

A HIGH CONSERVATION VALUE FOREST ASSESSMENT
FOR IISAAK FOREST RESOURCES: MEETING
PRINCIPLE 9 OF THE FOREST STEWARDSHIP
COUNCIL STANDARDS

FINAL REPORT
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Submitted to:
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EXECUTIVE SUMMARY

BACKGROUND

Principle 9 of the Forest Stewardship Council (FSC) standards states that “management activities in High Conservation Value Forests (HCVF) shall maintain or enhance the attributes which define such forests”. FSC certification requires an assessment of whether such forests exist within the management unit. This report details the results of such an assessment for the forest management unit held by Iisaak Forest Resources in Clayoquot Sound (CS).

This Executive Summary is intended to highlight our key findings regarding the assessment, including comments on precautionary management and consultation. [For a more detailed discussion see the Summary and Conclusions in the main body of the report.](#)

STUDY AREA

Clayoquot Sound is an area on the west side of Vancouver Island that has been treated as a single planning unit resulting from the Clayoquot Sound Land Use Decision in 1993. The Clayoquot Sound Scientific Panel (CSSP) recommendations apply to the entire area, and have been implemented in part, through watershed planning for the entire area. Although our analysis is limited to the tenure of Iisaak Forest Resources, much of our discussion relates to the whole of Clayoquot Sound because Iisaak’s management planning repeatedly states that it will implement the CSSP recommendations and subsequent watershed planning recommendations, both of which apply to the whole CS area.

KEY FINDINGS

ASSESSMENT OF HCVFS

Table 1 identifies the major findings regarding the assessment of HCVFs in CS, and provides a general overview of their distribution and area extent.

- Clayoquot Sound contains a large number and diversity of HCVFs that span large areas and exist across the geographic extent of the Sound. HCVFs are identified in all of the six categories and for at least 12 different values.
- Due to the extensive number and distribution of those values, and the interconnectedness of many ecological and cultural values, we conclude that the whole of Clayoquot Sound should be classified as a High Conservation Value Forest.

Table 1. Summary of High Conservation Value Forests², and their distribution in each of the six categories outlined by Principle 9, FSC.

Category ³	Value	Extent / Distribution
1: ...significant concentrations of biodiversity values ...		
Qn. 1	▪ 13 rare and endangered species	Extensive distribution Extensive area
Qn. 3	▪ concentrations of salmon and marine birds	Throughout CS
Qn. 6	▪ Clayoquot Biosphere reserve + federal + provincial protected areas	Throughout CS
2: large landscape level forests, where viable populations of most naturally occurring species exist ...		

² For full definitions of HCVF categories click [here](#).

³ Determinations are based on the questions outlined in the FSC standards (Page 99)

Category ³	Value	Extent / Distribution
Qn. 7	<ul style="list-style-type: none"> Intact areas, combined with Strathcona Park meet the criteria outlined. 	Localised, but distributed across CS. Extensive area
3: forest areas that are in or contain rare, threatened or endangered ecosystems		
Qn 8.	<ul style="list-style-type: none"> Rare and threatened ecosystems are present (both naturally rare and anthropogenically rare) 	Extensive distribution Limited area
Qn.9	<ul style="list-style-type: none"> In areas with historic harvest, old growth ecosystems meet the criteria for ecosystems in decline. 	Relatively limited distribution Moderate area
Qn.10	<ul style="list-style-type: none"> Representation of CWHvm1 and CWHvm2 in Protected Areas 	Extensive distribution Extensive area
Qn. 11	<ul style="list-style-type: none"> Remnant forest fragments (those relatively intact areas not adjacent to the larger landscape level forest of Strathcona park). Dealt with under Qn.7 	Relatively limited distribution Moderate area
Qn. 12	<ul style="list-style-type: none"> Unique ecosystems (e.g. karst) present 	Very limited area
4. basic services of nature in critical situations		
Qn.13	<ul style="list-style-type: none"> Domestic watersheds and other water sources 	Limited distribution Limited area
Qn.15	<ul style="list-style-type: none"> Erosion control – to protect critical aquatic habitat 	Extensive distribution Moderate area
5. fundamental to meeting basic needs of local communities		
Qn. 17	<ul style="list-style-type: none"> First Nations subsistence use (discussed in conjunction with Category 6); limited use by non-First Nations as well, but not likely "fundamental" to meeting basic needs 	Extensive distribution Extensive area
6. forests critical to local communities' traditional cultural identity		
Qn. 18	<ul style="list-style-type: none"> First Nations cultural identity 	Entire CS, with specified areas Id'd.
Qn. 18	<ul style="list-style-type: none"> Non FN spiritual values? 	Entire CS, particularly intact areas.

PRECAUTIONARY MANAGEMENT

FSC requires that management within HCVFs is precautionary and maintains the conservation attributes that define the particular HCVF types. The management approaches outlined by the CSSP, and to the extent that they are reflected in the Watershed Plans and Lisaak's management strategies, have been assessed for each value to determine the extent to which they may, or may not, maintain the values identified in a precautionary manner.

The CSSP recommendations were developed using a precautionary approach in recognition of the significant ecological values present in Clayoquot (CSSP Report #5, Executive Summary, pg. xi). We have therefore assumed that if the CSSP recommendations are fully implemented on Lisaak's tenure, this will generally satisfy the need for precautionary management of HCVFs. However, there still remain some concerns regarding some details of implementation, specific management measures for selected values, and concern over values not addressed fully by the CSSP.

In particular, we assume that the complement of reserves (e.g., hydroriparian, old-growth representation, visual quality, and cultural value reserves) are adequate to maintain HCVFs associated with: concentrations of salmon, unique ecosystems, domestic watersheds and other water sources, and First Nations' cultural identity.

Extensive work by a large number of people from different agencies has been undertaken to

understand, map and plan reserves for these values. **Because we feel they are therefore managed in a sufficiently precautionary manner we do not discuss them extensively in this report.**

For the following HCVMs there are concerns regarding the level of precaution associated with the proposed management strategy:

Rare and Endangered Species:

- Species-specific management at the landscape level is focused primarily on Marbled Murrelets. This assumption has been tested only superficially. We recommend that a more explicit summary of how habitat requirements of multiple species are met be produced and made available to the public. This will allow hypotheses and assumptions to be tested during monitoring.
- We also recommend that requirements for individual species are explicitly linked to management requirements at the stand level. This will provide increased certainty that stand level assessments by an R.P.Bio will adequately maintain habitat as outlined in existing recommendations (e.g. for wetlands), or from existing research (e.g. for bats).

Marbled Murrelets:

- A total of 61.8% of the *available* "excellent and good" habitat within Clayoquot Sound is reserved either within murrelet reserves or as part of some other reserve network or protected area (Chatwin in prep.). This is much higher than dictated by provincial policy however there remain questions as to whether this can be considered a precautionary approach. Using the assumptions outlined by the Marbled Murrelet Recovery Team (Burger 2002) the reserve strategy proposed within CS can be hypothesised to result in a minimum 38% reduction in historic numbers of murrelets in current intact areas, and more than 38% reduction for areas that have already a reduced habitat level due to historic harvest over time. If these hypotheses are borne out then the population may not meet the requirement of declining less than 30% as outlined by the MMRT⁴.
- We recommend that explicit assumptions and hypotheses regarding the CS murrelet population are stated, and then tested using the planned monitoring scheme.
- There also remains public confusion as to the level of protection, and process for protection of murrelet habitat. We recommend that clear rationale is made available to the public along with watershed plan summaries for CS.

Large landscape level forests:

- A number of different studies have demonstrated the regional importance and rarity of the intact values provided by Clayoquot Sound. These values, in combination with the provincial low level of protection for relevant biogeoclimatic subzones (8% and 7% protection for the CWHvm1 and CWHvm2 respectively) suggests that at this scale, protection of all the intactness values in Clayoquot Sound may be an appropriate precautionary strategy. We note that protection of these values is the option that provides the highest certainty of outcome.
- Science however, fails to provide an exact answer in terms of 'how much is enough' to maintain a particular value, particularly in cases where the value is difficult to pinpoint (e.g. intactness). In order to acknowledge this uncertainty, and to attempt to provide additional understanding of the landscape level values present in CS we have evaluated the intact sub-basins and face units (i.e. Eehmiis areas) for their individual intactness values, and also attempted to assess their potential contributions to increasing the effectiveness of adjacent nationally significant large landscape level intact areas.

⁴ the MMRT actually allows a 30% decline over 30 years to meet the requirement for population recovery.

- We recommend that some areas must remain intact if their HCVF values are to be maintained in future. Other areas could potentially be developed: this development however, could only occur after monitoring has demonstrated that lisaak management activities are consistently implementing the CSSP recommendations, and that the CSSP management strategies are in fact effective in conserving ecological integrity. We believe this process would take a significant period of time (in excess of 20 years and possibly up to 100 years) because of potential time lags in response, the difficulties in detecting ecological change in a powerful statistical manner and the unknown influences of climate change on ecosystem functioning and resilience.
- We suggest that the management options outlined in this report may meet the test of precautionary management if undertaken with rigour. Due to the relatively coarse level of our analysis we are not suggesting however, that our recommendations are the only combination that could meet this test; other combinations of reserves and management regimes may also meet the test. However, we are of the opinion that reserving significantly less than we have recommended is unlikely to meet the test of precautionary management for intactness values, especially considering all the other values present in those areas.

Rare and threatened ecosystems:

- Management strategies require 100% protection of existing red-listed ecosystems and 50% protection of existing blue-listed ecosystems. We recommend that explicit rationale is provided for this level of protection for blue-listed ecosystems.
- In addition, protection levels do not explicitly consider historic harvest of rare ecosystems. We recommend implementing a reserve and restoration strategy that considers the historic abundance and distribution of both red and blue-listed ecosystems.

Old-growth and Representation in Protected Areas⁵:

- Representation in protected areas at the regional level for some biogeoclimatic variants found in CS is low (e.g. 7-15% for CWHvm1 and CWHvm2). This is increased in CS by the minimum 40% old forest protection target outlined by CSSP. This target increases the level of representation compared with provincial policy, however it falls considerably short of the 70% regional target outlined by the CIT for ecosystem-based management in coastal ecosystems (CIT 2002a,b)⁶. However, a recent recent roll-up report (CS TCP 2006) identifies that a total of 62% of forested landbase is protected from a combination of the different reserve types and Protected Areas. The extent to which the full range of ecosystems is represented is unknown⁷. We are therefore unable to state whether we feel the level of old growth ecosystem protection is fully precautionary. We do though note that some geographic areas have seen considerable harvest (e.g. Fortune, Kennedy Lake, Upper Kennedy, some areas of Cypre). In these areas we have not seen an ecologically defined restoration strategy for highly impacted site series or hydroriparian ecosystems, and we cannot therefore be assured that the watershed planning implementation results in precautionary management with regard to these values.
- In addition, we also raise questions whether the 8% interior forest target outlined by the CSSP is in fact precautionary in a forest type where natural conditions result in very high

⁵ Note these are two separate categories within FSC HCVFs, but we deal with them together since they are linked in the management strategies and watershed planning.

⁶ The total old-growth protected in CS is 62% (Retzer in prep.). This figure is much closer to that suggested by the CIT, but it does not assume an even representation of site series. Unfortunately, site series data are unavailable for the large protected areas, so an analysis of the extent of site series representation within the 62% is not possible at this time. We are therefore unable to state whether we feel the level of old growth ecosystem protection is precautionary.

⁷ Unfortunately, site series are unavailable for the large protected areas, so an analysis of the extent of site series representation within the 62% is not possible at this time.

(>70%⁸) 'interior' / unfragmented old-growth. We recommend that the overall targets plus requirements for interior habitat are reassessed in light of science and management advances since the CSSP made their recommendations. This is in direct accordance with the recommendations of the CSSP who stated that their recommendations were hypotheses and should be reassessed over time (CSSP 1995; K. Lertzman pers. comm. 2006.).

- We also note that for many planning units, a significant portion of the target has not been identified on the landbase (e.g. 40 - 50% for some units), with the intention that the remainder of the target will be allocated during site level planning. We recommend that explicit strategies are developed that use conservation biology principles to ensure additional areas required to meet the 40% target are employed in the most biologically effective manner.
- Some geographic areas have seen considerable harvest (e.g. Fortune, Kennedy Lake, Upper Kennedy, some areas of Cypre). In these areas we have not seen an ecologically defined restoration strategy for highly impacted site series or hydroriparian ecosystems, and we cannot therefore be assured that the watershed planning implementation has been precautionary with regard to these values. We recommend developing reserve/ restoration plans that use conservation biology principles to identify the most ecologically appropriate areas for retention and restoration of historically impacted ecosystems⁹.

Basic services of Nature - Erosion Control:

- Although we consider Iisaak's management of class IV and V terrain to be generally adequate, we recommend that Iisaak develop policies to state that high risk alternatives will not be pursued in any situation, and that even moderate risks will not be undertaken when potential downslope/ downstream consequences involve high value aquatic habitats, human habitation or domestic water supplies (e.g., see FSC-BC indicator 6.5.3). Similar policies should be developed for waterborne erosion and snow avalanche starting zones.

First Nations and Non-First Nations spiritual / cultural values:

- There are significant spiritual / cultural values attached to specific sites and forests throughout CS. We assume that the process to identify and maintain specific cultural values undertaken directly with the Nuu-chah-nulth is adequate to maintain these values in a precautionary manner. However, we raise a question about the potential conflict suggested by the Memorandum of Understanding, which appears to suggest that the intact areas are 'very very precious' and should be maintained for cultural reasons. We recommend that additional consultation may be required to resolve this question.
- In addition, although a novel interpretation of Category 6 HCVF, we feel there is sufficient evidence to suggest that the Clayoquot Sound in general, and the intact watersheds in particular, provide significant spiritual / cultural values to a significant number of local people, both First Nations and Non-First Nations. A HCVF designation is provided in this category (see the specific comments regarding the management above under large landscape level forests). Although not necessarily relevant to the specific criteria of Principle 9, we also note the significance of these areas to non-local people.

CONSULTATION

Principle 9 has specific requirements regarding consultation over and above those required in general management procedure. Significant consultation has occurred in relation to watershed planning, and as a result we assessed the fairness and effectiveness of this process.

⁸ This is a 'best guess' ballpark estimate of interior forest levels under natural disturbance conditions.

⁹ Note that this may have occurred already under watershed planning. However, from available documentation it is difficult to assess the extent to which historic impacts were mitigated using planning.

Overall, somewhat variable efforts have been made with regard to consultation: the first watershed plan release process appears to have been excellent, the two subsequent releases were potentially inadequate to meet the requirements regarding Principle 9 (due to the very short timeline). In each case there was a poor response to those who provided comments (e.g. members of the CSSP submitted comments and at least on one occasion received no response at all).

Given the fluid nature of the documents and the different releases, it has been quite difficult to determine exactly what comments have been specifically addressed in planning. Sections of the planning documents (Volume 1 in particular) have been revised to provide more clarity on how decisions were made, and what targets were used, plus changes were made to the watershed plans themselves.

We also found a number of documents that were not yet available to the general public that provide additional information (e.g. TPC 2003 regarding wildlife strategies; Chatwin in prep. regarding Marbled Murrelet adequacy). Incorporating key points from these documents into the central planning documents would help the general public to understand rationale used more clearly.

However, with regard to a number of key comments received it appears that the manager has not adequately demonstrated that the values of concern are adequately managed and maintained, as required by Principle 9. In particular, regarding intactness, there is no evidence of a response that demonstrates how intactness values are being managed in a precautionary manner. Although to date Iisaak has not harvested any of the intact areas, Iisaak's AAC calculations and the completed watershed plans indicate that harvesting will proceed in these areas sometime in the future. A recent progress report by the CS Technical Planning Committee (July 2006) acknowledges that even members of the CSSP have expressed concerns over development in the intact areas, and some areas have been deferred by Interfor. However, there has been no clear response by the Iisaak on how intactness will be managed at a precautionary manner under the watershed plans.

We recommend that in future, the comprehensive process undertaken for the first release of the watershed plans should be repeated. Ensure there are clear responses and clear communication regarding how concerns raised are dealt with.

We recommend that results from scientific study or other background material in the rationale should be explicitly made available to the public. This would increase understanding about how these multiple complex processes have resulted in a particular end product.

We recommend to undertake additional HCVF consultation to deal specifically with HCVFs regarding intact areas, old-growth forest retention and restoration and rare and endangered ecosystems (including adequate response to inputs received).

CONCLUSIONS

Clayoquot Sound contains a large number of differing HCVFs that cover the extent of the Sound. Given the interconnectedness of many of these ecological values, plus the fact that some HCVFs cover the entire area of Clayoquot Sound (e.g. the Biosphere Reserve designation), we suggest that an appropriate designation is that the entire area constitutes one of HCVF.

Many of the specific attributes of HCVFs are likely to be adequately maintained by the management strategies proposed by the CSSP, and reflected in the Watershed Plans and Iisaak's management strategies. However, the minimal amount of harvesting completed to date by Iisaak, and the lack of an established monitoring strategy for HCVF attributes makes it difficult for the authors (and Iisaak itself) to assess whether Iisaak is fully implementing the strategies, and whether they are effective.

There also remains significant emphasis placed on site level work – both planning (to locate a significant area of forest required to meet the total reserve requirements in many areas), plus the

site level assessments to maintain stand level features. Explicit frameworks for both these processes are required to provide some certainty around their future effectiveness.

We are basing our assessment of management strategies primarily on the final watershed planning documents. However, we are concerned that there is yet no legal vehicle for their implementation.

In addition, a number of HCVFs do not appear to have precautionary management strategies, in particular, large landscape level forests, and rare and endangered ecosystems, and possibly old-growth forests in watersheds where historic harvesting is significant.

Although not directly relevant to an HCVF assessment, in the FSC context it is necessary to consider the broader framework of forest management, and the obvious trade-offs between environmental, social and economic considerations. In light of the limitations on the terms of reference for the CSSP and further scientific information which has emerged over the last ten years, it would be prudent to consider the potential benefits of reviewing the structure of reserves within Clayoquot Sound with the objective of placing more emphasis on fully reserving more of the intact watersheds. For example, combining or realigning some of the watershed planning units could allow the reserve targets to be met primarily in the intact areas, while allowing increased harvesting in adjacent areas to reduce impacts to economic values. Additional conservation assessment may also allow consideration of designating portions of heavily impacted areas such as Kennedy Flats as FSC plantations to balance increased reserves in the intact areas. This type of approach (variable risk across the region/ landscape) would be more similar to that recommended by the CIT for coastal temperate rainforests.

Consultation regarding management strategies has been generally extensive, and much effort has been expended. Efforts have been made to answer many of the issues raised during the consultation process, but the large issues regarding intactness, old-growth reserves and rare and endangered species remain outstanding issues where the manager has not yet demonstrated precautionary management to stakeholders.

In addition, a comprehensive geographically-organised summary of the values present in CS would help to ensure that reserves in different watersheds sufficiently reflect the different values present. This should include an assessment of historic loss of certain habitats of ecosystems where possible. Meaningful restoration strategies could be developed as a result. To our understanding a large number of inventories have been concluded in CS, so we believe that this effort would require largely only a compilation of the efforts to date, rather than new inventories.

Monitoring is an essential part of meeting both principle 9, and the CSSP recommendations. Iisaak partnered with the Long Beach Model Forest (LBMF) in 2000 and 2001 to develop and implement a monitoring plan. However, due to lack of funding and the termination of the LBMF this program has not continued. Iisaak's SFMP identifies Criteria, Indicators and Targets of sustainable forest management and discusses how an 'Adaptive Management Strategy' can contribute to continuous improvement. However, to date there remains no specific plans for what indicators will be monitored, what measures will be employed to ensure early warnings of any HCVF conservation attributes that may be exposed to increasing risks. Given the complex nature of monitoring required for the high values present throughout CS, it would be logical for Iisaak to partner with other stakeholders and agencies with monitoring expertise, including other resource users, federal and provincial agencies, environmental groups, universities and local communities. We recognise the large task required to implement an effective monitoring plan, however, as laid out by the CSSP, monitoring is a central aspect of managing to maintain the full range of values. We believe that some of the central issues outlined above cannot be resolved before a substantive monitoring system has been put in place for a significant time period.

Overall, we believe that with the CSSP recommendations and the watershed planning process that has been undertaken, Iisaak meets many of the requirements of Principle 9. However, there remain a number of issues that require additional work, in order that Principle 9 be adequately met, as outlined above.

ACKNOWLEDGEMENTS

Many people helped us in this work by providing information regarding Clayoquot Sound in general and Iisaak Forest Resources in particular. Peter Verschoor (RFP) provided extensive input regarding Iisaak's management strategies, and the rationale used for many approaches outlined in the watershed planning process. Peter also spent time in the field providing a perspective on forest management in Clayoquot Sound. Chris Elliott and Tony Iacobelli (World Wildlife Fund) provided helpful comments on a draft of this report.

The following people also provided specific information or met with the team during the field visit - we thank them all for their time and efforts:

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Diego Garcia (FOCS), Stephanie Goodwin (Greenpeace), Claire Hutton (Sierra Club)

Iisaak Management Board – Gary Johnsen, Violet Clark, Heath Krevesky

Bill Irving (Manager of the West Coast Log Sort)

Derek Drake (Iisaak Operations Forester)

In addition, Ken Lertzman and Keith Moore provided perspectives on the CSSP.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	ii
Key Findings.....	ii
Conclusions.....	vii
Acknowledgements.....	ix
Table of Contents.....	x
1.0 AN OVERVIEW.....	1
Report outline.....	1
Study Area.....	1
Project Objectives.....	2
High Conservation Value Forests (HCVFs).....	3
Methodology.....	4
2.0 RESULTS IN BRIEF: HCV FORESTS, ATTRIBUTES, MANAGEMENT STRATEGIES AND CONSULTATION ISSUES.....	5
3.0 HCVF DISCUSSION.....	12
3.1 HCVF Identification.....	12
3.1.1 Intactness and HCVFs.....	12
3.1.2 Old growth.....	18
3.2: Management of HCVF Conservation Attributes.....	21
3.2.1: Management Related to Listed species and Marbled Murrelet.....	21
3.2.2: Management Related to Intact Areas.....	22
3.2.3: Management related to Rare and Endangered Ecosystems.....	30
3.2.4: Management Related to Old Growth.....	31
3.2.5: Management related to Representation of Ecosystems in Protected Areas.....	32
3.2.6: Management related to Erosion and Sedimentation.....	34
3.3 Consultation.....	34
4.0 SUMMARY OF FINDINGS AND CONCLUSIONS.....	41
5.0 ADDITIONAL SUPPORTING DOCUMENTS AND RATIONALE.....	49
6.0 REFERENCES.....	67

1.0 AN OVERVIEW

Iisaak Forest Resources Ltd. has acquired Forest Stewardship Council certification of its forest management tenure in Clayoquot Sound (CS). Holding an FSC certificate requires that each of 10 principles outlined in the FSC Standards are met, or are in the process of being met. To date, Iisaak has not had a document that is intended to explicitly meet the assessment requirements of Principle 9 regarding High Conservation Value Forests (HCVFs).

The project is being lead by Rachel Holt (Veridian Ecological Consulting Ltd.) and co-authored with Greg Utzig. Further assistance and information was provided from various individuals listed in the acknowledgements.

REPORT OUTLINE

This report is intended to be consistent with the FSC requirements for Principle 9, however does not provide everything required by Iisaak to meet Principle 9 (see FSC BC indicators under P 9, e.g., specific plans for monitoring, management strategies and adaptive management; management plan documentation). It is organised so that the key results are summarised and can be located in one main section (Section 2.0). Individual aspects of the work are then discussed or rationalised in subsequent sections. The document is laid out as follows:

Section 1.0: background on this process and methods used.

Section 2.0: A summary of the HCVF assessment, attributes, management issues and consultation questions, in tabular form.

Section 3.0: The tables (in section 2.0 and Section 5.0) provide a summary of the main results. However, where apparent conflicts or issues require additional discussion this is provided here.

Section 3.1: identifying high conservation value forests

Section 3.2: issues relating to management strategies for HCVFs

Section 3.3: consultation

Section 4.0: summary of our conclusions

Section 5.0: detailed working tables

Section 6.0: references

STUDY AREA

Clayoquot Sound encompasses an area of approximately 350,000 ha in total (262,600 ha of land and 87,400 ha of water) on the west coast of Vancouver Island, located within the Windward Island Mountains ecosection. Currently, there are three main forest tenures active within the Sound. The largest is managed by Iisaak Forest Resources (approx. 90,000 ha; Figure 1), followed by Interfor (approx. 50,000 ha) and BCTS (approx. 25,000 ha). All three tenures are interspersed with each other across the land base and are adjacent to and/or surrounded by Indian Reserves, private lands and provincial and federal parks.

Iisaak's management unit is the focus of this analysis. However, management strategies identified by the Clayoquot Sound Science Panel (CSSP) apply to the whole of Clayoquot Sound, as do the Watershed Plans. Many of the values present have ecological boundaries that do not simply overlay with the administrative boundaries of Iisaak's management unit, which is significantly fragmented and dispersed throughout CS. As a result, much of our assessment applies to the whole of Clayoquot Sound. Our conclusions however, obviously apply only to the management strategies as applied by Iisaak, since they hold the FSC certification on their tenure only.

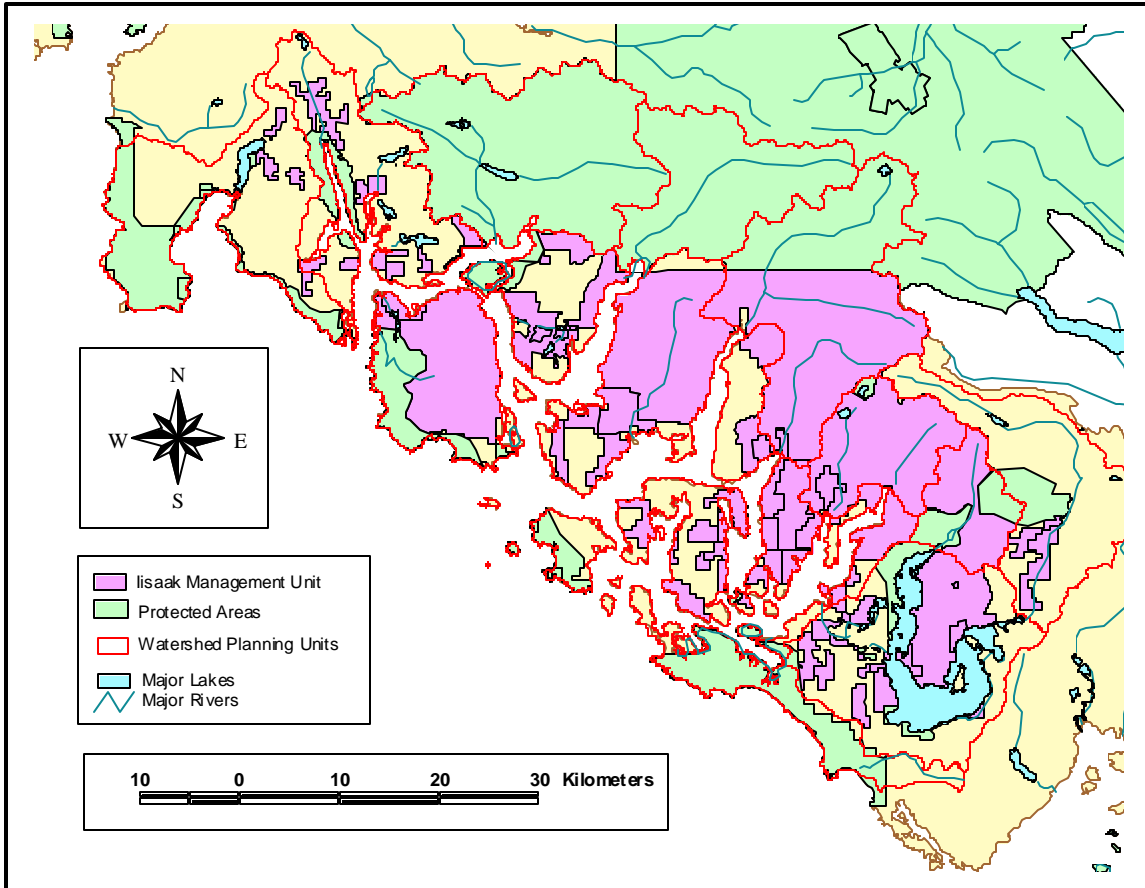


Figure 1. lisaak's management unit.

PROJECT OBJECTIVES

The project has the following specific objectives:

- a) To identify High Conservation Value Forests (HCVFs), as outlined in Principle 9 of the BC FSC standards.
- b) To identify conservation attributes of HCV forests within the tenure, and provide guidance as to how these could be maintained. This process is intended to meet the criteria as outlined in the BC standards.
- c) Identify compatibility and / or conflicts with lisaak's current management plan and strategies.
- d) Assess the extent to which the existing stakeholder consultation process related to the Clayoquot Sound watershed plans meets the requirements of Principle 9.

In addition, we provide comments regarding monitoring where it is relevant to the HCVF assessment and management review (monitoring strategies are required for HCVFs but lisaak's monitoring strategy is under development so we could not yet assess their adequacy). Most of the discussion is focused on the ecological aspects of HCVFs, primarily because most of the cultural aspects are relatively well accounted for under previous processes.

HIGH CONSERVATION VALUE FORESTS (HCVFs)

FSC Principle 9 outlines 6 categories of HCVFs:

Category 1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia);

Category 2: Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;

Category 3: Forest areas that are in or contain rare, threatened or endangered ecosystems;

Category 4: Forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control);

Category 5: Forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health); and

Category 6: Forest areas critical to local communities' traditional cultural identify (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

The intention of P9 is to address issues that have higher conservation or cultural values, or sensitivity than standard values (see Figure 2).

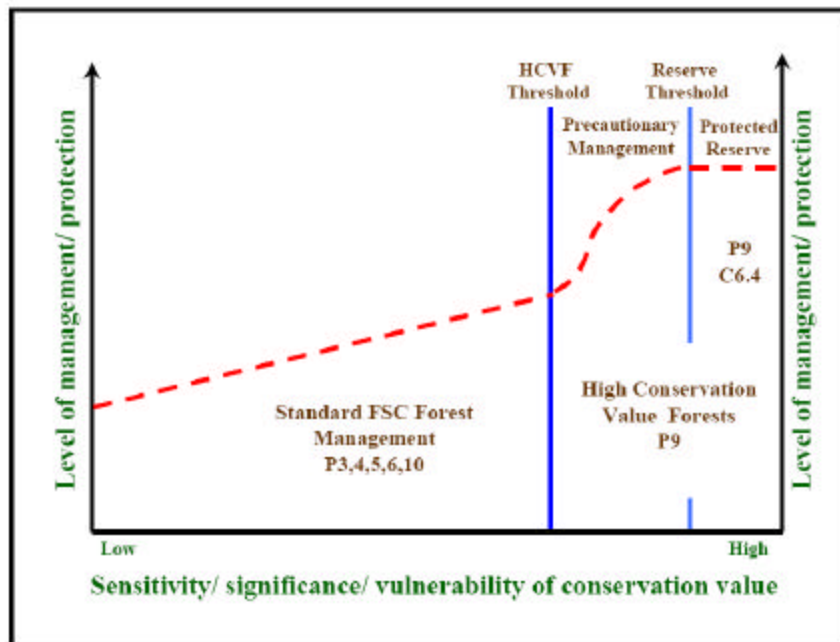


Figure 2. High conservation value forests in relation to the other FSC principles (from FSC BC standards, p.102).

Principle 9 therefore lays out a specific process that requires:

- a) assessing whether high conservation values are present,
- b) identifying the attributes that define those values,
- c) determining whether management strategies exist that maintain these values using a precautionary approach
- d) determining whether stakeholder input has been incorporated or appropriately dealt with

by the manager

In addition, P9 requires that the manager has adequate monitoring strategies in place to ensure a reasonable degree of certainty around management of the high values. Lisaak is in the process of defining their monitoring strategies and this assessment does not directly address monitoring, except where it is relevant to assessing the adequacy of management strategies.

METHODOLOGY

The following steps were used in undertaking this project:

a) Review of key information: Clayoquot Sound has been the subject of a very large number of reports and assessments. In order to meet our timelines and tasks, we focused our efforts on a number of key documents a) the Clayoquot Sound Science Panel (CSSP) reports, b) drafts of the Watershed Planning documents¹⁰, c) other relevant planning documents¹¹, d) key background material¹², and consultation documents provided by CRB. Where additional information or clarification was required, we also consulted directly with qualified specialists.

b) Field Visit and Meeting with the Lisaak Board and MoU Working Group:

A 5-day field visit provided:

- a meeting with the Lisaak Management Board and Lisaak operational staff
- a meeting with the Memorandum of Understanding Working Group¹³
- an overview of Clayoquot Sound,
- first-hand overview of Lisaak forest management (from field day lead by Derek Drake),
- review of Watershed Plan consultation documents around the public review process (provided by CRB),
- direct commentary from stakeholders (Bill Irving, Manager of the West Coast Log Sort, FOCS, Clayoquot Sound Biosphere Reserve Staff, Patricia McKim, CRB Director)

c) The assessment: A HCVF assessment was undertaken, in accordance with the detailed instructions laid out in Principle 9 of the BC regional standards (see full standards, available at <http://www.fsc-bc.org/BritishColumbia.htm>). HCV forests are identified by FSC on the basis of 6 different types in the two categories based on 'ecologically' and 'culturally' high values.

d) Assessment of conservation attributes and management strategies: An essential aspect of meeting Principle 9 is to identify what *conservation attributes* define any HCV forests within the management unit, and to identify how these attributes can be maintained through time. We examined the identified HCVF attributes and provide an assessment of the extent to which existing management strategies appear likely to maintain HCVF attributes. Potential shortfalls are examined in more detail.

The work was undertaken in a manner that was consistent with the requirements under Indicator 9.1.2 of the FSC BC Regional Standards, which states that an HCVF assessment should:

- a) be based on the best available information including scientific, traditional and local knowledge;

¹⁰ The final watershed plans were only released in July 2006. They are available at: <http://lmbwww.gov.bc.ca/lmb/lup/srmp/coast/clayoquot/index.html>

¹¹ e.g. CS TPC 2003;

¹² e.g. Huggard et al. 2005; Burger and Chatwin 2002; GFW 2003;

¹³ A Memorandum of Understanding exists between various groups and Lisaak. The MoU Working Group's role involves engaging in joint problem solving and relationship building in support of Lisaak and the implementation of the MoU signed in 1999 that forms to backdrop of the collaboration between our environmental groups, the Nuu-chah-nulth and Lisaak Forest Resources.

- b) be conducted using a hierarchical approach that includes consideration and identification of HCVFs and HCVF attributes at global, regional, landscape and site levels;
- c) identify conservation attributes associated with each HCVF present, the significance of each conservation attribute, and measurable thresholds for their maintenance;
- d) include documentation of underlying assumptions, uncertainties in data and knowledge and how they have been dealt with, and the rationale behind management recommendations; and,
- e) include independent, third party input from and review by qualified specialists.

2.0 RESULTS IN BRIEF: HCV FORESTS, ATTRIBUTES, MANAGEMENT STRATEGIES AND CONSULTATION ISSUES.

Due to the complex nature of this assessment we provide a summary of the results in this section (Table 2). For each category (1 – 6) the HCVF designation is provided, for particular values within each category, plus the rationale in brief¹⁴. A general idea of the distribution and area affected by this designation is estimated. Existing management strategies for the value are identified and assessed. In addition, if there appear to be consultation issues relating to the HCVF these are also identified. The last column indicates other sections of this report that may provide further discussion of any issue identified.

This table is accompanied by a more detailed table (Working Table 1) which provides additional rationale for the findings shown below. This 'working table' is lengthy and therefore provided at the end of the document, however it remains a significant part of the results of this work. This table is based on the questions specified in the FSC Standards regarding implementation of Principle 9 (starting page 99).

For some attributes, the results are relatively straightforward and for these we do not provide any detailed discussion. However, some values require additional discussion about whether they meet the test for an HCVF, or whether the management associated with them is consistent with a precautionary approach. The final column in Table 2 shows whether additional discussion is provided regarding one or both of these questions in Section 3.

Section 4 further summarises the information regarding consultation, and again provides rationale for decisions regarding adequacy.

¹⁴ Under each section the assessment of HCVFs in each category follows the specific questions outlined in the FSC standards (Page 104 of the FSC-BC standards). A more detailed answer to all questions in the standards is provided in Working Table 1 (see Section 5.0).

Table 2. High Conservation Value Forests in Clayoquot Sound: A Summary of Findings. The specific questions identified by '(#)' are from the FSC-BC Standards, Page 104.

Cat'y	HCV and Distribution	Rationale	Maintenance of Conservation Attributes	Consultation ¹⁵	Discn ¹⁶
Category 1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia);					
1 (# 1)	Yes – for rare and endangered species Wide distribution. Wide area.	13 rare species known or suspected on tenure.	Document in prep shows 61.8% of existing habitat reserved. Although high and suggested to be an effective strategy (T. Chatwin pers. comm.), this does not quite meet the MMRT recommendations for de-listing the species (69%) which is a concern given the fact the CS is a source population for surrounding declining populations. Determining that this is a precautionary strategy is therefore difficult. Potential concern around strategies to maintain other species: The CSSP outlined that habitat requirements for a range of species should be managed (CSSP, Report 5, Page 171), However, it is difficult to determine how this has been applied during watershed planning. Habitat for species was 'considered' (B. Retzer pers. comm.) during the process, but it is very difficult for the details of this process to be evaluated externally. We have no evidence to show that it was ineffective, however, it is equally difficult for us to gather evidence to show its effectiveness. Some analysis (TPC 2003) suggests no obvious gaps using the coarse filter of the proposed reserve network to maintain most other species. Recommendations provided regarding management of small wetland areas for other species. These recommendations are not included in watershed planning, and not explicitly mentioned in the FDP. We note that a site level assessment is required before harvest (stated in the FDP), and assume that this is where appropriate recommendations will be made. Outlining what types of	Concerns raised by stakeholders regarding MaMu management. Lack of rationale in final July 2006 management plan for level of protection for MaMu.	PM 3.2.1

¹⁵ Note that this column refers to whether there appears to be a raised issue in the consultation. A review of the consultation process itself will be provided separately below.

¹⁶ ID = discussion about identification of an HCVF; PM = discussion about precautionary management of that attribute.

HIGH CONSERVATION VALUE FORESTS IN CLAYOQUOT SOUND

Cat'y	HCV and Distribution	Rationale	Maintenance of Conservation Attributes	Consultation ¹⁵	Discn ¹⁶
			habitats / values should trigger a response from the R.P.Bio would be helpful in assessing the likely effectiveness of this strategy .		
1 (# 3)	Yes – for concentrations of fish species. Possible - for marine bird concentrations	5 freshwater residents (2 blue-listed) and 7 ocean-going fish species spawn or are resident in freshwaters in the sound. High biomass and high species diversity. Wide distribution and area. High level of use by migrating birds particularly. Coastal distribution, particularly Tofino mudflats	Strategies include riparian management and management to ensure no sediment above natural levels into streams.	No known issues	None
1 (# 4)	Critical habitat for regionally significant species	Salmon spawning habitat, elk winter range?	Dealt with above.		None
1 (#6)	Yes – for adjacent to or within other protected areas / reserves.	Federal, provincial parks adjacent and within MU. Also Clayoquot Biosphere reserve. High values locally are recognised and highlighted by these designations. Many parts of MU	Commitment in FDP (pg. 31) to maintain a minimum of 70% forest cover retention within 100m of Pacific Rim Park Boundary. CSSP recommended the establishment of regional linkages between major watersheds. The watershed planning reports acknowledge this, but to date have not specified how this will be achieved. Creating reserves in many of the intact sub-basins/ face units could potentially play a significant role in increasing the effectiveness of existing protected areas by increasing the number of complete watershed reserves and significantly enhancing regional connectivity between existing PAs and connectivity across the ecosection from the height of land to the Pacific Ocean.	High volume of input during consultation regarding intact areas. Concerns remain with the adequacy of dealing with input from CSSP members and other stakeholders regarding intact areas.	None
<p>Category 2: Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;</p>					

Cat'y	HCV and Distribution	Rationale	Maintenance of Conservation Attributes	Consultation ¹⁵	Discn ¹⁶
2 (#7)	Yes – for large landscape level forests	Intact areas in Clayoquot Sound and in Iisaak's tenure, specifically those that are contiguous with Strathcona Park meet the criteria, and guidance questions are all answered positively. Wide distribution. Large area.	Conflicting information regarding proposed management between the MoU (signed by Iisaak) and the Watershed Plans. Provincial / or Island context highlights the importance of intactness values within Clayoquot Sound. These are not explicitly addressed by watershed planning. Existing PAs in CS, especially the Strathcona PA complex, provide significant protection for large landscape level forests. However, some intact areas within Iisaak's tenure could significantly increase the effectiveness of existing PAs in their protection of large landscape level forests. We have compiled information on the values present in each intact area, in an attempt to provide a relative ranking of these areas. Note, there was limited available information on the relative level of values between the various intact areas, and this analysis likely could be improved using more detailed data. This ranking has been combined with CSSP recommendations regarding intact areas to develop a suite of potential management strategies that should be consistent with a precautionary approach.	High volume of input during consultation regarding intact areas. Concerns remain with the adequacy of dealing with input from Science Panel and other stakeholders regarding intact areas.	ID 3.1.1 PM 3.2.2
Category 3: Forest areas that are in or contain rare, threatened or endangered ecosystems;					
3 (#8)	Yes – for rare and threatened ecosystems	Number of both naturally and anthropogenically rare ecosystems identified. Wide distribution. Relatively small area.	Management strategies to maintain these values are in place. Red-listed plant communities are maintained 100% (for structural stage 6 and 7). Blue-listed ecosystems are maintained at 50% (for structural stages 6 & 7, and some 5) of existing levels. No rationale is provided for only reserving 50% of existing rather than all or at least 50% of potential occurrences. May fail to provide precautionary management. Requires adequate field protocols to ensure detection of these rare values. Unsure whether these protocols are adequate and effective.	Restoration raised as an issue by Science Panel. Not adequately addressed in the most recent watershed plans.	PM 3.2.3
3	Yes – for old growth	Extensive harvest of OG	Management strategies for OG in place – with targets to	Concern regarding the lack	ID

Cat'y	HCV and Distribution	Rationale	Maintenance of Conservation Attributes	Consultation ¹⁵	Discn ¹⁶
(#9)	forests in some watershed planning units with high levels of historic harvest (Kennedy Lake, Fortune, Upper Kennedy, possibly Cypre:).	throughout Vancouver Island, and the Windward Island Mountains Ecosection. Analysis shows OG in some watershed planning units (e.g. Kennedy Lake) have declined by over 50%.	maintain 40% old forest overall, and 30% by site series. CSSP identified 40% as a minimum retention level, whereas this appears to have become a maximum target. Increased representation of rare, but we have concerns regarding maintenance of OG in ecosystems that have been heavily impacted by historic harvesting. Does not appear to provide precautionary management in some cases. More recent CIT work that considered the whole coastal temperate rainforest, suggests that regional targets should be higher than 40% (i.e. ~70% of the natural levels of old forest). Note that the actual level protected (in total, not by ecosystem) is around 62%, however it is our understanding that this has 'fallen out' from the planning process rather than being explicitly managed to. It is unclear the extent to which this is representative of all ecosystem types, or whether it is all permanent reserve.	of adequate management for some ecosystems was raised, and not responded to (to our knowledge). However, clarification of the targets used was provided.	3.1.2 PM 3.2.4
3 (#10)	Yes – for representation of ecosystems in PAs	Marginal representation in PAs for Vancouver Island of CWHvm1 (10%) and CWHvm2 (12%), and lower at the provincial scale (7% & 8% respectively) Wide distribution. Varying area.	Watershed planning increases these numbers to generally adequate levels (see discussion). This conclusion assumes that retention is permanent (which is not stated in the watershed plans).	Concerns raised regarding the distribution of reserves in particular areas. Concerns remain in the final watershed plans, particularly in areas with high harvest history.	PM 3.2.5
3 (#11)	Yes - remnant areas	Although a large landscape level forest exists in the area (Strathcona PA complex), they are rare in the region, therefore isolated intact sub-basins/ face units constitute remnant areas in landscapes that have extensive harvesting histories. Moderate distribution.	We have compiled information on the values present in each intact area, in an attempt to provide a relative ranking of these areas. Note, difficulty in compiling available information and this can be added to. This ranking had been combined with Clayoquot Sound Science Panel recommendations regarding intact areas to provide guidance on appropriate precautionary management strategies.	High volume of input during consultation regarding intact areas. Concerns remain with the adequacy of dealing with input from Science Panel and other stakeholders regarding intact areas.	ID 3.1.1 PM 3.2.2

Cat'y	HCV and Distribution	Rationale	Maintenance of Conservation Attributes	Consultation ¹⁵	Discn ¹⁶
		Moderate area.			
3 (#12)	Unique ecosystems	Karst possibly meets the criteria for regionally important unique ecosystem. Localised distribution. Relatively small areas.	Management strategies for a number of unique ecosystems are provided in the watershed plans and Lisaak's FDP. These include karst ecosystems. None other are known (to us).	No known issues.	None
Category 4: Forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control);					
4 (#13)	Yes – community watersheds and diffuse water sources	Locally distributed	Maintained by hydriparian reserves and rate of cut limits, as well as forest practices recommendations by the CSSP.	No known issues.	None
4 (#15)	Yes – erosion control	Areas of inherent instability and high erosion potential, combined with high rainfall and steep slopes. Wide distribution and area	Management strategies call for reserves on all Class V terrain, and detailed terrain assessments on Class IV terrain. Concerns regarding lack of specific policy on what residual risk levels will be tolerated when harvesting and/or road building on Class IV terrain.	No known issues.	PM 3.2.6
Category 5: Forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health);					
5 (#17)	Yes – First Nation basic needs	Dealt with together under Category 6. Wide distribution. Large area.			None
5 (#17)	No - non-First nation basic needs	Use of forest for firewood, berry-picking, fishing, hunting, recreation from both Tofino and Ucluelet. However, these are unlikely to meet the threshold of being "fundamental to meeting basic needs." Locally distributed	No specific strategies in place for many of these values.	No known issues	
Category 6: Forest areas critical to local communities' traditional cultural identify (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).					
6	Yes – First Nation	The historical record of Nuu-	Culturally significant areas identified as part of Watershed	Site-specific management	ID

Cat'y	HCV and Distribution	Rationale	Maintenance of Conservation Attributes	Consultation ¹⁵	Discn ¹⁶
(#18)	cultural identity	<p>chah-nulth peoples' struggles to maintain control over this area, and the extent of their cultural sites identified during the various planning processes provide clear evidence of the importance of the area to their cultural identity .</p> <p>Wide distribution. Large area.</p>	<p>Planning process, and specifics are dealt with through consultation/ referrals during ongoing development planning.</p>	<p>appears to be adequate.</p> <p>Conflicting evidence at the regional/ landscape level: in the MoU intact areas are identified as Eehmiis (very, precious in Nuu-chah-nulth) – does the site-specific cultural mapping in the watershed plans adequately address cultural values in these area?</p> <p>Concern raised (in a letter to the team) about adequacy of this process.</p> <p>Additional consultation within the First Nations may be required to resolve this issue.</p>	<p>3.1.1</p> <p>PM</p> <p>3.2.2</p>
6 (#18).	<p>Non-first nation cultural identity</p> <p>Novel interpretation of Category 6, as this is normally applied only to First Nations communities in BC.</p>	<p>Potential for designation of Clayoquot Sound, or at least the remaining intact areas in this category. The information is inconclusive, as it is unknown whether this value is held widely enough to constitute a community value or only held by a limited segment of the community. Although this HCVF category focuses on local communities, this area has provincial and national implications as well.</p> <p>Wide distribution. Large Area.</p>	<p>The package of strategies for Clayoquot Sound does provide management for many of the significant values. This is witnessed by agreements to work together between First Nations, local and non-local ENGOs, and forest companies. However, there remains controversy over adequacy of some of these values, particularly the spiritual / cultural values associated with intactness.</p>	<p>Concerns raised locally and provincially.</p>	<p>ID</p> <p>3.1.1</p>

3.0 HCVF DISCUSSION

The key results and rationale for the HCVF assessment procedure are provided in Table 2 and Working Table 1. Most of the results are straightforward and don't require additional discussion. However, a number of key areas are more complex, and so we have separated them out and present a broader discussion on them below.

3.1 HCVF IDENTIFICATION

The following section provides discussion and rationale regarding potential HCVFs that are either contentious, or require additional discussion. Within each section, background information, rationale and conclusions are provided for each value.

3.1.1 INTACTNESS AND HCVFS

HCVFs are identified by assessing their attributes. The attribute of "intactness" (i.e. areas devoid of industrial development and permanent infrastructure¹⁷) is one such attribute. HCVFs are also required to be assessed at multiple scales, therefore our assessment examines the significance of the intact areas in CS and Iisaak's MU at global, continental, provincial, regional and landscape scales.

The remaining intact areas in Clayoquot Sound discussed in this assessment are taken from a map that was attached to the MOU signed by Iisaak Forest Resources Ltd. and various environmental groups on the 16th of June, 1999. Electronic GIS files of the intact areas on that map were acquired from one of the environmental groups signatory to the agreement. Subsequent verification ensured that the intact areas indicated on the GIS files were indeed identical to those on the map accompanying the signed MOU.

From a science perspective, 'intactness' (be it large landscape level forests or smaller remnant areas) is important for a number of reasons:

a) ecologically large intact areas potentially provide:

- areas where natural patterns and processes continue unhindered by human influence (relatively speaking – given climate change)
- areas with a natural habitat distribution allowing survival and evolution of native species
- landscape resiliency against human-caused changes (climate change, invasive species)
- areas for ecosystem representation at multiple scales (ecosystems and seral stages)
- areas where access-sensitive species can survive with minimal risk
- natural linkages between different environments (such as marine to high elevation)
- reference ecosystems – control areas which can be used as comparisons for assessing the impacts of human management in other similar areas

b) culturally intact areas potentially provide:

- areas where First Nations' traditional uses, including spiritual areas, may continue uncompromised by industrial activities
- both First Nations and non-First Nations peoples with the spiritual benefits that wilderness can provide (i.e. "nature" as a value in itself)

¹⁷ Disturbances associated with traditional activities of aboriginal peoples (i.e. First Nations) are not included in the broad concept of industrial development (i.e. disturbances associated with First Nations' subsistence do not preclude the presence of intactness)

ECOLOGICAL VALUES OF INTACTNESS

The following points summarise the portions of the BC FSC Standards glossary definition of HCVFs that potentially pertain to areas with intactness:

1. Forest areas containing globally, regionally or nationally significant: large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance....
 - 1.4 Large forest areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.....
2. Forest areas that are in or contain rare, threatened or endangered ecosystems.
 - 2.1 Forests designated as threatened or endangered at global, continental or national levels (e.g. Ecoregions or large forests designated as critical, endangered or vulnerable by WWF, WRI or Global Forest Watch).....
 - 2.3 Forest areas containing mature and old forest where those age classes are becoming rare due to human activities.
 - 2.4 Forest areas that are under-represented in protected areas.

The first category identifies areas that are significant because they are large intact forest areas, while the second category tends to emphasise areas that are significant because they are, or are about to become, remnants of forests that were more extensive than they are today. Large landscape level intact forests are important because they are becoming globally rare – relatively few large areas remain that are unimpacted by industrial activities. On the other end of the scale, many areas of the globe have been significantly developed already and only ‘remnant’ natural forests remain.

The coastal temperate rainforest of British Columbia can be considered, from a global perspective as in an intermediate level of industrial development. Significant activity has occurred, but over a relatively short time-frame, leaving a developed, yet mostly functioning landscape. The long-term effects of management to date may not yet have been observed. Vancouver Island has had a long development history, and Clayoquot Sound became the site of national and international attention in the early 1990’s because of its status as having some of the most significant intact forested areas remaining on Vancouver Island.

The FSC BC HCVF Assessment Framework provides a series of criteria to help in the assessment of these categories of HCVFs. The primary question for large landscape level forests (Category 2 in the HCVF Assessment Framework) is:

Does the forest constitute or form part of a globally, nationally or regionally significant forest landscape that includes populations of most native species and sufficient habitat such that there is a high likelihood of long-term species persistence? **Answer:** Yes.

Additional criteria associated with large landscape level forests include:

Definitive: Are there forest landscapes unfragmented by permanent infrastructure and of a size to maintain viable populations of most species? Some examples of size thresholds are provided (200,000 to 500,000 ha – nationally significant, 50,000 to 200,000 ha – regionally significant (free of permanent infrastructure, and less than 5% non-permanent human disturbance). **Answer:** Yes at the nationally significant level.

Guidance: Do the unfragmented forest landscapes include known populations of species representative of habitat types naturally occurring in the management unit sufficient for their long-term persistence? **Answer:** Assumed yes.

Guidance: Do unfragmented forest landscapes include a seral stage distribution that is within RONV? **Answer:** Yes.

Guidance: Are there levels of road density and habitat fragmentation sufficiently low within the large unfragmented forest landscapes to permit the persistence of most native species? **Answer:** Assumed yes.

Guidance: Are the unfragmented landscape sufficiently large or isolated from human development to allow for continued functioning of natural disturbance regimes? **Answer:** Yes.

Clayoquot Sound is adjacent to a complex of protected areas (Strathcona, Strathcona-Westmin, and Sulphur Passage Parks and the Megin River Ecological Reserve) that will be referred to as the Strathcona Protected Area Complex. Combined, these have a total area that exceeds 250,000 ha. Intact areas within Clayoquot Sound that are contiguous with, or in close proximity to the Strathcona PA complex, therefore meet the size guidelines for a nationally significant large landscape level forest, which is in part contained within the Iisaak Management Unit. To our knowledge, the intact areas, combined with Strathcona Park are adequate to maintain viable populations of native species. The Vancouver Island marmot is one species not adequately maintained by the current intact area (the population was historically found here – but the remaining occupied areas today are not within Strathcona Park complex). Although Marbled Murrelets may not be fully viable in only this area alone, adding the coastal intact areas will certainly decrease risk to the population that is presently nesting within the Strathcona PA complex.

In regions where large intact areas are rare or non-existent, smaller intact areas are identified as remnant forests under Questions #9 and 11 in the FSC BC HCVF Assessment Framework.

9. Are there ecosystem types or ecosystem type conditions within the forest or ecoregion that have significantly declined, or under sufficient present and/or future development pressures that they will likely become rare in the future (e.g., old seral stages)? **Answer:** Yes – old growth, especially in the CWHvm1 and vm2

11. Are large landscape level forests (i.e., large unfragmented forests) rare or absent in the forest or ecoregion? In regions or forests where large functioning landscape level forests are rare or do not exist (highly fragmented forest), many of the remnant forest patches require consideration as potential HCVs (i.e., best of the rest). **Answer:** They are relatively rare in the ecoregion, especially as whole watersheds (e.g., see Moore 1991, Wilkinson 1990, MoF 1992, Ricketts et al. 1999).

Within Clayoquot Sound, some of the smaller intact areas that are not contiguous or in close proximity with the Strathcona PA complex may meet these criteria, especially if one assumes that a single large intact area remaining on the island indicates large intact areas are rare. For the sake of simplicity, we have not separated these smaller intact areas in the discussion below. In the following discussion, all of the intact areas recognised in the MoU (1999) and Eehmiis map are discussed together.

In addition to their “intactness”, the intact areas, or portions of them may also contain other distinct values and/or attributes that contribute to their designation as HCVFs under other categories. These can include specific cultural values, habitat for endemic or species at risk, rare habitats, concentrations of biodiversity values, forest areas fundamental to meeting basic needs of local communities, forest areas that provide basic services of nature, etc. These are in addition to the attribute of intactness, and will further raise the significance of an intact area for HCVF designation.

CULTURAL VALUES

Category 4 of the HCVF definition and Category 6 of the HCVF Assessment framework also recognise:

Forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

The HCV Assessment Framework provides the following questions to assist in the identification of such areas:

Guidance: Do the communities consider that the forest is culturally significant? Is the particular forest in question more valuable than other forests? **Answer:** Yes, based on the "Eehmiis" designations and culturally significant areas designated by First Nations in the Watershed Plans.

Within the watershed planning process specific cultural values have been identified on maps and incorporated into the planning process as reserves and special management areas. However, there remains a larger question relating to how the intact watersheds relate to cultural values. In 1999 a Memorandum of Understanding was signed that identified the intact watersheds as 'Eehmiis' areas, a word in Nuu-chah-nulth that means very very precious. This MoU is between Iisaak Forest Resources Ltd., and a number of environmental groups. It notes that Iisaak is owned through a partnership between Ma-mook Natural Resources Ltd owned by the Central Region First Nations of the Nuu-chah-nulth Tribal Council.

One of the points in the MoU (1999) states is: "On the condition that Iisaak, in consultation with the First Nations in whose traditional territory the proposed activities would occur, will:

5. Designate "Eehmiis" (undeveloped areas that are, in Nuu-chah-nulth, "very, very precious") (see attached map) for activities listed below that maintain their pristine nature and spiritual and sacred values and that generate non-timber benefits for the region (see Section 13), as determined by ongoing research:

- a) ecologically sustainable harvest of non-timber forest products;
- b) eco-tourism;
- c) traditional cultural uses;
- d) scientific research; and
- e) other activities agreed to by the signatories to this agreement.

This MoU appears to suggest that the intact watersheds listed have cultural and other values that require them to be maintained intact. The current status of this MoU is unclear. However, the existence of the MoU points to the high values ascribed to the intact areas by the signatories of the MoU in 1999¹⁸. Many of the cultural and other values present in the Eehmiis or intact areas may be addressed by the watershed plans, but their intactness values are not.

In BC, the cultural values referenced under Category 6 of the HCVF Assessment Framework have typically been synonymous with First Nations cultural values. In the case of Clayoquot Sound, it is possible that non-First Nation cultural values are also relevant to HCVFs. The movement to protect Clayoquot Sound from industrial development in the 1990s resulted in the largest collective act of civil disobedience in Canada, and attention has continued to focus on that area since that time. In

¹⁸ Signatories of the MoU are: Chairman (Campbell) and Secretary (Coady) of the Board of Directors of Iisaak, and Greenpeace International, Greenpeace Canada, Natural Resources Defense Council, Sierra Club BC, Western Canada Wilderness Committee. Note that the wording of the MoU states "the Central Region First Nations of the Nuu-chah-nulth Tribal Council whose traditional territories include Clayoquot Sound, MacMillan Bloedel Ltd. and the undersigned environmental groups have come together to promote ..." (even though not all these parties signed the MoU).

consultation regarding HCVFs, our team heard many references to the spiritual and cultural values associated with the intact / pristine areas of the Sound. What is unclear is whether these values are held extensively enough in the local communities to be considered “critical to local communities’ traditional cultural identity.”

Although not a usual interpretation within Principle 9, we believe that this may also have relevance in this case. To illustrate this, the following is a quote from Peter C. Newman’s contribution to the Clayoquot Sound Anthology:

Loving forests is very much within the Canadian tradition. The wild land’s moods, seasons, and weathers were the original chronometer by which we measured out lives. We first laid claim to our citizenship by planting our settlements on the shoulders of our shores, the elbows of the rivers, and the laps of our mountains – testing nature rather than trying to conquer it.

It has always been the land – which really means its forests – that has anchored our sense of who we are and what we want to become. The shape and growth of our landscape has been the most potent influence on formation of the Canadian character..... (from Breen-Needham 1994 p.58)

THE SIGNIFICANCE OF INTACT AREAS IN CLAYOQUOT SOUND – OTHER REFERENCES

The World Wildlife Fund (Ricketts et al. 1999), in their conservation assessment for terrestrial ecoregions of North America, determined that the Central Pacific Coastal Forests Ecoregion (including Clayoquot Sound) is “globally outstanding” in biological distinctiveness, with an “endangered” conservation status due to forest harvesting, fragmentation and localised conversion to non-forest uses. They recommend “immediate protection of remaining habitat and extensive restoration.”

In an analysis of nationally significant ‘remnant’ forests greater than 5000ha (Global Forest Watch 2003), Clayoquot Sound combined with the Strathcona PA complex were identified as a significant area (see Figure 3).



Figure 3. Vancouver Island and remnant intact forests greater than 5000ha. Orange is naturally treeless, green is 'intact' forest (from GFW 2003, p.82).

In an analysis of the entire coast of BC including Vancouver Island, Moore (1991) identified a total of 354 primary watersheds greater than 5000ha – of these most (68%) are between 5000 – 20,000ha. 24% are 20,000 – 100,000 and 7% are >100,000ha (primary watersheds are those that drain directly into the ocean). The most common functional units then are less than 20,000ha in this generally rugged landscape. In his analysis of the entire coast he noted that the best opportunities to protect pristine coastal watersheds in BC are in this smaller size class. – Of the 241 watersheds in this class in 1991, only 25% were pristine, and three of those are in Clayoquot Sound: Sydney (5,900ha), Megin (24,300ha) and Moyeha (18,200ha). Two are protected in Strathcona Park and the other is one of the intact areas considered in this assessment. Note this analysis is now 15 years old.

In the same period, another inventory of undeveloped watersheds across the province was published by the Recreation Branch of the Ministry of Forests (MoF 1992). This study inventoried all undeveloped watersheds larger than 5,000 ha. Within the Western Vancouver Island ecoregion, 15 undeveloped watersheds over 5,000 ha remained, today only 7 of these have been protected (Figure 3). Three of the remaining unprotected intact watersheds are completely in Lisaak's tenure (Clayoquot, Bulson and Ursus) and one partially (Sydney).



Figure 4. Undeveloped watersheds larger than 5,000 ha in 1992. The regional significance of intact areas in Clayoquot Sound is demonstrated by the general lack of such areas in the remainder of Vancouver Island and the adjoining southern coast (from MoF 1992,p.iv).

In a similar Ministry of Forests study, Wilkinson (1990), found that there were 38 remaining undeveloped watersheds greater than 1,000 ha on western Vancouver Island. Of the 146 *primary* watersheds larger than 1,000 ha on western Vancouver Island, only 25 remained undeveloped at that time. A significant portion of these were in Clayoquot Sound.

In addition, a scientists' declaration (E.O.Wilson 2005) exists that specifically highlights the global rarity of temperate rainforest ecosystems, and the regional context of being within an area that has seen significant harvest to date. The declaration states:

“Therefore: given the global importance of the region and the imminent threats posed to the remaining intact areas, we, the undersigned urge First Nations, provincial and federal decision-makers, logging companies and other stakeholders, to immediately cease all logging, ongoing or planned, in the remaining intact valleys of Clayoquot Sound, and also urge that these areas receive full recognition and

protection as core conservation areas of the biosphere reserve in order to preserve the integrity of its ecosystems in perpetuity”.

The declaration is signed by 14 eminent scientists¹⁹, including Michael Church (member of the CSSP).

Also, in a letter dated 2/ 24/ 2005 commenting on the draft second set of watershed plans for Clayoquot sound, three members of the CSSP (Lertzman, Turner and Franklin) state that:

“We continue to feel strongly that the remaining undeveloped watersheds on the BC coast are globally significant conservation opportunities and as ecological and physical benchmarks. The undeveloped watersheds in Clayoquot Sound are doubly significant in their regional context because of the scale of development elsewhere on Vancouver Island.” (Lertzman et al. 2005)

CONCLUSION: INTACT AREAS

The intact watersheds adjacent to Strathcona Park therefore do meet the criteria of high conservation value forests based on their size and intactness (See Working Table 2 for a summary of which areas meet these criteria).

The majority of the intact areas of Clayoquot Sound meet the criteria for HCVFs, as ‘nationally significant large landscape forests’ based on the size thresholds and other criteria provided in the BC FSC HCVF Assessment Framework. Most of the remainder meet the criteria for ‘remnant’ areas, as defined under Questions 9 or 11. In the Management Strategy section (Section 3.2.2) we provide an assessment of how well these values are being maintained, and provide recommendations on where management strategies could be improved to ensure the intactness values are maintained within a precautionary context.

3.1.2 OLD GROWTH

A significant proportion of old-growth forests remain in Clayoquot Sound. However, some areas have seen significant historic harvest levels. Typically, an analysis would be undertaken to test the amount of old forest remaining in each biogeoclimatic variant within each large landscape unit in order to determine whether particular areas are of concern. Here, we did not have access to all the forest cover information (just that for Lisaak’s tenure) so have estimated whether the thresholds identified by the FSC standards appear to apply (e.g. a decline of >50% of natural levels of old forests – HCVF question #9). Table 3 provides a summary of this estimation to understand the historic context for old growth in each watershed planning unit. The first column provides estimates how close present levels of old-growth in Lisaak’s tenure are to natural levels, the second column identifies which, if any biogeoclimatic variants are of particular concern. In addition, because Lisaak only has tenure in a portion of Clayoquot Sound, the final column provides an estimation of old growth levels in areas outside Lisaak’s tenure for each of the watershed planning units.

Although very rough, the table highlights a number of areas of concern, in particular Kennedy Lake, Fortune Channel, and upper Kennedy. These areas appear to meet, or come close to meeting, the HCVF test for decline of old-growth. We therefore used this quick analysis to focus on the old-growth strategies outlined in the watershed planning units for these areas.

¹⁹ Dr.s’ E.O.Wilson, Jane Goodall, Michael Soule, Reed Noss, Chris Pielou, Neville Winchester, Alan Burger, Elliott Norse, John Terborgh, Wade Davis, Michael Church, Barrier Gilbert, Lance Craighead, Dan Doak.

Table 3. Visual estimation of remaining old growth in watershed planning units in Clayoquot Sound. Note this table was simply to provide guidance to identify areas important to examine further regarding this HCVF.

Watershed Planning Unit	Estimated % natural in lisaak's tenure	Estimated level of old growth by BEC units with significant harvesting	Harvest impacts in other tenure (not lisaak)*.
Hesquiaht	98		Significant
Sydney/Pretty Girl	100%		Virtually none
Flores	95		NA
Bedingfield	80	Moderate in CWHvm1	Significant
Cypre	60	Low in CWHvm1 and CWHvh1	Not much
Mearas	95		None
Fortune Channel	45	Very low in CWHvh1, low in CWHvm1 and mod in CWHvm2	Not much
Bedwell/Ursus/Bulson	90	Harvesting only at mouths of Bedwell and Bulson – CWHvm1, but lots left	NA
Tofino/Tranquil	70	Moderate-low in CWHvm1	NA
Kennedy Lake	35	Very low in CWHvh1, low in CWHvm1 and CWHvm2	Heavily harvested
Clayoquot	100		NA
Upper Kennedy	50	Low in CWHvm1	Significant
Beach	No tenure		

*NA means all or almost all the area is lisaak's tenure in that unit.

Figure 5 provides an overview of the status of old forest and historic harvest in the different watershed units.

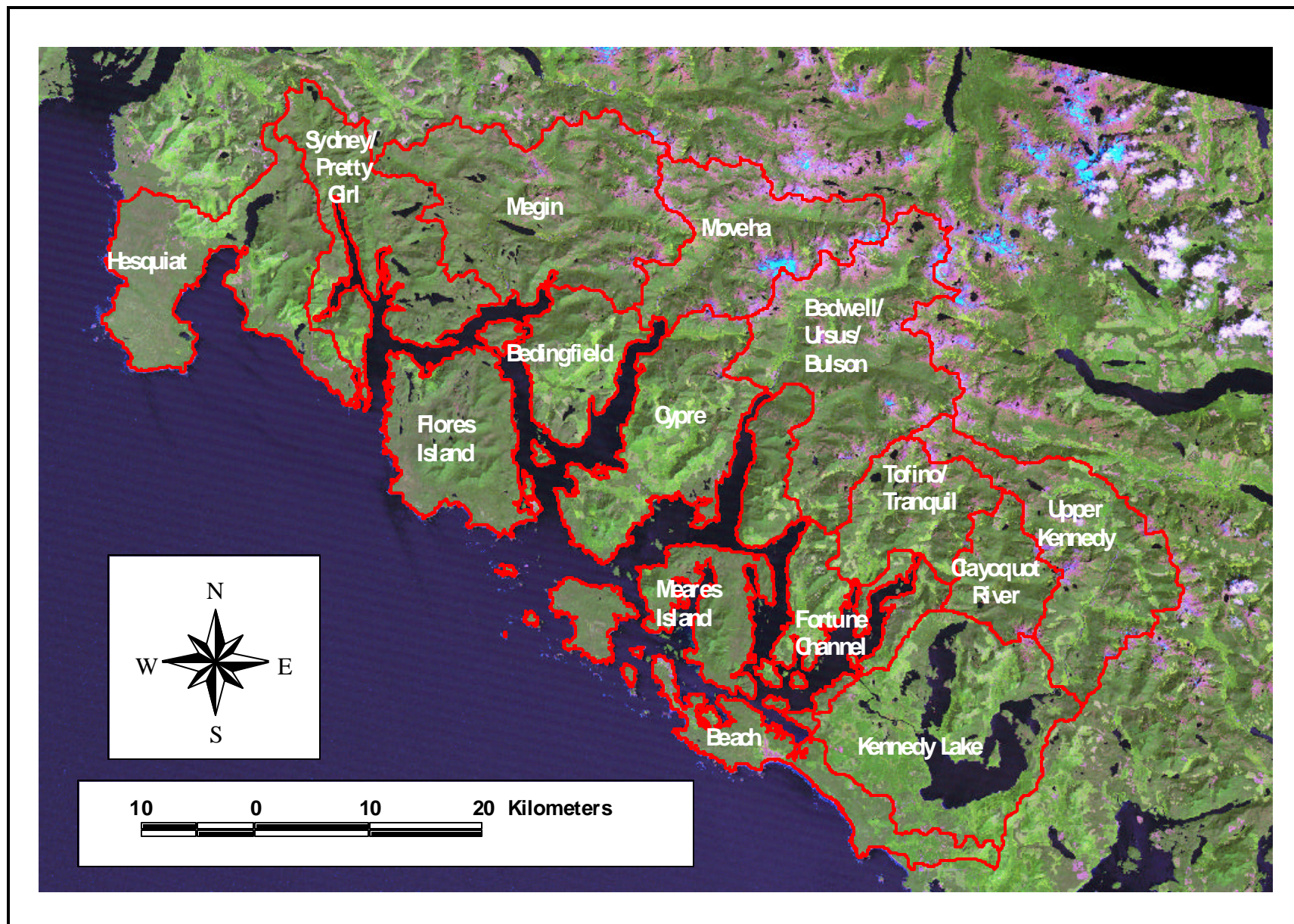


Figure 5. Overview of the watershed planning units, with previous harvesting shown in lighter green.

3.2: MANAGEMENT OF HCVF CONSERVATION ATTRIBUTES

Management of Clayoquot Sound and the Iisaak tenure in particular is intended to be under the recommendations provided by the Clayoquot Sound Science Panel. Many of the HCVF attributes identified in this analysis (see summary in Table 2 and in Working Table 1) are maintained (or potentially maintained) through implementation of the CSSP recommendations. The CSSP recommendations are comprehensive and detailed, and address many different aspects of management (most recommendations are in Volumes 2, 4 and 5). We therefore do not attempt to go through each potential HCVF and identify how they are maintained. Instead, we focus this discussion on areas that potentially fail to meet the criteria for precautionary management strategies as required by FSC P9.

3.2.1: MANAGEMENT RELATED TO LISTED SPECIES AND MARBLED MURRELET

A number of listed (and non-listed) species exist in Clayoquot Sound. A decision has been made to focus management effort on one of those (Marbled Murrelet) and to assume that the other values are maintained by coarse filter management strategies. While this may be a reasonable decision, no explicit rationale is provided in the watershed planning documents. A detailed document (TPC 2003) summarises the potential requirements of a wide range of species, including the listed species, and potential gaps are noted but not particularly highlighted in that document²⁰. No explicit tests of this broad assumption are provided as to how the many known and unknown species will be maintained, except to state that the composite series of reserves will in fact maintain them. This assumption requires additional exploration in order to be considered precautionary. A summary of regionally important species likely present in Clayoquot Sound is provided in Working Table 3.

Additional concerns were raised about the adequacy of the coarse filter in maintaining habitat for wetland- associated species and habitats. These concerns were translated to the technical planning committee by the CRB, with the specific recommendations outlined. No reference to these values is provided in the watershed planning documents (though it was noted that they were likely included in the process of planning as hydroriparian / wetland reserves were laid out – B. Retzer pers. comm.). Additionally, the Iisaak FDP outlines a process for a stand level review by a R.P.Bio prior to harvest, however, we feel that an explicit process for ensuring these values are in fact maintained is lacking. It is possible that this is largely a failure of communication (i.e. we note the difficulty in stating how every value will be maintained), however, we feel it is difficult to assess whether a precautionary management strategy is in place without explicit strategies in place. Working Table 3 outlines some questions relating to how individual values will be maintained.

Marbled Murrelet itself is a red-listed alcid that is unusual in that it nests primarily in old-growth forests, while foraging at sea. Clayoquot Sound is the home to a significant population of this species (6000 – 8000 birds), and much research has been undertaken here (Burger and Chatwin 2002). The birds nest at low densities and their population size appears to be directly related to the amount of suitable habitat present (i.e. there is no evidence that birds ‘pack’ into remaining habitat as habitat is lost – Burger 2002). The highest populations were found in the Moyeha, Watta, Megin, Clayoquot River, Kennedy, Bedwell-Ursus and Bulson watersheds.

A habitat suitability model, developed from research in Clayoquot Sound has been used to map the presence of potential habitat in four classes (important – excellent; important – good, sub-optimal and unsuitable). These maps have provided the basis for management recommendations regarding reserves for Marbled Murrelets, although exactly how they have been used is again difficult to determine from the watershed planning reports. The watershed planning documentation provides

²⁰ We also note that this useful and well written document is not readily available, which partly explains why there remains many comments by stakeholders about the lack of rationale throughout the watershed planning process.

no rationale for the choice of location, or amount, of murrelet habitat reserved. To date, it has therefore been difficult to assess the potential adequacy of the rationale and reserve network²¹. However, a report is in preparation (T. Chatwin pers. comm.), that provides a regional roll-up (for the whole of Clayoquot Sound) of the amount of habitat protected in different reserve areas, and within existing protected areas. Preliminary results from this analysis show that 61.8% of the currently available important habitat is maintained in reserve zones and protected areas. No patch size analysis is yet completed, but the reserves tend to be large (much larger than the recommended 200ha from IWMS) so likely will not incur increased predation pressure that is predicted to be caused by fragmentation of old-growth habitat.

Determining whether this overall high level of protection is adequate remains difficult however. The Marbled Murrelet Recovery Team (MMRT) set a recovery target of ensuring that there was less than a 30% decline in the overall population (from 2002) in 30 years, which requires 69% habitat retention from 2002 in order to de-list the species over the next 30 years. The level of reserve in CS (61.8%) is less than this target. Professional opinion (T. Chatwin pers. comm.) suggests that the reserves, combined with the low rate-of-cut in Clayoquot sound will be adequate to meet the goal of de-listing the species within the Clayoquot Sound area (T. Chatwin in prep.).

Alternatively, Clayoquot Sound has very high densities of murrelets, and is considered a significant source population for Vancouver Island, where the overall population is known to be declining, particularly on South Island (T. Chatwin pers. comm.). Since neither the designation of reserves nor the recovery targets considers the amount or distribution of historic harvest of murrelet habitat, it is difficult to determine whether the reserves are fully precautionary in terms of maintaining some percentage of an historic population. Science (as reviewed by the MMRT – see Burger 2002) suggests that Marbled Murrelets nest at relatively low densities, but do not appear to increase this density in areas with lower amounts of available habitat (i.e. they do not ‘pack’ into remaining habitat). Based on these assumptions, the management strategy can therefore be assumed to result in a minimum 38% reduction in present numbers of murrelets in currently suitable habitat, in addition to the historical losses of murrelets due to past harvesting.

Recommendation: explicitly state management goal for Marbled Murrelets within Clayoquot Sound²². This will allow hypotheses embedded in the management strategies to be explicitly monitored and tested in future.

Recommendation: consider whether restoration or increased targets are required in areas with significant historic loss of habitat.

Recommendation: clarify the rationale for focusing management attention primarily on Marbled Murrelets. Make rationale available to the public.

Recommendation: clarify how ongoing research (e.g. Van Den Driessche et al. in prep, outlining habitat use by bats) and / or existing recommendations (e.g. for wetlands or red-legged frogs) are to be implemented.

3.2.2: MANAGEMENT RELATED TO INTACT AREAS

As identified in section 3.1 above, portions of the intact areas (i.e. Eehmiis areas) of Clayoquot Sound do overall meet the definition of HCVF based on being part of a nationally significant large landscape level forest. Since the science of ‘thresholds’ is poorly developed, i.e. it is unclear ‘how much is enough’ in terms of maintaining large landscape level intactness values, we used three primary sources of information to identify potentially appropriate management strategies relating

²¹ This point is reflected in the many comments received to this effect by members of the public and science panel members.

²² The general goal of maintaining naturally-occurring species such that they persist in the long term and adapt to their environment within the normal range of variation (TPC 2002, Vol 1, page 23) should be translated explicit population targets.

to these values. The first set of information is a summary of previous assessments of intactness at various scales relevant to Clayoquot Sound (see Section 3.1.1 on the assessment), the second comes from the Clayoquot Sound Science Panel itself, and the third is an analysis of the relative intactness values provided by the various sub-basins and face units within the remaining intact areas.

INTACTNESS, IN CONTEXT

Conservation biology theory and practice has previously shown the need for establishing a network of protected areas and/or reserves that provide representation at all scales (e.g., Lindenmayer et al., Noss et al. 1999, Soule 1991, Callicott et al. 1999). To be effective, and efficient from a resource development perspective, these reserves should be located where they also provide for conservation of the maximum number of other values, and are complementary to natural disturbance and landscape patterns (Cissel et al. 1998, Noss et al. 1999, Pressey 1996). To be effective from a broad biological conservation perspective they also require sufficient redundancy to provide resiliency in the face of natural disturbances and climate change, and careful layout to ensure they capture complete home ranges and provide for potential immigration where local extirpations may occur (e.g., Noss 1996). They may also need to accommodate migration of whole ecosystems with the approach of climate change (Noss 2001). The protected area/ reserve network should also provide control areas for ongoing monitoring, (CSSP 1994, CSSP 1995, Arcese and Sinclair 1997).

Section 3.1.1 summarises the results of a number of studies that identify intact watersheds on Vancouver Island and coastal BC. These studies all point to a general lack of intact watersheds remaining, and some highlight the high conservation values present in Clayoquot Sound.

Representation data from BC Parks and Huggard et al. (2005) show that the existing network of protected areas within Clayoquot Sound and the Windward Island Mountains Ecoregion, combined with the reserves proposed in the watershed Plans for Clayoquot Sound provide a reasonable level of representation at the levels of BEC variant and Site Series within Clayoquot Sound. However, at the broader provincial scale, the CWHvm1 and CWHvm2 are not well-represented (7% and 8% respectively – see Tables 4 and 5). The present distribution of protected areas includes some complete watersheds (e.g., Megin and Moyeha); however, their effectiveness at landscape and watershed scales could be significantly improved through the addition of further complete watersheds. At the landscape level, their distribution does not fully capture some elevational and climatic gradients (especially between the outer coast CWHvh1 and interior), and they do not provide complete connectivity across the ecoregion. Some of the existing protected areas could also be made more viable by increasing their effective size through reserves in adjacent intact areas, or linking them with nearby protected areas with intervening reserves.

In their assessment of the potential contribution of the Eehmiis areas (i.e. the remaining intact areas) to ecosystem representation in Clayoquot Sound, Huggard et al. (2005) also highlight the importance of maintaining intact areas (see page 3). Their report primarily focuses on the *quantity* of representation by site series, without directly evaluating the potential increased value associated with reserving whole watersheds vs. dispersed smaller reserves. Although their assessment shows that the increase in representation provided by the Eehmiis areas only marginally improves representation, their assessment demonstrates that reserving the Eehmiis areas does provide a *substantial increase to the proportion of interior habitat*.

Within Principle 9, FSC attempts to use a science framework to identify the most valuable ecological and cultural values, and to ensure that these values are maintained at a low risk by advocating a precautionary approach. The FSC-BC HCVF Assessment Framework provides an approach to identifying such areas, yet it remains that there is very limited information or scientific rationale for determining: “How much is enough? How many intact areas are adequate? How valuable is additional protection or representation?” (e.g. Noss 1986). It is generally accepted

within ecology that ‘more is better’, but the question still remains – how much more? Quantifying the amount of forest adequate to maintain cultural values is similarly nebulous in its final analysis.

A potential conclusion from the contextual information on the rarity of intact valleys remaining on Vancouver Island and on the southern portion of the coast of BC, combined with provincial low levels of protection for the two main biogeoclimatic variants, is that the intact values in Clayoquot Sound should be fully maintained. This would be the most certain precautionary approach available, and may be reasonable, particularly given the very high values and unknown effects of climate change.

Alternatively, given the lack of certainty around thresholds, we undertook an additional step which attempts to incorporate suggestions from the CSSP, as well as general principles of conservation biology (as recommended by the FSC BC Standards) to develop additional guidance regarding the specific landscape level values present in the various intact areas. The following highlights how the CSSP dealt with intact valleys in its recommendations and we go on to make additional recommendations.

INTACT AREAS AND THE CSSP

The Clayoquot Sound Science Panel (CSSP) made a number of comments on the need for maintaining intact or undeveloped watersheds. The comments from Report #2 mainly discuss the need to prove that forest harvesting operations can consistently implement the recommendations of the CSSP (i.e. successful implementation monitoring), and secondly to prove that the recommendations of the CSSP are actually effective in maintaining ecological integrity (i.e. successful effectiveness monitoring). The statements imply that there should be no development in the intact areas until managers can demonstrate, through monitoring, that management activities in already developed areas can achieve all of the CSSP management objectives.

CSSP Report #2 (p. 58):

5.3 Undeveloped Watersheds

Areas that are currently undeveloped, but will be logged in the future, provide opportunities to manage according to principles and practices the Panel proposes. These principles and practices require fundamental changes in the way forests are managed—ways that, as a society, we have little experience in implementing. **A substantial amount of learning, better information, different logging practices, and different planning procedures are required to ensure sustainable ecosystem management will be implemented effectively. During the transition to a new approach to forest management, options for future management in the undeveloped watersheds must be maintained.** [emphasis added] They represent our best opportunity to demonstrate our commitment to stewardship and to development of exemplary forest practices.

CSSP Report #2 (p. 60):

5.3.3 Recommended Approach to Undeveloped Watersheds

1. Road construction and logging in the Clayoquot River, Sidney River, Ursus River, Ice River, and Cecilia Creek watersheds should be delayed until the following steps have been taken:
 - The necessary inventories of environmental and cultural resources and values, along with the approach to long-term planning (e.g., Total Resource Plans) have been prepared and subsequently approved by the Central Region Board (see also Section 5.5.2).
 - **Exemplary forest practices and silvicultural systems have been demonstrated elsewhere before they are applied in undeveloped watersheds.** [emphasis added]

- The Ministry of Forests has developed a prequalification procedure for work in environmentally sensitive areas, and all relevant companies and individuals are prequalified.
2. An implementation plan should be established and publicised for those steps potentially requiring significant time to implement. Phasing in the steps outlined in recommendation 1 should be completed as quickly as possible.

CSSP Report #5 (p. 2-3):

Panel recommendations are based on the following principles:[including]

- Inventories must be expanded to include the status, abundance, and distribution of resources and values in Clayoquot Sound and the critical factors (e.g., slope stability) that affect timber harvesting or other resource extracting operations. **Some undeveloped areas must remain as baseline reference areas against which managed areas can be compared.** [emphasis added]
- An effective monitoring program must be implemented and adaptive management practiced to improve forest practices and procedures as experience and knowledge are gained.
- **As part of adaptive management, research must be undertaken to ensure that the standards set are adequate to maintain long-term ecosystem integrity.** [emphasis added]

CSSP Report #5 (p. 189-191):

8.1 General Comments on Monitoring

Monitoring to detect changes caused by forestry activities is best done by comparing conditions at disturbed and undisturbed sites. Such comparisons can be made by comparing conditions: (1) upstream and downstream of a disturbed site; (2) before and after disturbance, at the same site; and **(3) in the valley containing the disturbed site and in a nearby similar, undisturbed valley.** [emphasis added] No one of these three possibilities is best for all purposes. An informed choice must be made for each specific purpose. Consensus is emerging, however, that to detect impacts of human activities, samples should be taken repeatedly and contemporaneously at the potential impact site, and at one or more control sites during periods before and after the impact has begun (Eberhardt 1976; Skalski and Mackenzie 1982; Carpenter et al. 1989; Stewart-Oaten et al. 1992; Schroeter et al. 1993). The objective is to exclude or identify, so far as possible, effects unrelated to human activities.

These comments by the Science Panel highlight the need for undisturbed valleys to act as controls for an ongoing monitoring program. The following quotes indicated that whole watershed reserves are necessary for monitoring water flow regimes.

CSSP Report #5 (p. 198-199):

8.2.3 Regional Monitoring of Streamflow and Water Quality

Within the Clayoquot Sound region, it is reasonable to expect to have three or four operating stream gauges, and perhaps six precipitation gauges (not counting ones established for research purposes). The planned period of record for a gauge should be 10–30 years. [emphasis added] This period corresponds with the time to establish the “normal” climate (Landsberg 1958:91–92), and is consistent with the time to establish the effects on runoff of forest harvest (see Section 7.2.4).

In Clayoquot Sound, it would be useful to establish gauges for a large primary watershed and for a small watershed within one of the protected watersheds (e.g., Megin River), and to seek observations for comparison in a basin subjected to development. **Because of the long-range nature of the program, it would be appropriate to establish gauging in a basin that is not, at present, highly developed.** [emphasis added]

These recommendations imply that a representative sample of undeveloped watersheds should be selected for long-term monitoring. This would require establishment of gauging stations prior to development, with data collection for 10-30 years prior to development to establish a baseline. This should occur in conjunction with establishment of long-term monitoring stations in control watersheds that are fully reserved for the long-term (protected areas or other reserved undeveloped watersheds).

Various members of the CSSP also provided written comments on the first two draft sets of watershed plans²³. The first letter dated October 30, 2002, signed by 10 members of the CSSP (Atleo, Berris, Bunnell, Church, Franklin, Kremsater, Lertzman, Moore, Ryder, Turner) commented on the need for considering a subregional context when setting watershed objectives and designing reserves:

We encourage the CRB to proceed with subregional planning, at least in a first draft form, so that the context for subsequent watershed level plans becomes more and more clear. At the very least, subregional issues should be addressed in a section in each watershed plan so that areas that may ultimately be recreational corridors, migration routes, and linkages between watersheds can be identified. That will help to avoid foreclosing options before other watershed level plans are produced. Some consideration of the subregional context (e.g., impact of adjacent parks on objectives) should be considered when deciding on which objective to emphasise in each particular watershed.

For example, under the current approach, it appears that 50% of the occurrences of Blue-listed plan species will be reserved in each plan. However, if the occurrences in one plan area are the only feasible reserves for many kilometers, then more than 50%, possibly 100%, should be reserved. Alternatively there may be better reserves in other plan areas, so the reserve in any given plan might be less.

Further in that letter the panel members state:

Also in Report 2, **the Panel recommends not developing undeveloped watersheds until methods are tested and shown to be effective in watersheds that already have a harvesting history**. Although we realise that there are not undeveloped watersheds currently slated for development, we are not clear on whether completion of these watershed plans will allow plans for undeveloped watersheds to proceed or whether they will be treated with that cautionary approach (or if all the undeveloped watersheds have now been given protected area status so the recommendation no longer applies) [emphasis added].

A second letter dated 2/24/2005 from three members of the CSSP (Lertzman, Turner and Franklin) commenting on the second set of watershed plans states that:

It was not within the mandate of the CSP to recommend that previously undeveloped watersheds be reserved. We felt strongly enough about them, however, **that we recommended that development in them be deferred until the new management regime we recommended was fully developed and tested**. We continue to feel

²³ Personal conversations during the preparation of this report by the authors with two members of the CSSP further confirmed the CSSP's concerns regarding maintaining the remaining intact watersheds in Clayoquot Sound.

strongly that the remaining undeveloped watersheds on the BC coast are globally significant conservation opportunities and as ecological and physical benchmarks. The undeveloped watersheds in Clayoquot Sound are doubly significant in their regional context because of the scale of development elsewhere on Vancouver Island. [emphasis added]

This letter ends with "... the resources in the undeveloped watersheds may be seen as the only option available. However, **we strongly urge that the existing undeveloped watersheds continue to be deferred** as long as there are other choices that can be made." [emphasis added].

Given the intactness values present and statements by the CSSP, the main questions that remain are: which intact areas should be managed as reserves, and what is necessary in terms of monitoring results to allow development to proceed in others. In an attempt to answer these questions, given the information available and in the context of a precautionary approach, the next section outlines a series of recommendations on management for the intact areas.

PRECAUTIONARY MANAGEMENT RECOMMENDATIONS FOR INTACT AREAS

At first glance, one could assume that precautionary management of HCVPs where intactness is a primary HCV will require maintenance of those areas fully intact in perpetuity. This is one interpretation of how to maintain the value. However, one must also be cognisant of the purposes for which intact areas are being maintained, and whether this may be met through other management measures.

In an attempt to better understand what values are potentially provided by the various intact areas, each of the sub-basins/ face units identified as intact by previous studies and the MOU were qualitatively assessed for what additional conservation value might be gained by fully maintaining their intactness. These values were summarised in Working Table 2 found in Section 5.0. The considerations included factors that are relevant to issues identified by the CSSP in their various comments (e.g., control areas for monitoring at landscape and watershed scales, adjacency to PAs, provision of subregional/ regional linkages, migration routes, etc.). The assessment methods included a review of existing inventory information (BEC mapping, habitat mapping, protected area mapping), 2005 satellite imagery, and watershed plans. Due to the limited budget and timeline for this project, the assessment of the intact areas was limited to a landscape-level overview. Further analysis of detailed inventories of the values in each area, and any new inventory information, may provide a basis for refinement of the designations or the combinations of recommended management regimes presented below.

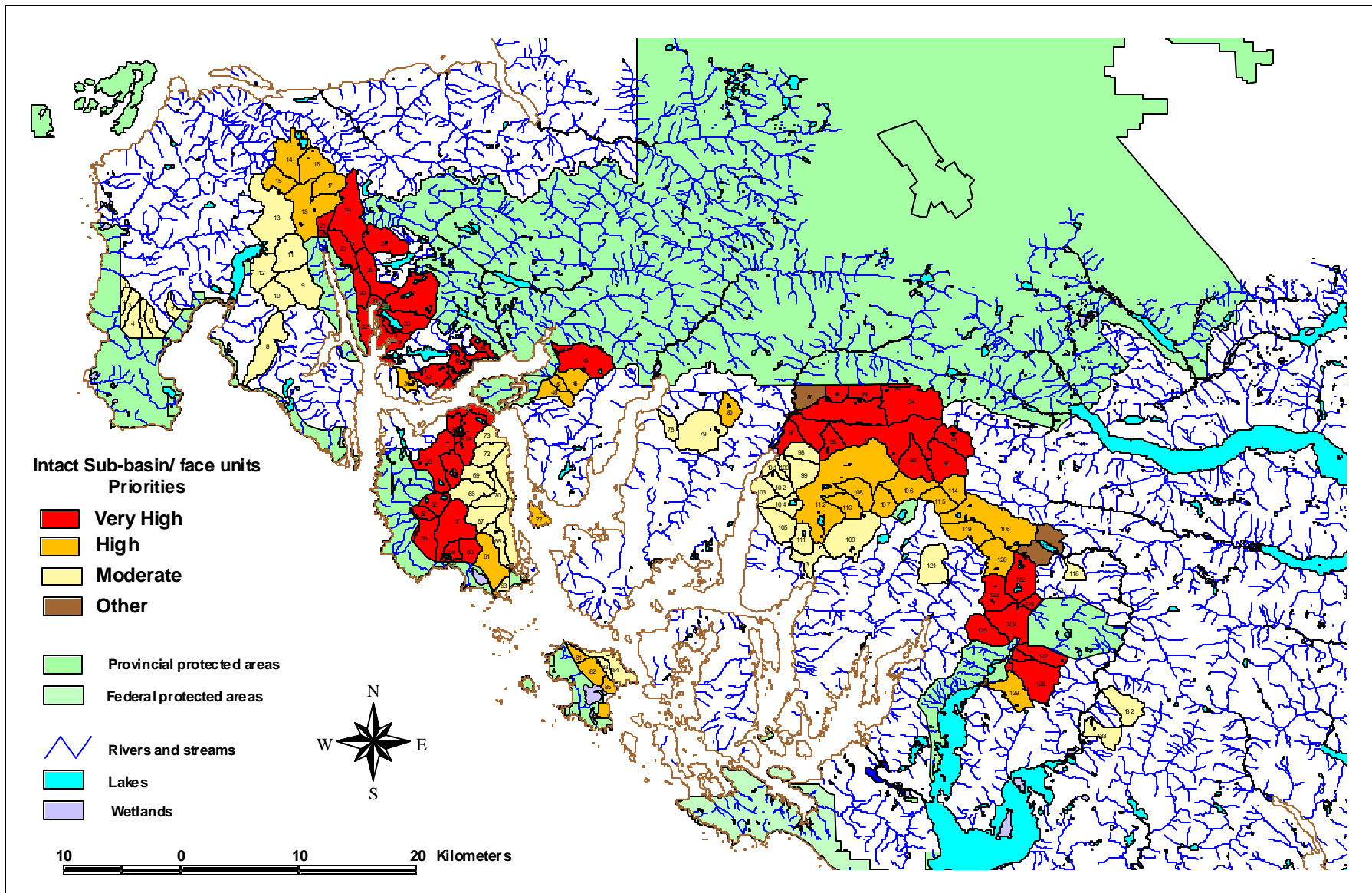


Figure 6. Priorities for intact basins and sub-basins in relation to their intactness (intact areas - i.e. Eehmiis areas – taken from MOU 1999). See Working Table 2 for additional details.

Based on the values identified, the various intact sub-basins/ face units (i.e. the Eehmiis areas) were divided into three broad categories of Very High, High and Moderate (see Figure 6) values for intactness. Low and very low areas would be the remaining sub-basins/ face units that were not identified as "Eehmiis" areas because they already had significant levels of development at the time the original map was produced. The criteria used for rating each sub-basin/ face unit were their potential for fulfilling the following goals:

- maintenance of whole watershed benchmarks or control areas
- increasing the effectiveness of existing PAs (e.g. creating ecologically meaningful boundaries, increasing connectivity)
- increasing landscape level representation (i.e. providing protection for whole watersheds and unique BEC unit elevational and/ or geographic sequences, e.g. see Utzig and Scott-May 2003)
- increasing the effective size of protected/ reserved intact areas
- the presence of unique and/or high quality habitat (e.g. lakes, wetlands, snow avalanche tracks, fisheries - limited information was available for this overview assessment – see further discussion below)
- regional connectivity across diverse habitats (e.g. inner and outer coastal shoreline to the height of the Central Ranges)

In addition to the sub-basins/ face units originally identified as Eehmiis areas, three other areas have been identified as potential additional reserves. An intact area in Upper Kennedy River surrounding Snag Lake (#117) should be included along with the other intact sub-basins in that area. The face unit (#87) in lower Bedwell provides connectivity between the Strathcona PA complex, Ursus Creek and Bedwell Sound. An area located near the mouth of the Clayoquot River (#130) provides an important habitat link between Clayoquot Sound and the eastern side of the Clayoquot watershed. The areas in lower Bedwell and Clayoquot Rivers will require restoration, but once restored they will significantly increase the effectiveness of the other intact reserves and protected areas.

The sub-basins/ face units designated as Very High are generally contiguous with existing PAs, increase connectivity between the Strathcona PA complex and the coastline, increase the effectiveness of existing PAs by completing watersheds that are only partially protected under present conditions, provide increased representation at the landscape/ watershed scale by reserving complete watersheds with biologically diverse elevational sequences and/or have unique habitat features. Areas rated as High may provide an additional increase in area to the Strathcona PA complex or other PA complex, but are similar to areas already protected or designated as Very High, and/or have less value from a connectivity perspective. Moderate areas are generally isolated and/or less diverse than areas rated as High or Very High.

Recommendation: Consider management of the various intact areas, depending on their rating (Working Table 2):

- **Very High - reserve indefinitely to maintain high values**
- **High – reserve at least until monitoring has confirmed the effectiveness of management in other operating areas (sufficient time for mature/old forest attributes to develop in managed stands – will require decades of monitoring for some attributes)**
- **Moderate – reserve until a monitoring program is in place (including collection of baseline/benchmark data), and has operated for sufficient time to confirm that operations are fully implementing all measures recommended by the CSSP (estimated at a likely minimum of 10 years)**

- **Low and Very Low – areas already developed – apply standard CSSP management recommendations**
- **Other – restoration where necessary and then treat them as rated in Working Table 2.**

This suite of recommendations is an interpretation of the information we have available, which is relatively coarse scale. A refinement of our recommendations is therefore possible using more detailed local information (see recommendation below).

It is possible that alternate combinations of watershed reserves and management regimes may also result in a precautionary management regime overall. However, we suggest that it is unlikely that most other combinations will achieve a precautionary approach, especially for intactness, without long-term reserves in at least the highest value intact watersheds. We would also suggest that there is a need to have some certainty around the overall effectiveness of management practices in maintaining ecological integrity prior to proceeding with harvesting in anything but the lowest value intact watersheds.

In addition, these recommendations are consistent with CSSP reports, including Report #2. These recommendations obviously go beyond the recently released watershed plans. The watershed plans may be generally consistent with most recommendations in CSSP Report #5, but they do not address recommendations in Report #2, and subsequent comments submitted by a majority of CSSP members during the review process for approval of the watershed plans.

Recommendation: compile geographically-organised summary of values for all areas of Clayoquot Sound (e.g. which watersheds have what fisheries values?, which have what percent of Marbled Murrelet habitat?). Refine above landscape level analysis as necessary using these values²⁴. The document should include an assessment of historic conditions in each area, to identify what values have already been impacted by historic harvest activity.

3.2.3: MANAGEMENT RELATED TO RARE AND ENDANGERED ECOSYSTEMS

The watershed planning process interpreted the Science Panel recommendations which required protection of endangered ecosystems and use protection level as follows:

- 100% protection of (remaining) red-listed ecosystems
- 50% protection of (remaining) blue-listed ecosystems.

It has previously been asked (e.g. by the Science Panel), what constitutes the rationale for reserving only 50% of the blue-listed ecosystems. No answer is yet provided in the planning documents, although it is stated that this was on advice from the BC Conservation Data Centre. We find that this does not provide adequate precautionary rationale.

In addition, we are concerned that the targets used do not take into account historic harvesting / current condition of a particular landscape. Because the rare ecosystems are defined on the basis of structural stages, we assume that only the stage 7 and 6 (and 5 in some cases) are considered 'listed' and therefore if much of it has been harvested, we assume that only the remaining high structural stages are considered as potential reserve. In areas with significant harvest, this will result in a small proportion of the historic distribution of these rare types being protected, and does not constitute a precautionary management strategy.

An analysis of historic abundance of these ecosystems should allow an appropriate restoration strategy to be developed, to ensure that an adequate level of the historic abundance of currently

²⁴ In addition, we believe this compilation would improve both a) planning and b) the public's understanding of how decisions are made during planning. Without this, much of the rationale used by planners is unavailable to the general public. In addition, it allows assumptions to be tested about where values are located.

rare ecosystems is implemented. This is of particular importance since many of these ecosystems are actually listed because of historic harvesting impacts (BC CDC pers. comm.).

- **Recommendation: Provide rationale for 50% retention for blue-listed ecosystems**
- **Recommendation: Undertake an assessment of the impact of historic harvesting on rare ecosystems using site series mapping. The results of this work should be used to guide reserve and restoration strategies for historically impacted ecosystems..**

3.2.4: MANAGEMENT RELATED TO OLD GROWTH

The CSSP recommended that a minimum of 40% old forest be retained in each watershed planning unit. In fact, a regional roll-up of the results of all the watershed planning units suggests that a total of about 62% of the existing old-forest is reserved by protected areas, or reserves. This meets the criteria as set out by the CSSP. However, we are concerned that the distribution of reserves did not consider areas that have been significantly impacted by historic harvesting. We are concerned that in these areas a maximum of 30% old-growth (i.e. the representation by site series target) may be the total old-growth retained, and that restoration strategies are not in place to ensure that an appropriate level of old-growth is recovered over time.

In our qualitative assessment, we identified a number of areas of particular concern that may meet the HCVF threshold for highly impacted old-growth, and we examine the management strategies for old-growth in more detail in those areas:

Kennedy Lake: The watershed plan states that 42% of the watershed planning unit is old growth, which it states is 'well above' the target set by the CSSP (which we note to be 40%), and the FDP indicates further harvesting is planned for this unit. The WP then states that 23% (4880ha) of the forested landbase is located within parks or reserves, leaving another 3750ha to be identified to meet the target of 40% which it is stated "will have to be retained during harvesting operations" .

Fortune Channel: 2547ha (25%) of the old forest are located within protected areas or reserves. Therefore an additional 1442ha (15%) must be retained during harvesting operations. With regard interior conditions, the WP states that 869ha are located within reserves in interior forest conditions which is only marginally higher than the 'required' 794ha. Although Huggard et al. (2005) note that overall, a high level of interior conditions remain, we are concerned if quite low levels of interior habitat are common, or will become common, for low elevation ecosystems. We are therefore concerned about the future effectiveness of these reserves to maintain functioning forest ecosystems.

Upper Kennedy: in this watershed planning unit, although the amount of available old-growth is significantly above the required 40%, there still remains 1800ha that must be identified during operations to meet the reserve target.

Other watershed plans: Although most of the other watershed planning units are well above the required targets of 40% we note that they all tend to have requirements for substantive additional old-growth to be reserved during operations, unless the total protected areas exceeds the 40% requirement.

We do not understand why additional area to meet the 40% old-growth is not identified as reserves on the maps in the watershed planning process. Management strategies for old-growth are to maintain 30% by site series within each management unit, with an overall target of 40% old growth by watershed planning unit (CSSP interpreted by Technical Planning Committee - TPC). CSSP specifically stated that 'within stand' retention should not contribute to this target. As originally stated, this is of particular concern in areas where there have been high historic impacts to date, however, it is also

a concern that conservation planning in all the watershed planning units has not included distribution of the entire target, but rather leaves allocation of a significant portion of the total 40% reserve to what appears to be an undefined process.

We also raise concerns regarding the interior forest requirements outlined by CSSP: under natural conditions, these forests have a very high percentage (perhaps in excess of 70% of the forested landbase⁸) in 'interior' / unfragmented old-growth. We raise the question whether retaining only 8%, as outlined by CSSP, actually meets the test for precautionary management of old-growth in these ecosystems. Many areas in fact retain considerably higher levels of interior forest (e.g. work on representation by Huggard et al. (2005, pp.16-17) indicates that approximately 60% of landbase of the reserves recognised in the watershed plans are interior habitat (i.e. >200m from a harvestable stand). However, in the more productive landbase some areas already come close to this 8% target, and this raises concerns.

In the larger picture, we raise the concern that newer information (CIT 2002a,b) has recommended much higher overall targets for retention in coastal ecosystems (70% by site series at the regional level). There is a significant difference between this and the level proposed more than a decade ago by the CSSP, however consideration of adjacent protected area representation may bring these values considerably closer together than it first appears.

- **Recommendation: reassess the overall targets and requirements for interior conditions proposed by CSSP in light of CIT and other work currently underway in coastal BC.**
- **Recommendation: develop explicit strategies that use conservation biology principles to ensure additional areas required to meet the 40% target are employed in the most biologically effective manner.**
- **Recommendation: Develop reserve/ restoration plans that use conservation biology principles to identify the most ecologically appropriate areas for retention and restoration of historically impacted ecosystems. .**

3.2.5: MANAGEMENT RELATED TO REPRESENTATION OF ECOSYSTEMS IN PROTECTED AREAS

A HCVF may be identified where there is inadequate representation of ecosystems in local Protected Areas.

Data from the Ministry of Environment summarises the representation of ecosystems in Protected Areas at a number of scales. Table 4 provides representation by biogeoclimatic variant for Vancouver Island and provincially, and Table 5 provides representation at biogeoclimatic variant level within the ecosection. Data are current to (2006) and from BC Ministry of Environment (Parks Branch).

Table 4. Representation at the level of biogeoclimatic variant in Protected Areas, for Vancouver Island and the province of BC (shaded zones are present in the MU).

Biogeoclimatic variant	Area on Island (ha)	Area Protected on Island (ha)	Percent protected on Island	Area in BC (ha)	Area Protected in BC	Percent protected in BC
CDF mm	86023	792	1	245,313	6,857	3
CMA unsp	66892	42610	64	4159164	84,5377	20
CWH mm 1	138825	14247	10	148,620	14,247	10
CWH mm 2	227006	30193	13	227,006	30,193	13
CWH vh 1	314366	84628	27	455,047	88,367	19

CWH vm 1	956157	84403	9	2,033,604	138,823	7
CWH vm 2	383225	41829	11	1,377,071	110,174	8
CWH xm 1	214516	3433	2	435,323	9,725	2
CWH xm 2	408184	14658	4	465,246	19,404	4
MH mm 1	343629	97594	28	1,602,020	290,297	18
Grand Total	3138823	414388	13			

Table 5. Representation at the level of biogeoclimatic variant in PAs, for Windward Island Mountains Ecosession. (shaded zones are present in the MU).

Biogeoclimatic variant	Total Area	Total Protected	Percent Protected
CMA unsp	7,980	3,795	48
CWH mm 1	758	0	0
CWH mm 2	1	0	8
CWH vh 1	179,515	66,009	37
CWH vm 1	585,391	69,688	12
CWH vm 2	200,632	29,468	15
CWH xm 2	14	0	0
MH mm 1	80,183	27,267	34
Grand Total	1,054,475	196,227	19

Provincially representation of the CWHvm1 and vm2 is very low within a conservation planning framework, and across Vancouver Island it is only slightly better. Within the ecosession it is somewhat improved. However, representation targets set by the Clayoquot Sound Science Panel increase the level of representation in reserves to a minimum of 40% for each site series / biogeoclimatic variant / watershed planning unit. Though this level significantly increases the level of protection, there remain some uncertainties regarding the level of precaution that this leads to:

- Old-growth reserve targets. The CSSP recommended that 40% of the forest in a watershed planning unit be maintained as old-growth (age classes 8 and 9). To meet this goal, site series representation targets of 30% of each site series and 50% of rare site series in reserves have been implemented. The additional 10% comprises other forests outside the timber harvesting landbase. As outlined above (Section 3.2.4), we are also concerned about the potential lack of effectiveness in areas where the amount of interior habitat comes close to the low minimum target of 8% of the forested landbase.
- The level of retention used (30%) is considerably lower than that suggested to meet goals of EBM for coastal forest by the Coast Information Team (in which a regional reserve level of 70% of the natural levels of old forest²⁵ was suggested to represent a low risk target), and in fact is very close to the 'high risk' cut-off suggested by the CIT (30% of natural). Note that because we do not have a regional summary of the watershed plans, it is not possible to test what total levels of protection remain in the Clayoquot Sound 'region'. If an overall total of close to 70% is met, with 30% at the watershed level then this may be close to the definition of EBM as outlined by the CIT which did allow higher risk at the watershed level if a regional low risk target is met.

²⁵ In these ecosystems, due to the very low levels of natural disturbance the 'percent of natural' is very similar to the actual percent

- It is unclear that the reserve network actually constitutes permanent reserves. This is not stated in the watershed plans, and we assume that this is the case in the discussion above.
- **Recommendation: Calculate the total amount of old forest reserved across Clayoquot Sound (by site series), and assess whether this does constitute a precautionary level of protection for old-growth, in light of new information from the CIT (2002a,b) and others.**
- **Recommendation: identify watershed planning units where interior habitat provided by reserves is close to the minimum target of 8%. Consider opportunities to increase this level of interior forest, since this appears to be a very low level of interior forest conditions in this ecosystem²⁶.**
- **Recommendation: develop explicit strategies that use conservation biology principles to ensure additional areas required to meet the 40% retention targets are employed in the most biologically effective manner.**
- **Recommendation: develop reserve/ restoration strategies that use conservation biology principles to identify the most ecologically appropriate areas for retention and restoration of historically impacted ecosystems²⁷.**
- **Recommendation: provide clarity that the reserves identified are permanent.**

3.2.6: MANAGEMENT RELATED TO EROSION AND SEDIMENTATION

lisaak's management plan states that Class V unstable terrain will be reserved and Class IV will only be harvested following recommendations from flowing from detailed terrain assessments. This is standard practice for Class IV terrain in BC. What is needed is some further comments on the precautionary level of risk that will be acceptable for development on Class IV terrain. Detailed assessments normally provide recommendations on road construction and harvesting techniques that will reduce risk, but there are still residual risks, even with those techniques.

- **Recommendation: develop policies to state that high risk alternatives will not be pursued in any situation, and that even moderate risks will not be undertaken when potential downslope/ downstream consequences involve high value aquatic habitats, human habitation or domestic water supplies (e.g., see FSC-BC indicator 6.5.3).**
- **Recommendation: develop similar policies for waterborne erosion and snow avalanche starting zones.**

3.3 CONSULTATION

Principle 9 requires consultation with third parties, in relation to high conservation value forest assessments.

lisaak Forest Resources Ltd, through the Central Regional Board, undertook a number of different consultation processes relating to the 11 watershed plans over three separate release periods post 2002. Because these processes are being assumed to have fulfilled the consultation required for an HCVF assessment, the processes themselves, and the substantive input and lisaak's response are all relevant to this report. Table 6 summarises for each watershed plan a) the type of consultation and b) the key substantive issues raised relating to HCVFs and c) how these issues they have been

²⁶ Note that analysis by Huggard et al. suggested that most watersheds were considerably higher than this minimum target so this is likely to be an issue only in areas with extensive harvest where opportunities to maintain larger patches were scarce.

²⁷ Note that this may have occurred already under watershed planning. However, from available documentation it is difficult to assess the extent to which historic impacts were mitigated using planning.

dealt with in the final watershed plans. A summary of our findings with respect to consultation are provided below.

Note that our task here is to identify how well concerns raised with regard to potential HCVFs were dealt with. We therefore focus on the concerns raised about whether management strategies are sufficiently precautionary. We also note here that comments were received by the Clayoquot Regional Board (CRB) that stated there was either adequate or too much protection in Clayoquot Sound (including personal comments made to the team on our field trip). However, that broader question of trade-offs is assessed during the FSC Audit, and is not relevant to the HCVF assessment itself. We therefore don't focus on those comments below.

Table 6. Consultation Summary. For ease of reading, quotes from the consultation are included in italics, and the remainder are comments from the HCVF team.

Consultation	Substance of comments received	Understanding of response to comments
Bedingfield, Cypre, Flores Island		
<p>Consultation occurred between July 26 – Sept 30th, 2002. The process: public presentations of the watershed plans (comment that it occurred only in 2 communities), public meetings and a significant time period for response. (though comments were provided that this overlapped with the summer season which is extremely busy for local residents).</p>	<ul style="list-style-type: none"> ▪ A significant number of responses to the plans were received by the CRB, which were summarised into a single document. A range of stakeholders provided comments, including former members of the CSSP themselves who provided detailed commentary on how their recommendations were being implemented. The summary document makes it very difficult to determine the breadth of these comments (and we do not know whether the full comments were passed on for implementation or not). ▪ Perhaps the most significant set of comments was provided by 10 former CSSP members who reviewed the first three plans. <ul style="list-style-type: none"> ○ <i>Four broad concerns are raised, dealing with a) the lack of restoration in the plans, b) the lack of comprehensive monitoring/ adaptive management strategies, c) lack of 'planning' of harvestable areas within the plans, d) lack of a timeframe in the plans (recommended at 100 years).</i> (Note that not all these items are necessarily relevant to HCVPs, but speak to the adequacy of the review process). ○ <i>An important comment concludes that potentially important 'remnant' old forest areas appear not to have been included as reserves, and rationale is not provided (e.g. old growth around Atleo River and Cypre River). The comments also note that "in general we felt it would have been prudent to gather more information and describe more clearly what is unique about each watershed unit to help tailor planning" (Science Panel Members).</i> ○ <i>The Panel Members also highlight the lack of rationale for decision-making, making the plan difficult to critique or follow. These include the MaMu planning decision, and the decision to maintain only 50% of blue-listed plant communities.</i> 	<p>All the comments received were generally quite effectively summarised (see below) by the Central Region Board and provided as recommendations back to the TPC for changes. The revised version of the Vol 1 of the watershed plans (July 2006) which provides the rationale for the subsequent plans does attempt to answer many of the points raised by both the Science Panel Members and other reviewers in these comments. Such changes include better linking from inventory to planning decisions, a more clear statement of how reserves have been chosen, and a clear presentation of exactly what targets were used for some values (e.g. red and blue-listed ecosystems and representation of other rare old forest ecosystems). It does not provide a monitoring strategy, but lays out an approach for moving forward with a monitoring strategy. There remain a number of outstanding issues:</p> <ul style="list-style-type: none"> ▪ Restoration still remains a very minor part of the planning. The plans include a summary of what has occurred (largely in terms of road deactivation etc), and notes that further restoration will occur if finances are available. The plans do not address the broader issue of restoration relating to ecosystems where old forests have been significantly reduced by past harvesting. Restoration / reserves/ long rotations for general old forest is not mentioned. An important gap seems to be the calculation of how much of a rare ecosystem needs to be maintained, since the totals are based on structural stages 6 and 7, if an area has been heavily logged then the relevant rare ecosystem 'disappears' from the calculation. ▪ Rationale is still lacking for choice of wildlife indicators. Much background information exists on a number of wildlife species, including habitat models for various species. However, the planning simply assumes that these species are adequately managed using the overall reserve system, and this assumption does not appear to have been tested.

Consultation	Substance of comments received	Understanding of response to comments
	<ul style="list-style-type: none"> ○ <i>The Panel Members also comment on their concern that development not proceed in the intact watersheds until effectiveness monitoring has proven the broader recommendation to have been effective, re-iterating recommendations from their second report</i> ▪ In addition, a significant number of additional comments were received that included: <ul style="list-style-type: none"> ○ Concern around non-protection of intact areas within the plans. ○ Detailed comments asking for rationale to be provided around why only MaMu were chosen as triggers for reserves, why reserves have been located in particular areas ○ A request for multiple scenarios to that alternate plans could be evaluated (this was linked to part of the vision expressed by the science panel) ○ Requests that existing reserves in watersheds that are almost completely protected be expanded to increase the value gained by the reserve ○ Increased Marbled murrelet protection / provision of rationale ○ The need for a comprehensive 'effectiveness monitoring' strategy 	<ul style="list-style-type: none"> ▪ Rationale is still lacking for the amount of MaMu habitat reserved. Overall, about 50% of the existing class 1 and 2 habitat has been reserved in most watershed plans and a rationale for this level is still not provided. Many detailed points were raised by reviewers about the inadequacy of this level of protection and from the information provided it is not possible to determine whether this is precautionary or not. (see assessment of other background information above). As of Sept 2006, a review paper is in preparation that summarises the total level of Marbled Murrelet protection (Chatwin pers. comm.). This paper is not yet available. ▪ The issue of target minimums is not discussed (i.e. 40% was to be a minimum level for old growth representation, yet little discretion is (apparently) used in applying this target to the landbase). ▪ Outstanding issues that are not directly addressed in the plans include the conflict over intact/ Eehmiis areas. This issue is basically not dealt with in any meaningful way in the recommendations. ▪ In our assessment we note that there are many individual reports that identify often single values in a limited area within the MU, however there appears not to be a geographically-based summary of values to help planning (i.e. which watershed have highest or lowest values for a range of values). The (title) report does summarise wildlife values overall for the Clayoquot Sound, but provides very little geographic variability in these values, so it is hard to know to what extent variability within the area influenced planning decisions. This seems to be a significant flaw in the planning system to date. <p>Although we appreciate the extensive work that has gone into the planning, we also note that it is hard to follow the rationale, or critique the choice of reserves because the published maps include only that habitat that <i>was reserved</i>, rather than showing what is available and what of that was chosen for reservation. As a result it is impossible to assess alternatives, or what decision-making process has occurred.</p>

Consultation	Substance of comments received	Understanding of response to comments
		Again – a rationale is missing for these major decisions.
Hesquiaht/ Bedwell-Ursus-Bulson / Sydney-Pretty Girl / Tofino-Tranquil		
<p>Consultation occurred started Jan 21, 2005, and involved no public meetings or presentations. Three weeks were allowed for receipt of comments.</p>	<ul style="list-style-type: none"> ▪ A number of stakeholders expressed very strong dis-satisfaction with the lack of response to lengthy comments had been received after the first round of consultation and in how the public processes have developed. As a result some stakeholders provided more brief comments repeating the major issues raised previously. ▪ Three former members of the Science Panel provided a letter that stated concern about the undeveloped watersheds, noting that the Panel's mandate was not to comment on where to log, but how to log. They also state their concern that these areas are <i>"globally significant as conservation opportunities, and particularly in their regional context because of the scale of development elsewhere on Vancouver Island"</i>. ▪ A member of the Kinqwashtacumliith-Hesquiaht First Nation raises the issue that members of the community were not contacted regarding input into the Watershed plan for the Hesquiaht watershed, and that the plan is inadequate to maintain values. [The summary of input notes that this matter can only be reconciled within the FN.] ▪ An email was received by the HCVF team from another First Nation member (Wolf Clan of the Tla-o-qui-aht First Nation) raising a similar concern about the lack of opportunity / understanding regarding input. ▪ A total of 27 comments were in the CRB files, all of which expressed strong concern about the lack of adequate protection overall, particularly relating to the pristine watersheds. These comments include those from former science panel members, plus a scientists' declaration (see above). The substance of the comments varies, but refers to the lack of precautionary management, concerns regarding values inherent in the intact areas, and includes reference to the Science Panel itself that suggested caution regarding these areas. 	<ul style="list-style-type: none"> ▪ The summary document of the comments does not appear to adequately represent the content or strength of concern regarding a number of significant issues, particularly the issue of the intact watersheds. ▪ The notes from the summary of public input state that the CSSP recommendations are intended to deal with these issues, but in fact, as outlined in the Lertzman et al. letter also received, the Panel did not have the mandate to consider whether to log in a particular area, but only to comment on 'how to log'. Assuming then that the recommendations deal with this is not strictly correct. <p>The intact watersheds issue is dealt with in the summary comments with the following statement: <i>"The relative rarity and global significance of temperate rainforest is a recurring theme in public comments. This is a socio-economic question that must be answered by the people and government of BC. The world class forest management practices contemplated by the Scientific Panel are expected to mitigate effects on other uses. The general premise of the science panel was for planning to identify and protect, or management for, non-fibre values first. UNESCO MAB make it clear: areas designated as biosphere reserves must fulfill three basic functions: conservation, development and research / education. Underlying principles of biosphere reserves are to manage for conservation in core areas and sustainable development in large portion of remainder of biosphere reserve. As result of the Clayoquot Sound Land Use Decision, greater than 1/3 of Sound is protected in provincial and national parks, these constitute biosphere core. Lands outside these core areas are designated to be buffer zones or transition zones. The TPC watershed plans identify additional areas for conservation reasons."</i> This footnote does not directly address the issue raised by members of the Science Panel that in fact their mandate was solely to decide how best to log, not to look at the broader context of whether to log. The CS Technical Planning Committee progress report (July, 2006) acknowledges these</p>

Consultation	Substance of comments received	Understanding of response to comments
		<p>concerns by members of the CSSP, and states that some licensees have deferred some areas in response to the CSSP recommendations. However, the watershed plans do not include a monitoring plan or a strategy for effectiveness assessment to determine whether the CSSP recommendations are meeting their objectives.</p>
Clayoquot River, Fortune-Channel, Kennedy Lake , Upper Kennedy		
<p>3 week period allowed for response.</p>	<ul style="list-style-type: none"> ▪ Only 3 sets of comments were received about the final four watershed plans, from Interfor, Parks Canada, and a group of ENGOs. The first two were relatively minor comments. The ENGO comments focus on the intact values associated with Clayoquot Valley and the inconsistency between the proposed logging plans and the MoU between lisaak and the ENGOs which identified this as an Eehmiis area. 	<ul style="list-style-type: none"> ▪ Concerns were raised to the HCVF team about the lack of response to previous detailed comments, which people felt had lead to a considerable reduction in comments for this final set of watershed plans.

CONCLUSION RE CONSULTATION

The Consultation Process: Three separate consultation periods occurred regarding the watershed plans. The first appears to have been significant in terms of efforts to disseminate information into the communities, and to allow significant feedback. Although some concerns were raised about this first process the effort that was undertaken appears overall to have been consistent with the FSC-BC requirements for HCVF consultation. However, the two subsequent public input periods were very short (only a few weeks), had minimal notification of stakeholders, involved no public meetings and had poor timing (mid summer). These processes do not seem to have been adequate to meet the test for consultation regarding high conservation value forests as described by Principle 9.

Adequacy of Consultation Response: In terms of the substance of the public review period, it is clear that over the whole period of the 11 watershed plans, significant effort has gone into addressing concerns raised of a specific technical nature. However, there remain some specific concerns that appear to be outstanding or not adequately addressed in relation to high conservation value forests and the application of precautionary management. These include primarily:

- Intact / pristine watersheds (or Eehmiis areas). Many concerns have been raised regarding the future of these areas, from a wide contingent of stakeholders (local ENGOs, national ENGOs, community members, First Nation members, tourism operators, and members of the Science Panel). Yet, no substantive response has been given, particularly from a precautionary perspective (see also discussions in Sections 3.1.1. and 3.2.2).
- Rationale for reserve approach. Significant concerns have been raised regarding the rationale for choosing the species that would be specifically managed for (only Marbled Murrelet), then specifically how the level of reserves was determined. This also applies to blue-listed plant communities (see also discussions in Section 3.2.1 and 3.2.3).
- Restoration was a significant component of the CSSP reports, and the watershed plans do not directly address it in any significant way. Various parties, including Iisaak have undertaken a significant amount of watershed restoration over the last 10 years (primarily road deactivation and stream rehabilitation). It should also be recognised that through implementation of the Watershed Plans and other key CSSP recommendations (e.g. managing second growth forests in a way that expedites old growth characteristics through retention strategies) Iisaak's management has created the conditions under which restoration is allowed to occur through natural succession processes (e.g. stages 1-5 of red and blue listed ecosystems captured in the WP reserve network will be allowed to reach stages 6 & 7). What is needed is a review of the more heavily impacted watershed planning areas (e.g. Kennedy Lake, Fortune Channel) to determine where there may be specific restoration priorities for terrestrial ecosystems, similar to the watershed assessments conducted for watershed restoration.
- **Recommendation: in future, repeat the comprehensive process undertaken for the first release of the watershed plans. Ensure there is clear communication regarding how concerns raised are dealt with.**
- **Recommendation: explicitly include results from scientific study or other background material in the rationale provided to the public (or at least specific information on where this information can be accessed). This would increase understanding about how these multiple complex processes have resulted in a particular end product.**
- **Recommendation: undertake additional HCVF consultation to deal specifically with HCVFs regarding intact areas, old-growth forest retention and restoration and rare and endangered ecosystems (including adequate response to inputs received).**

4.0 SUMMARY OF FINDINGS AND CONCLUSIONS

ASSESSMENT OF HCVFS

Table 7. Summary of High Conservation Value Forests, and their distribution in each of the six categories outlined by Principle 9, FSC. For full definitions of HCVF categories click [here](#).

Category ²⁸	Value	Extent / Distribution
1: ...significant concentrations of biodiversity values ...		
Qn. 1	<ul style="list-style-type: none"> 13 rare and endangered species 	Extensive distribution Extensive area
Qn. 3	<ul style="list-style-type: none"> concentrations of salmon and marine birds 	Throughout CS
Qn. 6	<ul style="list-style-type: none"> Clayoquot Biosphere reserve + federal + provincial protected areas 	Throughout CS
2: large landscape level forests, where viable populations of most naturally occurring species exist ...		
Qn. 7	<ul style="list-style-type: none"> Intact areas, combined with Strathcona Park meet the criteria outlined. 	Extensive distribution Extensive area
3: forest areas that are in or contain rare, threatened or endangered ecosystems		
Qn 8.	<ul style="list-style-type: none"> Rare and threatened ecosystems are present (both naturally rare and anthropogenically rare) 	Extensive distribution Limited area
Qn.9	<ul style="list-style-type: none"> In areas with historic harvest, old growth ecosystems meet the criteria for ecosystems in decline. 	Relatively limited distribution Moderate area
Qn.10	<ul style="list-style-type: none"> Representation of CWHvm1 and CWHvm2 in Protected Areas 	Extensive distribution Extensive area
Qn. 11	<ul style="list-style-type: none"> Remnant forest fragments (those relatively intact areas not adjacent to the larger landscape level forest of Strathcona park). Dealt with under Qn.7 	Relatively limited distribution Moderate area
Qn. 12	<ul style="list-style-type: none"> Unique ecosystems (e.g. karst) present 	Very limited area
4. basic services of nature in critical situations		
Qn.13	<ul style="list-style-type: none"> Domestic watersheds and other water sources 	Limited distribution Limited area
Qn.15	<ul style="list-style-type: none"> Erosion control – to protect critical aquatic habitat 	Extensive distribution Extensive area
5. fundamental to meeting basic needs of local communities		
Qn. 17	<ul style="list-style-type: none"> First Nations subsistence use (discussed in conjunction with Category 6); limited use by non-First Nations as well, but not likely "fundamental" to meeting basic needs 	Extensive distribution Extensive area
6. forests critical to local communities' traditional cultural identity		
Qn. 18	<ul style="list-style-type: none"> First Nations cultural identity 	Entire CS, with areas of identified specific importance.
Qn. 18	<ul style="list-style-type: none"> Non FN spiritual values 	Entire CS, particularly intact areas.

²⁸ Determinations are based on the questions outlined in the FSC standards (Page 99)

Clayoquot Sound contains a large number and diversity of HCVFs that span large areas and exist across the geographic extent of the Sound. Table 7 outlines the different categories, the rationale and the generalised extent and distribution of each of the different HCVF types that apply. HCVFs are identified in all of the six categories and for at least 12 different values.

Due to the extensive number and distribution of those values, and the interconnectedness of many ecological and cultural values, we conclude that the whole of Clayoquot Sound should be classified as a high conservation value forest. Note that we do not intend this designation to create unintended consequences in terms of monitoring of values as outlined by FSC, however, we do believe it should act as a guide to ensure that the HCVFs in Clayoquot Sound are considered as values that are linked together from both an ecological and social perspective.

Many of the individual designations are easily determined by applying the FSC standards. Our analysis and results tables focus on the series of questions outlined in the FSC standards (page 99). Many determinations are obvious by asking these questions, while others are more difficult to determine due to data or information availability, or are simply controversial due to varying interpretations. Where necessary detailed rationale are provided that explains how our decisions for assessment or adequacy of management have been made.

PRECAUTIONARY MANAGEMENT

FSC requires that management within HCVFs is precautionary and maintains the conservation attributes that define the particular HCVF type. The management approaches outlined by the CSSP, and to the extent that they are reflected in the Watershed Plans and Lisaak's management strategies, have been assessed for each value to determine the extent to which they may, or may not, maintain the values identified in a precautionary manner.

Given the large number of HCVFs and many management recommendations from the CSSP we do not attempt to detail how each combination of management strategies is likely to function. Rather, we focus in more detail on areas where we feel there may be some shortfall or concern in terms of the management strategies.

We assume that the complement of reserves (e.g., hydroriparian, old-growth representation, visual quality, and cultural value reserves in particular) are adequate to maintain HCVFs associated with: concentrations of salmon (although there remains concern about restoration strategies), unique ecosystems, domestic watersheds and other water sources, and First Nations' cultural identity.

For the following HCVFs there are concerns regarding the level of precaution associated with the proposed management strategy:

Rare and Endangered Species: It has been assumed in interpreting the CSSP recommendations, that species-specific management at the landscape level is generally required only for Marbled Murrelets. It is assumed that this, combined with the coarse filter management of old-growth and hydroriparian areas, will be adequate to maintain other species. A detailed summary of the habitat requirements of other species has been produced (TPC 2003), which looks for potential gaps, but does explicitly test these assumptions. We recommend that a more explicit summary of how habitat requirements are met by the coarse filter and other strategies is needed to allow assumptions and hypotheses to be tested around how well specific values are actually maintained into the future.

In addition, Lisaak has committed to undertaking a stand level assessment prior to harvest, by an R.P.Bio, which we assume is intended to maintain stand level values associated with individual species (e.g. to maintain wetland-associated species). Additional guidance should be provided as to what this will consist of, and how it will be ensured that appropriate biological decisions are followed through into prescriptions.

Marbled Murrelets: A draft regional roll-up of the total high quality nesting habitat (excellent and good) has been provided (T. Chatwin pers. comm.), and within Clayoquot Sound 61.8% of the available habitat is reserved either within murrelet reserves or as part of some other reserve network or protected area.

This level is considerably higher than that typically applied under provincial policy (which is limited by a timber supply impact cap). However, it is also slightly lower than the target set by the Marbled Murrelet Recovery Team (MMRT) which required 69% habitat retention from 2002 in order to de-list the species over the next 30 years. Professional opinion (T. Chatwin pers. comm.) suggests that the reserves, combined with the low rate-of-cut in Clayoquot Sound may be adequate to meet the goal of maintaining the population sufficiently to meet the 'de-listing criteria' within the Clayoquot Sound area (T. Chatwin in prep.). A preliminary patch size analysis also suggests that the reserves in general are large and will likely not result in significant increased nest predation as a result of fragmentation (T. Chatwin pers. comm.).

However, Clayoquot Sound also has some of the highest densities of murrelets known in BC, particularly on Vancouver Island, and is considered a significant source population for Vancouver Island (where the population is known to be declining, particularly on South Island; T. Chatwin pers. comm.). Since neither the allocation of reserves nor the recovery targets directly consider the amount of historic harvest of murrelet habitat, it is difficult to determine whether the reserves are in fact fully precautionary in terms of maintaining the population. Science collated by the MMRT (Burger 2002) suggests that Marbled Murrelets nest at relatively low densities, but do not appear to increase this density in areas with lower amounts of available habitat (i.e. they do not 'pack' into remaining habitat). The reserve strategy within CS can therefore be hypothesised to result in a minimum 38% reduction in historic numbers of murrelets in currently intact areas, and an increased reduction (i.e. more than 38% reduction) for areas that have already a reduced habitat level due to historic harvest. Assumptions made regarding murrelets in CS should be explicitly stated, and tested for effectiveness against specific goals within the monitoring scheme.

We recommend that management goals for murrelets are explicitly stated within Clayoquot Sound. This will allow hypotheses embedded in management strategies to be explicitly monitored and tested for effectiveness.

There also remains public confusion as to the level of protection, and process for protection of murrelet habitat. We recommend that clear rationale is made available to the public, along with watershed plan summaries for CS.

Large landscape level forests: the watershed planning process has considered the recommendations set by the CSSP in each planning unit and laid out reserves within each to meet a number of different targets. However, the overall regional context of Clayoquot Sound within the Windward Islands Mountains Ecoregion, nor the provincial, national and potentially global significance of CS does not appear to have been explicitly considered. The planning documents do not address these contextual values and particularly, do not express how the intactness values present in CS might be valuable, unique, or maintained in future. The expressed values are well known to IISAAC due to the existence of an MoU (signed by IISAAC board members) that stated the significance of the intact areas.

In our assessment, we summarise studies that have analysed the existence of intact watersheds, or large landscape level forests on Vancouver Island and coastal BC. These analyses point to the lack of large intact areas across this region. A number of different studies all identify the Clayoquot Sound / Strathcona complex as a quite unique opportunity to maintain otherwise rare intactness values (Wilkinson 1990; Moore 1991; MoF 1992; Ricketts et al. 1999; GFW 2003).

In terms of protection levels, within CS itself, there is a generally high level of protection (compared to other areas in BC), however at the broader provincial scale the CWHvm1 and CWHvm2 are not well-represented (7% and 8% respectively). Within CS, the distribution of protected areas includes some complete watersheds (e.g., Megin and Moyeha); however, their overall effectiveness at landscape and watershed scales could be significantly improved through the addition of further complete watersheds. At the landscape level, their distribution does not fully capture some elevational and climatic gradients (especially between the outer coast CWHvh1 and interior), and they do not provide complete connectivity across the ecoregion. Some of the existing protected areas could also be made more viable by increasing their effective size through reserves in adjacent intact areas, or linking them with nearby protected areas with intervening reserves. From this broad perspective therefore, a reasonable interpretation of Principle 9 might be to reserve the intact areas within Clayoquot Sound. This is particularly the case in light of

the uncertainties relating to climate change, and because full protection is the most certain precautionary approach.

Science however is insufficient to make definitive statements on exactly how many areas are required in order to maintain ecological values in a precautionary manner. As a result, we therefore took an additional step that is intended to provide guidance IF a local decision is made to harvest in some intact areas. In our assessment, we evaluated the intact sub-basins and face units at a landscape overview level for their individual intactness values, and also attempted to assess their potential contributions to increasing the effectiveness of the nationally significant large landscape level intact area of which some of them are a part. We provide a set of recommendations that we suggest may meet the precautionary management test, including a ranking of intactness values for the intact sub-basins and face units outside protected areas in CS. The recommendations are provided in the context of the high values present, the need to maintain landscape and watershed scale control areas for completion of the effectiveness monitoring of the CSSP recommendations regarding harvesting and road building, and the context of global climate change. We identify intact areas that have HCVs that require reservation from development to maintain their conservation attributes, and some areas that potentially could be developed. This development however, should only occur after monitoring has demonstrated that Iisaak management activities are consistently implementing the CSSP recommendations, and that the CSSP management strategies are in fact effective in conserving ecological integrity. We believe this process would take a significant period of time (likely in excess of 20 years and possibly up to 100 years) because of potential time lags in response, and the difficulties in detecting ecological change in a powerful statistical manner. We stress that science does not provide the ability to definitively state how many areas are required in order to maintain ecological integrity. Conservation science simply can say that in general, more areas increase the certainty that values will be maintained.

Secondly, we note that although extensive surveys and research have occurred within Clayoquot Sound, no geographically organised summaries of this work appear to exist. It is important to understand that our ranking is based on minimal data and our preliminary ranking may likely be modified if additional values information were available, and that potentially other combinations of watershed reserves and management regimes may also be sufficient to meet the precautionary management test. A recommendation is that a geographically-organised summary of values should be compiled, which would aid in further planning within CS.

Rare and threatened ecosystems: recommendations were made by the CSSP to maintain rare and threatened ecosystems, and interpreted by the Technical Working Group to mean 100% protection of existing red-listed ecosystems, and 50% protection of existing blue-listed ecosystems. The rationale provided for this level of protection is that it was provided as expert advice by the Conservation Data Centre (Watershed Planning Volume 1, page 23). However, we feel it would be useful to examine this question in greater detail and provide the actual rationale used by the experts in providing this advice.

In addition, the proposed management of these ecosystems does not appear precautionary because it does not consider the historic condition of these ecosystems: i.e. in areas where 50% of the ecosystem has already been harvested no restoration strategies are provided (for red-listed or blue-listed), and the protection level is not appropriately increased (for blue-listed). It is probable that some listed ecosystems that already been historically harvested are retained within hydroriparian or other reserves, and will be left to recover over time. However the extent to which this has occurred is unknown, and no specific strategy identifies this as a goal. It is therefore difficult to consider this precautionary management. We recommend that an assessment of the impact of historic harvesting on rare ecosystems be undertaken using site series mapping. The results of this work should be used to guide reserve and restoration strategies for historically impacted ecosystems.

Management strategies do result in increased protection of old growth for ecosystems that have a limited areal extent (<2% or 6 occurrences), resulting in 50% protection for these types. We *assume* this is based on the actual distribution of the site series, and is not affected by existing old-growth for this type. However, if this is in error, then there would similarly be a concern about the retention for this level.

Old-growth and Representation in Protected Areas: Representation in protected areas for some biogeoclimatic variants found in CS is low from an ecological perspective provincially - across Vancouver Island, and within the Windward Island Mountains Ecoregion (7-15 for CWHvm1 and CWHvm2). The old-growth representation targets outlined by the CSSP recommended a target of a minimum 40% of the forest within the watershed planning unit be protected, with increased protection for rare site series (those with limited distribution as opposed to those listed). This has been implemented using a target of 30% protection by site series with 50% protection for site series with less than 2% of the area. Although this target increases the level of representation for under-represented site series, it falls considerably short of the 70% regional target outlined by the CIT for ecosystem-based management in coastal ecosystems (CIT 2002a,b). A draft report has been made available to this team (B. Retzer pers. comm.) that states that the total old-growth protected in Clayoquot Sound (including parks and reserves and areas outside the timber harvesting landbase) is 62%. This figure is much closer to that suggested by the CIT (2002a,b), but we note that it does not assume an even representation of site series. Unfortunately, site series are unavailable for the large protected areas, so an analysis of the extent of site series representation within the 62% is not possible at this time. We are therefore unable to state whether we feel the level of old growth ecosystem protection is precautionary. We do though note that some geographic areas have seen considerable harvest (e.g. Fortune, Kennedy Lake, Upper Kennedy, some areas of Cypre). In these areas we have not seen an ecologically defined restoration strategy for a) highly impacted site series or hydriprarian ecosystems, and we cannot therefore be assured that the watershed planning implementation results in precautionary management with regard to these values. We recommend that explicit strategies are developed that use conservation biology principles to ensure additional areas required to meet the 40% target are employed in the most biologically effective manner. We also recommend developing reserve/ restoration plans that use conservation biology principles to identify the most ecologically appropriate areas for retention and restoration of historically impacted ecosystems²⁹.

We also raise concerns regarding the interior forest requirements outlined by CSSP: under natural conditions, these forests have a very high percentage (perhaps in excess of 70% of the forested landbase⁸) in 'interior' / unfragmented old-growth. We raise the question whether retaining only 8%, as outlined by CSSP, actually meets the test for precautionary management of old-growth in these ecosystems. Many areas in fact retain considerably higher levels of interior forest. Huggard et al. (2005, pp.16-17) indicates that approximately 60% of landbase of the reserves recognised in the watershed plans are interior habitat (i.e. >200m from a harvestable stand). However, in the more productive landbase some areas already come close to this 8% target, and this raises questions about the potential effectiveness of the retained old forest.

We recommend that the overall targets plus requirements for interior habitat are reassessed in light of science and management advances since the CSSP made their recommendations. This is in direct accordance with the recommendations of the CSSP who stated that their recommendations were hypotheses and should be reassessed over time.

Basic services of Nature - Erosion Control: Iisaak's management plan states that Class V unstable terrain will be reserved and Class IV will only be harvested following recommendations from flowing from detailed terrain assessments. Although the SFMP and the FDP state that Iisaak will follow recommendations of terrain specialists who assess Class IV terrain, they do not indicate what level of residual risk will be tolerated in those situations. There is also no mention of assessments for water-borne erosion or snow avalanching (although there is some mention of surface soil erosion in Management Plan 1 for TFL 57 (p.37-41)). We recommend that Iisaak develop policies to state that high risk alternatives will not be pursued in any situation, and that even moderate risks will not be undertaken when potential downslope/ downstream consequences involve high value aquatic habitats, human habitation or domestic water supplies (e.g., see FSC-BC indicator 6.5.3). Similar policies should be developed for waterborne erosion and snow avalanche starting zones.

²⁹ Note that this may have occurred already under watershed planning. However, from available documentation it is difficult to assess the extent to which historic impacts were mitigated using planning.

First Nations and Non-First Nations spiritual / cultural values: There are significant spiritual / cultural values attached to specific sites and forests throughout CS. We assume that the process to identify and maintain specific cultural values undertaken directly with the Nuuchahnulth is adequate to maintain these values in a precautionary manner. However, we raise a question about the potential conflict suggested by the Memorandum of Understanding, which appears to suggest that the intact areas are 'very very precious' and should be maintained. We recommend that additional consultation may be required to clarify this question.

Although a novel interpretation of Category 6 HCWF, we feel there is sufficient evidence to suggest that the Clayoquot Sound in general, and the intact watersheds in particular, provide significant spiritual / cultural values to a significant number of local people, both First Nations and Non-First Nations. A HCWF designation is provided in this category (see the specific comments regarding the management above under large landscape level forests). Although not necessarily relevant to the specific criteria of Principle 9, we also note the significance of these areas to non-local people.

CONSULTATION

Principle 9 has specific requirements regarding consultation over and above those required in general management procedure. First, there is a requirement for specific consultation regarding HCWFs, and P9 requires that this process is fair and effective. In addition, P9 [9.1.6].states that:

"...where the results of the assessment are contested ..the onus is on the manager to prove that HCWFs and their associated conservation attributes have been adequately identified and assessed, and will be maintained under the proposed management strategies".

Significant consultation has occurred in relation to watershed planning, and as a result we assessed the fairness and effectiveness of this process. Overall, somewhat variable efforts have been made with regard to consultation, with three different releases of watershed plans. The first release was the most elaborate and included an extensive review period, plus community meetings to allow reasonable viewing of the plans. Extensive comments were received, and these were reviewed (by the CRB), compiled into a series of recommendations, and returned to the technical planning committee. Subsequent releases of the next watershed plans were considerably less elaborate, and included very short periods for review (3 weeks, in summer), and received fair criticism from interested stakeholders. These subsequent plans did not appear to substantially address some of the more major comments received from stakeholders (including former CSSP members). In summary, the consultation with the first release was excellent, the two subsequent releases were potentially inadequate. Part of the difficulty lies in the complex organisational structure surrounding Lisaak, including the somewhat divorced structure of having the CRB pass on comments to the Technical Planning Committee – neither of which are actually managed by Lisaak.

Regarding the response to the comments received, given the fluid nature of the documents and the different releases, it has been quite difficult to determine exactly comments have been dealt with. Some sections of the planning documents (Volume 1 in particular) have been revised to provide more clarity on how decisions were made, and what targets were used. However, during this work we also found a number of documents that were not yet available to the general public that provide additional information (e.g. TPC 2003 regarding wildlife strategies; Chatwin in prep. regarding Marbled Murrelet adequacy). Incorporating some of the key points of these documents into the central planning documents would help the general public in understanding the process, and in having some certainty that comments were dealt with, rather going unheeded (see note above about the complex organisational structure).

However, with regard to a number of key comments received it appears that the manager has not adequately demonstrated that the values of concern are adequately managed and maintained. In particular, regarding intactness, there is no evidence of a response that demonstrates how intactness values are being managed in a precautionary manner. Although to date Lisaak has not harvested any of the intact areas, Lisaak's AAC calculations and the completed watershed plans indicate that harvesting will proceed in these areas sometime in the future. A recent progress report by the CS Technical Planning Committee (July 2006) acknowledges that even members of the CSSP have expressed concerns over

development in the intact areas, and some areas have been deferred by Interfor. However, there has been no clear response by the Technical Committee or Lisaak on how intactness will be managed at a precautionary manner under the watershed plans. In addition, there remains a lack of rationale for decision-making in within the watershed plans, particularly regarding Marbled Murrelets (and this has been raised by many in previous versions), plus the lack of rationale for allocating old-growth targets, and the lack of rationale for the level of protection for rare and endangered ecosystems as outlined above. Although science cannot provide exacting rationale for many aspects of management, providing explicit rationale serves two purposes: to provide explicit assumptions and hypotheses that can then be tested during monitoring, and to provide the stakeholders with a clear process that can be reviewed.

We recommend that in future, the comprehensive process undertaken for the first release of the watershed plans should be repeated. Ensure there are clear responses and clear communication regarding how concerns raised are dealt with.

We recommend that results from scientific study or other background material in the rationale provided should be explicitly made available to the public. This would increase understanding about how these multiple complex processes have resulted in a particular end product.

We recommend to undertake additional HCVF consultation to deal specifically with HCVFs regarding intact areas, old-growth forest retention and restoration and rare and endangered ecosystems (including adequate response to inputs received).

CONCLUSIONS

Clayoquot Sound contains a large number of different HCVFs, that cover the extent of the Sound. Given the interconnectedness of many of these ecological values, plus the fact that some HCVFs cover the entire area of Clayoquot Sound (e.g. the Biosphere Reserve designation), we suggest that an appropriate designation is that the entire area constitutes one HCVF.

Many of the specific attributes of HCVFs are likely to be adequately maintained by the management strategies proposed by the CSSP, and reflected in the Watershed Plans and Lisaak's management strategies. However, the minimal amount of harvesting completed to date by Lisaak, and the lack of an established monitoring strategy for HCVF attributes makes it difficult for the authors (and Lisaak itself) to assess whether Lisaak is fully implementing the strategies, and whether they are effective.

In addition, a number of HCVFs do not appear to have precautionary management strategies, in particular, large landscape level forests, and rare and endangered ecosystems, and possibly old-growth forests in watersheds where historic harvesting is significant.

Although not directly relevant to an HCVF assessment, in the FSC context it is necessary to consider the broader framework of forest management, and the obvious trade-offs between environmental, social and economic considerations. In light of the limitations on the terms of reference for the CSSP and further scientific information which has emerged over the last ten years, it would be prudent to consider the potential benefits of reviewing the structure of reserves within Clayoquot Sound with the objective of placing more emphasis on fully reserving more of the intact watersheds. For example, combining or realigning some of the watershed planning units could allow the 40% reserve targets to be met primarily in the intact areas, while allowing increased harvesting in adjacent areas to reduce impacts to economic values. A more detailed review of HCVF values, may also allow consideration of designating portions of heavily impacted areas such as Kennedy Flats as FSC plantations to balance increased reserves in the intact areas. This type of approach (variable risk across the region/ landscape) would be more similar to that recommended by the CIT for central and north coast areas.

Consultation regarding management strategies has been generally extensive, though less than effective at times. Efforts have been made to answer some issues raised in consultation, but the large issues regarding intactness, old-growth reserves and rare and endangered species remain outstanding issues where the manager has not yet demonstrated precautionary management to stakeholders.

We are basing our assessment of management strategies primarily on the final watershed planning documents. However, we are concerned that there is yet no legal vehicle for their implementation.

In addition, a comprehensive geographically-organised summary of the values present in CS would help to ensure that reserves in different watersheds sufficiently reflect the different values present. This should include an assessment of historic loss of certain habitats of ecosystems where possible. Meaningful restoration strategies could be developed as a result. To our understanding a large number of inventories have been concluded in CS, so we believe that this effort would require largely only a compilation of the efforts to date, rather than new inventories.

Monitoring is an essential part of meeting both principle 9, and the CSSP recommendations. No monitoring has yet been put in place, and we assume that as stated in the watershed planning documents and Iisaak's Sustainable Forest Management Plan, adequate monitoring strategies will be developed. This will be key to undertaking precautionary management, for all HCVPs, but particularly in relating to intact watersheds.

We believe that with the CSSP recommendations, and the watershed planning process that has been undertaken Iisaak meets many of the requirements of Principle 9. However, there remain a number of issues that require additional work, in order that Principle 9 be adequately met, as outlined above.

5.0 ADDITIONAL SUPPORTING DOCUMENTS AND RATIONALE

The following tables are provided as supporting documents to the main conclusions reached above.

Working Table 1. Assessment of HCVFs and Precautionary Management: following questions outlined in Principle 9 of FSC BC Standards.

Working Table 2. Assessment of the sub-basins associated with intact areas. Table highlights biogeoclimatic diversity, tenure, special values where information was readily available, and rationale for determining priority. Priorities are linked to precautionary management strategies outlined in Section 3.2.2

Working Table 3. Table of species and comments on their habitat requires (based on TPC report CS Wildlife 2003).

Working Table 1. Assessment of HCVFs and Precautionary Management: following questions outlined in Principle 9 of FSC BC Standards.

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
Category 1. ... significant concentrations of biodiversity values ...			
<p>1. Does the forest contain species at risk or potential habitat of species at risk as listed by international, national or territorial/ provincial authorities?</p> <p>HCVF – Yes.</p>	<p>There are 13 blue-listed and 7 red-listed species present in the MU.</p> <p>A table of the relevant species is shown below (Working Table 3). In that table each species and their attributes are summarised, along with management strategy.</p> <p>Highest priority species include: marbled murrelet, all fish species listed. Marbled murrelet is of particular concern, because of the significant reductions in population in adjacent ecosections (particularly on south of VI).</p> <p>Many of the other species, esp. at a local level (e.g. local populations of amphibians).</p>	<p>To our knowledge there is a full complement of species occurring within the MU, some of which are rare or endangered as listed provincially and federally.</p> <p>The particular attributes that define HCVFs here will vary by species (see Working Table 3).</p>	<p>Informal testing of whether species are maintained by the coarse filter approach used. Needs to be more fully developed.</p> <p>Concerns raised about MaMu management throughout development of watershed plans are mostly resolved. Total 61.8% of existing habitat reserved, which doesn't meet MMRT recommendations. However, professional opinion suggests this may be adequate (T. Chatwin pers. comm.).</p> <p>However, significant populations – difficult to determine that the strategy is precautionary.</p> <p>Recommend: clear statement regarding intention of management, plus detailed monitoring strategy with clear assumptions stated.</p> <p>Recommend: more explicit assessment of whether there remain management gaps for other species (based on TPC 2003).</p>

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
			Rationale is lacking in public documentation.
2. Does the forest contain a globally, nationally, or regionally significant concentration of endemic species? HCVF – No.	Not broadly identified as an area of high endemism (unlike e.g. southern tip of VI, or Haida Gwaii). Only known endemic species associated with the area is Vancouver Island marmot. Historic populations from Strathcona no longer in existence. Little if any relevant habitat in management portion of CS.	Vancouver Island marmot was historically relevant here, but likely low impact on historic habitat due to habitat being primarily outside operability or within protected areas. No concentration of values here.	N.A.
3. does the forest include critical habitat containing globally, nationally, or regionally significant seasonal concentrations of species. HCVF – Yes.	5 freshwater residents (2 blue-listed) and 7 ocean-going fish species spawn or are resident in freshwaters in the sound. High biomass and high species and potentially genetic diversity within the sound itself. Marine birds. High numbers and diversity, particularly associated with extensive Tofino mudflats. Adjacent to Management Unit.	High diversity and biomass of fish present in the sound. Historically, many adjacent areas would have similar diversity and biomass of species. Many areas to the south have reduced spawning runs likely as a result of impacts to habitat quality from harvest, and general habitat loss due to development in southern VI. Fishing has also been a cause of decline. Fish: Attributes of HCVFs relate to maintaining spawning and resident habitat. This includes maintaining physical and hydrological characteristics of the hydriparian, plus any areas capable of supplying sediment (e.g. class IV and V terrain and roads). Marine birds – mudflats around Tofino provide significant habitat to resident marine birds and is part of the Pacific flyway.	Assume hydriparian guidelines adequate to maintain these values for fish. Concern regarding restoration of habitat plus erosion potential guidelines (see below). Management of upland flow into the tidal / marine areas important. Assumed to be maintained within natural levels by hydriparian and shoreline guidelines.
4. Does the forest contain critical habitat for regionally significant species? HCVF – Yes (see Qn 1).	Yes there is critical habitat, but most species are dealt with under Question 1.	No additional species known.	Species in general are assumed to be maintained by the coarse filter management strategies (hydriparian / old-growth / marbled murrelet reserves). Plus other reserves and strategies at landscape and stand level.
5. does the forest support concentrations of species at		To our best knowledge, this does not apply.	

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
the edge of their natural ranges or outlier populations? HCVF – No.			
6. Does the forest lie within, adjacent to, or contain a conservation area? a) international b) Fed/ prov PAs c) Id'd in regional LU plans or conservation plans HCVF – Yes.	Federal Parks (Pacific Rim) is adjacent. Various provincial parks are adjacent to and surrounded by the MU. The area is also classified as a biosphere reserve.	CS is recognised regionally, nationally and internationally as being of high importance for biological, scenic and cultural reasons. A number of ENGO conservation plans recognise the area as having values not captured elsewhere (e.g. WCWC and Nature Conservancy). Biosphere reserve status adds importance regionally.	In general, the protected areas appear to be relatively satisfied with forest management adjacent to the parks. Some areas have buffers or specific strategies to limit management identified within FDP. Analysis regarding intact areas has identified some areas that would increase the effectiveness of adjacent parks. (see Question 7). An existing MoU between lisaak and a group of ENGOs could be considered a conservation plan that has not been implemented, in relation to the intact watersheds (see discussion under Question 7).
Category 2:significant large landscape level forests, where viable populations of most naturally occurring species exist ...			
7 Does it constitute or form part of a significant forest landscape that includes populations of most native species with high likelihood of long-term species persistence? HCVF – Yes.	MU as a whole able to support most of all native species, plus long-term large-scale natural disturbances (because of the nature of disturbance here). Clayoquot Sound overall, and the intact areas of the Sound in particular are part of a significant large forested landscape when combined with the adjacent Strathcona Park. This complex of ecosystems, from ocean to mountaintop is rare in the larger context of the Windward Island Mountains ecosection and for Vancouver Island and the southern	Thresholds for intactness suggested by FSC drop to regionally important areas of 50,000 to 200,000ha (and less than 5% disturbance). CS can be considered in a context at a number of different and relevant scales. Moore (91) examined primary watersheds on coastal BC >5000ha. Of 354 on the entire coast, 72 are pristine (20%). In western Vancouver Island, of 60 primary watersheds only 5 are pristine: Sydney (5,900ha) and Megin (24,300ha) and Moyeha (18,200ha) in CS.30 Unfortunately, TEM data are unavailable for the park and adjacent area, so an analysis of the additional representation provided by these	Management strategies do not directly address the values of intactness. lisaak and the Technical Committee have assumed that the CSSP recommendations maintain overall ecological integrity so intactness is not relevant. However, this ignores the ecological (and cultural, see below) values associated with intact areas. The CSSP did identify the values within the intact watersheds, and also recommended precautionary management that required lisaak to prove out both the implementation and effectiveness of the suite of management strategies before entering into these areas. In our analysis we assess the remainder of the intact areas for broad landscape level values, and propose a precautionary management regime (see section 3.2.2). Note contradictory management proposed by lisaak – MoU states these areas are very very precious and will be

30 The other are Nasparti (6,000ha) and East Creek (5000ha) in Kyuquot-Brooks area.

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
	<p>coast (see intactness Figures 3 & 4 above).</p> <p>Because intact watersheds are rare on this part of the coast, intact areas here fit either as part of the large landscape intact forest, or as part of the remnant areas (under questions 9 & 11). For ease of reading we deal with all the intact areas in a single location within the document (Working Table 2 summarises which category the areas best belong in – large landscape or remnant).</p>	<p>areas onto the park is not feasible for this project, but some of these areas provide clear additional values (see Working Table 2). Note that our analysis is based on broad landscape level values, and should be augmented by specific values present in each watershed to fine-tune our recommendations.</p> <p>Megin and Moyeha are captured within Protected Areas. Sydney is adjacent to the Park, and primarily within Interfor's tenure, but lisaak has some area at the mouth. Flores Island and Clayoquot river are somewhat isolated. Flores Island, Bulson, Ursus and Clayoquot River are the drainages that lisaak has full control of. The bottom of Clayoquot River is mostly park.</p> <p>Note that guidance questions are explored in Section 3.2.2 above.</p>	<p>protected, however they are not protected in watershed plans, and identified in long-term planning, though we are unclear what the immediate impact on intact areas will be. Apparently, there are no immediate plans to harvest in the intact areas (P. Verschoor pers. comm.), but they are on the 20 year development plan, and we are unsure whether any current plans include putting roads into intact areas. This is our understanding of the current potential development situation:</p> <p>Sidney/ Pretty girl – not likely to build a road on your own first. Likely to move ahead if Interfor start to move ahead there. At present Interfor has deferred Pretty Girl area. Much of the TL portion of lisaak's MU are in Sidney/ Pretty Girl; 3 year extension and all will expire within 5 – 8 years. So these are short-term risk. Unknown really.</p> <p>Ursus – not on any plan.</p> <p>Bulson – not on any plan.</p> <p>Clayoquot River – already road engineered into that valley. Nothing on a FDP to date – 5-20 years likely.</p> <p>Consultation: Many concerns raised, and not directly answered by lisaak. Inadequate consultation regarding this HCVF.</p>
<p>Category 3: forest areas that are in or contain rare, threatened or endangered ecosystems.</p>			
<p>8. Does the forest contain naturally rare ecosystems types? HCVF – Yes.</p>	<p>There are a significant number of red and blue listed plant communities that are identified in the watershed plans and in the FDP. (Note that the CDC generally combines naturally and anthropogenically rare ecosystems in their lists).</p> <p>Also, a large number of ecosystems as defined by site series have limited areal extent and so are</p>	<p>Many Listed ecosystems</p> <p>Also identify ecosystems that cover < 2% and with less than 6 occurrences in the watershed plans.</p>	<p>Red-listed ecosystems are maintained at 100% of current distribution. Blue-listed ecosystems are maintained at 50% of current distribution. 'Areally' rare ecosystems are maintained at 50% (an over-representation compared with the standard representation of 30% for common site series).</p> <p>Concerns primarily about the adequacy of these because of the historic impacts on these rare ecosystems. No strategies for restoration appear to exist, and targets are not altered in areas where significant area of rare ecosystems have already been harvested. We find these do not meet the test for precautionary management.</p>

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
	naturally rare.		Consultation: lack of rationale for targets set (e.g. 50% of blue-listed). Plus lack of clarity on how reserves were applied during watershed planning.
<p>9. Are there ecosystem types or ecosystem type conditions within the forest or ecoregion that have significantly declined, or under sufficient present and/or future development pressures that they will likely become rare in the future?</p> <p>HCVF – Yes. Localised Old Growth ecosystems.</p>	<p>Relatively high impact to old-growth forests within the CWHvm1 and vm2 within the ecoregion (Enns 1994 and other draft analysis, e.g. as yet unsubstantiated data from WCWC in prep³¹).</p> <p>Locally, within MU – natural conditions prevalent overall, but very high impacts in certain watersheds, particularly around Kennedy Lake, Fortune Channel, areas of Cypre and possibly Upper Kennedy. (Visual assessment performed here – data for other tenures not available to us).</p>	<p>CDC ecosystems that are listed for structural stage 6 and 7 due to harvest (dealt with above).</p> <p>Typically, a representation analysis by BEC / LU (or large watershed unit) would be undertaken to determine extent of decline. Only a visual assessment was possible for us (since we don't have the age-class data for other tenures in CS), but some areas appear to show declines close to those ID'd by FSC threshold as concerns (e.g. >50% decline from natural levels).</p>	<p>Management strategies for old-growth are to maintain 30% by site series within each management unit, with an overall target of 40% old growth by watershed planning unit (CSSP interpreted by TPC). CSSP specifically stated that 'within stand' retention should not contribute to this target.</p> <p>This has been applied in WP but we have concerns about strategies employed particularly when there has been significant harvest, e.g. within Kennedy Lake 23% (4880ha) of the forested landbase is located within parks or reserves, leaving another 3750ha to be identified to meet the target of 40% which it is stated" will have to be retained during harvesting operations"³² We do not understand why this additional area is not identified as reserves on the maps. There is a similar concern in Fortune WP (where 15% of the 40% target has to be retained during harvesting operations).</p> <p>In the larger picture, we raise the concern that newer information (CIT 2002a,b) has recommended much higher overall targets for retention in coastal ecosystems (70% by site series at the regional level). There is a significant difference between this and the level proposed more than a decade ago by the CSSP. Additional efforts should be made to a) ensure that the targets outlined by CSSP are employed in the most effective way, and b) to reassess the overall targets proposed in light of CIT work and c) to undertake a regional analysis of CS to determine whether there are actually under-represented ecosystems with levels as low as 30% (when considering parks etc). This analysis could help to identify areas where additional landscape and / or stand level</p>

31 From an analysis by Dave Leverage for WCWC – in preparation: 73% of the original productive old-growth forests of Vancouver Island have been logged (i.e.73% have been converted to second-growth forests or other uses, while 27% remained as old-growth in 2004); 87% of the original productive old-growth forests on southern Vancouver Island south of Barkley Sound/Horne Lake, have been logged. ie.13% remained in 2004; 6% of the productive forest on Vancouver Island is captured in Protected Areas.

32Volume 6 Kennedy Lake WP. Page 19.

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
			<p>retention might be required.</p> <p>Consultation: difficult to assess how specific comments (related to the kinds of concerns identified above) have been answered to date. Lack of clear communication about how reserves are being laid out.</p>
<p>10. Are there ecosystems that are poorly represented in protected areas, and likely to become rare in an intact state due to ongoing human activities?</p> <p>HCVF – Yes.</p>	<p>Representation in protected areas for some biogeoclimatic variants found in CS is low from an ecological perspective - provincially, across Vancouver Island, and within the Windward Island Mountains Ecoregion - particularly for a number of biogeoclimatic variants (e.g. 7- 15% for CWHvm1 and CWHvm2). See section 3.2.5.</p>	<p>Low representation (given the high level of stability in these ecosystems naturally), for two biogeoclimatic variants, plus the global rarity of global temperate rainforest.</p>	<p>Watershed planning has increased overall protection within CS to a minimum of 40% old-growth, and 30% by site series. This raises the level of protection, but see concerns relating to Question 9 above.</p> <p>Also - Lack of certainty that the protection is permanent. (this is clearly the intention from the CSSP, but is not clarified within the Watershed Plans).</p>
<p>11. Are large landscape level forests rare or absent in the forest or ecoregion?</p> <p>HCVF – Yes.</p>	<p>This question is intimately linked to the question of large landscape level forests (Qn 7). We deal with this and the remnant forest question together, in relation to the intact watersheds. See section relating to Qn 7.</p> <p>Working Table 2 (below) itemises which areas we feel meets Qn 7 and which meets remnant criteria here.</p>	<p>Guidance for remnant:</p> <p>Guidance: Are moderate to large remnant patches the best examples of intact forest for their community and landform types ? (assumed yes)</p> <p>Guidance: Do the intact remnant patches include a logical ecological unit ? (yes – watersheds)</p> <p>Guidance: Do the largest remnant forest patches include a significant proportion of old forests (yes)</p> <p>Guidance: Do the remnant forest patches include a significant proportion of structural features such as CWD etc (yes)</p> <p>Guidance: Do the largest remnant forest patches include known populations of species representative of habitat types naturally occurring in the MU, especially</p>	<p>See results from Qn. 7</p>

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
		access sensitive? Assumed yes – but limited information on access sensitive.	
12. Are there nationally, regionally significant diverse or unique forest ecosystems, forests associated with unique aquatic ecosystems? HCVF – Yes (possible).	Yes - karst. Virgin falls – is that unique?	No other types that we are aware of. Many inventories have been completed, but are not summarised or presented for public consumption. Unsure whether karst meets test for regionally significant. Possibly spray communities.	Karst and salt spray communities are both dealt with by management recommendations in FDP.
Category 4: basic services of nature in critical situations			
13. Does the forest contribute to maintaining the quality, quantity and seasonal timing for water flows that are a source of drinking water, irrigation water or water for a critical economic activity? HCVF – Yes.	Two community watersheds are located within Lisaak's managed forest land base - Marktosis (on Flores Island) and Tofino (on Meares Island).		MP: follow the provincial guidelines (except there are none now). Under CSSP this is a key protection element. Hydroriparian and unstable terrain reserves are intended to maintain these values. We assume this is adequate. See recommendation in summary regarding adequacy of erosion control policies.
14. Are there forests that provide a significant ecological service in mediating flooding and / or drought, controlling stream flow regulation and water quality? HCVF – Yes.	Yes there are, but these values are covered off under Salmon (maintaining hydrologic processes). Don't feel this is a large issue here.		Assume adequacy of practices.
15. Are there forests critical to erosion control? HCVF – Yes.	Significant areas mapped as unstable, or with high erosion potential.		We note that additional policy regarding how management decisions will reflect risks in an appropriately precautionary manner. For example, regarding high values, even undertaking action under even 'moderate' risk may not be sufficiently precautionary.
16. Are there 'interface'			

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
<p>forests that play a significant role determining the potential spread of wildfires into developed areas or other areas where fire would be harmful?</p> <p>HCVF – No.</p>			
<p>Category 5: forest areas fundamental to meeting basic needs of local communities</p>			
<p>17. Are local communities making use of the forest for basic needs/livelihoods?</p> <p>HCVF – Yes.</p>	<p>Many areas (if not all) CS relevant to meeting basic needs for First Nations. However, we deal with all these values together under Category 6, since it difficult to separate basic needs from cultural identity.</p> <p>Many areas also important for non-First Nations community members. However, we don't think they meet the test for basic needs.</p>	<p>Dealing with all First Nation values under Category 6 even if relevant to basic needs, since these are interlinked to cultural identity.</p> <p>Non-First Nations communities use the forest for many values – from berry / firewood collection, fishing, recreation. Difficult to determine whether it meets the test for basic needs or not – we judge not overall, though raise some concerns particularly around values such as mushroom-picking (non-commercial), and values such as basic needs relating to health / recreation etc.</p>	<p>See Category 6 relating to First Nation values.</p>
<p>Category 6: forest areas critical to local communities' traditional cultural identity.</p>			
<p>18. is the traditional cultural identity of the local communities particularly tied to a specific forest area?</p> <p>HCVF – Yes.</p>	<p>Culturally significant areas have been identified by each First Nation directly through the Watershed Planning Process and maps and descriptions of these culturally significant areas are included in each Watershed Plan. This process included extensive consultation with each First Nations community, Hereditary Chiefs, Elders and Chief and Council and referenced to</p>	<p>First Nations communities have used in the past and continue to use today the forest resources in the practice and maintenance of their culture. This includes bark stripping for crafts and sustenance items, the harvest of large cedar logs for canoes, the harvest of medicinal plants, the use of hemlock branches to harvest herring roe, the harvest of yellow cedar, red cedar and yew logs for paddles, carvings and ceremonial purposes, etc.</p>	<p>Extensive First Nations consultations have resulted in detailed management guidance for specific areas of importance.</p> <p>Concerns raised by a number of people in consultation about lack of real consultation occurring within First Nation. It has been noted by the CRB (and we repeat here) that these concerns can really only be resolved within the First Nations themselves.</p> <p>We assume overall that the FN cultural and 'basic needs' values are maintained by extensive input by FN's into the planning process.</p> <p>Broad non-FN values are expected / intended / to be</p>

Question	Findings	Rationale and Attribute	Adequacy of Management Strategy/ Consultation
	<p>confidential archaeological and anthropological data on CMT use, burial sites, and spiritual sites. Non-First Nations cultural values.</p>	<p>Re Non-First Nations values: Many locals in Tofino suggested a cultural / spiritual significance associated with CS and particularly the intact areas. This is very different from the FN values (in terms of timeframes, direct connection to the land etc), but perhaps similar in terms of deep spiritual connections to the land (though not as a result of direct access to these areas). Also culturally significant for many people across BC, not just locally.</p>	<p>maintained by the CSSP recommendations. However, they note that they were asked to determine 'how' to log, not 'whether' to log, and a number of members have raised concerns about the significant values associated with intact areas. See further discussion under Question 7.</p>
<p>19. is there a significant overlap of values that individually did not meet HCV thresholds, but collectively constitute HCV's? HCVF – Yes.</p>	<p>All Clayoquot Sound is a HCVF</p>	<p>This is due to the large number and distribution of HCVFs combined with the inherent connectedness between many of the ecological and cultural values</p>	<p>Overall, many values within CS should be maintained by the CSSP. We raise some concerns however, in particular:</p> <ul style="list-style-type: none"> a) the coarse filter targets for representation seem low, given newer work to define EBM in coastal ecosystems that recommend a much higher target overall. b) Minimal interior habitat management may result in non-functioning old growth protection in some areas with significant historic harvesting c) Some discrepancies remain between CSSP and implementation. In particular, lack of clear rationale for some values d) No monitoring has been underway. The CSSP was clear that their advice was a series of hypotheses, and must be tested. <p>Note that it is not our intention that this designation creates the need for additional monitoring over and above the monitoring required for the individual HCVFs. However, we think it is important to stress the overall high conservation values, and their interlinked nature on the landbase.</p>

Working Table 2. Assessment of the sub-basins associated with intact areas. Table highlights biogeoclimatic diversity, tenure, special values where information was readily available, and rationale for determining priority. Priority is linked to precautionary management strategies outlined in Section 3.2.2

Sub-Basin #s	WS Group	Area Description	BEC Diversity	Tenure	Special Values	Rationale/ Considerations	Priority
1-7	Hesquiaht	Upper ends of watersheds draining into Hesquiaht Peninsula Park	CWHvh1 (very minor CWHvm1)	Not lisaak	None known	Increases whole watersheds reserved in CWHvh1; minimal BEC diversity; other similar complete watersheds in adjacent and other PAs; no connectivity	Moderate
8	Hesquiaht	Lower portion of Hesquiaht Point Creek, smaller isolated watershed draining into the mouth of Hesquiaht Harbour	CWHvm1 (minor CWHvh1 and CWHvm2)	Not lisaak	None known	Does not increase whole watersheds reserved in CWHvh1 (upper sub-basins already developed); minimal BEC diversity; other similar complete watersheds in adjacent and other PAs; no connectivity	Moderate
9-13	Hesquiaht	Sarchie Creek and other smaller watersheds draining into Hesquiaht Lake	CWHvm1 (very minor vm2)	Significant lisaak areas in all except #11	None known	Increases whole watersheds reserved in CWHvh1; minimal BEC diversity; other similar complete watersheds in adjacent and other PAs; limited connectivity	Moderate
14-18	Sydney/ Pretty Girl	Main northwestern tributaries of Sydney River	CWHvm1 (minor vm2 and very minor MHmm1)	lisaak all lower elevations in 15,17 & 18	None known	Increases whole watersheds reserved with CWHvm1/vm2/ MHmm1 elevational sequence, increase the size of the Strathcona PA complex, increase the effectiveness of the Sydney Inlet Park, and increase connectivity of the Strathcona PA complex to the Pacific Ocean to a limited extent if the adjacent Pretty Girl watersheds and Eastern Sydney sub-basins were also reserved; other similar complete watersheds in adjacent areas with higher values	High
19-23	Sydney/ Pretty Girl	Southeastern tributaries to Sydney River	CWHvh1, vh2 and minor MHmm1	lisaak all lower elevations	None known	Increases whole watersheds reserved with CWHvm1/vm2/ MHmm1 elevational sequence, increase the size of the Strathcona PA complex, increase the effectiveness of the Sydney Inlet Park, and increase connectivity of the Strathcona PA complex to Sydney Inlet Park and the Pacific Ocean	Very High
24-35	Sydney/ Pretty Girl	Watersheds draining into Pretty Girl Cove - south to	CWHvm1, minor vm2 and very	lisaak areas in mid-lower	Significant number of lakes	Increases whole watersheds reserved with CWHvm1/vm2 elevational sequence, increase the size of the Strathcona PA	Very High

HIGH CONSERVATION VALUE FORESTS IN CLAYOQUOT SOUND

Sub-Basin #s	WS Group	Area Description	BEC Diversity	Tenure	Special Values	Rationale/ Considerations	Priority
		Young Bay/ Celia Creek drainage (includes Pretty Girl, Ice, Camp, Ellen, Cecelia and Easter Lakes)	minor MHmm2	elevations of 26-32 and some area in 35	and wetlands; high levels of habitat diversity	complex, increase the effectiveness of the Sydney Inlet Park, and greatly increase connectivity of the Strathcona PA complex to the Pacific Ocean	
36	Sydney/ Pretty Girl	A small watershed draining into Young Bay - south of Cecelia Creek	CWHvm1	Mostly lisaak	None known	Increases whole watersheds reserved in CWHvh1, but minimal BEC diversity and limited connectivity values	High
37-42	Sydney/ Pretty Girl	Watersheds draining into Shelter Inlet and Dixon Bay	CWHvm1	lisaak areas in 37-38 and 42	Significant number of lakes and wetlands; high levels of habitat diversity	Increases the size of the Strathcona PA complex, increase connectivity of the Strathcona PA complex to the Pacific Ocean and provide whole watershed protection for watersheds already partly protected in Sulphur Passage Park	Very High
43-45	Bedingfield	Upper portions of small watersheds draining into Shelter Inlet between Belcher Pt. and Bachante Bay	CWHvm1, vm2 and MHmm1	lisaak most of 43-45, lower elevations of 46	Small lakes and associated wetlands in #43	Completes small and moderate size watersheds with CWHvm1/vm2/ MHmm1 elevational sequence already partly protected in Strathcona Park; significant connectivity to coastline for Strathcona PA complex	Very High
46-48	Bedingfield	Upper portions of small watersheds draining into Shelter Inlet and Sulphur Passage near Belcher Pt.	CWHvm1 and vm2	lisaak lower elevations of 46, small portion of 47, none of 48	None known	Completes small watersheds with CWHvm1/vm2 elevational sequence already partly protected in Strathcona and Sulphur Passage Parks; moderate connectivity, harvesting in upper portion of #47	High
49-60	Flores	Upper portions of small watersheds on western Flores Island	CWHvm1 and vm2 (minor CWHvh1)	All lisaak	Small lakes and associated wetlands	Completes watersheds with shoreline and CWHvh1/vm1/vm2 elevation sequence, lakes and wetlands; significant increase in size and diversity to Flores Island Park; connectivity from Strathcona PA complex to outer coast	Very High
61-62	Flores	Small watershed on the south end of Flores Island	CWHvh1 and CWHvm1 (very minor CWHvm2)	Upper elevations lisaak	None known	Complete watershed, but moderate BEC diversity	High
63-73	Flores	Small watersheds on the	CWHvh1 and	Mostly lisaak	None known	Complete small watersheds with protected shoreline,	Moderate

HIGH CONSERVATION VALUE FORESTS IN CLAYOQUOT SOUND

Sub-Basin #s	WS Group	Area Description	BEC Diversity	Tenure	Special Values	Rationale/ Considerations	Priority
		eastern side of Flores Island	CWHvm1 (very minor CWHvm2)			moderate BEC diversity	
74-76	Flores	Small watersheds and inner coastline on the north end of Flores Island adjacent to Hayden Passage and Shelter Inlet	CWHvh1 and CWHvm1 (minor CWHvm2)	All lisaak	Small lakes and associated wetlands	Whole small watersheds; lakes and wetlands; increases effective size and diversity of Flores Island Park with #s 49-60; provides connectivity to outer coastline with Strathcona PA complex (across Hayden Passage)	Very High
77	Bedingfield	McKay Island	CWHvh1	Not lisaak	None known	Whole island; minimal BEC diversity	High
78-79	Cypre	Sub-basin draining into Moyeha Bay and upper Cypre River	CWHvm1, vm2 and MHmm1	All lisaak	None known	Isolated sub-basins; some harvesting in lower elevations of #79; good BEC diversity in #79	Moderate
80	Cypre	Upper sub-basin of Cotter Creek	CWHvm1, vm2 and MHmm1	All lisaak	Snow avalanche habitat	Isolated whole sub-basin with CWHvm1/vm2/ MHmm1 elevational sequence; and rare avalanche habitats	High
81-82 & 85-86	Beach	Upper ends of western watersheds on Vargas Island	CWHvh1	Not lisaak	None known	Completes whole watersheds partially protected in Vargas Park; minimal BEC diversity	High
83-84	Beach	Watersheds on eastern Vargas Island	CWHvh1	Not lisaak	None known	Other similar areas in adjacent PAs or other intact areas	Moderate
87	Bedwell-Ursus-Bulson	Eastern face slopes of Bedwell River north of mouth of Ursus Creek	CWHvm1, vm2 and MHmm1	All lisaak	None known	Provides important connectivity between Ursus Creek, upper Bedwell River in Strathcona Park and Bedwell Sound; harvesting in lower elevations - requires restoration	Non-Eehmiis (V. High)
88-90	Bedwell-Ursus-Bulson	Upper ends of southern tributaries to Bedwell River (e.g. Sam Craig, Blaney and Ashwood Cks.)	CWHvm2 and MHmm2 (minor CMAup)	All lisaak	None known	Completes whole sub-basins already mostly protected in Strathcona Park; increases effectiveness of Strathcona PA	V. High
91-96	Bedwell-Ursus-Bulson	Ursus Creek watershed	CWHvm1, vm2 and MHmm1 (minor CMAup)	All lisaak	None known	Whole large watershed; major BEC unit diversity; significant addition to Strathcona PA complex; avalanche track habitat in #s91-94	V. High

HIGH CONSERVATION VALUE FORESTS IN CLAYOQUOT SOUND

Sub-Basin #s	WS Group	Area Description	BEC Diversity	Tenure	Special Values	Rationale/ Considerations	Priority
97	Bedwell-Ursus-Bulson	Eastern face slopes of Bedwell River south of mouth of Ursus Creek	CWHvm1 and vm2	All lisaak	None known	Provides important connectivity between Strathcona PA complex and Ursus Creek to Bedwell Sound	V. High
98-105	Cypre	Smaller watersheds draining into northeastern Bedwell Sound	CWHvm1, vm2 and MHmm1	98-101 almost all lisaak, 102-105 not lisaak	None known	Series of whole sub-basins with good BEC unit diversity; limited connectivity; similar to other intact areas with higher values or already protected	Moderate
106-108, 110, 112	Bedwell-Ursus-Bulson	Upper Bulson Creek watershed	CWHvm1, vm2 and MHmm1 (minor CMAup)	All lisaak	Avalanche track habitat in #s106-107	Major portion of moderate-sized watershed; good BEC unit diversity; avalanche track habitat; potential addition to Strathcona PA complex with Ursus Creek, but limited connectivity	High Moderate
109, 111, 113	Bedwell-Ursus-Bulson	Lower Bulson Creek watershed	CWHvm1, vm2 and MHmm1 (minor CMAup)	All lisaak	None known	Extensive harvesting and roads in sub-basin 109 and 113, and some in lower 111	Moderate
114-116	Upper Kennedy	Upper Kennedy River above Snag Lake	CWHvm1, vm2 and MHmm1 (minor CMAup)	Not lisaak	None known	Significant upper portion of watershed with wide BEC unit diversity; potential contribution to connectivity between Strathcona and Clayoquot PA complexes; other similar areas with higher values	High
117	Upper Kennedy	Upper Kennedy River - area draining directly into Snag Lake	CWHvm1, vm2 and minor MHmm1	Not lisaak	Unique geologic/hydrologic feature - landslide dam	Unique geologic feature; significant upper portion of watershed and with 114-116; potential contribution to connectivity between Strathcona and Clayoquot PA complexes	Non-Eehmiis (High)
118	Upper Kennedy	Upper Kennedy River small sub-basin	CWHvm2 and MHmm1 (minor CWHvm1)	Not lisaak	None known	Partially harvested and isolated	Moderate
119-120	Tofino-Tranquil	Upper Tofino Creek	CWHvm1, vm2 and MHmm1	All lisaak	None known	Whole sub-basins with good BEC unit diversity; potential contribution to connectivity between Strathcona and Clayoquot PA complexes	High
121	Tofino-Tranquil	Upper Tofino Creek	CWHvm1, vm2 and MHmm2	All lisaak	None known	Whole sub-basin with good BEC unit diversity; somewhat isolated; other similar areas with higher values	Moderate

HIGH CONSERVATION VALUE FORESTS IN CLAYOQUOT SOUND

Sub-Basin #s	WS Group	Area Description	BEC Diversity	Tenure	Special Values	Rationale/ Considerations	Priority
122-123	Clayoquot River	Northwestern sub-basins of Clayoquot River	CWHvm1, vm2 and MHmm1	All lisaak	Small lakes and associated wetlands; avalanche habitat	Whole sub-basins with good BEC unit diversity; completes whole watershed reserve with 124-128; potential contribution to connectivity between Strathcona and Clayoquot PA complexes	Very high
124-128	Clayoquot River	Mid-Clayoquot River sub-basins	CWHvm1, vm2 and MHmm1	All lisaak	None known	Whole sub-basins with wide BEC unit diversity; significantly increases effectiveness of Clayoquot Sound and Clayoquot Plateau Parks; completes whole watershed reserve with 122-123 & 129-130; potential contribution to connectivity between Strathcona and Clayoquot PA complexes	Very High
129	Clayoquot River	Lower Clayoquot River sub-basin	CWHvm1 and vm2 (minor MHmm1 and CMAunp)	All lisaak	None known	Increases effectiveness of Clayoquot Arm Park; whole sub-basin with #130; contributes to whole watershed reserve with 122-128 & 130	High
130	Clayoquot River and Kennedy Lake	Remnant area near mouth of Clayoquot River	CWHvm1	Not lisaak	None known	Whole sub-basin with #129 and provides connectivity with Clayoquot Arm; contributes to whole watershed reserve with 122-129; requires restoration	Non-Eehmiis (High)
131	Upper Kennedy	Upper sub-basin of a mid Kennedy River western tributary	CWHvm1, vm2 and MHmm1	Not lisaak	None known	Increases effectiveness of Clayoquot Plateau Park; whole sub-basin; good diversity of BEC units	Very High
132-133	Upper Kennedy	Mid-Kennedy River sub-basins	CWHvm1, vm2, MHmm1 and CMAunp	lisaak has lowest elevations only	None known	Wide diversity of BEC units; isolated small sub-basins; other similar areas with higher values	Moderate

Working Table 3. Table of species and comments on their habitat requires (based on TPC report CS Wildlife 2003).

Table provides a summary of the information in the Clayoquot technical planning committee document (CS wildlife 2003). Some specific questions are raised here that relate to adequacy of Marbled Murrelet and coarse filter for management. Plants or rare communities are not included in this summary.

Species / habitat	Ranking	Comment
Fish		Noted that relatively good surveys in most watersheds, but not everywhere. Steelhead thought to be in decline throughout range.
Freshwater fish Rainbow trout *Dolly varden char Kokanee *Cutthroat trout Peamouth chub Sculpins?? not mentioned in the background piece ..	*Blue list G5 S3S4 *Blue list G4T4 S3S4	Many are regionally significant, due to genetic isolation. No specific strategies for fish are outlined, except that it is assumed they are maintained by the coarse filter reserve system and guidelines regarding precautionary harvest of unstable areas. (see our commentary on how to improve the precautionary nature of the erosion control guidelines).
Migratory Chum Chinook Coho Pink Sockeye Steelhead Cutthroat (ocean going)		Can create genetically isolated stocks. See comment above about management.
Amphibians		9 species on Vancouver Island, all documented in Clayoquot (Beasely 2000).
Northwestern salamander Long-toed salamander Rough-skinned newt Pacific treefrog *Red-legged frog Western toad	*blue-list (provincial) G4 S3S4	Yes. Require cool temps to maintain body condition. Concern about sinks in ponds / shallow areas that then either dry up, or remove connectivity potential to mature forest post breeding. All aquatic breeders. Generally likely maintained by riparian management guidelines (and other reserve networks) -.But difficult to ID small isolated wetlands using TEM (Beasely – from comments) so requires stand level management requirements. This is occurring (identified in FDP) but specific requirements not identified. Red-legged frog have specific guidelines for their breeding sites, plus guidelines for restricted falling times. However, these are not specifically outlined in the management plan, and we assume the intention is to employ these guidelines during the site level assessment. Needs some explicit mention so the intention is clear.
Western red-backed salamander		Terrestrial breeders – sensitive to forestry. Need to maintain current and future attributes. Shady,

Species / habitat	Ranking	Comment
Clouded salamander Ensatina		moist habitats required. Cover around talus slopes, rock outcrops etc, plus ground cover, sword ferns, moss, wood debris etc.
Reptiles		
Common garter snake Northwestern garter snake Western terrestrial garter snake	Not at risk	Local sensitivity (lack of ability to escape), but habitat likely not majorly affected.
Birds		
Marine-related species: 26 species identified (listed in wildlife doc), all of which are blue or red-listed.		Management document notes that only *Marbled Murrelet habitat is likely affected by forestry activities (except for disturbance on estuaries / log dumps etc). Is there specific management outlined for these sensitive areas? Assume estuaries protected by coarse filter, but it is hard to assess the extent of this Management doc lists a number of management strategies that should be used to reduce marine impacts including reducing sedimentation (from riparian), reducing runoff from dryland log dumps sites, water storage time should be minimal, log dumps be located away from sensitive ecological areas, restoration of areas with excessive accumulations of debris. These strategies don't appear to be specifically outlined in the FDP/ SFMP - again, specific intentions should be laid out to provide clarity and certainty. Particular concerns with respect to Meares Island mentioned. Adequate management regarding potential marine spills? And impact by aircraft?? (This should likely be dealt with as part of the broader FSC audit.)
Marbled Murrelet	*Red-listed G3G4 S2B, S4N Threatened (Cosewic)	Tied to mature forests with specific characteristics for nesting requirements. Also potentially negative impacts of predation caused by fragmentation. Science is unclear about density of birds, how population sizes may be influenced by harvesting, and how predation / success rates may be affected by fragmentation and increased predation. see comments throughout report regarding this element.
Freshwater Waterfowl Harlequin duck	Not listed	Potentially sensitive – but likely maintained by riparian management guidelines.
Great Blue Heron (fannini)	Blue-listed, G5T4, S3b,S2N, Special concern (COSEWIC)	Sensitive to forestry – assumes that existing reserves are adequate to protect the species. Can be single, or many nests- Particularly adjacent to high quality foraging areas? (eel grass / estuaries etc?). Should be picked up by the site level R.P.Bio assessment.? Adequate? Lack of data, and very difficult to find nests.
Green-backed heron	Blue-list, G5, S3S4B	Observed locally, but no known nest sites. Willows / alder / hawthorn, adjacent to aquatic habitats with cover. Lack of data to test whether management is adequate.
Bald eagle	? none (or yellow?)	Require large trees near aquatic habitats.

Species / habitat	Ranking	Comment
		TEM and MoE eagle nest maps used to compare how well reserves overlap with nest sites. Seems to cover best habitat and most nests (particularly hydriparian and foreshore reserves). Some discrepancy with importance of area for bald eagles. Moul suggests CS is one of least productive areas for eagles on the coast ? (in contrast to comment by Madrone consultants). Should be identified by site level R.P.Bio assessment. The detailed guidelines should be similarly used for herons (since they are likely more critical).
QC Goshawk (laingi)	Red-listed (sub species) G5T2 , S2B	Yes. Mature forest dependent for nesting and foraging. No known nests here, but likely. Note that management will be overviewed by IWMS (which has little budget available).
Peregrine falcon (pealei?)	Blue-listed G4T3, S3B	Likely little conflict – nest on cliffs primarily, and forage often on seabirds. Likely maintained by reserves and buffers. Relatively little survey effort
Western screech owl Great horned owl Northern pygmy owl Northern saw-whet owl Barred owl	Blue-listed, G5T4, S3 Blue-listed G5T3Q, S3	Relatively little survey effort. Assumes that existing reserve will maintain this species. Note – three other migratory / non-resident species that may occasionally occur. Not being considered.
White-tailed ptarmigan	Blue-listed G5T3, S3	Little sensitivity – high alpine species that does come adjacent to tree-line, but rarely.
Sandhill crane	Blue-listed	Highly sensitive, but likely little nesting habitat here.
Woodpeckers Northern flicker Hairy woodpecker Downy woodpecker Pileated woodpecker Three-toed woodpecker Red-breasted sapsucker Yellow-bellied sapsucker (?)		Not at risk – but potentially sensitive to forestry activities. Maintained by reserves at landscape level, and stand level retention that should focus on wildlife trees. Assume these values will be maintained by site level assessment by R.P.Bio – didn't see much evidence of this during site visit. Requires follow up for efficiency of this process
Songbirds Relatively low diversity of species, with perhaps highest number in deciduous forests. Communities dominated by winter wren, pacific slope flycatcher, varied thrush and chest-backed chickadee.		Variable by species.
Hutton's vireo	Blue-listed?	
Purple martin	Red listed	Suggested it is protected already by being associated with estuaries, deciduous stands near water.
Vesper sparrow		Grassland associated species, likely little affected.

Species / habitat	Ranking	Comment
Pine grosbeak (carlottae)		Not likely to be affected? Unknown whether present species.
Mammals		
Vancouver Island Water Shrew	Red-listed	Yes – but likely maintained by hydroriparian
Bats *Keens' long-eared myotis California myotis Yuma myotis Little brown myotis Silver-haired bat Big brown bat	*Red-listed	Yes – require stand level attributes plus natural openings and water to maintain foraging and roosting habitat. Unknown maternity colonies – difficult to protect. Is an issue regarding the lack of burden of proof to find important sites ..how are the management ideas identified by research (Van Den Driessche et al.) implemented? Assume again that this ties back into the site level assessment by R.P.Bio. Again, lack of explicit requirements here makes it difficult to determine the effectiveness of this process.
Ungulates *Roosevelt elk	*blue listed	Localised populations in various of the watersheds, with small numbers of animals. Thought to be primarily limited by overwinter mortality? Done a test across 4 watersheds to determine whether there's adequate habitat – using TEM based habitat model, checked with reserves .. all fine except for Tofino- Tranquil. Notes that they require additional work with MoE staff to ensure adequacy.
Columbia black-tailed deer	Regionally significant (?)	Again Tofino-tranquil is under the provincial target. Notes that ongoing consultation is required.
Black bear		Suggest that reserves, particularly along shorelines / estuaries, are beneficial. Need to avoid the midterm crash of dense habitat – which would be aided by rate of cut guidelines.
Vancouver Island ermine	Blue listed	Likely need undisturbed areas adjacent to riparian, and also may forage in natural or man-made openings. Likely maintained by riparian reserves?
VI Wolverine	Red-listed	Habitat distribution is largely unknown. Tend to be at higher elevations, and prefer to be undisturbed. May be maintained ? by ungulates (historically VI Marmot may have been important).
Cougar	Not on any list?	

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