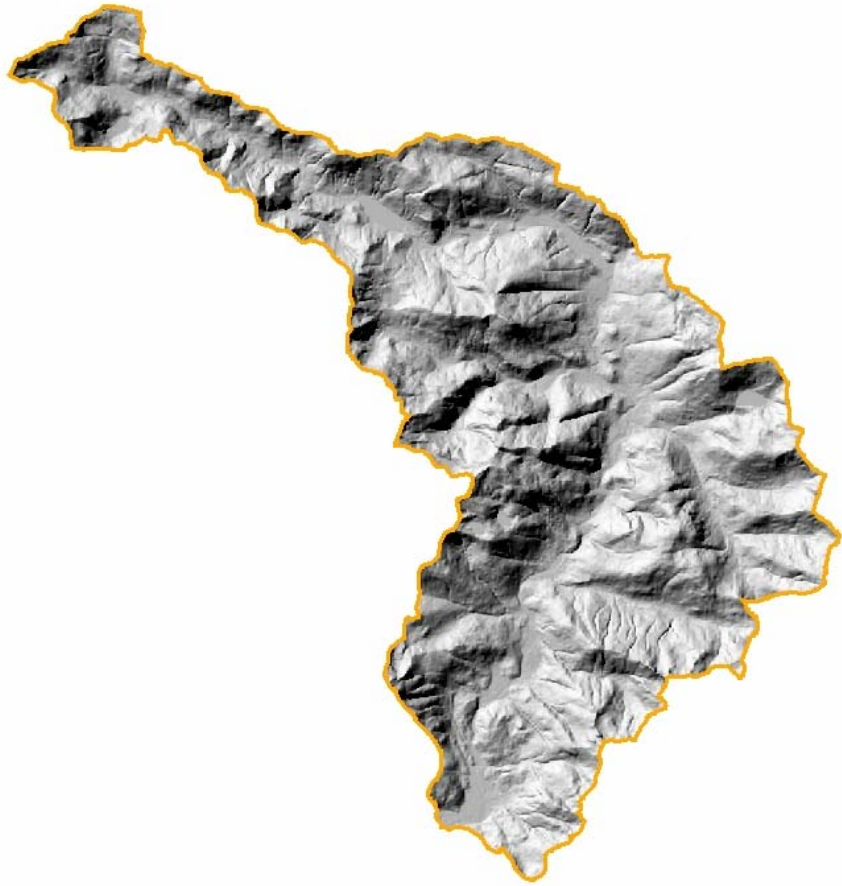


WATERSHED PLANNING IN CLAYOQUOT SOUND

VOLUME 7: UPPER KENNEDY WATERSHED PLAN



CLAYOQUOT SOUND TECHNICAL PLANNING COMMITTEE

July 2006



**Central Region Chiefs
Administration**

Box 790, Ucluelet, B.C. V0R 3A0

July 10, 2006

Guy Louie and Jim Lornie, Co-Chairs
Clayoquot Sound Central Region Board
Post Office Box 790
100 Hittatsoo Road
Ucluelet, BC V0R 3A0

Dear Guy Louie and Jim Lornie:

**Re: Watershed Plan Endorsement for the Tofino - Tranquil (Onadsilth - Eekseuklis),
Sydney - Pretty Girl, Bedwell - Ursus - Bulson, Hesquiaht, Kennedy Lake, Upper
Kennedy River, Clayoquot River, and Fortune Channel planning units.**

On behalf of the Parties to the Clayoquot Sound Interim Measures Extension Agreement, and as recommended by the Central Region Board (CRB) in two letters to the Parties during 2005, we are pleased to endorse the watershed plans for the above watershed planning units.

The Board made several significant recommendations in both their letters, including: specific recommendations about individual plans involving technical content; that a summary plan document be completed to provide a regional synopsis of watershed reserves and other Scientific Panel objectives; that a Beach watershed plan be completed and incorporated into the summary document; and, that legal objectives be established under the *Forest and Range Practices Act*.

We understand the Clayoquot Sound Technical Planning Committee (TPC) has undertaken the following initiatives with regard to those recommendations:

- completion of technical changes for individual plans;
- begun work on a regional summary document, including incorporation of Scientific Panel objectives for the Beach planning unit; and,
- initiated inter-agency discussions with regard to setting legal objectives under the *Forest and Range Practices Act*.

We also understand that following the second public review period and during preliminary work on the regional summary document, the Planning Committee found a small number of minor errors and discrepancies in the GIS analyses results. The Committee determined that these, as well as other inconsistencies between watershed plans, could be addressed without making significant revisions to the watershed plans or the reserve networks. Therefore, they

have incorporated the necessary corrections and changes into the final versions of the watershed plans and the regional summary document.

The Parties are pleased to confirm our support for the CRB recommendations and the efforts by the Planning Committee to address them. We have instructed the TPC to ensure all changes and updates are completed, so that individual watershed plans are ready for public distribution by July 31, 2006. At that time, the plans will take effect as 'Official Watershed Plans'.

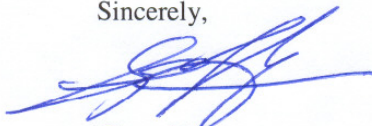
The Board made one other significant recommendation in its two letters: that the Parties identify the resources to develop and implement a comprehensive monitoring program. Now that the watershed planning process is drawing to a close, the Parties are pleased to announce we have begun discussions regarding the availability of resources that will allow for the evaluation of outstanding priorities, including the details associated with plan implementation and monitoring. The Parties recognize that these priorities are important steps on the road to sustainable ecosystem management, as envisioned by the Scientific Panel, and are crucial components to the practice of adaptive management. We anticipate our discussions will yield direction on these topics to the Board and the Planning Committee in the near future.

We wish to acknowledge the considerable work required of the CRB to conduct two public reviews of the draft watershed plans during 2005. We especially appreciate the Board's efforts to organize and summarize the results from the public processes and its own reviews, then to structure its subsequent recommendations in order to provide assistance to the Parties' review and evaluation of these plans.

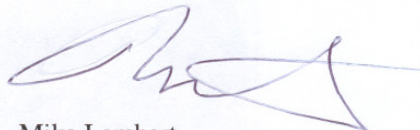
Further, we would like to thank the CRB, the Central Region First Nations, various stakeholders and interest groups, local governments, and members of the public for their contributions to the development of these plans - and, for their thoughtful comments during each review process.

We look forward to a continued close working relationship between the Parties, the Central Region Board, and the Technical Planning Committee to achieve the objectives envisioned by the Scientific Panel. Continued close cooperation between all partners will be instrumental in achieving this goal.

Sincerely,



Elmer Frank
Chairman
Central Region Chiefs



Mike Lambert
Associate Deputy Minister
Integrated Land Management Bureau

cc. Nelson Keitlah and Rudi Mayser, Co-chairs, Clayoquot Sound Technical Planning Committee

Preface

This plan for the Upper Kennedy planning unit was prepared by the Clayoquot Sound Technical Planning Committee (TPC). Committee membership consists of representatives from the First Nations of Clayoquot Sound and technical staff from provincial agencies. The TPC is co-chaired by one representative each from First Nations and the Integrated Land Management Bureau (ILMB), of the Ministry of Agriculture and Lands¹. A complete membership list is provided in Appendix 1.

The primary responsibility of the TPC is to complete watershed-level planning for Clayoquot Sound. Watershed plans are compiled in a series of volumes. *Volume 1: Principles and Process* describes the planning process and objectives for the Sound (for planning purposes the boundaries of the Sound are defined as those established in the Clayoquot Sound Land Use Decision, included as Map 1). The remaining volumes, including this document, summarize the results for individual watershed planning units.

In preparing this plan, the TPC followed the recommendations of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound for watershed-level planning and identification of reserves. At times, the TPC also sought additional advice from respected specialists in their field of expertise.

The intent of this watershed plan is to guide site-level forest planning and forest harvesting in the Upper Kennedy watershed planning unit, in accordance with the Scientific Panel recommendations for sustainable ecosystem management in Clayoquot Sound.

The effective date of this plan is July 31, 2006. This plan will be subject to periodic updates and amendments to keep it current and to reflect new information.

¹ When the TPC was first established, government representatives included staff from the Ministry of Forests, the Ministry of Environment, Lands and Parks and the Ministry of Small Business, Tourism and Culture. In 2001, responsibility for resource management was transferred to the new Ministry of Sustainable Resource Management (MSRM). In 2005, the MSRM was dissolved and a new agency (Integrated Land Management Bureau, Ministry of Agriculture and Lands) assumed responsibility for land use planning.

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Executive Summary

This watershed plan encompasses the entire Upper Kennedy watershed planning unit (WPU), which covers 20,591 hectares. The WPU is bounded to the west by the Clayoquot River, Tofino-Tranquil, and Bedwell-Ursus-Bulson watershed planning units; to the north by the Taylor River and Sutton Creek watersheds (both are outside the Clayoquot Sound Land Use boundary area); to the east by the headwaters of the Nahmint, Effingham and Toquart watersheds (also outside the Clayoquot Sound boundary); and to the south by small watersheds draining directly into Kennedy Lake.

This watershed plan was developed in accordance with the principles and recommendations set out by the Scientific Panel on Sustainable Forest Practices in Clayoquot Sound to guide planning for sustainable ecosystem management in Clayoquot Sound. It does not apply to provincial parks, Indian Reserves, federal lands, or private land.

The purpose of the plan is to map and designate the areas that will be set aside as reserves to protect a range of forest values. The plan also maps and designates the harvestable area – that is, the land that falls outside of reserves and on which sustainable forest harvesting can take place. Within the harvestable area, special management zones are identified. In these areas, certain conditions and limitations are imposed on harvesting and other management activities in order to maintain special and sensitive values including scenic, recreation, tourism and ecosystem values.

Development of the Plan

The Scientific Panel identifies three key ecosystem management planning themes: watershed integrity, biological diversity, and human values including First Nations cultural values. The Panel sets out management goals and objectives for each of these three themes. Overall, this framework forms the backdrop to a planning process that includes broad-based regional and sub-regional plans, watershed-level plans, and site-specific plans.

The Scientific Panel identifies watershed-level planning as the cornerstone to the overall ecosystem-based management planning process. Watershed-level plans give practical meaning to ecosystem management goals and objectives, and also guide the site-level plans that direct forestry activities. Within watershed-level plans, the designation of reserves and special management zones is the key

strategy for achieving the ecosystem management objectives articulated by the Scientific Panel. In the harvestable area, a variable retention silviculture system, rate-of-cut limits and various restoration strategies provide a site-level complement to ecosystem management.

This watershed plan for the Upper Kennedy watershed planning unit was developed by a Technical Planning Committee (TPC) made up of First Nations representatives and technical staff from provincial agencies, led by the Integrated Land Management Bureau of the Ministry of Agriculture and Lands. The TPC relied on the Scientific Panel reports and recommendations, as well as other expert advice, to develop the criteria for establishing reserves and special management zones.

The Upper Kennedy Watershed Reserve Network

The Scientific Panel proposed eight different kinds of reserves to protect forest values. Each of these reserve types serves as a strategy to achieve management objectives within one of the key management themes, as described below. Accompanying maps show the location of individual reserves.

Watershed Integrity

Reserves to protect hydroriparian resources

Approximately 3480 ha have been designated as hydroriparian reserves. This represents approximately 17 percent of the total land base of the Upper Kennedy watershed planning unit (see Map 7).

Reserves to protect sensitive soils and unstable terrain

Unstable terrain reserves (areas of Class V terrain) cover approximately 2,818 ha, or 14 percent of the unit. Reserves for sensitive soils cover 4,589 ha or 22 percent of the land base. These layers overlap each other and other reserves at several locations. Together, unstable terrain reserves and sensitive soils reserves make up 6,882 ha or 33 percent of the total land base of the Upper Kennedy watershed planning unit (see Maps 8 and 9).

Biological Diversity

Reserves to protect red- and blue-listed plant and animal species

Approximately 1,159 ha have been set aside in nine separate Marbled Murrelet reserves within the Upper Kennedy watershed planning unit. Approximately 59 percent of this area (673 ha) was already reserved for other purposes. These reserves, in combination with other reserves and

protected areas, protect approximately 3,065 ha of class 1 and 2 Marbled Murrelet nesting habitat in this planning unit. This amounts to 47 percent of the total class 1 and 2 habitat available, or 15 percent of the land base (see Map 11).

Approximately 163 ha, or approximately one percent of the land base of the Upper Kennedy watershed planning unit, have been designated as reserves for the protection of red- and blue-listed plant communities (Map 10).

Reserves to protect forest-interior conditions in late successional forest

Currently, there are approximately 11,406 ha of old forest within the Upper Kennedy watershed planning unit. This represents 55 percent of the WPU, and 65 percent of the total forested land base. Of this, the reserve network encompasses approximately 5,182 ha, or 30 percent of the forested land base. To satisfy the Scientific Panel recommendation for a minimum old growth retention of 40 percent, an additional 1,823 ha will have to be retained. Since there are 6,224 ha of old growth outside the reserve network, there is sufficient area remaining to meet this management objective. Map 12 shows the current old-growth forest and forest in interior conditions.

Within the reserve network, 2,574 ha are classed as forest-interior condition. This exceeds the old-interior forest recommendations of the Science Panel (see Map 13).

Reserves to represent all ecosystems

After the reserve network had been completed, the Committee found that 233 ha had to be added to the reserve network to satisfy ecosystem representation requirements (see Map 14).

Reserves to ensure linkages among watershed-level planning areas

Once watershed-level plans are completed for a number of adjacent watershed planning units in Clayoquot Sound, opportunities for linkage corridors will be evaluated. Where necessary, reserves that create linkages needed to support biodiversity or recreation objectives will be added to the reserve network.

Human Values

Many of the areas designated to protect culturally significant sites, scenic areas and recreational or tourism values are better characterized as special management zones than as reserves. Most of these areas are not excluded from harvesting; however, certain conditions and requirements must be met before harvesting may proceed. Only reserve buffers around recreational and tourism features, certain

cultural sites and scenic features – to the extent they are located within parks or reserves for other values – are excluded from harvesting.

Reserves to protect cultural values

Approximately 9,174 ha, or 45 percent of the Upper Kennedy watershed planning unit, has been identified by the Tla-o-qui-aht First Nations (TFN) as areas of cultural significance. For reasons of confidentiality, the cultural values map included in this report (Map 15) shows only the general locations of sites of cultural importance.

Reserves to protect scenic and recreation/ tourism values

Reserves have not been established for scenic values, although many areas of high significance for scenic values have been preserved within existing parks and reserves for other values. Scenic values within the harvestable area are maintained through management criteria designed to achieve scenic class objectives and standards.

In total, 7,984 ha, or 39 percent of the Upper Kennedy watershed planning unit, have been assigned scenic class objectives: 1,345 ha to the natural-appearing scenic class objective, 5,436 ha within the minimal alteration class, and 1,203 ha within the small-scale alteration class. The remaining landscape is not classified because it is generally not visible from communities, recreation sites, and travel corridors. Of the scenic class areas, approximately 3,724 ha (47 percent) are included within parks and reserves (see Map 16).

In addition to areas that are assigned scenic class objectives and areas within other kinds of reserves, approximately 133 ha containing features of high to very high recreation and tourism significance have been reserved, primarily around large lakes. This represents 0.7 percent of this planning unit. Areas surrounding recreation and tourism reserves have been identified as special management zones (Map 17).

Summary

A total of 10,829 ha, representing 53 percent of the land base of the Upper Kennedy watershed planning unit, have been reserved from harvesting in accordance with the recommendations of the Scientific Panel. Map 18 shows the complete watershed reserve network.

The Upper Kennedy Harvestable Area

Once all watershed reserve areas are mapped, the remaining area outside reserves is designated as harvestable area. Forest harvesting and related development, such as road-building, can take place within the harvestable area as long as such activity is consistent with the

Scientific Panel recommendations relating to operations, the *Forest Practices Code Act*, the *Forest and Range Practices Act*, and the watershed plan. All forest harvesting will take place in accordance with the Variable Retention Silvicultural System designed to preserve the characteristics of natural forests.

Within the harvestable area, special management zones have been identified where additional conditions and limits are imposed on forest harvesting and other operational activities. These conditions and limits ensure that the special and sensitive values in these areas - including scenic, recreation, tourism, and ecosystem values - are maintained. Map 20 shows the location of the harvestable area, including Special Management Zones, as well as the reserve network.

The harvestable area within the Upper Kennedy planning unit encompasses 9,049 ha of the productive forest, representing 44 percent of the planning unit, or 52 percent of the forested land base. Special management zones comprise 5,832 ha (64 percent) of the harvestable area.

Forest management within harvestable areas is also subject to hydrological rate-of-cut limits, in accordance with Scientific Panel recommendation R3.1. Rate-of-cut limits applicable to watersheds within this planning unit are set out in Chapter 3. Map 21 shows the locations of these watersheds.

Harvesting systems will be determined at the site level in accordance with watershed-level objectives. The selection of systems and their application will be consistent with the recommendations set out by the Scientific Panel with respect to harvesting methods and equipment.

Amendments, Implementation and Monitoring

The plan will be subject to minor updates, as well as major scheduled and unscheduled amendments, as outlined in Volume 1, Chapter 4. Implementation and monitoring of the plan will be the joint responsibility of provincial resource agencies, First Nations, forest tenure holders and partners who share the common goal of sustainable ecosystem management in Clayoquot Sound, as discussed in Volume 1, Chapter 5.

1.0 The Upper Kennedy Planning Unit

1.1 The Physical Landscape

The Upper Kennedy watershed planning unit is located in the southeast corner of the Clayoquot Sound Land Use Decision area. This planning unit is bounded to the north by the Taylor River and Sutton Creek watersheds, and to the east by the Nahmint River, Effingham River and Toquart River headwaters. All five of these drainage basins lie outside Clayoquot Sound. The Bedwell-Ursus-Bulson, Tofino-Tranquil, Clayoquot River and Kennedy Lake planning unit watersheds are to the west and south of the Upper Kennedy planning unit. Map 2 shows the location of this planning unit within the Land Use Decision area.

The Upper Kennedy planning unit boundaries coincide with the entire area covered by a single watershed, the Kennedy River above Kennedy Lake. The total area of this watershed, and the planning unit, is 20,591 hectares, making it the third largest watershed in Clayoquot Sound. From its headwaters, the Kennedy River flows east-south-easterly for almost 20 kilometres, then turns, near Sutton Pass, and flows south for approximately 20 kilometres before draining into Kennedy Lake. In the upper sections, the Kennedy River valley is characterized by a narrow floodplain surrounded by steep and rugged slopes; in the lower half, the valley develops into a wide floodplain with several sections of hummocky terrain, surrounded by steep slopes.

Lakes are scattered throughout the planning unit. The largest, at 73 hectares, is Snag Lake (also known as Spire Lake) straddling the mainstem, west of Sutton Pass. This waterbody was created by a large slide which blocked the river. There are four other lakes greater than ten hectares: Louise Goetting Lake (32 ha) occurring at 791 metres elevation, in the headwaters of the largest tributary to Marion creek; Deb Lake (12.4 ha) at 581m elevation in the uppermost portion of the valley; an unnamed lake (12.9 ha) at 984m on Devil's Club Creek; and another unnamed lake (10.5 ha) at 839m, north of Devil's Club Creek.

Most of the Clayoquot Sound landscape was modified by glaciers during the Pleistocene period, and a number of features and landmarks in the planning unit bear witness to this. Evidence includes the broad U-shaped valley of the lower half of the planning unit, the U-shaped nature of several tributary valleys, a high percentage of glacially-smoothed exposed rock, and extensive glaciofluvial deposits.

Elevations within the planning unit range from approximately 6.0 metres on the river mouth at Kennedy Lake to over 1,500m at Adder Mountain and Peak 5040, southeast of Sutton Pass. There are several significant peaks on the planning unit boundaries: Adder (1,507m), Peak 5040 (1,532m), Cat's Ears (1,479m), Mackenzie (1,360m), Steamboat (1,477m), Limestone Lions (1,385m), Peak 20-35 (1,439m) and Peak 20-33 (1,419m). Pogo Mountain (also known as Needle Mountain) is a striking landmark from several highway vantage points; at 1,486m elevation, it is a dominant topographic feature centrally-situated within the planning unit. Map 3 illustrates the topographic relief of the area.

Exposed limestone outcrops occur on the Limestone Lions and Steamboat Mountain. Both peaks and associated ridges are within Clayoquot Plateau Provincial Park, which was established to protect sensitive karst features, caves and sinkholes.

The climate in the Upper Kennedy unit, as throughout the west coast of Vancouver Island, is temperate and very wet; however, because of its distance from the ocean, this planning unit is less subject to marine influence than other planning units. Annual precipitation can exceed 700 cm, mostly falling between October and May². The Pacific Ocean is the source of warm, moist weather which moves onshore and falls as heavy rain or snow as it encounters higher elevations inland. Since there is less direct marine influence, mean daily winter temperatures tend to be lower. High precipitation levels therefore result in greater snow accumulation and longer retention periods. Snow packs linger late into spring, especially on north-facing slopes.

1.2 The Ecological Landscape

Approximately 85 percent of the Upper Kennedy watershed planning unit supports forests dominated by western redcedar, western hemlock, mountain hemlock, yellow-cedar, and amabilis fir. Much of the remaining area is bare rock at high elevations and water bodies.

Two biogeoclimatic ecosystem classification (BEC) zones occur in the Upper Kennedy watershed planning unit: the Coastal Western Hemlock (CWH) and the Mountain Hemlock (MH). The CWH zone occupies approximately 68 percent of the planning unit and is represented by two variants. The CWHvm1 variant (Submontane Very Wet Maritime) occurs below 600 meters elevation, and covers

² Johannes, M., C. Robinson, & K. Hyatt. 1999. Kennedy Lake Watershed Atlas Series – Volume 1: Watershed Overview, A Working Atlas. Northwest Ecosystem Institute, Lantzville, BC.

approximately 46 percent of the planning unit. The CWHvm2 variant (Montane Very Wet Maritime), located along the upper slopes at elevations between 600 and 800 m., covers approximately 22 percent. The MH biogeoclimatic zone is characterized by one variant, and one sub-variant. The MHmm1 variant (Windward Moist Maritime) occupies 27.6 percent of the WPU, at elevations of 900+ meters. The MHmmp1 sub-variant (Moist Maritime Parkland MH) occurs above 1200m, and occupies 4.8 percent of the planning unit. Refer to Map 4 for BEC variant locations.

**52 different ecosystems
are represented in the
Upper Kennedy watershed
planning unit.**

52 different vegetated ecosystem types are represented within the Upper Kennedy watershed planning unit. The most common are Western Hemlock/Amabilis Fir - Blueberry (AB) – which occupies almost 29 percent of the planning unit area, Western Hemlock/Western Redcedar - Salal (HS) at 11 percent, and Mountain Hemlock/Amabilis Fir – Blueberry (MB), at almost 13 percent.

Approximately 65 percent of the Upper Kennedy forested land base supports ecosystems that are over 140 years old. Approximately 20 percent is less than 40 years old. Available records indicate harvesting began during the 1950s. Previously harvested areas now support second growth forests of various ages, as shown on Map 5.

This planning unit contains nesting habitat for the Marbled Murrelet, a red-listed bird species. Studies indicate a direct correlation between Marbled Murrelet nesting habitat suitability and old growth forests. Some nesting habitat has been lost in the portions of this planning unit that have been harvested.

The Upper Kennedy watershed supports Chinook, Chum, Coho, Pink, and Sockeye Salmon; Rainbow, Steelhead and Cutthroat Trout; Dolly Varden Char; and Peamouth Chub. Johannes *et al.* indicate that the Kennedy River mainstem provides spawning habitat for Chinook, Chum, Coho, Sockeye, Cutthroat and Dolly Varden from Kennedy Lake extending upstream beyond Cat's Ears Creek. Steelhead spawning is confirmed from the lake until beyond Mercer Creek. Mainstem side-channels, tributaries, and adjacent wetlands provide rearing habitat for juvenile Coho, Cutthroat, and Dolly Varden. Juvenile Chinook, Sockeye and Steelhead tend to migrate downstream to rear in the lake. The presence of several species of concern (Cutthroat, Dolly Varden, Sockeye, and Peamouth Chub) indicates that this watershed has high biodiversity values.

Black Bears are common throughout Clayoquot Sound. In this planning unit, forest harvesting may have contributed to an increase in bear numbers, due to the creation of early seral communities that

provide an abundant supply of fruit-bearing shrubs, grasses and forbs. In 1999, Madrone Consultants reported that early spring and spring feeding habitat was limited in the planning unit.³ The best such habitat tended to be located within floodplains and riparian areas adjacent to the mainstem and its tributaries. These areas also provided high value summer and fall feeding and security habitat. This may be a cause for concern as Highway 4 runs parallel to the Kennedy River for a considerable distance; therefore, the likelihood of human and bear interactions is high. During summer and fall, moderately-high and high value feeding habitat are common throughout the entire planning unit at all elevations. Madrone's findings indicate that moderate to high denning habitat remains widely available.

Wildlife inventories in the late 1990s indicate that Black-tailed Deer use in this planning unit was moderate to high (Madrone, 1999). Madrone biologists found deer habitat values are high for all seasons throughout the CWHvm1 subzone in the southern portion of the planning unit. Overall, the watershed offers moderate habitat values in the spring, widespread moderate to moderately-high values in the summer, and moderate to moderately-high values in the fall. It is likely that forest harvesting increased spring and summer forage opportunities at lower elevations. Upper elevation areas provide low or no values in winter and spring due to heavy and late season snowpack and subsequent delays in plant growth. However, these higher altitudes contain excellent feeding habitat during the summer and early fall, especially in herbaceous and wet meadows. Winter habitat is limited throughout the MH and tends to be limited in the CWHvm2 due to cool temperatures and deep snow.

The upper Kennedy River, formerly known as Elk River, supported a resident Roosevelt Elk herd until the 1940s (Wilcon, 1996). Wilcon cites a previous study which documented occasional elk hunting by the Tla-o-qui-aht in this area. Elk are regularly seen in several adjacent watersheds, the Nahmint, the Ursus and the Taylor – so, are expected to be occasional visitors to the Kennedy River. Madrone (1999) determined that spring feeding and security habitat for elk in the planning unit is predominately low, with a scattering of highly-rated exceptions in wetlands and floodplains near the mainstem and some tributaries. In the summer and fall, moderate habitat is abundant, with some areas (such as floodplains, willow and alder sites) offering high value habitat. During winter, most valley bottoms offer low to moderate habitat, interspersed with frequent pockets rated moderately-high and high.

³ Madrone Consultants Limited. 1999. *Wildlife Interpretations for Ecosystem Mapping for the Clayoquot Sound Area*. Interim Document. Year Three. Duncan, BC.

1.3 Human Values

The Upper Kennedy planning unit lies entirely within the traditional territory of the Tla-o-qui-aht First Nations. There are no First Nations Reserves within the planning unit.

First Nations' values are discussed in the Scientific Panel's *Report 3: First Nations' Perspectives Relating to Forest Practices Standards in Clayoquot Sound*. In the following passages in *Report 5*, the Scientific Panel highlights the close connection between Nuuchahnulth culture and the natural resources of the region:

Nuuchahnulth people view the forest and its resources as gifts of the Creator, to be used with respect and to be maintained by careful stewardship through the legislative power of tribal government found within "hahuulhi." Traditional practices of resource management include harvesting of selected trees and other forest products; highly selective controlled burning to promote production of berries, to provide grazing areas for deer, and to produce firewood; and monitoring and controlled use of all lands and waters and their resources through stewardship of hereditary chiefs.

Within each community, chiefs' territories - rivers and fisheries, hunting and gathering areas, and portions of the ocean - are delimited by boundary markers such as easily recognizable topographic features. While permanent Nuuchahnulth villages are situated along the coast of Clayoquot Sound, economic and cultural activities (e.g., hunting, fishing, plant gathering, and spiritual practices) occur throughout the region, from the ocean and offshore islands to remote places in the mountains. For example, culturally modified trees, places of spiritual significance (especially caves, streams, pools, waterfalls, and offshore islands) which are often personal to individuals and families, and areas used for traditional activities are scattered widely across the landscape. These places and the area's forests and water resources are essential for Nuuchahnulth economic, cultural, and spiritual well-being, yet both have been threatened, depleted, or damaged by the activities of non-indigenous peoples.⁴

The Upper Kennedy watershed planning unit contains important land-based and freshwater recreational and tourism features.

The planning unit also contains important recreation and tourism features, including a large portion of Clayoquot Plateau Provincial Park. This park was established to protect several rare plant species; outstanding and fragile high-elevation karst, sinkhole and cave features; and a number of small, high-elevation lakes. Clayoquot Plateau Park, which straddles the boundary between this planning unit and the Clayoquot River planning unit, has a total area of 3,156 ha. Of this, 1,986 ha are located within the upper Kennedy River planning unit; this comprises 9.7 percent of the planning unit area. Although the

⁴ Report 5, p.38

park was established primarily to protect sensitive features, it also offers opportunities for wilderness recreation in a pristine setting.

There are other important recreation and tourism features within the planning unit. For example, there are several road-accessible rest and picnic spots adjacent to the Kennedy River which offer scenic views of rugged mountain vistas, river and creek pools, cascades and falls, and small to medium gorges. Many locations are popular swimming spots for residents and visitors.

Other important features in this planning unit include hiking trails, such as the Clayoquot Valley Witness Trail. This wilderness trail, constructed in 1993, is located primarily within the adjacent Clayoquot River planning unit, but it originates near the downstream end of Snag Lake and gains elevation from there until it crosses the planning unit boundary near Upper Solstice Lake. The trail crosses back into the upper Kennedy River valley via the Olympic Creek headwaters.

Much of the planning unit outside the provincial park lies within Tree Farm Licences 44 and 57, which are held, respectively, by Western Forest Products and Iisaak Forest Resources Limited (Iisaak). TFL 44, at 11,502 ha, occupies the entire northern portion, or 56 percent, of the planning unit. Iisaak's TFL, located in the southern portion on parcels adjacent to the Kennedy River mainstem, cover 1,812 ha, or 8.8 percent of the planning unit. Most of the remainder of the planning unit, representing approximately one quarter of the plan area, lies within the Arrowsmith Timber Supply Area and is managed by the Ministry of Forests and Range or by Timber Sales British Columbia. Map 6 shows the location of the various tenures.

The Pacific Rim Highway (Highway 4) is the only paved road access into Clayoquot Sound. Highway 4 enters the Sound at Sutton Pass, approximately 40 kilometres west of Port Alberni, then follows the Kennedy River valley. From this point the highway more or less bisects the planning unit until the river meets Kennedy Lake on the southern boundary of the planning unit. All residential, commercial and recreational vehicle traffic destined for communities and parks in Clayoquot Sound and northern Barkley Sound use this highway. The utility supply corridor for west coast communities, including land lines for electricity, telephone, etc., runs parallel to the highway. Recently, a small hydroelectric power generation plant was constructed on Marion Creek adjacent to the highway.

There are twenty-six mineral tenures in this planning unit. In the past, there has been gold-silver-zinc production at two locations. The potential for future metal development ranks high to very high.

2.0 The Upper Kennedy Watershed Reserve Network

The network of reserves set out in this watershed plan represents the cornerstone of the Scientific Panel's ecosystem management strategy for Clayoquot Sound. For a summary of the reserve types and how they address ecosystem management objectives, as well as details of the inventories and technical analyses involved in the designation of the various reserves, see Volume 1.

2.1 Reserves to Protect Watershed Integrity

Watershed integrity is one of the three primary themes of sustainable ecosystem management identified by the Scientific Panel. The strategy for achieving this goal is the designation of reserves to protect the integrity of the hydroriparian system and the integrity of forest soils.

2.1.1 Hydroriparian reserves

Hydroriparian zones distribute water through the ecosystem and provide important habitat.

The Scientific Panel recognizes the paramount importance of water bodies and their immediate vicinity, describing these zones as the "skeleton and circulation system of the ecological landscape." Hydroriparian ecosystems distribute water through the environment, and also contain the richest and most diverse habitats. These systems are crucial to the protection of watershed integrity.

For a description of the hydroriparian inventory assembled in accordance with the Scientific Panel's classification system, please refer to Volume 1. Due to the lack of detailed hydroriparian inventories for the southern portion of this planning unit (below Canoe Creek), a 50 metre default reserve was applied uniformly along all lakeshores and stream banks.

Approximately 3,480 ha have been designated as hydroriparian reserves for the Upper Kennedy planning unit. This represents approximately 17 percent of the total land base of the unit. The hydroriparian reserves are shown on Map 7.

2.1.2 Sensitive soils and unstable terrain reserves

Only stable terrain and resilient soils will be available for forest harvesting.

To reduce the risk of erosion, the Scientific Panel recommends that "only stable terrain and resilient soils should be available for forest

harvesting operations.”⁵ Watershed plans therefore must include reserves to protect sensitive soils and unstable terrain.

The single criterion established for the designation of reserves to protect unstable slopes is that all Class V terrain – that is, the terrain most at risk of slides due to forest harvesting – must be reserved. Sensitive soils requiring reserves at the watershed level are grouped into six categories: bedrock terrain; shallow organic matter; organic soils; blocky and bouldery colluvial material; active colluvial cones or fans and alluvial fans; and poor growing sites.

Unstable terrain reserves (areas of Class V terrain) cover approximately 2,818 ha. In addition, 4,589 ha are set aside in sensitive soils reserves. These layers overlap at several locations; together, unstable terrain reserves and sensitive soils reserves cover 6,882 ha (33 percent) of the total land base of the unit. The locations of these reserves are shown on Map 8 and 9.

2.2 Reserves to Protect Biological Diversity

The Scientific Panel acknowledges that “maintenance of biological diversity is inextricably related to the long-term maintenance of healthy, productive ecosystems.”⁶ A series of reserves provide strategies to advance this management objective.

2.2.1 Reserves to protect red- and blue-listed species

The protection of rare species is a key strategy for maintaining biological diversity.

A key strategy for maintaining biological diversity is the protection of rare or threatened species. The Scientific Panel recommends that reserves be established at the watershed level to protect red-listed and blue-listed plant and animal species. At the same time, the Panel notes that some species require protection measures at the site level, and that planning for species protection may also occur at the sub-regional level.

Plant Species

There are one red-listed and two blue-listed plant communities in the Upper Kennedy planning unit. See Appendix 2 for the Conservation Data Centre’s list of red and blue-listed plant communities in Clayoquot Sound.

The red-listed plant community is Sitka spruce/ Salmonberry Very Wet Maritime (CWHvm1/SS). Following advice from the Conservation

⁵ Report 5, p.169.

⁶ Report 5, p.200

Data Centre (CDC), the TPC reserves all red-listed plant communities occurring in structural stages 6 and 7 (mature and old forest). As a result, 82 ha of this site series has been reserved.

The two blue-listed plant communities found in the Upper Kennedy planning unit are:

- Western Redcedar - Sitka Spruce/Skunk Cabbage (CWHvm1/RC); and,
- Western Redcedar - Western Hemlock/Sword Fern (CWHvm1/RS).

The TPC was advised to reserve 50 percent of blue-listed plant communities occurring in structural stages 6 and 7. As a result, 81 ha of these communities were reserved.

The list of rare natural plant communities provided by the CDC includes three yellow-listed communities found in this WPU. Mountain Hemlock-Amabilis Fir/Blueberry (MHmm1/MB), Western Redcedar - Yellow-Cedar/Skunk Cabbage (CWHvm2/RC) and Amabilis Fir - Western Redcedar/Foamflower (CHWvm2/AF) are given an “apparently secure/vulnerable” ranking. In the Upper Kennedy watershed planning unit, MHmm1/MB is the second most common ecological unit, encompassing 2,569 ha or just over 12 percent of the total planning unit area. For this reason, the TPC decided it was not necessary to set aside more of this site series than was already reserved by other reserve layers. GIS analysis indicates approximately 63 percent of the MHmm1/MB overlaps with other reserves. With regard to CWHvm2/RC, almost all of this site series has been captured by other reserve layers. Almost 52 percent of the CWHvm2/AF occurs within the reserve network.

In total, approximately 163 ha (0.8 percent of the land base of the Upper Kennedy planning unit) that support red- or blue-listed plant communities have been identified within the reserve network. The locations of these various plant communities are shown on Map 10.

Individual rare plants will be reserved at the site level when identified.

Animal Species

The Upper Kennedy planning unit contains known nesting habitat for the Marbled Murrelet, a provincially red-listed bird. Maximum dawn murrelet counts recorded near the mouth of the upper Kennedy River range from 223 in 1996 to 540 in 1997.

47 percent of all Class 1 and 2 Marbled Murrelet habitat has been reserved.

For the Upper Kennedy watershed planning unit, Water, Land and Air Protection biologists (Leigh-Spencer, 2005) identified nine reserves to protect murrelet nesting habitat, totalling 1,159 ha or 5.7 percent of the planning unit. Approximately 684 ha of these reserves were already reserved for other reasons, accounting for 58.4 percent of the total murrelet reserve area. These reserves were established to capture important nesting habitat which had been confirmed during helicopter assessments. Additional important habitat is included in reserves for other purposes and in protected areas. In total, approximately 47 percent of all class 1 and 2 murrelet nesting habitat remaining in this planning unit has been protected in the various reserve layers and protected areas. The location of Marbled Murrelet reserves is shown on Map 11.

Other animals that are vulnerable or of particular management concern in Clayoquot Sound include Roosevelt Elk, Black Bear and Black-tailed Deer. For elk, a blue-listed species, the reserve network focuses on hydrosiparian zones, thereby capturing large valley bottom areas which provide high value winter habitat. Given that elk appear to be casual visitors to this planning unit, the amount and location of reserved areas, together with the suite of management strategies recommended by the Science Panel, are more than adequate. Should a small herd become re-established in this planning unit (as has happened in the past), there is sufficient habitat to protect an over-wintering population.

Suitable habitat for Black Bear is represented in reserves and protected areas throughout the planning unit. Specific reserves for this species have therefore not been established.

Three ungulate winter ranges (UWRs) have been identified in this planning unit for Black-tailed Deer, a regionally-important species. This plan proposes these be designated special management areas. More than 50 percent of the total area covered by the three UWRs overlies reserve layers; and, much of the remaining area overlaps special management areas established to address scenic objectives, or have been identified to be culturally significant by the Tla-o-qui-aht First Nations. As a result, better than half of these UWRs are located within no-harvest zones, and much of the remainder is subject to high levels of retention. In addition, a high percentage of the area adjacent to these UWRs falls within other reserve layers or other special management zones. In consideration of the above, the planning committee is confident that deer winter habitat values will be maintained by the special management area designation. This would require consultation with Ministry of Environment ungulate biologists for any activity proposed within these UWR boundaries. Outside these UWRs and outside the reserve network, various management strategies

– such as, high retention levels, rate-of-cut restrictions, and minimum old growth requirements – are expected to provide winter habitat and security cover at the stand level, plus contribute to increased forage production.

2.2.2 Reserves to protect forest-interior conditions in mature forests

The Scientific Panel recognizes the importance of maintaining sections of older forests, and of ensuring that these are large enough to maintain conditions similar to those in the interior of historic forests.

Currently, approximately 11,406 ha, or 65 percent of the forested land base of the Upper Kennedy planning unit, are covered by old growth forests over 141 years old. Sixty percent of this old growth (6,832 ha) is currently in forest-interior condition. The amount of old growth forest, and the amount of old interior forest, are currently well above the minimum amounts recommended by the Scientific Panel. Map 12 shows the current locations of old growth and interior old growth forests in the Upper Kennedy planning unit.

5,182 ha of old forest (30 percent of the total forested area) are located within provincial parks and within reserves proposed for other values (e.g. hydrioparian, terrain, soils, murrelets, etc.). Therefore, in order to satisfy the Scientific Panel recommendation for retention of 40 percent of the forested area as old growth, another 1,823 ha will have to be retained during harvesting operations.

Recommendation 7.16 of *Report 5* recommends that a minimum of 20 percent of the retained old forest should be reserved in forest-interior condition. The total forested land base for this planning unit is 17,511 hectares. Applying Scientific Panel recommendations, 7,004 ha (40 percent) must be retained as old growth; therefore, a minimum of 1,401 ha (20 percent) must be forest interior. At this time, 2,574 ha of the forested land base, is encompassed within the reserve network as forest-interior condition. Map 13 shows the location of the old and old-interior forest within the reserve network in the Upper Kennedy planning unit.

Approximately 2574 ha of the forested land base is in forest-interior condition and captured by the reserve network.

2.2.3 Reserves to represent all ecosystems

The Panel recommends that reserves to represent all ecosystems be added to the reserve network “as necessary, to ensure that the entire variety of ecosystems is represented in the reserve system to maintain plants, animals, and other organisms that have specific habitat

requirements.”⁷ Representation of all ecosystems is an essential component of biological diversity.

As shown in Table 2.1, two biogeoclimatic zones are represented within the Upper Kennedy planning unit: the Coastal Western Hemlock zone (CWH) and the Mountain Hemlock zone (MH). The CWH is represented by one subzone, which includes two variants: the CWHv1m - Submontane Very Wet Maritime; and, the CWHvm2 - Montane Very Wet Maritime. These variants occur below 800 metres. The Mountain Hemlock zone includes one variant, the MHmm1 (Moist Maritime, Windward); and one sub-variant, the MHmmp1 (Moist Maritime Parkland). These occur above 800 metres. Refer to Map 4 for the biogeoclimatic classification of this planning unit.

Table 2.1 Biogeoclimatic zones, subzones and variants occurring in the Upper Kennedy planning unit

Biogeoclimatic Zone	Subzone	Variant	Location	Total Area
Coastal Western Hemlock (CWH)	Very Wet Maritime (CWHvm)	Submontane (CWHvm1)	Below 600 metres.	9,494.7 ha
Coastal Western Hemlock (CWH)	Very Wet Maritime (CWHvm)	Montane (CWHvm2)	Between 600 metres & 800 metres.	4,422.4 ha
Mountain Hemlock (MH)	Moist Maritime (MHmm)	Windward (MHmm1)	Above 800 metres near the outer coast	5,684.6 ha
Mountain Hemlock (MH)	Moist Maritime (MHmm)	Parkland (MHmmp1)	Depending on location, begins between 1200 and 1250 metres.	989.2 ha
Total				20,591 ha.

52 different ecosystem types (site series) are found in the Upper Kennedy unit.

Fifty-two different naturally-vegetated ecosystem types (site series) occur in the Upper Kennedy planning unit: 20 different site series in the CHWvm1; 16 in the CHWvm2; 9 in the MHmm1; and 7 in MHmmp1. The most common forested ecosystems are Western Hemlock/Amabilis Fir - Blueberry (AB), Western Hemlock/Western Redcedar - Salal (HS), and Mountain Hemlock/Amabilis Fir - Blueberry (MB).

Many of the site series occurring in the Upper Kennedy planning unit are defined as rare; that is, they cover less than 2 percent of the planning unit or exhibit less than 6 occurrences. Table 2.2 presents an overview of the occurrence and extent of rare site series within the different variants.

⁷ Report 5, p. 171.

Table 2.2: Rare site series in the Upper Kennedy Planning Unit

Variant	Rare Natural Vegetated Site Series			
	#	Area (ha)	% of variant	% of PU
CWHvm1	16	1,373	14.5	6.7
CWHvm2	14	1,086	24.5	5.3
MHm1	7	478	8.4	2.3
MHmmp1	7	370	37.4	1.8
All	44	3,351	n/a	16.3

In total, rare site series cover approximately 3,351 ha, or 16.3 percent, of the planning unit.

Once the reserves for all other values were mapped, the planning committee determined the degree to which the existing reserve network achieved the recommended ecosystem representation targets. In the Upper Kennedy planning unit, 10 ecosystems were found to be underrepresented in the existing reserve network:

- CWHvm1: HD, HS, LC, LS, RS and YG; and,
- CWHvm2: HS, LC, LS and YG.

Ecosystem polygons in underrepresented units had to be added to the reserve network to satisfy representation requirements. All other ecosystem units were represented in the reserve network, in many cases well above the minimum thresholds.

Approximately 233 ha were added to the reserve network to ensure complete ecosystem representation. Map 14 shows the location of ecosystem units added to the reserve network.

2.2.4 Reserves to ensure linkages between watershed planning areas

The Scientific Panel recommends that watershed planning areas be linked in order “to allow migrations of animals, to provide connectivity among plant and animal populations, or to accommodate recreational opportunities.”⁸ While such linkages are primarily an objective of sub-regional plans, the Panel also acknowledges that this objective can only be realized after some watershed-level planning has taken place.

⁸ Report 5, p. 171

Reserves to ensure linkages among watersheds will be established once watershed-level plans are completed for adjacent watersheds.

Once watershed-level plans are completed for a number of adjacent watershed planning units in Clayoquot Sound, opportunities for linkage corridors will be evaluated. Where necessary, reserves that create linkages needed to support biodiversity or recreation objectives will be added to the reserve network.

2.3 Reserves to Protect Human Values

The Scientific Panel recognizes that “many aspects of the Clayoquot Sound environment are important to people – both First Nations and others – for cultural, spiritual, and scenic values, and for recreational and tourism use.”⁹ Accordingly, reserves to protect these values at the watershed planning level form part of the Panel’s overall framework for sustainable ecosystem management in Clayoquot Sound.

2.3.1 Culturally Important Areas to protect First Nations’ Values

Culturally important areas include sacred sites, historic areas and areas in current use.

The Scientific Panel stresses the importance of maintaining First Nations’ cultural values. An entire report is dedicated to an account of First Nations’ perspectives and recommendations on how to incorporate these perspectives in planning and management of land, water and resources in Clayoquot Sound. Culturally important areas include sacred sites, historic areas, and areas in current use. The Panel recommends that these areas be identified by the Nuuchahnulth First Nations and that they must be protected in ways that are consistent with traditional knowledge.

Tla-o-qui-aht First Nations Culturally Significant Areas

Note: The material in this section, including the text and Map 15, was prepared by the Tla-o-qui-aht First Nations.

Watershed Planning for Tla-o-qui-aht First Nations Cultural Values

The Tla-o-qui-aht First Nations (TFN) are the only First Nations with territory in the Upper Kennedy Watershed Planning Unit. The entire area encompassed by this planning unit lies within their traditional territories.

The TFN are members of the Clayoquot Sound Technical Planning Committee (TPC) - which is responsible for watershed level planning in Clayoquot Sound. The TFN are solely responsible for First Nations cultural input with regard to watershed plan areas overlapping with TFN territory. The following Scientific Panel recommendations guide

⁹ Report 5, p. 37

the Tla-o-qui-aht First Nations and the Technical Planning Committee with respect to First Nations cultural input into the watershed plans:

In Report 3 (Scientific Panel, 1995), Recommendation 10 states: "Before the completion of any ecosystem planning process in Clayoquot Sound, the Nuu-Chah-Nulth of the area within which the planning is undertaken must be given the opportunity to identify, locate, and evaluate culturally important sites and areas." And, Recommendation 15 states: "Planning inventories undertaken in Clayoquot Sound for ecosystem management must be done in full consultation with and full participation of the Nuu-Chah-Nulth of Clayoquot Sound. Nuu-Chah-Nulth cultural resources and culturally important areas must be incorporated in planning inventories before completion of the planning process."

Report 5 (Scientific Panel, 1995), Recommendation 7.16 states:

At the watershed level, map and designate reserves in which no harvesting will occur to protect key hydrosiparian ecosystems, unstable slopes and sensitive soils, red- and blue-listed species, late successional forest with forest-interior conditions, important cultural values, and areas with high scenic and recreational resources."

Under direction from Chief and Council, TFN staff initiated a consultative process within their communities to identify, inventory and evaluate areas of cultural importance within their territories. Before beginning, it was necessary for the TFN to develop interview and consultation methodologies and protocol to allow for the collection of cultural information while respecting that some of this information was confidential or sensitive. Once acceptable protocol was endorsed by the TFN Chief and Council, staff proceeded to collect information from community members through a series of interviews, meetings, and workshops.

After TFN staff identified and inventoried areas of cultural importance for each planning unit, it became necessary to determine how to inform the watershed planning process while respecting the sensitivity of cultural values. Chief and Council provided this guidance. They decided the TFN could provide consultation advice to individual watershed plans without releasing sensitive information - by showing areas of cultural importance on watershed maps, accompanied by explanatory text.

Cultural information has been passed on by TFN Elders to the present *Hawiih* (Hereditary Chiefs) and other community members. The Elders share their knowledge and, through their teachings, confirm *Hahouthlee*, the hereditary chief's responsibility for community, land and resources within their territories.

All information compiled during this project is considered to be confidential, and is stored in the TFN community. It is available to Chief and Council and, at their discretion, to TFN members involved in review of resource management proposals. It is anticipated that this information will facilitate TFN response during future consultations and reviews.

The TFN determined it was not necessary to locate areas of cultural importance within no-harvest reserves, as had been envisioned by the Scientific Panel. Instead, the TFN chose to identify areas according to their significance, and then develop consultation protocol according to the cultural values associated with different classifications.

Map 15 shows the TFN culturally sensitive areas in this watershed planning unit. Also, if not otherwise indicated, all creeks and streams shown on this map are considered to have high cultural significance and require a buffer equivalent to the Scientific Panel hydriprarian reserve width plus an additional 30%. It is extremely important to provide protection for water resources within TFN territory because the Tla-o-qui-aht recognize water is critical to life.

Some road corridors are recognized by the TFN as important routes providing access to areas of cultural importance.

All activities proposed within Tla-o-qui-aht territory require consultation to ensure that TFN values and interests are not impacted. The level of consultation and the outcome will differ depending on the cultural significance of the area. For activities proposed in areas not shown to be culturally significant, the TFN expect the review period would be shorter and the TFN response would not request many changes or modifications. However, if a proposed activity is located in a culturally-significant area, depending on the location of the proposed activity, the TFN response would take more time and would likely request modifications or restrictions.

To achieve effective consultation for activities proposed within their territories, the TFN recommend that interested parties or proponents provide Chief and Council with as much information as possible, and as early as possible in the process. Submissions should include descriptions of the activity proposed, maps showing accurate locations of areas involved, and other pertinent details, including but not limited to: timing, access considerations, species affected. The length of time allotted for review must be sufficient to allow the TFN to learn about the proposed activity, consult with Elders and other community members, and consider outstanding information needs. The TFN may

request assistance if they anticipate their participation requires extra resources.

The Tla-o-qui-aht First Nations consider all the information provided by the accompanying map and the above text to be part of a dynamic planning process; that is, they are expected to be adaptive and to change and evolve in response to new knowledge and experiences.

Approximately 9,174 ha, or 45 percent of the planning unit, has been identified by the Tla-o-qui-aht First Nations to be of cultural significance. Sixty-four percent of this area overlaps with the watershed reserve network. Map 15 shows the locations of TFN culturally significant areas.

2.3.2 Protection of scenic values

Landscape appearance is important both for aesthetic reasons and as an indicator of the health of the forest.

The Scientific Panel acknowledges that “landscape appearance is important to Nuu-chah-nulth, other residents, and visitors to Clayoquot Sound, both for aesthetic reasons and as a potential indicator of the health of the forest resource.”¹⁰ Accordingly, the Panel identified the protection of scenic values as one component of the ecosystem management theme of maintaining human values.

In the Upper Kennedy planning unit, the scenic class objectives that have been assigned include scenic class 1 (small-scale alteration); scenic class 2 (minimal alteration); and scenic class 3 (natural-appearing). These scenic classes have been applied to ensure that areas of especially high scenic value receive the greatest level of protection. In addition to assigning visually sensitive areas to the above scenic class objectives, many unaltered areas with the highest visual values are located within parks or placed within reserves identified for other resource values, and are thus provided the highest level of protection.

Scenic values are protected by management standards rather than through reserves.

As noted above, while reserves have not been established specifically for scenic values, many areas with identified scenic values have been preserved within existing parks and reserves for other values. Scenic values that are located within the harvestable areas in the Upper Kennedy planning unit are maintained through management criteria designed to achieve scenic class objectives and standards (see Volume 1 for these management criteria).

Table 2.3 presents the breakdown of area within each scenic class in the visible portion of the Upper Kennedy planning unit, both within reserves and within the harvestable area.

¹⁰ Report 5, p. 40

Table 2.3 Upper Kennedy - scenic classes by area

Scenic Class	Reserves	Harvestable Area	Total* Ha
Natural - Appearing	821	516	1,345
Minimal Alteration	2,444	2,835	5,436
Small-Scale Alteration	459	726	1,203
TOTAL	3,724	4,077	7,984

*: Total Ha may include scenic class areas that are not located in reserves or harvestable areas

Areas comprising 39 percent of the Upper Kennedy unit have been assigned scenic class objectives.

In total, 7,984 ha, or 39 percent of the planning unit, have been assigned scenic class objectives. Of these, 3,724 ha (almost 47 percent) are located within parks and reserves.

The portion of scenic area in Upper Kennedy that is located within the harvestable area will be managed in accordance with the assigned scenic class objective. Timber harvesting and road building operations within these scenic areas will be guided by the management criteria presented in Volume 1.

The remaining landscape is not classified because it is largely not visible from communities, recreation sites, and travel corridors. Any future development in these non-visible areas will take place according to Scientific Panel recommendations. In the case of future timber harvesting, variable retention silvicultural systems will be employed in all areas, visible and non-visible.

Map 16 shows the location of the various scenic class objectives in the Upper Kennedy planning unit.

2.3.3 Reserves to protect recreation and tourism values

Protection of areas with significant recreation and tourism values at the watershed level forms part of the Scientific Panel's strategy to maintain the human values associated with the Clayoquot Sound ecosystem.

Clayoquot Plateau Provincial Park, at 3,156 ha, was established to protect one of the best examples of a "self-contained coastal karst ecosystem in a completely undisturbed condition¹¹." MWLAP determined this "area is superior to other karst areas for its diversity of landforms, geological and vegetation features." In addition, the park was established to protect First Nations prehistoric use sites, and to provide wilderness recreation opportunities. 63 percent of this park lies

¹¹ Ministry of Water, Land and Air Protection (2003), *Clayoquot Plateau Provincial Park Purpose Statement and Zoning Plan*. The Environmental Stewardship Division, Victoria BC. Sept. 2003

within the Upper Kennedy planning unit boundaries, encompassing almost 10 percent of the planning unit.

Important recreation and tourism features outside the provincial park include the large number of scenic formal and informal off-highway rest stops along Highway 4. These provide views of, and access to, numerous pools, cascades, falls, gorges, small lakes and forested areas on the Kennedy River and its tributaries. Logging roads provide further access to similar features and hiking trails, such as the Clayoquot Valley Witness Trail. The Witness Trail, constructed in 1993, originates in the Kennedy Lake planning unit near Snag Lake and crosses into the Clayoquot River planning unit near Solstice Lake. From there, it follows the Clayoquot River for approximately 10 kilometres before turning to follow Delessio Creek up and out of that planning unit. The trail returns to the Upper Kennedy planning area in the Olympic Creek headwaters, following the creek to the valley bottom. In addition to wilderness hiking and camping, sport fishing is popular in this watershed. Some lakes have been stocked with Rainbow Trout fry.

In addition to the areas that fall within the scenic classes and within reserves for other purposes, such as hydriparian reserves, approximately 133 ha containing features of high to very high recreation significance have been reserved. These areas are located primarily around lakes. This represents 0.7 percent of the total land base of the Upper Kennedy planning unit. This reserve layer has considerable overlap with the hydriparian reserve layer.

2.4 Summary: The Upper Kennedy Watershed Reserve Network

The watershed reserves identified for the Upper Kennedy unit are a cornerstone of the Scientific Panel's framework for sustainable ecosystem management. They are designed to maintain watershed integrity, key components of biological diversity, First Nations' cultural values, and scenic and recreational values and opportunities.

As described in Volume 1, six of the nine different reserve types identified for the Upper Kennedy planning unit are reserves in a strict sense; that is, forest harvesting is prohibited under normal circumstances (exceptions to this prohibition are described in Section 2.5 of Volume 1).

These strict reserves include those established to protect watershed integrity and biological diversity:

- hydriparian reserves

- reserves for unstable terrain and sensitive soils
- reserves for red and blue-listed species
- reserves to protect forest-interior conditions in late successional forest
- reserves to represent all ecosystems
- reserves to ensure linkages among watershed-level planning areas.

Reserves to protect human values are better characterized as special management zones.

In contrast, many of the areas identified to protect human values – culturally important areas, scenic areas and recreational or tourism values – are included within reserves or special management zones. Most areas associated with these values are not excluded from harvesting; however, certain conditions and requirements must be met before harvesting may proceed. Volume 1, Section 3 describes management criteria for special management zones.

A total of 53 percent of the Upper Kennedy planning unit has been reserved.

Map 18 shows all the reserves in the Upper Kennedy planning unit. A total of 10,829 ha or 53 percent of the planning unit have been reserved. Many of the different reserves overlap and reserve totals and percentages are thus not cumulative. In other words, a given reserve location may be designated for a number of different reasons, and serve a multitude of conservation objectives.

3.0 Sustainable Ecosystem Management in the Upper Kennedy Watershed Planning Unit

3.1 Management Criteria for Special Management Zones

The areas in the Upper Kennedy planning unit that are identified to protect human values – that is, First Nations’ culturally important areas and areas identified for their scenic, recreational and tourism values -- are better characterized as special management zones, rather than strict reserves. These special management zones are generally accessible for forest harvesting, subject to certain limits and conditions designed to preserve the areas’ sensitivities. Only areas of highest significance within these special management zones are excluded from harvesting.

The Scientific Panel also refers to special management zones in the context of hydroriparian reserves, specifically in R7.30 and 7.31 relating to lakes.

This section describes the special conditions, considerations and procedures that apply in each special management zone type.

Culturally Important Areas

Approximately 45 percent of the Upper Kennedy planning unit has been identified by the Tla-o-qui-aht First Nations as being culturally significant. Consistent with traditional knowledge, culturally important areas are not designated as “reserves”. Rather, the designation “culturally significant” indicates that a more stringent Tla-o-qui-aht consultation process must be engaged in order to initiate development proposals (please refer to section 2.3.1 of this volume). Based on the cultural significance and sensitivity of the area in question, the consultation process will determine the compatibility of the development proposal with First Nations rights and interests. The process will also identify whether special conditions, considerations and procedures need to be met and followed should the development proceed.

Scenic Areas

Lands representing approximately 39 percent of the planning unit have been classed as scenic areas. Forty-seven percent of these areas are located within parks or reserves for other values, and are therefore excluded from timber harvesting operations. Most of the balance is located within the harvestable area. While this area is available for

timber harvesting, management activities will be guided by standards and criteria designed to ensure that the applicable scenic class objectives are achieved.

Volume 1 describes the management standards that apply for each scenic class objective in this watershed planning unit. As proposed by the Scientific Panel, the standards are descriptive and qualitative in nature, avoiding quantification of levels of alteration and green-up.

To ensure that the applicable scenic class objectives are achieved, visual landscape design principles will be applied in the development of harvesting proposals. In accordance with Scientific Panel recommendation R6.6, visual impact assessments will be conducted prior to commencement of harvesting operations on all of the most important scenic areas (this includes, at a minimum, all areas within the 'natural appearing' scenic class objective).

For a breakdown of scenic class objectives by area for this planning unit, please refer to section 2.3.2. Map 19 shows the location of scenic areas in relation to the reserve network and the harvestable area.

Recreation and Tourism

Marine and lake shores, as well as special features such as significant trails and waterfalls, are protected by reserve buffers of varying widths. Management zones adjacent to these reserves serve to maintain the integrity of the buffers. In the Upper Kennedy planning unit, the management zones for recreation and tourism amount to 464 hectares. Of this, 308 ha (67 percent) overlaps with the reserve layer and 157 ha (33 percent) occurs within the harvestable areas. Please refer to Volume 1 for a description of reserve and management zones.

Forest practices and the application of the retention system in the management zones need to be designed to ensure the integrity of recreation and tourism values encompassed in the reserves. Many (if not most) recreation and tourism features, settings and opportunities are valued for the visual enjoyment and experience they provide. For this reason, the visual impact of any forest practices must be managed and should remain minor within recreation and tourism management zones. This may be achieved by following the management standards described in Volume 1.

Lakes

The panel recommends that a special management zone be designated around all lakes, adjacent to the hydric riparian reserve zone. This

special management zone is to extend 20 m beyond the reserve zone, or up to the edge of the hydroriparian influence, whichever is greater.

The panel states that the special management zone around lakes may be subject to retention systems of harvest provided it is outside the hydroriparian reserve proper. The management zone will function as a buffer to protect the integrity of the reserve zone next to the lakeshore.

3.2 Management Criteria for Sensitive Sites

Over the years, the TPC consulted a number of experts for assistance with watershed level planning. These experts recognized the limitations inherent in the scale and intensity of watershed-level mapping. Accordingly, some provided recommendations regarding site-level measures that should be undertaken to ensure that sensitive sites are afforded adequate protection prior to and during operational management activities. Site level recommendations address a variety of sensitive sites and features, including terrain, soils and wildlife habitat.

Terrain and Soils

A team of soils and terrain specialists provided advice to the TPC on unstable terrain and sensitive soil reserves. This team described instances where terrain or ecosystem mapping does not provide sufficiently detailed information to determine whether a terrain or sensitive soils reserve is needed, or where specifically the reserve should be. The team recommends that, in such instances, the resource management decisions be based on site level assessments. See Table 3.2 in Volume 1 for the terrain types or features that should be field assessed, including any site-level management recommendations referenced in the consultation report.

Plants and Wildlife

The Scientific Panel provided recommendations for the protection of sensitive plant and animal species through the designation of reserves at the watershed level, and this watershed plan describes the area and locations of reserves. The Scientific Panel was mindful, however, that for many species, protection could often be better implemented at the site level. Consequently, the Panel recommended that more refined information be collected at the site level about plant and animal species considered to be at risk by human activity. The Panel described the biodiversity objective at the site level as confirming the presence or absence of species or habitats that will affect operational management of the site.

Three ungulate winter ranges (UWRs) have been identified in this WPU for Black-tailed Deer, a regionally-important species. The Technical Planning Committee proposes these become special management areas, to be managed to protect deer winter habitat values. At present, more than 50 percent of the total area covered by these UWRs is protected by various reserve layers, and much of the remainder falls within areas managed for First Nations culture values and scenic class objectives. In addition, a very high percentage of the forest adjacent to these UWRs lies within reserves and special management areas. The TPC is confident that these three UWRs can be managed to protect critical winter habitat if designated special management areas. This requires proponents consult with Ministry of Environment ungulate biologists prior to proposing activities within the UWR boundaries. For the remainder of the planning unit, various stand level strategies - such as, rate-of-cut restrictions, high retention levels, and minimum old growth requirements - are expected to maintain areas which provide adequate winter habitat and security cover, and ensure sufficient forage is maintained.

In addition to the Scientific Panel recommendations pertaining to site-level information and management requirements for species at risk, further information on accommodating such species at both the watershed and site level can be found in the 2003 TPC report entitled *Clayoquot Sound Watershed Level Planning - Wildlife Habitat Overview*.

3.3 Silviculture, Harvesting and Transportation Systems

The Scientific Panel sets out guidelines for a new silviculture system known as the Variable Retention Silviculture System (VRSS). This system is used in all forestry activities in Clayoquot Sound. The Scientific Panel recommendations also provide guidance to forestry operators with respect to harvesting and transportation systems. For details of these recommendations and their application to ecosystem management in this watershed planning unit, please see Volume 1, Sections 3.2, 3.3 and 3.4.

3.4 Rate-of-cut

Rate-of-cut limits protect hydrological integrity. The calculation of rate-of-cut will occur at the site level of planning.

For the purposes of this watershed plan, the Panel's recommendations with respect to rate-of-cut are interpreted as limits imposed on forest development operations in order to protect the hydrological integrity of watersheds. Limits to the rate-of-cut apply to individual watersheds within the Upper Kennedy planning unit. Table 3.1 identifies the individual watersheds within this planning unit and sets out the rate-

of-cut limits assigned in accordance with the Scientific Panel recommendation R3.1.

Volume 1 describes the methodology used to assign rate-of-cut limits in Clayoquot Sound. Map 21 shows the individual watersheds for this planning unit.

Table 3.1: Rate-of-Cut Limits for Upper Kennedy Planning Unit

Watershed or Map Unit	WS ID	Type	Area (ha) ¹²	Does Rate-of-cut Rule Apply?	5 Year Cut (ha)	10 Year Cut (ha)
4.12 Total		Secondary Watershed, >500 ha	20,350	Yes	1,017.5	-
4.12	962	Secondary – residual area	8,273	No	-	-
4.12.1	1330	Tertiary Watershed, <=500 ha	468	No	-	-
4.12.2	1284	Tertiary Watershed, >500 ha	607	Yes	30.3	-
4.12.3 Total		Tertiary Watershed, >500 ha	889	Yes	44.4	-
4.12.3	1270	Tertiary – residual area	2	No	-	-
4.12.3.1	1236	Quaternary Watershed, >500 ha	567	Yes	28.4	-
4.12.3.2	1199	Quaternary Watershed, <=500 ha	320	No	-	-
4.12.4	1238	Tertiary Watershed, >500 ha	1,350	Yes	67.5	-
4.12.5	1182	Tertiary Watershed, <=500 ha	318	No	-	-
4.12.6 Total		Tertiary Watershed, >500 ha	2,611	Yes	130.5	-
4.12.6	1140	Tertiary – residual area	1,493	No	-	-
4.12.6.1	1120	Quaternary Watershed, >500 ha	693	Yes	34.7	-
4.12.6.2	1166	Quaternary Watershed, <=500 ha	425	No	-	-
4.12.7 Total		Tertiary Watershed, >500 ha	2,264	Yes	113.2	-
4.12.7	1100	Tertiary – residual area	679	No	-	-
4.12.7.1	1085	Quaternary Watershed, >500 ha	1,005	Yes	50.3	-
4.12.7.2	1127	Quaternary Watershed, >500 ha	579	Yes	29.0	-
4.12.8	1067	Tertiary Watershed, <=500 ha	309	No	-	-
4.12.9	946	Tertiary Watershed, >500 ha	600	Yes	30.0	-
4.12.10	1041	Tertiary Watershed, <=500 ha	215	No	-	-
4.12.11 Total		Tertiary Watershed, >500 ha	2,445	Yes	122.3	-
4.12.11	892	Tertiary – residual area	1,671	No	-	-
4.12.11.1	869	Quaternary Watershed, <=500 ha	373	No	-	-
4.12.11.2	889	Quaternary Watershed, <=500 ha	401	No	-	-

¹² Area (ha) identifies the area of individual watersheds exclusive of waterbodies, rivers and large creeks.

The Ministry of Forests and Range will verify that forest development plans are consistent with rate-of-cut limits.

It is the forest tenure holder's responsibility to ensure that the amount of development proposed within a given watershed is consistent with the rate-of-cut that applies for that particular watershed. The Ministry of Forests and Range will verify that forest development proposed by licence holders is consistent with applicable rate-of-cut limits.

As described above, rate-of-cut will be determined at the site level in accordance with watershed-level objectives. Rate-of-cut will also be calculated at the management unit level; that is, rate-of-cut limits will be considered along with other factors in the Chief Forester's determination of the AAC for a given tree farm licence or other management unit (or portion thereof) within Clayoquot Sound.

3.5 Restoration

While most Scientific Panel recommendations focus on the implementation of new planning approaches and new forest practices to maintain ecosystem integrity, the Panel also recognizes that past practices have led to some environmental damage and degradation. Recommendation R3.12 calls for the development of restoration plans where forest values have been degraded, with an initial focus on hydriparian areas and large clearcuts.

Weyerhaeuser Limited reported that it coordinated deactivation for 52.9 kilometres of logging roads in the Upper Kennedy planning unit: 37.3 kilometres were permanently deactivated, and 15.6 kilometres were semi-permanently deactivated¹³. Weyerhaeuser also completed restoration on 73 hectares within riparian areas. Warttig¹⁴ reported International Forest Products (Interfor) completed 450m of stream restoration on Tributary #18, between Canoe Creek and Kerr Creek, in 1993; and, the Ministry of Transportation completed restoration on 50m of Kerr Creek in 2004. Johannes¹⁵ reported that since 1996, the Tla-o-qui-aht First Nations and the Northwest Ecosystem Institute have worked with several partners, including forest licensees and government agencies, to complete 11 kilometres of road deactivation, 8.5km of side channel and main channel in-stream fisheries habitat restoration, and 10 ha of riparian habitat restoration.

¹³ McLennan Shawn. 2005. Pers. Comm. (Jan 10/2005 E:mail. Subject: RE: Restoration summary) ; and, MacDonald, Rick. 2005. Pers. Comm.(Jan 10/2005 E:mail. Subject: RE: Restoration summary)

¹⁴ Warttig, Warren, 2004. Pers. Comm.(Dec 9, 2004 E-mail. Subject: RE: Restoration summary).

¹⁵ Johannes, Mark. 2004. Pers. Comm.(Dec 13, 2004 E-mail: Subject: Re: Restoration summary).

3.6 Summary: Harvestable Area in the Upper Kennedy Planning Unit

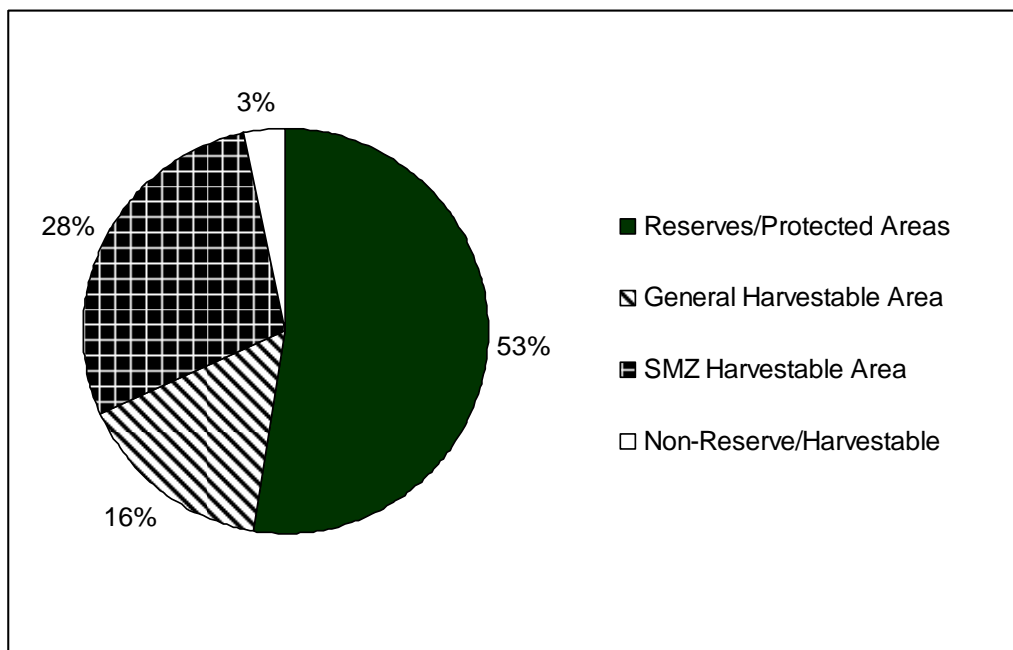
The harvestable area is the area that lies outside designated reserves. Forest harvesting can take place within the harvestable area as long as it is undertaken in a manner consistent with the Scientific Panel recommendations relating to operations, the *Forest Practices Code of British Columbia Act*, the *Forest and Range Practices Act* and the special management considerations described in Volume 1.

Approximately 52 percent of the forested land base in the Upper Kennedy watershed planning unit is designated harvestable area.

Approximately 9,049 ha, or 52 percent, of the forested land base in the Upper Kennedy watershed planning unit have been designated as harvestable area. The remainder is in reserves.

Special Management Zones comprise approximately 5,832 ha or 64 percent of the harvestable area. Map 20 shows the location of the harvestable area, including Special Management Zones, as well as the reserve network. Figure 3.1 shows the proportion of designated reserves, Special Management Zones and general harvestable area (i.e., without special management zone designation) in the Upper Kennedy planning unit.

Figure 3.1 Reserves and Harvestable Area in the Upper Kennedy Planning Unit



Appendix 1: Clayoquot Sound Technical Planning Committee

Membership on the Technical Planning Committee changed during the period it took to complete *Watershed Planning in Clayoquot Sound, Volumes 1 to 9*. The following list includes membership throughout this period:

Nelson Keitlah, First Nations Co-chair, Nuuchah-Nulth Tribal Council
Central Region Chiefs

Rudi Mayser, Provincial Co-chair, Integrated Land Management
Bureau, Ministry of Agriculture and Lands

Jackie Godfrey, First Nations Co-chair Alternate, Central Region Chiefs
Executive

Matthew Lucas, former Representative for Hesquiaht First Nation

Guy Louie, Representative for Ahousaht First Nation

Thomas Martin, Representative for Tla-o-qui-aht First Nations

Simon Tom, former Representative for Tla-o-qui-aht First Nations

Brian Retzer, Provincial Co-chair Alternate, ILMB, MAL

Mike Amrhein, former Clayoquot Sound Central Region Board Liaison

Dean Fenn, Ministry of Forests Liaison

Peter Verschoor, former Central Region Chiefs Strategic Planning
Forester

Marylin Touchie, Representative for Ucluelet First Nation

Colleen Charleson, Representative for Hesquiaht First Nation

Patricia McKim, Clayoquot Sound Central Region Board Liaison

Associates:

Dan Sirk, Land Information Coordinator, ILMB, MAL

Doug Fetherston, GIS Analyst, ILMB, MAL

Anette Thingsted, Planning Officer, ILMB, MAL

Lindsay Jones, Manager Representative, ILMB, MAL

Appendix 2: Red- and Blue-listed Plant Communities in Clayoquot Sound

Rare Plant Communities	Rank	Associated Ecosystem Units		
		BEC unit	Site Series	
Red-Listed			Number	Symbol
<i>Picea sitchensis</i> / <i>Maianthemum dilatatum</i> (Sitka spruce / false lily-of-the valley)	S2	CWHvh1	08	SL
<i>Picea sitchensis</i> / <i>Rubus spectabilis</i> (Sitka spruce / salmonberry)	S2	CWHvm1	09	SS
[<i>Anaphalis margaritacea</i> – <i>Aster foliaceus</i> (pearly everlasting - leafy aster)	S2	MHm1	00	n/a]
[<i>Carex macrocephala</i> (large headed sedge) herbaceous community	S1S2	CWHvh1	00	n/a]
[<i>Phlox diffusa</i> - <i>Selaginella wallacei</i> (spreading phlox - Wallace's selaginella club moss)	S2	MHm1	00	n/a]
[<i>Picea sitchensis</i> / <i>Trisetum canescens</i> (Sitka spruce / tall trisetum grass)	S2	CWHvh1	09	ST]
Blue-Listed				
<i>Alnus rubra</i> / <i>Maianthemum dilatatum</i> (red alder / false lily-of-the valley)	S3	CWHvh1	10	AL
<i>Picea sitchensis</i> / <i>Eurhynchium oregonum</i> (formerly <i>Kindbergia oregana</i>) (Sitka spruce / Oregon beaked-moss)	S3	CWHvh1	15	SK
<i>Picea sitchensis</i> / <i>Polystichum munitum</i> (Sitka spruce / sword fern)	S3	CWHvh1	17	SW
<i>Thuja plicata</i> / <i>Picea sitchensis</i> - <i>Lysichiton americanus</i> (western redcedar - Sitka spruce / skunk cabbage)	S3	CWHvh1	13	RC
<i>Thuja plicata</i> / <i>Picea sitchensis</i> - <i>Lysichiton americanus</i> (western redcedar - Sitka spruce / skunk cabbage)	S3	CWHvm1	14	RC
<i>Thuja plicata</i> - <i>Picea sitchensis</i> / <i>Polystichum munitum</i> (western redcedar - Sitka spruce / sword fern)	S2S3	CWHvh1	05	RF
<i>Thuja plicata</i> - <i>Tsuga heterophylla</i> / <i>Polystichum munitum</i> (western redcedar - western hemlock / sword fern)	S3?	CWHvm1	04	RS
<i>Thuja plicata</i> - <i>Tsuga heterophylla</i> / <i>Polystichum munitum</i> (western redcedar - western hemlock / sword fern)	S3?	CWHvm2	04	RS
[<i>Abies amabilis</i> - <i>Picea sitchensis</i> / <i>Oplopanax horridus</i> (amabilis (silver) fir - Sitka spruce / devil's club)	S3	CWHvm1	08	AD]
[<i>Abies amabilis</i> - <i>Picea sitchensis</i> / <i>Oplopanax horridus</i> (amabilis (silver) fir - Sitka spruce / devil's club)	S3	CWHvm2	08	AD]
[<i>Picea sitchensis</i> / <i>Calamagrostis nutkaensis</i> (Sitka spruce / Nootka reedgrass)	S3	CWHvh1	16	SR]
[<i>Picea sitchensis</i> / <i>Carex obnupta</i> (Sitka spruce / slough sedge)	S3	CWHvh1	18	SE]
[<i>Picea sitchensis</i> / <i>Malus fusca</i> (Sitka spruce / Pacific crab apple)	S3	CWHvh1	19	SC?]
[<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> / <i>Cornus stolonifera</i> (black cottonwood / red-osier dogwood)	S3	CWHvm1	10	CD]
[<i>Tsuga heterophylla</i> – <i>Picea sitchensis</i> / <i>Rhytidiadelphus loreus</i> (western hemlock - Sitka spruce / lanky moss)	S3	CWHvh1	04	HM]
Yellow-Listed				
<i>Abies amabilis</i> - <i>Thuja plicata</i> / <i>Tiarella trifoliata</i> (amabilis (silver) fir - western redcedar / foamflower)	S3S4	CWHvm2	05	AF
<i>Thuja plicata</i> – <i>Chamaecyparis nootkatensis</i> / <i>Lysichiton americanus</i> (western redcedar - yellow-cedar / skunk cabbage)	S3S4	CWHvm2	11	RC
<i>Tsuga mertensiana</i> – <i>Abies amabilis</i> / <i>Vaccinium alaskaense</i> (mountain hemlock - amabilis (silver) fir / Alaskan blueberry)	S3S4	MHm1	01	MB

*Source: BC Conservation Data Centre (CDC), November, 2004

Note: Communities found in the Upper Kennedy watershed planning unit are shown above in grey shading.

Notes on ranking system:

S1 - Critically Imperiled because of extreme rarity in the province, or because of some factor(s) making it especially vulnerable to extirpation from the province. Typically, there will be 5 or fewer occurrences or very few remaining individuals (<1,000).

S2 - Imperiled because of rarity (typically 6-20 extant occurrences or few remaining individuals) or because of some factor(s) making it vulnerable to extirpation or extinction.

S2S3 is used to indicate uncertainty about the exact status of a taxon; may fall within S2 or S3 rankings.

S3 - Vulnerable provincially either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction.

S4 - Apparently Secure is uncommon but not rare, and usually widespread in the nation or province; possible cause of long-term concern; usually more than 100 occurrences and more than 10,000 individuals.

[] - Denotes communities which are not classified as distinct ecosystem units in the TEM data base which supports sub-regional and watershed level planning; these communities may, however, be encountered at the site level of planning.

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