

CONSERVATION AND
SUSTAINABLE FORESTRY PLAN

DRAFT MANAGEMENT PLAN No.4
TREE FARM LICENSE 54

Effective January 1 2005 to December 31, 2009.

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International Forest Products Ltd.

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EXECUTIVE SUMMARY

Like ordinary TFL Management Plans, this Conservation and Sustainable Forestry Plan will show how Interfor will manage TFL 54 in Clayoquot Sound over the coming five-year period (2005 to 2009). However, Clayoquot Sound is not an ordinary place and this is not an ordinary Management Plan. This Plan describes the special context and history of the Sound, it explains how Interfor has met the challenges of the last decade, and will show how Interfor will continue to sustainably manage the TFL in the future.

The 1995 Clayoquot Sound Scientific Panel recommendations resulted in fundamental and dramatic changes and marked a clear departure from earlier, conflict-inspiring industrial forest management focusing on timber production.

The preparation of this plan marks the 10th anniversary since Interfor began the implementation of the Scientific Panel's recommendations. In fully embracing these changes, Interfor has been on the forefront of ecosystem-based management in BC. It now has 10 years experience working with the new way of doing business.

Interfor has adjusted to a new philosophy that emphasizes the trees left behind, rather than the trees harvested. Interfor can claim numerous successes. It has:

1. Pioneered expertise in Variable Retention harvesting, meeting Science Panel rules, while at the same time running an efficient and safe operation;
2. Developed an innovative approach to soliciting public input into recreation and scenic resource management;
3. Developed effective and efficient methods of planning, engineering and harvesting under Scientific Panel rules;
4. Initiated, planned, implemented and monitored watershed restoration projects, resulting in channel recovery and significant increases in fish production; and
5. Developed a comprehensive and inventive area-based AAC analysis.

Not everything envisaged by the Scientific Panel has been accomplished in Clayoquot Sound, although Interfor cannot take sole responsibility for these inadequacies.

There has been no systematic, coordinated or logical strategy for research and monitoring, following the Scientific Panel's recommendations. Part of the responsibility for this lies in inconsistent government funding and lack of coordination between stakeholders – particularly after the disappointing performance of the Long Beach Model Forest. A more coordinated effort is necessary.

There has been no significant effort to understand the costs and benefits of the Clayoquot Experiment. After 10 years, there is still no real understanding of the impacts of the Scientific Panel's recommendations. The investment in this experiment warrants a comprehensive assessment. Interfor believes that the Provincial Government should take the lead in conducting an independent and unbiased assessment of the true costs and benefits.

Interfor has identified certain Scientific Panel recommendations that it feels can be modified without a concomitant increase in adverse ecological impact. Specific changes are presented in this plan (Section 4.4). The most significant changes involve rate of cut, hydriparian reserve management and opening size in VR harvest units:

1. For watersheds greater than 500 ha, Interfor suggests abiding by the 1% per year rule. However, for watersheds with low vulnerability to peak flow changes we suggest this rate of cut be averaged over 10, rather than 5 years. For these watersheds, Interfor would cap the Equivalent Clearcut Area at 30%.
2. For watersheds less than 500 m, Interfor would follow the 1% per year, but averaged over 20 years. The ECA cap for larger watersheds would apply.
3. Interfor proposes that for non-alluvial streams with channel gradients greater than 8 %¹ within proposed harvest areas, hydriparian reserves be increased in width, but for only one half of the length of the stream in the setting. In addition, Interfor will ensure that at least 60% of the total length of non-alluvial streams in a watershed remains under natural forest cover.
4. For alluvial streams less than 3 m wide and less than 8% in gradient, Interfor would adopt an average 30 m buffer.
5. Interfor proposes that in special circumstances where blowdown is likely to compromise retention targets, opening widths can be increased from 2 to 6 tree lengths, while still meeting the set retention targets on the gross harvesting area. Increased flexibility would allow Interfor to better manage blowdown hazards.

Interfor has achieved a great deal in Clayoquot Sound in the decade following the implementation of the Scientific Panel report. Yet it faces continued challenges on the economic front. Since Interfor acquired TFL 54 in 1991, the AAC has dropped from 180 000 m³ to 75 750 m³ – a reduction of 58%. To remain in business, Interfor must continue to strive to improve efficiency and achieve cost reductions.

By adopting the Scientific Panel's recommendations, Interfor participated in changes that dramatically raised standards for ecosystem-based management. While

¹ These correspond to B(2)(a), B(2)(b) and B(3) streams, according to the CSSP Hydriparian Classification

sustainable in the ecological sense, these changes were not sustainable from the perspective of social and economic factors.

Interfor is hopeful that the next 10 years of the Clayoquot Experiment will meet sustainability objectives in a more balanced and equitable way.

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1.0 INTRODUCTION

1.1 OBJECTIVES

1.1.1 The Clayoquot Experiment

International Forest Products Ltd. (Interfor) manages Tree Farm License (TFL) 54 under a license agreement with the Crown, as stipulated in the Forest Act. This Act also requires the licensee to submit Management Plans every five years. Interfor has submitted three Management Plans since its acquisition of the license in 1991, and this document represents the fourth in that series.

However, Clayoquot Sound, from a forest management perspective, is different from the rest of BC. In 1995, the Clayoquot Sound Scientific Panel recommended sweeping changes in the way the forests should be planned and managed. The announcement that the Province would implement these changes brought worldwide attention and interest. In a real sense, Clayoquot Sound became a testing ground for ecologically-based forest management.

Clayoquot Sound represented an experiment in forest management. Could such changes be implemented in a forested region while still maintaining an economically viable industry?

In 2005, in recognition of the unique status of Clayoquot Sound and its exceptional history in the 10 years since the implementation of the Scientific Panel's recommendations, Interfor decided to broaden the standard Management Plan scope, as reflected in the title of this document. This Plan will do more than simply describe how Interfor proposes to manage the TFL. It will describe how the Clayoquot experiment unfolded between 1995 and 2005, from the perspective of a logging company struggling to survive through unprecedented changes.

In this Plan, we chart the history of Clayoquot Sound, to place the current situation in a context of rapidly evolving social, cultural, economic and environmental factors. We explain how the Sound is, in many ways, unique in the way forest resources are managed in BC. The Plan also describes Interfor's social and economic role in Clayoquot Sound and its cooperation and collaboration with First Nations and communities. This role has changed dramatically over the past 15 years, as will be demonstrated.

Finally, the Plan will chart a future vision for the conservation and sustainable forest management of TFL 54. After 10 years of experience in implementing the Scientific Panel's recommendations, Interfor is in a position to adapt its response to certain

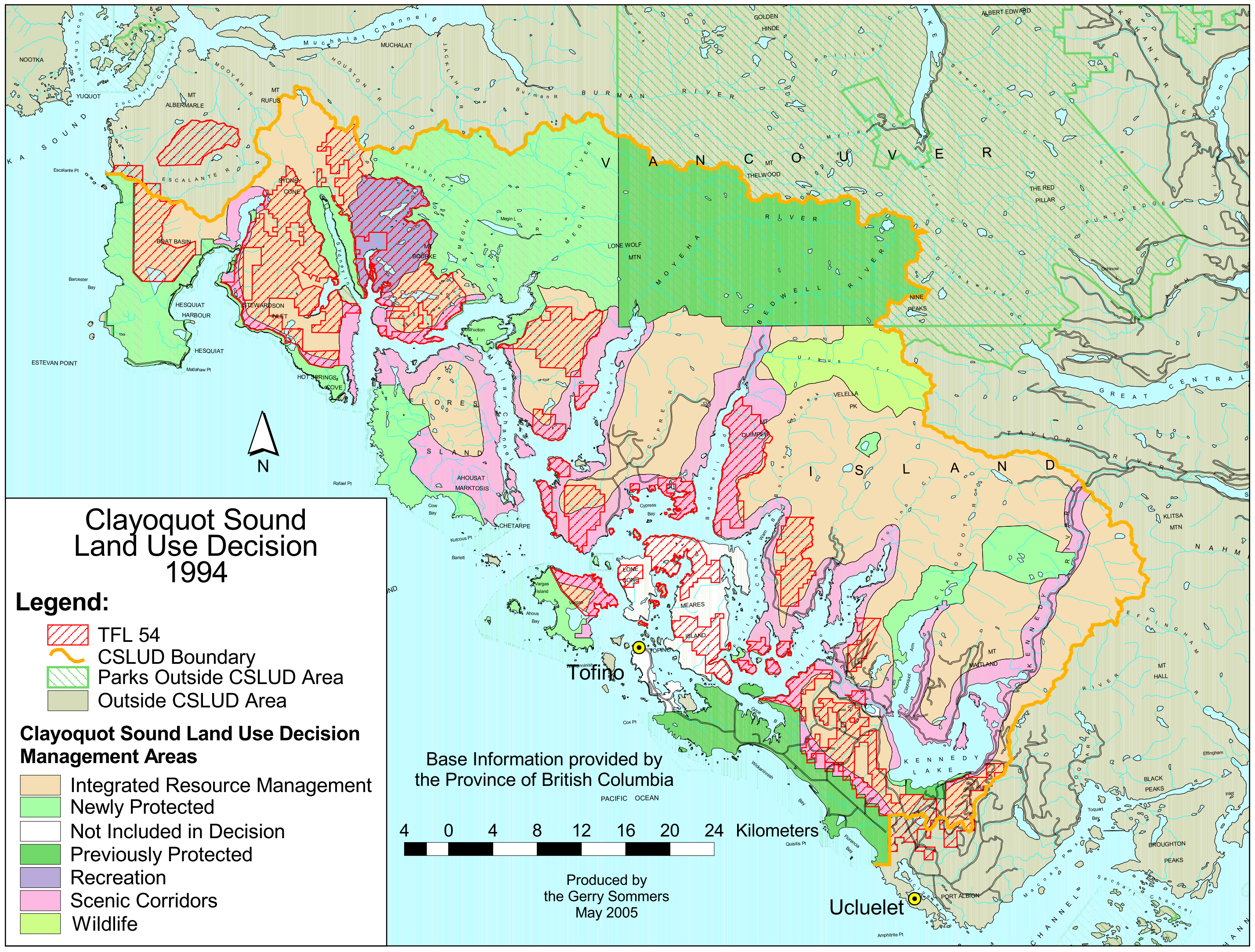
recommendations, while continuing to maintain compliance with the vast majority of the remainder.

1.1.2. Clayoquot Context

Clayoquot Sound – an area of 260,000 ha on the west coast of Vancouver Island – is frequently cited for its unparalleled wilderness, biodiversity and recreational value. Indeed it is a beautiful place, but its fame and uniqueness derives more from its history in the 1980s and 90s as the nexus of protest and dissent over forest management policies and practices of the time.

TFL 54 is located on the west coast of Vancouver Island primarily within the boundary of Clayoquot Sound (Figure 1). The majority of TFL 54 (92.5%) is dispersed throughout Clayoquot Sound and is interspersed with TFL 44², Arrowsmith Timber Supply Area (TSA) and Pacific Rim National Park. About 7.5% is located outside of the Sound, to the north and south.

² MacMillan Bloedel Limited.



Clayoquot Sound Land Use Decision 1994

Legend:

- TFL 54
- CSLUD Boundary
- Parks Outside CSLUD Area
- Outside CSLUD Area

Clayoquot Sound Land Use Decision Management Areas

- Integrated Resource Management
- Newly Protected
- Not Included in Decision
- Previously Protected
- Recreation
- Scenic Corridors
- Wildlife

Base Information provided by
the Province of British Columbia

4 0 4 8 12 16 20 24 Kilometers

Produced by
the Gerry Sommers
May 2005

Ucluelet

1.2 Relationship to Other Plans

All land use and resource management activities within TFL 54 are subject to the *TFL License Agreement*, the *Forest Act* and the regulations under that Act. For most of the period between 1995 and 2005, activities were subject to the *Forest Practices Code of British Columbia Act* (FPC) and the regulations and standards made under that Act. As this plan was prepared in 2005, the Province was in a state of transition from the FPC to the *Forest and Range Practices Act* (FRPA). Over the period covered by this plan (January 1, 2005 to December 31, 2009), the regulations and standards of FRPA will completely supersede those of the FPC (by December 31, 2006).

Since the early 1990's, the Provincial Government has been involved in negotiations with the Nuu-Chah-Nulth First Nations in Clayoquot Sound. The relevant agreement stemming from those negotiations at the time of writing in 2005 is the Interim Measures Extension Agreement (IMEA). Treaty negotiations in the 1990s also resulted in the establishment of a joint management board to oversee land use and resource management decisions. Through the Central Region Board, First Nations have a direct voice in the management of resources within their traditional territories. The CRB is empowered to review and recommend to the Government either acceptance, modifications to, or rejection of all strategic and operational resource management plans, as defined in the FPC. As per the IMEA, the CRB's objectives are to focus on the promotion of resource use that supports sustainability, economic diversification, ecological integrity, and the reconciliation of diverse interests.

Interfor in Clayoquot Sound has also committed to meeting recommendations of the *Clayoquot Sound Scientific Panel*³. However, as described in this document, Interfor proposes to make minor changes to some of the operational commitments to those recommendations. Interfor also complies with objectives and designations forming the watershed plans issued by the Clayoquot Sound Technical Planning Committee. The 7.5% of TFL 54 falling outside Clayoquot Sound is not subject to the Scientific Panel or the watershed plans.

Interfor's "TFL 54 Management Plan # 3" was in effect from January 2000 through December 2004. The TFL MP is a legislative requirement for TFL holders in BC. The MP described the planning, management, policy, research and monitoring environment for TFL 54, as well as detailing collaborative and cooperative agreements with First Nations, governments and other stakeholders. The MP also set out how Interfor would develop the Annual Allowable Cut (AAC) for the TFL over a period of 20 years. This Plan to some extent supersedes MP #4, but does not

³ The Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. 1995. *Report 5 - Sustainable Ecosystem Management in Clayoquot Sound: Planning and Practices*. Victoria, BC.

constitute a Forest Stewardship Plan (FSP), which is a requirement under the FRPA for a defined forest area.

Interfor has a “Sustainable Forestry Management Plan; EMS Program #5”, completed in January 2002. This document is applicable to all land managed by Interfor (not just TFL 54 and Clayoquot Sound). Interfor has attained third party certification to the International ISO 14001 Standard for environmental management systems and has obtained third party certification to the objectives and verification indicators for the Sustainable Forestry Initiative^(SM) (SFI) Program.



Interfor ensures that EMS protocols are followed in the field.

Interfor also has a draft Research and Monitoring Plan, for TFL 54, prepared in 2003. This plan identifies gaps in research and monitoring and recommends a strategy for rectifying them.

Ecosystem-Based Management

Ecosystem-based management (EBM) is a frequently used term in this Plan. The Scientific Panel did not explicitly define EBM, since this term was not in common usage at the time. The panel did note (Report 5, page xi) “ecosystem management must acknowledge the physical structures, processes and biological constituents of the ecosystem.” The report goes on to state: “sustainable forest practices must be judged by the extent to which all resources are respected and sustained”. In this context, the Panel embraced ecological and cultural resources, but did not address social or economic ones.

The Coast Information Team⁴ (CIT) defines EBM as:

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

The significance of this definition is that EBM recognizes both ecological sustainability as well as the condition of human communities. Following from that theme, the CIT identified two goals:

1. Maintain the ecological integrity of terrestrial, marine and freshwater ecosystems, and;
2. Achieve high levels of human well-being.

The phrase “High levels of human well-being” is meant to include the “health, wealth and education of aboriginal and non-aboriginal people”, living in “stable, resilient, well-serviced and peaceful communities.”

In this Plan, reviewing the progress and achievements over the 10-year period since the adoption of the Scientific Panel’s report, Interfor will argue that it has been successful in achieving the first component of EBM. But collectively the region has failed in the second.

1.3 Sustainable Forest Management

Sustainable forest management (SFM) maintains or enhances the long-term health of forest ecosystems, while providing social and economic opportunities for the benefit of present and future generations. Sustainability is typically defined as consisting of three elements, namely:

- Social: Integrating balanced values and needs of, local communities, First Nations and global concerns;
- Economic: Generate economic value today without compromising future opportunities; and
- Environment: A healthy, functioning ecosystem.

The principles, objectives, indicators and targets described in this Plan are directly related to the key elements of sustainability. The success of Interfor’s management

⁴ Coast Information Team 2004. Ecosystem-based Planning Management Handbook.
<http://www.citbc.org/c-ebm-hdbk-fin-22mar04.pdf>
April, 2004.

strategies and forestry practices are measured against its objectives and ultimately, how we balance the SFM elements. Balance is most achievable at the Landscape and TFL levels. It is not possible to perfectly balance economic, social and environmental values in all places at all times.

Principles

Interfor, as a Program Participant in the SFI® program, supports the following sustainable forest management principles as set forth by the AF&PA:

- Sustainable Forestry - To practice sustainable forestry to meet the needs of the present without compromising the ability of future generations to meet their own needs by practicing a land stewardship ethic which integrates the reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat, and aesthetics;
- Responsible Practices - To use sustainable forestry practices that are economically and environmentally responsible in forests, and promote among other licensees and forest landowners;
- Forest Health and Productivity - To protect forests from, wildfire events that are inconsistent with other principles and from epidemics of pests, diseases, and other damaging agents in order to maintain and improve long-term forest health and productivity;
- Protecting Special Sites - To manage forests and lands of special significance in a manner that takes into account their unique qualities (e.g. biologically, geologically, culturally or historically significant); and
- Continual Improvement - To continually improve the practice of forest management and also to monitor, measure and report performance in achieving the commitment to sustainable forestry.

1.4 Structure of this Document

The report has four chapters:

- Chapter one is an introduction;
- Chapter two develops the history of Clayoquot Sound;
- Chapter three is a description of the forest management practices, activities and circumstances that have evolved over the period 1995 to 2005; and

- Chapter four looks at the achievements, shortcomings, and opportunities for improvement. It also contains an overall vision for the future.

2.0 Historic Context

2.1 The Landscape

The West Coast of Vancouver Island is arguably one of Canada's most remarkable areas, geologically, ecologically, historically, and culturally. The area features intense, dynamic conflicts between powerful geological forces typically found at continent's edge where landmasses meet oceans. Its geology reflects a dramatic history involving the collision of continental and oceanic plates, followed by intense sculpting by glacial ice.

Most of Vancouver Island formed from an island chain that collided with the west coast of North America about 100 million years ago⁵. This giant mass of rock has been called *Wrangellia*. Geological activity continues: pressure between the continental and oceanic plates continues to cause faulting and tilting of the land, and earthquakes are common. As a result, the Clayoquot area is rising about one millimeter per year, and is moving northeastward at more than one centimeter per year¹.

Vancouver Island was strongly influenced by the last ice age, which peaked about 17,000 years ago. With the exception of the highest mountaintops and some of the outlying coastal areas and islands, Vancouver Island was completely covered by ice. The ebb and flow of the glaciers sculpted today's terrain and left surficial deposits of various materials from which Island's soils have been formed. By carving out valleys and depositing sediment, glaciation also resulted in the modern pattern of lakes, watersheds, rivers, creeks, and ocean beaches.

As the Cordilleran ice sheet began to retreat about 14,000 years ago, land areas appeared around the ocean, and plant spores and seeds were blown in from surrounding refugia not covered by the ice. Douglas-fir trees were growing in the coastal forests about 7,000 years ago, with redcedar becoming abundant only about 4,000 years ago. And, as vegetation colonized the emerging lands and forest ecosystems evolved, terrestrial and aquatic fauna appeared and flourished. As the forests matured, they developed into the highly productive, diverse, and beautiful coastal temperate rain forest landscape, which many sectors and people consider a unique global resource.

⁵ Windh, J. 2004. The wild edge – Clayoquot, Long Beach & Barkley Sound. Harbour Publishing Co. Ltd. Madeira Park, BC. 167 p.

2.2 First Peoples & Resource Use

2.2.1 Pre-historic to Western Contact (to 1792)

First Peoples may have arrived in North America on foot about 11,000 years ago via the Bering land bridge⁶. They may have been pre-dated by seafood-dependent people who traveled by canoe or raft prior to the end of the ice age. These nomadic peoples may be the ancestors of the current West Coast First Peoples, particularly those known as the *Nuu-Chah-Nulth* ('along the mountains'). Given that sea levels were considerably lower during the ice age, there might have been coastal lands, which were readily accessible and inhabitable to nomadic peoples. However they arrived, the Nuu-Chah-Nulth form a part of a cultural group occupying the west coast from the Neah Bay area in Washington to the Brooks Peninsula. These peoples were historically not politically unified, but living in several, small, separate tribes linked by common language, culture and family ties.

Clayoquot Sound has been and continues to be the traditional territory for four nations, the Ucluelet (the southernmost end), the Tla-o-qui-aht (southern Clayoquot Sound area), the Ahousaht (mid-Sound), and the Hesquiaht (northern Sound area). The Tla-o-qui-aht are considered *tla-ook* ("different") because they originated from the inland areas around Clayoquot Lake, unlike the other coastal nations.¹ Archaeological records indicate occupation of these traditional territories for at least the past 4,500-5,000 years.

The territory of each tribe was clearly defined, focusing on major villages. Three of the major villages appear to have been Opitsat for the Tla-o-qui-aht, Ahousat for the Ahousaht, and Hesquiat for the Hesquiaht. The small tribal groups lived throughout each territory, settling near valued resources, such as the mouth of a productive salmon stream, a lookout for spotting whales, or a sheltered cove. The tribes also migrated between 'outside' and 'inside' village sites, based on the location of seasonal food sources. Spring, summer and autumn were busy food gathering and preservation times, while winter village sites were chosen for their protection from the intense coastal winter storms.

Tribes readily traded with one another for the goods they could not harvest or produce on their own lands. Thus, the tribal business resulted in successful bartering systems, good communications, cultural exchanges, and considerable traveling within and among the three major tribes, and also within and among outside tribes.

⁶ Mowachaht-Muchalaht First Nations. 2000. Yuquot agenda paper. In: Hoover, A.L. (ed.), *Nuu-chah-nulth voices, histories, objects & journeys*. RBC Museum, Victoria, BC.

While many plants and animals are associated with the culture of the Clayoquot Sound tribes, western redcedar and salmon are the two most well-known. The western redcedar, massive, abundant, and easily worked, provided sources of shelter (logs and planks for the longhouses), transport (sea-worthy canoes for fishing, hunting sea mammals, warring, trading), and clothing (skirts, hats, capes, baskets). Smoked and dried salmon was the lifeblood of these tribes, providing sustenance year-round. The productive marine and terrestrial environments in the temperate rain forest also provided an abundance of food: herring, shellfish, whales, deer, elk, and berries.

The availability and abundance of food, fresh water and protected living sites, the high degree of tribal communications and interactions, and close identification of the peoples with their environment allowed the development of a rich culture. The artwork, the ceremonials (e.g., masks) produced for winter celebrations, the storytelling and oral histories, are but a few examples which, when ‘discovered’ by western cultures, have been perceived as complex, diverse, and, to many, mystifying. It is this cultural richness, which provides much strength to the current First Nations.

2.2.2 Western Contact – the First 100+ Years (1772 – 1875)

In 1792⁷, José Mariano Moziño spent five months at the Spanish garrison in Nootka Sound (immediately north of Clayoquot), and has provided the most detailed written description of pre-contact native life over the last 225 years.

The first recorded contact with the Clayoquot tribes occurred in 1794, with the arrival of the Spaniard Juan Perez. Contact was made with the Hesquiaht near their village of Hesquiat. Perez was sent north from Mexico to investigate the Russian expansion in Alaska. None of the Spaniards went ashore but some gift-sharing and trading occurred. Perez left the Sound and life returned to pre-contact normality for four years. In the spring of 1778, Captain James Cook arrived and spent a month in Nootka Sound, just north of Clayoquot. Cook *et al.* received a friendly reception and stayed for a month as the guests of the Mowachaht in Yuquot (named Friendly Cove by Cook). They traded, fished, gathered food for the shipboard cattle, and brewed spruce beer to prevent scurvy¹.

The main result of Cook’s visit was that the west coast of BC became well known as a cheap source of sea otter pelts. The Mowachaht view was that they did very well in trade with the Spanish, “...being able to exchange a few trifling furs, combs, spoons, and hats for items we greatly valued, in particular iron, axes and cloth.”⁸ Regardless of who bested whom in such trading, a trading relationship had begun, and within a

⁷ Moziño, J.M. 1991. *Noticias de Nutka. An account of Nootka Sound in 1792.* I.H. Wilson Engstrand (Trans. and ed.). U Washinton Press, and Douglas & McIntyre, Vancouver, BC, Canada. 142 p.

⁸ Mowachaht-Muchalaht First Nations. 2000. Yuquot agenda paper. In: Hoover, A.L. (ed.), *Nuu-chah-nulth voices, histories, objects & journeys.* RBC Museum, Victoria, BC. p. 19.

decade of western contact, the west coast of now Vancouver Island became a hub for trading ships hungry for the otter pelts. The Clayoquot Sound area became important, with maritime fur trade being largely controlled for a time by Chief Wickaninnish of Clayoquot.

In 1787, Captain Charles Barkley proposed the name Wickaninnish Sound, and in 1791, Captain Robert Gray and his ship wintered on Meares Island, building Fort Reliance. John Meares traded with the Tla-o-qui-aht, and charted the area at the southern entrance to Clayoquot Sound, which he called Port Cox in the District of Wicananish. This included the peninsula on which Tofino is now located, and across the water, the village of Opitsat on Meares Island, and nearby islands, including Stubbs Island. Relations between the traders and the west coast tribes were friendly at first but soon soured.

In 1791, the Americans Robert Gray and John Kendrick made a winter stop-over on the shore of the inlet east of Opitsat (now known as Lemmens Inlet), where they built a trading sloop. In the same year, Gray also burnt the Tla-o-qui-aht village of Opitsat to the ground, destroying forever its finely carved longhouses. In 1803, the Mowachaht captured the American ship, Boston, in Nootka Sound, killing all but two of the crew, who were then taken as slaves. One of these captives, John Jewitt, wrote a detailed account of his imprisonment⁹.

In 1811, the Tla-o-qui-aht attacked the American ship, Tonquin, in partial retribution for the destruction of the community of Opitsat in 1791. All but one of the Tonquin's crew was killed, and several hundred Tla-o-qui-aht perished when a wounded crewman detonated the ship's powder magazine. The capture and destruction of the Tonquin represented a significant setback for relations between the western countries and the west coast tribes. It initiated a period of about 50 years in which the traders largely avoided the west coast. The fur trade declined with the depletion of sea otter populations. Contact and activity with the western traders changed relationships among the west coast tribes. The balance of power was upset as stronger factions acquired arms and seized resource territories from weaker neighbours. Warfare intensified up and down the coast, while at the same time, tribal populations declined through venereal and other diseases introduced by western traders.

By the 1860's, trade had increased and settlers began to arrive, attracted by renewed demand for fur, this time for northern fur seal. Unrest continued, with attacks on traders and vessels in distress resulting in government warnings and attempts by naval authorities to arrest the persons responsible.

⁹ Jewitt, J.R. 1815. White slaves of Maquinna. John R. Jewitt's narrative of capture and confinement at Nootka. Heritage House Publishing, Surrey, BC. 191 p.

Western “civilization” had indeed arrived on the west coast of Vancouver Island. Many more ships began to arrive at the tribal communities, and the tribes began to learn a great deal about the visitors, particularly about the different languages, customs, laws, values, and religions brought to the area by the English, Spanish, American, Russian and other colonizing powers. The tribes learned that western traders would pay dearly for the increasingly rare sea otter pelts, willing to part with virtually anything from their ships.

Throughout the early 1800s, trade focused on furs, other provisions from their lands, and various objects of art. Hides and pelts from elk, deer, mink, marten, and the northern fur seal augmented the fur trade. In the 1850s and 60s, the First Nations began to produce and trade dogfish oil used as skid grease in the small local logging industry (based primarily in Port Alberni). Trading was set back somewhat when the Ahousaht captured and killed the crew of the *Kingfisher* in 1864. Because the community was unwilling to give up those responsible for the killings, traders destroyed nine villages.

In the early 1870s, commercial pelagic sealing became a preferred occupation of the First Nations, and the sale and trade of traditionally crafted curios for the western traders became an important cottage industry. In 1871, British Columbia joined Canada, and the First Nations became part of the Indian reserve system of the federal Department of Indian Affairs. In the mid 1870s, the first trading posts were established: Stubbs Island in Clayoquot Sound, and Spring Cove at the entrance to Barkley Sound. And, in the late 1870s, the commercial fishery off the west coast expanded significantly and began to include salmon.

To illustrate their friendly and diplomatic ways, the West Coast tribes presented “carved images of our great ancestors”⁴ to representatives of visiting governments. “These ancestors are now living in your great treasure houses, which you call museums. They are our representatives in your cities and capitals. They are your acknowledgement of our diplomacy and the greatness of our nation. They are our boundary markers showing the extent of our influence throughout the world.”⁴

The First Nations also viewed this early contact as a good time, having attempted to befriend all visitors, and having secured a monopoly on the trading opportunities with the ships. Thus, not only did the tribes have access to the best trade goods, they also solidified their role as middleman in all trading among their neighbours and the ships.

2.2.3 Western Contact – the Second 100+ Years (1875 – 1995)

The second one hundred years of contact are not viewed as kindly by the First Nations as the consequences of western contact came into play, particularly the devastation by diseases, including smallpox, tuberculosis, measles, sexually-

transmitted diseases, and alcoholism. Over the course of the next 80 to 100 years, local populations were reduced to approximately 10% of pre-contact levels. Many communities and families had been completely wiped out. The survivors faced an uncertain future. The First Nations struggles, coupled with the expansion of western settlement and occupation, resulted in further stresses and uncertainties, particularly the loss of their territories, control of their affairs, their children to residential schools, family structure and skills, oral histories, religion, language, community relocation, and of many cultural and sacred treasures. The federal and provincial governments of the day embarked on a strategy of assimilation (e.g., the federal *Indian Act*) of the aboriginal peoples into mainstream society that, to a large extent, failed. In many areas of Canada and British Columbia, First Nations became the forgotten nations, and were not recognized and treated as equals to the Euro-Canadian peoples. “Dependency under the Indian Act has not served us well. Generations of our people have died poor on our rich lands.”¹⁰

The next 20 to 25 years (1970 – 1995) saw significant strides forward for the west coast tribes in recapturing their past, their physical and intellectual heritage, their identity, and their pride, and in claiming and controlling their future. The west coast tribes now have a strong cultural, social, and political voice, and are progressing towards self-government. They developed a strong voice for environmental issues, recognizing that their traditional areas and values were under serious threat.

In the early 1980s, the Ahousaht took MacMillan Bloedel (MB) to court to stop log booming in Steamer Cove on Flores Island. While the judge agreed that the log booming debris was hurting the shellfish beds, he found in favor of MB. In the mid-1980s, the west coast tribes became involved in a resource-use conflict over MB’s plans to log on Meares Island. This conflict drew international interest. In essence this was the beginning of the Clayoquot Sound protest, and marked the start of a growing relationship between First Nations and the environmental community. First Nations were involved in the blockade of Meares Island in 1984 and declared the establishment of Meares Island Tribal Park. In March 1985, the Tla-o-qui-aht and Ahousaht obtained an injunction, which stopped logging on Meares Island. In 1988, some First Nations people and the Friends of Clayoquot Sound (FOCS) blockaded road construction along Sulphur Passage, the entrance to Talbot and Moyeha Valleys. In 1989, more than 200 people from FOCS and Ahousaht attempted unsuccessfully to stop clearcut logging along the Atleo River. The west coast First Nations supported and participated in several of the protest activities as the BC Government and its task forces failed through 1989 to 1995 to resolve the Clayoquot conflict.

¹⁰ Inglis, R., Haggarty, J.C. and Neary, K. 2000. Balancing history: an emerging First Nations authority. Pp. 7-10 in: Hoover, A.L. (ed.), *Nuu-chah-nulth voices, histories, objects & journeys*. Royal BC Museum, Victoria, BC. 389 p. p. 8.

2.2.4 1995-2005: *Ten Years of Change*

Over the past ten years, First Nations have been increasingly asserting their authority over representations of their history by controlling access to their communities, their members, and their information sources. Formal permission is required for outside researchers and writers to work within the First Nations territories and with their people. Some First Nations are forging partnerships with outside individuals and organizations to ensure that their voices are heard, and to take control of their own affairs. Other partnerships are being formed to create economic opportunities for economic development and sustainability for the First Nations communities.

Such progress and assumption of control involve operating beyond the isolation and exclusion of reserve life, and not accepting the normal barriers they have faced with 'status quo' western society. The tribes are turning to their rich history and traditions for guidance in pursuing community development and sustainability options. The west coast tribes are seeking innovative ways to achieve sustainable communities and industries, and to foster community health and well-being.

The last ten years have seen the tribes in Clayoquot Sound begin to play a more significant and substantive role in natural resource management decision-making in the Sound. The First Nations have seen the reduction of many resources which were once abundant in their territories and on which they lived for centuries: e.g., sea otters, whales, fur seals, pilchard, herring, shellfish and salmon. They also believe that forest, stream and ocean habitats have been heavily impacted through industrial activity. As well, they have witnessed a substantial reduction in employment in the forestry and fishing industries.

In March of 1994, the BC Government and the Nuu-Chah-Nulth Central Region Chiefs signed the *Interim Measures Agreement* (IMA), which gave First Nations the right to review and recommend to Government either acceptance, modification or rejection of resource development plans in Clayoquot Sound. In March of 1996, industry and government, in response to a request from the Nuu-Chah-Nulth, prepared, then presented a two-day symposium on alternatives to clearcutting in Clayoquot Sound.

In April of 1996, the IMA was extended for three more years. At about the same time, FRBC funded the Ahousaht Wild Side Heritage Trail and Eco-Tourism Project aimed at clearing an ancient trail to the outside beaches on Flores Island. An important objective was to train First Nations youth in tourism.

Frustrated by Government's decision not to conduct full inventories of all forest values in the Bulson Valley, Greenpeace and Friends of Clayoquot Sound (FOCS) blockaded the valley in June 1996, but were persuaded by First Nations to forego the blockade and agree to meet with the forest companies to begin meaningful

negotiations to terminate the conflict. To that end, First Nations hosted an all-stakeholder meeting in July 1996 to talk about solutions to the Clayoquot conflict, and to request peace in the Sound. In the fall of 1996, the World Conservation Union recommended a resolution supporting designation of Clayoquot Sound as a UN Biosphere Reserve.

In 1997, Ma-Mook Natural Resources Limited (representing the collective economic interest of the five Nuu-Chah-Nulth Central Region First Nations) was created. In 1998, under the Interim Measures Extension Agreement (IMEA), MacMillan Bloedel Limited and Ma-Mook Development Corporations signed a shareholders agreement detailing their partnership in the operation of a new company to operate in Clayoquot Sound. The new company was named Iisaak Natural Resources Ltd., with the controlling interest owned by the Nuu-Chah-Nulth. In 1999, a Memorandum of Understanding was signed between Iisaak Natural Resources Ltd. and Greenpeace Canada, Greenpeace International, Natural Resources Defense Council, Sierra Club of BC and Western Canada Wilderness Committee.

2.3 Settlement History

2.3.1 Homesteaders (1860-1900)

In 1875, when the Catholic priests came to establish a mission at Hesquiat in 1875, the only non-aboriginal peoples resident in the area were the four men in charge of the trading posts¹¹. Initially, during this period, there was little trading activity and the trading posts did not flourish. Then, with the rapid settlement of areas in southern British Columbia (e.g., Victoria), the California and the Fraser River gold rushes, and increasing interest in immigration and settlement of remote areas in western Canada, there was a revival of interest in settling the west coast of Vancouver Island. Two main attractions seem to prevail as far as settlement was concerned:

- (1) The potential for resource exploitation along the west coast; and
- (2) The conversion of the indigenous peoples to Christianity leading to their assimilation into western society.

In 1890, the Clayoquot Trading Post was sold to a number of local businessmen who consolidated much of the trading activity. About the same time, a hotel was built on Stubbs Island, near Tofino. The Trading Post became quite successful in the early 1890s as the sealing industry boomed. Sealing schooners came up out of Victoria to pick up aboriginal crews with their canoes and take them out to intercept migrating fur seals. This industry had quite an impact on the First Nations communities who now had western money to spend.

¹¹ Guppy, W. 1997. Clayoquot soundings: A history of Clayoquot Sound, 1800s to 1980s. Grassroots Publication, Tofino, BC. 80 p.

By the end of the 1890s, the fur seals were nearly eliminated from the area, and the sealing industry was on the decline. At the same time, however, there was increasing interest in mining, and settlers were flocking into the area to preempt parcels of land the government had made available on the coastal plain south of Tofino Inlet and in the Long Beach area. Thus, by the end of 1899, the Clayoquot Trading Post had become a thriving hub of trade and business, being strategically located on an island in an area where all traffic in and out of the area was by boat. The expected mining 'boom' never materialized, but mining has remained in the background as an economic activity.

In 1899, a Catholic mission and residential school were built on Meares Island, near Opitsat, and a Methodist mission was established at Ahousat.

2.3.2 Community Establishment

Tofino

Even though the Clayoquot Trading Post on Stubbs Island was the local service and supply centre, most of the settlers in Clayoquot Sound at the end of the 1800s were scattered throughout, living on many of the islands as well as on Vancouver Island itself. Maintaining such a remote lifestyle was fraught with hardship, risk, and inconvenience, with access only by water. This access was unreliable, subject to frequent winter storms.

In the early 1900s, there was a move to establish a centralized community in Clayoquot. The favoured site for this community was the outer end of Esowista Peninsula, where the Village of Tofino was subsequently established. There was a concurrent attempt to expand the community around the Trading Post on Stubbs Island but most of the community-oriented development occurred on the Esowista Peninsula. By 1913 there were about 13 families in the new settlement⁷. Most of the outlying homesteads on the islands were abandoned during World War I, primarily because the young men were off fighting in Europe. Also, as the number of school-aged children increased, it became necessary to live closer to the schools.

During the 1920s, Japanese settlers arrived in Clayoquot, bringing their expertise in salmon trolling to the area. They settled generally in their own communities just outside Tofino and Clayoquot, and by 1923, about 30 families called the area home⁷. The Japanese formed a significant portion of the non-aboriginal population, settling in and working well with the communities until 1941 when Japan bombed Pearl Harbour. The Canadian Government ordered all Japanese descendents removed and confiscated their homes, properties, and businesses. Few returned after the war.

The Tofino Board of Trade (much later, the Chamber of Commerce) was established in 1929. The stimulus for its initiation was the designation of a road through the

mountains from Port Alberni to Tofino. A road had been promised before 1929 but it was never realized. The Tofino Board of Trade, in conjunction with the Ucluelet Chamber of Commerce, lobbied for the next 30 years for the completion of the road. Municipal government for Tofino was established in 1932, with a Board of Commissioners (with a chair), and a municipal clerk⁷.

Through the 1950s and 1960s, Tofino continued essentially as a frontier community, with fishing and logging as the main economic activities. The Maquinna Hotel beer parlour became the prime social gathering place. The 1960s, the decade of the 'flower children,' saw the arrival of a number of 'hippies' who squatted primarily at Long Beach and used Ucluelet as their base. Many of these squatters headed north to the Tofino area in the early 1970s when they were uprooted during the formation of Pacific Rim National Park. Today, tourism makes a significant contribution to the local economy, as the area develops into a year-round destination for tourists and recreationists alike.

Ucluelet

Ucluelet evolved from a number of smaller communities. During the 1860s, a fur trading post was established at Spring Cove on the extreme tip of the Ucluth Peninsula¹. In 1861, a sawmill and store were built near the native village of Itatsoo. In 1937, the mill was converted into a pilchard-processing plant, and during World War II, a cannery was added. This change resulted in a number of big seine boats being brought to the Ucluelet area. In 1900, gold was discovered in the beach sands of Wreck Beach (Florencia Bay) and started Ucluelet's roller-coaster ride as a boom-and-bust resource town. Miners were plagued by the heavy storms and scarcity of gold. Fur trading was still an important activity but was secondary to fishing. In the 1930s, salmon prices collapsed and the town's economy reeled. A seaplane base was an important component of the local economy during World War II but when the war ended, the base's activity decreased. Fishing rebounded during the 1940s but by the advent of the 1950s, logging had begun to dominate the local economy¹.

In the 1960s, the Brynnor Iron Mine was established just outside Ucluelet but operated only until 1966. Logging and forestry continued to develop from the 1960s through to the 90s. Commercial fishing collapsed in the 1990s, halving the number of jobs in that industry. Following Tofino's lead, Ucluelet began to pursue economic opportunities in the tourism and outdoor recreation industries¹. The hope is that these industries will endure, along with revitalized fishing and forest industries.

Ucluelet has experienced the same transportation and access challenges, as did Tofino. Both communities were involved in lobbying for the highway, and at one point in 1948, merged their chambers of commerce into one lobbying entity.

2.3.3 Infrastructure Development – Transportation

Given the location and isolation of the Clayoquot Sound area, transportation has been vitally important to the area from the earliest contact days to the present. Access was difficult and for many centuries was restricted to primarily water travel, with some overland travel from the interior of Vancouver Island. Transportation challenges have influenced a number of activities and processes in the Clayoquot Sound area, not the least of which are: colonization and settlement, lifestyles, local and regional governance, economic development and diversification, trade and export, harvesting and utilization of natural resources, infrastructure development, community establishment and growth, and community services.

Water

For thousands of years, First Nations traveled the immediate area within and around their territories and beyond their territories by water. The sturdy, sometimes very elaborate, dugout canoes were used for the many basic transportation needs: e.g., seasonal community relocation, family visiting, fishing, whaling, sealing, trading, community defense, waging war, and exploring. A landscape divided by inlets and choked with vegetation made it nearly impossible for the First Peoples to travel any significant distance on foot. For the first 100 years post-contact, the primary non-First-Nations boats encountered were the trading schooners.

Near the end of the 1800s, steam-powered boats began to appear on the West Coast of Vancouver Island. Vessels, such as the sidewheeler, Maude, and the steamships, Willapa, Queen City, and Tees, were some of the first steamships operated on the west coast⁷. In 1912, the Canadian Pacific Steamship's Princess Maquinna arrived on the scene and remained in service on the West Coast for many years. It became the main social contact with the outside world, and their only means of delivering mail and supplies to the outlying settlements. By 1928, Canadian Pacific Steamships had a second vessel, the Princess Norah, built especially for the West Coast service. The Princess Norah operated alternatively with the Princess Maquinna, thus reducing the time interval between runs from ten days to five.

Transportation service by water increased during the first half of the 1900s, with technological advances made during the world wars contributing to the development of better and safer modes of water transportation. While water transport is still vital to the area, much of the supply and communications functions were taken over by the highway-based travel, which began, in the late 1950s with the completion of the highway⁷.

Land

Tofino and Ucluelet were promised for well over half a century that a road would be built connecting them to Port Alberni and the rest of Vancouver Island. Federal and provincial politics intervened on several occasions and the road was not completed.

One of the bigger stumbling blocks seems to have been the initial designation of Tofino as the western end of the Trans Canada Highway. Provincial and municipal politicians in Victoria lobbied very hard for Victoria to be the western terminus and were ultimately successful.

In October 1954, an historic agreement was completed through which MacMillan Bloedel Limited and British Columbia Forest Products Limited, as a condition for being awarded Tree Farm Licenses, would undertake to build portions (and connect with previously-built logging roads) of the road to the west coast of the Island. The road was to remain a private industrial road with limited public access and utilization for ten years, at which point the road would be turned over to the provincial government as a public road. The road was completed in 1959. The highway was designated as Highway BC No. 4 and was paved in its entire length in 1972 after considerable reconstruction at both ends⁷.

Air

In 1946, with the sudden availability of war-surplus aircraft Queen Charlotte Airlines was established to provide service to points along the West Coast of British Columbia⁷. Such services included installing radio-phones at logging, mining and fishing camps all along the coast, bringing in supplies and small equipment and transporting workers. Passenger service was provided on floatplanes up and down the coast, and regular planes provided direct service between Tofino Airport and Vancouver, for example.

There was a Royal Canadian Air Force unit located at Ucluelet in 1939, with two seaplanes operating out of this base. After the attack on Pearl Harbour, the Canadian Government decided that an airport was required immediately and would be located at Long Beach. By 1943, the airport was completed, replete with runways 1,800 meters in length, two large hangars, a control tower, living quarters for married personnel, coal-fired central heating plants, a water supply from Kootowis Creek, a diesel power plant, and all the other facilities required to establish and operate a permanent airport and training facility⁷. The airport was deactivated at the end of World War II, although the runways remain, and many buildings remain intact.

The initiation of the Cold War in the 1950s led to the reactivation of the Tofino airport as part of the Distant Early Warning System. Radar installations were installed west of the airport, the airport facilities were rehabilitated, and an RCAF unit was re-established at the airport. The radar installations and the airport were declared surplus and closed as a military establishment in 1957. Many of the airport buildings and building materials were used contributed to the building boom in Tofino in the later 1950s⁷.

2.3.4 Community and Regional Economic Development and Diversification

Economic development and diversification in the Clayoquot Sound area has involved a number of different industry and business activities but it has had a boom-and-bust history. All of the major primary industries have focused on natural resources, predominantly renewable resources but some non-renewable.

Logging and Sawmilling

The utilization of trees in Clayoquot Sound has a long history, from the single tree utilization by the First Peoples for thousands of years to the intensive utilization of forest management during the boom years (1960's through 80s) to the variable retention harvesting currently being employed. Records show that the earliest mill in the Clayoquot area may have been a steam-operated mill built in Grice Bay in 1899⁷. A somewhat larger steam- and water-powered mill was built at Quait Bay between Cypress Bay and Bedwell Sound at about the same time. A much bigger mill was built at Mosquito Creek during the mid-1890s. This was the largest mill of its kind on the Pacific Coast at the time but did not prove to be profitable, despite large timber leases in the Kennedy Lake area, a deep harbour to accommodate ocean-going freighters, and abundance of timber readily accessible from the water. Poor management and the daunting geographical and climatic challenges of establishing an industry on the West Coast seem to have been the reasons for this failure. The Mosquito Harbour mill was, however, kept in good repair for a number of years after it was built.

After the closing of the Mosquito Harbour mill, there was little logging and sawmilling in the area. There was, however, the first discussion of building and operating a pulp mill in the area to take advantage of the abundance of western hemlock. This plan would have required a fifty-foot high dam at Kenn Falls on Kennedy River. The area around Kennedy Lake would have been logged before the flooding. There was also a plan to build a cedar mill in conjunction with the pulp mill. These plans were held in abeyance because of economic conditions and World Wars I and II.

Up to the end of World War II, there had been limited small-scale logging activity in Clayoquot Sound, probably for two main reasons: lack of Douglas-fir (the preferred species at the time), and lack of overland access. But by the early 1950s, all species of timber were in demand and the development of sea-going barges for transporting logs made logging in remote areas more feasible. Two larger companies, North Coast Timber Ltd. and Alaska Pine Ltd., began logging operations at various points around Clayoquot Sound. Knott Brothers Ltd., C & B Logging, and Taylor Way Logging were smaller operators in the area as well. All of these operations had one thing in common, the difficulty in obtaining timber leases or cutting rights. This led to the departure of the North Coast Timber and Alaska Pine, but the other, smaller operators kept going.

The election of W.A.C. Bennett's government in 1952 resulted in important changes to the forest industry. As an inducement to the construction and expansion of the pulp and paper industry, and as an incentive for timber companies to replant forests for 'sustained yield' operations, the government made provisions for the granting of Tree Farm Licenses (TFLs)⁷.

Two major companies applied for TFLs in the area between Barkley Sound and Clayoquot Sound: they were MacMillan Bloedel Ltd. (MB) and BC Forest Products Ltd. (BCFP). MB was firmly established in the Alberni Valley, and had bought the North Coast Timber and Sutton Lumber and Trading Company holdings at Kennedy Lake and on Meares Island. BCFP had no timber holdings in the area, and was a new company. Its application was in opposition to a large tract of timber that had been proposed as a 'Public Working Circle' for smaller logging companies. There was considerable small company and community opposition to the BCFP proposal, but some intensive lobbying and a promise to build the road from Port Alberni, resulted in community support for their application, which was ultimately approved. Thus, a significant era began on the BC Coast. Despite the advent of the TFLs, logging operations in the Clayoquot Sound area was undertaken primarily by the 'gyppos,' or the small independent operators throughout the 1950s.

During the 1960s and 1970s, logging became the major industry in Clayoquot Sound, with early camps and operations at or near Hecate Bay, Cypre River, Herbert Inlet, Rankin Cove, Tranquil Creek, Warn Bay, Bulson Creek, and Stewardson Inlet. In the early 1980s, logging operations were expanding rapidly throughout the Cypre Valley, Herbert Inlet, Bedwell Sound, Tofino Inlet, Tranquil Creek and Warn Bay. But, logging was beginning to come under attack, however, from environmental groups, and the Clayoquot Sound protest had begun.

Table 1 gives an indication of the proportion of the local workforce employed by the forest industry in 2001. The proportions of logging- and forestry-based employment in Ucluelet (10%) and Tofino (4%) in 2001 were about the same as in 1996⁸. Similar data for earlier years were not readily accessible however it can be assumed that the percentages were much higher as the major forest companies in the Tofino - Ucluelet area (BCFP and MB) employed 350 to 400 loggers in the 1980s and early 1990s.

Table 1. Labour force by industry in Tofino and Ucluelet, 2001.¹²

TYPE OF INDUSTRY	UCLUELET	TOFINO
Agriculture, food and beverage products	0	75
Fishing and fish processing	110	60
Logging and forestry, manufacturing	100	40
Non-resource-based manufacturing	10	10
Construction	45	60
Transportation, storage and utilities	55	55
Business, professional, related services	100	40
Information, entertainment, other services	95	80
Wholesale and retail trade	125	135
Finance, insurance and real estate	25	15
Accommodation and food	185	305
Education, health, public administration	105	150
Mining, oil, gas extraction and processing	10	0
Total employment	960	1,005

In September 2004, Ucluelet was invited to apply for a Community Forest License to harvest 25,000 m³ of fibre annually. Once this is secured, the community hopes to partner with local First Nations and possibly others to create a joint partnership which could see an annual cut of 75,000 m³, and result in an estimated 75 direct jobs and 240 indirect jobs. Land use strategies in this initiative will include incorporating forestry activities, recreation activities, tourism, and other non-forestry related activities such as hydro-electric generation.

Fishing

Utilization of fish (principally salmon) and aquatic mammals is part of centuries-old First Nations traditions. Harvesting was primarily for community and family consumption, with surpluses available for trading with neighbouring tribes. Salmon were caught in nets or weirs in the creeks and rivers when they returned to freshwater to spawn. Herring, halibut and dogfish were caught at sea. Oil derived from the dogfish was a vital domestic and trade commodity. It was used for food, medicine and cosmetics, and greasing skid logs.

In the period after contact, some aboriginal people were employed on fishing boats providing fish for the canneries which were eventually built, and some (primarily women) were employed in the canneries. Also, Chinese labour was employed, on a seasonal basis, by the Clayoquot Sound Canning Company at Kenn Falls, and by other canneries along the coast⁷.

¹² BCStats – <http://www.bcstats.gov.bc.ca>.

Of the early settlers, most of the men engaged in fishing were the Norwegians. It was the Norwegians' knowledge of the meat and fish preservation process by salting, including how to make the barrels in which to pack the salt fish that was the basis of an early fishing industry in Clayoquot Sound – processing fish for export to the Hawaiian Islands and the Orient⁷. This industry flourished until the building of the canneries early in the 1900s.

In the early days, hand-lining or trolling for salmon was primarily a recreational activity. Salmon trolling did not become a commercial enterprise until the Japanese fishermen began to arrive in the Clayoquot Sound areas in the early 1920s. There were about 30 families in the area and about the same number of Japanese trolling boats, as each family required a boat for their livelihood. Each also required a fishing license, which was quite restrictive in that only existing licenses could be passed on from father to son or to newcomers; i.e., no new licenses were available⁷.

As time went on, the Japanese fishermen developed and built better, safer boats and equipment, and better fishing methods and gear types. The Japanese fishermen can be credited with much of the evolution of the commercial salmon trolling industry on the Pacific Coast of Canada⁷. They formulated their own fishing cooperative association to market their fish. All of this came to an end when the Japanese were interred after the attack on Pearl Harbour, and their assets taken from them.

During the 1920s, a pilchard fishing and processing industry developed in the Clayoquot Sound area⁷. The main product marketed from this industry was oil. Several pilchard reduction plants were built in the Sound area, with the pilchards being harvested in the inlets in the summer months with the salmon seine nets and boats. Large scows and tugs were used to haul the fish to the processing plants. The vast schools of mature pilchards have since disappeared from their traditional areas in the inlets. Offshore fishing for pilchards required much larger vessels capable of operating on open waters and carrying huge loads of fish to far-off points. This resulted in the end of the processing industry in the Sound area but Tofino continued to reap some economic benefit from the pilchard fishing boats calling in for fuel and supplies.

The salmon trolling industry flourished and Tofino became a well-established fishing centre. Near the end of the 1950s, Tofino had constructed a major boat harbour to attract the bulk of the salmon trolling industry. The breakwater was completed in 1960. It has been estimated that, at the heyday of the salmon trolling industry, there were 400 boats working out of the Tofino Harbour⁷. At about this time, the road to Port Alberni was completed and had a major impact

on the fishing industry. Fishermen could now drive home during slack fishing times, and trucking fish out of the area now became an option. This led to diversification of the industries involved: fish-buying stations or camps with ice-making equipment. Also, the variety of species of fish being caught by the trollers was increasing, with coho and sockeye salmon constituting the bulk of the catch.

Fishing has and will continue to contribute to the economy in Clayoquot Sound.



Fishing continued to be the major industry on the Tofino-Clayoquot area during the 1970s. It appeared at the time that Tofino and Ucluelet might become the major fishing ports on the BC coast. A number of fish processing plants were built in the area and were operated primarily by local residents. The utilization of other fish and seafood products was increasing beyond salmon, halibut, pilchards and herring, which were the industry mainstays. Several attempts at processing and marketing shellfish were not successful for any length of time. The roe-herring fishery developed into a major industry in the area.

The major processing and packing companies were reluctant to relocate any operations entirely to the Tofino-Ucluelet area to avoid negatively impacting the flow of fish to the mainland plants. Eventually, set backs within the fishing industry, including collapsed stocks and markets, caused a major decline in fishing activity in Clayoquot Sound. Fish farming emerged as a major industry in Clayoquot Sound in the late 1980s.

While the wild fishery and fish processing are not the large components of the local economy they once were, there are still communities where the fishery and related manufacturing activities are important to the local economy. Port Alberni, Ahousaht, and Ucluelet are still thought of by many as fishing towns.

However, Ucluelet has been hard hit by the decline in the fish-processing sector, with three processing plants, which in the early 1990s ran 24-hour shifts during peak summer and autumn fishing seasons, now sitting idle most of the year. At least half of a processing workforce has relocated or moved on to other employment. Fishing infrastructure, including docks, vessels, off-loading facilities, icehouses and net lofts, remain in the communities as valuable and under-utilized assets. Most of the fish caught in West Coast waters are now

processed in Vancouver. The last wild fish processing plant in Tofino shut down in 2005, prompting concerns about the loss of economic diversity.

While commercial fishing is still the fourth largest primary industry in BC after forestry, mining and agriculture, the harvest of farmed salmon now exceeds the wild salmon harvest (Table 2) in harvest quantity and value, and in the wholesale value of processed products. Clayoquot Sound is one of three primary areas for wild salmon production in BC⁸. The industry is becoming increasingly integrated, with hatcheries, grow-out, processing and marketing operations.

Table 2. The value of the wild fishery and aquaculture harvests in BC in 2003.

WILD FISHERY		AQUACULTURE	
Species	Value (\$M)	Species	Value (\$M)
Wild salmon	48.1	Atlantic Salmon	212.9
Herring	45.5	Chinook Salmon	36.8
Groundfish	135.6	Coho and Other ¹	6.1
Wild Shellfish	119.3	Oysters	7.6
Tuna and Other	16.1	Clams	7.6
		Scallops and Mussels	0.7
<i>Total Value</i>	354.6	<i>Total Value</i>	271.7

¹ Includes sockeye salmon, marine trout, and sablefish.

As of 2001, the number of workers employed by the fishing and fish processing industries in Tofino and Ucluelet, respectively, was approximately 60 (6% of local workforce) and 110 (11.5%).⁸ The Clayoquot communities have only a small remnant (estimated to be in the 30-50 range) of the commercial fishing fleet reputed to number about 450 to 500 in the 1970s and 1980s.⁸ The Ahousaht have seen the number of their seine boats diminish to between 6 and 8 from 40 since the 1980s. About 10% (70) of the Ahousaht community now works in the aquaculture industry.

Despite the decline in fish-processing, however, fishing remains an important industry.¹³ Ucluelet provides a number of support services for the West Coast fishing fleet, which attracts non-resident fishers to the community for fish processing, repairs, to refueling, and purchasing supplies. At peak season in 2004, 21 vessels were fishing salmon, 44 fishing tuna, and 22 fishing both tuna and salmon; also present were 18 dragging vessels and 30 gear-type vessels. In addition, recreation/sport fishing has become a major tourism driver and recreational opportunity for visitors and residents alike.

Machine Shop and Boat Works

It is not surprising that, in an area so reliant on water-based transportation and water-based industries, a boat building and machine shop industry has developed. Most of the early boats were fishing boats but others were built to service other

¹³ District of Ucluelet. 2005. Municipal information. Unpublished summary of local economy.

industries, such as logging. The largest employer in Tofino after World War I was the Tofino Machine Shop and Boat Works⁶. This operation had facilities for hauling boats out of the water for overhaul and repair, including engine work. Restrictions on the utilization of labour and materials for non-military purposes limited the development and expansion of this industry during World War II.

Mining

In the late 1890s, 46% of the adult white males were miners or prospectors⁷. Some local residents believed that, because of the geography of the western half of Vancouver Island, the area was an “El Dorado” for precious metals⁷, and that Clayoquot would become a “western port of great importance.”⁷ While neither of these predictions has yet to come true, the “first mining boom”⁷ which occurred in the 1890s and early 1900s, did indicate some promising prospects, some of which resulted in workable and profitable claims, particularly for gold. But there was no boom.

The first major discovery was the Privateer gold vein at Zeballos farther up the coast. This led to a significant increase in economic activity on the West Coast, some of which benefited the Tofino-Clayoquot area directly. Other than this venture, the mining industry during the first four decades of 1900 was a series of “...failed expectations.”⁷ (p. 29), with mineral exploration continuing to boom and wane over the next 40 years. The biggest difficulties seemed to be finding rich mineral deposits and rich investors willing to capitalize such projects sufficiently.

Farming

While farming was an occupation (or pre-occupation) for the early settlers to provide food for their families and communities, farming has never become a major industry in Clayoquot, despite the amenable climate. Today, gardening is an activity of some individuals or families, with some marketing of the produce.

Tourism

Tourism is viewed by some as the industry of the future for Clayoquot Sound. Given the natural beauty, ready access, the heritage, and the history, one can conclude that the recreation and tourism industries will be a major part of the local economy. Tourism was slow to develop as an important industry in the area – in fact many people did not believe that it ever would.⁷ While the new highway was opened in 1959 and paved in 1972, auto travel to Tofino was an adventure (and many times a mis-adventure).

The first major step towards a tourism industry was a proposal by the Tofino Chamber of Commerce in 1964 to have Long Beach designated a national park⁷. Long Beach itself was considered too small for a national park so the Broken Group Islands and the West Coast Trail were added to the proposal for Pacific

Rim National Park Reserve. The park was officially dedicated on May 4, 1971 at Long Beach. At the time of park establishment, all privately-owned property, except the Wickaninish Inn) was expropriated. Access roads onto the beach remained open and there were no restrictions on driving or camping on the beach. After a major conflict on the holiday weekend in May 1973, Parks Canada closed the beach to traffic and camping, and began a program of construction of off-beach parking and camping facilities.

While Pacific Rim National Park Reserve was the main tourist attraction in the 1970s, other developments were happening. Parks Canada closed Wickaninish Inn in November 1977, with plans to tear it down and replace it with a Parks Canada interpretative centre and restaurant. Surfers, kayakers, off-shore campers, whale-watchers, and wilderness explorers started to frequent the area in large numbers, and the development of a diverse tourism industry was underway. Today, tourism is one of the mainstays of the Tofino economy, with the area being developed as a year-round destination for tourists, eco-tourists, and recreationists alike. Following Tofino's lead, Ucluelet began to pursue economic opportunities in the tourism and outdoor recreation industries¹, with the same year-round goal in mind. The hope is that these industries will endure. In Ucluelet, as of 2004, the tourism industry is the fastest growing sector⁸. Ucluelet is embracing sustainable tourism development strategies to ensure the long-term prosperity of its tourism sector.

Table 3 indicates the overall impact of the tourism industry on the BC economy. In comparison, export revenues for the wood products industries in BC totaled \$14 billion, and GDP contributions amounted to \$8.2 billion for the same year.

Table 3. The contributions of the tourism industry to the BC economy in 2001.⁸

TOURISM IN BC	VALUE OF ALL TOURISM (\$B)	VALUE OF NATURE-BASED TOURISM(\$B)
Gross Revenues	9.2	1.55
Contribution to Gross Domestic Product	5.0	0.78
Export Revenues	4.0	
Wages and Salaries to Employees	3.2	
Contribution to Provincial Treasury	0.2	0.2

There are limited tourism industry data available specifically for the Clayoquot Sound area. In 2003, the annual room revenue (hotels, motels, vacation rentals) alone for the Clayoquot area was approximately \$31 million⁸. Add to this the revenues for transportation and warehousing services, retail trade, food services, travel arrangement services, and recreational services and the tourism/recreation industries are significant components of the Ucluelet and Tofino economies.

The nature-based tourism industry is growing dramatically in BC and comprises a significant piece of the tourism puzzle (Table 3). Twenty-seven percent of such businesses are located on Vancouver Island, Victoria and Gulf Islands, and another 25% in the Vancouver, Coast and Mountains area. According to 2001 data, nature-based tourism businesses generated \$632 per client-day.

Revenues from nature-based tourism appear to be growing, and Interfor recognizes its importance to local communities. However, the long-term economic and social sustainability of the area will depend on maintaining a diversified economic base. While tourism should continue to be encouraged as a source of revenue, it is necessary to recognize the role of primary industry in continuing to support the local economy.

2.4 The Evolution of Forest Tenures in British Columbia

In the last decades of the eighteenth century and the first part of the nineteenth century, the logging industry in BC was peripherally engaged in supplying the British Admiralty with timbers for ship construction and maintenance, especially around the Pacific Ocean. Although a few sawmills were built in the 1850s and 1860s, large-scale utilization of BC's forests had to wait for the arrival of the Canadian Pacific Railroad in 1886 and the opening of the Panama Canal in 1914. The challenge of distance declined in the twentieth century but linking remote timber supplies to distant markets has remained a challenge. Reliance on distant markets has revealed the close ties of BC's forest economy to the short- and long-term rhythms of global industrial transformation, and regulation of the forest sector in BC has been a political challenge throughout the twentieth century and into the twenty-first.

Life in general, and resource utilization in particular, were unregulated on Vancouver Island throughout the first half of the 1800s. That began to change when BC became a Crown Colony in 1858, and when Vancouver Island was included in the Crown Colony of BC in 1867. In 1865, the Land Ordinance Act passed; this act authorized the sale of timber on forest land to be sold for one dollar an acre. The low price led to a 'cut and run' mentality. Because of this, in 1896, the sale of timberland was forbidden, and land remained as Crown land in BC.

Some of the significant milestones in the evolution of forest tenures in BC include:
1906 - Timber Manufacturing Act required that all timber cut on Crown land had to be manufactured in the province

1901 – pulp leases granted as a timber lease to pulp mills

1906 – pulp leases discontinued

1904-1907 – frenzied timber staking; 15,000 claims in BC, most on the coast

1907 – first Royal Commission of Inquiry into Forest Resources (Fulton Report).

The Fulton Report recognized the need for a good inventory of timber and

its value, and stressed strongly that sustained yield was not possible until old-growth was replaced by vigorous young forests. Also, the Fulton Report recommended that:

- Forest revenue be treated as capital which should be used to manage fire protection, conservation, and the replanting of areas not quickly stocked by natural regeneration; recommendation never accepted;
- Future governments should not set leases, license fees, and royalties for terms longer than one calendar year so that they could be changed without restrictions or limitations.

1912 – Forest Act passed; Timber Licenses (TLs) created; the BC Forest Service determined the minimum asking price for any particular tract of forest; advertisements would then be placed in newspapers and tenders would be called to establish the successful applicant; this system was ultimately abused by people who would bid successfully but had no intention of cutting the trees themselves; they would extort the highest payments from companies who badly needed the timber

1945 – The royal commission by Chief Justice Gordon Sloan posed the basic question: Can we continue to follow a system of unrestrained and unregulated forest exploitation, regarding the forest as a mine to be exhausted of its wealth, or must we move to a system based on the concept of sustained yield in which the forest was to be considered as a perpetually renewable asset? Sloan defined sustained yield as: “a perpetual yield of wood of commercially usable quality from regional areas in yearly or periodic quantities of equal or increasing volume.”¹⁴ Sloan recommended:

- The appointment of a Forest Commission to formulate and administer a long-term system of planned forest management and industry regulations; the Commission would have authority to assess and collect taxes from industry, and would have jurisdiction over all forest users;
- Creation of Forest Management Licenses, which later became Tree Farm Licenses, which could be granted without competition or cost; the licensees were required, by the terms of the licenses, to maintain an adequately stocked growing crop; any lands which fell below minimum stocking standards (including NSR lands) must be reforested by the licensee to the satisfaction of the Minister of Forests. Unfortunately, the early provisions of the Forest Management Licenses were not well-enforced and vast NSR areas resulted.

1947- the revised Forest Act was passed and revolutionized the industry by creating the Forest Management Licenses. In return for ensuring maximum growth of timber in a TFL, the company was assured by government of and economical and continuing wood supply, leading to greater stability in the

¹⁴ Delhert, L.H. 1998. Sustained yield: why has it failed to achieve sustainability? In: Tollefson, C. (ed.), *The wealth of forests: markets, regulation, and sustainable forestry*. UBC Press, Vancouver, BC. pp. 255-277.

industry. This gave impetus to integrated ownerships of mills, timber reserves, and logging camps.

- 1955 – the second royal commission by Chief Justice Gordon Sloan continued to support the TFL system, and recognized that active competition throughout the forest industry (including the independent loggers) was the best way to properly reflect the true value of the forests for stumpage purposes. Sloan was harshly critical of the preponderance of NSR lands, particularly those lands cut under timber sales with no legal obligation of the companies to reforest. He also stressed strongly that sustained yield was not possible until old-growth was replaced by vigorous young forests and protected from fire and pests. Sloan recommended that all cut-over forest land must be reforested.
- 1957 - government changed the terms of the TFLs, granting them on a renewable twenty-one lease instead of in perpetuity. The licensee had to replant, guard against fire, and restrict harvest to the sustained yield capacity of the land. Upon harvesting, the company was required to pay a fixed price for the government timber (stumpage), which was to be set by formula annually. The government provided incentives for long-term planning.
- 1976 – report from the Pearse Royal Commission. The provincial government was concerned about the unevenness of forest management in TFLs and Public Sustained Yield Units (PSYUs), and about the corporate concentration of harvesting rights. The Pearse Commission stimulated better forest management, most obviously in the effective stocking of logged-over land. It also recommended liquidation of Timber Licenses (TLs) to regain Crown control and generate revenue. This development created deadlines for logging of TL parcels, resulting in excessively large harvested areas that conformed to administrative boundaries rather than topographic or watershed ones.
- 1978-a revised Forest Act, which included Pearse’s main recommendations, was passed. The Act harmonized the TFLs and replaced the quota system used to allocate wood from the PSYUs by a new form of harvesting license, the forest license (FL), which provided licencees with stronger entitlements to wood and greater forest management responsibilities. In addition, the new policy provided wood fibre to small- and medium-sized enterprises (SMEs), simultaneously revealing the government power to change timber licenses which critics had suggested were de facto ‘in perpetuity arrangements’ which favoured large corporations. SMEs which qualified for the new Small Business Forest Enterprise Program (SBFEP) were allowed to obtain a timber sale license by bidding on timber made available from the non-quota wood in the old PSYUs.
Expiry dates were placed on Timber Licenses (TLs) to force the harvest so they could be returned to managed forest land (TSA or TFL) and contribute to the annual allowable cuts. This change had a significant influence on

harvesting schedules in Clayoquot Sound, which included large areas of TFLs (in, for example, Hesquiat, Kanim, Hot Springs, and Atleo River). Many of these areas had TFL expiry dates in the early 1990s, which resulted in an accelerated rate of logging. In this way the forest management decisions of decades (if not a century ago) are still influencing the area today. In recent years the Government has reconsidered the expiry dates and is allowing companies to apply for extensions but eventually all TFLs must be harvested or returned to the Crown.

1980-BC's forest economy was shaken to its core by the deepest recession since the 1930s. This recession saw severe financial losses, job losses, a stimulation of American protectionism against BC lumber production, and modifications to BC's forest policies, which infuriated environmentalists. The basis cause of this recession was market-driven¹⁵; processing over-capacity existed, and global demands declined alarmingly. At the same time, technological change, especially that driven by information technology, was changing production methods, work organization, and market opportunities. On the basis that stumpage in Canada was so low as to constitute a subsidy; American lumber producers commenced protectionist actions against Canadian lumber that persist today.

1980-falldown effects had emerged as an issue in the BC Ministry of Forests. The Ministry's 1984 Forest and Range Resource Analysis stated that harvests will decline at some future date because of falldown, and that past estimates of the Allowable Annual Cut (AAC) were high by assuming optimistic scenarios of continuing improvements in wood-utilization technology. For industry, the concerns expressed about falldown meant a reduced AAC at some future date; for environmentalists, these concerns provoked calls to preserve the remaining vestiges of old growth, and suggested the irrevocable loss of a wide range of ecological values.

Early 1980s-the Ministry of Forests introduced a policy of 'sympathetic administration' to allow companies leeway in meeting forest regulations. The discovery of this policy led to deepened environmentalist anger that resulted in the 'war of the woods' later in the 1980s.

1985-the five-year Canada-BC Forest Resource Development Agreement (FRDA) was established for the primary intention of addressing BC's burgeoning NSR land base, and investing in research and development.

1988-in response to American protectionism, the BC Government redirected five percent of the cut in TFLs to SBFEP, and introduced higher stumpage and a new way of stumpage calculation (shifting from market-based to waterbed-based system).

1988-Department of Fisheries and Oceans, in conjunction with industry and Provincial agencies, introduce the Coast Fish-Forestry Guidelines, aimed at

¹⁵ Hayter, R. 2000. Flexible crossroads: the restructuring of British Columbia's forest economy. UBC Press, Vancouver, BC. 430 p.

- introducing consistent Coast-wide standards for logging practices that protect fish habitat.
- 1990-FRDA II introduced to continue provincial efforts at eliminating NSR lands. Research funding provided primarily for programs in silviculture, forest ecology, watershed management, alternative silviculture systems, fish-forestry interactions, and wildlife-forestry interactions.
- 1991-the report from the Peel Commission recommended a new policy of enhanced stewardship designed to obtain environmental as well as economic values from provincial forests. This recommendation led to a number of forest policy initiatives in the 1990s, and the introduction of 'super stumpage'.
- 1991-the Provincial Government passes Bill 13 to protect and entrench the rights of logging contractors working for major tenure-holders. Logging costs begin to increase.
- 1993-Canada-BC Memorandum of Understanding. The BC Government agreed to begin resolve Aboriginal land claims.
- 1994-Forest Renewal BC (FRBC) was created and supported by revenues from super stumpage. FRBC had a broad mandate to invest in silviculture across BC, to assist forest-based communities, workers, companies, and other interest groups, and to fund research.
- 1995-the BC Forest Practices Code reformed forest practices in BC to meet more rigorous environmental standards: e.g., size of clearcuts restricted; continuous clear-cutting eliminated; wildlife, biotic, and aesthetic values included in forest plans.
- 1997-the Jobs Accord provided agreements-in-principle between government and industry to promote jobs, especially in smaller companies and in 'value-added' subsidies for new jobs provided.
- 2000-01-new BC Government eliminates Forest Renewal BC.
- 2004-BC Government replaces the Forest Practices Code with the Forest and Range Practices Act, which substantially streamlines the administrative procedures companies have to undertake to plan and implement their operations, promotes a results-based approach rather than a code/regulation-based approach; which places greater emphasis on professional accountability of resource managers, and which places a greater stewardship responsibility on the companies.

The early 2000s have seen an increasing discussion of diversification of tenure ownership, particularly with regard to the interests of communities, First Nations, and small forest companies. The concept of 'local control' has emerged. "The main reasons being espoused for local control appear to be⁹:

- Communities will have a stronger commitment to the sustainability of our forest resources;

- Greater involvement in decision-making, basing decisions on local priorities rather than the demands of distant markets
- Greater opportunities for reinforcement of local identities; and
- More meaningful resource stewardship.

A number of community forests have been established in BC but most seem to be modeled after more traditional approaches to forest management, and many are being managed primarily for generation of revenues. A true community forest, according to one definition,¹⁶ must have three characteristics:

- (1) It must include and respect the needs and integrity of the whole community, which means both the natural environment of which the community is an integral part, and future generations of the current population;
- (2) There must be a high degree of actual local control of political decision-making; thus, the central, provincial government would have more of a facilitative role; and
- (3) The local community must both derive the benefits and pay the costs of the exercise of this control.

The community forests in BC have different primary objectives. Some, like the community forests in Mission and Revelstoke are production-oriented. Others, such as the North Cowichan Community Forest, are still somewhat production-oriented in nature, but have greater emphasis on stewardship, non-timber forest values and uses, and community-based benefits.

In light of some of the recommendations of the Clayoquot Sound Scientific Panel with respect to meeting conservation goals, Interfor has introduced the concept of Community Cooperative Areas (CCA) to benefit local communities and First Nations in Clayoquot Sound. The CCAs accent: economic benefits, social benefits, cultural benefits, aesthetic benefits for recreation and tourism, non-timber forest product opportunities, environmental restoration and enhancement, long-term planning, and access development and management. It is Interfor's intent to implement the CCAs over a ten-year period (2002-2012).

¹⁶ M'Gonigle, M. 1998. Living communities in a living forest: towards an ecosystem-based structure of local tenure and management. In: Tollefson, C. (ed.), *The wealth of forests: markets, regulation, and sustainable forestry*. UBC Press, Vancouver, BC. pp. 153-185.

2.5 The Clayoquot Dispute

2.5.1 *The larger context: Forest Conservation*

Since the 1930's there has been a growing advocacy for protection of forests – slowly at first, but gaining momentum by the 1990s. Aldo Leopold, with his *Sand County Almanac* (1949), helped to generate a movement supporting conservation in land management. Rachel Carson's "Silent Spring" in the 1960s catapulted environmental protection to the forefront of the public mindset, although this focused on chemical contamination from industrial sources. In the 1970s resource depletion was a major theme (e.g.: the Club of Rome) triggered in part at least by sudden oil shocks. The forest conservation movement received a big boost in the 1980s with the publication of books such as "The Fragmented Forest" by Larry Harris.

With the rise of public consciousness about forest conservation, civil disobedience – in the form of protests and logging blockades - has emerged as an effective means of expression by the more passionate advocates. Protests in the 1970's called attention to the forest practices of the day (Mabee *et al.*, 2004). These gathered steam in the 1980's and were effective in drawing the public's attention to issues such as clearcutting and riparian protection. Government and industry responded with the first Coast Fish-Forest Guidelines in 1988. Despite significant changes, the 1990s saw a continued increase in the intensity of protest. By 1993, the largest public protests in Canadian history were successful in putting Clayoquot Sound on the front page of newspapers around the world. This publicity – along with other, more serious, criticisms of forest management – led to a desire by both senior governments to institute change.

Forest management in BC went through sweeping changes in the 1990s, as industry and government embraced conservation principles. These were reflected in sustainability commitments by the Canadian and BC Governments. Many companies – including Interfor – committed to higher environmental standards through certification.

The question was not whether forest areas should be protected, but how much should be protected. Under the Clayoquot Sound Land Use Decision, one third of the land area was designated for protection. On Vancouver Island, the area of protected area in Parks and Reserves doubled to nearly 13%, with an additional 8% falling in a Special Management Zone.

2.5.2 *People and Parks*

ENGOS and others have promoted the idea that the failure to protect large areas of forest gravely threatens the security of individuals, communities, and nations (e.g.: Mabee *et al.*, 2004).

The relationship between forest conservation and development was a key concept at the Earth Summit in Rio de Janeiro in 1992. A debate evolved about the opportunities to protect biodiversity and alleviate poverty at the same time. The concept was most applicable to parts of the world where biodiversity was rich and the local people poor (Christensen, 2004).

“Integrated Conservation and Development Projects” (ICDPs) were introduced in a paper entitled “People and Parks” (Wells and Brandon, 1992) at the Earth Summit. ICDPs were touted as “the only hope for breaking the destructive patterns of resource use by reducing poverty and improving income levels, nutrition, health care and education”

It was the Rio Summit concept of ICDPs that formed the foundation for the Clayoquot Sound Scientific Panel recommendations for the first application of ecosystem management in Canada (Mabee *et al.*, 2004).

The ICDP concept quickly came under criticism. Redford and Sanderson (1992) concluded: “Parks may be ecological islands, but they are part of the social and political mainland”. Brandon himself concluded that parks do not work in isolation (Brandon *et al.* 1998). Redford and Sanjayan (2003) stated “To change the fate of the world, conservation biology must provide scenarios balancing human well-being and a world rich in nature, as well as the scientific basis for making trade-offs”. And in 2003, indigenous groups threatened to interrupt the Worlds Parks Congress in Durban, South Africa to broadcast a simple message to the world that “parks and protected area are fundamentally incompatible with the rights and aspirations of impoverished local communities”(Christensen 2004).

Even though the World Wildlife Federation (WWF) continues to advocate to increase the total forest protected areas, a 2004 study of protected areas in 37 countries, concluded that there was a “depressingly consistent problem of failing to manage relations with people”(WWF, 2004). Their report concluded, “Problems are evident in term of effectively channelling the input of local communities and indigenous peoples and securing their voice and participation in management decisions”. (This finding parallels what has been experienced in Clayoquot, and highlights the importance of Interfor’s new public input process: see, for example the ‘Dot Process’ in section 4.2).

Christensen *et al.* (1996) concluded that ecosystem management focused primarily on the ecosystem while underemphasizing socio-economic implications of forest protection. Mabee *et al.* (2004), reviewing ecosystem management in British Columbia, emphasized that political, economic and cultural networks are also important components of ecosystem management. The Central Coast “Ecosystem Based Management Handbook” (Cardinal *et al.* 2004) does acknowledge the

importance of the social and economic components in managing ecosystems. Balancing social and economic goals, with sound ecosystem-based management, is fundamental to continued forest management in Clayoquot Sound. Recognizing this, Interfor has been promoting the concept of designated “Community Cooperative Areas”. This concept is discussed in greater detail in section 3.3.

The WWF report stated that the maintenance of the biodiversity and cultural values of protected areas depends on the “...support and goodwill of local communities, local governments, nearby commercial interests and, eventually, on the willingness of governments and taxpayers to shoulder the bills for protection”. This finding is borne out in Clayoquot Sound, where governments and taxpayers – as well as communities and industry – have shouldered a significant bill. Interfor continues to pay through increased operational costs.

The point of this discussion is to review the progression of ideas in the last two decades about forest conservation and sustainability. Many forest conservationists have recognized that decisions about forest protection are not just about biodiversity. Social and economic considerations must be given equal weight.

2.5.3 Clayoquot Sound

As logging activity increased in the Ucluelet-Kennedy Lake area through the 1970s and 80s, concerns were raised simultaneously about longer-term timber supply, as well as forest practices, including clearcutting, burning and road construction. Many perceived that such practices were inappropriate to the west coast environment. Objections were raised to the rate of cut in Clayoquot Sound. As noted above the policy of an expiry date on Timber Licenses caused an acceleration of harvesting in some areas.

Given its easy accessibility for protesters, its spectacular and diverse landscape, and its very high resource value, it is not surprising that Clayoquot Sound became the site of a show-down of international proportions. A brief litany of milestone events in the Clayoquot protest is as follows:

- 1978 – Nuuchahnulth Tribal Council asked that the declining employment of First Nations in the forest sector and the damage poor logging practices were causing to fisheries and other resources be addressed.
- 1979 – Friends of Clayoquot Sound was founded and the campaign to protect the Tofino water supply on Meares Island from logging by MacMillan Bloedel commences.
- 1980’s – the “War in the Woods” begins with several non-profit societies, First Nations, environmental groups, and concerned citizens banding together to protest logging in Clayoquot Sound.

- 1984/85 – Friends of Clayoquot Sound (FOCS) and First Nations blockade MacMillan Bloedel from logging Meares Island. MB turned away and a First Nations' court injunction was granted, and logging was suspended.
- 1988 – Blockades were set up at Sulphur Pass, several people arrested, road construction voluntarily suspended by Fletcher Challenge Canada Ltd. (the successor to BC Forest Products Ltd.)
- 1989 – Clayoquot Sound Sustainable Development Task Force was set up by the BC Government, and eventually failed due to disagreements over interim logging and representation at the table.
- 1990 – BC Government established the Clayoquot Sound Sustainable Development Strategy Steering Committee. Environmental Groups walked out following the decision to approve interim logging.
- 1991 – BC Government instructed the Commission on Resources and Environment (CORE) to develop a comprehensive land use plan for Vancouver Island but excluding Clayoquot Sound.
- 1992 – Blockade set up at Clayoquot Arm Bridge of Kennedy Lake and arrests follow.
- 1993 – The CORE Steering Committee failed to reach full agreement on areas to be protected. BC Government announced the Clayoquot Land Use Decision. Opposition to logging in Clayoquot Sound led to widespread civil disobedience and the arrest of over 800 people for blockading logging operations. Government of BC introduced new strategy to resolve the issues creating a special panel of scientists and First Nations representatives charged with the mandate of making recommendations on special forest practices appropriate to Clayoquot Sound.
- 1994 – An independent Scientific Panel on Sustainable Forest Practices in Clayoquot Sound drafted new rules for forest practices guided by ecosystem integrity. An historic two-year Interim Measures Agreement (IMA) between provincial government and the five First Nations of the Nuu-Chah-Nulth Central Region was signed.
- 1995 – The provincial government adopts the Scientific Panel's recommendations.
- 1997 – MB turned over the Clayoquot segment of its Tree Farm License 44 to a new company, Iisaak Natural Resources Ltd, 51% of which is controlled by Central Region Nuu-Chah-Nulth First Nations.
- 2000 – Clayoquot Sound officially declared a World Biosphere Reserve by UNESCO.
- 2003 – the first three official Clayoquot Sound Watershed Plans were brought into effect, after being endorsed by the two parties of the Clayoquot Sound Interim Measures Extension Agreement.

2005 – Sustainable management practices continue with respect to the Scientific Panel's recommendations.

2.5.4 Recommendations of the Clayoquot Sound Scientific Panel

In 1995, the BC Government accepted all 120+ recommendations of the Clayoquot Sound Scientific Panel (Appendix 1). These recommendations called for, among other things, ecosystem-based forest management, the elimination of conventional clearcutting, the maintenance of biological diversity, and the inclusion of local and First Nations input in management decisions. In 1993, when the protests were at the peak, over 21% of Clayoquot's productive old-growth forest had already been cut. Today, in 2005, this figure has only marginally increased.

Industry has agreed to take an ecosystem-based management approach to logging and economic development. About 33% of the Sound is now protected in parks and protected areas; harvesting is less than 1,000 ha per year total in an area of around 265,000 ha (or less than 0.4% per year): more than half of the old growth is protected in park or Scientific Panel reserves; biodiversity is a management objective; special management areas protect other values; harvest levels and cut standards have been improved; and the local land-use process is utilized and respected.

2.6 Current and Emerging Social, Economic, and Environmental Issues

It is impossible for forest companies to operate outside of the public eye – it seems that all operations in coastal forests are under intense scrutiny locally, provincially, nationally and internationally. Sustainable forest management is widely espoused globally, and there appears to be a greater number of concerns (at least from the point-of-view of non-corporate sectors) emerging related to the social and environmental components of sustainable forest management. The voices of First Nations, resource-dependent communities, and other forest-resource based-industries, for example, are becoming stronger, and are asking for meaningful involvement in sustainable forest management planning and decisions, and for access to forest resources. Governments and the forest companies have the traditional concerns about the economic component of sustainable forest management, i.e., industry profitability and competitiveness, timber supplies and accessibility, jobs, operating costs, taxes and royalties, softwood tariffs and penalties, and are also dealing with environmental, social and cultural concerns.

Some of the specific issues currently emerging in the forest-resource sector in coastal BC include:

- Communities and First Nations are seeking more control over land- and resource-use decision-making;

- The provincial government is leaning toward more shared resource management responsibility; for example, sharing land and resource stewardship responsibilities with resource development companies;
- Coastal operating costs, particularly for log acquisition and labour, remain high;
- Employment in the coastal forest industry continues to decrease;
- The softwood disagreement with the United States has imposed severe economic hardship on the BC forest industry, particularly coastal companies;
- Logging in the Pacific rain forest remains in the international spotlight with environmental groups, consumer groups, and certification organizations;
- Traditional markets for BC wood products, and particularly coastal wood products, are shrinking because of increasing outputs of new competitors in the market place and increased production in the BC interior;
- There is increasing interest in developing value-added and non-timber forest product industries;
- There is increasing awareness on potential impacts on species at risk;-
- The threat of climate change has introduced a new element of uncertainty about long-term ecological effects;
- Concerns are being raised about the impacts of forest harvesting on the reduction in coastal stream flows, fish habitat, and fish populations.

As one reads through this list of issues, it is useful to reflect back on some of the historical context described throughout the majority of this chapter:

- There is a long history of economic activity in the Clayoquot Sound area, ranging from the bartering and trading undertaken for thousands of years by First Nations, to the boom years of the logging industry, to the emerging economic force of the tourism industry.
- Despite the extraordinary value in the diversity of the terrestrial resources in Clayoquot Sound, the marine and freshwater resources remain vital to living and working in this area.
- Natural resource use has varied in intensity, from the subsistence living needs of the First Nations to the intensive harvesting of the fur, fishing, whaling, and forest industries.
- The diversity and profitability of industries have been cyclical, emphasizing the risks of a single-industry economy and the need to have a variety and balance of industries.
- Global economics have played a substantive role in the 'boom and bust' nature of the resource industries on the west coast.

- The initial relationship between the Clayoquot First Nations and the western traders was, for the most part, friendly and cooperative. During the years of attempted assimilation and the dramatic population decline of the indigenous peoples, that relationship deteriorated. Currently, there is an emergent working relationship among First Nations, resource companies, and governments which can be best described as a 'work in progress,' and will undoubtedly lead to future partnerships bringing benefits to the communities and companies involved.
- Clayoquot Sound, with its impressive range of terrestrial, marine and freshwater resources, has international recognition and status.

We are in a position now, because of the history of Clayoquot Sound and the accomplishments of a number of communities, First Nations, organizations, institutions, and citizens, to ensure that Clayoquot becomes an enduring symbol of biological, economic and social diversity, collaboration and partnerships, sustainable resource management, sustainable and healthy communities, and sustainable industries, including a revitalized forest industry being managed to world-class standards.

3.0 PRESENT CONTEXT

3.1 Interfor in Clayoquot Sound

International Forest Products Limited (Interfor) is a publicly traded company on the Toronto Stock Exchange. The operation of TFL 54 represents approximately 2% of Interfor's current allowable annual cut (AAC) of 3.08 million cubic metres.

Tree Farm License 54 was transferred to Interfor on December 30, 1991. The license was obtained by an assignment of the former west coast portion of TFL 46 held by Fletcher Challenge Canada Limited.

Interfor's objective is to create an economically viable forestry operation while adhering to the recommendations of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, the community review in the form of the Central Region Board, and applicable Provincial and Federal legislation and regulations. Through these commitments, Interfor has shown a consistent willingness to comply with sustainable forest management principles in Clayoquot Sound.

The AAC set for Management Plan (MP) No. 1 for TFL 54 in 1991 was 180 000 m³. In May, 1994, the Chief Forester determined temporary AAC reductions totaling 42 000 m³ for the TFL under Part 15 of the *Forest Act* as an interim measure to account for protected areas and anticipated changes to management resulting from the Clayoquot Sound Land Use Decision (CSLUD). The resulting AAC of 138 000 m³ remained in effect until December 29, 1996 and included 129 009 m³ for the licensee and 8 991 m³ for the Small Business Forest Enterprise Program.

The AAC set for MP #2 for TFL 54 effective December 30, 1996 was 75 750 m³ and includes 66 759 m³ for the licensee and 8 991 m³ for the Small Business Forest Enterprise Program. This represents a decrease of 58 percent from the AAC of 180 000 m³ that was in effect before the CSLUD, or 45 percent from the AAC prior to MP #2 of 138 000 m³ which includes the Part 15 reduction.

During the period 1992 through 2005, a number of external factors have influenced harvesting opportunities on TFL 54, over and above the implementation of the Scientific Panel's recommendations. These include:

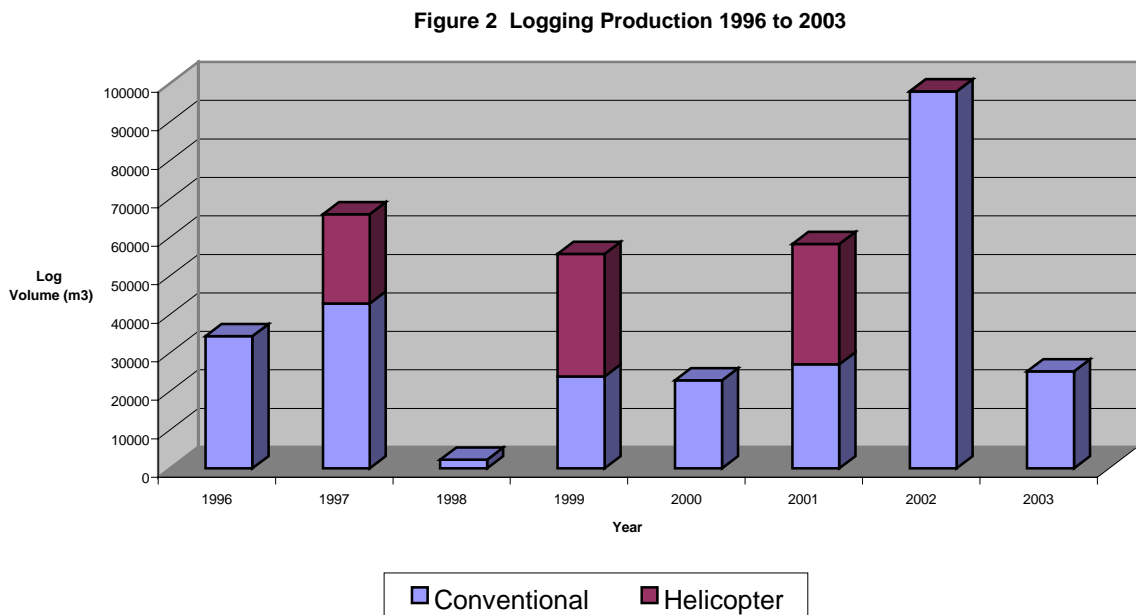
1. Clayoquot Sound Land Use Decision;
2. Interim Measures Agreement;
3. Central Region Board; and
4. Interim Measures Extension Agreement.

The implementation of these recommendations has created more complex planning and approval requirements, including inventory collection, data analysis, application

and referrals. The additional burden has resulted in substantial delays and extra costs to the company. In particular, slow progress in watershed planning was restricting harvesting options for Interfor. Worse, the bottlenecks resulted in a substantial volume of timber unavailable for harvest. The net result was an undercut of 228 635 m³ for the 1992 to 1996 cut control period. The annual harvest reached a low point in 1998 at approximately 2 200 m³, or less than 3% of the allowable cut. (The actual harvest in 1992 was 174 692 m³).

The Ministry of Forests acknowledged that the cumulative cost of these initiatives represented an extraordinary impact that was beyond the control of Interfor. Accordingly, the undercut volume of 203 871 m³ was granted to be made available for harvest under TFL 54 during the 1997 to 2001 five-year cut control period. However the majority of this volume was never fully realized.

Figure 2 shows the volumes logged during the period 1996 through to 2003. The spike in activity in 2002, when nearly 98 000 m³ were logged, represents the inclusion of some undercut volume from previous years, combined with a period of relatively strong log prices. Logging activity fell again in 2003, when the industry was adversely affected by softwood tariffs in the US and weak prices. An estimated 88 550 m³ was logged in 2004.



Although harvest levels from Interfor's West Coast Division have been low they have generated up to \$20 million in direct economic activity. Total employment generated by the West Coast Division has been as much as 600 jobs (including direct and indirect employment). Forestry has been, and hopefully will continue to be, one of the cornerstones of the local economy along with fishing and tourism. For TFL 54 alone the economic activity is up to \$6.6 million annually with a potential of approximately 300 direct and indirect jobs.

The radical changes wrought by the in the implementation of the Scientific Panels recommendations increased costs, as expected. Interfor, together with its main Bill 13 contractor, Alliford Bay Logging Ltd., applied for FRBC funding to assist in the transition to a post-Scientific Panel working environment. FRBC awarded a \$3M contract to assist in this transition (however, only \$1.8M was used). The funding included extensive training for logging and engineering personnel in VR harvesting and other new developments; including the completion of some initial interim watershed plans. Interfor successfully complied with the terms of this contract, which terminated in late 1999.

When this contract was completed, Interfor negotiated an agreement with the Ministry of Forests for an Appraisal Manual amendment that recognized the increased costs of operating under Scientific Panel rules. A "Clayoquot Stumpage Additive" was applied to help offset these increased costs and is available to all licensees operating in Clayoquot Sound. The additive was originally pegged at over \$19 per m³ in 2000 based on a cost survey conducted by the MOF Appraisal Branch. By 2005 this has been reduced by about one third (to \$13.05) reflecting lower costs as identified in recent cost surveys, and the sentiment by the Appraisal Branch that VR harvesting has ceased to be an exceptional harvesting method on the BC coast.

Costs continue to pose a problem in Clayoquot Sound. Interfor feels that the reduced Clayoquot Stumpage Additive does not fully recognize its costs in the Sound.

3.2 Working with Partners

Interfor does not work alone in Clayoquot Sound. In the post-Scientific Panel work environment, Interfor works closely with numerous partners. Under the *Forest Act*, Interfor is the licensed tenure-holder for TFL 54 and accordingly must conform to legislated requirements, which involves close participation with the BC Ministry of Forests, at both Regional and District levels. The relationship between the licensee and the MOF is changing as the province moves through the transition between the prescriptive framework of the Forest Practices Act (1994) to the more results-based framework of the Forest and Range Practices Act.

Through the period 1995 to 2005, Interfor has worked closely with the provincial government on resource inventories and planning initiatives. Early in the period, Interfor provided existing inventories (estimated value: \$1.2M) to the MOF at no cost. The MOF coordinated extensive inventories of vegetation, ecosystems, terrain, landslides, wildlife and cultural and visual resources. Interfor provided in-kind support for these activities, by supplying accommodation, data, analyses and transportation where possible.

Interfor collaborated with the Provincial Ministry of Environment, Lands and Parks (MOELP), then later with the Ministry of Sustainable Resource Management (MSRM) on planning initiatives. When watershed planning became bottlenecked in 1996-98, Interfor led the process and was responsible for the completion of interim plans, which established reserve areas and allowed certain logging activities to move ahead.

From the outset Interfor has cooperated with the Central Region Board (CRB), assisting with training, technical advice and in-kind support for local communities and First Nations.

A key set of recommendations of the Scientific Panel was to actively solicit public review and participation in the management and planning process. Interfor went over and above existing requirements for public participation as required for Forest Development Plan applications and other legislated standards. Through countless public workshops, meetings and events, Interfor sought to involve local communities in long-term planning, watershed planning, restoration activities, and other initiatives affecting recreation, tourism, and other activities in Clayoquot Sound. This topic is covered in more detail in section 3.8.

First Nations

Interfor understands the importance of active involvement and participation of First Nations in the management of TFL 54. The Scientific Panel made numerous explicit recommendations that suggested how First Nations should be involved with managing the forest resource. Many of the recommendations in the report fall under the aegis of the Provincial Government through the treaty process and are not the responsibility of Interfor. However, there is clearly an onus on Interfor to establish working relationships with First Nations – a responsibility it has taken seriously.

Towards that end, Interfor commits to respecting aboriginal interests in TFL 54. Interfor has hired First Nations on forestry, engineering, logging and silvicultural crews to the extent possible (given Bill 13 and Union agreement constraints). It has participated in the initiation, funding and implementation of training opportunities. Interfor has explored ways of effectively communicating planning decisions with First Nations.

Interfor consults First Nations in the management of cultural resources, using protocols developed through agreements with each Nation. Interfor considers First Nation advice, and is compliant with all relevant elements of the Heritage Conservation Act, and recommendations of the Scientific Panel.

Interfor's signed protocol with the Ahousaht First Nation serves as an example. On February 19, 1997 Interfor and the Ahousaht First Nation signed a working protocol to guide the planning process and the working relationship. The protocol reads as follows:

- Whereas the *Hawiih* of the Ahousaht First nations are prepared to work in their *Hah-bahoultee* with Interfor on all aspects of Interfor's activity in forestry.
- Whereas Interfor will work with the *Hawiih* of the Ahousaht First Nations within their *Hah-bahoultee*.
- Whereas this cooperative working relationship between Ahousaht First Nations and Interfor will focus primarily on forestry activity.
- The Ahousaht First Nations and Interfor will work with the Central Region Board by keeping them fully informed of all forestry planning, including Forest Renewal initiatives.
- Interfor respects the Provincial Government's and Central Region *Hawiih*'s establishment of the Central Region Board.
- Interfor respects the right of the Ahousaht First Nations to make decisions within their territory.
- Interfor will incorporate into its planning those recommendations of the Scientific Panel which have been approved by government for implementation.
- The Ahousaht First Nations and Interfor will work out plans to pursue opportunities for training of First Nations in all aspects of the planning process, both short and long term.
- Interfor will provide ample notice of work plans to Ahousaht First Nations in order to fully include Ahousaht in the planning process from the beginning. This will include on site work as well as preliminary discussions. This on site work will include opportunities for hiring personnel from Ahousaht to participate in forestry and engineering work with Interfor.
- Interfor will work with any professional foresters who may be hired from time to time by Ahousaht or the Central Region.
- Ahousaht will commit to providing a timely presence at all times throughout the whole planning process, including the newly hired employee plus the committee members from Ahousaht to ensure the timely approval of all permits and plans.

- Ahousaht will continue to work on educating Interfor on the *Hawiih* and their *Hah-bahoultee*.
- Interfor will educate the Ahousaht First Nations about Interfor structure, policies, practices and objectives, with emphasis on their decision and policy makers and their planning processes.
- Any forestry activity being planned in Ahousaht territory must provide for the protection of cultural history. This must include a workable process in dealing with CMTs, as referred to in the Interim Measures Extension Agreement¹⁷.
- Any forestry activity being planned in Ahousaht territory must provide for the protection of areas required for medicinal purposes, which includes herbs, plants, roots and bark. This information will be kept confidential and retained by the Ahousaht First Nations.
- Any forestry activity being planned in Ahousaht territory must provide for the protection of sacred and spiritual sites. This information will be kept confidential and retained by the Ahousaht First Nations.
- Any forestry activity being planned in Ahousaht territory must manage all streams at least to the level required by the new Forest Practices Code. Ahousaht Fisheries personnel will conduct stream classification with the assistance of the NTC regional biologist. Such classification will then be reviewed jointly with personnel from Interfor. It is the intention of the Ahousaht First Nations to rebuild all their streams in their territory, with the help and support of Interfor.
- Ahousaht and Interfor will work out a plan to hire Ahousaht First Nations members to work directly with their foresters for on-site work.
- Interfor will explore and implement where appropriate, along with Ahousaht First Nations and others, alternative harvesting techniques and silviculture techniques in all Ahousaht territories, where they hold current TFLs.
- Ahousaht and Interfor will work to maintain and enhance economic opportunities that are mutually beneficial.
- It is understood by both parties that existing laws and agreements must be honoured unless legal and moral alternatives are found and agreed to by both parties.
- This protocol will be amended from time to time as required and with the agreement of both parties.

¹⁷ “Culturally Modified Tree” means any tree or portion of a tree from which aboriginal peoples in the exercise of an aboriginal right have used bark or wood for traditional, sustenance, medicinal, ceremonial, or transportation purposes. This definition does not include trees bearing trail blazes or evidence of marks associated with agriculture, trapping, prospecting, mining, timber cruising, logging or land surveys. In addition, “Culturally Modified Tree” shall mean any tree that would normally be identified as modified by archaeologists.

Two protocols have been signed with the Hesquiat First Nation; the first in 1993 and the second revised version in 1999. They are similar in nature to the Ahousaht protocol. Interfor and the Tla-o-qui-aht First Nation have negotiated a number of draft protocols but have yet to sign a final document.

The protocol documents are the first step in a long-term approach to working with local communities. Interfor's next step was the direct involvement of the communities in forestry activities and risk/revenue sharing to assist in capacity building (subject to Bill 13 constraints). Interfor created "Community Involvement Pilot Projects Agreements" (CIPPAs). These agreements were for 2 to 5 year periods and were based on having the communities actively participate in logging. CIPPAs were signed with the Hesquiat, Ahousaht and District of Ucluelet.

Based on the successful completion of the CIPPAs, Interfor has been working with the communities to develop the next phase of forestry relationships - the "Community Cooperative Area" (CCA) plans to provide community, social and economic benefits while managing for conservation values. For example Interfor and the Hesquiat First Nation have been working together on economic development plans for the "Hesquiat CCA". This has included constructing a road to connect the Hot Springs village into the extensive network of forestry roads to allow the Hesquiat access to their traditional territory, cedar salvage contracts, market log contracts, cooperatively working on a BC Timber Sales project, etc.

Contractors

Within Tree Farm Licences a minimum portion of the harvest must be harvested by contractors. In accordance with the Licence agreement and to meet the requirements under the legislated in the *Forest Act*, the Company will ensure that each calendar year during the term of the Licence:

- The Licensee will ensure that not less than 50% of the AAC volume harvested from Schedule B Land within the Licence area is harvested by persons under contract to Interfor;
- Compliance is calculated in accordance with the method prescribed under the Forest Act and regulations;
- If the volume of timber harvested by contract is less than the volume required, the Regional Manager may require the Licensee to pay an amount determined as follows: the volume required minus the volume harvested by contractors multiplied by the average stumpage rate charged for sawlogs in statements issued to the Licensee in respect to timber harvested under this Licence; and

- That the contractor clause conditions will be amended if required, meeting new harvest standards or cutting control requirements that may occur because of changing environmental practices.

Interfor's primary logging contractor is Alliford Bay Logging (Nanaimo) Ltd. This company bought out Millstream Timber Ltd. in 1993, and has since been the Bill 13 contractor for Interfor in TFL 54. A&M Excavating is the road construction contractor.

Ucluelet Economic Development Corporation

Interfor has a cooperative working relationship with the UEDC and has had the UEDC harvest unallocated Bill 13 volume on the TFL under non-replaceable contracts in the Kennedy Flats area. Interfor also assists the UEDC in planning and management of its Timber Sale A64035 (located immediately south of Clayoquot Sound).

BC Timber Sales

BC Timber Sales manages and sells 8 991 m³/year on average in Clayoquot Sound, within TFL 54, as part of the 1991 take-back agreement, pursuant to Interfor's acquisition from Fletcher Challenge. Interfor has cooperated with BCTS by selling them planned, engineered and developed blocks.

Pacific Rim National Park

The Pacific Rim (Long Beach Unit) shares a common boundary with Interfor's TFL 54, in the Kennedy Flats area. Interfor has a standing protocol to inform Parks staff if it plans any harvest unit in the area. Interfor is sensitive about blowdown hazards, and ensures that boundaries of harvest units are not likely to blowdown, such that trees in the Park are affected. The Ministry of Forests also has a protocol with the National Parks and Interfor works closely with MOF to ensure it is followed. Legal lines are run by certified BC Land Surveyors under the direction of the Surveyor General of Canada to ensure there are no trespasses.

Interfor also designed its reserve corridor network to link various portions of the Park and waterbodies to promote long-term ecosystem integrity.

BC Parks

BC Parks manages 16 parks in Clayoquot Sound, some of which are close to or abut Interfor's license. These range from Strathcona – the largest park on the island – to small areas such as Kennedy River Bog and Dawley Passage Parks¹⁸. Interfor follows a protocol similar to that it maintains with the National Park, such that where harvest units are planned near to park boundaries, parks staff are informed and joint inspection tours are arranged. Again Interfor strives to ensure that its harvesting will

¹⁸ http://wlapwww.gov.bc.ca/bcparks/explore/parkpgs/strathcn/clayoquotsound_brochure.pdf

not impact park resources, either through blowdown, hydrologic impacts or landslides. Legal lines are also run by certified BC Land Surveyors to ensure there are no trespasses.

Central Westcoast Forestry Society

Interfor has had a close and very productive relationship with the CWFS. This non-profit society has employed laid off loggers, fisherman and First Nations for restoration projects in Clayoquot Sound¹⁹. These include silviculture, trail building, research and education. But the showcase projects are rehabilitated streams in the Kennedy Flats area, where streams formerly choked with logging debris are free-flowing with dramatically improved fish production.

3.3 Planning in Clayoquot Sound

3.3.1 Introduction

Perhaps the most far-reaching of the changes proposed by the Scientific Panel was the new perspective on forest resource planning. These fundamental changes permeated all levels of activities associated with forest land management. The new planning initiatives – superimposed on the dramatic reduction in annual allowable cut – revolutionized forestry in Clayoquot and helped to make it a model for sustainable resource management in Canada.

Prior to the Scientific Panel Recommendations, forest planners identified harvestable areas first, and only then identified environmental values. Forest harvesting generally took priority over environmental values. The Scientific Panel reversed this priority: timber harvesting was to be regarded as a “residual” of the planning process. The Panel proposed detailed inventories that were to identify a range of values to be reserved under the watershed reserve planning process. The “harvestable areas” are the areas remaining after the reserve networks have been identified and mapped.

Further- the public and First Nations were to be involved at the “front end” of the planning process. Under the new process, planners were to gather information on public values at the beginning of the planning process. This input was to be considered proactive- rather than at the end of the process- reactive. It was hoped that this would minimize any potential resource use conflicts.

Many critics of the forest industry saw this as a significant step forward in forest management. And while Interfor did place an appropriate emphasis on management of environmental values, and it did eventually solicit the effective input of other

¹⁹ See www.clayoquot.org for more information.

stakeholders, the transition to the Scientific Panels new planning process was not without difficulty and expense.

Licensees and government agencies were now required to solicit the active and effective participation of local governments and First Nations. All parties had to work more closely together than ever before. Suddenly, the time-honored practice of the licensee submitting development and logging plans to government agencies and expecting approval within set time limits was a thing of the past. All applications were now scrutinized by participants from First Nations and local governments, as well as by representatives from Provincial and Federal Governments. Naturally, the increased complexity of the approval process took time, and the lengthy delays were a source of frustration for licensees and their logging contractors.

In addition, the new planning requirements for more sophisticated watershed analysis and mapping, the implementation of new rules, the demand to respond to myriad requests for additional information, and the facilitation of applications through a complex procedure exacted tolls not only time but also on cost. The licensees bore the cost of much increased planning costs (which for a few years has been partly compensated by a stumpage additive which will diminish as planning is completed). The Provincial Government invested many millions of taxpayers' money in developing the resource inventories that were needed to design the reserve network. All told, the extra money spent in Clayoquot has made it an expensive model. History may well show that this was a worthwhile investment. In any case, the costs – as well as the benefits – must be considered in the final evaluation of the Clayoquot experiment.

3.3.2 Planning Framework

In the same year as the decision to implement the Scientific Panels recommendations, the Province enacted the Forest Practices Code (FPC), which encoded forest practices for forestry companies working on crown land in BC. In Clayoquot, the Scientific Panel standards took precedence over the FPC, where there was a conflict or contradiction in standards. However, in areas where the CSSP lacked detailed direction, FPC standards became the default.

In 2003, the Government of BC enacted the Forest and Range Practices Act (FRPA), which superseded the FPC. This Act brought a change in the philosophy of the regulation of forest practices from rule-based to results-based. Essentially managers of BC's forest resources were required to articulate objectives, goals and standards for the protection of resources, and then take the responsibility for meeting them. At the time of writing, forest planning is in a transition phase between the FPC and FRPA.

The management of both timber and non-timber resources is driven by a planning framework that directs both strategic and operational activities. Key components of this framework for TFL 54 include:

- Strategic Planning Directives - Clayoquot Sound Land Use Decision;
- Scientific Panel recommendations;
- Forest Practices Code of BC Act, Regulations, Standards and Guidebooks;
- Interim Watershed Plans;
- Watershed Plans;
- TFL Management Plans; and
- Operational Plans.

In this section, we describe the general planning framework, including the hierarchy of planning scales. Operational plans are described in section 3.5 'Planning for Timber Resources'.

3.3.3 Scientific Panel Planning Recommendations

The Scientific Panel noted that conventional forest resource planning suffered from inadequacies, when reviewed in the context of ecosystem-based management. These included:

1. A focus on timber over other resources;
2. Inadequate information (inventories) of environmental and cultural resources;
3. The use of administrative, rather than ecological planning boundaries;
4. The lack of effective participation by First Nations and local peoples; and
5. The lack of effective monitoring.

Recognizing these limitations, the Panel determined that there should be a fundamental change in the way planning was conducted in Clayoquot Sound. Many of its recommendations were designed to address these shortcomings.

Shift of Focus

Instead of focusing on sustained timber flow, the new approach would focus on sustaining the productivity and natural diversity of the area. There should be a shift in focus from the timber harvested to the forest left behind. The emphasis should be on maintaining ecosystem processes, rather than on removal of wood products.

Inventories

The Scientific Panel also recommended (R7.8) that a full range of resource inventories be carried out; including terrain, terrain stability, terrestrial ecosystems, hydrospheric areas, archaeological resources, vegetation, and visual resources.

The resource inventories were intended to guide the delineation of reserve areas. In the interval before the results were available, an interim set of reserves were drawn up, to guide development and allow for experimentation and learning at the site level during forest harvesting operations.

The Ministry of Forests took responsibility for conducting the inventories, although Interfor had already, on its own initiative, commissioned some of them for TFL 54. Interfor agreed to turn over the results of over \$1M worth of inventory to the MOF in 1996.

Ecological Planning Boundaries

Prior to the Scientific Panel, the timber supply planning was based purely on administrative units (e.g.: the TFL) and ignored ecologically relevant boundaries such as watersheds. As a result, it was possible to concentrate the cut in any one watershed, with little regard to ecologic or hydrologic impacts.

A key outcome of the Scientific Panels report was the adoption of the Watershed Plan as the cornerstone of the planning process. Serving as a link between the broader context of regional/subregional plans and the more specific site level plans, Watershed Plans were envisioned as the level whereby reserve areas would be delineated in an *a priori* fashion. Forest land outside this reserve network would then be available –subject to other operational and planning rules – to harvesting (i.e.: the harvestable land base).

Participatory Planning

The Scientific Panel also recommended (R7.4) that the Nuu-Chah-Nulth and other local peoples be engaged in the planning and managing of the resources in Clayoquot Sound. To that end, the Central Region Board was created, with appointees from First Nations, local communities, and government, to review resource planning and management in the Sound.

Furthermore a community, government and First Nation planning group was created to identify the specific planning criteria and details required to operationalize the Scientific Panel planning recommendations. Once this planning group completed their work the Clayoquot Sound Technical Planning Committee was created and is composed of Government staff and First Nations representatives who have worked for many years to complete the detailed Watershed Reserve Plans.

Area-based AAC

A critical planning recommendation of the Scientific Panel was that the annual allowable cut be determined based on the harvestable timber land base, expressed on an area-based, rather than a volume-based calculation. This recommendation, ultimately the responsibility of the Chief Forester under the Forest Act (1976) was

not acted upon until late 2004. In the meantime, the Chief Forester set a volume-based Allowable Annual Cut (of 75 000 m³), which was deemed to be a conservative expectation of the volume of timber that could be harvested from TFL 54 under his interpretation of the Scientific Panels' recommendations. The dramatic reduction in cut levels was the result of a decision incorporating on the Precautionary Principle; i.e.: a low level was adopted until the impact of such a cut could be evaluated *viz a viz* the emphasis on environmental values and participatory planning.

Harvesting Rules

In addition to the above changes, the Scientific Panel recommended sweeping changes to the way harvesting should be planned on the timber harvesting land base. The core operational recommendations were:

Rate of Cut

The Scientific Panel recommended an overall rate of cut based on a 1% per year average. For practical reasons, 5 or 10 year rate-of-cut limits are assigned to individual watersheds, depending on their size and order, provided the long-term average was maintained at the 1% rate. The rate-of-cut restrictions were designed to avoid cut concentrations. The primary consideration was the potential for hydrologic impacts associated with increased peak flows. But avoiding cut concentrations was also considered desirable from a biodiversity perspective.

Old-Growth Retention

The Panel recommended that at least 40 % of watershed planning units be retained in late successional forest (defined as Age Class 8 and 9, or 140 years and older). The rationale for this recommendation was that coastal forests historically had high proportions of old growth forests (due to the relatively limited natural disturbance rate). Accordingly, a 40% minimum was proposed to ensure that a significant proportion was retained. One of the results of this recommendation is that for certain watersheds where the total percent of the reserves plus retention did not account for 40% of the timbered area, additional old-growth had to be set aside. Old-growth in retained patches within VR logging blocks could contribute to this reservoir. It turned out that for most relatively undisturbed watersheds, this did not pose a constraint for timber harvesting. However, for watersheds that had experienced substantial logging since the 1960's (e.g.: Kennedy Lake), the limited amount of old-growth has limited the current amount available for harvest.

Variable Retention Systems

One of the most visible changes in the way timber would be harvested in Clayoquot Sound was the adoption of Variable Retention (VR) logging. The key element was to limit opening size and retain patches (aggregates) or dispersed standing live trees within a harvesting unit. The Panel recommended that retention vary from a minimum of 15% (of total trees in a unit) in non-sensitive areas, to 70% in sensitive

ground. In addition, opening size was limited to a total of four tree lengths (no point could be more than two tree-lengths from standing timber). Small openings are also allowed with no retention as long as they meet the four tree length criteria. Beyond these limitations, there was no new constraint on the size of a harvesting unit. This replaced the 40 ha clearcut limit that was in force on the rest of the BC Coast.

Interfor worked with its Government partners to implement this new approach to planning. This change was made concurrently with the adoption of higher standards of forest practice, such as Variable Retention harvesting, as well as with the transition to a dramatically reduced annual allowable cut (until it could be reviewed after watershed planning was completed).



VR logged block from the air.

The Scientific Panel issued its final report in May 1995. The Provincial Government accepted its findings in July of that year. Interfor also committed to working within the recommendations of the Panel's report. In so doing, it committed to cooperating in the planning initiatives developed by planning bodies approved by the Crown based on Sections 7.2 and 7.3 of Report 5 of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound.

Interfor agreed to respect the Central Region Board, the communities of Clayoquot Sound and those communities that rely on economic activities in Clayoquot Sound to increase local employment, economic opportunities and community stability through use and development of the forest resources of Clayoquot Sound.

Undeveloped Watersheds

In 2004, Interfor announced that it has deferred plans to harvest in the two undeveloped valleys that are within its license until the B.C. government and First Nations have completed watershed plans and agreed on future activity.

3.3.4 Planning Process

A three-tiered planning hierarchy was adopted, and plans were to be developed at subregional, watershed and site levels (R7.5). The larger scale plans (subregional and watershed) were to be developed on a long-range time period (100 years), and site plans – roughly similar to development plans at the time – were to identify individual harvesting areas and access within portions of a watershed.

Regional Level

Protected Areas

Prior to the Clayoquot Sound Land Use Decision (CSLUD) in 1993, 39 100 ha or 15% of the total land area in Clayoquot Sound had been protected from development as parks or reserves. The largest areas were within Strathcona Park and the Pacific Rim National Park Reserve. Smaller areas were Maquinna Provincial Park, Gibson Marine Provincial Park, Megin River Ecological Reserve, and Cleland Island Ecological Reserve.

Under the CSLUD, an additional 48 500 ha, or 18 %, was provided protected status. The result is that a total of 87 600 hectares, or about 34%, of the Clayoquot Sound land area is protected. It dedicated an additional 45% as integrated resource management areas, and 17% as special management area.

The protected areas created by this 1993 decision were:

- Megin Watershed, including the Talbot Creek watershed: 21 300 ha;
- Upper Shelter Inlet (including Watta and Shelter Creeks): 3 900 ha.
- Obstruction Island and a coastal strip on the north and south shores of inner Shelter Inlet and Sulphur Passage: 6 000 ha.
- Sydney Inlet (including the Sydney River estuary and a portion of the river up to Sydney Cone): 2 400 ha.
- Hesquiat Peninsula and Trail (from Hot Springs Cove around Hesquiat Harbour and past the Estevan Point lighthouse along the outer coast): 7 600 ha.
- Flores Island (western side): 4 000 ha.
- Vargas Island: (western two-thirds, including the adjacent Blundon Island) 2 000 ha.
- Clayoquot Arm/Clayoquot Lake (including Clayoquot Lake, the lower Clayoquot River and the west side of the Clayoquot Arm of Kennedy Lake): 1 800 ha.
- Clayoquot Plateau: 2 800 ha.
- Six smaller areas (including: Dunlap and Morfee Islands, Dawley Passage and Lane Islet, Kennedy River Bog, Kennedy Lake, Tranquil Creek Headwaters, and Hesquiat Lake): 600 ha,

The CSLUD designated 45% of the land-base as Integrated Resource Management Area (IRMA) (Figure 3). The intent of the IRMA was to support economic activity, including timber use and management, fisheries, wildlife, tourism, recreation, mineral exploration and development. Aquaculture activity may occur in the shoreline areas that adjoin integrated resource management areas.

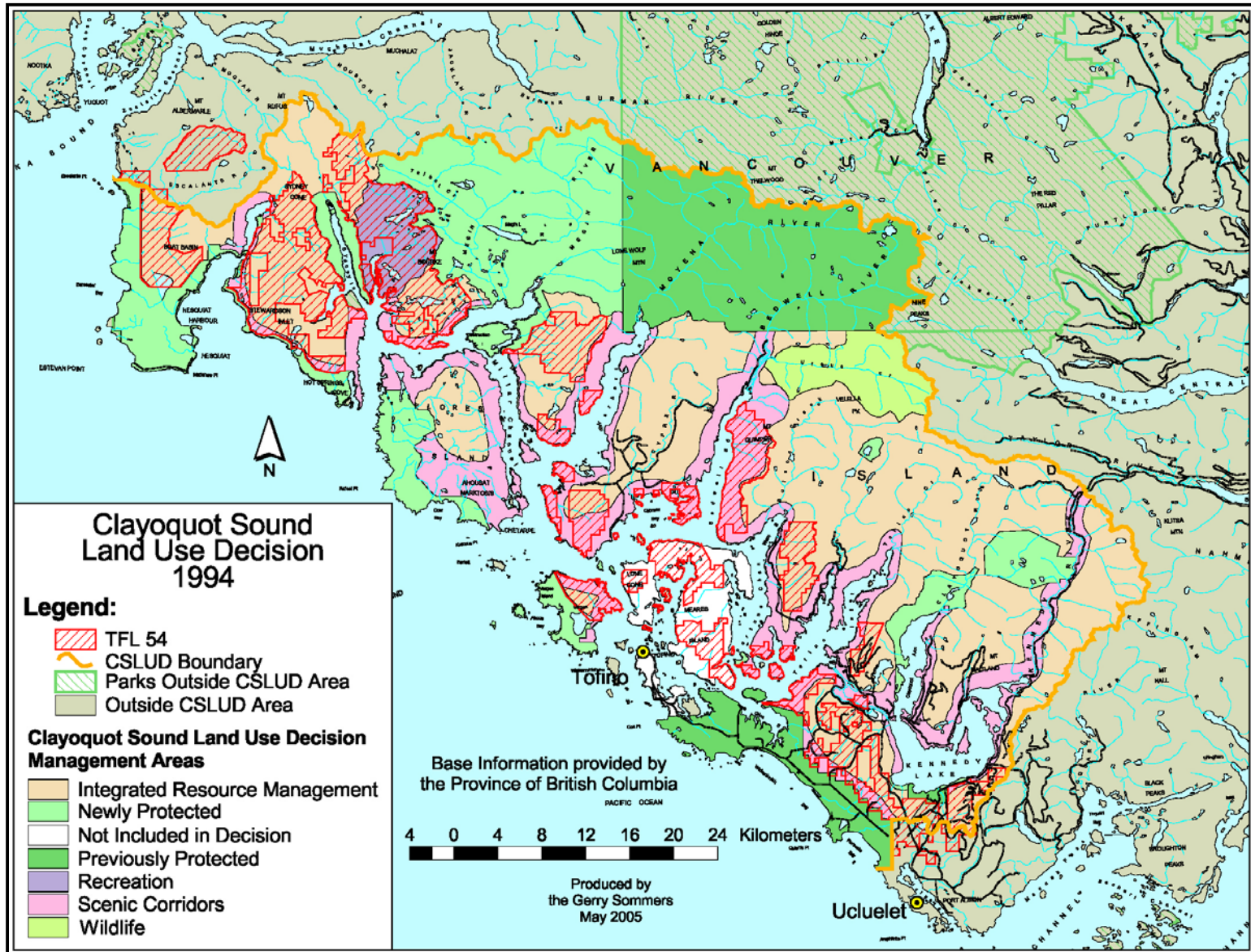
It is the IRMAs that contained the “working forest”. Areas with special management emphasis have been identified for recreation and scenic corridors. Timber harvesting within Special Management Areas were to be managed as required to meet recreation or scenic landscape objectives.

Scenic corridors have been designated on 15% of the land area in Clayoquot Sound. Timber harvesting may occur in these areas, but the management emphasis for these areas is to maintain key scenic values.

The CSLUD designated portions of TFL 54 for protected areas, special management and general integrated management areas. A total of 11 951 ha in TFL 54 were protected and designated as park. Special Management Areas²⁰ in TFL 54 represent approximately 16 650 hectares, and Integrated Resource Management Areas represent 24 450 hectares.

The World Wildlife Fund (WWF) has placed an emphasis on the protection of High Conservation Value Forests (Jennings 2004). In Clayoquot, the designation of protected areas and the establishment of a network of reserves, under the Scientific Panels recommendations, are actions consistent with the WWF aspirations.

²⁰ Special Management Zones have been replaced by reserves and retention areas after implementation of the Scientific Panel recommendations.



Sub-regional Planning

Sub-regional Plans

Sub-regional plans were intended to identify broad objectives for large areas consisting of groups of watersheds. Planning at the subregional level is intended to consider issues and resources that span large areas, provide a context and guidance for watershed plans, and address issues that cross watershed boundaries. They also support the central communities and provide a planning scale for other aspects such as recreation planning.

Initially, the Provincial Government carried out certain sub-regional planning tasks, including the identification and delineation of watershed planning units and resource inventories. Subsequently, Interfor has taken the lead in subregional planning. The term “Community Cooperative Areas” (CCAs) was adopted to emphasize the intention to involve First Nations and local community participation.

Interfor identified three CCAs, namely the Hesquiaht (northern part of Clayoquot Sound), the Ahousaht (central part) and South End. The Hesquiaht FN has a total population of about 630 persons, with about 120 residing at the main village of Hot Springs Cove. The Hesquiaht FN hopes to be able to provide the opportunity for their remaining members to move back to their traditional territory. Two logging camps, Stewardson and Mooyah²¹ are operational, and at times these house up to 100 workers who come from communities all over Vancouver Island and the Lower Mainland. The Ahousaht CCA revolves around the village of Ahousat with a total membership of approximately 1,770 members; of which 900 to 1 200 reside at Ahousat.

In the South End, the CCA encompasses an area containing Tofino, Ucluelet, the Tla-o-qui-aht villages of Opitsat and Esowista, the Ucluelet First Nation village of Ittatsoo and the Toquaht First Nation at Toquat. Interfor works cooperatively with the three First Nations as well as the Ucluelet Economic Development Corporation. It is cooperatively working with local governments to plan road upgrades and construction for long-term access – not only for forestry, but also for fisheries, recreation, ecological restoration and other activities.

Interfor’s vision is to use the CCA concept to broaden the scope of social and economic planning. It hopes to work further with First Nations and local people to develop integrated resource plans, incorporating objectives not just for forestry, but also for aquaculture, tourism, and other sectors. Interfor has current Community

²¹ Mooyah is on Nootka Sound, not in Clayoquot, but is connected by road to Stewardson.

Involvement Pilot Project Agreements with Hesquiaht, Ahousaht, and the Ucluelet Economic Development Corporation. One outcome of these agreements would be integrated Community Development Plans, whereby Interfor works with First Nations and local communities to develop infrastructure that will benefit the company as well as local communities (for example the road from Hot Springs Cove to forestry sites, to enable employment for Hesquiat residents), future community sites, sewer, water, power and other facilities.

Watershed Plans

Watershed planning has been the responsibility of the Provincial Government. Following the Scientific Panel's recommendations a planning process was developed, with input from government officials, First Nations, elected local governments, labour, licensees (including Interfor), and environmental groups.

The Scientific Panel recommended that a multidisciplinary team coordinate the forest planning process in Clayoquot Sound. A planning committee was established in June 1997. Membership in the Clayoquot Sound Planning Committee (CSPC) is composed of members from the Central Region Board (CRB) and one representative from each of the Ministries of Aboriginal Affairs; Forests; Environment, Lands and Parks; and Small Business, Tourism and Culture. The CSPC took on the responsibility for all matters related to forest planning and was mandated with ensuring that planning was consistent with Scientific Panel recommendations and based on sustainable ecosystem management principles. The Forest Industry was not represented or involved in the CSPC.

In 1999, the CSPC was replaced with the Clayoquot Sound Technical Planning Committee (TPC), which was charged with the responsibility of completing Watershed Planning. The TPC completed plans for three watershed units in 2003, and for eight more in March 2005.

Watershed Plans were slow to materialize. Interim plans, partly developed by Interfor, were developed for planning in the 1990's. Delays in the completion of watershed plans complicated the planning process.

The main objective of watershed planning is to identify and delineate reserve systems, to identify special management areas, and lastly, to designate harvestable areas. The plans follow the Panel's recommendation closely. The Scientific Panel proposed eight classes of reserves designed to protect watershed integrity, biodiversity and human values. These reserve classes were:

1. Reserves to protect hydrioparian resources.
2. Reserves to protect sensitive soils and unstable terrain.
3. Reserves to protect red- and blue-listed plant and animal species.

4. Reserves to protect forest-interior conditions in late successional forest.
5. Reserves to represent all ecosystems.
6. Reserves to ensure linkages among watershed planning areas.
7. Reserves to protect cultural values.
8. Reserves to protect scenic and recreation values.

Site Plans

At the site level Interfor develops silviculture prescriptions and harvesting plans (Fig.2 refer to SB3R map provided later on in report). The objectives in site level planning are to:

1. Identify smaller features requiring protection that were not identified during watershed level planning.
2. Ensure individual sites are well integrated with other existing and potential sites.
3. Identify, precisely, the location of all roads and cutting unit boundaries.
4. Determine the silviculture prescription, including the levels of retention.
5. Specify the harvesting methods and any seasonal constraints on cutting.
6. Identify and specify any other constraints on road construction and cutting activities.

Restoration Plans

Interfor was active in planning not only for timber harvest, but also for restoration and road deactivation. From 1995 through to 2000, Interfor, in partnership with the Forest Renewal of British Columbia (FRBC), and from 2000 to the present, in partnership with the Forest Investment Account (FIA), completed millions of dollars worth of restoration projects, including:

- Road prescription prescriptions
- Road deactivation
- Revegetation prescriptions and revegetation
- Hydro-seeding
- Bio-engineering
- Stream restoration
- Riparian prescriptions
- Riparian restoration, and
- Monitoring.

Restoration planning, and the activities themselves, were commonly carried out in conjunction with the Central Westcoast Forest Society, a non-profit group initially dedicated to increasing meaningful employment amongst local citizens in restoration activities. Many of the participants were loggers displaced when the allowable cut in Clayoquot was reduced. Once it became a registered charitable organization, the

mandate focused on restoration, education, monitoring and research, as it relates to sustainable development.



Example of restoration program to provide long-term LWD input in streams: underplanting of conifers.

3.3.5 Management and Other Plans

Formerly, the Forest Act required a TFL holder to submit a Management and Working Plan (later Management Plan) every five years. The objectives of the Management Plan (MP) were to:

1. Provide strategic guidance to lower-level (operational) plans and to assess short and long-term management implications of alternative strategies;
2. Provide opportunities for government agencies, First Nations, local communities, and the public to review of the status of forest management;
3. Update and re-analyze timber and non-timber resource inventory and data; and,
4. Propose an Allowable Annual Cut (AAC).

Since 1992, Interfor has submitted three Management Plans for TFL 54. Management Plan # 3 was submitted in 2000, and was effective from January 2000 to December 2004 but has been extended to December 2005. Key participants in the development of this plan were Interfor, government agencies (Ministry of Forests, Ministry of Environment, Lands and Parks, Federal Department of Fisheries and Oceans), First Nations, local communities, special interest groups, and the Central Region Board (CRB). To date, Interfor has not submitted MP#4. It will be – in part – replaced by this management plan.

New regulations under the Forest and Range Practices Act will require a Forest Stewardship Plan. Interfor, in partnership with other licencees operating in Clayoquot Sound, will be developing one overall Forest Stewardship Plan for Clayoquot Sound in recognition of the unique planning requirements of the Scientific Panel Recommendations.

Plan Approval

Higher level Strategic and Operational plans are to be submitted by the licensee to the Ministry of Forests who forwards them on to the CRB for its review. The CRB is empowered to review and recommend to Government that the plan be accepted, or

propose modifications to, or rejected. Applications then follow the regular government approval process which takes into account the recommendations and comments of the CRB.

Site-level plans are produced in accordance with higher-level (sub-regional and watershed) plans and Scientific Panel Operations Standards. They must be submitted by licensees to the government for review as per the Forest and Range Practices Act

3.4 Planning for Non-Timber Values

3.4.1 Introduction

In this section we describe how Interfor plans for the management of non-timber values in harvestable areas at the site level, after the reserve network has been delineated at the landscape level. In essence, the nature of non-timber values in the harvestable area sets the level of sensitivity, which in turn influences management options or variable retention levels.

Prior to implementation of the Scientific Panel recommendations, Special Management Zones were designated for areas that were deemed to have significant values for non-timber resources. Under the Scientific Panel rules, SMZs are no longer used: reserves are delineated in the watershed plans, and retention is specified at the site level. Retention levels are set according to the sensitivity of an area. Some retention areas are 100 % retention, meaning no harvest; other areas can have different levels of retention based on their sensitivity (i.e. 70% retention, no openings larger than 0.3 ha in size in very sensitive areas- down to 15% retention in areas that are not sensitive).

Retention areas are not immutable – they can be amended if better information is acquired. Retention can be either “hard or soft”. Hard retention is permanent, and is usually located around a specific identifiable resource feature requiring protection. Areas of soft retention can be temporary, for example, once the surrounding second growth matures, or other constraints (e.g.: visual green up) are met.

In the mid 1990s, Interfor commissioned specific resource inventories in TFL 54. These were provided to the Ministry of Forests as part of earlier Management Plans for visual landscape, recreation, fisheries and operability. These were completed in 1996 and provided to the Ministry of Forests for the creation of a Clayoquot Sound database. Since that time, the Ministry has funded terrain stability, ecosystem and hydrospheric mapping for most of Clayoquot Sound. As well, inventories of scenic and cultural resources were completed for most of the area. These have been used operationally as they have become available, from 1996 through 2001. One of the

primary uses of these inventories was to assist in the design of reserve networks, as described in Section 3.3.

However, many of the decisions regarding forest management and protection of non-timber values are made at site level planning.

Reserves mapped at a 1:20,000 scale are intended to provide general planning direction, and are often adjusted on a site planning level of detail (1:5000). Furthermore, Interfor will apply logical adjustments to reserve boundaries, where, for example, reserve attributes are not present at the site level or if the reserve attribute can be substituted for another area of equal or better quality within the watershed planning unit.

3.4.2 Visual Quality

Visual Quality Objectives considerations for TFL 54 had been captured in part by the *Clayoquot Sound Scenic Corridors Landscape Management Plan (Draft May 5, 1995)*. Scenic Corridors were identified and delineated in this plan. Such corridors are areas visible from water or from major roads. This was an outcome from the Scenic Corridors Planning Process, co-chaired by the Ministry of Forests, and the Ministry of Small Business, Tourism and Culture. The Scientific Panel has acknowledged that this process had already addressed many of the concerns related to scenic areas management.

One of the recommendations articulated by the Panel was to provide opportunities for meaningful public involvement. A successful project undertaken by Interfor to solicit public input was the “Dot Process”, whereby participants at public meetings were asked to place dots on maps of known non-timber resources value, such as recreational, scenic, fisheries, wildlife, cultural or historic significance. Interfor solicited suggestions not just of areas with present values, but also areas with past, and possible future use. Interfor has duly incorporated these data into its planning process.

In 1999, an inventory of scenic resources was completed²² which identified areas that require special management for visual impact and provides management recommendations to minimize that impact. The overview mapping (at a scale of 1:20,000) uses a classification of six classes for managing scenic corridors; these are:

- ❑ *Unaltered*
- ❑ *Natural appearing*
- ❑ *Minimal alteration*

²² Catherine Berris Associates Ltd. 1999. Scenic resource inventory and scenic assessment. Consultant Report for Ministry of Forests,.

- ❑ Small-scale alteration
- ❑ Moderate alteration and
- ❑ Intensively altered.

Only the first three classes are used in Clayoquot Sound. Each class has limits set on the allowable level of visual disturbance. “*natural appearing*” requires less than 4% (cumulative visual disturbance), and “*minimal alteration*” requires less than 8%, as viewed in a perspective taken from water or highway. This classification process replaced the Scenic Corridors Planning Process outlined above²³.

On November 13, 1998, the South Island Forest District designated the Clayoquot Sound Scenic Corridors and TFL Visual Landscape Inventories (VLIs) as ‘known scenic areas’ as defined in the *Operational Planning Regulation* (OPR) under the FPC. (That regulation is no longer valid under the FRPA, however Interfor manages to the same standard).

Interfor employs visual landscape design principles and a variety of visual landscape analysis techniques in analyzing and planning operations in areas with scenic values. To assess the visual impact of a proposed development, Interfor uses visual software (e.g.: World Construction Set®) to display an image of the proposed openings on the hillslope, as viewed from various perspectives on water or on highways, to ensure that the degree of disturbance lies within standards for scenic area management.

Interfor commissions, where necessary, a Visual Impact Assessment to assess the impact and, if needed, to recommend ways to minimize that impact. Interfor employs a variety of visual landscape information such as photo mosaics, Digital Terrain Models, angle of incidence analysis, plan-to-perspective analysis and written descriptions of proposed development to support Forest Development Plan submissions for the identified scenic areas. Computer models are used to generate visual images of the harvestable areas and cutting units as seen from numerous viewpoints. The first image completed is one showing 100% harvest to determine which areas of the cutting unit are visible. Then the various “hard” retention areas are located and the model rerun to determine the scenic impacts at this level of retention. If any further “soft” retention areas are required to meet the allowable level of visual disturbance they are then identified and incorporated into the final block design.

²³ The Scenic Corridors Process was never officially accepted by Government as it became redundant when Scientific Panel was accepted.

3.4.3 Biological Diversity

The Scientific Panel (Report 5) recommended reserves to protect biodiversity. The objective is to maintain healthy, functional ecosystems that support all species and genetic variants. To achieve that end, four types of reserves were proposed, namely:

- Reserves to protect red- and blue-listed plant and animal species;
- Reserves to protect forest-interior condition in late successional forest;
- Reserves to represent all ecosystems;
- Reserves to ensure linkages among watershed planning areas.

These reserves, with appropriate levels of connectivity between and within watershed planning units, accommodate the strategy to manage biodiversity at the landscape level. Stand level biodiversity is managed at the site level, and this was the driving force in the transition from clearcut to Variable Retention logging.

Managing forest resources that mimic natural disturbance regimes was a key concept embraced by the Scientific Panel, and has also emerged as a paradigm for ecosystem management (e.g.: Reeves, *et al.* 1995).

The objective in the transition from clearcut to VR was to shift harvesting impacts to a condition that more closely emulates natural ecosystem processes. The rationale was that in the coastal forests of Clayoquot Sound, large stand-level disturbances are rare. The Coastal Western Hemlock biogeoclimatic zone (covering most of Clayoquot) is mostly located within Natural Disturbance Type 1²⁴, in which stand-initiating events are rare.

However, the Biodiversity Guidebook describes the dry, moist and wet sub-maritime subzones of the CWH (vm1 and vm2) as NDT 2, with infrequent stand-replacing events occurring at mean intervals of 200 years. Exposed parts of the coast may be described as NDT 3 with frequent stand-replacing windthrow events with return intervals of 100 years.

The most common natural disturbances are blowdown and landslides. Along riparian areas, disturbance by avulsion and undercutting is common, but spatially limited.

In any case, the natural disturbance pattern is dominated by small openings, rather than the much larger wildfire openings prevalent in much of the BC interior (and in the rest of Canada). To better emulate the natural disturbance patterns in the CWH, it was necessary to adopt smaller openings and greater retention of forest structure. The Scientific Panel stated that forest structure can be retained either by the retention of dispersed individual trees (dispersed retention) or by retaining small but

²⁴ Biodiversity Guidebook.

relatively intact patches of standing timber (aggregate retention). Interfor has practiced and optimized both methods. Dispersed retention maintains some forest cover over most of the area, thus maximizing the area under 'forest influence'. However this method also disperses the impact of harvesting throughout the block, and may render the retained stand more susceptible to blowdown. The Scientific Panel noted that aggregated retention allows more ecosystem components to be retained than with dispersed retention.

The recommendations of the Scientific Panel were to phase out clearcutting and phase in Variable Retention in Clayoquot Sound. VR was to provide a continuum of retention options, ranging from light 15% in areas without significant non-timber resources, to high (70%) where visual, cultural or wildlife resources were deemed



significant. Opening sizes were to be limited in similar fashion (openings can be the equivalent of four tree lengths square with no point more than two tree lengths from standing timber).

Example of high retention VR logging.

Interfor was quick to adapt to this change, despite economic, silvicultural and safety concerns. By 1997, all logging in TFL 54 within Clayoquot Sound was under the VR system. This was far in advance of the phase-in schedule proposed by the Scientific Panel Report #5 (R3.21).

3.4.4 Wildlife Habitat

At the landscape level, wildlife habitat is protected through the reserve system delineated through the watershed planning process. The full range of reserve types contribute to the objective of protecting wildlife habitat. Indeed, four of the reserve types are focused on maintaining biodiversity and one was explicitly designed for protection of red and blue listed species.

The Scientific Panel recommended that wildlife inventories be carried out. Accordingly, the Provincial Government commissioned wildlife inventories for identified species-at-risk and other species as recommended in the Clayoquot Sound Planning process, or through public concern (which was why bald eagle and black bear were added to the list). The main objective of these inventories was to identify and delineate critical habitats (CSTPC 2004). These were incorporated in reserve delineation during watershed planning.

The species inventoried were:

- Marbled Murrelet (red-listed)
- Black Bear
- Roosevelt Elk (blue-listed)
- bats (one red-listed species: Keen's Long-eared Myotis)
- forest birds (Hutton's Vireo was blue-listed in the 1990s)
- owls (two blue-listed species: the Northern Pygmy Owl and the Western Screech Owl)
- amphibians (one blue-listed species: the Red-legged Frog)
- eagles.
- Vancouver Island Water Shrew
- White-tailed Ptarmigan (last two both red-listed, and inventoried as part of an Island-wide study).

In addition to these species-focused inventories, terrestrial ecosystem maps were used to assess and model potential habitat for Black Bear, Marbled Murrelet, Black-tailed Deer, Roosevelt Elk, Bald Eagle and amphibians.

Marbled Murrelet

There was recognition both by the Scientific Panel and by the Technical Planning Committee that habitat protection is also necessary at the site level.

Although a great deal of species inventory and habitat research was conducted during the FRBC funding period (1996-2001), there was a growing awareness that one key species required further study, namely the red-listed Marbled Murrelet. This key species is widely considered to be dependent on old-growth forest along the North American coast²⁵. Concerns about the availability and quality of murrelet nesting habitat - coupled with the contention that Clayoquot Sound harbours the habitat of an estimated one-third of marbled murrelets on Vancouver Island - prompted calls for additional research and the assessment of the need for an additional reserve area.



Many scientists believe that large patches of suitable interior forest were necessary to protect murrelet nests from predation by corvids and other predators. As a result of such considerations, a management plan for protection of marbled murrelet nesting habitat in Clayoquot Sound was prepared in December 2001²⁶.

The resulting murrelet reserve system was implemented in 2002 for an interim period of three years, during which time new research and management criteria could be established. This allowed for continuous improvement and adaptive management.

At the site level of planning, known murrelet nest trees are protected by require timbered buffers, as required by the Wildlife Act. However, the small and inconspicuous nature of these nests makes it unlikely that they would be recognized prior to logging. Nevertheless, Interfor routinely commissions pre-logging habitat assessments for all red and blue listed species where it is deemed necessary.

²⁵ Steventon et al.. 2003. Long-term risks to marbled murrelet (*Brachyramphus marmoratus*) populations: assessing alternative forest management policies in Coastal British Columbia. Tech. Rep 012. Min. Forests Forest Science Program.

²⁶ Chatwin, T. 2001. Management of marbled murrelet nesting habitat in Clayoquot Sound.

3.4.5 Fish and Water Resources

At the landscape level, fish and water resources are protected by the reserve network, and particularly by the hydroriparian reserve system (and to a lesser extent, designated Community Watersheds). This set of reserves – which require forested buffers around streams of various sizes – protects more riparian area than any other in the Province when it was introduced in 1995. Roads may cross streams and riparian areas, but only where necessary. Even then, the amount of disturbance must be minimized. Interfor has worked assiduously to comply with the Science Panel's recommendations for buffering hydroriparian areas.

Three Community Watersheds have been designated within the TFL, one on Meares Island, one at Hot Springs Cove and one outside Clayoquot Sound but within TFL 54. The community watershed outside Clayoquot Sound is the Ucluelet District water supply area in Mercantile Creek (Ucluelet First Nation treaty land removed from Arrowsmith TSA land). It is unlikely that the Meares Island and Hot Springs Cove Community Watersheds will be affected by proposed activities. Interfor will be active in Hot Springs Cove watershed, but activities should not affect the water quality and will of course meet Scientific Panel recommendations.

The Provincial Government commissioned a reconnaissance (1:20 000) Fish and Fish Habitat Inventory. This study covered whole watersheds (including lakes, streams and connected watersheds). In addition to fish species composition, distribution and abundance, stream and lake biophysical data were recorded. This allowed interpretation of habitat sensitivity and productivity for fish. This inventory – in conjunction with DFO records – was used in reserve system delineation and, where it was possible, to identify and delineate critical fish habitat. This inventory was also helpful in restoration planning.

At the watershed level, fish and wildlife resources are also protected by rate of cut rules, embodied in several Scientific Panel recommendations. The Panel recommended an overall rate of cut set at no more than 1% per year, but in recognition of economic realities, did allow the flexibility to cut up to 10% over 10 years in certain watersheds (primary watersheds between 200 and 500 ha), or 5% over 5 years (watersheds over 500 ha). The intent behind this rule was to limit the concentration of harvesting impacts on watersheds, including the potential impact on peak and low flows, stream channel morphology and fish habitat. As well, the Scientific Panel believed that implementing a watershed-level rate-of-cut would help to maintain favourable flow conditions for existing fishery resources.

At the stand-level, hydroriparian reserves are commonly fine-tuned to ensure that the buffer widths meet the recommendations of the Scientific Panel. In 10 years of working with these rules, Interfor has observed that in certain areas, narrow stream

buffers (primarily those consisting of hemlock-amabilis fir stands) have experienced blowdown, limiting the functional effectiveness, and compromising the original intent to protect stream environments.

Fish habitat has been dramatically improved in certain areas where Interfor has participated with the Provincial Government (especially through FRBC and later FIA funding arrangements) on restoration and enhancement planning. These have been primarily located in the Kennedy Flats. There have been significant increases in returns of Coho and other species from the investments made to date. An economic analysis of the remaining works to be completed shows that for a total expenditure of just under C\$4 M (FRBC funds), the annual economic benefit potential from increased Coho production would amount to nearly C\$2.5M. Interfor and the Central Westcoast Forest Society continue to pursue funding for this worthwhile venture in partnership with local communities and First Nations.

3.4.6 Soils and Terrain

The Scientific Panel makes recommendations with respect to the protection of sensitive soils and unstable slopes. Interfor, and later the Ministry of Forests, commissioned comprehensive terrain and terrain stability mapping in Clayoquot Sound. As a result, for all operating areas in TFL 54, Interfor has 1:20 000 scale maps identifying and delineating potentially unstable areas (Class IV or V terrain). The Panel recommended no development in Class V terrain, and that such areas be included within the reserve network. Areas mapped as Class IV terrain have a moderate probability of containing unstable ground in some part of the polygon. Because of this, they are regarded as having significant non-timber resource value, and require high retention levels.

The objective of this kind of overview inventory is to support planning activities at a watershed level, and to aid in identifying areas for more detailed site level assessments.

At the site planning level, Interfor engineers routinely call for site specific terrain stability assessments where terrain class IV polygons overlap or impinge on proposed harvesting areas or roads. In addition, assessments are requested at the discretion of Interfor foresters or engineers if they believe that the terrain warrants it, regardless of the presence of Class IV polygons. In many of these assessments, site-specific measures may be implemented to minimize terrain stability hazards.

Finally, over the 10 years between 1995 and 2005, Interfor has substantially improved its performance in the management of road drainage; installing more and larger culverts, aggressively deactivating roads according to detailed plans, and grassing road fills and other disturbed areas. Concentrated road drainage was a common cause of road-related landslides in the era prior to 1995.

3.4.7 Recreation Resources

A key recommendation of the Scientific Panel was to ensure that First Nations, provincial, regional and local governments, and recreation and tourism groups were involved in the inventory, analysis and planning of tourism and recreational resources (R6.9).

Prior to implementation of the Scientific Panel's report, Interfor commissioned a recreation features inventory and analysis for Management Plan No. 2²⁷. The approved recreation information was used for incorporating recreation considerations into the Clayoquot Sound planning process for TFL 54.

Even at that time there was a growing awareness of the importance of recreation and tourism in the Sound. As part of the drive to gather resource information in support of the Scientific Panel's recommendations, the Ministry of Forests and other Provincial Government agencies commissioned additional studies on recreation and tourism resources, including:

- Developing a Detailed FRBC Recreation and Tourism Inventory Proposal for Clayoquot Sound, Juan de Fuca Environmental Consultants, April 1996.
- Measuring Levels of Tourism and Recreation Use in Clayoquot Sound, Literature and Annotated Bibliography, Axys Environmental Consulting, March 1997.
- A Recommended Methodology for Measuring Levels of Tourism and Recreation Use in Clayoquot Sound, Final Report, Axys Environmental Consulting, March 1997. (CSTPC 2004).

One outcome of this information was the decision to implement reserves and management zones around recreation and tourism features. Such entities include marine shores, lakes, and special features including significant trails and waterfalls. These have reserve zones ranging from 30 to 150 m wide, with additional special management zones (ranging from 70 to 200 m) in which logging may be allowed, but only in such a way as to retain the integrity of the reserve zone.

In addition to these studies, Interfor incorporated a process to solicit public input for Forest Development Plan public meetings, whereby participants were asked to review regional maps and place dots on areas of recreational (and other) significance. This "dot process" has proved invaluable in obtaining effective public participation in the planning process.

One component of managing for recreation use of forest land is the provision and maintenance of road access. Interfor, as mentioned before, has aggressively

²⁷ Webb, Jeremy B. 1995. *Recreation Analysis Report: Maquinna Tree Farm Licence 54*. RRL Recreation Resources Limited.

deactivated many kilometers of road in Clayoquot Sound to minimize impacts on fish and water resources. However, some local residents have complained about losing road access as a result of this deactivation. This issue has arisen in public meetings organized by Interfor, and needs to be addressed in road access planning.

3.4.8 Cultural Heritage and Archaeological Resources

The Scientific Panel regarded cultural and archaeological resources, particularly associated with First Nations peoples, as an issue of great importance. One entire volume (Report 3) was dedicated to First Nations' perspectives on forest practices.

The Panel was clear that the Nuu-Chah-Nulth of the area must have the opportunity to identify, locate, and evaluate culturally important sites, including sacred areas, historic areas, current use areas and future use areas (R10).

Prior to the implementation of the Scientific Panel, Interfor attempted to ensure that plans provide for the protection of cultural heritage resources such as sacred and spiritual sites and areas required for traditional purposes. It committed to assessing cultural resource values in or near proposed development areas, and to developing effective management prescriptions consistent with requirements of the Forest Practices Code (in effect at the time) and the Heritage Conservation Act. Interfor hired First Nation Liaison's to work with the forestry and engineering staff to identify cultural values at the site level and assist in developing retention plans if necessary.

With the adoption of the Scientific Panel's report, the Provincial Government – and ultimately the Clayoquot Sound Technical Planning Committee (CSTPC) assumed responsibility for delineating and mapping areas of cultural significance at the landscape level.

Accordingly, the government commissioned archaeological inventories that were conducted between 1996 and 1999. The purpose of these studies was to inventory and describe existing and new sites of historical (archaeological) resources. Over the course of this project – carried out by Golder Associates Ltd. - several First Nations individuals were employed, assisting in the inventory. Archaeological sites constitute physical evidence of past human occupation or activity. These sites are important to First Nations people and are protected under the Heritage Conservation Act (TPC 2004[need reference watershed planning]) but some can be modified by applying for an alteration permit under this act.

The TPC reports that three First Nations have decided not to produce mapping of cultural reserve areas for incorporation into the watershed planning process. Instead, First Nations rely on a culturally significant designation to prompt site-specific

consultation, according to working protocols with forest licensees, including Interfor.

In Clayoquot Sound, traditional territories of four First Nations straddle the boundaries of both forest tenure boundaries and watershed planning units. Each Nation has its own approach to inventorying, and identifying culturally significant sites. Interfor has working protocols with each Nation in this regard. In some areas, the traditional territory of one Nation may overlap with another. In this circumstance, Interfor must communicate with both parties.

At the stand level, protection is also given to Culturally Modified Trees (CMTs) under Section 27 of the Clayoquot Sound Interim Measures Extension Agreement. Under this Agreement CMTs are protected and may only be moved, cut or logged with the consent of the First Nations in whose traditional territory they occur (CSTPC 2004).

3.4.9 Parks

Interfor recognizes that a number of parks border TFL 54. Where this occurs, Interfor ensures that plans are consistent with and respectful of the parks land-use objectives. Interfor will ensure that proposed activities do not cross legal lines. However there is no compulsion to provide additional buffers along boundaries.

Where Interfor's proposed development abuts the boundary of parks or protected areas, Interfor attempts to mitigate blowdown hazards. These measures are intended to reduce the probability of blowdown extending across park boundaries. Interfor welcomes the input of park planners or technical specialists in reviewing proposed developments adjacent to or near park boundaries.

Interfor has developed a working agreement with Pacific Rim National Park Reserve staff for any proposed harvest near the National Park Reserve boundary. Interfor has voluntarily classified a 300 m "operational transition zone" along the boundary for TFL 54 whereby a higher retention level will be used to aid the park in managing for ecological integrity. Interfor also works cooperatively with the National Park staff to implement regional ecosystem planning and restoration. Interfor has assisted in raising grant money to do stream restoration within the National Park boundaries.

3.5 Planning for Timber Resources

3.5.1 Introduction

Interfor administers forest practices within TFL 54 in a manner that is consistent with government-approved procedures associated with the planning framework. Forest practices and operational plans for the Clayoquot Sound portion of TFL 54

will be in accordance with official government approved watershed plans or government approved interim watershed plans, in developed areas. Interfor has and will cooperate with other tenure holders in the area when planning operations.

Under the Operational Planning Regulation of the FPC, operational plans were to be submitted in support of planning for timber resources. Forest legislation is presently in transition to the Forest and Range Practices Act (FRPA) and new regulations and the various operational plans required are changing (however old plans are still in effect until their obligations are completed). There were five²⁸ operational plans under the FPC, of which four are relevant to Clayoquot Sound:

1. Forest Development Plans (FDPs) (changing to Forest Stewardship Plans (FSP));
2. Logging Plans (LPs) (no longer required under FPC or FRPA);
3. Silviculture Prescriptions (SPs) (changed to Site Plans) and,
4. Stand Management Prescriptions (SMPs) (no longer required).

Forest Development Plans²⁹

In addition to the multi-stage planning required by the Scientific Panel, Interfor also prepared these plans pursuant to the FPC. The Forest Development Plans were subordinate to the Watershed Unit Plans, but covered a larger area and longer-time frame than the logging plan and the silviculture plan.

The objective of the FDP was to guide the implementation of the goals and objectives contained within higher-level plans (in this case the TFL Management Plan, as well as sub-regional plans as they became available). The FDP showed how forest activities would occur in the five years following submission. It also allowed for the input of the public and First Nations, through a required public information review and comment process.

The scope, content and term of Forest Development Plans are described in the *Operational Planning Regulation* of the FPC Act. The regulations specify requirements pertaining to: terrain mapping in community watersheds; forest health and watershed assessments prior to review; riparian assessments for areas of joint approval; terrain stability assessments for areas of joint approval; map information; Category I and Category A blocks³⁰; and notice, review and comment.

²⁸ The fifth is the Range Use Plan, intended for management of grazing land in the interior.

²⁹ Forest Development Plans are in effect until replaced by a Forest Stewardship Plan which must be prior to December 31, 2006

³⁰ Category "A" blocks are those approved in principle, Category "I" are not yet approved.

In addition to the regulations, all Forest Development Plans for the TFL may make consideration of the *Forest Development Plan Guidebook*.

These plans involved the public, community groups, First Nations, and interested parties through formal consultation and when plans are presented for public viewing. Comments received from public and government agencies and First Nations will be considered before finalization of the plan and submission to the respective ministries.

Some other guidebooks that may be referenced in forest development planning include: the *Riparian Management Area Guidebook*; the *Fish-stream Identification Guidebook*; the *Mapping and Assessing Terrain Stability Guidebook*; the *Gully Assessment Procedure Guidebook*; the *Visual Impact Assessment Guidebook*; the *Coastal Watershed Assessment Procedure Guidebook*, *Community Watershed Guidebook*; the *Channel Assessment Guidebook*; and the *Public Consultation Guidebook*.

In the FDP, the applicant had to specify approximate locations of planned blocks and roads, together with the necessary measures to mitigate impacts on non-timber resources. In Clayoquot Sound, these applications were reviewed by the CRB, in addition to the MOF and other agencies.

3.5.2 Forest Stewardship Plans

Under FRPA, Forest Stewardship Plans (FSPs) will replace FDPs. FSPs are intended to apply to a “forest development unit” which may or may not conform to existing tenures. The Act states that the Plan must specify all activities associated with harvesting and road-building within the development unit. The Plan will specify how the licensee will meet stated objectives, pertaining to timber management, soils, wildlife and biodiversity (at both stand and landscape levels), cultural values, visual quality, fish habitat, and water quality in Community Watersheds. The Plan must set silvicultural standards, such as stocking and free-growing, and it must explain how the licensee proposes to respond to public review and comment.

Despite some similarities to the planning structure under the FPC, the fundamental difference in FRPA is the shift in emphasis from a detailed prescriptive approach – in which legislated standards were imposed across the province – to a results-based approach – in which the licensee sets the objectives and standards, and states how they will be met. This places the responsibility on the licensee and associated professionals to ensure that stated objectives are met.

The FDP is being phased out under the new Forest and Range Practices Act (2002), as this Conservation Plan is prepared in 2005. Interfor has already commenced preparatory work on the FSP, which in Clayoquot Sound will form part of a

cooperative effort between different licensees who manage TFLs or work in the Arrowsmith Timber Supply Area (for example, Coulson, Iisaak, BC Timber Sales).

3.5.3 Cutting Permits

Cutting Permits (CPs) provide the authority to implement development and harvesting as proposed in Forest Development Plans and Silviculture Prescriptions.

Cutting Permits (CPs) are issued by the Ministry of Forests to allow harvesting in a particular area or group of cutblocks. The *Forest Act* provides for Cutting Permits to be issued within TFLs by the District Manager, within the limits specified in the Tree Farm License document, to authorize harvest of portions of the allowable annual cut from specified areas within the Tree Farm License area (i.e. Schedule A and Schedule B).

Cutting Permit application format, contents, and conditions are specified in the TFL 54 License document. CPs detail site-specific harvesting rights, including: term; timber mark; stumpage; felling, bucking and utilization specifications; and obligations.

Under the Operational Planning Regulation, Logging Plans were required to specify detailed information about each cutblock, including for example, boundaries, streams, wetlands and other riparian areas, wildlife habitat areas, permanent and temporary access structures, bridges, culverts, proposed quarries or pits and other features. In this plan, the licensee was also required to demonstrate that it was in compliance with all other regulations pertaining to both timber and non-timber resources.

The silviculture prescription (SP) replaced the pre-Code pre-harvest silviculture prescription (PHSP). These plans were prepared well in advance of harvest. The SP included all assessments required, including terrain stability, gully assessment, archaeological impact, pest incidence survey and riparian assessment. Despite its name, the SP is not exclusively about silviculture (although it does provide a plan for planting and stand management after harvest). It is an inter-disciplinary document that covers all other resources as well.

3.5.4 Silviculture Planning

The traditional objective of silvicultural planning is the prompt and effective regeneration of logged over land, to ensure the continuous production of fibre on a sustained yield basis. However, the Scientific Panel embraced a wider definition of sustainability that included environmental and social factors. Under this paradigm, Interfor recognized that forest regeneration is not the over-arching silvicultural objective that it was in the former era. One of the implications of this change is that opportunities to increase AAC by investment in incremental silviculture are more limited.

The dominating silvicultural management objective, as reiterated in R6.5, is to maintain ecosystem integrity. The primary objectives are to retain natural functions in the managed forest and to retain the natural range of stand and forest structure. Accordingly, Interfor's objectives for TFL 54 are:

- Carry out area-based rate-of-cut determination as recommended by the Scientific Panel;
- Manage the available timber harvesting land-base with variable retention silvicultural systems, consistent with the recommendations of the Scientific Panel (R3.1 through R3.22);
- Periodically evaluate the application of variable retention silvicultural system to assess the results and benefits and adapt management practices accordingly;
- Maintain a silviculture program that will ensure all harvested areas are reforested promptly, with appropriate native species, densities and stock types, as part of variable retention silvicultural harvesting described by the Scientific Panel;
- Focus protection efforts primarily on slash pile burning for silvicultural purposes and hazard abatement where appropriate and feasible³¹;
- Enhance the productivity of the available operable forest through intensive silviculture, alternative harvesting techniques, optimized utilization and innovation where appropriate in consideration of the Watershed-level Plans that must be delivered by the Clayoquot Sound Planning Committee; and
- Seek intensive silviculture funding for those units best suited for intensive silviculture practices that provide the greatest benefit to sustainable timber production (i.e. return-on-investment).

Watershed Unit Planning has only recently been made available from the Clayoquot Sound Technical Planning Committee (CSTPC) – nearly 10 years after the Scientific Panel completed its report. The protracted delay limited the ability of Interfor to formulate site level silvicultural plans for TFL 54 for much of the 10 year period between 1995 and 2005.

In 2000, the company prepared an Incremental Silviculture Strategy for its four TFLs (10, 38, 45 and 54). This document set out broad objectives common to all TFLs, but did not specifically address the unique conditions in Clayoquot Sound. Interfor plans to concentrate on late seral stage forest for the next five to seven decades, and will focus on the cost effective acquisition of saw-log grade conifers. Planting will normally be done within one year in most areas. Furthermore, the company will pursue an enhanced silviculture program, including prompt reforestation with larger-

³¹ Interfor is attempting to move away from burning slash piles unless they are very large.

sized genetically improved stock, hardwood conversion, the use of alternative silvicultural and harvesting systems, and other prescriptions (spacing, thinning, fertilization, and pruning) where economically feasible, or where funded by outside sources.

The strategy also commits to maintaining accurate inventories and modeling growth and yield. This would be a particular challenge in Clayoquot Sound with its exclusive reliance of VR harvesting. To meet that need, Interfor completed a Growth and Yield Strategy for TFL 54, prepared by JS Thrower and Associates³². This and other reports identified that existing site indices based on old-growth consistently underestimated the growth of managed second-growth stands. Subsequently, Interfor completed an in-house Site Index Adjustment, which raised the average site index from 17 m to 28 m for hemlock and from 15.1 to 22.6 m for redcedar.

The Ministry of Forests completed an Interim Incremental Silviculture Strategy for TFL 54 in 2002 (funded by FRBC). This was aimed at providing strategic direction for FRBC-funded silviculture investment, over and above that required by law. Strategies of this type assess the sensitivity of the timber supply to silvicultural investment, that is, where should investment be directed to maximize AAC and consequently job creation or maintenance. The strategy for TFL 54 recognized that in Clayoquot Sound, such analyses do not reflect the current realities of management. However, it stated that an increase from the current level of 75 000 m³ to 150 000 m³ appeared to be feasible. At the current level, the strategy envisaged significant job creation from planting, fertilization, pre-commercial thinning, commercial thinning and pruning, amounting to some 528 direct jobs at the current cut level, and 843 at the enhanced level.

3.5.5 Silviculture Systems

Interfor's objectives with respect to silviculture systems for TFL 54 are to carry out area-based rate-of-cut determination as recommended by the Scientific Panel, and to harvest timber from the land-base using variable retention harvesting systems, consistent with the recommendations of the Scientific Panel (R3.1 through R3.22).

Interfor's objectives with respect to a silviculture program for TFL 54 are to ensure all harvested areas are reforested promptly with appropriate native species, densities and stock types, as part of variable retention harvesting as described by the Scientific Panel.

³² J.S. Thrower & Associates Ltd. 2003. Strategic recommendations for a growth & yield program for Interfor's TFL 54. Contract report for Interfor, Ucluelet, BC. March 31, 2003. 31 pp.

Interfor carries out basic silviculture to support the management objectives of TFL 54. Interfor has traditionally endeavoured to evaluate and carry out programs that were of incremental value to basic silviculture responsibilities. Traditionally the objectives of incremental silviculture have been to accelerate tree growth and to improve the value of the final crop through reducing competition, increasing nutrition, and modifying tree form (i.e. pruning and spacing).

Interfor has successfully implemented variable-retention harvesting recommended by the Scientific Panel, and has been active in establishing new regeneration in harvested areas. Variable-retention harvesting will result in mixed age classes over small areas and retain more of the structural characteristics of older forests than would stands regenerated under a clearcut silvicultural system. The dominant silvicultural objective remains the maintenance ecological integrity.

3.5.6 Protection

3.5.6.1 Wildfire

Interfor's objectives with respect to protection for TFL 54 are to develop and carry out appropriate strategies that will protect the forest and minimize losses from anthropogenic fire. The focus of protection efforts is primarily on slash pile burning for silvicultural purposes and hazard abatement, where appropriate, feasible and prescribed. The coastal forests of Clayoquot Sound are not naturally prone to wildfire (see for example: Gavin *et al.* 2003). Slash piles may be left for the benefit of biodiversity, as they are effective piles of large woody debris that provide habitat for small mammals and invertebrates.

3.5.6.2 Blowdown

Every winter, Clayoquot Sound is buffeted by storms rolling in off the Pacific Ocean. Strong winds topple trees as they have for thousands, if not millions, of years. Blowdown is a natural phenomenon, and is probably the major type of natural disturbance (e.g.: Scott 2005). Prior to 1995, blowdown along the edges of clearcuts was a common-place occurrence.

After 1995 and the phasing out of clearcutting, the implementation of VR harvesting there was a change in the pattern of blowdown. More trees were left standing; more trees were rendered vulnerable to blowdown. Monitoring of blowdown in the 10 years after 1995 showed that blowdown of retained trees in VR blocks ranged from 0 to 60%, with an average of 10%. Blowdown was higher in VR blocks with dispersed retention, than those with aggregated retention, particularly at low retention levels (Scott 2005).

Interfor embarked on a program of annual monitoring of blowdown in VR blocks. One of the outcomes of this monitoring was an understanding of which stand types

were most vulnerable, and which were least. Tall, relatively even-aged stands of amabilis fir and hemlock (for example: forest cover labels BH 952) were most likely to experience blowdown, whereas uneven-aged stands of redcedar and hemlock (e.g.: CH 931) were much less likely to blow down. Interfor adopted a rating scheme, whereby each proposed block was assessed for potential hazard. Blocks with high or very high hazards were identified and earmarked for additional effort at minimizing hazard. In certain cases, an on-site assessment would be required, and changes to layout, or pruning of trees along hazardous edges, would be considered.

Where blowdown could be expected, Interfor adjusted the retention level to account for future blowdown. For example, if the target retention was 35%, but the estimated blowdown hazard suggested 10%, then Interfor would manage for 40% retention.

In consideration of recommendation R3.10 of the Scientific Panel, salvage of coarse woody debris and blowdown (windthrow) has not occurred without the approval of the MOF. However, Interfor proposes to conduct salvage operations in blowdown where appropriate as part of its blowdown management strategy. This departure from the Scientific Panel's rule is described in more detail in section 4.4.

3.5.6.3 Forest Health

The primary forest health management objectives were:

- To maintain forest resource losses from insects, diseases, windthrow, and other damaging agents at levels below socially and economically acceptable thresholds; and
- To ensure that forest health issues are managed in a manner that maintains, recovers, or enhances the short and long term productivity of the forest resource.

Significant Pests and Impacts

Field staff monitor the incidence and levels of insect pests and disease within the TFL and maintain communication with the Ministry of Forests regarding aerial and other detection surveys.

Detection will occur initially at the planning stage (Forest Development Plan) and again at the Silviculture Prescription stage. As stands are monitored from establishment to final harvest, inspections will occur by ground and air.

Treatments will be based on the best data available, and will be designed to solve the specific problem in the most effective and cost-efficient manner. These may involve biological or manual methods approved for use on Crown Lands.

The common forest health factors in Clayoquot Sound are as follows:

- Hemlock Mistletoe
- Spruce Weevil
- Deer Browse
- Ambrosia Beetle
- Windthrow
- Residual tree damage

The general management strategies for these common forest health factors are as follows:

Hemlock Dwarf Mistletoe

This disease is found throughout the area at various levels of infection, although the lower elevation CWHvh is considered to be of greater risk (Muir et al. 2004). A three-meter knockdown of all residual trees will be done concurrent with harvesting activities if prescribed in the SP. If the pronounced rate of growth and vigorous characteristics of the advanced regeneration and young conifers is able to outgrow existing and potential infections of Dwarf Mistletoe then the three-meter rule may not apply. Diseased trees or infected trees will not be accepted as well spaced trees during stocking or Free Growing surveys. Non-host species will be utilized in any post harvest planting. Planting of Hw adjacent to the block boundaries will be minimized (<20%). The use of western hemlock seedlings for regeneration has steadily declined to less than 10% over the past 4 years. Natural ingress of hemlock will supplement planted stock and this strategy is intended to minimize the risk and impact of Dwarf Mistletoe on the total growing stock. With respect to variable retention silviculture, Interfor does not propose sanitation strategies for over storey infection sources. Heavily infected trees may be good candidates for wildlife trees.

Implementation of VR harvesting results in regeneration establishing amidst retained standing timber. Where hemlock is prevalent, this will increase the risk of dwarf mistletoe. Interfor has sought funding to research and monitor the incidence of mistletoe in hemlock regeneration. Further details are provided in section 3.7.

Spruce Terminal Weevil

The TFL 54 operating area is a high hazard area for this weevil. Sitka spruce will be accepted to a maximum of 10% of the well-spaced stems evenly distributed throughout any site unit to minimize the impact of a spruce weevil attack. Weevil resistant Sitka spruce are used where it is planted.

Deer/Elk Browse

Deer and Elk browse is a concern on cedar plantations and on re-contoured roads. If deer and elk browse is precluding the achievement of regeneration or free growing

standards determined in the SP; protection devices or protection methods will be prescribed to ensure these standards are achieved. Deer and Elk are not currently a reforestation concern.

Ambrosia Beetle

This insect reduces wood quality in felled timber by tunneling into the wood. Felled wood should be removed as soon as possible to minimize insect damage. Beetle traps may also be set up in the dryland sort to minimize the impact.

Residual tree damage

Falling and harvesting activities will be conducted in a manner to minimize damage to retained trees. Interfor will use partial or full suspension cable yarding and helicopter logging as required to minimize damage to retained trees. If there is incidental damage to retained trees, they will continue to be retained consistent with the primary objective of retention, unless required for safety. Damaged trees will provide a source of snags in the future. In the case of harvesting in uniform second growth stands; some trees maybe intentionally scarred to create snags for biodiversity.

3.5.7 Other Resource Users

Consistent with the spirit and intent of managing lands and resources in Clayoquot Sound, the objective is that the planning process will continue to consider the guidance of the CRB with respect to the reconciliation of diverse interests within and between communities.

Guide outfitters, trap-line licensees, and mineral claim holders will be informed of proposed activities through notification of regular public viewings of both strategic and Operational Plans. Comments received through public viewing will be considered and plans revised where appropriate.

3.5.8 Timber

Timber harvesting in the portion of TFL 54 outside Clayoquot Sound (7.5% of the gross land-base) will be according to requirements of the *Operational Planning Regulation* of the FPCBC Act, to be replaced by new FRPA and Regulations as they are phased in. All timber harvesting in the Clayoquot Sound portion of TFL 54 will be in accordance with government approved interim watershed plans and government approved watershed plans. Watershed plans that are to be based on the analysis of resources and the adaptive principles for sustainable ecosystem management as prescribed by the Scientific Panel³³.

³³ The Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. 1995. *Report 5 - Sustainable Ecosystem Management in Clayoquot Sound: Planning and Practices*. Victoria, BC.

Consistent with the objective to create a viable sustainable forestry operation, Interfor's timber management objectives for TFL 54 are to:

- Conduct harvesting operations according to Provincial Acts and Regulations, Scientific Panel recommendations and the Interim Measures Extension Agreement, as approved by government for TFL 54;
- Continue to have management opportunities to carry out harvesting methods according to Scientific Panel recommendations;
- Continue to harvest the allowable annual cut that in the Chief Forester's considered opinion is a reasonable indication of the volume of timber that may be expected to be harvested from TFL 54 under his interpretation of Scientific Panel recommendations;
- Incorporate the principles of visual landscape design to maintain harvesting opportunities, protect scenic values, and to manage scenic resources;
- Provide sufficient flexibility with harvesting operations that will allow for the best use of timber, capital and resources; and
- Effect enhanced forest management to maximize the long-term economic volume and value of harvestable timber. The specific product objective is to harvest timber suitable for the manufacture of wood products for competitive world markets.



Figure 3. Variable retention harvest block (Block UC5C Sandhill)

3.5.9 Distribution of Blocks

Timber harvesting will be dispersed in order to:

- Achieve watershed-based rate-of-cut objectives;
- Balance seasonal harvesting;
- Balance hauling distance; and
- Rationalize block sizes to produce a mosaic of variable sizes and shapes of openings.

Stand condition is also a factor in harvest block selection. The largest portion of the total growing stock in TFL 54 is made up of old-growth timber, and the volume of merchantable second-growth is limited at this time. Interfor's strategy is to focus cutting on older stands. Operationally, the minimum harvest age considered is that associated with log sizes that meet the minimum merchantability standards.

3.5.10 Access Roads

To facilitate harvest, Interfor must plan, design, maintain and where necessary deactivate a complex network of roads, including mainlines, branch roads, spurs and trails. Interfor recognizes that roads constitute the potential for deleterious environmental impact and plans its access accordingly. Keeping road lengths and areas to a minimum also has economic advantages. Road Permits issued by the Ministry of Forests are required for operations roads. These permits authorize the construction and on-going use of forest roads on crown land.

The Scientific Panel made numerous recommendations regarding the planning, design, and deactivation of road systems (R5.1 through R5.7). The recommendations include the consideration of not building roads where irreplaceable or highly sensitive features are threatened (R5.1). Over the period 1995 to 2005, Interfor has used helicopter logging in many areas where roads may have threatened such features.

The Panel also encouraged the use of expertise for on-site assessments, to mitigate hazards where roads were required. Interfor has made extensive use of such expertise, routinely commissioning geotechnical assessments on areas where roads were located on moderate or steep hillslopes or where there was doubt about terrain stability. End-hauling of road spoil and other special construction techniques have been used where recommended by specialists.

Over the period 1995 to 2005, Interfor has improved its design and construction of roads (as have most licensees in BC). The effect of the FPC was to impose standards on the design, location and maintenance of road drainage structures. Interfor

believes that these have had a substantial improvement in general road standards and environmental impact. The incidence of road-related landslides appears to have diminished over pre-Scientific Panel time, however this claim has not been corroborated by research or monitoring.

The Panel recommended the preparation and implementation of an overall deactivation plan, taking into account long-term access needs. This plan has been completed, but has not yet been completely implemented.

Interfor recognized local concern over permanent deactivation and/or rehabilitation of logging roads affecting access to recreation, fishing and hunting opportunities. The Scientific Panel recommended integration of road deactivation planning with watershed-level planning to address and recognize that roads are a long-term investment and are needed for future land management, stand tending, protection and recreation.

However, the Scientific Panel also states that the maximum percentage of the harvestable area designated for permanent access should normally be less than 5%, and that all temporary roads and access trails must be rehabilitated to a productive site.

In the past there may have been some conflict between the desire to deactivate certain roads and public interest in maintaining access to backcountry areas. This was particularly true in the FRBC era (1996-2001) when a great deal was invested in large-scale road deactivation efforts. This conflict is likely to subside, as future road deactivation will mainly focus on temporary branch roads and spurs within a cutting unit. One of Interfor's primary objectives is to maximize the sustainable productive forest land-base, and to reduce the long-term risk associated with roads.

3.5.11 Timber Supply

The revolution in forest planning brought about by the Scientific Panel has resulted in a reduction in the emphasis in sustained yield; at least as it pertains to fibre flow. Emphasis is now placed on the sustainability of non-timber, as well as timber resources. The amount of timber harvested in Clayoquot Sound is no longer a function of the mean annual increment (MAI) on the harvestable land base; instead it is set by a consideration of the maximum area that can be harvested without impairment of the environmental, social and cultural values inherent in the area. This is explicit in recommendation R7.1 that reads:

"Adopt an ecosystem approach to planning, in which the primary planning objective is to sustain the productivity and natural diversity of the Clayoquot Sound region. The flow of forest products must be determined in a manner consistent with objectives for ecosystem

sustainability. This entails abandoning the specification of AAC as an input to local planning."

and in recommendation R7.10 (page 247), which reads:

"Recognize that the rate (percentage of area cut per unit time) and geographical distribution of timber harvesting are more important determinants than is the volume removed when wood harvest is planned. After analysis of resources and development of area-based plans, determine the anticipated annual volumes of timber to be cut for watershed planning units."

It is significant that the Scientific Panel reports interpret sustainability in terms of ecosystem productivity, but not from social and economic perspectives.

The primary objective of a Tree Farm License Management Plan was the preparation of a timber supply analysis for the purposes of identifying the consequences of current forest management and forest practices, including the impact on short and long term timber supply. The timber supply analysis lays the groundwork for setting the Annual Allowable Cut (AAC), which under the Forest Act must be set every five years by the Chief Forester.

Interfor acquired TFL 54 (amalgamated from blocks 4 and 5 of TFL 46) on December 30, 1991. In its Management Plan # 1, the AAC for the license was set at 180 000 m³. This was reduced by 42 000 m³ in 1994 in anticipation of the establishment of protected areas under the Clayoquot Sound Land-use Decision. Thus an AAC of 138 000 m³ (129 009 m³ for Interfor, and 8 991 m³ for the Small Business Forest Enterprise Program) was in place when the Scientific Panel's recommendations were accepted in 1995.

In 1996, the Chief Forester (Larry Pedersen) set a new AAC³⁴ of 75 750 m³ – a reduction of 58% from the original AAC for the TFL when Interfor acquired it in 1991. The AAC was based in part on timber supply analysis provided by Interfor. However, the Chief Forester felt it necessary to take into account increased practice standards stemming from both the Scientific Panel and the FPC. Given the high profile of Clayoquot Sound (and by this time it had also been proposed as an International Biosphere Reserve) and the attention given to it through the highly publicized protests, Mr. Pedersen adopted a low risk approach, namely a low AAC

³⁴ Pedersen, Larry. December 1996. Tree Farm Licence 54 Rationale for Allowable Annual Cut Determination: effective December 30, 1996. Ministry of Forests, Victoria BC.

with the proviso that the cut could change if monitoring showed that a higher cut would not compromise the standards and goals articulated by the Science Panel.

Although the Scientific Panel recommended "abandoning the specification of AACs as an input to local planning", recommendations R7.1 and R7.10 do contemplate determining a flow of timber products and anticipated annual volumes of timber to be cut for watershed planning units. Determination is to occur *after* the analysis of resources and development of area-based plans.

Area-Based AAC

One outcome of recommendation R7.10 was the transition from volume-based to area-based cut. The MOF did not introduce a change in the regulations until 2004. TFL 54 was one of three TFLs in the province taking part in a trial program, following a report on the feasibility of setting area-based cuts for BC forest tenures³⁵. Interfor entered into an agreement with the Crown on October 31, 2003 to implement a trial program on area-based AAC for TFL 54.

When the MOF finally agreed to accept the Scientific Panel recommendation to move to an area-based AAC, the simplest option was simply to transcribe the existing volume-based AAC (in cubic metres per year), in hectares, based on average volume per hectare. Interfor rejected this approach as too simplistic, particularly given the variation in retention targets (15 to 80%) and growth and yield across the land base.

Interfor commissioned consultants Timberline Forestry Consultants Ltd. and J.S. Thrower & Associates Ltd. to assist in developing an innovative approach to determine economic minimum harvest age in existing managed and future stands³⁶.

Accordingly, Interfor envisaged numerous silviculture regimes with different species mixes and retention targets to reflect their existing and future stand conditions. The consultants (J.S. Thrower & Assoc.) produced volume curves for each regime. The volume curves were based on new ground-based site indices that reflect conditions in managed stands – and reflect the impacts of variable retention. These were applied to each forest cover polygons in the TFL, and adjusted according to probable silvicultural regime.

³⁵ Friesen Rea & Company 2002. Area-based Allowable Annual Cut Determination Recommended Information Requirements for Tree Farm Licenses. <http://www.for.gov.bc.ca/hts/pubs/abaacr2Final1.pdf>

³⁶ Timberline Forest Inventory Consultants Ltd. And J.S. Thrower & Associates Ltd. 2005. Timber supply analysis information package: TFL 54. Unpub. Consultant report for Interfor, submitted April 2005.

The future cost of logging was estimated by establishing a series of ‘cost zones’ across the TFL – coupled with estimated future stand value to derive economic Minimum Harvest Ages (MHAs). A spatially-explicit model (“Complan”) was used to analyze timber supply scenarios. The model incorporated a detailed analysis of the timber harvesting land base as it is affected by operability, non-contributing land such as roads, landings and other alienations, and reserves identified in Watershed Plans. In addition, the outcomes were subject to Scientific Panel rules governing watershed rate-of-cut, visual quality, and stand-level biodiversity.

Forest Inventory

The original inventory of old growth timber was prepared by Fletcher Challenge Limited or its predecessor companies during the period 1967 to 1970 when the lands were administered as TFL 22 and 27. In December 1982 these licenses were combined to create TFL 46. In December 1991 west coast Blocks 4 and 5 of TFL 46 were separated to create TFL 54.

The inventory had been updated from time to time for harvesting, road construction, reforestation, silvicultural treatments, and TFL area amendments, generally but not exclusively in support of new Management Plans. The most recent updating of the inventory records occurred in 1997. In addition, the forest cover polygons have been converted onto the Province of British Columbia’s TRIM standard base maps. An Arc/Info GIS is used to facilitate interactive analysis.

A Vegetation Resource Inventory (VRI) was completed for Clayoquot Sound (including TFL 54) in 1999. This was a relatively new inventory designed by the Ministry of Forests Inventory Branch to replace the traditional forest cover inventory. The main difference is the inclusion of data pertaining to non-tree vegetation, coarse woody debris and snags, which were not collected under the conventional forest inventory process. Arc Alpine Consultants Ltd conducted VRI in Clayoquot Sound from 1996 to 1999. Vegetation was classified and mapped at a scale of 1:20 000. Crews collected vegetation and tree data, including stand structure, species composition, age, height, basal area, density, and number of snags per hectare; shrub, herb and moss cover; non-vegetated data; and history. For some areas, tree site indices and average tree volumes were calculated.

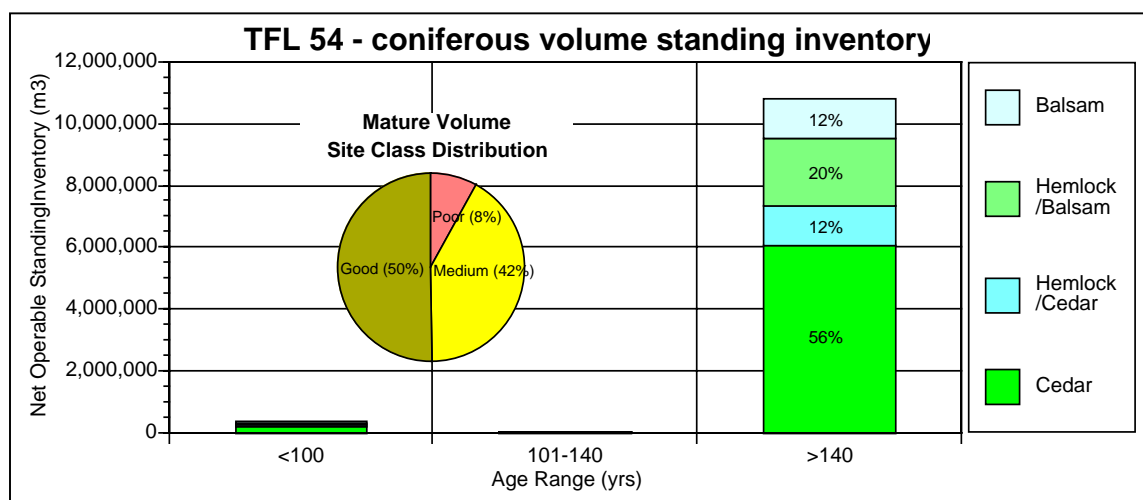


Figure 4 Coniferous volume standing inventory and mature volume site class distribution

Growth and Yield

Interfor inherited a number of permanent sample plots when it acquired TFL 54 in 1991. These have been used to estimate site indices and derive stand volume estimates.

In 2003, Interfor commissioned J.S. Thrower & Associates to provide strategic recommendations for a growth and yield program for TFL 54³⁷. Among other recommendations, the J.S. Thrower report suggested that the use of current inventory site indices resulted in an underestimation of the potential growth of management (second-growth) stands. It also made a number of recommendations to modify existing models to predict growth in VR blocks, including the establishment of a growth and yield-monitoring program.

At Interfor's request, J.S. Thrower completed a site index adjustment in TFL 54 to account for this underestimation. This adjustment resulted in an upward revision of the overall average site index for second growth stands of western hemlock from 17 to 28 m (a 65% increase), and for redcedar from 15.1 to 22.6 m (a 33% increase).

³⁷ J.S. Thrower & Associates 2003. Strategic recommendations for a growth & yield program for Interfor's TFL 54. Contract Report for Interfor. March 31, 2003. 31 pp.

3.6 Forest Practices

3.6.1 Introduction

In Clayoquot Sound, Interfor has followed, and will continue to follow, both Scientific Panel recommendations and FPC/FRPA standards, defaulting to the highest standards where a conflict exists. In general, the Scientific Panel does not specify detailed standards, so Interfor relies on the FPC and - in future - the new Forest and Range Practices Act (FRPA) for specific standards relating to forest practices.

The *Forest Practices Code* is the legislative mandate that sets requirements for forest practices, sets enforcement and penalty provisions, and specifies administrative arrangements. It was introduced in 1994, and was in effect for most of the period between 1995 and 2005. In 2002, the Forest and Range Practices Act was enacted, but at the time of writing (2005), Interfor was still conducting operations mainly under the FPC under a transition period.

FPC regulations and standards apply across the province, not just in Clayoquot, although Clayoquot Sound is the only area where the Scientific Panels recommendations have been implemented. FPC guidebooks support the regulations, but are not generally part of the legislation. Guidebook recommendations are not mandatory requirements, however once a recommended practice is included in a plan, prescription, or contract, it becomes legally enforceable. These guidebooks describe procedures, practices and results that are consistent with the legislated requirements of the Code.

The information provided in each guidebook is used to aid professional judgement in developing site-specific management strategies and prescriptions designed to accommodate resource management objectives. Flexibility in the application of guidebook recommendations and Scientific Panel recommendations is required to adequately achieve the specified land use and resource management objectives. Practices recommended by the Scientific Panel may be modified when an alternative could provide better results for forest resource stewardship. Guidebooks were not intended to be definitive and are not be interpreted as being the only acceptable option.

Interfor recognizes that specific forest practices appropriate for TFL 54 will be developed and adjusted over time. This will reflect the application of new knowledge and techniques that are considered part of adaptive management. The company will apply those forest practices that are environmentally sound, operationally achievable, economically prudent and safe.

3.6.2 Engineering

Standards for engineering apply to roads, bridges, facilities and other structures that will be designed, constructed or maintained within TFL 54. In addition, standards apply to the lay-out of proposed cutblocks. The adoption of Variable Retention as a harvesting system resulted in a dramatic increase in the complexity of cutblock lay-out. In addition to ribboning the outer boundaries of the unit, it now became necessary to ribbon out patches of retained standing timber, following the Scientific Panel's recommendations regarding cutting unit design (R3.5, 3.6, 3.7 and 3.8).

For all engineering plans and structures, Interfor consults the *Forest Road Engineering Guidebook* and *Stream Crossing Guidebook*. The *Forest Road Regulation* pertains to road layout and design, construction and modification, maintenance and deactivation. The *Forest Road Engineering Guidebook* contains recommended engineering practices. The Scientific Panel also has specific recommendations regarding roads (R5.1 to R5.7) and water transportation (R5.8 to R5.13).

Proposed road building, maintenance and deactivation are included in the FDP for review and approval by the MOF District Manager. As part of the process, older roads (where Interfor has Road Permits), and structures are monitored for deactivation and maintenance requirements. Assessments follow the most current revision of the *Advanced Forest Road Deactivation Course Manual and Standards* (1997). Plans for specific projects will be reviewed by the appropriate government agencies as required.

3.6.3 Timber Evaluation and Appraisal

All engineered harvest blocks included in Cutting Permit applications are cruised to evaluate timber quality and assess profitability. The TFL license document specifies that cruises must be carried out in accordance with the MOF *Cruising Manual*. Cruise data submitted must be compiled in accordance with the *Cruising Compilation System, Change Specifications, Detailed Requirements and Design Manual*.

Stumpage is determined in accordance with the *Coast Appraisal Manual*.

3.6.4 Variable Retention Harvesting

The Scientific Panel³⁸ recommended the adoption of a variable retention silvicultural system. Franklin *et al*³⁹ had previously described this system in detail. The

³⁸ The Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. April 1995. *Report 5 - Sustainable Ecosystem Management in Clayoquot Sound: Planning and Practices*. Executive Summary

³⁹ Franklin, Jerry F., D.R. Berg, D.A. Thornburgh and J.C. Tappeiner. 1997. *Alternative silvicultural approaches to timber harvesting: variable retention harvest systems*. pp. 111-139, In: Kohm Kathryn A. and Franklin Jerry F. 1997. *Creating a forestry for the 21st century: the science of ecosystem management*. Island Press, Washington DC, USA.

recommendation stems from the increased awareness of the importance of structural complexity to forest ecosystem functioning and the maintenance of biodiversity.

Harvesting and silviculture operations are based on prescribed practices that maintain a greater amount of these structural elements or “old-growth attributes”. Variable retention harvesting is not a true silviculture system in that it is not a means of facilitating the regeneration of a new forest.

Specifically, the objectives are:

- to provide spatial structural elements for a variety of animal species until forest cover is re-established;
- to enrich structural complexity by maintaining some mature/old-growth conditions sooner after harvesting that would otherwise be absent;
- and to enhance connectivity in a managed landscape providing for dispersion and species migration.

Variable retention follows a short-term natural disturbance model by always retaining part of the forest after harvesting. It focuses on the role of structural complexity to forest ecosystem function and biological diversity. Important structural features include snags, woody debris on the forest floor, multiple canopy layers, varied sizes and conditions of live trees, and the presence of canopy gaps. The resultant structure provides habitat components for many species.

Variable retention harvesting systems can be implemented using a variety of harvesting techniques. VR blocks have attributes that are more similar to natural disturbance gaps than the clearcuts they replaced⁴⁰.

Logged block (LS27) with retained structure.



In Clayoquot Sound, retention levels range from 15 to 70%, following Scientific Panel recommendations. The Panel also emphasized that implementation must proceed with caution and results must be monitored, envisaging that as experience accumulated, certain techniques would be adapted.

⁴⁰ Pearson, A., L. Daniels and G. Butt 2003. Regeneration dynamics in clearcuts, variable retention and natural disturbance gaps in the forests of Clayoquot Sound, Vancouver Island. FII Final Report.

The type, amount and spatial pattern of retention will be dispersed throughout a cutblock (individual trees or small groups) or aggregated (clumps or patches) depending upon management objectives. Two common models for structural retention are termed “dispersed retention” and “aggregated retention”. For safety and ecological reasons, aggregate retention is preferred, however Interfor may utilize a combination of dispersed and aggregate retention.

Interfor will implement variable retention using the following criteria:

A) integrated Resource Management Areas (where timber is the primary resource)⁴¹:

1. Retain at least 15% of the forest;
2. Retain most timber as forest aggregates of 0.1-1.0 ha well dispersed throughout the cutting unit;
3. Ensure aggregates are representative of forest conditions in the cutting unit (i.e., should not be disproportionately located in less productive portions of the cutting unit);
4. Retain aggregates intact as "no-work zones". In some cases small areas of high “dispersed” retention (i.e. 70 to 90%) are retained to allow for the safe removal of danger trees. They look similar to aggregates however the dispersed areas have some of the old growth characteristics removed (i.e. snags around the edges);
5. Regardless of retention level, ensure that most openings are less than four tree heights in width and that no point is more than two tree lengths from the edge of an existing aggregate or stand. Exempt very small working units (i.e., less than four tree heights across) from the minimum 15% retention requirement;
6. When dispersed retention is employed, select the most windfirm dominant trees present on the unit;
7. In general, retain a representative cross-section of species and structures of the original stand;
8. Select specific structures and patches to meet ecological objectives (e.g., provide future habitat for cavity-using species);
9. Select patches to protect culturally important features (e.g. culturally modified trees, recreation sites, scenic features);
10. Determine appropriate amounts of retention based on ecological sensitivity and forest values within the working unit;
11. Do not salvage blowdown in retention cutting units except where it threatens desired values (e.g., by establishing the potential for unnaturally

⁴¹ The Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. 1995. *Report 5 - Sustainable Ecosystem Management in Clayoquot Sound: Planning and Practices*. Victoria, BC. Chapter 3, R3.7, R3.8, R3.9, R3.10, and R3.11

large or frequent debris flows, especially ones that might threaten special sites such as spawning areas). Areas of blowdown provide live trees, snags, downed wood, or wood in streams, which constitute habitat for many organisms in present, and future stands. Abundant coarse woody debris is an important element in the forests and stream channels of Clayoquot Sound; its removal is potentially disruptive to the objectives of retention and, in most cases, is unnecessary; and

12. Design the size, shape, and location of areas to be harvested within a cutting unit to comply with topography and visual landscape management objectives established for the area.

Interfor is proposing minor changes to these criteria:

Point 5. In certain areas, where blowdown hazard is moderate or high, allow greater flexibility to increase opening size up to six tree lengths in width;

Point 11. Interfor is proposing that blowdown salvage be conducted under a comprehensive blowdown management plan that identifies probable levels of blowdown under certain management regimes. This plan would involve setting higher retention targets in areas where some blowdown is probable.

B) Sensitive Areas (i.e. Scenic Areas, Class IV and V Terrain, Sensitive Riparian outside Reserves)⁴²:

- ❑ Retain at least 70% of the forest in a relatively uniform distribution;
- ❑ When harvest occurs in small patches, limit opening sizes to 0.3 ha or less;
- ❑ Retain at least some larger diameter, old, and dying trees; snags; and downed wood throughout the forest (but not necessarily in harvested patches); and
- ❑ Identify "no-work zones" representing a minimum of 15% of the cutting unit area (i.e., areas including snags and other danger trees) before any harvesting takes place.

⁴² Ibid. Chapter 3, R3.6



Variable retention harvest block (Block LS10 Lost Shoe Creek)

3.6.5 Harvesting Systems

Scientific Panel recommendations pertaining to harvesting systems are:

R4.1 Select a harvesting system that meets safety and other specified objectives (e.g., minimal ground disturbance) consistent with variable-retention silvicultural prescriptions.

R4.2 Plan and implement yarding to minimize soil disturbance, site degradation, and damage to retained trees. Restrict ground-based logging to hoe forwarding or similar low-impact yarding methods appropriate to the prevailing weather and soil conditions in Clayoquot Sound. Use partial or full suspension cable yarding and helicopter logging as required to minimize detrimental soil disturbance and damage to retained trees.

The procedures for harvesting in the TFL consider harvesting pattern, stand conditions and utilization standards. The harvesting pattern is dictated by the operability, resource sensitivity, green-up requirements and logistics outlined in Forest Development Plan.

Interfor employs three harvesting methods in Clayoquot Sound: ground-based (“hoe-chucking”), cable (grapple or skyline yarding) and helicopter. The unit costs

of logging increase in that order, with ground-based logging being the cheapest, and helicopter the most expensive.

The selection of a harvesting method is a function of topography, soil type and landslide potential, silvicultural system, timber characteristics, road access and roading constraints, yarding distance and direction, and resource values and management considerations. Specific harvesting and silvicultural systems are described in the Silvicultural Prescription or Site Plan.

Ground-based harvesting

Ground-based harvesting involves the use of conventional or modified log-loaders, equipped with tracks, to ‘swing’ felled and bucked timber from the stump to the road, where it is then loaded onto trucks. Interfor does not, in Clayoquot, use wheeled or tracked skidders, and therefore avoids the site disturbance associated with that type of harvesting. Hoe forwarding is a cost-efficient form of moving wood, and is highly appropriate for VR lay-out, because the hoes are capable of moving logs around aggregated or dispersed retention in a controlled manner. In addition, they can lift timber over small watercourses without disturbing them. Ground-based harvesting is only suitable for gentle terrain, generally on slopes less than 30%. Provided the operator is careful to use logging slash to support the tracks, hoe forwarding does not create significant site degradation or compaction. The use of hoes requires an appropriate road network; the costs of forwarding (as well as the potential for site disturbance) increase with the number of swings required to move the logs to the road. Interfor tries to keep forwarding distances to less than 200 m.



Hoe forwarding, also known as hoe-chucking.

Cable logging

Cable logging in Clayoquot now is primarily done with grapple yarders⁴³ as the use of tower and skyline systems have been phased out by most operators on the BC coast. An interlock grapple yarder

has the capability to be used as a running skyline machine for selection yarding (i.e. slack pulling carriages on a standing skyline or running skyline system). Cable logging is appropriate for a wider range of terrain and soil conditions than ground-based systems, but it is still necessary to build roads to the harvest unit.

⁴³ sometimes referred to as “swing yarders”.

Grapple yarders are used to yard felled and bucked timber from the stump to the road or landing. Grapples represent a partial suspension system, and full suspension is rarely used however the newer interlock yarders can be used as skyline machines. Maximum yarding distances are about 300 m, although most yarding is less than 200 m. Dragging the butt end of logs across the hillslope causes some soil disturbance, but this is usually minimal where good deflection, or elevation, is obtained. Where deflection is poor – resulting in ‘ground-lead’ conditions- yarding can result in logs gouging the soil. Good engineering avoids poor deflection. In addition, the use of backspars (usually tracked excavators or log-loaders) can improve deflection where stump-rigging would create marginal yarding conditions. However, these require the construction of trails along the block boundary to allow machine access. Where Interfor uses backspar trails, it rehabilitates them by de-compacting the surface and properly managing runoff.



Grapple yarder (behind) and loader (foreground) on landing in VR block.

During the period 1995 to 2005, towers were also used for cable yarding, but these have been gradually phased out due to higher cost.

Designing VR blocks for grapple yarding must take into account the need for unimpeded yarding ‘roads’ (lines) with sufficient clearance to yard large timber to the landing or road. Thus the layout may differ from that typical of ground-based harvesting.

Heli-logging

Interfor is an industry leader in the use of helicopters to log in areas where accessibility and terrain sensitivity limit alternatives. Despite the high cost, Interfor’s use of helicopter logging in Clayoquot exceeds the coast industry average. The advantage of helicopter logging is that roads are not required to the block. Logs can be flown to a nearby road, or dropped in the water. Economics dictate that flight cycles be limited to 3 or 4 minutes (depending on stand value), restricting the distance from logging to drop site to about 2 km or less. The use of helicopter logging is ideal for high retention harvesting, or for blocks on steep slopes, as well for areas where road access is impossible, inappropriate or too expensive. Heli-logging has allowed access to timber that otherwise would be inaccessible.



Heli-logging.

As for any harvesting system, VR harvesting had to be safe and economically feasible. To that end, Interfor worked with its contractors (mainly Alliford Bay) to implement training and safety programs. Over the period 1995 to 2005, Interfor

successfully managed the difficult transition from conventional clearcut logging to Variable Retention. FRBC helped to fund the additional costs of implementing Scientific Panel standards (over and above Forest Practice Code standards), and this helped Interfor and Alliford Bay accelerate the transition.

This transition involved substantial change in human resources, as well as logging methods and equipment. There was less demand for fallers and log loaders (due to the decreased cut), but increased need for planning, inventory, monitoring, engineering and restoration, as well as for intensive silviculture. In theory, the transition period was to train logging crews so that ultimately they would be capable of working about two-thirds of the year in a range of logging and forestry related jobs. Unfortunately this has not become a reality for a number of reasons, namely:

- Logging activities have been periodic; in some years there was no work at all, in others only two to six months - then in some years 10 months;
- New planning and regulatory requirements resulted in delays and uncertainty in scheduling logging operations; these, hand to mouth logging etc.
- logging crews have not become multi purpose and mostly lack the flexibility originally envisioned - and unfortunately most come from outside the region.
- budgets for restoration activities, first FRBC, then FIA have fluctuated dramatically. FIA budgets are based on a running average of past logging activity; so reduced harvest levels in Clayoquot have resulted in dwindling funding.
- Uncertainty regarding the long-term status of the land base (e.g.: treaty negotiations) has led to reluctance to invest in intensive silviculture

- Economic realities: logging is expensive in Clayoquot Sound, and therefore financial returns are more sensitive to the impacts of US tariffs, dollar fluctuations and market shocks.

Felling, bucking and utilization specifications and requirements that apply to the TFL are specified in the TFL 54 License document and in Logging Plans (Cutting Permits in pre-FRPA era). Harvest residue and waste assessment requirements are also specified in the license document. Assessments are carried out in accordance with the *Provincial Logging Residue and Waste Measurement Procedures Manual*.

Salvage Logging

Salvage logging refers to the harvesting of diseased, dead or windthrown timber. Under the terms of the TFL agreement, Interfor holds salvage rights for this wood. It has the choice of utilizing the wood for its own needs, or selling the rights to salvage operators. Thus, Interfor can issue contracts to local operators for wood that for some reason does not meet Interfor's economic criteria. The harvesting, processing and sale of this product creates local employment and supports a small value-added industry in Clayoquot Sound.

Following the Scientific Panels report in 1995 – and increased awareness of the ecological role of dead wood – concern was raised about the ecological impacts of harvesting dead and downed wood. Between 1998 and 2000, the Long Beach Model Forest explored the ecological implications of salvaging down wood, in particular redcedar⁴⁴. It suggested that additional research and monitoring were required to better evaluate the problem. The report also acknowledged the existence of a struggling industry dependent on the supply of wood left over after logging.

The reduction in the allowable cut in the mid-1990s curtailed supply to the salvage industry in Clayoquot Sound. Other developments hurting the supply of salvage wood – including shake and shingle – were reduced access through aggressive road deactivation and increased utilization.

The Friends of Clayoquot Sound conducted an analysis of the Value-added and alternative wood products sector in Clayoquot Sound. They recognized a new initiative by Interfor in making wood available to this sector:

“A new initiative by Interfor may provide some access to these "alternative species". The company has opened a log sales yard that

⁴⁴ Newson, D. and B. Beasley, 2000. A review of salvage practices and the ecological roles of downed wood in Clayoquot and Barkley Sounds. LBMF Report.

makes wood available to local individuals and companies, including alder, yew, hemlock, white pine, red and yellow cedar and other species. A portable sawmiller can be brought in to custom cut. Already area residents and firms have earmarked timber for their operations, construction, flooring and furniture making. Timber at the site is sold at market value with the help of an on-site log grader”.⁴⁵

Another unexpected issue was the Scientific Panel’s recommendation 3.10:

R3.10: Do not salvage blowdown in retention cutting units except where it threatens desired values (e.g., by establishing the potential for unnaturally large or frequent debris flows, especially ones that might threaten special sites such as spawning areas). Areas of blowdown provide live trees, snags, downed wood, or wood in streams, which are habitat for many organisms in present, and future stands. Abundant coarse woody debris is an important element in the forests and stream channels of Clayoquot Sound (see Sections 2.2.2 through 2.2.4); its removal is potentially disruptive to the objectives of retention and, in most cases, is unnecessary.

Interfor proposes (Chapter 4) that this rule (R3.10) be modified so that it can salvage log blowdown in VR blocks as part of a comprehensive blowdown management strategy. Such salvage operations would avoid riparian areas or any potential damage to stream channels or banks, unless a qualified specialist recommended such action.

In-Stream Wood Salvage

Although in-stream salvage was done in the past, Interfor has no plans for recovering wood volume from below high water mark. The liabilities associated with the FPC, the beneficial contribution of Large Woody Debris (LWD) to the maintenance of fish habitat, and the likely increase in sedimentation associated with in-river salvage preclude any consideration for a salvage program.

Mitigating action will be considered where large log-jams are considered to be impassable to migrating spawners, where there is risk of severe channel scouring, or risk of property loss. No action will be taken without prior consultation with local MWLAP and/or DFO offices, and qualified registered professionals.

⁴⁵ Friends of Clayoquot Sound, 2003. Sector analysis value-added and alternative wood products. Report funded in part by the Clayoquot Biosphere Trust. A green economic opportunities report. http://www.focs.ca/reports/cgeo2_5.html

3.6.6 Access Management

The public and other resource users are generally given access to roads in the TFL, unless otherwise approved by the MOF District Manager. Under some circumstances road access will be restricted for reasons of safety, security, environmental conditions or other conditions that may affect the operations of the licensee. The commercial use of roads by others within the TFL may result in road use charges that apply to the maintenance costs or costs of road modification arising out of such use. The public assumes a reasonable risk associated with the use of industrial forest roads.

Non-operational roads are maintained in a condition suitable for fire or emergency access wherever they effectively serve this purpose. Roads that are not required will be 'put to bed' using methods such as roadfill pull-back, cross-ditching, and removal of culverts and bridges if necessary to stabilize road prisms and reduce erosion risk, and in some cases to re-establish a productive growth medium. Interfor may address access management concerns via inspections and maintenance or deactivation programs.

Post harvesting site degradation due to temporary and permanent access structures, and harvesting related soil disturbance is monitored as part of the *Environmental Management System*. The *Phase Inspection Report for New Roads, Road Deactivation, Site Rehabilitation or Roadside Site Preparation* and the *Post-Logging Block* of Interfor's *Environmental Management System* (EMS) require outstanding post-activity inspections to confirm that the work was completed according to the plan. The reports produce a priority risk assessment of any identified concerns. The EMS also requires that an *Environmental Action Plan* be prepared and carried out for inadequacies.

3.6.7 Watershed Restoration and Road Deactivation

Since 1994 Interfor has been involved with salmon and trout habitat rehabilitation in the Kennedy Flats watershed unit, including Kootowis, Hospital, Sandhill, Staghorn, Trestle, Trestle South, Indian/Harold, Lostshoe and Salmon Creeks⁴⁶. These sub-basins were the subject of an intense restoration project spanning 11 years. Much of the work has been done under FRBC funding, later (2002) replaced by FIA funding. In many areas, the work was very labour intensive and involved local displaced forest workers, displaced fishers and First Nations, many of whom were coordinated under the Central Westcoast Forestry Society (CWFS). The training component of the

⁴⁶ For example: Warttig, W., D. Clough, M. Leslie 2001. Restoration plan: Kennedy Flats. Report submitted to BC Ministry of Environment Lands and Parks, BC Ministry of Forests, and Department of Fisheries and Oceans.

works has focused on empowering the crew with knowledge and responsibility in order to minimize requirements for outside ‘professional’ help.

The watershed restoration consisted of upslope restoration (mainly road landslide rehabilitation), riparian restoration and in-stream work, in that order. Upstream restoration was aimed at reducing sediment transport to lower stream reaches. The riparian restoration focused on developing a new, uneven-aged conifer cover to act as a source of future woody debris, to provide shade and input of invertebrates and organic material.

In-stream work was mainly aimed at adding large woody debris (LWD) or removing excessive log accumulations from early logging, and restoring a flowing channel with pools, riffles and glides. Most streams on Kennedy Flats were LWD deficient. Interfor removed excessive small woody debris, then added and re-oriented LWD in functional structures. In certain areas, gravel was added to create spawning habitat.

The net result of these efforts was a measurable increase in Coho salmon returns, identified in 2002. This watershed restoration program is a demonstrable success, and continues to be the subject of numerous tours.

The road deactivation component of FRBC funded projects employed a risk assessment procedure to focus limited funding on road sections with the greatest risk of landsliding or erosion – thus ensuring the greatest return on investment. In certain areas, the road prism was fully restored (“Full hill slope restoration”), which involved out-sloping of the original road surface from the bottom of the ditch line, ramping down to retrieve as much of the road side-cast as possible, sorting the material as it was placed back against the road cut. Coarse material was placed on the bottom, covered with fines, and large organic debris placed on the surface. This



process resulted in re-establishing of sub-surface drainage as well as providing the most suitable medium for seedling growth.

An example of road deactivation: complete re-contouring. This is from the Escalante, north of Clayoquot Sound. Warren Warttig is in the foreground.

Interfor was heavily involved throughout Clayoquot, with extensive deactivation of high risk roads in Mooyah, Zuciarte, Escalante, Hesquiat, Kanim, Shark Creek, Catface, Muriel Ridge, Thunderous, Boat Launch, Little Toquat, Upper Lostshoe, and Salmon Creek. Work included hydroseeding and bioengineering on landslide scars. Many roads were planted with conifers.

3.6.8 Sustainable Forestry Certification

Interfor achieved third-party certification of its forest management practices in 1999. This initiative was undertaken in response to our customers' specific needs, and the growing marketplace demand for quality wood products that are independently certified to be derived from sustainably managed forests. It also reflected Interfor's longstanding commitment to sustainable forest management and environmental leadership.

Interfor has been certified with the globally recognized International Standards Organization (ISO 14001) since 1999. The accredited ISO certifier is KPMG Performance Registrar Inc., which monitors and reviews Interfor for continuous improvement. To meet this certification, Interfor has developed an approved Environmental Management System.

Interfor's Coastal Woodlands Operation (including TFL 54) has been certified with the Sustainable Forestry Initiative (SFI) standard, since the fall of 2003. Interfor was the first BC forest company to achieve this certification. Areas of scrutiny in the certification process were:

1. The use of sustainable forestry practices in growth, harvest and use of the forest;
2. Conservation practices for wildlife and water quality protection;
3. Efficient use of forest resources;
4. Protection of historic and cultural values; and
5. Public involvement.

Interfor is considering working towards pursuing Forest Stewardship Council certification in Clayoquot Sound TFL 54, and has produced a gap analysis for the purpose.

3.6.9 Fire Protection

A fire protection program is part of the timber strategy to reduce the risk of fire and to prevent timber loss. The company's objective is to have all fires contained by 10:00 a.m. the day following initial attack.

Interfor will submit a Fire Preparedness Plan before April 1 of every year, as required by the *Forest Fire Prevention and Suppression Regulation* of the FPCBC Act and the

new *Wildfire Regulation*. The plan will outline the Company's response procedures including details of operating conditions and safeguards, responsible personnel, equipment, fire tool locations and initial attack actions.

The *Forest Fire Prevention And Suppression Regulation* of the FPCBC Act and the new *Wildfire Regulation* specifies requirements for:

- 1) Personnel and equipment: including fire watch, fire fighting tools, water delivery systems, and central equipment cache;
- 2) Fire prevention precautions relating to large and small engines, hot work, cable logging, sawmills, fireworks, combustible material, explosives, and restrictions on industrial activities;
- 3) Open fires: including fires for cooking, warmth and ceremony, fires for disposal of waste, fires not permitted;
- 4) Planning for protection operations: including requirement for a fire preparedness plan, content of fire preparedness plan, and training requirements;
- 5) Fire hazard assessment and abatement: including requirement for carrying out a hazard assessment, content of a fire hazard assessment, what constitutes a fire hazard, and abatement or removal of a fire hazard;
- 6) Initial fire suppression and site rehabilitation;
- 7) Forest fire fighting compensation, and offenses.

Operational weather stations are established near active logging operations during fire season. Logging operations are curtailed during high and extreme fire hazard conditions and public access to the TFL will be restricted during these periods.

3.6.10 Silviculture

Introduction

The aim of silvicultural management and treatment regimes on TFL 54 is to produce logs suitable for lumber manufacturing at the lowest cost. Interfor is committed to carrying out basic silviculture to support the TFL resource management objectives. Silviculture activities are and will be conducted in accordance with the FPC and associated Regulations, and then with the FRPA as it is phased in. Interfor has adjusted silviculture strategies to accommodate objectives of the Scientific Panel and to incorporate new information about the science of silviculture.

Silvicultural Systems

The company will develop, design, implement and monitor the results of these new "alternate variable retention silviculture systems". Key aspects to consider in the application of alternative silviculture systems include:

- Silvics of commercial tree species (as well as non-commercial brush and shrubs species, as they may effect conifers);
- Aspect of the landscape;
- Ecological suitability and forest health concerns;
- Terrain limitations;
- Exposure to high wind conditions that increase blowdown concerns;
- Worker safety;
- Economic feasibility;
- Equipment limitations;
- Other resource values (visual, wildlife, fisheries etc.); and
- Sustainable timber production

Interfor will apply a range of variable retention systems that address the above concerns to meet the objectives for forest management on the TFL. Silviculture system selection may make consideration for the *Silvicultural Systems Guidebook*.

Site Plans⁴⁷

Site Plans (SPs) will be prepared for all areas to be harvested and will be prepared in accordance with FRPA. The regulations specify requirements pertaining to information that must be available and the minimal contents of site plans.

Site Plans are not submitted to the Ministry of Forests however they are filed and available upon public or agency request (within a reasonable time frame) at Interfor's office. Site Plans must be consistent with the associated Forest Development Plan or Forest Stewardship Plan, and identify how the higher level plan, or the intended results or strategies described in the forest stewardship plan, apply to the site.

Site Productivity Reductions

The proportion of productive growing site, permanently converted for access and forest development, will be limited to that compatible with safety and long-term resource management objectives. Area converted to permanent access will be limited to the maximum stated and approved in the SP. Interfor naturally wishes to minimize the amount of road it builds and maintains, but it is also cognizant of other criteria, such as public use, fire control and other resource users.

The risk of landslides is recognized. Detailed terrain stability field assessments are conducted to evaluate risk of losses in productivity attributed to landslides. Risk of landslides will be assessed for impact on resource management objectives, and for significant risk of damage to resource values.

⁴⁷ Formerly called "Silviculture Prescriptions" under the FPC.

Interfor recognizes two components of risk. The first hazard is the probability that a landslide will occur. The second consequence is the impact that will be felt if the landslide occurs. High risk entails both a high hazard and a high consequence.

If new slides are noted, they will be reported to the South Island Forest District (Field Operations Supervisor and/or Engineering Officer). Reporting of slides will be in accordance with South Island Forest District landslide reporting procedures. As part of the individual event report an action plan for remediation work will be prepared if required.

Slides that have a detrimental impact upon the resource management objectives will be evaluated and where appropriate stabilized to:

- Control surface erosion and improve stability through revegetation and/or other techniques; and
- Re-establish conifer crops or appropriate deciduous species as required to meet objectives, where appropriate.

Other than the reductions in site productivity required for permanent access, management strategies will strive to maintain or enhance site productivity. The *Hazard Assessment Keys for Evaluating Site Sensitivity to Soil Degrading Processes Guidebook* may be considered in the assessment of the inherent sensitivity of a site to the following:

- Soil-degrading processes;
- Soil compaction and puddling;
- Soil displacement (including exposure of unfavourable subsoil and slope hydrology changes);
- Forest floor displacement;
- Surface soil erosion (exposed mineral soil); and
- Mass wasting.

In addition to the regulations, Interfor may consider measures in the *Soil Conservation Guidebook* and the *Soil Rehabilitation Guidebook*.

Site Preparation

Site preparation – through mechanical means or fire – is not commonly prescribed in TFL 54 since it is possible in most areas to achieve regeneration goals without it. Some reduction in competing vegetation is accomplished through ground-based harvesting in salal sites, but this is a beneficial by-product of logging, rather than a pro-active site preparation technique.

When it is done, the most commonly prescribed method involves mechanical preparation of planting spots through the moving and placement of logging slash. Most site preparation will be done with machines (excavators), however other techniques may be employed where appropriate.

The necessity for, and method of site preparation, is prescribed in the SP through assessment of potential slash loading, planting spot availability, species preference, regeneration method, biodiversity requirements, and fire and pest risk.

Interfor may refer to the *Site Preparation Guidebook* in developing prescriptions. Site preparation may occur on individual areas either on an individual planting microsite basis (<5 m²) or on a broadcast application to create a target number of plantable spots per hectare. Broadcast prescriptions generally target between 500 and 1000 spots per hectare.

As well as achievement of target stocking objectives, site preparation treatments may be carried out as part of integrated vegetation management strategies, or to improve soil or other site conditions for tree growth. These treatments may be considered where compatible with resource management objectives and scheduled in an SP. Under the FPC, the SP required approval from the Ministry of Forests. Under FRPA, a qualified registered professional (QRP) can sign off SPs.

Reforestation

Reforestation is accomplished as soon as it is practicable following the completion of harvest and any necessary site preparation treatments. In accordance with the SP the majority of harvested areas will be:

- Planted within one year of completion of harvest to minimize regeneration delay.
- Natural regeneration is prescribed on a site-specific basis. Fill planting of sites prescribed for natural regeneration may be required to achieve stocking standards within the specified regeneration delay period;
- Planted to ensure the presence of ecologically suitable and preferred species;
- Planted at densities that, along with natural regeneration, will ensure prompt achievement of target stockings standards;
- Planted with appropriate sized stock types (in general larger stock types are planted where vegetation competition, climatic conditions and animal browse are problematic);
- Planted with a component of genetically improved stock where available;
- Fill-planted within one year of plantation failure, if that occurs; and
- Fertilized where necessary to enhance growth on poor sites or to achieve crown closure on brushy sites.

The *Establishment to Free Growing Guidebook - Vancouver Forest Region*, may be referenced. Exceptions to this guidebook may be proposed after assessing the use of variable retention systems, and to overcome or reduce the effect of the following:

- Colluvial sites (precluding achievement of minimum stocking standards);
- Sites with high water table (within 30 cm of mean soil surface and restricting productive sites to mounds);
- Shallow organic soils over rock or other impermeable layers (Folisols); and
- Sites where lower stocking standards are deemed in accordance with wildlife management objectives.
- Unique standards for these and other sites will be defined in the FSP or the FDP.
- Colluvial sites, sites with high water tables, and sites with Folisols will be harvested only if they are capable of sustainable forest management, or if required for safety.

Where regional stocking standards cannot be achieved, proposed minimum stocking densities will be similar to those present before harvesting. In some cases, the SP will identify and recommend longer than normal regeneration delays.

Planting is only one component of reforestation, which also includes seed collection, ordering of seedlings, prescription of appropriate species and stock-types for each ecological unit in the harvested area. Interfor only uses seed from within the Maritime Seed Planning Zone. In addition, where possible, Interfor uses genetically improved stock that has been selected for improved growth performance or pest-resistance.

Brushing

Deciduous and brush competition in planted and natural stands will be controlled to allow stands to reach a free-growing condition as prescribed in the SPs. Plantations are monitored from completion of harvesting to determine the need for brushing treatment(s).

Interfor may brush where stocking standards cannot be achieved due to brush competition, or if improved crop growth performance is financially desirable. In most cases, the objective will be to avoid the need to brush by promptly planting suitable stock types. If brushing is required then the methods employed will be manual or mechanical. The brushing technique used will consider specific site, stand, and regulatory conditions.

Red alder and salmonberry present potential brush problems, particularly on moist sites. These species can usually be managed through prompt aggressive planting with large stock-types. Salal competition is best managed through site disturbance at the

time of harvest or post-harvest site preparation treatment, and the use of larger stock types combined with fertilizer treatment.

The method of brush control, whether manual or mechanical, is chosen on a site specific basis to provide the most efficient means of achieving the vegetation management control objectives. Interfor will not use chemical herbicides to manage brush in Clayoquot Sound.

Site Rehabilitation

Site rehabilitation opportunities may exist for backlog Satisfactorily Restocked (SR) and Not Satisfactorily Restocked (NSR) stands to improve stocking on sites with less than optimal conifer densities or preferred conifer species.

Non-coniferous cover

Red alder is the main non-conifer tree cover in Clayoquot Sound. It establishes rapidly, especially where disturbed areas contain exposed mineral soils, thus encouraging seed germination. Accordingly, red alder frequently establishes naturally on disturbed sites (i.e. slides, roads and landings) and is often the most suitable species to rehabilitate these poorer sites and to control erosion. Alder growing on these sites provides additional stand level biodiversity. Alder is, in places, planted to ameliorate erosion problems or unstable slopes.

Non-preferred conifer cover

Certain sites become naturally or artificially stocked with non-preferred conifer species. Examples are Sitka spruce plantations that are vulnerable to the terminal weevil, Douglas-fir plantations on wet hypermaritime/maritime sites, and pure Western Hemlock stands on wet salal sites. These situations are not prevalent in the TFL. Where they do occur, it may be possible to convert them to preferred species. However, in each case any activity will require a cost/benefit analysis.

Poorly stocked stands

These areas may have low or patchy stocking with conifers. Although they meet minimum stocking standards, tree quality and form may be less than optimal. These areas will likely produce stands with canopy gaps that provide stand diversity. Fill-planting will be considered where it is deemed economically feasible. These areas are not abundant in the TFL.

Seed Sources

Interfor attempts to have available a five-year or greater supply of seed necessary to meet planting stock requirements for the TFL. Genetically improved seed-orchard seed, will be obtained whenever it is available and suitable for Interfor's needs. The Licensee is neither an owner nor partner in any seed orchards, and therefore purchases suitable seed from other producers.

Interfor will trade and purchase seed to ensure adequate supply. Interfor will initiate collection programs if seed cannot be purchased or traded to meet its needs.

Spacing

Stands may be spaced as a part of the basic silviculture obligation as stated in the Site Plan. In accordance with the Chief Forester's memo dated January 26, 1998, the specified Maximum Density is subject to amendment following application of the Chief Forester's *Policy on Maximum Density* and the *Stand Management Guidebook*. Maximum Density is being reviewed, and maybe retroactively eliminated or modified as a requirement for achieving free growing on openings that have Maximum Density requirements.

The *Spacing Guidebook* may be considered in developing site-specific management strategies and prescriptions to accommodate resource management objectives identified in this Management Plan. The guidebook is not definitive and is deemed to allow reasonable flexibility to vary and adapt juvenile spacing practices to site and stand-specific conditions and to achieve a wide range of forest management objectives.

Stand density plays an important role in the growth function of regenerating stands, and the production of merchantable sawlogs, and is monitored in second growth inventory and regenerated stand assessments.

Stands will be considered for juvenile spacing where stocking control can be reasonably expected to result in a positive financial return from an earlier harvest of sawlog-sized conifers, or where stocking control is appropriate to achieve other resource management objectives. In addition, social objectives and stands that qualify for incremental funding will be considered for spacing as funding (FIA) becomes available. Spacing in older stands to achieve biodiversity objectives may also be carried out from time to time.

Silviculture Surveys

An appropriate regime of surveys and inspections will be maintained to support the basic silviculture program. Sites will be:

- Inspected at harvest completion to identify and prescribe any site preparation or planting treatments and to refine prescriptions for planting or natural regeneration;
- Inspected after site preparation to determine the quality/efficacy of the treatments and to further prescribe the planting/regeneration strategy;
- Inspected during planting to determine the quality of the planting stock, plantation and survival chance;

- Inspected between the first and second growing seasons after planting to determine the seedling survival rate and the need for additional planting or treatments;
- Surveyed before or at Regeneration Delay to determine stocking levels, stand height, species composition and stand health;
- Inspected at or before the anticipated onset of undesirable levels of vegetation competition;
- Surveyed for Free Growing condition; and
- Considered for other surveys and inspections as required to manage site conditions and to achieve resource management objectives.

Free Growing Stands

A free-growing condition will be achieved on all regenerated stands according to the relevant Acts and Regulations. The free-growing standards are specified in the approved FSP or the FDP for individual growing sites and stands. Target objectives for free-growing stands will generally conform to the *Establishment to Free Growing Guidebook - Vancouver Forest Region*, unless otherwise stated in the FSP or FDP. Stocking standards for regenerated stands, established prior to the FPC or the approval of this Management Plan, will conform to the approved SP.

Determination of the free-growing condition will be made for each individual stand type and site using the standards and criteria detailed in the approved plan. The determination of free-growing shall include the criteria of size, species composition, proximity of crop trees to competing vegetation, and the effects the competing vegetation has on crop tree performance.

Stand Management Prescriptions

The Stand Management Prescription (SMP) was required under the FPC of 1994, but is not required under the FRPA. SMPs specified requirements pertaining to treatments and objectives content of Stand Management Prescriptions, and review and comment.

An SMP was required prior to the commencement of any silvicultural treatment on Free Growing stands. Stand Management Prescriptions for TFL 54 took into consideration the *Stand Management Prescription Guidebook*. As noted above, SMPs are no longer carried out.

Pruning

Stands will be considered for pruning where stand manipulation can be reasonably expected to result in a positive financial return from a harvest of higher quality (i.e.: relatively knot-free) sawlog-sized conifers, or where stand manipulation is appropriate to achieve other resource management objectives (i.e. wildlife habitat).

In addition, stands that qualify for incremental funding will be considered for pruning, as incremental funding becomes available.

Planning and implementation of pruning activities may consider direction and standards recommended in the *Pruning Guidebook*. Under the FPC, pruning activities had to be prescribed under an SP or SMP, under FRPA, a QRP can include pruning prescriptions in the SP.

Commercial Thinning

Commercial thinning is the removal of merchantable volume from a stand prior to stand culmination. Commercial thinning will be considered to satisfy various resource management objectives and economic objectives. Objectives that may dictate commercial thinning are wildlife habitat, biodiversity emphasis, terrain stability, water quality, stand dynamics, fibre flow requirements or social values.

Fertilization

Fertilization has been considered in conjunction with planting to enhance seedling growth on poorer sites and as a pre-brush strategy on brushy sites. Broadcast application of fertilizer for pre- or post-free-growing crop enhancement is not planned or anticipated during the term of this management plan. Over the period 1995 to 2005, Interfor has operationally fertilized redcedar plugs with 'teabags' at the time of planting. Interfor also broadcast fertilized a regenerating redcedar plantation popularly known as the 'Black Hole' the site of protest camps in the early 1990s.

3.7 Research and Monitoring

3.7.1 Introduction

The Science Panel was unequivocal about the need to maintain an effective monitoring program, alongside forest management. Members of the Panel had no illusions about their ability to create perfect rules that would withstand the effects of time. They weren't sure if all the recommendations would provide the level of environmental protection hoped for, nor if they were all operationally feasible. At the time the report was tabled in 1995 there was no certainty that forest companies could adopt VR harvesting rules and conform to the many recommendations while maintaining an economically viable business. Nor for that matter, were they sure that allowing up to 5% of watersheds within 5 years would adequately protect them from increased peakflows.

The Panel couched its recommendations with the proviso that an effective monitoring program be established that assessed the impacts of its recommendations, and the modified the recommendations accordingly. This was to be the basis of an adaptive management system that would allow flexibility and would result in a fine-

tuning of the recommendations to optimize environmental protection on the one hand, and operational feasibility on the other.

Few forest products companies have the financial and personnel resources to carry out an extensive program of research and monitoring themselves. Furthermore, Provincial and Federal Governments have a mandated role to support forest research, especially where findings will benefit the sector rather than individual stakeholders. Agencies having some responsibility for forest research and monitoring in Clayoquot Sound include the Federal Department of Fisheries and Oceans (DFO) and Canadian Forestry Service (in Victoria, the Pacific Forest Research Centre). The Pacific Rim National Park also has a limited research and monitoring mandate. Provincially, the agencies in the 1990s were the Ministry of Forests (MOF), Ministry of Environment, Lands and Parks (now Ministries of Sustainable Resource Management and Water Land and Air Protection). However, prior to the 1990's relatively little research was actually carried out in Clayoquot, in part because of the relative remoteness.

3.7.2 Long Beach Model Forest Society

In 1992, under the auspices of the Canadian Forest Service, the Long Beach Model Forest (LBMF) Society was created to – among other things – facilitate research and monitoring activities in Clayoquot. Long Beach formed the westernmost of a network of Model Forests across Canada. The LBMF Society, consisting of mainly local representatives, were instructed to look beyond their own core funding (\$500,000 pr year) and to forge partnerships with other stakeholders in the region.

Interfor, from the outset, was an enthusiastic supporter of the LBMF Society (however, support waned in the middle period when it strayed away from the federal mandate). Interfor had hoped that the LBMF Society would in large part take the responsibility to fulfill the recommendations of the Science Panel for research and monitoring. Interfor provided direct and indirect support, and some staff acted as board members. The company contributing direct funding, as well as in-kind support, in the form of access to internal data, research expertise and experience, transportation and accommodation at logging camps.

The first five years of the LBMF Society's existence were not productive ones, as progress was hindered by internecine squabbles, lack of direction and difficulties over governance. Performance improved in the second five-year period (1997 to 2002), particularly in the last 3 years. However, funding was reduced at one point (due to perceived shortcomings) and ultimately withheld due to alleged non-compliance with program objectives.

Working with a wide range of partners, the LBMF Society facilitated numerous research and monitoring projects, in the following areas:

- ❖ Applied Forestry Research
 - Wetland connectivity and hydroriparian reserve networks;
 - Windthrow monitoring;
 - Dwarf Mistletoe incidence in VR blocks;
 - Ecosystem dynamics modeling
- ❖ Criteria and Indicators
 - Work Plan for Monitoring program for Scientific Panel
 - ‘Visioning’ symposium for Ucluelet and surrounding area;
 - Coordination of monitoring;
- ❖ Ecology, Hydrology and Climate Research
 - Water quantity, quality and climate monitoring network;
 - Amphibian inventory
 - Fisheries inventory mapping
 - Hydroriparian inventory mapping
- ❖ First Nations cultural values
 - Sharing and protecting our knowledge workshop
 - The meaning and practice of Hahulthi
 - First Nations perspectives on wildlife inventories.

The LBMF Society also developed initiatives in communication and education, for example the Rainforest Interpretative Centre, the Nuu-Chah-Nulth Biology Curriculum, and speaker series. The Interpretive Centre was dropped in 2000, but is now being managed by the Raincoast Education Society.

By 2001, the LBMF Society was engaged in research and monitoring activities that were supportive of the Science Panels recommendations, and met the requirements of Clayoquot-based licensees, including Interfor and Iisaak. Among the many projects, several directly dealt with monitoring of harvesting activities:

- ❑ *Coarse Woody Debris and Forest Structure.* A team from the LBMF monitored pre and post-harvest levels of coarse woody debris, vegetation, and forest structure within Iisaak’s TFL 57⁴⁸. The results showed that VR harvesting did not decrease the amount of CWD, however it substantially reduced the age of the CWD (in other words natural debris was largely replaced with undecomposed logging slash).
- ❑ *Hydroriparian Reserves and Wetland habitat protection* (McNutt *et al.* 2003.). This study described landscape planning and site-planning procedures and assessed their effectiveness in protecting landscape requirements and connectivity. The monitoring was done for Iisaak, but the results apply equally to Interfor.

⁴⁸ Beasley, B., R. Scott, D. Edwards, C. Jacobsen, M. Moeges, and K. McNutt. 2002. Monitoring and demonstrating the Scientific Panel recommendations for sustainable forest management. Long Beach Model Forest, Ucluelet, B.C. Unpublished report.

- ❑ *Dwarf Mistletoe in the LBMF*⁴⁹. This project monitored the incidence of dwarf mistletoe in Variable Retention blocks in 25 harvest units in TFL 54. The author found highly variable incidence, although the severity was greatest in small units less than 1 ha. Increasing reliance on redcedar as the main crop species has lessened the potential impact of this issue.
- ❑ *Variable Retention windthrow monitoring*⁵⁰. Robyn Scott conducted a multi-year project monitoring blowdown in VR harvest units in TFL 54. She found an average of 7% blowdown along untreated edges of cutblocks, and also that blowdown was greater in narrow buffers compared to wider buffers. She followed this up with a Masters thesis submitted to the Faculty of Forestry at UBC, under the direction of Professor Steve Mitchell (Scott 2005).
- ❑ *Aquatic Ecology in headwater streams (Price et al. 2003)*. In this study a team working with LBMF investigated flow persistence, stream size, canopy cover, organic detritus and algal biomass, as well as aquatic invertebrates in perennial and intermittent streams in old growth and clearcuts.

Interfor and the LBMF also developed a project examining habitat connectivity in Kennedy Lake. In conjunction with Dr. Andrew Fall of SFU and with funding from the Habitat Conservation Trust Fund of BC, the Kennedy Flats Landscape Model was developed to assess habitat connectivity. The purpose of the model was to provide strategic direction to harvest planning and the maintenance of habitat connectivity. One finding was that under the existing Kennedy Flats Watershed Plan and harvest levels, connectivity of old forest would increase over time.

The research and monitoring program conducted by the LBMF was directed by a board of governors and the general manager, and did not conform exactly to Interfor's requirements. Many of the projects did not specifically address monitoring needs, but addressed general knowledge gaps in Clayoquot Sound, for example climate monitoring, lichens, amphibians and First Nations perspectives.

3.7.3 Clayoquot Biosphere Trust

Early in 2000, Clayoquot Sound was declared an UNESCO (United Nations Educational, Scientific and Cultural Organization) Biosphere Reserve. The aim of a biosphere reserve is to promote and demonstrate a balance between people and nature, between conservation and sustainable local communities.

With this announcement came a \$12 million federal grant for an endowment fund for the Clayoquot Biosphere Trust (CBT) which was intended to use the income to support local research, education and training in the Biosphere Reserve region.

⁴⁹ Edwards, D.N. 2002. Incidence of hemlock dwarf mistletoe in variable retention cutblocks in the Long Beach Model Forest. LBMF Unpub. Rep.

⁵⁰ Variable retention windthrow monitoring report. LBMF Unpub. Rep. 2002.

Interfor has cooperated with the CBT since its inception, providing in-kind support. The CBT was successful in leveraging additional funding for numerous projects.

In 2002, the CBT obtained funding from the Vancouver Foundation and the Federal Department of Indian and Northern Development for the Iisaak Sustainable Forestry Project. This three year project aimed at Iisaak, the other TFL licensee in Clayoquot was an attempt to develop indicators and implement a monitoring program to determine what is sustainable within Iisaak's TFL and to determine whether the level of sustainability is economically viable. The second component of the project was to develop capacity within the Nuu-Chah-Nulth Central Region in the areas of management and leadership and key areas of forest management.

3.7.4 Other Research and Monitoring Initiatives

Forest Investment Initiative

After the demise of the LBMF, Interfor explored other avenues for meeting its research and monitoring objectives. In 2001, the Provincial Government established the Forest Investment Initiative (FII), administered initially by Forintek, in part to fund forestry-related research. Interfor applied for funding for numerous projects in Clayoquot Sound, in partnership with various agencies and institutions. Two applications were successful.

The first project was titled "Regeneration dynamics in clearcut, VR and Natural old-growth gaps in the Clayoquot Sound Area". Fieldwork was conducted mainly on Interfor blocks in Clayoquot Sound, over the winter of 2002/03, and a report was submitted to FII in April, 2003⁵¹. The study investigated species diversity, stem density, light parameters and understory brush in openings of different sizes and types. The team confirmed that VR openings have ecological conditions intermediate between clearcuts and natural openings. One finding however was that the growth rate of natural regeneration under small gaps was in many cases very slow.

The second project was "Long term population monitoring in relation to habitat availability for Marbled Murrelets in TFL 54 Clayoquot Sound⁵²". The objective of this study was to develop and apply a long-term radar monitoring program and to determine sustainable population thresholds for Marbled Murrelet. However, only the first phase of this study was funded; this resulted in a summary report of information needs, and a workshop of murrelet experts to chart future course of research.

⁵¹ Pearson, A., L. Daniels and G. Butt 2003. Regeneration dynamics in clearcut, VR and natural old-growth openings in Clayoquot Sound. Rep. Submitted to FII, Recipient Agreement No. R2003-0144.

⁵² Tripp, T. 2003. Literature review and information requirements for long term monitoring of Marbled Murrelets in Clayoquot Sound. Rep. Submitted to FII, Recipient Agreement No. R2003-01443

Research and Monitoring Plan

Interfor recognized the need for a strategic plan to direct future research and monitoring activities in Clayoquot Sound. In 2003, Interfor commissioned a Research and Monitoring Plan for Clayoquot Sound⁵³. This plan undertook to identify gaps in knowledge pertaining to forest management in Clayoquot Sound, and to propose areas of high priority for research and monitoring. The plan has not yet been finalized. Key areas were:

1. Assessing the effectiveness of the reserve system (e.g.: Marbled murrelet);
2. Researching and monitoring the transition from early seral to old-growth condition (particularly with a view to accelerating the recovery);
3. Researching and monitoring the effect of VR logging on ecosystem dynamics;
4. Researching and monitoring the regeneration performance in VR blocks (growth and yield);
5. Comparing environmental impacts of changed forest management practices between 1995 and 2005, with those prior to 1995 (i.e.: how successful were post-Scientific Panel methods in reducing environmental impacts?); and
6. Facilitation and participation of a paired-basin study aimed at documenting the effects of VR harvesting on watershed processes.

Local Landscape Ecosystem Management Simulator

Interfor partnered with a team led by Professor Hamish Kimmins of the UBC Faculty of Forestry to develop a spatially explicit model, the Local Landscape Ecosystem Management Simulator (LLEMS). This model was designed to assist managers in assessing the long-term impact of variable retention management on indicators such as timber volume flow, natural regeneration patterns, growth and yield, species composition, stand structure, and windthrow risk. LLEMS was calibrated and evaluated for use in Clayoquot Sound, and other parts of the BC coast.

VR Monitoring

Partly in response to SFI requirements to improve and maintain research and monitoring capability, Interfor initiated a program to monitor the effects of VR harvesting. Although this was a company-wide initiative, it held particular relevance to Clayoquot Sound, where 100% of logging was VR. The monitoring program was designed to evaluate the effects of VR on the following attributes:

1. Implementation progress
2. Training and safety
3. Economics
4. Achievement of Visual Management Goals

⁵³ Butt, G. and D. Lousier 2003. Research and monitoring plan: A strategy for Learning. Vol 1. Unpub. Report for Interfor, West Coast Operations. Madrone Environmental Services Ltd. Duncan.

5. Achievement of Planned Retention Targets
6. Regeneration success
7. Blowdown
8. Achievement of wildlife habitat objectives

SB3R Research Program

In 2003, Interfor approached Weyerhaeuser with the idea of participating in their Coast-wide monitoring initiative, which was focused on the effects of VR harvesting on small streams. With retention levels generally higher than those set by Weyerhaeuser, Interfor proposed that the inclusion of one of their Clayoquot harvest units would provide a good comparison with the 8 to 12 other installations which made up the study. After some study, the proposed block SB3R (a portion of the cutblock SB3) in the Kennedy Flats area was selected as a candidate.

Below is the Operational (1:5000 scale) map of SB3R.



International Forest Products Limited
WEST COAST DIVISION

Harvest Plan Map

BLOCK	SB3R	LICENCE NUMBER	TFL54	TIMBERMARK	54/113	CUTTING PERMIT	113	PRINTED:	Oct 16, 2003
FOREST DISTRICT	South Island	LOCATION	Kennedy/ Swim Beach	MAPSHEET	92F003	T.A.U.P	18.3ha	NET HARVESTED	17.3ha
								DRAWN BY: H. Botterill	
								REVISED:	

Co-ordinates:
Lat: 49' 01' 04"
Lon: 125' 34' 56"

Target Retention Level:

30%
50%

All Fallers must have Wildlife Danger Tree Certification

Block Features:

Block Boundary	
TFL Boundary	
T.A.U.P.	
HRRZ	
Wetland (W3)	
Retention Aggregate	
Logged Block	

Identified Resource Features:

Stream Reach	
Stream Class (FPC)	
NCD	
Designated Stream crossing	

Hoe Chuck

HC

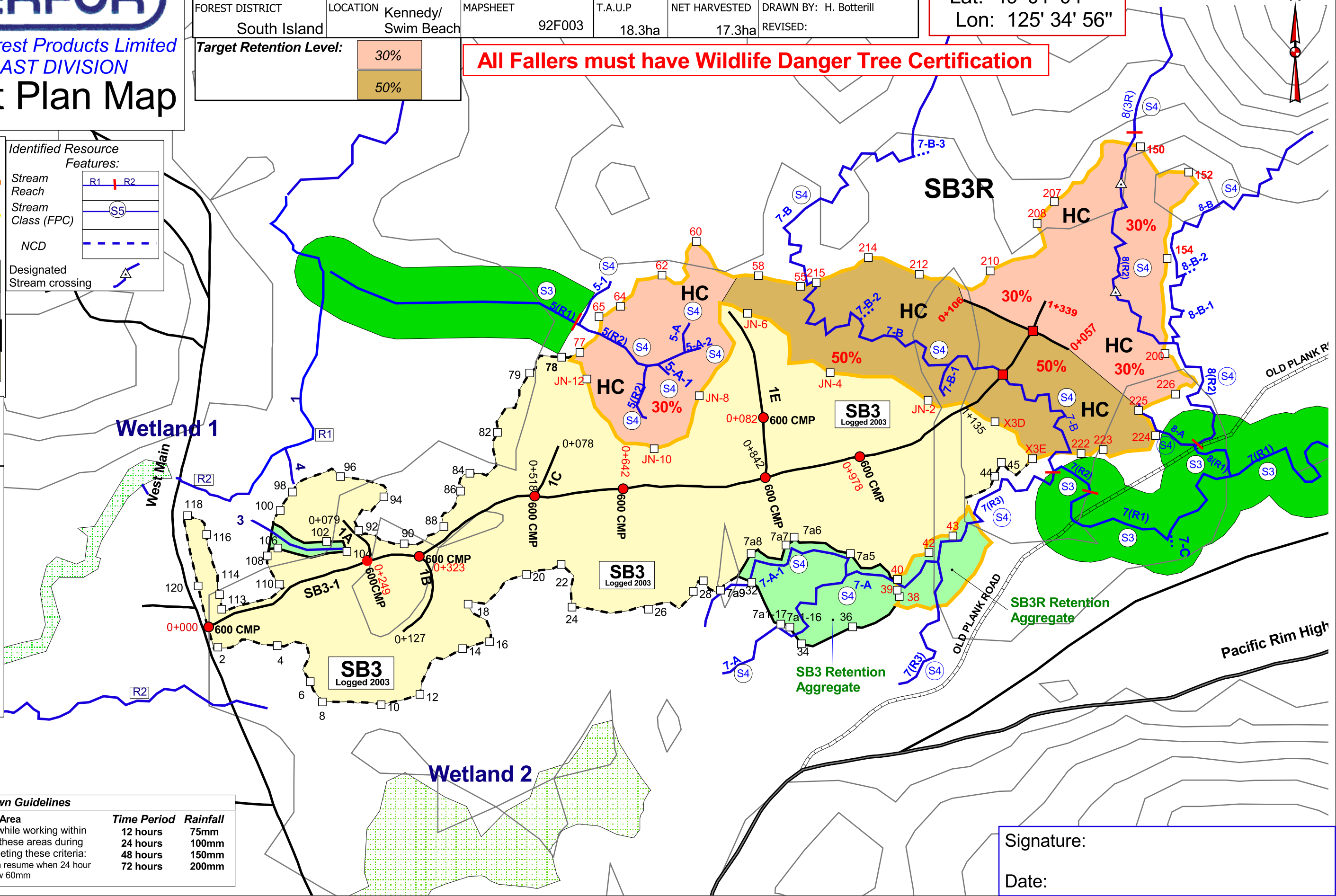
Access Structures:

Highway	
Existing Road	
Reconstruction	
Proposed constr.	
Endhaul Section	
Old Plank Road	
Bridge (Existing)	
Bridge (New)	
Wood Box Culvert	
Metal Culvert	

Rainfall Shutdown Guidelines

Landslide Hazard Area
Cease operations while working within (or downslope of) these areas during weather events meeting these criteria:
Note: Operations can resume when 24 hour rainfall is below 60mm

Time Period	Rainfall
12 hours	75mm
24 hours	100mm
48 hours	150mm
72 hours	200mm



Signature:

Date:

Later, Weyerhaeuser withdrew from the project, and Interfor decided to continue with the monitoring alone and without external funding. The block was laid out with three 'treatments', namely 30% retention, 50% retention and control (unharvested). The monitoring covered herb, shrub and tree response, including vertical structure, snag density, and coarse woody debris. In addition, streams are being monitored (in cooperation with Malaspina University College) for litter accumulation, temperature, fry density, pH, dissolved oxygen and other chemical parameters. The long-term objective is to monitor these variables as the area becomes reforested. Subsequently, the study was expanded to include a chronosequence investigation of second-growth development, in cooperation with the CBT. This monitoring program is being led by Warren Warttig, *R.P.Bio.*, of Interfor.

Road Deactivation Effectiveness Monitoring

Interfor collaborated on a project that monitored the effectiveness of road deactivation in Lostshoe, Thunderous and Toquart watersheds. It included several 20 x 50 m permanent plots to measure stability changes and several 3.98 m radius (50 m²) to monitor vegetation response. Wildlife logs were also installed at this time. The results showed:

- no instability initiated from the deactivated road sections,
- vegetation cover was greater on de-compacted road surfaces;
- vegetation cover was greater when applied mixes contained greater proportion of bunch (rather than sod-forming) grasses; and
- no use of wildlife trees until seven years after installation.

4.0 Future Vision

4.1 Introduction

In Clayoquot Sound, Interfor commits to meeting its environmental, social and economic obligations as the manager of Tree Farm License 54. This means that Interfor will remain in full conformance with the intent of the Scientific Panel's recommendations. It will conduct its forestry operations based on the tenets of ecosystem-based management and sustainable forestry. And it will participate – respectfully and fairly with First Nations, local communities and other stakeholders.

At the same time, it will continue to function as a viable forest products company, mindful of important social and economic benefits that flow both to itself and to its partners including the people of British Columbia. Interfor believes that it is possible to harvest, process and deliver forest products from Clayoquot Sound on a sustainable basis, without deleteriously affecting ecological, aesthetic, recreational, cultural or other values.

Since the early 1990's, the standard of forest management in Clayoquot Sound has undergone a great deal of progress - as documented in this plan. Enormous strides have been made in the areas of resource inventories, hazard assessments, delineation of reserves and protected areas, ecologically sensitive forest practices – including the adoption of Variable Retention and better road design, construction and deactivation.

Detailed, watershed based restoration plans have been developed, and millions of dollars have been spent on restoration of disturbed ecosystems, particularly in Kennedy Flats, where substantial and dramatic improvements in salmonid returns have been seen.

There have also been fundamental changes in the nature of the partnership between Interfor and its partners, with effective working agreements and protocols in effect with First Nations, regular consultation with Central Region Board (CRB), agencies and local governments (see Section 3.2).

Interfor has developed an innovative model for involving the public in planning exercises, and has made a noteworthy effort to communicate the new forestry being practiced in Clayoquot (see the “dot process in Section 4.2). It has also invested in training and education to ensure new practices are being carried out safely and effectively.

Finally Interfor has participated, commissioned or helped fund innumerable research and monitoring initiatives to guide and improve its management (see section 3.7).

However, all these developments have resulted in higher operating costs and poorer returns on investment. There are increased costs not just in harvesting, road building, silviculture, planning and engineering. As well, fixed unit costs are substantially higher due to the dramatic decrease in the annual cut – from 181,000 m³ in 1992 to 75,000 m³ in 2003. The net effect of these changes has been to threaten the economic viability of TFL 54. Reductions in the ‘Clayoquot Stumpage Additive’ –initially taking into account the overall operational cost increases but now only recognizing increased overhead costs have compounded the economic difficulties.

Despite these problems, Interfor has a long-term vision in Clayoquot Sound, one that includes surmounting economic challenges. The vision includes the following elements:

Science Panel Recommendations

- Meeting or exceeding the Science Panels recommendations in the vast majority of cases, but introducing changes to certain recommendations, based on new scientific findings, and/or based on 10 years of experience with

implementation; all in accordance with the Scientific Panel philosophy of adaptive management.

Return on Investment

- Improving efficiencies in planning, consultation, engineering, forest practices, log storage and delivery, marketing and management overheads, such that the return on investment (both to Interfor and other stakeholders) is increased;
- Rationalizing the overall asset base (i.e. reducing or sharing fixed assets such as camps, dryland sorts, booming grounds, etc) to allow for a sufficient return on assets;
- Reducing or recovering fixed costs by innovative means (e.g.: Stewardson logging camp- potential for combined forestry, aquaculture and tourism use) and using a local labour force that can stay at home to save on room and board costs;
- Reducing variable costs for road construction and logging by trying to move to a competitive market based rate system;
- Working on a spatially-explicit, area-based AAC and utilizing the new-found flexibility to optimize sustainable forest management.

Working with Partners

- Developing new, or strengthening existing, partnerships, based on the model of Community Cooperative Areas (CCAs);
- Working with First Nations, local communities, government agencies and other stakeholders to improve communication, cooperation and consultation on management issues in the TFL.

Research and Monitoring

- Continuing to invest in research and monitoring, in partnership with agencies, universities and/or other institutions, and to use new information or insights to adaptively manage the TFL.

Marketing

- Seeking potential FSC certification for TFL 54, and exploiting newly available market niches;
- Continuing to promote Clayoquot Sound as a model of sustainable forestry, predicated on the precepts of ecosystem-based management.

4.2 Building on Success – Achievements in Clayoquot Sound

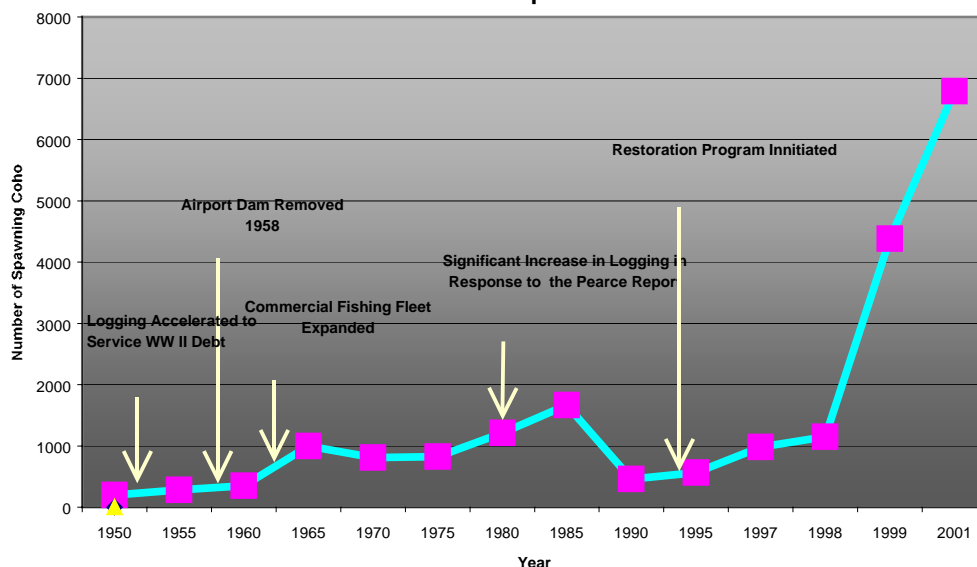
In many areas, Interfor has exceeded expectations in working with the paradigms of ecosystem-based forestry, heralded by the Scientific Panel recommendations.

4.2.1 Ecological Restoration

Interfor and its partners have achieved substantial good will and trust as a result of a consistently well-managed program funded in part by Forest Renewal BC (FRBC), Habitat Restoration and Salmon Enhancement Program (HRSEP), and Forest Investment Account (FIA) and various private donors (including Home Depot, the Vancouver Foundation, the International Pacific Salmon Commission).

Through the latter half of the 1990s, Interfor expended a great deal of effort in restoration and enhancement plans, mostly but not exclusively in the Kennedy Flats. The company managed nearly 4M\$ on road deactivation, erosion control, stream and riparian restoration and monitoring, and employing mostly local people. The restoration plans and activities were “watershed based”, and applied across tenures. There has been a significant increase in returning salmon. With a further investment of close to another \$4,000,000 the annual economic benefits (through increased coho returns) have been estimated at nearly 2.5M\$⁵⁴. IN 1992, DFO escapement records indicated that salmonid returns were greater than at any other time since escapement has been monitored in the 1950s(Figure 5). This is a real success story, that Interfor is justified at showcasing with pride.

**Fig.5. Kootowis Creek
Coho Escapement Trends**



⁵⁴ Warttig, W.R., D. Clough, M. Leslie. 2001. Restoration Plan, Kennedy Flats - Kootowis, Hospital, Sandhill, Trestle, Trestle S, Indian/Harold, Salmon. Ministry of Water, Land, and Air Protection. BC Ministry of Forests. P.65



Kootowis Creek,
before restoration:
choked with
logging debris from
the 1960s and 70s.



Kootowis Creek
after restoration.

Place photos side/by/side or juxtapose.

4.2.2 Variable Retention Logging

Interfor pioneered the implementation of Coastal VR harvesting systems⁵⁵. Using a range of yarding systems, including skyline, helicopter, grapple and ground-based techniques, Interfor has worked with its contractors to reduce logging costs, while at the same time maintaining safety standards. Interfor has exceeded expectations in its success in optimizing safe, efficient, and effective techniques for meeting the recommendations of the Science Panel (see Section 3.6 for more detail).

In TFL 54, Interfor designs cut-blocks to meet Scientific Panel recommendations, and to meet the objectives of ecosystem-based management⁵⁶. Under VR harvesting, in-block retention (ranging from 15 to 70%) has reduced opening size and retained representative old-growth patches. In so doing, its logging operations emulate natural disturbance patterns (mainly windthrow) much more closely than the clearcutting of the previous era. Interfor has refined the planning, design, lay-out and monitoring of complex patterns of cutting units interspersed with leave areas. In addition, its management of second growth using VR designs - may accelerate the



acquisition of old-growth features, as the residual stand matures⁵⁷. There is increasing evidence that second-growth conifer plantations can be effectively managed for biodiversity (see, for example: Carey *et al.* 1999).

Example of second-growth habitat enhancement: a raptor platform has been placed in this stand.

Interfor's success in Clayoquot Sound has been recognized. A special audit in 2001 by the Forest Practices Board reaffirmed that Interfor was compliant with the Science Panel. Interfor's manager in Clayoquot, Don McMillan was awarded the Habitat Canada- Forest Stewardship Award in 2003, and more recently was named "Forester of the Year" in 2004 by the Association of BC Forest Professionals. Both awards

⁵⁵ In 1995, Interfor was the first large forest company to implement VR techniques. By 2005 several other companies have used VR – most notably Weyerhaeuser which has attempted to phase out clearcutting. Harvesting in Interfor's Coastal Operation is approximately 50% VR, although all Clayoquot Sound it is 100% VR.

⁵⁶ For a definition of EBM, see Section 1.3.

⁵⁷ This may be accomplished through some combination of variable-density thinning, gap-thinning, retention of windfirm trees, underplanting in riparian areas, or snag creation.

recognized his commitments to sustainable forestry and working under the stringent codes of the Scientific Panel recommendations.

Although arguably a success in developing efficient techniques for logging in Clayoquot Sound, costs are still too high to maintain a consistently viable forest products operation. An unpublished study commissioned by Interfor in 1998⁵⁸ documented the low productivity in planning, engineering and harvesting timber under Scientific Panel rules. The problems emerging from continued high costs, weak markets and unfavourable appraisal policies are explored in section 4.4.

4.2.3 Relationship with First Nations and Local Communities

Interfor has developed good working relationships with the local First Nations including the Hesquiaht, Ahousaht, Tla-o-qui-aht, Ucluelet and Toquaht. Interfor has working protocols with some of these First Nations and continues to work towards long-term, mutually beneficial relationships with all of them while meeting the challenges associated with maintaining a viable forestry operation. All this is taking place in an environment of evolving treaty negotiations between First Nations peoples and Governments. Naturally there have been some setbacks along the way, but Interfor is proud of the progress that has been made in the 10 years since the Scientific Panel completed its reports.

Over the course of these 10 years, First Nations involvement in forestry has grown substantially. They were part of the Science Panel team (contributing one of the five volumes); First Nations members participated in the Clayoquot Sound Technical Planning Committee, which was responsible for drawing up the Watershed Reserve Plans; they are members of the Central Region Board who are tasked to ensure that First Nations and local communities have an opportunity for input into forestry activities. And, First Nations work directly for and with Interfor in various forestry and restoration activities.

Interfor has fostered First Nation and Community involvement in forestry Community Involvement Pilot Project Agreements and Business Partnership Agreements (Hesquiaht, Ahousaht, District of Ucluelet) that were created to start the challenging process of revitalizing a local forestry labour force; Timber Sale Joint Ventures (Hesquiaht), Market Log Agreements (Hesquiaht), Cedar Salvage Agreements (Hesquiaht, Ahousaht, Ucluelet FN (Looker)), silviculture contracts, forestry and engineering work from higher level planning to site level planning as First Nation Forestry Liaison employees walk each block to assess and provide recommendations for cultural resource management, and so on.

⁵⁸ LaLari, I. 1998. Productivity analysis of alternative harvesting practices in Clayoquot Sound. Unpub. Consultant report for Interfor, West Coast Division.

Interfor has developed a good working relationship with local communities including Ucluelet, Tofino and the Alberni Clayoquot Regional District. Interfor is assisting the District of Ucluelet (DOU) in its goal of managing a forest tenure (and eventually being awarded a Community Forest tenure). This is one of the outcomes of the District of Ucluelet and Interfor Community Involvement Pilot Project Agreement –as the DOU has generated revenue that has allowed it to cover the costs of creating the applications and establishing its business (Ucluelet Economic Development Corporation). Interfor is working with the Alberni Clayoquot Regional District on the Official Community Plan for the Long Beach (Area C) Region. Interfor is providing the planners all the digital information and planning data collected over the past few years at no charge.

Interfor has made many donations towards the various communities; wood for a boat house in Ucluelet for Search and Rescue, wood for the gazebo in the town centre of Tofino, tens of thousands of dollars of GIS products shared with local organizations (Search and Rescue, Pacific Rim National Park, etc); donations to numerous local charities and organizations.

Interfor, through its involvement with the Central Westcoast Forest Society, continues to work towards further enhancement of salmon streams and the creation of the “Clayoquot Community Forest Centre” near the Interfor office site; a place to celebrate and share our knowledge of forestry to the world. Interfor has provided space for a small entrepreneurial custom cut sawmill that was established by local contractors to create further local social and economic benefits for the region.



The sawmill near the Interfor Office.

Interfor has also received credit from *Friends of Clayoquot Sound* (a surprising and highly critical source) in providing access for local value-added processors to a supply of wood. It has opened a log sales yard, providing alder, yew, hemlock, white pine, redcedar and yellow cypress and other products. An on-site log grader is available to facilitate sales at market value. This initiative has assisted a struggling value-added sector, and represents a move

towards product diversification and local partnership that could yield significant benefits in the future.

4.2.4 Relationship with Government

Interfor has directly funded or collaborated with government agencies on resource inventories, and has assisted in development of watershed plans. It contributed nearly \$1M of Interfor-purchased resource inventories (at the outset of the process) and completed a number of interim watershed plans that it provided to the Clayoquot Sound Technical Planning Committee for their use at no cost. Interfor continues to work cooperatively with all levels of Government and assists both Provincial and Federal Agencies.

One of the most exciting cooperative relationships is that with the Pacific Rim National Park- our “neighbour”. Over the past few years Interfor has developed an excellent working relationship and has assisted the National Park in working towards one of its mandated objectives of ecosystem integrity. This has been done by cooperative involvement in landscape planning, ecosystem restoration (Interfor has worked to raise funds to allow for in-stream restoration in the National Park), road access control to remote areas of the park and many other examples of a cooperative relationship.

4.2.5 Public Consultation

Interfor has developed a successful and emulated public consultation model, and incorporated the results into their sub-regional plans. In particular, the “dot-process” was developed by Interfor to facilitate public input in identifying areas of significant forest, fisheries, recreational, scenic, cultural and other values. Participants were urged to place ‘dots’ to represent sites that they felt were important for camping, hunting, wildlife viewing, scenery, food-gathering or other purpose. Interfor digitized these dots, and incorporated them – as much as possible – in its strategic plans. The process encouraged the public to think about spaces within the TFL and surrounding areas that are important to them, and enabled them to have a real say in the forest development of the area. This program helped to foster trust in the company amongst local communities.

4.2.6 Blowdown Monitoring

Interfor has – for four years – conducted annual monitoring of blowdown in VR blocks, and has developed a relatively sophisticated blowdown management policy. For each of these years Interfor commissioned Madrone Environmental Services Ltd. to conduct aerial inventories of actual blowdown in 30 to 45 openings, most of which had been harvested under VR rules. The amount, direction and where possible, composition of blowdown for each opening was recorded. On the basis of this

accumulated experience and knowledge of blowdown patterns, Madrone developed a simple prediction model – based on forest cover attributes and topographic exposure that enabled Interfor foresters to rank the blowdown hazard of proposed blocks. Madrone and Interfor developed a risk management program that included on-site assessment and special design measures to minimize hazard in moderate and high risk blocks. Testing of the model in 2004 showed that in general it was successful in differentiating low from high hazard stands, but in about 20% of blocks actual blowdown differed significantly from predicted levels.

4.2.7 Innovative AAC Methodology

Interfor has successfully managed the transition from a volume-based to an area based AAC, finally meeting a key Scientific Panel recommendation. The Timber Supply Model developed by Interfor in conjunction with JS Thrower and Timberline represents an innovative approach that has incorporated the knowledge gained over the past few years of operations in Clayoquot Sound. The model is spatially-explicit and based on best-available growth and yield-data, realistic cost estimates (to calculate minimum harvest ages) as well as the effects of rate-of-cut and biodiversity harvesting constraints.

4.2.8 Planning

Interfor has been a leader in developing new planning methods, new ways to use resource data, remote sensing, habitat models, engineering approaches, silvicultural techniques and access management to meet and exceed Scientific Panel recommendations. The numerous ways that Interfor provided innovative solutions to planning problems are highlighted in sections 3.4 and 3.5.

4.2.9 Education and Demonstration

Over the past few years Interfor has provided numerous tours and presentations to groups from all over the world; showcasing the local Sustainable Forestry Ecosystem Management. Annually between 200 and 400 people from places like Russia, France, Germany, Holland, Belgium, U.S.A, Canada, Japan have been toured to see the new variable forestry and ecosystem restoration. Elementary students, foresters from all over the world, reporters and many other people have toured the operations and have left with a new and greater appreciation for the high standards of forestry practiced in Clayoquot Sound.



Warren Warttig guiding a tour in Clayoquot Sound.

4.3 Improving Short-comings

While Interfor can be proud of its accomplishments in Clayoquot Sound, there are short-comings that represent potential areas of improvement.

4.3.1 Research and Monitoring

A key short-coming identified in this plan has been inadequate monitoring and research to support adaptive management. This was a general recommendation stemming from the Scientific Panel Report, which espoused the concept of adaptive management (essentially ‘learning by doing’). The Panel did not intend that its 120 recommendations be permanent; it envisaged a supportive program of research and monitoring to adjust the rules as new information and experience was gained.

Research and monitoring (R&M) have traditionally been viewed as the purview of the Provincial Government. However, the 10 years since the implementation of the Scientific Panel report has seen a substantial reduction in funding in the capability of the Ministry of Forests (and associated resource Ministries) to carry out this function. A major function of the Central Region Board was to facilitate monitoring, but lack of consistent funding has drastically limited its ability to meet this objective.

Nevertheless, Interfor has been active in R&M activities, particularly in support of its SFI certification. And it has made a significant effort to cooperate with other agencies, organizations, institutions, and government departments to facilitate R&M. Section 3.7 describes these activities in more detail.

The failure lies largely in the inability of its partners to maintain continuity. For example, Interfor extended consistent and generous support for the Long Beach Model Forest Society (LBMF) until the Canadian Forest Service pulled its funding in

2003. It attempted to coordinate with Weyerhaeuser on its Forest Project, a broader monitoring initiative, only to have that company withdraw. On its own accord, Interfor established a monitoring protocol on one of its VR blocks in Kennedy Flats (SB3R). Interfor initially cooperated with Iisaak and Clayoquot Biosphere Trust on a large Government funded monitoring project – but later withdrew.

Interfor made numerous attempts to procure funding for research from the Forest Innovation Investment – a provincial government fund aimed specifically at research and monitoring in the forestry sector. It was only successful on two projects. One an investigation of forest regeneration in natural, VR and clearcut openings⁵⁹ was completed. The other a review of Marbled Murrelet radar-assisted monitoring was funded for its first phase, but not for completion. FII instead funded similar research from another proponent.

Despite these efforts, the vision of the Science Panel to develop a long-term, consistent and comprehensive program of research and monitoring has failed to materialize. This inadequacy has hindered efforts to adopt adaptive management and introduce greater flexibility in managing the land base.

4.3.2 Lack of Impact Assessment of Scientific Panel Implementation

Despite several attempts, a comprehensive study on the environmental, economic and social impacts of the Science Panels implementation has not yet been undertaken.

The fault of this shortcoming does not fall entirely on Interfor's shoulders. Government should have some responsibility for conducting such an impact assessment. Indeed, Interfor has attempted to obtain funding for such a study via the Forest Innovation Investment account and other funding sources, without success.

Such a study is timely, not least because it is now 10 years since its implementation. A greater understanding of the full “triple bottom line”⁶⁰ accounting of this revolution will help provide perspective for some of the changes proposed in this plan.

⁵⁹ Pearson, A.F., L.D. Daniels and G. Butt. 2003. Regeneration dynamics in clearcuts, variable retention and natural disturbance gaps in the forest of Clayoquot Sound, Vancouver Island. FII final Report. Abstract available at http://www.feric.ca/en/wd/home/events/regenissues/Pearson-Daniels-Butt_CR.doc

⁶⁰ Defined conceptually as economic prosperity, environmental quality and social justice: Elkington, John (1998), “The Triple Bottom Line: Sustainability’s Accountants”, Chapter 4 of *Cannibals with Forks: The Triple Bottom Line in 21st Century Businesses*, New Society Publishers.

4.3.3 Conformity with Applicable Scientific Panel Recommendations

When the Scientific Panel released its recommendations in 1995, Interfor committed to full conformity – at least those recommendations that pertained to the tenure holder and not to governments or its agencies. Several recommendations are not entirely applicable to the licensee, for example, R1 requires adherence to standards that reflect indigenous peoples' relationship with the forest. While Interfor is cognizant of these standards, much of the responsibility for this recommendation lies with the Province, through their Government-to-Government agreements, and is subject to treaty negotiations to which Interfor is not a party.

There are 170 recommendations (97 general, 73 specific) in the Science Panel report. Of these, 44 are the sole responsibility of Governments, mainly associated with treaty negotiations and legislated responsibilities under the Forest Act. Another 30 fall under joint responsibility of Government and Licensees, and the remaining 96 are mainly the responsibility of Licensees. Most contain guidelines or objectives that are reasonably achievable, (although in some cases costly). Interfor has strived to meet the intent of all of these. Some however are rather restrictive, and limit the flexibility of the licensee to meet the intent of the recommendation in other ways.

In the following section, we summarize areas where Interfor has not achieved full conformity, and identify the reason for non-conformity. In some of these cases, incomplete conformity is not necessarily a shortcoming, and revising the recommendation should instead be considered as an opportunity for improvement (and these are discussed further in 4.4: "Future Strategies and Goals").

Recommendation R5.2: Improve on-the-ground performance in construction and maintenance of road drainage structures (ditches, culverts, bridges). Reduce the impact of roads by allowing the passage of shallow subsurface groundwater (requires research).

Nature of Incomplete Conformity: Interfor has made substantial improvements in the construction and maintenance of ditches, culverts and bridges, in the 10 years since 1995. However it has not intentionally designed roads for the specific purpose of passing shallow subsurface groundwater. In certain areas, subsurface drainage has been accommodated through road deactivation.

Reasons for incomplete conformity: As noted in the Scientific Panel, more research is needed to evaluate the effectiveness of measures that will allow the passage of subsurface flow. Interfor periodically uses 'porous fills' and French drains to allow passage of subsurface flow, but does not routinely incorporate this objective in its road designs. Furthermore, no research specifically directed at this project has been undertaken. The need for subsurface flow passage is a highly site-specific need, and this is more appropriately addressed in a geotechnical review, as requested from time to time by area engineers. Interfor does not feel that it is necessary to make this a

routine requirement, or that conventional surface drainage measures in most cases are not adequate. In the 10 years since 1995, Interfor has increased its density of surface drainage (culverts and cross drains) along roads to ensure surface drainage is not concentrated. On deactivated roads, Interfor has used trench and blanket drains to facilitate hillslope drainage⁶¹.

Recommendation 5.5: Revegetate all disturbed areas associated with roads. Promptly apply erosion control, and use indigenous, non-invasive species.

Nature of incomplete conformity: Interfor routinely seeds road fills and other disturbed areas and where required uses hay bales or straw mats and filter fabric for erosion control. Except for the use of native shrubs (e.g.: red alder, salmonberry, willows, etc.) for specific erosion control or landslide restoration, it does not use indigenous species. It does use a specially formulated mix of agronomic grass and legume species designed for west coast conditions, in such a way that does not inhibit natural encroachment of indigenous species.

Reason for incomplete conformity: The use of indigenous species for routine erosion control is impractical and infeasible due to the limited supply⁶² of such species, and the prohibitive cost where such supply is available.

Interfor was aware from the start that this recommendation would pose a problem, in that there was **no** native grass seed available. As a result, Interfor participated in the initiation of a Native Grass Seed research program that started in April 1996, and finished March 2004⁶³.

Under this program, Interfor preferentially utilized seed mixtures high in bunch grass content to allow for infilling of native seed. As well, Interfor specifically ordered the seed mixtures without white clover, which was actually the only seed listed in the Scientific Panel (R5.5, P. 243, Vol.5) as being invasive on the coast.

Operationally, Interfor had three mixtures that were generally ordered through Dawson Seed (now called NuSeCo). Two were FRBC mixtures (one summer mixture, and one winter mixture that was frost tolerant). The third was a general roadside-wet site mixture (designed for ditch use) that also had the white clover omitted. Operational experience with the use of these seed mixes for erosion control has been satisfactory, and the spread of non-native grass species has not been significant.

⁶¹ Wise, M., M. Leslie, G. Horel, D. Collins, W. Warttig 200_. Road deactivation for hillslope restoration: lessons learned on the Escalante Watershed Restoration Project.

⁶² No indigenous grass species are available to date, but four species should be available by 2008.

⁶³ Vaartnou & Associates 2004. Establishment of a native seed industry for the west coast of BC. Final Report – 2004-05. Consultant Rep. For Interfor, Weyerhaeuser and WFP.

Recommendation 5.6: Determine required road widths based on anticipated vehicle use (i.e., vehicles that will use the road) and traffic volumes. Road widths should not exceed 4.25 m except as required on curves for sidetracking of trailer units and for turnouts. Wider or higher standard roads may be justified by special needs or safety, such as heavy industrial or recreational use, or regular use by local communities.

Nature of incomplete conformity: Interfor constructs its roads with a running surface width of 5 m, or 6 m including ditch. This is the industry standard in BC.

Reason for incomplete conformity: A running surface of 4.25 m is not adequate for most logging roads and logging equipment required to harvest the larger logs in Clayoquot Sound. Designing to such narrow standards would result in unsafe conditions under some circumstances. Interfor, like most other logging companies in BC, strives to minimize road widths, both to minimize site disturbance as well as to minimize construction and deactivation costs.

The industry standard of 5 m reflects a widely accepted compromise between the desire to minimize disturbance and safety standards. Under certain conditions (e.g.: gentle slopes, high bearing strength and compactability of native soils) narrower roads can be built, but in most conditions, an Industry standard of 5 m will still be followed. [This is also identified as a strategy under section 4.4.]

Recommendation R5.8a: The surface of the dryland sort should slope landward, rather than seaward.

Nature of incomplete conformity: All dryland sorts that are currently controlled or operated by Interfor in Clayoquot Sound were constructed over 30 years ago by other companies (i.e. Stewardson Inlet Camp was originally built by Pacific Forest Products Ltd., and the Rankin Cove sort was built by MacMillan Bloedel Ltd). All other Dryland Sorts used by Interfor, namely: Cypre River, Bedingfield, and Kennedy are owned by Iisaak Forest Products Ltd or Weyerhaeuser Ltd.

Interfor has up-graded these sorts to meet its internal Environmental Management System (EMS) criteria, and accordingly achieves the intent of this recommendation, which is to minimize sediment delivery to marine waters. However, it does not slope the surface of the dryland sorts landward.

Interfor's design of dryland sort water and sediment management incorporates ditches and catch-basins that minimize the escape of sediment and contaminants to the ocean. Through these means, it achieves the intent, if not the letter of the recommendation. Since these measures effectively achieve the results desired, Interfor

proposes to continue using them for the design and construction of any future dryland sorts⁶⁴.

4.4 Strategies and Goals

4.4.1 Introduction

The over-arching goal for Interfor is to realize the vision articulated in 4.1. This means remaining a viable economic entity, while meeting environmental and social sustainability objectives.

The difficulties facing Interfor in Clayoquot Sound are two-fold; one is to maintain economic viability and ensure a minimum return on investment. At the same time, it must continue to communicate its progress, and to demonstrate its commitment to managing its forests in accordance with accepted tenets of ecosystem-based management.

To maintain the economic viability of TFL 54, Interfor must continue to make progress on several fronts. Foremost is seeking far-ranging and innovative ways of reducing unit costs while at the same time realizing revenues. Interfor is moving ahead in these initiatives:

1. New approaches to AAC calculation and increased flexibility in harvest planning (4.4.2 and Section 3.5);
2. Modification of certain Science Panel recommendations, to improve operational efficiency without compromising ecological integrity (4.4.3);
3. Continued effort to develop new partnerships and strengthen existing partnerships with stakeholders, including FN, local governments, senior government and contractors (4.4.4);
4. Continuing to negotiate with the Provincial Government to achieve a fair and equitable stumpage formula that will more realistically recognize the unique difficulties encountered in the Clayoquot environment (4.4.5);
5. Pursuit of FSC certification that will ultimately allow new marketing opportunities for wood products (4.4.6).

Interfor must continue to strive to showcase its efforts as a practitioner of world-class forest management. We must continue to emphasize the social and economic benefits that would be lost if it is prevented from conducting business in Clayoquot Sound – benefits that are largely ignored by Interfor's critics. Interfor's environmental performance in Clayoquot Sound since 1995 has been exemplary (see, for example, the successful Forest Practices Board audit of 2001, as well as successful

⁶⁴ Interfor has in-sloped sorts outside Clayoquot Sound, where site conditions are favourable, and such an approach is not ruled out.

KPMG internal and external audits for certification requirements), and although there is continued criticism (and always will be), there should be no reduction in effort to showcase this operation to local communities and to the world.

Interfor's strategy to continue to build trust, improve public relations, and foster stakeholder cooperation should include:

1. Continued efforts to develop a forest centre, in conjunction with local partners and FN groups (4.4.7);
2. Continued efforts to educate and inform the public, through demonstration of research and monitoring activities as well as ecological restoration projects (4.4.8);
3. Invigorated efforts to develop a coordinated research and monitoring program, in partnership with agencies, universities, other research institutions and individuals (4.4.9).

4.4.2 Area-based AAC

Although one of the recommendations of the Science Panel has been to move to an area-based AAC, this measure has only recently been accepted by the MOF and regulations were enacted in 2004. Interfor – with its consultants - has developed an innovative method for area-based AAC⁶⁵. If the Chief Forester accepts the new AAC, it will offer an opportunity for Interfor to benefit both from increased harvesting flexibility, as well as increased timber flow.

The outcome of this exercise, which represented a significant investment by Interfor, is a credible and realistic AAC calculation. The timber supply model used is based on a spatially explicit model that addresses the most recent growth and yield data modified for reduced growth expectations in VR units and realistic estimates of minimum harvest ages throughout the Sound. The approach is described in more detail in section 3.5.

4.4.3 Conformity to Scientific Panel Recommendations

4.4.3.1 Rate of Cut

R3.1: Within the watershed planning unit, determine a rate-of-cut based on the watershed areas.

⁶⁵ Timberline Forest Inventory Consultants and J.S. Thrower & Assoc. 2005. Timber supply analysis information package. TFL 54. Unpub. Report submitted to Interfor, April 2005.

Proposed Modification. No change.

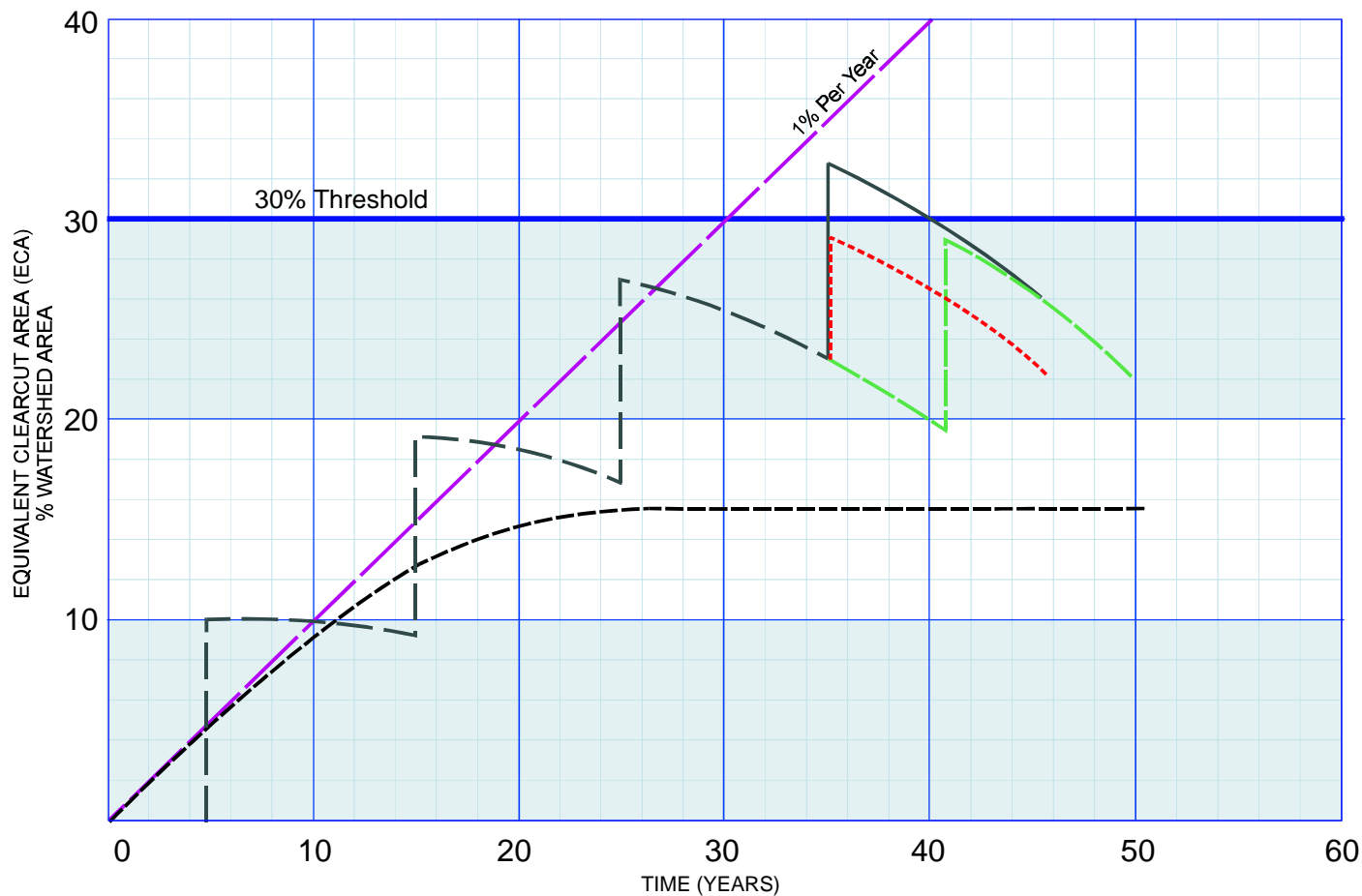
R3.1a: Watersheds larger than 500 ha – no more than 5% of total watershed area in a 5 year period.

Proposed Modification: Interfor proposes that this rate of cut be modified - but only on watersheds where it can be demonstrated that peak flow changes are likely to be small, or that channels have a low vulnerability to peak flow changes. The modified rule package would be:

1. Retain a rate of cut at 1% per year, averaged over a 10 year period;
2. Allow individual entries up to 10% of watershed areas, followed by a hiatus of at least 9 years (in which all roads are hydrologically deactivated);
3. Ensure ECA does not exceed 30% at any time.

The implications of the third rule will be to delay or reduce the fourth entry.

FIGURE 6



LEGEND

1% Per Year

SCENARIO 1:
1% Per Year

SCENARIO 2:
10% in Entries Spaced 10 Years Apart

SCENARIO 3:

SCENARIO 3

SCENARIO 3A:
4th Entry Delayed
Or

SCENARIO 3B:
To Keep Within 30% Limit

Fig 6 shows the ECA effects of three different scenarios, namely:

Scenario 1. Constant harvesting at 1% per year. The ECA begins to level off as hydrologic recovery sets in, becoming asymptotic to an ECA of approximately 15%.

Scenario 2. Multiple entries at 10-year intervals (beginning at Year 5 in Fig. 1). Roads are deactivated during each hiatus. There is no cap on ECA.

Scenario 3. As scenario 2, but with an ECA cap of 30%. As a result the fourth entry will have to be reduced (3a) or delayed (3b).

These changes apply only to watersheds that are deemed to have a low vulnerability to peak flow changes or have systems well buffered by lakes or wetlands. Interfor will continue manage watersheds deemed vulnerable to streamflow changes by existing Scientific Panel rules or better.

Rationale: The Scientific Panel proposed rate of cut prescriptions due to the concern about the effect of cumulative harvesting impacts on hydrologic response. The suggested rates were deemed interim in nature, with the recommendation that a program be initiated to monitor the impact on streamflow. This monitoring has never been done in Clayoquot Sound, however since the implementation of the Scientific Panel report and prior to it there has been a substantial amount of research in similar watersheds, leading to a body of knowledge that will allow some prediction of the magnitude of impacts. After 10 years of managing TFL 54 under the Scientific Panel rules, Interfor feels that it is time to review these interim measures.

The intent of this rule was to minimize the cumulative impact of harvesting on streamflow, based on the premise that the greater the area of mature forest cleared, the greater the increase in peak streamflow (and conversely, the greater the decrease in summer low flows as green-up occurs). This relationship is supported by the scientific literature for clearcut harvesting, but is less strongly supported for partial cutting. The concern is that increased peak flows will result in channel degradation and deterioration of aquatic habitat. In addition, reduction in summer low flows may affect fish production.

There are several arguments in support of this modification:

1. Documentation of the effect of increased peak flows due to logging (and not due to bank disturbance or increased sediment fluxes) on aquatic habitat is inconclusive, at best⁶⁶. Provided riparian ecosystems are well protected, we are

⁶⁶ In a review of hydrologic impacts of forest harvesting in the Pacific Northwest, Church & Eaton (2001) suggested that the timing and magnitude of stormflow can indirectly affect fluvial sediment transport, but that "soil exposure and disturbance, altered slope stability, damage to streambanks, and

- not aware of any studies that demonstrate that peak flows alone have damaged aquatic habitat.
2. It is environmentally (and economically) advantageous to develop an area within a relatively short time (e.g.: 1 year) then move away and deactivate all access roads for a hiatus until the next entry. This limits the time-exposure of the road network to hydrologic change – a measure that will likely compensate for any harvesting impact on peak flows. Many researchers have emphasized the role of forest roads in influencing peak flows⁶⁷ (Wemple *et al.* 1996).
 3. Certain watersheds (and their mainstem stream channels) have a low vulnerability to peak flow increases, due to a predominantly bedrock or other kind of resilient substrate. It seems reasonable to manage these watersheds differently from those with higher sensitivities.
 4. Certain streams contain lakes or wetland complexes that buffer peak flows – these are therefore less vulnerable to peak flow changes;
 5. All harvesting in Clayoquot Sound is conducted under Variable Retention rules, and therefore is likely to have lesser hydrologic impacts than clearcutting – at least within harvest units.

A watershed assessment, similar to the ‘Watershed Sensitivity Analysis’ mentioned in the Scientific Panel report would be required to justify an increase in the rate of cut limit. Interfor does not propose that this modification in rate of cut be imposed on watersheds with moderate or high sensitivity.

This proposed modification is conservative compared to newly established rules for the central mainland coast of BC⁶⁸. These rules allow the rate of cut to average 20% over 20 years (thus allowing a single entry of 20 % of watershed area). They also specify that in small (<1000 ha) watersheds, the cut should be restricted to 10% in any three-year period.

Specific changes to rate of cut limits are as follows:

R3.1b: In primary watersheds of 200-500 ha in total area, limit the area cut to no more than 10% of the watershed area within a 10-year period.

Modification: Interfor proposes no change to this rule.

the emplacement of forest debris in gullies and stream channels”... are likely to have more direct effects.

⁶⁷ Wemple, B.C., J.A. Jones, and G.E Grant. 1996. channel network extension by logging roads in two basins, western Cascades, Oregon. *Water Resources Bull.* 32:1195-1207.

⁶⁸ Coast Information Team, 2004. Hydoriparian Planning Guide.
<http://www.citbc.org/abostrucomm.html>.

R3.1c: In any watershed larger than 500 ha in total area, and primary watersheds of 200-500 ha in total area in which harvest has exceeded 20% of the watershed area in the most recent 10 years, allow no further harvest until the watershed conforms with the specified rate of cut.

Modification: None proposed.

R3.1d. Allow no further cutting in watersheds with recent harvests greater than 5% in the last five years, but less than 20% in the last 10 years, until a watershed sensitivity analysis and stream channel audit have been done.

Modification: Interfor suggests that the lower threshold be raised to 10% before such assessments are required, based on research that suggests ESA's lower than 10% are unlikely to result in measurable changes in peak flows⁶⁹.

R3.1e. In any watershed larger than 500 ha in total area (and primary watersheds of 200-500 ha), in which harvest has occurred, require a watershed sensitivity analysis and stream channel audit once every 5 years.

Modification: Interfor has fully complied with this rule, but suggests that in the future it be relaxed for watersheds that show a low vulnerability to peak flow change or channel degradation.

R3.1f. In watersheds where harvestable areas are less than 30% of the total area, resource managers can use their professional judgment to vary these standards [meaning rate-of-cut rules] without changing the intent to regulate rate of harvest to minimize hydrological change.

Modification: None proposed.

R3.1g: Periodically review these recommendations and reformulate as the results of monitoring accumulate.

Proposed Modification: None proposed. This plan represents the first attempt to revise recommendations. This is a clear example of where monitoring is needed to allow adaptive management.

⁶⁹ For example, in a review of peak flows in seven (low-elevation) Vancouver Island watersheds, Chapman (2003) found harvesting-related peak flow increases in only one of them (Carnation Creek) with an ECA of 46%. However, in the (higher-elevation) Russell Creek watershed on northern Vancouver Island, Hudson (2002) found peak flow changes at ECA's as low as 10%. Most watersheds in Clayoquot Sound are more similar to those studied by Chapman, than to Russell Creek.

R3.1b: In watersheds important for their scenic values, complying with the visual landscape management objectives may restrict the rate-of-cut below the limits specified above.

Proposed Modification: None proposed.

4.4.3.2 Variable-Retention System

R3.6: On cutting units with significant values for resources other than timber or with sensitive areas, implement high levels of retention. Specific rules include minimum retention (70%), opening size (< .3 ha), inclusion of snags, downed wood, large diameter and dying trees in retention patches, and delineation of ‘no-work zones’ prior to harvesting.

Proposed Modification: Interfor has scrupulously complied with this recommendation in the 10 years of operation since 1995. Now we suggest increasing the minimum opening size from .3 ha to 1.0 ha (i.e.: widths of 2.5 tree length, assuming 45 m height), to allow greater flexibility in on-the-ground management for blowdown hazard and logging feasibility.

In areas that were mapped as Class IV terrain stability, but were found upon site inspection by a qualified assessor to be stable, Interfor proposes to manage with intermediate levels of retention, rather than high (i.e. 20-50% vs. 70%). In addition, Interfor proposes to make changes to the way hydroriparian reserves are managed; these changes are discussed under R7.1.

R3.7: On cutting units without significant values for resources other than timber, or without sensitive areas, implement low levels of retention. This recommendation includes several guidelines regarding retention aggregate, namely level of retention (>15%), size (0.1 to 1.0 ha), representation, intactness of aggregates (“no-work zones”), width of opening (2 tree heights), and retention of windfirm, dominant trees.

Proposed Modification: Interfor proposes to use greater flexibility with some of these rules, as local conditions permit. Specifically, we wish to allow greater flexibility with regard to opening size only where blowdown hazard management warrants a change. In areas where the hazard is rated as Moderate or greater (and only in such areas), Interfor suggests that maximum width of opening should be increased to six tree lengths (with no point being greater than three tree lengths from standing timber). In areas of Low or Very Low blowdown hazard, no change in opening size (or distance to standing timber) is proposed.

In other words, Interfor is seeking greater flexibility to manage blowdown hazard based on local conditions. Retention levels will not change. Where larger openings are designed, they will be offset with commensurately larger patches. However with increased flexibility it will be possible to design these patches to maximize their value, be it habitat, biodiversity, riparian, visual or recreational.

This modification arises from Interfor's experience in monitoring and developing policies for managing blowdown risk. Experience gained from Interfor's blowdown hazard monitoring has shown that if tall hemlock and amabilis fir are retained they are highly prone to blowdown⁷⁰.

R3.8: Tailor prescriptions for retention to stand characteristics, topographic conditions and other resource values on the working unit. This recommendation contains several rules, including the requirement to retain a representative cross-section of species and structures in the retention, ensuring that retention meets specific objectives, and setting retention levels according to ecological sensitivity.

Proposed Modification: Interfor has complied, and will continue to, comply with this objective.

R3.9: Openings must not exceed four tree heights across.

Proposed Modification: Again, Interfor seeks greater flexibility when dealing with areas of Moderate or higher blowdown hazard. We propose extending the maximum width of openings to six tree lengths (about 5.7 ha, assuming tree heights of 45 m). No point will be greater than three tree lengths from standing timber. This will be consistent with R3.7. Interfor only proposes this change where blowdown hazard is moderate or high.

R3.10: Do not salvage blowdown in retention cutting units except where it threatens desired values.

Proposed Modification: Interfor proposes greater flexibility to salvage some downed timber, as part of a blowdown management strategy. We suggest that salvage be allowed where, and to the extent that, coarse woody debris objectives allow. Recent monitoring of coarse woody debris levels⁷¹ after VR harvesting suggests that

⁷⁰ This experience is from Interfor's monitoring of blowdown in VR areas in Clayoquot Sound, Mooyah, Stewardson, Zuciarte and Escalante areas. Observations and suggestions for management are contained in Butt, G. 2004. Blowdown Monitoring of Cutblocks in Zuciarte, Escalante, Mooyah, Hesquiat, Catface and Pineetle Areas. International Forest Products Ltd., West Coast Division; unpublished consultant report.

⁷¹ Beasley, B., R. Scott, D. Edwards, C. Jacobsen, K. McNutt and M. Moeges (2002). Monitoring and demonstrating the Scientific Panel Recommendations for Sustainable Forest Management. Long Beach Model Forest Report.

the quantity of post-logging CWD levels is high, although it includes abundant relatively undecomposed wood (compared to pre-logging levels). Allowing additional blowdown to remain would only add to this already sufficient 'fresh' CWD amount.

Furthermore, under a comprehensive blowdown management plan, Interfor would amend its retention targets according to probable blowdown levels, increasing targets where necessary to achieve realistic retention targets after blowdown occurs.

R3.11: Design the size, shape, and location of areas to be harvested within a cutting unit to comply with topography and visual landscape management objectives established for the area.

Proposed Modification: None proposed.

4.4.3.3 Harvesting Systems

Interfor is fully compliant with the recommendations for harvesting systems in Clayoquot Sound. In fact, its performance has substantially exceeded expectations in 1995. These achievements are described more fully in 4.2.

4.4.3.4 Transportation Systems

R5.2: Improve on-the-ground performance in construction and maintenance of road drainage structures (ditches, culverts, bridges). Reduce the impact of roads by allowing the passage of shallow subsurface groundwater (requires research).

Proposed Modification: The reason that the second part of this recommendation has not been implemented is described in Section 4.3. Interfor suggests that this sentence be dropped from the set of recommendations. The use of porous fills or French drains should be available options under site-specific road prescriptions, but should not constitute the rule for general road construction.

R5.5: Revegetate all disturbed areas associated with roads. Promptly apply erosion control, **and use indigenous, non-invasive species.**

Proposed Modification. Interfor has a record of incomplete conformity with this recommendation, as explained in 4.3. We suggest that the rule be modified so that erosion-control mixes are drawn up without known, invasive non-indigenous species such as white clover⁷².

⁷² Note that Interfor conforms to the SFI standard: "to limit the introduction, impact, and spread of invasive exotic plants and animals that directly threaten or are likely to threaten native plant and animal communities".

R 5.6: Determine required road widths based on anticipated vehicles (i.e., vehicles that will use the road) and traffic volumes. Road widths should not exceed 4.25 m except as required on curves for sidetracking of trailer units and for turnouts. Wider or higher standard roads may be justified by special needs or safety, such as heavy industrial or recreational use, or regular use by local communities.

Proposed Modification. This is one of the few rules with which Interfor has not been able to comply. The reasons for incomplete conformity are described in 4.3. Essentially Interfor feels that the industry standard for road widths (5.0 m) is appropriate and represents a sensible, practical and safe compromise between the need to minimize road widths and yet adhere to safety objectives. Interestingly, the Scientific Panel report includes a table showing standard road dimensions from a FERIC study (Table 5.1, p. 123), showing average running surface widths of 5.4 m, but refers to earlier MOF guidelines of 5 m (p.122). The recommendation for a road width of 4.25 m was stated without explanation or rationale, and Interfor feels that the requirement is unwarranted.

4.4.3.5 Water Transportation

R5.8 Water handling and transport standards must protect estuarine and marine environments, and their associated biota. This broad recommendation includes the specific rule that the surfaces of the dryland sort should slope landward, rather than seaward.

Proposed Modification. Interfor is in incomplete conformity with this rule, as described in 4.3. Interfor believes that we can meet the more general recommendation of environmental protection using other measures, such as perimeter drains, ditches and sumps. We suggest that this rule be modified so that licensees are free to employ other appropriate, site-specific prescriptions, to achieve the same objective.

4.4.3.6 Planning

The Scientific Panel report sets out (e.g.: R7.14) how planning should be undertaken, and specifies working protocols, establishing planning objectives, inventory methods and goals, data analysis, scale of investigations and monitoring. Interfor has been proactive in its planning efforts, often leading the process, in consultation with First Nations, government agencies and local governments. Interfor's successful track record is described in more detail under 4.2 "Building on Success".

The Scientific Panel also states that it is necessary to identify reserve areas (Chap. 7, p.158). Reserve area delineation is perhaps the most important component of watershed plans. A network consisting of eight types of reserve has been implemented over the 10 years since the Scientific Panel report was completed.

However, the Clayoquot Sound Technical Planning Committee (TPC), in its 2005 Watershed Planning document, acknowledges the need to periodically update or amend reserve areas as new information is acquired.

4.4.3.7 Marbled Murrelet Reserve Area

The most recent of these is the **marbled murrelet reserve area**, based on habitat modeling completed by Chatwin⁷³ (2002). It was implemented on an interim basis for three years.

4.4.3.8 Proposed Modification

Interfor proposes that the marbled murrelet reserve area be revisited. Interfor is aware of the need to retain a sufficient supply of good quality habitat to ensure marbled murrelet populations are not threatened⁷⁴. And we do not question the scientific credibility of the methodology in which original reserve was designed. However, we feel that alternative designs should be evaluated against **both** habitat protection **and** timber supply impacts (rather than just the former). In other words, if an alternative design meets habitat protection objectives, but has lower timber supply impacts than the original reserve, then the alternative will be more sustainable from a social and economic perspective.

4.4.3.9 Area of Mature Forest in a Watershed

The Scientific Panel suggested the creation of reserves to protect forest interiors in late successional forest. To accomplish this, it suggested that 40 % of a watershed level planning unit should consist of forests in age classes 8 and 9 (i.e.: >140 years). The intent of this recommendation is clear, and is scientifically justifiable for most watershed planning units.

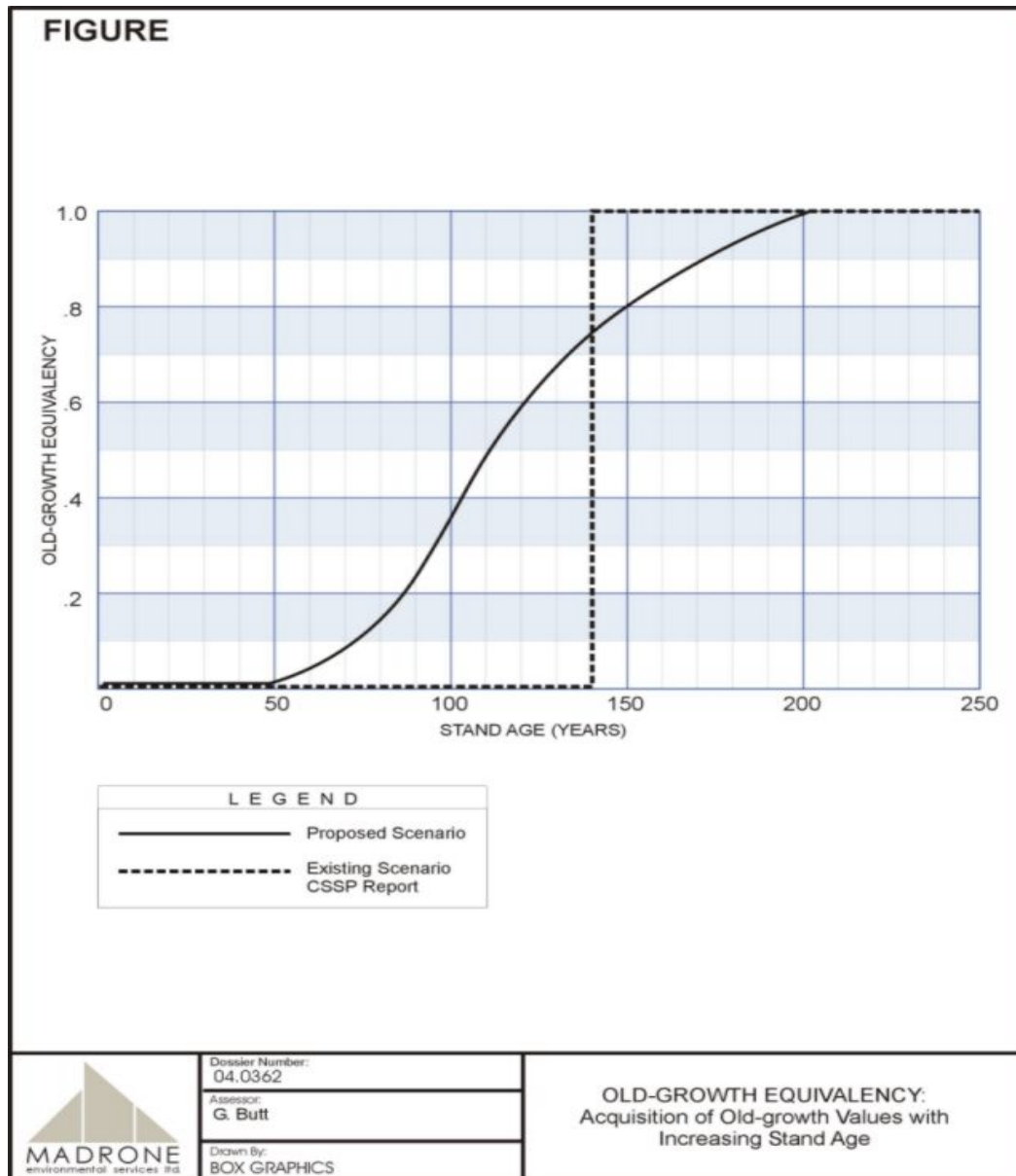
Proposed Modification: The Kennedy Lake Watershed Planning Unit contains a substantial area of immature forest stands (areas that were logged in the early post-war era). Application of this rule means that a large amount of closely accessible timber will not be available for 60 to 80 years. The rule implies that second-growth forest has no value until it turns 140 years old, and then becomes equivalent to old-growth, in terms of biodiversity and habitat values. Clearly, the value of a second-growth stand for habitat increases gradually and incrementally between 60 and 250 years old, and with certain stand management practices (e.g.; variable-density thinning, snag-creation) this trend may be accelerated. An approach is needed that simulates the approach that forest hydrologists use to assess harvesting impacts in watersheds, namely, Equivalent Clearcut Area (ECA). In other words, incorporate

⁷³ Chatwin, T. 2001. Management of Marbled Murrelet nesting habitat in Clayoquot Sound. Ministry of Water, Lands and Air Protection, Victoria.

⁷⁴ Steventon, J.D., G.D. Sutherland, and P. Arcese. 2003. Long-term risks to Marbled Murrelet (*Brachyramphus marmoratus*) populations: assessing alternative forest management policies in coastal British Columbia. Res. Br., B.C. Min. For., Victoria, B.C. Tech. Rep. 012. <<http://www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr012.htm>>

the concept of increasing habitat value from 60 to 250 years in the calculation of forest interior representation. Thus, as a stand passes 60 years of age, it begins to contribute to the old-growth account, albeit in a small way at first (Figure 7).

FIGURE 7



An additional allowance should be made where the licensee has attempted to accelerate the acquisition of old-growth features through active stand management thus creating an incentive for stand management and the associated social and economic benefits.

4.4.3.10 Hydroriparian Reserves

R7.17: Designate the entire hydroriparian zone as a special management zone. In the 10 years since the implementation of the Scientific Panel, Interfor has scrupulously followed the hydroriparian rules.

Proposed Modification: Interfor proposes a number of changes in the way that hydroriparian zones are managed.

Table 4. Summary of Proposed Changes to Scientific Panel Hydriparian Rules			
		Existing Scientific Panel	Proposed Changes
Streams	Description		
class			
A 1 I	alluvial, <8%, <3 m	entire contemporary Fp	30 m average reserve
	ii alluvial, <8%, 3-30 m	except dry Fp 50 m	No change
	iii alluvial, <8%, >30 m	except dry Fp 50 m	No change
	2 I alluvial, >8%, <3 m	30	No change
	ii alluvial, >8%, 3-30 m	50	No change
	iii alluvial, >8%, >30 m	50	No change
B 1 a I	non-alluvial, <8%, not entrenched, < 3m	entire contemporary Fp	adopt 30, 50, 50m buffers
	ii non-alluvial, <8%, not entrenched, 3-30 m	entire contemporary Fp	unless adjacent land is
	iii non-alluvial, <8%, not entrenched, > 30m	entire contemporary Fp	active Floodplain
	b I non-alluvial, <8%, entrenched, < 3m	30+machine reserve 30 m	
	ii non-alluvial, <8%, entrenched, 3-30 m	50+machine reserve 30 m	Reduce machine reserve to
	iii non-alluvial, <8%, entrenched, > 30m	50+machine reserve 30 m	15 m
			Ensure windfirm buffer, for
	2 a I non-alluvial, 8-20 %, not entrenched, < 3m	30 m	at least 60 % of stream
			length
	ii non-alluvial, 8-20%, not entrenched, 3-30 m	50 m	Ensure windfirm buffer, for
			at least 60 % of stream
	iii non-alluvial, 8-20%, not entrenched, > 30m	50 m	length
			Ensure windfirm buffer, for
	b I non-alluvial, 8-20%, entrenched, < 3m	30 m	at least 60 % of stream
			length
	ii non-alluvial, 8-20%, entrenched, 3-30 m	50 m	Ensure windfirm buffer, for
			at least 60 % of stream
			length

iii non-alluvial, 8-20%, entrenched, > 30m	50 m	Ensure windfirm buffer, for at least 60 % of stream length
3 a I >20%, not entrenched, seasonal or perennial	20 m	Exclude seasonal, treat like ephemeral
ii >20%, ephemeral	No buffer, but evaluation by R.P.Bio.	Require R.P.Bio. evaluation only where necessary
b		
>20%, entrenched	20 or top of embankment	Manage for blowdown and site specific factors

See table 4 for a summary of proposal changes. Under the Scientific Panel rules, all streams require some level of hydriparian protection except for ephemeral streams over 20%. Small permanent streams, of which there are many in all harvesting areas, require reserve areas ranging from 40 m on small headwater streams to 60 m small streams (<3 m wide) on moderate or steep hillslopes, to 100 m wide on larger streams (>3 m wide) on moderate or steeper hillslopes.

This has resulted in numerous narrow riparian reserves, which have been subject to blowdown. The 10 years of post-Scientific Panel experience in Clayoquot Sound (and indeed throughout the BC coast⁷⁵) has demonstrated that narrow riparian reserves are highly prone to blowdown, especially where they are perpendicular to the valley orientation (although Interfor has found relatively little riparian blowdown in redcedar-hemlock stands). The blowdown usually results in sudden increases in channel disturbance, bank erosion and sediment entrainment. And the riparian buffer ceases to perform the desired function.

Interfor proposes that for non-alluvial permanent streams with channel gradients greater than 8 %⁷⁶ in the hydriparian classification) within proposed harvest areas, hydriparian reserves be increased in width, but for only one half of the length of the stream in the setting. Thus if there were 100 m of this stream class in a proposed unit, Interfor will provide standing timber protection to one half of the length of the stream (50 m), but the protection would be widened from a total average width of 40 m (20 m on each side), to 80 m (40 m on each side). Interfor would ensure that yarding disturbance to the unprotected 50 m of stream length was minimized. The current rules would impose a 40 m wide total riparian buffer for the entire length of the stream in the setting. The alternative would provide exactly the same area of timber protected, but with a lower probability of blowdown. Table 1 (at the end of the chapter) summarizes the proposed changes to the hydriparian reserve system.

To avoid cumulative effects on the downstream aquatic ecosystem, Interfor proposes to ensure that at least 60% of the total length of non-alluvial streams in a watershed remains under natural forest cover.

Rationale: This is a practical and common sense, yet ecologically defensible, solution to the widespread problem that narrow buffers suffer a high incidence of blowdown. The rule change applies only to non-alluvial, non-fish bearing streams, where they are

⁷⁵ According to Rollerson, T.P. , W.J. Beese, N. Smith, and C.M. Peters (2000) Progress Report: Variable Retention Monitoring Project (FIA Project Number 6353004), rates vary from about 28% windthrow for strips in the 15 to 20-metre width category to less than 10% for strips in the 115 to 200-metre width category.

⁷⁶ These correspond to B(2)(a), B(2)(b) and B(3) streams, according to the Scientific Panel Hydriparian Classification

located within proposed harvesting areas. The change will provide better protection to one half the stream length within the proposed unit.

The impact of the rule change will be that a relatively small proportion of the total length of a first order (headwater) stream will be exposed in an opening. Since in general stream temperature is not a significant factor in the mild west coast climate⁷⁷, and since Interfor will protect the channel, banks and understory vegetation from yarding disturbance, the only impact will be localized loss of invertebrate drift, reduction in litter input and some benthic community shifts due to higher solar energy inputs. Increased sunlight to affected reaches appear to experience an increase in algal growth, which may compensate for any loss of invertebrate drift from the lost coniferous forest cover.

It must be stressed that the exposed lengths will constitute, in general, a low proportion of the total length of the tributary or the system upstream of alluvial stream systems. The impacts will likely be lower – from the perspective of aquatic ecology – than would have occurred with narrow riparian buffers and subsequent blowdown. And cumulative effects would be minimized by the commitment to maintain at least 60% of total non-alluvial stream length under natural forest cover.

These changes are consistent with the conservative, ‘precautionary’ approach adopted by the Coast Information Team (2004) in their Hydroriparian Planning Guide, developed for the central coast of mainland BC. This rule package recommends that at least 60% of the total stream length in any process zone (in our case the ‘source zone’) should remain in natural forest cover.

R7.18: Reserve the entire “contemporary floodplain” of streams in Class A(1) (alluvial channels with gradients less than 8%), except areas of ‘dry floodplain’ more than 50 m from a perennially or seasonally active channel or site of seasonal standing water .

Proposed Modification. Interfor has complied with this rule. Problems have arisen in field interpretation of this recommendation however; since many stream reaches falling into this class fail to have ‘dry floodplain’ areas surrounding them, and instead have developed a small alluvial plain within a glaciofluvial or morainal landscape. Interfor proposes that for A1i (alluvial reaches less than 3 m wide and gradients less than 8%), which lack ‘dry floodplain’ adjacent to them, the hydroriparian reserve be set at an average of 30 m.

⁷⁷ Mr. Dave Clough, *R.P.Bio*. Personal communication. Mr. Clough has “not seen any temperature problems outside the [Kennedy] flats that related to it being a critical factor, indeed many are so cool fry may take 2 years to smolt (e.g.: Hesquiaht Point Creek)”.

R7.19: Class A(2) (alluvial channels with gradient of 8–20%) should have reserve areas within 50 m of present channels (30 m for A(2)(i): channels less than 3 m wide), recently active channels, and any other routes that appear, in the opinion of a professional geoscientist or professional engineer with expertise in fluvial geomorphology or river engineering, to be subject to avulsion. Other portions of the hydroriparian zone of Class A(2) streams may be harvested by a high retention system. In the case of alluvial fans, the “contemporary fan surface” shall be treated the same as the contemporary floodplain (R7.18) and reserved from logging.

Proposed Modification: Interfor has and will continue to comply with the intent of this rule. However, it proposes that, on demonstrably inactive alluvial fans⁷⁸, “high retention” logging can be allowed up to 50 m from a stable channel (30 m from a stream <3 m wide). This modification in most cases will not represent non-conformity from the original rule; rather it is a clarification. Depending on the interpretation of “contemporary fan surface”. The intention is that active alluvial fans will be protected, but that high retention logging will be allowed on inactive fans, provided it is greater than the prescribed distance from the stream.

R7.20: Treat streams in Class B(1)(a) (non-alluvial channels with gradient less than 8%, not entrenched) as Class A(1) (see R7.25 for exceptions) as a larger portion of the valley flat will be available for high retention harvest.

Proposed Modification: Interfor has fully complied with this recommendation in the 10 years since it implemented the Scientific Panel recommendations. The intent of this recommendation was to protect streams developed in Holocene alluvium, which experience seasonal flooding. However, most B(1)(a) stream reaches are not located on such alluvium, and simply flow on till or glaciofluvial deposits. Interfor suggests that for these reaches, the rules emulate those designed for Class B1(b) (i.e.: 50 m for >3 m wide streams and 30 m for < 3 m wide streams). Stream reaches with a distinct alluvium base should be classed as A1.

R7.21: For streams in Class B(1)(b) (non-alluvial channels with gradient less than 8%, entrenched), designate a reserve that extends to the top of the entrenchment slope or 50 m from the streambank (30 m for B(1)(b)(i), width less than 3 m), whichever is greater. An additional reserve or “no machinery” zone of at least 30 m width will be designated beyond the top of slopes that are being actively undercut by the stream. Mature trees in this zone may be harvested if they can be felled away from the stream within a high retention harvest plan. Streams confined by stable rock slopes constitute a special case (see R7.28).

Proposed Modification: Interfor has, in the 10 years since Scientific Panel implementation, complied with this rule. Several changes are suggested, based on

⁷⁸ “Inactive fans are those with well-incised streams with no geologic evidence of recent avulsion.

operational experience. Interfor suggests that the 30 m 'no machinery' zone be reduced to 15 m, above actively undercut banks. There appears to be no rationale in the Scientific Panel report for selecting 30 m as the width of such a zone, except to avoid aggravating potential instability by destroying the root network. Interfor feels that 15 m is sufficient to protect root networks on such small banks.

Standard set-backs for machinery above such banks are 10 to 15m, depending on the height of the banks and season of operation. Selecting 15 m as a standard no machinery zone width is conservative but operationally reasonable, given that these channels have no alluvium and therefore their banks are likely to be small.

Secondly, the wording in this recommendation implies that harvesting adjacent to the hydroriparian reserve on these streams will be under a high-retention harvest plan. This may not be the case, and the wording as such should be dropped.

Thirdly, operational evidence suggests that feathering is not an effective wind-proofing measure, and should be deleted.

R7.22: Treat streams in Class B(2)(a) (non-alluvial channels with gradient 8–20%, not entrenched) as Class A(2) (see R7.25 for exceptions).

Proposed Modification: No change. However, there should be some recognition that not all streams in this class are on recent alluvium.

R7.24: For streams in Class B(3)(a)(i) (non-alluvial channels with gradient greater than 20%, not entrenched, seasonal or perennial flow), designate a reserve that extends 20 m from the channel.

Proposed Modification. Interfor has complied with this rule, and agrees with the intent. However, the distinction between seasonal and ephemeral flow is very difficult to make, especially if lay-out is proceeding in summer months. We therefore suggest that B(3)(a)(i) streams with seasonal flow be treated like those streams with ephemeral flow, and receive no general reserve.

R7.25: Designate no general reserve for streams in Class B(3)(a)(ii) (non-alluvial channels with gradient greater than 20%, not entrenched, ephemeral flow), and those channels in classes B(1)(a)(i) and B(2)(a)(i) (non-alluvial channels with gradient less than 21%, not entrenched, less than 3 m wide) that carry only ephemeral flow. But, require evaluation by a professional biologist to determine whether special management prescriptions are warranted for ecological reasons, and employ special management where deemed necessary.

Proposed Modification: Interfor feels that the requirement for a field assessment of all such stream reaches by a professional biologist is excessive. Instead, Interfor suggests that it develop a policy, signed off by an R.P.Bio. that will identify the need for special management, and define circumstances where a field assessment is necessary.

R7.26: For streams in Class B(3)(b) (non-alluvial channels with gradient greater than 20%, entrenched), designate a reserve that extends to the top of the entrenchment slope or 20 m from the channel, whichever is greater. However, if the sidewalls adjacent to the channel (and including the channel zone) are classified as having low or no potential for instability, then apply criteria for Class B(3)(a). Apply gully assessment procedures to channels that are classified as gullies according to the *Gully Assessment Procedures for British Columbia Forests* (Hogan *et al.* 1995).

Proposed Modification: Interfor has complied with this recommendation, since implementation in 1995. Interfor's experience with narrow riparian buffers is that under certain conditions, they can be subject to blowdown, which compromises the objectives in designing a reserve (and may increase potential for debris flow initiation under certain circumstances). Interfor wishes to retain some flexibility to manage these gullies according to site-specific factors, rather than according to blanket rules, which in some cases may result in poor forest management. Interfor also feels that the recommendations in a Terrain Stability Field Assessment should supersede the results of a Gully Assessment Procedure.

R7.27: Apply the gully management prescription (BC Ministry of Forests 2001). No logging will take place in any channel with high or moderate potential for downstream impact, and/or potential for debris flow, water flood, or fan destabilization.

Proposed Modification: Interfor agrees with this recommendation and has been compliant. Again however Interfor wishes to retain the flexibility to manage gullies on a site-specific basis, rather than according to blanket rules. At a minimum all timber in a gully with moderate or high potential for debris flow will be managed as a reserve zone. However, for purposes of blowdown management, it may be preferable to extend the reserve zone to the crest of the sidewall, rather than to an arbitrary point beyond this crest.

Interfor proposes no modifications of other hydriparian rules.

4.4.4 Partnerships

Interfor has strived to build goodwill and trust with its partners in Clayoquot Sound, including FN, local governments, contractors and agencies. The economic isolation of Clayoquot Sound creates a need for local partners to work together to rationalize

operations, cut costs and take advantage of joint efforts in research, monitoring, planning, log transport and storage, marketing and public relations. Key areas for collaboration are:

4.4.5 First Nations

Interfor has been pro-active in building trust with First Nations groups and has signed or drafted working agreements with some of the groups in Clayoquot Sound. It has worked closely with the Hesquiaht, assisting them in developing new road access to their traditional territory, and providing employment wherever possible. Interfor has initiated, funded or participated in numerous programs aimed at training and upgrading skills, to allow First Nations people to work in logging, planning, assessment and other activities (see 3.2). However, relationships have been complicated by the treaty process and conflicting resource management objectives. Building relationships with First Nations is a necessary part of doing business in Clayoquot Sound, and this must be part of Interfor's strategy for continued presence.

Perhaps the most promising model for increased FN participation in forestry activity is the Community Cooperative Area (CCA) model. The prospect of greater economic stability and prosperity is the best enticement for trust and cooperation, and Interfor, with its tenure in Clayoquot Sound, is in a good position to facilitate this prospect.

The long-term goal of the Community Cooperative Area⁷⁹ concept is to build on this foundation and continue to move towards revitalizing the local communities and First Nations involvement in forestry in Clayoquot Sound- a true "Joint Venture" between the communities of Clayoquot Sound and Interfor. The process will be dynamic and challenging in the years to come and will no doubt change in many ways as the forestry business changes in Coastal B.C. However the foundation laid over the past few years is solid and has gone a long ways to making Clayoquot Sound a model of sustainable development and conservation.

4.4.6 Local Communities

Interfor has developed a successful partnership with the District of Ucluelet, in particular the Ucluelet Economic Development Commission (UEDC), for whom it conducts, under contract, forest planning and administration services for the UEDC's temporary forest license. There are continued opportunities for Interfor and UEDC to work together on infrastructure initiatives, as has been seen in the Maggie Lake area (just south of Clayoquot Sound). Once wood starts flowing out of the UEDC's license, there will be future opportunities to benefit from joint log handling, transportation and sales. Interfor is also assisting the District of Ucluelet and UEDC towards their long-term community tenure as well.

⁷⁹ CCAs are more fully explained in Section 3.3.

4.4.7 Contractors

Presently Interfor has two Bill 13 (Contractor and Subcontractor Regulation) contractors. Alliford Bay (Nanaimo) Logging Ltd. has rights to harvest in TFL 54, and A&M Excavating Ltd. has rights to build road. Bill 13 requires that a set minimum percentage of the amount of work in the tenure (both logging and road construction) is provided to designated contractors. This encumbrance has affected Interfor's ability to provide local employment and contract work to benefit the local communities. Over time Interfor hopes to be able to reconcile the various interests of all parties to a mutually beneficial outcome.

4.4.8 Stumpage and Appraisal Policy

Interfor has successfully implemented the recommendations of the Scientific Panel on TFL 54 with respect to variable retention harvesting. Interfor, and associated logging and road building contractors, and consultants have made great progress in meeting the challenges associated with complex planning and regulatory processes, advancements in alternate harvesting, watershed restoration, enhanced forestry and involvement with First Nations and local communities. The associated dual authority administration has resulted in prohibitively high planning and administrative costs due to the "Code Plus Plus" nature of forest management in Clayoquot Sound.

As a result of negotiations between Interfor and the Ministry of Forest, a 'Clayoquot Stumpage Additive' was introduced, to help compensate for the added financial burdens of complying with Science Panel recommendations. In recent years, this compensation has been eroded as cost recognition for the additional Variable Retention harvesting costs has been removed. There is no longer any recognition for the phase costs of falling and yarding in the more difficult Variable Retention logging. This increased burden, on top of the low AAC, and the complexity of the planning process has compromised the economic viability of continued forest management activities in TFL 54.

In late 2004, Interfor was forced to dramatically curtail its operations in TFL 54, as a result of poor timber prices and poor return on investment. Remaining economically viable is the greatest challenge facing the company. Realistic stumpage cost recognition would help to overcome this problem. One example is the current log barging or towing allowances for wood harvested from Clayoquot Sound. All wood is appraised to Port Alberni (i.e. only the cost of moving logs to Port Alberni is recognized). However Port Alberni does not have sawmills that can manufacture all wood processed in Clayoquot Sound and therefore a large amount of logs are barged to Vancouver. There is no allowance for this additional cost.

4.4.9 FSC Certification

Interfor is considering an application for FSC certification for TFL 54. The consideration is based on the overall cost of the certification versus the potential benefits. If Interfor does choose to acquire FSC certification, Interfor would be one of a handful of companies in BC (others include Iisaak and Tembec) that are FSC certified. Now that BC standards are available⁸⁰ (ref.), the door is open for Interfor to take advantage of this opportunity. The initiative may be successful if the company is able to exploit new market niches that will become available. This will require a 'branding' exercise to highlight Interfor's experience with meeting stringent conservation goals in Clayoquot Sound. Thus it will meet the other strategic goal of fostering improved public relations.

4.4.10 Forestry Centre

One of Interfor's long-held visions in the Central West Coast of Vancouver Island is the Clayoquot Community Forest Centre. Interfor has for several years, in conjunction with the Central Westcoast Forest Society and its partners, promoted this project and have commissioned a business plan to guide the creation and operation of the centre.

The Clayoquot Community Forest Centre will be built at a site along the Pacific Rim Highway between Ucluelet and Tofino, near the entrance to Pacific Rim National Park Reserve.

The goal of the centre is to celebrate, study, and promote all aspects of the temperate rainforest through various attractions:

- A 'Wood Village' showcasing timber and non-timber value-added products;
- A forest interpretive centre;
- Demonstration sites for restoration work and new forest harvesting techniques;
- Interpretive walking trails;
- Opportunities to celebrate the area's culture and heritage;
- Picnic/day use area;
- Campsites; and
- An old-style logging camp bunkhouse to house visiting students and researchers.

The forestry centre would occupy a central focus for Interfor's strategic goal to improve public relations.

⁸⁰ BC Preliminary Regional Certification Standards for FSC became available in 2003: <http://www.fsc-bc.org/SiteCM/U/D/FSC%20Cda%20approved%20BC%20Stds.pdf>

4.4.11 Public Relations

Despite Interfor's outstanding track record in maintaining its business through the tumultuous period since the implementation of the Science Panel report, the company continues to receive an undue share of criticism aimed at logging, and perpetually takes a back seat to the perceived achievements of Iisaak. Interfor has been diligent in its attempt to foster a good reputation with FN and local residents, as well as the wider public of Vancouver Island and BC. Through Interfor's websites and countless tours and presentations to the public as well as to foresters and other resource managers, Interfor has been striving to 'get the message out', that it has been successfully maintaining a logging division operating under the most stringent regulatory regime in the Province. However its success in public relations is mixed at best.

The solution is not clear, and there is little hope that a certain segment of the population will ever be convinced of Interfor's commitment to sound forestry practices. However, through diligent and unwavering effort to build trust and earn the confidence of partners and public, Interfor should eventually reap the benefits of an improved reputation.

Certification of Clayoquot wood will assist in differentiating TFL 54 wood (logged under Scientific Panel rules) from wood from Interfor's other operations. Continued support for the CCA initiative that eventually will make material economic progress for local FN and other residents through employment, improved infrastructure and closer participation in economic benefits. Interfor must continue to stress the need to maintain the social and economic dimensions of resource management, and not just the environmental dimension.

Finally, continued investment (in conjunction with government funding programs) in ecological restoration, intensive second-growth stand management, road deactivation and other activities that can be demonstrated to the public at large, as well as schools and universities, will continue to enhance Interfor's reputation.

4.4.12 Research and Monitoring

Interfor has initiated, funded or participated in numerous R&M activities in Clayoquot Sound, described in detail in 3.7. A vigorous R&M program is an essential part of a sustainable forestry and conservation plan in Clayoquot Sound.

R&M is expensive, and the costs need to be shared with other stakeholders, governments and institutions. In the past, R&M has suffered from inconstancy, failed partnerships, the lack of a coherent strategy or direction, and insufficient funding.

Interfor has commissioned a Research and Monitoring Strategic Plan⁸¹, which due to funding problems was never implemented or properly reviewed. Interfor's strategy in Clayoquot Sound, as it moves forward, should be to formally adopt this plan, or a modified version of it, and ensure that R&M is done in conjunction with forest development and in support of it.

In particular, Interfor has been highly vocal over the past 10 years since 1995 about the increased costs it has had to bear due directly (and indirectly) due to the implementation of the Science Panel report. However, we have never seriously attempted to document the myriad impacts on the social and economic not to mention the environmental fabric of Clayoquot Sound. Interfor should, either using its own resources, or via a third party, commit to assessing the impact of the Science Panel report – on a full-accounting basis – to learn for itself, and for Canadians, how much the environmental revolution in Clayoquot has cost. The intent is not to turn back the clock, but to better understand that world-class environmental standards come at a cost.

4.4.13 Conclusion

This plan proposes a number of minor changes to some of the Science Panels recommendations. These have been made on the basis of 10 years of operational experience in implementing the new rules. The intention is not to compromise ecological integrity, but to increase management flexibility and hopefully to reduce logging costs. These changes will help to mitigate the harsh social and economic impacts of the Panels recommendations, while at the same time maintaining stringent standards in ecosystem-based management.

⁸¹ Butt, G. and D. Lousier 2003. Research and Monitoring Plan: A strategy for learning. Vol's. I and II. Madrone Environmental Services Ltd., Duncan. Unpublished report for Interfor, West Coast Division.

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APPENDIX I. SUMMARY OF CSSP RECOMMENDATIONS AND PROPOSED CHANGES

Number	RECOMMENDATIONS	Comments
REPORT 3	First Nations' Perspectives Relating to Forest Practices Standards in Clayoquot Sound	

• RECOMMENDED FRAMEWORK FOR CHANGE		
International Convention ³³		
R1	All forest activities in Clayoquot Sound must meet either the following standards, or international standards (e.g., United Nations 1992) regarding indigenous peoples' relationships with the forest, whichever is more rigorous.	Gov't to Gov't agreement- IMA and IMEAs- treaty negotiations- created Central Region Board.
Co-Management		
R2	Co-management of the Clayoquot Sound ecosystem must be based on equal partnership between the Nuu-Chah-Nulth and the Province of British Columbia.	Both parties have IMA and IMEAs – working together as Clayoquot Sound Technical Planning Committee
R3	A working protocol must be established and agreed upon by all agencies and individuals, and must be followed throughout planning and decision-making processes.	See above.
Consultation and Planning		
R4	All decision-making processes relating to ecosystem use and management must be undertaken in full consultation with the Nuu-Chah-Nulth of Clayoquot Sound.	See R1 and R2
R5	All planning processes for forest and ecosystem use must be undertaken with full consultation and shared decision-making with the Nuu-Chah-Nulth of Clayoquot Sound.	See R1 and R2.
Recognition of Traditional Ecological Knowledge (TEK)		

APPENDIX I. (Cont'd) SUMMARY OF CSSP RECOMMENDATIONS AND PROPOSED CHANGES

R6	Standards for forest practices must incorporate traditional ecological knowledge. Conflicts must be resolved in consultation with the Nuu-Chah-Nulth of Clayoquot Sound. Inventory, monitoring, and research must also recognize and include TEK.	Higher-level planning- CSPTC was a partnership between Gov't and FNs. At the site level Interfor has FN Cultural Liaisons that do the cultural block reviews. IFP also participated with the LBMF (now defunct), which has undertaken projects involving TEK.
H a h uulhi: Traditional System for Ecosystem Management		
R7	The traditional system for ecosystem management must be recognized in ecosystem co-management processes, based on consultation with the co-chairs of the Nuu-Chah-Nulth Tribal Council, <i>b a b uulhi</i> , <i>H a h uulhi</i> will be used in determining ecosystem management within traditional boundary lines.	As per R1 and R2- also have protocols and draft protocols between IFP and FNs.
Foreshore and Offshore Resources		
R8	Impacts of planned forestry practices on foreshore and offshore resources must be assessed in consultation with the Nuu-Chah-Nulth of Clayoquot Sound. Where there is a risk of damage to these resources, alternative low risk practices must be employed.	Any new applications for water leases etc are sent to CRB for consultation. Interfor commissions biological studies of dump sites, and follows recommendations and permit conditions to minimize impact. Offshore impacts are the responsibility of the provincial Government.
R9	In cases where foreshore and/or offshore resources have already been damaged or are damaged accidentally, immediate steps must be taken to mitigate or reverse the damage and to restore resource capabilities to their former condition.	IFP follows the conditions of the leases and licenses that are approved by Gov't.
Nuu-Chah-Nulth Cultural Areas, Including Sacred Areas, Historic Areas, Current Use Areas, and Future Use Areas		

APPENDIX I. (Cont'd) SUMMARY OF CSSP RECOMMENDATIONS AND PROPOSED CHANGES

R10	The Nuu-Chah-Nulth must be given the opportunity to identify, locate, and evaluate culturally important sites and areas which planning is to be undertaken before the completion of any ecosystem planning process in Clayoquot Sound.	This is at the higher level planning. FNs did some arch surveys and the cultural level of planning in the Watershed Plans. IFP will respect the final approved plans. IFP has FN cultural liaisons to review site level planning for cultural values and follows directions of the Gov't with regard to management of cultural heritage resource use.
R11	The Heritage Conservation Branch typology (Section 4.2.2) for classification of culturally important sites ("traditional use sites") should be used with the categories of "Traditional Land Management Sites" and "Education and Training Sites" to be added to the categories delineated in this typology.	The Clayoquot Sound First Nations have been provided funding to inventory culturally significant areas (also called a Traditional Use Survey – TUS). These form a basis for consultation with Government and Information sharing with Interfor and other licensees as directed by Gov't. These inventories form part of the watershed planning process.
R12	Physical and written evidence, and communicated oral traditions will be used to determine the existence and significance of culturally important areas.	Culturally significant areas assessment incorporates these types of evidence.
R13	Culturally important areas identified as significant by Nuu-Chah-Nulth must be protected using methods appropriate to the area and to the use.	IFP follows the Scientific Panel Planning, direction from the CSTPC and MOF.
Nuu-Chah-Nulth Tribal Parks		

APPENDIX I. (Cont'd) SUMMARY OF CSSP RECOMMENDATIONS AND PROPOSED CHANGES

R14	Tribal Parks, owned and managed by the Nuu-Chah-Nulth for public purposes, must come under the authority and jurisdiction of the Nuu-Chah-Nulth. The character of Tribal Parks is not yet firmly specified; Nuu-Chah-Nulth must participate in developing concepts concerning Tribal Parks.	This is an issue under the jurisdiction of the Nuu-Chah-Nulth and the Provincial Government.
Inventory and Mapping		
R15	Planning inventories for ecosystem management must be done in full consultation with and full participation of the Nuu-Chah-Nulth of Clayoquot Sound. Nuu-Chah-Nulth cultural resources and culturally important areas must be incorporated in planning inventories before completion of the planning process.	The BC Government in the mid 1990's commissioned natural resource inventories. FNs participated in the inventories and with the CSTPC to develop the cultural layer of the Watershed Plans. Bouchard and Kennedy (1990) completed an early inventory.
R16	Mapping projects must be done in full consultation with the Nuu-Chah-Nulth of Clayoquot Sound. Cultural resources and culturally important areas (especially high cultural and sustenance value), as identified by the Nuu-Chah-Nulth of Clayoquot Sound, must be clearly shown on maps. (First Nations sacred areas are a potential exception.)	See above.
Operations		
R17	All operations in Clayoquot Sound relating to ecosystem management, such as environmental impact assessment, selection of silvicultural systems and harvesting methods, proposed use of herbicides and pesticides, and road location, construction, and deactivation, must be carried out in full consultation with the Nuu-Chah-Nulth of Clayoquot Sound.	The FNs have participated in ecosystem management through the participatory planning process, via the CSTPC and the Central Region Board, which reviews proposed operational plans.

APPENDIX I. (Cont'd) SUMMARY OF CSSP RECOMMENDATIONS AND PROPOSED CHANGES

Education and Training		
R18	Provisions must be made for the Nuuchah-Nulth of Clayoquot Sound to participate in education programs relating to ecosystem management processes and practices to enable them to obtain the necessary background to co-manage Clayoquot Sound ecosystems.	Interfor has trained FN loggers under Community Involvement Pilot Project Agreements and Business Participation agreements. Interfor has participated with the First Nation Timber Access Committee for training of loggers in the Hesquiaht FN in the Stewardson area and Ahousaht FNs at Catface. Interfor has hired FN liaison and trained them in forestry and engineering.
R19	All forest and ecosystem workers and managers should view educational videos produced by Nuuchah-Nulth people about the culture in general, and Nuuchah-Nulth perspectives on forest practices and their impacts on the environment.	No videos were produced. But IFP staff worked with FN cultural liaison workers and met with elders, chiefs and councils many times and had numerous discussions about NTC culture and perspectives on forest practices and their impacts on the environment. IFP provided \$10,000 towards the making of a video: "The story of the cedar", which has not been completed.
Employment		
R20	Firms must actively recruit First Nations in employment equity; federal government guidelines for employment equity must be followed.	See R18

APPENDIX I. (Cont'd) SUMMARY OF CSSP RECOMMENDATIONS AND PROPOSED CHANGES

Monitoring		
R21	Monitoring programs for impacts on biodiversity, soil, water quality, fisheries and marine systems, and cultural sites, must be incorporated in management plans with full consultation of and participation by the Nuu-Chah-Nulth of Clayoquot Sound.	First Nations have worked with the LBMF, CBT, Interfor and Iisaak on ecological research and monitoring activities.
Evaluation		
R22	Impacts of present and ongoing forest activities must be evaluated through environmental and social impact assessment procedures in full consultation with the Nuu-Chah-Nulth of Clayoquot Sound.	See R17.
R23	Mitigative actions must be undertaken where damage to ecosystems, culturally important areas, and traditional resources is likely to occur.	This recommendation has been accommodated in working protocol agreements between Interfor and Clayoquot First Nations. Interfor has also aggressively pursued funding from FRBC and FIA (transferring in money from other tenures to Clayoquot Sound) and has spent millions in ecosystem restoration.
Restoration		
R24	Restoration must be undertaken where damage to ecosystems, culturally important areas, and traditional resources due to forestry activities is found.	See R23.
R25	All phases of restoration activities in damaged Clayoquot Sound ecosystems must be undertaken in full consultation and with active participation of the Nuu-Chah-Nulth of Clayoquot Sound.	See R23.
Research		

APPENDIX I. (Cont'd) SUMMARY OF CSSP RECOMMENDATIONS AND PROPOSED CHANGES

R26	Research and inventory must be undertaken to complement Nuu-Chah-Nulth traditional ecological knowledge and experience.	Traditional ecological knowledge was taken into consideration during Terrestrial Ecosystem Mapping. At the site level FN cultural liaison review blocks for cultural values.
R27	Opportunities and imperatives for research on impacts of past, present, and future forest practices on Clayoquot Sound ecosystems, and on possibilities for employment identified by the Nuu-Chah-Nulth of Clayoquot Sound must be developed, in full consultation with and participation of the Nuu-Chah-Nulth of Clayoquot Sound.	Interfor has attempted to obtain funding to participate in research into logging impacts on culturally significant plants. It has co-funded LBMF and CBT in conducting impact studies.

Report 5 - Sustainable Ecosystem Management in Clayoquot Sound

Planning and Practices

Chapter 3 - Silvicultural Systems

• RECOMMENDATIONS WITHIN THE PLANNING CONTEXT		
Rate-of-Cut		Comments
R3.1	Within the watershed planning unit, determine a rate-of-cut based on the watershed area	Interfor has, and will continue to comply, with an overall average rate of cut of 1% of watershed area per year. However, greater flexibility for short-term logging entries is proposed.
R3.1a	Limit the area cut in any watershed larger than 500 ha in total area to no more than 5% of the watershed area within a five-year period.	Interfor proposes that certain watersheds >500 ha can sustain up to 10% over 10 years, without significant hydrologic effects, depending on specific watershed characteristics.
R3.1b	In primary watersheds (drains directly to the sea) of 200–500 ha in total area, limit the area cut to no more than 10% of the watershed area within a 10-year period. (This prescription provides flexibility for harvesting within small watersheds.)	In small, primary watersheds that have a low vulnerability to peak flow changes, this rule be relaxed to 20% over 20 years. This will allow short-term development followed by hydrologic deactivation of roads.
R3.1c	In any watershed larger than 500 ha in total area, and primary watersheds of 200–500 ha in total area where harvesting has exceeded 20% of the watershed area in the past 10 years, no further cutting should not be permitted until the watershed conforms with the specified rate of cut.	Interfor has, and will continue to comply, with this recommendation.
R3.1d	Allow no further cutting in watersheds with recent harvests greater than 5% in the last five years, but less than 20% in the last 10 years, until a watershed sensitivity analysis and stream channel audit have been done. If these assessments indicate significant hydrological disturbance, substantial or chronic increase in sediment yield, or significant deterioration in aquatic habitat, cease	Interfor suggests that the threshold for triggering watershed analyses be increased to 10% in the last 5 years, based on recent watershed studies on disturbance thresholds for peak flow change.

	harvesting until undesirable conditions are relieved.	
R3.1e	Harvested watersheds larger than 500 ha total area and primary watersheds of 200–500 ha in total area, require a watershed sensitivity analysis and stream channel audit once every five years. Where such assessments identify hydrological disturbance, substantial increase in sediment yield, or significant deterioration in aquatic habitat, cease harvesting until these conditions are relieved. If such conditions are recognized at any other time, sensitivity analysis and/or stream channel audit shall be undertaken immediately.	Interfor has fully complied with this recommendation. However, in the future, Interfor proposes that this rule should not apply to watersheds that have a low vulnerability to peak flow change.
R3.1f	In watersheds where harvestable areas are less than 30% of the total area, resource managers can use their professional judgment to vary these standards without changing the intent to regulate rate of harvest to minimize hydrological change.	Interfor has, and will continue to comply, with this recommendation.
R3.1g	Periodically review these recommendations and reformulate as the results of monitoring accumulate.	This plan represents Interfor's first attempt at reviewing these recommendations.
R3.1h	In watersheds important for their scenic values, complying with the visual landscape management objectives may restrict the rate-of-cut below the limits specified above.	Interfor understands the need to comply with visual landscape management objectives. It has, and will continue to comply, with this recommendation.
Size of Cutting Unit and Adjacency		
R3.2	Determination of the size and configuration of cutting units should be based on topography, site and stand conditions, adjacent reserve areas, visual landscape management objectives and design principles, and operational constraints.	Interfor takes these factors into serious consideration when planning cutting units.

R3.2a	Proposed rate-of-cut limits obviate the current arbitrary limits on the size and adjacency of individual cutting units within a watershed. Exceptions occur where size and adjacency must be considered in relation to visual landscape management objectives. Riparian and other reserve areas established at the watershed planning level will protect values that require reserve forest.	This recommendation refers to arbitrary 40 ha maximum cutting unit size set in the <i>Coast Planning Guidelines Vancouver Forest Region</i> (October 1993). Interfor may wish to retain the flexibility to increase cutting unit size under certain conditions (see R3.7).
A New Terminology for Silvicultural Systems		
R3.3	Adopt new terms to describe non-conventional silvicultural systems, designed to protect multiple values, maintain ecosystem function, and produce a diversity of forest products.	Interfor has fully adopted Variable Retention (VR) harvesting systems in TFL 54.
Adopt a Variable-Retention Silvicultural System		
R3.4	Replace conventional silvicultural systems in Clayoquot Sound with a variable retention silvicultural system.	Interfor has fully complied with this recommendation.
Prescribing the Variable-Retention System		
R3.5	Specify prescriptions for retention in terms of the types, spatial distribution, and amount of forest structures that are to be retained.	For each cutting unit, Interfor plans the retention amount and distribution, based on forest type, distribution, blowdown hazard, hydriparian and terrain constraints, and operational factors.
R3.6	On cutting units with significant values for resources other than timber or with sensitive areas, implement high levels of retention.	Interfor has, and will continue to comply with this recommendation. However, Interfor seeks greater flexibility on Class IV terrain and on certain hydriparian reserves.
R3.6a	On cutting units with significant values for resources other than timber or with sensitive areas, retain at least 70% of the forest in a relatively uniform distribution.	Interfor has, and will continue to comply with this recommendation. However, Interfor seeks greater flexibility on Class IV terrain and on certain hydriparian reserves.

R3.6b	When harvest occurs in small patches, limit-opening sizes to 0.3 ha or less.	Interfor wishes to retain greater flexibility in opening sizes, based on ecosystem characteristics and blowdown hazard management.
R3.6c	Retain at least some larger diameter, old, and dying trees; snags; and downed wood throughout the forest (but not necessarily in harvested patches).	Interfor has, and will continue to comply, with this recommendation.
R3.6d	Identify “no-work zones” representing a minimum of 15% of the cutting unit area (i.e., areas including snags and other danger trees) before any harvesting takes place.	Interfor has, and will continue to comply, with this recommendation.
R3.7	On cutting units without significant values for resources other than timber, or without sensitive areas, implement low levels of retention.	Interfor has, and will continue to comply, with this recommendation.
R3.7a	Retain at least 15% of the forest.	Interfor has, and will continue to comply, with this recommendation. However, in areas of Moderate or High Blowdown Hazard, Interfor wishes to avoid the requirement to retain trees that are likely to blow down.
R3.7b	Retain most material as forest aggregates of 0.1–1.0 ha well dispersed throughout the cutting unit.	Interfor has, and will continue to comply, with this recommendation.
R3.7c	Ensure aggregates are representative of forest conditions in the cutting unit (i.e., should not be disproportionately located in less productive portions of the cutting unit)	Interfor has, and will continue to comply, with this recommendation.
R3.7d	Retain aggregates intact as “no-work zones”	Interfor has, and will continue to comply, with this recommendation.
R3.7e	Regardless of retention level, ensure that no place in an opening is greater than two tree heights from the edge of an existing aggregate or stand	Interfor wishes to retain greater flexibility in opening sizes, based on ecosystem characteristics and blowdown hazard management.
R3.7e	When dispersed retention is employed, select the most	Interfor has, and will continue to comply, with this

	windfirm, dominant trees present on the unit.	recommendation.
R3.8	Tailor prescriptions for retention to stand characteristics, topographic conditions, and other resource values on the working unit.	Interfor has, and will continue to comply, with this recommendation. To manage blowdown hazard, Interfor has commissioned a consultant to monitor the blowdown in harvested VR blocks, and to provide detailed management recommendations to minimize and mitigate. It has also supported research by UBC (Dr. Steve Mitchell and Robyn White, an M.Sc. student) focused on blowdown management.
R3.8a	Retain a representative cross-section of species and structures of the original stand.	Interfor has, and will continue to comply, with this recommendation.
R3.8b	Select specific structures and patches to meet ecological objectives (e.g., provide future habitat for cavity-using species).	Interfor has, and will continue to comply, with this recommendation.
R3.8c	Select patches to protect culturally important features (e.g., culturally modified trees, recreation sites, scenic features).	Interfor has, and will continue to comply, with this recommendation.
R3.8d	Determine appropriate amounts of retention based on ecological sensitivity and forest values within the working unit.	Interfor has, and will continue to comply with this recommendation. However, Interfor seeks greater flexibility on Class IV terrain and on certain hydric riparian reserves.
R3.9	Openings must not exceed four tree heights across.	Interfor wishes to retain greater flexibility in opening sizes, based on ecosystem characteristics and blowdown hazard management.
R3.10	Do not salvage blowdown in retention cutting units except where it threatens desired values.	Interfor wishes to have the flexibility to salvage some blowdown as part of a blowdown management strategy.
R3.11	Design the size, shape, and location of areas to be	Interfor has, and will continue to comply, with this

	harvested within a cutting unit to comply with topography and visual landscape management objectives established for the area.	recommendation.
Implementing the Variable-Retention System		
R3.12	Develop restoration plans for areas where forest values have been degraded.	Interfor has led a very successful restoration program on fish habitat on streams in the Kennedy Flats (see section 3.4).
R3.13	Augment clear understanding of retention objectives with judgment and local experience.	Interfor now has 10 years experience in the implementation of VR harvesting.
R3.14	Initiate training programs in new techniques (e.g., wildlife tree assessment, no-work zones, and riparian management) for forest workers.	Interfor signed a multi year FRBC contract to train our contract logging crew in alternative harvest techniques- including the purchase of new equipment (Madill 124 interlock grapple/skyline yarder and Madill 3800 hoe chucker). Crews learned how to rig and log skyline- harvesting in Fortune Channel in 1997. And hoe chucking in dispersed VR blocks on the Kennedy Flats. In participation with MWLAP and WCB, Interfor also conducted training of fallers in developing practices and procedures for VR falling- Wildlife Danger Tree course development.
R3.15	Provide incentives for tenure holders to implement the variable-retention system.	Earlier the MOF provided a Clayoquot Stumpage Additive, to partially compensate for the extra planning, engineering and harvesting costs entailed in meeting CSSP recommendations. This additive has been phased out. The current stumpage appraisal system no longer recognizes the costs of VR logging- it is acting as a disincentive and should be reviewed by Gov't.

R3.16	Encourage innovative approaches to silvicultural practices throughout the stand rotation to promote diverse forest structure and habitats, and to attain structural features of old-growth forests.	Interfor has taken measures to maximize productivity in forest regeneration, and has participated in trials to diversify structure in second-growth forests. It hopes to experiment with stand management techniques in return for greater flexibility on old-growth retention rules (see section 3.5).
R3.17	Post-harvest silvicultural treatments should approximate natural patterns.	Interfor attempts to preserve snags and danger trees (consistent with meeting safety objectives) and to retain coarse woody debris on-site.
R3.18	Devise methods of monitoring success of retention silvicultural prescriptions that reflect their multiple objectives.	Interfor has participated in research and monitoring activities in support of this recommendation (see section 3.7).
R3.19	Implement an adaptive management strategy to incorporate new knowledge and experience. Establish research and monitoring programs to assess effectiveness of these initial recommendations in meeting ecological, cultural, scenic, and economic objectives, and to improve recommendations on an ongoing basis.	Interfor commissioned a Research and Monitoring Strategic Plan for Clayoquot Sound in 2003. This is a partial outcome of that strategy.
R3.20	Policies also must be adaptive. Establish policies to modify standards and practices.	Interfor agrees with this recommendation.
R3.21	Phase in the variable-retention silvicultural system in Clayoquot Sound over a five-year period,: <ul style="list-style-type: none"> • 20% of the annual area harvested by end of 1996; • 50% of the annual area harvested by end of 1998; and • 100% of the annual area harvested by end of 1999. 	Interfor immediately and fully implemented VR well ahead of the recommended phase-in period. All logging now conducted in TFL 54 utilizes the VR system.
R3.22	Fast-track watershed-level planning (harvest without requisite watershed-level planning should be minimized).	Watershed planning was the responsibility, formerly of the BC Ministry of Forests, and later the BC Ministry of Sustainable Resource Management and FNs

		(CSTPC). Plans for the 13 watersheds are nearing completing at the time of writing.
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- **CHAPTER 4 – HARVESTING SYSTEMS**

• RECOMMENDATIONS REGARDING HARVESTING SYSTEMS		
R4.1	Select a harvesting system that meets safety and other specified objectives consistent with variable retention silvicultural prescriptions.	Interfor has developed a considerable degree of expertise in ecologically appropriate and economically sound harvesting under VR rules.
R4.2	Plan and implement yarding to minimize soil disturbance, site degradation, and damage to retained trees. Restrict ground-based logging to hoe forwarding or similar low-impact yarding methods appropriate to the prevailing weather and soil conditions in Clayoquot Sound. Use partial or full suspension cable yarding and helicopter logging as required to minimize detrimental soil disturbance and damage to retained trees.	All ground-based harvesting is done with hoe-forwarding. Due to the ability of experienced operators and the large amount of woody debris on-site, this has resulted in very low amounts of site degradation. Sites too steep for hoe forwarding are cable logged or heli-logged. Interfor is therefore fully compliant with this recommendation.
R4.3	Undertake operational trials of harvesting with the variable-retention silvicultural system.	Interfor has perfected VR harvesting over the last 10 years, and has been able to reduce unit costs to some extent (see section 3.6).

Chapter 4 (Cont'd) Harvesting Systems

R4.4	Provide continuing education opportunities for professional foresters, forest engineers, and fallers for appropriate variable retention silvicultural systems to encourage development of a skilled, motivated, and stable workforce.	Interfor In addition, it contracted Forest Engineering International from the US to train its staff on total chance planning/engineering and to develop some of their full drainage 1:5,000 engineering tools as well as skyline training. Interfor contracted an American Skyline consultant to assist and train in the planning and layout of Rolling Stone R20 area; and also participated in the Ahousaht Alternative Harvesting symposium, using 2 cutblocks (R20 and UC5E) as training for alternate harvest layout and design. Interfor also trained its staff in the use of PC logger- lift angle analysis for skyline. Also see above R3.14.
R4.5	A university-level program of study in forest engineering is needed	This recommendation is not applicable to Interfor.
R4.6	Government, forest companies, and labour, through discussion, must address issues of increased manpower requirements, reduced productivity, and increased costs involved with the variable-retention silvicultural system.	Increased costs, following implementation of VR rules are discussed in section 3.5. Recognition of these costs has resulted in modification of appraisals in Clayoquot Sound. ("The Clayoquot Stumpage Additive). Currently, this only covers overhead costs- and no longer covers selection or VR logging.

- CHAPTER 5 – TRANSPORTATION SYSTEMS

• RECOMMENDATIONS REGARDING ROADS		
R5.1	Respect recommended priorities related to road location.	Interfor has, and will continue to comply, with this recommendation.
R5.1a	Where irreplaceable values or highly sensitive features are on or near a proposed road, select another road location or do not build a road.	Interfor has, and will continue to comply, with this recommendation.
R5.1b	Where damage to watershed integrity and ecosystem function is possible, construct roads only if: no alternative route is available; the road is required to access a substantial harvestable area; <i>and</i> mitigating measures are biologically and physically feasible. Seek professional advice from appropriate specialists approved by the B.C. Ministry of Forests whenever road construction is contemplated in areas.	Interfor has, and will continue to comply, with this recommendation.
R5.1c	Where significant damage to visual or recreational values is possible, use the proposed location only where mitigating measures are feasible according to appropriate specialists.	Interfor has, and will continue to comply, with this recommendation.
R5.2	Improve on-the-ground performance in construction and maintenance of road drainage structures (ditches, culverts, bridges). Reduce the impact of roads by allowing the passage of shallow subsurface groundwater (requires research).	Interfor has improved standards of road construction and maintenance since the implementation of the Science Panel's report. The need to monitor road-related erosion and landslides has been recognized in the R&M strategy. Interfor periodically uses 'porous fills' and French drains to allow passage of subsurface flow, but no research on the efficacy of this has been conducted.

Chapter 5 (Cont'd) Transportation Systems

R5.3	Require an overall road deactivation plan.	Interfor routinely prepares deactivation plans, and has deactivated hundreds of km of road since 1995. FRBC and FIA funded road risk assessments have been done for every road in IFP tenure as well as other tenure holders (2003). They identify all roads previously deactivated and those requiring work that will be completed when Gov't funding is available.
R5.4	For main or branch roads on slopes consistently greater than 55%, use full bench cuts and endhaul construction, or seek professional advice to ensure slope stability is maintained. Use controlled blasting techniques in rock-cuts and follow manufacturers' specifications.	Interfor employs end-haul construction techniques as necessary to maintain slope stability. Terrain stability assessments are commissioned on roads crossing hillslopes greater than 55%. Road inspections have shown a high level of compliance with blasting prescriptions.
R5.5	Revegetate all disturbed areas associated with roads. Promptly apply erosion control, and use indigenous, non-invasive species.	Road fills and other related disturbed areas are seeded with grass where erosion may result in sediment delivery to a stream. Several research projects on the use of indigenous grass species have been conducted, but the routine use of such species is not feasible at this time.
R5.6	Determine required road widths based on anticipated vehicles (i.e., vehicles that will use the road) and traffic volumes. Road widths should not exceed 4.25 m except as required on curves for sidetracking of trailer units and for turnouts. Wider or higher standard roads may be justified by special needs or safety, such as heavy industrial or recreational use, or regular use by local communities.	The specification of 4.25 m is too narrow to safely accommodate heavy logging equipment. Interfor attempts to minimize road widths, consistent with safety and engineering feasibility. The industry standard is for 5 m wide running surfaces; or 6 m including ditch.

Chapter 5 – Transportation Systems

R5.7	The maximum percentage of the <i>harvestable</i> area designated for permanent access should normally be less than 5%. All other temporary roads and access trails must be rehabilitated to a productive state.	Interfor has, and will continue to comply, with this recommendation.
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• RECOMMENDATIONS REGARDING WATER TRANSPORTATION		
R5.8	Water handling and transport standards must protect estuarine and marine environments, and their associated biota.	Interfor agrees with the objectives in this recommendation, and is in full compliance.
R5.8a	The surface of the dryland sort should slope landward, rather than seaward	Interfor sorts (Stewardson and Fortune) have been audited during EMS audits and have been found to meet environmental standards with the proper water management systems in place (drainage and sumps). All other sorts are owned by Iisaak or Weyerhaeuser.
R5.8b	Surface runoff should be intercepted by a ditch on the landward side of the dump. The ditch should direct runoff to a collecting basin from which solids are filtered and regularly removed.	Interfor has, and will continue to comply, with this recommendation.
R5.9	On all proposed log dump sites, undertake an ecological assessment that permits DFO to evaluate and assess the site.	Interfor has, and will continue to comply, with this recommendation.
R5.10	Minimize time logs are in the water, especially shallow water, by sorting on land and storing log bundles in deep water.	Interfor has, and will continue to comply, with this recommendation.
R5.11	Locate log dumps at sufficient distances from sensitive areas to preclude physical disturbance or deposition of deleterious organic materials.	Interfor has, and will continue to comply, with this recommendation.
R5.12	Ensure log dump sites are deep enough to avoid problems with the propeller wash of dozer boats and grounding of booms or bundles.	Interfor has, and will continue to comply, with this recommendation.
R5.13	Restore sites that have been damaged by excessive accumulations of bark, woody material, or fine organic material.	Interfor has, and will continue to comply, with this recommendation.

Chapter 6 - Scenic, Recreational, and Tourism Values and Resources		
Recommendations Regarding Scenic Values		
R6.1	Involve the provincial government, First Nations, regional and local governments, recreation and tourism groups, industry, and other public interest groups in the inventory, analysis, and planning of scenic resources. Provide opportunities for meaningful involvement by the public at large.	Interfor has developed an innovative process for soliciting public participation in identifying significant scenic and recreational resources in TFL 54. This “Dot Process” has been successful in garnering public input into forest planning, as well as mapping areas of scenic, recreational and cultural significance.
R6.2	Develop an inventory system for scenic resources	Catherine Berris Associates Inc. completed a “Scenic Resource Inventory and Scenic Assessment” for Clayoquot Sound in 1999.
R6.2a	Map scenic resources for all of Clayoquot Sound at a scale of 1:250 000, which considers overall landscape patterns, and the role of the landscape in relation to existing and potential use.	See above.
R6.2b	Develop a new inventory system for visual landscape units, which would be used during subregional and watershed planning, based on similarities in landscape characteristics, the degree and type of human activity, and viewer related factors.	This was completed in the scenic resource inventory, referenced in R6.2.
R6.2c	Develop a new scale to describe visual quality objectives, which describes alteration by less technical terminology.	See above and R6.2.
R6.2d	Clearly summarize the landscape inventory information on maps	See R6.2

Chapter 6 (Cont'd) Scenic, Recreational, and Tourism Values and Resources

R6.3	Use the information from the landscape inventory, existing and potential use patterns, and public preferences in the area to analyze scenic resources. Determine the patterns in the landscape, levels of scenic quality, and opportunities and constraints for use related to future scenic resources. Conduct this analysis at the subregional and watershed levels. Computer modeling is an effective way to analyze the landscape inventory information. Involve the planning group in the analysis.	Interfor has extensively and consistently used the scenic resource inventory – on a GIS base - for operational planning. Interfor also uses visualization software to assess the visual impact of proposed cutting units on the landscape.
R6.4	Develop a long-term management plan for scenic resources identifying visual landscape management units for all of Clayoquot Sound.	Interfor operates under refined visual landscape management (VLM) standards, developed in part by Catherine Berris Associates and MOF.
R6.4a	Each plan unit should describe essential characteristics of the scenery; existing and potential resource values and human uses; the relative value of scenic resources; visual landscape management objectives, including the desired character of the area, the proposed level of alteration or development, needs and methods of rehabilitation, acceptable land and water uses, and any specific measures that may be required to protect scenic values.	See above.
R6.5	Integrate the recommendations of the visual landscape management plan into all other forest plans during subregional-level, watershed-level, and site-level planning. Where visual concerns must be reconciled with those of other resource values, do so in a collaborative manner with all disciplines represented, recognizing that the primary goal is to maintain ecosystem integrity.	Interfor has, since 1995, practiced integrated resource management at subregional, watershed and site levels, taking into consideration ecological, scenic, recreational, hydrologic and terrain stability factors, as well as operational and economic issues.

Chapter 6 (Cont'd) Scenic, Recreational, and Tourism Values and Resources

R6.6	Use landscape design principles in the development of detailed silvicultural plans and development plans for other uses. Require visual impact assessment and subsequent refinement of proposed alterations to meet visual landscape objectives on all of the most important scenic areas. Involve the public in the review of proposed harvest areas, providing illustrations that can be easily understood.	Interfor meets this recommendation by following the VLM standards referenced in R6.4.
R6.7	Continue the development of visual landscape guidelines in consultation with interdisciplinary teams, using monitoring and research results to refine the guidelines so that all resource values are appropriately addressed.	Interfor has, and will continue to comply, with this recommendation.
Recommendations Regarding Recreational and Tourism Values		
R6.8	Integrate planning for recreational and tourism resources	Interfor takes these resources into consideration, but ultimately watershed planning is the responsibility of the Provincial Government and FNs- CSTPC.
R6.9	Ensure that the First Nations, provincial, regional, and local governments, and recreation and tourism groups are the principals involved in the inventory, analysis, and planning of tourism and recreational resources. Create opportunities for meaningful involvement by other public and industry groups.	Interfor, through referrals of development plans through the Central Region Board, and through protocols developed with First Nations, plans its developments cooperatively, thus meeting this recommendation. Also through the FSP and Dot processes we have involved may public and special interest groups. We also do many tours (200 to 400 people per year from all over the world) to review our operations.

Chapter 6 (Cont'd) Scenic, Recreational, and Tourism Values and Resources

R6.10	Ensure that recreation inventories are conducted at subregional scales and watershed scales and that information is in a form that is easy for the public to understand.	Interfor has invited public participation to inventory sites of scenic and recreational significance, as described in R6.1.
R6.11	Analyze recreational and tourism opportunities, and develop plans for recreation and tourism at the subregional, watershed, and site levels.	This recommendation is not applicable to Interfor.
R6.12	Ensure that forest planning includes maintaining the recreational and tourism capability of resources.	Interfor complies with this recommendation by following VLM standards, and by soliciting public input in the inventory and management of scenic and recreational resources (see R6.1 and R6.3). In addition, watershed planning and integration of resource objectives at that level, is the responsibility of the provincial government.

Chapter 7 - Planning for Sustainable Ecosystem Management In Clayoquot Sound		
New Planning Framework - Planning Principles		
R7.1	The flow of forest products must be determined in a manner consistent with objectives for ecosystem sustainability. This entails abandoning the specification of AAC as an input to local planning.	Interfor agrees with this objective; see response to following recommendations.
R7.2	Adopt physiographic or ecological land units as the basis for planning. Use the watershed as the basic unit for planning and management, recognizing that more than one watershed may be required to plan for values.	Interfor has implemented this recommendation since 1995. However, harvest levels are still set at the TFL level. The BC Ministry of Sustainable Resource Management and FNs are responsible for integrated watershed planning (CSTPC).
R7.3	Use practices that represent the best application of scientific and traditional knowledge and local experience in the Clayoquot region by collecting baseline information about the full range of biophysical and cultural forest resources and values, and use this information and knowledge to assess ecological responses to change.	Since the implementation of the Science Panel's recommendations, most of Clayoquot Sound has been inventoried for terrestrial ecosystems, terrain stability, landslides, vegetation resources, hydrosiparian resources, marbled murrelet habitat and sites of archaeological and cultural significance.

Chapter 7 (Cont'd) Planning for Sustainable Ecosystem Management In Clayoquot Sound

R7.4	Engage the Nuu-Chah-Nulth and other local people in all phases of planning and managing.	Until recently, Interfor employed a full-time Ahousaht/Ucluelet FN cultural liaison officer. Interfor plans to hire a "Forest Warden" with the Hesquiaht FN, and has a part time Tla-o-qui-aht FN cultural liaison- who participates in site level planning. Interfor has also maintained working protocols (draft or signed) with First Nations in Clayoquot Sound. In addition, all operational plans (FDPs) are referred through the Central Region Board, which is well represented by First Nations people. Interfor is also working through CIPPAs and BPAs and timber sales to engage FNs in forest management and social benefits from harvest.
R7.5	Develop subregional, watershed and site level plans to establish consistency so that plans developed for smaller areas and shorter time periods are consistent with plans for larger areas and longer time periods	Interfor has been very active planning its operations in Clayoquot Sound at subregional, watershed and site levels.
R7.6	Ensure that plans are consistent with land-use objectives for adjacent Protected Areas and special management zones.	Interfor has, and will continue to comply, with this recommendation.
R7.7	Base planning on a long-term perspective, at least in the order of 100 years when considering large areas, and 10 years for operational planning of smaller areas.	Planning for timber harvest levels is based on the concept of long-term sustainability, i.e.: it is set at a rate that will maintain ecological integrity indefinitely. This will need continuous monitoring and adaptive management. While planning does not explicitly project a 100-year time horizon, long-term scenarios are taken into consideration.

Chapter 7 - Planning for Sustainable Ecosystem Management In Clayoquot Sound

R7.8	Inventory, analyze, and plan for a full range of forest resources, forest uses, and forest management activities. Undertake new inventory as needed at an early stage of planning, prior to analysis.	As noted in R7.3 a wide range of inventories have been completed (or nearly completed) in Clayoquot Sound. Interfor has re-analyzed timber inventories, in support of a scientifically credible and sustainable area-based harvest level. Interfor had spent over \$1,000,000 on various inventories that were provided to Gov't to assist in getting the Watershed Planning underway after the CSSP was implemented.
R7.9	Conduct monitoring to understand the effects of plans and to guide future adjustments.	Interfor's plans and inventories are regularly updated as new information becomes available.
R7.10	Analyze resources and development of area-based plans (the rate and distribution of harvesting), THEN determine the anticipated annual volumes of timber to be cut for watershed-level planning units.	Interfor is one of the first forest products companies in BC to adopt an area-based timber harvest schedule, and therefore meets and exceeds this recommendation.
Participation in Planning		
R7.11	Appoint a planning committee of highly motivated people who are knowledgeable about resources and are willing to adopt the protocol in R7.14	The CSTPC has been established to meet this recommendation.
R7.12	Open planning committee meetings to public observation and participation, with all papers, reports, and documents used by the planning committee area made available for public review.	The process that was developed involved the public in the development of the Watershed Planning process and procedures- that the CSTPC has followed in the completion of the plans. The CRB is ensuring that the plans are available for public review and comment.
The Planning Process		

Chapter 7 - Planning for Sustainable Ecosystem Management In Clayoquot Sound

R7.13	At the site level, planning should be undertaken by the forest manager in accordance with higher level plans (i.e. notify subregional- and watershed-level planning committees, which, do not need to be involved in site level plans, but should monitor the implementation of these plans).	Interfor plans its operations at the site level in accordance with higher level plans. However, watershed plans are only recently been finalized. MOF staff monitor all site level activities.
R7.14	Develop and agree on a working protocol that will clarify how the group will work together, how disputes will be settled, how decisions (consensus or other) will be reached, and how the process (including meeting and work schedules) will proceed.	The planning process in R7.12 was developed by Gov't and FNs and local communities and evolved into the CSTPC and CRB working cooperatively to meet this objective.
R7.14a	Establish planning objectives in terms appropriate for each planning level. Identify the types of environmental and cultural resources that are to be protected.	Interfor has met this requirement for subregional (Kennedy flats area) and site level planning, as well as for interim or draft watershed plans. Sensitive resources have been protected by a series of reserves throughout the Sound. Final CSTPC Watershed Plans will address this recommendation.
R7.14b	Based on these objectives, determine the methods and scope of the inventory required. (Section 7.3 describes the type of information to be collected at the three levels; Appendix III provides more detail.)	Inventories have been completed to the highest provincial standards, and these have been used to design appropriate reserves.

Chapter 7 - Planning for Sustainable Ecosystem Management In Clayoquot Sound

R7.14c	Determine status of resources, rates of biological processes, and consequent land and resource sensitivities and capabilities, technical analysis by experts from appropriate resource management agencies, forest companies, First Nations, and other parties to identify reserve areas and areas where resource extraction or development may occur, including constraints that may limit the amount and type of activity.	Reserve areas have been designed based on 'state of the art' inventories, in conjunction with expert input and advice from Gov't agencies and First Nations. Some modification of these reserves may occur as new information is obtained. (See section 3.4). The Plans are "living documents" and will be updated based on new information and knowledge over time.
R7.14d	Develop and evaluate plans for specific management activities based on input from members of the planning team and the public.	Interfor has participated with other agencies and stakeholders to evaluate specific management activities; Interfor and UBC have attempted to model stand development at the stand and landscape level after VR harvesting; it has also modeled habitat connectivity and fragmentation in participation with SFU and LBMF.
R7.14e	Workers with education and training in ecosystem management must implement plans at the site level as well as monitor the effects at the site and watershed level.	Interfor participated with Iisaak and LBMF to monitor structural and habitat attributes of areas subject to VR logging; Interfor conducted research into regeneration dynamics in VR, natural and clearcut openings.
R7.14f	Monitor ecosystem processes and components to assess the extent to which objectives are being met.	See R7.14d and R7.14e
Time Frames		

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R7.15a	100 years for subregional-level planning with major revisions every 10 years, or more frequently if required	Interfor's Partial Interim Kennedy subregional planning is based on long-range scenarios. This plan represents the first major revision. Interfor is also developing the concept of "Community Cooperative Areas- CCAs to attempt to address social and economic matters as well as environmental planning.
R7.15b	100 years for watershed-level planning, showing projected activities in 10-year increments, with revisions every five years, or more frequently if required	Watershed planning is primarily the responsibility of the Provincial Government and FNs -CSTPC.
R7.15c	10 years for site-level planning, starting five or more years ahead of the work, with revisions every year during active operations.	Interfor revises site level plans progressively as the phases of planning occur (paper/map projections, reconnaissance, layout, site level reviews, final site plans).
Watershed-Level Planning – Identifying Reserves		
R7.16	At the watershed level, map and designate reserves in which no harvesting occurs. Integrate reserve establishment with the refinement and detailed mapping of various land-use zones (e.g., Protected Areas).	The BC Provincial Government, FNs designed reserve areas and Protected Areas. Interfor provided assistance through completion of interim watershed plans and inventory work.
R7.16a	Identify reserves that include the drainage system and hydrosiparian zone around streams, lakes, wetlands, and marine shores	These reserves have been identified through the has Watershed Planning process under the auspices of the CSTPC.
R7.16b	Identify reserves for sensitive soils and unstable slopes by the extent of stability class V terrain	Terrain stability mapping has been completed, with identification and delineation of Class V terrain.

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R7.16c	Identify reserves to protect red- and blue-listed plant and animal species.	Reserves for Marbled Murrelet have been identified and reserved, based on an interim study by Chatwin (2002). Interfor will review this reserve network based on new information and propose amendments as per the CSTPC final watershed plan document (updates and amendments section).
R7.16d	Identify reserves to protect forest-interior conditions in late successional forest. Assuming tree heights of 50 m, a reserve width of 300 m will provide at least some forest-interior conditions. 20% of the forests in age classes 8 and 9 of a watershed-level planning unit should constitute forest-interior conditions.	A reserve system has been implemented that retains at least 20% of forest in age classes 8 and 9 (>140 years) in each watershed-level planning unit. With these reserve networks, the requirement for protection of forest-interior conditions is met.
R7.16e	Identify reserves to protect cultural values that are determined by the Nuu-Chah-Nulth Nations and protected in ways consistent with traditional knowledge.	Kennedy and Bouchard (1990) completed an inventory of culturally sensitive sites. Culturally significant areas mapping (TUS) has been completed by the First Nations on the CSTPC for the Watershed Plans. Interfor has working draft or final protocols with all First Nations in Clayoquot Sound, which recognizes specific cultural values and management at the site level.
R7.16f	Identify reserves to protect scenic and recreational values.	Interfor follows the CSTPC Watershed Plans with respect to scenic and recreational values.
R7.16g	Calculate areas of each biogeoclimatic site series contained within all designated reserve areas, identifying reserves to represent all ecosystems.	This is done as part of the WP process and is shown in the Watershed Plans.

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R7.16h	Identify reserves to ensure linkages among watershed-level planning areas.	Reserve areas have been designed by the CSTPC with a view to maintain linkages within and between Watershed Planning Units.
Hydroriparian Reserves		
Streams		
R7.17	Designate the entire hydroriparian zone as a special management zone.	Hydroriparian zones have been inventoried and mapped throughout Clayoquot Sound. Interfor has scrupulously complied with CSSP recommendations for management around hydroriparian areas. In this review, Interfor suggests some modifications to these rules, based on the 10 years of experience since their implementation. See section 4.4 for a description of the general modifications and the rationale to support the adoption of these changes.
R7.18	Access in hydroriparian areas must not constrain ecosystem function. Reserve the entire “contemporary floodplain” of streams in Class A(1) (alluvial channels with gradient less than 8%), except areas of “dry floodplain” more than 50 m from a perennially or seasonally active channel or site of seasonal standing water. Dry floodplain may be a special management area harvested by a silvicultural system with high retention, provided that appropriate access can be arranged.	Interfor has, and will continue to comply, with this recommendation.

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R7.19	Class A(2) (alluvial channels with gradient of 8–20%) should have reserve areas within 50 m of present channels (30 m for A(2)(i): channels less than 3 m wide), recently active channels, and any other routes that appear, in the opinion of a professional geoscientist or professional engineer with expertise in fluvial geomorphology or river engineering, to be subject to avulsion. Other portions of the hydroriparian zone of Class A(2) streams may be harvested by a high retention system. In the case of alluvial fans, the “contemporary fan surface” shall be treated the same as the contemporary floodplain (R7.18) and reserved from logging.	<p>Interfor has, and will continue to comply, with this recommendation, with a minor exception.</p> <p>Interfor wishes to have the flexibility to practice “high retention” on parts of inactive fans more than 50 m from a stable channel (30 m from a stream <3 m wide). This modification would be then be consistent with the intent embodied in recommendation R7.18.</p>
R7.20	Treat streams in Class B(1)(a) (non-alluvial channels with gradient less than 8%, not entrenched) as Class A(1) (see R7.25 for exceptions) as a larger portion of the valley flat will be available for high retention harvest.	Interfor has fully complied with this recommendation in the 10 years since it implemented the CSSP recommendations. The intent of this recommendation was to protect streams developed in Holocene alluvium, which experience seasonal flooding. However, most B1a stream reaches are not located on such alluvium, and simply flow on till or glaciofluvial deposits. Interfor suggests that for these reaches, the rules emulate those designed for Class B1(b) (i.e.: 30 m buffers). Stream reaches with a distinct alluvium base should be classed as A1.

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R7.21	For streams in Class B(1)(b) (non-alluvial channels with gradient less than 8%, entrenched), designate a reserve that extends to the top of the entrenchment slope or 50 m from the streambank (30 m for B(1)(b)(i), width less than 3 m), whichever is greater. An additional reserve or “no machinery” zone of at least 30 m width will be designated beyond the top of slopes that are being actively undercut by the stream. Mature trees in this zone may be harvested if they can be felled away from the stream within a high retention harvest plan. Streams confined by stable rock slopes constitute a special case (see R7.28)	Interfor has, complied with this recommendation. It suggests that the “no machinery” zone be reduced to 15 m, in recognition that these are small, non-alluvial channels. Interfor feels that a 30 m set-back is excessive on such small streams.
R7.22	Treat streams in Class B(2)(a) (non-alluvial channels with gradient 8–20%, not entrenched) as Class A(2) (see R7.25 for exceptions).	In this recommendation, it is assumed that such stream reaches will be flowing on active fans. Such reaches should be classed as A(2). Many non-alluvial channels in reach class B(2)(a) are formed on tills and glaciofluvial deposits. Accordingly, Interfor feels that these should be treated as B(1)(b) class reaches.
R7.23	Treat streams in Class B(2)(b) (non-alluvial channels with gradient 8–20%, entrenched) as B(1)(b).	Interfor has, and will continue to comply, with this recommendation, subject to proposed general modifications, as described in _____.

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R7.24	For streams in Class B(3)(a)(i) (non-alluvial channels with gradient greater than 20%, not entrenched, seasonal or perennial flow), designate a reserve that extends 20 m from the channel.	Interfor has complied with this recommendation in the past. However, difficulties have arisen in the field distinction of seasonal and ephemeral flow in channels, especially when the assessment is done in summer. Interfor suggests that the requirement for a general reserve on b(3)(a)(i) streams with seasonal flow be lifted.
R7.25	Designate no general reserve for streams in Class B(3)(a)(ii) (non-alluvial channels with gradient greater than 20%, not entrenched, ephemeral flow), and those channels in classes B(1)(a)(i) and B(2)(a)(i) (non-alluvial channels with gradient less than 21%, not entrenched, less than 3 m wide) that carry only ephemeral flow. But, require evaluation by a professional biologist to determine whether special management prescriptions are warranted for ecological reasons, and employ special management where deemed necessary.	Interfor has, and will continue to comply, with this recommendation. However, Interfor does not feel that it is necessary to have every small and/or ephemeral stream channel assessed by a professional biologist. Instead, Interfor will develop policy, signed off by an R.P.Bio., that will identify the need for special management, and define circumstances where an R.P.Bio. assessment is necessary.

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R7.26	For streams in Class B(3)(b) (non-alluvial channels with gradient greater than 20%, entrenched), designate a reserve that extends to the top of the entrenchment slope or 20 m from the channel, whichever is greater. However, if the sidewalls adjacent to the channel (and including the channel zone) are classified as having low or no potential for instability, then apply criteria for Class B(3)(a). Apply gully assessment procedures to channels that are classified as gullies according to the <i>Gully Assessment Procedures for British Columbia Forests</i> (Hogan <i>et al.</i> 1995).	Interfor has complied with this recommendation, since implementation in 1995. Interfor's experience with narrow riparian buffers suggests that they may be subject to blowdown, which compromises the objectives in designing a reserve. Interfor wishes to retain some flexibility to manage these gullies according to site-specific factors, rather than according to blanket rules, which in some cases may result in poor forest management. Gully management is part of a package of hydriparian rule modifications, as described in section 4.4.
R7.27	Apply the gully management prescription of Hogan <i>et al.</i> (1995). No logging will not take place in any channel with high or moderate potential for downstream impact, and/or potential for debris flow, water flood, or fan destabilization	Gullies with unstable sidewalls will be incorporated within a hydriparian reserve. Retention of narrow riparian reserves along gullies with unstable terrain may trigger debris slides and flows through blowdown. Gully management is part of a package of hydriparian rule modifications, as described in section 4.4.
R7.28	Class B streams (non-alluvial channels) that are confined by stable rock walls, and are classified as having low overall habitat value and low potential to affect downstream reaches have no special management requirements with respect to hydriparian integrity. Where a V-notch in surficial material occurs immediately above a rock notch, apply the prescription for a trenched channel.	Interfor has, and will continue to comply, with this recommendation.

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R7.29	In community watersheds, make all channels above the intake subject to the previous prescriptions and extend the special management zone 50 m from any channel.	Interfor has, and will continue to comply, with this recommendation.
Lakes		
R7.30	Around all lakes, designate a special management zone that includes all the area under hydroriparian influence, or 50 m. The reserve will include the first 30 m from the shore with the remaining zone subject to retention systems of harvest provided it is outside the hydroriparian zone proper.	Interfor has, and will continue to comply, with this recommendation.
R7.31	Where special in-shore lacustrine, ecological, or cultural values are identified and steep slopes occur immediately behind the shore, extend the reserve or special management zone upslope as far as necessary to protect these special values.	Interfor has, and will continue to comply, with this recommendation.
R7.32	For Class (2) lakes smaller than 4 ha in area, designate a reserve that includes all the area under hydroriparian influence or 30 m, whichever is greater.	Interfor has, and will continue to comply, with this recommendation.
Wetlands		
R7.33	Establish a reserve on low gradient (less than 1% slope) edges of a wetland that extends to the limit of hydroriparian influence.	Interfor has, and will continue to comply, with this recommendation.
R7.34	On sloping edges of a wetland, establish a special management zone on the same basis as for lakes.	Interfor has, and will continue to comply, with this recommendation.
Marine Shores		

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R7.35	On Class A(1) and A(2)(i) shores (low shores adjacent to open waters), extend a riparian reserve inland 150 m from the seaward edge of forest vegetation, or to the inland limit of shore-associated features.	Interfor has, and will continue to comply, with this recommendation.
R7.36	On the remaining Class A(2) shores (cliffs, bluffs, and steep shores adjacent to open waters), extend a riparian reserve 100 m inland from the top of the coastal slope or bluff. On eroding shores, a larger distance may be specified if required by slope stability criteria.	Interfor has, and will continue to comply, with this recommendation.
R7.37	On Class B marine shores, extend a riparian reserve 100 m inland from the seaward edge of forest vegetation, or to the inland limit of shore associated features. For lagoons within the forest, establish a reserve on the inland shore (R7.30).	Interfor has, and will continue to comply, with this recommendation.
R7.38	In estuaries proper, make a smooth transition from the marine shore reserve to the streamside special management zone.	Interfor has, and will continue to comply, with this recommendation.
Roads		
R7.39	Avoid road construction in hydriparian reserves. If no alternative is possible, engineer and construct the road to minimize disturbance (requires professional engineering supervision at all stages).	Interfor has, and will continue to comply, with this recommendation.
R7.40	In hydriparian reserves, engineer the road and bridges to ensure that the security of neither the road nor the hydriparian ecosystem is jeopardized.	Interfor has, and will continue to comply, with this recommendation.

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R7.41	Roads constructed near the slope base at the edge of a floodplain or other hydroriparian zone must provide for passage of cross-drainage into the riparian zone. Design traffic and machinery holding places to prevent traffic-associated contaminants from escaping into the hydroriparian zone. Select road surface materials to minimize dust production.	Interfor has, and will continue to comply, with this recommendation.