island fall fair. Table 2.9 highlights the increasing popularity of the park - 17 percent increase in campground attendance, and 59 percent increase in day use over the period 1991 to 1993.

Gwaii Haanas, located on the southern portion of Moresby Island, is not accessible by road. As a result, Gwaii Haanas attracts a different type of visitor than Naikoon. According to Parks Canada's first visitor survey (conducted in 1991), visitors to Gwaii Haanas come for the kayaking, cultural history, and inter-tidal life. From May to October, 1991, 1 500 registered visitors entered the park. Visitors spent an average of 18 days on the Islands, 11 of which were spent in Gwaii Haanas. Because of the park's isolation,

almost half of the visitors were on organised tours. Visitors on organised tours tended to stay in commercial accommodation before and after their visit to the park, whereas independent travellers tended to use their own accommodation, such as boats or campgrounds. According to Parks Canada officials, visitor use of Gwaii Haanas in 1991 represents approximately 80 percent of the targeted total annual visitor days for the park - 16 000 visitor days, of a targeted park ceiling of 20 000 visitor days.

Table 2.9
Queen Charlotte Islands
Naikoon Provincial Park - Campground and Day Use Attendance, 1991-93

(Number of Parties)	1993 Total	% Off Season [1]	1992 Total	% Off Season[1]	1991 Total	% Off Season[1]
Campground Attendance [2]	4 612	-	4 085	-	3 938	-
- % increase of past yr	+13%		+4%			
Day Use Attendance [3]	34 153	20%	29 806	23%	21 435	18%
- % increase of past yr	+15%		+39%			

Note: 1 Represents the period October to April.
2 Campgrounds (Agate Beach, East Beach and Misty Meadows) are open from May to September.
3 Day use for the following areas: Agate Beach, Mayer Lake, Misty Meadows, Morin Beach, Tlell River and Tow Hill

Source: Ministry of Environment, Lands and Parks, Naikoon Park, Tlell.

2.3.5 *Forestry Sector*

Approximately 77 percent of the QCI land base (784 640 hectares) falls within either the Queen Charlotte Timber Supply Area (TSA), or one of three Tree Farm Licences. Only a portion (36 percent) of the TSA/TFL land base, however, contributes to, and is available for, long-term timber supply. This area, called the 'timber harvesting land base', is calculated by reducing the total TSA/TFL land base by areas such as the following:

- non-forested areas - areas of water, rock, swamp and alpine;
- inoperable areas - areas defined as unavailable for harvest, terrain-related, or economic reasons;
- problem forest areas - forest types of poor timber quality or low timber volume that cannot be economically harvested as sawlogs.
- environmentally sensitive areas - areas considered to have sensitive soils, high water values, or tree regeneration problems;

- streamside management zones - forested buffers along fish bearing streams to protect non-timber values;
- preservation visual quality areas - areas in which no visible alterations to the landscape are permitted;
- other areas - roads and trails, culturally modified trees.

Table 2.10
Queen Charlotte Islands
Timber Harvesting Land Base and Annual Harvest Rate, 1993[1]

	Total Land Base (hectares)	% of Total	Total Timber Harvesting Land Base (hectares)	% of Total	Annual Harvest Rate[2] (000s m^3)	% of Total
Tree Farm Licences (TFLs)						
TFL 39 MacMillan Bloedel	242 961	31%	177 778	63%	1 250	62%
TFL 47 TimberWest Forest	27 676	4%	22 695	8%	132	7%
TFL 24 Western Forest Products	53 668	7%	23 514	8%	115	6%
Total TFL	324 305	42%	223 987	79%	1 497	75%
Timber Supply Area (TSA)	464 827	58%	60 358	21%	514	25%
Total TFL/TSA	784 640	100%	284 345	100%	2 011	100%

Note: 1 Information taken from licensee's recent Management Plans [TFL39 (1988), TFL47 (1988), TFL24 (1994, unofficial)], and the *Queen Charlotte TSA Timber Supply Analysis* (Ministry of Forests, 1994b).
2 TFL39 and TFL47 include supply blocks outside of the QCI. Annual harvest rate calculations for these TFLs were provided by the Queen Charlotte forest district. TFL39 and 47 cut levels include the 5 % takeback volumes for the SBFEP.

Table 2.10 highlights a number of points:

- MacMillan Bloedel controls over 60 percent of the Islands' timber harvesting land base[21];
- the TSA comprises the majority of the Islands' land base, but comprises only 21 percent of the TFL/TSA timber harvesting land base.

Timber harvesting on the Islands occurs through four major types of forest tenure: Tree Farm Licences (TFL), Timber Licences (TL), Forest Licences, and Timber Sale Licences

[21] The TFL area also includes areas under Timber Licence.

for Small Business Enterprises (SBFEP). Table 2.11 provides an overview of the general nature, and relative importance (in terms of annual harvest) of these forest tenures on the QCI. A brief description of each type of forest tenure is provided below.

- Tree Farm Licence (TFL)
  A TFL is a stewardship agreement between an individual forest company and the Forest Service that allows the company to occupy, and continuously manage the forests of a specified area. Licences include the right to harvest timber according to plans approved by the Forest Service, and the obligation to carry out all phases of forest management. TFLs have a term of 25 years and are replaceable every ten years. The three TFLs on the QCI are TFL 39, TFL 47 and TFL 24, belonging to MacMillan Bloedel Ltd., TimberWest Forest Ltd., and Western Forest Products Ltd., respectively.

- Timber Licence (TL)
  TLs are area based tenures that were issued in the early 1900s. A TL includes a right to harvest timber according to plans approved by the Forest Service, and an obligation to reforest. After harvesting, the area reverts back into either the TSA, or a TFL. The majority of the TLs on the QCI are incorporated within the TFL timber harvesting land base, and are owned by the Islands TFL licensees[22].

- Forest Licence
  A Forest Licence provides an individual forest company with the right to harvest a specified volume of timber within a TSA. It also bestows on the forest company an obligation to reforest the land. Both timber harvesting and reforestation activities are done according to a strategic management plan prepared by the licensee. A Forest Licence has a term of 15 to 20 years, and is generally replaceable every five years. There are four forest licences on the Islands, three of which are held by Husby Forest Products Ltd. The other forest licence is held by TimberWest Forest Ltd.

- Timber Sale Licence for Small Business Forest Enterprise
  These licences are offered to small business loggers, and to timber processors who qualify for registration under the Ministry of Forest's Small Business Forest Enterprise Program (SBFEP). They are short-term and allow the holder to harvest the timber within a specific area. Timber under this form of tenure is sold competitively in two ways: Competitive Sales (Section 16.0 of the *Forest Act*, for a period of one to two years), and Bid Proposal Sales (Section 16.1 of the *Forest Act*, for a period up to ten years). Competitive Sales are sold to the highest bidder, while Bid Proposal Sales are awarded to the applicant with the best combination of highest bid, and value-added manufacturing proposal. Other factors, such as the plant location, employment, and the type of product may also be considered in awarding Bid Proposal Sales. Under this form of tenure, the Forest Service assumes responsibility for most forest management, including development planning, road construction to the licence area,

[22] TimberWest's TLs (approximately 2 500 hectares) are not included as part of their TFL area. Once harvested, these areas will become part of the TSA.

Table 2.11
Queen Charlotte Islands
Major Types of Forest Tenure, 1990-93

	TYPE OF FOREST TENURE			
	Tree Farm Licence	**Timber Licence**	**Forest Licence**	**Timber Sale for Small Business Forest Enterprise**
GENERAL INFORMATION				
Licencee Rights	Occupation of specific areas of Crown land for the purpose of forest management	One-time harvest of timber from a specified area of Crown land	Specified volume per year within a specified TSA	Harvest a defined parcel of Crown land
Provincial Revenues [1]	Stumpage	Royalty	Stumpage	Stumpage and Bonus Bid
Term	25 years, replaceable every 5 or 10 years	Area becomes part of a TFL or TSA after it is harvested	Not exceeding 20 years, replaceable on 5th anniversary	Not exceeding 10 years, non-replaceable
WITHIN THE QCI/HAIDA GWAI FOREST DISTRICT				
Major Licencees, ranked by harvest volume (1990-93)	1. MacMillan Bloedel 2. Timberwest 3. Western Forest Products	1. MacMillan Bloedel 2. Timberwest 3. Western Forest Products	1. Husby Forest Products 2. Timberwest	n/a
Average Annual Timber Volume harvested 1990-93, cubic metres [2]	945,000 m^3	356,650 m^3	292,670 m^3	121,100 m^3

Note: 1 Timber harvested from provincial Crown land is subject to either royalty or stumpage charges at the time of harvest. Royalty rates are fixed according to regulation and are charged only on Timber Licences. Stumpage rates are mostly site-specific, and are determined by an appraisal method known as the Comparative Value Pricing System, which has been in effect since October, 1987. This system is intended to ensure equitability among licensees, as well as a financial return to the public that is determined by government.

2 The total average annual volume of timber harvested on the QCI over the period 1990-93 was 1.9 million cubic metres. Over this four year period, the harvest ranged from a high of 2.1 million cubic metres in 1993, to a low of 1.8 million cubic metres in 1991 and 1992. The four major types of forest tenure on the QCI accounted for 93 percent of the total volume of timber harvested during this period.

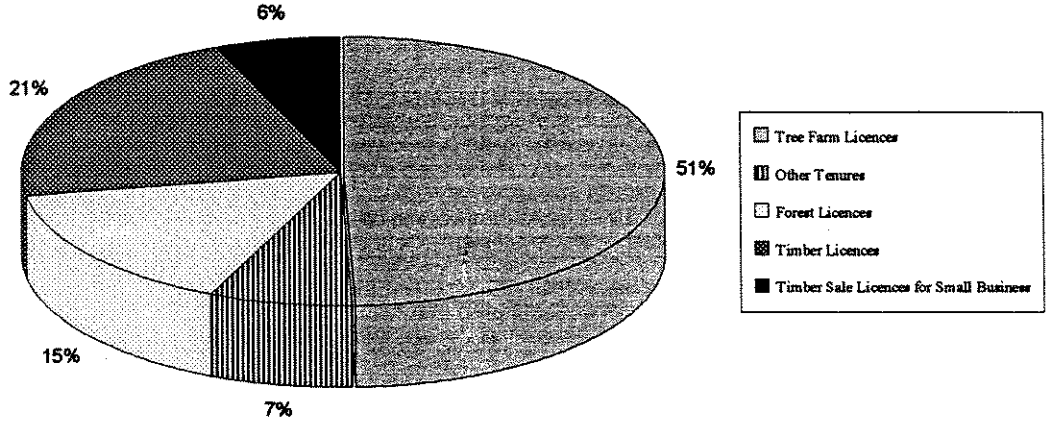
Source: Ministry of Forests, Harvest Database System, Billing History Reports

timber cruising, timber sale layout, basic silviculture and program administration. The SBFEP awards Timber Sale Licences from various areas within the TSA, and from two of the three TFLs. Currently, approximately 35 small businesses are registered with the QCI SBFEP.

Over the four year period 1990 to 1993, an average of 1.9 million cubic metres was harvested annually from the Queen Charlotte Forest District (Crown land, and private land). Approximately 70 percent of this timber was harvested under TFL agreements, or Timber Licences. A further 15 percent was harvested within the TSA by Husby Forest Products and TimberWest Forest Ltd under Forest Licences. Timber Sale Licences for Small Business Enterprise accounted for 6 percent of the timber harvest, and occurred primarily within the TSA. The remaining 7 percent was harvested from privately owned land (4 percent of the total), and the TSA (3 percent of the total). The small TSA volume (3 percent) was harvested under a variety of tenure forms including opportunity Wood Licences, Licences to Cut, and Woodlot Licences. Western red cedar, western hemlock, and Sitka spruce accounted for 95 percent of the merchantable volume over the period 1990 to 1993 (Ministry of Forests, 1994a).

Approximately 94% of the timber harvested on the Islands is barged to the lower mainland, or Vancouver Island for processing. There are two established mills on the QCI: Abfam Enterprises, and QCI Sawmills. Both had operated using ten year term Opportunity Wood Licences, amounting to less than 3 percent of the Islands annual harvest. These licences expired in June of 1994.

Figure 2.6
Queen Charlotte Islands
Percentage of Volume Harvested by Major Type of Forest Tenure, 1990-93



2.3.6 *Community Concerns and Issues*

The following discussion is intended to provide an overview of local community issues and concerns based on discussion with community officials and representatives. In addition to forestry related issues, two other concerns were identified: downsizing of the CFS at Masset, and local constraints to tourism development. All three issues have important implications for the standard of living and quality of life of local residents.

General Issues:

- As a result of the 1994 Canadian federal budget, the CFS Masset listening post (High frequency direction finding and signal intelligence collecting facility) will be reduced to a remote operation with a skeleton staff. While the precise nature of the personnel impact from downsizing has not yet been determined, it is anticipated that by 1997 only 40 to 60 staff will remain of the Station's current 300 military and civilian workers. According to the Department of National Defence (1994), the station population currently contributes upwards of 50 percent of the community's income base, and provides grants in lieu of taxes that account for approximately 50 percent of Masset Village's revenues. The Village of Masset is just beginning a process to discuss their options and decide on a future direction for the community. Of particular concern to local residents is the future of the CFS hospital, which is also used by the residents on the north-end of Graham Island.
- The local communities (aboriginal and non-aboriginal) have rejected a tourism strategy that would attempt to make the Islands a world class tourist destination. Instead, communities have opted for a "local control, and a go slow approach to tourism development" (Gram, 1994: 44). Inexperience and differing visions among the communities, however, have stalled the development of an on-Islands' tourism strategy. In turn, this has held up efforts to enhance the limited existing tourism infrastructure. Parks Canada has also established a visitor ceiling for the Gwaii Haanas park reserve that is only slightly above its current visitor level. Combined, these factors have led to only a limited increase in tourism, since the establishment of the park in the late 1980s. Moreover, they will likely constrain future growth of the tourism sector on the Islands over the short to medium term[23].

Forestry Issues:

- A majority of the community representatives contacted felt that the current total TFL/TSA AAC level was too high, and not sustainable in the long run. Almost all local community representatives thought it needed to be reduced immediately, especially within the TSA.
- Forestry is the leading economic sector on the Islands. In particular, the communities of Port Clements and Sandspit are highly dependent on forest sector employment. Other settlement areas (Queen Charlotte City/Skidegate and Masset/Old Masset) also look to

[23] Parks Canada initiated an socio-economic impact study of Gwaii Haanas park reserve on the economy of the QCI in the fall of 1992. The study is targeted for release in 1994.

the forestry sector to ensure community stability, especially in the face of the constraints on tourism growth, and the pending downsizing of CFS Masset. People are concerned that reductions in timber harvesting will either directly, or indirectly, undermine the health and viability of their communities.

- Community representatives, however, believe that local employment and community stability can be maintained in the face of timber harvest reductions if policy/legislative changes are introduced to increase the amount of timber processed on the QCI.
- While unanimity seems to exist around the desire for increased on-Islands processing of locally harvested timber, there is a lack of consensus as to how this should be accomplished. Opinions ranged from (a) requiring existing licence holders to manufacture a portion of their AAC on the QCI, (b) making more timber available to the Small Business Forest Enterprise Program, i.e., timber sales on a competitive basis, and Bid Proposal sales, and (c) ensuring that existing local processing facilities have access to a continuous wood supply through renewable licences.
- The cost and availability of energy are currently constraints to industrial development on the QCI. Customers are presently served by a diesel generating station in Masset, and a hydroelectric generating station at Moresby Lake, on Moresby Island[24]. At present, the two systems are not electrically connected; Masset/Old Masset Village, and the Village of Port Clements receive their power from Masset, while Tlell, Queen Charlotte City/Skidegate and Sandspit are serviced from the Moresby Lake hydroelectric station. The existing systems are unable to meet the Islands forecasted long-term electricity needs. B.C. Hydro is in the process of evaluating projects to address this capacity issue. When implemented, the new system should reduce electricity generation costs to B.C. Hydro. Because B.C. Hydro is obligated to provide electricity to all of its 'off-main grid' customers at a set price, cost savings realised from the new system will not affect electricity prices on the Islands. At present, customers on B.C. Hydro's main grid pay significantly cheaper rates than do households and businesses in areas such as the QCI (i.e., off-main grid).

2.4 Haida Nation

The purpose of this section is to outline the Haida use of the Islands' forest resources, as well as present their specific concerns with respect to current forestry management practices. This section was written with the intent to reflect Haida thought, and in many cases the comments are those of the Haida.

2.4.1 *Overview*

Two Haida communities are located on Haida Gwaii: Old Masset Village, situated on the north end of Graham Island, and Skidegate, situated on the south east end of Graham Island. Two Haida villages are also located in southeast Alaska, and significant communities are found in urban settings in both the US and Canada. The total Haida

[24] A diesel generating plant is also located in Sandspit and provides back-up and peaking to the hydroelectric station.

population (on and off QCI) is 3 137, of which 36 percent (1 120) live on reserves (INAC B.C. Region, 1993).[25] The Council of the Haida Nation (CHN) represents the interests of the Haida communities.

Haida history recalls the emergence of the islands from the ocean, the first tree and at least two floods. Recent archaeological and historical studies confirm the Haida story of lands and people that were flooded by the sea, and suggest that humans have occupied the Islands for at least 10 000 years (Archipelago Management Board, 1994).

Resource harvesting activities and the inherent interaction with the land and sea constitute a significant aspect of Haida culture. The availability and abundance of food and materials from the sea and the Islands' forests enabled the Haida to establish an elaborate social, religious, and economic structure. The Haida "art form" evolved through a close interaction with the natural world. Today, common household utensils used in the old days are held in high esteem as art objects, and contemporary art is displayed in galleries around the world. Haida building technology is recognised in the world of architecture, and Haida marine engineering skills are exemplified by their ocean-going canoes. The Islands continue to be a source of spiritual, cultural and economic activity to the Haida people. (Archipelago Management Board, 1993)

Haida Forestry

Haidas have always enjoyed an industrious marine lifestyle and winter villages were located along the waterways and coastlines of the archipelago. The Islands' forests were also integral to the Haida. Not only did plants provide them with diverse foods, ranging from berries to the inner bark of trees, but many species were also sources of materials required for medicines, and for housing, fishing and hunting technologies (Turner, 1994). Recent archaeological work has documented Haida habitation (shell middens[26]), and resource utilisation (lithic sites[27], culturally modified trees) sites throughout the Islands (Archipelago Management Board, 1994).

Studies conducted separately and jointly by the CHN, the Forest Service and forest companies have begun to document the frequency and location of Culturally Modified Tree Sites (CMTS) on Haida Gwaii. A CMT is a tree that has been intentionally altered by Haida forestry practices. Three examples of CMTs include the following:

---

[25] Dalzell (1968) estimates that the Haida population numbered 10 000 people prior to European contact in the late 1700s. By the turn of the 20th Century, the Haida nation, decimated by European introduced epidemics, was reduced to a population under 500. The surviving Haidas moved from various seasonal settlement sites throughout the Islands, and consolidated in the two permanent communities of Old Masset and Skidegate.

[26] A midden indicates a site of former human habitation and usually consists of shell and bone fragments, charcoal, remains of cooking fires and food gathering tools.

[27] Lithic sites are characterized by concentrations of stone tools and fragments, and chipped stone flakes which indicates locations of ancient tool making.

(1) barked stripped trees - bark slabs removed for use as building materials, and long tapering (triangular) scars associated with the collection of strips of inner bark for weaving into clothing, mats and baskets;
(2) logged trees - either standing or felled trees with evidence for wood use as planks for construction, poles, canoes, and kindling;
(3) test hole trees - trees with squared holes cut into the heart.

A recent study was conducted by Arcas Consulting Archaeologists for the Ministry of Forests and the CHN (1994),and was carried out in seven regions on the Islands: Pacific Coast, Naden Harbour, Masset Inlet, East Coast, Skidegate Inlet, Moresby East and Moresby West. Findings of the study include:

- Haida forestry took place in all seven regions.
- CMTs were found in a variety of environmental settings but more frequently in (1) old stands of forest (251+ years) on medium quality growing sites with either red cedar or hemlock as the leading species, (2) on low gradient terrain, and (3) within 800 metres of shore; although in parts of Masset Inlet (notably Ain, Yakoun and Mamin Rivers, and in Florence and Canoe Creeks), as well as Naden Harbour, CMTs were found up to seven kilometres from shore.
- Almost 700 CMTs were identified in the plots surveyed.
- CMTs are significantly more common on land classified as operable (containing stands suitable for logging), than on inoperable land.

Current Economic Activities

In addition to government, the formal economies of Old Masset and Skidegate are based on participation in the forestry and fishing sectors. Other employment opportunities include manufacturing, retailing, tourism, and transportation. The two Haida communities, however, differ significantly in terms of their economic health. The unemployment rate (1993) in the village of Old Masset is estimated to be upwards of 50 percent, whereas in Skidegate, the rate is estimated to be 25 percent.

The forestry sector is currently estimated to employ between 15 to 20 percent of the labour force in both Old Masset and Skidegate. In Old Masset, Haida silviculture companies are a major source of employment, with fewer numbers of people employed in logging, and processing. In Skidegate, almost all forestry employment is associated with logging. Forestry (logging, silviculture, timber processing, as well as activities such as carving and weaving) is regarded by both communities as being an essential component of the Haida future.

Treaty Negotiations

The Haida Nation has asserted its ownership and jurisdiction over all the lands and waters surrounding Haida Gwaii. The Haida maintain that they have never been conquered, nor have they ever entered into a treaty. In 1993, the Haida agreed to submit a letter of intent to participate through the British Columbia Treaty Commission to negotiate a modern day treaty with the governments of British Columbia and Canada.

Negotiations are intended to resolve the current ambiguities associated with the common law concept of aboriginal rights and resolve outstanding jurisdictional disputes. The objective is to negotiate modern treaties that provide a clear, certain and long-lasting definition of rights to lands and resources. The three parties have agreed to begin formal negotiations. A specified timetable for concluding the negotiations process has not been set.

2.4.2 *Issues and Concerns*

During interviews for this study, Haida representatives stated the following four broad concerns with respect to current forestry activities on Haida Gwaii: (1) poor logging practices that compromise other values, (2) the rate of timber harvesting, which exceeds the lands capacity to regenerate, (3) off-Islands "corporate" control over the forestry sector, which is impoverishing the Islands, and (4) a need to leave some regions in a natural, unlogged state. The CHN believes that industry's practice of clear-cut logging disturbs and destroys wildlife and fish habitat, as well as highly valued cultural sites (for example CMTs and old village and canoe making sites). They consider the current total harvest rate of 2.1 million cubic metres to be unsustainable, i.e., beyond the Islands' capacity to regenerate a full range of forest values. The CHN is also dissatisfied with the current timber allocation and that their communities to date have been unable to obtain timber rights. Moreover, they are concerned by what they see as a narrow and misplaced focus on the part of the major forest companies, who give priority to profits at the expense of community stability (local jobs and processing) and sustainable management of the forest resource.

The Haida are interested in securing access to, and control over, forests on Haida Gwaii for ecological and cultural reasons, and for economic purposes within a sustainable rate of cut. From an ecological and cultural standpoint, the Haida want to ensure that future generations will be able to enjoy the range of forest values that exist today, in particular, old, large diameter cedar trees for carving poles and use in traditional architecture. From an economic perspective, they want to increase their communities involvement in the forest industry, and develop more on-Islands processing and marketing.

In 1993, the CHN requested a moratorium on forest development activities within 14 areas on Haida Gwaii (see Table 2.12, and Figure 2.7) until treaty negotiations are concluded. Forest development pressure is not anticipated for the next five years in nine of these interest areas. However, timber harvesting proposals are pending in the remaining five areas of Duu Guusd, Gray Bay-Cumshewa Head, Government Creek, Kootenay Inlet and the Tlell River Watershed (TFL Portion). Two of these interest areas (Duu Guusd and Kootenay Inlet) are in the TSA and are under immediate forest development pressure. CHN representatives state that use of these areas for timber harvesting would jeopardize treaty negotiations.

Summary of the Haida position

The Haida Nation sees a wholesale change to the land as being comparable to the relocation projects of the 18th and 19th century when people were removed from the land and cultures were suppressed. The Haida believe that changing the land around the people would have the same effect as removing them.

Other CHN positions include the following:

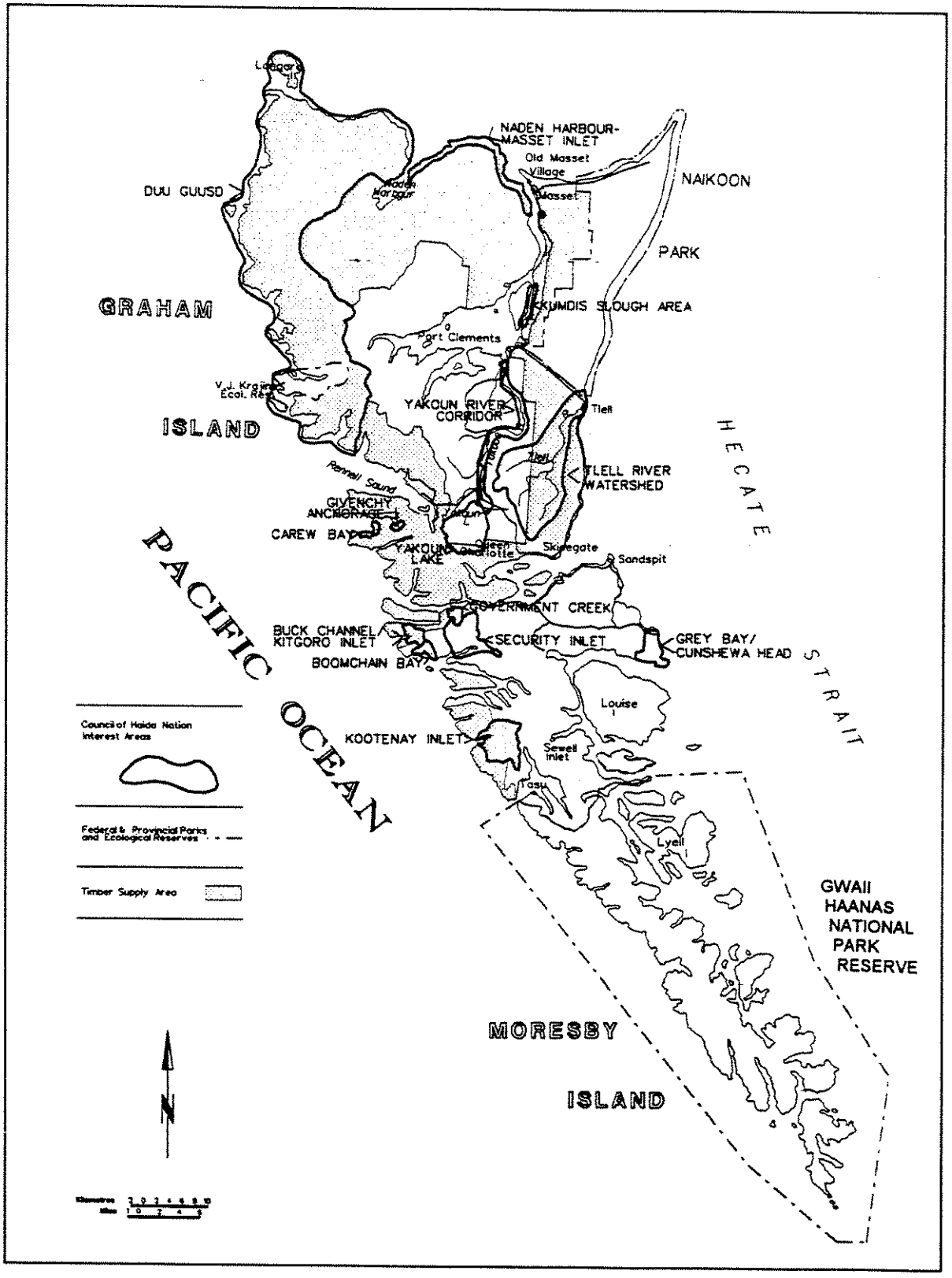
- decrease the total AAC (TSA and TFL) on the Islands by at least 50 percent, from 2.1 million to approximately 1.0 million cubic metres;
- encourage more labour intensive logging focusing on employment for Islands' residents;
- ban the planting of non-indigenous species, and the use of pesticides or herbicides on the Islands;
- make local processing and value added production a priority on the Islands; and,
- restructuring of the forest tenure system.

Table 2.12
Queen Charlotte Islands/Haida Gwaii
CHN Areas of Interest - Request for Moratorium on Forest Development Activities

Interest Area	Immediate Forest Development Pressure ?	Location
Duu Guusd	Yes	TSA
Gray Bay - Cumshewa Head	Yes	TFL 39
Government Creek	Yes	TFL 47
Kootenay Inlet	Yes	TSA
Tlell River Watershed (TFL Portion)	Yes	TFL 39
Tlell River Watershed (TSA Portion)	No	TSA
Masset Inlet-Naden Harbour	No	TSA
Buck Channel - Kitgoro Inlet	No	TSA
Kumdis Slough	No	TSA/TFL 39
Boomchain Bay	No	TFL 39
Security Inlet	No	TFL 39
Givenchy Anchorage	No	TSA
Carew Bay	No	TSA
Yakoun Lake and Drainage	No	TFL 39

Note: TFL 39 (MacMillan Bloedel); TFL 47 (Timber West)
Source: Council of the Haida Nation, B.C. Ministry of Forests

Figure 2.7
Queen Charlotte Islands / Haida Gwaii
Haida Areas of Interest



TSA FOREST SECTOR OVERVIEW

The purpose of this chapter is to describe the current Timber Supply Area (TSA) situation, including the land base available for timber harvesting, guidelines that direct forest management, planning and land claims processes which may in the future impact on the timber harvesting land base, apportionment of the AAC, and employment associated with timber harvesting and related activities. As well, the chapter outlines the base timber harvest forecast for the Queen Charlotte TSA.

3.1 Timber Harvesting Land Base

The Queen Charlotte TSA has and area of approximately 460 000 hectares, of which 13 percent (60 358 hectares) is currently considered available for timber harvesting. Table 3.1 presents the long term timber harvesting land base.

The TSA timber harvesting land base is comprised mainly of hemlock (49 percent), western red cedar (30 percent) and Sitka spruce (21 percent). A large portion of the existing forest is classified as mature, i.e., over 120 years old. Much of this mature timber is over 250 years old. (Ministry of Forests, 1994b)

3.1.1 Land Base and Timber Supply Issues

Use of the Islands' forests continues to be the subject of intense debate. Dissension stems from disputes over land and resource ownership/jurisdiction, as well as conflicting resource values, such as timber harvesting, community stability, recreation, tourism, biodiversity, and cultural heritage. The establishment of Gwaii Haanas national park reserve in 1988, for example, was the culmination of over a decade of conflict locally, nationally, and to some extent internationally. The debate involved, (1) people concerned with logging on the Islands and protecting wilderness, (2) Haida Nation interests in maintaining resource options until the question of title and jurisdiction can be settled, and (3) forestry companies and their workers interested in maintaining jobs, standards of living, and a way of life.

In the past, these types of conflicts were addressed when they reached a flash point. Today, provincial processes have been initiated to address First Nations land claims, and proactively deal with the conflicting and changing demands that our society places on its resource base. These processes, comprehensive claims and various levels of land and resource use planning, may impact on the Queen Charlotte TSA timber harvesting land base, and thus affect the timber available for harvest. These potential impacts have not been factored into the 1994 timber supply analysis.

- **Comprehensive Claims Process:** It is impossible to forecast what impact comprehensive claims will have on the TSA timber harvesting land base. Moreover, this process is only in its early stages on Haida Gwaii. In the interim, the Council of

Table 3.1
Queen Charlotte TSA
Timber Harvesting Land Base

Classification	Area (hectares)	% of Total Area
Total land base	464 827	100 %
Less:		
Non-Crown land	- 26 518	5.7 %
Non-forest land	- 89 927	19.3 %
Reductions to Crown forest [1]	- 288 759	62.2 %
Initial timber harvesting land base	59 623	12.8 %
Additions:		
Not satisfactorily restocked (NSR) [2]	+ 2 261	.5 %
Timber Licence reversions [3]	+ 2 161	.5 %
Current timber harvesting land base	64 045	13.8 %
Future Reduction:		
Future roads, trails and landings	-3 687	.8 %
Long term timber harvesting land base	60 358	13.0 %

Notes:

1 Reductions include problem forest types (142 085 ha), inoperable areas (127 943 ha), and environmentally sensitive and visual quality concern areas, streamside management zones, Skidegate reserve expansion, culturally modified trees, existing roads and trails and NSR (total of 18 731 ha).

2 NSR are considered available for timber production and are added back into the timber harvesting land base once prescribed treatment plans have been specified.

3 Areas under timber licences are expected to be harvested over the next 25 years. Once harvested, these areas will return to the Crown forest and become part of the timber harvesting land base.

Source: *Queen Charlotte TSA Timber Supply Analysis*, Ministry of Forests, Victoria, August 1994.

the Haida Nation (CHN) has requested a moratorium on logging activities in seven areas of the TSA. Two of these areas, Duu Guusd (136 400 hectares) and the Tlell River Watershed (7 500 hectares), represent significant portions of the remaining operable mature forest area within the TSA, and are scheduled for timber development in the near future (see Table 2.12, and Figure 2.7). Together, these two areas comprise approximately 40 percent of the gross operable mature timber harvesting land base[27] (Duu Guusd, 14 000 hectares, and Tlell River Watershed, 7 500 hectares).

- **Land Use Planning Processes and Forest Management Guidelines:** Also impossible to forecast is how various land use planning processes, such as Land and Resource Management Planning, Local Resource Use Plans, Protected Areas Strategy,

[27] Gross operable timber harvesting land base represents operable hectares prior to netdowns for non-timber values, roads, trails and landings.

and new forestry legislation will impact on the TSA timber harvesting land base. Moreover, many of these processes have not yet been implemented on the Islands.

Land and Resource Management Planning (LRMP):
An LRMP is a sub-regional (i.e., forest district level) integrated, consensus building process that produces a Land and Resource Management Plan for review and approval by government. The process considers resource issues such as wildlife management, ecosystems networks, recreation/tourism designated areas and protected areas, and involves active participation by the public, aboriginal groups, and government agencies. The plan specifies broad resource management objectives and strategies, and provides direction for more detailed resource planning by government agencies and the private sector. LRMPs are scheduled to be initiated and completed for all forest districts in the province, including the Queen Charlotte forest district, by the Year 2002. The process will consider all Crown land (TSA and TFL).

Protected Areas Strategy (PAS):
In 1992, the government of British Columbia released a Protected Areas Strategy (PAS) with the intention of protecting representative examples of the major ecosystems across the province's 119 ecosections, as well as, special natural, cultural and recreational features. The Prince Rupert Regional Protected Areas Team (RPAT) is in the process of completing a technical analysis of the Prince Rupert Region, including the QCI, identifying gaps in the existing protected areas, and evaluating large proposed areas of interest to fill those gaps. On the QCI, the analysis focuses on 11 areas of interest from a conservation and recreation standpoint, seven of which are within the TSA[28].

A significant portion of the Islands is already protected (see Table 2.1) and the regional RPAT analysis will place areas under study on the QCI into a PAS regional context.

Provincial government approved PAS study areas, such as Northwest Graham Island, are subject to interim protection from development activities. PAS study areas, however, have not been removed from the timber harvesting land base. A decision on the study areas proposed in the gap analysis will be made following public review.

Local Resource Use Plan (LRUP):
An LRUP is carried out to develop area-specific resource management objectives and prescriptions (i.e., watershed level). It is typically used in response to conflicts that arise among interest groups as a result of multiple demands on the resource base. One LRUP process is currently pending for the Tlell River watershed as a result of a request from local community members who wish to protect the area's old growth and

[28] The seven interest areas identified in the RPAT analysis that fall within the QCI TSA are: Northwest Graham Island (35 650 hectares), Duu Guusd (136 400), Kootenay Inlet (2,800 hectares), Gudal Bay/Marble Island (3 100 hectares), Engelfield Bay (2,500 hectares), Upper Tlell River (7,000 hectares), South End of Eden Lake (4 100 hectares). Northwest Graham Island is also included within Duu Guusd.

wetlands ecosystems. Timber harvesting within the TSA portion of the watershed is suspended until the LRUP has been completed. However, the area remains part of the timber harvesting land base.

Forest Practices Code:
The Ministry of Forests has developed forest management guidelines to provide an overall framework for integrated resource management within the province. The newly introduced Forest Practices Code will enhance and support existing guidelines. Potential impacts could include reductions in AAC to meet biodiversity, and riparian (lakes and streams) guidelines.

3.1.2 Current Management Practices

Forest management in the Queen Charlotte TSA is subject to a wide range of guidelines. Those guidelines which are particularly important to the *Queen Charlotte TSA Timber Supply Analysis* (1994) are outlined below.

- **Harvesting System and Maximum Cutblock Size**
  To date, virtually all areas in this TSA are managed using a clearcut silvicultural system, and restocked by planting or natural regeneration. In accordance with Coastal Planning Guidelines, the largest clearcut blocks permitted are 40 hectares. In special cases, such as salvage of fire and windblown stands, and partial-cutting harvest systems, cut blocks may exceed 40 hectares.

- **Utilization Levels**
  The most common measure of the amount of standing timber is cubic metres per hectare. This measure assumes a utilization level, or set of dimensions that establishes a minimum size limit for trees and logs that forest licensees are obligated to harvest and remove from a site. Utilization levels specify a maximum stump height and minimum diameters at the tree base and top. Minimum tree top diameter for old growth timber is 15 centimetres. Second growth harvesting is still uncommon within the TSA. Its minimum tree top diameter is 10 centimetres. A 30 centimetre stump height is the standard for both old growth and second growth timber. All harvested areas are waste assessed in accordance with current policy, i.e., licensees will be charged stumpage/royalties on timber still on site that meets utilization standards, and the volume will be charged against the licensees cut-control volume.

- **Minimum harvest ages** - Minimum harvest age is defined as the time it takes for stands to grow to harvestable size. In this timber supply area, a minimum average tree diameter of 45 centimetres and a minimum timber volume of 350 cubic metres per hectare were used to define minimum harvest age. The resulting minimum harvest ages range from 100 to 150 years, and vary by tree species, site productivity and management regime. Although the minimum harvest age defines the lower limit for harvesting, actual harvest age depends on many factors including ages of other stands, limits on overall harvest level and forest cover requirements.

- **Cutblock Adjacency, Green-up and Forest Cover Objectives**
  Cutblock adjacency and green-up requirements specify the spatial pattern of cutblocks and the amount of time required for regenerated stands to reach a specified condition before adjacent timber can be harvested. Forest cover objectives specify the desired distribution of areas by age or size class. The Queen Charlotte TSA is separated into three forest management zones, an Integrated Resource Management (IRM) zone, and two Visual Quality Objective (VQO) zones (Retention, and Partial Retention). Specific requirements set out for each of these zones are as follows:

  IRM zone: Comprises 77 percent of the TSA's timber harvesting land base, and emphasizes integration of all resource values. At all times, no more than 25 percent of the forest within this zone can be less than 5 metres in height. All harvested areas must be reforested. Adjacent blocks can be harvested once young stands reach free-to-growth status.

  VQO zones: The Retention and Partial Retention VQO zones comprise 7 and 15 percent, respectively, of the TSA timber harvesting land base. The retention VQO zone includes areas deemed to be of high landscape value, such as forested slopes facing viewpoint and recreational use areas, while the Partial VQO zone includes areas of moderate landscape value. Initial forest cover requirements allow no more than 5 percent of forest area within the Retention VQO to be less than 5 metres in height, while within the Partial Retention VQO zone the allowance is 15 percent.

  All three management zones are subject to old growth/biodiversity forest cover requirements that specify that at least 6 percent of the forested area must be greater than 150 years of age at all times.

- **Silviculture**
  Successful reforestation of logged sites is assumed following a regeneration establishment period of three years. A Pre-harvest Silviculture Prescription must be prepared for each proposed cutblock, based on the B.C. biogeoclimatic ecosystem classification system. Currently, the TSA has virtually no backlog of not satisfactorily restocked (NSR) areas.

- **Protection**
  Forest losses due to wildfire, insects, diseases, and blowdown within the TSA are minimal. Blowdown is usually salvaged with little loss of volume, except where access, cost, isolation, and adjacent values are limiting factors. Average losses due to insects are approximately 3 000 cubic metres per annum, while wildfire losses are irregular and small in scale.

3.2 Current Timber Supply Situation

The current allowable annual cut (AAC) for the TSA is 514 335 cubic metres[29]. The apportionment of the AAC is outlined in Table 3.2.

3.2.1 Overview of Major TSA Licensees

Husby Forest Products Ltd.

The largest apportionment of TSA timber is held by Husby Forest Products Ltd. Comprised of three Forest Licences apportioned to Sitkana Timber Ltd., Naden Harbour Timber Ltd., and Husby Forest Products Ltd., and one major Timber Sale Licence apportioned to Dawson Harbour Logging Co. Ltd., Husby's tenures total 341 906 cubic metres, or 65 percent of the total AAC. Harvesting activity takes place on Graham Island and involves both land based and helicopter logging. Once harvested, the timber is barged to the Lower Mainland for sorting and eventual sale to Vancouver and Vancouver Island mills. From 1990 to 1992, hemlock was the predominant species harvested (49 percent), followed by spruce (31 percent), cedar (17 percent), and cypress (3 percent).

Husby operations provide harvesting, road building, transportation, silviculture, and head office related employment of approximately 32 PYs for Islands residents, and a further 130 PYs for off-Islands residents. Husby Forest Products Ltd. head office is located in Delta, just south of Vancouver.

TimberWest Forest Ltd.

TimberWest Forest Ltd. possesses both TFL and TSA timber rights. The company is majority owned by Fletcher Challenge Canada Ltd. The bulk of its operations involve TFL 47, located at the north end of Moresby Island. Harvesting rights for TSA timber is apportioned through a replaceable Forest Licence of 24 292 cubic metres per year, accounting for five percent of the total AAC.

The majority of TimberWest's TSA operation takes place on Moresby Island (70%) with the remainder on Graham Island. Both pulp logs and saw logs are harvested. The pulp logs are shipped to the Fletcher Challenge pulp mill at Crofton, on Vancouver Island, while the saw logs are shipped to the Lower Mainland for processing. The majority of these saw logs are purchased by International Forest Products whose resulting wood chips are then returned to Fletcher Challenge for use in its pulp operations.

TimberWest's TSA operations support approximately 12 to 15 PYs of harvesting and related employment (4-5 PYs accrue to Islands' residents), and a further 22 processing PYs in mills located off-Islands.

---

[29] The AAC in 1981 was 450 000 cubic meters. Two opportunity wood licences were issued in 1984 to Abfam Enterprises and QCI Sawmills. These licences amounted to an additional annual cut of 60 000 cubic meters. However, these licences were not added to the TSA AAC until 1989. In 1991, the AAC was further increased by 4 335 cubic meters as a result of an area take-back from TFL 47 (TimberWest) for the Small Business Forest Enterprise Program.

Table 3.2
Queen Charlotte TSA
Apportionment of TSA Allowable Annual Cut

	Coniferous (cubic metres)	Percent of Total AAC
Forest Licences:		
Husby Forest Products Ltd. [1]	333 950	65 %
TimberWest Forest Ltd. [2]	24 292	5 %
Total Forest Licences	358 242	70 %
Timber Sale Licences - Small Business:		
Any Category [3]	76 692	15%
<= 10,000 (major) [4]	8 712	1 %
Total Timber Sale Licences - Small Business	85 404	16 %
Temporary Opportunity Wood Licences:		
Abfam Enterprises Ltd.	40 000	8 %
QCI Sawmills Ltd.	20 000	4 %
Total Temporary Opportunity Wood Licences	60 000	12 %
Woodlot Licences	10 689	2 %
Total TSA QCI/Haida Gwaii	514 335	100 %

Notes:

1 Includes three licences: Husby Forest Products Ltd. (183 132 m^3), Naden Harbour Timber Ltd. (125 380 m^3), and Sitkana Timber Ltd. (25 438 m^3).

2 Formerly Fletcher Challenge Canada Ltd.

3 Includes Competitive Sales (Section 16.0) and Bid Proposal Sales (Section 16.1). From 1991 to 1993, between 12 and 17 Timber Sales licences were awarded per year to 19 different small businesses. Timber Sale licence volumes ranged from 25 cubic metres, to 26 000 cubic metres. This volume excludes 5% TFL take-backs from TFL39 (56 324 m^3 per year) and TFL24 (10 335 m^3 per year).

4 Includes three licences: Dawson Harbour Logging Co. Ltd. (7 956 m^3), Kano Logging Co. Ltd. (484 m^3), and S.S.E. Sound Spars Enterprises (272 m^3). These three licences have ten year terms and are replaceable.

Source: Ministry of Forests, 1994

Abfam Enterprises Ltd.

Abfam Enterprises Ltd. is a locally owned and operated lumber mill located on the outskirts of Port Clements. From 1984 to 1994 its timber supply came from a ten year, non-renewable, Opportunity Wood Licence for 40 000 cubic metres per year (8 percent of the total AAC). The tenure of this licence expired in June, 1994.

The mill primarily saws red cedar, some of which is obtained by trading hemlock and spruce to other operators in British Columbia, and Alaska. In 1991 and 1992, the mill

processed 44 700 and 45 000 cubic metres of timber, respectively, for an average annual output of approximately 8 million board feet. The harvesting and milling operations provide 39 PYs of employment for local area residents.

The central issue for this operation is a secure access to timber. With the expiration of its temporary timber sale licence this year, Abfam Enterprises must turn to bidding for timber sales provided by the Small Business Forest Enterprise Program. Company officials argue that because of the minimal amount of timber processed on the Islands, more emphasis should be placed on access to timber for local processors.

QCI Sawmills Ltd.
QCI Sawmills Ltd. is located a few kilometres south of Masset. From 1984 to 1994 a temporary Opportunity Wood Licence provided an AAC of 20 000 cubic metres per year (4 percent of the total AAC). Similar to Abfam Sawmills, this licence expired in June, 1994. The mill primarily saws red cedar and has produced some log homes using special peeling and grooving machinery. QCI Sawmills Ltd. supports approximately 12 PYs per year. A secure access to timber is the central issue facing this company.

Small Business Forest Enterprise Program (SBFEP)
From 1990 to 1993, the TSA SBFEP averaged an annual timber harvest of approximately 94 000 cubic metres, or 16 percent of the total AAC. This figure does not include timber cut under the SBFEP on TFL lands. Approximately 35 operators compete for the timber sold under the SBFEP. The average employment supported by SBFEP harvesting was approximately 18 PYs on the Islands, and 36 PYs in the province. Because harvesting employment is seasonal, these PY figures would translate into a higher number of part-time jobs. The timber harvested under the SBFEP supports a further 85 processing jobs across the province.

In 1992, the Queen Charlotte Islands Independent Forestry Association commissioned a study into the SBFEP on the QCI. The report, prepared by Strathinnes Forestry Consultants Ltd., concluded that a greater focus on the smaller operator was necessary. As a result, the SBFEP has offered a greater variety in the quantities of timber for sale. In 1992, SBFEP sales ranged from a low of 50 cubic metres to a high of 26 000 cubic metres (the latter sale represented windthrow salvage).

3.2.2 Forest Sector Employment
Current TSA forestry operations support 695 direct PYs; approximately 169 PYs, or 24 percent of those, are local residents. Included in these estimates are harvesting and related employment comprised of falling, log sorting, transportation, road building and maintenance, all processing activity generated by TSA harvested timber (both on and off-island), basic and incremental silviculture, marine transportation and sorting, various planning and administrative jobs, and Forest Service jobs.

The forest sector employment supported by the TSA harvest can be separated into harvest-dependent and harvest-related categories. Harvest-dependent activity includes harvesting, processing, and basic silviculture, and is closely correlated with the level of harvest, i.e., if the harvest level changes, harvest dependent activity changes concurrently and in the same direction. Conversely, harvest related activity is not so tightly correlated to the harvest level. For example, Forest Service employment would not necessarily change as the harvest changes, as it is more dependent on government policy than the level of harvest. Similarly, incremental silviculture is not as dependent on the level of harvest as is basic silviculture. This assumption would hold in the short-term. In the longer-term, causal linkages between harvest related employment and harvest levels exist, but are difficult to accurately quantify. The economic analysis in this report examines the changes in harvest dependent activity.

Harvesting

Harvesting activities support approximately 82 PYs of forestry employment for Islands residents, and 200 PYs for the province as a whole. The majority, 118 PYs, or almost 60 percent, are non-Islands residents who are flown to logging camps for specific periods of time. While road transportation is included in this total, transporting the timber to the mainland is not. Marine transportation providing log barge services supports approximately 31 PYs, through upwards of 41 barge trips per year.

Processing

Approximately 76 percent of the timber harvested in the Queen Charlotte TSA is destined for processing mills elsewhere in British Columbia. The majority of processing employment generated by this timber occurs in the Vancouver and Vancouver Island region. From 1990 to 1993, the average number of off-island processing jobs dependent on Queen Charlotte TSA timber was approximately 366 PYs. Approximately 12 percent of the TSA wood is processed on the Islands, generating an annual average of 46 PYs over the same period.

From 1989 to 1992, an additional 12 percent per year (60 000 cubic metres) of the timber harvested on the Islands was exported from British Columbia. The export of raw logs from the QCI occurs through an Order in Council (OIC). Concurrent OICs have been in effect for the Queen Charlotte, North Coast, and Mid-Coast TSAs since the late 1980s, and cover volumes of standing timber. The current OIC is in effect for the period January, 1994, to January, 1995, and permits the export of raw logs other than western red cedar and cypress according to the following conditions: the tenure must be a SBFEP sale or other licence not associated with a processing facility and must have been awarded prior to January, 1994; 30 percent of the first 10 000 cubic metres of volume scaled and billed after January 1, 1994; and, 10 percent of the volume scaled and billed after the first 10 000 cubic metres to a total export volume of no more than 4 000 cubic metres. The volumes approved for export under this type of application have decreased in recent years and will likely be discontinued, unless future economic conditions warrant further exports.[30]

[30] Export of raw logs from British Columbia can also occur through Ministerial Orders (MO). An MO is for volumes of harvested timber less than 15 000 cubic metres and is approved on a case by case basis; the

The processing employment figures are adjusted to reflect the export of logs under the existing market logger OIC. The analysis of future employment and income impacts assumes that the volume of exports will remain roughly the same. This assumption may not reflect the future export situation; however, any adjustment is unlikely to provide a greater degree of accuracy, given the uncertainty surrounding the future of the northcoast market logger export OIC, or other export program.

Silviculture

Silviculture operations associated with the Queen Charlotte TSA generate approximately 39 PYs of employment per year. These jobs are divided into 26 PYs of basic silviculture (comprised of site surveys, preparation, planting, brushing, and some spacing), and 13 PYs of incremental silviculture (comprised of spacing, fertilising, and pruning), which occurs after the new growth reaches free growing status. Twenty PYs of basic silviculture and the 10 PYs of incremental silviculture accrue to Islands residents. Husby Forest Products and TimberWest Forest Ltd. are responsible for basic silviculture on all of their harvested lands. Basic silviculture on all other harvested lands, and all incremental silviculture on all Crown lands in the TSA is the responsibility of the Ministry of Forests.

Basic and incremental silviculture operations support approximately 39 person years, but because of its seasonal nature much of the employment consists of part-time work. As a result, a significantly higher number of people participate in silviculture work than is indicated by PYs.

Forest Service

The Queen Charlotte Forest District office is located in Queen Charlotte City and is part of the Vancouver Forest Region. The district office oversees TFL and TSA forest management, and employs 46 Forest Service staff. The TSA supports approximately 10 PYs at the District level and a further 3 PYs at the Regional office in Vancouver[31].

Employment Coefficients

Table 3.3 shows the direct, indirect and induced, and total employment levels for the TSA and province. The table also presents 'harvest dependent' employment coefficients used to estimate future employment and income levels. Appendix 4 gives a detailed description of the coefficients' calculation, use, and underlying assumptions. Note, the table does not include Forest Service or incremental silviculture employment when calculating employment coefficients.

timber must be surplus to the needs of the province. Prior to export, the timber must be made available for sale to any British Columbia producer through an open bid system. An application for export is approved only if no bids have been received.

[31] Estimates of District and Region employment are found by prorating total employment by the percentage of TSA AAC to total District AAC, and to total Region AAC, respectively.

Table 3.3
Queen Charlotte TSA Employment and Employment Coefficients
(based on the current AAC of 514,335m3)

	TSA employment	Total provincial employment [1]	TSA employment per 1000 m^3	Provincial employment per 1000 m^3
Harvest Dependent				
Harvesting [2]	82	200	0.16	0.39
Processing [3]	46	412	0.09	0.80
Basic Silviculture [4]	21	26	0.04	0.05
Marine transportation [5]	--	31	--	0.06
Total direct employment	149	669	0.29	1.30
Indirect/Induced [6]	72	1 003	0.14	1.95
Total Harvest Dependent	221	1 672	0.43	3.25
Harvest Related				
Forest Service/Incr Silv.	20	26	n/a	n/a
Indirect/Induced	9	39	n/a	n/a
Total Harvest Related	29	65	n/a	n/a
Total Employment	250	1 737	n/a	n/a

Notes:
1 Provincial employment includes TSA employment.
2 Harvesting includes falling and related activities, road transportation, sorting, harvest planning and other office activities, and road building and maintenance.
3 Processing includes all primary wood industry activities including sawmilling, shake and shingle production, pulp and paper, plywood and other wood products.
4 Basic silviculture is comprised of surveys, site preparation, planting, brushing, and some spacing.
5 Marine transportation includes all barge related operations.
6 Direct employment is comprised of forestry related activity; indirect employment results from forest industry expenditures on goods and services; induced employment results from forest industry employees spending their wages.

3.3 Timber Harvest Forecasts

The purpose of this study is to assess the economic, social and environmental implications of different timber harvest levels within the Queen Charlotte TSA. The *Queen Charlotte Timber Supply Analysis* report (Ministry of Forests, 1994b) is the technical document that analyzes the volume of timber available for harvesting. It assesses how current forest management practices affect the supply of wood available for harvesting over the next 200 years, and demonstrates harvest reductions that would lead to a sustainable long-term harvest level (LTHL). The report also examines the potential changes in timber supply stemming from uncertainties regarding current management assumptions. The forecasts produced in the Timber Supply Analysis are not AAC recommendations, but provide a basis for discussion about the timber supply.

3.3.1 Base Timber Harvest Forecast

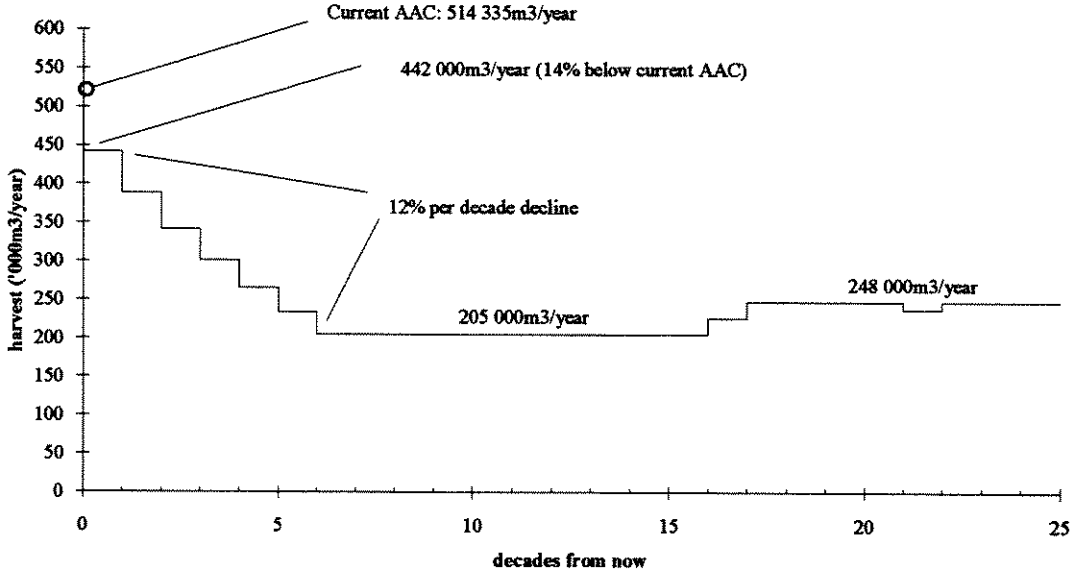
The base timber harvest forecast for the Queen Charlotte TSA, termed the base case in the Timber Supply Analysis report, begins with an immediate reduction of the harvest to 442 000 cubic metres per year - a 14% drop from the current AAC of 514 335 (see Table 3.4 and Figure 3.1). After this initial reduction, the timber available for harvest is lowered by 12 percent per decade for six decades to about 205 000 cubic metres per year, a level 17 percent below the LTHL. This drop below the LTHL lasts for ten decades and is necessary to avoid more severe timber supply shortfalls.. The LTHL is finally reached in Decade 18 following two harvest increases between Decades 16 and 17. The long term harvest level is 248 000 cubic metres per year and represents a 44 percent decline from the forecast's initial level, and a 52 percent reduction from the current AAC.

Table 3.4
Queen Charlotte TSA
Base Timber Harvest Forecast

(000s m3)	Current AAC	Projected Timber Supply by Decade								
		1	2	3	4	5	6	7-16	17	18
Harvest Level	514	442	389	342	301	265	233	205	226	248
• % of Current AAC		86%	76%	66%	59%	52%	45%	40%	44%	48%

Source: *Queen Charlotte TSA Timber Supply Analysis*, Ministry of Forests, 1994.

Figure 3.1
Queen Charlotte TSA
Base Timber Harvest Forecast



3.3.2 Alternative Initial Timber Harvest Forecasts

The socio-economic assessment also provides an analysis of the implications of alternative forecasts that set the initial harvest rate at a different level than the base harvest forecast. For example, if the harvest remains at the current AAC, what would be the long term implications for the harvest, and would the short-term socio-economic impacts change? Alternatively, what would be the effect of an immediate reduction of the harvest to near its long-term harvest level. The purpose of examining these variations in initial harvest rates is to estimate a range of short-term socio-economic effects, while acknowledging the subsequent longer-term harvest implications.

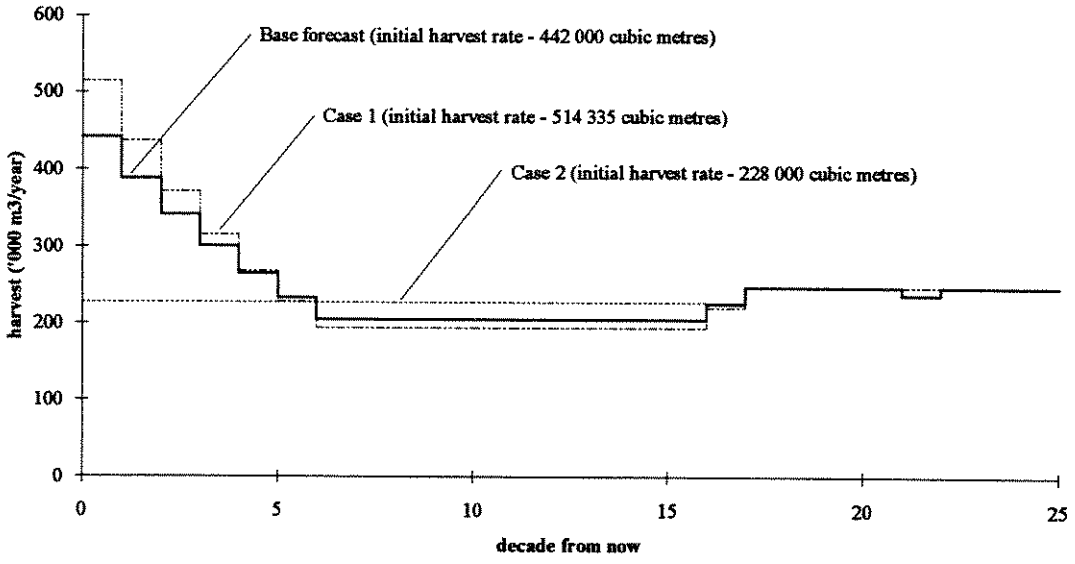
Case 1.

The timber supply analysis models a harvest rate that maintains the AAC at its current rate of 514 335 cubic metres per year for the first decade. In the second decade, the forecast starts its decline to the LTHL (see figure 3.2). To avoid a future timber supply shortfall, the harvest flow would need to decline by 15 percent per decade (versus 12 percent in the base harvest forecast) in Decades 2 through 6. Between Decades 7 and 16, in contrast to the base forecast, the harvest would settle at a lower rate than the base forecast (22 percent below the LTHL, versus 17 percent for the base forecast) before beginning its rise to the LTHL. The short-term gain modelled in Case 1 would create a greater harvest shortfall in the medium-term, and a more severe step-down from the current AAC.

Case 2.

To achieve a constant, or non-declining, supply of timber over the forecast period, the harvest would have to decline immediately by approximately 58 percent to 228 000 cubic metres, 8 percent below the LTHL (see figure 3.2). In Decade 5, the Case 2 harvest rate would equal that of the base forecast, then would remain higher (10 percent) during Decades 6 through 16. The lower short-term harvest rate under Case 2 would enable a higher harvest rate in the medium-term.

Figure 3.2
Queen Charlotte TSA
Alternate Initial Harvest Forecasts



3.3.3 Allocation of Harvest Level Reductions

This study assumes that timber harvest reductions will be proportionally allocated among licensees according to their current share of the TSA AAC[32], as shown in Table 3.2.

[32] Section 54(1) of the Forest Act, Proportionate reduction, states "Notwithstanding a forest licence or timber sale licence, the minister, in a notice served on all persons who hold forest licences or timber sale licences in a public sustained yield unit or timber supply area, **may** proportionally reduce the allowable annual cuts authorized in all of the licences ..."

ECONOMIC IMPACTS

The purpose of this chapter is to present the results of the economic impact analysis of the timber supply forecasts for the Queen Charlotte TSA.[34] The presentation is organized into two sections: (1) employment and income impacts, and (2) provincial and federal revenue impacts.

4.1 Economic Impact Results

This section presents employment, employment income, and government revenue impacts associated with the base harvest forecast, followed by a comparison of Case 1 and 2 impacts to those of the base forecast. Employment and income levels related to the Forest Service and incremental silviculture are presented separate from the tables and associated discussion. This activity is considered to be more dependent on government policy than the rate of harvest, thus is assumed not to change over the forecast period. These impacts are discussed under the heading of harvest related forestry.

4.1.1 Forestry Employment and Employment Income Impacts

Two assumptions to be aware of when reading the following section are the time at which the impacts occur, and the projection of current employment-harvest relationships into the future.

- The presentation of impacts suggests that employment losses would occur at the same time the harvest rate changes. While harvesting employment may be closely tied to the level of harvest, processing and silviculture may not immediately change in response to a different harvest level. Declines in processing employment may be offset by shifting wood flows, or sources. Further, processing employment may be affected by thresholds where, at some quantity of fibre supply, the number of shifts may be reduced, or as a worst case, the mill may shut down completely.

  Indirect and induced impacts would also occur over a longer period of time as spending levels adjust and businesses recognize and adjust for a loss of business. The exact time at which all the impacts would occur is unknown. This possible lag effect is not adjusted for in the analysis.

- The second assumption concerns the prediction of future economic activity using employment coefficients based on current inter-industry relationships, technology, and employment conditions. The probability that these conditions will hold in the medium

[34] The reader should be aware of the assumptions inherent in the figures presented and the limitations of economic impact analysis, and, as such, is encouraged to read Appendix 4 describing the methodology used.

to long-term is low. Changing productivity, growth in other employment sectors (e.g., value-added manufacturing), and other changing economic conditions will affect the accuracy of the coefficients. Further, the impacts presented are gross effects and do not consider a redistribution of income, or offsetting employment gains.

Interpretation of the following estimates requires caution and they should not be considered definitive, but illustrative of the employment and employment income trends expected as the harvest level changes.

TSA Employment and Employment Income

Employment and employment income impacts associated with the Queen Charlotte TSA base timber supply forecast are presented in Table 4.1. The table presents direct, indirect/induced, and total forestry impacts. A table of incremental impacts (the number of PYs lost in each decade) may be found in Appendix 5.

TSA direct forestry employment and income impacts:

- At present, forestry activity supports approximately 149 direct PYs, and contributes $4.3 million in employment income within the TSA. Eighty-two of those PYs are harvesting and transport related, 46 PYs are in timber processing, and 21 PYs are in basic silviculture.
- Reducing the harvest to the starting base forecast level would lower direct employment by 21 PYs, and employment income by approximately $600 thousand. In the second decade, a further decline of 15 PYs and $500 thousand would occur. At the end of Decade 2, harvest dependent direct employment and employment income would be 113 PYs, and $3.2 million, respectively.
- The lowest harvest rate of the base forecast, 205 267 cubic metres between Decades 7 and 16, would support 59 direct PYs and $1.7 million of associated direct employment income: a decline of 90 PYs and $2.6 million from the current AAC employment and employment income levels.
- The LTHL would support 72 PYs and $2.1 million of direct forestry employment and employment income, respectively. This represents a reduction of 77 PYs and $2.2 million from the current AAC employment and employment income levels.

The Islands' two processing facilities account for a significant proportion (27 percent) of the TSA harvest dependent employment. The impact analysis assumes that harvest reductions would be spread evenly among all licensees and types of tenure. Sawmill processing on the Islands may not be able to withstand large scale declines in available timber. As the harvest decreases, the allocation of timber to the Islands' mills may reach a threshold, whereby processing becomes uneconomical. However, the precise level of such a threshold is unclear. A loss of approximately 39 processing jobs would occur if the two mills shut down. Further, with the expiration of the two temporary Opportunity Wood Licences, this loss of employment may occur regardless.

Table 4.1
Queen Charlotte TSA - Base Harvest Forecast
Local Harvest Dependent Employment and Employment Income Impacts [1]

	AAC	EMPLOYMENT (PYs)			EMPLOYMENT INCOME ($ MILLIONS)		
Decade	('000m^3)	Direct [2]	Indirect/ induced[3]	Total[4]	Direct [5]	Indirect/ induced[6]	Total[4]
Current (1992)	514	149	72	221	$4.3	$1.6	$5.9
1	442	128	62	190	$3.7	$1.3	$5.0
2	389	113	54	167	$3.2	$1.2	$4.4
3	342	99	48	147	$2.9	$1.0	$3.9
4	301	87	42	129	$2.5	$0.9	$3.4
5	265	77	37	114	$2.2	$0.8	$3.0
6	233	68	33	101	$1.9	$0.7	$2.6
7-16	205	59	29	88	$1.7	$0.6	$2.3
17	226	66	32	98	$1.9	$0.7	$2.6
18 (LTHL)	248	72	35	107	$2.1	$0.7	$2.8

Notes:

1 See Appendix 4 for a discussion of the methodology used in calculating the economic impacts at the TSA level. The methods outlined below may be used to estimate impacts for any harvest rate for the QCI TSA.

2 Direct employment is calculated by multiplying the TSA direct employment coefficient, 0.29 PYs per 1000 cubic metres (see Table 3.3) by a particular harvest level: e.g., for Decade 1, 0.29 PYs * 442 000m^3/1000 = 128 PYs.

3 Indirect/induced employment is calculated by multiplying the TSA indirect/induced employment coefficient of 0.13 PYs per 1000 cubic metres (see Table 3.3) by a particular harvest level: e.g., for Decade 1, 0.14 PYs * 442 000m^3/1000 = 62 PYs.

4 Total employment is the sum of direct and indirect and induced employment: e.g., 128 + 62 = 190. TSA employment and employment income including Forest Service and incremental silviculture (not shown in table) is calculated by adding 29 PYs and $0.67 million to the total harvest dependent employment and employment income results. The 29 PYs and $0.67 million represent total , direct + indirect + induced, employment and employment income associated with incremental silviculture and Forest Service employment. For example, total employment at a harvest rate of 442 000m^3 equals 128 + 62 + 29 = 219PYs.

5 Direct employment income is calculated by multiplying direct PYs by an average after-tax income of $28 500 per year. For example, 128 PYs * $28 500 = 3.7 mil. $28 500 is a weighted average of the current (1992) harvesting, processing and silviculture incomes.

6. Indirect/induced employment income is calculated by multiplying direct employment income by a factor of 0.37. This factor is the indirect/induced income component of the QCI income multiplier of 1.37 (1.35 - 1.0 = 0.35). For Decade 1: 0.37 * $3.7 mil. = $1.3 mil. Total employment income equals $3.7 mil. + $1.3 mil. = $5.0 mil., or $3.7 mil. * 1.37 = $5.0 mil.

TSA indirect/induced and total forestry employment and income impacts:
Economic activity related to forestry generates 'spin-off' employment and income effects through the purchase of goods and services by forest companies (indirect impacts), and through the spending of incomes by forest company employees (induced impacts).

- The economic activity associated with the current AAC generates a further 72 employment opportunities, and close to $1.6 million in indirect and induced incomes.

Total, direct, indirect, and induced employment supported by the current AAC is 221 PYs; total harvest dependent income is approximately $5.9 million. This economic activity accrues to TSA residents.

- Reducing the current AAC to the initial forecast harvest of 442 000 cubic metres would reduce total harvest dependent employment and income by 31 PYs and $830 thousand respectively. By the end of Decade 2, employment would decline by a further 23 PYs, while employment income would decline by a further $600 thousand. The total reduction in harvest dependent employment and income over the 20 year span would be 54 PYs, and approximately $1.43 million.
- The low harvest rate between Decades 7 and 16 would support 88 PYs of total harvest dependent employment, and $2.3 million of total employment income. This timber supply level represents a decline of 133 PYs, and approximately $3.6 million in employment income within the TSA.
- The LTHL harvest dependent total employment level would be 107 PYs, and the associated employment income level would be close to $2.8 million. Within the TSA over the forecast period, 114 PYs would be shed from forestry and 'spin-off' activity, and $3.1 million in employment income would be lost.

TSA harvest related forestry employment and income impacts:
Direct employment and income associated with the Forest Service and incremental silviculture adds approximately 20 PYs and $500 thousand to the above estimates. Indirect and induced activity would add a further 9 PYs to employment, and approximately $170 thousand to employment income. In total, this activity adds 29 PYs and $670 thousand to the total results presented in table 4.1. These estimates are assumed to remain constant for the duration of the forecast period.

Provincial Employment and Employment Income
The majority of employment and income supported by the TSA harvest accrues to non-Islands residents. Approximately 80% of the employment supported by the Islands TSA harvest (in harvesting, processing, silviculture, and transportation) go to off-Islands residents. This figure includes non-Islands residents used for harvesting and related activities, and those employed in processing timber destined for off-Islands mills.

Provincial employment, and employment income impacts associated with the Queen Charlotte TSA base timber supply forecast are presented in Table 4.2. Similar to Table 4.1, the table presents direct, indirect/induced, and total forestry impacts.

Provincial direct forestry employment and income impacts:

- The current AAC supports 669 PYs of direct forestry employment and contributes approximately $20.5 million in employment income at the provincial level. Approximately 231 PYs of this total are related to harvesting and marine transport jobs, 412 PYs are related to timber processing, and 26 PYs are in basic silviculture.
- As the harvest declines to 442 000 cubic metres in the first decade, direct employment would fall by 94 PYs, and employment income by $2.9 million. During the second decade, a further decline of 69 PYs and $2.1 million would occur. By the end of

Decade 2, direct employment and employment income would be 506 PYs, and $15.5 million, respectively.

Table 4.2
Queen Charlotte TSA - Base Harvest Forecast
Provincial Harvest Dependent Employment and Employment Income Impacts [1]

	AAC	EMPLOYMENT (PYs)			EMPLOYMENT INCOME ($ MILLIONS)		
Decade	('000 m^3)	Direct [2]	Indirect/ induced[3]	Total[4]	Direct [5]	Indirect/ induced[6]	Total[4]
Current (1992)	514	669	1 003	1 672	$20.5	$19.7	$40.2
1	442	575	863	1 438	$17.6	$16.9	$34.5
2	389	506	759	1 265	$15.5	$14.9	$30.4
3	342	445	668	1 113	$13.7	$13.1	$26.8
4	301	392	588	980	$12.0	$11.5	$23.5
5	265	345	517	862	$10.6	$10.1	$20.7
6	233	303	456	759	$9.3	$8.9	$18.2
7-16	205	267	401	668	$8.2	$7.9	$16.1
17	226	294	441	735	$9.0	$8.7	$17.7
18 (LTHL)	248	323	484	807	$9.9	$9.5	$19.4

Notes:

1 See Appendix 4 for a discussion of the methodology used in calculating the provincial economic impacts. Provincial employment and income includes TSA employment and income. The methods outlined below may be used to estimate impacts for any harvest rate for the QCI TSA.

2 Direct employment is calculated by multiplying the provincial direct employment coefficient, 1.3 PYs per 1000 cubic metres (see Table 3.3) by the particular harvest level: e.g., for Decade 1, 1.3 PYs * 442 000 m^3/1000= 575 PYs.

3 Indirect/induced employment is calculated by multiplying direct employment by a factor of 1.5 – the indirect/induced portion of the provincial forestry employment multiplier of 2.5 (2.5 - 1.0 = 1.5). For Decade 1, 1.5 * 575 PYs = 863 PYs.

4 Total employment for the harvest of 442 000 cubic metres equals 575 + 863 = 1438, or 575 * 2.5 = 1438. Provincial employment and employment income estimates that include Forest Service and incremental silviculture (not shown in table) are calculated by adding 65 PYs and $1.4 mil. to total harvest dependent employment and employment income results. The 65 PYs and $1.4 mil. represent total, direct + indirect + induced, employment and employment income associated with incremental silviculture and Forest Service employment.

5 Direct employment income is calculated by multiplying direct employment by an average provincial after-tax income of $30 650: e.g., for Decade 1, 575 PYs * $30 650 = $17.6 mil. $30 650 is a weighted average of the current (1992) harvesting, processing, silviculture, and transportation incomes.

6 Indirect/induced employment income is calculated by multiplying indirect/induced PYs by an average provincial after-tax income of $19 625: e.g., for Decade 1, 863 PYs * $19 625 = $16.9 mil. $19 625 is a weighted average of indirect and induced incomes associated with forestry on the QCI. Total employment income equals $17.6 mil. + $16.9 mil. = $34.5 mil.

- The lowest harvest rate of the base forecast, between Decades 7 and 16, would support 267 direct PYs, and $8.2 million of associated direct employment income - a decline of 402 PYs and $12.3 million from the current AAC direct employment and employment income levels.

- The LTHL would support 323 PYs and $9.9 million of harvest dependent direct forestry employment and employment income, respectively. This represents a reduction of 346 PYs and $10.6 million from the current AAC employment and employment income levels.

Provincial indirect/induced and total forestry employment and income impacts:

- The current AAC generates a further 1 003 indirect and induced PYs, and close to $19.7 million in indirect and induced incomes. Total provincial direct, indirect and induced employment supported by the current AAC is 1 672 PYs; total employment income is approximately $40.2 million.
- By the end of the first decade, total employment and income would decrease by 234 PYs and $5.7 million, respectively. During Decade 2, employment would decline a further 173 PYs, while employment income would drop by $4.1 million. The reduction in total employment and income over the twenty year span would be 407 PYs, and over $9.8 million.
- The low harvest rate between Decades 7 and 16 would support 668 PYs of total employment, and $16.1 million of total employment income. This timber supply level represents a decline of 1 004 PYs, and approximately $24.1 million from current harvest levels.
- The LTHL would support 807 PYs, and the associated employment income would be close to $19.4 million. Over the forecast period, 865 PYs of TSA forestry and 'spin-off' activity, and $20.8 million of employment income related to the harvest would be lost within the province.

Harvest related forestry employment and income impacts:

Direct employment and income associated with the Forest Service and incremental silviculture adds approximately 26 PYs and $650 thousand to the above estimates. Indirect and induced activity would add a further 39 PYs to employment, and approximately $750 thousand to employment income. In total, this activity adds 65 PYs and $1.4 million to the totals presented in table 4.2. These estimates are assumed to remain constant for the duration of the forecast period.

4.1.2 Case 1 - Comparison to the Base Harvest Forecast

Case 1 maintains the annual harvest at 514 335 cubic metres for the first decade prior to a step-down of 15 percent per year for 5 decades (see figure 3.4). The harvest remains at approximately 194 000 cubic metres per year between Decades 7 and 16, then increases over the following two decades until reaching the LTHL of 248 000 cubic metres in Decade 18. By initially holding the harvest at a higher rate, the harvest would eventually have to drop below the base harvest forecast; this occurs in Decades 6 through 17.

Direct Forestry Employment and Employment Income Impacts

TSA level impacts

- Under Case 1, the first decade of the harvest would continue to support the current level of 149 direct PYs and 221 total PYs, and $4.3 million direct and $5.9 million total employment income.
- In Decade 2, direct employment and income would decline to 127 PYs and $3.7 million respectively - approximately 14 PYs and $0.5 million above that of the base harvest forecast in Decade 1. Total employment and income would decline to 184 PYs and $5.0 million respectively - approximately 20 PYs and $0.7 million above that of the base harvest forecast.
- Over the first twenty years of Case 1, approximately 22 direct PYs would be lost under Case 1, while 36 direct PYs would be lost under the base forecast. Total employment lost would be 32 PYs under Case 1 versus 54 PYs under the base forecast.
- By Decade 3, employment would decline to 108 direct and 156 total PYs, and income would decline to $3 million direct and $4.3 million total. The total number of PYs lost by the end of Decade 3 would be 41 direct and 59 total, as opposed to 50 direct and 74 total for the base forecast.

Provincial level impacts

- During the first decade of Case 1, provincial employment and employment income would remain at 669 direct and 1 672 total PYs, and $20.5 million direct and $40.2 million total income, respectively - a level higher than the base forecast by 94 direct and 234 total PYs, and $2.9 million direct and $5.7 million total income.
- In the second decade, direct employment would decline to 568 PYs, with direct income declining to $17.4 million - 62 PYs and $1.9 million higher than the base forecast. Total employment and income would be 1 420 and $34.1 million respectively - 155 PYs and $3.7 million higher than the base forecast.
- Over the first twenty years, approximately 101 direct PYs and 253 total PYs would be lost under Case 1; in contrast, 163 direct and 407 total PYs would be lost under the base forecast.
- Employment under Case 1 would remain above that of the base harvest forecast in Decades 1 through 5. However, the gap between the two would narrow as Decade 6 approaches, at which time Case 1 would employ less PYs and generate less income. The Case 1 harvest would support less employment and income than the base forecast until reaching the LTHL in Decade 18.

4.1.3 Case 2 - Comparison to the Base Harvest Forecast

Under Case 2, the timber harvest would immediately decline by 56 percent to 228 000 cubic metres per year (see figure 3.4). The harvest rate would then remain constant until Decade 18 when the harvest would increase to the LTHL of 248 000 cubic metres. Dropping the harvest by 56% immediately would allow the harvest to remain at a higher rate than the base forecast during Decades 7 through 17.

Direct Forestry Employment and Employment Income Impacts

TSA level impacts

- Direct employment under Case 2 would drop in the initial decade by 83 PYs to 66 PYs, and direct income would decline by $2.4 million to $1.9 million - 62 direct PYs and $1.8 million less than the base harvest forecast. Total employment would decrease by 125 PYs to 96 PYs and total income by $3.3 million to $2.6 million respectively, - 94 PYs and $2.4 million less than the base forecast.
- At the end of Decade 2, TSA employment would be less than that supported by the base harvest forecast by 47 direct PYs and 71 total PYs, while employment income would be lower by $1.3 million direct and $1.8 million total. The differences between the base forecast and Case 2 diminish over time as the base harvest rate declines.
- Direct employment and income under Case 2 and the base forecast would be approximately the same by the end of Decade 6 at about 68 PYs and $1.9 million respectively. Total employment would be about 100 PYs and total income would be about $2.6 million. Case 2 employment and income would be greater than the base case in subsequent decades until both scenarios attain the long-term harvest level.

Provincial level impacts

- In Decade 1, direct employment and income would decline by approximately 373 PYs and $11.4 million to 296 PYs and $9.1 million respectively. Total employment and income would decline by 932 PYs and $22.2 million to 740 PYs and $18.0 million respectively. In contrast to the base forecast, in Decade 1, approximately 279 fewer direct PYs per year, and 698 fewer total PYs would be supported in the province.
- By the second decade, the gap between Case 2 and the base forecast would narrow to approximately 210 direct PYs and 525 total PYs. Case 2 would continue to support 296 direct PYs and 740 total PYs in Decade 2, while the base forecast would support 506 direct PYs and 1 265 total PYs.
- Between Decades 6 and 7, employment and income supported by Case 2 would begin to exceed that of the base forecast.

4.2 Government Revenue Impact Results

Government revenues stemming from forestry operations associated with the Queen Charlotte TSA are comprised of provincial stumpage, export fees in lieu, provincial personal income tax, provincial corporate taxes, other provincial revenues, federal corporate, excise and withholding tax, and federal personal income taxes.

4.2.1 Provincial Forestry Revenue Impacts

Provincial stumpage, income taxes, export fees in lieu, corporate taxes, and other taxes are presented in Table 4.3. Export duties relate to the export of raw logs from the QCI TSA through the north coast market logger OIC.

Table 4.3
Queen Charlotte TSA - Base Harvest Forecast
Provincial Forestry Revenue Impacts ($ millions)

Decade	AAC ('000m^3)	Stumpage	Income Tax [1]	Export Fees in Lieu	Corporate Taxes[2]	Other Prov'l Tax[3]	Total Prov'l Revenues
Current (1992)	514	$7.4	$4.8	$1.0	$3.1	$0.5	$16.8
1	442	$6.3	$4.1	$0.9	$2.6	$0.4	$14.3
2	389	$5.6	$3.6	$0.8	$2.3	$0.4	$12.6
3	342	$4.9	$3.2	$0.7	$2.0	$0.3	$11.1
4	301	$4.3	$2.8	$0.6	$1.8	$0.3	$9.8
5	265	$3.8	$2.5	$0.5	$1.6	$0.3	$8.7
6	233	$3.3	$2.2	$0.4	$1.4	$0.2	$7.6
7-16	205	$2.9	$1.9	$0.4	$1.2	$0.2	$6.6
17	226	$3.2	$2.1	$0.4	$1.3	$0.2	$7.2
18 (LTHL)	248	$3.6	$2.3	$0.5	$1.5	$0.2	$8.1

Notes:
1 Includes direct, indirect and induced income taxes. Harvest related activities contribute a further $0.2 million in provincial income taxes annually.
2 Includes logging tax, corporate income tax, corporate capital tax, sales tax, property tax, and electricity taxes.
3 Includes range fees, scaling fees, interest and miscellaneous charges

The following revenue estimates are based on historical rates adjusted for inflation and do not reflect changes expected through the Forest Renewal Plan. Policy changes announced in April, 1994, as part of the Forest Renewal Plan will result in higher stumpage rates if the increase in lumber prices which occurred in 1993 represents a structural shift in the market. Based on the average lumber selling price of $350 U.S. per thousand board feet, initial estimates indicate that stumpage rates may be 60 percent to 80 percent higher than in the past. Stumpage revenues will vary with changes in lumber prices and volumes of timber harvested, and would be difficult to project the impact of these new policy changes until the new policy has been implemented for a period of time.

- Forestry operations associated with the current AAC of 514 335 cubic metres generates, in total, approximately $16.8 million in provincial revenues. Stumpage revenues account for $7.4 million, provincial income tax $4.8 million, export fees in lieu $1.0 million, corporate taxes $3.1 million, and other taxes account for a further $0.5 million.
- Provincial revenues would decline commensurately with reductions to the harvest. In the first decade, stumpage revenues would decline by approximately $1.1 million. Provincial income taxes would decline by $0.7 million as companies reduce employment. These forestry related income tax effects would be offset to some degree by gains in other sectors; however, the exact amount is unknown. Export fees in lieu and other provincial revenues would each decline by approximately $100

thousand, while corporate taxes would decline by $500 thousand. The total decline in provincial government revenues would be $2.5 million.
- Total provincial revenues would continue to decline until Decade 7 when they would stabilize at $6.6 million. This level would be maintained until Decade 16.
- Upon reaching the LTHL in Decade 18, total revenues would slightly increase to the long-term level of $8.1 million. This represents a $8.7 million reduction from the provincial revenues provided by the current AAC.

4.2.2 Federal Forestry Revenue Impacts

Federal revenues stemming from the forestry industry in B.C. are outlined in Table 4.4 and comprise federal income taxes, and other corporate taxes, such as corporate income, excise, sales, and withholding taxes.

- Federal income tax is the largest portion of federal revenues. In total, employees related to the current AAC pay approximately $9.7 million in federal income taxes. Other taxes represent an additional $0.6 million in federal revenues bringing total federal revenues to $10.3 million. As the harvest declines, these federal revenue sources will also decline. However, the reader should note that the income tax revenues lost through forest industry declines would be somewhat offset as labour shifts into other sectors of the economy.
- As the harvest declines to its initial level, federal revenues would decline by $1.4 million, to $8.9 million. The declines would continue until Decade 7, at which time revenues would level off at approximately $4.2 million. Federal revenues would rise somewhat to $5.0 million as the harvest increases in Decade 18 to its long-term harvest level.

4.2.3 Government Revenue Impacts of Alternate Harvest Rates

Case 1 versus the Base Forecast

Provincial revenue impacts

- Case 1 would maintain current provincial revenues for the first decade. In the second decade, provincial stumpage revenues would decline to $6.3 million, approximately $700 thousand above the base forecast.
- Provincial income tax would remain constant for the first decade, prior to dropping to $4.1 million in Decade 2.
- Provincial corporate taxes would decline to $2.6 million in Decade 2.
- Other provincial revenues would decline in the second decade to $425 thousand.

Federal revenue impacts

- Case 1 would maintain current federal income tax levels in Decade 1. In Decade 2, income tax revenues would decline to $8.2 million - a level $900 thousand above the base forecast.

Table 4.4
Queen Charlotte TSA - Base Harvest Forecast
Federal Forestry Revenue Impacts ($ millions)

Decade	AAC ('000 m^3)	Corporate Tax [1]	Income Tax [2]	Total Federal Revenues
Current (1992)	514	$0.6	$9.7	$10.3
1	442	$0.6	$8.3	$8.9
2	389	$0.5	$7.3	$7.8
3	342	$0.4	$6.4	$6.8
4	301	$0.4	$5.7	$6.1
5	265	$0.3	$5.0	$5.3
6	233	$0.3	$4.4	$4.7
7-16	205	$0.3	$3.9	$4.2
17	226	$0.3	$4.2	$4.5
18 (LTHL)	248	$0.3	$4.7	$5.0

Notes:
1 Federal corporate taxes include corporate income tax, excise, sales and withholding taxes.
2 Federal income tax includes harvest dependent activity. Non-harvest dependent activity contributes an additional $0.5 million to federal revenues.

- Federal corporate taxes would decline in the second decade to approximately $546 thousand, or about $50 thousand higher than the base forecast.
- Government revenues would remain above those generated by the base forecast until approximately the end of Decade 5, at which time the Case 1 harvest drops below the base forecast harvest. After Decade 5, revenues under Case 1 would remain below those generated by the base forecast until the LTHL is reached in Decade 18.

Case 2 versus the Base Harvest Forecast

Provincial revenue impacts

- Under Case 2, stumpage revenue would decline in the first decade by approximately $4.1 million to $3.3 million. This level would remain constant for 17 decades. The base forecast would generate higher stumpage revenues than Case 2 by $3 million in Decade 1, $2.3 million in Decade 2, and $1.6 million in Decade 3.
- Provincial income tax revenues would drop in the first decade to $2.1 million - $2 million less than the base forecast in Decade 1, and $1.5 million less in Decade 2.
- Provincial corporate taxes would decline to $1.4 million in Decade 1 - $1.2 million less than the base forecast in Decade 1 and $900 thousand less in Decade 2.
- Other provincial revenues would decrease to $222 thousand in Decade 1.

Federal revenue impacts

- Under Case 2, federal income taxes related to total forestry employment would be $4.3 million, a level $4 million less than the base forecast in Decade 1, and $3 million less in Decade 2.
- Federal corporate taxes under Case 2 would decline to $285 thousand in Decade 1 - approximately $300 thousand less than the base forecast in Decade 1, and $200 thousand less in Decade 2.
- All government revenues would remain below those of the base forecast until Decade 7 at which time the base harvest forecast would drop below the Case 2 harvest.

IMPLICATIONS FOR COMMUNITIES

This chapter discusses the social and community implications of the TSA timber harvest forecasts. Specific implications with respect to Haida communities are discussed in Chapter 6.

Social effects of TSA timber supply reductions are organised into two categories: (1) worker and family based effects, and (2) community based effects. It should be pointed out that the following discussion is both brief, and qualitative in nature. This is due to a number of factors: the Timber Supply Review's terms of reference focus on aggregate changes in harvesting levels; limited time and financial resources are available to conduct field work (e.g., surveys/interviews); and, the inherent difficulties associated with projecting qualitative social impacts into the future with an acceptable level of accuracy.

Discussion of potential social effects of AAC reductions is focused on the short-term, i.e., the first decade. First, the PY reductions identified in the economic impact analysis (Table 4.1) are translated into numbers of workers affected, followed by a short review of how job loss can affect the mental and physical health of individuals and their families. Next, these job losses are placed in context with respect to the Islands' total forestry sector employment, and other events currently occurring on the Islands that will affect local employment. The implications of these changes on the Islands' social services infrastructure is then discussed. Finally, opportunities for mitigating the employment and employment income impacts resulting from AAC reductions are presented.

5.1 Translating PYs into Jobs

5.1.1 Base Harvest Forecast

The base timber harvesting forecast assumes a 14 percent reduction to the TSA AAC within the first decade and reaches the LTHL in Decade 18. Over the first ten years, this decline would result in a total loss of 21 direct PYs from the Islands' labour force. The 21 PY represent an estimated loss of between 27 and 32 local harvest dependent direct forestry jobs, and could result in an additional loss of approximately 12 to 14 indirect and induced jobs[35]. This level of job loss equates to approximately 2 percent of the Islands' current total employment base[36].

---

[35] The actual job numbers are calculated by multiplying PYs by a part-time actual labour/PY ratio. The ratios range from approximately 1.3 to 1.5 and are averages based on various part-time data provided by QCI licensees and District Forest Service staff. These ratios provide rough estimates only. Total employment figures are calculated by using a TSA employment multiplier of 1.48 (see Appendix 4).

[36] Calculated by dividing the estimated job loss due to timber harvesting reductions, by the 1991 employment by sector statistics outlined in Table 2.5.

5.1.2 Mill Closures

Job losses in the short-term could double if the Islands' mills are forced to close down permanently. The processing operations of Abfam Enterprises and QCI Sawmills account for approximately 40 full-time positions. The future of these jobs is dependent on the mills' abilities to adjust to the loss of their opportunity wood licences. These licences expired in June of 1994, and are non-renewable. In future, the mills will have to bid for timber through the Small Business Forest Enterprise Program. A further 18 PY of indirect and induced employment may also be affected by the mill closures.

5.1.3 Alternative Harvest Forecasts

The Case 1 alternative initial harvest forecast assumes that the AAC is held at its current rate of 514 335 cubic metres for the first decade. As such, it would not affect the Islands' labour force in the short-run. Case 2, however, models an immediate 56 percent decline in the supply of timber to 228 000 cubic metres. Over the first ten years, this results in a total loss of 83 direct forestry PY. This change represents an estimated loss of employment to the Islands of between 100 and 120 direct forestry jobs, and the potential loss of an additional 45 to 54 indirect and induced jobs. This level of job loss equates to approximately 7 percent of the Islands current employment base in all sectors.

5.2 Effects of Job Loss on Workers and their Families

Research indicates that unemployment can affect the mental and physical health of individuals. Lee (1994), notes that unemployment has been associated with a higher probability for cardiovascular-renal disease mortality, numerous stress-related diseases, including hypertension, bone and joint ailments, gastrointestinal disturbances, and chronic headaches, as well as psychological effects such as diminished self-esteem and depression. Lee recognises that unemployment is only one of many factors causing these effects, but contends that unemployment often precipitates physical and/or mental breakdown.

While it is impossible to predict how individuals will react to job loss, a recent study (ARA, 1993) provides a sense of how workers/families within resource industry dependent communities in B.C. may be affected:

- Increases in measures of behavioural stress, such as domestic violence, substance abuse, suicide or threats of suicides, and marital breakdown.
- Negative impact on children as a result of changes in parental roles and the economic stresses of job loss. This was reflected in increases in school drop out rates.
- Greater suffering by older, longer tenured workers (45 to 55 years old), versus younger workers. Older workers were the most vulnerable, still having sizeable financial and family responsibilities, but with limited hope of finding new occupational opportunities.
- A definite pattern in the timing of effects: first, immediately following the layoffs, and then 18 to 24 months later, when the initial community response to the layoffs had died down.

5.3 Employee Transition Following Job Loss

Evidence suggests that many workers have strong ties to their communities. A report from the Pacific Northwest region of the United States (Lee, 1993) suggests that unemployed forest workers tend to remain within their community, and align with one of three options: (1) look for another job in the forestry industry, while using unemployment insurance and/or social assistance to get by in the interim; (2) seek re-training and/or other work within another industry; or, (3) adopt a subsistence lifestyle, relying on community programs such as food banks and short-term jobs. Moreover, the pathways through which workers adjust to layoffs is a dynamic process not captured by snapshots at one point in time. A worker who has lost his or her job, and remains in the community, may pass through all of the above options; in many cases, workers will likely be relying on several of these options concurrently.

The quality of life on the Islands and local environmental attributes provide a strong inducement for residents who may lose their jobs to stay. Moreover, if similar or worse economic conditions and problems exist in other parts of the province and the country, workers and their families would have little inducement to relocate. Those who leave in search of other opportunities will tend to be younger, more skilled, and more occupationally mobile individuals.

Because of the province's social safety net, estimates of the total income lost, and by extension, the number of induced jobs lost may be overstated. The results presented in Table 4.1 assume that the incomes of all individuals who lose their jobs drop to zero, i.e., they either leave the area, or remain, but without a source of income. The fact that many residents are likely to stay on the Islands, at least in the short-term, and are able to access Unemployment Insurance or Income Assistance programs, will mitigate some of these adverse economic impacts. In the first decade, assuming the base harvest forecast, the safety net would result in 4 fewer job losses.[37] Note that, with respect to employment, all the jobs 'saved' by the safety net are in the induced sector, i.e., the safety net will not reduce the number of direct forestry employment losses; it only provides these workers and their families with a source of income with which to maintain their households in the short-term.

5.4 Effects on Communities

Stresses placed on workers and their families as a result of job losses, in turn, increase pressures on community social services. In the short-term, under the base harvest forecast, it is unlikely that the number of affected workers and families would overwhelm the existing local social services infrastructure. These job losses, however, are in addition to the 250 (direct) local positions scheduled to be lost as a result of downsizing at CFS Masset. A significant portion of the Armed Forces personnel will likely either transfer to another Defence post, or, if they lose their job, will relocate off the Islands. Nevertheless,

[37] See appendix 4 four a discussion on how this safety-net adjustment was calculated.

assuming that the civilian portion remains, Station downsizing will result in a significant number of additional Islands' workers and families (20 percent of the total affected, or 30 to 50 workers and their families) turning to local social services for support and assistance. Further, the loss of income circulating within the community and local spending on goods and services will affect other Masset residents.

Overall, job losses resulting from TSA AAC reductions, potential mill closures, and CFS Masset downsizing may be beyond local service agencies current capacity. The Case 2 harvest forecast would result in a significant increase in the numbers of local jobs lost, and would generate even further pressures on the Islands' social services. At present, the Islands ability to respond to mental health problems is limited, as are the opportunities for skills up-grading and retraining. Moreover, CFS Masset downsizing will adversely affect the Islands existing social services infrastructure. The Station currently contributes approximately 50 percent of the Village of Masset's tax base, and operates one of the two hospitals on the Islands.

The Islands' communities need to be aware of these potential job losses and related problems so that adequate staffing and resources are available, and effective social service, and worker re-employment and re-training programs can be developed.

5.5 Opportunities for Mitigation

A number of opportunities currently in process, or in the planning stages, may be able to assist the Islands in coping with the above mentioned changes. Having sufficient time to fully plan for these changes may be a concern.

- An examination of resource-based communities that have responded well to job losses indicates that they have done so through an emphasis on slow, painstaking attention to consensus seeking, public involvement and goal definition, and detailed specification of community objectives (ARA Consulting Group, 1993). The QCI communities, prompted by the establishment of Gwaii Haanas park reserve in 1987, are already well into such an adjustment process. One outcome of this process to date is the establishment of the Gwaii Trust Interim Planning Society (GTIPS), which has attempted to create a development plan for the islands. GTIPS administers a trust fund for the Islands and has initiated public involvement processes to identify common community interests and concerns regarding the future development of the Islands. It is close to completion of a four year process to develop an economic development strategy for the Islands. The focal point of the organization has shifted from an active promotion of tourism growth to a more passive approach through infrastructure development.

- Another important outcome of the designation of the park is the South Moresby Forestry Replacement Account (SMFRA). The SMFRA administers an interest bearing multi-year forestry enhancement fund of $24 million, intended to partially mitigate the economic impact associated with the reduction in timber supply. Twelve

million dollars was provided by the federal government through the Regional Economic Development Initiative (REDI) program and a further $12 million was provided by the provincial government. Work resulting from these funds focuses on forestry research and development, inventory, incremental silviculture, and public education.

- The recently announced Forest Renewal Plan (British Columbia, 1994) will collect additional stumpage revenues from forest licensees, and invest this money within forest-based communities throughout the province. Immediate priorities of the Plan include the following:
  - developing new silviculture programs such as improved thinning, spacing and pruning,
  - rehabilitating watersheds, eroded logging roads and other sites,
  - assisting value-added companies to start-up, expanding and developing new markets, and ensuring that they have greater access to wood supply,
  - increasing First Nations' participation in the forest economy, including structuring joint ventures with First Nations' companies, forest worker training, and competitive bid proposal assessment and development training.

- The Village of Masset will also likely be eligible for financial assistance from the federal government, as a result of the significant impact of closing the Station.

- The Islands' possess high quality wood fibre, probably some of the highest quality found in British Columbia, and yet to date, there has been little local manufacturing of this fibre. The report entitled *Evaluation of the Small Business Forest Enterprise Program in the QCI Forest District* (Strathinnes,1992: iv), suggests that real opportunities for forestry-related value added cottage industries exist on the Islands. The report identifies the following value-added opportunities:
  - A large volume of fibre is currently either being burned or landfilled. The residue from logging could be used by a local co-generation plant. This is one option currently being considered by B.C. Hydro to address the Islands' current energy capacity and cost issues (also see section 2.3.6).
  - The two local sawmills are using lower quality cedar stands to produce lumber and log houses. A percentage of their lumber is being further broken down into siding and panelling. They have shown that value added manufacturing is economically feasible on the QCI.
  - Small cottage industries based in Masset are creating violin and guitar stock, boxes, and poles out of high quality spruce and cedar logs. These types of ventures, typically under 10 employees, greatly enhance the value of the fibre and are compatible with the current industrial infrastructure (energy requirements and transportation facilities) of the area, and the lifestyles of local residents.

IMPLICATIONS FOR THE HAIDA NATION

This chapter presents the potential effects of TSA timber harvest forecasts on the Haida Nation. It focuses on the degree to which harvest level changes are in line with Haida policies and positions, and the extent to which Haida communities may be affected by such changes. For the most part, Haida concerns outlined in section 2.4, such as access to forest tenure, are beyond the scope of this study. These concerns will have to be addressed within processes outside of the Timber Supply Review.

6.1 Timber Supply Reductions

For the past decade the Council of the Haida Nation (CHN) has advocated that the total AAC (TSA/TFL) for the Islands should be adjusted. Their contention is that the present rate of cut is twice the level required for a sustainable harvest of the forests. The base timber harvest forecast would reduce the TSA AAC by 60 percent, but would take 60 years to achieve this level. The lengthy lead time required to realise the long run AAC level inadequately addresses Haida ecological concerns associated with current harvest levels, as well as their desire to exclude areas of mature forest from timber harvesting until comprehensive claim negotiations are concluded.

Case 2 harvest forecast, which realises a 58 percent reduction in the TSA AAC and drops timber harvesting immediately to the long term harvest level is most similar to the Haida policy objective. However, the longstanding Haida policy calls for a reduction in the Islands annual timber harvest of 1.0 million cubic metres, while Case 2 would reduce the harvest by only 286 thousand cubic metres per year. The Haida policy can be achieved only if there are similar adjustments made to the annual timber harvest rates of the Islands' TFLs.

6.2 Employment Effects

Forestry is currently a significant source of seasonal, and in a few cases, full-time employment and employment income within Old Masset Village and Skidegate - between 60 and 100 people, in total, work within TSA and TFL related forestry operations. Moreover, both communities are looking to the forestry sector as a means to strengthen their economies in the future.

The base timber harvesting forecast, assuming the forest tenure situation remains unchanged, should not significantly affect existing Haida employment in the first decade, especially in light of the recently announced Forest Renewal Plan (Province of British Columbia, 1994). First, approximately 40 percent of the Haida employment, particularly in Skidegate, is associated with the Islands' TFL operations . Second, the majority of the remaining Haida forestry jobs are associated with basic and incremental silviculture activities. As such, Haida communities are well placed to take advantage of the Forest Renewal Plan's anticipated injection of additional resources into improved reforestation

and silviculture. There is a good chance, therefore, that silviculture activities will not diminish in tandem with timber harvesting activities in the short-term. Haida forestry workers who may be most negatively impacted by TSA AAC reductions are the independent fallers/contractors, and the employees of the Islands two processing operations.

Under the Case 2 harvest forecast, Haida employment would undoubtedly be more significantly affected; however, by how much would be difficult to determine.

From an employment standpoint, the more negative implications of the TSA AAC reductions relate to the Haida's interest in accessing tenure rights to the Islands' forests. The Haida communities/individuals have to date never possessed any type of forest tenure on the Islands.

6.3 Request for a Timber Harvesting Moratorium

While outside the scope of this study, the CHN request for a timber harvesting moratorium on the Islands (see section 2.4.2) poses a serious challenge for the Forest Service in the immediate future. Duu Guusd, and the Tlell River watershed comprise approximately 40 percent of the gross operable mature timber within the TSA. All of the timber supply forecasts (base, Cases 1 and 2) assume that these two areas are available for timber harvesting. Removal of this area from the timber harvesting land base would make it extremely difficult for the Forest Service to meet its AAC objectives, as well as adhere to existing forest management guidelines. On the other hand, a decision by the Forest Service to allow timber harvesting within these two areas may have negative implications vis-a-vis Haida and British Columbia relations.

The Case 2 harvest forecast, because it realises such a significant immediate harvest reduction, would provide the Forest Service the most flexibility in dealing with this issue.

ENVIRONMENTAL IMPLICATIONS

This chapter discusses the potential effects of current timber harvesting practices on forest and freshwater habitats and wildlife species populations, and comments on the extent to which changing timber harvest forecasts may alter these effects.

Unlike discussions about community and First Nations effects which focus on the short-term, i.e., the first decade of harvest forecasts, this section assumes a long-term perspective and discusses effects in more general terms. As such, the following discussion is more brief and qualitative in nature than the previous impact sections of this report. Two factors, in addition to the time horizon issue, account for this: the Timber Supply Review's focus on aggregate changes in harvesting levels as opposed to watershed specific changes, and a lack of information about current wildlife populations, and ecosystem processes and relationships.

The potential cumulative effect of current forest management practices on forest and freshwater ecosystems is an issue of particular concern to scientists and resource managers. Unfortunately, neither the time frames over which environmental effects may occur, nor the threshold levels at which profound ecosystem changes take place are at present well understood.

Note, the following discussion relates to the TSA timber harvesting land base, which constitutes only 13 percent of the total TSA land base, and just 6 percent of the total QCI land area. It should also be re-iterated, that a number of on-going processes outside the Timber Supply Review are attempting to address long-term habitat requirements for some wildlife and fish species (LRMPs, PAS), and to improve timber harvesting practices (Forest Practices Code, Coastal Biodiversity Guidelines).

7.1 Narrowing of the Forest Age Class Distribution

Natural forest stands are especially complex in early, and late (old growth) stages of succession - in contrast with the simpler structure and composition of stands managed intensively for wood fibre production. In general, existing forest management practices tend to eliminate or reduce the duration of these complex early, and late seral forest stages, possibly eliminating ecological processes and species that are dependent upon them (Swanson and Berg, n.d.). As a result, forest ecologists suggest that biodiversity is best maintained by forest management practices that create forests resembling natural stand and landscape patterns, i.e., contain a broad mix of tree ages.

Under the base timber harvest forecast, most of the remaining net operable mature forests in the Queen Charlotte TSA would be converted to immature forests within the next 100 years. Once converted, the majority of these forests will not redevelop to an old growth

state as they will be harvested again, before this occurs[38]. From a wildlife standpoint, the conversion of mature forests to immature forests on the QCI may cause changes in species distribution and population levels.

Species believed to be dependent on mature forests, or attributes of mature forests, such as soft dead snags or coarse woody debris, may experience population declines. Snags, for example, provide habitat to cavity nesting birds (woodpeckers and owls), and mammal species (black bears, martens and bats). Current safety standards require snags to be felled at the time of harvesting. The situation is further aggravated by management practices like thinning and short rotations, which do not allow trees to mature, die and serve as nesting, feeding, and overwintering sites (Backhouse, 1990). Many of these species are already of significant management concern within the province (see Table 2.3, for a list of those bird and mammal species currently identified to be 'at risk'). On the other hand, wildlife species that can better adapt to a wide range of habitat types, and species that prefer early successional forest types may increase in numbers; most of these species are not of significant management concern within the province.

7.2 Freshwater Aquatic Habitat and Populations

The Queen Charlotte TSA contains a number of important salmonid spawning rivers and streams[39]. In general, current timber harvesting practices, such as clear-cutting, affect the hydrology (water balance, yield, turbidity and temperature) and channel conditions (i.e., volume, stability and distribution of large organic debris) of catchments, and associated streams and rivers. These changes in turn can adversely impact freshwater aquatic habitats and populations.

The extent and degree to which clear-cutting will affect freshwater aquatic habitats and populations, however, is dependent upon a number of variables, such as the proportion of the watershed harvested, the extent to which buffer strips are retained, and the quality and intensity of roading (Keenan and Kimmins, 1993). Moreover, the interaction of these variables, especially over the long-term, is still not well understood.

On a positive note, a recent evaluation of British Columbia Coastal Fisheries Forestry Guidelines (Tripp, 1994) found that salmonid habitat on the QCI was not being 'significantly' impacted by clear-cutting operations, at least in the short-run. The study revealed that site specific prescriptions for streams were being adhered to in 92 percent of the 28 cut blocks reviewed, and that most site specific prescriptions were effective in reducing or eliminating the effects of logging on streams. It should be noted, however,

[38] The minimum harvestable age for forest stands in the TSA is between 100 and 150 years depending upon the species and growing site (Ministry of Forests, 1994b). Based on current and proposed forest management habitat objectives, some areas of second growth forest will be allowed to develop back into old growth forest stands. At this time, it is not known how much will be allowed to redevelop to old growth, or where it will occur.

[39] The majority of the QCI's salmon bearing streams, including the most significant, the Yakoun River, are located within TFL areas.

that the objective of the Coastal Fisheries Forestry Guidelines is to maintain salmonid habitat; they do not, and were not intended to, maintain the full biodiversity of freshwater systems (Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, 1994).

7.3 Haida Interest Areas

At present, pressure from the CHN to defer timber harvesting within Duu Guusd and the Tlell River watershed is forcing the Forest Service to locate the full TSA harvest within a significantly reduced mature forest area. If this situation was to continue in the future, it would accelerate the removal of these mature forest areas, and increase the pressure on freshwater aquatic habitat and populations within that area.

7.4 Implications of Timber Harvest Forecasts

Each of the timber harvest forecasts (the base, and the two alternative initial harvest forecasts) offers some degree of environmental benefit over the continuation of harvesting operations at the current AAC level. However, they are all based on the same assumptions with respect to environmental management considerations in the TSA; they differ only in the timing of the harvest reductions. As such, the above mentioned trends and issues should hold irrespective of the harvest forecast considered.

Case 2, which would see the AAC drop by approximately 228 000 cubic meters in the first decade (58 percent reduction), would best assist the Forest Service in addressing the CHN's moratorium request, by reducing cutting pressure on the remaining mature forest stands. This may lead to the maintenance of a broader range of forest stand ages within these areas, which in turn would promote biodiversity

SUMMARY AND CONCLUSION

8.1 Summary

This report (a) describes the economy, physical environments, and land use issues of the Queen Charlotte Islands, and (b) assesses the socio-economic and environmental implications of changing the Islands' current TSA timber harvest level.

Chapter two provides a profile of the entire archipelago, placing the TSA in context with respect to other land uses on the Islands. Chapter three focuses on the TSA. It describes the land base available for timber harvesting, the guidelines directing forest management, the current harvest level and its apportionment, the major licensees, and the employment associated with current timber harvesting operations. This chapter also outlines the three harvest level forecasts (base harvest forecast, and two alternative initial harvest forecasts - Cases 1 and 2). Chapters four, five and six examine the potential economic, social, and environmental implications of the three harvest forecasts. Economic impacts are estimated at both a regional (QCI), and provincial level using the methodology described in Appendix 4. Tables 4.1 and 4.2 present TSA and provincial employment and employment income results for the base harvest forecast. Government revenues under the base harvest forecast are presented in Tables 4.3 and 4.4. Employment, income and government revenue results under the alternative initial harvest forecasts are presented for selective decades and contrasted with the base harvest forecast. The social and environmental analysis component of the study is more tentative and qualitative than the economic analysis component. This is due to a number of factors including the Timber Supply Review's narrow terms of reference, which focus on aggregate changes in harvest levels, and a limited amount of time and financial resources to conduct field work.

8.1.1 Harvest Level Forecasts

All three harvest forecasts in this study involve a 52 percent drop in the harvest level from the current AAC of 514 335 cubic metres to a long-term harvest level (LTHL) of 248 000 cubic metres. The forecasts differ in the timing and magnitude of initial harvest reductions; each forecast achieves the LTHL in Decade 18 (180 years in the future).

- The base harvest forecast assumes an immediate 14 percent drop from the current AAC to 442 000 cubic metres, followed by further reductions of 12 percent per decade for the next six decades.
- Under Case 1, the harvest is held at the current AAC level for the first decade. To avoid a future timber supply shortfall, the harvest must decline by 15 percent per decade in Decades 2 through 6, and settle at a lower level in Decade 7 than the base harvest forecast.
- The Case 2 harvest forecast achieves the most constant supply of timber over the forecast period. In order to do so, the harvest declines immediately to 228 000 cubic metres, before rising gradually to attain the LTHL.

8.1.2 Economic Impacts

Base Harvest Forecast

TSA Employment and Employment Income

- Forestry plays a significant role in the local economy. The TSA currently supports approximately 149 direct forestry PYs and $4.3 million of associated employment income. This in turn generates a further 72 PYs of employment opportunities and close to $1.6 million in indirect and induced incomes. A further 29 harvest related PYs are divided between the Forest Service and incremental forestry activities, with a related $0.67 million in employment income (These impacts are assumed to remain constant over the forecast period and are not included in the impact tables of Chapter 4. For an explanation of this assumption see pages 51-52.).
- In the first decade, a 14 percent drop in the harvest would lower direct employment to 128 PYs and direct income to $3.7 million. This represents a reduction of 21 PYs and $0.6 million from current levels. The total direct, indirect and induced reduction in employment and employment income would be 31 PYs and $0.9 million.
- As harvest levels continue to decline, for every 1000 cubic metres change, 0.29 PYs of direct TSA employment, and 0.14 PYs of indirect and induced employment would be lost. This employment/harvest relationship is assumed to remain constant throughout the analysis.
- The lowest harvest level achieved, 205 267 cubic metres between Decades 7 and 16, would support 88 total PYs in the TSA (58 PYs direct), and $2.3 million ($1.7 million direct) of associated direct, indirect and induced income. This represents a decline from the current situation of 133 PYs and approximately $3.6 million in total direct, indirect and induced employment, and employment income, respectively.
- The total direct, indirect and induced TSA employment level supported by the LTHL would be 107 PYs, and the associated employment income level would be close to $2.8 million. Over the forecast period, a total of 114 PYs would be shed from TSA forestry and 'spin-off' activity, and $3.1 million in employment income would be lost.

Provincial Employment and Employment Income

- At the provincial level, the current harvest supports 669 PYs of harvest dependent direct forestry employment, and $20.5 million of associated employment income. This in turn generates a further 1 003 employment opportunities and close to $19.7 million in indirect and induced incomes. Total direct, indirect and induced harvest dependent employment and employment income is 1 672 PYs and $40.2 million, respectively. Harvest related direct, indirect and induced employment and employment income adds 65 PYs and $1.4 million to these totals.
- In the first decade, the 14 percent drop in harvest results in a drop to 575 direct PYs and $17.6 million of direct employment income. This represents a reduction of 94 direct PYs and $2.9 million from current levels. The total direct, indirect and induced reduction in employment and employment income is 234 PYs and $5.7 million.
- As harvest levels continue to decline, 1.3 PYs of direct employment, and 1.95 PYs of indirect and induced employment are lost for every 1000 cubic metres change. This relationship is assumed to hold throughout the analysis.

- The lowest harvest level, 205 267 cubic metres between decades 7 and 16, would support 668 total PYs within the province (291 PYs direct), and $16.1 million ($8.2 million direct) of associated direct, indirect and induced employment income. This represents a decline from the current situation of 1 004 total PYs and approximately $24.1 million in total direct, indirect and induced employment, and employment income, respectively.
- The total direct, indirect and induced employment level supported by the LTHL would be 807 PYs, and the associated employment income level would be close to $19.4 million. Over the forecast period, a total of 865 PYs would be shed from TSA forestry and 'spin-off' activity, and $20.8 million in employment income would be lost.

Government Revenues

- Forestry operations associated with the current harvest level generates, in total, approximately $27.1 million in government revenues - $16.8 million in provincial revenues, and $10.3 million in federal revenues. Provincial stumpage ($7.4 million), provincial and federal personal income tax ($4.8 million and $9.7 million, respectively),and provincial corporate taxes ($3.1 million) comprise over 90 percent of total government revenues. It should be noted that the Forest Renewal Plan will likely result in higher stumpage rates. This policy change is not reflected in the stumpage calculations.
- In the first decade provincial revenues would decline by $2.5 million, and federal revenues by $1.4 million, to $14.3 million and $8.9 million respectively. Provincial and federal revenues would continue to decline until Decade 7, at which time revenues would level off at approximately $6.6 million, and $4.2 million respectively. They would rise to $8.1 million (provincial) and $5.0 million (federal) in Decade 18 when the LTHL is achieved.

Alternative Initial Harvest Forecasts

Case 1

- Case 1 has no immediate impact on current levels of employment, employment income, or government revenue. Beginning in Decade 2, the harvest would decrease by 15% per decade for the next five decades. As a result, no employment losses would occur in Decade 1 and employment and income levels would remain above those supported by the base forecast until Decade 5.

Case 2

- Case 2 would cause an immediate decline in direct provincial harvest dependent employment and income to 296 PYs and $9.1 million, respectively - 373 PYs and $11.4 below the current level, and 279 PYs and $9.1 million below the base harvest forecast. Total provincial forestry dependent income and employment under Case 2 is 932 PYs and $22.2 million below the current level, and 740 PYs and $18.0 million below the base harvest forecast. Government revenues are similarly reduced under Case 2 - $15 million lower than the current level, and $11.2 million below the base forecast.

8.1.3 Social and Environmental Implications

Implications for Communities

- Discussion of potential social effects is focused on the short-term.
- In the first decade, PY reductions under the base harvest forecast equates to approximately 2 percent of the Islands' current total employment base. If the Islands two mills are also forced to close, this would double the number of job losses. Under Case 2, the number of job losses increases significantly, amounting to approximately 7 percent of the Islands' current total employment base.
- In the short-term, the province's social safety net will mitigate some of the adverse economic impacts resulting from harvest reductions. In the first decade, assuming the base harvest forecast, the safety net would result in four fewer job losses.
- Research has shown that job loss can affect the mental and physical health of individuals. While unemployment is only one of many factors causing these effects, it is often the factor which precipitates physical or mental breakdown.
- TSA forestry related job losses, combined with job losses due to Canadian Forces Station downsizing at Masset will place pressure on the Islands existing social services infrastructure. At present, the Islands' ability to respond to mental health problems is limited, as are the opportunities for skills upgrading and retraining.
- The QCI communities need to be aware of these potential job losses and related problems so that adequate staffing and resources become available, and effective social service, and worker re-employment and re-training can be developed.
- Resources and opportunities which should assist Islands communities in coping with job losses include the Forest Renewal Plan, Gwaii Trust (Islands-wide planning society), The South Moresby Forestry Replacement Account, and the potential for forestry-related value-added cottage industries.

Implications for the Haida Nation

- The CHN has been advocating for an immediate 50 percent reduction to the Islands' total AAC (TSA and TFL). The base harvest forecast reduces the TSA harvest level by 60 percent, but takes 60 years to accomplish. The Case 2 harvest forecast, which reduces the harvest level by an immediate 58 percent, best meets CHN's interests.
- A considerable portion of Haida employment on the Islands is associated with TFLs. Within the TSA, the Haida are primarily involved in silviculture activities. The Forest Renewal Plan, with its focus on First Nations and forest rehabilitation should help mitigate harvest reduction pressures on these activities.
- Declining harvest levels will likely only make it more difficult for the Haida in their efforts to gain access to forest tenure within the TSA in the future.
- Duu Guusd and the Tlell River watershed comprise close to 40 percent of the gross operable mature within the TSA. CHN requests for a timber harvesting moratorium in these areas poses a serious challenge for the Forest Service. Removal of this area from the timber harvesting land base would make it difficult to meet AAC targets, as well as adhere to existing forest management guidelines. On the other hand, the CHN has stated that a decision by the Forest Service to allow timber harvesting to proceed within these areas would have serious implications vis-à-vis Haida and British Columbia relations.

Environmental Implications

- Each of the timber harvesting forecasts should offer some degree of environmental benefit over the continuation of harvesting operations at the current AAC level. Since all assume existing forest management practices, the benefits that may occur will result from the differences in the timing and magnitude of harvest reductions.
- Harvesting of mature forest stands would occur most rapidly under the Case 1 and base harvest forecasts. The age class distribution of the forest would narrow and populations of species that depend on mature forest may decline, while those dependent on a wide range of habitat types and/or immature forest may increase in numbers.
- The lower initial harvest rate under Case 2 would allow greater flexibility in future land use planning and would best assist the Forest Service in addressing the CHN's moratorium request for Duu Guusd and the Tlell River watershed.
- The potential cumulative effect of current forest management practices on forest and freshwater ecosystems is an issue of particular concern to scientists and resource managers. Unfortunately, there is currently a lack of information about wildlife populations, and ecosystem processes and relationships. Moreover, neither the time frames over which environmental effects may occur, nor the threshold levels at which profound ecosystem changes may take place are at present well understood.

The positive environmental implications of lower harvest levels should be viewed in context with the impacts on short- and long-term employment and incomes. This more balanced evaluation of various implications of the changing forest industry is the purpose of using multiple accounts analysis.

8.2 Concluding Remarks

This study identifies potential economic, social, and environmental implications associated with reductions in TSA timber harvest levels. The analysis assumes that factors such as the timber harvesting land base, forest management practices, harvesting and processing technology, timber prices, and productivity remain constant. A change in any of these variables would require re-visiting the analysis.

The *Queen Charlotte TSA Timber Supply Analysis* indicates that the long-term harvest level for the TSA is 48 percent of the current AAC. In order to achieve this long-term level, the current AAC level must be reduced by some 266 000 cubic metres. There are many paths by which this can be accomplished, each of which will result in social and economic impacts. Moreover, in order for reductions to occur gradually and to avoid future timber supply shortfalls, they need to begin in the near future. As such, this does not allow local communities much time to plan for job losses, or develop mitigation strategies. Major government initiatives such as the Forest Renewal Plan, in concert with other processes already underway on the Islands may help offset some local adverse impacts that may occur.

APPENDIX 1
GLOSSARY OF TERMS

Allowable Annual Cut (AAC) — The volume of timber that may be cut each year from a forest management unit (e.g., a Timber Supply Area), set by the Chief Forester in accordance with Section 7.0 of the *Forest Act*. It equals roughly the amount of new growth produced by the forest each year, including a proportion of the mature volume minus deductions for losses due to fire, insects, and disease.

Age-class — Any interval into which the age range of trees, forests, stands, or forest types is divided for classification. Forest inventories commonly group trees into 20 year age classes.

Basic Silviculture — The harvesting methods and silviculture operations, including seed collecting, site preparation, artificial and natural regeneration, brushing, spacing and stand tending, and other operations, prescribed for the purpose of establishing a free-growing crop of trees of a commercially valuable species.

Biodiversity — An umbrella term that represents the full variety of life. It is usually considered at three levels: genetic diversity, species diversity, and ecosystem diversity.

Coastal Biodiversity Guidelines — Guidelines, currently at the draft stage, designed to help forest managers incorporate the conservation of biodiversity into broad management planning on British Columbia's coast. The principle objectives are to maintain ecological processes of natural forests, and to maintain populations of native species, well distributed across their ranges, through (a) establishing a network of old growth and special habitats within each landscape unit, (b) planning harvesting activities to distribute a variety of seral stages and habitat patches across the landscape; and (c) managing stands to maintain or provide important biodiversity attributes.

Coastal Fisheries Forestry Guidelines — Developed jointly by the Forest Service, Ministry of Environment, Lands and Parks, the federal department of Fisheries and Oceans, and the Council of Forest Industries, and introduced on British Columbia's coast in 1988, the guidelines were designed to provide a common basis for improving the performance and effectiveness of fish-habitat protection and coastal forest harvesting operations. The guidelines define four classes of streams, each associated with specific fisheries values and forest management objectives. This classification system enables forest managers and biologists to concentrate fish habitat protection efforts where they are most needed.

Coarse Woody Debris — Rotting logs and stumps that provide cover for plants, animals, and their predators.

Culturally Modified Tree (CMT) — Trees that have been intentionally altered by aboriginal people as part of their traditional use of the forest. There are essentially two basic types of CMTs: (1) barked stripped trees (bark used to weave clothing, mats and baskets), and (2) logged trees (wood used as planks for construction, poles, canoes and kindling).

Clear-cutting	A type of silviculture system in which the crop is cleared from an area at one time and an even-aged, replacement stand is established. Clear-cutting is designed so that most of the opening has full light exposure and is not dominated by the canopy of adjacent trees. The minimum size of a clear-cut opening is generally considered to be 1 hectare.
Class II Water	The Ministry of Environment, Lands and Parks introduced a classified waters system in 1990 in an effort to protect unique fishing opportunities within the province. A Class II designation requires non-residents of British Columbia to fish with a licensed angling guide; British Columbia residents require only a Non-Guided Classified Waters Licence.
Direct Employment Employment Income Impacts	Effects on forestry sector (harvesting, hauling, silviculture and processing) and employment and income resulting from changes in the timber harvest level.
Ecosystem	A functional unit consisting of all living organisms (plants, animals, and microbes) in a given area, and all non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be any size - a log, pond, field, forest, or an earth's biosphere - but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, for example, forest ecosystem.
Environmentally Sensitive Areas (ESAs)	Areas requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes. ESAs for forestry include potentially fragile, unstable soils that may deteriorate unacceptably after forest harvesting, and areas of high value to non-timber resources such as fisheries, wildlife, water, and recreation.
Forest Practices Code	A package of legislation, regulations, and standards that govern forest practices in British Columbia.
Forest Licence	A type of forest tenure that provides the holder with the right to harvest a specified volume of timber from within a TSA. It also bestows on the licence holder an obligation to reforest the land. The licence has a term of 15 to 20 years, and is generally replaceable every five years.
Hydrology	The science that describes and analyzes the occurrence of water in nature, and its circulation near the surface of the earth.
Indirect and Induced Employment and Income Impacts	Indirect employment and related economic activity is the result of direct businesses purchasing business related goods and services. Induced employment and related economic activity is the result of the employees of direct companies spending their incomes on consumer goods and services.
Inoperable lands	Lands that are unsuited for timber production now and in the foreseeable future by virtue of their elevation, inaccessible location, low value of timber, small size of timber stands, steep or unstable soils that cannot be harvested without serious and irreversible damage to the soil or water resources, or designation as parks, wilderness areas, or other uses incompatible with timber production.

Integrated Resource Guidelines	Guidelines requiring that forest management activities, such as harvesting, road building and silviculture treatments, be conducted in a special way in order to protect or enhance timber and non-timber forest values.
Land and Resource Management Plan (LRMP)	A plan for a forest district (one or more) that provides broad resource management objectives and strategies, and direction for more detailed resource planning by government agencies and the private sector.
Land and Resource Use Plan (LRUP)	A plan for a portion of a Timber Supply Area or Tree Farm Licence that provides management guidelines for resource use integration in this area.
Landscape Level	A watershed, or series of interacting watersheds or other natural biophysical (ecological) units, within the larger Land and Resource Management Planning (LRMP) areas. This term is used for conservation planning and is not associated with visual landscape management and viewscape management.
Long Run Sustainable Yield (LRSY)	Timber harvesting levels whereby the volume of timber harvested in any given period can be replaced by a similar volume from regenerated stands within the same period.
Multiplier	Ratio of total income or employment impacts relative to direct impacts. Multipliers are generally greater than 1.0 since 1.0 represents the direct component.
Not Satisfactorily Restocked (NSR)	Productive forest land that has been denuded and has failed, partially or completely, to regenerate by natural or artificial means.
Protected Areas Strategy (PAS)	A process initiated by the government of British Columbia aimed at protecting representative examples of the major ecosystems across the province's 199 ecosections, as well as, special natural, cultural and recreational features. Under the PAS, the provincial government is committed to developing and expanding a protected areas system that will comprise 12 percent of British Columbia. The 12 percent target is applied at the biogeoclimatic level within each ecosection.
Person-year (PY)	A measure of employment representing one full-time job for one year. The length of a work year will depend on the type of job and working conditions that prevail in the area. A PY also takes into account part-time or seasonal full-time work. For example, if an employee works full-time for six months (i.e. one half of a year), he or she accounts for 0.50 PYs of employment. Using person-years allows employment of different duration to be compared on a similar basis. The number of PYs will not necessarily equal the number of people working full and part-time in an area.
Riparian Zone	The land adjacent to the normal high water line in a stream, river, lake, or pond and extending to the portion of land that is influenced by the presence of the adjacent ponded or channelled water. Riparian areas typically exemplify a rich and diverse vegetative mosaic reflecting the influence of available surface water.
Silviculture	The art of producing and tending a forest, and the application of the knowledge of silvics in the treatment of a forest; the theory and practice of controlling forest establishment, composition and growth.

Small Business Forest Enterprise Program (SBFEP)	This program permits the Forest Service to sell Crown timber competitively to individuals and corporations who are registered in the SBFEP. Approximately 10 percent of the province's timber allocation is directed towards this program.
Snag	A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.
Stand	A community of trees sufficiently uniform in species composition, age, arrangement, and condition to be distinguishable as a group from the forest or other growth on the adjoining area, and thus forming a silviculture or management entity.
Tree Farm Licence (TFL)	A stewardship agreement between an individual forest company and the Forest Service that allows the company to occupy, and continuously manage the forests of a specified area. The licence includes the right to harvest timber according to plans approved by the Forest Service, and the obligation to carry out all phases of forest management.
Timber Harvesting Land Base	The portion of the total land area of a management unit considered to contribute to, and be available for long-term timber supply.
Timber Licence (TL)	A type of forest tenure issued in the early 1900s. It includes a right to harvest timber according to plans approved by the Forest Service, and an obligation to reforest. After harvesting, the area is rolled back into either a TSA, or TFL.
Timber Sale Licence	A type of forest tenure offered to small business loggers and to timber processors who qualify for registration under the Small Business Forest Enterprise Program. These licences are short-term in nature (under ten years), and allow the tenure holder to harvest the timber within a specific area within a TSA. Under this form of tenure the Forest Service assumes much of the responsibility for forest management, including development planning, road construction to the licence area, timber cruising, timber sale layout, all silviculture and program administration.
Timber Supply (TSA)	An integrated resource management unit established in accordance with Area Section of the Forest Act.
Watershed	An area drained by a particular stream or river. A large watershed may contain several smaller watersheds.
Wildlife Trees	Dead, decaying, deteriorating, or other designated trees that provide present or future critical habitat for the maintenance or enhancement of wildlife.

APPENDIX 2
LIST OF CONTACTS

	QCI/Haida Gwaii Community Representatives
Village of Masset Village of Port Clements	T. Carty (mayor), F. Redick, K. Swanson (councillors) D. Orr, G. Johnson, R. Haralson (councillors), J. Effraimson (clerk-treasurer)
Queen Charlotte City - Skidegate Landing Advisory Planning Commission (QCCSLAPC)	G. Wiggins, C. Kulesha, G. Martin, L. Johnson, E. Azzara, C. Greenough
E. Collison	Administrator, Council of the Haida Nation (CHN), Old Masset Village
R. DuDoward	Forestry Committee chairperson, CHN, Skidegate
T. Greene Sr.	Haida elder, Skidegate
B. Brown	Economic Development Advisor, Old Masset Development Corporation, Old Masset Village
D. Crosby	Councillor, Skidegate
G. Russ	Outreach Coordinator, Skidegate
	Forest Licensees
J. Abbot	Abfam Enterprises, Port Clements
L. Dunn	Abfam Enterprises, Port Clements
E. Lavoie	QCI Sawmills, Masset
C. Lavoie	QCI Sawmills, Masset
D. Lavoie	QCI Sawmills, Masset
B. Storry	TimberWest Forest Products, Sandspit
D. Husby	President, Husby Forest Products, Vancouver
A. Pertile	Vice president, Husby Forest Products, Vancouver
P. Blanchard	Coast Forest Management (Husby), Victoria
R. Davis	Office Manager, Husby Forest Products, Vancouver
J. Hacket	Ass. Manager, MacMillan Bloedel Ltd., Port Clements
B. Dumont	Chief Forester, Sewell Inlet Operations, Western Forest Products, Vancouver
	Small Business Operators/Contractors - Forestry Sector
P. Shiels	President, Shiels Contracting Ltd, Sandspit
R. O'Brien	President, O'Brien & Fuerst Logging Ltd, Port Clements
G. O'Brien	O'Brien & Fuerst Logging Ltd, Port Clements
B. Mackay	Owner/Operator, Tlell
R. Leach	Owner/Operator, Tlell
Pat Alton	Owner/Operator, Queen Charlotte City
S. Schiller	Edwards and Associates (Osprey Timber), Richmond
M. Hennigan	Slark Tooth Logging, Queen Charlotte City
	Ministry of Forests, QCI Forest District
B. Hansen	Operations Manager
J. Andres	Planning/Inventory Officer
G. Wiggins	Resource Officer, Small Business
D. Williams	Resource Officer, Silviculture
G. Connolly	Resource Officer, Scaling
B. Banford	Field Operations Supervisor, Small Business

	Ministry of Forests - Other
D. Herchmer	Recreation Officer, IRM, Smithers
I. Ronalds	GAP Analysis Team, Smithers
V. Fletcher	Timber Supply Analyst, Victoria
J. Marczyk	Senior Policy Analyst, Corp Policy and Planning, Victoria
D. Ruhl/D. Zelisney	Export Policy, Economics and Trade Branch, Victoria
	Ministry of Environment, Lands and Parks
A. Cober	Forest Ecosystem Specialist, Queen Charlotte City
G. Schultze	A/Wildlife Biologist, Smithers
B. Hooton	Head, Fisheries, Smithers
L. McIntosh	IRM Habitat Biologist, Smithers
R. Saimoto	Fisheries Technician, Smithers
B. Harper	Endangered Species Specialist, Wildlife Branch, Victoria
S. Cannings	Program Zoologist, Conservation Data Centre, Victoria
	Other Federal and Provincial Officials
G. Usher	Fisheries Officer, Department of Fisheries and Oceans, Queen Charlotte City
B. Clauston	Labour Analyst, Canada Employment Center, Prince Rupert
S. Sheppard	Canada Employment Center, Prince Rupert
M. Panchuk	Canada Employment Center, Terrace
B. Ives	District Supervisor, Ministry of Social Services, Queen Charlotte City
C. Parnell	Economic Development Officer, Ministry of Small Business and Tourism, Prince Rupert
G. Fletcher	Planner, Skeena-QCI Regional District, Prince Rupert
S. Rose	Sargent, R.C.M.P., Queen Charlotte City
R. Hamilton	Superintendent, Parks Canada, Queen Charlotte City
G. Goyette	Captain, Canadian Forces Station, Masset
L. Thiessen	Senior Analyst, Power and Projects Branch, Energy, Mines and Petroleum Resources
	Other QCI/Haida Gwaii Community Interest Groups/Members
B. Beldessi	Chairman, Share the Rock, Sandspit
F. Collison	Administrator, Gwai Trust Interim Planning Society, Old Masset
A. Bellis	Huksta Forestry, Old Masset Village
J. Broadhead	Museum Society, QC City
J. Hart	Carver/Small Businessman, Old Masset Village

APPENDIX 3
REFERENCES

ARA Consulting Group Inc. 1993. *Resource Based Community Adjustments*, prepared for the British Columbia Ministry of Employment and Investment.

Archipelago Management Board. 1993. *Gwaii Haanas: Haida Heritage Site and National Park Reserve: Public Planning Program,* Newsletter Number 1, September.

----------. 1994. *Gwaii Haanas Research,* Newsletter Number 2, February.

Arcas Consulting Archeologists Ltd. 1994. *Haida Gwaii/Queen Charlotte Islands Culturally Modified Tree Inventory: Summary Report*, prepared for B.C. Forest Service, Queen Charlotte City, and Council of the Haida Nation, Masset.

Backhouse, Francis. 1990. *Wildlife Trees: Their Role in British Columbia's Forests*, Submission to the B.C. Forest Resources Commission, prepared for the Wild Tree Committee.

Banner, A., J. Pojar and R. Trowbridge. 1983. *Ecosystem Classification of the Coastal Western Hemlock Zone, Queen Charlotte Island Subzone (CWHg),* British Columbia Ministry of Forests.

Bohn, Glen. 1993. Hard times for Haida 'Place of Wonder', in the *Vancouver Sun*, Thursday, October 21, pp. B6-7.

British Columbia. 1993. *A Protected Areas Strategy for British Columbia,* Queen's Printer, Victoria.

----------. 1994. *Working in Partnership: British Columbia's Forest Renewal Plan.*

Campbell, R.W., Neil Dawe, Ian McTaggart-Cowan, John Cooper, Gary Kaiser, Michael McNall. 1990. *The Birds of British Columbia*, Volume 1, Royal B.C. Museum, Victoria, B.C.

Canadian Parks Service. 1988. *Background Information, South Moresby Agreement*, "Questions and Answers" document, prepared by J. Swannack.

----------. 1992. *1991 Gwaii Haanas Visitor Survey Results: Presented to the Gwaii Haanas Management Board.*

Dalzell, Kathleen. 1968. *The Queen Charlotte Islands: Volume 1, 1774 - 1966*, Bill Ellis Publishing, Queen Charlotte City.

Fenger, M.A. and A.P. Harcombe. 1991. *Biodiversity, Old-Growth Forests and Wildlife in British Columbia*, unpublished paper. Ministry of Environment, Wildlife Branch, Victoria, B.C.

Gram, C. 1994. *Making Homes Not Houses: A Community Economic Development Approach to Tourism Planning: A Case Study of Haida Gwaii/The Queen Charlotte Islands*, M.A. Thesis, School of Community and Regional Planning, University of British Columbia, B.C.

Hartman, G.F. and J.C. Scrivener. 1990. *Impacts of forestry practices on a coastal stream ecosystem, Carnation Creek, British Columbia*, Canadian Department of Fisheries and Oceans, Ottawa, Ontario, Bulletin Fish Aquatic Science 223.

Horne, G. 1994. *Recommended Procedures for Estimating Regional Economic Impacts Resulting from Direct Changes in the Forest Sector: An Interim Procedure*, Ministry of Finance and Corporate Relations, Victoria.

Horne, G. and Lee Robson. 1993. *British Columbia Community Economic Dependencies*, prepared for the British Columbia Round Table on the Environment and the Economy.

Kavanagh, B. 1992. *Spirits Not Broken: The Haida People and Fisheries Resource*, The Centre for Sustainable Regional Development, University of Victoria, B.C.

Keenan, Rodney J. and J.P. Kimmins. 1993. The ecological effects of clear-cutting, in *Environmental Review*, 1, pp. 121-144.

Indian and Northern Affairs Canada (INAC). 1990. *Schedule of Indian Bands, Reserves and Settlements Including - Membership and Population Location and Area in Hectares*, Ministry of Supply and Services, Ottawa.

----------. 1993. *Federal Policy for the Settlement of Native Claims.*

Integrated Resource Planning Committee. 1993. *Social and Economic Assessment for Land and Resource Management Planning in British Columbia*, Queens Printer, Victoria.

----------. 1993. Land and Resource Management Planning: A Statement of Principles and Process, Edition 1, Queens Printer, Victoria.

Lee, Robert. 1993. Effects of Federal Timber Sales Reductions on Workers, Families, Communities, and Social Services, in *Building Toward a Balanced Solution: Position Papers on Northwest Forestry Issues*, compiled by the Northwest Forest Resource Council.

----------. 1994. *Employee Transitions and Risks Following Timber Harvest Reductions: Preliminary Estimates and Suggested Methodology*, prepared for the Interior Manufacturers Association.

Matas, Robert. 1993. In the beggining there was Moresby, *Globe and Mail*, Saturday, November 13, pp. D1.

Meidinger, D. and J. Pojar (editors). 1991. *Ecosystems of British Columbia,* British Columbia Ministry of Forests, Victoria.

Ministry of Environment, Land and Parks. 1992. *British Columbia Freshwater Fishing Regulations Synopsis, April 1, 1992 to March 31, 1994.*

----------. 1994a. *Steelhead Harvest Analysis, Skeena Region, 1984-85 to 1992-93.*

----------. 1994b. *Hunter Harvest and Effort - Summary Statistics Data Base*, Wildlife Branch, Smithers.

----------. 1994c. *Wild Fur Harvest Summary Report, July 1, 1986 to June 30, 1992*, Wildlife Branch, Smithers.

Ministry of Forests. 1987. *Forest Tenures: licences and permits for harvesting timber in British Columbia*, Queens Printer, Victoria.

----------. 1992a. *An Inventory of Undeveloped Watersheds in British Columbia*, Recreation Branch, Victoria, B.C.

----------. 1992b. *Resource Planning in the Ministry of Forests: A Glossary of Past and Present Plans*, Integrated Resource Resources Branch, compiled by Kelly Ness.

----------. 1993. *The Economic Impact of Timber Harvesting in British Columbia*, Economics and Trade Branch, Ministry of Forests, Victoria.

----------. 1994a. *Billing History Report*, Harvest Database System, Valuation Branch, annual reports for 1990 - 1993.

----------. 1994b. *Queen Charlotte TSA Timber Supply Review*, prepared by the Ministry of Forests, Queens Printer, Victoria.

Ministry of Forests and Ministry of Environment, Lands and Parks. 1992. *Guidelines to Maintain Biological Diversity in Coastal Forests, Draft*, prepared by Coastal Biodiversity Guidelines Committee.

Ministry of Forests, The Centre for Applied Conservation Biology University of British Columbia, Environment Canada. n.d. *Approaches to Maintaining Biolgoical Diversity in British Columbia's Forests: An Introduction for Resource Managers.*

Moore, K. 1991. *An Inventory of Watersheds in the Coastal Temperate Forests of British Columbia*, Earthlife Canada Foundation and Ecotrust/Conservation International, Vancouver, B.C.

----------. 1993. *Environmental Resource Values in the Waterfall Creek Development Area, Jusklatla Inlet, Queen Charlotte Islands: Assessment and Recommendations, Final Report*, prepared for the Small Business Forest Enterprise Program, Ministry of Forests, QCI Forest District.

Prince Rupert Region Protected Areas Team (RPAT). 1994. *DRAFT - Prince Rupert Region Protected Areas Strategy Region: Queen Charlotte Islands, Gap Analysis - Conservation and Recreation Components*, January, Smithers, B.C.

Trip Biological Consultants Ltd. 1994. *The Use and Effectiveness of the Coastal Fisheries Forestry Guidelines in Selected Forest Districts of Coastal British Columbia*, report prepared for the Ministry of Forests, Integrated Resources Branch, Victoria, B.C.

Sawnson, Fred and Dean Berg. 19xx. The Ecological Roots of New Forestry Approaches to Forestry, in *Forestry Perspectives*, 1(3), pp. 6-8.

Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. 1994. *Progress Report 2: Review of Current Forest Practice Standards in Clayoquot Sound.*

Skeena-Queen Charlotte Regional District. 1992. *Business Directory/Labour Market Profile: Haida Gwaii/Queen Charlotte Islands, 1991.*

Turner, Nancy. 1994. Introduction - Ethnobotany, in *Plants of Coastal British Columbia*, compiled and edited by Jim Pojar and Andy MacKinnon, B.C. Ministry of Forests and Lone Pine Publishing, Vancouver, B.C., pp. 24-27.

APPENDIX 4
CALCULATION OF ECONOMIC IMPACTS

Appendix 4 is divided into two sections: the first, describes the employment and income assessment, and the second, the government revenues assessment. Estimating the employment and income impacts for the Queen Charlotte TSA forestry sector involved three stages: (a) identifying the direct impact, (b) calculating employment coefficients, and (c) estimating the 'spin-off' impacts related to forestry operations. Section 4.1 describes these three phases. The Appendix concludes by describing the method of estimating government revenues.

A4.1 Estimation of Employment and Income Impacts

The impacts presented in this analysis are estimates of the employment and income changes that may occur as timber harvesting decreases to a long-term harvest level. The numbers should not be considered definitive, but illustrative of the trends to expect. Three levels of impacts occur as a response to economic changes: direct, indirect, and induced. Direct activity comprises all forestry related activities involved with harvesting, processing, government, and silviculture. Indirect impacts result from the purchase of goods and services by direct forestry businesses. Induced impacts arise as a result of employees spending their wages and salaries on consumer goods and services.

A4.1.1 Direct Employment and Income Impacts

Estimating direct employment and income impacts involved (a) surveying forest sector businesses and government, and using Statistics Canada sources, and (b) verifying the estimates using Ministry of Forests data and other Timber Supply Review socio-economic studies. Harvesting, processing, silviculture, and marine transportation comprise the direct impact of forestry operations on the QCI. The direct impacts presented in this report are the best estimates available and, to a large extent, are a reflection of the quality of information provided by the forestry sector working on the QCI. At least three years of data was sought in order to provide an accurate reflection of labour and forestry activity.

To use the direct employment figures in an analysis of economic impacts, each job must be of a similar work year. The unit of measurement used in this study is a Person Year (PY). All part-time and seasonal jobs are translated into a PY unit. Direct employment was considered a PY if the normal work year ranged between 9 - 12 months. Part-time and seasonal employment was translated into person years on the basis of an 1800 hour work year.

Direct income was estimated using information provided by licensees, SBFEP operators, and from average income levels provided by the Ministry of Finance (Horne, 1994), and the Ministry of Forests (1993). The wages used in the analysis are net of taxes and include cash benefits, comprised of holiday pay, statutory holiday pay where applicable, and other cash benefits.

Harvesting
Harvesting consists of all logging activities, road building and maintenance, harvesting site to sorting area log hauling, and planning related activities. Direct harvesting employment information was obtained through surveys of TSA licensees and SBFEP operators. The TSA direct employment figure of 82 is comprised of QCI residents, while the provincial total of 200 adds 118 non-resident direct harvesting PYs to the TSA figure.

An average yearly wage of $43 000 resulted from this research; this figure is netted down to an after-tax employment income of $29 000. The employment coefficient at the TSA level is 0.16 (81 PYs / 514.335m^3), and the provincial coefficient is 0.39 (200 PYs / 514.335m^3).

Processing
Processing is comprised of on and off-island wood products milling, and pulp and paper related processing. The number of provincial processing PYs includes both the TSA employment figures and employment supported by timber processed off-Islands. Facilities located on the Islands consist of Abfam Sawmills, QCI Sawmills, and other small craft and wood products operations. Off-Islands mills receiving QCI timber include International Forest Products, and the Fletcher Challenge pulp mill at Crofton. Much of the timber was sold to mills through the Vancouver Log Market. A survey provided the necessary information to estimate on-Islands processing employment; off-Islands processing varied and was difficult to track through the log market, thus a more general coefficient was necessary. The Ministry of Forests (1993) has estimated a coastal processing coefficient of 0.91 per 1000 cubic metres. Because approximately 12% of the timber harvested on the Islands is exported (and is assumed to continue) the coefficient is adjusted to 0.80, which can be applied to the total harvest, not an export adjusted volume figure. Processing employment is estimated at 46 PYs on-Island and 366 PYs off-Island.

An average after-tax employment income of $31 000 resulted from this research. The TSA processing coefficient is 0.09 per 1000 metres of total timber harvested -- note that this figure is not per 1000 metres of timber processed on Island; an on-Islands per 1000 metres of timber processed ranges between approximately 0.76 and 0.87.

Silviculture
Silviculture activity is divided into basic silviculture, which involves site surveys and preparation, planting, brushing, and some spacing, and incremental silviculture which involves spacing, fertilizing, and pruning. Basic silviculture is assumed to be more dependent on the level of harvest than incremental silviculture. Consequently, only basic silviculture is tied to the harvest while incremental silviculture is assumed to remain constant. Licensees provided information regarding basic silviculture operations and expenditures, while Queen Charlotte forest district staff provided basic and incremental silviculture information for all other harvested lands. Silviculture activity supports approximately 26 PYs.

An average after-tax employment income of approximately $23 000 was estimated for this sector. The majority of the employment involved in silviculture activity is seasonal. A QCI silviculture coefficient is approximately 0.05 per 1000 cubic metres (this figure includes basic silviculture only).

Marine Transportation
Marine transportation involves barging timber to staging areas and sorting. Direct employment was calculated using information provided by Husby Forest Products. An employment coefficient per 1000 cubic metres of 0.06 was estimated from this information and applied to the remainder of the timber moving off-Islands. Log barging activity supports approximately 31 PYs. The average after-tax income used in the marine transport analysis was $31 400.

Forest Service Employment
Forest Service District and Region employment related to the TSA was estimated by prorating total employment by a TSA harvest to total district of region harvest ratio. District employment equals the total district employment times the ratio of TSA harvest to total QCI harvest: 40 PYs * 514 335 / 1 900 000 = 10 PYs. Region employment associated with the QCI harvest equals 127 PYs * 514 335 / 21 586 080 = 3. The District figure may be conservative.

An average forest service net employment income was estimated at $27 000 by using the Ministry of Forests Annual Report, 1991-1992, estimates of total employment and income for 1992. The gross average wage is approximately $39 000.

A4.1.2 Labour Coefficients
Labour coefficients are used to calculate forestry related direct employment associated with particular harvest levels. The coefficients reflect the relationship between the number of workers and the quantity of timber harvested, and are presented in the form of labour per 1000 cubic metres of timber cut. Coefficients were derived for harvesting, silviculture, marine transport, and processing. Multiplying the coefficients by each forecast harvest level provides a projection of the number of workers that would be employed in the forest industry at selected intervals of the forecast period.

Some assumptions are inherent in this type of analysis:

1. The analysis assumes a linear relationship between the number of workers and the quantity of timber harvested. Thus, the labour coefficients remain constant over the forecast period and do not adjust for potential increases or decreases in labour intensity. The method assumes that the current economic relationships will continue into the future. In other words, the current conditions (productivity, harvest practices, and social objectives of forests use) will continue for the length of the forecast period. These conditions may change in the future.

2. The presentation of impacts suggests that employment losses would occur immediately with a change in the quantity of timber harvested. Thus, if the harvest declines, employment in harvesting, basic silviculture, and processing is assumed to immediately decline also. However, the adjustment process would likely occur over a longer time period. The analysis is not able to predict the exact time at which the employment losses would occur. While direct harvesting activity would likely decline in concert with harvest levels, processing employment, for example, would adjust over a longer period as timber flows adjust to harvest changes occurring throughout the province. Silviculture employment would not decline immediately either, as a result of a lag time between harvesting and the completion of basic silviculture.

3. Changes in indirect and induced employment and income would also not occur immediately. While the quantity of jobs related to the harvest is estimatable, the time at which these 'spin-off' changes will occur is not identifiable. Multipliers are static representations of particular economic conditions and do not provide a temporal, or dynamic, insight into the occurrence of impacts.

These qualifications are not the fault of this or any impact analysis, but are the result of theoretical assumptions inherent in any static economic impact assessment model. As such, the assessment provided here represents the best approximations, given the use of the best available economic impact information.

The direct coefficients were estimated using direct employment information received from QCI licensees, Small Business operators, and the Forest Service. The total coefficients are weighted averages of the individual sector coefficients. Thus, for example, to find the total direct employment, either sum the employment estimates of individual sectors, or use the total direct coefficient. The coefficients are presented and used separately to provide a breakdown of forest sector impacts. For example, in Decade 1 of the base harvest forecast, the provincial harvesting component of direct employment equals 172 PYs (442 000m^3 * 0.39/1000m^3). The total direct employment for Decade 1 of the base harvest forecast equals 575 PYs (442 000m^3 * 1.3 PYs/1000 m^3).

Table A.1 presents a summary of Queen Charlotte TSA employment coefficients. Dividing the indirect/induced and total impact employment figures by the current AAC provides the remaining employment coefficients found in tables 3.3 and A-1. That is, 72 / 514.335 = 0.14 PYs per 1000 cubic metres, where 72 is the estimate of indirect and induced employment (see table 4.1), and 514.335 is the current AAC divided by 1000. A total employment coefficient can be calculated in the same manner using total employment and the current AAC. These factors can then be applied to any level of harvest to estimate indirect/induced and total employment.

Table A.1
Queen Charlotte TSA
Forestry Employment Coefficients
(per 1000 m^3 of total harvest)*

Forestry Sector	TSA Coefficient	Provincial Coefficient
Harvesting	0.16	0.39
Processing	0.09	0.80
Basic silviculture	0.04	0.05
Marine transportation	--	0.06
Total Direct Coefficients	*0.29*	*1.30*
Indirect / Induced Coefficients	0.14	1.95
Total Employment Coefficients	*0.43*	*3.25*

* AAC = 514,335.

A4.1.3 Indirect and Induced Economic Impact Methodology

TSA Impact Assessment

The Ministry of Finance has suggested a procedure for impact identification at the regional level (Horne, 1994). This procedures paper expands on an earlier Ministry of Finance paper that provides economic base income multipliers for 55 small areas of B.C. (Horne and Robson, 1993). The economic base technique was used to estimate the 55 multipliers.

Economic base analysis is predicated on the assumption that the regional economy is divisible into a basic, or export, sector and a non-basic, or service, sector. The basic sector is assumed to be the driver of the local economy. Thus, economic expansion is the result of growth in the basic sector, i.e., growth in the production of goods or services that will flow out of the region. All activity producing and providing inputs to the production process is included in the base sector. The non-basic, or service, sector captures all the activity involved with the sale of goods and services for final consumer demand, thus the induced effects. The relationship between the basic and non-basic sectors is assumed to be linear, thus the non-basic sector will grow by a constant proportion to the growth of the basic sector.

The 1994 procedures paper suggests that the income base multipliers should be scaled down by a factor of 0.92 (this adjusted multiplier reflects the availability of more detailed information, and thus regional activity). As a result, the base income multiplier for the QCI is 1.14 (1.24 * 0.92). Base income multipliers produce induced impacts only, thus the multiplier must be applied to the sum of the direct and indirect impacts. Thus, the analysis requires direct and indirect information to complete the assessment.

The process suggested by Horne (1994) involves the following steps:

1. separate direct employment into harvesting and silviculture, pulp and paper processing, and other wood manufacturing;

2. determine direct income by multiplying the direct forest sector employment by the appropriate average after-tax direct income as shown below:

Logging	$29 900,
Pulp and Paper	$33 300,
Other wood manufacturing	$27 700;

3. estimate indirect income using indirect factors of 0.21 for harvesting, 0.17 for pulp and paper processing, and 0.11 for other wood manufacturing;

4. add the direct and indirect income estimates then multiply the sum by the QCI income multiplier of 1.14;

5. to estimate indirect and induced employment, divide the indirect and induced incomes by the appropriate average after-tax wages:

Indirect	
Logging	$24 700,
Pulp and Paper	$23 400,
Other wood products	$22 300,
Induced	
All sectors	$18 900.

The output of this process is an estimate of direct income, indirect employment and income, induced employment and income, and thus the total employment and income generated by the forestry sector on the Islands.

Determining a total income impact multiplier is possible by adding the base income multiplier with a weighted average of the indirect factors. Harvesting dominates the local forestry sector, and as a result, the total impact multiplier is weighted towards the harvesting coefficient of 0.21. Thus, the total, direct, indirect, and induced multiplier for the QCI is 1.35 (1.14 + 0.21). The multiplier implies that for every dollar of direct employment income , a further $0.35 of indirect and induced income is generated within the QCI.

Once an estimate of the total TSA employment impact is complete for one harvest level, the calculation of a TSA employment multiplier is possible. The total, direct + indirect + induced, QCI base employment multiplier is approximately 1.45. This employment

multiplier implies that for every 1 PY in the forestry sector, a further 0.45 PY is employed in supporting activities.

Safety-net calculations

The analysis assumes that changes to income and employment would not be offset by growth in other sectors, or by the social safety net. While the analysis does not attempt to assess growth in other business sectors, unemployment insurance and welfare ensures that, over the short-term, some of the income lost would be replaced by social transfer payments. As a result, the loss of employment income would not be as great as the analysis indicates, although the income's source would change. Further, the spending of safety net transfer payments on consumer goods and services would save some induced jobs.

To estimate the amount of income saved and the number of induced jobs saved, the Ministry of Finance (Horne, 1994) has provided coefficients that identify the short-term safety net impacts at the TSA level. The adjusted employment loss as a result of the safety net is found by multiplying the total change in jobs between harvest levels by 0.85. The resulting figure is the actual number of total jobs lost. The difference between the two figures would be the total number of induced jobs saved. The difference between the adjusted and unadjusted induced figures reveals the number of induced jobs lost by the safety net.

For example, if the QCI harvest moved from its current level to the Decade 1 harvest level, total TSA employment lost would be 30 PYs (5 PYs of which are induced). Then, 30 * 0.85 = 25.5, where 0.85 is the TSA employment safety net factor and 25.5 is the actual employment loss, given safety net income spending. The difference, 30 - 25.5 = 4.5, is the number of induced jobs that would be saved by the safety net. Therefore, without the safety net, 5 induced jobs would be lost as the harvest decreases, but with the safety net, only 0.5 jobs, (5 - 4.5) would be lost.

Employment income saved is calculated by using a factor of 0.35 with the total change in employment income. The incomes saved are spread amongst those laid off in the direct, indirect and induced sectors related to forestry. A discussion of these safety-net effects can be found in Chapter 5, section 5.3 Employee Transition Following Job Loss, page 73.

Provincial Impact Assessment

Provincial impacts are estimated using an employment multiplier of 2.5. The provincial multiplier, in contrast to the one used at the TSA level, produces both indirect and induced effects. The direct provincial employment impact is multiplied by 2.5 to reveal the total, direct + indirect + induced, employment impacts.

Provincial direct employment is the sum of TSA direct employment plus off-Islands workers. Off-Islands workers are comprised of all forestry employees who work on QCI, but whose principle residence is located elsewhere, and all processing jobs associated with timber harvested from the Queen Charlotte TSA and shipped to off-Islands' mills.

Indirect and induced income impacts were found by multiplying the indirect and induced employment impacts by after-tax incomes of 24 000 and 18 900 respectively.

A provincial employment income multiplier of approximately 2.0 results from the above analysis.

A4.2 Government Revenues

Government revenues are divided into provincial and federal income tax, provincial stumpage, provincial export fees in lieu, provincial corporate taxes, other provincial revenues comprised of range fees, scaling fees, and interest and miscellaneous charges, and other federal revenues comprised of corporate income tax, excise tax, and withholding tax. Table A-2 provides a summary of current government revenues and their associated rates per 1000 cubic metres.

Provincial and federal income taxes were estimated using information provided by forestry operators. Average tax rates were used where specific company information was not provided. A total income tax bill was determined for the direct, indirect, and induced activity and was prorated (33% provincial, 66% federal) to estimate federal and provincial portions. The average direct employment tax per 1000 cubic metres harvested is $15 269, and the total direct, indirect, and induced tax per 1000 cubic metres is $28 075. Total provincial income tax per 1000 cubic metres is $9 253; total federal income tax is $18 785.

Provincial stumpage revenues were estimated using volumes billed information provided by the Ministry of Forests. From 1990 - 1993, the average stumpage rate for the Queen Charlotte TSA was estimated at $14 354 per 1000 cubic metres of volumes billed.

Fees in lieu are levied on OIC exports from the QCI. The analysis used an average rate for the North Coast OIC of $16 073 per 1000 cubic metres exported. The quantity of timber exported from the QCI/HG is assumed to remain constant during the forecast period at 12% of the total harvest. The current level of exports is approximately 60 000 cubic metres and will drop to about 30 000 cubic metres when the LTHL is reached. Total export fees in lieu per 1000 cubic metres of timber harvested is $1 929.

Other provincial and federal revenues were determined using averages per 1000 cubic metres derived by the Economics and Trade Branch, Ministry of Forests. The other federal revenue average is $1 250 per 1000 cubic metres cut. The provincial average is $973 per 1000 cubic metres cut.

Table A-2
Harvest Dependent Government Revenues [1]

	Current Harvest Dependent Revenues (in dollars)	Revenues per 1000 m^3 of Timber Harvested (in dollars)
Stumpage	7 382 945	14 354
Provincial Income Tax [2]	4 758 878	9 253
Export Fees in Lieu	992 029	1 929
Corporate Taxes	3 056 692	5 943
Other Provincial Revenue	500 448	973
Total Provincial Revenues	*16 690 992*	*32 452*
Federal Income Tax [2]	9 661 964	18 785
Other Federal Revenues	642 919	1 250
Total Federal Revenues	*10 304 883*	*20 035*

1 Non-harvest dependent revenues contribute a further 200 000 to provincial income tax revenues and $500 000 to federal income tax revenues.
2 Provincial and federal tax rates presented in this table include direct, indirect and induced taxes.

Appendix 5: Incremental Economic Impacts of the Queen Charlotte TSA Base Timber Harvest Forecast[1]

Employment (PYs) and Income (millions) Impacts

Decade	Change in Harvest[2]	TSA						Province					
		Direct Labour	Indirect/ Induced	Total Labour	Direct Y	Indirect/ Induced	Total Y	Direct Labour	Indirect/ Induced	Total Labour	Direct Y	Indirect/ Induced	Total Y
1	72	21	10	31	$0.61	$0.22	$0.83	94	140	234	$2.9	$2.8	$5.7
2	53	15	8	23	$0.44	$0.16	$0.60	69	104	173	$2.1	$2.0	$4.1
3	47	14	7	20	$0.39	$0.14	$0.53	61	91	152	$1.8	$1.8	$3.6
4	41	12	6	18	$0.34	$0.12	$0.46	53	80	133	$1.7	$1.6	$3.3
5	36	10	5	15	$0.20	$0.11	$0.41	47	71	118	$1.4	$1.4	$2.8
6	32	9	4	13	$0.27	$0.10	$0.37	42	61	103	$1.3	$1.2	$2.5
7	28	8	4	13	$0.23	$0.80	$0.31	36	55	91	$1.1	$1.0	$2.1
17	+21	+7	+3	+10	+$0.17	+$0.60	+$0.23	+27	+40	+67	+$0.8	+$0.8	+$1.6
18	+22	+6	+3	+9	+$0.19	+$0.70	+$0.26	+29	+43	+72	+$0.9	+$0.8	+$1.7
Total	*266*	*77*	*37*	*114*	*$2.20*	*$0.80*	*$3.00*	*346*	*520*	*866*	*$10.6*	*$10.2*	*$20.8*

Government Revenues (millions)

Decade	Change in Harvest[2]	Stumpage	Provincial income tax	Export fees in lieu	Corporate tax	Other Provincial	*Total Provincial*	Federal Income tax	Other federal revenues	*Total federal revenues*
1	72	$1.038	$0.669	$0.14	$0.430	$0.70	*$2.346*	$1.359	$0.90	*$1.449*
2	53	$0.762	$0.491	$0.10	$0.315	$0.52	*$1.723*	$0.996	$0.67	*$1.063*
3	47	$0.670	$0.432	$0.90	$0.277	$0.45	*$1.514*	$0.877	$0.58	*$0.935*
4	41	$0.589	$0.380	$0.79	$0.244	$0.40	*$1.332*	$0.772	$0.51	*$0.823*
5	36	$0.519	$0.334	$0.70	$0.215	$0.35	*$1173*	$0.679	$0.46	*$0.725*
6	32	$0.457	$0.295	$0.61	$0.189	$0.31	*$1.033*	$0.597	$0.39	*$0.636*
7	28	$0.401	$0.259	$0.54	$0.166	$0.27	*$0.907*	$0.526	$0.35	*$0.561*
17	+21	+$0.295	+$0.191	+$0.40	+$0.122	+$0.20	*+$0.668*	+$0.387	+$0.25	*+$0.412*
18	+22	+$0.318	+$0.206	+$0.42	+$0.132	+$0.21	*+$0.719*	+$0.416	+$0.28	*+$0.444*
Total	*266*	*$3.822*	*$2.464*	*$0.514*	*$1.583*	*$0.260*	*$8.643*	*$5.003*	*$0.333*	*$5.336*

1 Numbers represent negative changes unless specified.

2 Thousand cubic metres.