

**The Scientific Panel
for Sustainable
Forest Practices
in Clayoquot Sound**



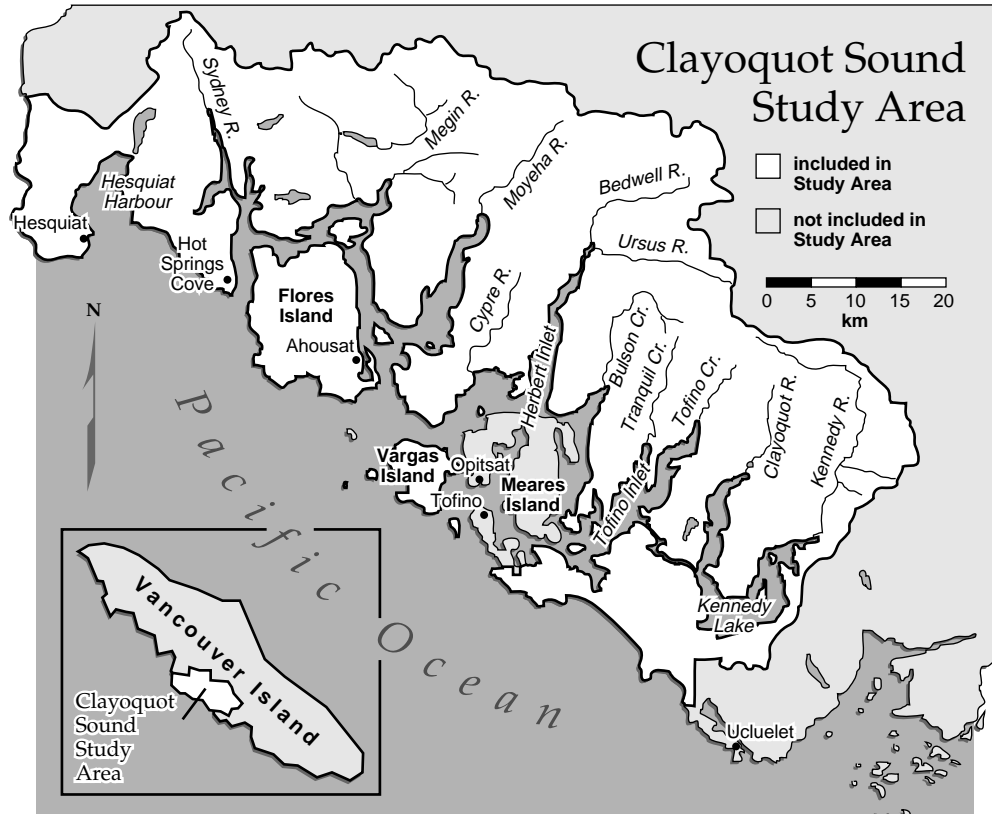
Report 4

A Vision and Its Context:

Global Context for Forest Practices
in Clayoquot Sound

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Source: Province of British Columbia (April 1993). Clayoquot Sound Land Use Decision: Key Elements.

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Executive Summary

This document provides the context for the work of the Clayoquot Scientific Panel in making recommendations for sustainable forest practices in Clayoquot Sound. The context is shaped by international conventions to which Canada is a signatory; by national and provincial initiatives related to sustainable forestry; and the area's forest values, history, government, and current patterns of use.

International Agreements

Four documents arising from the United Nations "Earth Summit," or UNCED '92, held in Rio de Janeiro in June 1992, greatly expanded the range of forest values recognized as part of sustainable forest management.

- *Framework Convention on Climate Change* seeks to stabilize concentrations of greenhouse gases; it addresses protection of old-growth forests and wetlands (which are important reservoirs of carbon), sustainable forest management, and, where appropriate, afforestation (the conversion of bare or cultivated ground to forest).
- *Convention on Biological Diversity* commits nations to conserve biological diversity, to use biological resources sustainably, and to share benefits of biodiversity fairly and equitably. It is the first international agreement to cover all genes, species, and ecosystems.

Both new Conventions contribute to a more complete recognition of the multiple roles and values of forests, and complement the two UNCED '92 documents that focus directly on forest issues: *Agenda 21* and *Guiding Principles on Forests*.

- *Agenda 21* addresses conservation and rational use of forests, sustaining multiple roles and functions of all types of forests, combating deforestation, and conserving biological diversity. It also recognizes and encourages the role of indigenous people and their communities in resource development.
- *Guiding Principles on Forests* commits signing nations to 15 principles covering the management, conservation, and sustainable development of all types of forests.

Certifying Sustainable Forestry

Accompanying these agreements, international efforts are also underway to restrict trade to forest products originating from sustainably managed forests. Efforts to certify forests that are sustainably managed have outpaced development of common international standards for certification, and often fail to encompass the full range of forest and social values contained in international agreements. To be effective at sustaining forest values, standards must recognize important ecological distinctions among tropical, temperate, and boreal forests.

There are two major approaches to certification. One approach is to certify specific actions (e.g., planting or not planting) as criteria for sustainability. The other approach is to certify the kind of forest that meets sustainable criteria. The Panel has attempted to envision the kind of forest desired rather than the specific methods employed in attaining that forest structure.

Canada's Commitment to Act

In response to international and domestic concern about forests, forest values, and forest management practices, Canada has acted, and is continuing to act, at national, provincial, and regional levels.

Nationally, the Canadian government is engaged in several programs directly relating to the international agreements signed at UNCED '92. These include the Canadian Forest Inventory, Model Forests Program, the national Criteria and Indicators process, Canadian Biodiversity Strategy, National Forest Genetics Resources Centre, ecological reserves, and a major research initiative on climate change.

Provincially, British Columbia has taken a lead role with initiatives such as the Protected Areas Strategy, Commission on Resources and Environment, Forest Practices Code, and *Interim Measures Agreement* (between British Columbia and the HwiiH of the Tla-o-qui-aht First Nations, the Ahousaht First Nation, the Hesquiaht First Nation, the Toquaht First Nation, and the Ucluelet First Nation, 1994). Such programs have the potential to meet or exceed objectives of international agreements—in many instances they extend the principles of international agreements directly into practice.

Because about 95% of British Columbia's forested land is publicly owned, the province has opportunities to play an active role in redefining and expanding forest stewardship. Realizing these opportunities to sustain all forest values, however, will likely incur additional costs and require foregoing immediate economic benefits.

Sustainable Forest Practices for Clayoquot Sound

Clayoquot Sound, on Vancouver Island, represents a land area of about 262 000 ha, of which 244 000 ha (93%) is forested. Some 160 000 ha of this forest land is commercially productive; of which about 30 000 ha has been logged, 39 100 ha is in protected areas, and most of the remaining area of about 90 400 ha is predominantly old-growth forest.

The Scientific Panel's vision for sustainable forest practices in Clayoquot Sound acknowledges and extends to specific practices recent international agreements and conventions. The Panel's goal was to recommend standards that maintained the full spectrum of forest values and explicitly incorporated First Nations' perspectives. Forest values include ecological services, such as improving air quality and regulating hydrological cycles; specific objects, such as large trees

and marbled murrelets; and less tangible values, such as spiritual and cultural context.

The Panel's vision stresses ecological relationships before development objectives, while recognizing that environmental protection and economic development are mutually dependent. Although scientific in its approach to forest ecosystems, it treats people and their aspirations within those ecosystems as a critical component. The vision has six tenets:

- the key to sustainable forest practices lies in maintaining functioning ecosystems;
- hierarchical planning is required to maintain ecosystem integrity from the subregional down to site-specific levels, and to ensure that the intent of higher level plans is reflected in lower level plans;
- planning must focus on those ecosystem elements and processes to be retained rather than on resources to be extracted;
- cultural values and desires of inhabitants and visitors must be addressed;
- scientific and traditional ecological knowledge of Clayoquot Sound must continue to be encouraged through research, experience, and monitoring activities; and
- both management and regulation must be adaptive, incorporating new information and experience as they develop.

To achieve this vision of sustainable forest practices the Panel has made over 120 recommendations covering: the selection and design of silvicultural systems, harvesting methods, and transportation systems; forest planning; First Nations' interests; managing scenic, recreation, and tourism resources; and monitoring procedures. These are presented in Panel documents: *First Nations' Perspectives Relating to Forest Practices in Clayoquot Sound*, and *Sustainable Ecosystem Management in Clayoquot Sound: Planning and Practices*.

The Scientific Panel's recommendations are among the first efforts taken to shift forestry from its historical focus on sustaining output levels for specific forest products to a focus on sustaining forest ecosystems. The recommendations are scientifically based and incorporate traditional ecological knowledge of First Nations peoples in whose territories Clayoquot Sound is located. In scope, they represent the most complete attempt, globally, to synthesize principles of international agreements and express these as specific actions.

Sustainable ecosystem management is the shared vision towards which most global conventions and grassroots efforts are moving. The Panel believes that its work in Clayoquot Sound begins to translate this vision into reality.

1.0 Introduction

In announcing the creation of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound,^{1,2} Premier Harcourt declared: “The goal of this Panel is to make forest practices in the Clayoquot not only the best in the province, but the best in the world.”³

To be the best calls for a new vision of forestry and a new approach to forest practices.

To be the best calls for a new vision of forestry and a new approach to forest practices. The Panel’s first step was to develop a protocol by which the Panel would successfully proceed.⁴ An early task was to investigate existing and emerging international standards for forest development to establish what would be the best forest practices in the world. With those standards in mind, the Panel established general and guiding principles to describe standards of forest practice that recognized and maintained all forest values—perceived by scientific, traditional, and international communities as the basis of “best forest practices.” The Panel then evaluated existing forest practices standards in Clayoquot Sound in light of its guiding principles to determine where standards were sufficient and where new standards are required to sustain forest values. Collectively, these steps create a vision for sustainable forest practices in Clayoquot Sound in the context of the area’s forest values, history, and current patterns of use.

This report describes:

- how the values attributed to forests have changed over time and how forests in Canada, British Columbia, and Clayoquot Sound are currently valued;
- how the global community has expressed its concern for forest values in new international agreements, and how Canada and British Columbia have responded; and
- how the Scientific Panel’s guiding principles provide the foundation for forest practices that meet or exceed emerging international standards.

¹Hereafter referred to as the Clayoquot Scientific Panel, Scientific Panel, or Panel.

²Clayoquot Sound refers to the area considered by the Clayoquot Sound Land Use Decision (British Columbia 1993), about 350 000 ha, including lakes, and not the water body itself.

³Premier Mike Harcourt. Press conference announcing Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. October 22, 1993.

⁴The Panel’s protocol is characterized by respect for one another, for different values, and for data founded both in scientific knowledge and traditional ecological knowledge. This respect enabled the Panel to be unanimous in its recommendations.

2.0 Forest Values

The values attributed to forests have changed over time. About 2500 years ago Druids protected sacred groves for their religious significance. Barbarian laws of 1500 years ago classified European forests by their productivity for grazing, and recognized honey and beeswax before lumber as products of the forest. By 556 A.D. the word *forestris* was being used in Europe to describe a tree-covered area retained to preserve hunting and fishing rights.⁵ Through the ages, forests have also been perceived differently by different groups. To many, forests have been impediments to movement or settlement. Others have valued forests as habitat for fur-bearing animals, or as storehouses of lumber and wood fibre. More recently, forests have come to be recognized as complex living ecosystems that provide many benefits more important than single resources such as fur, fibre, or recreation.

Forests are respected for a wide range of ecological services, specific objects, and less tangible values, such as spiritual context.

Today, forests are respected for a wide range of values that can be grouped into three broad classes: ecological services, such as improving air quality and regulating hydrological cycles; specific objects, such as large trees and marbled murrelets; and less tangible values, such as spiritual and cultural context. Such classification aids discussion but is potentially misleading because it singles out different facets of the same forest ecosystem. Some ecosystem-based values are summarized in Table 1.

2.1 Forests in Canada

Forests extend over about half of Canada's land mass and play a significant part in the Canadian lifestyle. Canadian forests represent roughly 10% of the world's forest cover and 14% of its conifer volume. About 76% of Canada's land-dwelling mammal species, 60% of Canada's breeding bird species, and two-thirds of the estimated 300 000 species of animals, plants, and micro-organisms in Canada are forest-dwelling (Bunnell 1990; Boyle 1991). Timber has been a dominant trade product of the country for 200 years. Today, production of timber and other wood products is Canada's largest domestic industry, providing about one million jobs—many in 350 single-industry towns—and generating almost \$45 billion per year.⁶

⁵Bunnell and Kremsater (1990) provide references for historical uses of forests.

⁶United Nations Food and Agriculture Organization (FAO) statistics and Canada (1990:61).

Table 1 Forest ecosystem-based values

Forest Value	Comment
Air Quality	Most life on earth depends on a unique chemical reaction—photosynthesis—that happens inside the cells of green plants. The green pigment chlorophyll combines carbon dioxide gas from the air with water from the soil to produce carbohydrates and oxygen. Since plants began to photosynthesize about 1 billion years ago, almost all life has relied on this reaction to produce food, generate oxygen, and remove carbon dioxide. The oxygen people breathe comes from green plants; large forests are major producers of oxygen and also filter pollutants from the air.
Water and Soil	Forests act like massive pumps, helping to recycle water, making it repeatedly available for plant growth. Through this action and their extensive rooting systems, forests also help to maintain a regular pattern of water flow in streams and reduce erosion, thus helping to maintain soils and their nutrients. In doing so they help maintain stream conditions favourable for fish and other species.
Climate	The earth's atmosphere acts like the panes of glass in a greenhouse, letting sunlight through and keeping heat in. When there is more carbon dioxide, methane, or other gases in the atmosphere, more heat is retained and the atmosphere warms up. Forests capture carbon dioxide and store vast amounts of carbon which might otherwise accumulate in the atmosphere and contribute to global warming. By producing oxygen and absorbing carbon dioxide forests provide a vital air-conditioning service to the planet.
Biodiversity	Natural (unmanaged) forests are remarkably rich in species. Survival of many species depends on the structural complexity and variety of habitats found in old, natural forests. Managed forests are deliberately simplified to make management easier. This simplification alters resident biodiversity, sometimes dramatically.
Scenic Values	People experience scenery over a large area. Thus, to understand scenic resources, it is necessary to look at broad patterns in the landscape. For residents, scenery provides a backdrop to their lives and reflects on their lifestyles. For tourists, scenic resources often provide the context for a trip or recreational activity. Forests are part of many of the world's most highly valued landscapes. To many people, removal of the forest reduces scenic resource values.
Cultural and Spiritual Values	Forests have values that go beyond specific resource attributes, such as the presence of large trees or deer. They provide traditional foods, materials, and medicinal plants important to indigenous cultures. As systems, they provide a context in which physical and spiritual events take place. Because of their longevity and many values, forests often form part of the cultural identity of the people who inhabit or live near them.
Economic Values	Forests provide many goods, such as wood and its diverse products, fish, wildlife, and water—all of which support human society. The sale of forest products and forest-based experiences generates funds that support health, education, and other social services.
Intergenerational Values	Many forest trees, especially those in the Pacific Northwest, are potentially long-lived, some reaching ages greater than 1000 years. Thus, the values associated with any individual forest can benefit several human generations. Values attributed to forests have changed over human history, and it is reasonable to expect that they will continue to change. The obligation of current generations is to sustain forest systems without damaging their potential value for future generations.

Canada's forests benefit more than just Canadians.

They contribute to global air quality and biodiversity.

Because forests so dominate the Canadian environment and economy, the total environmental, economic, social, cultural, recreational, and spiritual benefits received from forests are greater in Canada than in most other nations (Johnston 1993). Moreover, Canada's forests benefit more than Canadians. Globally, Canadian forests make significant contributions to air quality and biodiversity. For reasons such as these, Canada's forests have become a focus of international attention. Other nations want Canadians to nurture their forests wisely so they will continue to provide benefits for the rest of the world. Because Canada relies so heavily on exporting its wood products, other countries have powerful means to encourage good stewardship. Canada is extremely sensitive to international actions such as consumer boycotts, "green consumerism," or "eco-labelling" of wood products. Forces from within and outside the country are working to ensure that Canadian forests—and their many values—are sustained.

2.2 Forests in British Columbia

British Columbia is Canada's most biologically diverse province.

British Columbia is the most biologically diverse of Canada's provinces.⁷ It contains 23% of Canada's productive forest land and about 50% of the country's conifer volume. British Columbian forests contain some of the longest-lived and tallest-growing tree species in the world. The province is home to about 70% of bird species and 74% of land-dwelling mammal species that breed in Canada; most of these are forest-dwelling.

The *Convention on Biological Diversity* (Section 3.2.2) addresses the maintenance of both species number, or richness, and the genetic variation within species. British Columbia is particularly rich in both the number of resident species and the genetic variation within species. The province not only hosts most of the land-dwelling vertebrate species found in Canada—the majority of them forest-dwelling—but also supports greater genetic diversity, as evidenced in subspecies differentiation, than elsewhere in Canada.

B.C.'s economy is strongly shaped by its forest industry.

The economy of British Columbia has been strongly shaped by the forest industry since the mid-19th century, when sawmills began to cut lumber for export. The timber trade developed in British Columbia within the context of a European colonial economy, which initially regarded the forests as a practically limitless source of wood. But even in the early 20th century, it was recognized that the resource was in fact finite. The first Royal Commission on British Columbia's forests recommended that administrative controls be established over forest exploitation (British Columbia 1910). From this exercise the *British Columbia Forest Act* was passed in 1912. The act included provision for the establishment of provincial forests "for the perpetual growing of timber" and "for the protection of the water supply" (British Columbia 1912:C.17:89–90).

⁷Sources for comments on biodiversity include Bunnell and Williams (1980); Wilson and Peter (editors, 1988); Bunnell (1990); and Bunnell and Kremsater (1990).

The new Forest Branch began to express concern in its annual reports as early as 1925 about overcutting the coastal forest. Only after the Second World War was a determined attempt made, through two further Royal Commissions (British Columbia 1945, 1956), to regulate the wood supply according to principles of “sustained yield.” The concept of sustained yield—that a forest in which the volumetric harvest rate of wood is deliberately limited to the long-term growth rate can yield wood in perpetuity—was developed in Prussia in the late 18th and 19th centuries.⁸ Sloan also advocated maximizing wood yield:

That then must be our objective: To so manage our forests that all our forest land is sustaining a perpetual yield of timber to the fullest extent of its productive capacity. (British Columbia 1945:Q127)

To achieve this objective, the “decadent” old-growth forest must be replaced by thrifty young stands. While the *Forest Act* of 1979 introduced measures to permit the allowable cut to be adjusted regionally to accommodate other resource values and public policies (for example, preservation of selected old-growth stands), wood production has remained the basic criterion for managing British Columbia’s forests until the present day. Altogether, forest management in British Columbia has been dominated throughout this century by the single objective of maximizing timber yield. Recognition of other forest values has been incorporated as constraints on this objective.

Today, British Columbia receives more of its revenue from its forests than does any other Canadian province.

Today, British Columbia receives more revenue from its forests than does any other province. Forestry activities⁹ directly provide about 6% of all jobs in British Columbia and about 16% of all employment when supply and service jobs are considered (Price Waterhouse 1994). The forest industry’s direct share of gross domestic product is generally around 8% of the provincial total.¹⁰ Forest products typically represent about 55% of the province’s exports; in 1993, high lumber prices raised this share to 62%.¹¹ The province contributes about 34% of world exports of softwood lumber.¹²

As the province with the most spectacular and diverse forests, British Columbia is also subject to the greatest scrutiny regarding forest land use and forest practices. Many recent government and non-government efforts have addressed specific interests and developed provincial, regional, and local policies that sustain forest values and provide economic benefits.¹³ While building consensus

⁸By the end of the 18th century, German foresters, led by Heinrich Cotta and George Hartig, had worked out steps for determining, predicting, and controlling wood production (see Lowood 1990).

⁹“Forestry activities” include logging, silviculture, and the production of all wood fibre products (from sawlog and pulp to tissue and kraft paper), including secondary manufacturing (Price Waterhouse 1994).

¹⁰B.C. Ministry of Government Services. B.C. Economic accounts 1984–1992 and 1993 interim estimates.

¹¹Council of Forest Industries of British Columbia. B.C. Forest industry statistical tables.

¹²FAO values for 1991.

¹³For example: Clayoquot Biosphere Project, Committee on Resources and Environment (C.O.R.E.), Protected Areas Strategy, B.C. Forest Practices Code, Forest Renewal B.C., *Interim Measures Agreement*.

and setting new policy directions is slow and sometimes painful work, British Columbia is well structured to meet these challenges.

Because most of B.C.'s forest land is owned by the province, government can play a major role in protecting public values and encouraging stewardship.

Unlike most regions of North America and Europe, about 95% of British Columbia's forested land is publicly owned. Government can play a major role in protecting public values and in encouraging stewardship of Crown forests. Further, whereas much of the primary or old-growth forest¹⁴ in other temperate regions has been converted to managed forest, British Columbia still has extensive tracts of primary forest. Much of this remaining primary forest, however, is on steep slopes or otherwise relatively unproductive areas where the full range of potential forest values is incompletely expressed (e.g., growth rates may be low). Nonetheless, British Columbia has opportunities, absent elsewhere in the world, to protect values and develop management strategies to maintain soil productivity, biodiversity, and other values associated with forest ecosystems—for example, First Nations' cultural and heritage values, scenic values, fisheries, wildlife, and recreation values (also see Table 1).

The opportunity to protect these values has no easy solution, particularly when forestry practices are eliminated or constrained on productive sites. To conserve and sustain all forest ecosystem values, British Columbia will have to incur additional costs, forego immediate economic benefits, and endure some hardship.

2.3 Forests in Clayoquot Sound

Clayoquot Sound is rich in forest values.

Clayoquot Sound represents a land area of about 262 000 ha on Vancouver Island, of which 244 000 ha (93%) is forested. Some 160 000 ha of this forest land is commercially productive, of which about 30 500 ha has been logged. Of the 129 500 ha of unlogged, merchantable forest, some 39 100 ha is in Protected Areas. The remaining 90 400 ha is predominantly primary, or old-growth, forest.¹⁵ Clayoquot Sound is rich in forest values, with spectacular old-growth forests, a long history of First Nations' settlement, world-class scenic resources and tourism values, and major commercial fishery and timber industries. The area's natural beauty, other ecosystem values, cultural resources, and extractive resource potential have drawn international attention.

¹⁴International documents generally use the term "primary" to describe natural, unmanaged forests. It is, thus, nearly synonymous with common North American usage of the term "old growth," although no age is intended.

¹⁵Source: B.C. Ministry of Forests, Port Alberni Forest District.

The area's natural beauty, ecosystem values, cultural resources, and extractive resource potential have drawn international attention.

A large part of local and international concern about Clayoquot Sound derives from its significance within the Coastal Temperate Rain Forest (CTR) biome, which includes areas as widely spread as Chile, Tasmania, Norway, and the Pacific coast of North America. Weigand (1990) estimated that about 60% of the unlogged global CTR and over 95% of the unlogged CTR in the Pacific Northwest occurs in British Columbia and Alaska. Because of the low frequency of natural, large disturbances such as forest fires in this biome, most undeveloped areas contain long-established forest. Between 18% and 25% of the world's CTR is estimated to occur in British Columbia (Weigand 1990; Kellogg (editor) 1992).

Forests in Clayoquot Sound are important globally for their vigorous growth and undeveloped nature. The distribution of CTR in North America is centred on Vancouver Island and attains its most dramatic expression around Clayoquot Sound. The two tallest western redcedars (*Thuja plicata*) in British Columbia, at 59.2 m and 56.4 m, respectively, are found in adjacent Pacific Rim National Park Preserve. The tallest Sitka spruce (*Picea sitchensis*), at 95.7 m, occurs in Carmanah Pacific Provincial Park immediately to the south; the tallest Douglas-fir (*Pseudotsuga menziesii*), at 82.9 m, in adjacent Strathcona Provincial Park. The tallest western hemlock (*Tsuga heterophylla*), at 75.6 m, and two tallest yellow-cedars (*Chamaecyparis nootkatensis*), 45.5 m and 44 m, respectively, are nearby to the northeast.¹⁶

Clayoquot Sound forests are important globally for their vigorous growth and undeveloped status.

Most of the forests in Clayoquot Sound have not been converted to managed stands. Three of the five pristine primary watersheds on Vancouver Island larger than 5000 ha are within the Clayoquot Sound region (Wilkinson 1990; Moore 1991). Sizable tracts of this rainforest have been placed in Protected Areas; the combined, contiguous area of the Megin, Moyeha, and Watta/Shelter watersheds, about 45 000 ha, is contiguous with Strathcona Provincial Park.

Not surprisingly, Clayoquot Sound has become a focal point—in British Columbia and globally—in the conflict over forest values and issues of environmental and economic sustainability. It is a special area, with many world-class values, and as such merits special consideration.

In this context—of changing forest values, in a country characterized by forested landscapes, in a province dependent on forests for its lifestyles and economy, in a region with spectacular forest resources and a rich history of forest use—the Clayoquot Scientific Panel was charged with developing the framework and standards for making forest practices in Clayoquot Sound “not only the best in the province, but the best in the world.”

¹⁶Source of record tree heights is Stoltmann (1993).

3.0 Global Concerns and Agreements

As western society has grown to recognize more values within a forest, its concern for maintaining these values and the system that provides them has also grown. That concern is reflected in recent international agreements (Section 3.2) seeking to improve forest practices. The controversy over use and management of forests in Clayoquot Sound mirrors a widespread concern for sustainability and multiple resource use. As evidenced by the number of signatory nations to the international agreements discussed in Section 3.2, this concern is global. However, only a small proportion of the world's population is aware of the existence of such agreements. This last observation does not deny the importance of these agreements, but serves to illustrate the important role Canada and British Columbia can play.

Canadians can lead the way in developing and implementing standards that recognize global concerns and all forest values.

As relatively wealthy regions, with abundant resources per capita, British Columbia and Canada can better manage forests for all their values than can less affluent regions with fewer resources per capita. Whereas some less affluent regions may struggle to attain emerging international standards, Canadians can lead the way in developing and implementing standards that recognize global concerns and all forest values.

3.1 Global Concerns

Although humans have been using forest products for millennia, widespread respect for the environmental roles of forests and concern about the long-term effects of forest practices have risen to the forefront only in the past three decades. In this time, pressures of increasing population and consumer demand for a variety of resources escalated the rate at which forests have been cleared.¹⁷ Similarly, major technological advancements increased the rate at which managed forests could be logged.¹⁸ Throughout the world, the amount of forest is decreasing. In many areas forests are being replaced by grazing or agricultural land; elsewhere, by hydroelectric reservoirs, pavement, suburbs, golf courses, and ski runs—uses that do not supply *any* forest values. Other forests are now managed, with subsequent loss of some values. The undesirable consequences of taming or managing all wild (natural) forests are potentially many; values lost are extremely difficult, in some cases impossible, to regain.

Throughout the world, the amount of forest is decreasing.

¹⁷The pre-agricultural area of forest and woodland on earth has been estimated to have been 6.2 billion ha (of which 4.6 billion ha was closed forest) (Matthews 1983). Today, about 5.2 billion ha remains, of which an estimated 3.9 billion is closed forest. During this same period, the number of people increased from about 4 million to 5.7 billion (McEvedy and Jones 1978:343–345). Most of the forest loss is recent: it is estimated that at least 60% has occurred since the commencement of the European Industrial Revolution about 1750, and 0.42 billion ha is believed to have been lost between 1850 and 1978 (Williams 1990). In North America, 64 million ha was cleared for settlement and agriculture between 1860 and 1978 (Revelle 1984, cited by Williams 1990). Today, there is net gain to forested land in North America.

¹⁸Between 1975 and 1980, the forest area harvested in British Columbia averaged 177 000 ha/yr, with 34% replanted (Statistics Canada 1986:Table 3.2.10). By 1988 this rate had increased to 244 000 ha/yr, with 68% replanted (Statistics Canada 1991:Table 4.3.1.2).

Initial concern about large-scale natural forest removal focused on tropical forests simply because problems there were especially evident. For many reasons, events in tropical forest areas have encouraged forest conversion either to grazing land, agricultural land, or plantations for products other than wood fibre (e.g., oil palms, cocoa, and rubber). That conversion has potential to eliminate large portions of earth's biodiversity¹⁹ and reduce other forest values.

Managed forests have fewer non-timber values and less diversity than the natural forests they replace.

By the time nations in temperate regions became concerned about tropical deforestation, many of them had eliminated or converted most of their natural forests. Today, many developed nations have predominantly managed forests, which are characterized by fewer non-timber values and less biodiversity than the natural forests they replace.

Concerns about rates of harvesting in tropical forests and the conversion of forests to other uses were mobilized at the United Nations Stockholm Conference in 1972, and furthered at the Nairobi Conference in 1977.²⁰ Forests were officially recognized and valued for their roles in providing habitat for numerous species and in performing important ecological functions (e.g., acting as water purifiers and carbon sinks, and contributing to oxygen cycling) that are critical to sustaining human life and domestic and global productivity. Conditions in the tropics dramatized these values and emphasized the importance of reducing rates of forest loss and improving standards for managing forests.

“Sustainable development” seeks to balance the need to use forests with the need to preserve them.

The World Commission on Environment and Development (Brundtland Commission) in 1987 reiterated the many values of forests and stimulated discussion on a wide range of environmental problems. The Brundtland Report, *Our Common Future*, emphasized “sustainable development”—“meeting the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development 1987:43). Sustainable development seeks to respect the needs of future generations, and to provide equal emphasis to human needs and the natural environment or resource base. The commission argued strongly that both economic development and environmental protection were needed (they were considered mutually dependent) and that “The crucial task is to balance the need to exploit forests against the need to preserve them” (ibid.:136).

Continuing this theme, world leaders met at the United Nations Conference on Environment and Development (UNCED '92 or “Earth Summit”) at Rio de Janeiro in June 1992 to choose a path intended to balance development and protection. They called for responsible resource management, moderate resource consumption, equitable sharing of the benefits and costs of development and production, and a synthesis of the diverse goals people have for individual well-being and healthy environments. The commitment to sustainable development

¹⁹Although tropical forests cover only about 6% of the earth's land surface, they contain an estimated 50–90% of earth's species (Wilson and Peter (editors) 1988; Miller and Shores 1991).

²⁰United Nations Conference on the Human Environment (Stockholm), June 1972. United Nations Conference on Desertification (Nairobi), 1977.

was reiterated. Its intent was to meet people's subsistence needs and foster levels of economic development that would improve human well-being and social equity while maintaining ecosystems upon which such well-being ultimately depends. Specifically, they acknowledged the social, cultural, recreational, and spiritual benefits that forest ecosystems provide to humankind, and viewed these benefits as fundamental to successful sustainable development of forests (Maini 1991, 1992a). UNCED '92 also introduced the concept of biodiversity to international agreements.

3.2 International Agreements

Recent international agreements seek to maintain forest ecosystems and their associated values.

Several recent international agreements commit signing nations to action based on common goals of maintaining the world's forest ecosystems and their associated values. UNCED '92 produced four documents that relate directly to forest practices:

- *Framework Convention on Climate Change*;
- *Convention on Biological Diversity*;
- *Agenda 21*; and
- *Guiding Principles on Forests*.

These documents are a major step in translating global concerns for sustainable development into collective local action.

The two Conventions have been ratified by enough countries to come into force as treaties. Countries that have ratified the Conventions must abide by measures specified in the texts, and ensure that the legislation and policies of various jurisdictions within the nation (e.g., provinces) are consistent with the measures identified in the Conventions.

3.2.1 *Framework Convention on Climate Change*

The Framework Convention on Climate Change seeks to stabilize concentrations of greenhouse gases.

The *Framework Convention on Climate Change*, signed by some 150 countries and now ratified by more than 90, including Canada, attempts to stabilize concentrations of greenhouse gases²¹ at levels that prevent dangerous interference with the climate system. Generally, the Convention calls for:

- national inventories of emissions and removals of greenhouse gases;
- development of national programs to mitigate climate change;

²¹Greenhouse gases, such as carbon dioxide and methane, entrap heat in the atmosphere, thereby contributing to global warming (see Table 1, Climate).

Forests play an important role as carbon sinks.

- promotion and development of practices and processes to control emissions of greenhouse gases in all sectors (including energy, transport, industry, agriculture, forestry and waste management); and
- promotion of research, education, training, and public awareness.

Critics argue that the Convention focuses only on carbon dioxide and lacks both a timetable for reducing carbon dioxide emissions and reference to specific targets. Despite lack of specific targets, the Convention relates directly to forestry because forests function as carbon sinks. Canada is thus committed to a national policy that will protect and enhance carbon dioxide sinks, such as forests. That policy must address protection of old-growth forests and wetlands (which are important reservoirs of carbon), sustainable forest management, and, where appropriate, afforestation (the conversion of bare or cultivated ground to forest). Further requirements treating greenhouse gases other than carbon dioxide may be added progressively as protocols to the Convention.

The Convention on Biological Diversity commits nations to conserve biodiversity, to use biological resources sustainably, and to fairly and equitably share the benefits of biodiversity.

3.2.2 Convention on Biological Diversity

The *Convention on Biological Diversity*, signed by more than 160 nations at UNCED '92, has since been ratified by more than 30 nations (including Canada). The objective of the Convention (Article 1) is the "conservation of biological diversity."²² At the broadest level, it contains three national obligations: to conserve biological diversity, to use biological resources sustainably,²³ and to share benefits of biodiversity fairly and equitably. Parties to the Convention are committed to 41 articles representing major commitments to:

- establish a network of protected areas within each country;
- accept the concept that developed countries must assist developing countries with funding and with knowledge on issues related to conservation of biological diversity; and
- recognize that the first beneficiaries of the conservation and sustainable use of wild plants and animals should be rural communities and indigenous peoples, whose traditional knowledge and respect have conserved these resources for centuries.

²²Within the Convention "biological diversity" or biodiversity means: "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species [genes], between species and ecosystems. Biological diversity is an attribute of life and refers to the variability of life in all its forms, levels, and combinations" (*Convention on Biological Diversity* Article 2. Use of Terms).

²³Biological resources are living entities, including "genetic resources, organisms or part thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.... 'Sustainable use' means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations" (*Convention on Biological Diversity* Article 2. Use of Terms). This definition of sustainable use is ecosystem-oriented rather than species-oriented.

The *Convention on Biological Diversity* represents a huge step in global recognition of the variety of life. It is the first international agreement to cover all genes, species, and ecosystems.

Both new Conventions contribute to a more complete recognition of the multiple roles and values of forests, and complement the two UNCED '92 documents that focus directly on forest issues—*Agenda 21* and *Guiding Principles on Forests*.

3.2.3 *Agenda 21*

Agenda 21 is a blueprint for sustainable development.

Agenda 21 is a broad agenda for action on environmental and development issues to lead the world community into the 21st century.²⁴ It is meant to provide a blueprint for action in all areas relating to sustainable development. Implicit in *Agenda 21* is the need for change in the economic activities of all humans—change based on a new understanding of the impacts of human behaviour on the environment.

A key component of the Agenda is recognizing and strengthening the role of indigenous people and their communities in resource development.

Specific chapters of *Agenda 21* address conservation and rational use of forests, sustaining multiple roles and functions of all types of forests, combating deforestation, and conserving biological diversity. Another key aspect of the Agenda involves recognizing and strengthening the role of indigenous people and their communities in resource development. Several objectives of this last aspect are directly relevant to concerns of the Clayoquot Scientific Panel, among them:

- Recognition that the lands of indigenous people and their communities should be protected from activities that are environmentally unsound or that the indigenous people concerned consider to be socially and culturally inappropriate.
- Recognition of their [indigenous peoples'] values, traditional knowledge, and resource management practices with a view to promoting environmentally sound and sustainable development.
- Recognition that traditional direct dependence on renewable resources and ecosystems, including sustainable harvesting, continues to be essential to the cultural, economic and physical well-being of indigenous people and their communities. (United Nations 1992a:Section 26.3)

Among the issues in *Agenda 21* most relevant to forestry in Canada are:²⁵

- the need for world governments to develop national forest action plans for sustainable forest development;
- the recognition of multiple roles of forests, including the maintenance of biodiversity;

²⁴The complete text of both *Agenda 21* and *Guiding Principles on Forests* is provided in United Nations (1992a). For chapter headings of *Agenda 21* see Canadian Institute of Forestry (1992).

²⁵United Nations (1992c:12, 13); see also Canadian Institute of Forestry (1992).

- the acceptance of the critical environmental role forests play in the biosphere;
- the recognition of the intergenerational aspects of human welfare to which forests contribute; and
- the promotion of further international cooperation on forestry.

3.2.4 Guiding Principles on Forests

The Guiding Principles on Forests commits signing nations to 15 principles covering the management, conservation, and sustainable development of all types of forests.

The *Guiding Principles on Forests*, among the most controversial documents at UNCED '92, contains 15 principles to which the 145 signatory nations must conform.²⁶ The term “guiding principles” reflects the document’s complete title: *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests*. Major international elements of the Guiding Principles can be summarized as six guidelines which stipulate that:²⁷

- all states, particularly developing states, must work towards “greening the world” by pursuing reforestation and forest conservation practices;
- each sovereign state has the right to develop its forests consistent with national policies for sustainable development which recognize specific socioeconomic requirements;
- developing countries must be provided with financial resources to allow them to formulate and implement forest conservation and sustainable management programs, and promote alternative social and economic practices;
- the transfer of environmentally sound technologies on concession-based and preferential terms must be advanced to enable developing countries to manage their forests in a sustainable manner;
- international trade in forest products must be based on the application of international law so as to prevent illegal unilateral actions designed to limit or prohibit trade in forest products or timber; and
- further international discussion by the signatories is left to their discretion.

Elements of the *Guiding Principles on Forests* (United Nations 1992a) that relate directly to the charge of the Clayoquot Scientific Panel include:

Preamble (items c and f)

- Forestry issues and opportunities should be examined in a holistic and balanced manner within the overall context of environment and development, taking into consideration the multiple functions and uses

²⁶The unofficial final text is in Canadian Institute of Forestry (1992:424–426); for slightly altered final text see United Nations (1992a).

²⁷Following Johnston (1993) from United Nations (1992b:5).

of forests, including traditional uses, and the likely economic and social stress when these uses are constrained or restricted, as well as the potential for development that sustained forest management can offer.

- All types of forests embody complex and unique ecological processes which are the basis for their present and potential capacity to provide resources to satisfy human needs as well as environmental values, and as such their sound management and conservation is of concern to the governments of the countries to which they belong and are of value to local communities and the environment as a whole.

Principles

- 2b Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural, and spiritual human needs of the present and future generations.
- 5a National forest policies should recognize and duly support the identity, culture and rights of indigenous people, their communities and other communities, and other forest dwellers.
- 8e Forest management should be integrated with management of adjacent areas so as to maintain ecological balance and sustainable productivity.

3.2.5 Certifying Sustainable Forestry

International efforts are also underway to restrict trade to forest products originating from sustainably managed forests.

The international concerns that led to the UNCED '92 agreements also stimulated efforts to restrict trade to forest products originating from sustainably managed forests. Efforts at specifying sustainable forest management began in the tropics where recent concerns over forest practices originated and have since expanded to include temperate and boreal forests. The marketplace will increasingly require some form of certification of forests to prove that they are managed in a sustainable fashion, and will accept only programs deemed to be operated in an independent and credible fashion, and using accepted standards.

Approaches to developing criteria and indicators for sustainable management of forests are evolving rapidly from different quarters. Government (national, bilateral, or multinational initiatives), industry, and non-government organizations are involved in these efforts.²⁸

²⁸See Canadian Forest Service (1994) and *ci Newsletter*. The newsletter notes various bilateral and multilateral initiatives making clear that there is more than one Canadian initiative.

The first international agreement on forest practices was the International Tropical Timber Agreement (1983), a non-legally binding pact administered by the International Tropical Timber Organization (ITTO), based in Yokohama, Japan.

The agreement seeks to promote timber producer-consumer relations and to support activities such as research and development, trade, reforestation, and forest management initiatives. Objective 1(h) of the agreement seeks “to encourage the development of national policies aimed at sustainable utilization and conservation of tropical forests and their genetic resources, and at maintaining the ecological balance in the regions concerned.” In December 1990, ITTO addressed this objective with the first document in its Policy Development Series, *ITTO Guidelines for the Sustainable Management of Natural Tropical Forests*.

In a series of 41 “essential principles,” these ITTO guidelines cover all aspects of management, from forest policy and taxation to harvesting and protection. Most principles are followed by a statement of “possible actions.” Together the principles and actions provide an international reference standard for the development of more specific national guidelines by ITTO member nations. The focus on sustainable management of natural tropical forests, rather than plantations, makes parts of the document relevant to Canada where most wood and wood products currently come from natural forests.

Efforts to certify sustainably managed forests have outpaced the development of international standards for certification.

Efforts to certify forests that are sustainably managed, as a means of ensuring that forest products meet marketplace requirements, have outpaced the development of common international standards for such certification. Several certification programs—the largest from private firms—have emerged to meet marketplace demand.²⁹ In the absence of widely accepted criteria for sustainable forestry, each program has developed its own standards. Some groups wish to certify specific actions or “tools” (e.g., planting versus not planting, or clearcutting versus not clearcutting) as criteria for sustainability; others wish to certify the kind of forest that meets sustainability criteria. Such variation in the broadest of goals may confuse customers and reduce the credibility of all certification programs. Among the approaches to certification in which Canada is involved,³⁰ two are particularly significant: one involving the Forest Stewardship Council and the other proceeding under the aegis of the Canadian Standards Association.

The Forest Stewardship Council (FSC), an international body founded in Toronto, Canada in October 1993, is promoting sustainable forestry around the world by establishing a set of Principles and Criteria for good forest management and accrediting certification programs which conform to its Principles.³¹

²⁹But see also efforts such as Working Group of Experts on Sustainable Forestry (1994).

³⁰Some of these approaches are described in sources noted in footnote 28.

³¹The Forest Stewardship Council accredits certification organizations to guarantee the authenticity of their claims. Its draft statutes provide that “social, environmental, and indigenous organizations...have 75% of the voting power in the General Assembly” (Forest Stewardship Council 1994a).

One approach is to certify specific actions (e.g., planting or not planting) as criteria for sustainability.

At least one of the principles (#10) is troublesome for Canada. It stipulates that “Plantations shall complement, not replace, natural forests. Plantations should reduce pressures on natural forests.” This principle, submitted for review at the June 1994 FSC meeting in Oaxaca, Mexico, was not ratified (Forest Stewardship Council 1994b). A major difficulty is in defining “plantation”; strictly interpreted, the principle could eliminate the use of all artificial regeneration, such as planting.

Another approach is to certify the kind of forest that meets sustainability criteria.

FSC has attempted to clarify its intent by defining plantations as “forest areas lacking most of the principal characteristics and key elements of native ecosystems as defined by FSC-approved national and regional standards of forest management, which result from the human activities of either planting, sowing or intensive silvicultural treatments” (ibid.). The attempt proved unsuccessful because it repeats a general problem in deriving criteria: it mixes the kind of forest desired (characteristics and native vegetation) by specifying a limited set of “tools” to achieve the desired forest state. The intent of principle 10, including preference of mixed species, maintenance of soil productivity, avoidance of exotic species, and promotion of diverse stand structure (specified in six subsections of the principle), is consistent with Clayoquot Scientific Panel recommendations. The Panel, however, has attempted to envision the kind of forest desired rather than the specific kinds of tools or methods employed in attaining that forest structure.

The approach to certification through the Canadian Standards Association (CSA) would use the network of standards associations already established around the world through the International Standardization Organization (ISO) to provide international credibility, applicability, and compatibility. Major problems associated with this route relate to designing the process of certification (means of implementation),³² timing, and perceived credibility in the marketplace. Even with support of the CSA, sustainable forestry cannot be addressed by the ISO before fall of 1995.

Outcomes of any struggle for perceived credibility are unpredictable but will involve comparisons of approaches promoted by industry and government (such as that with the CSA) and approaches promoted by environmental organizations (such as the FSC). Each approach has both benefits and drawbacks. Although the Principles and Criteria created by the FSC may not accurately reflect ecological and social differences around the globe, they already exist and enjoy widespread support. The second approach, though potentially delaying the creation of standards for sustainable forest management, would ensure that the standards created reflect Canadian conditions.

³²Technically, the forest being managed would be registered as sustainable, and the final products of the forest would then be certified.

International agreements on forests recognize a full range of forest values and respect the needs of future generations and indigenous cultures.

Current standards for certification do not adequately reflect the full range of forest values.

Nor do they recognize all differences between tropical and temperate forestry.

3.2.6 Summary of International Agreements

A full range of forest values is now recognized in international agreements on forests, and respect for the needs of future generations and indigenous cultures is explicitly stated. The four documents arising from UNCED '92 provide both the broad direction and general principles upon which a future international convention on forests might be achieved. In fact, the newly created United Nations Commission on Sustainable Development (CSD) is meant to ensure that commitments made in the recent international agreements are implemented by each nation.

None of the agreements, however, provides specific international standards for sustainable forestry explicitly and universally based on credible research. That condition results largely from the necessary generality of global principles and the fact that scientific findings from one forest type do not apply to all forest types. As a result, regional certification programs have arisen to meet marketplace demand. These regional standards for sustainable forestry, while often more appropriate to regional conditions, are inconsistent and potentially confusing. Moreover, they tend to focus on specific "tools" or methods as surrogates for sustainable forestry, rather than establishing criteria for sustainable forests. Only the rather general standards of performance established by the Forest Stewardship Council (FSC) have been widely agreed to; FSC principle 10, relying on specific methods, remains under review.

Although the recent international agreements address a wider range of forest and social values, current standards for certification do not adequately reflect this range of values nor recognize all differences between tropical and temperate forestry. Unless these issues are addressed in international standards and certification programs for sustainable forestry, temperate forestry practices could possibly be assessed by standards for tropical conditions. For example, recent efforts in Clayoquot Sound, and elsewhere in British Columbia, that retain trees and diverse forest structure in harvested areas (confusingly termed "clearcuts-with-reserves") retain forest values better than do former clearcutting practices. This approach, however, would be inappropriate in most tropical regions because it would gradually change the species composition of their more diverse forests. Similarly, the fear of plantations and a preference for selection silviculture that has arisen from forest practices in the tropics is not appropriate for many northern forest types. A universal commitment to specific silvicultural systems will produce undesirable consequences in either temperate, boreal, or tropical regions.

4.0 Commitments to Action

In response to international and domestic concern about forests, forest values, and forest management practices, Canada has acted, and is continuing to act, at national, provincial, and regional levels.

4.1 National Actions

Canada has taken a lead role in developing international agreements on forests.

Although Canada converts relatively little forest to non-forested land, it shares two similarities with the tropics: it still contains large tracts of primary³³ or old-growth forests, and it obtains many of its wood products from primary forests. Canadians are genuinely concerned about the ecological roles forests play *and* the economic well-being they derive from forests. These facts, combined with the growing demand for “green products” and the threat of consumer boycotts, encouraged Canada to take a lead role in developing international agreements on forests. An initial step was to develop a National Forest Strategy. The Canadian Council of Forest Ministers (CCFM) undertook this step explicitly with the publication of *Sustainable Forests: a Canadian Commitment*, in which sustainability is defined as a way

to maintain and enhance the long-term health of our forest ecosystems, for the benefit of all living things both nationally and globally, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations. (Canadian Council of Forest Ministers 1992:7)

Major themes of Agenda 21 and the Guiding Principles on Forests were based on Canadian experience.

At UNCED '92, the Canadian government pursued three objectives within the forest agenda:

- to improve sustainable forest management practices domestically by obtaining internationally agreed upon principles and standards for a “level playing field”,³⁴
- to ensure the continued viability and further liberalization of trade in forest products; and
- to increase the involvement, commitment, and knowledge of developing nations with regard to sustainable forest development. (Maini 1992b:1)

Some of Canada’s objectives were attained: the major themes of both *Agenda 21* and the *Guiding Principles on Forests* were formulated largely with reference to Canadian experience and the Canadian National Forest Strategy (Canadian

³³Refer to footnote 14.

³⁴“Level playing field” is an ambiguous term. Here it appears to refer to both equitable accessibility to world markets, and criteria (potentially governing that accessibility) that equally and justly reflect regional ecological and social differences.

Council of Forest Ministers 1992).³⁵ In other ways, the international agreements fell far short of Canada's objectives.

Although the Canadian government supports the broad themes in UNCED '92 agreements on forests, and recognizes them as an important framework for future action, the government has significant reservations about the lack of technical precision in portions of the agreements. For example, the agreements use words (e.g., clearcutting) that have both different consequences and different meanings in different parts of the world.³⁶ Similarly, the failure to move beyond very broad principles in the international agreements has resulted in a variety of regional standards being developed in response to marketplace desire for certification of sustainable forestry. This situation generates public confusion and reduces the credibility of both national and international efforts. Confusion is compounded when standards focus on methods rather than the kind of forest sought.

The Canadian forest industry is helping to enable a national certification program.

Canada currently has no national standards for certifying sustainable forestry. In October 1993, the Canadian forest products industry acknowledged this deficiency by establishing a Sustainable Forestry Certification Task Force. The Task Force, led by the Canadian Pulp and Paper Association, has established an action plan with two objectives:

- 1 Develop a national certification program under the auspices of the Canadian Standards Association (CSA).
- 2 Encourage recognition of international sustainable forestry standards by the International Standardization Organization (ISO).

Developing a national certification program is a major undertaking. The CSA is overseeing a panel addressing step 1; this process is linked to ISO through the ISO 14000 Technical Committee 207 (step 2). Two national certification documents are envisioned:

- guiding principles and supporting codes of practice for sustainable forest management in Canada; and
- detailed forest management specifications intended for independent auditors to form the basis of the certification program.

³⁵Johnston (1993) reviews connections between the National Forest Strategy and the UNCED '92 agreements relating to forests.

³⁶The natural disturbance regimes of subboreal and boreal forests are more closely approximated by clearcutting than are such regimes in many tropical or Pacific coastal forests, *provided* that some trees are retained during logging. Size of cut, rate of cut, and kinds of material retained can all vary dramatically during clearcutting. The evolving, and admittedly confusing, terminology in British Columbian forestry uses expressions such as "clearcut-with-reserves" to describe harvesting systems that more closely approximate natural disturbance regimes of some forest types.

The Panel views a mid-1995 date for completion of these two documents as optimistic. As well as determining criteria and standards for certification, agreement must be reached on the process of certification, perhaps through CSA's Quality Management Institute. The Canadian forest industry is currently both trying to inform and refine existing international agreements while quickly enabling a national certification program. All such actions must be taken in concert with the national government.

The Canadian government is engaged in several programs that put international agreements into effect.

Canada led the follow-up to *Guiding Principles on Forests* by hosting a meeting of experts on the sustainable development of boreal and temperate forests in September 1993 at Montreal. Since then, nations or groups of nations (e.g., the "Helsinki Process" involving 32 European nations, ITTO involving tropical forest nations, the "Montreal Process" involving non-European nations with boreal and temperate forests) have worked towards developing criteria and standards for sustainable forestry. The Canadian government, and especially Canadian Forest Service, are engaged in several programs directly relating to the international agreements signed at UNCED '92. Among these are the national Criteria and Indicators process,³⁷ the Canadian Forest Inventory, the Model Forests Program, the Canadian Biodiversity Strategy, National Forest Genetics Resources Centre, ecological reserves, and a major research initiative on climate change.³⁸

Four points summarize Canada's actions related to international agreements on forests:

- Canada has played a lead role in developing global instruments recognizing forest values and governing forest standards.
- Canada is a signatory of major international agreements regarding forestry standards.
- Canada is actively working to meet the commitments made as a signatory nation.
- Canada must hasten its progress towards national standards for certifying sustainable forestry or accept standards derived by groups with less specifically Canadian interests.

³⁷Currently this process does less to provide guidelines for, and measures of, sustainable forestry than does the industry-initiated CSA process.

³⁸This document was prepared prior to the February 27, 1995, federal budget. It is unclear how these programs fared within that budget.

4.2 British Columbia's Actions

Canada's national policies will be an aggregate of provincial policies.

Given Canada's federal system of government, and the partitioning of responsibilities between national and provincial jurisdiction, the national policies that Canada must develop concerning climate change, biodiversity, indigenous people, and forest principles will represent an aggregate of provincial policies. National standards, even while serving as a model for international agreements, will encompass a range of expertise and commitment of effort. Moreover, because the provinces have authority for managing the forest resource, the provinces must go beyond general principles to particular practices. All provinces do not bring the same capabilities to deriving approaches for sustainable forestry. Ecological classification systems, for example, are rudimentary in some parts of Canada but are well developed in British Columbia. Because the Canadian government is committed to creating and demonstrating high standards in forestry practices, efforts to develop excellent standards within British Columbia serve important national goals.

British Columbia leads Canadian efforts.

In fact, British Columbia has already taken a lead role nationally. When fully implemented, the following major initiatives of the provincial government may meet or exceed objectives of international agreements:

- Old Growth Strategy;
- Protected Areas Strategy (which now subsumes the Old Growth Strategy);
- Commission on Resources and Environment;
- Timber Supply Review;
- Forest Practices Code;
- Forest Renewal Plan, including the Watershed Restoration Program;
- *Interim Measures Agreement* (between British Columbia and the HwiiH of the Tla-o-qui-aht First Nations, the Ahousaht First Nation, the Hesquiaht First Nation, the Toquaht First Nation, and the Ucluelet First Nation, 1994); and
- efforts to establish a more integrated, ecosystem-based approach to sustainable use in Clayoquot Sound.

In many cases, B.C. initiatives put the principles of international agreements into practice.

These actions are consistent with the international agreements noted, and in many instances put the principles of those agreements into practice. Although all of these initiatives are underway, few are complete; likewise, other First Nations besides the Nuu-Chah-Nulth are actively seeking an interim measures agreement. Once the full range of provincial initiatives is fully defined, the next step must be to determine how separate initiatives are combined at the strategic level and for specific areas of forest. Because various initiatives have been developed so rapidly, clear areas of overlap and potential conflict must be reconciled. For example, both the (evolving) guidelines for biodiversity, spotted owl, and marbled murrelet, and the Protected Areas Strategy remove forest from harvest. The degree to which they overlap and support each other is unknown. Similarly, the combined effects of all such initiatives is unknown.

British Columbia is in a situation similar to that of many tropical nations—using income gained from commercially exploiting primary forest to finance social services and economic development.

Despite these forward-looking actions, two broad kinds of difficulties remain. The first is related to the issues surrounding the *Interim Measures Agreement*. The agreement reflects and extends principles of international agreements (e.g., *Agenda 21, Convention on Biological Diversity*). The provisions of the agreement, however, have not been consistently expressed in practice. Meaningful consultation with Nuu-Chah-Nulth nations has not yet adequately incorporated their concerns and interests, especially about culturally important areas, into forest management.³⁹ Effective consultation will require time, trust, and respect. Second, British Columbia remains vulnerable to international censure because: the province is one of the most biologically diverse areas of north temperate regions, old-growth forests represent a high proportion of its timber harvesting landbase compared to other regions, and it is the world's major exporter of softwood lumber. Internationally, British Columbia is in a situation similar to that of many tropical nations—using income gained from commercially exploiting primary forest to finance social services and economic development—but without the population pressures.

Combined, British Columbia's initiatives, such as the Commission on Resources and Environment, attempt to balance the subsistence, protection, and development values envisioned at UNCED '92. Interests of indigenous peoples and values nurtured in subsistence relations with the forest are recognized in the *Interim Measures Agreement*. Specific values to be protected are recognized in both the Protected Areas Strategy and the Forest Practices Code. Values associated with development are implicit in the Code and directly addressed by the Timber Supply Review.

³⁹The *Interim Measures Agreement* is discussed more fully in the Panel's third report: *First Nations' Perspectives Relating to Forest Practices Standards in Clayoquot Sound* (Scientific Panel 1995a).

4.3 Principles and Recommendations of the Clayoquot Scientific Panel

The Panel sought standards that would ensure the long-term sustainability of forests, and that incorporated First Nations' and non-indigenous peoples' perspectives.

Forest management standards in Clayoquot Sound have historically been dominated by timber production. The standards recognize other forest values but focus on developing access to and harvesting timber products. The Panel's two broad objectives were: 1) to recommend practices that would ensure the long-term sustainability and health of the forests of Clayoquot Sound, and 2) to incorporate both First Nations' and non-indigenous peoples' perspectives into the evaluation of current forest management standards.

To determine a common approach among Panel members, the Panel first established general principles to describe:

- the manner in which it would view the forests of Clayoquot Sound (1);⁴⁰
- how people relate to Clayoquot Sound (2, 3, 4, 5); and
- the nature of human knowledge and values, and their application to resource management (6, 7, 8).⁴¹

It envisioned the kind of forest desired, then focused on methods and standards that would create that forest.

Although derived independently and specifically for Clayoquot Sound, these principles embody and extend the spirit of international agreements governing forestry. Based on these principles, the Panel recommended approaches to desired standards under an inclusive recommendation for "sustainable ecosystem management" (Scientific Panel 1994b:11, 14–17). This approach promotes forestry that requires intensive and careful management, but does not assume primacy in the harvest of wood or any other forest product. Unlike some efforts at certification, the Panel first envisioned the kind of forest desired, then focused on the methods and standards that would create that forest.

⁴⁰Numbers refer to the general principles set out in Section 4.3.1 of the Panel's first report (Scientific Panel 1994a:6).

⁴¹General principle 9 simply supports provincial intent embodied in such actions as creating the Panel.

Nine general and 18 guiding principles provide the framework for the Panel's review of existing forest practices standards in Clayoquot Sound.

4.3.1 Principles

General Principles

The Clayoquot Scientific Panel recognizes natural systems and processes as the source of resource values and products. In this context, the Panel holds as paramount the management of forest ecosystems for their long-term health. The Panel also promotes the management of forest ecosystems for a mix of resource values and products.

The Panel's general principles (Scientific Panel 1994a:6–8) concerning forest management in Clayoquot Sound are:

- 1 The world is interconnected at all levels; attempts to understand it entail analyzing its components and considering the whole system.

In the course of scientific study or the development of guidelines, specific functions or aspects of a system may be targeted at the expense of others, or of the system as a whole. In developing guiding principles, the Panel has tried to maintain a holistic view of forest ecosystems, to recognize connections across the landscape, and to draw on both scientific knowledge and the Nuu-Chah-Nulth "lived experience." Current forest management standards will be assessed, and new standards developed, in this context.

- 2 Human activities must respect the land, the sea, and all the life and life systems they support.

Living organisms have a place in nature that must be sustained to maintain the health of the system in which they exist. The necessity to maintain natural ecological systems—including the land and sea themselves—supersedes the value that society may place on any individual component of those systems.

- 3 Long-term ecological and economic sustainability are essential to long-term harmony.

The Panel views harmony as a stable and healthy relationship between people and the ecosystems that support them. Maintaining harmony is the responsibility of each generation to those that follow. Standards guiding land use and resource management should ensure ecological, cultural, and long-term economic sustainability. Current rates of population growth and resource extraction may not be sustainable or permit the desired harmony.

- 4 The cultural, spiritual, social, and economic well-being of indigenous peoples is a necessary part of that harmony.

Indigenous peoples live within the landscape from which they and the rest of society extract resources. Because of their longer, often closer connections to nature, the cultural and spiritual relationships of First Nations peoples with their environment are different from those of other cultures. Such cultural and spiritual needs must be accommodated in standards governing land use and resource management.

- 5 Restoration of historical degradation is a necessary part of a healthy human relationship with the land.

Long-term harmony requires the repair of systems that have been degraded by human activities. Standards should require the rehabilitation of sites damaged through past activities, and should prevent activities that will contribute to future degradation.

- 6 Standards must accommodate new information and changing social values.

Forest management standards reflect, but lag, changing social values and improvements in information and understanding. Standards for land and resource management must continue to evolve by nurturing new knowledge and accommodating changing values.

- 7 Information on the resources of Clayoquot Sound and understanding of its forest ecosystems is incomplete.

The forest ecosystems of Clayoquot Sound are varied and complex. Understanding how these systems function and respond to human actions is incomplete. Where available, the Panel will use published literature to support the development of standards. However, its recommendations cannot be limited to what is written down. Reasoned judgment and the ecological knowledge and experience of First Nations peoples and of resource managers will be incorporated in the development of standards. Areas that are poorly understood will be addressed in recommendations for research.

- 8 Standards cannot be designed to meet all situations that will be encountered on the ground.

Standards must prescribe management activities appropriate at both landscape- and site-specific levels and must communicate expected levels of performance. At the same time, standards must allow for local variance to accommodate individual situations, recognizing that external factors influence responses and that the response in one watershed system will not necessarily be the same in the next. Standards must be conservative to maintain options and flexible to accommodate new knowledge.

- 9 British Columbia can and should show leadership in the management of forest ecosystems.

British Columbia is one of the most biologically diverse regions in the northern hemisphere. British Columbians have a moral obligation to maintain that diversity for future generations. Clayoquot Sound presents an opportunity to show leadership in the management of forest ecosystems for a multitude of values. The area is rich in resources and is highly valued by residents and tourists alike. Indigenous people with an extensive history of resource use still live in the region. The area has had significant industrial resource development in the forest and fishery sectors. Most of its forest land

is publicly owned in large contiguous tracts which permit considerable flexibility in resource allocation and use.

Guiding Principles

The Panel's general and guiding principles represent a commitment to sustainable ecosystem management.

Following from these general principles, the Panel established 18 guiding principles that provide the framework for reviewing existing standards and developing new standards for forest management in Clayoquot Sound (Scientific Panel 1994a:8–9).

Forest management standards must prescribe practices that:

- 1 Meet or exceed international and emerging world standards.
- 2 Are based on the capabilities, limitations, and sensitivities of ecosystems.
- 3 Recognize cumulative effects and response thresholds within ecosystems.
- 4 Maintain healthy ecosystems that sustain well-distributed populations of native species.
- 5 Avoid activities that would damage natural ecosystems, and where unforeseen damage has occurred due to human activity, rehabilitate such landscapes and habitats.
- 6 Recognize the watershed as the basic unit for planning and management. More than one watershed may be required to plan for values such as biodiversity, scenery, and cultural features.
- 7 Take an ecosystem approach to planning, in which the primary planning objective is to sustain the productivity and natural diversity of the Clayoquot region, and the flow of specific forest products is determined in a manner consistent with this objective.
- 8 Recognize that the rate (percent of area affected per unit time) and geographical distribution of timber harvesting are more important determinants than total volume when harvest is planned and wood is removed.
- 9 Provide for sustainable activities such as logging, fishing, tourism, and cultural pursuits.
- 10 Accommodate the needs of First Nations for cultural, social, and economic well-being.
- 11 Protect cultural and spiritual values and other special sites.⁴²

⁴²For example: areas of cultural or spiritual significance; habitats for threatened, rare, or endangered species; exceptional natural features (e.g., caves and hot springs); community watersheds; or important recreational and scenic areas.

- 12 Represent the best application of scientific, traditional, and local knowledge and experience in the Clayoquot region.
- 13 Are adaptive and respond to new knowledge and experience as well as to unforeseen natural and human-induced environmental changes.
- 14 Involve local people and affected parties in planning and management processes.
- 15 Provide a constructive and safe working environment.
- 16 Are clear, understandable, and enforceable. Where local decisions may replace prescribed standards, they must result in equal or better integrated resource management.
- 17 Are supported by ongoing education and training programs to ensure that standards are applied correctly and effectively.
- 18 Are continually monitored, evaluated, and improved.

These general and guiding principles of the Clayoquot Scientific Panel represent a commitment to sustainable ecosystem management. They move the intent within international agreements into a framework for assessing and developing sustainable forest practices.

The “holistic” approach to forestry explicitly requested by the *Guiding Principles on Forests* is recognized by the Panel’s first two general principles. The respect for indigenous peoples requested by the *Guiding Principles, Agenda 21*, and the *Convention on Biological Diversity* is present throughout the Panel’s principles, and explicit in its general principle 4. The Panel recognizes tensions among subsistence, development, and protection values, and seeks harmony among these tensions (general principles 3 and 6). Several of its guiding principles were developed explicitly to aid the Panel in creating workable standards in a world of changing information and values.

4.3.2 Recommendations

The Panel recommends a fundamental shift—from sustaining output levels for specific forest products to sustaining forest ecosystems.

The Panel has made over 120 recommendations to improve existing forest practices standards in Clayoquot Sound and to establish new standards where needed. The Panel report, *First Nations’ Perspectives Relating to Forest Practices Standards in Clayoquot Sound* (Scientific Panel 1995a), presents 27 recommendations for the inclusion of First Nations’ interests and protection of First Nations’ values in forest planning and management. *Sustainable Ecosystem Management in Clayoquot Sound: Planning and Practices* (Scientific Panel 1995b) presents about 100 further recommendations covering forest planning; the selection and design of silvicultural systems, harvesting methods, and transportation systems; managing scenic, recreation, and tourism resources; and monitoring procedures.

The Scientific Panel's recommendations are among the first efforts to shift forestry from its historical focus on sustaining output levels for specific forest products to a focus on sustaining forest ecosystems. The scientifically based recommendations incorporate traditional ecological knowledge of First Nations' peoples in whose territories Clayoquot Sound is located. In scope, these recommendations represent the most complete attempt, globally, to synthesize principles of international agreements and express these as specific actions.

5.0 The Vision

The vision of forests and their values is changing. Over time, the historical valuation of forests by specific components is broadening to a more inclusive view based on forest ecosystems. Managing for this broader perspective requires a new approach to forest planning and forest practices.

Clayoquot Sound is one example of emerging approaches to zoning the intensity and emphasis of forest use.

In a global context, Clayoquot Sound is but one example of emerging approaches to zoning the intensity and emphasis of forest use. Before the creation of the Panel, the provincial government had made major decisions regarding the allocation of land in Clayoquot Sound to protected areas (no use), specific use emphasis (e.g., scenic corridors), and general integrated management areas (all uses) (British Columbia 1993). The Panel's recommendations apply to the general integrated management areas and present a vision for maintaining all forest values in such areas. Other jurisdictions have confronted the issue of maintaining the entire range of forest values differently. Malaysia, for example, employs more than 10 kinds of zones emphasizing different values and uses, including intensive wood fibre production. Attempting to maintain all values in an area necessarily foregoes intensive use of any single ecosystem value or resource.

The Scientific Panel's vision for sustainable forest practices in Clayoquot Sound acknowledges and extends to specific practices recent international agreements and conventions. It has six tenets:

- the key to sustainable forest practices lies in maintaining functioning ecosystems;
- hierarchical planning is required to maintain ecosystem integrity from the sub-regional down to site-specific levels, and to ensure that the intent of higher level plans is reflected in lower level plans;
- planning must focus on those ecosystem elements and processes to be retained rather than on resources to be extracted;
- cultural values and desires of inhabitants and visitors must be addressed;
- scientific and traditional ecological knowledge of Clayoquot Sound must continue to be encouraged through research, experience, and monitoring activities; and
- both management and regulation must be adaptive, incorporating new information and experience as they develop.

The Panel's vision for forestry in Clayoquot Sound includes First Nations' perspectives and the spectrum of forest values.

The Panel's vision for forestry in Clayoquot Sound explicitly includes First Nations' perspectives and is intended to maintain the entire spectrum of forest values. It stresses ecological relationships before development objectives, while recognizing that environmental protection and economic development are mutually dependent. Although scientific in its approach to forest ecosystems, the vision treats people and their aspirations within those ecosystems as a critical component.

The vision the Panel holds for forestry in Clayoquot Sound is best expressed in Section 3.0 of *Review of Current Forest Practice Standards in Clayoquot Sound* (Scientific Panel 1994b) and particularly in *Sustainable Ecosystem Management in Clayoquot Sound: Planning and Practices* (Scientific Panel 1995b). This vision represents a goal of the international agreements that not all regions or nations will be able to attain.

The Panel offers a kind of forestry that can serve as a model for excellence in forest standards where population pressures are not great.

Alternative visions could place less emphasis on the naturalness of ecosystems or on maintaining all forest ecosystem values, and still meet the spirit of international agreements. Those agreements recognize the tension between protection and development actions while viewing them as equal goals, and recognize the primacy of national, social, and economic interests in moving towards these goals. Because of the special nature of Clayoquot Sound, the Panel has de-emphasized economic interests and offered a kind of forestry that can serve as a model for excellence in forest standards where population pressures are not great. The framework proposed by the Panel—the processes of identifying values, forming plans based on values to be maintained, and using inclusive planning—can, however, be applied elsewhere.

In creating the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, the British Columbia government took four bold steps:

- It advanced the content and spirit of international agreements on sustainable forest practices.
- It recognized the contributions of both scientific and traditional ecological knowledge to understanding how ecosystems function.
- It created a structure that would ensure the Panel's independence from government, industry, and other groups, and its freedom from the distraction of day-to-day issues in Clayoquot Sound.
- It made a commitment to act on Panel recommendations.

This framework gave the Panel both freedom and support in its task of recommending standards for forest practices in Clayoquot Sound. From this starting point, the Panel established a protocol based on respect for one another, for different values and perspectives, and for data founded in scientific knowledge and traditional ecological knowledge.

Respect, reflection, commitment to act on the best available knowledge, and to incorporate new information as it develops have characterized the Panel's work. These qualities will also influence the successful implementation of Panel recommendations.

Sustainable ecosystem management is the shared vision towards which most global conventions and grassroots efforts are moving.

Because it directly addresses principles of recent international agreements and extends them as specific recommendations, the Scientific Panel provides a useful model for other areas. Many of the specific recommendations are based on the terrain and natural disturbance regimes of Clayoquot Sound; the process of developing an approach to forest management from general principles, through a planning framework, to specific practices and procedures is far more general.

The Panel's task in Clayoquot Sound is only one example of the larger task of managing all of British Columbia's provincial forests. This larger task must:

- consider a wide range of values on a finite landbase;
- describe what is necessary to sustain functioning ecosystems;
- define forestry practices that are sustainable within the context of maintaining ecosystems;
- protect values and provide an economic base for communities; and
- merge the traditions and belief systems of indigenous and non-indigenous peoples.

In some areas, transition strategies will be necessary; most areas will benefit from incorporating value-added activities and products.

Sustainable ecosystem management is the shared vision towards which most global conventions and grassroots efforts are moving. The Panel believes that its work in Clayoquot Sound begins to translate this vision into reality.

Appendix I

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Appendix II

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