

# Revitalizing British Columbia's Coastal Economy: A New Economic Vision For The North And Central Coast And Haida Gwaii

**Pacific Analytics Inc.**

P.O. Box 5103, Stn B. Victoria, British Columbia

CANADA V8R 6N3

Tel/Fax: (250) 370-1775

Email: [pacanalytics@pacificcoast.net](mailto:pacanalytics@pacificcoast.net)

and

Don Harrison, P. Geo

EcoTech Consulting

Pender Island, BC

Tel/Fax: (250) 629-3132

Email: [ecotech@cablenet.net](mailto:ecotech@cablenet.net)

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## 1.0 EXECUTIVE SUMMARY

The North and Central Coasts of British Columbia (collectively the Great Bear Rainforest) make up a largely undeveloped and rugged region stretching along a thin band of Canada's west coast for nearly 500 kilometres - from Knight Inlet, on the south-central coast of British Columbia, to the Alaskan Panhandle. An area the size of Switzerland, the Great Bear Rainforest covers almost 7 million hectares of mountains, rivers, valleys, islands and coastline. Haida Gwaii, also known as Queen Charlotte Islands, is an archipelago 250 kilometres long and 80 kilometres wide consisting of 150 islands and hundreds of islets with a total land area of approximately one million hectares. The North Coast, Central Coast and Haida Gwaii together make up the study area, a region of global conservation significance comprising 25% of the remaining coastal temperate rainforest in the world, with much of the area still unaffected by industrial development.

Only 31,000 people live in this vast region, of whom almost 15,000 live in the City of Prince Rupert, while one quarter live in small, dispersed First Nation communities. Since colonization, the region's economy historically has been based on resource extraction, primarily fishing and logging with a minor amount of mining. The majority of the economic benefits generated by these activities have not accrued to local populations, but instead have flowed out of the region. As a result, communities in the region face significant social and economic challenges. Many of these challenges are inter-related and self-perpetuating. Poverty, poor social and health conditions, low morale, disaffected young people, inadequate housing, and lack of access to education and skills upgrading are combined with high unemployment levels and limited business opportunities. Poor performance on most social and economic indicators point to the need for a new approach to economic development.

### 1.1 THE SUSTAINABILITY SCENARIO

Coastal logging companies, First Nations, the provincial government, environmental organizations and other stakeholders have been working collaboratively to secure viable long-term solutions to improve the economic and social conditions of coastal First Nations and communities while maintaining the ecological integrity of the Central Coast, North Coast and Haida Gwaii - the "Sustainability Scenario". While the final details of the Sustainability Scenario are still being developed, the parameters are likely to include:

- ❑ 32.4% of the land base on the Central Coast, 35.4% of the North Coast and 45% of Haida Gwaii will be set aside in protected areas, either as fully-protected areas or as biodiversity areas (see qualifier below);
- ❑ an Ecosystem-Based Management (EBM) approach to managing lands where logging and other economic activities are permitted, focusing on achieving human well-being and ecosystem integrity simultaneously;
- ❑ First Nations that secure a significant proportion of their landbase as protected areas become eligible to benefit from a fund worth up to \$120 million for Conservation Financing (CF) under the Conservation Investments and Incentives Initiative (CIII)<sup>1</sup>. The funds would

<sup>1</sup> The Conservation Investments and Incentives Initiative is a new initiative arising from a dialogue among environmental organizations, First Nations, forest industry, philanthropic foundations and the provincial government. CIII is intended to support conservation objectives by making available for conservation financing and economic development funds from philanthropic foundations, the federal and provincial governments and socially responsible investors in a way that reflects the level of conservation achieved in final land use plans.

be allocated in two parts, the first to an endowment to support conservation-related jobs, and the second to invest in economic development in First Nation communities;

- As a result of setting aside protected areas, Socially Responsible Investment (SRI) opportunities could attract up to \$80 million in venture capital and loan funds to support new businesses and economic sectors whose activities are consistent with EBM throughout the region and in adjacent coastal communities.

The percentage of the land base protected under the Sustainability Scenario referred to above is subject to an important qualifier. Conservation organizations advocate full protection for this landbase, while government has indicated that a certain proportion of this total (known as “biodiversity areas”) would prohibit logging and hydroelectric development but would still allow exploration and mining (e.g., on the Central Coast, 20.9% fully protected and 11.5% where mining is allowed despite logging being prohibited). The authors of this study were asked to assume that exploration and mining would be prohibited in all protected areas and biodiversity areas. Throughout the remainder of this report and in all analyses, it is assumed that under the Sustainability Scenario, mineral exploration and mining is excluded from all protected areas and biodiversity areas.

This study was undertaken on the basis that the Sustainability Scenario will be as defined above, though readers should recognize that many details are still to be worked out, and a final decision to adopt and implement the Sustainability Scenario or a variation thereof has not been made at the time of writing this report. Furthermore, it should be understood that the Aboriginal Title and Rights of First Nations with traditional territories in the study area have yet to be accommodated or addressed through treaties, land use plans and resource tenures. The authors of this study recognize that First Nations have their own land use plans, resource management priorities, etc., and final land use plans and resource management outcomes have yet to be resolved in government-to-government negotiations. Clearly, the ultimate outcome of the Sustainability Scenario will be influenced considerably by First Nations.

## **1.2 STUDY PURPOSE**

ForestEthics, Greenpeace, Rainforest Action Network and the Sierra Club of Canada, BC Chapter retained Pacific Analytics to provide an independent qualitative assessment of the economic implications of adopting the Sustainability Scenario. To do this, a point of comparison or baseline scenario was required. For the purposes of this study, the “baseline scenario”<sup>2</sup> was defined based on: i) land use plans with levels of protection in effect in the study area following the agreement of April 4, 2001<sup>3</sup>, and ii) the application of status quo industrial logging practices in the unprotected portions of the land base. Under the baseline scenario, the proportion of the total land mass included in protected areas would include the following: 21.6% on Haida Gwaii; 3.1% on the North Coast; and on the Central Coast, 8.2% in pre-2001 protected areas (of which Tweedsmuir Provincial Park represents 8.1%) plus 12.6% in April 2001 Candidate Protected Areas. Furthermore, rather than applying Ecosystem-Based Management across the

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<sup>2</sup> If the Sustainability Scenario is not implemented, there is no guarantee that the resulting land use plans and management practices would be exactly the same as this baseline scenario given government-to-government discussions and other changes in provincial policy, etc. It is intended to approximate a decision that would put low emphasis on the maintenance of ecosystem integrity. The baseline scenario is sometimes referred to as the “Business-as-usual scenario.”

<sup>3</sup> April 4, 2001 was selected as the point of comparison because on that date an historic interim agreement that provided for new protected areas was reached between environmental groups, logging companies, coastal communities and the provincial government, and a protocol was signed between the province and many First Nations. The agreement also recommended that logging be deferred in “Option Areas” pending further study and negotiations, and deferred the decision with respect to “First Nation Lead Areas.” The assumption in this study is that if the Sustainability Scenario is rejected, the province would still accept April 4, 2001 protected areas, but that it would release Option Areas for logging and other resource development. The April 2001 agreement did not apply to the North Coast or Haida Gwaii.

landbase, logging and other resource management activities would revert to management standards as applicable generally in the province. Finally, since levels of protection would be low under the baseline scenario, the Conservation Investments and Incentives Initiative (CIII) would be cancelled, implying that there would not be any Conservation Financing funds available to coastal First Nations, and that coastal communities would not benefit from Socially Responsible Investment (SRI) funds.

This report summarizes the findings of that assessment, focusing on how the logging, mining and tourism sectors will be affected (employment, business opportunities and government revenues) by implementing, or failing to implement, the Sustainability Scenario. Other sectors such as shellfish aquaculture and non-timber forest products are also assessed in this study, though in less detail.

## **1.3 FINDINGS**

### **1.3.1 TIMBER INDUSTRY**

The timber industry in the study area will continue to come under pressure due to a number of factors. The proportion of global fibre supply from plantations will increase from 35 to 44% of global roundwood supply by 2020. Increasing production from non-traditional producers is putting pressure on traditional suppliers: where six regions supplied Japan's fibre needs 15 years ago, today, 100 regions compete for that same market. The demand for higher cost industrial roundwood from old growth will continue to decline due to the availability of substitutes. Independent market analysis indicates that consumers will increasingly be interested in ensuring that the wood products they purchase are "green". All of these factors create a challenging business climate for coastal timber companies.

Within the study area, the original endowment of timber has been drawn down by logging. The timber industry has reacted to difficult market conditions by logging the best and most profitable forests first, focusing on high value cedar, implying that future logging operations will have to move into forest stands that are less accessible, that involve higher costs, and where timber has lower value. This implies that more hemlock will be harvested in the future as it makes up over 50% of the remaining available old growth timber on the coast, yet hemlock has lost 50% of its value in recent years.

On Haida Gwaii alone, over 100 million m<sup>3</sup> of timber has been logged and exported off the islands unprocessed. Data on log grade and species breakdown for Haida Gwaii indicate that the quality of logs leaving the islands has and will continue to decline over time. For the North Coast, using 2003 as an example, the estimated revenue generated by the total volume of timber extracted would have dropped from \$1 million to minus \$2.6 million had logging companies not focused on cedar stands but instead insured that the timber extracted reflected the proportion of hemlock found in North Coast forests. Within the territory of the Heiltsuk First Nation on the Central Coast, at current rates all operable cedar is projected to be logged by 2026, putting into question the long-term economic viability of future logging. Studies by Veridian Consultants on the risk to ecosystems have been completed for the Central and North Coast portions of the study area, while as of writing a similar study is underway for Haida Gwaii. Both completed studies indicate that the logging industry has focused on logging the high and medium productivity sites (which make up a small proportion of the total area) putting most of these ecosystems at risk, while avoiding low productivity sites.

Given the volume of timber logged, the baseline scenario also performs poorly as a source of employment in the study area. The 2001 Central Coast Socio-Economic and Environmental Assessment revealed that only 4% of jobs supported by logging in the area went to local residents, while parallel studies for Haida Gwaii and the North Coast determined that the proportion in those areas was 25% and



16%. Outside the study area, processing facilities supported by the coast-wide harvest continue to shed jobs as mills become more efficient and are rationalized. Between 1996 and 2003, 27% of employees in coastal mills lost their jobs; mill closures have eliminated over 2,250 jobs in recent years. As the harvest shifts to second growth, further job loss is anticipated as more uniform piece size will facilitate automation: one new mill built specifically for coastal second growth timber supports only .15 jobs per 1,000 m<sup>3</sup> of logs processed. Furthermore, as of 2002, up to 35% of North Coast logs can be exported unprocessed. Of the volume logged BC-wide in 2002, over 4 million m<sup>3</sup> of logs with a total value of \$500 million were exported raw.

If the Sustainability Scenario is not adopted, the timber industry will persist in a slow decline as the resource base is drawn down further. Threshold analysis indicates that as companies have no choice in the next two decades but to shift logging from over-cut cedar to less valuable hemlock, losses will likely result. Logging second growth stands will be economically marginal at best; the logging of many second growth stands are unlikely to generate profits at the age they are considered operable under present industrial logging plans. A 2004 study by Cortex indicates that if current plans for logging second growth stands on Haida Gwaii are implemented, a net loss of almost \$100 million would result unless logging costs can be reduced and marketing efforts succeed at improving market acceptance for a second growth product that is generally considered inferior. The baseline scenario therefore suggests considerable future economic difficulties for the timber industry in the study area.

In contrast, adopting the Sustainability Scenario will provide the timber industry in the study area with longer-term stability, adequate profitability, and preferential market access through credible third party certification, albeit with a decline in the volume of timber harvested. The legally permissible harvest level (Allowable Annual Cut - AAC) will drop, but this is of minor economic significance since the actual harvest levels and the value of the resource that affect the flow of benefits has been substantially below the present AAC on the Coast. Consequently, except perhaps during brief peaks in the market cycle, the maximum volume allowable for logging is unlikely to be reached. Hence, in comparing the baseline scenario to the Sustainability Scenario, projected and not the maximum legal logging levels are the appropriate point of comparison. In addition, analysis needs to consider that the timber set aside in protected areas by the Sustainability Scenario is largely of marginal economic value (and often negative value) as a timber resource, but of high value for conservation purposes. For instance, the average value of a cubic metre of wood in new protection areas on the Central Coast is \$10 less than wood available for logging in the Timber Harvesting Land Base, indicating that little economic opportunity is being forgone as a result of protection.

Even with a coast-wide undercut, many logs have been exported unprocessed. Consequently, workers whose processing facilities are currently supplied with timber from the study area need not lose their jobs as a result of the Sustainability Scenario – raw logs that are currently exported unprocessed could be diverted to meet much of the fibre need of these facilities. Rather, timber sector jobs are at risk from global competition, the pressure for productivity improvements, and the falldown to a second growth harvest. In order to improve profitability under continuing difficult market conditions, the coastal timber industry has made it clear that it must further increase productivity, shedding more jobs. But it is also likely that the Sustainability Scenario will improve timber industry employment in portions of the study area as it will enable more constructive engagement between timber companies and local First Nations and communities, and innovation in the application of EBM. If the logs currently exported raw were to be processed in coastal mills, the implications of the Sustainability Scenario to mill workers could be significantly offset.

From a provincial revenue perspective, the Sustainability Scenario implies considerable conservation gains in exchange for a moderate reduction in provincial revenue from timber industry activities that decreases in magnitude over time. This is because a good deal of the cut is of marginal or negative economic value and therefore does not contribute significantly to revenues or to economic welfare. On the North Coast, government stumpage revenues are projected to drop by a mere \$40,000 per annum under the Sustainability Scenario. At present, revenues do not even offset the cost to the province of overseeing timber industry activities on the North Coast. For the study area as a whole, our study projects that the impact to government stumpage revenue of implementing the Sustainability Scenario will be under \$20 million per annum initially, declining to under \$10 million within two decades. This projection is likely an overestimate, as it assumes that second growth can be logged profitably and because it does not address the need to log the timber profile rather than high grading cedar. The actual impact is thus likely to be considerably less.

The economic values of the ecological services that forests provide are also important. These services include climate regulation, fish and wildlife habitat protection, erosion control, nutrient cycling, and flood control. Such values have not been addressed in this study; were they factored into this economic analysis, the conclusion would point even more strongly towards the Sustainability Scenario.

Finally, the adoption and effective implementation of EBM will ensure that coastal timber products will continue to have access to world markets that are increasingly focused on environmental practices, and timber harvested under EBM is likely to qualify for credible, third-party certification such as Forest Stewardship Council certification. The Sustainability Scenario also improves confidence over land and resource allocation for the timber sector, although this ultimately depends upon outcome of treaties between the Province and First Nations.

### **1.3.2 MINING**

Structural changes in the global mining industry hinder the resurgence of the mining sector in the study area. These changes favour large scale mines with low unit costs; such mines typically require large capital investment. The recent peak in the price cycle notwithstanding, the United States Geological Survey has shown that metallic mineral prices have generally exhibited a long-term downward trend since 1900. For over a decade, industry has allocated much of its exploration budget to the under-exploited regions of the globe that more recently became amenable to mining investment, and areas where world class deposits have the greatest probability of being discovered and brought into production. For instance, though Canadian companies raised \$2.7 billion for exploration in 2003, they only spent \$48 million in 2003 on new exploration projects in BC, and an inconsequential portion of this total in the study area.

The study area has had over a century of mineral exploration. While some portions of the North Coast show significant mineralization, the study area is generally rated as low potential when compared against other regions of the world endowed with minerals. There has not been a producing mine of any significance since 1983 and exploration activity has been minimal for over two decades. As there are no operating mines, implementing the Sustainability Scenario does not affect the existing level of mining activity and would at most have minor ramifications on the level of exploration expenditures in the study area.

Mineralization in the study area tends to be concentrated in a few relatively small and well-demarcated mineral belts, but generally is not geologically compatible to hosting economically significant deposits of coal, diamonds, platinum group elements, or "high-tech" metals. Due to the distance to

markets and the lack of infrastructure, and cheaper sources closer to market, industrial mineral deposits (e.g., gravel, limestone) in the study area are generally not competitive and therefore the likelihood of mining or quarrying such deposits is very low. There are few, if any, metallic mineral deposits with defined reserves in the study area that could be put into production without a significant and sustained increase in the price of the minerals in question. Two recent reports on the mineral potential of areas proposed for protection on the Central and North Coast by a professional geologist (one of this report's contributing authors) confirm that future prospects for mineral development in areas proposed for protection under the Sustainability Scenario are very low within the Central Coast, and modest to very low on the North Coast. As for Haida Gwaii, aside from an iron ore mine that operated from 1966 until the ore was depleted in 1983, past mines have been small scale marginal producers. The total value of all ore shipped off islands between the late 1800s and 1962 was a paltry \$2.7 million in 2003 dollars. Simply put, aside from some pockets on the North Coast, the study area is relatively insignificant from a mineral potential perspective.

Consequently, most relevant factors suggest that it is unlikely that mining will play a significant and sustained role in the economic development of the region. Protection status that excludes all mining exploration and development can therefore be applied to new proposed protected areas (including biodiversity areas) at little or no cost to society and without the loss of mining sector jobs and government revenues. In the over half a million hectares proposed for new protection as biodiversity areas on the Central Coast, a mere 75 hectares or .014% were covered by mineral claims as of July 2004 – 50 hectares of which was for facial clay, the remaining 25 hectare claim is not related to a known geological target. The mining industry has shown by its lack of claim staking in proposed biodiversity areas on the Central Coast where the mineral endowment is well below investment grade. On the North Coast, current mineral claims affect portions of biodiversity areas in the Cambria Icefield/Hastings Arm area (Kswan biodiversity area), the Kitsault/Alice Arm area, the Ecstall Belt and Porcher Island. Nevertheless, despite the existence of these claims, the ore bodies that have been delineated to date have not warranted mining. On Haida Gwaii, there would be little to no loss in economic opportunity from excluding mining activities from proposed protected areas. At the same time, in much of those same proposed protected areas, should mining go ahead, there would be a significant risk of acid mine drainage and arsenic contamination due to the geological characteristics of mineral deposits.

Although there is little empirical support for the idea that the Province's past land use planning efforts scared off mining sector investment (the drop in exploration investment coincided with a market downturn; indeed, other regions in Canada posted similar declines during that period), the Sustainability Scenario has the potential to reduce investor uncertainty. If the Province adopts the Sustainability Scenario, the mining sector benefits from increased confidence in land allocation, although the more certainty would be provided by the successful conclusion of government-to-government treaties. However, even with land use plans and treaties in place, First Nation(s) in whose traditional territory a proposed mine is located may still accept or reject the project based on their assessment of its viability and desirability.

Should a mine go ahead in the study area without the Sustainability Scenario being in place, only a small proportion of the benefits generated by mining are likely to be retained locally in the study area, while most of the environmental and social costs are imposed locally. Thus, while nearby communities may stand to benefit from the increased economic activity that accompanies mining, this benefit will tend to be offset to a certain degree by potential decline in other sectors that rely upon the same land base, as well as the drawbacks resulting from increasing the exposure of local economies to global price cycle

fluctuations, the boom/bust nature of the mining sector, the disruptive effect of sudden but short-lived increases in wage income in small communities that have little time to adjust, and a mine development process that often fails to address local needs and priorities. In sum, communities do not necessarily come out ahead economically when a local mine proceeds.

The EBM approach involved in the Sustainability Scenario would increase the likelihood of communities being tangibly and beneficially involved in any mining project that went ahead, would improve the “social license to operate” of mining companies, and would increase incentives to develop the mine in an environmentally and socially responsible manner. Nevertheless, despite the potential opportunities under EBM, mineral development projects would still present challenges to local communities.

Finally, it should be noted that from a societal standpoint, the economic benefits of mining are often much lower than the sales, jobs, exploration expenditures, corporate earnings and government revenue numbers would suggest. This is because the environmental impacts of mining can be extensive and very long term, and the costs of correcting, for example, acid mine drainage, or restoring damaged ecosystem services, are a cost to society that reduces the overall benefits. Furthermore, revenues to government from the mining sector are moderate compared to the gross value of the resource extracted. Despite extracting \$3.6 billion of the province’s mineral wealth in 2003, the mining industry paid a mere \$40 million in mineral taxes and no income tax in 2003. Revenues to government from the mining sector are offset by generous tax breaks for investments in exploration – a BC resident making a \$1,000 investment would have \$617 of this cost paid for by taxpayers. Taking all of these factors into account, and the mineral endowment of the areas proposed for protection in the study area, it is clear that the cost to society of setting aside from mining areas with high ecological value is lower than might otherwise be estimated. Assuming all categories of protection, including biodiversity area, exclude exploration and mining, the Sustainability Scenario does not preclude the future emergence of a mining industry in the study area. Rather, the Sustainability Scenario focuses industry efforts on those lands where mineral development is less likely to compromise areas of high ecological and cultural values. The land base remaining available to industry tends to include the lands with the better mineral potential.

### **1.3.3 TOURISM**

The North American tourism market is expected to grow by 3.9 % per annum until 2020. Growth in nature based tourism will be even higher. Already, wilderness tourism spending exceeded \$900 million in 2001 in BC, creating 14,000 jobs and \$50 million in government revenues – half of this spending related to Coastal activities. This is a promising market context for the development of the tourism sector in the study area.

The study area generates significant and growing tourism revenues from a variety of nature-based tourism operations, ranging from high-end fishing lodges, to lodges catering to wildlife viewing, to ocean kayaking adventures, to cruise ships to the provision of high-value recreational activities. While much of this revenue accrues to companies and individuals residing elsewhere in British Columbia, incomes earned by study area residents make up a respectable proportion of the total, and this proportion earned locally is likely to continue expanding. As well, the employment opportunities afforded by nature-based operations and their local suppliers represent economic diversification and add considerably to social well-being of local populations and to enhancing local skills. These incomes represent an important share of overall incomes and employment in the study area.

Under the baseline scenario, continued industrial forestry development and the failure to protect a sufficiently large portion of the land base could put some high-end lodges at risk, with the lost revenues estimated at \$1.3 million, and 11 jobs at risk per lodge affected.

Since the Sustainability Scenario protects a greater proportion of the landbase, ensures that industrial development that does occur takes an EBM approach, and provides direct links to investment funds that can be used to further develop local businesses that service wilderness tourism activities, adopting the Sustainability Scenario will unambiguously contribute to an expanded tourism sector – the sector in the study area with the best growth potential. As an example, the average new lodge would collect revenue over the next twenty years with a present value of almost \$19 million, creating \$10.4 million in total value added, 166 Full-Time Equivalent (FTE) jobs, and 0.9 million dollars in government revenues. Of course, this growth must respect resource capacity if it is to avoid being a victim of its own success by degrading the very environmental and cultural values upon which its continued success depends.

A consequence of this is that the Sustainability Scenario will generate a considerable increase in long-term employment, GDP and government revenues from the tourism sector. While this sector has its limitations, such as seasonal employment and the relatively high proportion of lower-wage positions, it also has the ability to create jobs in many different communities. In addition, many of these jobs, such as guiding, will be compatible with local values and work preferences, such as the ability to go out on the land. Finally, the provision of significant investment funds through the adoption of the Sustainability Scenario will result in the creation of new businesses owned by locals, enhancing overall entrepreneurial skills over time which, in turn, is expected to contribute to the continued economic and social development of the region.

#### **1.3.4 OTHER SECTORS**

As a result of the CIII, the Sustainability Scenario provides for conservation financing and socially responsible investment, enabling investment in a variety of enterprises which will assist in creating local employment, generating government revenues, and diversifying the economy. The shellfish aquaculture and the non-timber forest product sectors are particularly likely to benefit. The Sustainability Scenario also enables the creation of many new First Nations jobs in the conservation sector managing protected areas, thanks to Conservation Financing, providing employment where it is most greatly needed.

The shellfish aquaculture industry on the British Columbia coast has become one of the leading community-based industries, and it is poised for rapid expansion if economic conditions are right. Due to its unique ties with coastal First Nations culture, further commercial expansion of the industry offers the advantages of environmentally sensitive economic development in coastal communities where long term, relatively high skilled, well paid employment is desperately needed. Availability of investment capital through the Conservation Investments and Incentives Initiative (CIII) funds if the Sustainability Scenario is adopted has the potential to provide significant investment funds for further development. Within the next five to ten years, between 200 and 350 local jobs in First Nation communities and Prince Rupert could be supported by shellfish aquaculture. Without the implementation of the Sustainability Scenario, funds for capital investment will be more difficult to obtain, and it is therefore likely that shellfish aquaculture in the study area will expand more slowly and modestly.

BC's coastal forests contain a multitude of other products that are economically valuable, both for generating wage income and in meeting the subsistence needs of local First Nations and communities. By 1997, this sector was estimated to be generating \$680 million in revenues and supporting 32,000 seasonal and part-time jobs province-wide, and the market for these products has been growing at 10-

12% in recent years. Non-timber products collected for commercial gain include items such as wild food and nutraceutical/medicinal mushrooms, plant-based pharmaceuticals, biocides, and floral greenery for use by retail flower vendors. This sector also offers the advantage of environmentally sensitive economic development in coastal communities. As one example, pine mushroom harvesting could create 30 additional jobs on the Central and North Coast.

Adoption of the Sustainability Scenario is an integral part of any strategy to expand the non-timber forest products sector in large part due to the linkages to investments under the Conservation Investments and Incentives Initiative (CIII). Besides access to risk capital, a necessary pre-requisite for any further development of the industry is the maintenance of a relatively non-industrialized forest area associated with the growing stock of non-timber forest products, which is more likely to be achieved through an EBM approach. Areas within the study area which have a high suitability rating for such non-timber forest products should be managed accordingly, which will often exclude logging.

A diversity of other business activities, such as artisanal crafts, small high-tech operations, and local renewable energy projects, could create a total of 190 new jobs in the study area as a result of financing enabled and opportunities created through the Sustainability Scenario.

### **1.3.5 OVERALL JOB IMPACTS**

Job prospects in the study area under business-as-usual practices are limited. Overall, the employment impacts of implementing the Sustainability Scenario in the study area are positive. While the Sustainability Scenario will displace some timber industry workers, more than an equivalent number of positions will be created as a result of pursuing logging under ecosystem based management and by increasing the proportion of timber processed within the study area. A high proportion of these jobs will go to First Nation communities. The mining sector is currently insignificant as a source of employment; the Sustainability Scenario does not imply lay-offs in this sector, and though it reduces the landbase for mining by setting aside land with a generally low mineral endowment, it also reduces uncertainty, and thus has an insignificant if not positive effect on future employment in mining. Current tourism jobs will be secure, and new ones created. With new investment under CIII enabled by the Sustainability Scenario, new jobs will emerge in conservation and in non-traditional sectors; these jobs will be created in First Nations and other local communities where they are most needed. Many of these jobs will fit closely with First Nation values and work preferences.

### **1.3.6 OVERALL GOVERNMENT REVENUE IMPACTS**

Government is also interested in the cost and revenue implications of implementing the Sustainability Scenario. Companies harvesting timber on public lands pay stumpage to the Province. Mining companies also pay royalties. Tourism operators pay licensing fees and collect other taxes on the government's behalf. Government also faces costs for social services when unemployment is high and social distress pervasive.

The Sustainability Scenario implies a modest reduction in provincial revenue from timber industry activities, no change in revenues from mining activities and an increase in provincial revenues from tourism and non-traditional sectors such as shellfish aquaculture. By improving social and economic conditions, and improving self-confidence and self-reliance in First Nations communities, government finances will further benefit as the costs of dealing with underemployment and the costs of economic and social distress should gradually decline.

### **1.3.7 BUSINESS OPPORTUNITIES**

The implications of implementing the Sustainability Scenario to business opportunities in the study area are generally positive. In exchange for a manageable reduction in the available landbase so as to meet ecosystem integrity requirements, it provides both the timber and mining sectors with greater confidence in land use allocation. In addition, the timber sector will be in a position under EBM to take the necessary steps to certify its product under a credible, third-party certification scheme, and therefore be able to take advantage of market demands and to ensure continued market access. With ecosystem integrity requirements more likely to be met as a result of the Sustainability Scenario, the mining industry's social licence to operate is improved. The tourism businesses will be the greatest beneficiary from the Sustainability Scenario; knowing that the amenities and attributes demanded by their clientele will not be degraded by industrial activity, business owners can invest in new or upgraded facilities. The availability of CIII funds will favour investment in local businesses such as value-added and the shellfish aquaculture sector.

### **1.3.8 OTHER BENEFITS**

There also are likely to be a number of less tangible, but nonetheless important benefits, of implementing the Sustainability Scenario, such as local First Nations feeling more secure about the long term health of the land, increasing their sense of pride in their roles as stewards to a landscape that is of interest to the overall human family, and feeling a greater degree of control over land and resource management decisions. Together, these changes will help improve human well-being on the Coast as compared to the baseline scenario.

## **1.4 IMPLICATIONS: THE SUSTAINABILITY SCENARIO IS ECONOMICALLY SOUND**

Taken together, whether or not one considers the actual ecological benefits of the Sustainability Scenario, there is an economic case for the Sustainability Scenario. This study is not alone in finding that the Sustainability Scenario is advantageous. The North Coast SEEA also determined the Sustainability Scenario was the best option for that portion of the study area. After considering the socio-economic implications of the proposed Central Coast land use plan, stakeholders reached consensus and recommended the plan to the province. The results of this study indicate that economic prospects for the First Nations, communities and residents of the study area are best achieved by adopting the Sustainability Scenario. This despite the fact that the Sustainability Scenario lowers the rate at which forests are logged and reduces the area open to mineral exploration and development. While this result may seem counterintuitive to many people given the historical role of logging and mining in BC's economic development, it reflects land use planning taking resource characteristics into account, how the timber resource base has changed as a result of logging, and the evolving economic context faced on the Coast due to global markets and other factors.

The Sustainability Scenario is a rational economic choice favourable to the future economic prosperity of the province and in particular to the First Nations and other communities of the study area. Even if a decision-maker gave no weight to the globally significant conservation values in the study area, the business case for adopting the Sustainability Scenario is compelling.

## 2.0 INTRODUCTION AND STUDY PURPOSE

The Great Bear Rainforest (comprised of the North and Central Coast of British Columbia) is a largely undeveloped and rugged region stretching along a thin band of Canada's west coast for nearly 500 kilometres--from Knight Inlet, on the south-central coast of British Columbia, to the Alaskan Panhandle. An area the size of Switzerland, the Great Bear Rainforest covers almost 7 million hectares of mountains, rivers, valleys, islands and coastline. Haida Gwaii, also known as Queen Charlotte Islands, is an archipelago 250 kilometres long and 80 kilometres wide of 150 islands and hundreds of islets with a total land area of approximately one million hectares. The Great Bear Rainforest and Haida Gwaii together comprise 25% of the remaining coastal temperate rainforest in the world, with much of the area still unaffected by industrial development. It is a region of global conservation significance<sup>4</sup> that draws visitors from Europe and beyond seeking opportunities to view grizzlies in their natural habitat and trees that have been patiently growing for centuries. This is the region that is the subject of this study (henceforth the study area).

Coastal logging companies, First Nations, the provincial government, environmental organizations and other stakeholders have been working collaboratively to secure viable long-term solutions to maintain the ecological integrity of the Great Bear Rainforest and Haida Gwaii while providing for human well-being. These parties have been working towards a "Sustainability Scenario" for the Great Bear Rainforest and Haida Gwaii. While the final details of the Sustainability Scenario are still being developed and negotiated, the parameters include:

- 32.4% of the land base on the Central Coast, 35.4% of the North Coast and approximately 45% of Haida Gwaii will be set aside in protected areas, either as fully-protected areas or as biodiversity areas (see qualifier below);
- an Ecosystem-Based Management (EBM) approach to managing lands where logging and other economic activities are permitted, focused on achieving ecosystem integrity and human well-being simultaneously;
- First Nations that secure a significant proportion of their land base as protected areas become eligible to benefit from a fund worth up to \$120 million for Conservation Financing (CF) under the Conservation Investments and Incentives Initiative (CIII), with the endowment allocated to in two parts, the first to support conservation-related jobs and to contribute to implementation of the Sustainability Scenario, and the second allocated to invest in economic development in First Nation communities;
- As a result of setting aside protected areas, Socially Responsible Investment (SRI) opportunities could attract up to \$80 million in venture capital and loan funds to support new businesses and economic sectors whose activities are consistent with EBM throughout the region and in adjacent coastal communities.

The percentage of the land base protected under the Sustainability Scenario referred to above is subject to an important qualifier. Conservation organizations advocate full protection for this land base, while government has indicated that a certain proportion of this total would prohibit logging and

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<sup>4</sup> For information on the conservation significance of the study area, see for instance the Coast Information Team's Ecosystem Spatial Analysis available at [www.citbc.org](http://www.citbc.org) or Jeo, R., Sanjayan, M., and Sizemore, D. (no date). *A Conservation Area Design for the Central Coast Region of British Columbia, Canada*. Round River Conservation Studies.



hydroelectric development but would allow exploration and mining (e.g., on the Central Coast, 20.9% fully protected and 11.5% where mining is allowed). The authors of this study were asked to assume that exploration and mining would be prohibited in all protected areas and biodiversity areas in order to test the economic implications of the scenario that best provided for ecosystem integrity. Throughout the remainder of this report and in the supporting analysis, it is assumed that mineral exploration and mining is excluded from all protected areas and biodiversity areas.

ForestEthics, Greenpeace, Rainforest Action Network and the Sierra Club of Canada, BC Chapter retained Pacific Analytics to provide an independent assessment of the economic implications of baseline scenario management versus adopting the Sustainability Scenario. This report summarizes the findings of that assessment. This study was undertaken on the basis that the Sustainability Scenario will be as defined above, though readers should recognize that many details are still to be worked out, and the decision to adopt the Sustainability Scenario or a variation thereof has not been made at the time of writing this report.

## **2.1 HISTORY LEADING UP TO THE SUSTAINABILITY SCENARIO**

By the 1990s, there was growing recognition of the conservation values involved in the Great Bear Rainforest and Haida Gwaii, and the threats to these conservation values if industrial development in the region continued unabated. This resulted in a period of conflict involving environmental organizations, First Nations, logging companies and the provincial government. Dozens of companies that relied upon wood products raised concerns regarding logging in the Great Bear Rainforest, including Home Depot, the world's largest "do-it-yourself" store, and Ikea, the world's largest furniture retailer. These wood product consumers urged logging companies operating in the region to seek a solution to the conflict.<sup>5</sup> In addition, British and Canadian fund managers, including the Royal Bank, divested shares in logging companies harvesting in the area. These events lead to all parties working towards a solution.

In April of 2001, an historic interim agreement for the North and Central Coast was reached between environmental organizations, logging companies, workers, coastal communities and many First Nations. The agreement included the establishment of 20 new protection areas (comprising 600,000 hectares). "Option areas" (comprising 900,000 hectares) were also identified where a moratorium was placed on logging to enable further analysis and negotiation to be conducted. The agreement also provided for the establishment of the Coast Information Team (CIT) to provide independent science in support of land use planning and decision-making on the Coast, with the goal of developing an ecosystem-based approach to land management that would provide for both human and ecosystem well-being. The provincial government also established a \$35 million fund to compensate those affected adversely by the April 2001 agreement. In addition, a working group, the Conservation Investment and Incentive Initiative, was launched to explore conservation investments funding. At the same time, the BC government announced the signing of a formal government-to-government protocol on land use planning with eight coastal First Nations.<sup>6</sup>

Over the last three years, extensive research and negotiations continued. In December 2003, the Central Coast land use planning table reached a consensus agreement on new protected areas and ecosystem based management for the Central Coast Land and Resources Management Plan (CCLRMP). The North Coast LRMP table reached a preliminary consensus in the autumn of 2004. Land use planning has only been recently initiated on Haida Gwaii; it is expected that the outcome of land use planning will

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<sup>5</sup> For information on the Coastal logging companies involved, see: <http://www.coastforestconservationinitiative.com>.

<sup>6</sup> The General Protocol Agreement on Land-Use Planning and Interim Measures.

similarly result in a commitment to ecosystem based management, and a somewhat higher percentage of the landbase in protected areas. Assuming an agreement can be reached, there will be a new approach to economic development for the study area as a whole that provides for economic opportunities and human well-being while maintaining conservation values. For the purposes of this study, this outcome is named the Sustainability Scenario.

A more complete description of the Sustainability Scenario is provided in Section 3.0.

## **2.2 THE STUDY AREA**

The region under consideration in this study includes the Central Coast, the North Coast, and Haida Gwaii/Queen Charlotte Islands (Figure 2.1).

**Figure 2.1: Study Area Boundaries**



The Central Coast, made up of the mainland portion of the coast from Bute Inlet to Princess Royal Island, totals about 4.8 million hectares in area. The North Coast covers the area between Princess Royal Island and the town of Stewart, for a total of 1.7 million hectares.<sup>7</sup> Haida Gwaii totals just over a million hectares.

The study area contains four Timber Supply Areas (TSAs). The Queen Charlotte TSA is comprised largely of the mountainous and lowland areas on Graham Island. The North Coast TSA is diverse, ranging from floodplains along major rivers, to coastal fjords and steep mountains, though little of it is suitable for logging; only 7% of the land is within the Timber Harvesting Land Base. The Mid Coast TSA is located on the central coast. Most of the Kingcome TSA is located on the mainland, ranging from Knight Inlet in the south and east, to Tweedsmuir Park in the northeast and Cape Caution in the northwest. Part of the Kingcome TSA is located on northern Vancouver Island and is thus outside of the study area.

The study area also contains portions of a number of Tree Farm Licences held by a variety of licensees (see Table 2.1).

**Table 2.1: Tree Farm Licences in the Study Area**

Tree Farm Licence	Licensee	Areas
TFL 25	Western Forest Products	Block 5 (Swanson Bay) Block 6 (Queen Charlotte Islands)
TFL 39	Weyerhaeuser	Block 3 (Coast Islands) Block 5 (Philips River) Block 6 (Queen Charlotte Islands) Block 7 (Namu)
TFL 43	Scott Paper	Block 3 (Kingcome)
TFL 45	Interfor	Knight Inlet
TFL 47	TFL Forest Ltd	Block 1 (Johnston Strait) Block 3 (Moresby)

### **2.3 THE FIRST NATIONS AND PEOPLE OF THE STUDY AREA**

Half of the population in this sparsely populated region is First Nations, half of whom live in 11 isolated villages with between 200 and 1,500 people. The Haida Nation's traditional territory covers the entirety of Haida Gwaii. Nine First Nations have community settlements and territories entirely or primarily within the Great Bear Rainforest:

Gitga'at	Haisla
Heiltsuk	Gitxaala (formerly Kitkatla)
Kitasoo/Xai'xais	Lax Kw'Alaams
Metlakatla	Nuxalk
Wuikinuxv (formerly Oweekeno)	

Four other First Nations also have some traditional territory within the study area, but do not have communities: Kitselas, Kitsumkalum, Kwakwaka'wakw (several Bands) and Nisga'a.

According to 2001 census data, the largest city in the study area, Prince Rupert, has a population of 14,643; the next largest towns are Masset, Queen Charlotte City, Bella Bella and Bella Coola. Roughly one quarter of the population lives in First Nations communities. The total study area population as of the 2001 census was just over 31,000 (see Table 2.2).

<sup>7</sup> While the North Coast LRMP excludes Nisga'a lands, some 58,000 ha in the north of the plan area, and some of the islands on the Skeena River, these are from an ecological perspective part of the Great Bear Rainforest.

**Table 2.2: Breakdown of the Study Area Population**

Region	First Nation Communities	Other Communities	Total Population
Haida Gwaii	1,450	3,485	4,935
North Coast	3,645	16,195	19,840
Central Coast	3,380	2,992	6,372
<b>Total</b>	<b>8,475</b>	<b>32,957</b>	<b>31,147</b>

Source: Coast Information Team Well-being Assessment, 2001 data.

The region's economy was based historically on resource extraction, primarily fishing, logging and mining. The majority of the economic benefits generated by these activities have not accrued to the local people - and, in particular, not to First Nations - but instead have typically flowed out of the region. As a result, communities in the region face significant social and economic challenges. Many of these challenges are inter-related and self-perpetuating. Poverty, poor social and health conditions, low morale, disaffected young people, inadequate housing, and lack of access to education are combined with high unemployment levels – 70% not being unusual for Coastal First Nation communities.

As the CIT's Well-being Assessment<sup>8</sup> concluded, "All subregions ... are far from the goal of high levels of human well-being. ... The main reasons for this modest performance are: excessive population change, inadequate employment income, high proportions of low-income households, weak economic foundations (poor access to resources and limited business diversity), mediocre knowledge and education, and lack of power over decisions that affect local livelihoods." Levels of human well-being in the study area are thus well below the level necessary for the EBM goal of achieving high levels of human well-being to be met.

The coastal population has emphasized the serious economic challenges faced in the region, as the Coastal Communities Network made clear in its 2003 "Report Card":

*The vast majority of coastal communities have actually witnessed robust development, in terms of both population growth and economic development this century. However, Statistics Canada census data shows that for many coastal regions the long period of prosperity has come to an abrupt end. The tides have turned: many coastal communities are in severe decline. In the last five years, more people have abandoned B.C.'s rural coastal communities than at any time in their modern history. It is a population decline that is unprecedented outside of wartime conscription and disease which devastated aboriginal communities.*<sup>9</sup>

Given the difficult economic and social conditions faced by residents of the study area, particular emphasis will be placed on assessing the implications of the Sustainability Scenario versus baseline scenario management to the economic opportunities available to First Nations and people living in the study area. If study area economic conditions and human well-being are to be improved, it is critical that resources harvested or extracted from the study area provide benefits to local populations. A consensus statement from all organized community and planning commission leaders and the Council of the Haida Nation described the need for increased local retention of economic benefit:

*In all, an estimated 100 million cubic metres of wood, from a total of 170,000 ha, have been extracted from the Islands forests. Meanwhile, the Island Community lacks basic infrastructure and many of the amenities that other places take for granted. ... Over time, while the Islands forests have increased in value, the communities' share of the benefits has declined, creating*

<sup>8</sup> Prescott-Allen, R. 2004. Well-being Assessment. Coast Information Team. Peer review draft. Page 4.1.

<sup>9</sup> Coastal Communities Network. 2003. The State of BC's Coastal Communities, Executive Summary Email coastcom@island.net

*social, economic and environmental concerns. Unemployment rates of up to 70 percent exist in some communities.*<sup>10</sup>

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<sup>10</sup> Islands Community Stability Initiative, Introduction. (Source: [www.spruceroots.org/ICSI/ICSI.intro.html](http://www.spruceroots.org/ICSI/ICSI.intro.html)).

## 3.0 THE SUSTAINABILITY SCENARIO

### **3.1 GENERAL PARAMETERS OF THE SUSTAINABILITY SCENARIO APPLICABLE TO THE STUDY AREA**

The Sustainability Scenario is an integrated approach to land use that recognizes the importance of maintaining the environmental integrity of the land and seascape, while at the same time appreciates the contribution of resource extraction to the economic well-being of the region. It involves setting aside land in protected areas and restoration areas<sup>11</sup> as well as including provisions for ecosystem-based management (EBM) for those areas where timber harvesting and other resource extraction activities are permitted.<sup>12</sup> EBM aims to secure ecosystem integrity and to create the economic opportunities that contribute to economic diversity, social enrichment and human well-being of local populations while enabling appropriate resource utilization and extraction. First Nations that secure a significant proportion of their landbase as protected areas become eligible for conservation investments through the Conservation Investments and Incentives Initiative. Socially Responsible Investment funding will also be enabled by the Sustainability Scenario, to which non-aboriginal communities will be eligible.

#### **3.1.1 NEW PROTECTED AREAS**

The Sustainability Scenario substantially expands the proportion of the study area that is placed under various forms of protection.<sup>13</sup> At present, the boundaries and attributes of recommended protected areas have been finalized for the Central Coast and have been preliminarily agreed to in the North Coast with the exception of some significant outstanding issues.

##### ***3.1.1.1 The Central Coast Component of the Sustainability Scenario***

In December 2003, various sector stakeholders, including community representatives, environmental organizations, business interests, and labour reached a consensus agreement for the Central Coast LRMP. The agreement includes lands protected before land use planning was initiated (390,000 hectares), all areas first proposed for protection in 2001 (approximately 597,000 hectares) plus new areas comprising another 545,000 hectares.<sup>14</sup> Together with the already-protected areas on the Central Coast, the agreement would bring the total area under protection from industrial logging to 1.5 million hectares, or to almost one third of the Central Coast land base. Recommendations of the LRMP Table also clearly state that areas not protected will be managed using the adopted EBM Handbook and under agreed-to EBM principles. This agreement is subject to government-to-government negotiations, which

<sup>11</sup> Restoration areas are areas previously impacted by industrial development that are to be restored such that they can contribute to ecosystem integrity.

<sup>12</sup> Ecosystem-based Management is an integrated set of principles, objectives and measures. Its purpose is to ensure the long-term sustainability of both natural and the socio-economic systems while recognizing aboriginal rights and titles.

<sup>13</sup> Note that the different land use planning processes have not always used consistent terminology for protection, and that different protected areas will have different management requirements. This is in part due to First Nations concerns. Some areas that have been previously impacted by industrial development are designated as restoration areas. To make this study tractable, all protected areas have been considered as closed to further industrial development including forestry, mining, and hydroelectric development.

<sup>14</sup> These new areas are known as Biodiversity Areas and are the same as protection areas with the exception that it has been proposed that mineral exploration and development would be permitted under the Province's Two-Zone system in a manner consistent with ecosystem-based management (EBM). For the purposes of this study, it has been assumed that these biodiversity areas will not be open to mineral development. All biodiversity areas are recommended to be available for First Nation's traditional and cultural uses within ecological limits. Areas may also contribute significantly to recreational, cultural heritage, and tourism economic objectives, providing this is consistent with area-specific management directions to be developed by the CCLRMP Monitoring Committee.

will influence the final details of the Central Coast component of the Sustainability Scenario. Figure 2.2 on page 13 identifies the proposed protected and candidate protected areas under the agreed-to Sustainability Scenario for the Central Coast.

New areas recommended for protection on the Central Coast, beyond those already part of the April 2001 agreement, include a number that were under logging moratoriums (known as option areas):

- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| 1. Archie                            | 14. Piper/Rhind                       |
| 2. Ashlum-Reeve                      | 15. Roscoe                            |
| 3. Calvert                           | 16. SW King                           |
| 4. Cascade-Nascall                   | 17. Skowquiltz-Sutslem                |
| 5. Cougar South                      | 18. Swallow-Dean Corridor, S. of Dean |
| 6. Dallery                           | 19. Takush                            |
| 7. Swallow-Dean Corridor, N. of Dean | 20. Chic Chic Lake                    |
| 8. East Knight                       | 21. Nascall River                     |
| 9. Elizabeth                         | 22. Humpback Creek                    |
| 10. Helmken                          | 23. Four Lakes                        |
| 11. Ickna                            | 24. Nusash Creek                      |
| 12. JumpAcross-Nusash-Swallow        | 25. Paradise (Parker) Creek           |
| 13. Neekas                           |                                       |

New areas with high conservation values were also recommended for protection on the basis of the Coast Information Team's Ecosystem Spatial Analysis. These include, but are not limited to the following:

- |                     |                            |
|---------------------|----------------------------|
| 1. Don Peninsula S. | 7. Kilbella -Chuckwalla    |
| 2. Deer Lk.         | 8. Inziana                 |
| 3. WashWash         | 9. Laredo Inlet            |
| 4. Tzeo             | 10. Princess Royal Island  |
| 5. Takush Extension | 11. South West King Island |
| 6. Nekite           |                            |

### *3.1.1.2 The North Coast Component of the Sustainability Scenario*

The North Coast LRMP has held its final meeting and the Table has reached a preliminary consensus recommendation of placing approximately 35.4% of the land base into some form of protection and the adoption of the EBM Handbook and principles. However, as with the Central Coast LRMP, the final outcome depends on the results of government-to-government negotiations.

### *3.1.1.3 The Haida Gwaii/Queen Charlotte Islands Component of the Sustainability Scenario*

The provincial government and the Haida Nation agreed to co-manage a land use planning process for Haida Gwaii/Queen Charlotte Islands; this process was initiated in early 2004. The goal is to develop recommendations on a land use plan that is ecosystem-based, maintains spiritual and cultural values, and fosters community well-being, while providing for economic opportunities on the islands. It will be many months before a final plan is agreed to. The Haida Nation's has already done considerable work defining their land use vision, and it is likely to shape the final result. From this vision, it is likely that the final land use plan will bear similarities with the Central Coast plan in terms of a commitment to EBM, though the level of protection is anticipated to be considerably higher.<sup>15</sup>

<sup>15</sup> For the purposes of this report, it was assumed that approximately 45% of the landbase of Haida Gwaii would end up as protected, reflecting the fact that the current level of protection is above 21%, and the Haida Land Use Vision (the only land use proposal presently available for review) brings total area set aside from industrial activities up to 43.3%. The final number could be

### **3.1.2 ECOSYSTEM-BASED MANAGEMENT**

As part of the Sustainability Scenario, stakeholders have adopted the ecosystem-based management handbook and are committed to applying ecosystem-based management (EBM) in the study area. EBM in the study area is defined as:

*"...an adaptive approach to managing human activities that seeks to ensure the coexistence of healthy, fully functioning ecosystems and human communities.*

*The intent is to maintain those spatial and temporal characteristics of ecosystems such that component species and ecological processes can be sustained and human well-being supported and improved.*<sup>16</sup>

Some key principles of EBM include<sup>17</sup>:

- Maintain ecological integrity – by sustaining the biological richness and services provided by natural terrestrial and marine processes, including the structure, function and composition of natural terrestrial, hydriparian and coastal ecosystems at all scales through time.
- Recognize and accommodate Aboriginal Rights, Title and interests – by respecting First Nations governance and authority, and by working with First Nations to achieve mutually acceptable resource planning and stewardship, and fair distribution of economic benefits.
- Promote human well-being – by assessing risks and opportunities for communities, by facilitating and enabling a diversity of community economic and business activity, and by planning for local involvement in existing and future economic activities.
- Sustain cultures, communities and economies within the context of healthy ecosystems – by sustaining the biological richness and ecological services provided by natural ecosystems while stimulating the social and economic health of the communities that depend on and are part of those ecosystems.
- Apply the precautionary principle – by recognizing uncertainty and by working to establish and implement management objectives and targets that err on the side of caution. The onus is on the proponent to show that management is meeting designated objectives and targets.
- Ensure planning and management is collaborative – by encouraging broad participation in planning; by clearly articulating collaborative decision making procedures; by respecting the diverse values, traditions and aspirations of local communities; and by incorporating the best of existing knowledge including traditional, local and scientific knowledge.
- Distribute benefits fairly – by acknowledging the cultural and economic connections that local communities have to coastal ecosystems, and by ensuring that diverse and innovative initiatives increase the share of employment, economic development and revenue flowing to local communities, and also maintain cultural and environmental amenities and other local benefits derived from land and water resources.

### **3.1.3 CONSERVATION FINANCING AND SOCIALLY RESPONSIBLE INVESTMENTS ENABLED BY THE SUSTAINABILITY SCENARIO**

The land use planning areas encompassing the North Coast, Central Coast and Haida Gwaii/Queen Charlotte Islands can potentially benefit from a significant pool of investment dollars aimed at conservation initiatives and business development. The availability to a First Nation of these

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considerably higher once other conservation and cultural needs are taken into consideration. Use of 45% in this report does not imply that the authors recommend a given level of protection.

<sup>16</sup> See CIT EBM Framework. Available at [www.citbc.org](http://www.citbc.org)

<sup>17</sup> See CIT EBM Planning Handbook, Section 2.2, Guiding Principles. Available at [www.citbc.org](http://www.citbc.org)



Conservation Investments and Incentives Initiative (CIII) funds<sup>18</sup> is predicated on placing a significant proportion of their traditional territory in conservation.

The CIII investment pool as envisaged will provide up to \$120 million for conservation funding,<sup>19</sup> of which \$96 million will fund specific conservation and economic development initiatives by participating First Nations communities. A further \$24 million will be allocated to supporting these initiatives through programme support, technical assistance, and the like. The ultimate level of conservation financing will depend greatly on the actual level of conservation and protection adopted in the final land use plan. Below a given threshold of conservation, First Nations are ineligible for conservation financing. To access conservation financing, a number of requirements must be met that provide certainty that the conservation gain will be realized and to ensure accountability.

As a result of setting aside protected areas, Socially Responsible Investment (SRI) opportunities could attract up to \$80 million in venture capital and loan funds to support new businesses and economic sectors whose activities are consistent with EBM throughout the region and in adjacent coastal communities. SRI enables individuals, venture capital firms, and philanthropic organisations to achieve both investment and social objectives. SRI funds will be directed to coastal communities for the purposes of business development and long-term job creation and will provide loans as well as venture capital to high-growth, environmentally sustainable companies with strong commitments to the environment and the local community. The availability of SRI funds is predicated on achieving an ecologically sufficient level of conservation in the three regional land use plans. There are also requirements to be met around economic viability and oversight before funds can be disbursed.<sup>20</sup>

In developing the CIII, a series of funding principles were suggested. These can be summarized as follows. First, before any funds can be allocated for economic development purposes, it is imperative that business criteria such as market potential and security of supply be assessed without any preconceived notions. Two, the funding strategy should focus on a few core sectors and skills in order to take advantage of the comparative advantages of the area and to capture economies of scale. Three, it is important to attract and fund proven business leaders who can start and run mid-sized businesses successfully. Four, funds should be selectively invested in training and technical assistance linked directly to new job demand. And finally, there should be an established mechanism in place to track investments closely and procedures set out to intervene quickly if problems arise.

Independent analysis of the potential economic impacts of CIII investments indicates that some 1,400 direct jobs could be generated on the Coast in such core industries as tourism, shellfish aquaculture, and non-timber forest products, as well as employment stemming from the land conservation initiatives anticipated in the CIII.<sup>21</sup>

### **3.2 WHAT IS THE ALTERNATIVE IF THE SUSTAINABILITY SCENARIO IS NOT IMPLEMENTED?**

In order to conduct an assessment of the Sustainability Scenario, it is necessary to have a baseline against which comparisons can be made. For the purposes of this study, it is assumed that if the Sustainability Scenario is not adopted, land use plans will fail to include any new protected areas beyond

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<sup>18</sup> For the purposes of comparing the two scenarios for this study, the authors assumed that the final total of funds under CIII would be substantially the same as the amounts noted here (\$120 million for Conservation Financing and \$80 million for SRI). As of the report date, work on CIII fundraising and institutional design was still underway.

<sup>19</sup> The funds for this CIII will come from governments (50%) and philanthropic foundations/corporations/individuals (50%).

<sup>20</sup> See *Conservation Investments and Incentives Initiative FAQs*, November 2003.

<sup>21</sup> See *Coastal BC Economic Development: Phase II Working Draft*, CIII Forum, prepared by Redstone Strategy Group, LLC, October 16, 2003

those that existed prior to or as a result of the April 2001 agreement. It would thus include older protected areas (e.g., Tweedsmuir, Gwaii Hanaas), plus April 2001 Candidate Protected Areas. The moratorium on timber industry activities on all April 2001 Option Areas would be ended, and timber development would resume and many currently intact watersheds would be open to harvesting. As a result, less of the land base would be protected, at a level well below the threshold required to maintain ecosystem integrity. Furthermore, rather than applying Ecosystem-Based Management across the land base, management would revert to management standards as applicable generally in the province. Finally, the Conservation Investments and Incentives Initiative (CIII) would be abandoned and neither Conservation Financing funds or Socially Responsible Investment (SRI) funds would be available to local First Nations or communities. Market access could be compromised if market campaigns against the purchase of timber products from the study area were resumed as a result of the failure to achieve a solution that protected the globally significant conservation values on the Coast.

Certain variations on the two scenarios have not been assessed in this report. For instance, under the Sustainability Scenario, it may be that most First Nations decide to put a sizeable portion of their landscape in protection, thereby qualifying for Conservation Financing under CIII, but that one or two adopt land use plans that are below the protection threshold to qualify for such funds. In such case, some of the costs and benefits of adopting the Sustainability Scenario will not apply to the First Nations that have “opted out.” To simplify the analysis, it is assumed all affected First Nations will agree to protection levels that will qualify for CIII funding.

It is not the purpose of this report to assess the ecological implications, or the conservation value, of the Sustainability Scenario versus the baseline scenario alternative. There are a number of studies that address the risk to ecosystem integrity if the Sustainability Scenario is not implemented.<sup>22</sup>

### **3.3 ON EVALUATING THE ECONOMIC IMPLICATIONS OF THE ALTERNATIVES**

There are a variety of ways to assess the economic implications of a proposed policy. It is important to differentiate between projecting economic impacts, and projecting implications for economic welfare. Economic impacts refer to changes in certain economic measures of importance to society, such as jobs or government revenues, as a result of a decision. Projections of changes in economic welfare (also known as economic efficiency) estimate the net costs and benefits to society of proceeding with a decision. Those decisions which maximize total net benefits are generally preferred, all else being equal. In this study, reference will be made both to economic impacts and economic welfare. Jobs and business opportunities are particularly relevant to the people of the study area, the government is concerned about government revenues, and industry is concerned about profitability. And yet, since a decision could create many jobs, but impose a net cost on society, it is also important to get some sense of the costs and benefits of a decision.

This study, like most economic evaluations, involves predicting future economic conditions. The further one projects into the future, the more uncertain the predictions. For the economic analyst, it is tempting to focus on the short term, when impacts are more easily assessed, but this would miss the important, longer-term consequences of societal decisions. Because new approaches to land use planning involve economic adjustment, a short-term focus might identify all of the pain involved with a decision, but miss out on the gains. This is particularly true when the issues at hand, such as ecosystem integrity,

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<sup>22</sup> See for instance the Ecosystem Trend Risk Analysis reports for the Central Coast and North Coast produced by the Coast Information Team, as well as the Ecosystem Spatial Analysis, at [www.citbc.org](http://www.citbc.org).

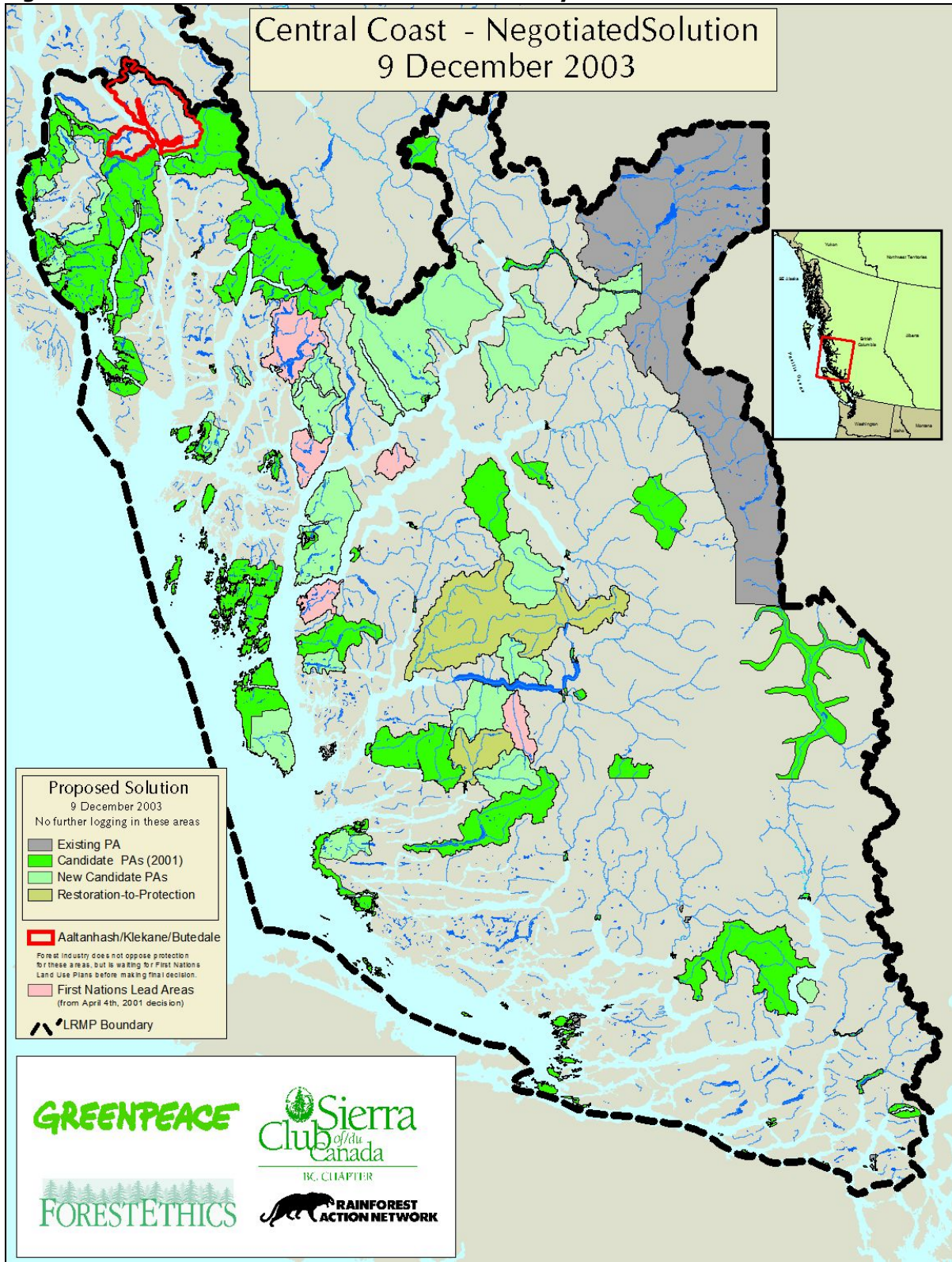
the state of the forests, community well-being, are by their nature longer term. In search of a balance, this study therefore focuses on the period up to 50 years hence.

In many instances, when a sector wishes to stress its importance to the provincial economy, it will quote revenue figures, which can be quite impressive. For instance, in 2003, the BC mining sector had revenues in excess of \$3.6 billion – a large figure. However, revenues are not the best measure of the value of a sector to an economy. More accurately, the sector's Gross Domestic Product (GDP) should be used. While GDP and revenues are linked, GDP excludes material inputs and therefore does not double count the output of other industries. Each industry is unique in terms of its (calculated) GDP-to-Output ratio. For the timber sector, every dollar of output (revenues) contributes about \$0.38 to the economy. For the fishing lodge sector, on the other hand, every dollar of revenues contributes about \$0.58 to the economy. Hence, if both the timber industry and fishing lodges earn the same revenues in a locality, the fishing lodges actually contribute roughly 50% more to the economy. Returning to the mining example, of the \$3.6 billion of revenue generated by ore mined in BC, we must deduct treatment and refining charges of \$239 million, freight and transportation charges of \$688 million, supplies of \$1,365 million, etc., before we have its contribution to GDP. Once these costs are taken into account, it quickly becomes apparent that an industry's true contribution to the economy is less impressive than revenue figures would suggest.

Unfortunately, it is not possible, given the resources available for this study, the numerous uncertainties and the available data, to precisely project the economic impacts and economic welfare implications of adopting or failing to adopt the Sustainability Scenario. Therefore, this study does not attempt to derive detailed estimates of economic impacts or costs and benefits. Rather, the assessment takes a broader view, with the aim of providing qualitative indicators of the expected impacts of adopting the Sustainability Scenario given known attributes of the resource base and the key sectors in the study area.

Finally, this study does not examine how the contribution of the wild fisheries sector would vary with and without the implementation of the Sustainability Scenario. Nor does it include consideration of offshore oil, currently under a development moratorium. While it is recognized that the Sustainability Scenario would have the advantage of offering further protection to fish-bearing streams and would protect a significant number of additional watersheds, and would better maintain ecosystem integrity on the Coast, also benefiting wild fish populations, it is beyond the scope of the study to estimate how this would impact fish populations and potential harvest levels.

**Figure 2.2: Central Coast Portion of the Sustainability Scenario**



## 4.0 THE TIMBER SECTOR AND THE SUSTAINABILITY SCENARIO

### 4.1 INTRODUCTION

Adopting the Sustainability Scenario (as outlined in Section 3.0) for managing land resources on the BC coast will have significant implications for both the local economy and the environment. In this section of the report, we examine the implications to timber sector activity of adopting the Sustainability Scenario, with the specific objective of assessing the potential long-term implications for timber harvest volumes, timber industry employment and government revenues. Consequently, this section of the report has two overarching objectives:

- to assess the economic viability of, and net economic benefits generated by, continued industrial logging in the study area without the adoption of the Sustainability Scenario being adopted;
- to assess the economic viability of, and the net economic benefits generated by, a timber sector with the Sustainability Scenario, including Ecosystem-Based Management (EBM) in all non-protected areas.

Before undertaking this comparison, it is essential to review the implications of recent structural changes that influence the timber sector on the coast, and the state of the timber stock. The next task is to assess the future potential of the timber sector in the study area with and without the Sustainability Scenario. The two outcomes are then compared.

### 4.2 IMPLICATIONS OF STRUCTURAL CHANGES AFFECTING TIMBER INDUSTRY ACTIVITIES IN THE STUDY AREA

#### 4.2.1 GLOBAL STRUCTURAL CHANGES AFFECTING MARKETS FOR WOOD PRODUCTS

The industry reference publication *Wood Markets 2002*<sup>23</sup> provides a relatively up-to-date assessment of global timber sector trends and the structural changes that are occurring in the timber industry. The report concludes that despite anticipated population and economic growth in the coming two decades, the world is not running out of industrial timber. Indeed, since the mid-1990s there generally have been surpluses of pulpwood, sawlogs and veneer logs, resulting in downward pressures on log prices. With Russia's forests representing about half of the world's standing softwood timber, the potential for more investment in harvesting capacity in that country could put further downward pressure on global fibre prices. Improvements in pulping, composite wood, and veneer/paper overlay technologies also are increasing the efficiency of fibre usage, resulting in technologically enhanced wood products. These enhancements enable the utilisation of lower-cost wood resources that were formerly not included in the supply base. Roundwood plantations, which have increased in area by a factor of ten from the early 1980s to 2002 and now make up 5 percent of the world's forest area, are projected to increase from 35 percent of the world's industrial roundwood supply to 44 percent by 2020. As well, technological innovations have resulted in non-wood substitutes being developed for a number of applications formerly satisfied by products manufactured from old-growth timber, further decreasing demand. Finally, environmental concerns regarding old-growth timber harvesting are anticipated to influence buyers' sourcing decisions. Together, these global structural changes can be summarized as follows:

<sup>23</sup> The information in this subsection of the report is drawn from R. E. Taylor and Associates, 2002. *Wood Markets 2002* Vancouver: International Wood Markets Research Inc., 2002.

- Global prices for logs are unlikely to improve over the medium term;
- Increasing production from non-traditional producers, particularly Russia, and increasing output from plantations will put pressure on traditional suppliers;
- The demand for higher cost industrial roundwood from old growth will continue to decline;
- Growing consumer sensitivity to environmental concerns is demanding wood products produced under ecologically-sound management principles.

#### **4.2.2 STRUCTURAL CHANGES IN BC'S COASTAL TIMBER SECTOR**

At the BC government's request, Dr. Peter H. Pearse assessed the current state of the Coastal timber industry in the fall of 2001. His report, "Ready for Change," made clear the difficulties faced by the industry:

*The forest industry in the coastal region of British Columbia, historically the driving force of the region's economy, has been struggling for several years. The available supply of timber is declining, costs have risen and products have weakened. In consequence, profits have withered, mills have closed, employment has fallen and whole communities have lost their economic base. The present outlook is for more, if not accelerating, decline.<sup>24</sup>*

The generally deteriorating performance of the coastal timber industry over the past decade is not the result of an unfortunate combination of outside circumstances (e.g., the US softwood dispute; market cycles) that will be resolved in a few years, enabling the industry to achieve its previous performance levels. Rather, the poor performance is to a large extent attributable to a series of structural changes that will likely continue to limit the scale and profitability of the coastal timber industry for years to come.

##### **4.2.2.1 Changes In Market Demand For Coastal Timber**

Most BC residents are aware of how the ongoing softwood lumber dispute with the US is affecting the BC timber industry by reducing returns on sales to the US market. Between 2001 (prior to the tariff) and 2003, BC's lumber exports to the US fell by some 24 percent. This is a particularly hard blow to the BC industry, since, of the \$5.4 billion worth of softwood lumber shipped by BC in 2003, 70 percent went to the US.<sup>25</sup> This dispute is the longest lasting trade dispute between the two countries, and although Canada is pursuing the matter both through negotiations and formal appeals under trade agreements, and has recently been vindicated on a number of counts, it is unlikely that BC will have unrestricted access to the US market in the future.<sup>26</sup>

As displayed in Figure 4.1, Canadian (for the most part, BC) exports of lumber to Japan have fallen considerably since the peak in 1996 as a result of strong European competition, and to a growing extent, increased Russian production. According to the US-based Center for International Trade in Forest Products,<sup>27</sup> the European competitive advantages include: increased emphasis on price and price stability; reliability of supply; and the willingness of European suppliers to meet customer needs in Japan. The latter is particularly important to the Japanese as their needs vary considerably from North American needs. For example, there is a need in Japan for a variety of metric component sizes, lumber of uniform

<sup>24</sup> Pearse, Peter H. 2001. Ready for Change. Crisis and Opportunity in the Cost Forest Industry. A Report to the Minister of Forests on British Columbia's Coastal Forest Industry. November 2001. PP 1

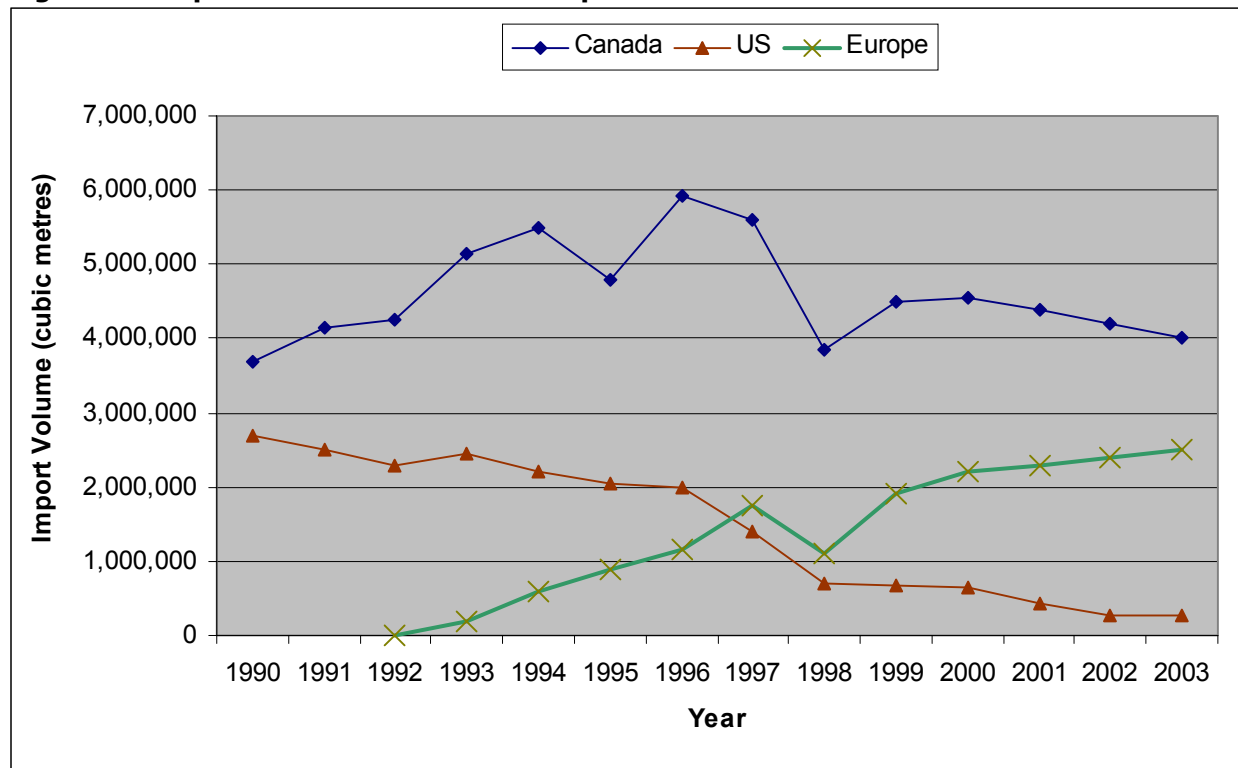
<sup>25</sup> See BC Stats at: [http://www.bcstats.gov.bc.ca/data/bus\\_stat/busind/trade/SWLdest.htm](http://www.bcstats.gov.bc.ca/data/bus_stat/busind/trade/SWLdest.htm)

<sup>26</sup> Runsheng, Y. and Baek, J. 2004. The US-Canada softwood lumber trade dispute: what we know and what we need to know. *Forest Policy and Economics* 6 (2) March 2004, Pages 129-143. John Allan, President, Council of Forest Industries, oral presentation to Association of Professional Economists of British Columbia, March 1, 2004. A negotiated settlement would involve Canada accepting certain restrictions to lumber exports to the US.

<sup>27</sup> A Preliminary Competitive Assessment of the Japanese Market for Imported Softwood Lumber, Dr. Ivan Eastin, Center for International Trade in Forest Products, University of Washington, 2001

length, and single containers of mixed sizes. Generally, North American producers have been slow to respond to these needs, though the BC coastal producers have recently shown more initiative in adapting to market demands.

**Figure 4.1: Japanese Softwood Lumber Imports**



As important to coastal producers is the fact that hemlock-balsam wood products have lost their appeal in the Japanese market, formerly the largest market for Coastal BC hemlock-balsam products. This is partly due to the *Housing Quality Assurance Act* that Japan enacted in response to the 1995 Kobe earthquake, legislation that requires higher strength wood in all new construction. At the same time, however, there are a number of other concerns with hemlock-balsam. These include: the dimensional instability of green hemlock-balsam; the high incidence of compression wood in hemlock-balsam; and the occurrence of wet pockets in kiln-dried hemlock-balsam lumber. Even with extensive investment in new technology, there would be limited potential to improve the marketability of hemlock-balsam in Japan.

The commercial viability of timber harvesting and processing on BC's coast requires strategies that adapt to evolving market conditions and in particular to poor demand for hemlock-balsam lumber. And harvesting for pulp is not the answer. The BC Forest Service has concluded that BC will have difficulty competing if it seeks to manage stands for pulp production:

*One cannot be optimistic about planning silvicultural regimes to produce small diameter fibre logs for the purpose of expanding pulp production. There are too many other cheap potential sources of fibre available at the global level. Technological developments and foreign exchange rates also pose threats.*<sup>28</sup>

<sup>28</sup> Ministry of Forests, 1999. Incremental Silvicultural Strategy for BC (Interim), April 15, p. 15.

Coastal timber industry leaders as well are aware of the structural changes affecting their industry. Facing crisis in 2003, they noted in a widely-publicized document that global competition was becoming increasingly stiff:<sup>29</sup>

**FACT: THE WORLD IS AWASH IN WOOD**

*The dramatic increase in competition from other regions and non-wood substitutes means that our customers have more choice than ever before. Just 15 years ago, only six regions of the world supplied Japan with wood products. Today more than 100 regions compete for its business. New European competitors captured \$800 million in annual sales to Japan from Coastal producers in the last five years alone. The Coast is also losing ground in other key markets – lumber shipments to the United States and Europe declined by 40% and 75%, respectively, in the last 15 years.*

**FACT: OUR HIGH-QUALITY WOOD NO LONGER PROVIDES A COMPETITIVE ADVANTAGE**

*BC's Coastal forests produce some of the strongest and most beautiful wood in the world. For years our customers paid a premium for appearance-grade Coastal wood products. But they are no longer willing to pay the traditional premiums because our competitors are now using technology to turn inferior wood into high-quality products that compete directly with Coastal products. Our products are also facing more competition from non-wood alternatives, including plastic, cement and composite wood products. In fact, our most abundant species, hemlock, has lost 50% of its primary market in recent years.*

**4.2.2.2 Price Trends For Coastal Timber**

Log prices for coastal species since 1998 have been increasing for cedar, cypress, fir and spruce. However, for hemlock and balsam, prices have declined. The fall in hemlock-balsam prices reflects the drop in demand from Japan for this species of wood and, as discussed previously, is unlikely to recover to previous highs. And since the timber profile of the study area is largely hemlock-balsam, this bodes poorly for the long-term viability of the coastal timber sector (see Section 4.2.2.4).

**Table 4.1: B.C. Coast Log Prices by Species**

B.C. Coast Log Prices in Current \$	Cedar	Cypress	Fir	Spruce	Hem-Bal	Average/ Total
1992	84.06	145.38	85.51	106.41	50.04	73.77
1993	101.11	219.29	147.71	164.39	72.01	103.41
1994	88.77	217.73	151.07	191.49	89.14	109.01
1995	89.81	164.98	150.63	263.36	114.17	117.14
1996	102.40	142.72	148.03	276.42	84.26	107.03
1997	134.38	158.45	141.44	191.42	76.21	110.32
1998	131.13	124.07	114.71	121.41	68.90	99.14
1999	117.79	117.96	111.75	106.48	69.03	95.39
2000	128.78	168.86	108.27	119.99	70.24	100.80
2001	131.07	171.87	106.03	120.62	65.17	107.35
2002	150.44	173.32	101.60	121.21	66.95	108.65
2003-1 QR	163.77	197.94	129.69	131.71	59.46	116.70
Average Growing Stock	17%	8%	6%	5%	64%	

Source: Analysis of Woodflow in the Coast Forest Region. Op. cit.

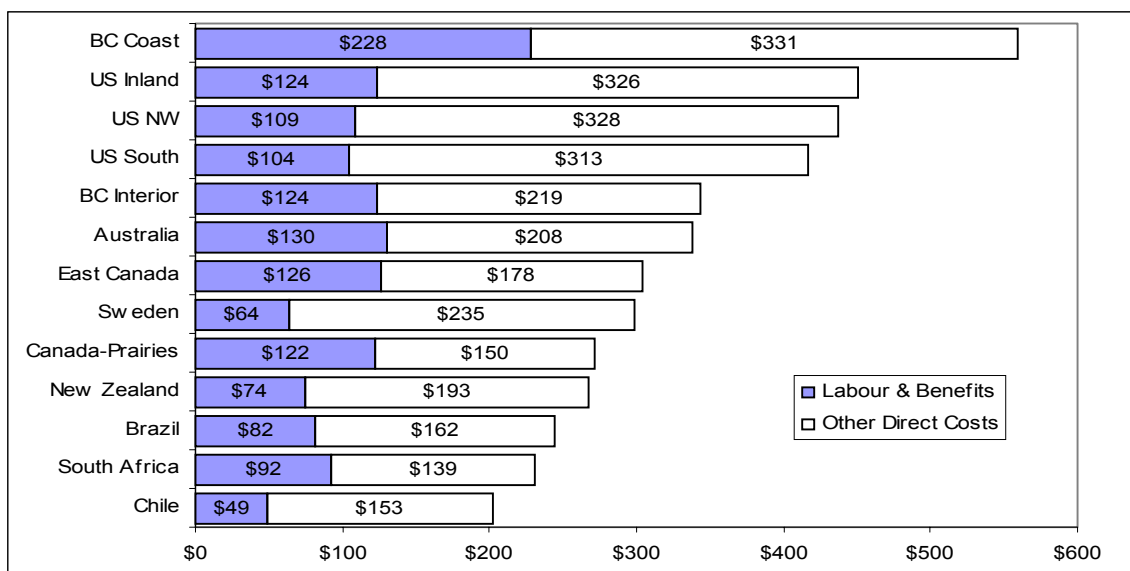
<sup>29</sup> Duncan Davies, President & Chief Executive Officer, International Forest Products Limited (Interfor); Paul McElligott President & Chief Executive Officer, TimberWest Forest Corporation; Craig Neeser Vice President, British Columbia Weyerhaeuser Company Limited. 2003. *Embracing A New Vision: Rebuilding BC's Coastal Forest Industry*. <http://www.interfor.com/pdf/Coastal%20Vision%20Paper--Final.pdf> (Accessed February 25 2004). The IWA, for its part, has suggested that companies' claims of economic distress were exaggerated so as to pressure the IWA to give concessions of 20 to 30% in wages. See Routley, B. 2003. "What Forest Industry Propaganda is Not Telling You." *Woodworker's Review* Issue 6, pp 1-3.



### 4.2.2.3 *Changes To Harvesting Costs*

The Coastal Timber industry also faces the highest labour costs of any major lumber producing region in the world, as shown in Figure 4.2. Labour costs are both a reflection of hourly wages, and worker productivity. High labour costs on the coast can be explained by the relatively difficult accessibility of most coastal timber, a characteristic that will become ever greater, and the fact that since most harvesting is still in old growth stands, opportunities for mechanization have been limited.

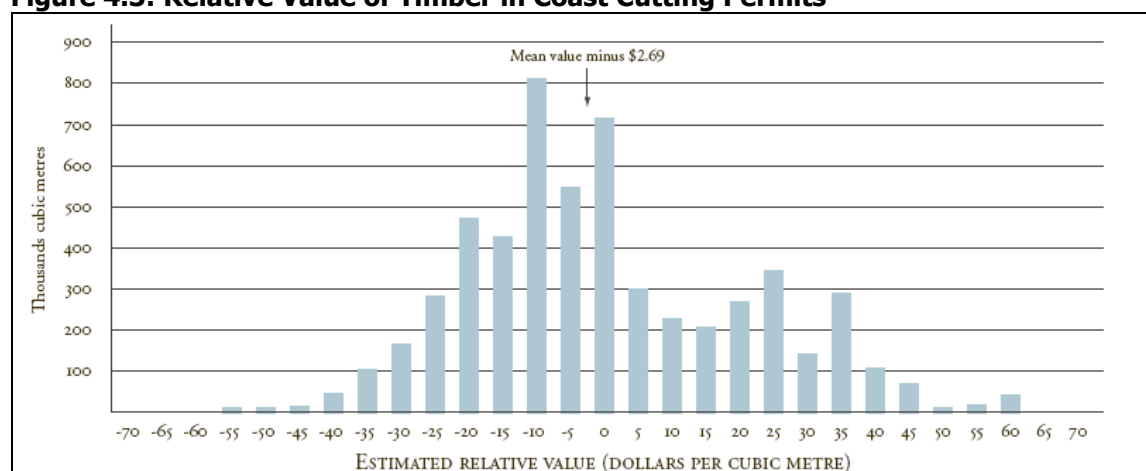
**Figure 4.2: Costs of Producing Lumber in BC vs. Other Regions (\$ per mfbm)**



**Source:** Based on PricewaterhouseCoopers data, as reported in Pearse, P. (2001) *Ready for Change*, 2001 and reproduced in Pierce Lefebvre and D.A. Raffles and Associates March 2003.<sup>30</sup>

The cost implications of harvesting on the cost can be appreciated by examining relative value of timber from cutting permits. The Pearse report included the following graph (Figure 4.3) on the relative value of timber in coast cutting permits, showing a mean value of minus \$2.69 in July of 2001.

**Figure 4.3: Relative Value of Timber in Coast Cutting Permits<sup>31</sup>**



<sup>30</sup> Labour and other direct costs in Canadian dollars per thousand board feet (mfbm) in 2001. Excludes cedar.

Since Pearse's graph is an average of the Coast-wide harvest and thus factors in higher value Vancouver Island timber, the mean relative value of -\$2.69 would tend to be more optimistic than the mean relative value of timber resources from within the study area. The implication of this graph is clear: due to a combination of high harvesting cost and modest timber value, much of the timber on the coast is either not commercially viable, or is marginal.

The 1999 study "Silvicultural Options for the Central Coast" by Pojar et. al. compared the relative economics of logging in this area with Vancouver Island. A number of factors have a negative impact on Central Coast net revenue. For instance, average stand volumes are 19% lower per hectare on the Central Coast, timber volume accessible per km of road built are 37% lower, the proportion requiring helilogging is 50% higher. While these factors are offset by some positive factors (e.g., average haul distance is shorter), the overall result is that net return is -\$11.11/m<sup>3</sup> on the Central Coast. Thus it is safe to say that the Central Coast, in general, has higher costs than the Coast as a whole and that it is a less profitable place to log than Vancouver Island.

Between 1992 and 1995, logging costs rose dramatically, and have averaged above \$107 per m<sup>3</sup> since then – a \$40 increase over 1992 levels. While stumpage and royalty payments also increased over that same period, they did so by slightly under \$10/m<sup>3</sup> on average, and hence \$30/m<sup>3</sup> of the increase reflects the real increase in costs to society of logging coastal timber.<sup>32</sup> About a third of this increase reflects increased use of helicopter logging (see Table 4.2). The effect of this increase in logging costs was to put log prices and costs at the break-even point since 1996, as displayed in Figure 4.4 on the following page.

**Table 4.2: Average Coastal Logging Costs (\$/m<sup>3</sup>)**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Falling & Bucking	4.20	4.31	4.73	5.10	5.22	5.41	5.55	5.37	6.37	6.75
Yarding & Loading	11.11	11.91	13.42	16.33	17.53	14.30	12.98	13.42	15.23	15.10
Other Direct	21.96	23.89	25.96	29.65	29.99	24.15	22.93	22.88	25.29	27.37
	37.27	40.11	44.11	51.08	52.74	43.86	41.46	41.67	46.89	49.22
Stumpage & Royalty	10.14	13.65	21.39	26.58	25.84	27.17	23.01	17.28	16.99	14.93
Overhead and Roads	11.99	13.11	15.53	19.45	19.47	19.72	21.42	19.71	20.42	20.15
Head Office	7.60	9.12	11.60	14.14	15.51		12.35	10.81	11.06	12.18
Total	67.00	75.99	92.63	111.25	113.56		98.24	89.47	95.36	96.48
Helicopter Logging						8.55	9.32	7.52	10.45	11.52
Total	67.00	75.99	92.63	111.25	113.56		107.57	97.00	105.81	108.00

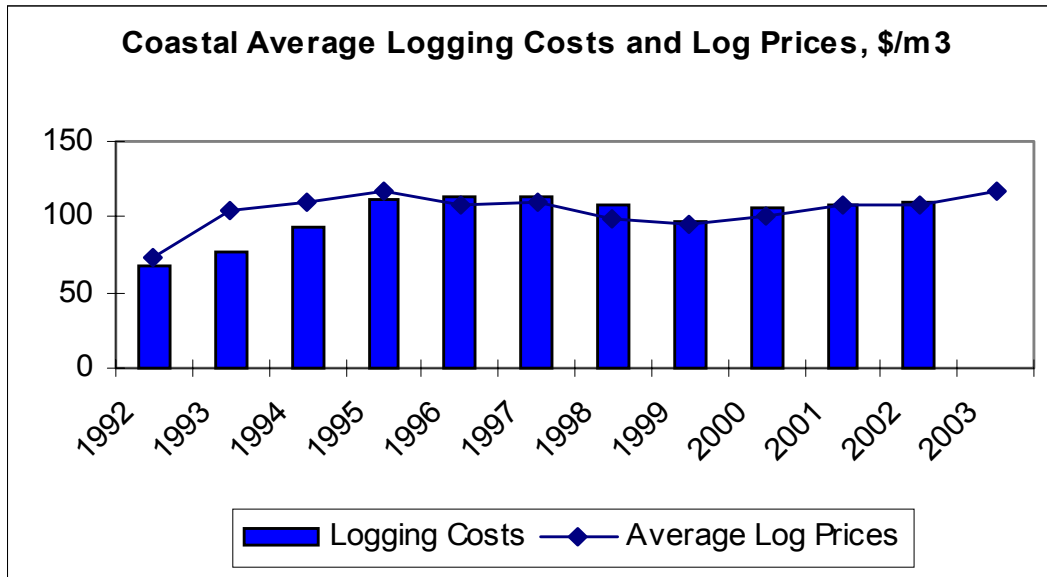
Source: PricewaterhouseCoopers, 2002

1. The survey changed in 1997 and Head Office costs may not be directly comparable to previous years.
2. Starting in 1997, helicopter-logging costs were divided by total haul volume in order to estimate their overall impact on logging costs. The average helicopter logging costs based on heli-log volume (1,020,237 m<sup>3</sup>) was \$70.00 per m<sup>3</sup> for the year 2000, but when averaged on the total volume logged, the impact adds to \$10.45 per m<sup>3</sup>.

<sup>31</sup> Source: Pearse, Op Cit., based on Ministry of Forests data, providing distribution of value indexes (estimated selling price less estimated operating costs) for coast cutting permits July 2001, rounded to nearest \$5.

<sup>32</sup> Since stumpage payments involve a cost to one party (the logging company), but a benefit to another (government), from a societal perspective the cost and benefit cancel themselves out.

**Figure 4.4: B.C. Coast Comparison of Average Logging Costs and Log Prices**



Source: Analysis of Woodflow in the Coast Forest Region. Op. cit.

While the above data indicates that the Coastal timber industry is operating in areas where revenues are barely sufficient to cover costs, it is based on Coast-wide averages. In contrast, in much of the study area, and in particular the North Coast and the northern portion of the Central Coast, log values are lower than the coast average, while logging costs are higher. Consequently, one can assume that the economic profitability of harvesting in the study area is generally lower than demonstrated here.

With low log values and high costs, companies have had little leeway to invest in upgrading capital equipment. The narrow margin between log values and logging costs explains to a large degree why some coastal timber companies have had such poor rates of return in recent years. For instance, largely as a result of difficult market conditions and a high debt load, Doman Industries Ltd. was forced to seek bankruptcy protection on November 7, 2002, with a loss in 2002 of \$164.1 million, or 25.8 percent of sales.<sup>33</sup> For the twelve months ended December 31, 2003, Interfor announced a net loss of \$23.0 million.<sup>34</sup> The C.E.O.s and senior representatives of three of the Coast's biggest operators characterized the situation faced by their companies over the past 15 years as a "*continued downward spiral*" that led them in 2003 to seek coordinated action by all stakeholders to save the industry.<sup>35</sup>

In early 2004, the financial picture for the timber industry improved. With the current exceptionally low interest rates, the US demand for lumber for housing construction is very high, helping to bid up prices, though interest rates have begun to increase again. High growth rates in China are fuelling a global surge in commodity prices as producers cannot immediately adjust to unanticipated demand. Part of the recent return to proximate profitability in the coastal timber sector merely reflects industry taking advantage of high cedar prices and focusing on logging this species. Also, companies have undertaken aggressive cost-cutting measures as a result of the softwood lumber duties. For instance, Canfor's costs

<sup>33</sup> Source: [www.doman.com](http://www.doman.com). Doman has emerged from bankruptcy protection as Western Forest Products.

<sup>34</sup> <http://www.interfor.com/investorinfo/pdf/quarterly-2003-q4.pdf>

<sup>35</sup> Duncan Davies, President & Chief Executive Officer, International Forest Products Limited (Interfor); Paul McElligott President & Chief Executive Officer, TimberWest Forest Corporation; Craig Neeser Vice President, British Columbia Weyerhaeuser Company Limited. 2003. *Embracing A New Vision: Rebuilding BC's Coastal Forest Industry*.

<http://www.interfor.com/pdf/Coastal%20Vision%20Paper--Final.pdf> (Accessed February 25 2004).

for converting logs to lumber have decreased by 30% from 1998 to 2004.<sup>36</sup> Despite these improvements, which are unlikely to be sustained, longer-term prospects for the timber industry in the study area are not encouraging as will become clear in the following sections.

#### 4.2.2.4 *Changes In The Inventory Profile*

Logging has occurred on the BC Coast for over 100 years, growing steadily between the early 1900s to the early 1970s when the cut was hitting 30 million m<sup>3</sup> per year, peaking in 1988 at about 33 million m<sup>3</sup>. Since 1988 however, there has been a rapid and steady decline in the logging rate, with the 2003 cut at 11.4 million m<sup>3</sup> (see Figure 4.5).

There is a significant gap between the coastal timber inventory and the timber that has been harvested, with timber companies concentrating in the more valuable species such as cedar, and avoiding the less valuable hemlock and balsam, as displayed in Table 4.3. Industry analyst Reid Carter from National Bank Financial has raised this gap as an issue affecting the industry's long term viability.<sup>37</sup>

Timber inventory varies by subregion and by tenure. For instance, Interfor's long-term coastal timber supply consists of a species mix of approximately 58% hemlock-balsam, 26% western red cedar, 9% Douglas-fir, 3% spruce, and 4% cypress.<sup>38</sup> The species distribution of the cut also has changed over the years as the companies have responded to market conditions. In 1988, when the volume of timber logged on the coast peaked, log prices were high which made it profitable to cut the lower value species (hemlock and balsam); in that year low value species constituted roughly 56 percent of the cut. By 2002, when prices were depressed, producers shunned low value species to avoid losses; lower value woods contributed less than 38 percent of the overall cut.

**Table 4.3: Percentage of Growing Stock by Species**

Species	Harvest profile (%)	Inventory Profile (%)	Gap (%)
Hembal	44.6	62	17.4
Douglas-fir	23.9	12	-11.9
Red Cedar	23.2	18	-5.2
Yellow Cedar	4.0	3	-1.0
Spruce	2.3	2	-0.3
Alder	1.3	1	-0.3
Other	0.9	2	1.1
Total	100	100	

Source: Reid Carter, National Bank Financial. Gap calculated by author.

These trends in production, inventory changes and AAC have a number of important implications for the future of the coastal timber industry. First, a significant proportion of higher-value timber cut in recent years reflects an increased level of helicopter logging. The cutting of this high-value, formerly inaccessible timber, is profitable as old growth but likely to be marginal during the second rotation when second growth timber values may not be sufficient to offset helicopter logging costs. Hence, this cut is essentially a limited duration opportunity for industry. Second, to be sustainable, the cut must be in long-term balance with the "timber profile" - the species distribution of the timber supply – which has not

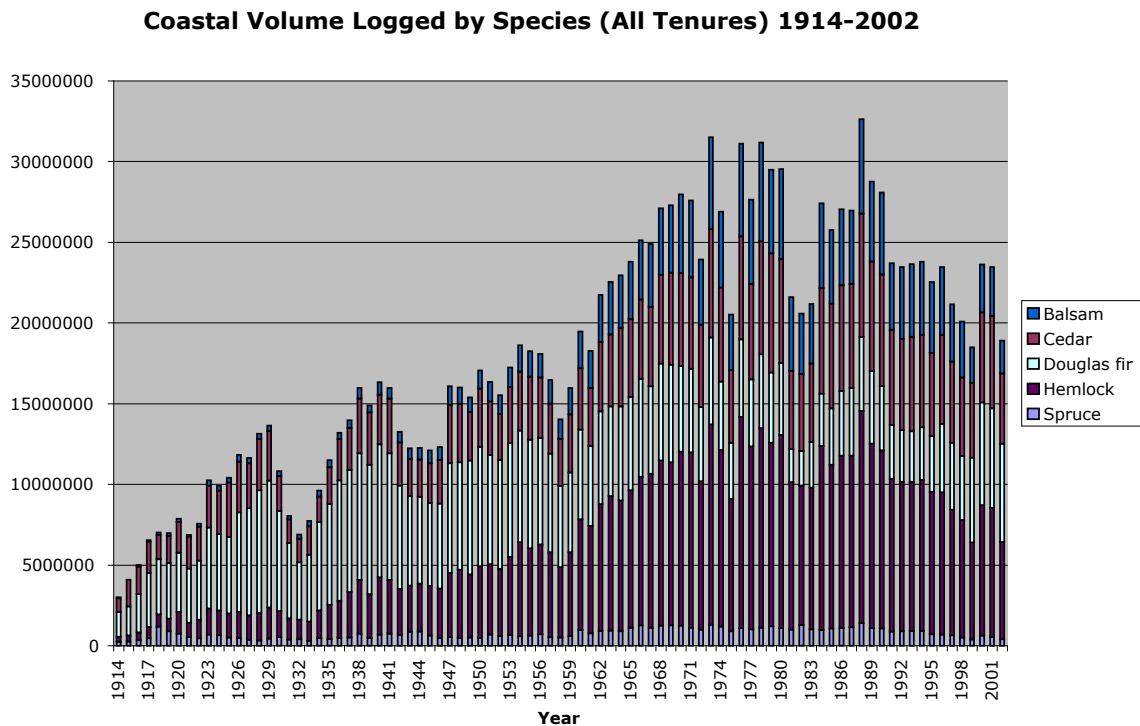
<sup>36</sup> Gordon Hamilton, "Good times are back in B.C. forests," *Vancouver Sun* May 1, 2004, page H3.

<sup>37</sup> Reid Carter, National Bank Financial. *The Move to 2nd Growth and Other Challenges to the Coastal Forest Industry: An Equity Analyst's View*, January 15, 2003. Presentation to the Truck Loggers Association.

<sup>38</sup> Interfor, 2003. *Annual Report 2002*. Note that Interfor's tenure extends beyond the study area, and that exact percentages will change as a result of the timber takeback.

been the case in recent times. And third, for industrial logging to be viable in the study area over the long term, it will need to generate positive returns from harvesting hemlock and balsam. If the inventory of hemlock and balsam is used to support a high AAC, but the harvesting effort is focused on the high value species such as cedar and Douglas Fir, future commercial viability and the volume of timber flowing from the study area.

**Figure 4.5: Coastal Volume Logged by Species 1914-2002**



For the profit-maximizing firm, given the opportunity cost of capital, it makes sense to harvest the resource with the highest returns first, in order to avoid or delay harvesting stands with low or negative margins. Although this may maximize the firm's return on investment, it is rarely in society's best interests; society must act to create the necessary constraints – such as land use plans and regulations. The harvest history demonstrates that the coastal timber industry has been operating, as would be expected, in a profit-maximizing manner which emphasizes the short to mid term, within the limited constraints imposed by BC's legal and regulatory framework. The future profitability and financial viability of the industry has thereby been reduced.

The tendency of primary sectors to overexploit and degrade the natural resource base on which they depend has been documented in many instances. Unless constrained by governments, logging companies often liquidate the high value resource at an unsustainable rate, and abandon the region when operations are no longer commercially viable, moving onto to the next frontier or moving capital into new business opportunities.<sup>39</sup> The net effect in the timber sector is that the harvesting and processing capacity exceeds the forest's capacity to grow timber. Depletion is first observed in the best, most accessible old growth.

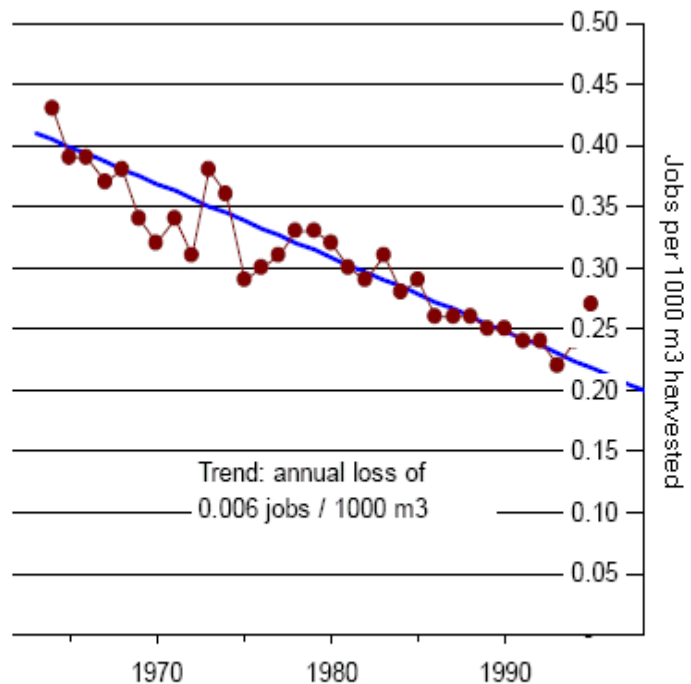
<sup>39</sup> See Clapp, R. 1998. "The Resource Cycle in Forestry and Fishing," *Canadian Geography* 42(2): 129-144.

What is happening in the timber sector on BC's Coast has been repeated across North America over the last one hundred and fifty years as the industry liquidated timber supplies in the east, and moved to the West. Most recently it has been observed in Oregon and Washington. The decision to limit harvesting in old growth National Forests in Oregon and Washington in order to protect the endangered spotted owl caused considerable controversy at the time, and there were predictions of severe regional impacts and job losses. However, the actual consequences of protecting spotted owl habitat were not as severe as expected and even lead to new economic opportunities. In a retrospective study on the spotted owl decision, economists identified a number of explanatory factors.

Many decades of unsustainable harvests meant that the old growth timber was close to exhaustion and harvest levels were already dropping regardless of the spotted owl decision. Timber processing facilities had already completed much of the shift to operating off of second growth. Improvements in labour productivity enabled by harvesting and processing second growth had significantly reduced employment in the timber sector, a trend which can be seen in BC as well (see Figure 4.6). Meanwhile, the state economies had matured and diversified, reducing the relative importance of the timber sector, while sectors dependent upon environmental amenities were experiencing rapid growth.<sup>40</sup>

This pattern is evident on the B.C. coast. As industry players have observed: *"We're now trying to get the 'guts and feathers' of what's left. Particularly in coastal areas we're logging in the back end of valleys and off the top of mountains ... more expensive areas to operate in."*<sup>41</sup> A report examining cost drivers within the industry acknowledged that *"In some areas of the province, historic harvesting practices have taken the best, most accessible timber, leaving behind poorer quality stands with more difficult access."*<sup>42</sup> The BC Ministry of Forests acknowledges that on the coast *"a continuation of the present downward trend in timber supply appears unavoidable over the next few decades."*<sup>43</sup>

**Figure 4.6: Productivity Trends in Coastal BC's Logging Sector**



Source: CIT 2003. Economic Gain Spatial Analysis-Timber, Page C-1 (November 17, 2003 Draft).

<sup>40</sup> Niemi, E., E. Whitelaw and A. Johnston. 1999. The sky did NOT fall: The Pacific Northwest's response to logging reductions.  
<sup>41</sup> Quoted in "Forestry reaching into guts and feathers." G. Hamilton. Vancouver Sun, March 12, 1998, p. D1. Reid Carter is an industry analyst and was a director of the Forest Alliance of B.C.  
<sup>42</sup> KPMG et al., 1997. Financial State of the Forest Industry and Delivered Wood Cost Drivers. Report for the Economics and Trade Branch, Ministry of Forests.  
<sup>43</sup> B.C. Ministry of Forests, 1999. Incremental Silviculture Strategy For British Columbia (Interim).

#### 4.2.2.5 *Changes In The Regulatory Environment*

Under pressure from industry to improve the industry's profitability, the BC government has instituted a number of timber sector reforms which diminish government oversight, relax environmental regulations, and guarantee a land base for timber harvesting.<sup>44</sup> Other reforms were initiated partly as a response to the softwood lumber dispute so as to demonstrate that timber from BC's public lands is not subsidized and therefore should not be subject to American duties or other penalties. These reforms have removed minimum cut requirements, eliminated timber processing and appurtenancy requirements<sup>45</sup>, enabled transfer of tenures or ownership without penalty, and eliminated cross subsidization of timber.<sup>46</sup> Through a reallocation of logging rights, 20% of the AAC from major licencees with tenures greater 200,000 m<sup>3</sup> in volume is being taken back by the province. Half of this volume is being allocated to B.C. Timber Sales to be sold by auction; the remainder is being reallocated to woodlots, First Nations, and community forest licencees. The desired end result is a competitive market for timber in B.C., such that with this price information, the government can set market-based stumpage rates.<sup>47</sup>

As of February 29, 2004, stumpage for Coastal timber is based on a market price system, where price is calculated on the basis of timber auctioned off under B.C. Timber Sales. While this generally reduces stumpage rates (and hence payments to government) on the Coast, in some areas such as the North Coast stumpage rates are not anticipated to come down.<sup>48</sup>

By removing restrictions, and moving closer to free market conditions, such reforms do create the potential for greater profitability within the timber industry. This profitability does come at a cost to society. Responding to market forces, companies will tend to rationalize operations, reducing employment levels and potentially wages (though processing and appurtenancy requirements did not benefit the populations of the study area as there was no requirement that timber be processed locally). With a lax regulatory environment, environmental and social costs will tend to be externalized, and companies will have the leeway to continue drawing down study area timber stocks. However, given the international interest in the study area, companies that took full advantage of reforms that reduce protection for non-timber values might face market campaigns or other pressures if the "results-based" approach ends up damaging valued ecosystems or components thereof. Finally, the elimination of cross-subsidization and minimum cut requirements make it less likely that timber companies will harvest stands where cost of development, harvesting, silviculture and transportation to the processing facility exceed the log value. This could significantly reduce the cut, particularly during downturns, throughout much of the study area. The net result within the study area in the mid-term would likely be a smaller industry with an improved rate of return, even more focused on the higher value stands. The industry would decline in size even further once the best timber was gone.

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<sup>44</sup> Ministry of Forests, 2004. "Results-based regulations revitalize resource sectors." News release, January 23, 2004. Ministry of Forests, 2004 "Market-based forestry reforms to enhance access to timber." Backgrounder. January. Available at: <http://www.for.gov.bc.ca/mof/plan/marketbasedreforms.htm> (Accessed April 30, 2004). For an analysis of the reforms see: West Coast Environmental Law, 2004. *Deregulation backgrounder: "Timber rules" Forest regulations lower standards, tie government hands and reduce accountability.* Available at: [http://www.wcel.org/deregulation/Timber\\_Rules.pdf](http://www.wcel.org/deregulation/Timber_Rules.pdf)

<sup>45</sup> Timber processing and appurtenancy requirements required licensees to process timber harvested under their agreements (or an equivalent volume) at their own mills, or in the case of appurtenancy, at a specific mill.

<sup>46</sup> In the past, two cutting authorities (which form the basis for the application of stumpage) could be "blended" so that a common stumpage rate was charged. In this way, high value timber could subsidize negative value timber, enabling harvesting of an otherwise uneconomic resource (but also diminishing the profitability of timber harvesting).

<sup>47</sup> See, *Forestry Revitalization Act (2003)* -- (Bill 28) and BC Ministry of Forests, 2003. *The Forestry Revitalization Plan.* Available at <http://www.for.gov.bc.ca/mof/plan/> (April 2003).

<sup>48</sup> NC SEEA, March 2004 Draft, footnote 28 on page 35. Source: Pearse Report, Op. cit

The implications of the above reforms in the study area will depend significantly on whether or not the Sustainability Scenario is adopted, and the results of government-to-government negotiations. While these reforms have largely eliminated the long-standing (though not always effective) social contract underlying BC timber policy, increasingly coastal First Nations are insisting that they have more say in the timber industry, and are entering into joint ventures and other arrangements to improve the flow of local benefits with timber companies. Furthermore, a commitment to EBM would involve timber management significantly different than created by the Province's new regulatory regime. While the details of how the commitment to EBM would be translated into legislation or regulations have not been sorted out as of press time, for the purposes of this study it is assumed that under the Sustainability Scenario EBM would be translated into legally binding requirements. For this reason, regulatory change and "working forest"<sup>49</sup> provisions intended for the remainder of the province are considered to have limited relevance if the Sustainability Scenario is adopted.

#### **4.2.2.6 Certification**

A trend that continues to gather momentum is the market preference for wood that is not from endangered forests, that is produced in an ecologically sustainable manner, and that is certified by credible third parties. This will have important ramifications for the BC timber industry as a whole and especially for the BC coastal timber industry, given the fact that the coastal temperate rainforests within the study area are considered globally significant for their high conservation values. A recent report by IBM Business Consulting Services concluded<sup>50</sup>:

*Based on our discussions with 30 major customers [for BC forest products], we believe there is clear evidence of a greenward shift in the market for forest products, including those from B.C. The shift is real, buyers believe it will continue, and we believe it will have a negative impact on forest regions and producers that do not respond to it.*

As one of the major buyers interviewed for the study put it:

*We will immediately begin to phase out the purchase of wood products from endangered forests as soon as these areas are properly defined and mapped. We will give preference to wood products that come from well-managed forest that have been certified by independent third-party organizations.*

The conclusion is that, unless wood products produced from the study area can be certified by credible third-party certifiers in the next few years, timber companies will face market access issues.

#### **4.2.3 SYMPTOMS OF ECONOMIC DISTRESS IN THE COASTAL TIMBER SECTOR**

*My investigation of the coastal forest industry has revealed strong evidence of an industry in crisis. All the usual measures of economic performance lead to the conclusion that the industry cannot sustain itself on its present path.*

*Dr. Peter Pearse*

Taken together, these structural changes have created difficult conditions for the Coastal timber sector. Symptoms of distress have shown up in a number of ways.

##### **4.2.3.1 Coastal BC Sawmill Output**

As displayed in Figure 4.7, data for Canadian lumber production since 1961 confirm that, while overall Canadian lumber production has increased steadily, and while BC interior lumber production has

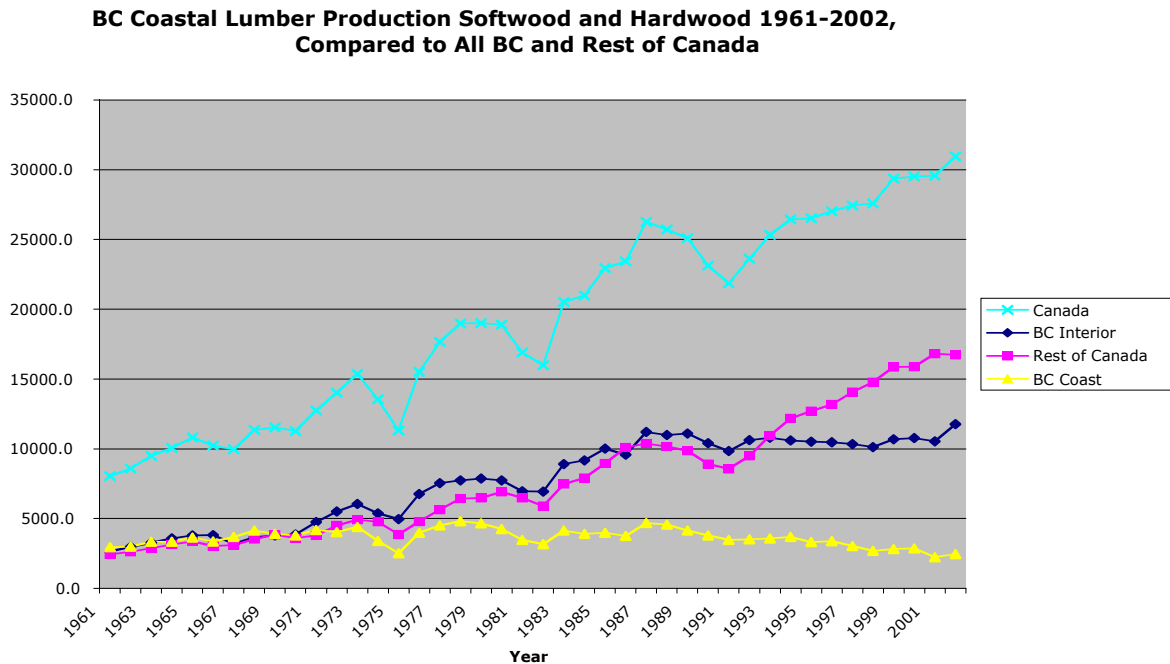
<sup>49</sup> Those lands designated by the province as "working forest" are prioritised for timber production. (See: <http://srmwww.gov.bc.ca/rmd/workingforest/faq.htm>)

<sup>50</sup> IBM Business Consulting Services, 2003. A Greenward Shift in the Market for Forest Products from British Columbia



held its position since the late 1980's, the output from BC Coast sawmills has been in decline since the peak year of lumber production in 1988.

**Figure 4.7: Canadian, Coastal and Interior Lumber Production 1961- 2002**



#### 4.2.3.2 Coastal BC Mill Closures

Another symptom of declining economic viability of the Coastal timber industry is the high rate of mill closure. While some closures are the result of consolidating operations and replacing old and inefficient mills with new mills, many of the closures are due in large part to local depletion of the resource base, reduced profitability as harvesting shifts into higher cost portions of the land base, and reduced ability to compete given structural changes faced by the industry. Table 4.4 identifies the sawmills on the B.C. coast that have shut down permanently in recent years.

#### 4.2.3.3 Sawmill Capacity Utilization In BC Coastal Sawmills In 2003

Recent data shows that sawmills dependent on the Coastal harvest are operating well below capacity, with average capacity utilization in 2003 estimated at only 70.4 percent and in the Mid Coast, QCI and North Coast of only 19.2 percent (see Table 4.5). Such figures reflect the combined effect of processing overcapacity given structural changes and timber supply drawdown as well as the low point of the market cycle.

**Table 4.4: Partial List of Permanent Sawmill Closures in Coastal B.C.**

Name	Location	Number of Employees	Approximate Year of Closure	Approximate Log Input (000 m3)
Bayside Sawmills	Port Mellon	140	2001	205
Campbell River Mills Ltd.	Campbell River	85	1997	350
Canadian Forest Products Ltd. - Eburne Sawmill	Vancouver	241	1998	465
CIPA Lumber Co. Ltd.	Nanaimo	115	2001	285
International Forest Products Ltd. - Fraser Mills	Coquitlam	265	2000	700
International Forest Products Ltd. - McDonald Cedar	Fort Langley	130	1997	175
J.S. Jones	Boston Bar	190	2002	535
MacMillan Bloedel Ltd.	Powell River	260	1999	145
TimberWest Forest Ltd.	Youbou	174	2001	265
Tolko	North Vancouver	200	1997	500
Weyerhaeuser Company Ltd. (Canadian White Pine)	Vancouver	400	2000	545
West Fraser Mills	Prince Rupert	50	2002	300
<b>Total</b>		<b>2,250</b>		<b>4,470</b>

Notes: The above list of mills is compiled for illustrative purposes and there may be other operations that have closed and are not included (smaller sawmilling operations that have closed are excluded). Source: Pierce Lefebvre Consulting, 2003. *Analysis of Woodflow in the Coast Forest Region.*

**Table 4.5: Coast Forest Region Estimated Capacity Utilization Rates (2-Shifts)**

Manufacturing Facilities	B.C. Coastal Region 2-Shift Capacity (Log Inputs in 000 m3)			Avg. Log Usage		% Utilization
	Number	2-Shift Capacity Volume	Avg.	(000 m3)		
Sawmills	78	16,539	66%	212	11,503	69.6%
Shake & Shingle	44	2,054	8%	47	838	40.8%
Plywood and Veneer	3	1,250	5%	244	1,015	81.2%
Chipping Plants	8	3,393	13%	424	3,074	90.6%
Woodrooms	5	1,850	7%	370	1,225	66.2%
Pole & Post Plants	7	119	0%		90	75.6%
Total Log Input	145	25,205	100.0%	174	17,746	70.4%
By Sub-Region:						
Vancouver Island	70	11,312	45%	162	8,430	74.5%
Lower Mainland	69	13,560	54%	197	9,252	68.2%
Mid-Coast, QCI & North Coast	6	333	1%	56	64	19.2%
Total	145	25,205	100%		17,746	70.4%

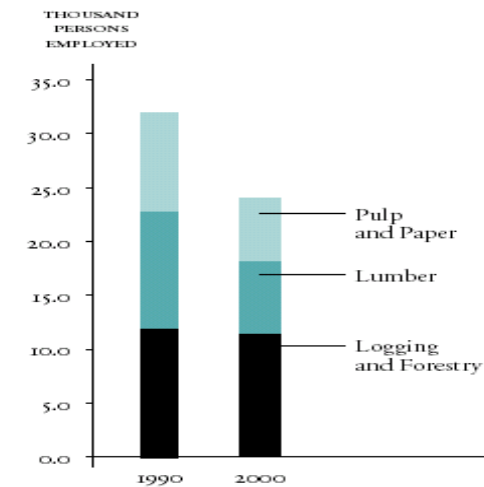
Source: Analysis of Woodflow in the Coast Forest Region. Op. cit.

#### 4.2.3.4 Logging and Sawmill Employment<sup>51</sup>

The BC Coastal timber industry has shed many jobs since the peak year of Coastal production in 1988. As shown in Figure 4.8, when Pearse compared employment in 2000 to 1990, he found a large fall in overall timber sector employment on the coast. Employment levels in 2003 would be even lower.

<sup>51</sup> Up until 1995, Statistics Canada employment data separated out employment in logging, silviculture and processing between Coastal BC and the interior.

**Figure 4.8: Coastal employment in the timber industry**  
**Employment in the**  
**coast forest industry**



Source: PricewaterhouseCoopers and Forest Industrial Relations

Over the long-term, employment prospects are not likely to improve. Employment levels are related not only to the level of timber harvested and processed, but also to technological changes affecting worker productivity. As one operator recently commented, *"Five years ago, less than five percent of our annual cut (on the coast) was harvested using mechanized logging.... Today, that number is at 20 percent, and within another year, as much as 35 to 40 percent of our harvesting will be mechanized."*<sup>52</sup> Mechanization rates can reach as high as 80 percent in some coastal operations. Given global competition, the Coastal timber industry will be under continued pressure to shed workers from harvesting operations.

Table 4.6 shows that coastal employment in wood product manufacturing facilities (excluding logging) between 1996 and 2003 fell by some 27 percent. Most of this change was not due to productivity improvements since, as the Woodflow analysis reported, productivity figures for primary processors did not change significantly, dropping slightly from .693 jobs to .666 per 1000 m<sup>3</sup> harvested.<sup>53</sup> Rather, the drop in employment resulted from lowered output in response to poor market conditions. This implies that the job impacts of productivity improvements to coastal manufacturing facilities have yet to be felt. As mills are upgraded, more jobs will be shed.

On May 27, 2004, an arbitrator's report imposed a four year agreement on Coastal timber sector workers. Noting the timber industry was "in tough financial shape" and failing to renew itself, the arbitrator found that "certain flexibilities and cost adjustments must be accepted as inevitable." By allowing employers the right to set shifts, they can consolidate operations, keeping fewer mills that then run 24 hours a day. The agreement was assessed by one IWA Local President as likely to result "...in the loss of a lot of members. It will certainly lead to more mill closures."<sup>54</sup>

<sup>52</sup> "Heli-Logger: A second-growth solution," *Trucklogger*, Vol 25, issue 4 winter 2003, pp 41-42.

<sup>53</sup> Taken from chart 9, Woodflow analysis (p. 23).

<sup>54</sup> Gordon Hamilton, "Contract Imposed of forest industry workers: companies win flexibility to set hours of work, close old mills." *Vancouver Sun*, page F1, May 28, 2004. Forest Industrial Relations, 2004. "Arbitrator's report a first step in rebuilding BC's troubled coastal forest industry."

**Table 4.6: Summary of Employment in B.C. Coast Primary Manufacturing Facilities**

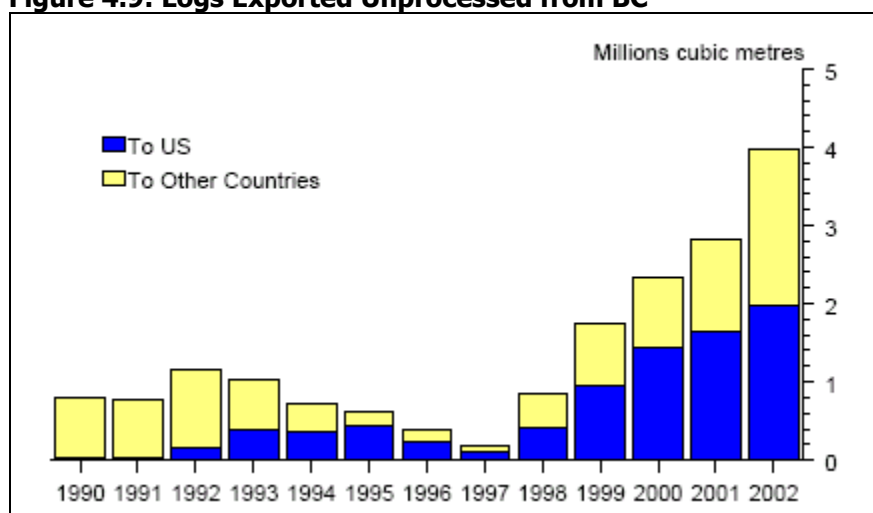
B.C. COAST PRIMARY PROCESSING EMPLOYMENT	2003				% Change 1996-2003
	Lower Mainland	Vancouver Island	Other	Total	
Primary Facilities					
Sawmills	3,477	2,738		6,215	-33%
Shakes and Shingles	897	166		1,063	-23%
Pulp and Paper	1,115	3,838		4,953	-30%
Plywood, Veneer, Poles and Other	929	279	100	1,308	49%
<b>2003 Total</b>	<b>6,418</b>	<b>7,021</b>	<b>100</b>	<b>13,539</b>	<b>-27%</b>
	1996				
Primary Facilities					
Sawmills	5,401	3,826	61	9,288	
Shakes and Shingles	1,183	198		1,381	
Pulp and Paper	2,078	5,019		7,097	
Plywood, Veneer, Poles and Other	689	187		876	
<b>1996 Total</b>	<b>9,351</b>	<b>9,230</b>	<b>61</b>	<b>18,642</b>	

Source: Analysis of Woodflow in the Coast Forest Region. Op. cit. Note these figures exclude employees at secondary pulp and paper facilities, secondary wood products manufacturing, and tertiary wood product sector.

#### 4.2.3.5 *Export Of Unprocessed Logs*

Under the *Forest Act*, timber harvested from public land must be processed within the province, except where it is deemed surplus to BC's processing facilities or if an exemption would avoid waste or improve wood utilization. The BC government has used this exemption in February 2002 to allow up to 35% of logs harvested on the North Coast to be exported unprocessed. In recent years, the proportion of logs exported from BC to other countries unprocessed has risen sharply, to 5% in 2002 (see Figure 4.9), with the total value rising from \$128 million in 1998 to \$515 million in 2002.<sup>55</sup>

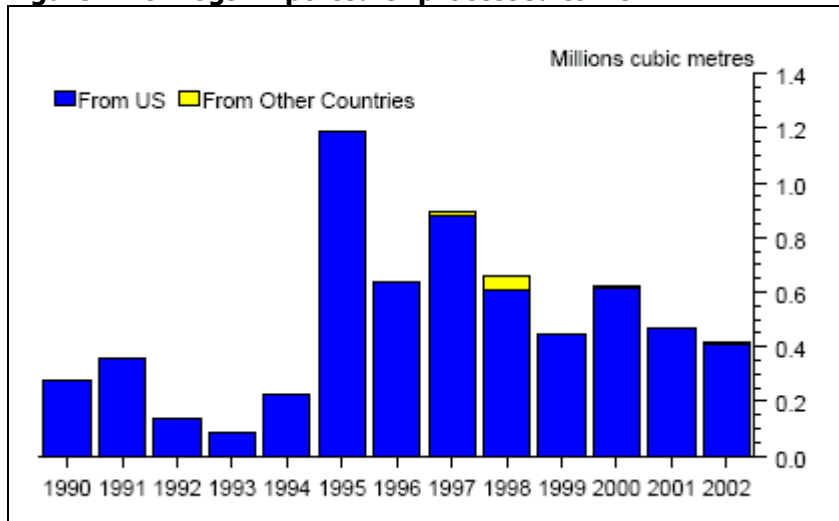
**Figure 4.9: Logs Exported Unprocessed from BC**



BC also imports unprocessed logs (see Figure 4.10; note the difference in scale from previous figure), and it is the balance between log exports and imports that is relevant. Imports have been on the decline.

<sup>55</sup> Data and figures in this section are from BC Stats 2003. *Business Indicators: Rising Log Exports Fuel Controversy*.

**Figure 4.10: Logs Imported Unprocessed to BC**



In evaluating the net balance of logs imported versus exported unprocessed, it is important to look at the relative value of logs. BC Stats reports that in 2002, the average value of raw logs exported was \$130 per m<sup>3</sup> (\$115/m<sup>3</sup> for logs exported to the US), whereas the average value of logs imported was \$61/m<sup>3</sup>. BC is exporting higher value saw logs, and importing pulp logs.

Taken together, the fact that BC presently exports a significant quantity of unprocessed but valuable logs suggests that it is not timber availability that has idled BC processing facilities. If the Sustainability Scenario is adopted, logs currently exported could be directed to BC mills. There is thus some buffer room to diminish timber volume harvested from the study area without strong negative impact on fibre flows to Vancouver Island and Lower Mainland mills.

#### **4.2.4 NET TIMBER VALUES IN THE STUDY AREA**

The economic value of standing timber in the three sub-regions that make up the study area, the Central Coast LRMP,<sup>56</sup> North Coast LRMP<sup>57</sup> and Haida Gwaii Land Use Plans<sup>58</sup>, has been assessed through the use of woodshed<sup>59</sup> analysis to support land use planning efforts. For each woodshed in each subregion, the current value index (CVI) was estimated by subtracting harvesting and transportation costs from the market value of the timber, based on immediate liquidation of all commercial timber. The CVI is thus the difference between mean delivered wood cost/m<sup>3</sup> (DWC) and mean total value/m<sup>3</sup> (TV). While the results are indicative rather than definitive, and will vary with market conditions, actual harvest scheduling and layout, a CVI < 0 indicates that the woodshed likely would be harvested at a loss. In contrast, a positive CVI indicates a woodshed where timber extraction is likely to be profitable.

$$CVI = TV - DWC$$

<sup>56</sup> Timberline Forest Inventory Consultants Ltd. August 2000. Assessing Current Timber Harvesting Value in the Central Coast. Submitted to the Ministry of Forests, Vancouver Forest Region. Reference 9941034 27 pp.

<sup>57</sup> Major Forest Licensee Sector. October 10, 2003. Woodshed Analysis for the North Coast LRMP. Methodology, Approach, Results. Final Draft. 15 pp.

<sup>58</sup> Timberline Forest Inventory Consultants. December 2002. Haida Gwaii/QCI Land Use Plan Woodshed Analysis. Submitted to the Ministry of Sustainable Resource Management. Coast Region. Final Report. 31 pp.

<sup>59</sup> A woodshed is defined "...as an area of forest serviced by one or more, closely related, wood gathering points." Timberline Forest Inventory Consultants. August 2000. Ibid.

Table 4.7 lists all woodsheds with a net value (CVI) less than zero, and compares them with the total woodsheds in the three study areas.

**Table 4.7: Woodsheds With Negative Timber Values**

Location	Years Included	Total Woodsheds	Woodsheds Net Revenue < 0	% Woodsheds Net Revenue < 0
Haida Gwaii	2000-2002	26	19	73 %
North Coast	1993-2002	46	17	37 %
Central Coast	1995-2000	158	102	65 %

Source: NC Woodshed analysis, CC Woodshed analysis, QCI/HG woodshed analysis

While the time frames for the three woodshed reports do not cover identical years, it is clear that the Central Coast, the North Coast and Haida Gwaii have many woodsheds that are below the economic margin for logging, most of the time.

If the timber supply is to support commercially viable timber harvesting over the long term, then timber beyond the economic margin must be excluded from the Timber Harvesting Land Base. Given the significant proportion of negative value timber that is in the THLB within the study area, the AAC is likely to be inflated. As the operable timber is depleted, harvesting levels are likely to drop as the proportion of commercially viable timber declines.

#### 4.2.4.1 *Factors Influencing The Declining Economic Margin*

The economic margin is the point where net logging revenues equal zero - where logging revenues equal logging costs:

$$\text{Net Logging Revenues} = \text{Logging Revenues} - \text{Logging Costs}$$

The most favourable (greatest revenue, least cost) logging conditions exist where the timber is high quality, has low defect, is uniform in size, grows on uniform terrain, and in areas that have a long operating season. The least favourable (least revenue, greatest cost) logging has the opposite conditions, with low quality timber, high defect, variable size, rough terrain and short operating season. To assess future returns from timber harvesting it is important to assess how cost and revenue factors are likely to change over time.

#### ➤ **Factors that Will Decrease Logging Revenues in the study area in the Future**

- **Species and Log Quality:** Although the relatively recent advent of helicopter logging on the Coast has provided a temporary injection of high value timber from pockets of high value timber that was formerly inaccessible, generally in the mature timber supply that remains, it is expected there will be more of the harvest coming from low-grade species (i.e. hemlock and balsam), and that the harvest will contain more low-grade logs of all species. Pearse noted that, "*As the best of the original timber has been taken, the premium that world markets once paid for its exceptional size and quality, and for its end products, has diminished.*"<sup>60</sup>
- **Volume per hectare:** Past logging has been concentrated in the higher volume stands. With the exception of a temporary influx of timber from higher volume stands accessed by helicopter logging, as a rule in the study area stand volumes are likely to decline over historic values.<sup>61</sup>

<sup>60</sup> Pearse, page 7.

<sup>61</sup> See for instance projection of harvest volume per hectare over time in the various timber supply analysis reports for the study area.

## ➤ **Factors that Will Increase Logging Costs in the study area in the Future**

### Physical Site Factors

- **Logging Chance** (steepness, terrain shape, terrain roughness): the quality of future logging chances is expected to decline. The future slopes will be steeper than in the past, will have more convex slopes (concave slopes are better for cable logging), and will be located in rougher terrain. As Pearse found in his review of the Coastal Timber industry, "*The general pattern was to take the nearest most accessible and most valuable timber first, gradually expanding up coastal valleys and mountainsides into more remote and lower quality timber, less valuable and costlier to harvest. Today, loggers are approaching the end of the merchantable old growth in many areas.*"<sup>62</sup>.
- **Length of Operating Season** (i.e., climatic constraints): as logging operations are forced into higher, cooler elevations to access timber, the length of the operating season will decline, idling equipment and increasing overhead costs.

### Timber Factors

- **Defect** - defect in logs such as rot have a serious negative impact on logging revenues and costs. Up to about 15% volume loss from defect can be tolerated by "long butting" in the forest. Above 15% defect, the negative impact on net revenues becomes punitive, defect will be high in many hemlock-balsam stands; as the harvest shifts to hemlock-balsam the overall defect rates will increase.

### Operational Factors

- **Road Construction Costs:** where roads must be built in hard rock (granite), costs are greatly increased. Constructing roads on steep slopes also increases costs. Both conditions apply on the mainland coast and will be more significant as logging operations shift into more difficult terrain.
- **Small woodsheds where capital costs are difficult to cover:** Major companies within the coastal timber industry use as a rule of thumb a minimum volume of ~50,000 m<sup>3</sup> of timber per annum as the required volume to make a logging show viable. The woodshed analyses have documented that many woodsheds in the study area have low total volumes of timber and would not meet this volume criterion and therefore can not be expected to provide a sufficient return if logged by major companies.<sup>63</sup>

The declining economic margin being experienced in the study area is reflected in the relatively low level of stumpage paid. Stumpage data from the Ministry of Forests indicates that the North Coast generates very low stumpage returns, at 86% below Coastal average, while the Mid Coast generates stumpage 26% below average. Only Haida Gwaii timber is equivalent to the Coastal average. This is particularly disturbing since in most areas of the study area timber harvesting has been concentrating in the more valuable stands and species, thereby increasing revenues (and therefore stumpage) at the expense of future viability. Stumpage payments are likely to decline over time.

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<sup>62</sup> Pearse, page 7.

<sup>63</sup> Small operators, community forests and woodlot owners are interested in and able to operate below this threshold, though often profitability is secondary to some other purpose such as maintaining water quality or recreational value.

**Table 4.8: Stumpage Values for Coastal Regions**

Stumpage, \$/m3	2002	2001	2000	1999	1998	1997	Average
Mid Coast	13.76	9.61	11.27	12.51	14.84	20.34	13.72
QCI/HG	19.70	12.86	15.92	8.89	23.33	37.88	19.76
North Coast	0.93	1.13	5.32	1.76	2.15	4.52	2.64
Coast-wide Avg	17.86	14.50	16.17	15.97	20.58	25.91	18.50
<b>Stumpage, % variance from coastal average</b>							
	2002	2001	2000	1999	1998	1997	Average
Mid Coast	-23%	-34%	-30%	-22%	-28%	-21%	-26%
QCI/HG	10%	-11%	-2%	-44%	13%	46%	2%
North Coast	-95%	-92%	-67%	-89%	-90%	-83%	-86%

Source: Ministry of Forests Data. Note: does not include small business program.

#### 4.2.5 DECLINING TIMBER STOCK

##### 4.2.5.1 North Coast – Evidence of Timber Stock Drawdown

Timber harvesting on the North Coast has been financially feasible in recent years largely because the cut has focused on higher value species despite the preponderance of hemlock and balsam in the area, as indicated in Figure 4.11.

**Figure 4.11: North Coast Species Harvest Profile<sup>64</sup>**

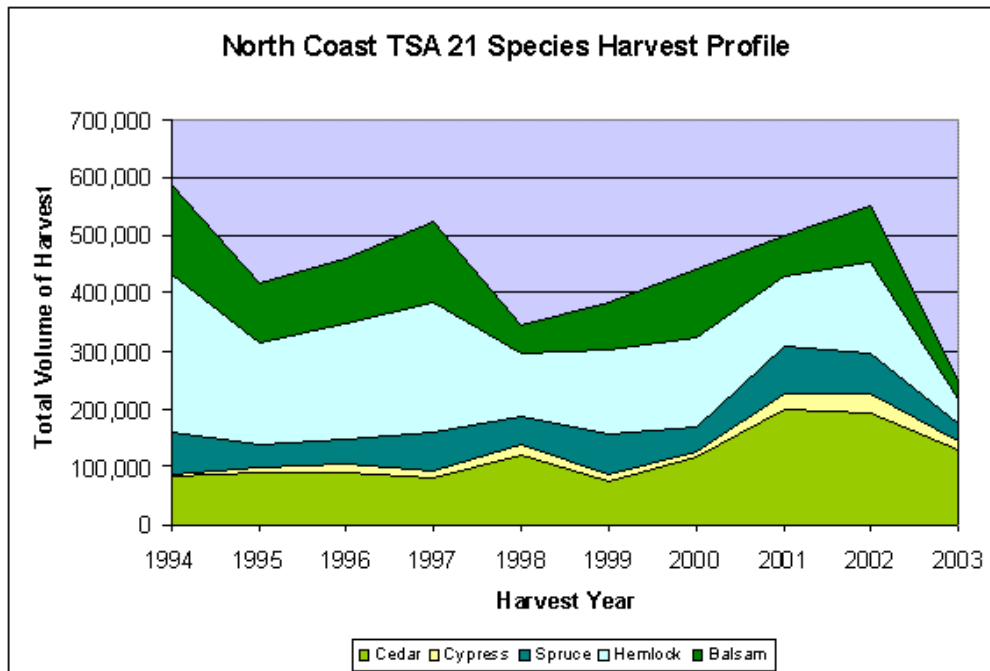


Table 4.9 examines the implications of shifting to a harvest that better reflects the profile. Part I indicates that the net value for Q1-Q3 of the 2003 harvest was just over \$1 million. This is in large part

<sup>64</sup> Source: De Biasio, D., Marlyn Chisholm & Associates and Enfor Consultants, 2004. *Socio-Economic and Environmental Assessment of LRMP Scenario developed by the North Coast LRMP Table as of April 2004 – Volume I: Socio-Economic Analysis*. Prepared for: North Coast Land and Resource Management Plan Table and BC Ministry of Sustainable Resource Management.



because over 50% of the volume was in high-value cedar. Part II uses a threshold analysis example to identify the breakeven profile, which still requires that to cover costs, 45% of logs extracted must be cedar, well beyond what the existing timber profile contains. Part III shows that if operators logged closer to the profile (necessary to maintain long-term viability), they would have lost over \$2.5 million. Thus, as the higher value cedar is depleted, it will be increasingly difficult for timber companies to reach breakeven on the North Coast

Figure 4.12 indicates how past logging has compromised future economic viability of logging on the North Coast. There is little old growth remaining in higher productivity ecosystems with valuable leading species (such as high value cedar); the forest has been converted to early seral (less than 40 years old) and immature stages (under 80 years old).

**Table 4.9: Threshold analysis showing implications of shifting harvest to reflect profile**

**I) Financial outcomes under 2003 Actual Cut (Source: NC SEEA, Table 3-7)**

Species	Avg logging cost	Average stumpage	Q1-Q3 2003 harvest vol	Distribution	Avg log value	Weighted value	Net Value
CE	\$97.00	\$0.93	95,836	50.5%	\$149.78	\$75.67	\$4,969,269
CY	\$97.00	\$0.41	6,668	3.5%	\$97.01	\$3.41	(\$2,667)
SP	\$97.00	\$4.01	26,204	13.8%	\$65.66	\$9.07	(\$926,305)
HE	\$97.00	\$2.96	37,545	19.8%	\$51.02	\$10.10	(\$1,837,570)
BA	\$97.00	\$2.40	23,437	12.4%	\$51.02	\$6.30	(\$1,133,785)
All	\$97.00	\$1.82	189,689	100.0%	\$82.90	<b>\$104.56</b>	<b>\$1,068,943</b>

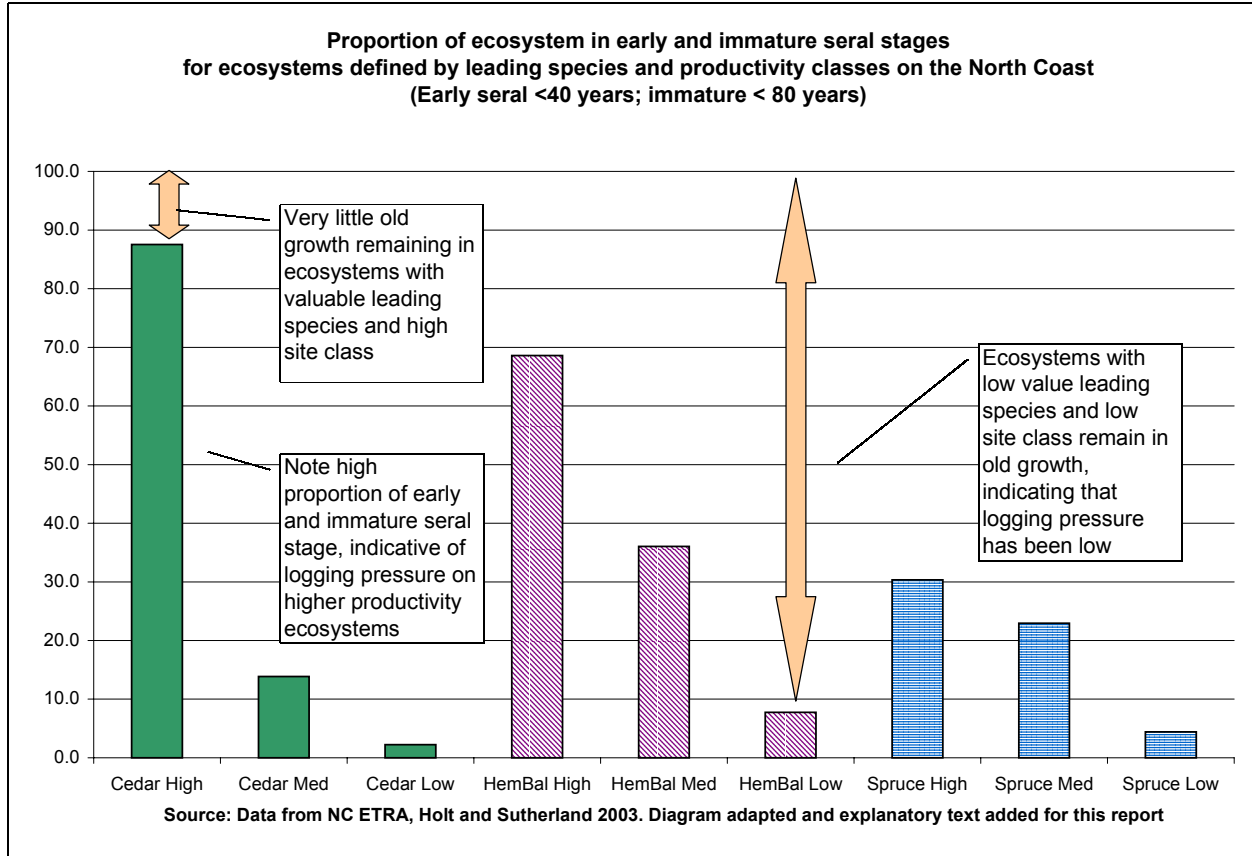
**II) Threshold analysis: breakeven profile**

Species	Avg logging cost	Average stumpage	Q1-Q3 2003 harvest vol	Distribution	Avg log value	Weighted value	Net Value
CE	\$97.00	\$0.93	85,042	<b>44.8%</b>	\$149.78	\$67.15	\$4,409,449
CY	\$97.00	\$0.41	6,668	3.5%	\$97.01	\$3.40	(\$2,667)
SP	\$97.00	\$4.01	26,204	13.8%	\$65.66	\$9.06	(\$926,311)
HE	\$97.00	\$2.96	42,238	<b>22.3%</b>	\$51.02	\$11.36	(\$2,067,136)
BA	\$97.00	\$2.40	29,213	<b>15.4%</b>	\$51.02	\$7.86	(\$1,413,333)
All	\$97.00	\$1.82	189,689	100%	\$82.90	<b>\$98.85</b>	<b>\$0</b>

**III) Financial outcome had 2003 cut more closely reflected profile**

Species	Avg logging cost	Average stumpage	Q1-Q3 2003 harvest vol	Distribution	Avg log value	Weighted value	Net Value
CE	\$97.00	\$0.93	58,804	<b>31.0%</b>	\$149.78	\$46.43	\$3,048,973
CY	\$97.00	\$0.41	6,668	3.5%	\$97.01	\$3.41	(\$2,667)
SP	\$97.00	\$4.01	26,204	13.8%	\$65.66	\$9.07	(\$926,311)
HE	\$97.00	\$2.96	45,525	<b>24.0%</b>	\$51.02	\$12.24	(\$2,228,016)
BA	\$97.00	\$2.40	52,544	<b>27.7%</b>	\$51.02	\$14.13	(\$2,542,077)
All	\$97.00	\$1.82	189,689	100.0%	\$82.90	<b>\$85.29</b>	<b>(\$2,650,099)</b>

**Figure 4.12: Concentration of harvesting in higher productivity sites**



#### 4.2.5.2 *Central Coast – Evidence of Timber Stock Drawdown*

The Central Coast Coarse Filter Ecosystem Trends Risk Assessment<sup>65</sup> was prepared to assess the implications of current timber management on biodiversity values. The study also provides an indication of the extent to which the highest value timber has been depleted. The report concludes:

*In general, the abundance of old forest in high productivity ecosystems... is currently much lower than that expected to occur under natural disturbance processes... The abundance of old forest in medium productivity ecosystems tends to be moderate compared to predicted natural abundances... The abundance of old forest in low productivity ecosystems tends to be very similar to that expected under natural conditions.*

All cedar/high, fir/high, and fir/medium productivity ecosystems are currently in the high to very high risk category, suggesting that old forest has been depleted from intense harvesting pressure in these ecosystems. While these ecosystems represent a relatively small proportion of the total landbase (.9%, 1.8%, 2.3% respectively), they are largely within the Timber Harvesting Land Base. Of 146 ecosystems, 60 are currently at very high risk, and 14 are at high risk.<sup>66</sup> Timber harvesting is likely to be the causative factor. If status quo logging continues (assuming that it is economically feasible to continue logging), most medium productivity ecosystems will shift from moderate risk to high and very high risk

<sup>65</sup> Holt, R. and Sutherland, G. 2004. Central Coast Coarse Filter Ecosystem Trends Risk Assessment – Base Case. Prepared for the Coast Information Team.

<sup>66</sup> Only ecosystems > 200 ha are included.

over the next 50 years. This will tend to foreclose economic opportunities in other sectors that depend upon the environmental amenities and ecosystem goods and services provided by old growth forests.

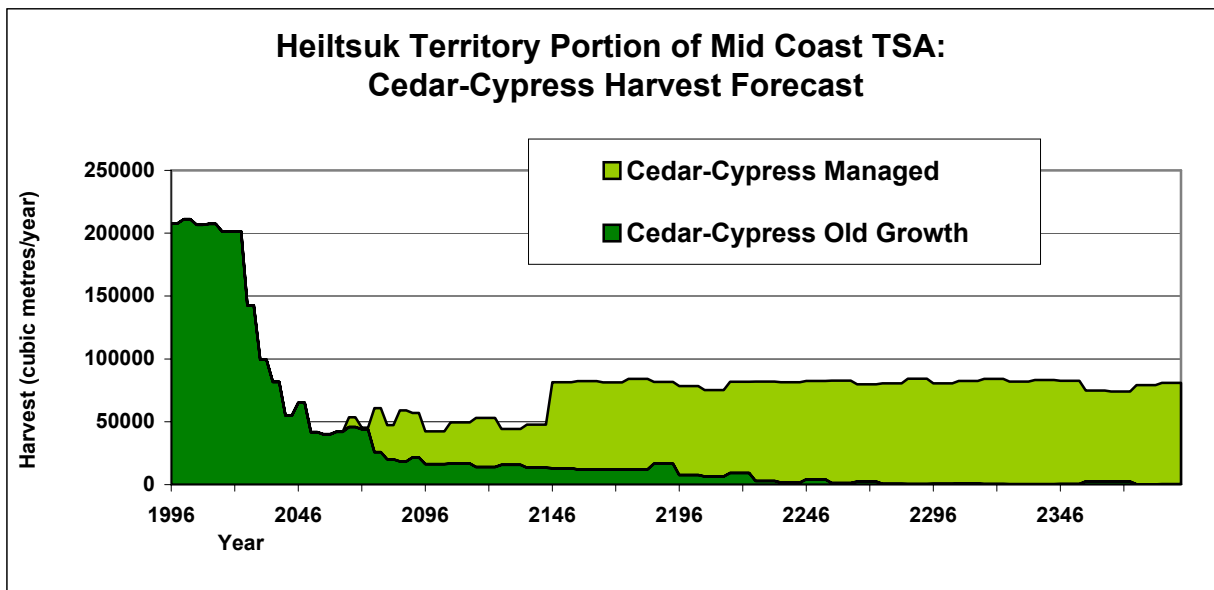
Further evidence that industrial logging on the Coast has compromised future economic viability of timber harvesting can be seen by examining cedar harvesting within the Heiltsuk Nation's traditional territory within the Central Coast LRMP portion of the study area. The Heiltsuk Nation recently filed an official complaint under the auspices of the Convention on Biological Diversity that Western red-cedar and yellow-cedar were being overcut at a level 4 times the sustainable harvest. Over-cutting has been ongoing for 15 years; the Heiltsuk estimate that by 2026 at almost all operable old-growth cedar will be gone (see Figure 4.13).<sup>67</sup>

A technical report on cedar harvesting in Heiltsuk territory concluded in 2001:

- current cedar harvesting levels will lead to "precipitous decline" in future harvest levels and long term instability in the supply of cedar and cypress timber;
- immediate and significant reductions in the harvest are needed to avoid a long period during which the harvest falls below the Long Term Harvest Level.

Even these projections are subject to considerable uncertainty. For instance, the 2001 technical report notes that it can be challenging to regenerate cedar and cypress after logging certain sites, these species often being out-competed by vigorous natural regeneration of lower-value Western Hemlock.

**Figure 4.13: Cedar-Cypress Harvest Forecast showing implications of current overcut<sup>68</sup>**



Industry has recognized that this dependence on cedar will cause issues for the future viability of the timber industry on the coast. In 2001, Rick Jeffrey, the then Executive Director of the Truck Loggers Association, stated "We have been logging more cedar than is in the profile and that is a reflection of the

<sup>67</sup> Heiltsuk First Nation, 2003. Petition Under The Convention On Biological Diversity To The Subsidiary Body On Scientific, Technical And Technological Advice Regarding The Over-Cutting Of Western Red-Cedar On Coastal British Columbia, Canada And Its Relationship To The Implementation Of The Convention On Biological Diversity And The Programme Of Work On Forest Biological Diversity. Available online at: <http://www.savethegreatbear.org/PDF/cedarpetition.pdf>

<sup>68</sup> Doug Hopwood, D. 2001. *Timber Supply Analysis of the Heiltsuk Portion of the Mid Coast Timber Supply Area Technical Report* (Review Draft). Prepared for Heiltsuk First Nation with the assistance of Ecotrust Canada.

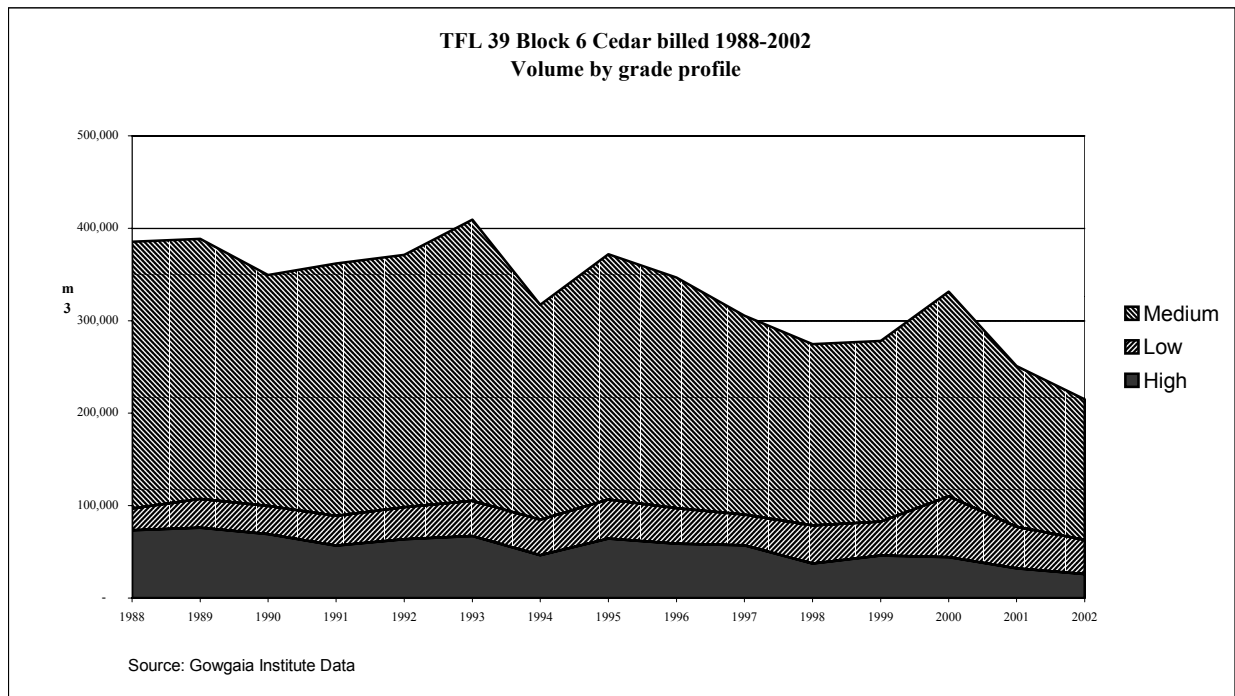
economics.”<sup>69</sup> Similarly, the President of the Coast Forest & Lumber Association, Brian Zak, admitted in 2001, “...the coastal industry has been surviving by selling a greater percentage of cedar products. As most of the coastal forest is hemlock, the current dependence on cedar cannot be sustained.”<sup>70</sup>

#### 4.2.5.3 Haida Gwaii – Evidence of Timber Stock Drawdown

The timber resource base on Haida Gwaii has been drawn down as a result of timber sector activities for over a century. In the late 1800s, a small timber rush occurred on the islands, with the highest value stands being staked out by surveyors. This trend accelerated as highly sought after Sitka Spruce (with its properties of great strength and light weight) were felled to support the nascent aircraft industry, and during WWII, to build the Mosquito bomber. Industrial scale logging was established on the islands in the 1950s and 1960s. Thus, it is not surprising that after over a half century of considerable harvesting effort, the remaining old growth promises reduced conversion return.

There are a number of indications that future returns from industrial logging on Haida Gwaii/Queen Charlotte Islands have been compromised by past logging, which has tended to concentrate in the higher value stands. Data collected by the Gowgaia Institute for TFL 39, Block 6 provides an excellent representative case study.<sup>71</sup> As Figure 4.14 shows, the volume harvested from high and medium grade cedar stands has been slowly dropping off. This pattern is consistent with the best stands being liquidated first.

**Figure 4.14: Cedar harvesting on Haida Gwaii, 1988-2002**



<sup>69</sup> Gordon Hamilton, “Coast loggers turn to cedar to stay alive: harvesting more of the high-value wood only alternative as hemlock prices plunge” *Vancouver Sun* (January 17, 2001), p. C1.

<sup>70</sup> Gordon Hamilton, “Forest-plan deadline shot, executive says”, *Vancouver Sun* (December 5, 2001), p.C1

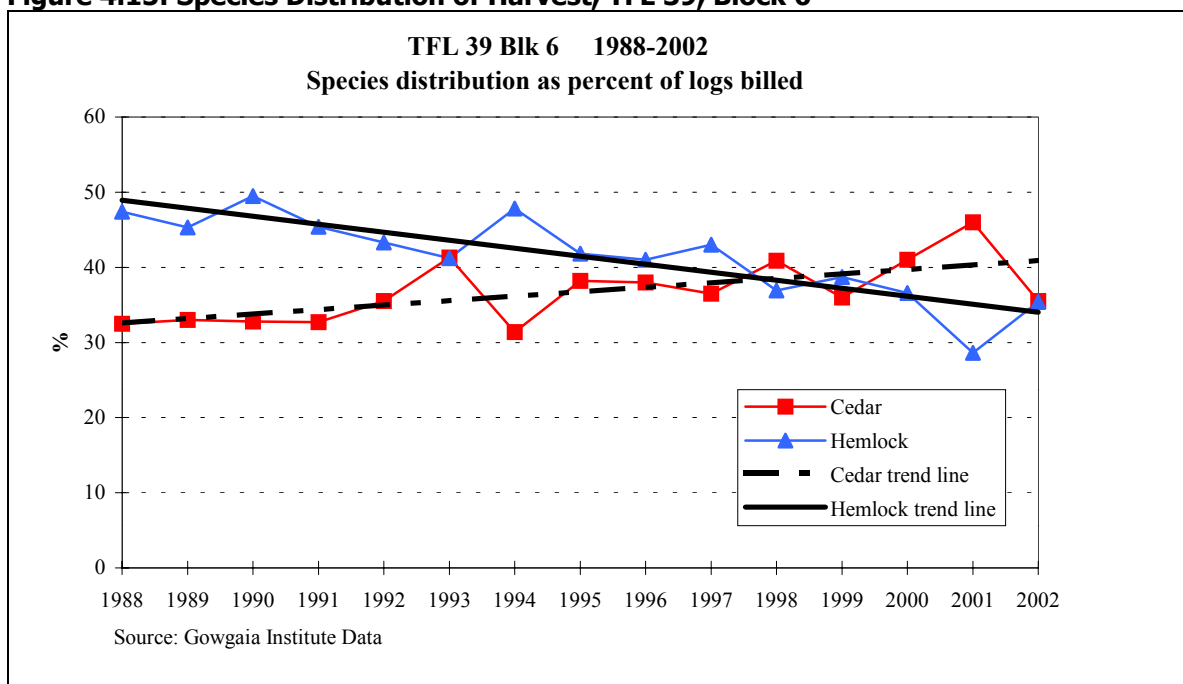
<sup>71</sup> Block 6 of TFL 39 encompasses 236,000 hectares of land (or almost 25% of the Haida's traditional territory) most of which is found on Moresby, Louise, and Graham islands. First granted to MacMillan Bloedel in 1961, since 1999 it has been part of Weyerhaeuser's tenure.

Figure 4.15 shows that in the same TFL, despite the declining quantity of standing cedar, the proportion of cedar logged has increased over time, while the proportion of hemlock has declined. This is the reverse of what one would expect given the forest species profile; such highgrading cannot be sustained over the long term.

Figure 4.16 also suggests that the resource base is gradually declining. The trend line suggests that there is a declining proportion of logs of all species coming from the higher value logs. The inference is that, over time as the proportion of higher value logs in the harvest profile declines, net revenues must decline, leading to even poorer performance prospects for the industry.

Figure 4.17 displays the impact on net revenues resulting from the structural changes documented earlier on one TFL in Haida Gwaii. Net revenues per m<sup>3</sup> have declined from averages of over \$40 in the mid 1990s to less than \$10 since 1998, reaching an historic low of only \$5 per m<sup>3</sup> in 2001. Anecdotal evidence suggests that the net revenues in 2002 and 2003 were even lower. Although market prices have recovered somewhat in 2004, the structural changes are unlikely to be reversed and the industry is not likely to return to and maintain robust rates of return.

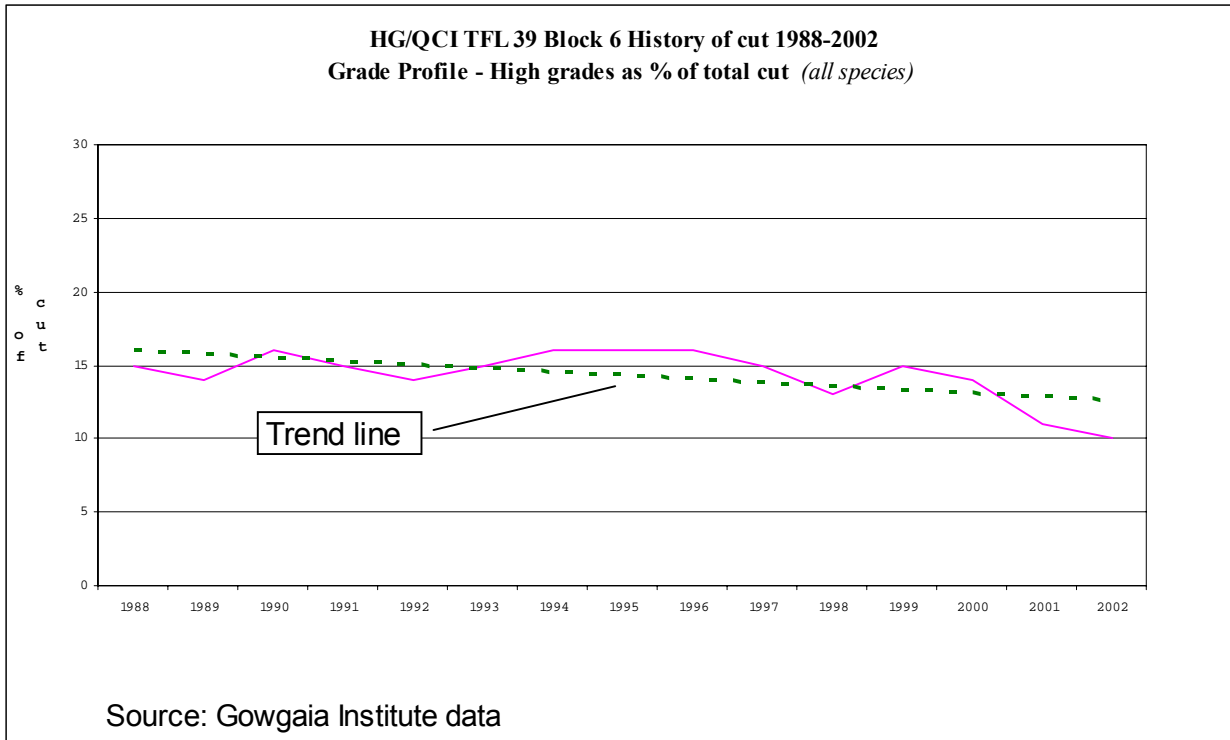
**Figure 4.15: Species Distribution of Harvest, TFL 39, Block 6**



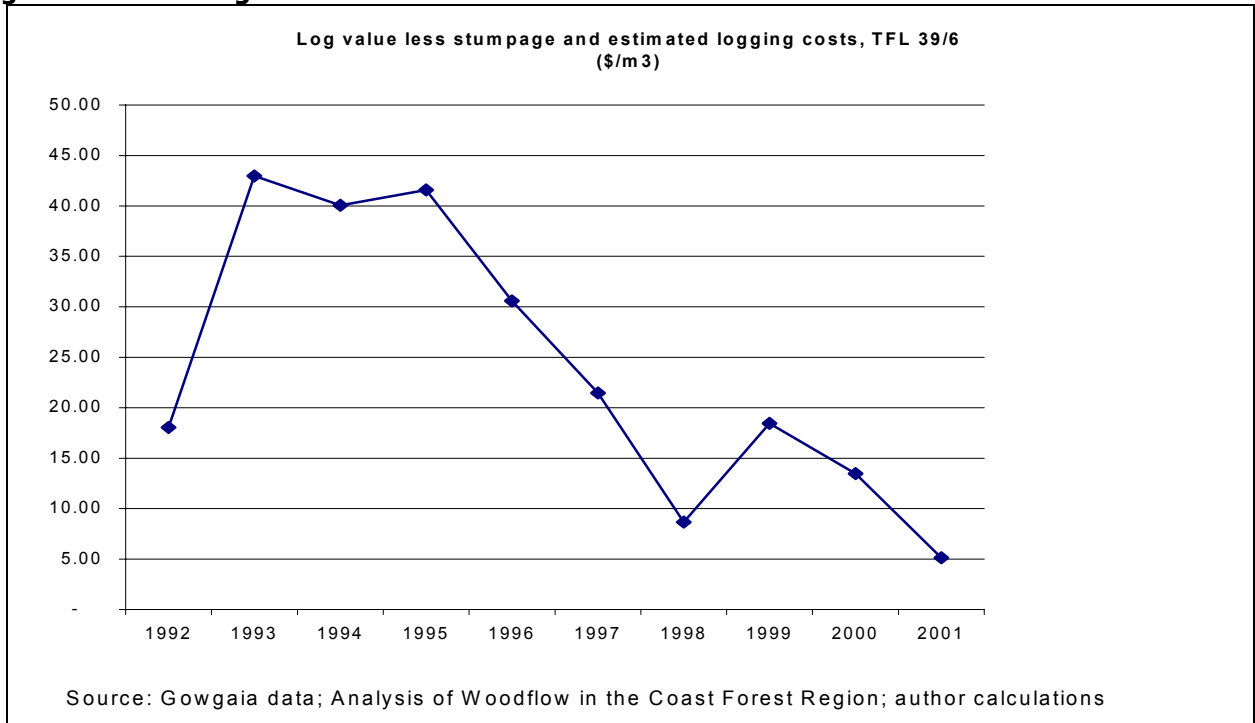
The total AAC for Tree Farm Licences, Timber Supply Area, Forest Licences, Woodlot Licences, etc., on Haida Gwaii currently amounts to 1.7 million m<sup>3</sup>. Similar to other portions of the study area, there has been a significant undercut in recent years. For instance, the TSA harvest was only 86% and 72% of AAC for the periods 1992-1996 and 1997-2001 respectively.

The QCI Woodshed study reported that the average value of wood from the 26 QCI woodsheds was \$92.15, while the average cost of harvesting was \$90.19 per m<sup>3</sup>. This is a thin margin of only \$1.96 per m<sup>3</sup>. However, if only positive value woodsheds are included, which peak at a Mean Value Index of \$16.69/m<sup>3</sup>, the timber volume would decline by 32%, and new Mean Value Index would be \$5.71 per m<sup>3</sup>. This suggests that much of the timber currently considered operable should be reclassified, and that future logging opportunities are currently overstated in volume terms. This is particularly relevant given

**Figure 4.16: Trend for high grades in TFL 39 Block 6**



**Figure 4.17: Net Log Values in TFL 39 Block 6**



government's efforts to make log values reflect market forces, such as removing provisions that allow cross-subsidization. In this new reality, negative value stands are less likely to be cut.

## **4.2.6 IMPLICATIONS OF SHIFTING TO A SECOND GROWTH RESOURCE BASE**

### **4.2.6.1 Second-Growth Under Industrial Logging**

In order to evaluate the Sustainability Scenario, the implications of shifting to second growth forests as old growth is depleted must be taken into consideration under both the baseline scenario and the Sustainability Scenario alternatives.

For the entire coast region, second growth now comprises about 12% of the coastal harvest, and is expected to rise to 40% by 2010, most of this from Vancouver Island and the Sunshine Coast.<sup>72</sup>

The shift to second growth has already begun in the study area, particularly in the south end of the Central Coast region and on Haida Gwaii, though the majority of logs from the study area are still old growth and will be so through the medium term. TimberWest and Weyerhaeuser<sup>73</sup> are now into a significant component of second-growth. Interfor reports that 20% of its harvest is now second growth, but this figure includes holdings outside of the study area.<sup>74</sup> The North Coast Timber Supply Analysis Report shows that it will be almost a century before second growth timber makes up a significant portion of the harvest.<sup>75</sup>

There are few authoritative studies on the economic implications of shifting to a harvest based on second growth. Two of Pearse's observations are particularly relevant:

*...As the remaining stands of old-growth timber are removed, harvesting must be reduced for several decades until more of the second-growth stands, established during the last half century, reach maturity.<sup>76</sup>*

*...second growth lacks the unique qualities of old growth, its characteristics not greatly different abundant supplies of competing softwood timber from the United States, Europe, Russia and the rest of Canada.<sup>77</sup>*

Second growth stands have some qualities that are advantageous from a timber industry perspective as compared to their old growth counterparts. Development costs are lower in second growth as road networks are already in place; logging costs are lower since log size is more consistent and amenable to mechanized harvesting. Enhanced use of mechanized harvesting implies that employment levels from harvesting will be lower per 1000 m<sup>3</sup>. With consistent log sizes and fewer defects, manufacturing costs can be reduced, and conversion efficiency improved; as well, labour productivity will be considerably increased. For instance, J.S. Jones Timber Ltd.'s new sawmill in North Surrey built specifically for second growth timber requires a mere 0.15 jobs per 1,000 m<sup>3</sup> processed. By 2006, its output may equal that of the largest sawmill in the world – yet only employ 320 people. If the entire 2001 Coastal AAC of 21,000,000 m<sup>3</sup> had been put through such efficient mills, only 3,150 jobs would be supported by milling.<sup>78</sup>

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<sup>72</sup> Compilation of Pearse, 2001, *Ready for Change* and BC government sources.

<sup>73</sup> Weyerhaeuser reports that in TFL 39, the second growth harvest is already significant in Block 3 on the Central Coast, beginning to increase in Block 6 on Haida Gwaii, and that old growth will dominate harvesting in Block 7 on the Central Coast for the next half century. See Weyerhaeuser 2001. TFL 39, Management Plan 8, page 30.

<sup>74</sup> See: <http://www.interfor.com/investorinfo/faqs.asp>

<sup>75</sup> North Coast Government Technical Team, 2002. Timber Supply Analysis, North Coast LRMP.

<sup>76</sup> Pearse, 2001, *Ready for Change*, p. 7.

<sup>77</sup> Pearse, 2001, *Ready for Change*, p. 9.

<sup>78</sup> Based on figures from "New mill ready for future" *Vancouver Sun*, December 3, 2003, pages D1 and D8. According to one of the owners, Tom Jones (personal communication, Dec 3, 2003), it takes between 3.5 and 4.0 m<sup>3</sup> to manufacture 1000 board feet at the

The shift to second growth will therefore require considerable capital investment in harvesting and processing equipment, both to maximize value from the raw material, and to achieve the labour productivity gains upon which the viability of second growth economy is predicated. In both harvesting and processing, the BC coastal timber industry will continue to decline in importance as an employer. This decline could be even more dramatic if it turns out that in much of the landbase, second growth harvesting is not economically viable at projected rotation ages.

TimberWest asserts that it “does not expect future markets to show significantly differential pricing associated with larger diameters and/or rapidly grown clear logs,” and is therefore “focused on maximizing the volume of high quality saw logs and pulp logs on reduced rotations.”<sup>79</sup> While recent operating experience shows that on high productivity sites, second growth can be logged for an acceptable return within a reasonable rotation, Market Pricing System log values for the Coast show a marked difference in values between old and second growth timber for a given log grade (see Table 4.10). Second growth values for the two most relevant species are generally between 31% to 90% of their old growth counterparts, except in the lowest grades U, X and Y where there is no difference.

The timber industry also faces silvicultural challenges in shifting to second growth. For instance, to maintain cedar in second growth stands, in many areas there is a need to cage seedlings to avoid deer browse, which adds very significantly to silvicultural costs and reduces the profit potential. There is concern that hemlock will out compete cedar on many stands; if this cannot be avoided the value of such stands will decline for the 2<sup>nd</sup> harvest.

**Table 4.10: Difference In Value Between Old Growth And Second Growth Timber**

Log grade	Hemlock			Cedar		
	old growth \$/m3	2nd growth \$/m3	Ratio: 2nd to old growth	old growth \$/m3	2nd growth \$/m3	Ratio: 2nd to old growth
B						
C						
D	194.20	61.16	0.31	291.81	151.34	0.52
E						
F	120.12	61.16	0.51	255.37	151.34	0.59
G						
H	81.55	61.16	0.75	189.17	151.34	0.80
I	61.14	45.86	0.75	114.33	102.90	0.90
J	53.76	49.46	0.92	131.77	112.00	0.85
K				116.72	87.54	0.75
L				101.92	76.44	0.75
M				71.33	53.50	0.75
U	39.66	39.66	1.00	67.74	81.29	1.20
X	38.95	38.95	1.00	48.80	48.80	1.00
Y	38.37	38.37	1.00	13.16	13.16	1.00

(Source for log values: Ministry of Forests, Coast Market Pricing System Log Values for the three months ending Jan 31, 2004. [www.for.gov.bc.ca/hva/timberp/Parameters/MPS\\_apr04\\_coast.pdf](http://www.for.gov.bc.ca/hva/timberp/Parameters/MPS_apr04_coast.pdf))

mill. With 211 million board feet and 120 employees, and assuming 3.75 m<sup>3</sup> as an average, milling 1000 m<sup>3</sup> of timber creates 0.15 jobs at the mill. Note that Pearce estimates that 90% of second growth sawlogs will be suitable for milling; the remaining 10% would be used for pulp.

<sup>79</sup> TimberWest 2002. Management Plan 3, Tree Farm Licence No. 47, Page 19.



A recent study undertook a detailed examination of the second growth timber harvesting opportunities on Haida Gwaii available over the next 10 to 20 years.<sup>80</sup> Despite the fact that the review found second growth stands to be highly productive and growing considerably faster than had been assumed in earlier Timber Supply Reviews, and that stand volumes were generally higher than shown in the timber inventory, second growth under current conditions was below the economic operability threshold. With current second growth prices and harvesting costs, the second growth resource available within 10-20 years would generate a revenue **loss** of \$94 million if harvested. Even if operators manage to reduce harvesting costs by 20%, the resource still generates negative revenue, with a loss of \$24 million. On a per m<sup>3</sup> basis, second growth stands were only worth on average between 55 to 70% of their old growth equivalents. The faster growing trees found in harvest-established stands generally have wider growth rings, which results in generally lower grades. The study found that to achieve profitability, the gap between second growth and old growth timber prices must be reduced. Unless harvesting is deferred in second growth stands to later in the rotation than is currently planned, timber quality limits potential profitability. The study found for instance that 45 year old spruce stands showed a 30% reduction in scaled grade versus cruise grade (i.e., between actual and predicted grade). Indeed, operators reported that harvest-oriented stands with significant hemlock and Sitka spruce component led to a loss of -\$10 to -\$20 per m<sup>3</sup> harvested. Generally, to be economically operable under current conditions, second-growth stands require a high cedar component – yet much of the resource will be dominated by Sitka spruce and hemlock.

To improve the market value of second growth timber so as to ensure the resource generates positive return, the study recommends:

- that the technical characteristics of second growth-derived products be determined so that end users have confidence that the product will meet performance requirements;
- that the industry invest in second growth market identification and development efforts;
- that government ensure that stumpage payable on second growth be reduced to better reflect poor grain characteristics of the resource.<sup>81</sup>
- that mills be modernized to more efficiently process second-growth, and production capacity in engineered wood products be increased to help overcome some of inherent limitations of second growth fibre.

These recommendations also imply that government will collect less revenue and that fewer jobs will be supported; corporate revenues are likely to be modest.

Despite finding that the second growth resource is not currently economically operable, the authors are “optimistic that the second-growth resource will eventually become economically operable through normal ongoing processes of market development, technological innovation, and industry investment.”<sup>82</sup> However, this optimism is poorly supported in the report, and contradicts the finding in this study that ongoing structural change in the global timber industry will put BC’s second growth timber at a

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<sup>80</sup> Cortex Consultants and HiMark Forest Consultants, 2004. *Second-growth timber opportunities on Haida Gwaii / QCI*. Prepared for the Ministry of Sustainable Resource Management.

<sup>81</sup> Furthermore, due to higher stocking density in many harvest-origin stands, the average volume per hectare was found to be higher than old growth stands. The Market Price System for calculating stumpage payable also assumes that with higher volumes, there is better financial return per hectare, and hence stumpage payable is higher.

<sup>82</sup> Cortex Consultants and HiMark Forest Consultants, 2004. Page 26.

substantial disadvantage. Much of the second-growth harvest will be for wood products that could be manufactured from plantation wood. This puts BC increasingly in competition with plantation forests in other parts of the world where timber can be grown on very short rotations, with lower harvesting costs due to lower wages and more easily accessible terrain.

The fact that the second growth resource on Haida Gwaii has negative economic value is particularly worrisome for the North Coast and much of the Central Coast,<sup>83</sup> where growing conditions are more marginal. It suggests that much of the second growth in these areas will only be economically operable well beyond currently planned rotation ages, resulting in a period when harvesting opportunities are less than predicted in past Timber Supply Analyses. BC's policy of liquidating old growth to replace it with thrifty, scientifically managed second growth stands has been found to be based on overly optimistic premises,<sup>84</sup> and appears likely to evolve into an economic liability in the study area. This implies that further conversion of old growth to second growth in the study area is a risky economic strategy; the presumption in the stumpage system that logging roads will be an asset in the future rotations is also questionable if those stands will not generate positive returns within a reasonable time frame.

Rotation ages within the study area will range from between 40-80 years in the most productive sites, to 90-120 years in the less productive sites. Log diameter will generally be in the range of 50 cm +/- 15cm. Volume per hectare will be variable. The Haida Gwaii study found higher volumes per hectare, while the Mid Coast Timber Supply Analysis report projects that average volume harvested will decline from 600 m<sup>3</sup>/ha to 450 m<sup>3</sup>/ha with the shift to second growth.<sup>85</sup> Incremental silvicultural investments, such as pruning, fertilization, or pre-commercial thinning, will not be financially warranted in the study area due to the expense and long lag between investment and financial return, except in a few cases involving fertilization of high productivity stands in the last two decades of growth.

#### 4.2.6.2 *Second Growth And The Sustainability Scenario*

Initial research suggests that if operators are proactive, alternatives to conventional clearcut management in second growth can be competitive with clearcutting.<sup>86</sup> This suggests that EBM forestry in second growth stands should not be at a considerable disadvantage from conventional clearcutting.

Given the fact that second growth provides marginal economic return at best, where the Sustainability Scenario locks up existing second growth in restoration areas, by and large it will not entail foregoing a significant economic opportunity. Under EBM management required by the Sustainability Scenario, second growth timber will generally be harvested at more advanced ages, providing a supply of logs with old-growth characteristics and higher better value. Retention requirements will imply that on some stands, growth will occur in more old-growth conditions, which implies slower growth rates but also the tighter growth rings preferred by the marketplace, and hence higher prices. There will be less conversion of old growth forest to second growth stands with negative economic value. The overall implication is that over the longer term, the Sustainability Scenario implies less volume from second growth, but greater value and economic opportunity.

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<sup>83</sup> On the Central Coast, future economic opportunities from the second growth resource are considerably better in the area generally South of Cape Caution – where the landscape is less rugged and more similar to Vancouver Island, a larger portion of the landscape being forested, with trees from shoreline up to the height of land, fewer steep, unstable slopes, and better growing conditions. Much of this area has already been logged, with some second-growth stands already reaching 70 years of age.

<sup>84</sup> Dellert, L. 1998. "Sustained yield: why has it failed to achieve sustainability." In Tollefson, C., (ed.) *The Wealth of Forests*. UBC Press.

<sup>85</sup> MoF, 1999. Mid Coast Timber Supply Area Analysis Report, Timber Supply Review.

<sup>86</sup> Howard A, and Temesgen, H. 1997. Potential financial returns from alternative silvicultural prescriptions in second-growth stands of Coastal British Columbia. *Can. J. For. Res.* 27: 1483-1495.

### **4.3 TIMBER SECTOR PROSPECTS WITHOUT THE SUSTAINABILITY SCENARIO**

Any assessment of the mid- to long-term economic viability of the timber industry in the study area must consider market conditions and trends, as well as structural changes specific to B.C.'s Coast. As noted in earlier sections, Coastal British Columbia is losing its competitive position in global forest products markets because of a combination of factors, including falldown, competition with engineered wood products, the limitations of products manufactured from hemlock, new entrants into global markets, and increased plantation production in other parts of the world. Under these conditions, given the high costs of logging on the Coast, and the high cost structure of coastal manufacturing facilities, there is diminishing economic opportunity involved in utilizing study area timber resources for the manufacture and sale of commodity wood products such as dimension lumber, woodchips, and market pulp. This does not imply the demise of the timber industry in the study area, but it makes clear that continued decline under baseline scenario management is inevitable.<sup>87</sup>

Not adopting the Sustainability Scenario could further weaken the coastal industry if market campaigns to boycott or otherwise discourage the purchase of coastal timber products by large, multi-national retailers are resumed. The April 4, 2001 agreement reflected a desire by government and the timber industry to have peace in the woods, and to have the environmental organizations such as ForestEthics and Greenpeace call off their market campaigns. Although the market campaign against wood products harvested from the Great Bear Rainforest was suspended as the parties sought to reach an agreement on the Sustainability Scenario, market campaigns are currently being waged by some environmental organizations against logging of other endangered forests. Recently, for instance, the big catalogue distributors such as L.L. Bean and Sears have been targeted to compel them to use recycled and Forest Stewardship Council (FSC) certified paper in their catalogues. As a result of similar campaigns, banks have entered the fray, with Citigroup Inc. and Bank of Americorp announcing a policy to include in its lending criteria consideration of the implications of financing to rainforests.<sup>88</sup>

There are certain aspects of the wood sector's activities which do not depend on whether or not the Sustainability Scenario is adopted. For instance, over the next 5 years, the province has made commitments to share an allocation of harvest volume and revenue with local First Nations.<sup>89</sup> However, under the Sustainability Scenario, First Nations are more likely to have a greater say in forest management decisions because of greater access to venture capital and are likely to share greater revenues through co-management ventures.

A cost that is not considered in this report is the cost of restoration if business-as-usual practices continue. For instance, streams damaged by industrial logging have required restoration work. There may be a significant long-term liability created when roads are built in marginal forests. Where logging is

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<sup>87</sup> Although one recent forest sector report for the study area contains economic projections such as the value of timber and government revenues that appear to contradict this assessment (the CIT's *Economic Gain Spatial Analysis -- Timber: CIT Region* by Williams, D and Buell, M. 2004), the report in question is not intended to be used for such purposes and the economic data generated are highly artificial. As the authors note, "The results reported here are not intended for business planning or harvest scheduling purposes. Readers should be aware that the EGSA Timber model incorporates many sources of uncertainty—including, among others, questionable resource data, approximations to the EBMPH policies, and assumptions about future log prices." and "The results reported in this report are based on timber prices held constant at the top of the price cycle..." Holding all species at the top of the cycle simultaneously for the next 200 years introduces severe optimistic bias into the results.

<sup>88</sup> Reuters News Service, May 19, 2004: "Bank of America Stiffens Environmental Loan Rules."

<sup>89</sup> For instance, the Haisla, Heiltsuk, Kitasoo and Wuikinuxv First Nations from the Central and North Coast, each signed agreements with the province in February of 2004, amounting to \$10.78 million in revenue sharing over five years. See Province of British Columbia 2004. "\$10.8 Million For First Nations, Forestry Opportunities." News Release, February 5. Some First Nations have refused to sign on to such agreements, citing concerns the agreements weaken their Aboriginal Title and Rights. Reported in Dirk Meissner, "Aboriginals threaten province wide blockade in treaty protest" Canadian Press, May 21, 2004.

only viable in some low productivity areas because it involves harvesting the initial endowment of old growth, such that harvesting of the second rotation is unlikely to be profitable, if roads are built that then need to be either maintained or decommissioned, such costs will not be offset by future revenue streams. This need for rehabilitation work without offsetting revenue could add up to a significant liability for the province.

The following subsections examine future prospects of the timber industry without the Sustainability Scenario in each of the three planning areas that make up the study area.

#### **4.3.1 PROSPECTS FOR THE NORTH COAST WITHOUT THE SUSTAINABILITY SCENARIO**

Evidence of the likelihood of poor future performance of the timber sector in the North Coast planning area is provided by a study commissioned by the provincial government that analysed the socio-economic and environmental assessment (SEEA) of land use scenarios under consideration by the LRMP table.<sup>90</sup> The "Baseline Scenario" would involve business-as-usual practices, and while it maintains the current AAC, it would negatively brand timber sourced from the North Coast and risk the resumption of market campaigns, thus failing to provide the certainty desired by the province and investors. Despite minimal ecological constraints, business-as-usual practices would support relatively modest levels of local employment (since there is basically no local processing) generating a mere 0.18 local direct jobs per 1000 m<sup>3</sup> harvested. Assuming harvest levels are equivalent to the 2001-2003 average, local direct employment would be 78 person-years, while province-wide direct employment dependent on the NC harvest is estimated at 491 person-years.

Given the low value of North Coast timber, stumpage collected by the province under the Market Price System is anticipated to average a mere \$2.18 per m<sup>3</sup> (in 2003, stumpage averaged \$1.82 per m<sup>3</sup>), for a total of \$944,000. Such low stumpage rates are insufficient to cover off the Ministry of Forest's costs of managing timber industry activities, and hence the North Coast timber harvest does not actually make a net contribution to Provincial finances. While the North Coast SEEA reports that, based on a 1999 Price WaterhouseCoopers survey, the total estimate of other corporate taxes paid by the timber sector is \$6.95 per m<sup>3</sup>, this fails to take into account the fact that North Coast timber is below average value, and would thus make a significantly lower contribution to timber industry profits and tax payments. Even so, the North Coast SEEA indicates that the Sustainability Scenario implies no impact to government revenue from the timber sector for the coming four decades.

Even though the North Coast SEEA makes clear that there is limited potential for continued industrial logging in the North Coast, the study may still be overstating the longer-term potential for the North Coast timber industry if a Sustainability Scenario is not agreed to. As this report has shown, there is evidence that the remaining timber will be decreasing in value just as costs escalate. As operators are forced to cut the profile and include more Hembal in their harvest, threshold analysis indicates that logging will generate substantial losses. Given returns that will typically be marginal at best, projected harvest levels may not be achieved. With much of the remaining timber being below break-even, stumpage payments are likely to be less than projected. A portion of the 78 local jobs estimated to be supported by the harvest would be at risk. Finally, the timber industry will face significant challenges to break even once old growth stands are exhausted and the harvest shifts to second growth.

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<sup>90</sup> De Biasio, D. 2004. Socio-Economic and Environmental Assessment of Interim Scenarios developed by the North Coast LRMP Table as of January, 2004 Volume I: Socio-Economic Analysis DRAFT Prepared for: North Coast Land and Resource Management Plan Table and BC Ministry of Sustainable Resource Management

#### **4.3.2 PROSPECTS FOR THE CENTRAL COAST WITHOUT THE SUSTAINABILITY SCENARIO**

With 65% of woodsheds showing negative value timber, and past logging having led to significant drawdown of the resource base, this study projects continuing decline for the Central Coast timber sector under the business-as-usual scenario. The AAC is currently set at slightly less than 3.2 million m<sup>3</sup>, but in recent years this volume has not been harvested. For instance, excluding BC timber sales, the Mid Coast TSA harvest in 1997 of 917,000 m<sup>3</sup> had dropped to 437,000 m<sup>3</sup> by 2002. Without the Sustainability Scenario, it would be reasonable to expect an average annual harvest of approximately 2.3 million m<sup>3</sup> over the medium term, declining to 2.0 million m<sup>3</sup> in the third and fourth decade hence. The industry will have difficulty achieving acceptable returns as the harvest shifts to second growth.

When the April 2001 agreement was reached that set the foundation for the Sustainability Scenario, the province commissioned a Socio-economic and Environmental Assessment of the Framework agreement.<sup>91</sup> This base case was subsequently updated to reflect the December 2003 agreement that is the basis for the Sustainability Scenario on the Central Coast.<sup>92</sup> Taken together, these assessments point to a relatively modest future for the timber industry in the area. In recent years, only 4% of jobs supported by the harvest have been held by residents of the study area. Here it is assumed that due to joint ventures and greater participation of First Nations in future resource management, up to 8% of jobs supported by the harvest would be held locally. Note that because there are no major processing facilities in the Central Coast, there is a limit to extent to which local employment can be increased. Finally, with or without the Sustainability Scenario, there will be less revenue sharing with local First Nations, since there would be less capital available to enter into joint ventures.

#### **4.3.3 PROSPECTS FOR HAIDA GWAII WITHOUT THE SUSTAINABILITY SCENARIO**

As noted in the introduction to this report, the residents of Haida Gwaii have shown great concern that harvest levels on the islands cannot be sustained and are eroding future economic opportunities. The Haida Nation also has made it clear that a supply of monumental cedar must be maintained for cultural and ceremonial purposes and that the total volume of cedar harvested must be less than the volume grown; given the profile of the remaining resource, this will considerably decrease future harvesting opportunities, volumes and government and company revenues. Companies have already implemented some voluntary constraints on harvesting to better meet cultural and ecological requirements.<sup>93</sup>

A socio-economic base case prepared earlier this year under the land use planning process notes that for the foreseeable future the shift experienced in the last two decades “from primary goods-producing (forestry and fishing) to service sectors and value-added manufacturing” will continue.<sup>94</sup> While the current AAC for the islands is 1.7 million m<sup>3</sup>, between 1998-2002 the annual harvest was 1.3 million m<sup>3</sup>, while 2003 was considerably lower. The Ministry of Forests’ latest projection (soon to be updated), suggests the AAC will decline modestly over the next several decades; this projection does not reflect all the constraints on future harvesting such as the Haida Nation cedar strategy and economic limitations on

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<sup>91</sup> Holman, G., Terry, E. and Ministry of Competition, Science and Enterprise, 2001. *Central Coast Land and Coastal Resource Management Plan Phase 1 Framework Agreement — Socio-economic and Environmental Assessment: Final Report*. July.

<sup>92</sup> Holman, G. 2003. *CCLRMP Scenario Socio-economic draft assessment*.

<sup>93</sup> Haida Nation, 2004. Haida Nation Backgrounder. Available at [www.ubcic.bc.ca/docs/Haida\\_Haida.pdf](http://www.ubcic.bc.ca/docs/Haida_Haida.pdf). Information on voluntary constraints provided by Dennis Crockford, RPF, personal communication, August 6, 2004.

<sup>94</sup> Holman, G. 2004. *Haida Gwaii – QCI Land Use Plan Socio economic base case*, p. 30.

harvesting. The timber sector will have increasing difficulty achieving acceptable returns as the harvest shifts to second growth.

The timber sector workforce in Haida Gwaii has been gradually declining, from 530 in 1981, to 475 in 1991, to 425 in 2001 (out of total labour force of 2,780). Haida Gwaii residents receive roughly one quarter of the jobs and one quarter of the wages supported by timber harvested on the islands. Most timber is processed in facilities on southern Vancouver Island and the Lower Mainland. Given the social conditions on Haida Gwaii, this pattern of resource extraction is inequitable. The Haida Gwaii/QCI base case study predicts “continued underharvesting and instability in timber sector employment in the short term.”<sup>95</sup>

Despite the fact that local processors do not have a secure timber supply, the level of processing jobs located on the islands has improved after dropping in 1991 to 15. By 2001, local processing employment had reached 105, while only relying on less than 3% of the timber harvested on the islands.<sup>96</sup> The largest mill is Abfam Enterprises in Port Clements. Log throughput processors on the islands in 2001 was 37,000 m<sup>3</sup> in sawmills, and 20,000 m<sup>3</sup> for shingles, for a total of 57,000 m<sup>3</sup>. Island processors are thus generating almost two jobs per 1000 m<sup>3</sup> processed – much more than the major companies, and the jobs are created on the islands, where they are most needed.

A factor complicating this analysis is that, even if the Sustainability Scenario does not proceed, the Haida Nation is highly unlikely to allow continued logging operations that do not accommodate their Aboriginal Title and Rights and a greater share of benefits. They are currently involved in a court case regarding timber industry activities on the Islands with the BC government and Weyerhaeuser. Furthermore, for Block 6 of TFL 39, the Haida secured an agreement from Weyerhaeuser to reduce logging levels by 40% until a sustainable cut level could be determined. The Haida Land Use Vision involves doubling the area where logging is excluded, which would cause a dramatic reduction in harvest volumes. In effect, without or without the overall coastal Sustainability Scenario examined in this study, there will be some form of Sustainability Scenario on Haida Gwaii due to the leadership of the Haida Nation.

It would not be unreasonable then to project that the harvest levels on Haida Gwaii without the Sustainability Scenario would approximate 900,000 – 1,000,000 m<sup>3</sup>, declining to 750,000 m<sup>3</sup> within two decades, or even less if market campaigns resume.

#### **4.3.4 FINDINGS: TIMBER SECTOR WITHOUT THE SUSTAINABILITY SCENARIO**

Without the implementation of the Sustainability Scenario, that is, without protecting certain areas of the coast and establishing an ecosystem-based management regime in the non-protected areas, the timber industry in the study area is unlikely to do much better in the future than it has done in the recent past. Indeed, the available evidence indicates that future industrial logging in the study area has been marginally viable because it has been depleting the capital stock on which it depends, by harvesting the most accessible, most valuable stands and species first. The presumption that future harvesting of second growth will be viable has been shown to be tenuous at best. Together, these factors indicate the future viability of the industry has been compromised. Furthermore, without the Sustainability Scenario,

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<sup>95</sup> Holman, Gary. 2004. Page 37.

<sup>96</sup> Holman, Gary. 2004. Haida Gwaii – Queen Charlotte Islands Land Use Plan Socio-economic base case. Draft for discussion. February.

timber harvested from the study area may be affected by negative branding, and investment in the industry may be stifled due to investor concerns regarding uncertainty.

The character of the forest is changing as old growth stands are logged. As the higher quality log supply declines, manufacturing possibilities will decline, affecting processing operations outside of the study area. The remaining timber inventory profile has a greater percent of lower-value hemlock and balsam and a lower supply of high-value cedar, spruce and Douglas fir. The quality and value of the remaining timber is declining, and it is located in higher cost logging chances. An increasing cost of harvesting cost per m<sup>3</sup> will continue as harvesting moves away from valley floors up the mountainsides. While there are some portions of the study area where industrial logging could continue well into the second rotation, such as the more productive 'wood basket' area in the southern part of the Central Coast, and portions of Haida Gwaii with higher productivity sites, for much of the remainder returns from logging will be marginal at best.

The above sections make clear that without the Sustainability Scenario, timber sector performance will be anaemic, and will not provide the level of socio-economic benefits that are required to meet the needs of coastal First Nations and communities. Government revenues from timber industry operations will be modest, and in some instances will not offset the government's oversight costs. Furthermore, there are risks involved in failing to work in a way that recognizes the significant conservation values of the study area.

#### **4.4 TIMBER SECTOR PROSPECTS WITH THE SUSTAINABILITY SCENARIO**

The first issue to address before evaluating the Sustainability Scenario is to determine exactly how it impacts future timber harvesting opportunities in the study area.

##### ***4.4.1 PROPOSED PROTECTED AREAS – IS VALUABLE TIMBER BEING LOCKED UP?***

In land use planning undertaken on the Coast, both ecological data and economic data are considered as various land use designs are developed that would achieve ecosystem and human well-being requirements. The result is that much of the time, protection can be allocated in a way that does not involve large Timber Harvesting Land Base implications. This can be seen by examining outputs from the woodshed analysis report for the Central Coast, and comparing new protection areas to woodshed values.

Using the results from the Timberline Woodshed Analysis for the Central Coast, which were based on April 2000 Coast Appraisal Manual parameters, the average "Current Value Index" for woodsheds newly designated for protection under the Sustainability Scenario is \$10 less than that of woodsheds designated for EBM timber harvesting.<sup>97</sup> Clearly, the newly protected areas have modest potential to generate stumpage revenue. While this analysis cannot yet be done for the North Coast and Haida Gwaii, given similarities in the different land use planning processes it is reasonable to assume that the result will be more-or-less the same.

##### ***4.4.2 PROSPECTS FOR THE NORTH COAST WITH THE SUSTAINABILITY SCENARIO***

The North Coast SEEA<sup>98</sup> predicts that LRMP 2, the equivalent of the Sustainability Scenario, would have a relatively neutral impact on the North Coast timber industry (see Table 4.11). While protection

<sup>97</sup> Crockford, D., and Green, T. 2004. Unpublished spreadsheet analysis. Rainforest Solutions Project.

<sup>98</sup> De Biasio, D. 2004. Socio-Economic and Environmental Assessment of Interim Scenarios developed by the North Coast LRMP Table as of January, 2004 Volume I: Socio-Economic Analysis DRAFT Prepared for: North Coast Land and Resource Management Plan Table and BC Ministry of Sustainable Resource Management

and EBM practices imply that the AAC would have to drop from 573,624 m<sup>3</sup> down to 416,000 m<sup>3</sup>, this harvest level is only a reduction of 17,000 m<sup>3</sup> from the average harvest over the 2001-2003 period, and well above the 2003 harvest of roughly 250,000 m<sup>3</sup>. As a result, in the North Coast planning area, the NC SEEA predicts that a mere 3 timber industry jobs are at risk from implementing the Sustainability Scenario, with another 17 jobs at risk in the remainder of the province. This is offset by the ability to brand positively timber sourced from the North Coast under a Sustainability Scenario, while operators will gain security of access. The loss in stumpage from adopting the Sustainability Scenario is under \$40,000 per annum, and the change in net economic value is a mere \$91,000 on an annual basis. Recent spatial analysis which took into consideration proposed protected areas and fine filter requirements (e.g., Grizzly bear habitat requirements, red and blue listed ecosystems), indicates that, although the AAC would drop as a result of implementing the Sustainability Scenario, the resulting level is still above recent harvest levels.<sup>99</sup> This implies that there would not be an opportunity cost involved in adopting the Sustainability Scenario.

**Table 4.11: Difference In Economic Rent From The North Coast Timber Sector As A Result Of The Sustainability Scenario**

Economic rent category	Baseline	LRMP 2	Difference
Public sector rent	\$944,258	\$906,612	<b>\$37,646</b>
Labour sector rent	\$1,331,271	\$1,278,195	<b>\$53,076</b>
Corporate sector rent	negligible	negligible	<b>negligible</b>
Net economic value	\$2,276,129	\$2,184,807	<b>\$91,322</b>

The adoption of the Sustainability Scenario on the North Coast has negligible impact on local and provincial employment, as the AAC under the Sustainability Scenario is greater than the 2003 harvest level, and there are many factors suggesting that an AAC above this level is not viable over the medium term. Furthermore, timber processing facilities are under utilized because of a coast-wide undercut and raw log exports that greatly exceed the impacts of the Sustainability Scenario on the study area AAC.

Independent analysis by Redstone Strategy Group suggests that with the Sustainability Scenario, an additional 25 to 60 jobs could be created in EBM logging on the North Coast, and a further 30 to 65 value-added jobs in Prince Rupert.<sup>100</sup> This would more than offset the 3 local harvesting jobs that might be lost because of reduced harvest volumes. Local communities are thus likely to benefit from a timber sector that is better able to generate local employment if the Sustainability Scenario is adopted.

#### **4.4.3 PROSPECTS FOR THE CENTRAL COAST WITH THE SUSTAINABILITY SCENARIO**

The update to the Central Coast SEEA that assessed the Sustainability Scenario included within it protection areas existing or agreed to in 2001, and hence overestimates the impacts of adopting the Sustainability Scenario, as they will be protected in either scenario.<sup>101</sup> Netting out 2001 protected areas, total impact of EBM practises and new protected areas on the Central Coast as a result of the Sustainability Scenario is 384,000 m<sup>3</sup>. Given an undercut of 321,000 m<sup>3</sup>, the net impact of the

<sup>99</sup> Morgan, D. 2004. Results of protection, fine filter and EBM and old growth targets on Modelled Harvest Flow. NC LRMP March 26-29th Table Meeting.

<sup>100</sup> Redstone Strategy Group, 2003. *Coastal BC Economic Development: Phase Two Final Report Part 1*. Report to the Conservation Investments and Incentives Initiative.

<sup>101</sup> Holman, G. 2003. Various handouts.



Sustainability Scenario is 63,000 m<sup>3</sup>. Under the assumption that the share of local employment doubles, there is a total of approximately 5 jobs at risk in the study area, and a total of 62 province-wide. This is before productivity improvements are taken into account, which would tend to reduce employment impacts since some workers would lose their jobs as measures to implement productivity are implemented. Independent analysis by Redstone Strategy Group suggests that with the Sustainability Scenario, an additional 50 to 100 jobs could be created in EBM logging on the Central Coast, and a further 5 to 10 value-added processing jobs in Bella Coala.<sup>102</sup> The job impacts of adopting the Sustainability Scenario on the Central Coast are thus more-or-less neutral for local timber sector employment.

#### **4.4.4 PROSPECTS FOR HAIDA GWAI WITH THE SUSTAINABILITY SCENARIO**

Although the Sustainability Scenario implies a reduced volume of timber harvested from Haida Gwaii, the actual job implications are not as significant as might be expected. The fact that local processors do not have secure access to a timber supply has impinged growth in the local processing sector. The 20% takeback from major licencees will make more timber available for on-island processing. Even if the Sustainability Scenario were to result in 40% of harvesting phase jobs being lost, it would be possible to more than offset such job losses by increasing the amount of timber processed locally from nearly 60,000 m<sup>3</sup> to 150,000 m<sup>3</sup> - 200,000 m<sup>3</sup>, thereby creating roughly 170 new processing jobs. Independent analysis by Redstone Strategy Group suggests that with the Sustainability Scenario, an additional 10 to 25 jobs could be created in EBM logging on Haida Gwaii.<sup>103</sup>

If a portion of the SRI funding enabled by the Sustainability Scenario is invested in local value-added processing, and assuming that tenures will be held by the Haida Nation and local communities/business interests, the logging, silvicultural and processing and value added sectors will be able to exceed current local employment levels. Haida Gwaii's timber is suitable for a variety of value-added applications. There will be some challenges during the transition phase, and workers who are displaced will not necessarily be the same ones getting the new positions as new entities gain access to timber volume. Nevertheless, the Sustainability Scenario is advantageous for maximizing total timber industry related employment on Haida Gwaii, especially over the long-term.

#### **4.4.5 GOVERNMENT STUMPAGE REVENUES AND THE SUSTAINABILITY SCENARIO**

The impact of the Sustainability Scenario on government revenues derived from timber sector management will be negative over the short term, but may well be neutral to positive over the long term. This is in part because the baseline scenario approach in the short run generates higher levels of revenue as it draws down the endowment of old growth timber and higher valued timber such as cedar and spruce. As the harvest under baseline scenario management transitions to second growth, and as harvest levels and timber value generally decline, government revenues from the timber industry will decline. Under the Sustainability Scenario, timber harvests are more modest but are sustained over time and managed more conservatively.

As noted above, the impacts on the North Coast to stumpage revenue are trivial, especially once one considers that North Coast stumpage payments do not even cover government's costs of overseeing the

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<sup>102</sup> Redstone Strategy Group, 2003. *Coastal BC Economic Development: Phase Two Final Report Part 1*. Report to the Conservation Investments and Incentives Initiative.

<sup>103</sup> Redstone Strategy Group, 2003. *Coastal BC Economic Development: Phase Two Final Report Part 1*. Report to the Conservation Investments and Incentives Initiative.

industry. On Haida Gwaii and the Central Coast, government revenue impacts warrant closer examination. Government stumpage revenues may decline under the Sustainability Scenario because: i) areas newly protected no longer support timber harvesting; ii) in areas open to timber harvesting, more trees must be left behind to meet EBM requirements; and iii) for timber that is harvested, the incremental costs implied by EBM practices (both increases in variable costs and the fact that capital costs are amortized over smaller volumes of timber) will reduce the stumpage rate due to government.

A briefing presented to the CCLRMP table suggested the impacts of the Central Coast portion of the Sustainability Scenario on government revenue from stumpage payments would be approximately \$35 million, and potentially as high as \$44 million if the full AAC were harvested.<sup>104</sup> However, this overestimates the impact on several fronts. First, included as an impact are the April 2001 protected areas. The decision to protect these areas was made in an earlier round of land use planning and should not be included in the Sustainability Scenario impact analysis. Second, stumpage is assumed to be constant across the land base, when in fact, as this report has noted, timber in areas slated for protection as a result of the Sustainability Scenario have a lower than average value. Furthermore, although EBM reduces the total amount of timber removed from a given cutblock, companies can be expected to carefully work out how to meet retention requirements and other aspects of EBM using, to the extent possible within requirements, lower value timber, and ensuring timber available for extraction is generally higher value. Thus, the stumpage value of retained timber should be somewhat lower than the assumed base case average, while the stumpage value of harvested timber will be somewhat higher.<sup>105</sup> Thus it can be anticipated that the timber “locked up” by EBM practices will have a lower than average stumpage generating potential. Also, the timber supply impact from the environmental requirements of the *Forest Practices Code* means there will be some overlap between EBM requirements and *Code* requirements, implying that the timber supply impact is more modest than the modelled 25% used in the briefing. Finally, based on initial field trials in Fraser Reach, the incremental costs of EBM were assumed to be \$9/m<sup>3</sup>, which reduces the stumpage payable to government by an equivalent amount for each m<sup>3</sup> harvested under the Sustainability Scenario. This approach both overstates the stumpage loss to government<sup>106</sup> and would suggest that companies are incapable of learning and innovating so as to cut the costs of implementing EBM. However, experience with the *Forest Practices Code* shows that although initial costs were high as companies had to learn new procedures, train staff, etc., the costs gradually declined. Netting out changes in stumpage rates, Coastal logging costs jumped by 18% when the Forest Practices Code was implemented in 1995, but by 1998 had come down again by 12%. Year 2004 data from Fraser Reach suggests that the cost impacts of EBM are likely to be below \$5/m<sup>3</sup>, and perhaps as low as \$3/m<sup>3</sup>.<sup>107</sup>

Taking into account the above factors and the projections of harvest level impacts from the above sections, the combined effect of locking up lower value timber in new protection, reducing the availability of timber in operating areas due to EBM requirements, and lower stumpage payments due to EBM costs, the total loss to government in stumpage revenue from the Sustainability Scenario is likely to be well under \$20 million per annum for the entire study area in the initial decade. Over the long term, the

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<sup>104</sup> Holman, G. 2003. (Undated, untitled document).

<sup>105</sup> There will be instances where EBM requirements lock up higher than average value timber (e.g., estuaries) but past experience with the *Forest Practices Code* and the economic incentive to maximize return will imply that, overall, this result is likely.

<sup>106</sup> If a particular stand would generate \$5 stumpage to government under status quo, under EBM minimum stumpage would apply so government does not end up picking up the entire \$9 differential.

<sup>107</sup> Data from Dennis Crockford, RPF, personal communication. August 06, 2004.

stumpage impact is likely to be around \$10 million per annum. However, this revenue calculation assumes that there is no resumption of market campaigns if the Sustainability Scenario does not go ahead. If markets were again to discriminate against study area timber because the Sustainability Scenario failed, government revenues could drop drastically, implying that this assessment of government revenue impacts is overstated. Impacts may be overstated if markets begin to put a price premium on study area timber if the Sustainability Scenario goes ahead. Also, long term stumpage impact estimates typically assume that second growth will be a valuable resource, when recent findings suggest the economic opportunities in second growth are very limited.

Such an impact on stumpage revenues is quite modest; government could see it as an “insurance premium” to ensure timber and other goods produced from the study area will find market acceptance and ensure collaboration between all stakeholders on the Coast.

#### **4.5 IMPLICATIONS OF THE SUSTAINABILITY SCENARIO TO THE TIMBER SECTOR**

The above analysis points to a number of important conclusions. The timber industry in the study area is to a large extent economically marginal, and will become increasingly so as it must shift to harvesting second-growth stands. If the Sustainability Scenario is not adopted, at least for the mid-term, the timber industry will continue a slow decline as the resource base is drawn down further. As the industry has reacted to difficult market conditions by harvesting the best and most profitable timber, it has limited its future potential. Threshold analysis indicates that if companies had to harvest less cedar and more hemlock, they would no longer break even. Independent analysis indicates that much of the second growth resource is by-and-large economically inoperable under current conditions.

Most of the workers living outside of the study area whose jobs are dependent on flows of timber from the study area to feed their processing facilities are not likely to lose their jobs as a result of the Sustainability Scenario. This is because even with a coast-wide undercut, many logs are being exported unprocessed. and their jobs are already at risk from global competition, the pressure for productivity improvements, and the falldown to a second growth harvest.

The analysis also suggests that the Sustainability Scenario alternative would provide the timber industry in the study area with longer-term stability, adequate profitability, and preferential market access, albeit with a decline in the volume of timber harvested. The AAC may well drop substantially, but this is of little economic significance since it is the actual harvest levels that effect the flow of benefits. There is currently a substantial undercut on the Coast, and the study area AAC is unlikely to be reached except perhaps during brief peaks in the market cycle. The timber being locked up by the Sustainability Scenario is largely of marginal economic value as a timber resource, but of high economic value for its conservation values. The Sustainability Scenario may well improve timber industry employment in portions of the study area as it will enable more constructive engagement between timber companies and local First Nations and communities, and innovation in the application of EBM.

From a provincial revenue perspective, the Sustainability Scenario implies considerable conservation gains, for a moderate reduction in provincial revenue from timber industry activities. This is in part because of the undercut, while cutting timber of marginal or negative economic value does not contribute significantly to revenues or to economic welfare. In the North Coast, revenues do not offset the cost of the province to oversee timber industry activities. There is also a risk that government revenues from stumpage payments would drop if the Sustainability Scenario is not implemented, and markets were to discriminate against study area timber.

In addition, the adoption of EBM principles will help ensure that coastal wood products will continue to have access to world markets that are increasingly focused on environmental practices. Key to continued market access under such a value-added strategy is to ensure that the fibre supply for such products is certified by credible, third-party certifiers as being produced under sustainable logging practices.<sup>108</sup> Timber harvested under EBM is likely to qualify for suitable certification.

Policy makers, First Nation governments, and Coastal BC residents face new realities in making forest management and land use decisions, and decisions are more likely to be viable when they reflect such realities. This section of the report has shown from an economic perspective that, despite widely held notions to the contrary, there is no compelling advantage in continuing with status quo industrial logging, while there are a number of disadvantages. This analysis of the Sustainability Scenario indicates there will be little cost or actual loss with allocating the land for the proposed protected areas and proceeding with the implementation of EBM. Indeed, the Sustainability Scenario will help secure the long-term viability of the forest and the flows of timber it provides, will ensure access to markets, and will improve confidence over land and resource allocation for the timber sector.

The economic values of the ecological services that forests provide are also important. These services include carbon sequestration, fish habitat protection, erosion control, nutrient cycling, and flood control. Such values have not been addressed in this study; were they factored into the analysis, the conclusion would point even more strongly towards the Sustainability Scenario.

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<sup>108</sup> The CIT's institutional analysis notes that FSC would be the most relevant and credible certification scheme. See page 31 of: J. Clogg, G. Hoberg, A. O'Carroll, 2004. Policy and Institutional Analysis for Implementation of the Ecosystem-Based Management Framework. Coast Information Team, February.

## 5.0 THE MINING SECTOR AND THE SUSTAINABILITY SCENARIO

### 5.1 INTRODUCTION

Historically, mineral exploration and mining have played a lead role in opening up much of BC to resource development. However, over the past few decades, there has been significant structural change in the global mining sector and this has had significant negative impacts on the industry in BC. This section first examines the changes on a global scale and how it impacts the future potential of the mineral sector in the study area. The section then examines the region's geology and its mineral potential, the history of exploration and mining in the study area and recent mineral resource assessments. Mining's hidden costs and its potential contribution to local economic development are also considered. Finally, based on this information base, the implications of the Sustainability Scenario on the mineral sector's economic contribution are assessed.<sup>109</sup>

### 5.2 GLOBAL TRENDS IN MINING

The global exploration and mining sector has experienced significant structural change over the last few decades. The main driver for change in the industry has been the complex interplay between the demand and supply for metals, technological advancement, international political change, and evolution in the legal and regulatory environment.<sup>110</sup>

#### 5.2.1 DEMAND AND SUPPLY FOR MINERALS

While the demand for minerals has grown steadily over the course of the twentieth century, and is anticipated to continue growing in coming decades, this has not led to problems of supply or to rising mineral prices. Indeed, both the US Geological Survey's metal price index, which includes copper, lead, zinc, gold and iron ore (see Figure 5.1), and the composite index, which adds in seven industrial minerals, show downward trends in constant dollar prices over the last century.<sup>111</sup> According to the US Geological Survey, these trends indicate, "...that adequate sources of supply exist, competition within the industry is prevalent, and the costs of production have decreased."<sup>112</sup>

A recent analysis of 50 years' worth of data on mineral exploration and development around the globe demonstrates that giant ore bodies<sup>113</sup> now control or significantly influence market prices and hence economics of production as such bodies can be exploited in a way that captures economies of scale.<sup>114</sup> To be competitive, new mines must be near the bottom of the cost curve. Modelling shows that many past producers would not be economically viable under current or future conditions as the ore bodies involved were too small to capture economies of scale. The unit cost of production would simply be too high to

<sup>109</sup> As the precious and base metals are much more economically significant than their industrial counterparts, this study focuses on the former. Also, the oil and gas sector was not included in the terms of reference for this report, as at present, other than the potential but unproven offshore oil and gas fields, it is not active, nor is it considered key to land use decisions on the non-offshore portions of the study area. The viability of the offshore resource would not be affected by the Sustainability Scenario.

<sup>110</sup> The US Geological Survey, in its annual publication, *Mineral Commodity Summaries*, provides a summary of significant events trends and issues affecting the mineral sector for each year.

<sup>111</sup> Sullivan, D., Sznopet, J. and Wagner, L, 2000. "20th Century U.S. Mineral Prices Decline in Constant Dollars". US Geological Survey. Open file report 00-389.

<sup>112</sup> Wagner, Lorie A., Sullivan, Daniel E., and Sznopet, John. 2002. *Economic Drivers of Mineral Supply* Open-File Report 02-335. U.S. Geological Survey, page 63.

<sup>113</sup> Defined as having a in ground value of \$10 billion US or more.

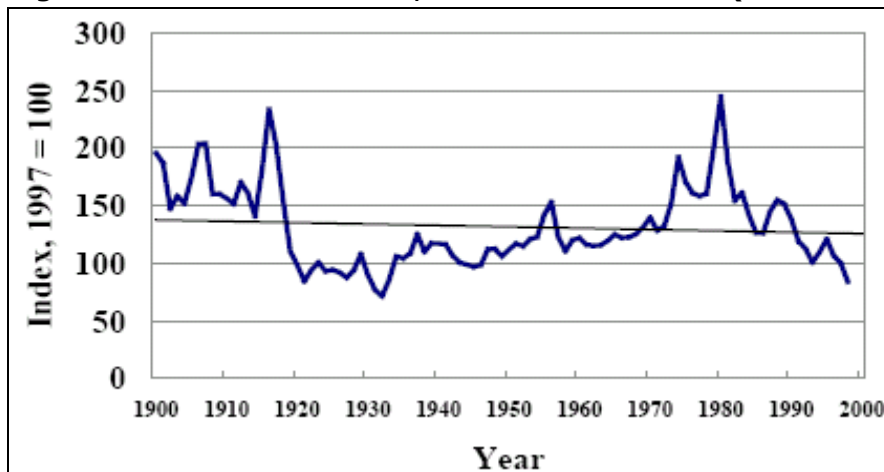
<sup>114</sup> Blain, C. 2000. "Fifty-year Trends in Minerals Discovery — Commodity and Ore-type Targets", *Explor. Mining Geol.*, Vol. 9, No. 1, pp. 1–11.

compete against current and projected mineral prices. The BC mining industry appears to conform with this trend towards larger, lower operating cost mines. Each of the base metal mines operating during 2003 in BC had a mill capacity in excess of 1,000,000 tonnes per annum.<sup>115</sup>

While the long-term trend is downwards, the mining sector is notorious for its volatile market cycles. This volatility is due to a number of factors. For most minerals, there are a relatively small number of producers, far from the ideal where many buyers and sellers act in a market. Mines are optimized for a given annual capacity; if market conditions warrant increasing this capacity, a lag of a couple of years or more between investment and increased output is not uncommon. When mineral prices are high, exploration budgets increase, resulting in new discoveries. However, it can take a decade or more between discovering a commercially viable deposit to commercial extraction. Because of the lead time required to develop mining projects or increase the capacity of existing mines, when markets peak, there is a time lag of months if not years before new output hits the market. When this increased output is available, prices may be dropping again. There is also a time lag between falling prices and the ability of mines to reduce output. Markets can thus become flooded despite dropping prices, and the price drops even further. Thus, a relatively small mismatch between supply and demand can cause large movements in prices.

Mineral consumption rises with economic growth, higher income levels, new construction, and infrastructure investments. Given the fact that developing nations have large infrastructure needs and a growing consumer class who desire more material goods, when growth is strong in developing countries, there is a significant boost in demand for minerals. The current peak in mineral prices is associated with the mining sector being caught unprepared by the surge in China’s demand, which is due to an exceptional though not sustainable rate of growth. Although it may take a few years for the market to come back into balance for certain minerals, this is not an indication that there is a change in the long-term price trend. Indeed, it would be reckless to proceed with a mine that was only viable during the current peak in the market cycle.

**Figure 5.1: Metals Price Index, constant 1997 dollars (US Geol. Survey)**



The economics of the gold industry changed fundamentally as gold’s monetary role diminished in the 1970s. In the 1990s, many central banks, and particularly Russia, began to unload their gold reserves, depressing gold prices, until agreement was reached amongst European Central banks to slow this disposition

<sup>115</sup> PricewaterhouseCoopers 2004.

to avoid a severe drop in prices.<sup>116</sup> Gold's long history and relevance as a store of value during uncertain economic times was challenged by an increasingly globalized market and the increased ease with which funds could be transferred electronically from one nation and currency to another. Gold is increasingly relegated to consumer and industrial applications.

### **5.2.2 TECHNOLOGICAL ADVANCEMENT**

The mining industry has benefited from a wide range of technological advancements which have enabled additional deposits to be discovered, new deposit types to be exploited, a greater proportion of minerals to be extracted from ores, and to lower the unit cost of production. Examples include huge trucks, high volume crushers, high-speed conveyor belts, and automated control systems that can significantly reduce the costs of producing minerals. New extraction technologies, such as cyanide heap-leaching, have allowed previously uneconomic ore bodies to be exploited. In the future, further automation, the use of remotely controlled mining and drilling equipment, improved exploration technology, and improved mineral recovery can be anticipated. With respect to exploration, technological advancement has included improved geophysical methods and models, airborne electromagnetic surveying, gravity survey methods, computer modeling, etc., all of which has resulted in the discovery of many new deposits. Enhanced recycling technologies have improved material recovery at the end of a product's life cycle.<sup>117</sup>

### **5.2.3 INTERNATIONAL POLITICAL CHANGE**

Particularly important to the long term success of the mining industry has been the trends towards liberalization of markets, the reduced role of the state in national economies, and improved conditions for transnational capital investment. With the dissolution of the Soviet Union and the trend away from state control or ownership, many formerly state owned mining enterprises were privatized. Under market discipline, those formerly state-owned mines that could not compete closed, whereas those with a viable resource base benefited from the influx of private sector investment. Regions that formerly placed impediments on foreign investors actively sought to create conditions conducive to investment. As South Africa abandoned apartheid, prohibitions against investing in that country were dropped, providing further opportunities in the country's mining sector.

### **5.2.4 LEGAL AND REGULATORY REFORM**

The Chamber of Mines of the US, Canada, UK and Australia and many CEOs of top transnational mining companies worked collaboratively to ensure that global trends towards liberalization, deregulation and privatization would benefit the mining sector. They promoted changes in the mining laws and regulations of more than 70 countries that would provide ease of access to mineral resources, favourable royalty and taxation regimes, tax holidays, guaranteed rights to move from exploration to mining, freedom from interference and expropriation, and the ability to repatriate capital and profits.

### **5.2.5 GLOBALIZATION OF THE MINING INDUSTRY**

As a result of highly competitive markets and a long-term downward trend in mineral prices, the larger mining companies went through a period of mergers and acquisitions, concentrating capital and economic power in fewer companies, and allowing for cost cutting. With this clout, mining multinationals have been

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<sup>116</sup> European Central Bank, 1999. "Joint statement on gold." September, 26.

<sup>117</sup> See Wilburn, David, Goonan, Thomas and Bleiwas, Donald 1997. *Technological Advancement -- A Factor in Increasing Resource Use*. Open-File Report 01-197. United States Geological Survey.

able to further expand their access to mineral wealth and to ensure governments provide a legislative and policy environment sympathetic to the mining sector. Facing such strong players, governments have reduced ability to set royalty or taxation rates that impinge upon corporate profitability, as the government of Chile discovered in 1997 when it proposed to raise taxes applicable to the mining sector.<sup>118</sup>

Most world-class mines now involve large capital investments intended to achieve high production levels and low operating costs. While junior and local companies can have a role to play in the exploration phase, the reality is that to be cost competitive, increasingly mines require the backing of a large, multinational mining company.

### **5.2.6 SHIFT IN EXPLORATION EFFORT TOWARDS REGIONS NEWLY ACCESSIBLE TO MINING**

Unlike Canada, and the study area, where exploration has been underway for over a century, many parts of the globe are relatively unexplored, especially when advancements in modern geochemical and geophysical techniques and the expanding knowledge of mineral deposit formation are taken into account. Improvements to the mineral investment climate worldwide discussed above lessened the risks of developing the large, but under explored, mineral potential known to exist in Latin America, Asia, the former Soviet Union and the conflict-free areas of Africa. Worldwide nonferrous exploration spending steadily increased through the early 1990s to a crest of \$5.2 billion in 1997, before falling for five straight years to a ten-year low of \$1.9 billion in 2002. This five year slump was mainly a result of declining metal prices, corporate consolidation from mergers of some of the larger metal producers, investment fear sparked from the Bre-X scandal, and the rapid emergence of the dot com sector which competed for capital investments. In 2003, exploration investment was once again on the upswing, with the largest share going to Latin America. Exploration expenditures in BC in 2003 were in the order of \$50 million, a slight increase over the last few years, but roughly the same as the early 1980s.

Canadian companies have been very active abroad. From 1995 to 1999, Canadian-based companies invested more exploration and mining dollars in Latin American than in Canada. In 1999, Canadian companies undertook almost 30% of all the larger-company exploration programs around the world.<sup>119</sup> This has led to Canadian exploration and mining companies dominating the exploration market of not only Canada, but also the markets of United States, Central and South America and Europe.

From 1992 to 1999, foreign mineral properties held by Canadian companies grew at an average annual compound rate of about 12 percent. In 1996, a record 141 Canadian-based exploration and mining companies each planned to spend more than \$4 million around the world that year. Aggregate exploration budgets for these companies stood at about \$2.1 billion.<sup>120</sup> By 1999, foreign properties represented more than half the total mineral property portfolios held by Canadian mining companies. The proportion of Canadian-based companies' total budgets allocated to foreign exploration and mining programs was 43 percent in 1992 and up to almost 73 percent in 1999. At the end of 2001, Canadian-listed exploration and mining companies held interests in almost 5700 mineral properties located in more than 100 countries around the world. By way of contrast, the total exploration budget allocated to BC has ranged from a high of \$105 million in 1996 to a low of \$25 million in 1998. Clearly, the newer areas of the globe are seen as providing greater potential returns. Canadian mines now have to compete with mines in many countries with low wages, lax environmental standards, and generous tax regimes.

<sup>118</sup> US Geological Survey, 1997. *1997 Mineral Commodity Summaries*.

<sup>119</sup> Minerals and Metals Sector of Natural Resources Canada, 2000. *Overview of Trends in Canadian Mineral Exploration, 2000*.

<sup>120</sup> Minerals and Metals Sector of Natural Resources Canada, 2002. *Overview of Trends in Canadian Mineral Exploration, 2002*.



### **5.2.7 IMPLICATIONS: ECONOMIC ENVIRONMENT FOR NEW MINES IN THE STUDY AREA**

Taken together, the above trends have implications for new mining ventures in the study area. The mineral market will continue to be globally competitive. Long-term market prices will continue to be heavily influenced by the giant mineral deposits which warrant large capital investments and consequently can command economies of scale that keep per unit costs of metals down. Technological advancements will continue to keep per unit costs of production down. As a long term study of discoveries concluded, "The only real lasting profit-making opportunity stems from resource quality — those giant high-grade ore bodies that sit at the bottom of the cost curve."<sup>121</sup>

With exploration capital largely focused on regions of the globe that have been relatively under explored due to formerly unfavourable investment conditions, new, high quality/volume discoveries can be anticipated that will significantly influence future market conditions. Already, past investments in exploration have resulted in an inventory of properties that are under consideration for development.

Although mineral prices tend to show significant volatility, such as the current upswing in mineral prices, the underlying structural changes affecting the mineral industry imply that the long term trend is for generally declining mineral prices. While this may not necessarily apply to all minerals, it does appear to apply to those minerals that are most likely to be economically significant in the study area. In assessing the viability of future mining in the study area, stable or slowly declining mineral prices should be assumed for at least the next few decades. Simply put, the market will not make mining in the study area more attractive in coming decades. If a deposit is not currently economically viable, it is unlikely to be viable within the next few decades; if the Sustainability Scenario implies that such below investment grade deposits will no longer be exploitable, there is a very low likelihood that society's economic welfare would be diminished. Indeed, conditions have changed to the point where many of the past producing mines in the study area would not have gone ahead were the ore bodies discovered in the twenty first century, instead of in the twentieth.

### **5.3 TRENDS IN BC MINING**

The above structural changes have resulted in unprecedented challenges for the BC mining industry. In 1982 there were 27 operating mines in BC. Throughout the 1980s, on average, two new mines were opening each year. By the 1990s, more mines were closing than were opening, with two mines closed for every new mine that went into production. There are now six metal mines and six coal mines operating in the province. As reserves are depleted, and as low cost producers in other regions of the globe continue to ensure new mines in BC will face highly competitive market conditions, the number of metal mines operating in the province could continue to decline.

The irony is that BC is home to 65% of Canada's 1,030 publicly trading exploration and mining companies. In 2003, Canadian companies raised \$3.1 billion for mineral exploration and development on the Toronto Stock Exchange, 43% of the global total, to be spent on exploration and development projects globally.<sup>122</sup> A mere \$63 million of that total was spent on new exploration projects in BC.<sup>123</sup> For 2004, with metal prices at the top of the market cycle, a maximum of \$100 million of will be spent on exploration in all of BC.<sup>124</sup>

<sup>121</sup> Blaine, 2000 (op cit). Page 8.

<sup>122</sup> Ellingham, E. 2004. "Benefits of Listing a Mining Company on the Toronto Stock Exchange." Toronto Stock Exchange.

<sup>123</sup> Ministry of Energy and Mines at: <http://www.em.gov.bc.ca/Mining/MiningStats/61surveyminexp.htm>.

<sup>124</sup> "Mining exploration to hit \$100 million in B.C. *Vancouver Sun*, May 21, 2004, p. F5.

Partly as a result of increased foreign exploration and mining expenditures by Canadian companies over the course of the last decade and earlier, exploration and investment in BC gradually declined. For many Canadian exploration companies, exploration opportunities were thought to be much greater in some of the lesser-developed and under-explored parts of the world where political regimes had stabilized. In addition, environmental and permitting requirements were much more lenient abroad, and labour costs were generally less than in Canada.

The trend in foreign exploration investment has started to turn around slightly, with more companies being attracted back to Canada, in part due to generous exploration tax breaks and weakening of environmental regulations. The magnitude of some of the discoveries made in Canada within the last decade or so, including the discovery of diamonds in Canada's north, and the Voisey's Bay nickel deposit on the Labrador coast are also factors in creating renewed interest. However, these discoveries and this renewed interest do not imply that more exploration money will be spent in the study area, as will be discussed below.

Mining is still one of the highest paid sectors in BC, with workers earning average salary and benefits of \$94,500 in 2003. Part of the wage premium associated with mining is related to working conditions, such as the remote locations of many mines, as well as perceived occupational hazards. For some time, mining jobs have been on the decline in BC. In 2003, there were 6,128 direct employees at work in BC's metal and coal mines.<sup>125</sup> This is down almost 60% from the 18,021 direct employees who worked at BC's mines in 1981.<sup>126</sup> In metal mining itself, there has also been a downward trend in employment across the province - from 14,401 employees in 1981, employment at BC's metal mines dropped to 3,350 by the year 2000.<sup>127</sup>

Industry proponents have suggested that the decline in mining in BC was due to government policies, legislation and land use planning brought in during the 1990s. However, a close examination of the production and economic data suggests otherwise.

First, the price in Canadian dollars of non-precious metals mined in BC adjusted for inflation peaked between 1974-1982, and then dropped substantially (see Figure 5.2). The fact that mineral prices have been relatively low in recent years goes a long way to explain the decreased interest in exploration. The total investment in exploration around the globe also dropped dramatically from its high in 1997 – a drop that cannot be blamed on BC government policies – while exploration expenditures in BC peaked one year earlier. Indeed, the Bre-X scandal was uncovered in May of 1997; this exploration fraud is one of the commonly cited reasons for the flight of capital from the mineral exploration sector.

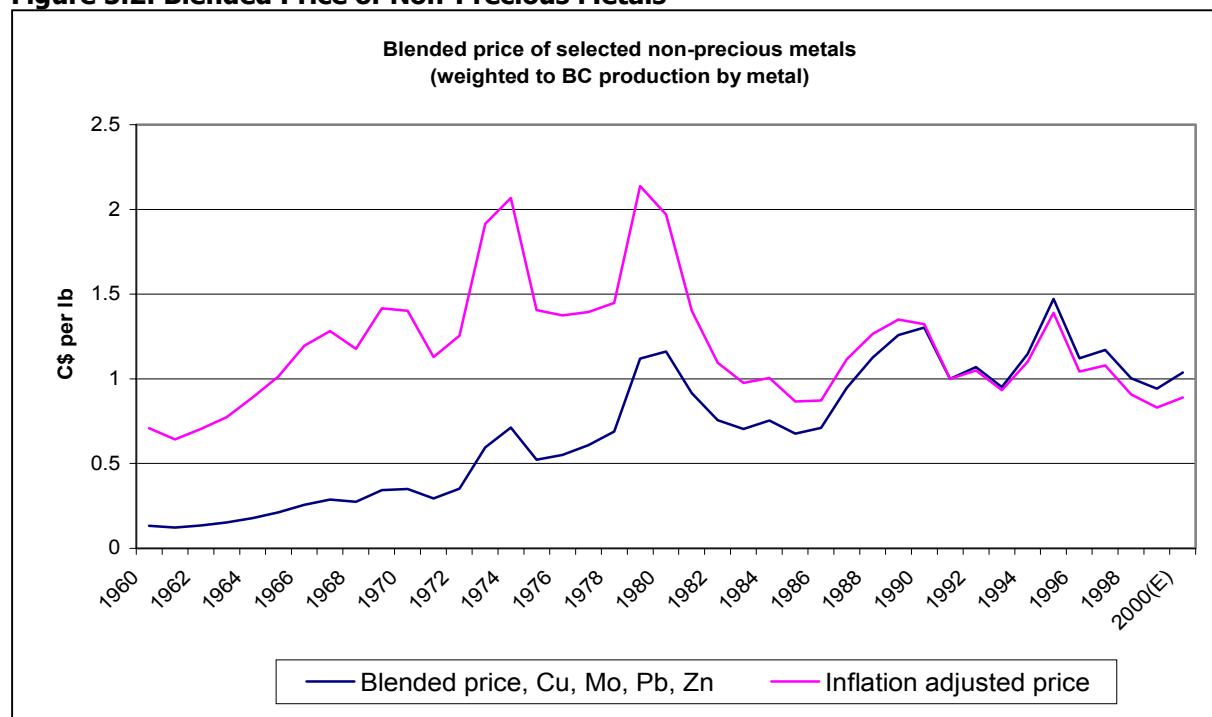
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<sup>125</sup> PricewaterhouseCoopers, 2004., op cit.

<sup>126</sup> BCMEMPR, (1990). "British Columbia Mineral Statistics – Annual Summary Tables – Historic Mineral Production to 1990". Mineral Statistics Section, Mineral Policy Branch, Mineral Resources Division; BC Ministry of Energy Mines and Petroleum Resources.

<sup>127</sup> BCMEM, 2003. "Metal Sector Trends" (webpage) at: <http://www.em.gov.bc.ca/Mining/MiningStats/25trendmetal.htm> (website accessed Dec. 2003).

**Figure 5.2: Blended Price of Non-Precious Metals**

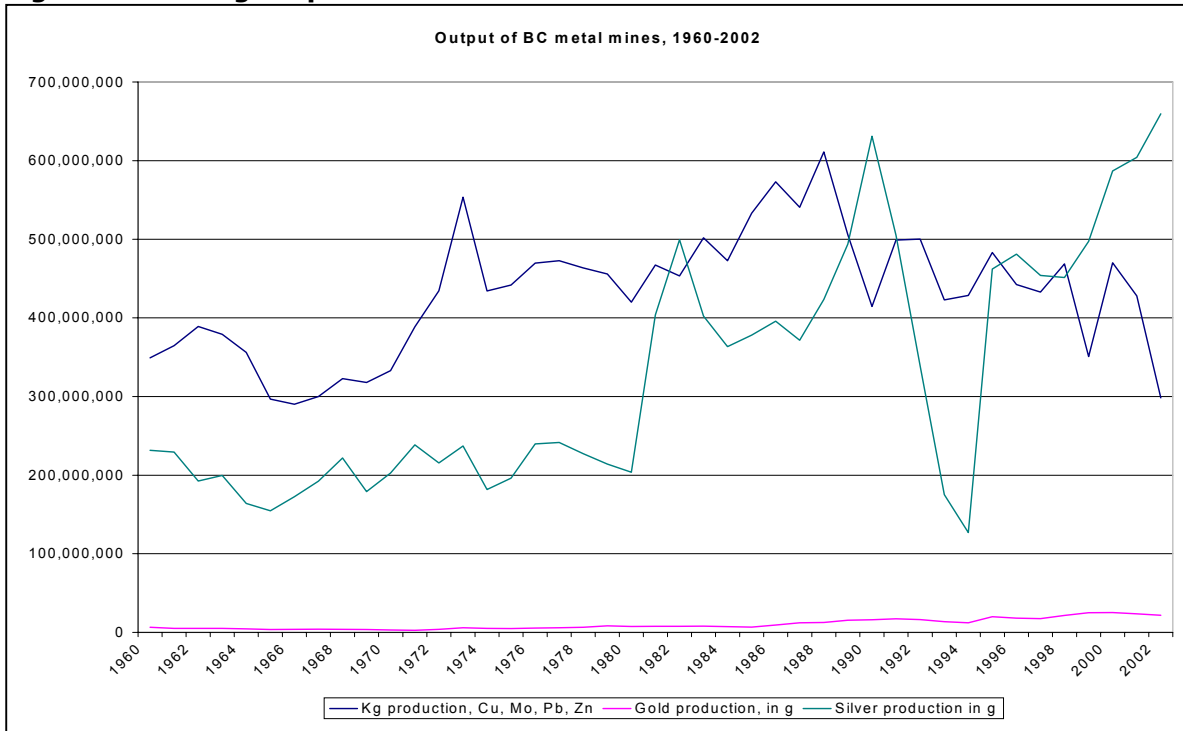


Second, mine production data suggests that mine output has been highly variable year-to-year, which is not surprising given how mining companies adjust output with fluctuations in market prices. With the time lag between exploration and a new mine coming on stream, and the fact that investors typically invest in exploration when mineral prices are high, it is to be anticipated that the BC mining industry would currently be below historical levels and that the creation of new parks, and provincial land use policies have little to do with the performance of BC’s mining sector. Indeed, just when the industry was most strenuous in its objections to BC land use policies in the mid 1990s, some of BC’s largest and richest deposits (Kemess, Eskay Creek) were being put into production.

Finally, as noted above, the mining industry is increasingly constrained by the ability of giant deposit, low operating cost mines to drive down the unit cost. It should be no surprise then that the future in BC, like other regions of the world, is likely to involve fewer mines working more important deposits. The drop in exploration expenditures in BC is parallel to the drop that occurred in many of the other Canadian provinces, which obviously had nothing to do with BC’s land use policies.<sup>128</sup>

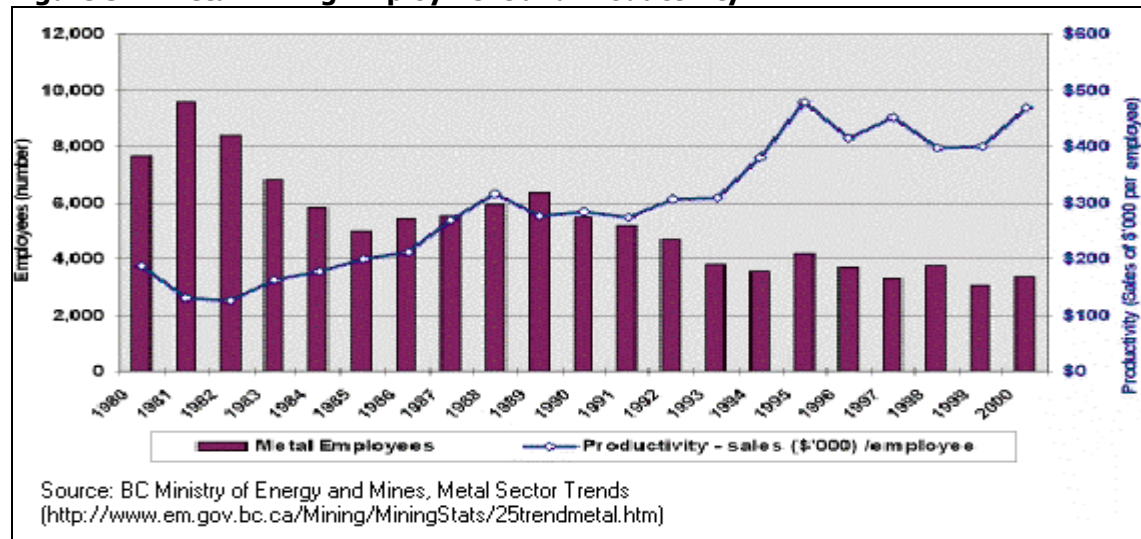
<sup>128</sup> See statistics reported in Natural Resource Canada’s annual publication, Overview of Trends in Canadian Mineral Exploration, available at [http://www.nrcan.gc.ca/mms/pubs/explor\\_e.htm](http://www.nrcan.gc.ca/mms/pubs/explor_e.htm)

**Figure 5.3: Mining Output**



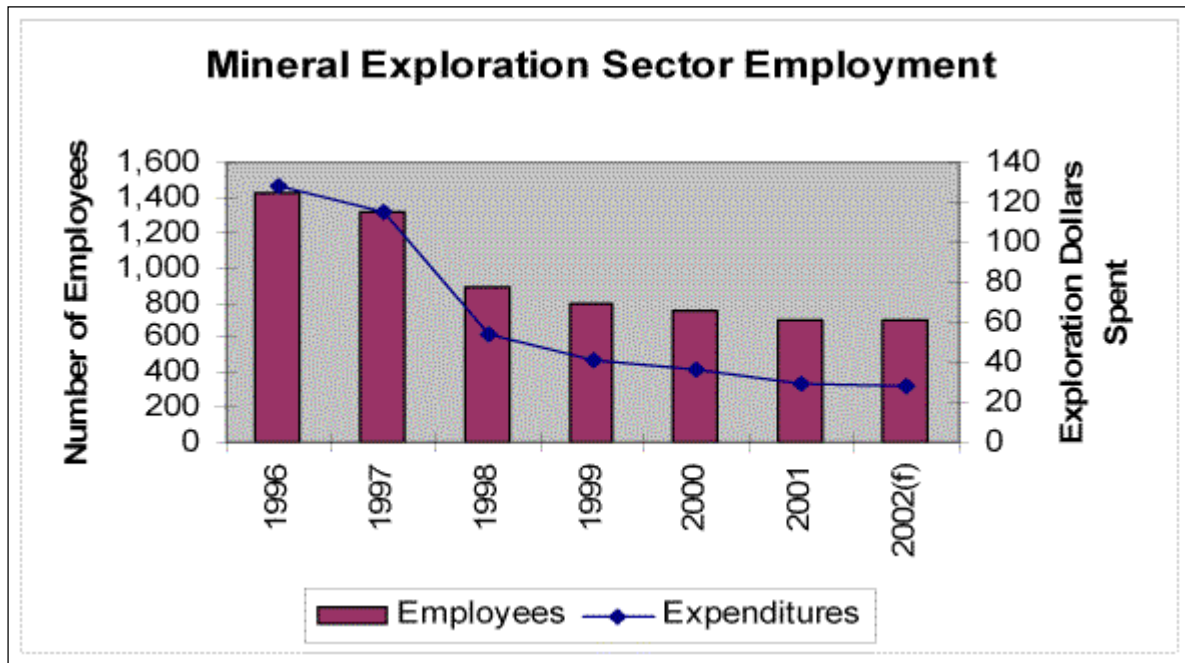
Statistics also indicate the decline in mine employment began over 2 decades ago, and is thus more than likely due to a variety of factors, including the opening of new regions of the world to mineral development, low mineral prices, and increased use of technology which increases the unit of production per mine employee. With continuing technological innovation and pressures to remain competitive, this trend towards mechanization and enhanced productivity is likely to continue, further decreasing mine employment. Figure 5.4 highlights how the BC metal mining industry has been able to make productivity gains (sales per employee) and shed workers over the past two decades in BC.

**Figure 5.4: Metal Mining Employment and Productivity**



Provincially, the total number of people employed in BC in 2002 was 1,973,400<sup>129</sup> versus approximately 3,000 metal mine employees in the same year. This represents in the order of 0.15% of BC's total employment. Following the same pattern, employment in BC's mineral exploration sector dropped by about 50 percent in recent years. Exploration employment fell from a high in 1996 of 1,423 (estimated number of employees in terms of full time equivalents) to about 700 in 2002 (Figure 5.5). Adding these 700 employees on the exploration side to metal mining indicates that together they represent a total of about 0.19% of BC's employment – less than one quarter of the employment generated by wilderness tourism in the province.

**Figure 5.5: Mineral Exploration Spending and Employment**



Gross mining revenues (metal and coal mine) decreased 5% from 2001 to 2002, falling from \$3.7 billion to \$3.5 billion, and recovered slightly to \$3.6 billion in 2003. In constant dollars, gross mining revenues from metal mining products in BC over the period 1980 to 2000 have been on a downward trend. During this period, the trendline shows the total value of sales dropping from a high of just under \$1.5 billion to around \$700 million (both figures in 1980 dollars).<sup>130</sup>

When speaking of the contribution of an industry to the economy, rather than using revenues, which because of double counting, over-states the true contribution, the usual standard used by Statistics Canada is Gross Domestic Product or GDP. In simplified terms, GDP is equal to the Output or revenues earned by the industry minus all of the material Inputs (excluding labour, depreciation and interest payment on long-term debt) used to produce that Output. Thus, GDP is made up of wages (payments to labour) plus depreciation and interest (payments for capital) plus profits (payments for entrepreneurship).

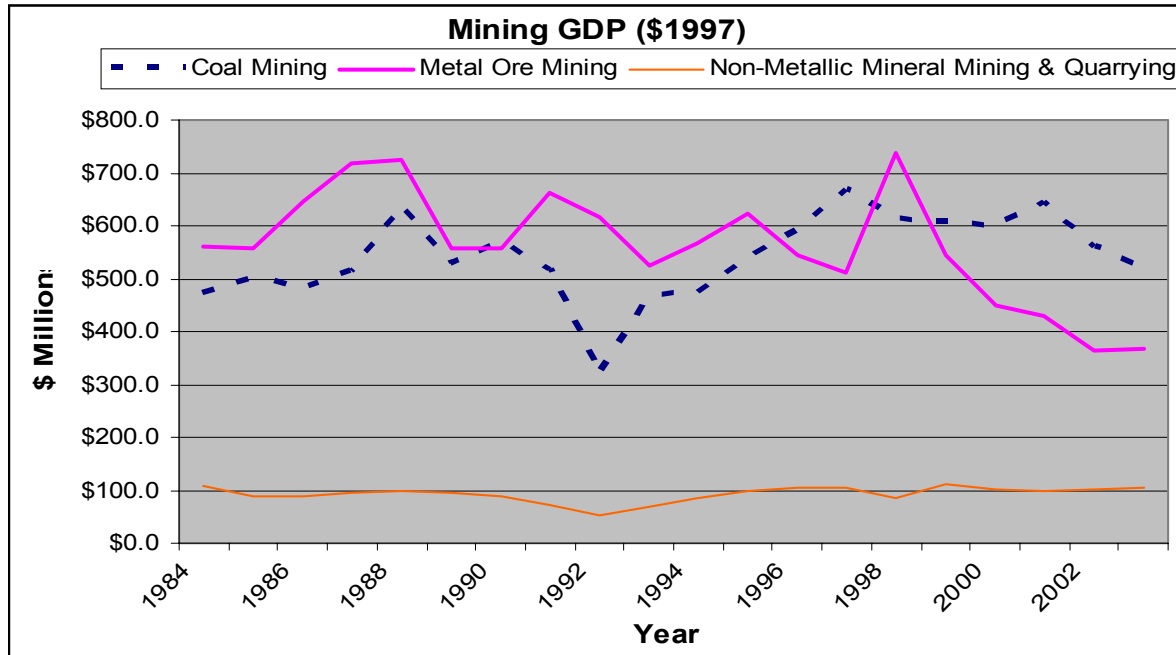
Provincial GDP estimates are available for three separate sub-sectors of mining: metal mining, coal mining, and non-metallic mineral mining. As highlighted in Figure 5.6, the trend in constant dollar (i.e., after accounting for inflation) GDP for the various mining sectors has been at best flat over the last twenty years.

<sup>129</sup> Statistics Canada, (2002). From: (<http://www.statcan.ca/english/Pgdb/labor07c.htm> )

<sup>130</sup> See BCMEM at <http://www.em.gov.bc.ca/Mining/MiningStats/25trendmetal.htm>

Metal mining in particular has seen its contribution to the economy decline, especially over the last five or six years since it peaked in 1998. It now contributes less to the economy than in any other time in the last twenty years. In terms of the proportion of the economy, this decline is even more pronounced.

**Figure 5.6: Provincial Constant Dollar Mining GDP, 1984 - 2003**



Based on these GDP figures, Statistics Canada estimates that the BC metal mining industry has a GDP-to-Output ratio of approximately 0.50. That is, for every dollar of Output, the metal mining industry contributes 50 cents to provincial GDP. In contrast, wilderness tourism sectors generally have higher GDP-to-Output ratios (the Guide Outfitter Industry, for example, has a GDP-to-Output ratio of 0.59<sup>131</sup>). In addition to these direct impacts, industries also contribute to the economy through their purchase of supplies (indirect impacts) and through the additional spending by employees on consumer goods and services (induced impacts). The BC metal mining industry is estimated to have indirect impacts on the economy of 0.22 per dollar of Output and induced impacts of 0.08. Overall, then, the mining industry contributes 0.80 dollars to provincial GDP per dollar of Output (the Guide Outfitter Industry in comparison contributes 0.95 dollars of GDP for every dollar of Output).

While there is a common perception that the mining sector contributes significantly to government coffers, the former Minister of Finances Task Force on Business Taxation, found the effective federal corporate tax rate on the mining sector in Canada to be 6%, the lowest of all sectors studied.<sup>132</sup> Given the globally competitive nature of the mining industry, the BC government is under pressure to maintain a royalty and tax regime friendly to the mining industry. Recent work by the C.D. Howe Institute found the effective tax rate on capital investment for the mining industry to be the second lowest among all of the sectors studied.<sup>133</sup> Indeed, despite extracting \$3.6 billion of the province's mineral wealth endowment in 2003, the BC

<sup>131</sup> *The Guide Outfitter Industry in BC: An Economic Profile*, prepared by the Guide Outfitters Association of BC, prepared by Pacific Analytics Inc., December 2003.

<sup>132</sup> Government of Canada Department of Finance, (1998). "Technical Committee on Business Taxation", Report from the federal Department of Finance, Tables 3.10 and 4.1.

<sup>133</sup> Mintz, J.M., 2001. "Most Favoured Nation: Building a Framework for Smart Economic Policy." Toronto: C.D. Howe Institute.

mining industry only paid a total of \$130 million in direct tax payments to all levels of government. Of this, there was no income tax, only \$40 million was in the form of Mineral tax to the BC government, while \$19 million was sales tax and \$7 million was gasoline and fuel taxes.<sup>134</sup> The mining sector will make a modest contribution to government revenues in proportion to the value of any resource depleted. This revenue will be further offset by government support to the industry.

While the mining sector generates revenues for government, it also receives benefits (subsidies) that offset this contribution. For instance, the Huckleberry mine, which began production in 1997, received financial assistance from the B.C. Government in the form of a loan of \$15 million for infrastructure relating to roads, power lines and port facilities.<sup>135</sup> Fifty-six exploration and mining companies received grants totaling \$2.4 million from the provincial Mineral Exploration Incentive Program, a component of the Explore B.C. Program. Another component of the Explore B.C. Program, the Accelerated Mine Exploration Program, granted approximately \$1 million to 11 projects. Sixty-nine grants, totaling approximately \$500 000, were awarded from the Prospectors' Assistance Program.

In order to stimulate mineral exploration in BC in 2002, the provincial government implemented a 20% BC Mining Flow-Through Share Tax Credit Program for "grass-roots" mining exploration in BC. This is in addition to the federal 15% flow-through Mineral Exploration Tax Credit introduced in October 2000. Both tax credits (35% combined) are available with respect to eligible exploration investments incurred in BC before December 31, 2004. Under federal tax legislation governing flow-through shares, eligible Canadian exploration expenses have been 100% deductible for nearly 2 decades. The latest provincial tax credit, when added to the federal tax credit and deduction is the equivalent to a 136.7% deduction for taxpayers in the highest marginal tax rate.<sup>136</sup> Thus, BC resident making a \$1,000 investment in exploration would have up to \$617 of this cost covered by fellow taxpayers.<sup>137</sup> The refundable BC Mining Exploration Tax Credit of 20% that existed prior to 2001 (for corporations and individuals) will continue to be available on exploration expenses in BC that are not financed by flow-through shares up to July 31, 2006. Tax credits in excess of 100 percent are essentially subsidies provided by governments to entice investors. Finally, over-and-above the infrastructure assistance and tax breaks discussed above, the BC mining industry also benefits from direct subsidies estimated at approximately \$700,000 in 2002.

Amongst commodities, the coal sector continues to be the largest segment of the mining industry, accounting for 36% of net revenues in 2003 and 40% of the employees.<sup>138</sup> However, there is very low potential for coal production in the Study area. Over the past two decades, six metal commodities (copper, gold, zinc, molybdenum, silver and lead) have accounted for 99% of the value of metals sold in British Columbia (aluminium sales are not included since this metal is not mined in BC; it is only refined at Kemano/Kitimat). None of these 6 metals are currently produced in the Study area and there are very few properties at an advanced stage of exploration development with these metals.

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<sup>134</sup> PricewaterhouseCoopers, 2004. Total payments to governments was reported as \$278 million, however, this adds in income tax paid by employees and workers compensation payments. Such accounting tends to overstate the importance of the industry. Workers compensation payments are offset by payments that must be made to injured workers or their survivors. Adding in employee income tax implicitly assumes that all of those employees would have been incapable of finding alternative employment which would also involve them paying income taxes.

<sup>135</sup> <http://www.imperialmetals.com/s/Huckleberry.asp>

<sup>136</sup> Prospectors and Developers Association of Canada, 2002. "What you should know about 'SUPER' FLOW-THROUGH SHARES".

<sup>137</sup> PricewaterhouseCoopers, 2004, op cit.

<sup>138</sup> PricewaterhouseCoopers, 2003.

## **5.4 MINING HISTORY AND POTENTIAL IN THE STUDY AREA**

### **5.4.1 OVERVIEW**

The study area has over a century-long history of limited mining exploration and development; including underground and open pit mines, and copper smelting at Anyox. However, there has not been a producing metal mine in the study area for the last 21 years, since the Tasu mine on the Queen Charlotte Islands permanently closed in 1983, and no mines are currently proposed. The Kitsault mine operated for a brief time in 1982, however the operation focused on processing previously stockpiled ore and not actual primary mining of ore. The Kitsault mine was the second most recent metal mine to operate in the Study area, producing from 1967 to 1972. Parts of the slag pile at the now closed Anyox smelter have been reprocessed for its industrial uses, primarily as an abrasive and for use in the cement industry. With a few exceptions, mining operations in the study area have tended to be quite small (see Figure 5.7 for locations and sizes of past producers). Of those mines that have seen production, only a very few have produced more than 2 million tonnes of ore.<sup>139</sup> Such small-scale mines have difficulty being competitive in global markets.

Certain parts of the study area are considered to be geologically favourable to hosting base and/or precious metal deposits. However these are a very small fraction of the overall land base. The most prospective areas are, from north to south:

- ❑ parts of the northern area of Anyox/Kitsault/Stewart;
- ❑ the narrow Ecstall/Scotia belt from Douglas Channel to the Skeena River;
- ❑ small portions of some of the coastal islands (e.g., west half of Porcher Island, west central Banks Island);
- ❑ small belt in the Noosgulch River region (headwaters) NE of Bella Coola (ie. Nifty prospect).

The rest of the study area has few mineral occurrences, reflecting generally low mineral potential.<sup>140</sup> Despite these small, geologically favourable areas, there are no producing or proposed mines in the study area. Beyond these favourable mineral areas, little effort has been invested in exploration of the study area in the past few decades. Extensive regional geochemistry surveys were conducted along the coast during the 1970s and 1980s by industry, and the BC government has conducted such surveys over parts of the coast as well. However, no significant new deposits have been identified from these surveys.

The BC Mineral Exploration Review was examined for this study, covering the last twenty years. This examination revealed that there have been very few advanced exploration projects in the study area compared to many other more prospective mineral areas of the province. Study area exploration projects eventually lost momentum due to discouraging results, demonstrating that the exploration community views the study area as showing low potential returns from exploration investments as compared to other parts of the province, or indeed the world. No new mineral-rich belts or “camps” have been discovered in the study area for many years, and little exploration has taken place around existing advanced prospects or past producers. Indeed, as of the end of 2003, many of the mineral showings in the study area were not even covered by mineral tenures, indicating that industry does not believe the resource warrants exploration work at these sites.

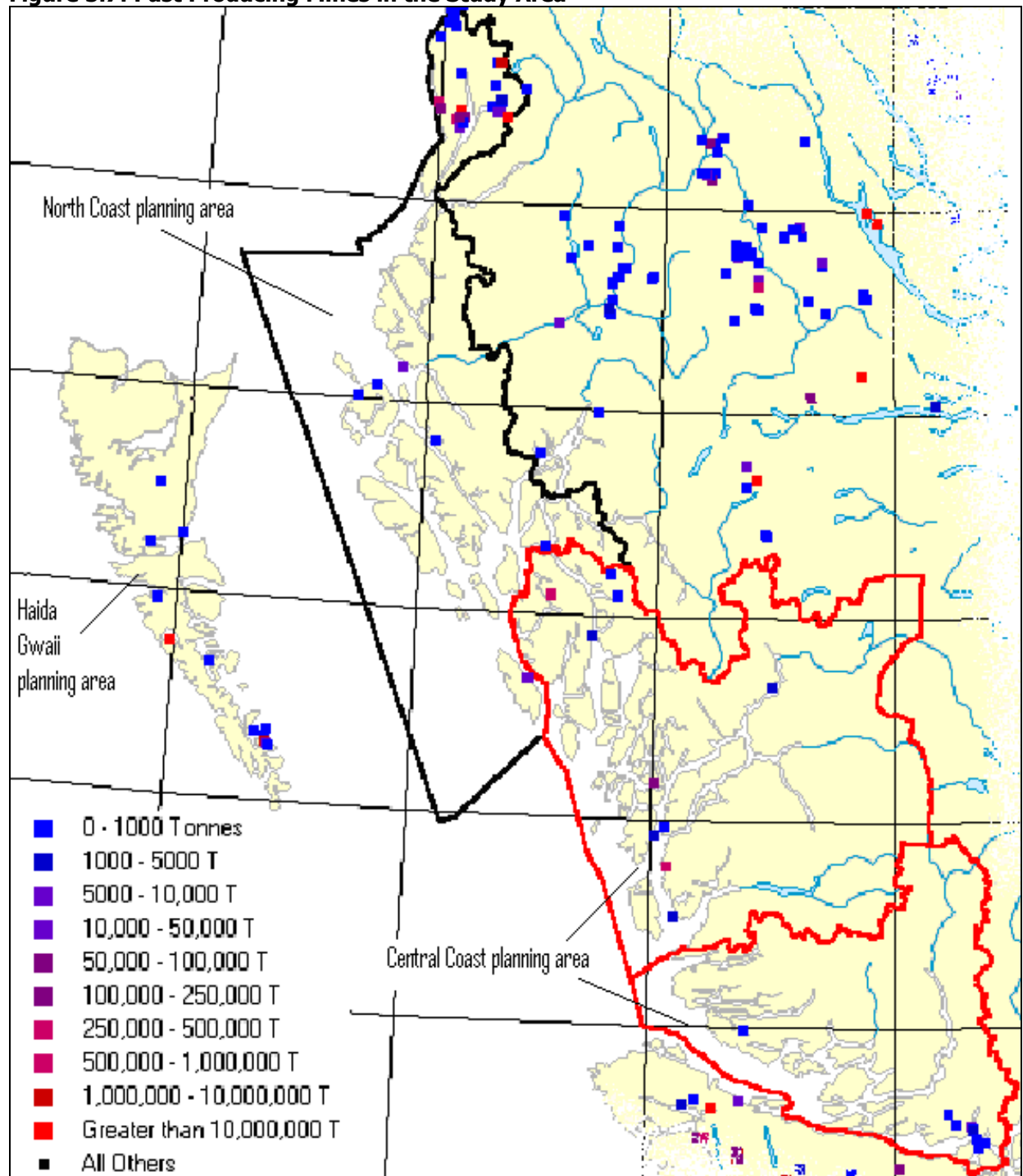
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<sup>139</sup> For comparison purposes, on average since 1999, 32 million tonnes of ore have been mined annually at the Kemess copper/gold mine in North-Central BC.

<sup>140</sup> MacIntyre, D.G., Ash, C.H., Britton, J.B., Kilby, W.E. and Grunsky, E.C. (1995): “Mineral Potential Evaluation of the Skeena-Nass Area”; in *Geological Fieldwork 1994*, Grant, B. and Newell, J.M., Editors, B.C. Ministry of Energy, Mines and Petroleum Resources, Paper 1995-1.



**Figure 5.7: Past Producing Mines in the Study Area**

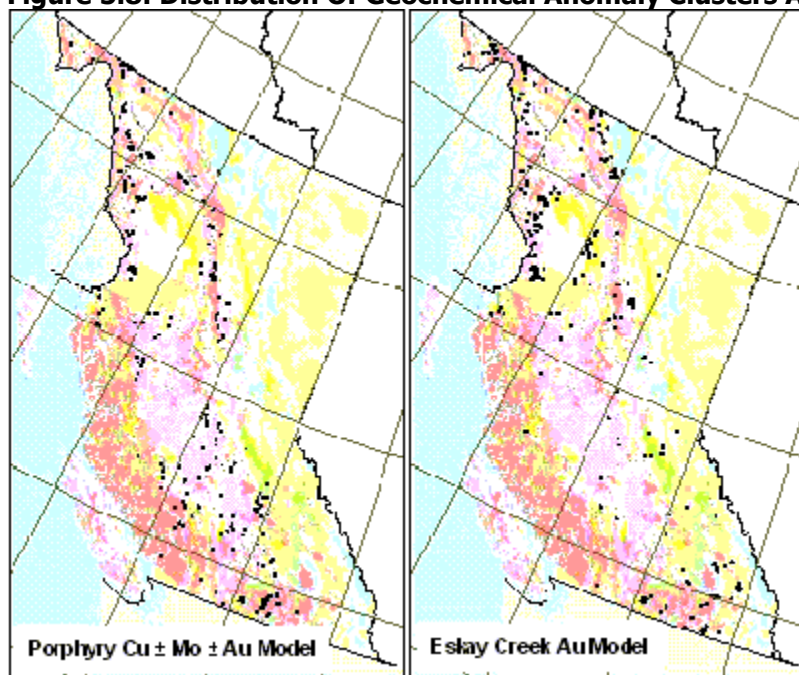


(Source: BC Geological Survey MapPlace)

#### 5.4.2 STUDY AREA LACKS MOST SOUGHT AFTER BC DEPOSIT TYPES

Figure 5.8 shows the distribution of anomalous clusters best matching Copper Porphyry and Eskay Creek Gold deposit types.<sup>141</sup> These deposit types rank with some of the most currently sought after in the province. Note that there are virtually no geochemical targets, and hence exploration targets, for these deposit types in the study area. This map illustrates on a province wide level that geochemical anomaly clusters in the study area do not correlate well with some of the most sought-after mineral deposits in BC.

**Figure 5.8: Distribution Of Geochemical Anomaly Clusters Across BC**



#### 5.4.3 STUDY AREA LACKS DIAMOND POTENTIAL

Exploration for diamonds in Canada has accelerated immensely since the discovery of diamonds in the Northwest Territories over a decade ago. Diamonds are now being sought and found across Canada in some of the oldest geological settings such as the Canadian Shield. Given the fact that only recently it was assumed that there was little potential for diamond mining in Canada, whereas now Canada is recognized as one of the major producing countries, it is natural to ask whether a similar unexpected discovery might be made on the coast. However, BC has very little of the favourable host rock for finding diamonds and published analyses of diamond indicator minerals in BC are scarce and limited to a few specific areas.<sup>142</sup>

Essentially, diamond-bearing regions must have areas of the earth's crust that is thick, old and with high concentrations of carbon.<sup>143</sup> The best potential for such an environment is in eastern BC where it remains to be established if old, deep ("basement") crustal rocks underlying the diamond occurrences in Alberta extend into BC. The geology of the study area does not contain some of the older geological settings known to host

<sup>141</sup> Smyth, C.P. (2003). "British Columbia Regional Geochemical Cluster anomalies and Best Matches to Mineral Deposit Types" in *Geological Fieldwork in BC – 2003*; Geological Survey Branch, BC Ministry of Energy and Mines.

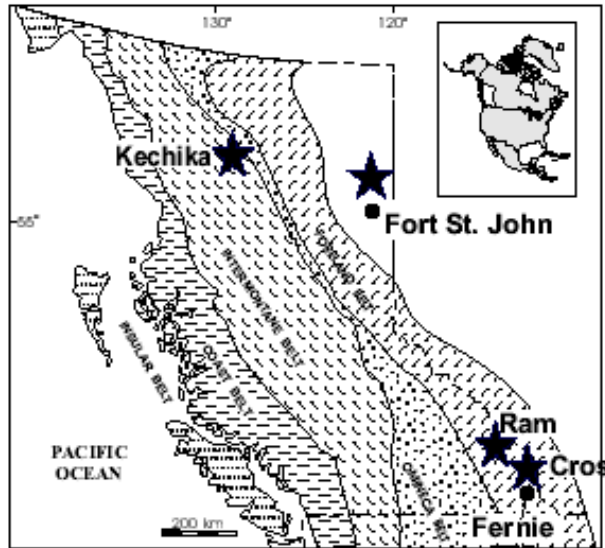
<http://www.em.gov.bc.ca/DL/GSBPubs/GeoFldWk/2003/27-Smyth-295-304-w.pdf>

<sup>142</sup> Simandl, G.J. (2003). "Diamond Potential in British Columbia – Progress Report". In *Geological Fieldwork in BC – 2003*; Geological Survey Branch, BC Ministry of Energy and Mines (<http://www.em.gov.bc.ca/DL/GSBPubs/GeoFldWk/2003/26-Simandl-291-294-w.pdf>).

<sup>143</sup> Jones, A.G. and Craven J.A. (2003). "Area Selection for Diamond Exploration Using Deep Probing Electromagnetic Surveying" from a presentation given at the Eight International Kimberlite Conference held in Victoria, BC, June 22-27, 2003.

diamonds in other parts of Canada. The main target areas for diamonds in BC are indicated by stars on Figure 5.9, and none of those locations are in the study area. The Sustainability Scenario is thus highly unlikely to imply forgone opportunities in diamond mining.

**Figure 5.9: Location of areas with geology compatible with hosting diamonds**



#### **5.4.4 STUDY AREA LACKS "HIGH TECH" METALS POTENTIAL**

The "high technology" metals include a number of rare and minor metals that have highly specialized applications in a wide range of industries. While only limited quantities of these metals are consumed, their uses are numerous and diverse. It is expected that demand for many of these high tech metals will increase significantly due in part to technological innovation. Industrial uses of high tech metals include the aerospace industry, specialty steel, nuclear industry, electronics, glass, ceramics and medicine. "High tech" metals in BC are all known to occur in the Intermontane, Omineca or Foreland Belts in the central to eastern parts of the province. The study area is not considered to have favourable geology to host deposits of "high tech" metals.<sup>144</sup>

#### **5.4.5 STUDY AREA LACKS PLATINUM GROUP ELEMENTS POTENTIAL**

Platinum group elements, or PGEs (platinum, palladium, osmium, iridium) are high priced commodities which when found in abundance can make mining very lucrative. On a global scale, economic deposits of PGEs are very rare. The BC Geological Survey Branch's report, Geofile 2000-2, indicates only two known areas of platinum mineralization in the study area and two other small areas with favourable geology for PGEs. The only known in-situ occurrence for platinum in the study area is in the North Coast area. The Sea Otter showing<sup>145</sup> is located at the entrance of Alice Arm on Observatory Inlet, about 7.5 km east of Anyox. It was first discovered in 1916, and has been evaluated periodically since then. It is reported to be a site with potential for platinum group elements; however analyses have returned only traces of platinum and gold.<sup>146</sup>

<sup>144</sup> Pell, J.A. and Hora, Z.D., (1990). "High-Tech Metals in British Columbia". Information Circular 1990-19; Geological Survey Branch; Ministry of Energy Mines and Petroleum Resources.

<sup>145</sup> Minfile 103P 110.

<sup>146</sup> BCMEMPR (2000). "Platinum Group Mineral Occurrences in British Columbia". Geofile 2000-2. Geological Survey Branch, BC Ministry of Energy, Mines and Petroleum Resources.

The occurrence is very small, in a 30cm wide vein, and unlikely to be developed much more. Geologically, the study area is not a favourable environment for discoveries of platinum group elements, and it is highly unlikely there will be production of PGEs directly or as by-product.

#### **5.4.6 STUDY AREA POORLY COMPETITIVE WITH RESPECT TO INDUSTRIAL MINERALS**

The extraction of industrial minerals is not a significant component of the economic activity in the study area. The economic viability of industrial minerals in general is largely dependent on proximity to existing markets and to transportation infrastructure. The southern third of BC has well-developed transportation and industrial infrastructure, and hence the vast majority of industrial mineral production. In addition to having the highest population, southern BC hosts numerous deep water ports, a well maintained, all-weather highway system, and rail links to other industrial and terminal points to permit efficient and cost-effective long-distance movement of locally produced industrial minerals. The most significant industrial mineral trend in BC in recent years has been an increase in export of crushed stone and natural aggregate to urban centres along BC's lower mainland and along the west coast of the United States. A good example of meeting this growing demand is the \$100 million construction aggregate complex near Port Alberni which will have a capacity of 6 million tonnes per year. A similar project proposed at Bella Coola did not progress through feasibility and permitting stages.

Other economically significant industrial minerals in BC include magnesite, white calcium carbonate, limestone, silica, dimension stone, gypsum and sulphur. Lesser commodities include jade, magnetite, dolomite, barite, pumice, flagstone, clay, diatomaceous earth and zeolites. Virtually all of the operations that produce these materials are concentrated close to existing infrastructure and markets. The relative lack of established infrastructure in the study area and the remoteness from major markets are significant obstacles to developing significant industrial mineral production in the study area.

The study area has seen very minor and sporadic industrial mineral production in the past. Laredo limestone on the east side of Aristazabal Island produced about 11,000 tonnes of limestone in 1952. Proven and probable reserves calculated in 1990 are 72 million tonnes of limestone. Despite this seemingly large resource, some of the limestone is contaminated with variable amounts of iron sulphides, graphite and other minerals, reducing its market value. There are abundant sources of limestone further south from the study area that are more competitive (i.e. Texada Island) with sufficient reserves to supply nearby markets for many years to come.

#### **5.4.7 CENTRAL COAST MINING HISTORY AND POTENTIAL**

The Central Coast saw a number of small scale mining operations discovered early in the last century. These mines typically operated prior to the 1950s and were very small and short-lived producers of gold, base metals and industrial minerals. If discovered today many such deposits would not be developed. The Surf Inlet property<sup>147</sup> is a past producer located on Princess Royal Island near the head of Surf Inlet. This small mine operated discontinuously from 1902 to 1945, extracting just over 900,000 tonnes of ore. Approximately 15 companies have been involved with exploring the property since production began, including mining giants Cominco Limited and Placer Development Limited. Their results ruled out the potential for a large tonnage, low-grade gold mine.<sup>148</sup> The Surf Inlet property is currently owned by junior

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<sup>147</sup> Minfile 103H 027.

<sup>148</sup> Minfile 193H 027.

venture mining exploration company, Rupert Resources Ltd. According to their website as of the end of 2003, Rupert is focused solely on its other gold projects in Red Lake, Ontario.<sup>149</sup>

The Geological Survey of Canada studied the geology of the Central Coast intermittently in the late 1800s and early 1900s. The Geological Survey of Canada (GSC) mapped the coastal geology around Bella Coola in the 1920s.<sup>150</sup> The GSC then conducted a 1:250,000-scale mapping program in the Bella Coola area in the early to mid 1960s as part of its Coast Mountain Project.

There has been mineral exploration in the Bella Coola region for over a century. It has been relatively intermittent, with much of it focused on the few known occurrences north of the Bella Coola River. Although there has been substantial exploration in the Central Coast region, much of it has not been described in the public domain (ie. early assessment reports and corporate regional geochemical surveys). Staking affidavits filed with the Ministry of Energy and Mines indicate that many localities have been staked at one time or another over the past thirty years, however most of these tenures have lapsed and are no longer located on tenure maps. Typically, when a tenure is allowed to lapse, it indicates the geological feature or exploration target (that was originally of sufficient interest to warrant claim staking), has proven on further investigation to have low geological potential with little or no economic value.

Mineralization and other features indicative of large mineralized deposits are lacking in the Bella Coola region. The prospects documented in the Minfile database for eastern Bella Coola region are copper-molybdenum porphyry targets. The porphyry-style mineralization in this region lacks broad zones of surface rust or "gossans", and alteration associated with large mineralized systems.<sup>151</sup> It is unlikely significant or economic copper/molybdenum deposits will be discovered in this region.

One relatively new area of focused exploration is northeast of Bella Coola close to the Tweedsmuir Park border. The Nifty prospect has geological affinities with the Eskay Creek silver mine in northwestern BC, yet comparable size, grade and intensity of mineralization are lacking; claims in the area have mostly lapsed, with only 125 ha still under claim by individual prospectors. This area near the headwaters of Noosgulch River may continue to be a focus of exploration, however preliminary indications are that a deposit in this area will be relatively small.

In general, the mineral potential in the Central Coast region is considered to be low relative to other areas of the Province.<sup>152</sup>

Exploration activity along the BC coast from Vancouver to the Central Coast region of Kimsquit (head of Dean Channel) - Surf Inlet, has focused on areas closest to the Lower Mainland. Of 600 mineral occurrences in this section of the coast<sup>153</sup>, 83% fall within 200 kilometres of Vancouver. The distribution of 1112 assessment reports for the same region shows 92% of the reports have been filed within a 200-kilometre radius of Vancouver. The lack of mineral occurrences and exploration assessment reports in the Central Coast region beyond this 200 km radius has been said to be due to lack of infrastructure, difficulty in access,

<sup>149</sup> <http://www.rupert.com/s/SurfInlet.asp>

<sup>150</sup> Dolmage, V., 1925. "Tatla-Bella Coola area, Coast District, British Columbia"; Geological Survey of Canada, Summary Report for 1925, pt. A, p. 155-163.

<sup>151</sup> Daikow, L.J., et al (2003). "Geology of the Eastern Bella Coola Map Area (93 D), West-Central BC". in Paper 2003-1, *Geological Fieldwork 2002*. BC Ministry of Energy and Mines, Resource Development Division.

<sup>152</sup> Holman, G., Terry, E., and BC Ministry of Competition, Science and Enterprise, 2001. "Central Coast Land and Coastal Resource Management Plan (LCRMP) Phase 1 Framework Agreement – Socio-Economic and Environmental Assessment". Prepared in association with the Provincial Members of the Central Coast Inter-agency Planning Team.

<sup>153</sup> The project area in question for this data is as defined by Alldrick and Bellfontaine, BCMEM 2004, and covers 76 660 square kilometres of southwestern British Columbia, including Vancouver, and all of NTS map sheets 92M, 93D, 102P and 103A and parts of 92G, F, H, J, K, L, M, N.

steep topography, large glacial masses and dense coastal forest.<sup>154</sup> In other words, the financial risk involved with exploring the Central Coast region has been too great, due to the above stated reasons, relative to other parts of the province and, indeed, the world. Infrastructure, access and topography in the Central Coast region are unlikely to change in the next few decades, resulting in this area continuing as a low priority, high risk exploration target region. Compare this to the Stewart-Iskut region of north western BC with steep-walled glacially carved fjords, massive permanent ice-sheets and extreme weather conditions with prolonged winters with extremely high rainfall and snowfall, and little to no infrastructure; yet the Stewart-Iskut region is one of the richest and most explored areas in the province. Companies involved in exploration must weigh the costs and challenges involved in an area with their estimation of the potential value of target deposits. On the Central Coast, the exploration cost is high, and the potential returns are low: the investment is not justified.

Harrison conducted a detailed review of mineral potential for each of the areas proposed for protection on the Central Coast.<sup>155</sup> These areas were grouped into “zones” for purposes of analysis. As Table 5.1 shows, at the time of the analysis, there were few assessment reports (which detail the results of past exploration), mineral occurrences were generally in the lowest category, and there were only three, one unit claims (25 hectares each) in the biodiversity, restoration and First Nation lead areas of the Central Coast. Two of the units are staked for clay in Kisameet Bay, a deposit that had been used historically by First Nations peoples for medicinal purposes. The third claim is owned by an individual prospector from Richmond.<sup>156</sup> The exploration target is undocumented and undefined. It is atypical to stake a claim for only one unit if mineral potential is anticipated, suggesting that the exploration target is small and insignificant. It is therefore unlikely to cover an economic metallic mineral deposit or other deposit of economic consequence. Protecting these areas thus involves little or no loss to potential mineral sector activity.

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<sup>154</sup> BCMEM (2004). <http://www.em.gov.bc.ca/Mining/GeolSurv/Minpot/articles/midc/mid-fld.htm> website accessed Jan 2004.

<sup>155</sup> Harrison, D. 2004 “Mineral potential in biodiversity areas, First Nation lead areas, and restoration areas on the Central Coast.” Report prepared for ForestEthics, Greenpeace, Sierra Club of Canada, BC Chapter.

<sup>156</sup> Of 12 claims made by this prospector in BC, two have been abandoned, five have been forfeited, three have been cancelled, and two are in good standing (of which only 1 is in a biodiversity area).

**Table 5.1: Mineral Potential Of Areas Proposed For Protection On The Central Coast**

	Metal Occurrences	Industrial Mineral Occurrences	Mineral Occurrence Name	Mineral Occurrence Status	Mineral Occurrence Model	Claims	Assessment Reports
Zone 1	1	0	Bute	Showing	Porphyry Copper Moly Gold	NO	NO
	1	0	Pink Rose	Showing	Copper Skarn	NO	2
Zone 2	1	0	Hebrew	Showing	Copper Skarn	NO	1
	1	0	Neekas	Showing	Lead-Zinc Skarn	NO	1
Zone 3	0	1	Roscoe Inlet	Showing	Kyanite	NO	NO
Zone 4	0	1	Elcho Harbour	Showing	Graphite	NO	NO
	1	0	Dean Channel	Showing	Iron Skarn	NO	NO
Zone 5	1	0	Russ	Showing	Undetermined	NO	NO
	0	1	Swallow Creek	Showing	Kyanite	NO	NO
Zone 6	1	0	Promise Well	Showing	Iron Skarn	NO	NO
	0	1	Lagoon Bay	Showing	Volcanic glass	NO	NO
	0	1	Kisameet Bay	Past Producer	Clay	2	NO
	0	1	King Island	Past Producer	Limestone	NO	NO
	0	0	N/A	N/A	N/A	1	NO
Zone 7	0	1	Kilbella Bay	Prospect	Limestone	NO	NO
Zone 8	0	0	N/A	N/A	N/A	NO	NO
Zone 9	0	0	N/A	N/A	N/A	NO	NO
Zone 10	0	0	N/A	N/A	N/A	NO	NO
Zone 11	0	0	N/A	N/A	N/A	NO	NO
Zone 12	0	0	N/A	N/A	N/A	NO	NO
<b>TOTALS:</b>							
	7	7	N/A	N/A	N/A	3	4

#### **5.4.8 NORTH COAST MINING HISTORY AND POTENTIAL**

The mining and exploration history of the North Coast region and the Skeena and Nass River areas and regions farther north can be divided into three phases. The first phase began with the major influx of European fortune seekers to north western North America in the 1890s as a result of the Klondike gold rush. The second phase of exploration was driven by mineral requirements for the Second World War. The third phase spans the period from 1965 to the early 1980s when large-tonnage porphyry deposits were the main exploration target.

During the past century 32 mineral deposits have been mined in the northern portions of the North Coast LRMP area. The region's larger mining operations have included Anyox, Kitsault, Dolly Varden and Torbrit. Other than the northern portions of the North Coast (ie. north of Anyox Camp), the rest of the North Coast area has few mineral occurrences, reflecting generally lower mineral potential. Mining and smelting of copper at Anyox began in 1914 and continued to 1935. Depressed copper prices forced the closure of both the smelter and town site. The Kitsault mine at the head of Alice Arm was a major producer of molybdenum between 1967 and 1972 and considerable reserves of molybdenum remained in place when mining operations ceased. Stockpiled ore at Kitsault was processed in 1981-82. The town of Kitsault subsequently closed down shortly thereafter. The Dolly Varden mine operated between 1919 and 1940 and was a small but very rich producer of silver. At present, the Dolly Varden deposit does not have mineable ore reserves. Just north of the Dolly Varden is another small, high-grade silver past producer, the Torbrit mine. It produced 1.2 million tonnes of ore grading 460 grams per tonne between 1928 and 1959.<sup>157</sup> No additional mineable reserves have been established.

Although mining has reduced the original mineral endowment of the North Coast LRMP area, there are still regions of favourable mineral potential, though the potential is less than reports presented to the planning table suggested. Harrison conducted a detailed review of mineral potential for each of the areas proposed for protection on the North Coast.<sup>158</sup> In general, the region from the Anyox mining camp north to Stewart contains some of the highest potential in the study area. In total, this part of the study area includes 26 past producing mines, 14 developed prospects, 17 prospects and 136 showings. A number of deposits have been developed and limited reserves have been delineated. It is possible that some of these may yet become viable economic metal mine operations, but not without additional exploration and development, and the right combination of economic and other conditions. Challenging access to these areas due to lack of transportation and energy infrastructure, steep and locally unstable terrain and high precipitation (especially as snow) have been and will continue to be major impediments to the economic viability of mining in this region. There is a gold camp on Porcher Island that would be affected by the Sustainability Scenario<sup>159</sup>, but the resource is on the small side and the gold grade is also low. The Ecstall biodiversity area is prospective for hosting a volcanogenic massive sulphide deposit, yet despite considerable exploration effort spanning decades, a viable project has yet to materialize. However, the iron sulphide content is high in the Ecstall belt, and mining would therefore be associated with very high potential for creating acid mine drainage and heavy metal leaching that would be very difficult to control.

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<sup>157</sup> Minfile No. 191.

<sup>158</sup> Harrison, D. 2004 "Review of Metallic Mineral Potential for select biodiversity areas in the North Coast LRMP region, British Columbia." Report prepared for ForestEthics, Greenpeace, Sierra Club of Canada, BC Chapter.

<sup>159</sup> Under the assumption used in this report that all areas proposed for protection, including biodiversity areas, do not allow mining. Government has proposed that logging not be permitted but mineral development would be acceptable in biodiversity areas.



Nearly \$18 million (1986 dollars) are reported as mineral exploration expenditures in the North Coast region. However, all exploration expenditures are not necessarily reported, and only about 40 percent of the exploration activity has been recorded and compiled by government.<sup>160</sup> If this is correct, then approximately \$45 million has been spent on exploration in this region. This indicates industry previously considered the region worthy of exploration investment, based on high mineral potential, yet mineral tenures currently cover only five percent of the gross land base. The fact that the region has not had a producing mine for a quarter century indicates exploration expenditures since then have not produced a significant return on the exploration investment.

#### **5.4.9 HAIDA GWAI/QUEEN CHARLOTTE ISLANDS MINING HISTORY AND POTENTIAL**

European colonizers first explored mineral deposits on the Queen Charlotte Islands more than 150 years ago. The earliest development, the Early Bird deposit<sup>161</sup> at Mitchell Inlet was discovered in 1852 and led directly to the establishment of the Queen Charlotte Islands as a Crown colony the following year.<sup>162</sup> This venture was reported to be the first lode-mining operation in BC and was variously reputed to have yielded \$5,000 to \$75,000 in gold from only 180 tonnes (which was apparently lost in transit in a shipwreck near Cape Flattery, Washington). The ore was reportedly mined out in the short operation, but news of the discovery created excitement, which led to succeeding expeditions that failed to recover any gold.

Since then, repeated cycles of boom and bust with accompanying optimism, unreal expectation, and quiet subsidence have followed one another. Indeed, A. Sutherland Brown, geologist with the BC Dept. of Mines stated in his 1968 report, "Geology of the Queen Charlotte Islands of BC": "Vague and optimistic statements about the mineral wealth of the islands have been made at intervals for a century, but even preliminary realization has been delayed to the present." Prior to 1962, the value of all ore shipped from the Queen Charlotte Islands was not much more than one-half million dollars (1968 dollars).

Most of the past producing mines on the Queen Charlottes were very small and operated at the latter end of the 1800s or prior to 1950. There are only 6 past producing mines in all the Queen Charlottes that are outside of existing protected areas. Of these six, one mined a very small amount of slate, one was a very small beach placer (it processed the beach sands), one produced a very small amount of coal, and two mined very small amounts of gold (including the Early Bird mine mentioned above), and one produced iron .

The Tasu iron mine (Minfile 103C-003) began operation in 1966 and produced accessory copper, silver and gold as by-product until the ore was depleted and the mine closed in 1983. This was the last mine to operate in the entire study area. The mine produced a respectable 23 million tonnes of iron ore. As of 1980, drill indicated reserves were low, at 2.7 million tonnes grading 0.275 percent copper. Substantially more reserves, at the least, would need to be proved to make this deposit economic to mine. Due to global economies of scale, it is highly unlikely this property will again be an economic producer of iron.

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<sup>160</sup> Malott, M. L., 2002. "Mineral and Energy Resource Analysis Report, North Coast LRMP" Resource Analysis Report by the North Coast Government Technical Team, BC Ministry of Energy and Mines, BC Geological Survey Branch.  
( [http://srmwww.gov.bc.ca/ske/lrmp/ncoast/docs/reports/resource/mineral\\_ar.pdf](http://srmwww.gov.bc.ca/ske/lrmp/ncoast/docs/reports/resource/mineral_ar.pdf) )

<sup>161</sup> Minfile 103C-001.

<sup>162</sup> Sutherland Brown, A. (1968). "Geology of the Queen Charlotte Islands, British Columbia". Bulletin No. 54; BC Department of Mines and Petroleum Resources.

The Specogna (also known as Cinola or Harmony) is the only developed prospect (Minfile 103F-034) on the Queen Charlotte Islands of any significance. The deposit was discovered by prospectors in 1970 while prospecting along the Sandspit fault. The prospect was optioned to a succession of major mining companies during the 1970s who ultimately relinquished their interests. The property has been explored almost continuously since then, but has never gone into production, despite there being reserves of over 52 million tonnes grading 1.7 grams per tonne gold. While the deposit tonnage is large, the gold grade is considered low. Project viability, poor metallurgy and environmental concerns related to use of cyanide, elevated mercury in the deposit and potential impacts to the nearby Yakoun River and its fishery have been obstacles to permitting and production decisions in the past. There is thus a relatively low likelihood this deposit will be mined in the time frame of relevance to this study.

There are 79 mineral occurrences on the Queen Charlotte Islands that are outside of parks and open to mining exploration. Sixty-one of these are in the lowest mineral occurrence class and are referred to as showings. Five of six occurrences outside of parks are very insignificant past producers. The other past producer is the Tasu mine which operated for 17 years before being mined out and closing in 1983.

A recent study by Harrison assessed the base and precious metal mineral potential of areas under consideration as new protected areas or biodiversity areas on Haida Gwaii. The study found that except for one limited portion of one proposed protected area, there would be little to no loss in economic opportunity from excluding mining activities from proposed protected areas. At the same time, in much of those same proposed protected areas, should mining go ahead, there would be a significant risk of acid mine drainage and arsenic contamination due to geological characteristics. The assessment concluded, "The lands with the greatest mineral potential and the most promising mineral occurrences on Haida Gwaii would not be alienated by the proposed Haida protected areas reviewed in this report."<sup>163</sup>

#### **5.4.10 MINERAL POTENTIAL RATINGS FOR LAND USE PLANNING**

In order to assist land use planning, the BC Geological Survey conducted a Mineral Resource Assessment for the entire province, and a more detailed assessment for the study area. The different geologically delineated "subtracts" in the study area were given a ranking based estimates of their gross mineral value without any consideration of the costs required to mine the minerals. These ratings appear to suggest that much of the land base in the study area has very high or high mineral potential, which could imply that protecting such areas would involve forgoing economic benefits from the mining sector. However, closer examination shows that these ratings are not economically meaningful, and are generally inflated, as is shown in Appendix A: Mineral Resource Assessment Limitations. Industry itself does not seem to give the Geological Survey's rankings much weight. For instance, only 11 of the 69 mineral occurrences (16%) in the so-called high mineral potential sub-tracts in Haida Gwaii are covered with mineral claims. In fact, only one of the four developed prospects is covered with claims. Developed prospects are the next most significant mineral occurrence before a producing mine. Industry does not appear to consider these developed prospects to have much potential since they have not been covered by mineral titles. In terms of the 141 exploration assessment reports filed by industry from work in the "high" potential sub-tracts, only 18 (barely 13%) were for work completed in the 1990s. All the rest reported on work conducted from 1990 and earlier. It appears industry has thoroughly explored the region and does not have further justification to continue exploration in the "high" potential areas. No assessment reports documenting work in the "high" potential areas have been filed since 2000. The

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<sup>163</sup> Harrison, Don. 2004. Review and Assessment of the Metallic Mineral Potential of Haida Gwaii (Queen Charlotte Islands, British Columbia). Ecotech Environmental Consultants, Pender Island.

designation of high mineral potential sub-tracts on the Queen Charlotte Islands appears to be over-optimistic and, judging from the paucity of mineral claims, not supported by the exploration industry.

## **5.5 HIDDEN COSTS OF MINING**

While many early mines were operated with little or no regard for environmental consequences, and with little or no government oversight, even modern mines operated under regulations supposedly intended to protect the environment have resulted in serious environmental impacts. These impacts have economic consequences, either because other resources and economic opportunities are degraded (e.g. a fishery is closed, tourism potential is diminished) or because resources must be devoted for the clean up.

### **5.5.1 IMPACTS OF EXPLORATION**

Of particular concern in the study area, given the global significance of the region's temperate rainforest ecosystems, is the potential environmental impact of mining exploration. By its nature, exploration involves an extensive land mass. With the absence of producing mines in the study area, exploration activities are presently the main mining related activity. Exploration activities can have various degrees of environmental impact, ranging from no direct impact (satellite data and aerial surveys) to high impact (advanced exploration project with large centralized camp, multiple drill rigs operating, trenching, roads/cat trails/ATV trails, high density line-cutting, helicopter over-flights). Recent government cutbacks to the BC Ministry of Water, Land and Air Protection, as well as to the cutbacks and changes in the Ministry of Energy and Mines (i.e. Mineral Exploration Code, Mines Inspectors, Notice of Work permits, etc.) means the impacts of many exploration activities may go unchecked and unreported. If exploration takes place in areas with high ecological values, and/or with high values for other sectors that are dependent on environmental quality, the potential for exploration activities to lead to broader economic costs is very real.

### **5.5.2 ACID MINE DRAINAGE AND METAL LEACHING**

Water pollution is one of the major environmental impacts caused by mining. There are four main ways mining causes water pollution: 1) acidic drainage from mines; 2) heavy metal contamination; 3) pollution from processing chemicals; and 4) erosion or sedimentation. The worst and most serious of these are impacts caused by acid drainage from mines and heavy metal pollution.

The natural mineralization at most metal deposits and mines in the study area include sulphides which, when exposed to air and water, react to form a sulphuric acid solution containing dissolved metals. The exposure of these sulphides by mining greatly accelerates a natural process that would otherwise have taken place over eons. The exposure of metal sulphides in mine walls, tailings, stockpiled ore, waste piles, dams and roads, etc., can produce concentrated, acidic, metal-contaminated solutions. This process is generally referred to as Metal Leaching /Acid Mine Drainage (ML/AMD), and it can be very toxic to life. These toxic solutions may then flow into water systems, harming fish, fish habitat, other aquatic and land species, water quality and human health. There is potential for ML/AMD to occur in varying degrees at virtually all sulphide-rich sites.

In North America, ML/AMD has caused significant ecological damage and resulted in multi-million-dollar cleanup costs for the mining industry and governments. Once conditions conducive to ML/AMD have been created, significant environmental impacts can persist for hundreds of years. (BCMWLAP 2002). Mitigation has a number of challenges, including cost and the required longevity of the process. ML/AMD mitigation can be very expensive, with capital costs of more than \$10 million and operating

costs up to \$1.5 million per year. Longevity is a key issue since most mitigation measures must be designed, constructed and operated in a manner that allows them to perform indefinitely.<sup>164</sup> At most sites in BC, the full extent and potential cost of ML/AMD mitigation are as yet unknown.

Certain acid generating mines in BC have been violating Section 36(3) of the *Fisheries Act* for decades yet have never been prosecuted. A number of closed and abandoned mines in the study area have been identified as being acid generating or potentially acid generating.<sup>165</sup> These include, but may not be limited to: Anyox, Dolly Varden, Kitsault, Surf Inlet and Tasu. In 2000, Environment Canada inspected eleven mines across the country, three of which were closed. The Anyox mine, which is regulated under Section 36(3) of the *Fisheries Act*, registered effluent discharges exceeding permissible levels.<sup>166</sup> Surf Inlet has been noted for its relatively higher levels of arsenic, cadmium, and mercury; and Laredo for barium, mercury, and lead.<sup>167</sup> The Anyox, Jedway and Tasu mines also disposed of mine tailings directly to the marine environment when the mines were operating. It seems there has been little in the way of scientific study on the effects of the tailings disposal at these sites.

The BC wide report produced by Steffen, Robertson and Kirsten Inc. and Norecol Environmental referred to above concluded, "The data show that, with notable exceptions, the majority of higher ranked (actual or potential AMD/ML) properties occur along the coastal cordillera." The closed and abandoned mines and potential mines in study area therefore have a high likelihood of producing acid mine drainage and metal leaching, which increases the potential environmental liability surrounding these mines in addition to the long term economic and environmental costs.

Unlike most developed countries, neither BC nor Canada has a provincial or national program to clean up contaminated sites (such as the US Superfund). A recent study reviewing bonding requirements for 150 major hardrock mines in the Western United States concluded that mines operating under current standards are covered by an average bond of US \$4,400 per acre, the actual cost of reclamation will range up to \$50,000 per acre, leaving a potential reclamation shortage of over \$1 billion.<sup>168</sup> The shortfall between funds available for reclamation and the actual cost could be even more severe at BC mines.

Initially exempt from the EPA's Toxic Release Inventory, the US metal mining industry's inclusion in annual reports beginning in 2000 showed that it was by far the top polluting industry.<sup>169</sup> This pollution also implies costs on society, from contaminated groundwater to health impacts. Increasingly, the argument is made that the environmental and social costs of a mine can exceed its benefits. Economist Robert Repetto has recently shown that mining companies' financial reports did not meet legal disclosure requirements to report material risks and uncertainties due to environmental events known to management which were likely to result in changes in financial conditions and results. Had such events

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<sup>164</sup> BC Ministry of Water, Land and Air Protection. 2002. *Environmental Trends in British Columbia* 2002. Victoria.

<sup>165</sup> Steffen, Robertson and Kirsten (Canada) Inc and Norecol, 1992. *Survey of Closed and Abandoned Mines in British Columbia for Acid Mine Drainage*. Report commissioned and funded by the Resource Management Branch of the BC Ministry of Energy, Mines and Petroleum Resources under the Canada/BC Mineral Development Agreement; and by Environment Canada.

<sup>166</sup> Environment Canada, 2000. 2000 Annual Compliance Report Summary Highlights Pacific and Yukon Region; from: [http://www.pyr.ec.gc.ca/EN/Enforcement/00sum\\_high.shtml](http://www.pyr.ec.gc.ca/EN/Enforcement/00sum_high.shtml)

<sup>167</sup> Harding, L. and M. Thomas. 1987. *Baseline Sediment and Tissue Trace Metals in Barkley Sound, Quatsino Sound, Surf Inlet and Laredo Sound, British Columbia*. Environment Canada Regional Program Report 87-06. 137pp. BOX: 12.

<sup>168</sup> Kuipers, J and Carlson, C. 2000. *Hardrock Reclamation Bonding Practices in the Western United States* (Summary Report). Center for Science in Public Participation.

<sup>169</sup> Environmental Protection Agency, 2001. *Toxics Release Inventory Executive Summary*. Washington, D.C.

been properly reported, investors would have realized that the investment was more risky and/or profitability had been overstated and stock value would have accordingly been discounted.<sup>170</sup>

## **5.6 MINING'S POTENTIAL CONTRIBUTION TO ECONOMIC DEVELOPMENT IN THE STUDY AREA**

### **5.6.1 FACTORS INFLUENCING THE VIABILITY OF FUTURE MINING OPERATIONS IN THE STUDY AREA**

A number of factors determine the viability of a mining project. While the influence of such factors on each mine will be specific, some general observations and trends can be identified for the study area. In Table 5.2, these factors are assessed from the perspective of a potential mine developer. Clearly, potential mines in the study area face a number of challenges to overcome in order to be competitive.

**Table 5.2: Factors Influencing Viability Of Mining Operations And Study Area Ratings**

<b>Factor influencing mine viability</b>	<b>study area observations</b>	<b>Trend +/-</b>
Sustained reserves above minimum grade cut-off and size of deposit large enough to reach economies of scale and low unit costs	Past experience suggests few quality deposits have large reserves; no large reserves presently delineated in the study area	-
Continuity of deposit (i.e., as opposed to faulted or separated pods of mineralization)	Dependent on deposit type: vein deposits have been small and discontinuous; strataform deposits have had multiple small lenses, some faulted; porphyry deposits cut by dykes and irregular masses of uneconomic rock	-?
Sustained high metal recoveries with relatively low cost metallurgical processing and low levels of harmful elements that could lead to smelter penalties	Many deposits with complex metallurgy and frequent presence of harmful elements.	-
Acceptable environmental consequences	Being in a region recognized globally for its ecological values, exploration and mining will have to operate at the highest environmental standards and avoid impacts on protected areas. Mines in area have high ML/AMD potential.	-
Acceptable development costs	Development costs generally high.	-
Consistent and affordable energy and fuel supply	Energy often not readily available, though in some areas hydro-electric potential exists	-
Consistent and affordable transportation infrastructure	Transportation infrastructure generally lacking	-
Potential for mine structure failures (human/environmental disasters)	Complex terrain presents engineering challenges; parts of region tectonically active; high snowfall on coastal mountains creates added challenges and costs.	-

<sup>170</sup> Repetto, Robert. 2004. *Silence is Golden, Lead, and Copper: Disclosure of Material Environmental Information in the Hard Rock Mining Industry*. Yale School of Forestry.

<b>Factor influencing mine viability</b>	<b>study area observations</b>	<b>Trend +/-</b>
Affordable bonding requirements	BC's bonding requirements are inadequate, and hence affordable to industry (though while positive for industry, this creates a liability for the province, local First Nations and communities).	+
Qualified labour force	Will largely need to come from outside the study area.	-
Manageable tax regime and timely cost recovery	BC's tax regime very favourable to mining industry.	+
Consistent or adequate cash flow to maintain on-going mining exploration	Mine specific.	?
Acceptance of mining project by local First Nations, communities and other stakeholders	Will require that mine achieves highest standards in planning, operations and engaging First Nations and communities.	?

### **5.6.2 LOCAL RETENTION OF BENEFITS FROM MINING**

Mining, along with logging, is often portrayed as a sector that "built" BC. The industry commonly refers to this history while asserting its continuing importance to the BC economy and arguing against impediments to future mines. While it cannot be denied that mining historically has been an important factor in provincial and regional development, in many instances the costs of proceeding with a mine can exceed the benefits.

Many current and former mining-dependent communities rate their share of the benefits from mining as woefully inadequate. This is particularly true of First Nations communities.<sup>171</sup> The boom/bust cycle involved with mining, the sudden influx of cash into communities unused to high incomes, and the disruptive work patterns often required in the mining industry, can all lead to many negative social impacts, especially where careful efforts to engage the community in planning and mitigation are not undertaken. Thus, while prospects for mineral development in the study area are modest, the economic implications should a mine proceed are not clearly positive.

With no producing mines in the study area for many years, most of the specialized labour required should a mine proceed will come from outside the region, and more than likely leave (taking retirement savings with it) when the mine closes. Indeed, many mine employees would likely commute from outside the study area, further reducing the degree to which benefits are retained locally.

Based on a consideration of geology, past mining activity, and the global context, the mining sector is unlikely to play a significant role in generating employment and wealth in the study area.<sup>172</sup> Setting

<sup>171</sup> Kuyek, J. and Coumans, C. 2003. *No Rock Unturned: Revitalizing the Economies of Mining Dependent Communities* MiningWatch Canada.

<sup>172</sup> One recent economic assessment of mining potential done in the study area (BriMar Consultants Ltd. and Finisterre Holdings Inc. 2003. *EGSA Minerals Sector Study* (March). Report prepared for the Coast Information Team) suggests the study area could see vast levels of activity from the mineral sector. However during peer review this study has been shown to be based on unrealistic assumptions and flawed economic analysis (See: Power, T., 2003. "Review of CIT minerals documents: Memo to A. R. Dobell, CIT Peer Review Chair." October 7 and also Hodge, R.A., Fraser, D., McPhie, M., Thomson, I., 2003. "Review of the Coast Information Team Economic Gain Spatial Analyses: Minerals Sector Study." 10 October 2003.) and it was not accepted as a final report by the client, the Coast Information Team, due to quality concerns and issues raised in the peer review. Furthermore, it fails to incorporate a sound understanding of the region's geology relative to ore deposit models. The fact that it projects that at any given point over the next 50 years, there would be more metal mines than exist in all of BC is indicative of its highly unreliable results.

aside the relatively unimportant issue of industrial mineral development, perhaps one or two moderately sized metal mines will go ahead in the North Coast portion of the study area in the next few decades. In the best case scenario, if such mines are developed properly, with careful environmental controls, restoration plans and impact benefit agreements, local First Nations and communities have the potential to retain modest benefits.

Unfortunately, there are all too many examples of mines where the actual legacy, despite the best efforts of proponents, has been a degraded environment that results in a liability that impedes future economic development and imposes costs on communities. Because there is no national or provincial funds or capacity to deal with abandoned mines or environmental contamination caused by mining, local communities are often left to deal with the toxic legacy of mines, or frequently, to cope and live with the contamination and its impacts on their health and the health of their children.

### **5.7 MINING SECTOR PROSPECTS WITHOUT THE SUSTAINABILITY SCENARIO**

Without the Sustainability Scenario, the mining industry retains the ability to explore and develop mines in all but those areas that were protected as of April 2001. While this increases the available landbase, since most of the landbase in question has little likelihood of being developed, and since there are currently no mines operating in the area, and mineral exploration is at low levels, this entails little boost to the mining sector. At the same time, without the Sustainability Scenario, the mining industry's "social licence to operate" is likely to be more tenuous, especially given the failure this would imply in terms of securing the areas' global ecological values. Campaigns against proposed mines might take place, and the industry would have less certainty over the outcomes of investments.

### **5.8 MINING SECTOR PROSPECTS WITH THE SUSTAINABILITY SCENARIO**

With the Sustainability Scenario, the mining sector loses access to an additional proportion of the landbase. However, this still leaves a substantial area within which exploration and mining are permissible, including the areas that are most likely to contain commercially viable deposits. The study area has not shown that its mineral endowment is globally competitive, and little exploration activity is underway. With the Sustainability Scenario, the mining industry's "social licence to operate" is improved, as there is greater likelihood that the areas' ecological integrity will be maintained. Communities may be more likely to accept proposed mines given the implications of EBM to resource development in the study area.

The Sustainability Scenario also reduces the probability that a marginal or poorly managed mine would proceed in the study area and harm the areas rich natural assets and other sectors that depend upon environmental quality. The likelihood of foreclosing upon other economic activities is thus much reduced, as is the potential liability faced by society when a mine causes an environmental disaster that subsequently needs to be remediated.

### **5.9 IMPLICATIONS OF THE SUSTAINABILITY SCENARIO TO THE MINING SECTOR**

Given the above information, the implications of the Sustainability Scenario to the mining sector in the study area, and its contribution to local and provincial economic development, can be summarized as follows:

- While the study area has had over a century of mineral exploration, there has not been a producing mine of any significance for nearly a quarter century. All metal production occurred in the study area from the early 1900s to 1983. Mine production has drawn down the study area's mineral endowment, leaving fewer economic mineral deposits to be found.

- ❑ Since the last mine operated in the study area, mining sector fundamentals have considerably changed and new regions of the world with a relatively untapped mineral potential compete to supply the global economy with minerals. These conditions favour development of large, world class deposits that require high levels of capital investment allowing them to compete by achieving low unit costs. Most historic mines in the study area were too small to be competitive under today's conditions.
- ❑ There has been a general trend in BC over the past 20 years towards decreasing numbers but larger mining operations and declining mining employment.
- ❑ Exploration efforts by the Canadian mining sector have expanded to foreign, under-explored frontier regions where the return on exploration investment (discovery potential) is greater than in the study area.
- ❑ Economic contributions to the region from the mineral sector (i.e., exploration) have been minimal for over two decades. As there are no operating mines, implementing the Sustainability Scenario does not affect the existing level of mining activity and would have minor implications to the level of exploration expenditures.
- ❑ For the most part, existing studies, data from exploration and development and mining performance in the study area lead to the conclusion that the known mineral endowment is relatively low and globally uncompetitive.
- ❑ Mineralization in the study area tends to be concentrated in a few relatively small and well-demarcated mineral belts. New protected areas have been proposed with this knowledge in mind, and are thus not likely to foreclose upon potential mines that would be economically viable.
- ❑ The study area is not geologically compatible to hosting economically significant deposits of coal, diamonds, platinum group elements, or "high-tech" metals.
- ❑ Considering the provincial government's regional geochemical coverage for the study area, the BC Geological Survey's MineMatch program exhibits very few geochemical clusters that correlate with mineral deposits currently sought after in BC or that could occur in the study area.
- ❑ There are few, if any, mineral deposits with defined reserves in the study area that could be put into production without a significant and sustained increase in the price of metals (which is unlikely).
- ❑ The methodology used in determining mineral potential in the study area by the Geological Survey has lead, as the BC mining industry acknowledges, to an over-estimation of the area which is rated as having high or very high mineral potential, which may bias land use planning. Although the Sustainability Scenario appears to foreclose upon a number of areas shown to have 'high' mineral potential, the ratings cannot be relied upon and are largely contradicted by available data and actual performance.
- ❑ From a societal standpoint, the economic benefits of mining are often much lower than the sales, jobs, exploration expenditures, corporate earnings and government revenue numbers would suggest. This is because the environmental impacts of mining can be extensive, and the costs of correcting Acid Mine Drainage, or restoring damaged ecosystem services, are a cost to society that reduces the overall benefits. Furthermore, revenues to government from the mining sector are offset by generous tax breaks for investments in exploration. The cost of excluding mining from areas with high ecological value is therefore lower than might otherwise be estimated.
- ❑ Should a mine go ahead in the study area without the Sustainability Scenario being in place, only a small proportion of the benefits of mining are likely to be retained locally in the study area. While nearby communities will experience some minor benefits of increased economic opportunities within the mining sector, this is likely to be accompanied by declines in other sectors that rely upon the same land base, as well as the drawbacks resulting from global price



cycle fluctuations, the boom/bust nature of the mining sector, the societal disruption of sudden wealth, and a resource development process typically dictated by outside investors.

- ❑ The EBM approach involved in the Sustainability Scenario – so long as it is not weakened to accommodate the mining sector – would increase the likelihood of communities being tangibly involved in any mining project that went ahead, would improve the “social license to operate” of mining companies, and would increase incentives to develop the mine in an environmentally and socially responsible manner.
- ❑ The discovery of new, world class mineral deposits in the study area, should they exist, will require increasingly more time, energy, technology and exploration expenditures. Mining is therefore very unlikely to aid in addressing the short term economic needs of Coastal First Nations and communities.

Consequently, most relevant factors suggest that it is unlikely that mining will play a significant and sustained role in the economic development of the region. Furthermore, since the protected areas network that makes up the Sustainability Scenario was designed considering existing claims of high mineral potential, the creation of these new protected areas is likely to have limited impact on the extraction of mineral wealth from the study area and the generation of economic benefits such as jobs and government revenues. Protection status that excludes all mining exploration and development can therefore be provided to all new proposed protected areas at little or no cost to society. Finally, by adopting the Sustainability Scenario, the mining sector benefits from increased investor confidence as uncertainty is reduced.

## **6.0 ECONOMIC IMPLICATIONS TO THE TOURISM SECTOR UNDER THE SUSTAINABILITY SCENARIO**

### **6.1 INTRODUCTION**

The above sections on logging and mining strongly suggest that the economic implications to these sectors of implementing the Sustainability Scenario are significantly less than might have been anticipated, and even provide some advantages to these sectors. For the tourism sector, the Sustainability Scenario creates an enabling environment for the tourism sector. In this section of the report, two types of potential “gains” for the tourism sector from the Sustainability Scenario are analyzed. The first “gain” assessed is the loss in existing economic activity should the Sustainability Scenario NOT be implemented. That is, if harvesting of the land base is permitted and protection and EBM principles not established, what decrease in tourism activity would be expected? Since this decrease would represent real losses in GDP, jobs, domestic incomes and government revenues, this decrease must be accounted for. The second “gain” assessed is the increase in economic activity due to investment in new tourism facilities directly attributable to implementing the Sustainability Scenario. While it is somewhat difficult to define exactly how much of any increase over time will be due to the Sustainability Scenario, it is clear that implementing the Sustainability Scenario will:

a) provide greater certainty to wilderness tourism firms in the form of protecting one of their major assets (the surrounding land base), thereby enabling long-term planning and investments; and

b) make available to qualified investors in wilderness tourism facilities the Conservation Financing and Socially Responsible Investments funds. These funds, offered only if the Sustainability Scenario is implemented, will encourage a significant level of new investment that would not take place in the absence of the Sustainability Scenario.

These two assessments are examined below, but first a brief sub-section is offered outlining the present tourism conditions in the world, in British Columbia and on the BC Coast and expectations for the future.

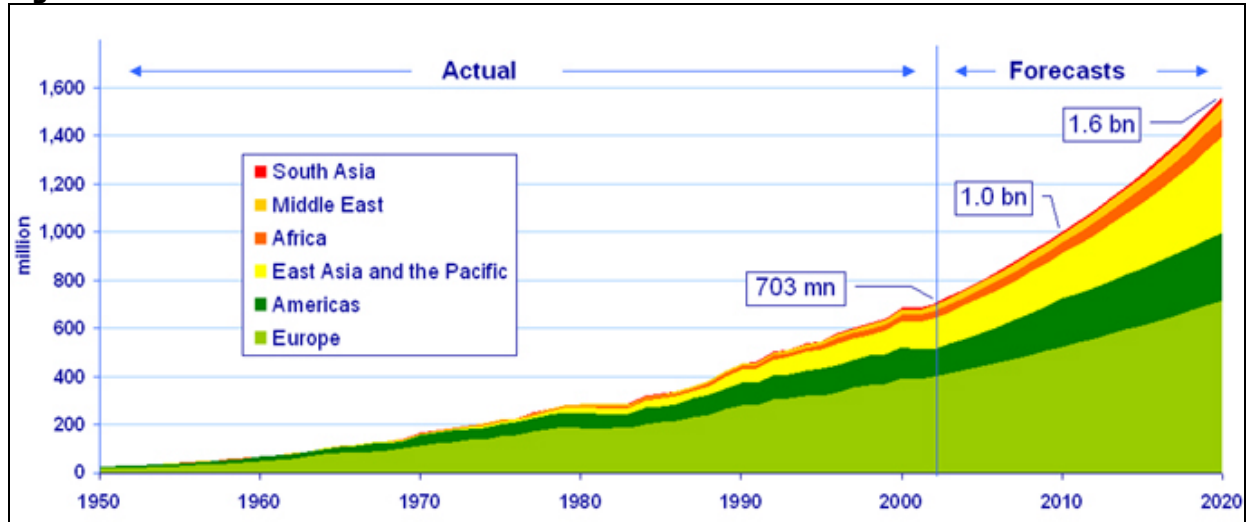
### **6.2 TRENDS IN TOURISM**

#### **6.2.1 GLOBAL TOURISM TRENDS**

Despite the shock of September 11, 2001, which seriously impacted world-wide tourism and especially visitor arrivals to North America, the expected long-term trends in overall tourism throughout the world are still very positive. Indeed, according to the World Tourism Organisation (WTO)<sup>173</sup> world international travel is expected to be almost triple by 2020 vs. 1995 and more than double 2020 vs. 2002, increasing from 565 million travellers in 1995 to just over 700 million in 2002 to over 1 billion in 2010 and to almost 1.6 billion by 2020. This translates into a long-term annual growth rate of 4.1 percent between the years 1995 to 2020 (3.2% 2002 vs. 1995, 4.6% 2010 vs. 2002, and 4.5% 2020 vs. 2010), significantly faster than the overall world economy. International arrivals in the Americas are forecast to grow at an annual rate of about 3.9 percent over the 1995 to 2020 period. These trends are shown in Figure 6.1 with the raw data presented in Table 6.1.

<sup>173</sup> WTO website: [www.unesco.org/baltics/world\\_tourism\\_organization.htm](http://www.unesco.org/baltics/world_tourism_organization.htm)

**Figure 6.1: Forecast of International Arrivals to the Year 2020**



**Table 6.1: International Arrivals by Region**

WTO Tourism 2020 Vision: Forecast of Inbound Tourism, World by Regions						
International Tourist Arrivals by Tourist Receiving Region (million)						
	Base Year	Forecasts		Average Annual Growth Rate (%) 1995-2020	Market share	
	1995	2010	2020		1995	2020
<b>World</b>	<b>565.4</b>	<b>1,006.4</b>	<b>1,561.1</b>	<b>4.1</b>	<b>100</b>	<b>100</b>
Africa	20.2	47.0	77.3	5.5	3.6	5.0
Americas	108.9	190.4	282.3	3.9	19.3	18.1
East Asia and the Pacific	81.4	195.2	397.2	6.5	14.4	25.4
Europe	338.4	527.3	717.0	3.0	59.8	45.9
Middle East	12.4	35.9	68.5	7.1	2.2	4.4
South Asia	4.2	10.6	18.8	6.2	0.7	1.2
Intraregional (a)	464.1	790.9	1,183.3	3.8	82.1	75.8
Long-Haul (b)	101.3	215.5	377.9	5.4	17.9	24.2

Source: World Tourism Organization (WTO) © (Actual data as in WTO database July 2000)

Notes: (a) Intraregional includes arrivals where country of origin is not specified  
(b) Long-Haul is defined as everything except intraregional travel

### 6.2.2 TOURISM TRENDS IN BC

Tourism in British Columbia has struggled over the last few years. The year 2003 was a particularly poor year for the province, with tourism experiencing the largest decline in visitor volume since 1987, which was itself a reflection of the very high visitor volumes enjoyed during Expo 1986. The decline last year was a response to a variety of events, both world-wide and specific to BC, that are unlikely to affect tourism in the long-term. These include the start of the Iraq war in March; the rapid appreciation of the Canadian dollar; the spread of SARS (Severe Acute Respiratory Syndrome) especially in Ontario, but also affecting Vancouver; the single case of BSE (Bovine Spongiform Encephalopathy) which had an unprecedented impact on farming incomes; and, of course, the wildfires that spread across much of the BC Interior and single-handedly brought wilderness tourism to a halt in many of the fire-ravaged areas. Assuming that similar major events do not occur in 2004 (e.g., an outbreak of human-to-human transmission of Avian Flu), Tourism BC forecasts that overnight visitor volumes will increase by some 2.8

percent in 2004 to a level of 22.5 million visitors and that overnight revenues will increase by 5.1 percent, reaching \$9.4 billion.<sup>174</sup>

A recent study by Tourism BC<sup>175</sup> assisted by the present author has estimated that clients of wilderness tourism operations (excluding non-commercial recreational activities) spent over \$900 million in the province of BC in 2001 and that this activity generated almost \$430 million in direct GDP (over \$780 million in total – direct+indirect+induced – GDP), created close to 14,000 direct person-years of employment (20,750 total person-years) and provided some \$50 million to provincial coffers (\$78 million in direct+indirect+induced provincial revenues). Over half of this spending is due to coastal activities such as saltwater fishing, boat charters, ocean sports (ocean kayaking, scuba diving, etc.) and other marine activities. And it is also true that a large number of coastal tourism clientele spend considerable sums in other centres of the province (e.g., Vancouver, Victoria) that are not accounted for in the above data.

Of course, a good deal of this spending takes place in areas outside the study area. Nevertheless, it is clear that coastal tourism activities are an important contributor to local economies along the coast. It is also true that wilderness tourism activities generate higher value added (GDP) and employment per dollar of spending than other tourism sectors (e.g. hotels, restaurants) and that tourism in general generates more value added and employment per dollar of spending than the general economy. This is an important consideration in regions that are desperately in need of long-term quality jobs requiring outdoor skills.

### **6.2.3 TOURISM TRENDS IN THE STUDY AREA**

There are no comprehensive data available describing tourism in the study area. Some estimates have been made for the Central Coast (\$64 million in spending in 1996) and a recent Socio-Economic Analysis of the North Coast region suggested that there are approximately 1,300 tourism-related jobs in the region. However, these data exclude a number of wilderness activities, and generally under-estimate the value of tourism to each region.<sup>176</sup> Anecdotal evidence based on room revenue data and the number of lodges newly completed in the region, however, suggests that tourism activity has been increasing in the study area.

In terms of the outlook for wilderness tourism, there are no explicit forecasts available. However, Tourism BC is suggesting that visitor arrivals from the US and Europe, the markets most likely to provide wilderness tourist clients, are expected to grow somewhat faster than overall tourism, by 4.0 percent and 3.2 percent respectively. Anecdotal evidence suggests that the wilderness tourism sector, with exception to regions directly affected by the fires, did not suffer the declines that more urban-based tourism suffered. The reasons behind this are variously explained by fewer tourists travelling overseas for their wilderness experience and, in place, selecting BC, and the fact that many wilderness tourism clients are, by nature, prepared to put up with greater difficulties in order to have a wilderness experience.

While this study focuses on the wilderness tourism potential, the study area is also important for the Cruise ship traffic from Seattle/Vancouver up to Alaska, and to the self-guided recreation sector.<sup>177</sup> The Sustainability Scenario contributes to protecting the viewscape on the Inland Passage route taken by the major cruise ships, benefiting both Vancouver's tourism industry, and the nascent cruise ship related sector in Prince Rupert. As well, pocket cruise ships have more flexibility as to where they travel, and the clientele are more interested in nature viewing and cultural experiences and are willing to pay

<sup>174</sup> [2004 Tourism Outlook](#). Tourism BC, March 2004

<sup>175</sup> [Economic Value of the Commercial Nature-Based Tourism Industry in British Columbia](#), Tourism BC, September, 2004

<sup>176</sup> See, for example, [North Coast Multi-Day Nature-Based Tourism Industry: An Economic Profile](#), prepared by Pacific Analytics Inc. for the North Coast Backcountry Caucus

<sup>177</sup> People who are self-sufficient in the area, not needing a local guide or outfitter, such as those using private sailboats or kayaks to visit the area.

accordingly. The Sustainability Scenario goes beyond a visual quality approach and addresses ecosystem integrity, thereby contributing to the viability of the pocket cruise industry. The Sustainability Scenario also entails advantages to the self-guided recreation sector.

### **6.3 STRATEGIC VISION FOR WILDERNESS TOURISM IN THE STUDY AREA**

In general, to achieve economic success in the tourism industry, four key strategies must be pursued:

1. **Growth based on market position:** To maintain a high rate of growth, the industry must develop a market position based on the study area's unique attributes.
  - The product must be kept current. If the product is old and out dated and so incapable of supporting growth, no amount of marketing will deliver growth. For the study area, this means that sufficient investment funding must be available to develop new product;
  - The product must be competitive in terms of being able to deliver what visitors in that market segment are looking for, as measured by high rates of visitor satisfaction. For the study area, this means that the pristine nature of the wilderness product must be maintained; restoration should be undertaken where the landscape has been degraded by previous industrial development;
  - The product must be targeted at attractive markets in which it can out compete its rivals. The marketing of the product must bring out what is distinctive and competitive about the product. The study area is well situated to take advantage of the fastest growing segment of tourism – nature-based, experiential activities – and to attract relatively high income, well-established clientele.
2. **Enhancing the visitor experience:** In order to sustain and improve the study area's market position, the product must deliver a quality visitor experience that is unique and distinctive. The need to preserve and develop the unique assets – natural, cultural, historic and built- must take centre stage in the visitor experience offered. The current relatively sparse number of destination lodges capable of attracting international clientele must be carefully expanded, gaps in the activities offered enhanced through mobilising additional investment, the competitiveness of smaller lodges improved and the visitor experience made more rewarding and diverse through increasing the types and quality of activities and other entertainment available.
3. **Community-based development:** Local communities must play a major role in defining, developing and managing the tourism experience. Local residents should come to view the industry as inclusive, belonging to and benefiting them and the synergies between tourism and other industries should be maximised. To increase the sense of ownership of the industry, it is essential that the benefits of the growth of the industry be spread more widely. In addition, the linkages with arts and crafts, agriculture and small businesses generally need to be improved. Improving the linkages with other sectors would help also to increase the role played by tourism as a lead industrial sector in pulling through other sectors of the economy and so its effect on economic development generally.
4. **Environmental Sustainability:** The environment is the product. The industry must contribute to the preservation of the natural habitat. This, of course, is key for the study area, as virtually all of the existing and potential tourism relates directly to wilderness experiences.

Addressing the aforementioned strategies is imperative if the study area is to achieve its tourism potential. A necessary, although not sufficient condition for achieving this, is the adoption of the Sustainability Scenario. The Sustainability Scenario, along with the investment funds that will accompany adoption, will provide the necessary foundation in order to market the unique natural and cultural attributes of the region.

## **6.4 TOURISM SECTOR WITHOUT THE SUSTAINABILITY SCENARIO**

### **6.4.1 WILDERNESS TOURISM**

With its abundant fishing resources and outstanding natural attributes the coastal regions of British Columbia have tremendous potential to increase their wilderness tourism activity. Yet, because of the relatively isolated nature of most coastal areas that increases operation costs substantially, it is acknowledged by all tourism operators that the major asset required to realize this potential is a relatively pristine landscape and a sound environmental base. Without these assets, it is unlikely that many existing businesses, especially those catering to higher-end clientele, will be able to continue to command the premium rates that enable these operations to overcome their high operating costs and to continue in the long run. As such, protection of the land base is imperative to existing operations.

Under a business-as-usual land management regime, that is, without the Sustainability Scenario, it is likely that a major degradation of the land base and environment will occur and that this degradation will have a significant impact on existing fishing lodges and other wilderness tourism operations. Hence, in order to determine the benefit of the Sustainability Scenario, it is necessary to determine the negative impacts on existing businesses if the areas are not protected.

Before continuing, it should be repeated that the mandate of this report is not to provide a detailed quantitative estimate as to the trade-offs between adopting or forgoing the Sustainability Scenario. Rather, it is to gather and evaluate information to determine which outcome is most likely to be economically advantageous to the people of the study area and to the province as a whole. With that in mind, this sub-section of the report will attempt to provide some reasonable measurement of the potential losses to the tourism sector if the Sustainability Scenario is not adopted, by examining one generic tourism operation. These results can then be used as a reasonable proxy, with some adjustment, for study area-wide impacts.

In the case of the Central Coast agreement, the tourism sector was involved in developing the Sustainability Scenario, and has signed on to the final land use plan forwarded to the provincial and First Nation governments. It is assumed here that likewise on the North Coast and Haida Gwaii, the tourism sector will be satisfied with the Sustainability Scenario. In other words, the combination of new protection areas and the adoption of EBM together are sufficient to protect the natural amenities upon which the tourism sector depends.<sup>178</sup>

According to data provided in the Socio-economic and Environmental Assessment of the Central Coast Land and Coastal Resource Management Plan (LCRMP) Phase I Agreement Framework<sup>179</sup>, there are approximately 50 floating and land-based fishing lodges in the Central Coast Plan Area, with another 42 marine charter companies.<sup>180</sup> Unfortunately, there are no estimates of the value of these operations either to the local economy or to the province. Consequently, it is necessary to use other available information that provides a reasonable picture of the value of these operations. For this purpose, we use data from the North Coast Study of fishing lodges and marine charters, since the tourism operations analyzed in that study closely resemble the types of operations on the Central Coast.<sup>181</sup>

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<sup>178</sup> Note that a qualifier is needed here, in that only current tourism operators were represented at the table, and their primary motivations would have been to protect their existing investments by reaching a workable trade-off that would allow consensus with other sectors. The interests of entrepreneurs who might have set up a tourism operation sometime in the future had the level of protection been higher may not have been taken into account.

<sup>179</sup> Holman, G., Terry, E. and Ministry of Competition, Science and Enterprise, 2001. *Socio-economic and Environmental Assessment of the Central Coast Land and Coastal Resource Management Plan (LCRMP) Phase I Agreement Framework*. Final Report. July.

<sup>180</sup> The Central Coast region is used as an example. Conditions in the North Coast and Haida Gwaii/Queen Charlotte Islands are similar and the conclusions reached in this section should apply equally to those regions.

<sup>181</sup> Pacific Analytics Inc., 2003. *North Coast Multi-Day Nature-Based Tourism Industry: An Economic Profile*. Prepared by for the North Coast Backcountry Caucus.

The North Coast Study found that the average income generated by lodges ranged from roughly \$500,000 to \$3 million, while the average income for marine charters was between \$200,000 and \$300,000. Even if we choose a lower range average income of \$1 million and \$200,000 respectively, the income accruing from lodges and charters on the Central Coast in 2002 amounted to approximately \$60 million.

The Socio-economic and Environmental Assessment report for Phase I of the Central Coast LRMP found that some 14.3% of currently operating tourism facilities are situated in existing Preservation/Retention VQO zones while another 5.1% are located in existing Parks/Recreation Areas.<sup>182</sup> Consequently, roughly 80% of facilities are in Partial Retention and Modification VQO zones. The report also notes that "at least 90% of those relatively pristine lands would be open to roaded development leading to increased risks to some backcountry operations."<sup>183</sup>

It is clear from the Phase I report than many of the fishing operations on the Central Coast could be at risk if preservation is not implemented. The question then becomes: if these areas are not preserved, what negative impacts could be expected?

In 2002, the BC Ministry of Forests conducted a "visual quality study" using Nimmo Bay (a wilderness lodge) as a test case. One aim of the study was to assess the response of patrons to differing levels of visual quality, in order to determine the loss in clientele (and hence revenues) due to reduced visual quality. The study revealed that, of the total number of clients who would return under a Preservation scenario (no visible alterations), 23% would not return under a Retention regime (not more than 1% disturbance; human-caused alterations are evident but subordinate and not dominate). Another 29% would not return under a Partial Retention system (not more than 5% disturbance; human-caused alterations are visible, but not evident), while 65% would not return under a Modification regime (human-caused alterations are dominate but have natural appearing characteristics).<sup>184</sup>

Without the Sustainability Scenario, some 80% of existing tourism facilities falls in areas that come under the Partial Retention and/or Modification regimes. Consequently, if protection (i.e., the Sustainability Scenario) is not adopted in these areas and some logging takes place, any facilities located within the perspective view would likely loose a minimum of 30% and as much as 65% of their clients.

The loss of a minimum of 30% of clients does not merely represent a loss of 30% in revenues; the impact on profits is considerably higher. This is partly because most variable costs (wages, guest supplies, etc.) would likely decline at a lesser rate (the Nimmo Bay study assumes a 25% reduction in clients results in a 15% reduction in costs). In addition, fixed costs such as insurance, taxes, financing costs represent a significant proportion of overall costs, are just that: fixed and do not fall because of a decline in the number of clients.

Using the detailed financial information from the North Coast Study and reducing client revenues by 30% and variable costs by 17.5% resulted in large, unsustainable losses. The (not surprising) conclusion is that any landscape alteration that reduces client revenues by 30% is likely to result in closure of the particular facility. Of course, closure of one facility may mean that some of the clients who would have accepted a less pristine landscape could be enticed to visit another facility in the area whose perspective view has not been altered. Nevertheless, in the event that Partial Retention/Modification VQOs are implemented in a region, one could expect, at the very minimum, that there would be a loss for the entire region of at least 30% of existing revenues and perhaps as high as 65%.

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<sup>182</sup> On page 20.

<sup>183</sup> On page 19.

<sup>184</sup> It is interesting to note that similar studies in 1996 and 1997 by the Ministry of Forests found that participants accepted up to 5.9% and 4.7% alteration for clear-cutting in the perspective view, while in 2002, this acceptance fell to 1.7%. Thus the studies provide clear evidence that the threshold for altered landscapes is falling and, conversely, that the value of pristine wilderness is

Table 6.2 below highlights the total operational impacts to the economy from one average wilderness tourism operator. If the failure to adopt the Sustainability Scenario implies that the lodge is no longer viable, economic activity will be reduced by approximately the amount shown.

**Table 6.2: Economic Impacts Of A Single Average Wilderness Tourism Operation**

	Direct	Indirect	Induced	TOTAL
<b>Tourist Expenditure</b>	\$1,309,231			
<b>Commercial Tourism Output</b>	\$1,206,615	\$312,000	\$77,308	\$1,595,923
<b>GDP (Value-Added)</b>	\$431,154	\$135,308	\$142,154	\$708,615
<b>Employment (FTEs)</b>	6.4	2.4	2.2	11.0
<b>Provincial Taxes and Levies</b>	\$42,538	\$15,538	\$6,385	\$64,462

Source: North Coast Multi-Day Nature-Based Tourism Industry: An Economic Profile

In addition, operators need to invest each year in capital assets in order to maintain their establishments. The average economic impacts of this annual investment are highlighted in Table 6.3 below. Again, if the failure to adopt the Sustainability Scenario implies that the lodge is no longer viable, economic activity will be reduced by approximately the amount shown.

**Table 6.3: Economic Impacts Of Annual Capital Investment**

	Direct	Indirect	Induced	TOTAL
<b>Investment Expenditure</b>	\$30,538			
<b>Investment Output</b>	\$29,231	\$12,385	\$4,231	\$45,846
<b>GDP (Value-Added)</b>	\$24,231	\$5,615	\$2,385	\$32,231
<b>Employment (FTEs)</b>	0.2	0.1	0.1	0.4
<b>Provincial Taxes and Levies</b>	\$1,308	\$1,462	\$308	\$3,077

A number of complicating factors make the analysis more difficult. There will be instances where the failure to adopt the Sustainability Scenario does not mean that the operation must close down, but rather that its level of activity, profitability, employment and contribution to GDP will be significantly reduced. Also, given that it takes time for industrial development to alter the landscape, it may take a few years, or even a decade or more, before industrial development encroaches upon the landscape that the tourism operation depends upon. Furthermore, some existing operators are well served by already existing protected areas, and will not suffer any negative consequences if the Sustainability Scenario is not implemented – indeed, they may even benefit from increased business as competitors are negatively impacted by development.

Despite the above qualifiers, the conclusion of this sub-section is that by failing to adopt the Sustainability Scenario, longer-term annual losses to the local economy could easily reach in the neighbourhood of \$1.31 million in revenues per operation affected and a total (direct, indirect plus induced) impact on GDP of \$740,000. Furthermore, some 11 direct jobs would be at risk. If some 10 to 20 operations were affected throughout the study area, the annual loss would be significant.

#### **6.4.2 CRUISE SHIP INDUSTRY**

The Cruise Ship Industry on the BC Coast is comprised of two segments: the large, Alaskan-bound ships travelling from Seattle and Vancouver through the inside passage and eventually to points in Alaska; and the pocket cruise industry that use smaller ships (usually less than 100 passengers) that tend to travel many of the smaller passages and exploit pristine areas that are inaccessible by other means. The fact that many of these vessels stop at various small ports along the coast suggests that the pocket cruise industry has an important place in expanding and diversifying the economic base of the coastal economy.

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increasing (page 14). This is a powerful argument that BC's wilderness tourism industry is likely to increase its value-added in the future and will generate returns to the province well outpacing normal inflation.



Historically, the large cruise ship industry has been based out of Vancouver or Seattle and ships have travelled directly to Alaskan ports. However, with the development of a new cruise ship terminal in Prince Rupert, a number of larger cruise ships will begin day-stopping at the Prince Rupert Port in 2004. At present, 36 arrivals are confirmed for 2004 comprising some 60,000 passengers.<sup>185</sup> Large cruise ship passengers often disembark to take part in onshore activities; the average spending by similar passengers in Alaskan ports ranges from US\$55 to US\$125. With expected spending of CAN\$85 per passenger, spending in the Prince Rupert area could exceed \$2.5 million in 2004. As this activity increases in the medium term (10 years out), it is projected that this spending could add \$35 million to the Prince Rupert economy each year.

The pocket cruise industry appeals to clientele seeking somewhat more adventurous, isolated outings, very often demanding viewsapes that are untouched and have an abundance of wildlife and plant life for viewing and photographing. In addition, there is a growing demand for cultural experiences hosted by First Nations communities. The pocket cruise industry using the port of Prince Rupert has experienced significant growth in the last few years, increasing from just 4 arrivals in 1997 to 20 arrivals in 2001 to 35 arrivals in 2003, the latter serving over 3,000 people, many of whom disembarked to visit the city and to partake in nature-based activities such as whale watching and ocean kayaking. There are no data available to estimate the average or total spending by pocket cruise clients in Prince Rupert or in other regions on the coast. However, it is generally felt that the pocket cruise industry has significant potential to generate economic activity in many coastal areas.

The Provincial Government is well aware of the importance of the cruise ship industry to its tourism strategy and to the overall economy. Indeed, the province has been instrumental in forming the "Cruise British Columbia Initiative", a strategy group comprised of federal, provincial, municipal and industry stakeholders. Recently, this group has commissioned a coastal cruise ship strategy paper aimed at growing the cruise ship industry and ensuring that coastal regions benefit from this growth.

While the cruise ship industry is poised to add significantly to the BC coastal economy, it must be recognized that a key attraction of coastal cruising is the opportunity to see and experience the unique, pristine attributes of the north. If passengers are exposed to viewsapes that are fundamentally altered from this expectation – or if there is public awareness that the wildlife and forests of the area are imperilled or the subject of a contentious public campaign because the environment of the area is being damaged – it is likely to hinder the growth of the industry.

Without the Sustainability Scenario, some additional degradation of the viewscape on the Inside Passage route taken by the major cruise ships can be expected. In addition, there would be an increased likelihood of campaigns being initiated that taint the Coast's image as a place with wilderness secure from development. Publicity describing environmental degradation in the area will further erode BC's image as a steward of the environment. It is difficult to assess the extent to which this could reduce large cruise ship traffic on the Coast, or cruise-related traffic in Prince Rupert. Pocket cruise ships have more flexibility as to where they travel, and therefore continued industrial development of the landbase may not be a big an issue to their clientele. However, it is also true that tourists who take part in pocket cruising are generally more discerning. This could reduce the ability of First Nations with territories impacted by development to build businesses that service the pocket cruise industry.

### **6.4.3 SELF GUIDED RECREATION**

Technically, non-commercial recreational activities such as hiking, self-guided kayaking and recreational boating and fishing do not add to the province's GDP, since there is no explicit price attached to partaking in the activity. On the other hand, recreational tourists do add to the economy through the

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<sup>185</sup> Socio-Economic and Environmental Assessment of Interim Scenarios developed by the North Coast LRMP Table as of January, 2004, Volume I: Socio-Economic Analysis

purchase of goods and services required to participate in the activity. These goods and services may be as diverse as the cost of recreational equipment to the cost of travelling to and from the recreation location to the cost of food and beverages.<sup>186</sup>

It is difficult to determine with great accuracy the level of recreational participation in the study area and how much these recreationists contribute to the local economies. However, a recent study commissioned by the Outdoor Recreation Council of British Columbia<sup>187</sup> suggests that recreational activities in the study area are an important contributor to both the local and provincial economies, involving some 75,000 users and 1.4 million user days:

*Based on the analysis described in this report, it is concluded that self-guided outdoor recreation is a significant activity in the coastal study area. It is estimated to contribute approximately \$55 million annually to the provincial economy. In spite of relatively low populations and the lack of proximity to markets, the area caters to a range of activities. Recreational pursuits take place in all seasons and throughout the three LRMP regions.<sup>188</sup>*

Furthermore, it is recognized that the demand for these activities is growing at the same time that the areas preserved for such activities close to urban areas are shrinking and/or becoming more densely used by ever-growing urban populations. As a consequence, the demand for protected areas outside the urban periphery is expected to continue its expansion. This increase in demand may be particularly important to local populations on the coast, since servicing the recreationist, through the sale of goods and services (e.g., food and beverages, trail guiding), First Nations interpretations, and the like could represent an important component of First Nations economies.

While not all of these recreationists would be affected by the failure to implement the Sustainability Scenario, it should be noted that nature study/wildlife viewing was responsible for almost 90 percent of the activities, that is, nearly one million user days, followed by saltwater fishing at 220,000 user days, with boating in third place at 72,000 boater days. Given the large number of recreationists partaking in nature viewing, it is likely that a large proportion of those users will find their experiences on the Coast gradually diminishing as the landscape is altered by further industrial development.

Without the Sustainability Scenario, the seascape and landscape that is so enticing to self-guided recreationists will be at greater risk. This will displacement will cause some recreationists to travel elsewhere, to reduce their activities in the study area, or may cause crowding in the smaller number of protected areas.

## **6.5 TOURISM SECTOR WITH THE SUSTAINABILITY SCENARIO**

### **6.5.1 WILDERNESS TOURISM**

Implementing the Sustainability Scenario will increase tourism sector-related economic activity in the region (and in the province) as a result of new tourism investment.<sup>189</sup> This investment would be due to the Sustainability Scenario because, with the existence of a protected landscape and an EBM approach to logging, entrepreneurs will be more likely to treat protected areas and environmental quality as assets. This, in turn, would entice entrepreneurs to provide greater risk capital for a new tourism development. This is especially true given the socially responsible investment funds and venture capital available under the Sustainability Scenario. This incremental investment would have short and long term impacts on the

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<sup>186</sup> The availability of high quality landbase in which to pursue these activities also adds to the quality of life of BC residents, adding to BC's competitiveness as a desirable place to work, to invest, and to retire, and thus indirectly adding to province economic activity.

<sup>187</sup> Economic Impact Analysis Of Outdoor Recreation On British Columbia's Central Coast, North Coast And Queen Charlotte Islands/Haida Gwaii, prepared for the Outdoor Recreation Council of BC, prepared by Economic Planning Group, November 2003.

<sup>188</sup> Economic Planning Group 2003. *Economic Impact Analysis Of Outdoor Recreation On British Columbia's Central Coast, North Coast And Queen Charlotte Islands/Haida Gwaii*. Prepared For: Outdoor Recreation Council Of British Columbia.

<sup>189</sup> There are other, non-pecuniary benefits such as greater local self-sufficiency, etc. that may be associated with the Sustainability Scenario land use regime.

number of tourism jobs, local incomes and government revenues, to say nothing of the positive, non-pecuniary effects on local social well-being and self-sufficiency.

#### *6.5.1.1 New Tourism Facilities Under The Sustainability Scenario*

It is clear from a number of studies that the world demand for more pristine wilderness experiences is increasing and that the high-value added nature of the BC Coast experience can only be expected to expand.<sup>190</sup> The issue for expansion on the Coast is with the availability of adequate capital to finance new operations and the marketing wherewithal to ensure adequate clients. Since the Coastal areas of British Columbia are staged to participate in a significant inflow of investment capital in the form of the Conservation Investment and Incentives Initiative (CIII) if the Sustainability Scenario is implemented, it suggests that there is significant opportunity to expand the wilderness-based tourism sector in the region. Indeed, the CIII strategy explicitly expects that a portion of these CIII monies will be available to develop sustainable wilderness tourism operations, if the proposed facility satisfies strict business viability tests and meets social and environment checks.

To begin the analysis, let's assume the development of a single (generic) "average" destination facility, catering to fishing clientele but having a relatively diversified set of activities available to guests. In order to determine the economic impacts of this facility over the next twenty years, it is necessary to assess the impacts of the (one-time) construction activity and the impacts of the annual facility operations.

In the North Coast Study, detailed financial information was provided by 13 multi-day nature-based tourism facilities on the North Coast, seven of which were fixed roof (floating and land-based) and another six were guided boat charters. Some of these were quite high end operations, catering to relatively affluent clients and providing high-end fishing and other wilderness activities, while others were strictly aimed at the sport-fishing client. Of the earned sports revenues, approximately 84% came from saltwater fishing, another 7% from fresh water fishing, and the remainder from land-based summer and ocean sports activities.

Given the high cost of construction and operations of most facilities on the Coast, it should be expected that most new investment will go to relatively high-end operations, catering to similar client demographics as those included in the North Coast Study. Indeed, a number of new, high-end operations have been developed in the Coastal region over the last years with such characteristics. It can be assumed with some confidence, then, that the capital costs, operations and average financial structure of these 13 facilities represent a reasonable facsimile of the type of operations that likely will be built in the study area in the future. As such, one can use the average impacts from the North Coast Study to approximate the gain to the economy of locating a new facility near a protected area or, alternatively, the loss to the economy if the area in question were not protected and the facility never built.

#### *6.5.1.2 Construction Impacts*

The construction capital costs of each facility will be unique, depending on location, type (fixed floating, moveable floating, land-based, vessel only, etc.), on the number of guests being housed, and on the level of amenities being offered. While there are some ad hoc estimates of required capital investment for destination lodges,<sup>191</sup> for the purposes of this study, the actual average capital costs

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<sup>190</sup> This increase in demand abstracts from the difficulties experienced in BC coastal fish stocks. While "fishing" will remain an integral part of most wilderness lodges on the Coast, there is a strong movement toward other wilderness-based experiences, including kayaking, whale-watching, First Nations experiences, etc. Indeed, of the 7 fixed roof lodges assessed in the North Coast Study, some 15% of revenues came from non-fishing activities.

<sup>191</sup> The Tourism Opportunity Study (TOS) suggests "several million dollars", while the Destination Lodge Building Block developed by the Ministry of Sustainable Resource Management has values of \$350,000 to \$2 million.

(adjusted to 2003 dollars) of the North Coast fishing facilities are used.<sup>192</sup> This construction capital value is \$1.85 million.

In order to determine the economic impacts of this capital investment on the provincial economy, this capital cost was run through Statistics Canada's BC Input Output Model. The results are highlighted in Table 6.4. The construction of a new wilderness tourism facility on the coast will generate approximately \$600,000 in direct GDP, create almost 13 direct jobs, and contribute \$36,000 in provincial government revenues.<sup>193</sup> When all spin-offs (indirect and induced impacts) are included, the construction will generate some \$1.21 million in provincial GDP, create 24 new jobs, and contribute \$88,000 in provincial government revenues.

**Table 6.4: Economic Impacts Of One-Time Construction Investment**

	Direct	Indirect	Induced	TOTAL
<b>Investment Expenditure</b>	\$1,850,000			
<b>Investment Output</b>	\$1,436,665	\$630,912	\$485,680	\$2,553,258
<b>GDP (Value-Added)</b>	\$605,575	\$338,395	\$269,713	\$1,213,682
<b>Employment (FTEs)</b>	12.8	6.1	4.6	23.5
<b>Provincial Taxes and Levies</b>	\$35,893	\$33,698	\$18,034	\$87,625

Source: North Coast Multi-Day Nature-Based Tourism Industry: An Economic Profile

### 6.5.1.3 *Impacts Of Annual Operating Activities*

Each year a wilderness tourism facility will generate economic activity based on the number of clients and the type of amenities offered. In order to estimate the approximate impacts of this activity, the North Coast Study data are once again used as a proxy for Coastal development. According to that Study, the average facility services approximately 315 guests during the year, amounting to roughly 1,431 client-days. With average daily spending of \$915, this represents approximately \$1.31 million in client expenditures. Of course, it is difficult to assess the number of new facilities that would or could be built on the Coast in the coming years. Nor is it easy to determine the number that would not be built if the surrounding viewscape is not protected. Nevertheless, Table 6.5 provides the normalized benefits to the economy if a single facility is built due to implementing the Sustainability Scenario.

**Table 6.5: Economic Impacts of a Single Average Wilderness Tourism Operation**

	Direct	Indirect	Induced	TOTAL
<b>Tourist Expenditure</b>	\$1,309,231			
<b>Commercial Tourism Output</b>	\$1,206,615	\$312,000	\$77,308	\$1,595,923
<b>GDP (Value-Added)</b>	\$431,154	\$135,308	\$142,154	\$708,615
<b>Employment (FTEs)</b>	6.4	2.4	2.2	11.0
<b>Provincial Taxes and Levies</b>	\$42,538	\$15,538	\$6,385	\$64,462

Source: North Coast Multi-Day Nature-Based Tourism Industry: An Economic Profile

The above data represent the benefits to the provincial economy for one year. A wilderness tourism facility as described above, however, offers a stream of returns over the years to both owner and the economy. In order to determine the contribution of the facility to the economy over a twenty year period, the present value (discounted at 5%) of impacts were calculated and are presented in Table 6.6 below.

<sup>192</sup> The costs highlighted here combine both lodges and vessels.

<sup>193</sup> The direct impacts generally reflect the impacts on the local economy, although some workers may be brought in from outside. There also may be a small amount of indirect and induced impacts assigned to the local economy, but this split is difficult to determine with the data available.

**Table 6.6: Present Value of Lodge Operations over 20 Years, 5% Discount Rate**

	Direct	Indirect	Induced	TOTAL
<b>Tourist Expenditure</b>	\$16,315,909			
<b>Commercial Tourism Output</b>	\$15,037,095	\$3,888,210	\$963,425	\$19,888,729
<b>GDP (Value-Added)</b>	\$5,373,130	\$1,686,233	\$1,771,551	\$8,830,914
<b>Employment (FTEs)</b>	79.6	29.9	27.8	137.3
<b>Provincial Taxes and Levies</b>	\$530,123	\$193,644	\$79,566	\$803,333

A single tourism operation as characterized above, will generate \$16.3 million in (discounted) tourism expenditures over a twenty year period, contribute almost \$5.4 million in direct GDP, and put over \$0.5 million into provincial coffers. When all spin-off impacts are included (indirect and induced) the total contribution to provincial GDP is over \$8.8 million and the contribution to provincial government revenues exceeds \$0.8 million. At the same time, some 80 person-years of direct work and 137 person-years of total work are created.

Annual operations are not the only source of economic activity stemming from a wilderness tourism facility. These facilities also spend considerable dollars refurbishing their lodges and purchasing capital equipment such as boats. The average annual investment per operation in the North Coast is highlighted in Table 6.7 and the discounted 20-year contributions to the economy in Table 6.8.

**Table 6.7: Economic Impacts Of Annual Capital Investment**

	Direct	Indirect	Induced	TOTAL
<b>Investment Expenditure</b>	\$30,538			
<b>Investment Output</b>	\$29,231	\$12,385	\$4,231	\$45,846
<b>GDP (Value-Added)</b>	\$24,231	\$5,615	\$2,385	\$32,231
<b>Employment (FTEs)</b>	0.2	0.1	0.1	0.4
<b>Provincial Taxes and Levies</b>	\$1,308	\$1,462	\$308	\$3,077

**Table 6.8: Present Value Of Annual Capital Investment Over 20 Years, 5% Discount Rate**

	Direct	Indirect	Induced	TOTAL
<b>Investment Expenditure</b>	\$380,577			
<b>Investment Output</b>	\$364,280	\$154,340	\$52,725	\$571,344
<b>GDP (Value-Added)</b>	\$301,969	\$69,980	\$29,718	\$401,667
<b>Employment (FTEs)</b>	2.9	1.2	1.2	5.3
<b>Provincial Taxes and Levies</b>	\$16,297	\$18,214	\$3,835	\$38,345

The impacts highlighted in these Exhibits, while certainly not as great as for the annual operations, do indicate that the annual capital asset investment activity do contribute to the economy, increasing total provincial GDP by roughly \$400,000 over the 20 year period and providing some \$40,000 in provincial government revenues.

Given the above assessment, it is now possible to estimate the 20 year discounted value of a new wilderness facility, taking into account the one-time construction costs, the annual operating costs, and the annual refurbishment costs. These impacts are highlighted in Table 6.9.

**Table 6.9: Total Benefits Over 20 Years, 5% Discount Rate**

	Direct	Indirect	Induced	TOTAL
<b>Total Benefits</b>	\$18,546,486			
<b>Total Output</b>	\$16,838,040	\$4,673,461	\$1,501,830	\$23,013,331
<b>GDP (Value-Added)</b>	\$6,280,673	\$2,094,608	\$2,070,982	\$10,446,263
<b>Employment (FTEs)</b>	95.2	37.2	33.6	166.1
<b>Provincial Taxes and Levies</b>	\$582,313	\$245,556	\$101,435	\$929,304

Over the twenty-year period, a single typical wilderness tourism facility will generate \$6.3 million in direct local GDP and over \$10.4 million in total provincial GDP. In addition, the provincial government will gain a total of \$0.9 million in (discounted) revenues over the same period.

It is difficult to predict how many already established lodges would be “saved” as a result of implementing the Sustainability Scenario. Likewise, it is difficult to project the number of new lodges that would be constructed if the land were adequately protected and financing funds are available. In a recent study for the Sea-to-Sky LRMP process, the Table consensus was that, with protection, the backcountry areas would likely see up to twelve new high-end lodges (and a number of medium-end lodges) constructed in the next five to ten years. While the present study is not specifying a specific projection of new lodge construction, it is likely that implementing the Sustainability Scenario will result in very significant provincial impacts and substantial provincial government revenues.

### **6.5.2 CRUISE SHIP INDUSTRY**

As noted earlier, the cruise ship industry in British Columbia depends greatly on an unaltered viewscape in order to attract an ever-growing number of passengers who are seeking to see the central and north coast and its majestic landscape in its natural state. The Sustainability Scenario contributes to protecting the viewscape on the Inside Passage route taken by the major cruise ships, benefiting both Vancouver’s tourism industry, and the nascent cruise ship-related sector in Prince Rupert.

Pocket cruise ships have more flexibility as to where they travel, and the clientele are more interested in nature viewing and cultural experiences and are willing to pay accordingly. The Sustainability Scenario goes beyond a visual quality approach which itself is integral to the viability of the pocket cruise industry and addresses ecosystem integrity, thereby contributing to the long-term growth and competitive advantage of the pocket cruise industry.

Although it is not possible to quantify the impacts that protecting the coastal viewscape and maintaining ecosystem integrity will mean to the coastal cruise ship economy, it is possible to say with confidence that adopting the Sustainability Scenario with its attendant protected areas and eco-system based management of those areas where timber harvesting will be permitted, will doubtless enhance the long-term competitiveness of the industry. Furthermore, the Sustainability Scenario will enhance the opportunities of the local population, particularly First Nations, to provide goods and services to cruise ships and their passengers. Given the availability of conservation funds for investment in socially productive initiatives if the Sustainability Scenario is adopted, the potential for furthering the economic development of local populations is significant.

### **6.5.3 SELF GUIDED RECREATION**

The growth in backcountry recreation is increasing due in part to population growth and, as well, due to the growing congestion in recreation areas relatively close to BC’s major urban areas. As a consequence, it can be expected that the number of people wishing to take part in recreation activities in the rural coastal regions of BC will increase, as long as the expectations of recreationists – relative isolation, no overcrowding and unaltered sea and landscape – are met.

Just as adopting the Sustainability Scenario will enhance the opportunities for the local population to supply goods and services to the cruise ship industry, the protection of the seascape and landbase will assist in expanding and enhancing the recreation possibilities in the study area and, with the assistance of investment funds, will enable the local population to develop businesses that cater to self-guided recreationists and their needs.

## **6.6 IMPLICATIONS OF THE SUSTAINABILITY SCENARIO TO THE TOURISM SECTOR**

The coastal regions of British Columbia generate significant tourism revenues from a variety of nature-based tourism operations, ranging from high-end fishing lodges, to lodges catering to wildlife viewing, to ocean kayaking adventures, to cruise ships to the provision of high-value recreational activities. While much of this revenue accrues to companies and individuals residing elsewhere in British Columbia, significant incomes are earned by residents of the coastal regions. As well, the employment opportunities afforded by nature-based operations and their local suppliers represent important economic diversification and add significantly to social well-being of local populations.

These incomes represent an important share of overall incomes and employment in the study area, particularly now that the timber sector has undergone a structural decline in activity that is unlikely to rebound in the future. Clearly it is important that any land use strategy recognize the importance of wilderness tourism to the coastal regions and implement plans and programmes that will enhance and grow the industry.

The Sustainability Scenario provides clear and unambiguous benefits to the wilderness tourism sector, which also happens to be the sector with the best growth potential in the study area. Since the Sustainability Scenario protects a greater proportion of the landbase, ensures that industrial development that does occur takes an EBM approach, and provides direct links to investment funds that can be used to further develop local businesses that service wilderness tourism activities, adopting the Sustainability Scenario will unambiguously contribute to an expanded tourism sector in the coastal regions.

A consequence of this is that the Sustainability Scenario will generate considerable increase in long-term employment, GDP and government revenues. While this sector has its limitations, such as seasonal employment and many lower-wage positions, it also has the ability to create jobs in many different communities. In addition, many of these jobs, such as guiding, will be compatible with local values and work preferences, such as the ability to go out on the land. Finally, the provision of significant investment funds through the adoption of the Sustainability Scenario will result in the creation of new businesses owned by locals, enhancing overall entrepreneurial skills which, in turn, is expected to contribute to the continued economic and social development of the region.

## 7.0 OTHER SECTORS AND THE SUSTAINABILITY SCENARIO

### 7.1 CONSERVATION SECTOR

The creation of new protected areas in the study area as a result of the Sustainability Scenario, and the availability of annuity payments from the Conservation Investment and Incentives and Initiative to pay for First Nation workers to help protect and manage these protected areas, will create 85 jobs in the study area.<sup>194</sup> Unlike jobs in for instance the mining sector which often are held by non-locals, these jobs are likely to match closely with the values of First Nations workers, as the work involved is stewardship of the land that builds upon local ecological knowledge, with much work time spent out of doors. The jobs will be based in the First Nation's traditional territories, providing employment where it is most urgently needed. These are likely to be highly sought after positions.

### 7.2 THE SHELLFISH AQUACULTURE SECTOR

The shellfish aquaculture industry on the British Columbia coast has become one of the leading community-based industries, and it is poised for rapid expansion if economic conditions are right. Due to its unique ties with coastal First Nations culture, further commercial expansion of the industry offers the advantages of sustainable, environmentally sensitive economic development in coastal communities where long term, relatively high skilled, well paid employment is desperately needed.

While it's clear from a number of recent studies that the shellfish aquaculture industry has huge potential for growth<sup>195</sup>, there are limiting factors to expansion for areas further north of the Sunshine Coast. These limiting factors include, beside the perennial problem of the lack of capital funds, the need for better product marketing, transportation difficulties due to the more isolated nature of sites, the need for greater training of staff, and increased investment in biotoxin monitoring. There are a total of 67 sites in the study area which are considered suitable for shellfish aquaculture. Despite transportation costs being a comparative disadvantage for study area shellfish operations, this disadvantage is offset by advantages in labour savings and the ability to set up larger operations.

While the preservation of forested lands proposed in the Sustainability Scenario will contribute to maintaining the integrity of inshore marine ecosystems, it will have limited direct impact on the growth and viability of shellfish aquaculture. What is of vital importance, though, is the Sustainability Scenario linkage to the Conservation Investments and Incentives Initiative (CIII), which potentially may offer direct solutions to or mitigation of many of the limiting factors, and obviously has the potential to provide significant investment funds for further development. The recent assessment of shellfish aquaculture potential on the coast suggests that between 200 and 350 local jobs could be supported by shellfish aquaculture over the next five to ten years, of which 100 would be in processing in Prince Rupert and Bella Bella. A more in-depth business plan for developing shellfish aquaculture potential in twelve Central and North Coast First Nation communities shows that 282 full time equivalents could be created, with total annual wages of \$7.5 million, and further solidifies the finding that shellfish aquaculture would be viable so long as investment capital is available and the appropriate management structures and financial controls are put in place.<sup>196</sup> Without adoption of the Sustainability Scenario, it is likely that shellfish aquaculture in the study area will expand more slowly and modestly.

<sup>194</sup> Redstone Strategy Group, 2003. *Coastal BC Economic Development: Phase Two Final Report Part 1*. Report to the Conservation Investments and Incentives Initiative.

<sup>195</sup> *First Nations Shellfish Aquaculture Regional Business Strategy*, prepared by Kingzett Professional Services Ltd. et al.

<sup>196</sup> Ecotrust, Kingzett Professional Services Ltd., Larry Greba and Associates, TBNC Consulting and Prince Rupert Economic Development Commission, *Central and North Coast Shellfish Aquaculture Business Plan*. Prepared on behalf of the First Nations of the Central and North Coast of British Columbia.



### **7.3 NON-TIMBER FOREST PRODUCTS**

While conventional wisdom identifies the economic value of forests with timber products, it is also true that BC coastal forests often contain a multitude of other products that are economically valuable, both for generating wage income and in meeting the subsistence needs of local First Nations and communities. Non-timber products collected for commercial gain include items such as wild food and nutraceutical/medicinal mushrooms, plant-based pharmaceuticals, biocides, and floral greenery for use by retail flower vendors. In 1997, this sector is estimated to have generated \$680 million in revenues BC-wide, and supported a total of 32,000 seasonal and part-time jobs; the sector is expected to have grown since then. This success is in spite of being marginalized, without effective regulations to control harvesting, without protection of NTFP interests as forest management plans are developed, and without security of tenure for harvesters. The Forest Practices Board emphasizes that with coordinated government policies, regulations or and economic development strategy, the sector could be considerably expanded.<sup>197</sup>

The market for NTFPs is large. It is estimated that the nutraceutical and herbal supplement industry, one of the markets for NTFPs, had world-wide sales of US\$12 to US\$18 billion in 2002, and has been experiencing growth rates in the 10% to 12% range over the past few years.<sup>198</sup> With recognition of the possibilities from NTFPs and sufficient support, not only in infrastructure development, but also in land use policies, then it is possible that there could be a significant increase in the coastal NTFP sector.<sup>199</sup> For instance, pine mushroom harvesting has the capability of creating 30 additional jobs in the Central and North Coast.<sup>200</sup>

Non-timber forest products have a strong link to First Nations culture. In a comparable vein as the shellfish aquaculture industry, commercial development of the non-timber forest products sector offers similar advantages of sustainable, environmentally sensitive economic development in coastal communities where long term, relatively high skilled, well paid employment is required.

Clearly, such an increase in industry activity is predicated on the entrepreneurial skill of producers, the capability to market products at a scale sufficient to generate profitable returns, and the ability to raise risk capital for expanding and enhancing the product and its manufacturing capacity. Adoption of the Sustainability Scenario is an integral part of any strategy to expand the sector in large part due to the linkages to the Conservation Investments and Incentives Initiative (CIII) funds. Given the economic nature of the non-timber forest products sector (an emerging but still poorly defined international market for many non-timber forest products, locally-oriented production, relative isolation from main markets, and small production runs), the necessity of dedicated risk funds to finance growth is imperative.

Besides access to risk capital, a necessary pre-requisite for any further development of the industry is the maintenance of a relatively non-industrialized forest area associated with the growing stock of non-timber forest products. This does not mean, of course, that the entire study area must be de-industrialized in order to promote the potential gains from non-timber forest products. It does mean, though, that those areas within the study area, which have a high suitability rating for such non-timber forest products and whose location will provide local communities with the benefits stemming from the industry should be dedicated to non-industrialized logging.

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<sup>197</sup> Forest Practices Board, 2004. *Integrating Non-Timber Forest Products into Forest Planning and Practices in British Columbia*. Special Report. FPB/SR/19. May.

<sup>198</sup> *Non-Timber Forest Products Economic Gain Spatial Analysis*, prepared for the Coast Information Team, prepared by Cognetics International Research, August 2003

<sup>199</sup> *Economic Strategy to Development Non-Timber Forest Products and Services in BC*, prepared by Russell Wills and Richard Lipsey, 1999; quoted from *Non-Timber Forest Products Economic Gain Spatial Analysis*, Op. cit.

<sup>200</sup> Redstone Strategy Group, 2003. *Coastal BC Economic Development: Phase Two Final Report Part 1*. Report to the Conservation Investments and Incentives Initiative.

#### **7.4 IMPLICATIONS OF THE SUSTAINABILITY SCENARIO TO THE OTHER SECTORS**

A diversity of other business activities, such as artisanal crafts, small high-tech operations, and local renewable energy projects, could create a total of 190 new jobs in the study area as a result of financing enabled and opportunities created through the Sustainability Scenario.<sup>201</sup>

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<sup>201</sup> Redtone Strategy Group, 2003. Op cit.

## **8.0 CONCLUSION**

This generally qualitative economic assessment of the Sustainability Scenario has shown that economic prospects in the study area under business-as-usual practices are limited. Given the current levels of unemployment on the coast, the limited economic opportunities in most coastal First Nations and communities, and signs of social distress, this is particularly troublesome.

The timber industry in the study area is on the decline, and the resource base upon which it depends has been drawn down as industry has sought to maximize return and survive under difficult market conditions. To survive, the coastal timber industry has made clear that it will continue efforts to shed jobs, to increase productivity and to cut costs. It will also be under pressure to continue to access the higher value timber and shun low value stands, but with each year, as the timber stocks are drawn down further, the flexibility to do so declines. The mining sector is essentially dormant in the study area, and a major resurgence should not be anticipated. The tourism sector has grown and is now an important generator of wealth and employment, but without the Sustainability Scenario, its future is uncertain. The non-timber forest products sector is a newer player whose full potential has yet to be realized.

### **8.1 ECONOMIC DEVELOPMENT SHOULD TAKE STRUCTURAL TRENDS INTO ACCOUNT**

The best strategy to promote future economic development in an increasingly globalized economy is to implement policies and business strategies that are based on understanding and working with underlying trends and structural changes.

For the timber sector, these structural changes imply that prices on international markets are unlikely to show sustained improvement; increasing production from non-traditional producers will put pressure on traditional suppliers; the demand for higher cost industrial roundwood from old growth will continue to decline; and growing consumer sensitivity to environmental concerns will put pressure on producers to show that wood products were produced under ecologically-sound management principles. Within the study area, the original endowment of timber has been drawn down, especially as the industry has reacted to difficult market conditions by harvesting the best and most profitable timber, and the remaining timber is more difficult and expensive to access. The structural changes limit the potential economic contribution of the timber sector if the Sustainability Scenario is not implemented.

With respect to the mining sector, structural changes that have taken place in the international arena also hinder the resurgence of the mining sector in the study area. These changes favour large scale mines that are able to achieve low unit costs, but typically require large capital investment. Exploration dollars are focused in underexploited regions of the globe more recently amenable to mining investment, and areas where world class deposits have the greatest probability of being discovered and brought into production. While some portions of the North Coast show significant mineralization, the study area is generally low potential when compared against other regions of the world with significant mineral endowments.

Trends in nature-based tourism, in contrast, indicate that the demand for wilderness-based tourism experiences, particularly those in pristine areas, is growing. As these relatively inaccessible areas continue to diminish around the world, demand will outstrip supply, leading to opportunities to develop high value-added operations catering to high-end clientele if the landscape and seascape are adequately protected.

## **8.2 TIMBER SECTOR**

Most of the workers living outside of the study area whose jobs are dependent on flows of timber from the study area to feed their processing facilities are not likely to lose their jobs as a result of the Sustainability Scenario. This is because even with a coast-wide undercut, many logs are being exported unprocessed. Timber sector jobs are already at risk from global competition, the pressure for productivity improvements, and the falldown to a second growth harvest.

The analysis also suggests that the Sustainability Scenario alternative would provide the timber industry in the study area with longer-term stability, adequate profitability, and preferential market access, albeit with a modest decline in volumes of timber harvested. Although the EBM approach implies that the AAC will drop, this is of limited economic significance since there has been a substantial undercut on the Coast, and the study area AAC is unlikely to be reached except perhaps during brief peaks in the market cycle. The timber being locked up by protection under the Sustainability Scenario is largely of marginal economic value as a timber resource, but of high economic value for its conservation values. The Sustainability Scenario may well lead to improve timber industry employment in portions of the study area as it will enable more constructive engagement between timber companies and local First Nations and communities, and innovation in the application of EBM.

From a provincial revenue perspective, the Sustainability Scenario implies considerable conservation gains, for moderate reduction in provincial revenue (less than \$20 million per annum, declining over time) from timber industry activities. This is in part because of the undercut, while cutting timber of marginal or negative economic value does not contribute significantly to revenues or to economic welfare. In the North Coast, revenues do not offset the cost of the province to oversee timber industry activities.

In addition, the adoption of EBM principles will help ensure that coastal timber products will continue to have access to world markets that are increasingly focused on environmental practices, and timber harvested under EBM is likely to qualify for certification. The Sustainability Scenario also improves confidence over land and resource allocation for the timber sector.

## **8.3 MINING SECTOR**

While the study area has had over a century of mineral exploration, there has not been a producing mine of any significance since 1983. Most historic mines in the study area were too small to be competitive under conditions dictated in global markets.

Economic contributions to the region from the mineral sector (i.e., exploration) have been minimal for over two decades. As there are no operating mines, implementing the Sustainability Scenario does not affect the existing level of mining activity and would at most have minor implications to the level of exploration expenditures and its allocation across the study area.

Mineralization in the study area tends to be concentrated in a few relatively small and well-demarcated mineral belts. The study area is not geologically compatible to hosting economically significant deposits of coal, diamonds, platinum group elements, or "high-tech" metals. Due to the distance to markets and the lack of infrastructure, and cheaper sources closer to market, industrial minerals in the study area are generally not competitive. There are few, if any, mineral deposits with defined reserves in the study area that could be put into production without a significant and sustained increase in the price of metals. The market will not make mining in the study area more attractive in coming decades. If a deposit is not currently economically viable, it is unlikely to be viable within the next few decades; if the Sustainability Scenario implies that such below investment grade deposits will no longer be exploitable, society's economic welfare is not diminished.

Consequently, most relevant factors suggest that it is unlikely that mining will play a significant and sustained role in the economic development of the region. Furthermore, since the protected areas network that makes up the Sustainability Scenario was designed considering existing claims of high mineral potential, the creation of these new protected areas is likely to have limited impact on the extraction of mineral wealth from the study area and the generation of economic benefits such as jobs and government revenues. With the possible though uncertain exception of some small portions of proposed biodiversity areas at the north end of the North Coast, protection status that excludes all mining exploration and development can therefore be provided to all new proposed protected areas and biodiversity areas at little or no cost to society. Arguments that past land use planning scared off mining sector investment in BC lack empirical support. Indeed, with the adoption of the Sustainability Scenario, the mining sector would benefit from increased confidence in investment outcomes.

#### **8.4 TOURISM SECTOR**

The Sustainability Scenario provides clear and unambiguous benefits to the wilderness tourism sector, which also happens to be the sector with the best growth potential in the study area. It protects a greater proportion of the landbase, and ensures that industrial development that does occur takes an EBM approach. This would protect the amenities upon which the tourism sector depends.

The Cruise ship industry, and in particular the pocket cruise industry, stand to benefit from the Sustainability Scenario. The Sustainability Scenario also benefits the self-guided recreationist and the businesses that supply this growing market.

The Sustainability Scenario will therefore contribute to an expanded tourism sector, and generate considerable employment, GDP and government revenues. While this sector has its limitations, such as seasonal employment and many lower-wage positions, it also has the ability to create jobs in many different communities. Some of these jobs, such as guiding, will be compatible with local values and work preferences, such as the ability to go out on the land.

#### **8.5 OTHER SECTORS**

The Sustainability Scenario also creates the conditions under which funds can flow under the CIII, enabling investment in a variety of enterprises which will assist in creating local employment, generating government revenues, and diversifying the economy. The Non-Timber Forest Product sector, the shellfish aquaculture sector and other emerging sectors stand as likely to particularly benefit. The Sustainability Scenario also enables the creation of many new First Nations jobs in the conservation sector, thanks to Conservation Financing under CIII.

#### **8.6 SUSTAINABILITY SCENARIO AND BUSINESS OPPORTUNITY**

The implications of implementing the Sustainability Scenario to business opportunity in the study area are generally positive. It provides both the timber and mining sectors with greater confidence in exchange for a modest decline in the available landbase so as to meet ecosystem integrity requirements; in addition, the timber sector can take advantage of market demands for credible, third-party certified product. With ecosystem integrity requirements more likely to be met as a result of the Sustainability Scenario, the mining industry's social licence to operate is improved. The tourism businesses will be the greatest beneficiary from the Sustainability Scenario; knowing that the amenities and attributes desired by their clientele will not be degraded by industrial activity, business owners can invest in new or upgraded facilities. The availability of investment and loan capital as a result of CIII will favour investment in local businesses such as value-added and the shellfish aquaculture sector.

## **8.7 SUSTAINABILITY SCENARIO AND EMPLOYMENT**

Overall, the implications of implementing the Sustainability Scenario to employment in the study area are positive. While the Sustainability Scenario will displace some workers currently employed by the timber sector, more than an equivalent number of positions will be created as a result of logging under ecosystem based management and by shifting more of the processing to the study area. The mining sector is currently insignificant as a source of employment; the Sustainability Scenario does not imply lay-offs in this sector, and it has an insignificant if not positive effect on future employment. Current tourism jobs will be secure, and new ones created. New jobs will emerge in conservation and in non-traditional sectors. The jobs created will be in the First Nations and communities where they are most needed. Many of these jobs will fit closely with First Nation values and work preferences.

## **8.8 SUSTAINABILITY SCENARIO AND GOVERNMENT FINANCES**

The Sustainability Scenario will have a moderate impact on government revenues from the timber sector, an impact that will decline over time. The mining sector is currently dormant in the study area, and the Sustainability Scenario has little implication for its future prospects, and hence no impact on government revenues. With the Sustainability Scenario, the tourism sector can continue to flourish, investments in tourism facilities can be expanded, and government revenues from this sector will increase. The same applies of non-traditional sectors.

By improving social and economic conditions, and improving self-confidence and self-reliance in First Nations communities, government finances will further benefit as the costs of dealing with underemployment and the costs of economic and social distress should gradually decline.

## **8.9 INTANGIBLE BENEFITS OF THE SUSTAINABILITY SCENARIO**

There are also likely to be a number of less tangible, but nonetheless important benefits, of implementing the Sustainability Scenario, such as local First Nations feeling more secure about the long term health of the land, having a sense of pride in their roles as stewards to a landscape that is of interest to the overall human family, and feeling a greater degree of control over land and resource management decisions. Together, these changes will help improve human well-being on the Coast as compared to the baseline scenario.

## **8.10 THE ECONOMIC CASE FOR THE SUSTAINABILITY SCENARIO**

Taken together, the above shows that whether or not one considers the actual ecological benefits of the Sustainability Scenario, there is an economic case to be for the Sustainability Scenario. This study is not alone in finding that the Sustainability Scenario is advantageous. The North Coast SEEA concluded that the scenario which best approximates the Sustainability Scenario,

*...is clearly the best alternative of the four assessed scenarios from a socio-economic perspective; it offers "balanced protection" through the following attractive features:*

- sufficient protection of North Coast land and resources to sustain its base of tourism resources*
- sufficient protection to likely satisfy conservation and cultural objectives of First Nations and conservation organizations*
- neutral impact on timber industry, possibly positive to the extent that avoidance of environmental market action campaigns are factored in*
- nominal loss in timber industry net economic value and likely gains in net economic value with additional high end tourism accommodation and from preservation values associated with additional protection areas and introduction of EBM*
- positive impact on the region's communities by sustaining tourism potential and the average historical timber harvest, protecting important salmon*

*habitat and much improving security of access to the plan area's land and resources*<sup>202</sup>

The implications of this analysis are clear: adopting the Sustainability Scenario is a rational economic choice for society to make, even if the conservation gains involved are not considered in the analysis. It increases society's economic welfare. It is particularly beneficial to the First Nations, communities and residents of the study area.

### **8.11 MOVING FORWARD TOWARDS THE SUSTAINABILITY SCENARIO**

Adopting the Sustainability Scenario works with changes that have and will continue to occur both in global markets, and on the Coast, and will itself result in considerable change. The transition period will involve challenges for many affected parties and individuals, and measures that assist with adjustments would be well warranted. Some such measures are already built into the Sustainability Scenario (e.g. conservation financing, ecological restoration of degraded areas with high ecological values). This study was not intended to address the details of how the Sustainability Scenario is implemented and what transition measures are put into effect, but recognizes these measures as important. A sound transition strategy will maximize the benefits that are obtainable from the Sustainability Scenario.

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<sup>202</sup> De Biasio, 2004. *Socio-Economic and Environmental Assessment of Interim Scenarios developed by the North Coast LRMP Table as of January, 2004. Volume I: Socio-Economic Analysis.* Page 4.

## APPENDIX A: MINERAL RESOURCE ASSESSMENT LIMITATIONS

While the main body of this report has shown that prospects for the mining sector in the study area are limited, the Mineral Resource Assessment prepared by the Geological Survey appears to suggest that much of the land base is rated very high or high in mineral potential. This appendix explains this apparent discrepancy and why the ratings do not indicate that the mining sector will prosper in the future, and do not imply that the mineral resource is too valuable to allow the protection of additional protected areas.

The Mineral Potential project was initiated in 1992 to meet the perceived need for regional mineral potential information in land-use planning. The mineral potential methodology originally used by the BC Geological Survey Branch (GSB) was a relative ranking of the provincial land base (Level 1 assessment). The province was divided up into 794 mineral "tracts" averaging 100,000 hectares in size based on common geologic features and geological boundaries such as faults.<sup>203</sup>

Using data from mineral deposits around the world, models for each deposit type likely to be encountered in BC were derived by the Geological Survey, showing grades and associated tonnages. For each tract, known deposits and past producers were tabulated. A panel of experts were then asked to independently predict how many undiscovered mineral deposits of each relevant deposit type existed in each tract, and their level of confidence in this prediction. This data was then fed into a resource simulator, which estimated the number of deposits of each type. From this estimate, the quantities of metallic commodities remaining to be discovered in the tract was derived. Using the average market value for the period 1981-1990, the Gross In Place Value of each deposit was calculated. This allowed the total GIPV of all deposits estimated within a tract to be calculated, and then all the tracts in the province to be ranked by their average GIPV per hectare. As Figure A-1 shows, the Central Coast region ended up with a large proportion of the landbase rated low.

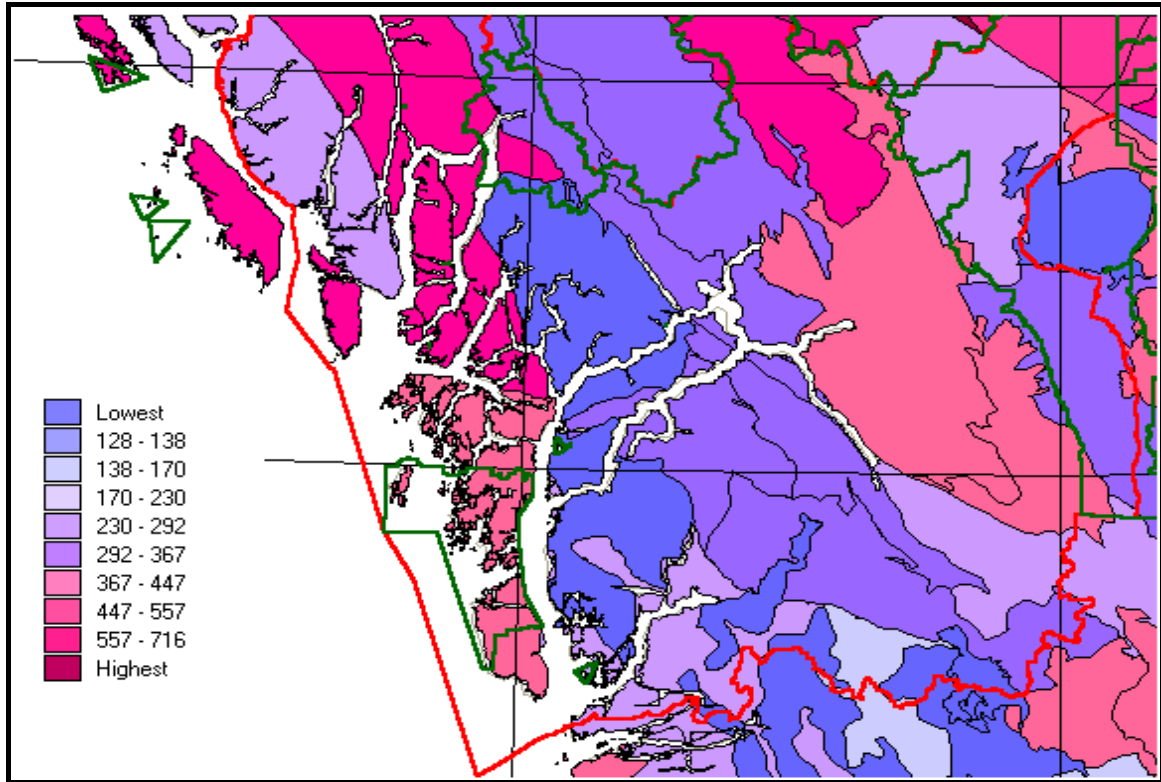
The north east region of the province was included in the original Level 1 ranking. This region is part of the western sedimentary basin and basically has no metallic metal potential. By including the northeast in the assessment, which is ~15-20% of the province, all of the "very low" rankings are used up. This results in the rest of the province, including the study area ranging in ranking from low to high, resulting in an upward bias in rankings. However, the implications of including the western sedimentary basin in the assessment and ranking is not brought to the attention of users of this ranking information.

In order to provide land use planning tables with finer scale data, Level 2 mineral resource assessments (MRAs) were undertaken in the Coast Information Team region (which extends beyond the Central Coast, North Coast and Haida Gwaii) as well as for Lillooet (see Figure A-2).

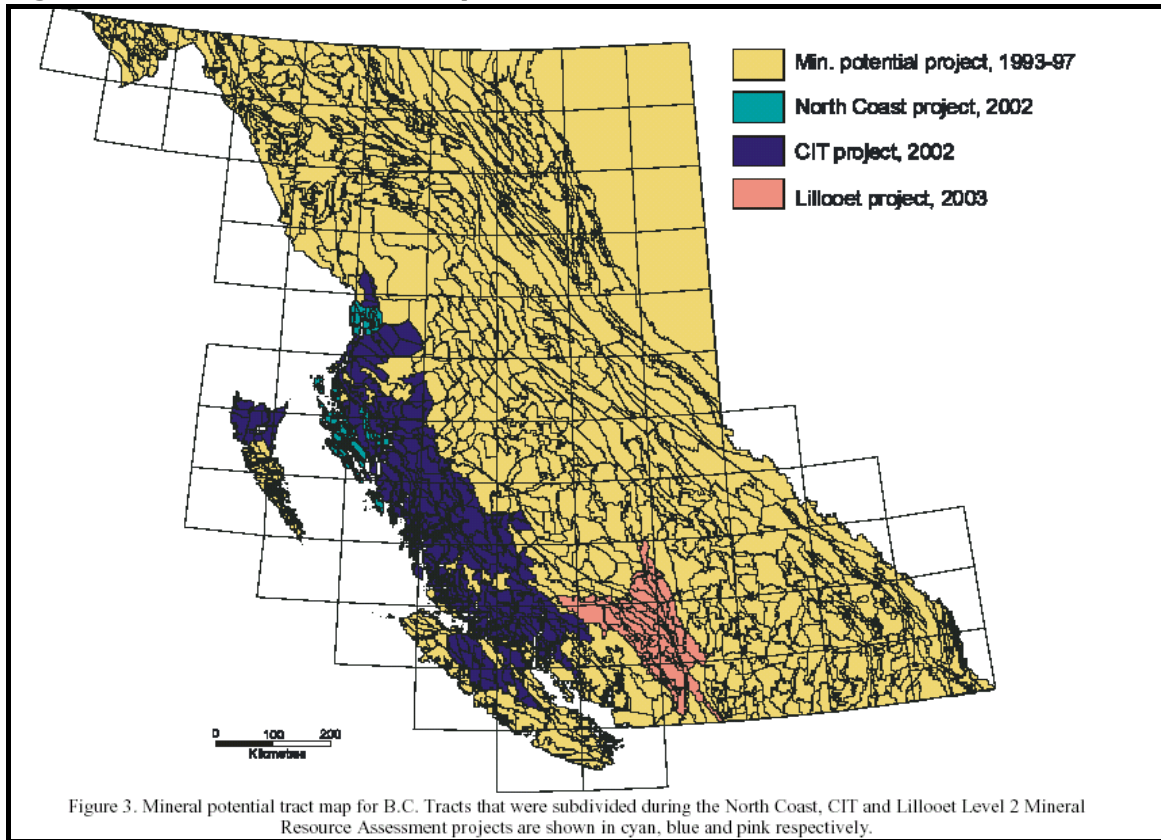
For the Level 2 Mineral Resource Assessment, the Geological Survey took the Level 1 "tracts" (most of which were considered too large for land use planning) and subdivided these into 2-5 subtracts as necessary. For each Level 1 tract, experts were asked to redistribute the deposits predicted in the initial assessment into the appropriate Level 2 subtracts. They were also given the option of adding new deposits to a given subtract. This expert opinion was then again fed into a resource simulator in order to estimate the total number of deposits of each type in each subtract. Again, this data was used to estimate the total metallic content of each subtract and from there to provide a relative ranking of all subtracts based on GIPV/ha values.



**Figure A-1: Ranking of Mineral Tracts on the Central Coast in the Level 1 MRA**



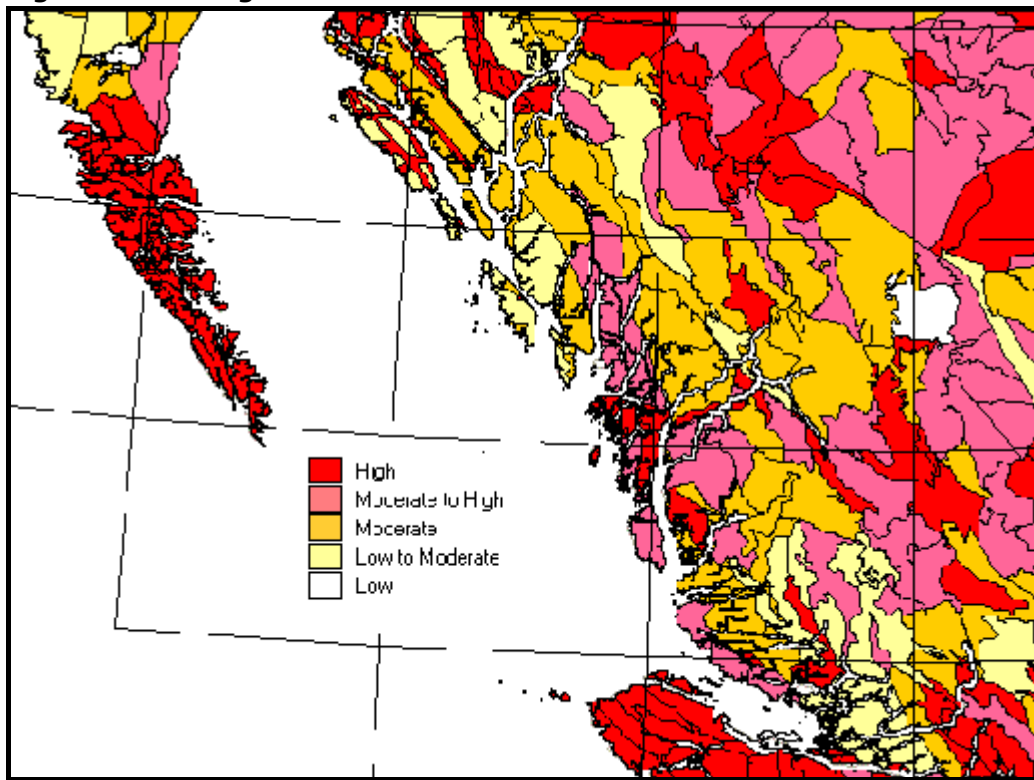
**Figure A-2: Areas of BC covered by Level 2 Mineral Resource Assessment**



<sup>203</sup> The methodology used in both the Level 1 and 2 assessments is explained in: MacIntyre, D., Massey, N. and Kilby, W. 2003. *Level 2 Mineral Resource Assessment: Coastal British Columbia – Methodology and Results*. Victoria, Geological Survey, Ministry of Energy and Mines.

The Level 2 assessment appears to have inadvertently introduced an optimistic bias in the rating of mineral wealth in the study area. As noted, during Level 2, new deposit models could be added by the experts as a result of more detailed examination of the subtracts. However, for the rest of the province where Level 2 assessment was not undertaken, there was no opportunity to add in new deposits. Suddenly, the rankings for the CIT region relative to the rest of province went up (see Figure A-3). They would decline again were Level 2 assessments completed for the remainder of the province, as new deposits would be added to other subtracts in other regions, increasing their predicted mineral endowment and hence their relative score.

**Figure A-3: Ratings from the Level 2 Mineral Resource Assessment**



It should be noted that Gross In Place Values (GIPV), on which the Mineral Resource Assessment are based, are not economically meaningful. GIPV represents an estimate of tonnage x grade x mineral value, without any consideration of costs. For instance, consider a subtract that covers 21,200 hectares and is estimated to have 3.2 deposits each with an average of 10,000,000 tonnes grading at .5% Copper and .25% Zinc. If Copper is worth \$2.20/kg, and Zinc is worth \$.90 kg, each deposit has a GIPV of:

$$10,000,000 \times 1000 \times (.005 \times 2.2 + .0025 \times .90) = \$132,500,000$$

And the subtract has a total GIPV of:

$$3.2 \text{ deposits} \times \$132,500,000 = \$424,000,000.$$

Implying a GIPV/ha of \$20,000.

These sizeable numbers would seem to indicate that the hypothetical subtract contains considerable mineral wealth. However, GIPV does not include any extraction costs, transportation costs, or refining costs – yet workers need to be paid, as do companies supplying fuel and materials to set up and operate a mine. Some deposits are contaminated with undesirable impurities, and there are smelting penalties for removing those substances. Furthermore, less than 100% of the metal will be recovered.

So, in the above example, if it cost \$172,500,000 to extract, transport, and refine the ore, and 92% of the metal was recovered, the actual economic value of each deposit would be:

$$\$132,500,000 * 92\% - \$172,500,000 = - \$50,600,000.$$

And the subtract would have a total net economic value of:

$$3.2 \text{ deposits} \times \$-50,600,000 = \$- 161,920,000.$$

Implying a net economic value/ha of zero.

In other words, despite a high GIPV, the subtract has zero economic value associated with its mineral endowment. The land could be protected without any loss from potential mining sector activity. One example of how inflated GIPV values can be is given by a deposit on Haida Gwaii, which is shown to have a GIPV in excess of \$20.9 billion dollars – and yet it is not being mined.

More relevant and reliable than basing rankings based on Gross in Place Value (GIPV) would be ratings based on mine-head<sup>204</sup> (or ideally, tide-water) value of commodities. This will avoid assigning value to ore bodies that may be costly to process or where metal recoveries are not viable. Specogna is a case in point, where the gold grade of the deposit is low and the mercury content is variably high, such that metallurgy becomes very complex, making the economic viability of mining questionable. Deposit types should not add to total subtract value if they will not be competitive on a global scale to mine. In other words, for some of the deposit types which currently add to the total subtract value in the study area, there is almost always a richer or cheaper alternative elsewhere in the world. In such cases, all deposits of this type should be zeroed out for resource assessment purposes. For instance, Pb-Zn skarn deposits have been found in other regions of the world with geology similar to that in parts of the study area. However, the 80 Pb-Zn skarn occurrences known in British Columbia are generally small and have had no major metal production. Important past and current producers of this deposit type exist in Mexico, China, U.S.A (New Mexico, California), and Argentina. No large productive Pb-Zn skarns have ever been discovered in B.C. (Smyth, 2003). The presence of a deposit type has no bearing on how large or rich it may be. Very few examples of each deposit type will ever become profitable producing mines.

Thus, these Level 2 mineral potential estimates have measured gross-in-place dollar value (GIPV) of minerals in the ground and have made some large assumptions and the outputs of such analysis must be used with these assumptions in mind. Unfortunately, these assumptions and margins of error tend to be ignored or forgotten when mineral potential data are used in land use planning.

Mineral potential rankings are neither absolute nor definitive; they are an estimate of where it may be most likely to find new mineral deposits relative to other parts of the province. They express potential in terms of probabilities. If the ranking is correct, the probability of finding a mineral deposit with a sizeable GIPV is therefore greater in a high ranked mineral potential tract than a moderate ranked mineral potential tract. However this does not imply that deposit that was found would actually be economically viable.

Calculating and reporting the figures in terms of GIPV/ha over the entire area of a subtract can lead to inappropriate conclusions for the lay person not familiar with ore deposit models. In the northern portions of the study area for example, volcanic and/or hot-spring-related massive sulphide deposits are most likely to occur, and indeed have been mined (ie. Anyox, Dolly Varden). Geologists know, however, that these deposits are hosted in layered volcanic and/or sedimentary rocks and the

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<sup>204</sup> Net value of direct shipping ore, or metal concentrate ready for shipment at tidewater (after mining, milling, processing, etc.) Calculating these costs precisely for a mineral resource assessment would be a prohibitively expensive undertaking as it would require a mine feasibility study for each mine. To make the analysis tractable, standardized "best case" cost factors could be used to provide an approximation. For instance, the lowest cost producer's cost factors could be used to adjust GIPV to "best case" mine-head value. This would have the benefit of removing all deposits that were clearly not viable under any foreseeable circumstances.

target mineralization is typically restricted to a specific time-stratigraphic horizon. In other words, mineralization is often confined to a layer of unique rock or a planar zone (horizon) that represents a narrow time range in the geologic record. In the case of the famous Eskay Creek deposit, the mineral horizon, as well as the rocks found above and below the mineral horizon can often be recognized on a regional scale. While a sub-tract may be ranked as having high or extreme mineral potential, it is more than likely an economic deposit would only be found in the narrow zone or horizon within that high/extreme mineral potential sub-tract. It would be inappropriate to conclude then that protecting a portion of the sub-tract would entail a loss in mineral potential, without reviewing the geology and other data at a finer scale.

Prospectors and geologists have explored much ground in the entire study area, including the high/extreme mineral potential sub-tracts. They know where the deposits are not found in the high/extreme ranked sub-tracts. They are not found in the sometimes vast and monotonous thickness of barren rocks that can occur above and below a mineral horizon. Yet these thick piles of barren rocks are included as part of the mineral depositional environment and are therefore considered as part of the area (in terms of hectares) of the high/extreme potential sub-tract. The area (in hectares) reported for a sub-tract may be vastly higher than the actual area where the deposit may be found. The potential for over-estimation is greatest for stratigraphically controlled ore deposits such as the example used above, or structurally controlled vein/shear deposits such as Surf Inlet, Banks Island and Specogna.

Malott (2002) also suggests the rankings are skewed because of the division of rankings into 5 equal levels (low, low-moderate, moderate, moderate-high, and high). Hence, one fifth of the mineral tracts in the province are ranked as low mineral potential, and conversely one fifth are ranked as high. A more relevant method of selecting the threshold of high potential tracts uses statistically determined percentile thresholds. Explorationists have used such determinations (ie. mean plus two standard deviations) to select anomaly thresholds. For example 2.5 percent of the highest tracts could be considered anomalous or high potential (those in 97.5 percentile). Using such breakdowns would in fact decrease the number of high potential mineral sub-tracts. Considering the mining industry typically determines the chance of finding a mine are in the range of 1:2,000 to 1:5,000, this method of dividing the sub-tract rankings may have more relevance. Such a ranking system would imply that of the study area, only 2.5 percent of the land mass could be considered high mineral potential and approximately 25 percent could be ranked moderate to high. Although the mining industry insists that it needs access to the maximum possible proportion of the land base on the basis that the location of potential mines is unknown,<sup>205</sup> in actual fact, where geological information indicates that the mineral resources underlying areas proposed for protection are not economically significant, and are unlikely to meet the thresholds for a globally competitive mine, the loss in economic opportunities to the mining sector as a result of implementing the Sustainability Scenario should be minimal.

A further problem with BC's Mineral Resource Assessment ratings can be seen when the international context is taken into account. Though a given deposit might be the cheapest source of a mineral within a country or province, since minerals are traded on international markets, and if the deposit is not globally competitive, it will not be viable. If a country had a very poor mineral endowment, such that none of its deposits were globally viable, the application of a mineral resource assessment rating as done in BC would still show that 1/5th of the country's land mass was high in mineral potential, 1/5th moderate to high, etc., when in fact all of the country should be seen as low

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<sup>205</sup> Mining Association of British Columbia (2003) "The Mining Industry in British Columbia: Fighting for BC's Economic Future". Submission to Ralph Sultan, Chairman, BC Mining Task Force. (<http://www.mining.bc.ca/MINING%20TASK%20FORCE%20SUBMISSION%20without%20Appendices.pdf>) February 2004.

potential. In such a country – or region – protection would impose no economic loss due to reduced mining potential. Much better would be a ranking system based on objective economic criteria or thresholds, rather than relative score. In such a ranking system, “high” would have potential economic implications.

The ratings for some sub-tracts under the Level 2 mineral resource assessment seem to be at odds with the available evidence. Figure A-4 shows that in the northern portions of the study area, the vast majority of known mineral occurrences and the majority of mineral claims are in volcanic rocks. However, the high mineral potential ranking has also been applied to granitic rocks of the Coast Belt that have very few mineral occurrences and very few mineral claims. Sub-tracts with few mineral claims indicate there is no real interest in exploration. Regional geochemical survey data also show higher values for certain elements in high potential sub-tracts and generally lower values in what should be lower mineral potential sub-tracts. An exhaustive review of mineral potential of sub-tracts was not part of this report, however it is evident other sub-tracts in the study area are also optimistically assigned a higher mineral potential rank than is justifiable.

The Geological Survey’s MRA data was used for a recent economic analysis of the mining sector’s potential contribution to the study area’s economy.<sup>206</sup> This study suggested that the study area could generate vast levels of economic wealth from the mineral sector. However, beyond limitations implied by relying on the data generated by the Level 2 MRA, this study has been shown to be based on unrealistic assumptions and flawed economic analysis.<sup>207</sup> The probabilities of discovery and exploitation used in this report have been shown to be off by more than 2 orders of magnitude (i.e., inflated by 100 times or more).<sup>208</sup> Furthermore, it fails to incorporate a sound understanding of the region’s geology relative to ore deposit models.

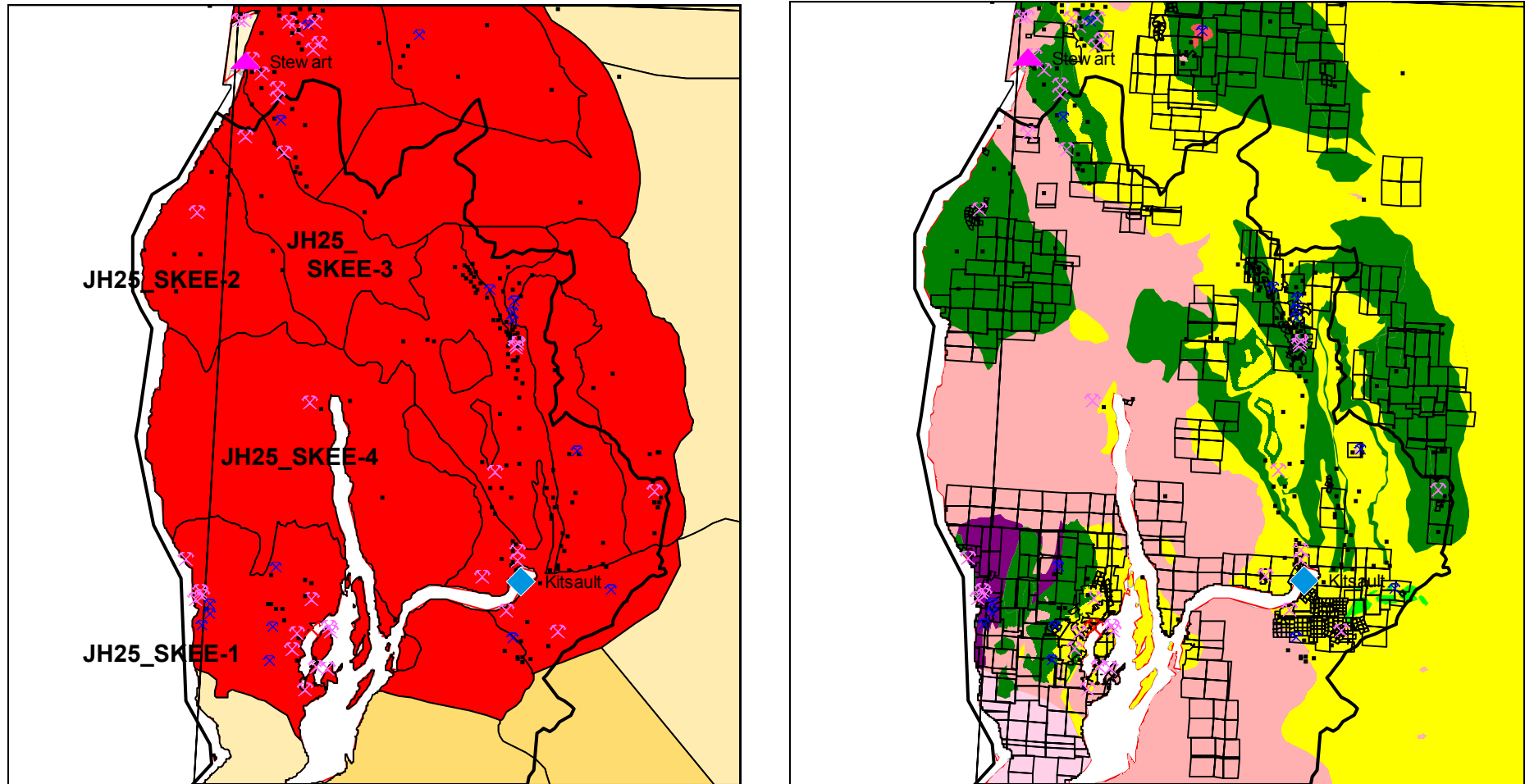
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<sup>206</sup> BriMar Consultants Ltd. and Finisterre Holdings Inc. 2003. *EGSA Minerals Sector Study* (March). Report prepared for the Coast Information Team) and it was not accepted as a final report by the client, the Coast Information Team, due to quality concerns and issues raised in the peer review. Furthermore, it fails to incorporate a sound understanding of the region’s geology relative to ore deposit models. The fact that it projects that at any given point over the next 50 years, there would be more metal mines than exist in all of BC is indicative of its highly unreliable results.

<sup>207</sup> Power, T., 2003. “Review of CIT minerals documents: Memo to A. R. Dobell, CIT Peer Review Chair.” October 7 and also Hodge, R.A., Fraser, D., McPhie, M., Thomson, I., 2003. “Review of the Coast Information Team Economic Gain Spatial Analyses: Minerals Sector Study.” 10 October 2003.

<sup>208</sup> Green, T. 2003. “Review of the March 2003 ‘EGSA Minerals Sector Study’ by BriMar and Finisterre.” Memo to the Coast Information Team steering committee.

**Figure A-4: Mineral Potential Ranking versus regional geology, mineral occurrences and mineral claim coverage**



The map on the left shows an area of the North Coast ranked as having high mineral potential (MP) in red, and identifies four sub-tracts (JH25\_SKEE-1 to 4). The map on the right shows simplified regional geology of the same area (green=volcanic rocks, yellow= sedimentary rocks, pink=intrusive rocks). Black rectangles are mineral claims. Both maps show locations of mineral occurrences. Sub-tracts JH25\_SKEE-1 and JH25\_SKEE-2 cover volcanic rocks, have more mineral occurrences, and are almost completely covered with mineral titles. Sub-tracts JH25\_SKEE-3 and JH25\_SKEE-4 cover intrusive rocks (pink), have fewer mineral occurrences, and have fewer mineral claims (ie. they are not of interest for exploration). By comparison, the mineral potential of the latter two sub-tracts appears over-rated. Regional geochemical survey data for copper, zinc, lead and others also confirm this: values are low in JH25\_SKEE-3, 4 (ie. low MP) and high in JH25\_SKEE-1, 2 (ie. high MP).

## ABOUT THE AUTHORS

Don Harrison of Ecotech Consulting graduated from the University of BC with a B.Sc. in Geology in 1984 and worked in the exploration industry for sixteen years. During this time he worked in all aspects of mining exploration from regional reconnaissance to underground drilling programs throughout North, Mexico, Venezuela and Ecuador. Don graduated with a Post Baccalaureate Diploma in Environmental Sciences from Capilano College in 1994. This led to a variety of work with major consulting firms on mine-dewatering, groundwater exploration and development, geotechnical engineering for resource roads, and terrain stability analyses. Since 2001, he has worked on various mining related issues including: land use, mineral potential, acid mine drainage and the impacts of mining and exploration on the environment and First Nation communities. Don has been a member of the Association of Professional Engineers and Geoscientists of BC since 1992, and is a member of the BC and Yukon Chamber of Mines.

Jim Johnson is Managing Principal of Pacific Analytics Inc., a firm of consulting economists based in Victoria. Prior to entering the consulting field, Mr. Johnson worked at BC STATS where he was responsible for both the development of the provincial GDP Accounts and the BC Econometric Forecasting Model. As well, he undertook a large number of economic impact studies using the BC Input-Output model. He worked (and continues to work) extensively with custom Census data, regional industry data, and in developing regional impact assessments based on Statistics Canada's BC Input-Output model.

Jim has a strong background in the economics of mining, logging and fisheries; however, he is particularly known for his work in tourism impact assessments and sustainable tourism development. He recently completed regionally impact assessments for the South Chilcotin area, the Babine River Corridor Park, the North Coast, and the Chilko region of BC, as well as undertaking a regional economic assessment of the Guide Outfitting Industry in BC. Internationally, Jim developed a detailed tourism Input-Output model for Jamaica in 1994 (updated in 1998), worked on a Tourism Master Plan for Jamaica in 1999, and was involved in a large-scale sustainable development project for the South Coast of Jamaica in 2002. In addition, Jim has undertaken several assessments of offshore oil and gas exploration and production, one in Brazil and another in Ireland.

The authors express their gratitude to reviewers of this study whose expertise in different sectors led to improvements in this study.