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Sustainability in coastal tourism using DPSIR with community perception to manage complexity in an adaptive social-ecological system

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RESUMO

As implicações do conceito de “turismo sustentável” não estão claramente definidas na Ilha de Norte Vancouver, o que causa difilculdades no plajenamento turístico. Uma solução para tal problema será apresentada através de uma nova abordagem ao manejo turístico. Serão utilisadas combinação de Análise Fatorial, Manejo Adaptativo e um DPSIR (Força motriz - Pressão - Estado - Impacto – Resposta) modificado, o qual baseia-se na percepção da comunidade e proporciona um modelo pragmático para o desenvolvimento do turismo sustentável. Esta abordagem é principalmente aplicável ao turismo ao reconhecer-se sua natureza complexa e adaptativa, como um sistema sócio-ecológico. Esta análise focar-se-á na atualização da teoria de turismo ecológico em uma escala regional (Ilha de Norte Vancouver, BC, Canadá). As possíveis variáveis (fatores) indicam uma origem comum à percepção de impacto, consequentemente os fatores podem ser utilizados para identificar pressões comuns. Ao usar esta abordagem, recomendações são propostas ao agentes de governo e operadores de turismo, com o entendimento de que o real valor está na abordagem, a qual ao seguir o conceito de manejo adaptativo contribui ao melhoramento e desenvolvimento sustentável do turismo costeiro.

Palavras-Chave: Manejo Adaptativo, DPSIR, Abordagem ecossistêmica, Serviços ecossistêmicos, Responsabilidade Social Coletiva, Análise Fatorial.

ABSTRACT

The implications of the concept of 'sustainable tourism' are not clearly defined as they relate to Northern Vancouver Island leading to difficulties in tourism planning. A solution to this problem will be presented through a novel approach to tourism management using a combination of Factor Analysis, Adaptive Management, and a modified DPSIR (Driver-Pressure, State, Impact, Response) framework, based on community perception. The approach will provide a pragmatic framework for sustainable tourism development and is especially applicable when recognizing the complex and adaptive nature of tourism as a social-ecological system. This analysis will focus on sustainable tourism theory actualization at a regional scale (Northern Vancouver Island, BC, Canada). The identified latent variables (factors) indicate a common origin of impact perception, thus factors can be used to identify common pressures in the causal nexus to develop proactive and long-term responses. Recommendations are made for government regulators and tourism operators that recognize the need for continuous improvement through the inclusion of adaptive management for sustainable development of coastal tourism.

Keywords: Adaptive Management, DPSIR, Ecosystem Approach, Ecosystem Services, Corporate Social Responsibility, Factor Analysis.

TABLE OF CONTENTS

LIST OF ANNEXES

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

AM – Adaptive Management

BC – British Columbia, Canada

CATS – Complex Adaptive Tourism Systems

Causal Nexus – The link between a cause and its effect

CBD – Convention on Biological Diversity

CSR – Corporate Social Responsibility

DPH - District of Port Hardy

DPSIR – Driving forces, Pressures, States, Impacts, and Responses

EA – Ecosystem Approach

EEA – European Environment Agency

First Nations – The Indigenous Peoples of North America

GDP – Gross Domestic Product

GIS – Geographic Information Systems

ICZM – Integrated Coastal Zone Management

KMO - The Kaiser-Meyer-Olkin Measure of Sampling Adequacy

NVI – Northern Vancouver Island

NVIC – Northern Vancouver Island Community

NIC – North Island College

RDMW – Regional District of Mt. Waddington

RRA – Rapid Rural Appraisal

SEEI – Social, Economic, and Environmental Impacts

SESs – Social-Ecological Systems

TALC – Tourism Area Life Cycle

TVI – Tourism Vancouver Island

UNEP – United Nations Environmental Programme

UNWTO – United Nations World Tourism Organization

A thing is right only when it tends to preserve the integrity, stability, and beauty of the community, and the community includes the soil, waters, fauna, and flora, as well as people.

- Aldo Leopold, A Sand County Almanac, 1949

1 Introduction

The following document serves as a partial fulfilment of the Erasmus Mundus Joint European Masters Degree in Water and Coastal Management. It addresses the need for management of coastal tourism development at a regional scale (Northern Vancouver Island, BC, Canada) within the context of sustainability science. Members of the Northern Vancouver Island Community (NVIC) have traditionally had an economy based on natural resource extraction industries, namely fishing, logging and mining. Due to declines in these industries, NVIC is turning to coastal tourism as an additional sector to diversify and improve the local economy. However, tourism is known to have both positive and negative impacts (*e.g.* conservation/degradation of natural environment and protection/loss of local cultural identity). This analysis seeks to understand the perceptions of tourism by the local community and in doing so, to allow for more holistic tourism planning and sustainable tourism development.

Northern Vancouver Island (NVI) has more coastline and waterways than any other area on the Island. The peripheral nature of NVI makes it a mecca for outdoor enthusiasts and nature lovers. This pristine and largely uninhabited environment has become increasingly accessible with the improvement of the highway to Port Hardy, 'where the highway ends and the adventure begins'. Bald Eagles are a very common sight along the coast, and Black Bears can be seen on most days while hiking the new 47 km North Coast Trail around NVI. Boat trips can be taken to see whales and other wildlife, or to catch some of the fantastic salmon that run in the area. Browning wall is praised as being one of the best cold water SCUBA diving locations in the world. The area is also rich in First Nations culture to make

this region especially attractive for tourists seeking cultural experiences. Tourism industries are growing on NVI causing impacts to the community and the ecosphere that need to be understood and managed to preserve the cultural and recreational ecosystem services on which they depend.

This analysis addresses the research question: How can coastal tourism be developed sustainably in Northern Vancouver Island (NVI)? The first objective is to determine the various impacts of coastal tourism in the region, integrating three approaches; bottom-up, top-down, and scientific literature. Before seeking to understand perceived importance of impacts a determination of what impacts are perceived to exist by local residents is necessary. The second objective is to understand NVIC perceptions of both coastal tourism impacts, and activities that use the recreational and cultural ecosystem services in the region. And last, a synthesis of perceptions and management tools that will guide government agencies and tourism industries in advancing sustainability for regional coastal tourism development.

The concept of 'sustainable tourism' is not clearly defined for Northern Vancouver Island (NVI). This is problematic for tourism planning. To address this gap, a novel approach to tourism management will be presented using a combination of Factor Analysis, Adaptive Management, and a modified DPSIR (Driver-Pressure, State, Impact, Response) approach based on community perception and providing a pragmatic framework for sustainable tourism development.

The concept of 'sustainable development,' which will be used synonymously with 'sustainability' for this analysis, has been the subject of debate since its inception with the publication of "Our Common Future" (Bruntland Commission, 1987). It involves the

integration of socio- cultural, economic and environmental impacts (SEEI). With attempts at pragmatic application of the concept of sustainability, it has become evident that it is not an achievable endpoint, but instead is a process (Farrell and Twining-Ward, 2005; UNEP, 2005) of continuously improving our understanding of the complex, dynamic and co-evolving relationship between humans and the ecosystem (Farrell and Twining-Ward, 2004). Thus, the concept of sustainable development, as applied to tourism, is about an evolving understanding of the complex and dynamic relationships between various parts of the social-ecological system. Sustainable development of a complex adaptive tourism system (CATS) requires region-specific knowledge of impacts and activities, including local community perception. Integration relates to understanding the interrelationships and common origin of pressures impacting CATS and should follow a systems approach (Schianetz and Kavanagh, 2008). Ultimately, tourism needs to be managed so that it provides net socio-economic benefits to the locals and does not undermine the ecosystems that make it possible.

The perceptions of NVIC are central to this analysis. Within NVIC, the focus will be on the people of the District of Port Hardy, the sub-community with the highest population on the North Island. NVIC has been experiencing economic recession over the past few decades as a result of declining revenues to natural resource extraction industries. Tourism is a slowly growing sector in the region with the potential for both important positive and unacceptable negative impacts. In appropriate circumstances, NVIC has potential to benefit from the sustainable use of ecosystem services, both natural and cultural, through sustainable tourism development. However, "measurement" of sustainability is not straightforward as it is an approach and not an endpoint. Furthermore, sustainability assessment is not as developed of a science as other forms of assessment, for example

Environmental Impact Assessment and Strategic Environmental Assessment (Gasparatos et al., 2007).

An in-depth look at impact perception within NVIC is needed to ensure the generation of positive and mitigation of negative impacts. Human beings define their environments, both natural and social. Furthermore it is human beings who define what constitutes an environmental problem (IHDP, 2009). This is especially true in the context of CATS. The analysis provided seeks (i) to gain an understanding of NVIC perception of positive and negative tourism impacts and the relative importance of coastal tourism activities and (ii) to integrate established methodology (factor analysis, DPSIR and adaptive management) using a systems perspective, such that management, by both the public and private sectors, can lead to sustainable tourism development.

1.1 Tourism Sustainability

Tourism is now the largest single economic sector in the world (Davenport and Davenport, 2006) and can cause adverse impacts as well as promote sustainable natural resource management. One paradoxical impact can be described as 'loving nature to death', as pressures mount through increased access to pristine areas and competition among key stakeholders (Wood and Glasson, 2005).

According to Simpson (2008) tourism is seen as a destroyer of culture, undermining social norms and economies, degrading social structures, and stripping communities of individuality. At the same time it can be a saviour of the poor and disadvantaged, providing opportunities and economic benefits, promoting social exchange and enhancing livelihoods. Even ecotourism, touted as a responsible form of tourism that protects the natural

environment and local communities, has not been shown to displace other relatively destructive industries and instead becomes an "add-on" contributing to the problems of degradation (Stronza and Gordillo, 2008). Since the 1980 Manila Declaration on World Tourism it has been clear that the impacts of this complex industry need to be managed. A list of historically significant milestones in tourism sustainability is presented below.

Milestones of Tourism Sustainability

1980 Manila Declaration on World Tourism

1982 Acapulco Documents on the Rights to Holidays

1985 Tourism Bill of Rights and Tourism Code, Sofia

1987 Our Common Future, Bruntland Commission

1989 The Hague Declaration on Tourism

1992 Rio Earth Summit

1995 Lanzarote Charter for Sustainable Tourism

1995 Statement on the Prevention of Organized Sex Tourism, Cairo

1999 UN commission on SD

1996 Agenda 21 for Tourism & Travel Industry

1999 WTO Global Code of Ethics for Tourism

2000 Tour Operators Initiative Launch, Berlin

2002 Quebec Declaration on Ecotourism

2002 World Summit on Sustainable Development, Johannesburg

2003 Djerba Declaration on Tourism and Climate Change

2003 Guidelines on Biodiversity and Tourism Development, CBD – Ecosystem Approach

2008 Global Sustainable Tourism Criteria

The United Nations World Tourism Organization (UNWTO) is a global authority in sustainable tourism theory and practice. Their mission statement is:

> "To promote the sustainable development and management of tourism... involving both public and private sectors for the generation of social, economic and cultural benefits for host communities... for ensuring the supply of quality tourism products and avoiding or reducing negative impacts upon the natural and socio-cultural environments."

Benefits as well as negative impacts can be region specific. Thus, sustainable tourism development requires both the participation of stakeholders and strong political leadership to achieve consensus. Achieving sustainable tourism is a continuous process requiring impact monitoring, preventative and corrective measures, and adaptive management. In addition, tourists should be satisfied with their experience while increasing their awareness of sustainability issues (UNEP, 2005). According to the UNWTO (1999) sustainable tourism should satisfy three fundamental objectives:

1. "Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity."

2. “Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance.”
3. “Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation.”

In summary, “sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future.” (UNWTO, 1999)

1.2 Tourism Indicators

Of the various different techniques used by practitioners to assess tourism, monetary tools have been widely used due to their simplicity, widespread acceptance and easy communication to stakeholders (Gasparatos et al., 2007). These can also be seen as weaknesses of these tools, highlighting a simplistic representation of an accepted reality that is presupposed to exist. The assumptions inherent in monetary indicators, (*e.g.* contingent valuation methodology) namely perfect information, rational action, and unlimited growth with limited resources, are impossible to satisfy in the real world, thus justifying the exclusion of this type of indicator in favour of a community-based approach.

Ecological footprint analysis (Wackernagel and Rees, 1996), as a measure of tourism destination sustainability, was also considered for this study. This is currently the only biophysical approach entering the mainstream of tourism assessment (Gasparatos et al., 2007; Patterson et al, 2008). When considering negative impacts on ecosystem services,

degradation to cultural services refers to a change in the ecosystem features that decreases the cultural (recreational, aesthetic, spiritual, etc.) benefits provided by the ecosystem (Millennium Ecosystem Assessment, 2003) as perceived by NVIC. Ecological footprint analysis provides a relatively objective analysis for comparing biophysical sustainability and provisioning ecosystem services in different places. The focus here is on a more subjective understanding of region specific tourism sustainability based on perception of biophysical as well as socio-cultural and economic impacts relating to cultural ecosystem services therefore ecological footprint analysis was not used.

The ratio of tourists to community residents in a region can provide an indication of tourist influx, (Faulkner and Tideswell, 1997) and be a useful indicator of when negative impact mitigation efforts should be concentrated. The Gini coefficient can give detailed information about number and times relating to tourism seasonality but was not calculated as part of the analysis of NVI coastal tourism. Detailed and complex modelling of socio-ecological tourism-based system sustainability has been used (Lacitignola et al., 2007) to provide integrated assessment of SEEI impacts on ecosystem goods and services in the context of system resilience. However, the formulae involved, in such complex mathematical analysis, is described by the authors as having "severe limitations as to its predictive capability for real situations as holds for any other kind of theoretical models. Consequently, we cannot use thresholds derived from the model straightforwardly for real world management" (Lacitignola et al., 2007). The purpose of such a model is therefore unclear, thus this type of approach was also not selected.

Gasparatos et al. (2007) discuss a variety of metrics and tools and come to the conclusion that none of them are capable of holistically assessing progress towards sustainability. They

assert that “the need to address the multitude of environmental, social and economic issues, together with intergenerational and intragenerational equity concerns, formulates problems that... reductionist approaches can [not] tackle individually in an adequate manner.” Interpretation of integrated tourism sustainability indicators should concentrate on enhancing systems and resilience thinking instead of simply interpreting individual system variables (Schianetz and Kavanagh, 2008). There is a need for hybrid methodology, integrating bottom-up and adaptive management, that can be used by non-experts to reduce indicator lists systematically to include all essential indicators from a systems perspective to increase understanding of system behaviour (Schianetz and Kavanagh, 2008). Thus, a bottom-up community based approach, combined with a top-down approach augmented with literature was selected. The approach uses factor analysis to systematically reduce indicators and understand causal nexus within CATS, making it well suited for DPSIR analysis.

As we progress into the Anthropocene, societal evolution necessitates a paradigm shift that recognizes human dependence on the ecosphere and the services that it provides. Furthermore as society gets wealthier, demands for ecosystem services will diversify and impacts on ecosystems will increase (Costanza et al., 1992). Thus, with rising GDP per capita, tourism and recreation will grow putting further pressure on ecosystems providing these services (Millennium Ecosystem Assessment, 2003). Cultural and nature-based tourism highlight the explicit linkages and affinity that exist between economies and ecosystems. It is people that need to be managed not the environment, which instead needs to be monitored, analysed and understood to facilitate integration of knowledge about natural systems with human systems.

1.3 Study Site

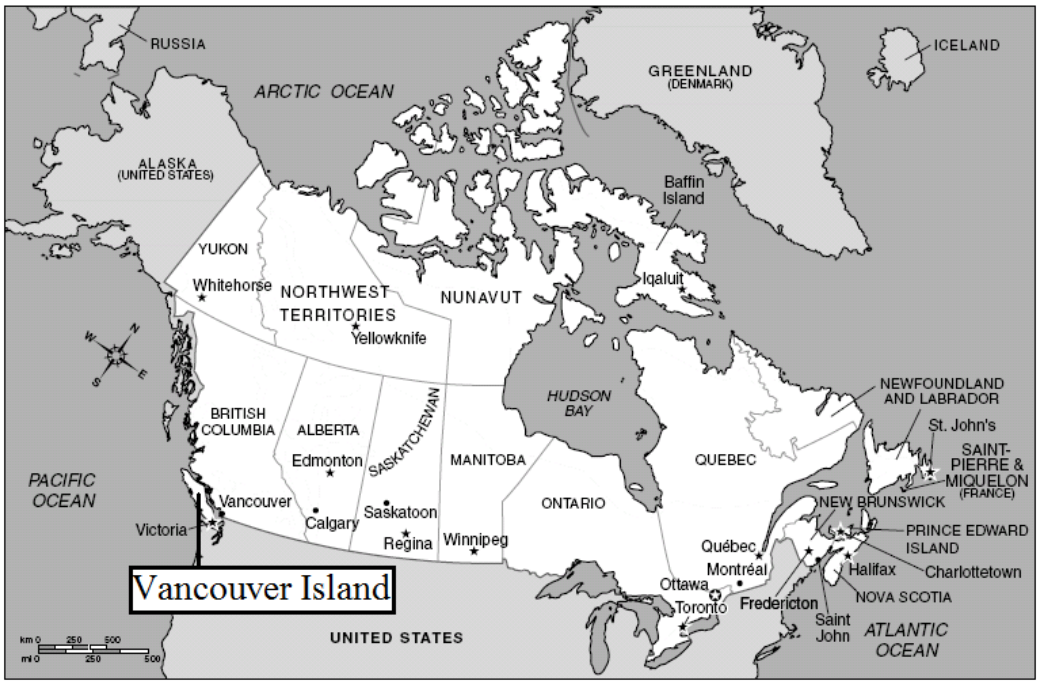


Figure 1. The Location of Vancouver Island within North America

Vancouver Island is the largest island on the West Coast of N. America (Fig. 1). It measures approximately 480 km in length and 80 km in width at its widest. Northern Vancouver Island (NVI) is approximately 16,000 square kilometers in size with a population of 10,000 people or 1.3% of the total for Vancouver Island (approx 750,000). The two largest population centers are Port McNeill (Pop. 3,114) and Port Hardy (Pop. 5,293) (Shown in Fig. 2). Port McNeill is the gateway community to the Broughton Archipelago and is the ferry terminal to Alert Bay. Port Hardy is at the northern end of Highway 19, a major BC Ferries terminal, and the gateway to Northern Vancouver Island recreation (www.vancouverisland.travel/north-island).

Because every region is unique, CATS require tourism management tailored to regional characteristics following an Ecosystem Approach. NVI is an easily identifiable geographic unit for management based on economic and community boundaries (Fig. 2) ecological uniqueness (Fig. 3) and regulatory institutional boundaries (Fig. 4).

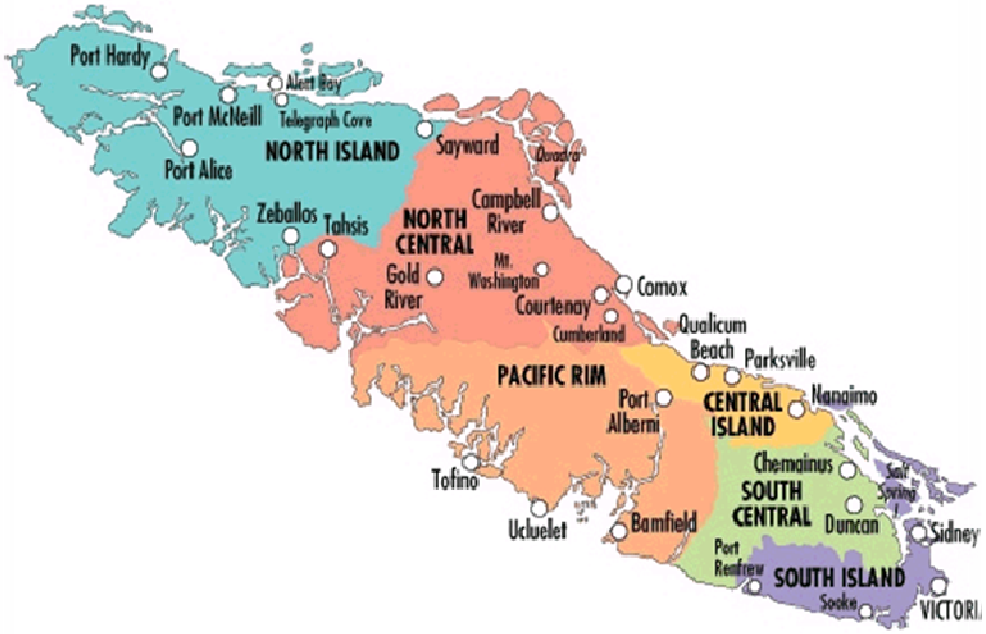


Figure 2. Economic and Community Divisions showing the North Island (TVI, 2008)

Figure 2 shows the divisions used by Tourism Vancouver Island, indicating NVI in blue. The divisions shown are also used by real estate agents on the Multiple Listing Service (www.mls.com) and are generally accepted by residents living on the Island.

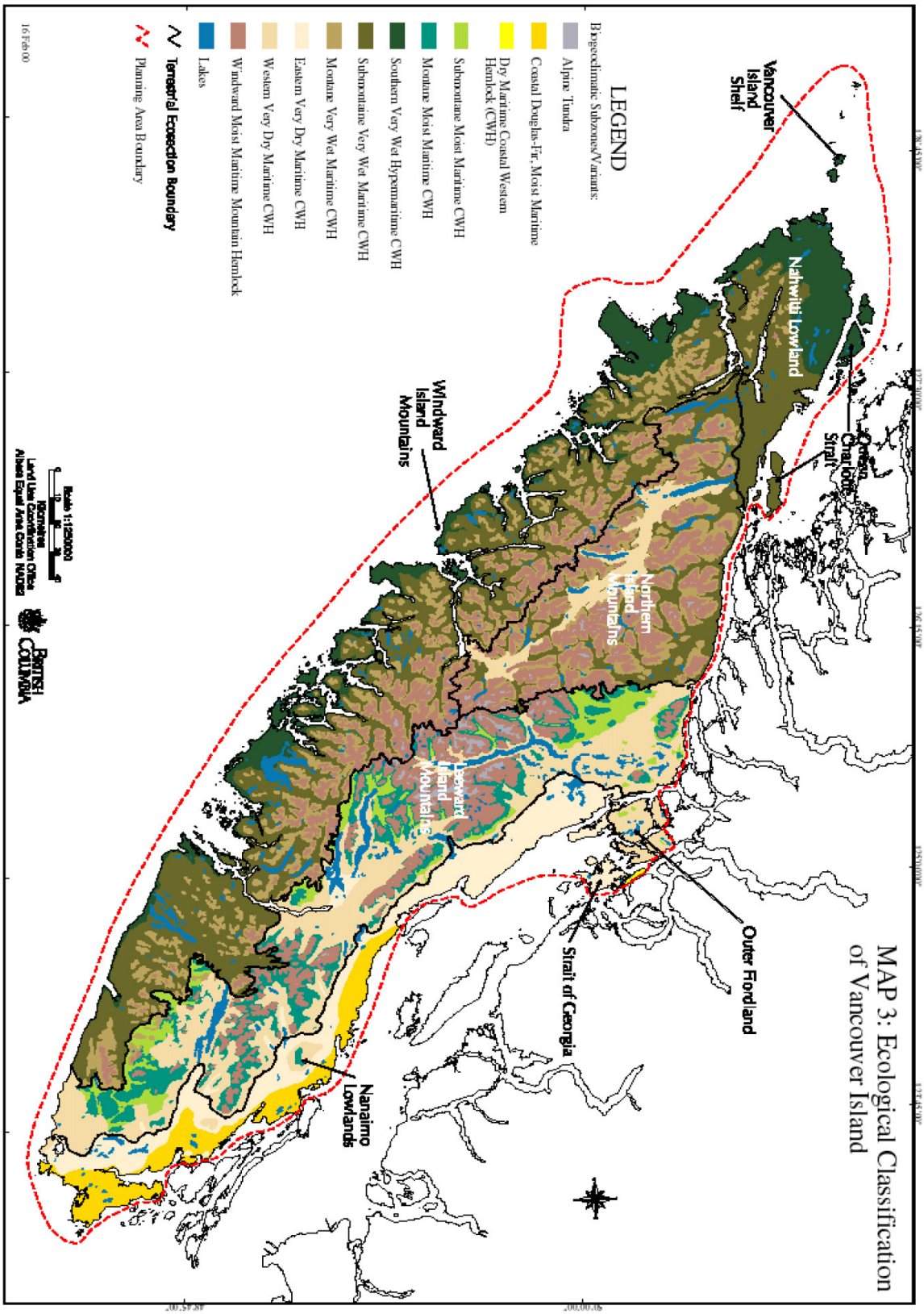


Figure 3. Ecological Classification and North Island Nahwitti Lowlands (VISLUP, 2000).

Figure 3 shows the Ecological classifications of Vancouver Island. Ecologically NVI has been labeled by the Nature Conservancy as the Nahwitti Lowlands Ecosection of the North West Pacific Coast Ecoregion (Vander Schaaf et al., 2006). These authors describe the area as having low to rolling topography covering approximately 250,800 ha. It has a maritime climate with cool, moist summers and wet, mild winters (750 – 3500 mm precipitation per annum), with the majority of the precipitation falling in the autumn and winter. Perched water tables with unproductive hemlock, pine and cedar bog forests growing low-nutrient conditions are characteristic of the ecoregion. Typical wildlife includes Black-tailed deer, Roosevelt elk, Black bear, and cougar as well as a variety of small mammals, birds and fish. Hunting for bear, deer and cougar is popular with NVIC as well as visitors to the region. Along the coasts, including the deeply incised fjords, there are many migratory bird species and rich marine biodiversity with a number of healthy salmon runs (Vander Schaaf et al., 2006). Other marine wildlife attracting tourists include Humpback, Grey, and Minke whales, seals, sea lions, Pacific white-sided dolphins, sea otters, and Bald eagles (TVI, 2008).

Figure 4. The Regional District of Mount Waddington (RDMW, 2002)

Figure 4 shows the administrative boundaries of the Regional District of Mount Waddington (RDMW). RDMW is located within 'Vancouver Island North', a federal electoral district in British Columbia, Canada, that has been represented in the Canadian House of Commons since 1997. The RDMW was incorporated on June 13, 1966 and developed its first regional plan in 1981 (RDMW, 2002). This has recently been updated in the 2004 Strategy and Action Plan and Strategic Vision and Business Plan 2008-09 (RDMW, 2008). It uses zoning bylaws and land use policies to set general priorities for tourism and other development in the region. Although the combination of Figures 1, 2 and 3 do not lead to a definitive 'line in the sand' delineating the "North Island", it is evident that a general division does exist.

1.4 Marine Planning Units

The Northwest Coast MPU (Map 1 - Annex 5) extends from Lawn Point to Hope Island and consists of open ocean and highly exposed shoreline with few embayments. There are 13 medium and high density heritage/traditional cultural sites identified. Marine mammals using the area include gray whale (milling areas), orcas, and several sea lion haulouts. There are mineral, oil and gas resources offshore in the unit (12-14 trillion cubic feet of oil and gas). There are significant recreation resources and the unit including Raft Cove and Cape Scott Park dedicated to recreational activities. Tourism resources include marine cruising, kayaking, sport fishing and scuba diving.

The Queen Charlotte Strait extends North West from Port Hardy along the coast and around Nigei and Hope Island (Map 2 - Annex 5). Within the Queen Charlotte Strait is the Goletas Channel, a straight and broad waterway between Vancouver Island and Hope and Nigei

Islands. It is bordered by a near continuous line of rocky cliffs on both sides of the channel. To the northwest it is closed off by Nahwitti Bar which is an area of very rough water. Seasonal winds are northwest in summer and southeast in winter and create waves up to 2.4 meters in the channel. Water temperatures for the upper 10 meters vary from 7 to 13 °C over the year, while the salinity ranges from 30 to 32 parts per thousand. Tourism Resources include extensive angling, scuba, cruising and kayaking opportunities and Browning Pass possesses high potential for marine tourism (VILUP-MPU, 2000).

The Southern Queen Charlotte Strait and Broughton Strait West (located between Port Hardy and Port McNeill) are described as having high recreational use resources including coastal area experiences (Map 3 - Annex 5). Tourism resources include established wildlife (orca) viewing, angling, kayaking, scuba and marine cruising area and extensive existing tourism infrastructure (VILUP-MPU, 2000).

1.5 Land Use Planning

Figure 5 shows the land use designations for Vancouver Island (VISLUP, 2000). The longest stretch of contiguous coastline in green (Protected Area – National & Provincial parks and protected areas) and Pink (Special Management – incorporating environmental, recreational and cultural heritage value) on the Island extends from Port Hardy around the tip of the Island and ¼ way down the west coast.

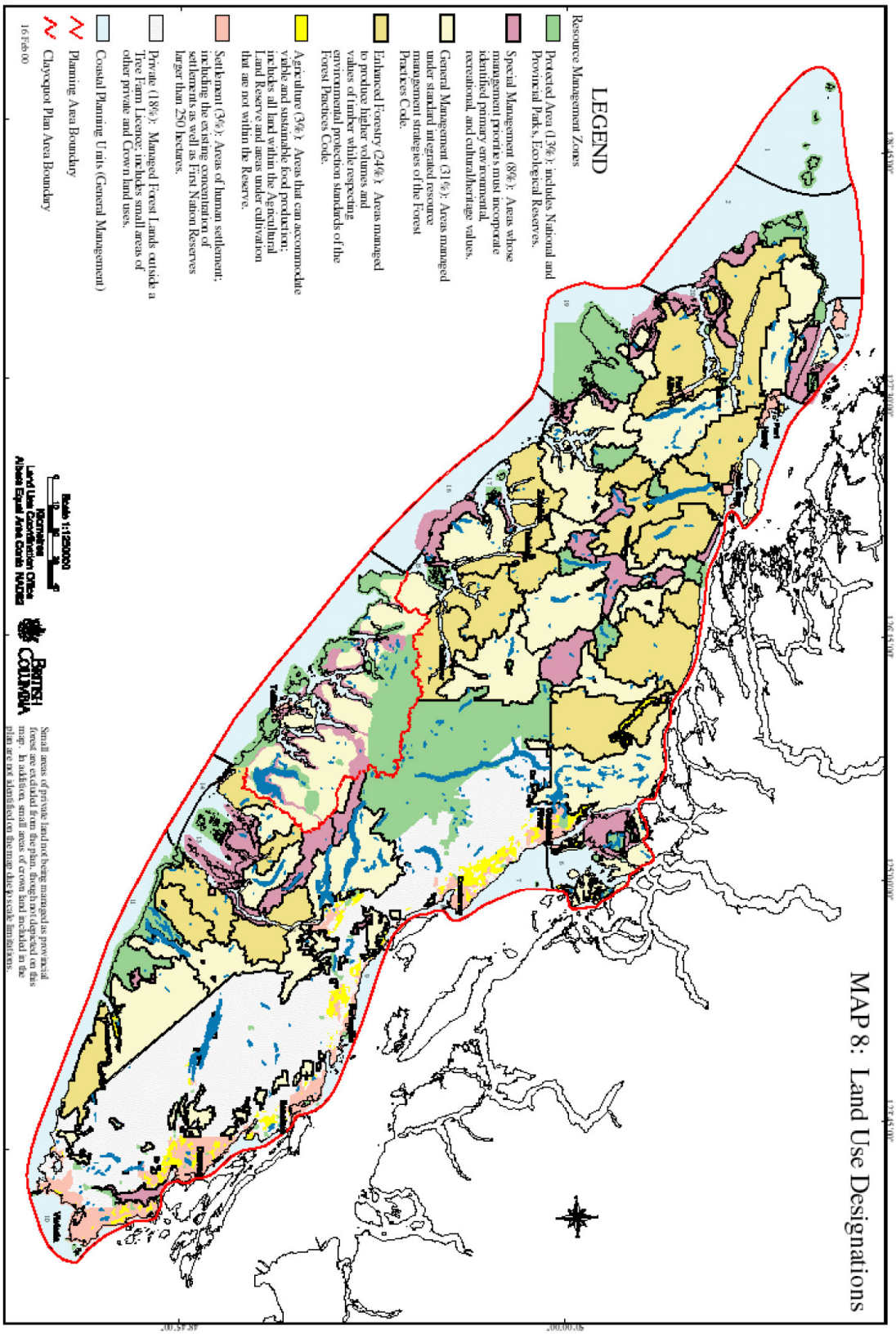


Figure 5. Land Use Designation on Vancouver Island (VISLUP, 2000)

Special Management Zone (SMZ) 1 in the VISLUP (2000) is known as the Goletas Channel SMZ. It is on the North East part of the Island (in pink in Fig. 5) and is described as having high lodge/resort potential throughout the zone. Management guidance for this area is to target special recreation, visual resources, and tourism as well as fish and wildlife management. Recreational resources include: coastal opportunities, the new North Coast Trail (opened May 2008), the Shushartie access route from coast to Georgie Lake, recreation values at Shushartie Lake, and diving at Browning Passage (VISLUP, 2000)

The West Coast Nahwitti Lowlands known as SMZ -2, is shown in pink (Fig. 5) on the South West side of NVI. The overall management guidance for this area emphasizes special management for significant scenic and recreational values concentrated along the coast. In addition, management guidance in the VISLUP recommends maintenance of the high riparian fish and coastal wildlife values. Clearly, current management objectives for the coastline of NVI, aside from Cape Scott Provincial Park, relate to nature-based recreation and lodge/resort development balanced with the protection of fish and coastal wildlife. However the VISLUP (2000) does not provide clear directions for maintaining a sustainable balance. This analysis will provide a novel approach to the determination of the causal nexus of this balance through elucidation of how it is perceived by NVIC.

1.6 Social / Cultural Considerations

The Port Hardy Strategic Plan (2002 – 2007) sees Port Hardy as "a safe and serene community offering unique cultural, recreational, educational and social experiences supported by diverse economic opportunities; the service centre for Northern Vancouver Island and the Central Coast and a year-round tourist destination." To satisfy this

description, Port Hardy must realize its potential to provide unique cultural, recreational, educational and social experiences. This will be possible only if the local community has the necessary capacity. Capacity for tourism is beginning to increase, a sign of this can be seen in the difference between 2005 and 2007 income assistance and employment insurance beneficiaries within RDMW that have dropped from 9% to 4% (BC Stats, 2007).

1.6.1 First Nations

Figure 6. First Nations on Northern Vancouver Island

(http://www.gov.bc.ca/arr/firstnation/maps/map_1.htm)

There are five First Nations groups within the NVIC (Fig. 6) including the Kwakiutl, Gwa'sala – 'Nakwaza'xw, Quatsino, 'Namgis (Alert Bay) and Tlatlasikwala Band. The Kwakiutl of Fort Rupert are globally one of the most well known indigenous cultures (Fig. 7) although this name was mistakenly given to all the above mentioned groups who now are referred to collectively as the Kwakwaka'wakw along with some other groups on the mainland. The term means "Kwak'wala speaking tribes" (traditional territories shown in Map 4 - Annex 5). In contrast to European societies, wealth was not determined by how

much you had, but by how much you had to give away. This act of giving away your wealth was one of the main acts in a potlatch ceremony which was outlawed by the Canadian Government between 1884 and 1951 (Nielsen, S. 2001).

Figure 7. Kwakiutl First Nation of Fort Rupert (Photo by E. Curtis, 1907-1930)

It is important to include First Nations communities in sustainable tourism planning. Within the RDMW, planning for tourism and other forms of development within traditional First Nations areas requires consultation. In addition, new tourism operators are encouraged to employ local First Nations, and often commit to doing so in their development applications. Whether these commitments are satisfied is not always clear as reporting this information is not obligatory (Neil Smith, Personal Communication, July 2008). First Nations communities have historically differed from the Euro-Canadian communities because they traditionally lived exclusively off the land by hunting, fishing and gathering (Ng'ang'a et al., 2005). They collected valuable management data as a

survival response to droughts, diseases, climatic disruptions, natural disasters, famine and have recently been involved in large-scale data collection exercises capturing knowledge of their traditional land use and occupancy patterns on which to base native land claims (Ng'ang'a et al., 2005).

1.7 Economics

Knowledge of regional economies should be included in the tourism planning process. Unfortunately historical patterns of land and resource use are often neglected in development plans and policies (Potts and Harrill, 1998). It is important to understand that the decline in logging, fishing and mining, not only affects individuals, but ultimately leads to diminished financial capacity of the Port Hardy district. Figure 8 below shows the distribution of economic dependence on various sectors for Northern Vancouver Island. It is clear that tourism is not likely to overtake forestry in the foreseeable future, but that it had surpassed agriculture, fishing and trapping, and mining in 2000.

Income Dependency 2000

Forestry	**44%**
Mining	**1%**
Fishing & Trapping	**6%**
Agriculture	2%
Tourism	8%
Public Sector	21%

Figure 8. Income Dependency by sector for the Northern Vancouver Island - RDMW (BC Stats, 2007)

According to the VISLUP (2000), those areas of the Island that are more reliant on forestry and other primary industries (*e.g.* Mt. Waddington Regional District) have been vulnerable

to the "boom and bust" cycles of international commodity markets. These trends have resulted in higher levels of unemployment, social assistance and population declines. The District also needs to balance its ability to maintain, and perhaps even improve, the infrastructure to make the town more attractive for some population growth, new business and tourists while doing so with a tax base that has shrunk (District of Port Hardy, 2002). In 1995, the Island Copper Mine near Port Hardy, was closed resulting in the direct loss of 540 jobs and may other jobs as a result of businesses that supported the mine. There are high hopes for tourism to make use of the recreational and cultural ecosystem services in the region and the district states that: "Our economy will be based on improving opportunities of being an exciting tourist destination" (District of Port Hardy, 2002)

1.7.1 Local Tourism Industry

According to Statistics Canada, tourism spending has posted increases every quarter since the second quarter of 2003. Since 1997, GDP in tourism has for the most part been increasing including, tourist-related accommodation & food services industries (10%), transportation (23%), and tourism-related industries including recreation (39%) (BC Stats – January 2008). Despite rising fuel prices over the past decade, the increased attention to the west coast of Canada as a result of the 2010 Olympics can be expected to draw large numbers of visitors to the region leading to an increased need for tourism management.

Tourism management and planning requires understanding the visitors to a region although the focus here is on local community perception. The average expenditure per day in the North Island Region was found to be $259.5 and 49% of those questioned said they used the internet in trip planning (Visitor profile, 2003). In approximately 2001 the District of Port Hardy formed a tourism steering committee (now called Tourism Port Hardy) to

provide advice to the district council and coordinate the marketing efforts of the District and Port Hardy Chamber of Commerce. Additional information on the status of this administrative body was difficult to obtain in July, 2008 and it is suspected that in the past eight years this committee has not developed to play a significant role in local tourism management.

The District of Port Hardy (DPH) produced a profile of Port Hardy in January, 2006 describing the North Island over the past five years. There is substantial room for growth in the NVI tourism industry. DPH used accommodation as an overall indicator of industry growth and potential. This may or may not be appropriate considering the characteristics of nature and culture based tourism in the region but is a standard and recognized indication of tourism growth. The Port Hardy profile (2006) describes DPH as the regional centre for the North Island and Mid Coast highlighting the ideal geographic situation to take advantage of the tourism potential. The Prince Rupert ferry and the Discovery Coast Passage ferry to the Central Coast both start in Port Hardy, adding to the summer season demand for accommodation, when hotels and motels are normally filled to capacity. Accommodation facilities in Port Hardy currently provide more than 400 motel and hotel rooms, three campgrounds, numerous bed and breakfast operations and a variety of eating establishments.

According to Tourism Vancouver Island (TVI, 2008):

> "The North Vancouver Island region is a paradise of natural splendour. It's the last frontier, where massive expanses of pristine wilderness beckon to adventurers of all kinds. The North Island region has more coastline and waterways than any other area within the Vancouver Island region"

TVI promotes a variety of activities including: boat tours, bear watching, whale watching, float plane trips, kayaking, scuba diving, surfing, salmon fishing, angling, camping, and hiking along the 27-kilometre Cape Scott Trail. There is also a shorter 2.5 km hike to San Joseph Bay and a link to 47 km North Coast Trail. The region is also rich in First Nations tradition and culture including Port Hardy's museum, Native art and gallery and the U'mista Cultural Centre in Alert Bay (TVI, 2008).

2 Approach

It is communities that should be sustained to support tourism, rather than focusing on "sustainable tourism" - Potts and Harrill, 1998

2.1 Community Based Management Approach

Community based management, guided by the Ecosystem Approach which recognizes the importance of communities in planning, is used for this analysis of coastal tourism. To produce benefits to local communities requires an understanding of what they perceive to be beneficial. Tourism developers and managers must assume that providing benefits to communities includes an element of trust in the community members to know what is best for themselves. However, communities cannot be expected to articulate this information on command. What is needed is an understanding of community value. The approach used assumes that the aggregation of individual value from members of NVIC is equal to community value and that by understanding this value, recommendations to manage tourism can be made leading to sustainable development.

Of the eight definitions for sustainable tourism listed by Garrod and Fyall (1998, p. 201) in Potts and Harrill (1998), only two specifically mention "communities" and none refer to "planning." In current literature, the importance of community engagement for sustainable tourism is recognized (Ap, 1992; Chan and Huang, 2004; Li, 2006; Schianetz et al 2007), but there is debate around the level and type of involvement. Simpson (2008) promotes 'Community Benefit Tourism Initiatives' and asserts that it is not essential for a community to be directly involved in tourism management or ownership. When communities are not directly involved, governments, industry and NGOs have more flexibility in the design and delivery of benefits without the 'baggage' that results from community involvement in the decision-making processes. Tourism investors and industry stakeholders may be wary of including communities in decision making processes if conclusions reached are not in line with company objectives. Stakeholder participation is not mandatory and may be limited by time or inclination to be involved. Lack of community involvement does not presuppose that they will not benefit (Simpson, 2008). Conversely Gursoy and Rutherford (2004) assert that success and sustainability of any development depends on active support of the local populations. Schianetz et al. (2007) state that approaches are needed that promote stakeholder collaboration and learning on an organizational, destination and regional level. Well organized public involvement is advantageous as it leads to higher quality decision making due to the inclusion of variance in local perception and better understanding of local complexities (van Ast and Boot, 2003)

Port Hardy residents, like residents of any community, require sufficient resources and skills to engage themselves in tourism management (Okazaki, 2008). Without resources and skills residents can be expected to be powerless and ineffective participants in tourism planning activities (Okazaki, 2008). Local resident perceptions of social climate, adverse

tourism impacts, and tourism benefits are very important to planning for successful and sustainable tourism development. The primary reason is the direct influence that locals have on the tourist experience (Okazaki, 2008). According to Chan and Huang (2004), a bottom-up perspective based on local action in a community is the most appropriate way to address sustainability at the scale of community development. This is supported by the internationally recognized Ecosystem Approach and Agenda 21.

2.2 Ecosystem Approach

The Ecosystem Approach (EA) has been followed in the development of this thesis; from conception, to planning and executing methodology and finally in the analysis. It is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The framework requires participatory approaches in the development of strategic environmental policy and emphasises the inclusion of indigenous and local communities (CBD, 2008).

The EA was developed out of the Convention on Biological Diversity, signed by 150 government leaders at the 1992 Rio Earth Summit, as a practical tool for translating the principles of Agenda 21 into reality. It was formally endorsed in 2000. It requires adaptive management to deal with complex and dynamic ecosystems and the absence of complete knowledge or understanding of their functioning. It also recognizes that humans, with their cultural diversity, are an integral component of many ecosystems.

The EA has 12 principles (Annex 4) numbers one and two state that environmental management is a matter of societal choice and that management should be decentralized to the lowest appropriate level. This analysis uses NVIC perception and recommends

management by regional bodies such as RDMW and Tourism Vancouver Island (TVI). The remaining 10 principles relate to ecosystem management in terms of: effects on adjacent ecosystems, economic considerations, conservation to maintain ecosystem services, appropriate spatial and temporal scales (long term), recognizing the inevitability of change (necessitating adaptive management), appropriate balance between conservation and use of biological diversity, utilizing all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices, and all relevant sectors of society and scientific disciplines. The use of the terms appropriate and relevant in these principles should be addressed based on regional characteristics and if possible NVIC perception.

The participatory approach in this analysis was designed following the Guidelines on Biodiversity and Tourism Development presented by the Secretariat of the Convention on Biological Diversity (2004) which states that management of tourism should be based on a consultative process involving multi-stakeholder participation and should consist of numbers one through six below. Numbers one, two and four are the focus here while three, five and six are beyond the scope of this analysis.

1. The development of an overall vision for the sustainable development of tourism activities;

2. The setting of short-terms objectives to implement the vision;

3. The review and building of regulations and tourism standards;

4. The assessment of the potential impacts of tourism projects;

5. The monitoring of impacts and compliance; and

6. The implementation of adaptive management in relation to tourism and biodiversity.

2.2.1 Agenda 21 and Tourism

The Ecosystem Approach was developed from Agenda 21 which challenges local authorities, *e.g.* the RDMW, to adopt policy goals incorporating participative and collaborative processes, which involve local communities in defining their own sustainable futures (Jackson and Morpeth, 1999). Local Agenda 21 documents adopt a simplistic approach to community management by assuming that they are homogenous and easily defined. A key question raised by Jackson and Morpeth (1999) is: who or what defines these 'communities' and whether, in reality, a number of sub-communities better describe the population under scrutiny? As discussed earlier, the delineation of NVIC for this analysis is based on ecological, economic and regulatory boundaries but is not rigidly fixed or explicitly defined with a "line in the sand".

The bottom up approach taken by Stronza and Gordillo (2008) used benefits and indicators of success determined by emic, or subjective and culturally-embedded views, rather than etic ones, or those defined by scholars, NGOs, conservationists, or other external individuals. They asked people to respond to questions and sought to discover which questions were most relevant to ask, putting the assessment in the hands of the community. In the same way a bottom-up approach was used for this analysis.

It is important to recognize that successful sustainable tourism development will directly depend on the delivery of benefits to the community through tourism. Furthermore the community is in the best position to determine it's needs, desires, and how to derive

benefits, so involvement is required at some level (Simpson, 2008). In the study by Ng'ang'a et al. (2005) the goal of gaining an understanding of coastal environments and communities used both scientific information and local knowledge. The authors made a distinction between local and traditional types of knowledge. In this study the NVIC is not divided into sub-communities and knowledge of perception obtained is not divided.

Research operating in an academic vacuum does not help solve real world problems. Ultimately the results must be translated into action plans that can be clearly communicated, in simple terms, to communities, governments, and tourism operators. Local level assessment of tourism impacts are often exclusively presented at international conferences and in academic journals limiting access of information to local peoples (Stronza and Gordillo, 2008). To overcome this challenge a simplified three page executive summary written in common language will be produced and distributed within NVIC.

3 Methods

A social science survey was developed to assess the perception of tourism impacts by the local community. The assessment looks to NVIC to discover their perception of positive and negative tourism impacts as well as recreational and cultural ecosystem services for coastal tourism development. Field work was carried out in July 2008, in the peak tourism season for Northern Vancouver Island, during the FILOMI (Fishing, Logging and Mining) days festival held in

Port Hardy. FILOMI days is a celebration of the local community and their natural resource extraction based economic history.

The methodology is divided into three subsections. The first section will explain how the impacts of coastal tourism in the region were determined through a combination of bottom-up and top-down approaches combined with scientific literature. This will be followed by a description of how perception of impacts was solicited from the community using a web-survey. And finally a description of data analysis will be provided, including statistical analysis methods.

3.1 Bottom-up Determination of Impacts

At FILOMI days, a rapid rural appraisal (RRA) was completed. RRA is a technique developed in the 1970s and 1980s in response to the perceived problems of outsiders miscommunicating with local people during development work (World Bank, 2006). As part of the RRA, residents were asked to provide their perception of tourism. They were informally queried about positive and negative perceptions of tourism to determine, based on a bottom up approach, which impacts are important to include in the social science survey (Annex 2). Those residents willing to participate in the RRA, as well as those who indicated they did not have time or were not interested, were asked to provide their email address for participation in a web-based survey.

To employ statistical inference techniques with interpretation of the survey results, it is important to ensure that a random sample of individuals is obtained allowing the sample to be representative of the wider population (*e.g.* NVIC). The RRA was carried out without any selectivity based on age, gender, race or any other factor. The individuals that were

encountered at various locations in Port Hardy were approached, provided a brief introduction to the study, including the universities affiliated, and asked for information regarding tourism using a statement such as "What do you think about tourism on the North Part of the Island, could you tell me some of the strengths and weaknesses in your opinion", or "could you tell me what you think about tourism, both good and bad, or anything really. What do you think about it?" and furthermore "I would be very appreciative if you would be willing to give me 10 minutes of your time to complete a web-based survey that will be sent to you via email in October 2008." Of the more than 200 people approached only three people indicated that they did not have an email address, thus biased selection toward those using the internet is not expected to be as significant as it may have been in previous years.

There are two main types of sampling error; random sampling error and non-sampling error. Criticism of formal surveys sent to random individuals relate to errors from the type and context of questions being asked, poor wording and ordering of questions and poor choice of a time of day to hold the interview. These can be much more damaging than random sampling error (FAO, 1989) and are, to an extent, overcome by the RRA and web-survey combination used in this investigation. The quazi-structured approach to ensure randomness, (*e.g.* non-selectivity based on age, gender, race or any other factor) may be criticized for lack of random structure. However, the benefits of RRA in minimizing non-sampling error are substantial and outweigh the costs associated with just focusing on the alleviation of potential random sampling errors. The flexibility in survey response time through web administration is expected to overcome difficulties with poor choice of timing for interviews. The demographic information obtained in the web-based surveys can facilitate an understanding of the 'spread' respondents to determine if a representative sample population was obtained.

Interviews with community members were completed at random public locations in Port Hardy (Fig. 9) including the FILOMI days festival grounds, the entrance to the Thunderbird Mall shopping centre (A), Overwaitea foods (Supermarket) entrance (B) at the Thunderbird Mall, the parking lot of the strip mall on Granville St. (containing the SAAN, Liquor Store, Office Supplies store and others) (C) and walking up and down Market street talking to people randomly. Locations A, B and C listed above are indicated in Fig. 9. Port Hardy is a small community (Pop. 5,293), thus by being present at these various general locations between 9:00 AM and 7:00 PM on weekdays and weekends, it is likely that a representative sample of the population was obtained.

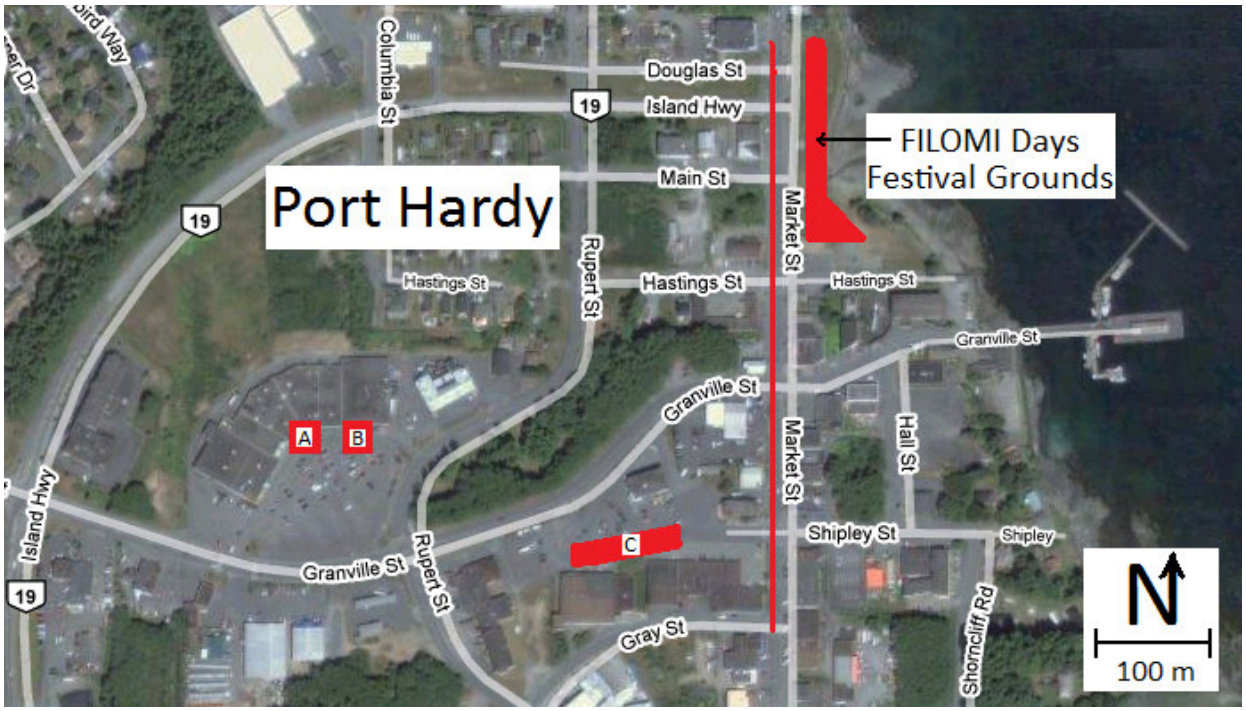


Figure 9. Sampling Locations in Port Hardy (in red).

During the RRA some NVIC members were willing to spend more time to explain their perception of tourism than others. In addition sometimes the topic digressed to a variety of topics not related to this analysis. In these cases, while maintaining complete respect for

other topics being discussed, including continuing to write notes, the discussion was steered back to the concept of cultural and coastal tourism. Interviews conducted with government, NGO's and stakeholder representatives did not diverge off topic to the same extent as NVIC community residents. These interviews were very valuable to understand local tourism history, development trends and issues.

3.2 Top-Down Determination of Impacts

Interviews were completed with key levels of government, NGO's and key stakeholders to identify issues critical to understanding tourism impacts from a local perspective for development of survey questions. They followed a non structured format to allow all potential issues to be recorded, using a laptop when possible or alternatively a note book. Interviews were scheduled in advance and took place in the offices of the interviewees. Interviews started with a brief and formal introduction to the study (universities affiliated) and the study objectives, followed by a brief statement of "Please, what can you tell me about tourism on the North Island" to initiate the meeting. As hoped, a 'snow-ball effect' occurred throughout the interviews in July 2008, where interviewees were able to provide names and contact information for other important people in the region with knowledge of tourism and planning.

Interviews were held with:

- Rick Davidge – Chief Administrative Officer for the District of Port Hardy
- John Tidbur - Acting Mayor of Port Hardy (and local tourism specialist)
- Yana Hrdy - Port Hardy Tourism
- Randy Black – Kwakiutl Band Economic Development Officer

- Pat Kervin - Odyssey Kayaking – Owner Operator
- Merv Jefferies - Tourism Vancouver Island (TVI) - Industry Services Coordinator
- Neil Smith – Regional District Mt Waddington - Manager of Economic Development
- David Pinel – North Island College – Adventure Tourism Program (by email)
- Al Huttlestan – President - North Coast Trail Society - Former Town Mayor
- Jim and Cathy Witton – Catala Charters and North Coast Trail Society

3.3 Web-based Survey

The generation of the survey questions (Annex 2) was based on a combination of literature review (to determine typical tourism management considerations), discussions with members from the local community during the RRA and official interviews as discussed. Management considerations, following an ecosystem approach, should include local input (CBD, 2008). However, members of the local community may be wary of providing input to an external researcher. To overcome this, an introductory letter (Annex 2) was used to familiarize the NVIC sample population with the written justification of the survey in addition to the verbal explanation during the RRA.

A consistent five point Likert Scale was used throughout the survey. The odd number of available responses provided individuals with the option of selecting a neutral response to those questions which they would not know how to answer otherwise, and is thus expected to minimize frustrations from not being comfortable answering one way or the other. An online social science survey tool was used to collect data. This approach significantly reduces biases that can be introduced from the administration of the survey, although some

elements of bias can be expected with this approach *e.g.* the use of email and internet, as discussed earlier. The online survey tool used was "Survey Monkey" (www.surveymonkey.com). Survey questions related to positive and negative impacts were presented in random order, using the random order option in survey design, to avoid ordering biases that may result from the first question being perceived as more important simply because it was presented first. In addition, the questions relating to the three dimensions of sustainability (socio-cultural, economic, and environmental) were presented together in two large question matrices, one for positive and one for negative impacts. The goal of presenting the impacts in such a way, mixed and random, is that psychologically it is expected to force the respondent to make comparisons between each dimension as opposed to only considering impacts in each dimension with other impacts in the same dimension. In this way community perception can be solicited to discover the priorities in consideration of all types of impacts.

Questions related to coastal tourism activities (Annex 2, Questions 5-1 and 5-2) were not randomly ordered but instead presented in a logical order with similar activities grouped together. It was expected that this order would simplify the thought process as respondents could consider activities grouped by similarity.

3.4 General Data Analysis Methods

Ordinal data were treated in two ways different ways:

1) For the factor analysis, values were given to responses following a scale of 1 to 5 according to the five point Likert scale used, 1 representing "strongly agree" and 5 "strongly disagree". (see survey in Annex 2)
2) To present the results generally in the most simple and easily interpretable manner the scale of -2 to +2 was used with neutral represented by 0. Respondents answers were summed up, with positive values indicating stronger agreement with the statement by the community and negative values indicating stronger disagreement (note: for questions related to importance and acceptability of positive and negative impacts, very important / very acceptable correspond to a value of 2 while not important / very unacceptable corresponded to -2).

It is important to understand that with ordinal data, contrary to continuous interval or ratio measurement scales, it is not possible to interpret 'strongly agree' as being twice as important as 'agree' or to interpret that the difference between 'agree' and 'neutral' is equal to the difference between 'neutral' and 'disagree'. According to Gasparino et al. (2006) converting ordinal scale into integer scores (*e.g.* -2,-1,0,1,2) is a straightforward and commonly used approach. Empirically, it has been observed that, especially when the number of categories is large, the failure to address the ordinality of the data is likely negligible and many multivariate techniques provide reliable results despite the ordinal scale being treated as an integer scale. The sum of ordinal scaled Likert-type variables (taking a code with equal interval lengths) was used to produce variables which could then

be compared quantitatively. To determine the most important / least acceptable impacts, the results were summed up and for comparison of factor groupings or SEEI dimensions the average of impacts within each group was calculated.

3.5 Statistical Factor Analysis Methods

Data analysis was completed using Statistical Package for Social Sciences (SPSS) licensed to the Universidade de Algarve, Portugal. Factor analysis was employed in order to reduce variables into a smaller number of factors to generate a synthetic representation of how the complex system in question is perceived. This allows for an explanation of what is going on in terms of a reduced set of independent and otherwise latent variables.

Two potential technical problems that need to be addressed before applying factor analysis to the data include; (i) how to deal with missing values (*e.g.* unanswered questions) and (ii) and how to treat the ordinal data. In this analysis, responses with missing values were excluded pairwise. This means that the respondent data are excluded only from the calculations for which the datum is missing (Field, 2000). This is opposed to listwise exclusion that would completely exclude any response with missing data for any variable. Considering the small sample size pairwise exclusion is more appropriate as it allows all the data that obtained to be used.

The terms principle component analysis (PCA) and factor analysis are often used synonymously. Factor analysis derives a mathematical model that is used to estimate factors whereas PCA only decomposes the original data into a set of linear variates. An extensive literature review was completed comparing the solutions generated from PCA and factor analysis concluding that there was little difference (Guadagnoli and Velicer,

1988 – in Field, 2000). Furthermore "to non-statisticians the concept of a principle component is identical to that of a factor" (Field, 2000). Within SPSS factor extraction was completed using PCA. However since these techniques are virtually indistinguishable, results discussed here will be referred to as factors and not components. In addition, the discovered factors were rotated orthogonally (Varimax rotation) to more clearly discover distinct clusters of interrelated original variables (impacts).

Factor loadings within +/- 0.5 were suppressed, in the analysis such that only the more significant factors are selected for the analysis. SPSS does not provide the ability to test statistical significance of factor loading. When the factor loading is squared an estimate of practical significance can be determined, like R^2, so $(0.4)^2 = 16\%$ of variance explained. Generally it is recommended that factor loadings greater than +/- 0.4 be interpreted (Stevens, 1992 – in Field, 2000). To ensure that only practically significant results were interpreted the slightly more conservative cut off of +/-0.5 (or a minimum of 25% of variance explained) was used.

Factors were labelled using descriptive labels allowing the content of the factor to be easily remembered in analysis and discussion, compared to assigning symbolic labels with no meaning *e.g.* Factor 1,2,3 etc. which would require the use of look up tables or redefinition. Naming the factors is essentially an arbitrary action, and can be seen as the only truly subjective part of the otherwise objective factor analysis method. In this analysis descriptive labelling was used to facilitate more transparent and simple communication and discussion of results with planning managers as well as with community stakeholders.

The eigenvalue is a representation of the variance explained by that factor. Within Factor Analysis it is important to select the optimal number of factors to explain the data. There

are three main criteria for selecting the number of factors that will be included. Cattell's scree test criterion provides a visual method of separating the most important from the least important factors as the line turns to approach zero showing a natural break between large and small eigenvalues. Second are Kaiser's criteria, which exclude principal components with eigenvalues below the average value (usually one). The third criteria, although only applicable for larger samples, is use of a significance test in the framework of 'maximum likehood' factor analysis (Gasparino et al., 2006). Here Kaiser's criteria was used in combination with Cattell's scree test. Underfactoring occurs when too small a number of factors are selected and can produce second-order factors. Alternatively overfactoring, with the extraction of too many factors, allows a subset of 'bloated specific' factors to emerge (Gasparino et al., 2006).

To ensure meaningful results and according to generally accepted factor analysis methodology (Field, 2000), only factors with eigenvalues greater than one were included. In the discussion, DPSIR has been combined with factor analysis as these two tools (data management and statistical methodology, respectively) both deal with understanding complexity and causality.

4 Results and Discussion

4.1 Survey Development

To develop a survey tailored to NVIC a wide variety of potential impacts of tourism on the community were assessed using top-down and bottom-up methods as well as literature. Newly generated jobs and incomes, are two of the most common indicators of success in tourism (Stronza and Gordillo, 2008), in addition this was one of the most common benefits

identified by NVIC during the RRA. A host of impacts were identified during the RRA in Port Hardy as part of the bottom-up community based approach. Below are some of the impacts included in the survey that were identified more commonly by NVIC through top-down and bottom-up impact determination:

Positive Impacts

- 'First Nations to be self sufficient in a post-treaty world' - from discussion with Randy Black – Kwakiutl First Nations Economic Development Office
- Less damage to environment than logging, mining and commercial fishing
- Better quality of life
- Employment – more jobs, better pay
- Stronger local economy
- Make area look better
- Give youth hope for future opportunities
- Better public transport (buses) – possibly on people minds as a new public transit system had recently been introduced linking towns in NVIC
- Create parks and protected areas – possibly in relation to the Cape Scott Provincial Park extension around the whole north tip of the Island
- More restaurants, bars, hotels and B&B's – was a particular issue that there was a lack of and that there should be more

Negative

- Tourism jobs replace traditional forms of employment – lingering resentment about the closure of the mine in 1995

- Unfair increases in rent
- More expensive – food, clothing, and services
- Damage to nature from tourism

Conflicting

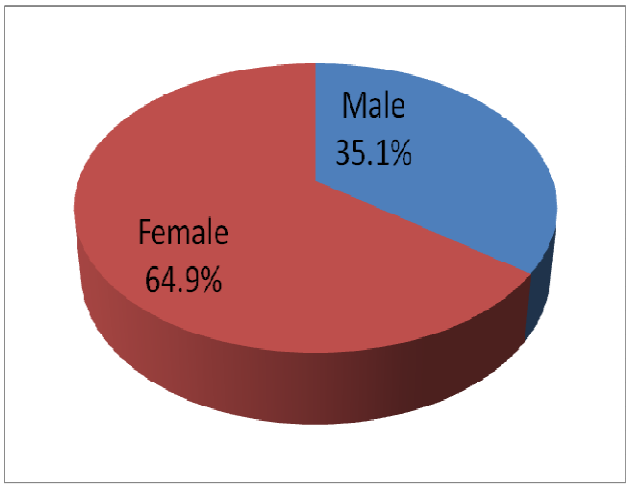
- More money for whole community vs. Benefits to only a small % of community
- Protect Wildlife vs. Disturb wildlife

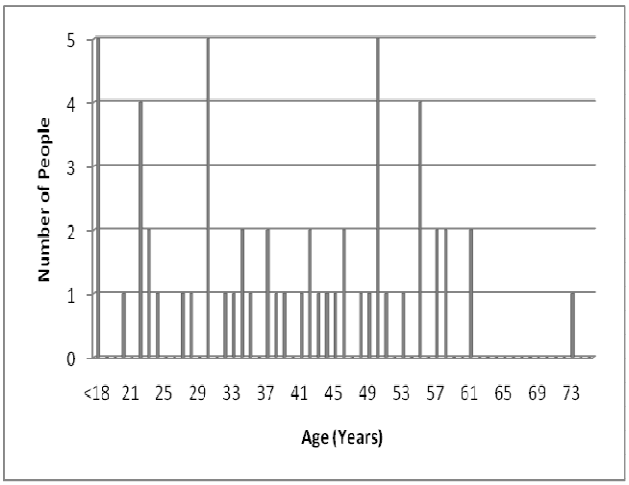
Lim and McAleer (2005) provide a good overview of environmental, social and economic indicators of tourism impacts. The five types of environmental indicators they identify include: fragility of ecosystems and biodiversity, waste disposal, water consumption, intensity of land use and physical impact, protection of the atmosphere, noise level and visual impact. In addition, the social indicators they identify include: tourism pressure, social impact, safety, public health and local population satisfaction, job skills, education and training, gender equality, acceptance of tourism by the local residents, and community participation in tourism projects. The economic indicators they identify include control over development, business generated, tax revenue, foreign exchange earnings or losses, and the proportion of local ownership. Not all of these impacts are appropriate with regard to questioning NVIC. For example the use of words like ecosystem and biodiversity were avoided in survey development in favour of more simple terminology like nature or environment.

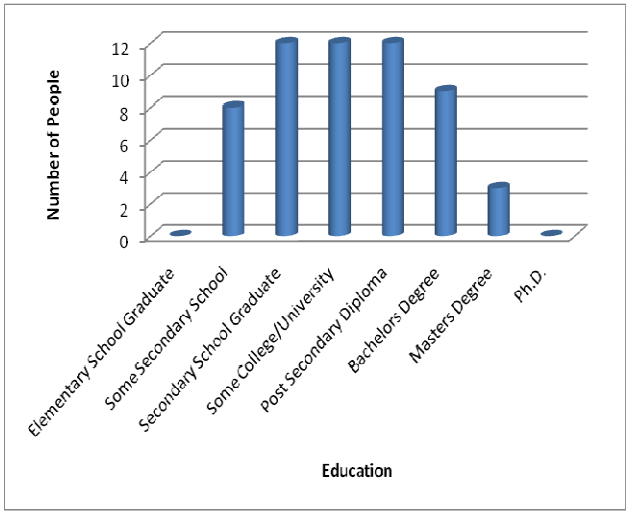
4.2 Survey Response Results

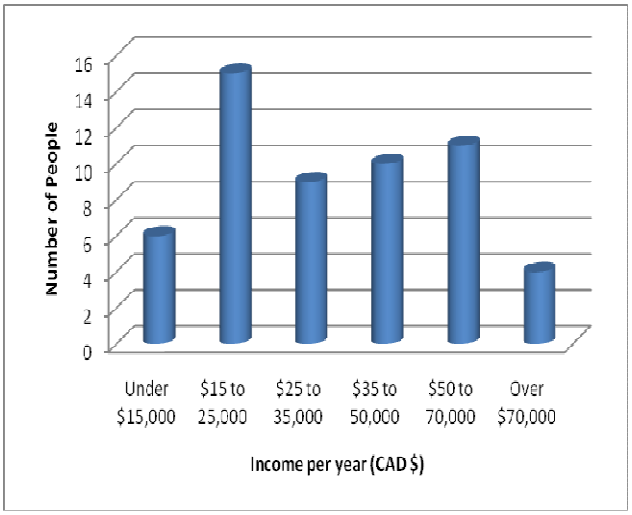
Of the 149 emails sent to members of NVIC, following previous agreement to participate during the RRA, 16 email addresses were non-deliverable. It is possible that these individuals changed their email between July and October 2008 or that human error led to mistakes in recording. Of the 133 emails successfully delivered 57 responses were obtained, representing a 43% response rate. The 76 individuals who did not respond to the survey may not have for a variety of reasons. It is possible that those who did not respond may have not had time or interest or may have had apprehension regarding their ability to provide meaningful results about tourism as expressed by a few individuals during the RRA. To overcome this, an introductory letter was sent with the survey (Annex 2) explaining the importance of the information and that no specific knowledge was required to participate. Despite the relatively small sample size (n=57), the factor analysis results reveal distinct and reliable factors. Bartlett's test of Sphericity ($p<0.001$) confirms that the underlying correlations between the original variables are sufficiently large for factor analysis. Thus the results presented are useful for understanding tourism based on public perception and to allow management recommendations to be made accordingly.

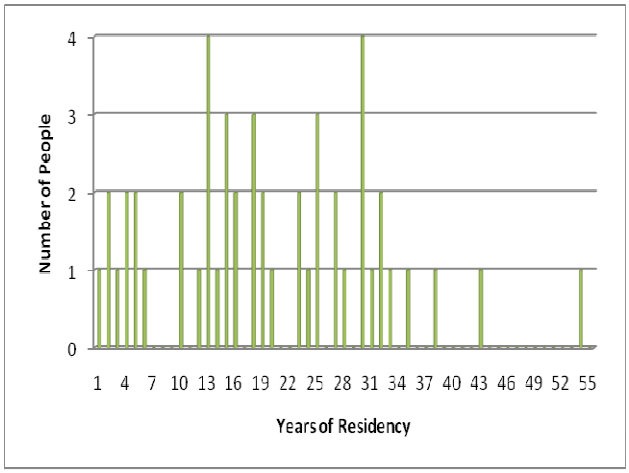
4.3 General Data Trends











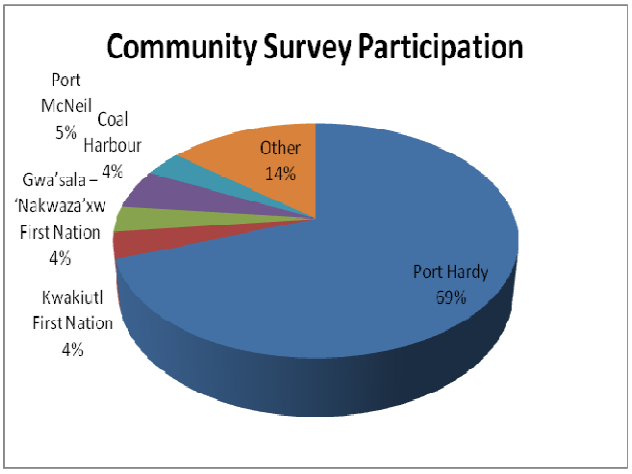


Figure 10. Six demographic indicators of NVIC sample population.

The demographics of the sample population show wide distribution of gender, age, income, education, community residence, and length of residency thus ensuring quality representation of the wider NVIC (Fig. 10). The FILOMI days festival attracts NVIC members to Port Hardy (PH) but because the RRA was completed just in PH, 69% of the respondents were from PH. The data correspond well with census data, and a UBC study of Port Hardy (Resilient Communities Project) shown in Annex 1. The only exception is that a disproportionate number of female respondent were found compared to males which, according to census data, make up 51% of the NVIC population. The 16% discrepancy in gender is not expected to affect the results of perception of tourism impacts.

Children were not asked to participate in the RRA, or the web-based survey, due to ethical considerations. In addition, they are not expected to have an understanding of the community and / or tourism, sufficient to answer the survey questions. Teenagers who were expected to be approximately 18 years of age were not excluded, however, were not able to provide their exact age into the questionnaire but instead to select the category 'under 18' as appropriate.

4.4 Desire and Capacity for Tourism

Andereck et al. (2005) found that all but one, out of more than 20 case studies analysed showed residents overall had positive attitudes towards tourism. The authors found a few negative aspects however, specifically traffic, crime and litter. Based on social exchange theory it can be postulated that support for tourism development will be influenced by evaluation of the resulting outcomes in the community and that expectation of individual benefit will lead to positive perception (Andereck et al., 2005).

The type of tourist visiting an area can affect the way a community perceives tourists especially when there is a great deal of variation between the characteristics of tourists and the community in racial, cultural, and socioeconomic status (Faulkner and Tideswell, 1997).

Table 1. Community Desire and Capacity for Tourism Development

Percent	Statement and level of agreement
94%	(Strongly Agree or Agree) that both 'I want tourism to increase' and that 'tourism is a good thing for the community.'
93%	(Strongly agree or agree) that 'Ecotourism (or Sustainable tourism) operators need to be certified to ensure they do not hurt the local culture and environment.'
89%	(Strongly Agree or Agree) that 'Community members should be involved in tourism planning.'
72%	(Neutral, Disagree, Strongly Disagree) 'If I want to get skills to work in tourism I can easily.'
71%	(Neutral, Disagree, Strongly Disagree) that 'Training opportunities to get skills for nature and cultural tourism are well known, accessible and affordable.'
69%	(Strongly Agree or Agree) that 'I feel a close connection to my community.'
62%	(Strongly Agree or Agree) that 'I know many people involved in tourism.'
60%	(Strongly agree or agree) that 'There is a great potential for First Nations cultural tourism.'

Community residents' perception of tourism can be influenced by the length of time and history of tourism development within a host community (Ko and Stewart, 2002). Negative tourism impacts will be greater in a tourist destination at a mature stage of development where the tourism ratio is higher, there is an emphasis on international tourism and there is higher seasonality (Faulkner and Tideswell, 1997). Although seasonality is a problem for NVI tourism it may be resolved more easily than in highly developed tourism locations, dependant on sun, sea, and sand, because NVI tourism depends on nature and culture-based tourism, which tend to be less reliant on the main summer period, as they typically engage older tourists who are not so closely tied to school holidays with their children. In addition these tourists are less concerned with climate and season than most other tourists.

Gursoy and Rutherford (2004) identified five factors likely to influence host community's perception of impacts and their support for tourism including: community attachment, community concern, use of tourism resources, ecocentric attitudes, and the state of the local economy. Benefits to host communities may include such things as reciprocity, community pride, tolerance, a stronger sense of ethnic identity (Driver, Brown and Peterson, 1991: In Besculides et al., 2002). The perception of tourism by residents can be influenced by strength of ties to an area through place attachment, long-term residency, or economic dependency (Besculides et al., 2002). Information from these indicators can be used to identify groups within the community with various concerns allowing planners and developers to address the issues raised by each group individually (Gursoy and Rutherford, 2004). A variety of community based questions were included in the survey of NVIC to understand tourism management in accordance with published literature as discussed above.

4.5 Building Community Capacity

According to the results 11% of people indicated that they are employed in the tourism industry compared to 8% as indicated in Figure 8 by BC Stats (2007). Of those not employed, 35% indicated that they would like to be employed in the tourism industry highlighting a need for capacity building related to the achievement of sustainable coastal tourism, especially with regard to ensuring benefits to local communities. The North Island College (NIC) Coastal Adventure Tourism Program, a five month or approximately 100 day, certificate program was started in 1997. It has the potential to address limitations in community capacity for coastal tourism development. Enrolment fluctuates between eight and 16 students, and has an 80% graduation rate with all graduates successfully finding employment within their chosen specialty area (*e.g.*, sea kayak guiding, sport fishing, wildlife viewing, youth camps, etc.). The program is not currently offered at the NIC campus in Port Hardy, but there is potential to do so provided that a critical mass of 10 students who meet the prerequisites and have funding in place were present. NIC has been engaged in informal discussions with 'Wi'la'mola Project for a number of years about the possibility of delivering a program to First Nations in Alert Bay. To date a critical mass of students has not been identified in either Port Hardy or Alert Bay (David Pinel, NIC, Personal Communication) and thus training has been limited in the region.

A report entitled Outdoor Tourism by the Canadian Tourism Commission (2001) highlights some of the challenges that the Outdoor Travel industry now needs to address. These include the development of operator business skills (strategic business planning, market research and product development, and effective product marketing) and the creation of more comprehensive packages offering outdoor tourism activities mixed with cultural and

learning experiences. This mixture was also discussed by Pat Kervin of Odyssey Kayaking in Port Hardy (Personal communication, July, 2008). Mr. Kervin sees great opportunity for the integration of kayaking and First Nations culture. However he indicated that hiring locals and especially first nations as tourism guides for his kayak business is not easy due to lack of capacity.

4.5.1 Community-based ecosystem monitoring

As shown in Table 1, 89% of community members indicated that they should be involved in tourism planning. 'Community-based ecosystem monitoring' (CBEM) is a tool that can address this desire. It involves non-government organizations, community groups, or individuals participating in long-term monitoring of selected species, habitats, or ecosystem processes for ecosystems and natural resources sustainability planning (Yarnell and Gayton, 2003). Three important characteristics of successful community-based ecosystem monitoring including; design in collaboration with government researches, inclusivity (involving a diverse group of participants at all stages), and possession of resources to support the needs of volunteers and to manage the data that are generated (Yarnell and Gayton, 2003). Those participating in monitoring must be provided with appropriate feedback regarding the outcomes arising from their efforts (Jacoby et al., 1997).

CBEM can be expected to present logistical, organisational and liability issues and will therefore require a capable organizing group, most likely at the regional government level (*e.g.* RDMW). The Northern Vancouver Island Trails Society was unable to have volunteers to help with construction of the North Coast Trail due to liability and training issues (Al Huttlestan, Personal Communication) that it was unable to solve for the individual project. A partnership between the RDMW, local tourism operators, First Nations and the North Island College to train community members is recommended.

4.5.2 First Nations Capacity

First Nations tourism employment may be impeded by lack of skills such as driving license, boat operator's certification, and first aid, highlighting the need for training. The 'Wi'la'mola project of the U'mista Cultural Centre in Alert Bay, serves both the Kwakwaka'wakw First Nations and the non-native population as a whole, with U'mista overseeing any cultural components of the business activity developments. The 'Wi'la'mola Project respectfully explores opportunities to use Kwakwa̲ka̲'wakw culture to create employment, business development and economic benefits for the community. This initiative of the Kwakwa̲ka̲'wakw First Nations (including the Kwakiutl First Nation at Fort Rupert) is to nurture the cultural heritage of the Kwak'wala-speaking people through education, of both visitors and the community, is put into practice through the activities of the 'Wi'la'mola project.

As expected, there is moderately strong agreement with the statement that 'There is a great potential for First Nations cultural tourism' with 60% of respondents indicating Strongly Agree (32%) or Agree (28%) (Table 1). This was expected from responses during the RRA. According to Al Huttlestan (Personal Communication, July 2008) The Northern Vancouver Island Trails society (NVITS) has been actively seeking cooperation with local native communities related to guiding opportunities on the newly opened (May, 2008) North Coast Trail. However, to date little to no progress has been made and according to Mr. Huttlestan, the local First Nations have not been overly receptive to the idea. The message and the messenger to the local First Nations may need to be adapted if engagement in this type of opportunity is to become a reality (for example through the 'Wi'la'mola Project or North Vancouver Island Aboriginal Training Society).

According to Randy Black, Kwakiutl Economic Development Office, who represents the first nations band at Fort Rupert (adjacent to Port Hardy), the band is not ready for a post

treaty world (Personal Communication, July 2008). He recognizes a great potential in cultural tourism but emphasises the need to go at it in a 'big way'. Mr. Black has a project in the planning stages entitled 'Historic Fort Rupert' which will recreate the Hudson Bay Company trading fort that was established in the area in the 1849 and the first nations settlement that was built next to the fort for the purpose of trading.

One of the major hurdles that Mr. Black has encountered in trying to achieve this project is the instability in band leadership (Band Chief and Council) and the small amount of land that is governed exclusively by the band (approximately 34 acres at Fort Rupert and 729 acres over all eight reserves, many in remote locations). However, traditional Kwakiutl territory is much larger (approximately 500,000 acres) necessitating consultation prior to development in the area. A map showing the traditional territory of all Kwakwaka'wakw tribes can be found in Annex 5 (Map 4).

According to Mr. Black, the First Nations here are not interested in business, but instead are interested in jobs. They do not trust business due to a lack of business knowledge and business mindset. They are hesitant to interact with business because past experience has led to unfair outcomes and exploitation. The issue of tourism seasonality in this region is congruent with the way that First Nations think about work, with more to be done in spring, summer and autumn. Mr. Black emphasises the need to separate business from politics (Band Council) to allow business decisions to be made based on what is best for business.

The North Vancouver Island Aboriginal Training Society (NVIATS) is an Aboriginal training and employment organization. It is a community driven board assisting all Aboriginal peoples to achieve self-sufficiency by endeavouring to deliver the highest quality training in the North Island Region. Direct links between NVAITS and the North Island College are unknown. A partnership between these two organizations could be instrumental in overcoming First Nations capacity issues related to the undeveloped potential for coastal tourism in the region.

4.6 Positive and Negative Tourism Impacts

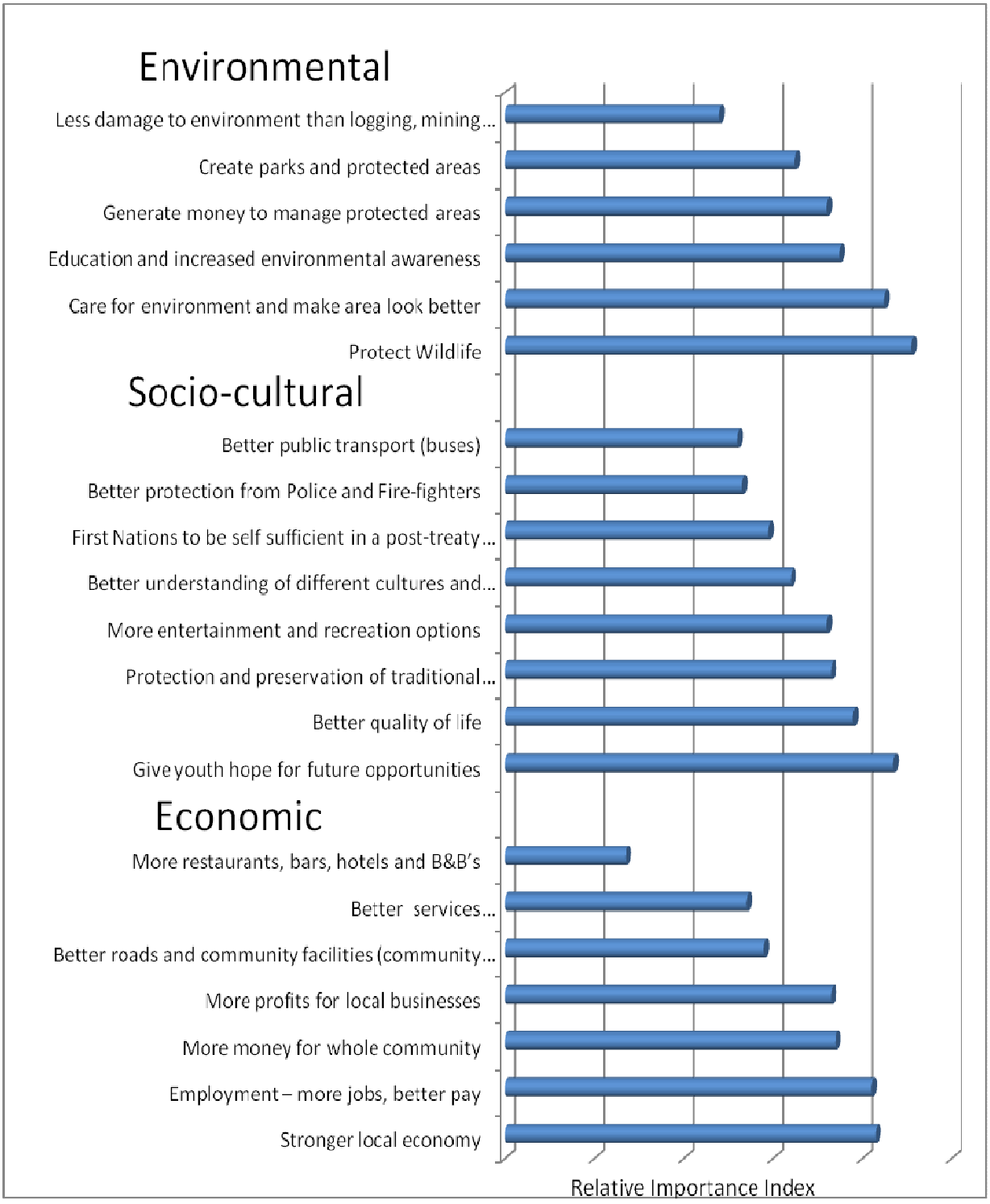


Figure 11. Positive Tourism Impact – Perception of Relative Importance.

The most important positive impacts are those perceived to be most beneficial and should be the focus of tourism operators and local government. The five most import benefits, include (in order); 'protect wildlife', 'give youth hope for future opportunities', 'care for environment and make area look better', 'stronger local economy', and 'employment – more jobs, better pay'(Fig. 11). The difference between 'stronger local economy' and 'employment – more jobs, better pay' is that the latter is a specific concern of the former. Other impacts associated with a 'stronger local economy', but not found to be in the five most important benefits include; 'business profit', 'housing', and 'price of goods and services.'

The remaining moderately important benefits to the local community should not be forgotten, as they are all still relatively important. The only real exception to the results of tourism benefits is 'more restaurants, bars, hotels and B&B's' which was found to be a less important positive impact, and furthermore could possibly be viewed as a negative impact and thus be managed accordingly (note the negative direction of the bar for this indicator in Figure 12). It is important to recall that impacts were ranked by applying an interval scale to the ordinal data as described in the methodology section. A complete ranking of positive impacts, from one (most important) to 21 (least important), can be found in Table 2 (Section 4.8) in the most right hand column titled 'Intrafactor Rank' with the top three impacts indicated in grey.

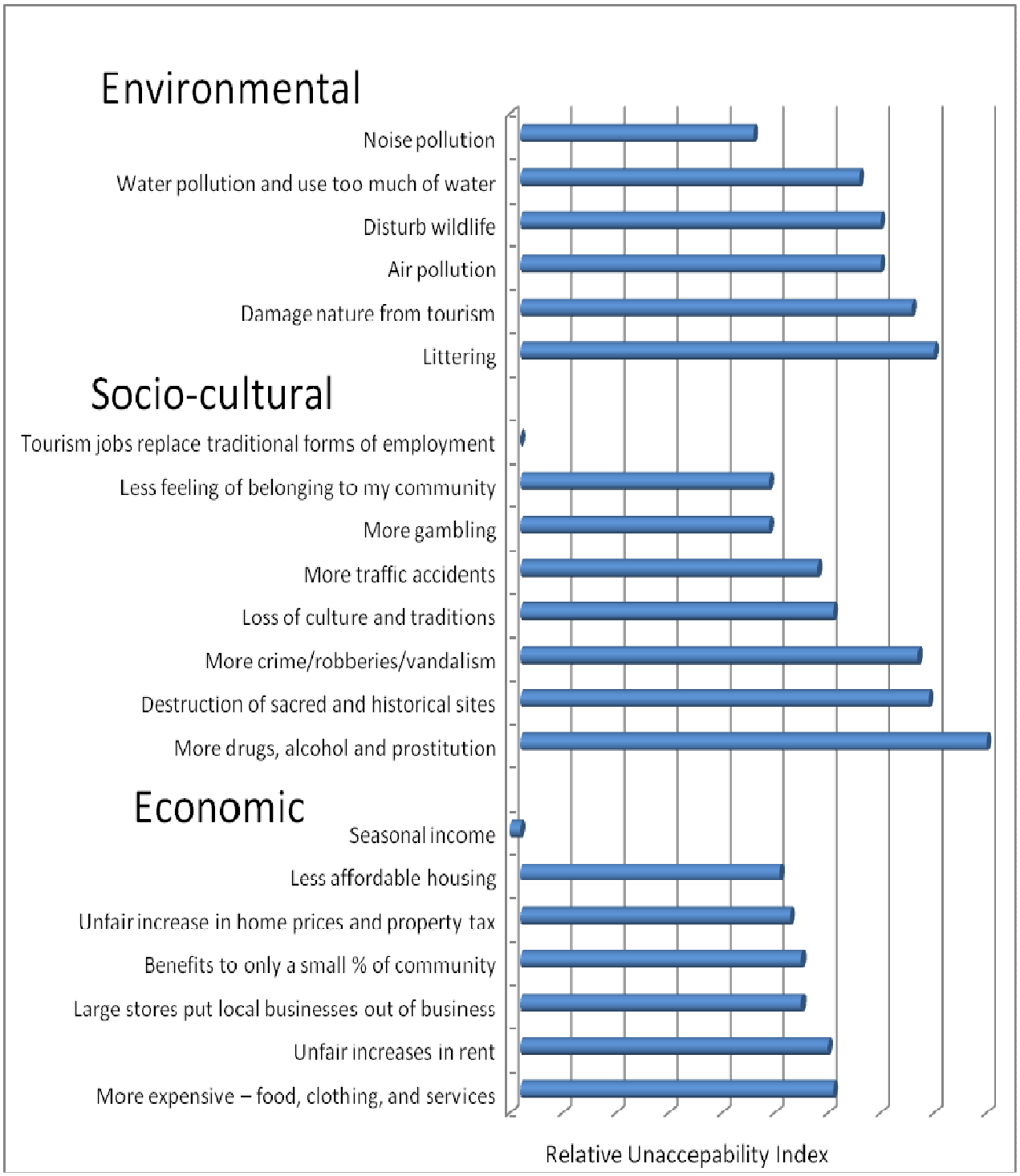


Figure 12. Negative Tourism Impacts – Relative Perception of Unacceptability.

When considering the management of negative impacts associated with tourism development in the region the impacts that are least acceptable are those that should receive the most mitigation effort to reduce the negative impacts. The five least acceptable impacts (in order) include: 'more drugs, alcohol and prostitution', 'littering', 'destruction of sacred and historical sites', 'more crime/ robberies/ vandalism', and 'damage nature from tourism' (Fig. 12). These should be mitigated by tourism operators and government as tourism develops in the region through laws, taxes, education, economic incentives and other regulatory tools. The moderately important impacts must also be considered in management just not with the same emphasis. The last two impacts: 'tourism jobs replace traditional forms of employment', and 'seasonal income', have the lowest level of unacceptability, or put another way, are the most acceptable negative impacts, and thus require little to no management effort for mitigation compared to the other impacts. A complete ranking of negative impacts can be found in Table 3 (Section 4.9) in the most right hand column titled 'Intrafactor Rank' with the three most unacceptable negative impacts indicated in grey.

It is not possible to analyze the 'spread' of ordinal data with statistical methodology. Both the impacts that were perceived to have the greatest importance or to have the least acceptability are indicative of greater consensus within the community. This can be used to prioritize management effort further. However those results with the lowest values, or approaching zero, a quazi indicator if large spread, may also reveal different opinions held by identifiable stakeholder groups which can then be used to manage and resolve potential conflicts before they start. On the other hand, those impacts ranked lowest may also be indicative of a high number of neutral responses. Before making policy decisions based on results, the raw data must be cross checked.

Impacts with corresponding positive and negative components in the survey are shown below. Those positive impacts are relatively more important than their negative counterpart as indicated by the number following the impact title (corresponding to the relative importance / unacceptability of the positive and negative impacts respectively).

- More money for whole community (8) vs. Benefits only a small % of community (13)
- Protect Wildlife (1) vs. Disturb wildlife (6)

Relative scoring indices, used to evaluate the order of importance of impacts, are a useful tool for managers (tourism operators and / or government regulators) to identify priorities in management. Within the relative indices of the two preceding figures it is not possible to assume that a bar double the length of another is twice as important. All that can be assumed it that it is more important based on consolidated community perception. Furthermore, because impacts were presented in random order combining SEEI, cross dimension comparison forces respondents to identify tradeoffs.

The relative summary scores are presented in three ways in this analysis (1) graphically as presented above in Figures 11 and 12 according to the original groupings of indicators between socio-cultural, economic, and environmental (2) within the factor analysis table, with relative ranking to compare between factors ('Intrafactor'), and (3) to compare within each of the factors ('Interfactor'), to show where management attention should be focused.

When considering the importance of positive impacts grouped into the classic sustainability dimensions (based on average scoring), economic impacts were found on average to be the most important, followed by environmental and finally socio-cultural impacts. The two most important economic impacts were (i) 'stronger local economy' and (ii) 'employment –

more jobs, better pay'. The overlap between these economic impacts should not be viewed as 'double-counting' as there are many other factors that can strengthen the local economy. Furthermore, by the nature of factor analysis methodology double counting is not an issue (Field, 2000). The two most important environmental impacts were (i) 'protect wildlife' and (ii) 'care for environment and make area look better'. The two most important socio-cultural impacts were (i) 'give youth hope for future opportunities' and (ii) 'better quality of life'. The relative importance of these impacts is important for tourism planning by both industry and government.

When considering the acceptability of negative impacts, based on averages of SEEI, the most unacceptable negative impacts (perceived as most important) were environmental, followed by economic and last socio-cultural. However of all the impacts the first and third most important impacts were from the socio-cultural dimension, namely 'more drugs, alcohol and prostitution' (first overall) and 'destruction of sacred and historical sites' (third overall). 'More expensive – food, clothing, and services', followed by 'unfair increases in rent' were the most important economic impacts and 'littering' followed by 'damage nature from tourism' were the most important environmental impacts. That socio-cultural impacts on average were the least important, but that the number one and three most important were from this dimension highlights the unequal perception of various impacts and raises curiosity regarding the origin or cause of community perception of impacts as well as questions the applicability of grouping impacts into the classic SEEI sustainability dimensions. Subsequent discussion of factor analysis will present an alternative way of looking at these impacts.

In general the less important impacts to the community were 'seasonal income', 'tourism jobs replace traditional forms of employment', 'noise pollution', 'more restaurants, bars,

hotels and BB's', 'better public transport (buses)', and 'less damage to environment than logging, mining and commercial fishing'. Thus, according to these results, if management of NVI tourism is to follow an ecosystem approach and embrace the idea of using community input to make management decision, these impacts of minor importance / greater acceptability should not be given the same level of priority as the most important / unacceptable impacts.

4.7 Activities - Ecosystem Services for Tourism

Recreational and cultural ecosystem services are used to support tourism activities. NVI has extensive opportunities for terrestrial, cultural, wildlife and aquatic tourism especially along the coast (Map 5 – Annex 5). The sustainability of activities relates to the degree that they degrade ecosystem services and the resilience of the CATS in question. The community is an integral part of the tourism system therefore NVIC perception needs to be included in sustainability assessment. Activity-based sustainability in tourism management relates to the idea that limits to tourism development can be reached with certain activities but when activity type is modified further development can occur. It is based on the idea that a tourism destination is dynamic (Saarinen, 2006). It was not possible to survey NVIC to discover which of the above impacts are most closely associated with each activity. With 42 positive and negative impacts and 19 activities a total of 798 questions would be required. Figure 13 below shows relative index rank of perception of activities related to ecosystem services for NVI coastal tourism. The index combines the idea of maximizing benefits and minimizing negative impacts with importance to the community for tourism development determined by perception.

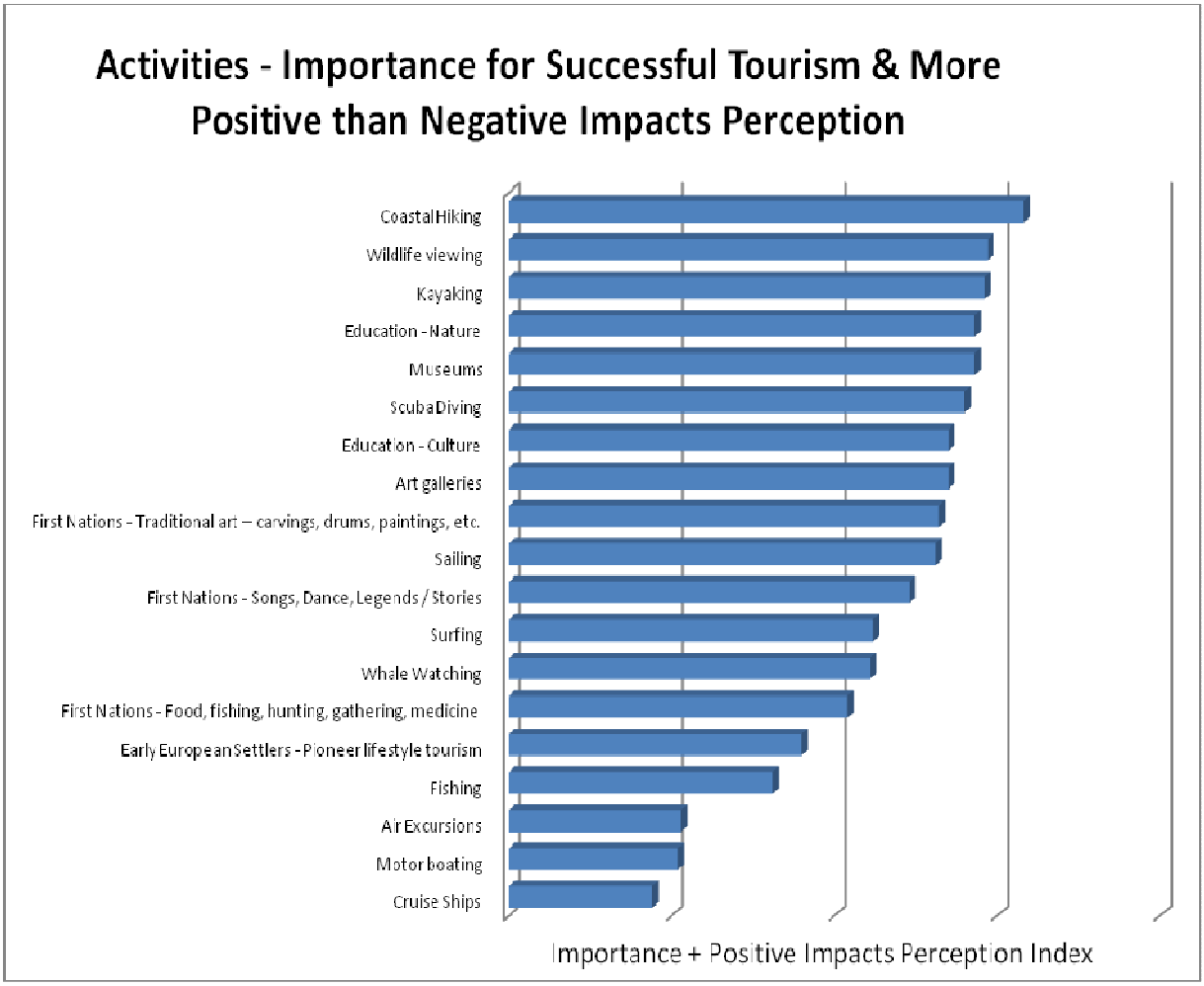


Figure 13. NVIC Perceptions of Coastal Activities using a Combination of Importance and Positive Impact Perception.

From the results in Figure 13 above it is clear that nature based tourism in the form of coastal hiking should receive the most attention for future tourism development in the region followed by wildlife viewing, kayaking, education – nature, museums, and scuba diving. While those activities in the middle should, according to community perception, be promoted with a moderate level of energy including art galleries, education – culture, First Nations - traditional art – carvings, drums, paintings, sailing and First Nations - songs, dance, legends / stories. Activities such as surfing, whale watching, First Nations - food, fishing, hunting, gathering, medicine, early European settlers - pioneer lifestyle tourism and fishing should only receive marginal promotion and marketing attention as they have not

been shown to rank highly on the community perception index (cultural heritage opportunities are shown in Map 6 – Annex 5).

Although whale watching and fishing were ranked relatively well in terms of importance for tourism development they were not perceived to have as many positive compared to negative impacts in relation to other activities. By combining perception of importance for development with perception of positive vs. negative impacts a more holistic understanding of tourism activity perception can be obtained. When considering the development potential of air excursions, motor boating, and cruise ships the results indicate that not only are these activities perceived to have lower positive vs. negative impacts but they are also not seen as being as important to tourism development as other activities. Thus these last three activities should not be promoted, and furthermore should be regulated by government through permits such that less important and beneficial activities are kept to a minimum.

4.7.1 Coastal Hiking and Wildlife Viewing

The North Coast Trail has been a vision of many members of NVIC for many years and after a great deal of work by the Northern Vancouver Island Trails Society and Strategic Forest Management (construction) it was officially opened in May 2008. It is a world class and rigorous 47 km hike connecting to the 27 km Cape Scott Trail. In the North Island Region wildlife viewing and hiking were both the top choice outdoor recreation activities (38% of respondents each) from a profile of visitors to the North Island region in 2002-03 (Visitor profile, 2003). The opportunities for wildlife viewing are extensive on NVI (Map 7 – Annex 5).

4.7.2 Kayaking

According to BC Ministry of Sustainable Resource Management (2003), sea kayaking days in BC have increased approximately 40% (similar to in Washington State) between 1987 and 2000. In their study one kayaking operator suggested a 60% increase in the last 15 years. There is high potential for sea kayaking in a wide variety of locations on NVI (Map 8 – Annex 5). During the winter months, some of the sea kayaking operators based in B.C. offer tours in more southern locations such as Baja California, Mexico, Belize and Central America (BC Ministry of Sustainable Resource Management, 2003). Thus the implications of progress towards sustainable tourism development in Canada can be expected to have internationally positive development trends as operators can be expected to bring their management practices and corporate social responsibility (CSR) agenda with them to other countries.

The North Island Straits Coastal Plan (December, 2002) highlights concerns over increasing levels of public and commercial recreational activity. Issues surrounding the accommodation of both commercial and recreational sea kayakers at local campsites are discussed in the plan as well as the role of the RDMW to manage camping in the area, and to protect the quality of experience for both tourists and recreational paddlers. In addition, the Tlowitsis First Nation (Mainland BC, across from Sayward but with most members live in Campbell River or Alert Bay) is interested in improving its involvement and influence over visitation to avoid disturbance or desecration of culturally significant sites. The need for a strategy for campsite management and allocation is recommended for this area, to address both recreation and tourism uses.

4.7.3 Motor Boating and Cruise Ships

Personal water crafts (PWCs) were never evaluated for environmental impact before their widespread promotion in the market place and furthermore they have not been subject to the same pollution regulations that control other technologies (*e.g.* Automobiles) (Davenport and Davenport, 2006). PWCs can be highly polluting, extremely noisy, and mechanisms for the transport of exotic species, leading to adverse environmental impacts. Regulation of PWCs can be difficult once economic reliance is developed, especially as it can lead to opposition and avoidance of regulation based on a long history of their use (Davenport and Davenport, 2006). However, based upon a study completed in 1997 titled Northern Vancouver Island, Forest Recreation and Tourism Opportunities Study (FROTOS) boat cruising (power and sail) were identified as one of the best or most viable tourism products in the region (Map 9 – Annex 5).

Based on community perception, the cruise ship industry should not be the focus of efforts to develop tourism by Tourism Vancouver Island. The District of Port Hardy sees itself as an ideal site for a "soft adventure" small vessel cruising port, due to its proximity to numerous fjords and island groups. They assert that opportunities exist to develop a full-service, all-season marina with boat storage and other visitors' services related to sports fishing and recreational coastal cruising (District of Port Hardy, 2006). The adverse ecological impacts from the use of PWC's as well as potential conflicts between motorized and non-motorized coastal activities need to be monitored and managed.

4.8 Factor Analysis

It is not practicable to assess the causal nexus individually for each of the 42 identified impacts (+/-). Factor Analysis has been used in a variety of studies to reduce information on a large number of tourism impacts down to a smaller and manageable number of indicators (Gursoy and Rutherford, 2004; Kibicho, 2008; Andereck et al. 2005; Faulkner and Tideswell, 1997). Simply put, factor analysis is used here to study patterns of relationship between a variety of dependent variables (tourism impacts as a result of perception of importance / acceptability), with the goal of finding out something about the independent variables (SEEI pressures on CATS leading to those + and – impacts) despite the fact that independent variables were not measured directly. Factor analysis can be used in two ways; absolute and heuristic. In this analysis factor analysis was used in a heuristic way, thus these factors do not necessarily represent all the pressures on CATS, but instead those identified that appear to be the most important based on community perception.

Factor loadings are a gauge of the substantive importance of a given variable to its factor (Field, 2000). In this analysis factor analysis with a varimax rotation was used in four separate factor analyses including both (i) positive and (ii) negative tourism impacts, and for activities in terms of (iii) positive vs. negative impacts and (iv) importance for successful tourism development. All factors converged in six to 13 iterations and explain between 61% and 78% of the total variance in each data set.

The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) shows if factor analysis reveals distinct and reliable factors. It ranges between zero and one with values greater than 0.5 being acceptable and values between 0.7 and 0.8 considered to be good. The value of 0.693 for factor analysis of positive tourism impacts (benefits), shown in Figure 14 below, is therefore acceptable, and very close to being considered good. Bartlett's test of Sphericity confirms that the underlying correlations between the original variables are sufficiently large for factor analysis. These two tests confirm that factor analysis is

appropriate for this data. All four factor analyses (positive impacts, negative impacts, and activities importance and benefits vs. negative impacts) revealed good KMO values and practically significant relationships between the data (all $p < 0.001$) (Annex 3).

4.8.1 Positive Impacts

Factor analysis of positive tourism impacts is shown in Table 2. This factor analysis was completed with Varimax rotation and Kaiser normalization and rotation converged in eight iterations. The impact 'First Nations to be self sufficient in a post-treaty' world did not explain enough variance to be significant to any factor and ranked 15 out of the 21 positive impacts in terms of importance. In addition the impact 'More restaurants, bars, hotels and B&B's' was found to represent variance in both factors two and three. Some impacts within a factor do not fit exactly with the title given to the factor and can be considered as noise in the results that is interpretable. Overlooking the odd exception within a factor the descriptive label used is expected to be useful to assess the causal nexus of these impacts based on perception for management purposes.

A total of four significant factors were identified explaining 61.43% of the variance in the data. The first two factors, which account for 17.08% and 15.58% of the variance respectively, show differences in their expected common origin. Impacts in the first factor relate to socio-economic considerations, compared to those in factor two which correspond more with environmental impacts. Factors three and four represent 14.89 % and 13.79% of the data and correspond to pressures on CATS related to ecosystem services and infrastructure respectively. There is fairly equal distribution of explained variance between all factors.

In terms of rank of importance according to the relative importance index previously described factor two (environment) is the most important followed by factor one (socio-economic). The cause of impact perception will be discussed using a modified DPSIR framework leading to recommended management and policy responses.

Table 2. Factor Analysis – Positive Impacts

Positive Tourism Impacts - Factor Analysis					Interfactor Rank	Intrafactor Rank
	Factor					
Factor 1 - Socio-Economic	1	2	3	4	2	
More money for whole community	0.85				4	8
More profits for local businesses	0.78				5	9
Employment – more jobs, better pay	0.66				3	5
Give youth hope for future opportunities	0.65				1	2
Stronger local economy	0.59				2	4
More entertainment and recreation options	0.57				6	11
More restaurants, bars, hotels and B&B's	0.50				7	21
Factor 2 - Environmental Protection					1	
Better quality of life		0.75			3	6
Protect Wildlife		0.73			1	1
look better		0.68			2	3
Less damage to environment than logging, mining and commercial fishing		0.61			5	20
Create parks and protected areas		0.59			4	13
Factor 3 - Safeguard Cultural Ecosystem Services					3	
Protection and preservation of traditional knowledge about nature			0.72		2	10
Better understanding of different cultures and communities			0.69		4	14
Education and increased environmental awareness			0.68		1	7
Generate money to manage protected areas			0.65		3	12
Factor 4 - Infrastructure					4	
Better public transport (buses)				0.78	3	19
Better services (water, gas, electricity, internet, phone, etc.)				0.74	2	17
Better protection from Police and Fire-fighters				0.73	4	18
Better roads and community facilities (community centre, traffic lights)				0.59	1	16
More restaurants, bars, hotels and B&B's	0.50			0.54	5	21
% of Variance	17.08	15.58	14.98	13.79		
Cumulative % of Variance	17.08	32.67	47.64	61.43		

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.693
Bartlett's Test of Sphericity	Approx. Chi-Square	535.283
	df	210.000
	Sig.	.000

Figure 14. KMO and Bartlett's test for positive tourism impacts factor analysis.

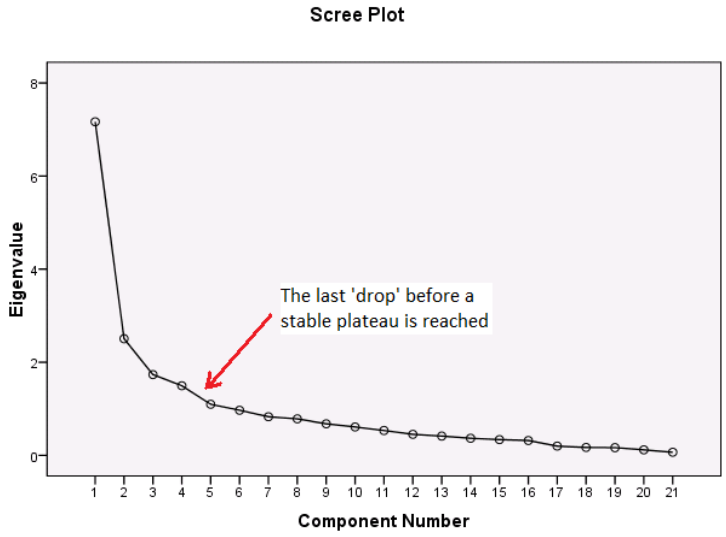


Figure 15. Scree plot of positive tourism impacts factor analysis eigenvalues.

Despite the Eigenvalue of factor five being slightly above one (1.096) based on visual interpretation of the scree Plot, showing a significant drop, aka 'flattening' of the curve between factors four and five, factor five was removed (Fig. 15).

4.8.2 Negative Impacts

Factor analysis of negative tourism impacts shown in Table 3 below shows a total of five significant factors explaining 70.93% of the variance in the data. This factor analysis was

completed with Varimax rotation and Kaiser normalization and rotation converged in 10 iterations. The impacts 'More crime/robberies/vandalism' and 'Less feeling of belonging to my community' did not explain enough variance to be significant to any factor and were ranked four and 18 respectively out of 21 negative impacts. In addition 'Littering' is in factors two and three, and 'Destruction of sacred and historical sites' is in factors two and five.

The first two factors, which account for 18.65% and 18.19% of the variance relate to goods and services compared to those in factor two which relate more to the environment based on the arguably objective factor label descriptions assigned. Factors three, four and five represent 17.39 %, 9.24%, and 7.47% of the data variance and correspond to pressures on CATS related urban environmental impacts, employment, and culture respectively. There is fairly equal distribution of explained variance between factors one, two and three, while factors four and five represent much less of the variance in the data. In terms of rank of importance, according to the relative importance index previously described, factor two (Environment) is the most important followed by factor one (Goods and Services). The cause of impact perception will be discussed using a modified DPSIR framework leading to recommended management and policy responses.

Table 3. Factor Analysis – Negative Impacts

Negative Tourism Impacts - Rotated Component Matrix						Interfactor Rank	Intrafactor Rank
	Component						
Factor 1 - Goods and services	1	2	3	4	5	4	
Less affordable housing	0.81					5	16
Unfair increase in home prices and property tax	0.81					4	15
Benefits to only a small % of community	0.69					3	13
Unfair increases in rent	0.67					2	11
More expensive – food, clothing, and services	0.59					1	9
Factor 2 - Environmental						1	
Damage nature from tourism		0.80				3	5
Water pollution and use too much of water		0.71				5	8
Disturb wildlife		0.70				4	6
Large stores put local businesses out of business		0.65				6	14
Destruction of sacred and historical sites		0.65				2	3
Littering		0.56				1	2
Factor 3 - Urban Environmental Impacts						3	
Air pollution			0.79			3	7
More traffic accidents			0.74			4	12
More drugs, alcohol and prostitution			0.64			1	1
Noise pollution			0.62			6	19
More gambling			0.57			5	17
Littering			0.50			2	2
Factor 4 - Employment						5	
Seasonal income				0.86		2	21
Tourism jobs replace traditional forms of employment				0.79		1	20
Factor 5 - Culture						2	
Destruction of sacred and historical sites					0.50	1	3
Loss of culture and traditions					0.81	2	10
% of Variance	18.65	18.19	17.39	9.24	7.47		
Cumulative % of Variance	18.65	36.83	54.22	63.46	70.93		

4.8.3 Activities

Coastal tourism activities in the region can be divided in to three main categories, with some overlap, including nature, culture, and education based tourism. A second set of factor analysis was completed on the responses related to the perception of coastal tourism activities in the region (19 activities analysed) revealing four factors when considering positive and negative benefits of each activity and five factors when considering importance of the activity for successful tourism development. Both factor analyses were completed using Varimax rotation with Kaiser normalization. The factor analysis for 'more positive than negative impacts' (Table 4) converged in six iterations and the factor analysis 'importance for successful tourism' (Table 5) converged in 13 iterations.

Table 4. Activities Factor Analysis – Positive vs Negative Impact Perception

More Positive than Negative Impacts - Rotated Component				
	Component			
Factor 1 - Art and Education	1	2	3	4
Art galleries	0.88			
Education - Nature	0.85			
Education - Culture	0.83			
Museums	0.79			
Factor 2 - Non motorized activities				
Kayaking		0.83		
Scuba Diving		0.82		
Sailing		0.81		
Coastal Hiking		0.76		
Surfing		0.50		
Factor 3 - Motorized acivities				
Cruise Ships			0.84	
Motor boating			0.78	
Air Excursions			0.78	
Fishing			0.72	
Whale Watching			0.70	
Factor 4 - Cultural Tourism				
First Nations - Songs, Dance, Legends / Stories				0.83
Early European Settlers - Pioneer lifestyle tourism				0.76
First Nations - Traditional art – carvings, drums, paintings, etc.				0.73
First Nations - Food, traditional fishing and hunting, gathering of foods, medicine plants				0.70
Surfing				0.52
% of Variance	19.71	18.51	18.19	15.90
Cumulative % of Variance	19.71	38.22	56.41	72.31

Table 5. Activities Factor Analysis – Importance for Successful Tourism

Importance for successful tourism development - Rotated Component					
	Component				
Factor 1 - Activities	1	2	3	4	5
Scuba Diving	0.83				
Kayaking	0.82				
Sailing	0.74				
Art galleries	0.59				
Wildlife viewing	0.57				
Surfing	0.50				
Factor 2 - Culture					
First Nations - Food, traditional fishing and hunting, gathering of foods, medicine plants		0.94			
First Nations - Songs, Dance, Legends / Stories		0.91			
First Nations - Traditional art – carvings, drums, paintings, etc.		0.74			
Early European Settlers - Pioneer lifestyle tourism		0.52			
Surfing		0.51			
Factor 3 - Education					
Education - Nature			0.92		
Education - Culture			0.92		
Factor 4 - High price activities					
Air Excursions				0.87	
Cruise Ships				0.78	
Factor 5 - Motorized Water Sports					
Fishing					0.88
Whale Watching					0.86
Motor boating					0.50
% of Variance	19.92	19.18	13.51	13.41	12.42
Cumulative % of Variance	19.92	39.10	52.61	66.02	78.44

Factor analysis of perception of coastal ecosystem services (cultural and recreational) in terms of a combination of both 'more positive than negative impacts' and 'importance for successful tourism development' allows for a comparison of the commonalities in perception of these activities in two different ways. Table 4 reveals four factor solutions accounting for 72.31% of the total variance in the data with fairly consistent distribution of variance between the four factors; ranging from 19.71% in factor one to 15.9% in factor 4. The division into four factors reveals differences in the origin of perception of these activities in terms of positive to negative impacts and divides activities into groups according to art and education, non-motorized activities, motorized activities, and cultural tourism.

Table 5 reveals five factors solutions accounting for 78.44% of the data ranging from 19.92% in factor one to 13.41% in factor 5. This factor analysis, in considering activities in terms of importance for successful tourism development, isolates education, high prices, activities and motorized water sports into factors not identified when considering the perception of these impacts in terms of positive and negative impacts.

As discussed in the previous section on general trends; fishing and whale watching activities ranked high in terms of importance for development but not in terms of more positive than negative impacts giving them an overall lower ranking. This is further highlighted when we compare the two tables above. Table 4 shows a common origin for perception of all motorized activities in factor three in terms of positive and negative impacts, whereas when considering the activities strictly in terms of importance for successful tourism development and not in terms of impacts fishing and whale watching are grouped in an independent factor along with motor boating (factor 5) and cruise ships and

air excursions in their own factor also (factor 4) indicating different origins of perception of these activities in terms of success for development of tourism on NVI.

4.9 Limitations of the Analyses

A possible criticism of data analysed here is the small sample size, consisting of 57 individuals out of a community of approximately 10,000 representing a sample population of 0.57%. Thus, for a community of 100,000 a similarly representative sample would be 570 individuals. The results show a strong and practically significant correlation between the data clustering in factor groups with identifiable traits that when combined, explain a large part of the variance. It is expected that the data is highly interpretable because it was obtained by asking questions appropriate to the concerns of NVI determined using RRA. In addition, the demographics show a wide variety within the sample to represent the overall community. Thus because this data has been found to be appropriate for factor analysis, is based on community perception, and shows community representativeness these results can be considered valuable to government and industry.

Statistically significant comparisons between different stakeholder groups were not determined. Therefore this analysis was unable to determine specific stakeholder groups within the larger community. This would be helpful in proactive conflict resolution between those groups of individuals with diverging perspectives relating to tourism development. Instead perspectives on tourism development were found to be relatively homogeneous throughout the sample population and so discussions were limited to the community as a consolidated single unit. Another limitation, common to social science surveys, is that it was not possible to trace non-respondents and check whether their reasons

for non-responding relate to their opinion about tourism in NVI. Furthermore the study could not reach members of NVIC who went on summer holidays, away from NVI. It is possible that these people might have had different opinions about tourism in NVI.

4.10 Tourism Management

The management of tourism is a complex and multidimensional task. There are a number of conceptual models that have been developed to describe tourism including the destination life cycle model (Butler, 1980), the Irridex Model (Doxey, 1975) and more recently with the inclusion of social exchange theory (Ap, 1992) to include residents' attitudes in impact assessment. According to Faulkner and Tideswell (1997) there are two broad dimensions of interaction between tourism development and community residents. The extrinsic dimension refers to the characteristics of the locations as a tourist destination (including the level of development and tourist activity). The intrinsic dimension refers to the characteristic of the community members. A comprehensive picture of both of these dimensions is necessary for tourism management thus the extensive introduction to NVI as a tourist destination and the focus on both perception of impacts and activities.

A variety of programs are in place in BC to manage and promote tourism including the BC Government Tourism Action Plan, Community Tourism Foundations, Foresight Project for sustainable tourism in BC, and the BC Province – Industry commitment to sustainable tourism. These are subsequently discussed in more detail.

The coastal tourism sector in BC is not coordinated and lacks policy directives. Without a coordinated voice, the tourism sector lacks power in negotiating resource allocations and resolving conflicts (Dobson, 2002). The BC Government released a Tourism Action Plan

(TAP) in February 2007 which articulates the government's goal of doubling provincial tourism revenues by 2015 (TAP, 2007). The guiding principles of TAP are to:

- Aggressively seize opportunities and leverage BC's competitive advantages.
- Take a visitor/tourist centric approach.
- Adapt best global practices from other leading tourism jurisdictions.
- Destination management guided by a whole-of-government approach and commitment to managing the Province as a destination for visitors and investors.
- Smart use of sound research, timely analysis and future insights.
- Utilize effective partnerships with clear accountabilities and deliverables.

According to TAP the Key Strategic Areas for Action are (1) marketing & promotion (with 18 Actions aimed at, among other things leveraging the 2010 Olympic Winter Games, emerging markets and products, parks and outdoor recreation, aboriginal tourism). These actions are very applicable to coastal tourism on NVI which is an emerging market with high outdoor recreation value and a worldwide recognized First Nations Community. (2) development & investment (3) access & infrastructure and (4) tourism workforce. Each area of action has a variety of sub actions. A great deal of time, money and energy will be required to implement all these actions. If significant progress is made, in even a few of these action areas, in the region of Northern Vancouver Island this destination will find itself on an accelerated path up Butler's Tourism Area Life Cycle Model (Butler, 1980) (example in Annex 3) which will necessitate sound and adaptive management action.

In addition to doubling tourism by 2015, the 2007 Tourism BC Tourism Action Plan has the goal of green certification for 20% of B.C. tourism operators by the end of 2009. If we consider doubling tourism (100% increase) with 20% green certification in 2015, simple mathematics shows 80% growth that is not green certified. In addition, the plans do not

adequately address the need to understand local communities and engage them at a grass roots level. There is little discussion of community capacity building in sustainable tourism development including the need to train local people to facilitate their employment in the local tourism economy thus providing them with benefits.

Tourism Vancouver Island, as part of a larger program by Tourism BC, is working on a program entitled Community Tourism Foundations (TVI, 2008). The purpose of the program is to provide support to BC communities' tourism marketing efforts and provide a range of tools, proven resources and customized destination development assistance. According to Neil Smith of the Regional District of Mt. Waddington (Personal Communication, July 16 2008) there is a plan soon to be released for the northern region of Vancouver Island.

The Council of Tourism Associations of BC recently released the Foresight Project which was completed between 2005 and 2007. It is a pan-industry effort to establish a vision and framework for sustainable tourism in BC. The project established terms of reference for ongoing and long-term tourism planning which will evolve into best practices for the tourism industry. The major components of the project are the BC Tourism Industry Sustainability Policy and the BC Tourism Operators' Code of Conduct. The action plan of the project will be incorporated into the long term plan of COTA and establish milestones, performance indicators and monitoring mechanisms. It envisages the adoption of a Tourism Industry Sustainability Policy and Code of Conduct by tourism operators to optimize social, environmental and financial benefits. This initiative by COTA is in line with the results of this analysis that NVIC perceives the need to ensure that 'ecotourism (or

sustainable tourism) operators need to be certified to ensure they do not hurt the local culture and environment'.

On October 27, 2008 the British Columbia, Canada government issued a press release entitled 'Province, Industry Commit to Sustainable Tourism'. The commitment outlines collaboration between government and industry in taking action on climate change, while ensuring the future sustainability of the industry. The BC Partnership for Sustainable Tourism will:

1. Establish best practices for sustainability specific to tourism businesses;
2. Develop and implement a certification program for "green" tourism operators;
3. Set up a system for tracking and reporting sustainable tourism indicators;
4. Offer practical carbon calculators for small and medium-sized tourism enterprises;
5. Embark on communications and outreach for businesses and travellers; and
6. Hold workshops across the province to educate businesses on carbon emission strategies and best practices.

At an international level The Tour Operators Initiative (TOI) for Sustainable Tourism Development, supported by the United Nations Environment Programme, the World Tourism Organisation, and UNESCO, recognizes that most tourism operators understand that tourism success depends on a clean and safe environment. The initiative seeks to provide management tools to assist operators in minimizing negative SEEI while optimizing benefits. Although many of the impacts associated with tourism on NVI as outlined in this analysis are region specific, the approach used here can be applied elsewhere and would be useful for TOI as a methodological approach to understanding positive and negative impacts.

4.11 Geographical Considerations

The peripheral nature of NVI makes it ideally suited to nature and culture based tourism as peripherality corresponds with less development and less negative consequences from unsustainable development in the past. In a sense the peripherality of the region can be seen as a great attribute that has preserved the recreational ecosystem services. Thus alternative forms of tourism can be expected to be more appropriate and realistic for success in NVI region than traditional mass tourism. However, peripherality can also complicate economic development in a region and diminishes the quality of life of the population (Garrod et al., 2004). For example, local government can suffer from the under-exploitation of local resources as has historically been the case of NVI tourism with unrealized potential. Marine tourism has generated substantial socio-economic benefits for peripheral coastal communities in many parts of the world (Garrod et al., 2004) and has the potential to do so in NVI but it must be done sustainably, to preserve the sense of peripherality as well as the ecosystem services. To do this will require well planned and limited tourism development.

Attracting enough customers to pay for natural and cultural history tours is not always easy for isolated / remote regions and may require assistance from governments including destination branding (Che, 2006). Another potential hindrance for tourism development on NVI is that North Americans are often not willing to pay for nature-based tourism in First World settings. Typically they are urban dwellers who visit provincial and national parks independently as opposed to in package tours run by multinational corporations like in the developing world (Che, 2006).

4.12 Adaptive Management

The concept of Adaptive Management (AM) is central to the Ecosystem Approach being taken here to manage tourism and increase sustainability in coastal tourism development for NVI. AM treats management policies as experiments analysing the responses of the complex system to changes in human behaviour (Patterson et al, 2008). Stakeholder input is central to AM (Figure 16 below) and is used to continuously improve all other components in the cycle such that overall planning is in sync with the perception and desires of the community.

Tourism development plans are not always implemented due to internal and external tourism industry impacts. So, to ensure that tourism development is both feasible and planned for the long term, it needs to be linked to the overall socioeconomic development of the community (Okazaki, 2008) which include a variety of dynamic dimensions. Sustainability indicators for CATS need to allow for adaptive learning processes within the local community (Schianetz and Kavanagh, 2008). As NVIC continues to change particularly in economic terms due to declines in natural resource extraction, and the current global economic crisis, planning for tourism will also have to change. Through AM, NVIC will be able to build resilience and deal with uncertainty through a continuous process of experimentation, monitoring and social learning (Farrell and Twining-Ward, 2004).

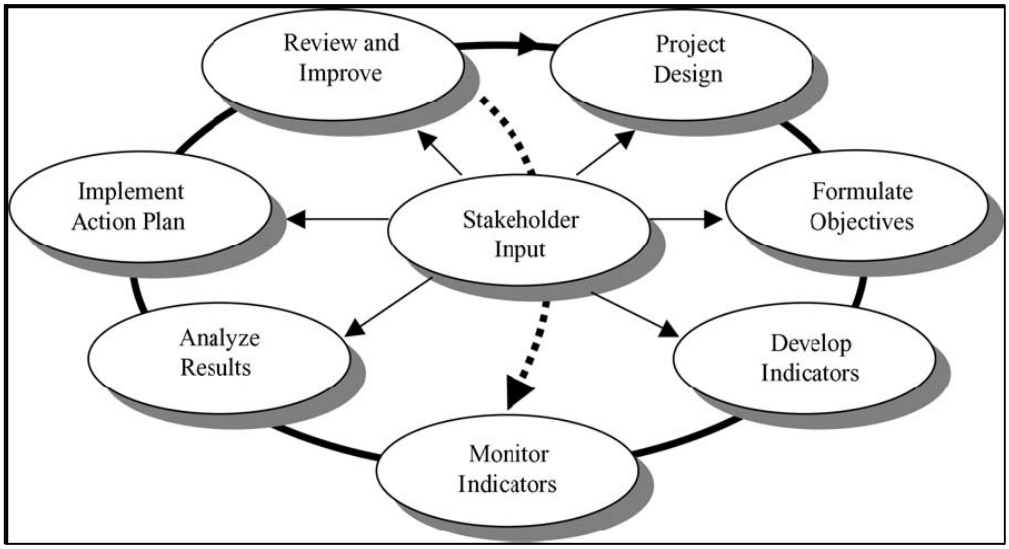


Figure 16. Cycle of Adaptive Management (Farrell and Twining-Ward, 2004)

Like the concept of sustainable tourism AM embraces the idea that attempting to maintain an idealized equilibrium state is not possible as it does not exist in the real and dynamic world. Instead AM uses the concept of social learning to facilitate knowledge sharing between stakeholders in a continual cycle of (1) objectives, (2) indicators, (3) monitoring, (4) results analysis and (5) review (Farrell and Twining-Ward, 2004). The first two of these have been addressed in this analysis for NVIC and following AM, in order to ensure capacity building and resilience in the tourism industry a monitoring program is needed next.

4.12.1 Problems with Adaptive Management

Adaptive management is reactive in nature, with little forward-looking policy, or ability to incorporate indirect or systemic impacts to the natural capital which supports tourism (Lawson et al., 2003 – in Patterson et al, 2008). This analysis started with both a bottom-up

and a top-down aproach to identify impacts of tourism and how they are perceived leading to an understanding of the systemic impacts within the causal nexus..

4.13 Tourism is a Complex Adaptive Social-Ecological System

The falsely optimistic idea that, if managed appropriately, things will ultimately return to a normal and expected state of equilibrium has been the governing principle of most social sciences including economics and tourism (Farrell and Twining-Ward, 2005). Tourism management in the past, following a command and control approach with cause-effect rationale that reduces the system to the sum of a few predictable indices (Berkes, F., 2004) should no longer be seen as appropriate considering new knowledge of the way that systems function (Farrell and Twining-Ward, 2005). Instead tourism involves complex interactions between various driving pressures within the social-ecological system that it operates, as identified here through factor analysis. Complex adaptive systems require adaptive management to consider attributes such as non-linearity, uncertainty, emergence, scale and self-organisation (Berkes, F., 2004).

Farrell and Twining-Ward (2005) assert that despite an understanding of social systems or ecosystems when viewed in isolation, tourism practitioners know little if anything about complex systems or interactions within SESs. In addition, because continual uncertainty in the system is generated by unknown forces within the system, management through rigid control is not effective. According to Farrell and Twining-Ward (2005) “Complex systems are not built frameworks but actually exist in reality, all with their own unique character” and they propose seven steps to move forward with this new knowledge: (1) Understanding Complex Adaptive Systems, (2) Learning From Natural Ecosystems, (3) Co-evolution of

Human and Natural Systems, (4) Extending Tourism Systems, (5) Integration, (6) Adding Post-normal Science, and (7) Facilitating a Transition (Farrell and Twining-Ward, 2005).

The components of Complex Adaptive Tourism Systems (CATS) can be seen as mini-systems (Farrell and Twining-Ward, 2005). The latent indicators identified in factor analysis represent a way of viewing linkages between these mini-systems. According to Farrell and Twining-Ward (2005) a tourism system is an ecosystem, where tourism is merged with life support systems and related social systems (Farrell and Twining-Ward, 2005). Therefore, as an ecosystem, tourism must be recognized as unpredictable and require flexible and adaptive management. Three feedback mechanisms are identified; Positive feedback through increasing cyclic flow of energy in growth oriented tourism development, negative feedback through reduced cyclic flows due to regulations or economic downturn, and structural entropy due to declining energy or investment (Farrell and Twining-Ward, 2004). As a result of the recent declines in natural resource extraction industries on NVI and the current global economic crisis, negative feedbacks can be expected to affect the NVI tourism system.

The simple fact that humans and most ecosystems have coevolved and adapted with one another over time (Norgaard, 1994: in Farrell and Twining-Ward, 2003) allows for the concept of CATS to be rationalized. This simple relationship is a good starting point for conveying information to members of the local community who may be put off by discussions about a “complex adaptive system” due to the complexity of the concept.

4.14 DPSIR Framework

The DPSIR (driver, pressure, state, impact, response) framework is an extension of the 'Pressure-State-Response' (PSR) framework which was developed by the Organisation for Economic Cooperation and Development (OECD, 1993) and the UN in the early 1990's (Scarstad et al., 2008). Further back the roots can be traced to the Stress–Response framework developed by Statistics Canada in the late 1970s (Scarstad et al., 2008). The DPSIR approach was first presented by the European Environmental Agency (EEA, 2006) in 1995. It assumes cause-effect relationships between interacting components of the social, economic and environmental systems (Gasparino et al., 2006).

DPSIR embodies a systems perspective. Its application to the management of CATS is both highly relevant and appropriate. Despite this DPSIR has been underutilized in the past for understanding tourism with the exception of a few interesting examples including planning documents and a MA thesis (Glekas et al., 2006, Noronha et al., 2002; Viljoen, 2008). Studies using this approach for tourism are nonexistent in peer reviewed scientific literature. This approach therefore represents an effort to fill in a gap in tourism management methodology. It embraces the fact that tourism needs a systems approach and uses an established methodology for that purpose. The system viewed in the context of DPSIR does not necessarily have to have scales that coincide for corresponding drivers, impacts and responses (Scarstad et al., 2008). It is likely that the scale for drivers will be geographically and temporally greater than for pressures and even more so for impacts. Responses that are most effective should address the larger scale drivers and pressures to be proactive in mitigating negative impacts or enhancing positive ones. If directed only

towards impacts the responses can be expected to be band-aid solution, reactive in nature, and not addressing the root causes.

The DPSIR approach can be used in decision-making, by identifying clear steps where the causal chain can be broken by policy action. It represents a systems view to understand how social and economic developments exert pressure on the environment with implications to ecosystems, human health, and societal responses (which in turn feed back through adaptation or corrective action) (Bosch and Gabrielson 2003). Traditionally 'pressure' has been understood only in terms of pressure on the ecosystem and 'state' as quantitative descriptors of the ecosystem. However in the modified approach to DPSIR used here both 'pressure' and 'state' will be used to also describe socio-cultural and economic dimensions of sustainability. Historically DPSIR has been used to understand the causal links between socio-cultural, economic, and ecosystem components within the overarching context of problems in the natural system. Thus, using this approach within the context of CATS (social-ecological system) necessitates expansion of the use of 'pressure' and 'state' variables to include socio-cultural and economic dimensions.

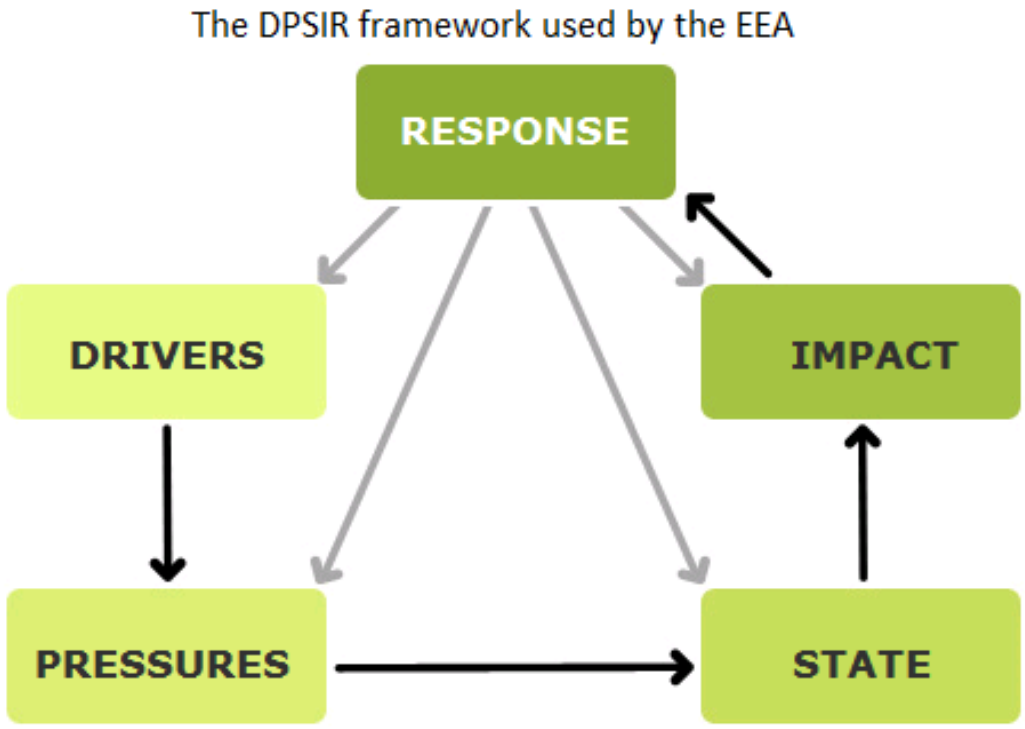


Figure 17. DPSIR Framework (EEA, 2006)

Figure 17 shows the relations between indicators with responses being directed to all other indicators. A variety of intermediate indicators can be understood in-between the DPSIR indicators (represented by the arrows in Fig. 17). These intermediate indicators are able to express more than other indicators in terms of the dynamics of interaction in the complex system. Some types of intermediate indicators include eco-efficiency indicators (between D and P) relating to the possibility of economic development without an equivalent increase in pressure on the environment (Bosch and Gabrielson, 2003). Technological innovations such as solar and wind power, constructed wetlands for wastewater treatment, and end of pipe treatments are some examples. This is similar to the aforementioned activity-based sustainability in tourism management where limits to tourism development can be reached

with certain activities, but when activity type is modified further development can occur (Saarinen, 2006). The link between P and S can be used to analyse time delay (Bosch and Gabrielson, 2003) that may occur as a result of foreign investment (pressures) from tourism (driver) leading to measureable increases in real estate and goods and services (state). Dose/response relationships link S to I and can help in choosing the most appropriate state indicator to act as an early warning. Following the previous example, increases in real estate price (state) can lead to less affordable housing (impact). Economic costs of impacts, as well as other indicators that confirm societal perception of the seriousness of the impacts, are key for triggering societal responses. These responses highlight the link between I and R (Bosch and Gabrielson, 2003).

Policy-effectiveness indicators are useful to summarize the relations between the response to change in: D, P, S, and I. Policies such as taxation for the use of recreational ecosystem services in an area can be an effective response using natural capital for generating economic capital to ensure the community (social capital) is maintained through the provision of low cost housing or subsidized goods and services inflated by tourism. Policies that change the driver (tourism) to increase net benefits of tourism can be seen as breaking the causal chain at the root by altering traditional mass tourism practices in favour of sustainable tourism practices. A diagram of the above example is shown in Figure 18.

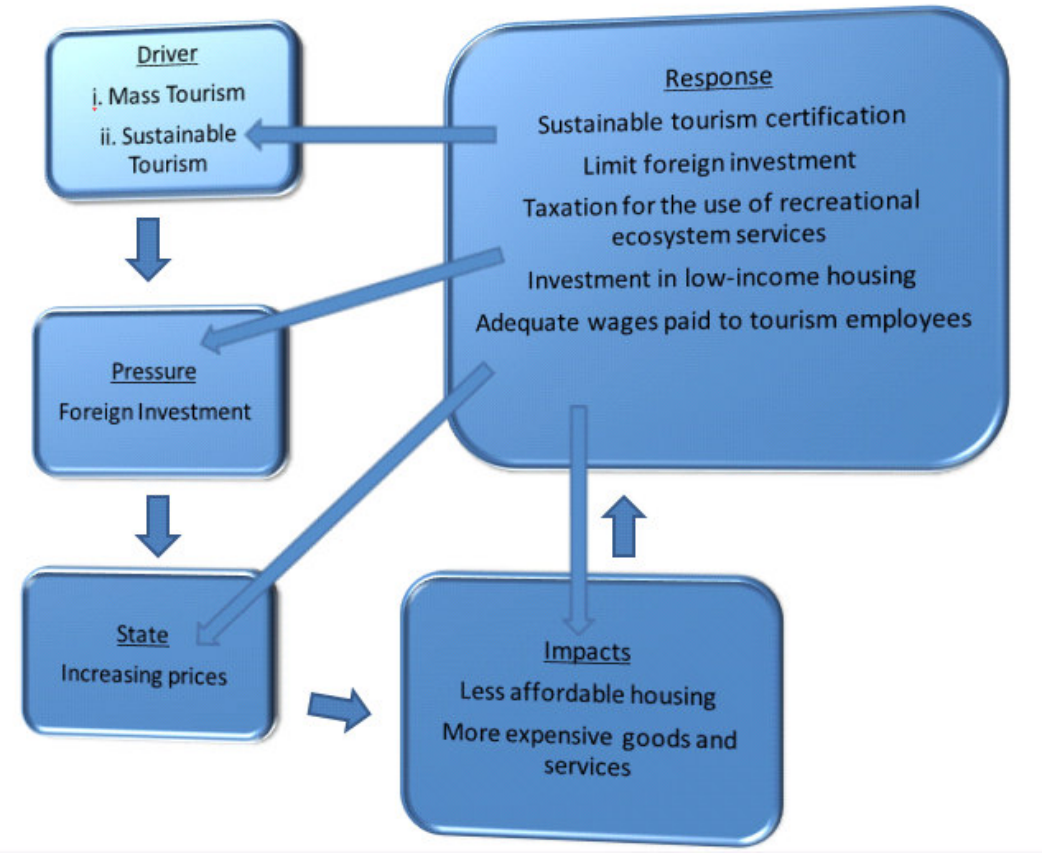


Figure 18. DPSIR for Sustainable Tourism Development - Example

So, how can the information from the previous sections, on community perception based pressures of tourism impacts, be used to develop a plan for: (i) a real-world tourism development as a matter of corporate social responsibility, or (ii) for regional government?

Traditionally DPSIR has been used to describe negative environmental impacts. This analysis starts with the identification of impacts, both positive and negative, and through factor analysis, it groups impacts into factors representing a common cause of the perception. And, since an impact really only exists if it is perceived to exist, these latent indicators (factors) can be seen as representing causes of this perception and therefore causes of impacts. In this way the DPSIR approach has been extended to provide a new

way of looking at interaction in complex SESs like CATS when combined with factor analysis of tourism impact perception.

4.14.1 Problems with DPSIR

DPSIR is often used inappropriately due to relating the components in the framework to common words with potentially different meanings. Drivers are exclusively economic activities. Ecologists and natural scientists may be tempted to consider natural drivers but this is not appropriate. State indicators must be quantifiable, thus discussing the state of the ecosystem as being good or degraded is not appropriate within DPSIR. The extension of State and Pressure to include socio-cultural and economic dimensions follows from the discipline of SESs and the work of Farrell and Twinning-Ward (2005) who state that a tourism system is an ecosystem. Thus in semantic terms, considering an advanced understanding of systems science, in the context of CATS socio-cultural and economics dimensions are also ecosystem dimensions. This may seem far-fetched; however, it is absolutely necessary to understand the nature of SESs and CATS to move forward with pragmatic application of the concepts of sustainable tourism development.

Scarstad et al. (2008) argue that the DPSIR approach does not generate neutral knowledge but instead, it reproduces the position of those applying the approach. Criticism is presented on the ability of DPSIR to find a satisfactory way of dealing with multiple attitudes and definitions of issues that are held by stakeholders and the public. The authors recommend future research to explore the incorporation of socio-economic and cultural drivers to broaden DPSIR. Furthermore they state that "there is a particular need for elaboration of methodology to address attitudes and definitions of the problem held by stakeholders and the general public" (Scarstad et al., 2008). However no description is

provided of the methodological approach, or tools that need to be elaborated. This requires ingenuity, as proposed in this analysis. The DPSIR approach to CATS presented in Tables 5 and 6 originates from perceptions of NVIC as it relates to coastal tourism. Attempting to use the DPSIR approach on all 42 impacts would be an exhaustive process that would ultimately be so disorganized it would be rendered useless compared to looking at four or five common factors.

4.15 Synthesis of DPSIR Framework and Factor Analysis

Sustainability indicator development in the context of tourism needs to follow a comprehensive systemic approach that recognizes the interrelations between indicators (Schianetz and Kavanagh, 2008). There is a causal connection between perceived impacts that are grouped together in factor analysis. DPSIR seeks to explain causal connections hierarchically and to develop holistic and proactive responses. As described above, impacts are clustered based on latent commonality in perception, which determines the nature of existence of an impact. Thus, factors indicate causes of impacts, or pressures within DPSIR.

A different approach to the use of the DPSIR framework is proposed. In the past DPSIR has followed an approach like steps one through six below.

1. Look at the quantifiable state indicators of the system;
2. Determine acceptability of change based on thresholds;
3. When thresholds are exceeded label these as impacts (thus only seeing negative impacts);
4. Determine what the pressures are;

5. Determine the driving forces of the pressures; and finally
6. Determine responses to D, P, S, and I to try and maintain the artificially constructed static equilibrium that may never have actually existed.

Instead, and more simply, the approach used here is to ask those impacted what the impacts are, and then to ask them if they are important and/or acceptable. The common origin of these perceptions can be seen through DPSIR as a common pressure on the system from the driver in question (tourism). This is the pursuit of the causal nexus.

The DPSIR framework is used here to identify commonalities in management of factors. It is used to determine where breaks in the causal chain can be identified to target responses for minimizing negative impacts and maximizing positive impacts. The integration of factor analysis with the DPSIR framework provides a systemic way of working though the causal chain of problems to develop effective and integrative management plans. The use of this approach is surprisingly limited (Gasparino et al., 2006; Schroder, 2005) especially in the context of coastal tourism where its use is unprecedented. Combining these tools represents a novel approach to the management of complex adaptive tourism systems (CATS). According to Schoder (2005) data and facts must be linked through propositions that confer meaning because (i) the aim of science is theory, (ii) data alone is meaningless, (iii) factor analysis is useful for defining factors that are seen as the causes of the patterns they represent and (iv) the regularities determined are indicative of a causal nexus. For example "just as the pattern of alignment of steel filings near a magnet can be described by the concept of magnetism, so the concept of magnetism can be turned around and be said to cause the alignment. Likewise, an economic development pattern delineated by factor analysis can be called a cause." (Schoder, 2005)

Noronha et al. (2002) use DPSIR in the context of Coastal Tourism and found (i) pressures on different domains including natural environmental resources, the built environment, and hospitality and cultural resources, and (ii) considerable environmental, socio-cultural, and economic impacts. Two tables from their study have been included in Annex 4 for comparison. Industries (including but not limited to tourism based), communities and governments have been found to see differences when looking at the key driving factors they expect to impact tourism in the future (Noronha et al. 2002).

In each factor the clustered original indicators (impacts) are those that are most closely associated and have the same underlying causes of perception. However, caution must be exercised in the interpretation of multivariate indicators such as factor analysis, especially in terms of cause and effect relationships (Kirby et al., 2005). Thus by using a recognized methodological approach (DPSIR), interpretation can be followed through the causal chain transparently.

This analysis follows the concept of adaptive management, therefore it is based on an understanding of the dynamic nature of the system and embraces the idea that latent and emergent properties in the system exist. Through the use of adaptive management (AM) principles, the understanding of pressures of certain groups of impacts can be redefined in the cycle of continuous improvement. This approach represents the first step on the path of sustainable tourism development requiring the framework to be improved based on a continuous monitoring program to improve the understanding of latent and dynamic complexities of CATS in accordance with sustainability science requirements in the anthropocene.

The results below use the DPSIR framework to understand the management of the perceived tourism impacts. The identified pressures and responses should not be viewed as answers that are complete, but are meant to elucidate a methodological approach to managing CATS. They should be considered as a starting point that should be improved through further consultation with NVIC residents, government, and tourism operators, using the adaptive management cycle.

With the assumption that current practices in mass tourism can be seen as the driver of the majority of impacts perceived by residents and government of NVIC as well as impacts as discussed in literature, we can look to sustainable tourism theory to provide responses to alleviate these impacts. So, through the use of concepts such as protection of recreational and cultural ecosystem services, and community perception integration in decision making, as discussed in the principles of sustainable tourism, responses to these impacts can be predicted, applied, monitored and adapted to improve conditions toward sustainability.

The following table will identify the concepts of sustainable tourism that can be applied as responses to each of the determined common pressures of tourism impacting the socio-cultural, economic and environmental state of NVIC with the hopes of improving these states by maximizing positive and minimizing the negative impacts. The DPSIR tables showing positive and negative impacts will be presented in different ways. Negative impacts (Table 6) will be assumed to have mass tourism as a driver and sustainable tourism concepts as response, whereas positive impacts (Table 7) will be assumed to be able to be driven by sustainable tourism, components of which will be highlighted as responses to ensure their provision.

Table 6. DPSIR - Negative Tourism Impacts.

Driver	Pressure	State	Impacts	Response
Mass Tourism	Foreign investment Peripherality	Rate of Property Value change Change in price of goods and services Migration Demographics	Factor 1 - Goods and services Less affordable housing Unfair increase in home prices and property tax Benefits to only a small % of community Unfair increases in rent More expensive – food, clothing, and services	Taxation and distribution to promote equity Subsidies - low income housing, essential goods and services
	Tourism comprised of SMEs lacking coordination Lack of training and certification by tourism operators	# km2 Protected Areas Ratio Developed : Pristine lands Satellite collar mega fauna	Factor 2 - Environmental Damage nature from tourism Water pollution and use too much of water Disturb wildlife Large stores put local businesses out of business Destruction of sacred and historical sites Littering	Limited numbers of people, guides to be trained, community based ecosystem monitoring
	Tourists looking for best dollar value without considering impacts Globalisation	PPM NOx and SOx Traffic Accidents / annum Alcohol Sales Drug related arrests Noise Casino Development	Factor 3 - Urban Environment Air pollution More traffic accidents More drugs, alcohol and prostitution Noise pollution More gambling Littering	Technological innovation Monitoring Legislation Education
	Global economic factors	% Employment Assistance in off-season % Dependence on tourism	Factor 4 - Employment Seasonal income Tourism jobs replace traditional forms of employment	Marketing, tourism diversification (storm watching)
	Lack of cultural sensitivity and understanding	% First Nations Speaking Kwakiutl Number of sacred and historical sites	Factor 5 - Culture Destruction of sacred and historical sites Loss of culture and traditions	Historic Fort Rupert Catalogue cultural capital

Tables 5 and 6 show the utility in organizing impacts using factor analysis in combination with DPSIR to provide responses to mitigate negative impacts and accelerate positive ones according to common origins. However the information within these tables should not be seen as complete. Instead it represents a brainstorming exercise following this newly developed approach. Following the concepts of the ecosystem approach and the inherent requirement for adaptive management the information above should be tested and improved over time with the inclusion of local community perception and engaging other stakeholders.

Table 7. DPSIR - Positive Tourism Impacts.

Driver	Pressure	State	Impacts	Response
Sustainable Tourism	High hopes that Tourism can offset declines in Fishing, Logging and Mining	Unemployment Rate Average NVIC Income Local Business Success Rate Youth Outmigration	Factor 1 - Socio-Economic More money for whole community More profits for local businesses Employment – more jobs, better pay Give youth hope for future opportunities Stronger local economy More entertainment and recreation options More restaurants , bars, hotels and B&B's	Equity, Tourism Cooperative
	Community Connection to Nature (Due to remote / peripheral nature of community)	# km^2 Protected Areas	Factor 2 - Environmental Protection Better quality of life Protect Wildlife Care for environment and make area look better Less damage to environment than logging, mining and commercial fishing Create parks and protected areas	Community based ecosystem monitoring Certification
	Protection of local environment and cultural heritage	$ Earned for Protected Area Creation / Management % Economy based on cultural and recreational ecosystem services High School and College graduation %	Factor 3 - Safeguard Cultural Ecosystem Services Protection and preservation of traditional knowledge about nature Better understanding of different cultures and communities Education and increased environmental awareness Generate money to manage protected areas	Educational programs, training locals Certification
	Provide benefits to local community	Municipal tax revenue # new roads % Public transport spatial coverage Timing of public transport # New restaurant, bars, hotels and B&B's per annum	Factor 4 - Infrastructure Better public transport (buses) Better services (water, gas, electricity, internet, phone, etc.) Better protection from Police and Fire-fighters Better roads and community facilities (community centre, traffic lights) More restaurants , bars, hotels and B&B's	User fees from nature-based tourism

5 Recommendations

This thesis identifies a series of recommendations tailored to be achievable, and appropriate for those groups within CATS with the ability to advance development in a sustainable way. Recommendations have been provided in the DPSIR tables, within the response column, and below additional recommendations have been directed towards academia, government and tourism operators.

5.1 Future Academic Research

Future academic research should focus on further development of the use of the structured management system used here to pursue the causal nexus by combining DPSIR with factor analysis. Academic research, although often theoretical in nature has an important role in continuous improvement understanding of the driving forces and pressures within CATS.

Cataloguing types of activities operating within a given geography would be useful in assessing potential impacts and GIS use would provide enhanced understanding. To address the issue of tourism seasonality a seasonal calendar of significant natural and cultural events should be completed and marketed accordingly (*e.g.* the FILOMI days, First Nations traditions, running and spawning of different species of salmon, blooming of certain flowers, summer and winter solstice, migration of whales and others).

5.2 Government Policy Development

A variety of tourism impacts have been identified through this investigation. This information should be used by regulators at various levels of government in combination

with adaptive management to generate new and evolving knowledge of regional scale CATS. Perception of the impacts and the activities should be used by government to establish policies and guidelines for net benefits. (*e.g.* air excursions, motor boating, and cruise ships were perceived to have lower positive vs. negative impacts and to be less important to tourism development as other activities). Furthermore to preserve the peripheral nature of NVI tourism (a tourist attraction) future growth must have limits imposed and future development must be well planned.

Engaging local First Nations in tourism using the cultural and recreational ecosystem services on NVI has the potential to cause both negative impacts and benefits. It is hoped that mitigation and promotion measures can lead to net benefits. It is recommended that First Nations tourism be developed through a partnership between stakeholders including: First Nations, the RDMW, local tourism operators, the'Wi'la'mola Project, North Vancouver Island Aboriginal Training Society, and the North Island College. The partnership should be administered by the RDMW.

Active participation with NVIC and joint decision making by key representative stakeholders should be part of future planning, this may be essential in the strategic planning process to yield useful results (Jamal and Getz, 1995). Active participation with NVIC should be the next step formulated around the ideas elucidated through this investigation. In addition, Ko (2005) recommends the inclusion of tourism service quality considerations (the demand side) into the sustainability assessment process. This analysis has overlooked desire by tourists for the first stage of sustainability assessment, but recognizes this as important for integration with the results provided here.

5.3 Tourism Operators

In 1999, 13 tourist operators on Vancouver Island came together to develop joint economic security through the formation of the Vancouver Island Adventures Co-operative. This group expanded throughout BC and is now called Adventures BC Travel Cooperative. The purpose of the group is to share marketing services and create tourism packages using various services of the membership (Wylie, 2001). Small, often family run, businesses providing ecotourism usually work with limited financial resources and can be overloaded with marketing, planning and administration (Reimers, 2002). Marketing issues in tourism are prevalent because this industry sector is characterized by thousands of small operators, many of whom need product development support. Ecotourism and adventure travel have been identified as priorities for the product development by the Canadian Tourism Commission. (CTC, 2002)

Adventures BC Travel Cooperative has been established to alleviate some of this pressure so that operators can devote more time to development of new markets and products (Wylie, 2001). There is great potential for the establishment of adaptive co-management with the BC Provincial government to assess sustainability while continuously improving and advocating best management practices in tourism along the BC coast.

5.4 Northern Vancouver Island Community

The community (including First Nations) has an important role to play in the future of sustainable tourism development. They need to be willing to engage with researchers from academia through processes like the one used in this analysis. In order to ensure that net benefits to the community are achieved the community should take an active role in tourism

planning and as shown here 89% strongly agree or agree that ‘community members should be involved in tourism planning’.

Co-management theory advocates that the responsibly for allocation and use of resources be shared among multiple parties to enhance efficiency of decision making, and provide more broad-based reasons for action with an emphasis on community engagement (Plummer and Armitage, 2007). By increasing capacity at local scales enhanced equity can also be achieved. Adaptive co-management considers nature as an evolutionary and self organising process at a hierarchy of scales, where the higher level broad scales provide rules and incentives to the smaller scales making the socio-ecological systems (SESs) more robust to change (Plummer and Armitage, 2007).

6 Conclusion

"Global thinking and local action both require understanding of ecological systems, but ecological management can be effective only if it takes into consideration the visceral and spiritual values that link us to the earth. [Therefore] ecological thinking must be supplemented by humanistic value judgments concerning the effect of our choices and actions on the quality of the relationship between humankind and earth, in the future as well as in the present."

-René Jules Dubos, The Wooing of Earth, p. 157, 1980

The above statement is as true today as it was nearly 30 years ago. Sustainable tourism is an evolving concept, a path towards travel and leisure that respects local communities and their values as well as minimizes impacts to the natural environment. Tourism industries

have great potential to use the natural and cultural ecosystem services of Northern Vancouver Island and in doing so can be expected to interact with the local socio-cultural, economic, and environmental components of this complex and adaptive social-ecological system. These interactions may be perceived as negative impacts or positive impacts and this perception will change with the tourist system and other sub systems as they evolve. By pursuing the causal nexus, and adapting management as latent complexities are understood through research into CATS, responses that are proactive, long term and region specific responses can be developed for sustainable tourism development.

The most important tourism benefits were found to be protection of wildlife, future opportunities for youth, and area aesthetics. The most unacceptable negative impacts were found to be an increase in drugs, alcohol and prostitution, littering, and destruction of sacred and historical sites. The most important tourism activities identified were coastal hiking, wildlife viewing, and kayaking. Air excursions, motor boating, and cruise ships were found to be the least important. A divergence occurs in resident perception of activities in terms of importance for successful tourism development and more positive than negative impacts (combined from the results above) indicating that certain activities like whale watching and fishing, although important for successful development are not perceived to have more positive than negative impacts. Overwhelmingly the Northern Vancouver Island Community was found to support increased tourism and believe that tourism is good for the community (94% for both) but feel that Tourism operators need to be certified to ensure that they do not damage the local culture and environment (93%).

In this analysis a novel approach to tourism management has been proposed using heuristic factor analysis in combination with a modified approach to the DPSIR framework. The

approach was tested using NVIC perception of coastal tourism impacts and activities indicating that the methodology is useful for (a) reducing a large number of variables to a smaller number linked by origin, and (b) describing the origin of the factors in terms of causality using DPSIR to understand where responses can be directed to enhance positive impacts and mitigate negative impacts. This approach elucidates linkages in the complex system allowing sustainable development to be planned based on an understanding of the causal nexus in terms of perceived SEEI. The factors discovered show overlap between SEEI and in doing so challenge the convention of viewing sustainability in terms of these dimensions that have historically been believed to be independent from one another. Although the context here is coastal tourism, adaptation of the methodology may be useful for other sectors with close socio-ecological interaction, and where integrated assessment is required for sustainability.

NVI has extensive, pristine, and ruggedly beautiful coastline. It is a dream location for outdoor adventure and nature-based tourism. The virgin wilderness is home to a great wealth of biological diversity and ecosystem services (both cultural and recreational) that provide extensive opportunities for tourism development. However, the development must be sustainable so as to avoid undermining the natural base, local economy and the communities in the region that tourism depends upon. Management of CATS for sustainable coastal tourism development requires an understanding of perception and the causal nexus.

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Annex 1 – Census Data

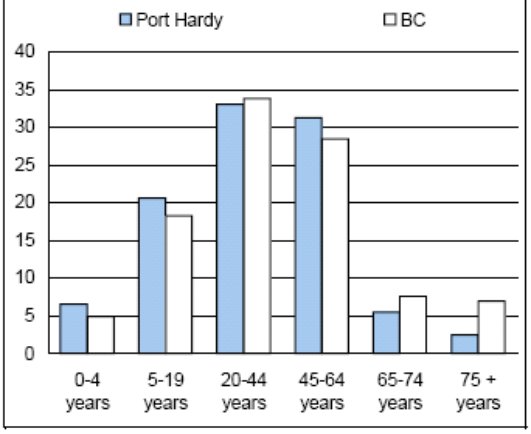
2006 Census Data for Port Hardy.

http://www.bcstats.gov.bc.ca/data/cen06/profiles/detailed/59043023.pdf (Last Accessed February 2009)

Population by Gender & Age

	Port Hardy	BC
Total population	3,825	4,113,485
Male	51%	49%
Female	49%	51%

Population by Age Group, percent distribution



SCHOOLING AND EDUCATION

Schooling

	2001	1996	1991	1986
Less than grade 9	3%	6%	8%	8%
Without secondary school graduation certificate	25%	28%	29%	32%
With secondary school graduation certificate	11%	15%	13%	13%
Trade certificate/diploma or other non-university	33%	25%	23%	31%
University without degree	16%	13%	12%	10%
University with degree	10%	14%	13%	7%

2007 – Statistical Profile: Regional District 43 - Mount Waddington.

http://www.bcstats.gov.bc.ca/data/sep/rd/Rd_43.pdf (Last Accessed February 2009)

2006 CENSUS POPULATION

	Number	% of Region
Port Hardy, DM	3,822	32.8%
Port McNeill, T	2,623	22.5%
Port Alice, VL	821	7.0%
Alert Bay, VL	556	4.8%
Rest of Region	3,829	32.9%
Total Region	**11,651**	**100.0%**
Total BC	4,310,452	
Region as a % of BC	**0.3%**	

	MT WADD
	2007
Population Estimate	
0-17 years	2,961
18-24 years	1,057
25-64 years	7,186
65+ years	1,084
Total	12,288

Income Dependency 2000

Forestry	**44%**
Mining	**1%**
Fishing & Trapping	**6%**
Agriculture	2%
Tourism	8%
Public Sector	21%

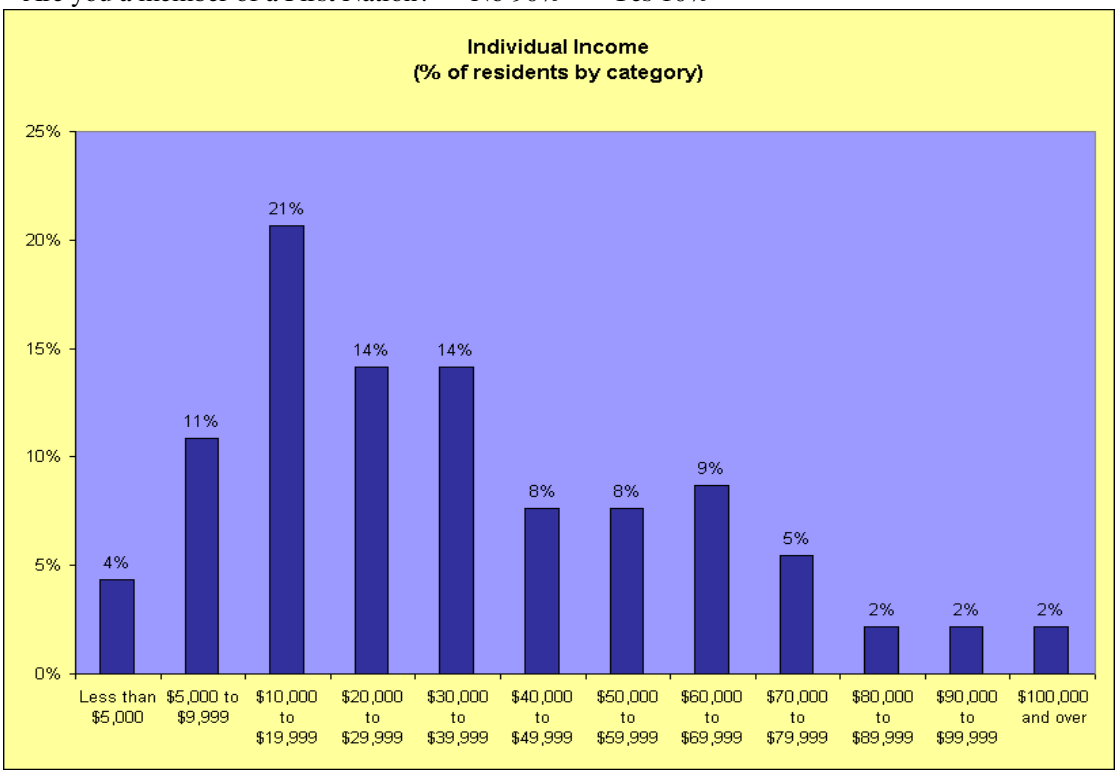
Income Distribution Among Families

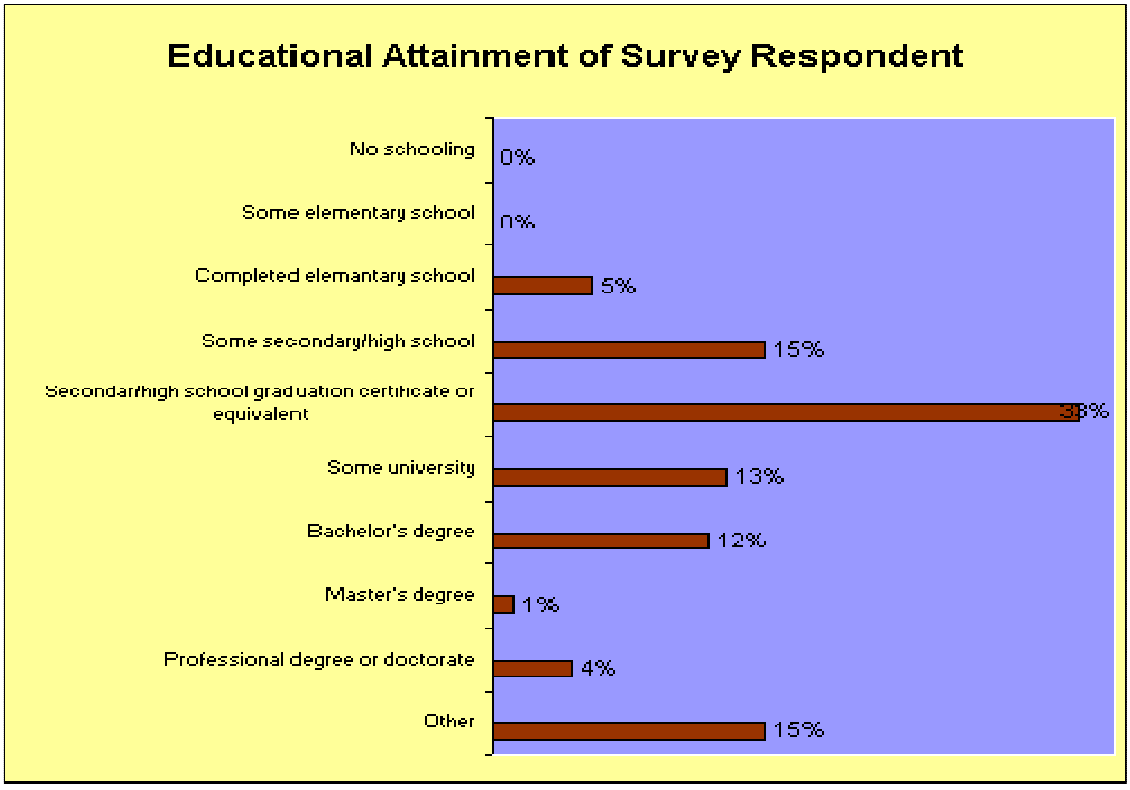
< $20,000	12.0
$20,000 - $79,999	57.8
$80,000+	30.2

ETHNIC IDENTITY

	MT WADD	**MT WADD**	**B.C.**
2001		(Percent Distribution)	
Total Visible Minorities	**275**	**2.1**	**21.6**
Single Origins	240	1.8	25.0
Chinese	60	0.5	9.4
South Asian	30	0.2	5.4
Filipino	50	0.4	5.4
Japanese	50	0.4	0.8
Other	50	0.4	3.9
Multiple Origins	35	0.3	0.4
Total Aboriginal People	**2,570**	**19.6**	**4.4**
Rest of Population	10,240	78.3	74.0
Total	13,085	100.0	100.0

Port Hardy Profile: UBC Resilient Communities Project. 2003.
http://www.resilientcommunities.ca/ (Last Accessed February 2009)
Gender: Female 41% Male 59%
Are you a member of a First Nation? No 90% Yes 10%





Annex 2 – Community Survey and Letter

Letter to Community

November 10, 2008

Subject: **Sustainable Tourism – Northern Vancouver Island.**

From:

Jeffrey M. Rempel
B.Sc. Environmental Scientist
M.Sc. Candidate, Water and Coastal Management
Email: jeff_rempel@hotmail.com

To Whom it may concern,

It was a pleasure to meet you at FILOMI days 2008 in Port Hardy, I hope you enjoyed the rest of summer. Thank you for providing your email address and agreeing to participate in this important study. As we talked about, your thoughts about tourism on North Vancouver Island are respectfully requested via a quick and simple online survey. Your input matters very much for sustainable and successful tourism in the region.

I am an independent university researcher working through the University of Plymouth (UK), Universidade do Algarve (Portugal), and with the University of British Columbia (Vancouver, Canada).

Your opinions on tourism are very important to this analysis. I would be so grateful if you could complete the short (less than 10 min) web based survey. You do not have to give your name and the information will not be linked to you in any way. The web address is:

http://www.surveymonkey.com/s.aspx?sm=4Dx92I9BN8ZQ6weuuhTmjw_3d_3d (click)

I must compile my research in November, thus your participation is requested as soon as possible. If you indicate in the survey, I will also send you a copy of the final analysis made up of a combination of all community members input.

Thank-you so very much for your contribution to this study and ultimately to the sustainability of tourism on the north part of Vancouver Island. As mentioned please rest assured that your input is completely confidential and anonymous.

Thank you for your participation.

Sincerely,

Jeffrey M. Rempel

North Vancouver Island Community Tourism Survey

1. General Information

1. Gender

- ◯ Male
- ◯ Female

2. Please indicate your Age

	Age
Age (Years)	

3. Please indicate you income

	Under $15,000	$15 to 25,000	$25 to 35,000	$35 to 50,000	$50 to 70,000	Over $70,000
Income (Canadian $ per year)	◯	◯	◯	◯	◯	◯

4. Please indicate your education (highest level achieved)

	Elementary School Graduate	Some Secondary School	Secondary School Graduate	Some College/University	Post Secondary Diploma	Bachelors Degree	Masters Degree	Ph.D.
Education level	◯	◯	◯	◯	◯	◯	◯	◯

5. Please indicate your community

- ◯ Port Hardy
- ◯ Port Hardy / Kwakiutl First Nation
- ◯ Port Hardy /Gwa'sala – 'Nakwaza'xw First Nation
- ◯ Quatsino
- ◯ Quatsino /First Nation
- ◯ Alert Bay
- ◯ Alert Bay / 'Namgis
- ◯ Tlatlasikwala Band
- ◯ Port Alice
- ◯ Port McNeil
- ◯ Holburg
- ◯ Coal Harbour
- ◯ Winter Harbour
- ◯ I do not live on North Vancouver Island
- ◯ Other North Island Community (please specify)

_____

North Vancouver Island Community Tourism Survey

6. How long have you lived in the North part of Vancouver Island (Years)

	Approximately
Years	

I do not live on N. Vancouver Island. I live in _____ (please be specific)

7. Tourism Employment

	Yes	No
Are you employed in the tourism industry	◯	◯
If not, would you like to be employed in the tourism industry	◯	◯

North Vancouver Island Community Tourism Survey

2. Sustainable Tourism

1. Community Impacts

Agree or Disagree ?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I want tourism to increase	◯	◯	◯	◯	◯
Tourism is a good thing for the community	◯	◯	◯	◯	◯
I feel a close connection to my community	◯	◯	◯	◯	◯
Community members should be involved in tourism planning	◯	◯	◯	◯	◯
Tourism should be more strictly regulated by the government	◯	◯	◯	◯	◯
Tourism operators are responsible people and can be trusted to regulate themselves	◯	◯	◯	◯	◯
Ecotourism (or Sustainable tourism) operators need to be certified to ensure they do not hurt the local culture and environment	◯	◯	◯	◯	◯

North Vancouver Island Community Tourism Survey

3. Positive Tourism Impacts

1. Possible POSITIVE impacts from tourism:

How important are these impacts ?

	Very Important	Important	Neutral	Little Importance	Not Important
Better services (water, gas, electricity, internet, phone, etc.)	◯	◯	◯	◯	◯
Better understanding of different cultures and communities	◯	◯	◯	◯	◯
Better quality of life	◯	◯	◯	◯	◯
Employment – more jobs, better pay	◯	◯	◯	◯	◯
Create parks and protected areas	◯	◯	◯	◯	◯
Better public transport (buses)	◯	◯	◯	◯	◯
Less damage to environment than logging, mining and commercial fishing	◯	◯	◯	◯	◯
More entertainment and recreation options	◯	◯	◯	◯	◯
Stronger local economy	◯	◯	◯	◯	◯
Protect Wildlife	◯	◯	◯	◯	◯
Generate money to manage protected areas	◯	◯	◯	◯	◯
Protection and preservation of traditional knowledge about nature	◯	◯	◯	◯	◯
More restaurants, bars, hotels and B&B's	◯	◯	◯	◯	◯
Better roads and community facilities (community centre, traffic lights)	◯	◯	◯	◯	◯
More money for whole community	◯	◯	◯	◯	◯
First Nations to be self sufficient in a post-treaty world	◯	◯	◯	◯	◯
More profits for local businesses	◯	◯	◯	◯	◯
Education and increased environmental awareness	◯	◯	◯	◯	◯
Care for environment and make area look better	◯	◯	◯	◯	◯
Better protection from Police and Fire-fighters	◯	◯	◯	◯	◯
Give youth hope for future opportunities	◯	◯	◯	◯	◯

North Vancouver Island Community Tourism Survey

4. Negative Tourism Impacts

1. Possible NEGATIVE tourism impacts:

Are these impacts acceptable ?

	Very Acceptable	Acceptable	Neutral	Unacceptable	Very Unacceptable
More expensive – food, clothing, and services	◯	◯	◯	◯	◯
More crime/robberies/vandalism	◯	◯	◯	◯	◯
Less feeling of belonging to my community	◯	◯	◯	◯	◯
More drugs, alcohol and prostitution	◯	◯	◯	◯	◯
Loss of culture and traditions	◯	◯	◯	◯	◯
Benefits to only a small % of community	◯	◯	◯	◯	◯
Water pollution and use too much of water	◯	◯	◯	◯	◯
Destruction of sacred and historical sites	◯	◯	◯	◯	◯
Unfair increases in rent	◯	◯	◯	◯	◯
Littering	◯	◯	◯	◯	◯
Air pollution	◯	◯	◯	◯	◯
Unfair increase in home prices and property tax	◯	◯	◯	◯	◯
Disturb wildlife	◯	◯	◯	◯	◯
Large stores put local businesses out of business	◯	◯	◯	◯	◯
Noise pollution	◯	◯	◯	◯	◯
More traffic accidents	◯	◯	◯	◯	◯
Seasonal income	◯	◯	◯	◯	◯
Less affordable housing	◯	◯	◯	◯	◯
Damage nature from tourism	◯	◯	◯	◯	◯
More gambling	◯	◯	◯	◯	◯
Tourism jobs replace traditional forms of employment	◯	◯	◯	◯	◯

North Vancouver Island Community Tourism Survey

5. Tourism Activities

1. Do you agree that _____ has more positive than negative impacts ?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Kayaking	◯	◯	◯	◯	◯
Scuba Diving	◯	◯	◯	◯	◯
Sailing	◯	◯	◯	◯	◯
Motor boating	◯	◯	◯	◯	◯
Fishing	◯	◯	◯	◯	◯
Whale Watching	◯	◯	◯	◯	◯
Cruise Ships	◯	◯	◯	◯	◯
Air Excursions	◯	◯	◯	◯	◯
Coastal Hiking	◯	◯	◯	◯	◯
Wildlife viewing	◯	◯	◯	◯	◯
Surfing	◯	◯	◯	◯	◯
First Nations - Traditional art – carvings, drums, paintings, etc.	◯	◯	◯	◯	◯
First Nations - Songs, Dance, Legends / Stories	◯	◯	◯	◯	◯
First Nations - Food, traditional fishing and hunting, gathering of foods, medicine plants	◯	◯	◯	◯	◯
Early European Settlers - Pioneer lifestyle tourism	◯	◯	◯	◯	◯
Museums	◯	◯	◯	◯	◯
Art galleries	◯	◯	◯	◯	◯
Education - Nature	◯	◯	◯	◯	◯
Education - Culture	◯	◯	◯	◯	◯

North Vancouver Island Community Tourism Survey

2. Do you agree that _____ is important for successful tourism development on N. Vancouver Island ?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Kayaking	◯	◯	◯	◯	◯
Scuba Diving	◯	◯	◯	◯	◯
Sailing	◯	◯	◯	◯	◯
Motor boating	◯	◯	◯	◯	◯
Fishing	◯	◯	◯	◯	◯
Whale Watching	◯	◯	◯	◯	◯
Cruise Ships	◯	◯	◯	◯	◯
Air Excursions	◯	◯	◯	◯	◯
Coastal Hiking	◯	◯	◯	◯	◯
Wildlife viewing	◯	◯	◯	◯	◯
Surfing	◯	◯	◯	◯	◯
First Nations - Traditional art – carvings, drums, paintings, etc.	◯	◯	◯	◯	◯
First Nations - Songs, Dance, Legends / Stories	◯	◯	◯	◯	◯
First Nations - Food, traditional fishing and hunting, gathering of foods, medicine plants	◯	◯	◯	◯	◯
Early European Settlers - Pioneer lifestyle tourism	◯	◯	◯	◯	◯
Museums	◯	◯	◯	◯	◯
Art galleries	◯	◯	◯	◯	◯
Education - Nature	◯	◯	◯	◯	◯
Education - Culture	◯	◯	◯	◯	◯

North Vancouver Island Community Tourism Survey

6. Tourism Opportunities

1. Opportunities and Potential for North Island Tourism

Agree or Disagree ?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training opportunities to get skills for nature and cultural tourism are well known, accessible and affordable	◯	◯	◯	◯	◯
If I want to get skills to work in tourism I can easily	◯	◯	◯	◯	◯
Local First Nations are interested in sharing traditional knowledge and culture	◯	◯	◯	◯	◯
There are many employment opportunities for nature and cultural tourism	◯	◯	◯	◯	◯
There is a great potential for First Nations cultural tourism	◯	◯	◯	◯	◯
I know many people involved in tourism	◯	◯	◯	◯	◯

2. Thank you !!! for your time and input, I cannot express how grateful I am for your participation.

If you would like to receive a copy of the final assessment on the sustainability of North Vancouver Island Tourism please enter your email in the box below. (confidentiality assured)

Email address:

Annex 3 – Statistical Results and TALC

Statistical Tests for Factor Analysis – Showing appropriate and significant results.

Activities – More positive than negative impacts

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.778
Bartlett's Test of Sphericity	Approx. Chi-Square	618.016
	df	210.000
	Sig.	.000

Activities – Importance to successful tourism development

KMO and Bartlett's Test

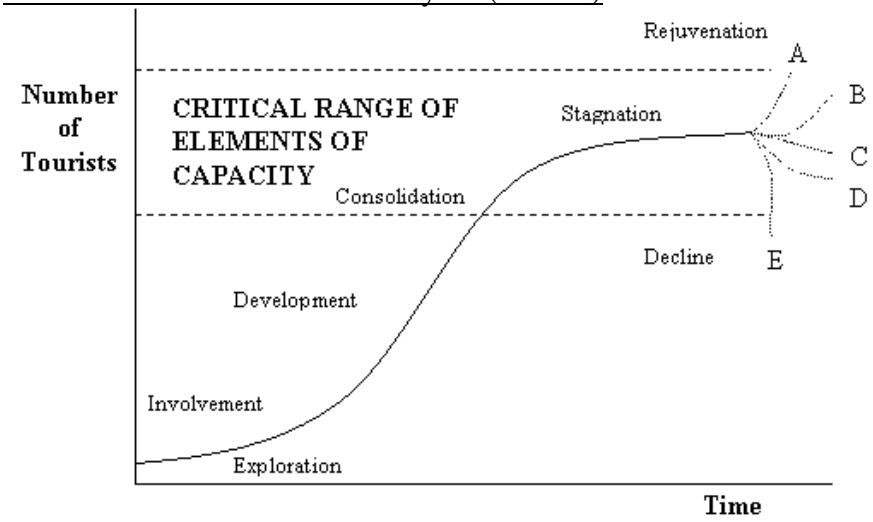
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.701
Bartlett's Test of Sphericity	Approx. Chi-Square	716.140
	df	171.000
	Sig.	.000

Negative Tourism Impacts

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.712
Bartlett's Test of Sphericity	Approx. Chi-Square	820.417
	df	171.000
	Sig.	.000

Butler's Tourism Area Life Cycle (TALC)



Annex 4 – Principles of Ecosystem Approach

http://www.cbd.int/ecosystem/principles.shtml (Last Accessed February 2009)

The following 12 principles are complementary and interlinked.

Principle 1:The objectives of management of land, water and living resources are a matter of societal choices.

Different sectors of society view ecosystems in terms of their own economic, cultural and society needs. Indigenous peoples and other local communities living on the land are important stakeholders and their rights and interests should be recognized. Both cultural and biological diversity are central components of the ecosystem approach, and management should take this into account. Societal choices should be expressed as clearly as possible. Ecosystems should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way.

Principle 2: Management should be decentralized to the lowest appropriate level.

Decentralized systems may lead to greater efficiency, effectiveness and equity. Management should involve all stakeholders and balance local interests with the wider public interest. The closer management is to the ecosystem, the greater the responsibility, ownership, accountability, participation, and use of local knowledge.

Principle 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.

Management interventions in ecosystems often have unknown or unpredictable effects on other ecosystems; therefore, possible impacts need careful consideration and analysis. This may require new arrangements or ways of organization for institutions involved in decision-making to make, if necessary, appropriate compromises.

Principle 4: Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:

Reduce those market distortions that adversely affect biological diversity;

Align incentives to promote biodiversity conservation and sustainable use;

Internalize costs and benefits in the given ecosystem to the extent feasible.

The greatest threat to biological diversity lies in its replacement by alternative systems of land use. This often arises through market distortions, which undervalue natural systems and populations and provide perverse incentives and subsidies to favor the conversion of land to less diverse systems.

Often those who benefit from conservation do not pay the costs associated with conservation and, similarly, those who generate environmental costs (e.g. pollution) escape responsibility. Alignment of incentives allows those who control the resource to benefit and ensures that those who generate environmental costs will pay.

Principle 5: Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.

Ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species.

Principle 6: Ecosystem must be managed within the limits of their functioning.

In considering the likelihood or ease of attaining the management objectives, attention should be given to the environmental conditions that limit natural productivity, ecosystem structure, functioning and diversity. The limits to ecosystem functioning may be affected to different degrees by temporary, unpredictable of artificially maintained conditions and, accordingly, management should be appropriately cautious.

Principle 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.

The approach should be bounded by spatial and temporal scales that are appropriate to the objectives. Boundaries for management will be defined operationally by users, managers, scientists and indigenous and local peoples. Connectivity between areas should be promoted where necessary. The ecosystem approach is based upon the hierarchical nature of biological diversity characterized by the interaction and integration of genes, species and ecosystems.

Principle 8: Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.

Ecosystem processes are characterized by varying temporal scales and lag-effects. This inherently conflicts with the tendency of humans to favour short-term gains and immediate benefits over future ones.

Principle 9: Management must recognize the change is inevitable.

Ecosystems change, including species composition and population abundance. Hence, management should adapt to the changes. Apart from their inherent dynamics of change, ecosystems are beset by a complex of uncertainties and potential "surprises" in the human, biological and environmental realms. Traditional disturbance regimes may be important for ecosystem structure and functioning, and may need to be maintained or restored. The ecosystem approach must utilize adaptive management in order to anticipate and cater for such changes and events and should be cautious in making any decision that may foreclose options, but, at the same time, consider mitigating actions to cope with long-term changes such as climate change.

Principle 10: The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

Biological diversity is critical both for its intrinsic value and because of the key role it plays in providing the ecosystem and other services upon which we all ultimately depend. There has been a tendency in the past to manage components of biological diversity either as protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in context and the full range of measures is applied in a continuum from strictly protected to human-made ecosystems

Principle 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

Information from all sources is critical to arriving at effective ecosystem management strategies. A much better knowledge of ecosystem functions and the impact of human use is desirable. All relevant information from any concerned area should be shared with all stakeholders and actors, taking into account, inter alia, any decision to be taken under Article 8(j) of the Convention on Biological Diversity. Assumptions behind proposed management decisions should be made explicit and checked against available knowledge and views of stakeholders.

Principle 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Most problems of biological-diversity management are complex, with many interactions, side-effects and implications, and therefore should involve the necessary expertise and stakeholders at the local, national, regional and international level, as appropriate.

DPSIR used in to asses Coastal Tourism (Noronha et al., 2002)

Table 3 Indicators of societal driving forces and pressures from resource use

Issues	*Indicator Type*	*Results based on data from study area for 2000*	*Policy relevance*	*Functional relationship to ecosystem vulnerability*
Social				
Population movements in-migration, out-migration, seasonal in-migration	Driver	Low migration (Net Migration Rate >< 1.5% per annum)	Employment available Unemployment/environmental stress Availability of jobs	Vulnerability ↑ as in-migration ↑
Density of population	Driver	High > 500/sq. km	Population pressure and stress on ecosystems	Vulnerability ↑as density ↑
Urban settlements	Driver	High > 40%	Population pressure and stress on ecosystems	Vulnerability ↑ as congestion ↑
Tourist arrivals	Driver	High	Stress on ecosystems	Vulnerability ↑ as numbers ↑
Accommodation for tourists	Driver	High	Proxy indicator showing stress on ecosystems, land conversions	Vulnerability ↑ as numbers ↑
Tourist satisfaction	State	Medium	Indicator showing response from tourists to the level of involvement and attention of industry	Vulnerability ↑ indirectly as satisfaction ↑
Industry satisfaction	State and impact	Medium	Indicates industry satisfaction and indirectly future of the activity	Vulnerability ↑ as industry investment ↑
Host satisfaction	Response	Good (high)	Indicates involvement of community in the activity	Vulnerability ↓ as positive community response ↑
Human resource training for quality tourism	Response	Low	Awareness of interactions of tourism with other domains	Vulnerability ↓ as human resource training ↑
Use of locally produced materials	State	Low	Improved multiplier effects	Vulnerability ↓ or ↑ depending on environmental practices
Economic				
Occupational shifts; Movements across economic sectors	Driver	Primary to tertiary	Degree of urbanization, modernization	Vulnerability ↑ as less attention is paid to resource base

(from: Noronha et al. 2002)

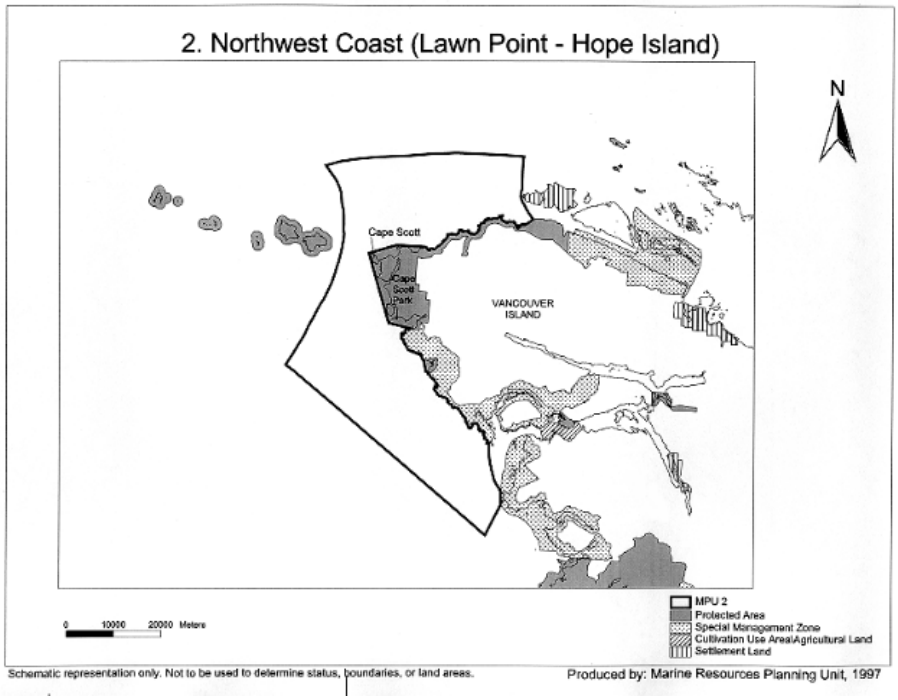
Table 3 Indicators of societal driving forces and pressures from resource use *(contd...)*

Issues	*Indicator Type*	*Results based on data from study area for 2000*	*Policy relevance*	*Functional relationship to ecosystem vulnerability*
Household earnings	Impact	Rs 5291[1]	Command over goods and services	
State revenue earned	Impact	Rs 1 580 000[2]	Importance of the activity and future policy support	Vulnerability ↓ or ↑ depending on environmental policy
Foreign exchange	Impact	Rs 208 crore[3]	Importance of the activity and future policy support	Vulnerability ↓ or ↑ depending on environmental policy
Environmental				
Land-use change changes in distribution of land under various activities	Impact	From productive resource base to built-up area	Highlights: productive, protective, speculative use of land Reduced diversity of use for land	Vulnerability ↑ as diversity ↓
Daily withdrawal of ground water	Pressure	309 lit./room/day	Availability of water	Vulnerability ↑ as groundwater balance ↓
Consumption of water	Pressure	617 lit./room/day	Availability of water, waste of water	Vulnerability ↑ as consumption ↑
Solid waste generation	Pressure	0.92 kg/room/day	High consumption of materials, need for disposal sites	Vulnerability ↑ as waste generation ↑
Waste water generation	Pressure	487 lit./room/day	Implications for ground and surface water if sewage is untreated	Vulnerability ↑ as waste generation ↑
Corporate green practices	Response	Medium	Sustainable resource use and less resource degradation	Vulnerability ↓ with ↑ corporate green practices
Consumer awareness	Impact	Medium	Good environmental practices	Vulnerability ↓ with ↑ consumer awareness
Political and legal				
Government initiatives	Response	Satisfactory	Direct links with policy	Vulnerability ↓ with ↑ good policy initiatives
Certification schemes	Response	Low	Indicates environmental awareness and practices followed	Vulnerability ↓ with ↑ certification schemes
Judicial interventions	Response	Satisfactory	Conflict resolving mechanism	Vulnerability ↓ with ↑ good judicial interventions

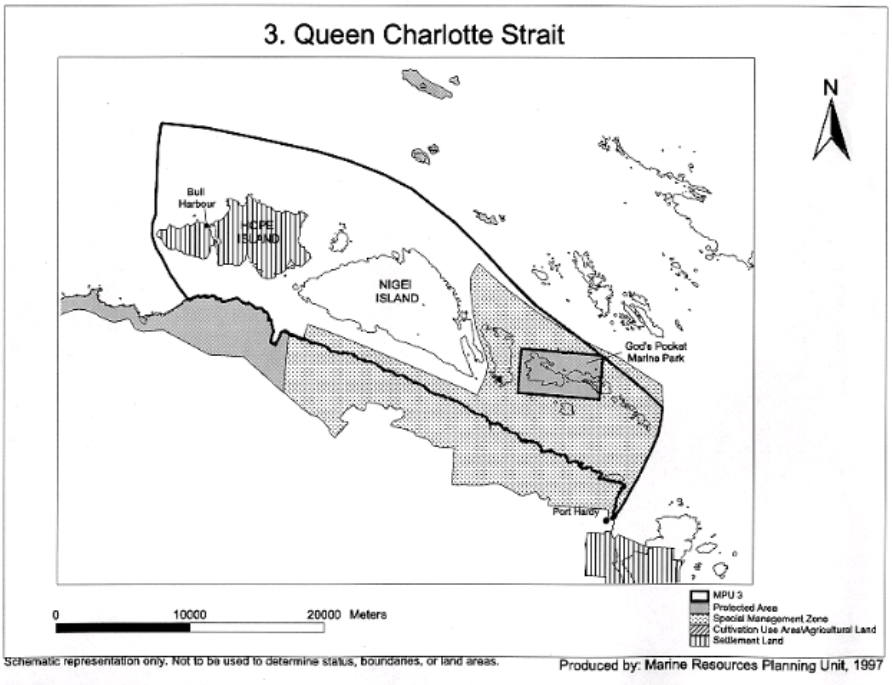
[1] Survey by TERI and Universidade Nova de Lisboa, 2000; [2] The revenue earned on account of tourism activity by the state of Goa is apportioned to the study area by using the share of tourist arrivals to the study area; [3] TERI estimates for the study area

(from: Noronha et al. 2002)

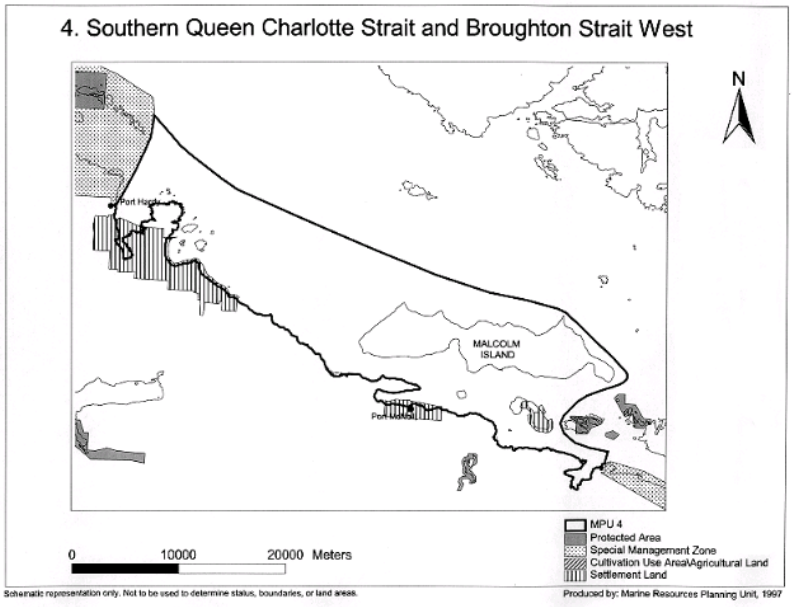
Annex 5 – Additional Maps



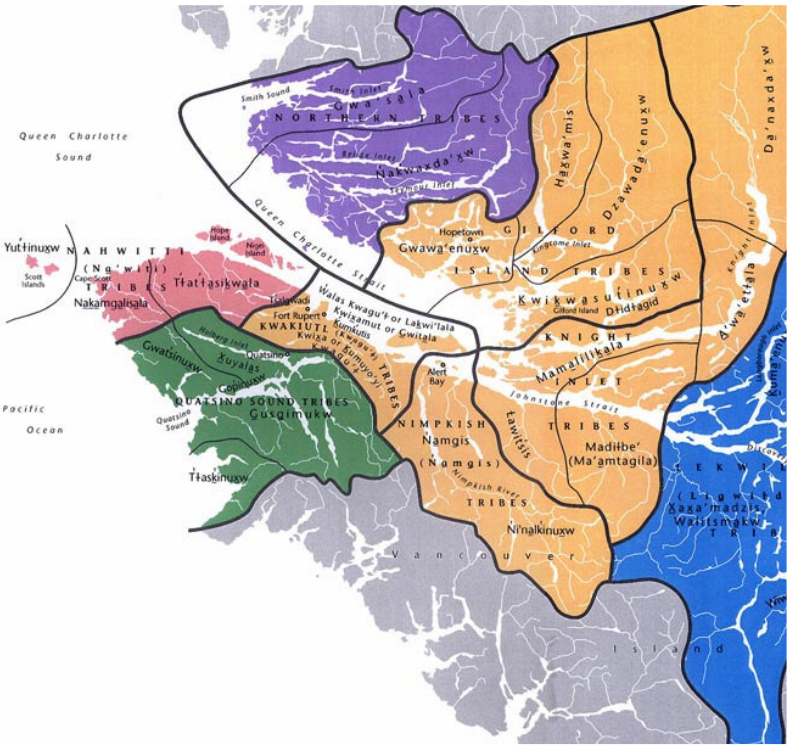
Map 1. Northwest Coast Marine Planning Unit (VILUP-MPU, 2000)



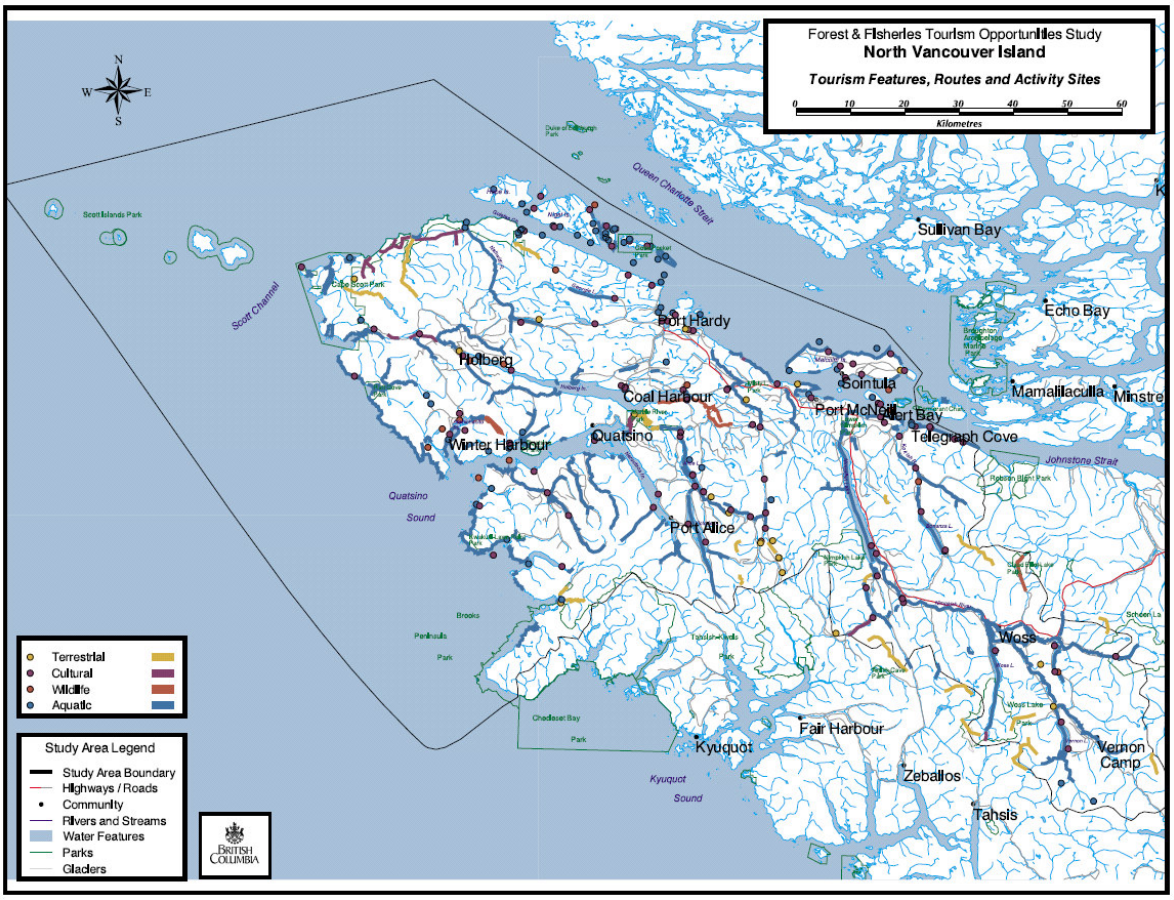
Map 2. Queen Charlotte Strait Marine Planning Unit (VILUP-MPU, 2000)



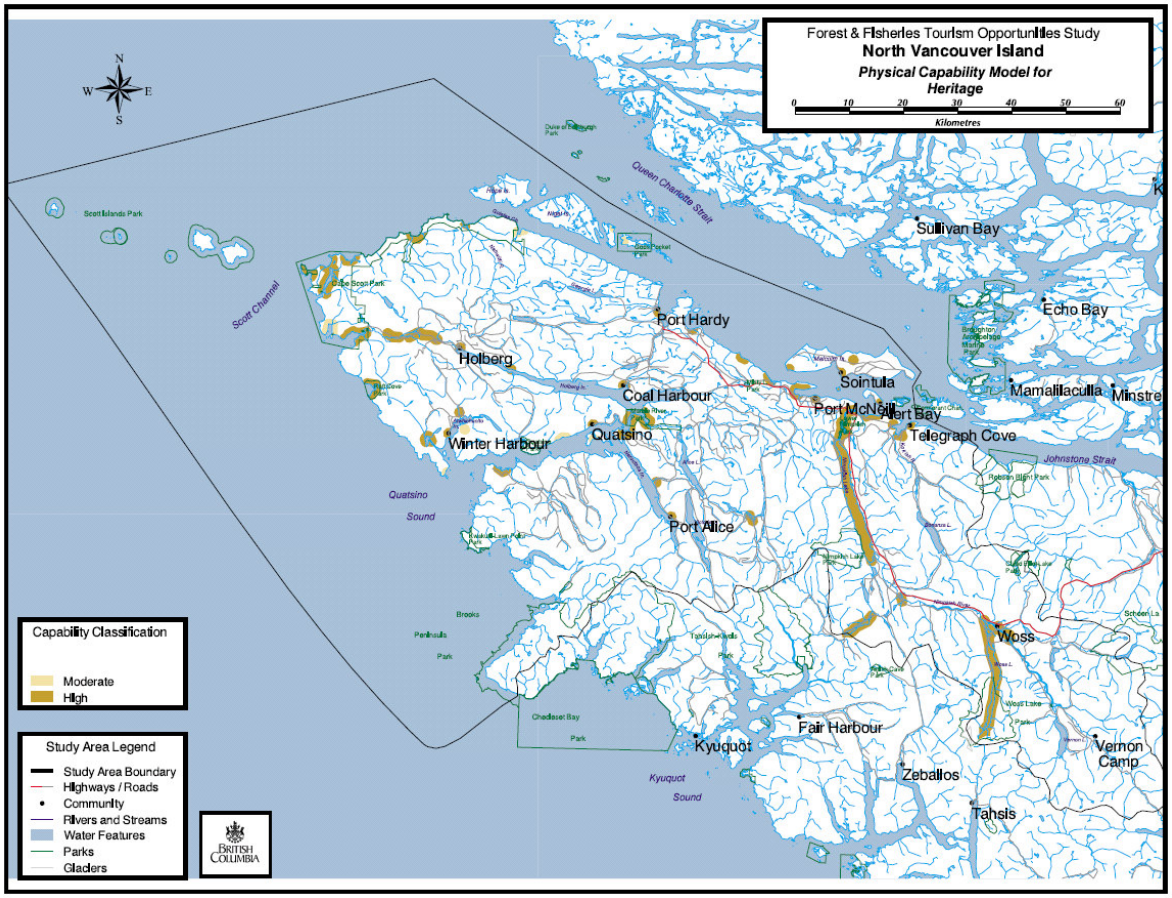
Map 3. Southern Queen Charlotte Strait and Broughton Strait West Marine Planning Unit (VILUP-MPU, 2000)



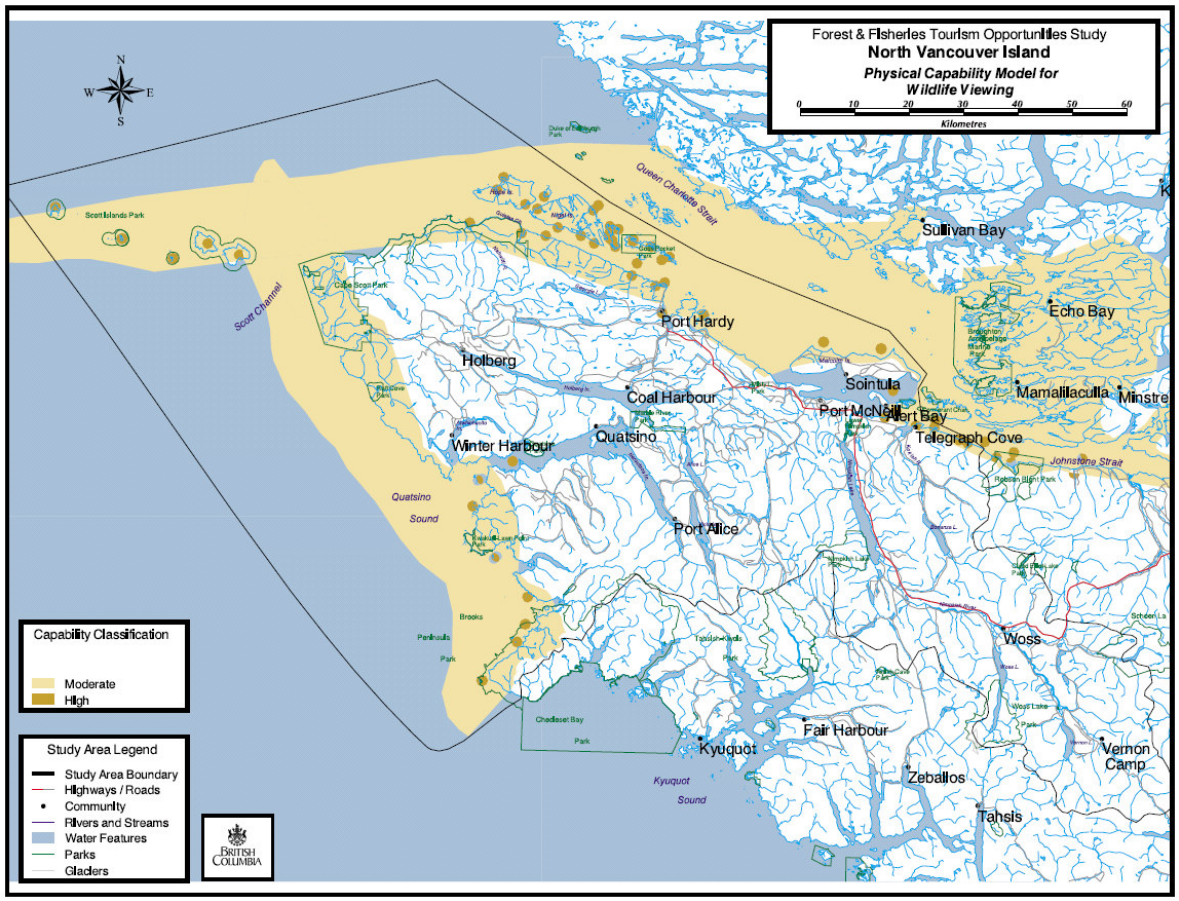
Map 4. Traditional territory of Kwakwaka'wakw (www.umista.org/masks_story)



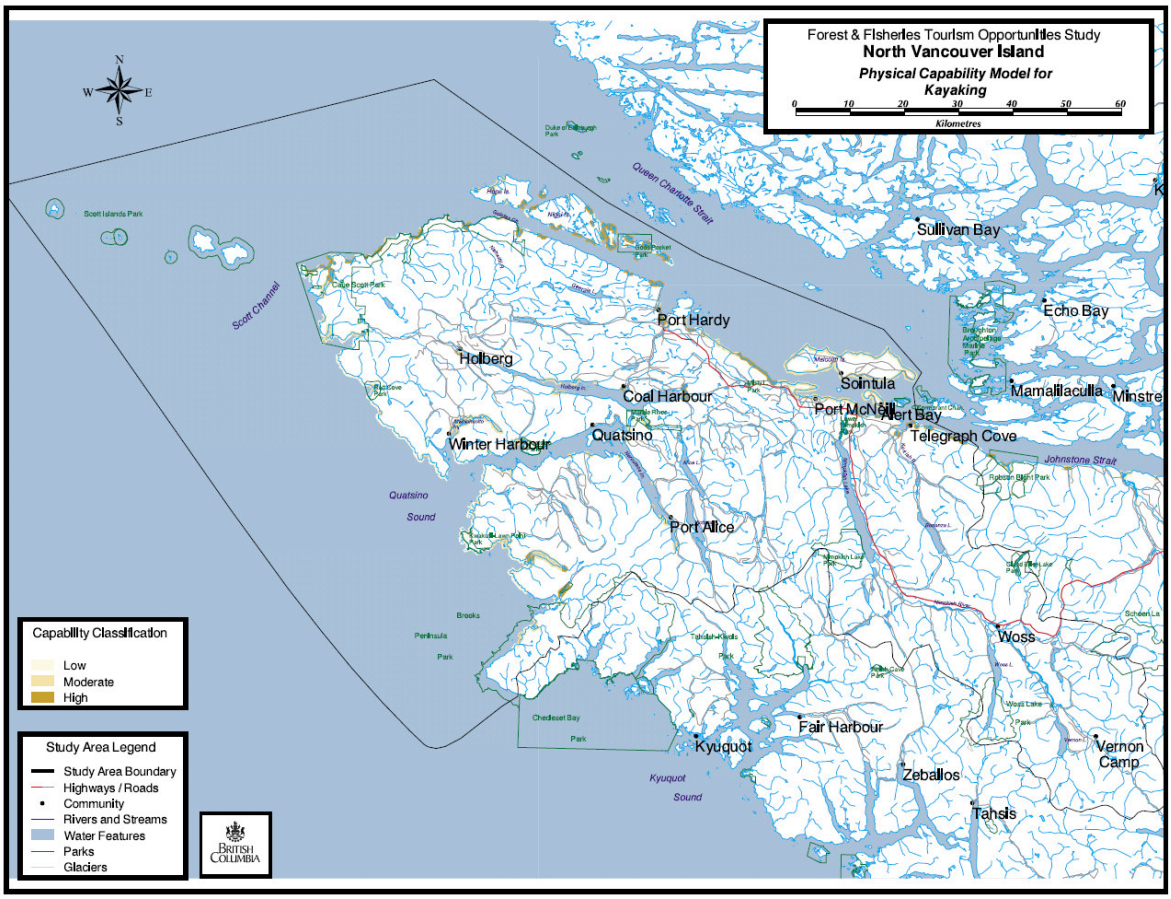
Map 5. Terrestrial, Cultural, Wildlife and Aquatic Tourism Opportunities in North Vancouver Island.
(ftp://ftp.gis.luco.gov.bc.ca/pub/tourism/nvi/features2.pdf Last accessed February 2009)



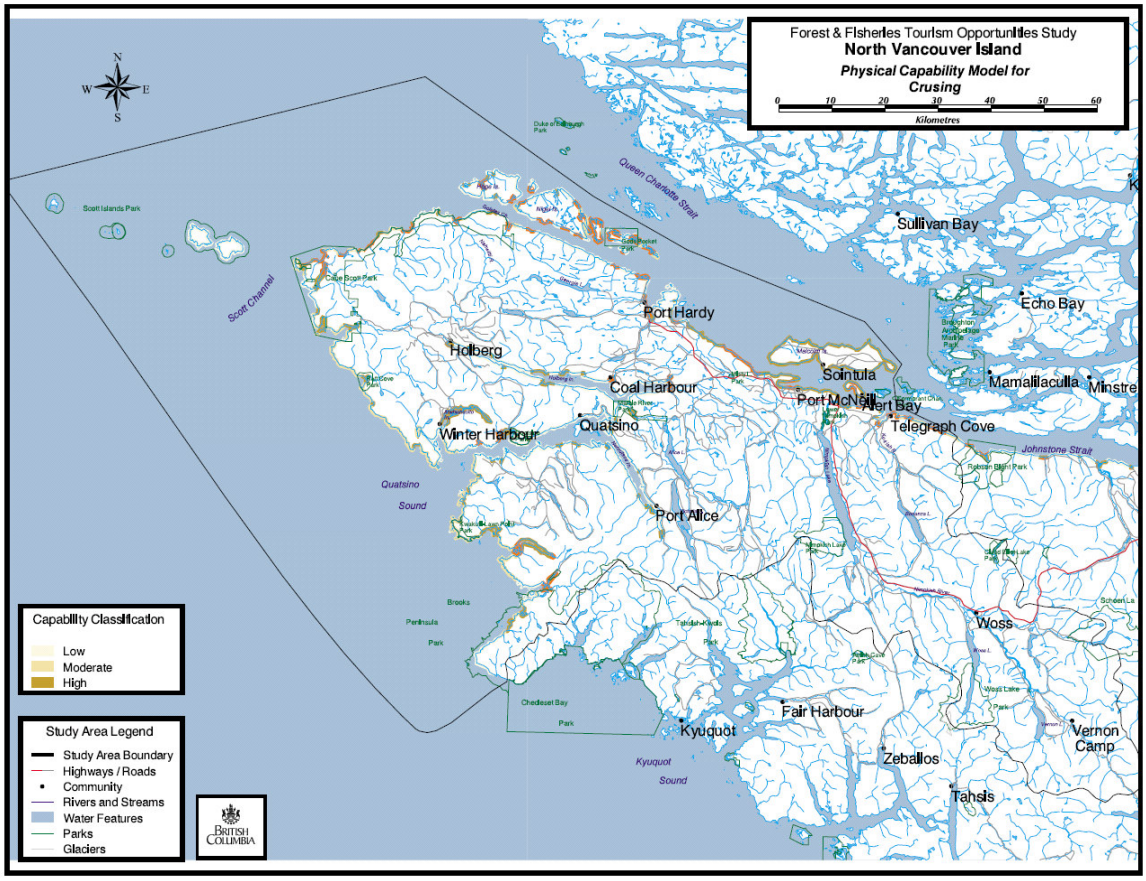
Map 6. Cultural Heritage in North Vancouver Island.
(ftp://ftp.gis.luco.gov.bc.ca/pub/tourism/nvi/her_cap2.pdf Last accessed February 2009)



Map 7. Wildlife Viewing in North Vancouver Island.
(ftp://ftp.gis.luco.gov.bc.ca/pub/tourism/nvi/wild_cap2.pdf Last accessed February 2009)



Map 8. Kayaking in North Vancouver Island.
(ftp://ftp.gis.luco.gov.bc.ca/pub/tourism/nvi/kay_cap2.pdf Last accessed February 2009)



Map 9. Cruising in North Vancouver Island.
(ftp://ftp.gis.luco.gov.bc.ca/pub/tourism/nvi/cru_cap2.pdf Last accessed February 2009)