BCTS
BC Timber Sales
Chinook

BCTS Chinook Business Area

FSP Supporting Document

Haida Gwaii
Natural Resource District

2019-2024

August 2019

1. Purpose & Audience:

The purpose of this document is to provide the statutory decision maker with supporting information an documentation that guides the interpretation of BCTS' Forest Stewardship Plan (FSP) for Haida Gwaii. This document also serves to support the implementation of the FSP by Qualified Professionals (as defined in the *Clarifications* section of the FSP) and Timber Sale Licence (TSL) holders, and is intended to provide clarification on the measurability, verifiability and relevance of results and strategies outlined in the FSP.

In preparing the FSP and this supporting document, BCTS has reviewed and considered the District Manager's Letter of Expectation (LOE) (July 25, 2016), the Chief Forester's Guidance on the Replacement of FSPs (March 2016) and comments from Solutions Table, the public and BCTS staff. Because forest stewardship guidance is constantly evolving, this document may be updated from time to time and new versions may be issued to address updated information or guidance.

2. Application of the District Manager's Expectations Letter:

The expectations in the Chief Forester's letter (Appendix 1) state that the District Manager should consider the content of the guidance letter in respect of local context and incorporate relevant sections in their expectations letter. The District Manager's LOE (Appendix 2) incorporates the Chief Foresters guidance in the context of the unique management framework on Haida Gwaii. BCTS, in the preparation of the FSP and this supporting document, has considered this guidance in the following ways:

New Information: BCTS has made specific changes to the FSP by adding or augmenting sections on Cedar Stewardship Areas (CSA's), climate change, visual quality, yew management and public engagement. BCTS has incorporated new management plans, effectiveness reports and strategies produced since the last FSP. BCTS has also included related supporting documentation in the results and strategies section of this document.

Measurability of Results and Verifiability of Strategies: BCTS has improved on cultural wood management by initiating a tracking ledger for monumental cedar, by developing a yew strategy and invasive plant measures with specific, measurable elements observed in the following results and strategies section.

Innovation: As the LOE highlights, BCTS together will all licensees on Haida Gwaii are continually innovating as we implement various aspects of the Haida Gwaii Land Use Objectives Order (HGLUOO) ecosystem-based management regime and as we respond to new guidance for managing cedar and species at risk. Innovation in intermediate stand harvesting continues to be a challenge as BCTS has not found an opportunity to utilize intermediate stocking standards in Land Use Objectives Order (LUOO) management zones, however BCTS continues to pursue opportunities for intermediate stocking standards and is aware of the ability to amend the FSP for this purpose.

Public Engagement: BCTS has committed to a public engagement strategy that exceeds the mandatory 60 day review period for FSP's. This is referenced in the relevant section of the FSP as well as in the results and strategies section of this supporting document.

3. Results and Strategies

Haida Gwaii Land Use Objectives Order

Cultural Objectives

Cedar Stewardship Areas

As stated in the FSP section 6.2 (a), BCTS has committed to practices consistent with the Council of the Haida Nation's (CHN's) CSA management plan that is available here as Appendix (3).

Haida Traditional Heritage Features (Karst)

BCTS' recognizes the relevant Karst Government Actions Regulation (GAR) for Haida Gwaii in the FSP (section 6.7 (a)) as a separate and complimentary ministerial order to the requirements for Karst under the HGLUOO. This GAR is available in Appendix 4. BCTS does not anticipate that the two legal instruments concerned with Karst (LUO&GAR) will conflict, however, in such a case, BCTS will seek an amendment to the FSP as described in s. 12(4) through 12(6) of the *Forest Planning and Practices Regulation* (FPPR) where a granted exemption from one of the objectives would result in the prioritization of objectives established under a LUO.

Cedar Harvest

The Ministerial Order 75.02(2)-01/TSA25 for the cedar partition (Appendix 5) referenced in the FSP, section 6.15 applies to Forest Licence holders but does not apply to BCTS explicitly. To ensure the partition is also applied to BCTS, the Minister has directed BCTS to adhere to the partition via a letter to BCTS (Appendix 6). The letter includes a reference to the 5-year term of the order beginning on the effective date of August 24, 2018.

Cedar Regeneration

BCTS has developed a Yellow Cedar Management Strategy in order to pursue the long-term maintenance of yellow cedar on the landscape and to guide the regeneration of yellow cedar in blocks. The strategy is accessible in Appendix 7. This strategy is also relevant to the Climate Change section in this document given that Yellow Cedar decline is due in part to climate change.

Western Yew Retention

The BCTS strategy for retention of western yew is described in section 6.19 to 6.22 of the FSP. To address operational implementation of this strategy, BCTS has developed a Best Management Plan (BMP) for Yew available in Appendix 8. This BMP includes a process for referring incidental harvest of individual yew stems to the Cultural Wood Access Program.

Monumental Cedar

In section 6.39 of the FSP, BCTS has made the commitment to provide 100% of harvested monumental cedar to the Cultural Wood Access Program. BCTS will adhere to other elements of the Operating Procedures for Cultural Wood Access for Monumental Cedar, Appendix 9, such as allowing the permit holder to harvest the monumental. However, given that most monumental cedar will be harvested by the licensee and delivered, BCTS has established a BMP for tracking monumental cedar available in Appendix 10.

Social Objectives

FSP Implementation Plan

As stated in FSP section 6.40, BCTS has signed the FSP implementation plan for Haida Gwaii that commits to meeting the targets for HGLUOO objectives. This includes the sharing of information for various management units that require tracking of depletions and contributions such as sensitive watersheds. For a copy of the agreement see Appendix 11.

Public Engagement

As referenced in the FSP sections 6.44-6.48, BCTS has committed to a public engagement strategy. The strategy is explained in more detail in Appendix 12. This strategy includes measurable public consultation and engagement events and it exceeds the mandatory amount of public consultation. BCTS also now publishes a multi-year development plan of planned blocks and roads which is available online at: https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/tsl/mydp. BCTS also intends to share yearly development plans, as defined in the engagement strategy.

BCTS ensures response to public feedback including complaints via established procedures outlined in Appendix 13: Chinook BA SFMS procedures for Public & Client Enquiries/Complaints/Potential Issues. Adherence to the engagement strategy is ensured by the BCTS EMS/SFM systems referred to in the section: *third party certification*.

Annual Reporting and Data Submission

BCTS is committed to annual reporting by year end, as described in section 6.49 of the FSP. Additionally, it is standard practice for BCTS to submit georeferenced spatial files for CFI surveys at the time of submission of block and sale information to the Solutions Table. BCTS is also aware that certain items in the HGLUOO require immediate reporting such as great blue heron and saw-whet owl nests, whereas black bear dens must be reported at the end of each year. BCTS will use a certain format for submissions if requested to do so by the CHN or Province.

Visual Quality

The HGNRD Stewardship Policy for Managing Visual Resources on Haida Gwaii as referenced in section 6.53 of the FSP is available here as Appendix 14. The associated letter from the District regarding implementation is attached as Appendix 15.

BCTS has received public feedback regarding the harvest and alternation of areas regarded as visually sensitive by local residents predominantly along highways. BCTS will consider this feedback during the public review and comment period for future operating plans as described in the public engagement section of this document. Additionally, BCTS has introduced Section 6.55 to the FSP, which addresses the management of visual impact adjacent to Highway 16.

Aquatic Habitats

Upland Stream Area

In response to public concern for the effects of forest harvesting in wetland-forest complexes such as the Naikoon landscape unit, BCTS commissioned a literature review and advice from a qualified professional concerning the differing effect of applying ECA in wetland-forest complexes. The report is presented in Appendix 16 and it concludes that ECA should have a relatively reduced impact in wetland-forest complexes.

Community Watersheds

In addition to measures to protect community watersheds, BCTS also maintains a Client Water Disruption Emergency Response Plan (Appendix 17) to protect water users collecting water from independent sources.

Biodiversity

Soils

In addition to BCTS' commitment to limit allowable soil disturbance in section 6.78 of the FSP, BCTS provides Ground Based Harvesting Guidelines (Appendix 18) to licensees in order to prevent soil disturbance in the short term and to provide for rehabilitation of trails.

BCTS also ensures the use of Wet Weather Shutdown Guidelines Available in Appendix 19 with technical material and tables available at: https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification/ems-sfm. These are in place to prevent unsafe conditions and maintain water quality though they also contribute to limiting soil disturbance. Guideline adherence is ensured by BCTS' EMS/SFM systems referred to in the section: *third party certification*.

Measures for Invasive Plants:

As referred to in section 7.1 of the FSP, The BCTS Chinook Invasive Plant BMP is provided here as Appendix 20. The BMP was recently updated to include the Haida Gwaii IPMA plant list. Further application of the BCTS invasive plant protocol is evidenced in Appendix 20.1 thorough 20.3. BMP's and SOP's are part of BCTS' EMS/SFM certification. BMP and SOP adherence is ensured by BCTS EMS/SFM systems referred to in the section: *third party certification*.

Climate Change

As referenced in section 8.1 of the FSP, the BCTS climate change strategy can be reviewed in Appendix 21. In addition to this strategy, BCTS Haida Gwaii has established a Yellow Cedar Management Plan available in Appendix 7 that includes planting Yc in harvested areas to the proportion that existed pre-harvest. The strategy incorporates new knowledge, monitoring and mitigation of Yc decline due at least in part to climate change. BCTS is also eligible to use the new Climate-Based Seed Transfer guidelines referenced in the Chief Foresters Standards for Seed Use dated April 5, 2018 (Appendix 22). BCTS awaits the upcoming climate change informed species selection tool in order to further assist in climate change impact mitigation. BCTS will engage in consultation with the Haida Nation (Council of the Haida Nation) and FLNROD District staff prior to utilizing these methods and tools for mitigation.

Third Party Certification

BMP, SOP and guideline adherence is provided for as part of BCTS' Environmental Management System (EMS) and Sustainable Forest Management (SFM) certification which includes SFI and CSA Z809 certification. EMS is predominantly a due diligence process that ensures adherence to policy where as SFI and CSA Z809 provide for the creation of policy in addition to FRPA. Policies include guidelines, BMP's and standard operating procedures (SOP's). Establishment of and adherence to policy is ensured by audit processes embedded in each system. Information on these schemes is available at: https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification
Chinook and Haida Gwaii specific BMP's are available at the following site: https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification/ems-sfm

Training and Qualifications

BCTS staff and contractors complete mandatory training as part of the BCTS EMS and SFI certification standards. This mandatory training includes, but is not limited to:

- BCTS Chinook Business Area Environmental Management System training
- BCTS Chinook Business Area Sustainable Forestry Initiative Awareness training
- Invasive species training
- Species at Risk training

BCTS staff and contractors also participate in relevant training provided by the District, Council of the Haida Nation, Ministry of Forests, Lands, Natural Resource Operations and Rural Development and other

sources, when offered. BCTS ensures that professional assessments and reports are completed by Qualified Professionals, as defined in the *Clarifications* section of the FSP.

Non-legislated Objectives

Species-at-Risk (SAR)

The Chief Forester's guidance letter (Appendix 1) references species-at-risk, federal recovery strategies and provincial implementation plans. BCTS harvest plans will be guided by federal recovery strategies to the extent practical, in situations where a provincial implementation plan is not available.

For established species-at-risk BCTS manages to the applicable provincial implementation plan or where no implementation plan is available, to established BCTS standards and standard operating procedures (SOP) as per our EMS/SFM program.

Contractors and staff receive species at risk training as referenced in BCTS' SFM training matrix available at: https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification/ems-sfm

Background information regarding BCTS' approach to managing SAR is described in the following document: Provincial BCTS Species and Ecosystems at Risk Management Guide (2018). In addition to the guide, BCTS follows an established SOP for SAR. Both items are available at the certification website link provided above.

Appendices

Appendix 1: Chief Forester's Guidance on the Replacement of FSP's

Appendix 2: District Manager's Letter of Expectations (Haida Gwaii)

Appendix 3: CHN's CSA Management Plan

Appendix 4: Karst GAR Haida Gwaii

Appendix 5: Ministerial Order 75.02 (2) – 01/TSA 25 (Cedar Partition)

Appendix 6: Letter to Ray Luchkow from Hon. D. Donaldson (Cedar Partition)

Appendix 7: Yellow Cedar Management Strategy

Appendix 8: BCTS HG Western Yew BMP 14022019

Appendix 9: Cultural Wood Access for Monumental Cedar Under the HGLUOO.

Appendix 10: BCTS Monumental Cedar Tracking BMP

Appendix 11: FSP Implementation Agreement 2018

Appendix 12: BCTS Public Engagement Strategy

Appendix 13: Client Enquiries/Complaints/Potential Issues Procedure 2018

Appendix 14: HGNRD Stewardship Policy for Managing Visual Resources

Appendix 15: Letter: use of HGNRD Policy for Managing Visual Resources

Appendix 16: BCTS Haida Gwaii Technical Memorandum Wetland Hydrology

Appendix 17: Client Water Disruption Emergency Response Plan

Appendix 18: Ground Based Harvesting Guidelines

Appendix 19: Wet Weather Shutdown Guidelines

Appendix 20: BCTS Chinook Invasive Plant BMP

Appendix 20.1: TCH Invasive Plant Process SOP

Appendix 20.2: TCH Standard for Invasive Plants

Appendix 20.3: TCH Invasive Species BMP

Appendix 21: BCTS Climate Change Strategy

Appendix 22: Chief Forester's Standards for Seed Use

BRITISH COLUMBIA

Ministry of Forests, Lands and Natural Resource Operations | Resource Stewardship Division

MEMORANDUM

File:
Ref: 220498

To: All District Managers
All Regional Executive Directors
Mike Falkiner, Executive Director, BC Timber Sales

From: Diane Nicholls, Chief Forester

Re: Guidance on the replacement of forest stewardship plans

Further to the Minister's letter dated March 8, 2016, I have attached guidance on the replacement of forest stewardship plans (FSPs) that outlines my expectations for the preparation of a new generation of plans.

Through the attached guidance, I aim to provide procedural certainty and fairness across the province, and to advocate that a reasonable approach is taken to address the expectations upon government, licensees and professionals for the management of British Columbia's Crown forest and range resources.

Furthermore, I expect that this opportunity is seized to advance our use of FSPs and to demonstrate our commitment to the FRPA model so that we can benefit from the business certainty and demonstrated resource stewardship that current and defensible plans can provide.

Improvements are the collective responsibility of the forest industry and government. If satisfactory improvements are not achieved, the province will consider whether more prescriptive actions should be taken.

Questions regarding the interpretation of this guidance may be directed to Jennifer Davis, Director, Resource Practices Branch at (250) 387-0088 or Jennifer.C.Davis@gov.bc.ca, or to Norah White, Sustainable Forest Management Policy Officer, Resource Practices Branch at (250) 387-8013 or Norah.White@gov.bc.ca.

Diane Nicholls
Chief Forester

pc: Tim Sheldan, Deputy Minister
FLNR Executive Committee
All Directors, Resource Stewardship Division
Perry Grilz, Director, Range Branch
Doug Stewart, Director, Forest Tenures Branch
Kevin Edquist, Director, Compliance and Enforcement Branch
Charles Hunter, Director, First Nations Relations Branch
All Members, Provincial Forestry Forum (c/o Patrick Russell)
All Members, Resource Stewardship and Tenures Committee (c/o Jacques Bousquet)

Guidance on the Replacement of Forest Stewardship Plans

March 2016

Introduction

Purpose

This guidance is intended to inform decisions regarding forest stewardship plans (FSP) by the Minister's delegated decision-makers (DDMs) under the *Forest and Range Practices Act* (FRPA).

The purpose of this guidance is to help:

1. Address the issues identified by government and the Forest Practices Board regarding FSP quality and effectiveness, and
2. Bring provincial consistency and fairness to the management of FSP expiries.

Context

The majority of British Columbia's FSPs will reach the expiry of their term within the next two years. Practitioners under FRPA are looking ahead to what they must address as they prepare the FSPs that will guide forest management practices in the coming years.

In the decade since most FSPs were first approved, British Columbia's bio-physical landscape has changed and we have gained experience and feedback to apply in our planning and practices.

Specifically, government has learned the following:

- The approval tests for FSP content require more rigor with respect to content that is measurable and/or verifiable.
- Results and strategies in FSPs need to contain consideration of new information such as forest health strategies and monitoring information.
- The public seeks better opportunities to review the content of a FSP and understand the forest management intent contained therein.
- Periodic review opportunities should be predictable and invite a sustained level of engagement.
- Improvements in planning and site-level information sharing are needed with all interested and affected parties, including reaching a common understanding of how the FSP can/cannot support these improvements.

The Replacement Process for Forest Stewardship Plans

In constructing this guidance, the following has been considered:

- Government's strategic stewardship goals, as set out in the Service Plan for the Ministry of Forests, Lands and Natural Resource Operations (FLNR);
- Consistency with the *Forest and Range Practices Act* and its framework;
- That there should be no unjustified financial or operational hardship upon forest licensees or natural resource districts;
- The duty of government for the consultation and accommodation of First Nations asserted or proven rights and title and treaty rights (Aboriginal interests); and,
- Principles of Administrative Law and Natural Justice.

Guidance for replacing an FSP whose term has expired

- FSPs whose terms are expiring should be replaced with a new plan (a 'replacement' plan). The majority of FSPs in the province are approximately 10 years old and should now incorporate new information and new forest management considerations in their results, strategies, measures and stocking standards.
- Extensions to the term of an expiring, or recently expired, FSP should be temporary and provide additional time for comprehensive planning of a new replacement FSP when more time is required.
- The licence holder has the right to request an extension to the term of their FSP. If the licence holder exercises this right, the DDM should, in turn, exercise his/her obligation to review all content in the existing FSP, and may use his/her discretion under section 28 of the Forest Planning and Practices Regulation to deny, or approve, an extension.
- The decision to approve or deny an extension should be conveyed in a letter of determination to the licence holder(s) and should be accompanied by a rationale signed by the DDM that identifies the term of the extension and the reason(s) for it (e.g., time to prepare a replacement FSP). For most licence holders, up to eight months is a reasonable timeframe within which to prepare a new plan.
- If a licence holder proposes major amendment(s) to an FSP and requests an extension to the term of the FSP at the same time, these requests should be submitted as a single request to approve a new replacement FSP.
- It is reasonable to propose that previously approved content within an existing FSP will carry forward into a replacement FSP; however, plans should be reviewed to identify and rectify all provisions that have been problematic to understanding, measuring and/or verifying the commitments in the plan.
- Default practices should not be modified or they are no longer defaults. Default practices listed in the Forest Planning and Practices Regulation must be either followed as-written, or alternate results and/or strategies that better meet local conditions should be proposed.
- Where a result or strategy is proposed in an FSP, the plan should clearly indicate which option (result or strategy) has been selected and how it will be measured or verified. Adhering to the

guidance set out in C&E Bulletin 12 (see 'Resources' below) will improve the measurability of results and the verifiability of strategies in FSPs.

- Measures for natural range barriers and invasive plants must specify actions that will effectively achieve their intended result, and must be enforceable. Therefore, measures should be reviewed to ensure they can be measured and/or verified.
- Wherever possible, the overlap of forest development units (FDUs) should be minimized and/or a single multi-signatory FSP should be proposed that covers the management unit to which it applies. This will help reduce management complexity, streamline approval and amendment procedures, and help facilitate public and stakeholder understanding and involvement.
- The timeframe for public review and comment must ensure that all interested and affected parties have ample time to understand and respond to proposed FSPs. DDMs may extend, or shorten, this timeframe. In some cases, such as where several overlapping FSPs are proposed for replacement, a longer review period should be allowed as per FPPR 20 (2) (b) to ensure that affected parties have time to review and understand the implications of the plan to them.
- The period for consultation with affected First Nations should remain at a minimum of 60 days unless a government-to-government agreement is in effect that provides otherwise. In some cases, additional time will be necessary to properly fulfill the Crown's legal obligation and to ensure adequate consultation has occurred.
- DDMs should produce written expectations for licence holders pursuant to this guidance. These expectations should be reasonable and substantiated, and if so, may effectively form criteria against which new FSP content will be evaluated. Expectations must be made known to licensees sufficiently in advance of the related decision that they can be discussed and addressed with all affected parties. Expectations should be communicated to all licence holders and affected parties in the district.
- DDMs should produce a written rationale documenting their considerations for approval of the FSP, including their reasoning for how legal approval tests have been met, the adequacy of First Nation consultation and any conditions of approval that they specify under FRPA s. 112 (1). A set of standard criteria will be developed to aid DDMs in developing provincially consistent written rationales. FRPA s. 16 (3) requires a rationale for refusing to approve an FSP or an amendment to one.
- DDMs must follow the principles of administrative law including a consistent process, maintaining decision-maker independence, and fairness. DDMs should consider all relevant information and the strategic goals and objectives of FLNR.

New Information for FSPs: Changes to Provincial Forest Lands and Societal Values

In the decade since the majority of British Columbia's FSPs were first approved, numerous factors have shaped the state of forest resources and the expectations of the public for how government ensures those resources are managed. The following factors, taken together or in combination, warrant the development of new FSP content:

- The mountain pine beetle epidemic of the past decade has significantly altered the forest composition of interior forests and the ecosystems they support.

- New information regarding the impact of climate change upon British Columbia's forested ecosystems is continually becoming available and refined. This information directly supports the development of FSP content (e.g., stocking standards).
- Most of British Columbia's management units are now covered by a formal forest health strategy. Where these exist, they contain information that should inform the development of new FSP content, such as stocking standards.
- There are a wider range of natural resource-dependent industries now operating throughout British Columbia and in many places, a greater number of rights-holders now operate upon the same land base as forestry operations. All rights-holders are entitled to fully exercise the rights they've been given and must be able to fulfil their legal obligations.
- Our collective understanding of First Nations Aboriginal interests, the requirement to consider adverse impacts, appropriate accommodation options and ensuring adequate consultation before making decisions, continues to evolve within the context of the government objective of reconciliation.
- There is new monitoring information regarding changes to the values listed under FRPA such as water supply, water quality, forage supply, backcountry recreation, fishing, guiding, trapping, and wildlife viewing. As well, there is information from cumulative effects assessments in some areas.
- New integrated monitoring information, such as the Multi-Resource Value Assessment reports, is becoming widely available that depicts important trends and risks to forest resources that may require coordinated planning among licensees to address, or different results and strategies.
- The requirements of Species at Risk in British Columbia identified in either federal recovery strategies or provincial implementation plans.
- Where Type 2, 3, or 4 Silviculture strategies are complete, as well as any new Integrated Silviculture Strategies, the information should be used and reflected in the FSP where appropriate.
- A Provincial Timber Management Goals and Objectives policy was launched in May 2014, that sets out the government's expectations for how timber is managed.
- The mounting case for collaborative planning across watersheds or within timber supply areas and the potential gains of a single FSP per watershed or timber supply area.
- FSP results and strategies should reflect, project forward, and be based upon the factors used in the Timber Supply Review of the Timber Supply Area to ensure the projected timber supply is not disconnected from actual results and strategy outcomes.

Not all of the considerations above will apply everywhere, but practitioners should be aware of, and able to demonstrate, how such factors affect or do not affect, forest resources within the operating area under their FSP. The responsibility of setting clear expectations which reflect the above considerations and are appropriate for local conditions is that of the DDM for each FSP on a case-by-case basis.

Applying This Guidance

The essence of my guidance is to encourage and assist DDMs in obtaining replacement FSPs because the British Columbia context requires an operational forest management plan be revisited on a five-year basis.

It is recognized that the legislation does not require an FSP to be replaced with a new plan at any point, and that results and strategies in an FSP are only required to be amended where specified events occur during the term of the FSP (e.g., new enactments or objectives are established) as per FRPA Section 7, or where the DDM determines that the FSP no longer meets approval tests. It is also understood that considerations of liability and risk will influence the inclusion of content that is not legally required, and finally, that the final evaluation of an FSP is the jurisdiction of the province's independent DDMs who cannot be directed, except by the Minister. It is, however, my opinion that sufficient evidence is now available for the province's DDMs to find that many FSPs no longer meet these approval tests and ultimately require a replacement plan.

As a statutory decision-maker, I understand the duty to consider the representations of those who may be affected by a decision; that each decision is adjudicated on a case-by-case basis; and that considering these representations and the unique circumstances of each decision may cause a DDM to diverge from a preferred course of action, such as this one. In such cases, a detailed and comprehensive rationale should be produced and made available. These circumstances are important opportunities to learn about the evolution of interests and pressures upon the legislated regime.

Specific applications of this guidance

Professional conversations

This document outlines considerations that should be discussed in the professional conversations that occur between district staff and licensees well-in advance of the work to develop a new FSP.

Written expectations

DDMs should draw upon this guidance when drafting their letters of expectation to licence holders. DDMs are urged to further interpret this guidance for their respective operating environments – particularly the considerations under 'new information' – and not to reissue these points verbatim without including local context.

Expectations above requirements in law should be presented and interpreted as best available information or voluntary guidance, and should not be prescriptive. As advisors to licence holders, professionals that prepare FSPs have the freedom to apply their professional advice and judgment to the task of preparing plans and prescriptions that assist licence holders in fulfilling their compliance obligations.

Expectation letters should be publicly available in keeping with the principle of fairness, which requires that those persons who may be affected by a decision have the opportunity to make representations to the DDM. All affected parties to the decision need to know about the decision that will be made,

including considerations and decision-aids that influence the DDM, in order to have a fair opportunity to make representations.

Rationale for replacement FSPs

The DDM applies discretion in the decision to approve an extension to the term of an FSP (Forest Planning and Practices Regulation, section 28). In my view, this guidance provides a sufficient rationale for why a replacement of the expiring FSP is likely warranted.

This guidance pertains to all FSPs province-wide until they have successfully progressed through a replacement process that applies the considerations of this document.

Further Information

Ongoing Work

Government is aware of outstanding elements of the FRPA framework, such as a final set of provincial objectives or a shared understanding of the risks and opportunities inherent in innovation that, if defined, would further support practitioners in creating high-quality and effective FSPs. Addressing these elements will require ongoing work in collaboration with licence-holders and professionals. This is not expected to be a hindrance to the achievement of the desired improvements that are outlined above.

The issue of meaningful engagement with the public, communities and stakeholders is one of importance to forest management, and is not presently addressed to the satisfaction of all involved, including many forest licence holders. Until such time as the province can establish an improved model, licence holders are encouraged to reference their engagement activities in their FSPs, or to outline them in detail in supporting documentation to the FSP, as a means of broadly conveying their engagement activities with the public and stakeholders that already occur during operational planning. Similarly, licence holders are encouraged to include information regarding how they will consider the rights and interests of First Nations that pertain to the area under the FDP.

Resources

There are many resources available online to support the development of FSPs including interpretive bulletins, provincial guidance and early training modules. Essential information, including the C&E Program Staff Bulletin #12 (assessment of measurable or verifiable) is available at the following locations:

- FRPA Bulletins:
  https://www.for.gov.bc.ca/hth/frpa-admin/frpa-implementation/bulletins.htm
- Administrative Guide to Forest Stewardship Plans:
  https://www.for.gov.bc.ca/hth/frpa-admin/agfsp.htm
- FRPA Training (original training material):
  https://www.for.gov.bc.ca/code/training/frpa/

- FSP Tracking System:
  https://www.for.gov.bc.ca/his/fsp/training.htm

A newly developed provincial training course for FSP preparers and approvers is targeted for delivery beginning in spring 2016. More information will be available on this course shortly.

Any further information for practitioners regarding FSP renewals will be distributed via the joint ministry-industry network of the Provincial Forestry Forum. This includes the Resource Stewardship and Tenures Committee and the Operational Issues Forums of the North, South and Coast FLNR Areas. Information regarding the membership of these committees can be accessed through FLNR district offices or industry associations. Challenges and inquiries faced in the FSP renewal process should also be presented to this network of committees for discussion and resolution.

BRITISH COLUMBIA
The Best Place on Earth

June 14th, 2016

To: All Licensees

Dear Licensees:

On November 16th, 2016 the Haida Gwaii Forest Stewardship Plan (FSP) is set to expire. The intent of this letter is to provide early expectations regarding new information that may be considered in the Statutory Decision Making process when determining a replacement or extension to your FSP.

As you know, the Chief Forester has provided recent Provincial guidance with respect to FSP replacement that addresses key elements of the 2015 Forest Practices Board Special Investigation Forest Stewardship Plans. I have reflected on these recommendations and have determined that certain aspects are applicable to natural resource management on Haida Gwaii. It is my perspective that your success in implementing comprehensive strategies under a complex legislative framework over the last four years has been exemplary, but I would like you to consider the following information as you move into the next planning cycle.

New Information:
Since November 2011, several new pieces of information have been made available to prescribing and reviewing practitioners. Future FSP submissions should clearly demonstrate how information such as Cedar Stewardship Areas, Climate Change guidance, Species at Risk, Visual Quality Management, effectiveness monitoring results, applicable Forest Practices Board reports, ABCFP guidance and public feedback have been considered. Some of these data sources may not find their way into your results and/or strategies, but it may be pertinent for you to show how they were considered in your supporting documentation.

Measurability/Verifiability of Results and Strategies:
During the course of this plan I was encouraged to see measurable practices like Annual Reporting, Cultural Feature Identification and the Inter-Governmental Process manifest and foster dialogue among prescribing and reviewing practitioners. There is, however, some room for improvement and I would like to have a wider discussion on the verifiability of mature/old forest recruitment provisions, cultural wood management and invasive plant measures.

Ministry of Forests, Lands and Natural Resource Operations
Haida Gwaii Natural Resource District
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Innovation:
It is recognized that the prescriptive nature of the Haida Gwaii Land Use Objectives Order has limited the choices available to the prescribing professional, but with greater understanding of operational limitations I would expect a higher level of innovation in your replacement Plan. For example, I believe it is important to discuss habitat augmentation in second growth Wildlife Tree Retention Areas and I would like to better understand why intermediate stocking standards are not being applied to promote harvest opportunity in LUOO management zones.

Public Engagement:
In 2010, many of us believed that a holistic ecosystem-based management regime that considered a complex array of local values would lead to greater social acceptance of natural resource management on Haida Gwaii. The most compelling and locally applicable finding from the Forest Practices Board Report (that was later affirmed by the Chief Forester) was that forest practitioners in British Columbia need to do a better job in engaging the public, who have a vested interest in the implications of natural resource development on public land.

Forest development without adequate communication of road and harvest areas of interest has been an ineffective approach to natural resource management. Engagement should not be relegated to 60 day every 5 years. Engagement should be early and often and needs to utilize innovative approaches to gather meaningful feedback. It's my expectation that you will lead this engagement piece as it will assist me in determining the adequacy of public review as per the *Forest Planning & Practices Regulation.*

As previously indicated, there is a significant need to revisit strategies and results outlined in your current FSP as it approaches expiry. I would appreciate the opportunity to sit down and discuss these expectations in greater detail in the next month. Please coordinate a time that works for you and your FSP author and I will have my staff adjust their schedules accordingly. If you have any questions or if further clarification is needed, please contact Sean Muise, Stewardship Officer, at 250-559-6200 (Sean.Muise@gov.bc.ca).

Yours truly,

Leonard Munt
District Manager

Ministry of Forests, Lands and Natural Resource Operations
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Cedar Stewardship Area Management Plan 2016

Heritage and Natural Resource Department
Council of the Haida Nation

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Cover – Bear den tree at Jiinanga, Haida Gwaii.
Photo: S. Davies

Cedar Stewardship Area Management Plan • 2016

Heritage and Natural Resource Department

Council of the Haida Nation

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1.0 INTRODUCTION

1.1 PLAN PURPOSE

This document is meant to serve as reference and policy for the Council of the Haida Nation for the long term management of the Cedar Stewardship Areas. The Cedar Stewardship Areas (CSAs) have been designated under the direction and authority of the House of Assembly (HOA 2007-42) through the Strategic Land Use Agreement.

Industrial logging has been ongoing on Haida Gwaii for the last 100 year. Since the signing of the Kunst'aa guu Kunst'aayah Reconciliation Protocol logging will continue under the guidance of yaagudaang (respect) to ensure for the natural function of the forests which include wildlife, water and fish, culture and cedar.

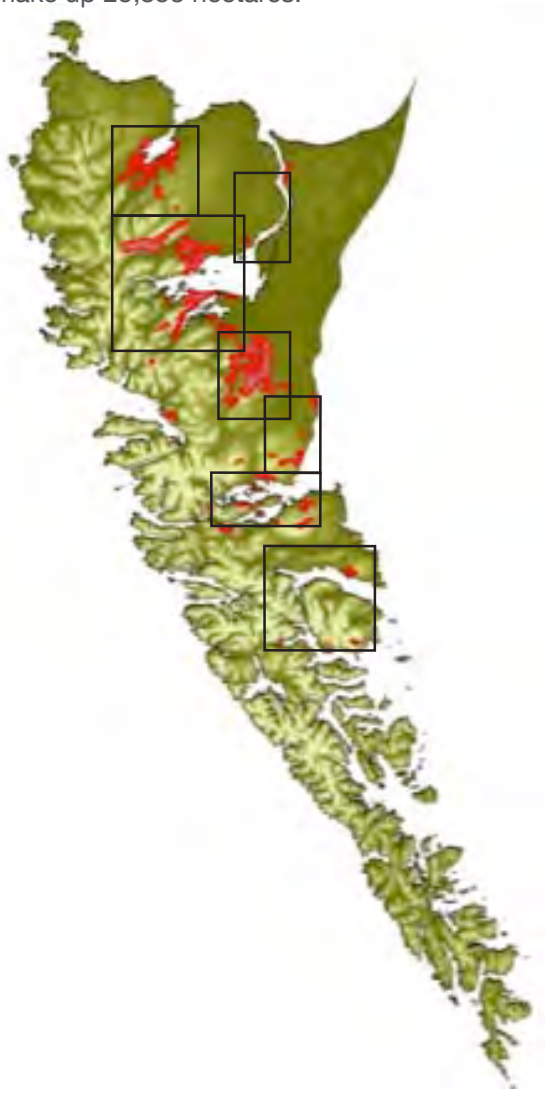
Cedar began growing on Haida Gwaii just over 5,000 years ago and has become integral to the ecosystems and culture of Haida Gwaii. The primary objective of the CSAs is maintain an ongoing supply of cultural cedar in the context of fully functioning old growth forests.

This Management Plan is meant address the following in the CSAs:
- Describe the Plan Area
- Describe the Purpose
- Describe the History
- Describe the Values and Known Inventory
- Describe Management Direction

1.2 PLAN AREA

This section provides a geographic description of the Cedar Stewardship Areas on Haida Gwaii. The majority of CSAs are within the physiographic area called the Skidegate Plateau. This region is typically made up of well drained soils which are part of deep glacial tills, a rolling topography with elevations rising up to 700 metres where mountain tops have been rounded by glaciation.

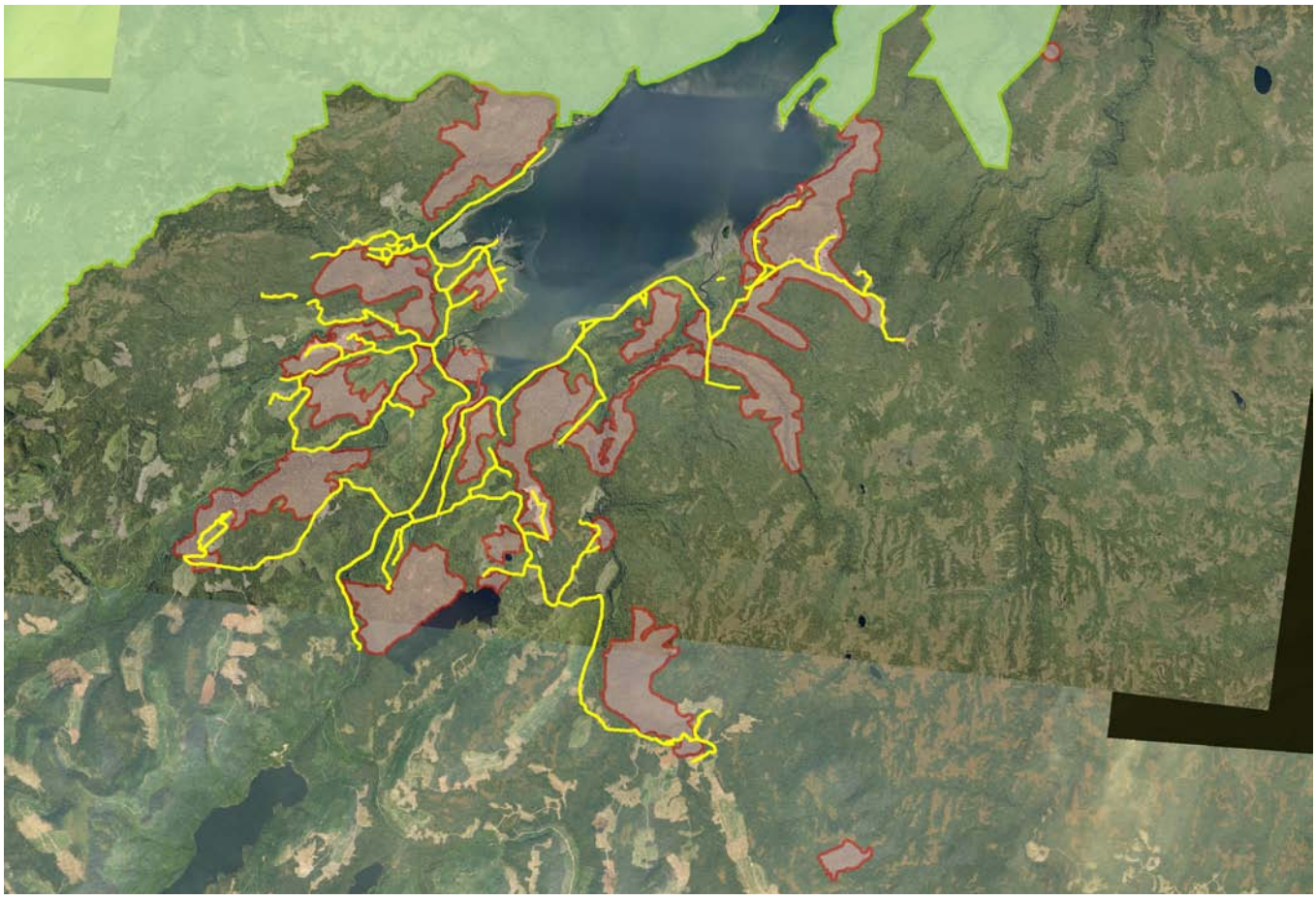
The plan area is divided into seven general regions, as described in the following text and combine to make up 25,353 hectares.



NADEN HARBOUR

The CSAs around Naden Harbour make up 3,707 hectares, or approximately 15% of the CSA reserves on the Islands and are low elevation with gentle slopes. Cedar Stewardship Areas in this region cover coastal areas near the mouths of Naden River, Stanley Creek, Lignite Creek and Davidson Creek. The CSA reserves also extend inland around the west side of Marian Lake, along the north side of the Lignite River on Dist Ian Hill and the east side of the Davidson River. Access to this area is by boat or sea plane to Naden Harbour. There is an extensive and well maintained road network which includes the Peregrine Main, Jaalun Main, Lignite Main and Naden Main. These roads run adjacent to all the areas, except around Whale Creek.

MAP 1. The CSAs are outlined in red, Heritage sites are green, main access roads in yellow. 1:110 000 scale.



MASSETT

The areas south of Massett make up 397 hectares or 2% of the CSAs. The area extends south from RivTow or Skoglands Landing along the inlet to Deep Creek north of Watun River. The southern part of the CSA reserve extends up the east side of Deep Creek and is met on the west side of the hill by the Naang Xaldaangas Heritage Site/Conservancy. Another area 112 hectare site is on the west side of Masset Inlet behind Collison Point.

Access to the area close to Masset is from Highway 16 as well as the gravel pit road accessed at the junction of the RivTow barge facility. Collison Point is only accessible by boat and then forest service road.

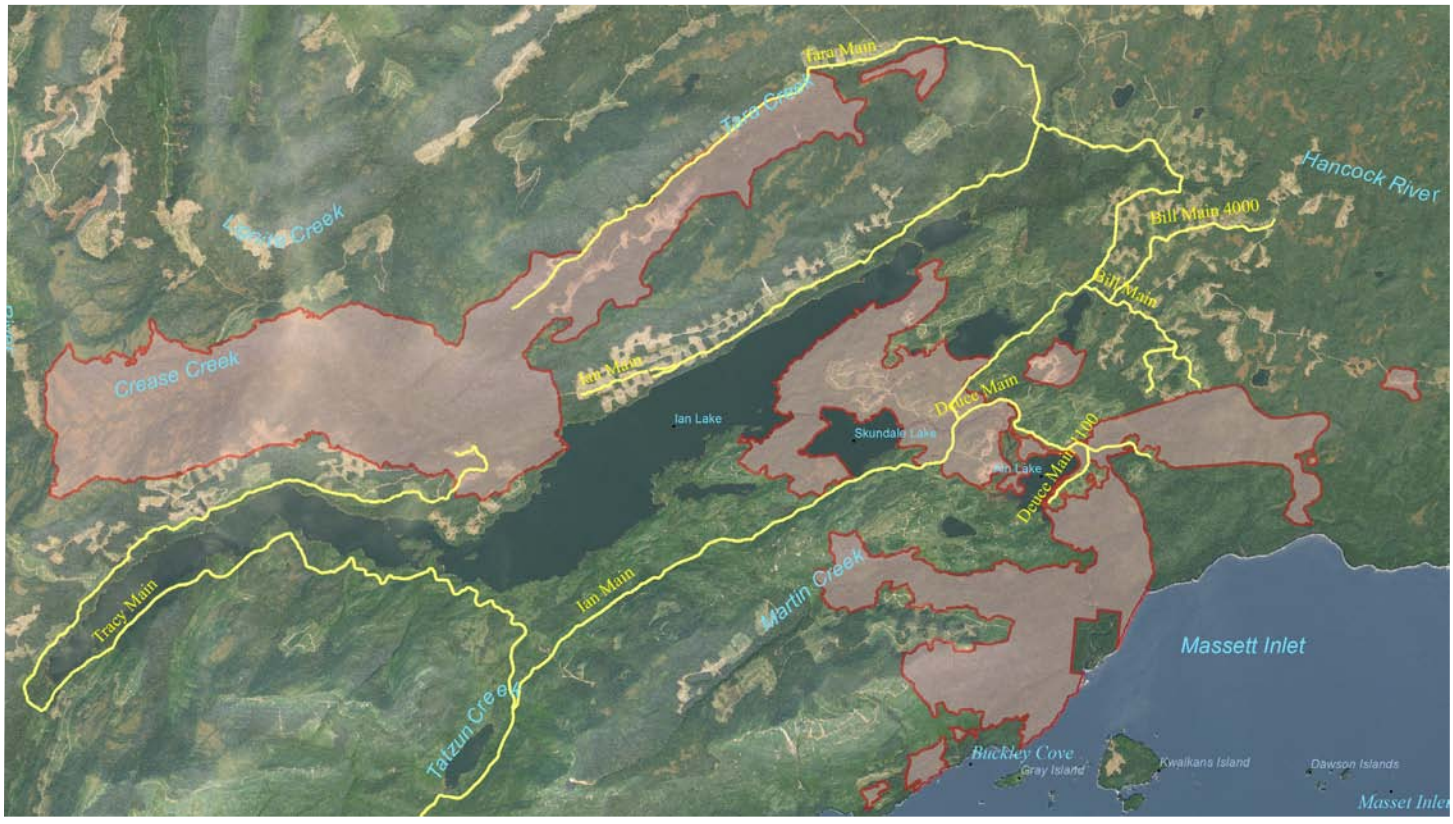
MAP 2. Masset Inlet: The CSAs are outlined in red, Heritage sites are green, main access roads in yellow. 1:60:000 scale

AIN and NORTHERN MASSETT INLET

The Ain River watershed CSAs are 6,420 hectares or 25% of all the CSAs. A special House of Assembly resolution was passed in 2001 directing the CHN to protect remaining old growth forest in the Ain River valley in light of the probable impact of Weyerhaeuser's 20 year development plan in the area. Now the protection for cedar extends along the Ain Creek, including Bill Creek, all the way to Ian Lake. The protection also includes the south side of Tara Creek (a tributary into Ian lake) and the entirety of Crease Creek. Crease Creek is the only intact or unlogged watershed on the Skidegate Plateau (hills and mountains east of the west coast) on Graham Island and was subject to intensive logging pressures leading up to a blockade by the CHN Heritage and Forest Guardians in the winter of 2006 prior to its protection.

A portion of the Ain CSAs are in young second growth less than 20 years old with planted cedar. The areas southeast of Ian lake have significant archaeological values. The inland areas (Crease Creek and Tara Creek) have significant reserves of monumental Yellow cedar, however Crease Creek has little to no access. Access by truck from Juskatla to Dinan Bay along Tracy Main, Ian Main, Deuce Main and Bill Main logging roads.

MAP 4. Plan area map for Aayan. CSAs outlined in red, main access roads are yellow lines. 1:100,000 scale.

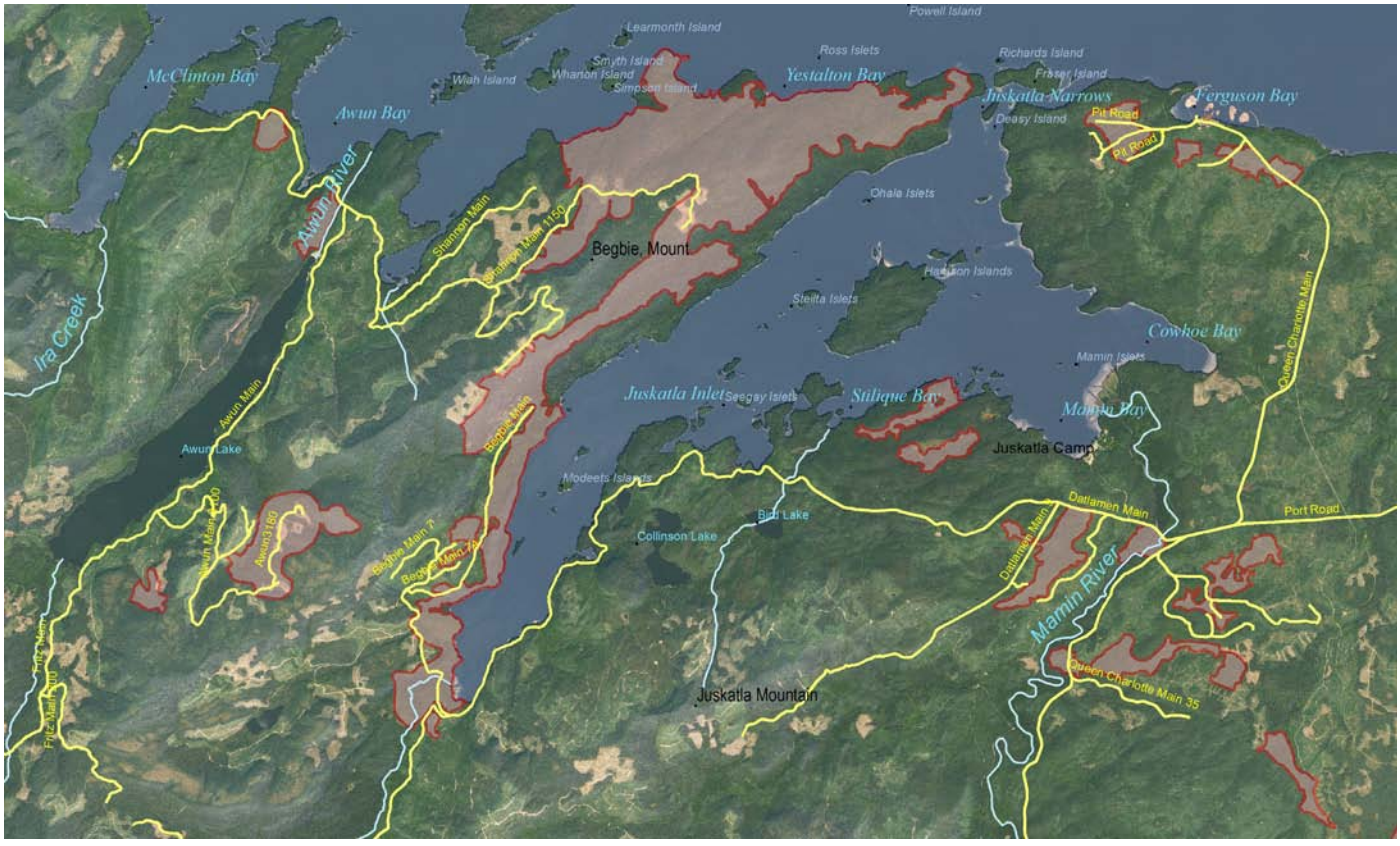


JUSKATLA

The CSAs around Juskatla Inlet including around Awun Lake and Mamin River represent 2,935 hectares or 11% of the CSAs on the Islands. Most of these areas have significant archaeological and monumental cedar values. This area contains some of the highest elevation CSAs which are in the Awun watershed and the top of the Begbie Peninsula which contain greater amounts of Yellow cedar. The area also contains the 'Raven's Nest' site, a well known site with significant CMT values adjacent to the former Juskatla camp.

Access to these areas is from Ferguson Main, QC Main and Datlaman hook-up to the Awun Main and Begbie Main logging roads, all accessible from Port Clements.

MAP 5. Plan area map for Juus Kaahlii. CSAs outlined in red, main access roads are yellow lines. 1:80,000 scale



YAKOUN

The CSAs along the Yakoun River represent the most significant areas of cedar reserves on Haida Gwaii, containing 8,160 hectares or 32% of the CSAs on the Islands. These areas include extensive continuous reserves along the Yakoun River corridor, Canyon Creek, Wilson and Drill Creeks, Black Bear Creek, Gold Creek, Florence Creek and Canoe Creek. Some higher elevation sites for Yellow cedar can be found in the upper Florence Creek and southern portions of the Canyon Creek area (along Drill ridge). The areas around Gold Creek are well known for some of the highest densities of monumental cedar. This area also encompasses the greatest variety of ages of cedar forest, including the highest concentration of fire-origin second growth cedar (120+ years old) on the east side of the Yakoun River, as well as many areas of planted second growth (under 20 years old). The area intersects with the Yaagun Gaandlay Heritage site to the north, and the Tlall Heritage site to the south east.

Access to this area is primarily along East Yakoun Main, Canyon Main, Drill Main, Black bear Main, Feather Main, QC Main S, Gold Main, Florence Main and Yakoun Main, all of which are maintained.

MAP 6. Yakoun River area. CSAs outlined in red, main access roads are yellow lines.

EAST COAST GRAHAM

The CSAs along the east coast of Graham Island extend from Chinukundl Creek up to the northern end of the Tlell watershed and encompass a total of 933 hectares or 4% of all the CSAs on Haida Gwaii. While the Chinukundl Creek areas and Upper Lawn Hill areas have significant culturally modified trees (see VALUES section following), other areas consist mainly of second growth stands that became established after fires in the 1850s (Golumbia, 2007). This area is physiographically unique within the CSAs because they represent some of the few areas within the physiographic region called the Queen Charlotte Lowlands. The areas are easily accessible from Highway 16 and many of these areas are adjacent to the Tlall Heritage Site/Conservancy.

MAP 7. East coast Graham Island. 1:90,000 scale.

SKIDEGATE INLET

The CSAs around Skidegate Inlet account for 1857 hectares or 7% of all the CSAs on Haida Gwaii. These extend from Haans Creek, Sachs Creek, South Bay Creek to the East Narrows on Moresby Island. There are small coastal areas with significant CMT values on Maude, Sandilands and Lina Island, along with areas on the Kagan Peninsula and directly north of Queen Charlotte.

MAP 8. Skidegate Inlet. 1:90,000 scale

AROUND LOUISE ISLAND

The CSAs around Louise Island make up 617 hectares, or 2% of the CSAs. Two small areas are on Louise Island. One is on the Moresby side of Cumshewa inlet, and there are two small areas in Sewell Inlet. Access to the Sewell Inlet areas, and the rock fish harbour area on Louise Island can be made by boat. One area further inland on Louise Island is inaccessible by boat or road, whereas the area on the north shore of Cumshewa Inlet is accessible from the Heather Main logging road.

MAP 9. Louise Island and Sewell inlet. 1:90,000 scale

1.3 PLAN AUTHORITY

A mandate for the Council of the Haida Nation to create Cedar Stewardship Area's was brought forward by the people of the Haida Nation during the 1993 and 2001 House of Assemblies:

HoA RESOLUTION 93-01-HOA-02

POLICY FOR PROTECTION OF RED CEDAR STANDS

WHEREAS stands for mature Red cedar are diminishing on Haida Gwaii due to logging and other activities; and

WHEREAS stands for Red cedar are sacred places to the Haida but also contribute to Haida culture as material necessary for building canoes, carving and raising totem poles and building of longhouses:

BE IT RESOLVED that the 1993 House Assembly directs the Haida Forestry Committee to develop policies to set aside stands of mature Red cedar from logging or other use;

BE IT FURTHER RESOLVED that a further policy be developed to guide Haida access to these sites.

MOVED BY Gary Russ
SECONDED BY Ernie Collison
Carried

HoA RESOLUTION 01 – 1

RESERVES FOR OLD GROWTH CEDAR

WHEREAS Old growth forests in Haida Gwaii have been cut at an alarming rate and Haida Gwaii forests are not currently managed to provide for the cultural needs of Haida over the long term;

And an adequate supply of Red and Yellow cedar is essential over the long term to provide for carving of Haida monumental art and other cultural needs.

THEREFORE BE IT RESOLVED THAT the CHN is directed by the 2001 Annual House of Assembly to develop a 1000 year plan for Haida Gwaii forests that will ensure a long term supply of Red and Yellow cedar for Haida cultural needs by:

assessing current and future Haida cultural needs for Red and Yellow cedar,
assessing potential risks to the existing forests and identifying areas of current and future supply of Red and Yellow cedar across the Haida Gwaii landscape,
developing policies and procedures for designating Red and Yellow cedar reserves to be protected for Haida cultural uses,
and, engaging the Province of BC, local governments and third parties interests in implementing measures to protect Red and Yellow cedar for Haida cultural uses until the 1,000 Year Plan for Haida Gwaii is implemented.

Moved by Charlie Bellis
Seconded by Lois Rullin
Carried

1.4 CSA HISTORY

Further to the House of Assembly Resolutions, the CHN protected archaeological and important cultural cedar forests illustrated in MAP 3 of the Haida Land Use Vision (2004) which was adopted by the 2005 House of Assembly.

The MAP 3 areas were recognized for temporary protection by the Province of BC in 2005 under the *Forest Act RSBC 1994, c.157, Part 13 sec. 169* as a result of the *Understanding Arising from April 22 2005 Discussions Between the Province and the Council of the Haida Nation*. The areas were further earmarked for long term protection under *Attachment C* of the *Haida Gwaii Strategic Land Use Agreement* between the CHN and BC in 2007.

While the areas were designated for protection by the CHN in 2005, formal legal protection by BC did not come until 2010 when the areas were mapped within *s.3.1, 3.2* and *Schedule 8* of the *Haida Gwaii Land Use Objectives Order* (LUOO) which was an order jointly written by the CHN and the government of BC. The LUOO was further authorized by the Council of the Haida Nation in 2010 under the *KaayGuu Gag a Kyah ts;as – Gin 'inaas 'laas 'waadluwaan gud tl'a gud giidaa* (Stewardship Law) which made the Land Use Objectives legal under Haida *Kil yah das – Gin yah Kil sGun* (law). The government of BC recognized the LUOO under the Land Act, R.S.B.C. 1996, c.245, ss.8, 93.4 and it was implemented under the *Forests and Range Practices Act, S.B.C . 2002, c.69, ss.149*.

By the 1990's there were a number of factors that led to the need for a precautionary approach to cedar management for Haida cultural use. In 1993 the Haida Nation's House of Assembly passed a resolution that directed the Haida Forestry Committee to develop policies to set aside stands of mature Red cedar from logging or other use. By 2001, the House of Assembly passed a resolution called Reserves for Old Growth Cedar that directed the CHN to develop a 1000-year plan for Haida Gwaii forests to ensure a long term supply of Red and Yellow cedar for Haida cultural needs. The plan was also to include long term reserves for cedar.

By the early 2000s, inventory data analysed through the Land Use Planning Forum identified a 47% decrease in higher productivity cedar growing sites on the Lowlands of Haida Gwaii (Holt & Utzig, 2009). While the overall harvest rate fell on the Islands by about 56% between 1982 and 2004, over the same period the proportionate amount of cedar harvested increased to close to 50% of the harvest profile (CHN & BC, Haida Gwaii Timber Supply Review: Timber Supply Analysis Report , 2012), providing evidence of old growth cedar being targeted by logging companies.

In addition to industrial harvesting, there was increasing concern about the lack of naturally regenerating cedar and doubt that the second growth inventory would contribute to monumental cedar supplies. These concerns were compounded when considering a growing population rooted in the culture of traditional art and practice. This emphasized the need to identify areas that could be managed for the long-term supply of cultural cedar.

Cedar Stewardship Area's (CSA) were first introduced as Haida Protected Areas as well as Cultural Cedar and Cedar Archaeology areas in the Haida Land Use Vision (Nation, 2004) at the community planning forum in 2004. The Haida Land Use Vision (HLUV) reiterated the growing concerns of the high

PHOTO 1. A CMT and Monumental cedar at Lignite Creek. Photo: Haida Laas, 2005

rate of cut of cedar as a direct threat to current and future Haida cultural practices. The text of the HLUV was complimented with a map of important archaeological forests, and cultural cedar areas identified through traditional knowledge interviews and forest inventory data, which were subsequently supported by almost 80% of the Land Use Planning Community Planning Forum (PMT, 2006).

However, tensions increased soon after the areas were made public, as logging companies began targeting the areas and the Ministry of Forests continued authorizing cutting permits for close to 180 hectares of cedar areas identified within the HLUV map. These actions, along with a provincially proposed increase in the Allowable Annual Cut, the provinces withdrawal from the Land Use Planning process and a lack of meaningful consultation in tenure transfers, contributed towards the general mistrust between industry, government and the Haida and Island communities.

As a result of the successful court case in Haida Nation v. British Columbia (Minister of Forests), 2004[1], along with Haida and Islands' community action – Islands Spirit Rising – in the spring of 2005, the Council of the Haida Nation entered into government to government negotiations with BC resulting in an agreement[2] that ultimately led BC to issuing Part 13[3] Orders (protection under the Forest Act) on areas identified within the HLUV maps. This agreement and subsequent government to government negotiations led to the Strategic Land Use Agreement[4] (SLUA) which emphasized the need to refine precise locations for these areas.

In 2008-2009, work was completed by the CHN, in collaboration with the province under *Detailed Strategic Planning*, to refine the boundaries of the areas designated as Part 13. Field surveys were conducted in over 168 polygons and 50 kilometres of traversing was completed to identify sites that were low quality cedar sites within the CSAs as well as high quality cedar sites that were not in the CSAs. This work resulted in some additions and deletions to the areas and a recognition of further work required to refine the boundaries of these cedar reserves.

[1] Haida Nation v. British Columbia (Minister of Forests), [2004] 3 S.C.R. 511, 2004 SCC 73
[2] Understanding Arising from April 22 2005 Discussions between the Province and the Council of the Haida Nation.
[3] Four separate Part 13 designations we signed into protection by Order in Council's (Duu Guusd DA, HGQCI DA, HGQCI DA 3, HGQCI DA 4)
[4] Council of the Haida Nation, Province of British Columbia. 2007. Strategic Land Use Agreement. Attachment C: Map of Monumental, Archaeological and Cultural Cedar Forest Resource Value Areas.

PHOTO. Clockwise from top left: A Haida forestry crew surveying for values in the early 2000s. Gwaayk'yaa (S) or gwaayk'aa(M) is one of many plants surveyed for in the forest. A barkstripped Red cedar.
Cedar photo: Lloyd Atler, all others Haida Laas.

2.0 VALUES

We will look into the heart of cedar and walk in the majesty of the great magician.

For thousands of years the people went into the forest for cedar.

Among the living trees we find some with strips of bark removed to make clothes, hats, and baskets.

We find cedar with planks split off – planks for a baby's cradle, a cooking box, a drum, a house, and a coffin.

In the remaining forests we find stumps marking the remains of trees crafted into canoes, houses, and to display the crests.

Some tluu will be shaped in various stages of construction.

Guujaaw

The primary values that are protected in CSAs are for cultural uses, and include, but are not limited to: monumental cedar, culturally modified trees, other archaeological sites, barkstrip cedar areas, recruitment of juvenile cedar, future cedar use for utility grade lumber, medicinal uses and spiritual uses.

The abundance or scarcity of any of the above values will be key indicators for maintaining the current CSAs and considered when new CSAs are created. Adaptive management will play a key role in defining levels of these values that should be reserved in CSAs for long term cultural use.

The primary role of a CSA is for the protection and sustainable use of cedar that is the rarest on the landscape – monumental and archaeological cedar. The existence of monumental cedar will ensure that the Haida will continue to have the ability to carry on cultural practices thus protecting our cultural identity. Archaeological cedar provides a link to our ancestors that clearly show that we not only occupied Haida Gwaii, but took it upon ourselves to protect and steward the land as our primary responsibility. That evidence can be clearly seen in every test hole, barkstrip, or sap tree, that is still alive hundreds of years after our people used it originally.

2.1 INVENTORY

There are two types of inventory used to describe known values in this report – strategic and field based. Strategic inventory is made up of forest cover information, which are maps created from aerial photo interpretations of the forests. Field based inventory is information gathered from archaeological assessments, CHNs cedar inventory project, or Cultural Feature Identification surveys.

Undertaking an inventory of a CSA is a key component of determining what values are in the CSA and how they should be managed. To date much of the CSA has limited field inventory information. This information is key to determining if areas should be added or dropped from the CSAs. Survey priorities have been identified in Section 3 to help guide inventory programs.

PHOTO 2. The Dist Ians or Lignite area is known to have many standing cedar trees with planks removed, which is not very common on Haida Gwaii.

The following summaries describe known inventory information on an area by area basis. These summaries are based upon a compilation of data, including forest inventory data (mapping), a collation of CHN field data and CHN and BC archaeological inventory information.

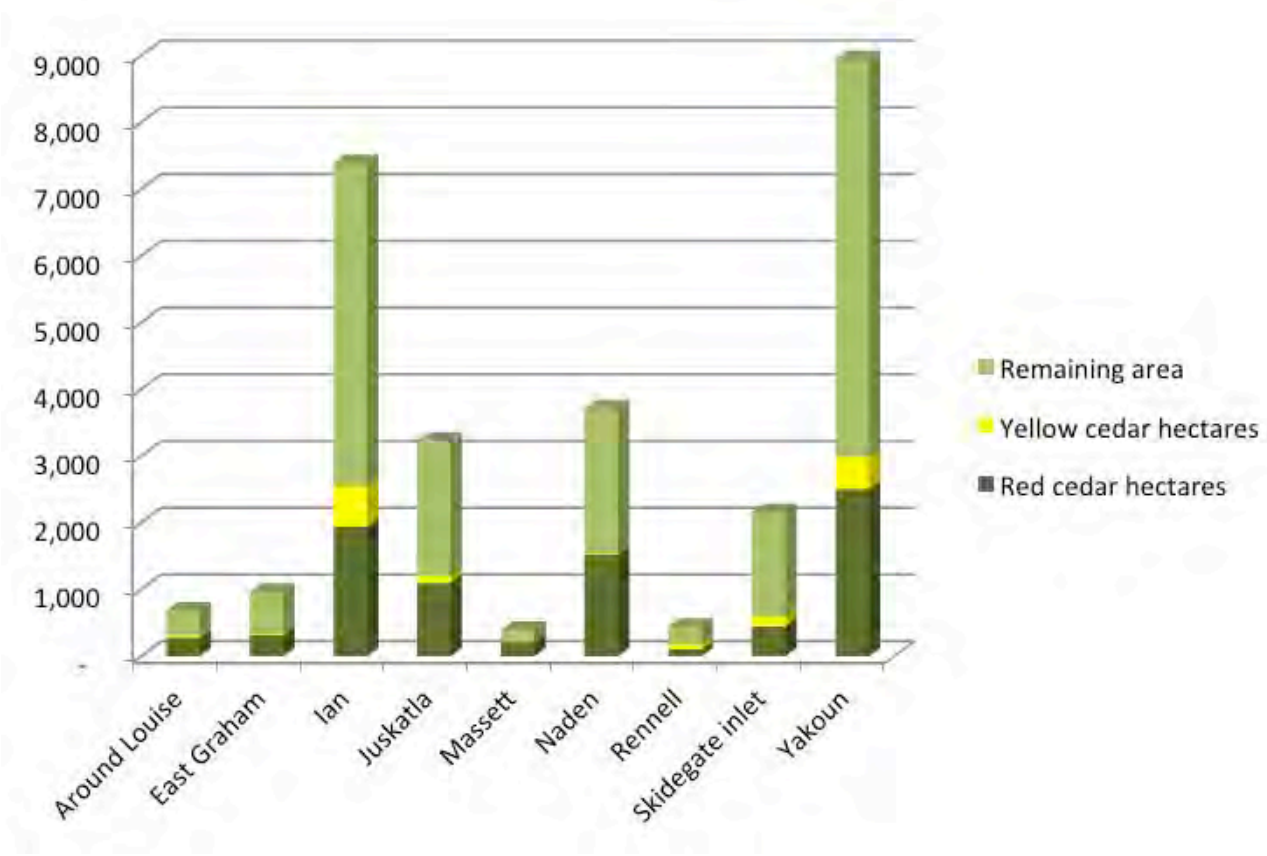
2.2 NADEN HARBOUR

Approximately 15% of this area has been field surveyed according to CHN records[5]. Note that a large volume of archaeological reports at the CHN still need to be cross-referenced to determine if the spatial data within the reports have been included in the overall inventory.

Although only 15% of Naden has been surveyed, over 1,250 Culturally Modified Trees have been documented. Additionally, there are184 registered archaeological sites within the CSAs around Naden Harbour.

Industrial logging in the Naden Habour area began in the 1960s with Goodwin Johnson Ltd., then CIPA Lumber Company Ltd., and today under Dave Husby's forest license. There have been many battles over forest development in the area. Over 46 Archaeological Impact Assessments have been done in the area around Naden Harbour and subsequent reports contain huge amounts of archaeological data[6]. BC's Archaeology Branch issued as many as 19 archae-

FIGURE 1. Distribution of Red cedar and Yellow cedar within the CSAs.



[5] Recorded archaeological sites, CHN cedar inventories, Haida Land Value Surveys.
[6] Reports housed at the CHNs Hertiage and Natural Resource Department, Old Massett.


CMT
CMT
CMT
CMT

ological site alteration permits[7] between 2003 and 2011 in the area where many CMTs were destroyed and many areas with archaeological resources were insufficiently buffered, which failed to protect the values[8].

While the CSAs around Naden Harbour account for over 3,700 hectares, only approximately 1,523 hectares or 41% of the area is Red cedar and only 16 hectares is Yellow cedar. All of the areas are in old growth except 13 hectares.

As an example of both cultural and scientific archaeological values, some CMTs have been dated in the Naden habour area, with one rectangular barkstrip in the Lignite area (LIG213) (Grant, 2010) dated back to 1679 AD (F1Ud-185).

Aside from specific cedar values, the CSA on the east side of Davidson Creek is also a Wildlife Habitat Area for Marbled murrelet nesting.

2.3 MASSETT

The Massett CSAs, situated along the inlet, are the smallest CSAs and approximately 57 hectares (or 14%) of the area has been surveyed. Out of these surveys 54 CMTs have been identified within these CSAs although certain areas like Deep Creek are used as CMT training areas and not all the CMTs have been registered. As many as 24 provincially registered archaeological sites within or immediately adjacent to the boundaries of the CSAs exist. Some of them are of incredible cultural and scientific significance. For example the FiUa-I site at Skoglund`s Landing has a total of 1,197 artifacts and flakes, dating back to 4,165 +/- 130 years B.P. (Fladmark, 1970).

Out of the 397 hectares in this area, all of it is old growth (greater than 250 years old) and 207 hectares or 52% of the area is made up of Red cedar. These stands are well drained with gentle to steep terrain and are very productive. There is no Yellow cedar in these low elevation stands.

2.4 AIN

Out of the 6,170 hectares of CSAs around the Ain watersheds, only about 640 hectares or 10% of the area has been surveyed on the ground.

Known values include 207 CMTs and 21 registered archaeological sites.

Around 31% or 1,940 hectares of this area are made up Red cedar, while another 10% or 610 hectares are made up of Yellow cedar. This area has some of the highest elevations of CSAs (up to 550m), which is where most of the Yellow cedar is found. These higher elevation areas are behind Ain IR (Galgam Mountain) and the upper watershed of Crease Creek.

The area has some second growth, about 17 hectares around the Ain IR that are predominantly Sitka spruce and Western hemlock (logged between 1920 and 1951) as well as approximately 20 hectares of young second growth (less than 20 years old) around the Skundale and Ain lakes.

The CSA forests on either side of the Ain River all the way up to Ian Lake are well known for supporting sockeye salmon and Crease Creek is the only unlogged watershed within the Skidegate Plateau that support sockeye spawning grounds.

The area is also known for incredible monumental cedars, including the infamous Ain 21 block, which had some of the highest concentrations of monumental cedar that CHN forest guardians had inventoried. Much of the area around this cutblock (east of Ain lake) has evidence of a major, catastrophic fire that pre-dates contact.

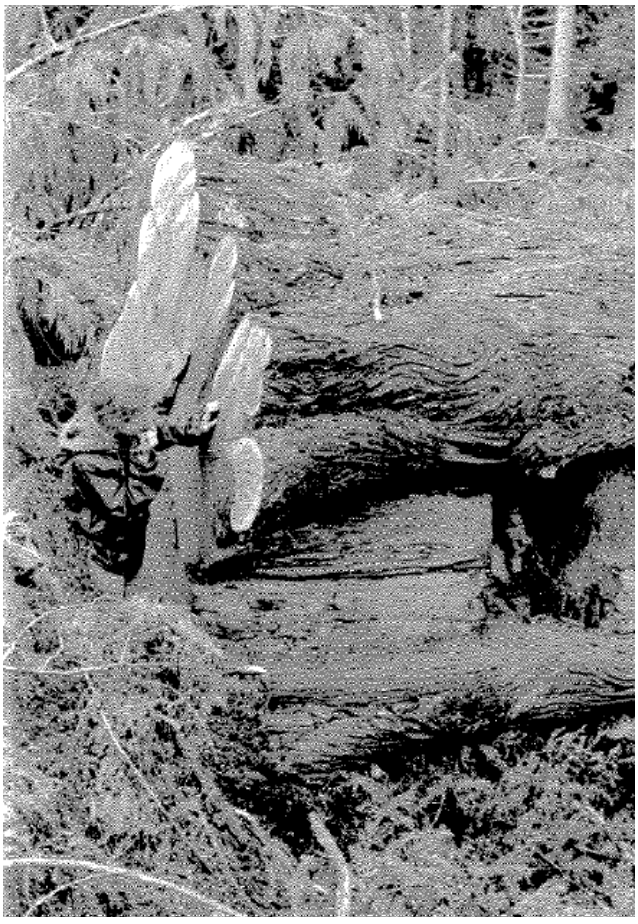
[7] Archaeology Branch query received from Jessica Ruskin, December 2012.
[8] Examples of blocks with insufficient management to protect heritage values include: TOR37, TOR38, TAR41, TAR42, DIV431, NAD507.

Other values that share legislated protection within the CSAs are two Northern Goshawk (skyaamskun[9]) nests. One is east of Ain Lake, and one is in the middle of the Crease Creek watershed.

2.5 JUSKATLA

Approximately 493 hectares, or 17% of the 2,935 hectares in the CSAs around Juskatla have been surveyed for cultural features. From that approximately 558 CMTs have been documented in the area. In addition, 42 provincially registered archaeological sites are within these CSAs, the majority of which are on and around the Begbie peninsula which is well known for its canoe building sites. Many other registered archaeological sites are immediately adjacent to these CSAs including raised lithic sites, intertidal lithic sites and shell middens (Eldridge & Young, 2001).

FIGURE 1. CMTs were logged in the Yakoun River area in the 1980s. Photo: Bernick, 1984.



The forests in these CSAs contain approximately 1,098 hectares of Red cedar and 103 hectares of Yellow cedar for a total of 41% of the area comprising of both Red and Yellow cedar trees. The majority of the area is old growth (greater than 250 years old) with only 84 hectares as mature forest (less than 250 years and greater than 80 years) likely as a result of early A-frame logging along the coast of Juskatla and Masset Inlets in the earlier 1900's.

2.6 YAKOUN

This is the largest area of the CSAs. It has the easiest access of any of the CSAs, which may account for why up to 1,065 hectares or 13% of the 7,990 hectares has been surveyed.

While this area is entirely inland, there are cedar areas that have been intensively managed for hundreds, if not thousands of years, in the Yakoun watershed. Family knowledge of these managed sites and the area's unique ability to grow monumental cedar, as well as the evidence of past use, is one of the reasons why this area has been designated a CSA.

Of the area surveyed by the CHN, 68 CMTs have been recorded, however most of the areas surveyed have been far away from the Yakoun River itself where many CMTs occur along its tributaries. A total of seven provincially registered archaeological sites exist within the Yakoun CSAs. Documenting these inland Yakoun sites should be a major priority for archaelogoical inventories. One small site, recorded as FkUb 7, illustrates the intensive and multi generational use within a stand, where there are five bark-strips, four canoes, 20 test holes, and 14 modified logs (slabbed logs etc.) (Bernick,1984). Ages

[9] From Skaay, 2001. Being in Being: The collected works of Skaay of the Qquuna Qiighawaay. Douglas & McIntyre.

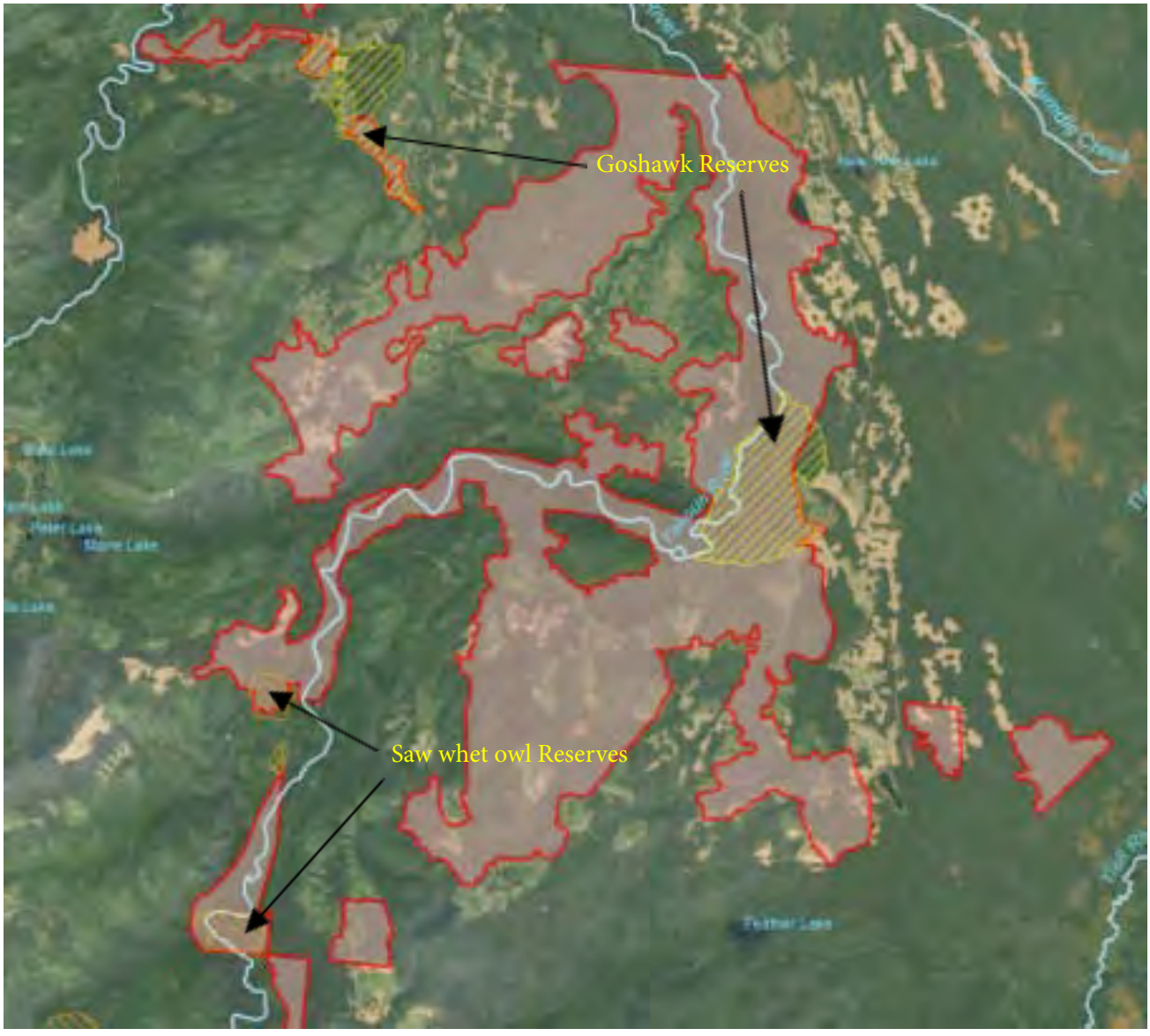
taken from this site in 1984 by the BC Archaeology Branch shows that the stand was used many times over many generations ranging from the 1930's back to the 1790's, and likely much earlier[10].

The CSAs in the Yakoun River area are made up of approximately 31% or 2,500 hectares of Red cedar and 6% or 480 hectares of Yellow cedar.

The age range for the Yakoun areas is the most diverse. While there are close to 2,580 hectares of Red and Yellow cedar old growth, there is also about 350 hectares of Red and Yellow cedar that are fire-origin second growth (since the 1850's). In addition, there are approximately 50 hectares of young second growth (less than 20 years old) mainly around the Canyon Creek and Florence Creek areas.

[10] The oldest ring count from that study shows ages from 192 years before 1984 but from a hemlock nurse tree on top of a stump. Likely the nurse tree took many years under closed canopied forest to reach diametre at breast height.

MAP 10. Other legal protection within the CSA along the Yakoun River.



Aside from specific cedar values, the CSA for the Yakoun river contain two Northern Goshawk nesting reserves (Florence Creek and Black Bear Creek). Both of these reserves are approximately 200 hectares each (see MAP 9). In addition there are two Northern Saw-whet owl reserves that overlap the CSAs. Commercial harvest within these areas is not permitted.

2.7 EAST COAST GRAHAM

Approximately 216 hectares or 23% of the 933 hectares that make up the CSAs along the east coast of Graham Island have been field surveyed. In this area there are over 950 CMTs, initially recorded through archaeological surveys associated with the Teal Jones development of the Mill blocks – most of which were deferred due to archaeological significance. There are 15 registered archaeological sites within these CSAs, most of which are in the Chinukundl drainage and a majority being barkstrips, many are along what is considered the ancient Chinukundl (Chini Kundlai) trail (pers. com. Jim Stafford 2011) (Stafford, Maxwell, & Christensen, 2003).

The forest inventory identifies approximately 16 hectares of Yellow cedar, compared to 316 hectares of Red cedar in the area. Of these, approximately 56 hectares are of younger but mature Red cedar stands, likely remnants of a fire in the 1850s. Other known and legally protected values that overlap these CSAs include two Blue heron nests in CSA polygon #19 (western most polygon in the Chinukundl drainage) along with another three that are immediately adjacent to the same polygon on the southern boundary. If monitored and deemed to be active, then these nesting areas do not allow for commercial timber harvesting within a minimum of 350 metres from the nests.

Another legally protected wildlife feature is a Northern goshawk nesting reserve in the Skowkona

PHOTO 3. Looking east towards a CSA along the access road to the Upper Chinukundl Watershed

Watershed that overlaps with half of the CSA polygon #22.

2.8 SKIDEGATE INLET

A total of around 712 hectares or 38% of the area of CSAs around Skidegate Inlet have been field surveyed. These inventories have accounted for approximately 463 CMTs along with approximately 11 provincially registered archaeological sites.

Approximately 450 hectares in this area are made up of Red cedar, and another 150 hectares of Yellow cedar. Most of the Red cedar is old growth forest, but around 85 hectares are younger, (>80 year) fire origin stands. The age breakdown is proportionately similar with Yellow cedar, with approximately 28 hectares made up of fire origin stands.

2.9 AROUND LOUISE ISLAND

Approximately 174 hectares or 28% of the 617 hectares of CSAs around Louise Island have been field inventoried. Currently around 48 CMTs have been catalogued in this area, along with five registered archaeological sites. Two hundred seventy-six hectares are made up of Red cedar and only 25 hectares are Yellow cedar, approximately 12 hectares of the 617 hectares are younger than 250 years old, but older than 80. None of these areas have ever been formally surveyed for monumental or other cultural features, other than CMTs.

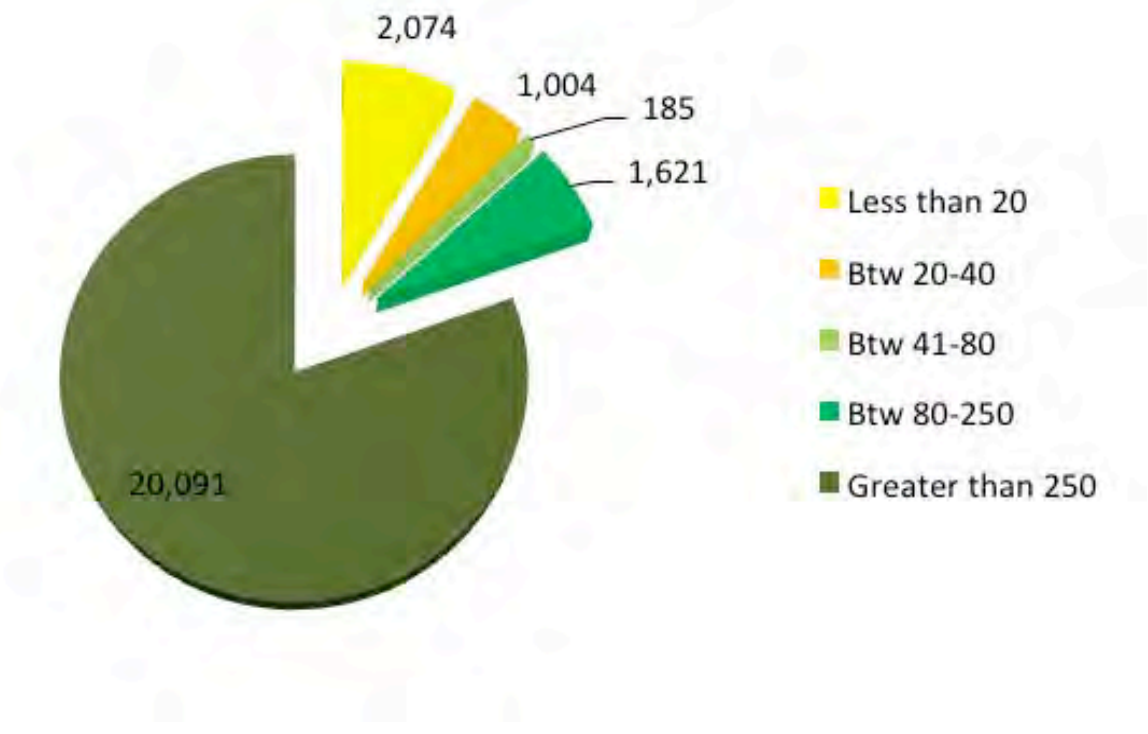
2.9 OVERVIEW CURRENT INVENTORY IN CSAs

Thirty-four per cent of the overall areas (all ages) are made up of Red cedar (8,423 hectares) and only 6% of the area is made up of Yellow cedar (1,477 hectares). The CSAs are primarily made up of old growth forests (80%). The remaining second growth areas are outlined in FIGURE 2.

Elevational gradients

Most of the area that make up Cedar Stewardship Areas are relatively low elevation within the physiological area known as the Skidegate Plateau and Queen Charlotte Lowlands. Almost no area is protected under CSAs on the west coast. FIGURE 3

FIGURE 2. Overview of the age classes of Red and Yellow cedar within all the CSAs.



illustrates the number of hectares in CSAs by elevation bands, with a comparative bench mark of Mount Moresby (the highest elevation on Haida Gwaii). Few hectares are higher than 350 metres, which helps to explains the small representation of Yellow cedar in the CSAs.

Second Growth Areas

Fire Origin Sites

All the ages between 80 and less than 250 years old, which are around 1,600 hectares, represent the area of fire-origin second growth stands which are primarily within the Yaagun G and East Coast Graham.

In the mid 1850's over 60,000 hectares of area burned north of Lawn hill (Pearson, 1963) up towards Port Clements. Much of this area now is made up of many high quality Red cedar leading sites. These areas are typically most abundant with trees of the right size for barkstripping and represent important recruitment areas for old growth in the next 150-200 years.

FIGURE 3. Hectares of CSA by elevation. Most CSAs are in low elevation areas

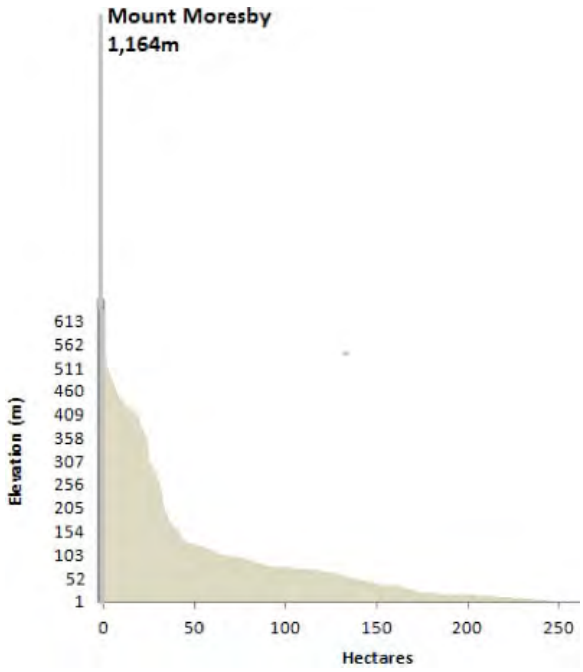


PHOTO 4. A veteran cedar tree in a fire-origin stand near Lawnhill.

PHOTO 5. Fire origin cedar stand and second growth plantation.
Photo: S. Muise

TABLE 1. Harvest origin of second growth cedar areas.

Age of stand	Total hectares	Hectares planted Cw with seedling protection	Hectares planted Yc	Hectares brushed [11]	Hectares burned	Hectares fertilized (site prep) but now Hw/Ss	Hectares previously Cw leading	Hectares not satis. restocked
0-20 years	2,084[12]	1,192	2	44	93	84	262	70
21[13]-40	1,004	Less than 10		2	0	0	unknown	0

[11] No hectares were spaced or pruned

[12] Note that only 1,722 hectares are accounted for in the RESULTS inventory database as second growth between 0-20 years old.

[13] Note that the RESULTS inventory has digital records only going back to 1987.

3.0 MANAGEMENT

MANAGEMENT GOALS

1 – PROTECT: Maintain CSAs as protected areas for Haida cultural use
2 – INVENTORY: Continue to inventory cultural and archaeological cedar in these areas to ensure they represent the best sites for long term cedar use
3 – ACCESS: Mitigate long-term impacts for access to cedar
4 – RESPECTFUL USE: Ensure commercial access is conducted in a measured and respectful way
5 – RESTORE: Restore CSAs so they are representing the natural capacity of the land

3.1 ADAPTIVE MANAGEMENT

Adaptive management is the key to preserving the health and function of the CSA for present and future use. Put simply, adaptive management is learning by doing and then adapting your actions to better fit your objectives. Adaptive management relates to every management goal for the CSAs. This translates into actively updating our inventory inside CSAs so we can better manage for the Haida values. It also means monitoring the management decisions we make inside CSA and improve on them for future management.

3.1.1 Amendments to CSAs

Regarding Management Goal 2, over time inventories outside of the CSAs will identify stands that should qualify as being CSAs and stands inside of the CSAs that should not be reserved for cultural purpose because they do not fit the criteria.

Legal amendments to the CSA are authorized by the Haida Gwaii Management Council (HGMC). As a result of surveys conducted by the CHN areas will be proposed to the HGMC to be added or removed from the CSAs. All proposed areas need to be endorsed by the Heritage and Natural Resource Committee prior to being submitted for consideration to the HGMC. Upon HGMCs approval, the amendments will follow the established process for the amendment of the Haida Gwaii Land Use Objectives.

When amendments are made, there should be a no net loss of area to the CSAs (i.e. the area deleted/ excised should approximate the area added) by Landscape Unit.

Criteria for excising areas from a CSA:

1. Area is identified by public, industry, FLNRO, CHN;
2. Area does not meet CSA value standards in section 2 of this management plan to the extent that the cultural values can be sufficiently managed under the Land Use Objectives Order/EBM.
3. Area to be advertised in Haida Laas, web and local newspaper for public input;
4. Area to be reviewed and endorsed by the CHNs Heritage and Natural Resource Committee and CHN Executive Committee;
5. The Haida Gwaii Management Council must approve areas for deletion to Schedule 3 Cedar Stewardship Areas within the Haida Gwaii Land Use Objectives Order (HGLUOO). Depending on the size of the proposed removal, this may require either a minor or major amendment to the HGLUOO.

Criteria for adding areas to a CSA

1. Candidate areas with high cedar values are identified by CHN, public, industry, FLNRO
2. Candidate areas must meet CSA value standards in section 2 of this management plan.
3. Area to be advertised in Haida Laas, web and local newspaper for public input;
4. Area to be reviewed and endorsed by the CHNs Heritage and Natural Resource Committee;

5. The Haida Gwaii Management Council must approve areas for additions to the Schedule 3 Cedar Stewardship Areas within the Haida Gwaii Land Use Objectives Order. Depending on the size of the proposed removal, this may require either a minor or major amendment to the HGLUOO.

3.1.2 Priorities for future inventories

Approximately 15% of the CSAs have been field surveyed for cultural features. Many of the areas that have not been formally field surveyed are well known to contain CMTs and monumental cedar, based on traditional knowledge. However for many other areas, mostly associated with inland sites away from water bodies, the quality of the inventory is not known. For these areas, ground truthing is the most reliable way to document values for long term management. See Appendix 2 for maps of areas currently known to have been inventoried for cultural values within the CSAs. The following sections outline CHNs priorities for conducting an inventory.

Old Forest/Natural Stands

1. Areas that are considered to have few cultural cedar values either currently or in the long term should not remain within the CSA unless there are other values (such as landscape connectivity, cultural or spiritual values) that the CHN wishes to maintain. Forest cover inventory can identify the following attributes to prioitize areas for surveying:
    - Sitka spruce or Western hemlock as leading or secondary species in the forest cover inventory;
    - Sites with a height class of 2 or less;
2. There are many other areas in old forest that likely do contain values but have not been inventoried.

These areas can be inventoried for monumental cedar, Culturally Modified Trees, Red and Yellow cedar barkstrip areas, cedar recruitment zones as well as medicinal plants and/or plants and trees that are important to the Haida

PHOTO. A natural stand in an old forest.

3. Through the implementation of the Haida Gwaii Land Use Objectives Order, licensees annually report spatial information about cultural cedar stands that have been protected within their development areas. The CHN can use this information to help prioritize areas outside of the CSAs that contain very high densities of CMTs or monumental cedar that are candidates for long term protection within CSAs.

Young forest

Some of the most important areas for long term cultural cedar are in second growth reserves. Many of these sites are in early ecological succession, with young trees in closed canopied stands, however there is still a need to field survey these sites to determine the volume and age of cedar. Field inventories for young stands should focus on identifying:

- barkstrip areas
- cedar recruitment zones (areas with high cedar content).

Methods

Surveying within CSAs must follow a consistent methodology that can be reliable, repeatable and easy to report. The intent of the survey is to sample a representative area of the CSA polygon using a variety of line transects, variable plots and fixed plots. This can be achieved by stratifying the CSA area into stand type, age or site series as necessary. The surveys should complete at minimum 20% of the stratification areas (20% of the polygons identified at a 1:5,000 scale).

The transects are meant to quantify the density of features per hectare as a representative sample of a CSA polygon. The variable plots (using prisms) are meant to quantify the amount of cedar (basal area and stems per hectare) and the relative health of the stand.

The fixed plots are meant to qualify the regeneration of cedar (seedlings, saplings) in the stands. (See Appendix 1 for a more detailed description of attributes and sampling methods.)

LiDAR (Light and Range Detection) data may be useful to help prioritize field inventory survey effort.

Annual survey effort will be stratified by geographic area (ex. Juskatla, East Coast Graham etc.) and divided into one square kilometre grid systems to ensure systematic coverage. Forest inventory mapping will identify priority areas based upon the criteria listed in this section

3.2 USE

This section covers a description of allowable commercial uses, as well as outlines processes for Haida Traditional Use with respect to Management Goal 4.

PHOTO. A young forest.

All CSAs that have proposed development – for Haida cultural or commercial use require a Cultural Feature Identification survey (CFI) in the proposed area. This survey must be completed by certified CFI surveyors that are employees of the CHN, or directly hired by the CHN, in order to account for additional values (such as bark-stripping areas, or areas of spiritual significance) that are not otherwise captured under regular CFI protocols. All surveys conducted in CSAs for the purpose of development that require any trees to be cut, must be Level 2 (high survey intensity) as per the Cultural Feature Identification standards manual.

3.2.1 Commercial Salvage Opportunities

All commercial salvage opportunities referred to in this section are for dead or down wood (wood that is not self-supporting). All commercial salvage applications must be go through the Solutions Table by submitting applications to Front Counter Haida Gwaii at the Haida Gwaii Natural Resource District office. All applications must have a Level 2 CFI survey completed for the immediate area surrounding the salvage area (within one tree length of salvage areas).

a. Ground based (machine) salvage opportunities are only permitted within 50 metres of a CSA edge unless the application is through a Forest Stewardship Plan holder. If the application is through a Forest Stewardship Plan holder (licensee) then the application must go through the Solutions Table and be consistent with the Haida Gwaii Land Use Objectives Order.
b. Helicopter salvage is permitted anywhere within CSA as long as:
    - the integrity of cultural values outlined in Section 2 of this management plan are protected;
    - other values and reserves identified through the Land Use Objectives Orders are followed (ex. nesting or forest reserves that overlap with CSAs);
    - the volume of wood salvaged is considered small (less than 2,000m^3) for any given application and are not successively submitted by the same proponent.
d. No commercial salvage will be permitted in areas containing archaeological values.
e. Commercial salvage will not be permitted if it has direct affects on bear dens or bear den recruiting habitat.

3.2.2. Commercial Harvest Opportunities

Commercial harvest opportunities in CSAs are restricted by the Haida Gwaii Strategic Land Use Agreement and its subsequent legal counterpart the Haida Gwaii Land Use Objectives Order (LUOO). Section 3 of the LUOO states that up to 10% of the CSAs can be commercially harvested. It is also intended that commercial activity occur in areas of the CSA that do not have significant cultural cedar values[14]. Also, this opportunity is meant to be distributed proportionally to the occurrence of CSAs within a given landscape unit.

In order to propose a commercial harvest within a CSA the following legal conditions under the Haida Gwaii LUOO must be adhered to:

a. An intergovernmental process must be completed (via the Solutions Table);
b. Cultural values within the specific CSA proposed for harvesting are identified in accordance with the Cultural Feature Identification Standards
c. The distribution of harvest is proportional to the occurrence of CSAs within a given land scape unit.

Additional considerations for commercial harvest opportunities:

a. The proposal is presented by the Solutions

[14] CHN/BC, 2010. Background and Intent for the Haida Gwaii Land Use Objectives Order. Joint Technical Team for the implementation of the Strategic Land Use Agreement.

Table and is vetted through the Heritage and Natural Resource Committee.

b. Short and Long term goals of CSA must be considered in approval of the application. This includes consideration for short and long term road access for Haida cultural use.
c. Commercial opportunities should favour sites that provide access to resources that otherwise are isolated by a CSA.
d. That the commercial harvesting does not damage or create undue risk to the areas outside of commercial harvesting within the adjacent CSA.
e. Windthrow risk and hazard assessments are conducted on block edges adjacent to CSAs. Appropriate treatments are implemented and outcomes monitored 2-3 years after harvest.
f. Tracking and updating a spatial data base must be completed if any development occurs.

Appropriate reforestation is carried out based upon the ecology of the site.

3.2.3 Haida Cultural Harvesting

The Cedar Stewardship Areas have been set aside for long term cultural use by the Haida. This management plan defines and manages access in consideration of the collective or individual rights of the Haida citizen. This section is meant to clarify the relationship between the CHNs long term management goals of the CSA with current and future Haida needs and uses within the context of Haida law. For the purpose of cultural harvesting, this section is divided into log access and other use.

Log Access

Recent studies by the CHN and the Province of BC have found that Red and Yellow cedar in the forestry operating land base (outside of all protected areas) may run out within the next 40 years (2050) and is projected to not contribute to the commercial harvest again until approximately 2110. This is because there is very little cedar younger than 120 years[15] on Haida Gwaii. It is also well known that within the next 60 to 100 years the operational land base for forestry will have switched to harvesting only second growth timber.

It is for these reasons that the CHN sets out the following policy for access to logs for cultural use:

a. All applications for wood in a CSA for cultural use reviewed by the Cultural Wood Advisory Board(CWAB) should be reviewed against the short and long term management objectives set out in this plan
b. Log resources are available through the CWAB and accessed from the operating land base before being made available from the CSAs
c. Selective logging is preferable (maintaining forest integrity)
d. Costs associated with logging are borne by the individual
e. Log resources must be applied for by a citizen of the Haida Nation as defined in the CHN constitution.
f. Cultural resource use inside a CSA must be used solely for cultural or traditional practices.
g. Approved harvesting by the CHN must be undertaken within one year of approval, with an allowance of a six month extension being considered by the CHN under extenuating circumstances.

The following are points for consideration by the Cultural Wood Access program when adjudicating log access within the CSAs:

- Does the individual applying have unavoidable time constraints that require

[15] CHN/BC. 2012. Haida Gwaii Timber Supply Review Analysis Report. Joint Technical Working Group report for the Haida Gwaii Management Council.

the use of CSA resources? Can the applicant undertake the harvesting within one year?
- Does the monumental cedar have specific criteria that make it useful for a particular type of project – size, shape, twist, species etc.?
- Is the wood quality matched to the proposed policy?
- Does the monumental cedar have spiritual value to the artist/project/area?
- Are there many monumental cedars in the area? Is the monumental cedar in an area where cultural cedar is scarce?
- Will the logging affect juvenile cedar? Will the applicant replant or have a strategy to protect natural young cedar in the area to account for what they have taken?
- Is the logging in the vicinity of archeological sites?
- Will the logging affect the integrity of the forest?

Other Uses

Other uses may include but are not limited to barkstripping, root gathering, food or medicinal plant gathering. As the CHN does not regulate these uses, all Haida citizens should consider the following when using these areas.

Barkstripping

- Does the barkstripping interfere with long term monumental cedar recruitment?
- Is the barkstripping in an area that has an abundance of resources so that barkstripping will have no effect on the cultural importance of the site. Is the barkstripping in an area where cultural resources are scarce? Are there juvenile cedar in the area?

3.3 RESTORATION

With respect to Management Goal 5, the restoration of areas inside the CSAs are a key component to ensuring an ongoing supply of cultural cedar. Past logging practices, a changing global climate that may lead to tree species shifts or changes in natural disturbance intensity and frequency, as well as numerous introduced species on Haida Gwaii all play active roles in the degradation of cultural values within CSAs.

The regrowth of juvenile cedar in an old growth setting is extremely important for continued cultural use. Cedar regeneration in commercially harvested areas or by seedlings whose genetic material was not originally from Haida Gwaii have no guarantee of being able to produce culturally appropriate cedar for the Haida. This is why the protection of natural regrowth of cedar in old-growth or mature stands of trees is essential.

Threats to cedar: Yellow cedar decline

Yellow cedar decline is a documented phenomenon (Hennon, Schaberg, Wittwer, & Shanley, 2012) extensively mapped in south eastern Alaska with up to 50,000 hectares documented on the BC coast (Westfall & Ebata, 2009) (Stan, Maertens, Daniels, & Zeglen, 2010). Research suggests that Yellow cedar has a greater proportion of shallow fine roots than many of its competitors, especially in areas of wet soil or general poor drainage. In higher elevation stands where snow pack is common in winter and freezing temperatures are common occurrences in spring, a declining snow pack due to changing climate is leading to vulnerability towards fine-root mortality in Yellow cedars. In other words, without the insulation of snowpack, and within an elevation band where freezing persists into the spring, fine and shallow roots of Yellow cedar are damaged leading to die back within certain areas. This phenomenon occurs at considerably lower elevations in northern latitudes (See PHOTO 6).

On Haida Gwaii, mid to upper elevation stands are more vulnerable to soil thaw and subsequent freezing injury. While Yellow cedar decline has been documented as being one of the leading abiotic loss factors on Haida Gwaii (CHN & BC, 2012) its full extent has not been determined. The reason for decline has not been positively correlated with the abiotic damage hypothesis discussed above, as there are many low elevation areas of Yellow cedar decline, outside the range of typical snowpack that lead to suspicions of biotic causes such as fungal pathogens or insect.

If Yellow cedar is maladapted to certain areas, it may be futile to try to conserve those areas as Yellow cedar sites if there is slow and continuous mortality. A number of conservation strategies are outlined under Section 3.6 Management Goal Summaries. These strategies include targeted dispersal (planting in new sites); incorporation of suitable Yellow cedar sites outside of CSAs to incorporate into CSAs; identifying areas of Yellow cedar decline within the CSA to exclude from the CSAs, and; planting and thinning to expand habitat niches.

Windthrow

Some areas in the CSAs have incurred significant blowdown, both along edges (endemic windthrow), as well as within the interior of polygons (from catastrophic windthrow). (See PHOTO 8). The area of disturbance should be qualified through the usage of satellite imagery (ex. SPOT 2.5m resolution panchromatic bands) to determine the extent of unsalvaged loss.

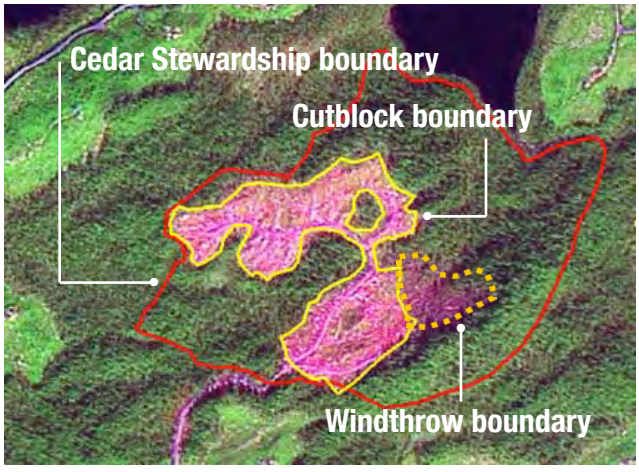
Threats to cedar: Introduced species

Sitka black-tailed deer browsing on cedar regeneration has been well documented on Haida Gwaii. Cedar regeneration has been seriously depleted or eliminated in many old forests. In some place cedar regenerates very slowly in the understory (gap-phase regeneration strategy); generally reproduces less than its competition (both sexually and asexually), and is very palatable to deer. These three factors have left Red and Yellow cedar very

PHOTO 6. Yellow cedar in West Chichagof-Yakobi island in Alaska, 300 kilometres north of Haida Gwaii. Photo: USDA Forest Service photo.

PHOTO 7. Yellow cedar decline within a CSA in Florence Creek. Photo: A.Lachapelle.

PHOTO 8. A three hectare high quality cedar site within a CSA, damaged from windthrow.



vulnerable to browsing pressure both in old growth (Stroh, Baltzinger, & Martin, 2008) and in managed stands (Grossnickle S., 2005). Population densities range from 13 deer per km^2 (Engelstoft, 2001) up to 33 deer per km^2 on smaller islands (Daufresne & J, 1997), underlining a major threat to long term natural cedar regeneration. A number of restoration prospects are outlined in the following sections.

3.3.1 RECRUITMENT

- Old growth planting: We know, and have known for generations, that the best monumental cedar grows in the darkest parts of the forest. Naturally growing suppressed trees, contribute to a tight ring width and is a well-known management technique that the Haida have used for ages. This recruitment project would help ensure that natural generation of cedar is happening in old forests through protecting seedlings/saplings from deer browse.

  While Red cedar take advantage of canopy gaps for seedling establishment, they also recruit independent of canopy gaps in old forest (Daniels, 2003). Red cedar also uses a different strategy than its competitors as it has different modes of recruitment and regeneration niches (intermittent seedlings, vegetative layering, germination substrates, apical dominance, growth independent of 'releases' in the sub-canopy). These different 'modes' and 'niches' for growth mean that relatively few saplings or seedlings can be in the sub-canopy for a long time (Daniels, 2003)[16]. In old growth forests where the understory is open, due to deer browsing, these seedlings and saplings are more vulnerable to browsing.

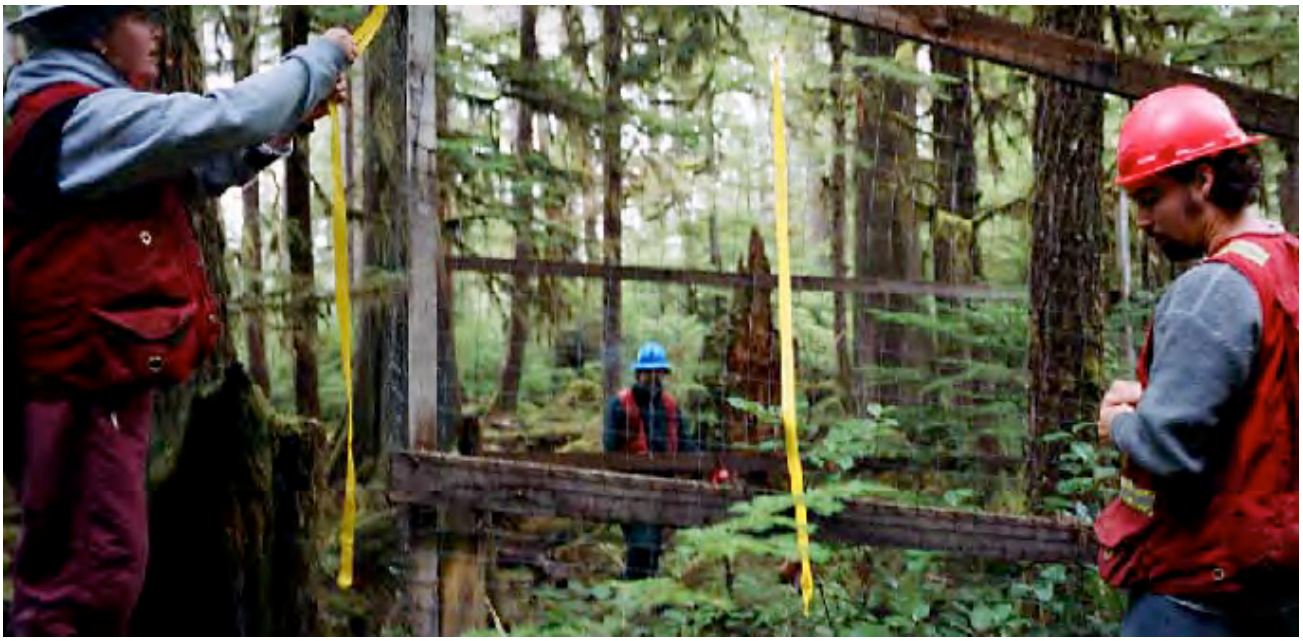
  An old growth planting project can identify stands in which the understory is most vulnerable to deer browse (likely zonal or slightly richer sites). A project can take advantage of optimum mineral substrate while using tree protectors (ex. vexars) to protect natural stems (or planted stems of appropriate local genetic stock). Also, while Red cedar doesn't require canopy gaps, solar radiation has a direct influence on growth. Red cedar seedlings reach 90% of their maximum rate of photosynthesis, maximum radial and height growth rates at about 30% of full sunlight (Drever & Lertzman, 2001) (Grossnickle S., 2005). A recruitment project could take advantage of natural canopy gaps to encourage initial growth so that seedlings escape browsing pressure (1.2 m height).

- **Second growth planting:** As discussed in Section 2 of this management plan, there are hundreds of hectares of second growth spruce and hemlock within the CSAs that used to be cedar-leading old growth stands. Many of these stands are easily accessible and some of them may be close to harvestable age. Opportunities may exist to harvest the Western hemlock/Sitka spruce sites and replant them with Red cedar under the auspice of restoration. Harvesting may be designed in a manner in which regeneration suits long term cultural use (slow growing), which may include selection harvesting (high retention). Stocking should be from Haida Gwaii stock and to approved stocking standards (see Haida Gwaii Natural Resource District, 2003 minimum cedar stocking standards based on preharvest composition).

- **Exclosures:** Many organizations over the last decade, including the Council of the Haida Nation, the Research Group on Introduced Species, BC Ministry of the Environment and the Laskeek Bay Conservation Society and Parks Canada have collaborated and designed a number of deer exclosure sites throughout the Islands. While deer exclosure sites may be impractical for large cedar reserves, they may prove to be

[16] One study of 50 saplings in old growth showed that the first release (big growth spurt) for western redcedar didn't happen for an average of 111 years.

PHOTO 9. Lana Wilhelm, Gerry Morigeau and Jaalen Edenshaw at the Yakoun Lake Exclosure.
Photo: Farah Nosh



necessary for the protection of rare and important Haida plants.

Most notably there are ten research sites (25m^2) throughout Graham Island (Stroh, Baltzinger, & Martin, 2008) and three sites established by the CHN. Some small research plots exist near the 'second' canoe near Juskatla (south of the Port Main/QC Main junction), near the Golden Spruce Trail, there are several small exclosures along Yakoun Lake, as well as some larger (two hectare) ones around Yakoun Lake, however the largest of these along the trail, is almost entirely dismantled.

The purpose of some of the sites has been to study long term effects of herbivory-browse on plant growth and cedar growth. Another significant objective was for the establishment of the larger exclosures in 2002-03 was to protect the rich understory vegetation which included rare Haida medicinal plants. The project meant to provide a place with easy access and rich ecology, to preserve genetic material, and provide access for continued use. The exclosures have been compromised on many occasions and have since been maintained to varying degrees by the CHN and BC Parks.

Further work can be done to:

a. Determine the status of the current exclosures;
b. Summarize report/literature findings on the efficacy of the exclosures;
c. Review/identify alternative fencing techniques and determine feasibility;
d. Compile and review sensitive plant inventory data within the CSAs and develop an exclosure strategy to protect them, if necessary;
e. Secure funding to maintain current exclosures and erect new exclosures in strategic places.

- **Deer Culls:** While Sitka black-tailed deer have proven to have impacted the ecology of Haida Gwaii, they have also become an important part of the Islands culture as a food source. While large scale culling of deer may be unwanted and/or impractical, it has been used as a ecological restoration measure in many places on

Haida Gwaii, typically on Islands within Gwaii Haanas or Laskeek Bay (Gaston, Stockton, & Smith, 2006). As smaller islands tend to support greater species diversity (Ibid.), islands in Masset Inlet could be considered as candidates for deer culls and inclusion into CSAs based on the result of further study.

3.3.2 Silviculture

Considering the extent of second growth forests within the CSAs, there are many aspects of silviculture that may contribute to the long term objective of maintaining a long term supply of cultural cedar for the Haida Nation. The following provides some brief examples of applicable silviculture strategies.

- Working with Taan Forest Products Ltd. and other licensees to identify and prioritize areas where vexar or browse protection or removal is necessary within the CSAs.
- Identifying areas to conduct silviculture surveys that are considered 'not sufficiently re-stocked' within the CSAs. Work with licensees to ensure they can use the information to prioritize fill-planting and updating inventories.
- Strip cutting is a system in which trees are removed in a series of cuts where the newly planted areas are designed to be under the shelter of the remaining trees. This system may work as a restoration technique in areas of second growth where Red cedar is ecologically appropriate but where the areas are currently dominated by Western hemlock or Sitka spruce.
- Prescribed burning studies show that cedar responds positively to prescribed burning, particularly for 20 year height growths on burned sites (Beese & Chrimes, 2010). This helps reduce competition from ericaceous shrubs (like salal) and gives cedar a head start for healthy establishment. Prescribed burning has occurred in over 90 hectares already within the CSAs. These areas can be revisited with paired plots with control sites to determine cedar response. Outcomes of a review may lead to more prescribed burns in low productivity second growth cedar sites.

3.4 Research

A number of research initiatives are possible within the CSAs. This section of the management plan outlines examples of some long term research ideas that could benefit the management of the CSAs:

- **Plant response to herbivore-herbivore interactions:** Dietary competition is potentially an important interaction between ungulates. When resources are limited and species are forced to compete for the same resource, it may lead to the exclusion of one of them. There has been evidence of Roe deer in Europe, who are territorial and solitary (like the Sitka black-tailed deer on Haida Gwaii), being intimidated/displaced by species such as Red deer which gather in herds when natural predators have been eliminated (Lantham, 1999). A similar relationship may exist on Haida Gwaii in areas where the introduced Rocky Mountain elk (Cervus elaphus nelson), which were introduced in 1929 (Golumbia, Bland, Moore, & Bartier, 2002) compete with the Sitka black-tailed deer. Anecdotal evidence suggests significant increase in understory vegetation around the elk habitat found in drainages such as Canyon Creek, Feather Lake, Three Mile Creek and Survey Creek. There have been similar studies that point to sapling recruitment or survival based upon certain thresholds of herbivore densities (Hester, Edenius, Buttenschon, & Kuiters, 2000). Similarly, interactions between different herbivores (ex. elk as grazers, deer as browsers) can have significant impacts on forest dynamics (Mitchell & Kirby, 1990).

- **Understanding growth patterns for suppressed Red cedar:** It is well known that the best monumental cedar grow in the darkest forest. It is known that cedars can remain in a suppressed state under the canopy as saplings for many years or even decades, leading to vulnerability from browsing. However it is unknown how long saplings take to reach breast height under closed canopied natural forest conditions in order to escape deer.

- **Use and development of browse resistant cedar:** The palatability of cedar to deer and the associated likelihood of browse are influenced by the phytochemical content of individual seedlings. Results from studies suggest that both plant tissue development (ontogeny) and monoterpene concentrations can greatly reduce browse (Vourc'h, de Garine-Wichatitsky, Labbe, Rosolowski, Martin, & Fritz, 2002). Selective breeding programs through the Cowichan Lake Research Station (Ministry of Forests, Lands and Natural Resource Operations) may be able to provide locally suitable cedar trees for such a trial (Russell & Kimball, 2010). Areas that are 'not satisfactorily restocked' within the CSAs may be also suitable for such a trial.

- **Deficiencies in the establishment of young cedar in natural/old growth forests:** Research suggests that deer populations in old growth forest, combined with cedar's palatability, slow growth rate under closed canopy conditions and lack of physical defences may lead to potential elimination of cedar in old growth forest over time (Stroh, Baltzinger, & J-L, 2008). However the extent of this issue has not been qualified across the range of growing conditions for cedar on Haida Gwaii. A research study within the CSAs can easily determine the presence, age range, crown class and diameter range of cedar in natural stands by site series. This research would help to quantify the scale of the issue of establishment for young cedar across different growing sites/site series on Haida Gwaii.

3.3.5 Mangement Goal Summaries

Management Goal	*Issue*	*Strategy*	*Performance measure*
Respectful Use: Commercial Access	Many edges of CSA's have blown down and the value of the timber (for culture or economy) will be lost unless salvaged	Follow the policy outlined in 3.2.1 Commercial Salvage Opportunity. Conduct windthrow assessment first to determine whether salvage of the blown edge will exacerbate windthrow.	Windthrown wood is salvaged for cultural or economic use.
		Where appropriate, use tree crown modification within the edge of the CSA to help prevent blowdown, or Buffer the edges of the CSA from a harvest area to account for consequences to adjacent values.	Blowdown along the harvested edge of a CSA is minimized.
	Licensees would like to harvest 10% of the area of CSA's	Through the Solutions Table, determine a CFI survey has identified cultural values within the area for protection. Ensure that the distribution of harvest is proportional to the occurrence of cedar stewardship areas within a given landscape unit. Ensure that the amount of area by Landscape Unit that is harvested commercially is tracked in a database on an annual basis. Ensure that strategies outlined in section 3.2.2 are considered or applied.	Minor amounts of commercial harvesting occurs in a way that is consistent with this Management Plan and the Haida Gwaii Land Use Objective Order.

Management Goal	*Issue*	*Strategy*	*Performance measure*
Respectful Use: Commercial Access	Monumental cedar has blown down, and commercial salvagers would like to harvest them.	Any area for commercial salvaging within the CSAs requires what is noted under section 3.2.1, which includes a CFI survey. The CFI standards says that dead and down cedar that have monumental attributes are qualified as 'Monumental Quality Wood'. Monumental Quality Wood should be made available to the Council of the Haida Nation through the Cultural Wood Access Program.	Monumental Quality Wood is made available to the Council of the Haida Nation. If the CHN does not require the wood, then it can be available for commercial purposes.
	Salvagers would like to harvest down wood immediately adjacent (less than a half a tree length) to a monumental cedar or cultural plant (considered to be in its reserve zone).	Ensure that harvesting operations do not affect the tree or the roots of the tree. Ensure that the wood that is salvaged is not bear den recruitable habitat (>80cm diameter log with evidence of black bear winter hibernation) and follows the salvage policy outlined in section 3.2.1 Commercial Salvage Opportunity.	Damage to monumental cedars or cultural plants is avoided when commercially salvaging trees in a CSA.
Inventory: CSA's represent the best sites for long term cedar	Some CSA areas do not contain any cultural cedar	The CHNs Heritage and Natural Resource department will conduct field surveys annually. A no net loss principle applies here (as outlined under section 3.1.1).	Between 0.1-1% of CSAs surveyed and reported annually to the Heritage and Natural Resource Committee.
	Some areas outside of CSA's have better cedar sites	Conduct an annual review of digital spatial data that are submitted by licensees as part of their HG Land Use Order requirements. Areas that have considerable Cultural Cedar stands become prioritized for field inventory. If the areas are deemed to have significant long term cultural cedar value, then they are proposed to the HGMC by the Heritage and Natural Resource Committee for consideration for inclusion as CSA protection in the Land Use Order.	Areas with high potential cedar value outside of the CSAs are surveyed. Areas that have been verified are included into protection in the Land Use Order.

Management Goal	*Issue*	*Strategy*	*Performance measure*
CSA's represent the best sites for long term cedar	Many older second growth sites for cedar are being logged and do not form part of the CSA's	Conduct inventory surveys in the areas known with fire-origin second growth. Identify hectares of high quality cedar that can support long term monumental trees. Propose sites for long term retention, and/or work with licensees to keep these areas retained as part of their retention strategy. If areas are set aside for long term conservation, then propose a similar area to be removed from the CSA which do not contain cedar values.	Areas are annually surveyed for long term monumental recruitment. Work with the Haida Gwaii Management Council and/or licensees to protect areas for long term cultural use.
Maintain access	Gaining access into CSA's is costly	Ensure that when roads are built for commercial harvesting up to or within the CSA's, that they can benefit access for long term cultural use in the area. Propose roads to bi-sect CSA polygons and propose that roads within the CSA's are not decommissioned unless required to restore aquatic or hydrological integrity.	Road infrastructure is not completely decommissioned up to and within CSA's unless for soil conservation, fish habitat or maintaining hydrologic integrity.
	Many existing roads that gain access into CSA's are de-commissioned	Work with licensees to identify what Permanent Access Structures exist up to or within the CSA's and request that roads within the CSA's are no longer decommissioned unless required to restore soil, fish habitat or hydrological integrity.	

Management Goal	*Issue*	*Strategy*	*Performance measure*
Restoration	Many second growth areas of CSA's were never planted with cedar	Identify areas that are not ecologically appropriate to grow cedar, and if there is not a major second growth component of cedar propose that these second growth stands be withdrawn from the CSAs. Otherwise, conduct restoration where commercial thinning or shelterwood harvesting is done and the area is regenerated with an appropriate stocking standard of cedar.	Second growth areas that do not have red cedar are either removed from the CSA, or re-stocked with cedar for long term cultural use.
	Many second growth areas are not free-growing and need re-planting	Conduct Free Growing silviculture surveys to determine the scale and extent of 'Not Satisfactorily Restocked' areas. Conduct surveys in a manner that the data can be used to update the forest inventory and/or compliments a licensees tracking system. Work with the licensee with the silviculture liability to ensure that the areas are re-stocked with cedar from Haida Gwaii.	Second growth areas with deficient stocking is re-planted with cedar at an appropriate stocking standard.

Management Goal	*Issue*	*Strategy*	*Performance measure*
Restoration	Many second growth areas need vexar-maintenance	Conduct reconnaissance and silviculture surveys to determine the scale and extent that vexar maintenance is needed. Conduct surveys in a manner that the data can be used to update the forest inventory and/or compliments a licensees tracking system .Work with the licensee with the silviculture liability to ensure that the vexar maintenance is completed and the employment benefits Haida people.	Silvicultural surveys are conducted annually in cooperation between CHN and licensees.
	Many areas of old growth do not have a range of cedar ages because of deer browse	Follow recruitment strategies identified in section 3.3.1 of this management plan along with research studies identified in section 3.5 of this management plan.	Recruitment strategies and research is conducted to help mitigate the homogeneity of some old forest cedar stands.

Management Goal	*Issue*	*Strategy*	*Performance measure*
Restoration	Yellow cedar is declining in specific areas	• Conduct targeted dispersal (assisted migration)- deliberate movement of species into areas which the projected climate is believed to be associated with persistence. • Identification of suitable yc sites outside of CSA to incorporate into the CSA's • Id areas of yc decline within the csa to remove. • Review potential for planting and thinning to expand their habitat niche. • Conduct research into potential abiotic or biotic causation of declines	Stands with declining yellow cedar are identified in the CSA's. Strategies are applied to mitigate the decline in Yc representation in the CSA's.
	Some older second growth sites are dominated by spruce and hemlock	Prescribe shelterwood or strip cut harvest system that allows for a certain amount of shade in the opening where cedar can naturally regenerate or can be planted if ecologically appropriate	Areas of merchantable second growth spruce/hemlock identified.
	Some areas of the CSA have incurred significant blowdown	Follow the strategy outlined in section 3.2.1 of this management plan.	Blowdown is salvaged in accordance with the management plan policies.

Management Goal	*Issue*	*Strategy*	*Performance measure*
Restoration	Many rare and important Haida plants are found in the CSAs and are at risk from browse	a) Determine the status of the current exclosures (are they intact?); b) Summarize report/literature findings on the efficacy of the exclosures; c) Review/identify alternative fencing techniques and determine feasibility; d) Compile and review sensitive plant inventory data within the CSA's and develop an exclosure strategy to protect them if necessary.	Strategies are implemented, rare plants are identified and protected.

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APPENDIX 1

Survey methods for Cedar Stewardship Areas

Objective

Qualify Cedar Stewardship Area polygons that have not been previously surveyed by the CHN and that are made up of mature or old forest. The intent is to determine the density of cedar and archaeological features to confirm the value of the area under protection. Each area is to be surveyed for:

a. CMTs;
b. Monumental cedar;
c. cultural cedar (volumes and general wood quality);
d. barkstrip potential (40cm to 100cm Cw/Yc with min. 3m clear face), and;
e. cedar regeneration.

If any area has a high density of any of these features then the area is to be maintained within the CSAs. If an area has none of or a low density of any of these features- and can be managed in forestry under EBM, then the CHN may consider removing those areas from the CSA and replacement areas added.

Survey method/Sample design

The intent of the survey is to sample a representative area of the CSA polygon. This can be achieved by stratifying the CSA area into stand type, age or site series as necessary. Each stratification area should have at minimum 20% of the area surveyed.

Transects

Each transect is 50m x 200m (1 hectare coverage) at minimum, but may be longer depending on the site. Each transect should be representative of the stands found in the CSA polygon. For each data point along the transect collect the geographic co-ordinate[17] and attributes below:

Monumental Cedar	Species
	DBH
	Log length
	Top height (if necessary for measuring defects- fork, candelabra or dead top)
	Dead top height (if applicable)
	Fork height (if applicable)
	Candelabra top height (if applicable)
	Twist (%)(if applicable)
	Visible rot (low/medium/high) (if applicable)
	Corrugation (low/medium/high) (if applicable)
	Sweep (low/medium/high (if applicable)
	Scar (length) (if applicable)
	Knots over 5cm (if applicable)
	Comments

Table continued next page

[17] Except for bark-strip potential trees which is collected as a single point at the end of the transect.

Table continued from previous page

CMTs	Species
	Diameter
	Class (AL, BS, OMT)
	Type (AL-)
	Distance to crown (if AL-S)
	Bearing to crown (if AL-S)
	For consideration-attributes used by BC Archaeology branch:
	Slope Length, Width, Thickness, Height above ground, Side, Nursing
	tree, Suitability for Dating.
Yew trees	Number of stems (point at geographic centre of patch)
Haida Traditional Forest Features	Type
	Number of stems
Haida Traditional Heritage Features	Type
	Comments
Barkstrip potential trees	Number of stems by diameter class

Random plots

Random plots are conducted at the POC, POT and every 100m along the transect. The intent of the random plots are to record the volume and quality of the wood in the stand, as well as to qualify the extent of cedar regeneration. If a stand does not have monumental quality wood or CMTs, the stand may still be important for long term cultural wood. Each plot has a variable (standing mature/old trees) and a fixed plot for future analysis purposes.

Information at the plot includes geographic co-ordinates of the plot centre as well as the following:

Plot Description		
CSA number		
transect number		
plot number		
crown closure	%	estimate within 5% dimensional area within variable
plot		
Aspect		In degrees
Slope	%	In percent
meso slope position	Plain	
	Depression	
	Lower slope	
	Mid slope	
	Upper slope	
	Crest	
structural stage	1	Sparse/byroad
	2	Herb
	3	Shrub
	4	Pole/sapling
	5	Young forest
	6	Mature forest
	7	Old forest
A1 layer	%	Dominant trees
A2 layer	%	Co-dominant trees
A3 layer	%	Intermediate trees
B1 layer	%	Tall shrub layer (2m-10m)
B2 layer	%	Low shrub layer (<2m)
BAF used		Basal Area Factor used
Site Series		Biogeoclimatic zone, variant and site series (ex. CWHwh1 01)
Photo number		Representative photo from the plot centre

Variable plot

In order to quantify cedar volume and quality of the stand for long term cultural use purpose, choose a Basal Area Factor prism (8 to 16) and collect the following data based on the prism sweep:

Tree number		
Species	Cw, Hw, Yc, Ss, Hm, Pl or Dr	
DBH		
Height		
Measured or Estimated	M or E	
Crown class	Dominant, Co-dominant, Intermediate, Supressed	
Conk	Code 1 to 7	
Blind Conk	Code 1 to 7	
Scar	Code 1 to 7	
Fork or Crook	Code 1 to 7	
Frost Crack	Code 1 to 7	
Mistletoe	Code 1 to 7	
Dead or Broken Top	Code 1 to 7	
Rotten Branch	Code 1 to 7	
Sweep	Code 1 to 7	
Damage Type	See appendix	
Damage Severity	Low, Moderate, Severe	

Fixed plot

In order to quantify the amount of cedar regeneration in a stand, conduct a dot count tally in either an 11.3m radius (0.04 ha) or 5.64m (0.01 ha) radius plot, measured from the centre of the plot. Dot count tally's are broken up into the following regeneration classes in order capture the presence/abundance of trees ranging from seedlings to

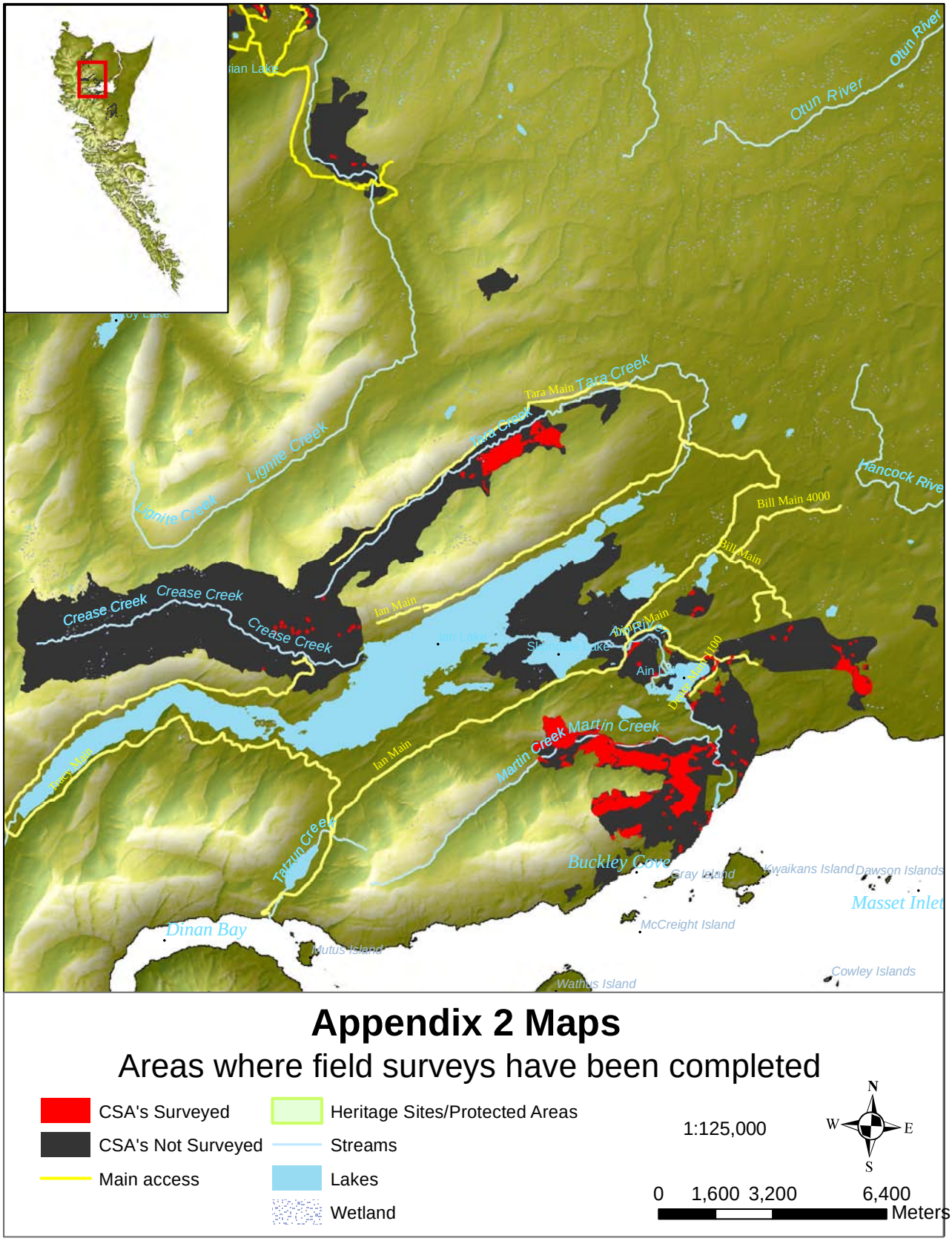
Less than 10cm tall	Number of stems to nearest 5	Seedlings per species
Between 0.01m and 1.3m tall	Number of stems	Established stems per species
Between 1.3m tall and 12.5cm DBH	Number of stems	Free growing stems per species
Seedlings Percent cover	% of fixed plot	Percent cover per seedling species For 5.64m plot 1/100% (1H)= 10 x 10 cm 1/1000% (1T)= 3 x 3 cm

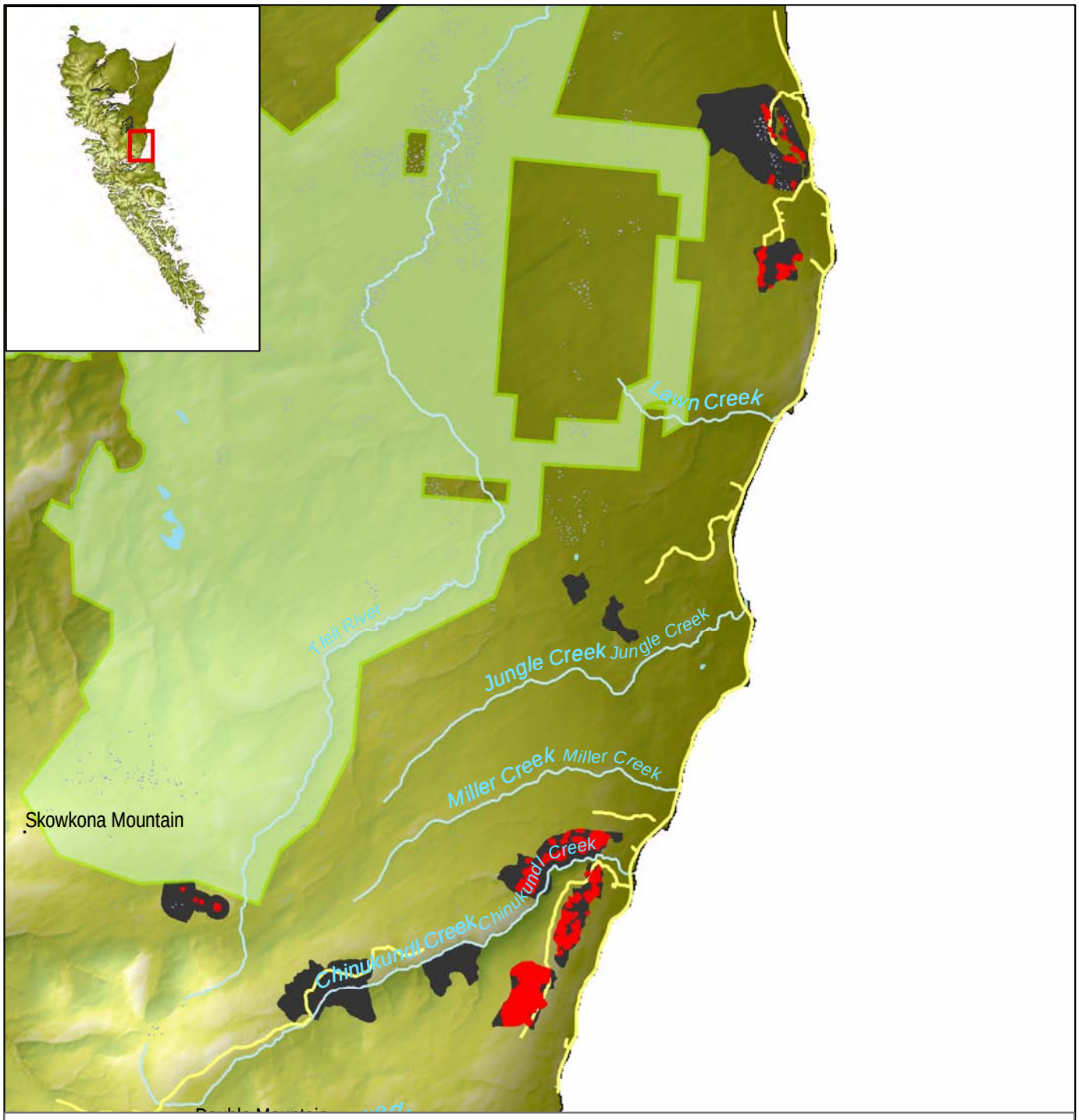
Reporting for commercial, cultural, and inventory surveys.
For each Cedar Stewardship Area polygon, a final report summarizing the findings of the survey is necessary. The report must contain the following elements and be delivered to the CHN Heritage and Natural Resource Committee.

Polygon Number and general area
Size of the Polygon
General ecology and stand type for CSA polygon
Number of features per hectare identified by type of feature
Summary of types of features
Summary of stand volumes, defects and pathogens
Summary of quality of cultural cedar
Summary of cedar regeneration
Individual plot data (appendix)
Map 1- general area
Map 2- transect lines, plots and features identified- include incidental survey lines
Plot photos

APPENDIX 2

Areas where surveys have been completed.





Appendix 2 Maps

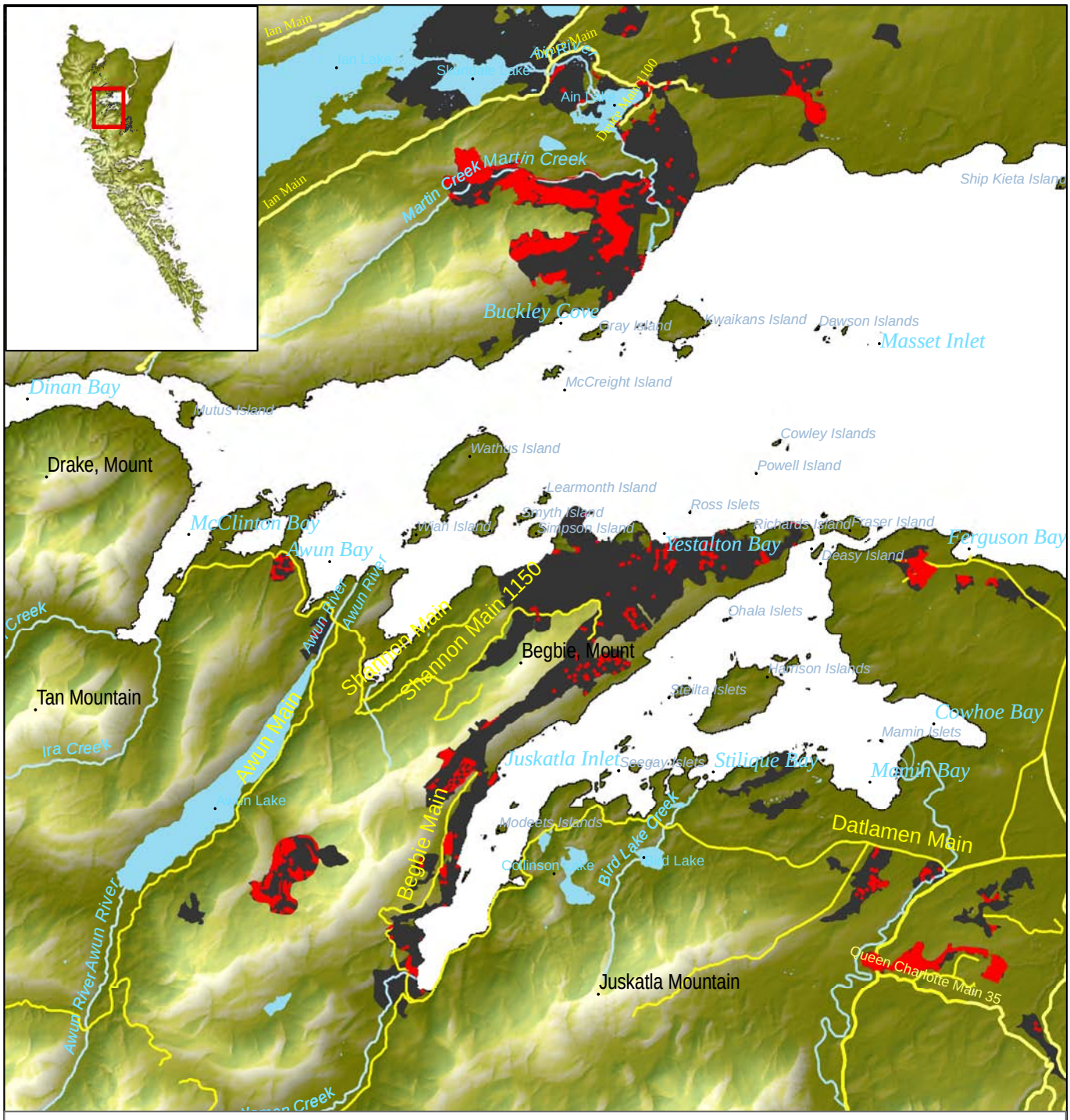
Areas where field surveys have been completed

CSA's Surveyed
CSA's Not Surveyed
Main access
Heritage Sites/Protected Areas
Streams
Lakes
Wetland

1:95,000

N
W E
S

0 1,200 2,400 4,800
Meters



Appendix 2 Maps

Areas where field surveys have been completed

CSA's Surveyed
CSA's Not Surveyed
Main access
Heritage Sites/Protected Areas
Streams
Lakes
Wetland

1:125,000

N
W E
S

0 1,550 3,100 6,200
Meters

Appendix 2 Maps

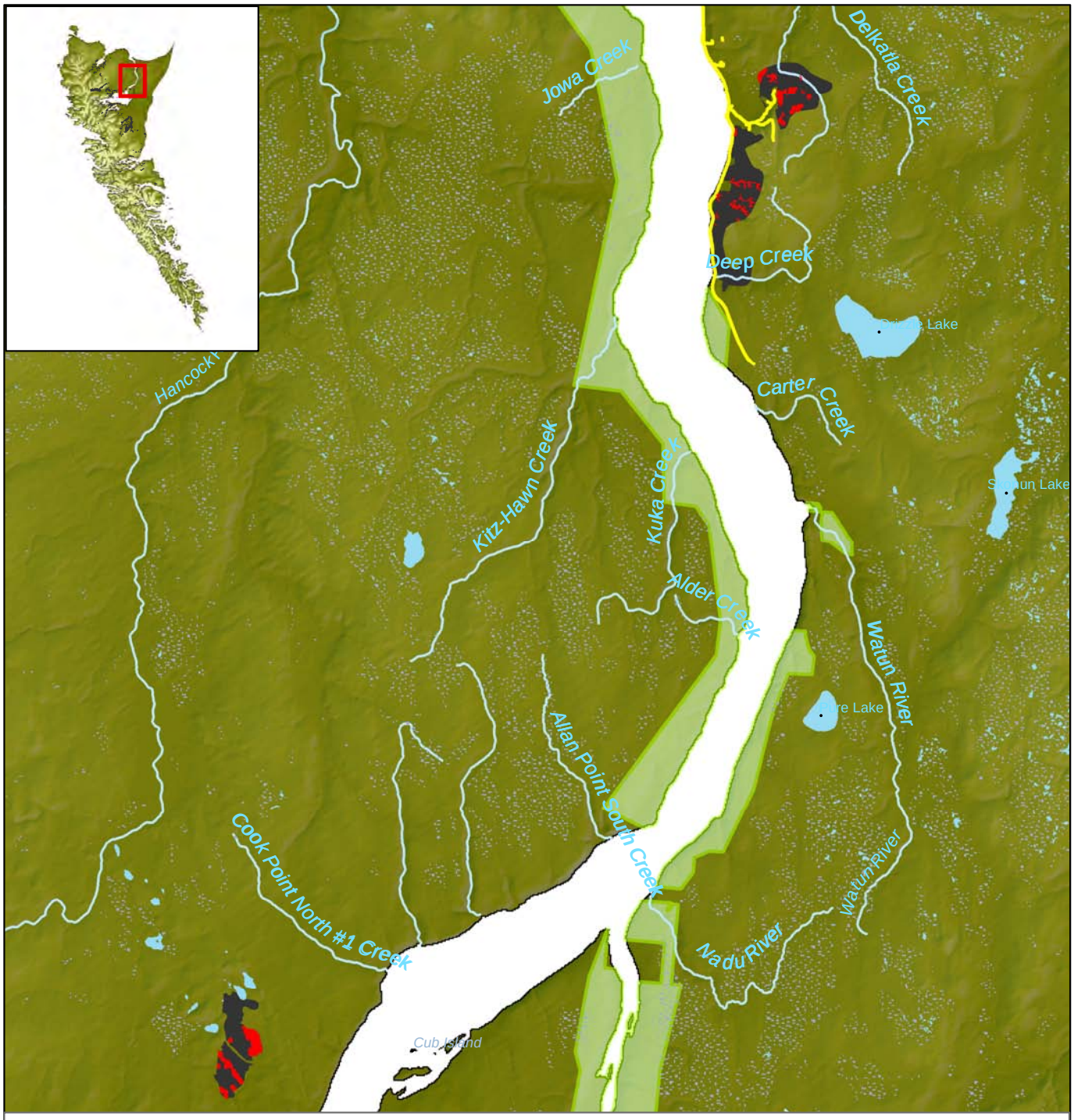
Areas where field surveys have been completed

CSA's Surveyed
CSA's Not Surveyed
Main access
Heritage Sites/Protected Areas
Streams
Lakes
Wetland

1:140,000

N
W E
S

0 1,750 3,500 7,000
Meters



Appendix 2 Maps

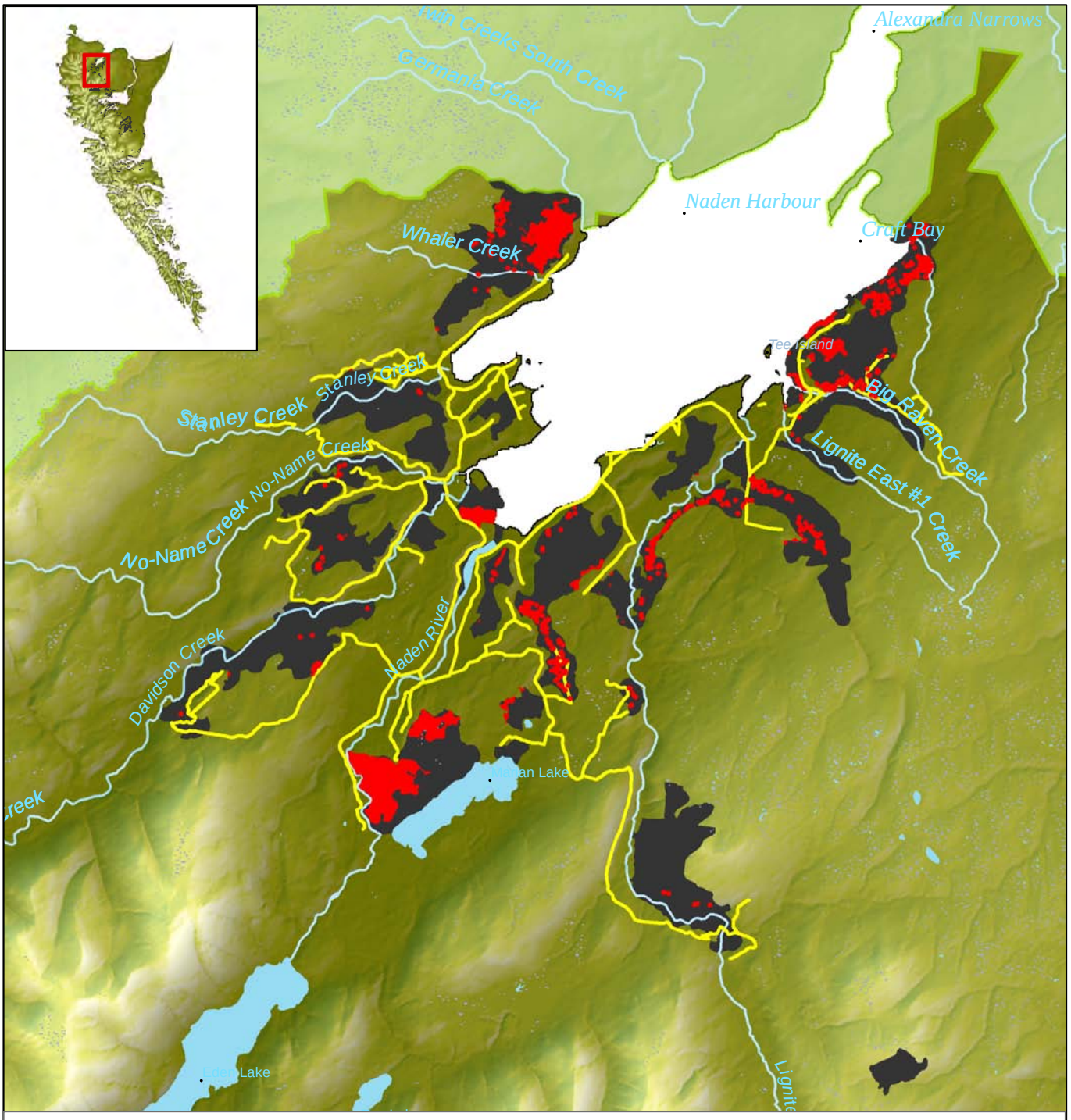
Areas where field surveys have been completed

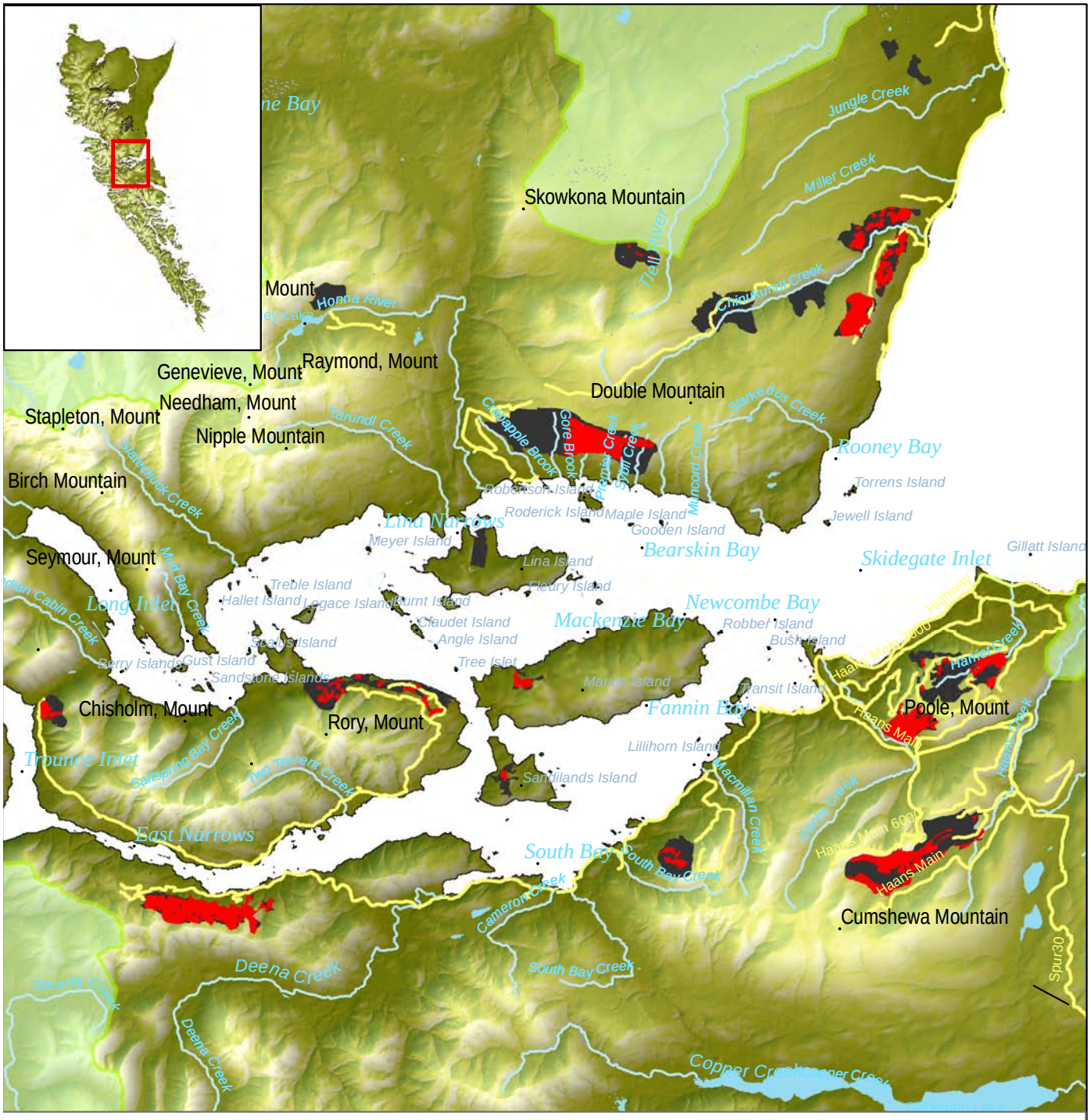
CSA's Surveyed
CSA's Not Surveyed
Main access
Heritage Sites/Protected Areas
Streams
Lakes
Wetland

1:100,887

N
W E
S

0 1,250 2,500 5,000
Meters

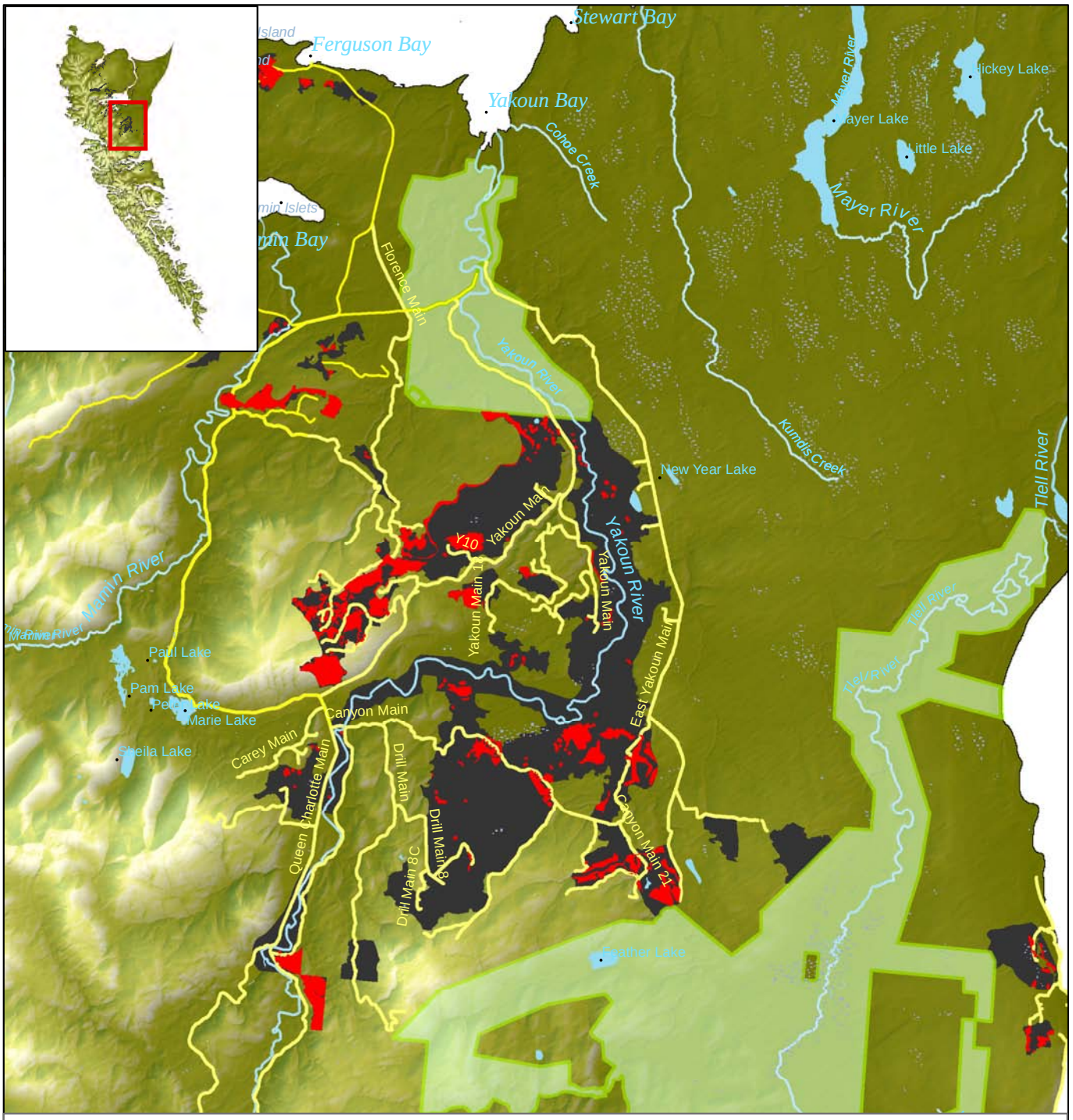

Alexandra Narrows
Germania Creek
Naden Harbour
Craft Bay
Whaler Creek
Tee Island
Stanley Creek
Big Raven Creek
Lignite East #1 Creek
No-Name Creek
Davidson Creek
Naden River
Eden Lake
Appendix 2 Maps
Areas where field surveys have been completed
CSA's Surveyed
CSA's Not Surveyed
Main access
Heritage Sites/Protected Areas
Streams
Lakes
Wetland
1:100,000
N
W
E
S
0 1,250 2,500 5,000
Meters



Appendix 2 Maps

Areas where field surveys have been completed

- CSA's Surveyed
- CSA's Not Surveyed
- Main access
- Heritage Sites/Protected Areas
- Streams
- Lakes
- Wetland



Appendix 2 Maps

Areas where field surveys have been completed

CSA's Surveyed
CSA's Not Surveyed
Main access
Heritage Sites/Protected Areas
Streams
Lakes
Wetland

1:150,000

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Meters

Heritage and Natural Resource Department
Council of the Haida Nation
2016

BRITISH COLUMBIA

File: 18750-20

Order to Identify Karst Resource Features

for the

Queen Charlotte Islands Forest District

Pursuant to Section 5 of the *Government Actions Regulation* of the *Forest and Range Practices Act* (FRPA), I hereby identify the following surface or subsurface elements of a karst system as resource features wherever they are found within the Queen Charlotte Islands Forest District (QCIFD), effective September 15, 2006.

- Karst caves
- Significant surface karst features
- Very high or high vulnerability karst terrain

Leonard Munt, District Manager
Queen Charlotte Islands Forest District
Ministry of Forests and Range

Sept 1/06
Date

Ministry of Forests and Range
Queen Charlotte Islands District Office
Location:
1229 Cemetery Road
Queen Charlotte, BC V0T 1S0
Mailing Address:
PO Box 39 Stn Prov Govt
Queen Charlotte, BC V0T 1S0
Tel: (250) 559-6200
Fax: (250) 559-8342

ORDER OF THE MINISTER OF FORESTS, LANDS, NATURAL RESOURCE OPERATIONS AND RURAL DEVELOPMENT
(Section 75.02 (2) of the *Forest Act*)

Ministerial Order Number 75.02 (2) – 01/TSA 25

I, Doug Donaldson, Minister of Forests, Lands, Natural Resource Operations and Rural Development, order that:

1. In this Order:

   a) words and phrases have the same meaning as in the *Forest Act*;

   b) "AAC partition" means the AAC partition specified by the Chief Forester on October 24, 2017, pursuant to Section 8 (5) of the *Forest Act* attributed to western red cedar and yellow cedar (collectively referred to as "cedar" in this Order) for the Timber Supply Area (TSA) 25 on Haida Gwaii;

   c) "AAC Partition Regulation" means the Allowable Annual Cut Partition Regulation under the *Forest Act*;

   d) "Pre-order period" means the pre-order period under the AAC Partition Regulation, starting on the date the AAC partition took effect and ending on June 30, 2018;

   e) "Schedule" means the schedule attached to this Order;

   f) "TSA" means Timber Supply Area.

2. To ensure the attribution specified in the AAC partition is carried out, during the term of this Order the holder of a forest licence specified in Column 1 of the Schedule may not harvest a volume of partitioned timber in excess of the total limit on the harvested volume specified for that forest licence in Column 5 of the Schedule, as determined in accordance with the AAC Partition Regulation by reducing the limit on the harvested volume determined for that licence (Column 3 of the Schedule) by the volume of partitioned timber harvested by that licence determined to be in excess of the AAC partition during the pre-order period (Column 4 of the Schedule).

3. In determining a reduction referred to in Section 2 of this Order, I have considered the following factors:

   a. Under the September 20, 2012, rationale for AAC determination for Tree Farm Licence 58, Tree Farm Licence 60 and TSA 25, the Chief Forester set an expectation that the harvest of cedar for TSA 25 should not exceed, on average, about 195,000 cubic metres of the AAC of 512,000 cubic metres (38%) and that a forest management strategy be developed for cedar harvest (the 2012 direction);

b. On October 24, 2017, the Chief Forester imposed the AAC partition to address the facts that the harvested levels of cedar continued to be in excess of the 2012 direction and that no cedar management strategy had been developed for the TSA; and

c. The harvest level of cedar in the TSA has continued to be in excess of the partition since the effective date of the AAC partition.

4. For the purposes of this Order, the volume of partitioned timber harvested under a forest licence specified in the Schedule will be determined using the following sources of information and data:

   a) scales made under Part 6 [Timber Scaling] of the *Forest Act*;
   b) stumpage billed by the government; and
   c) waste assessments.

5. For the purposes of this Order, the volume of partitioned timber harvested during the pre-order period under a forest licence specified in the Schedule was determined using the following sources of information and data:

   a) scales made under Part 6 [Timber Scaling] of the *Forest Act*;
   b) stumpage billed by the government; and
   c) waste assessments.

6. This Order has a term of 5 years and is effective on the date written below.

August 24, 2018

Honourable Doug Donaldson
Minister of Forests, Lands,
Natural Resource Operations and
Rural Development

Date

SCHEDULE TO MINISTERIAL ORDER NUMBER 75.02 (2) – 01/TSA 25

Column 1 **Forest Licence**	**Column 2** **Forest Licence's Proportionate Share of the Partition/Year** (cubic metres of cedar)	**Column 3** **Limit on the Harvested Volume for Forest Licence Before Reduction** (cubic metres of cedar)	**Column 4** **Reduction to Limit for Forest Licence for Excessive Harvested Volume during Pre-Order Period** (cubic metres of cedar)	**Column 5** **Total Limit on the Harvested Volume for Forest Licence** (cubic metres of cedar)
A16869	73,142	365,709	7,081	358,627
A16870	5,192	25,959	0	25,959

Reference: 240973

August 27, 2018

Ray Luchkow, Director of Operations
BC Timber Sales
3rd Floor - 727 Fisgard Street
Victoria, British Columbia
V8W 9C1

Dear Ray Luchkow:

The purpose of this letter is to advise you of a recent partition order (copy attached) that I have executed, which limits the harvest of cedar by forest licence holders operating in Timber Supply Area (TSA) 25 on Haida Gwaii.

The order provides a 5 year limit on the volume of cedar that each eligible licence in the TSA may harvest in accordance with their proportionate share of the cedar partition based on their licence's allowable annual cut.

It is my expectation that BC Timber Sales (BCTS) limits the harvest of red and yellow cedar under BCTS licences during the term of this order to its proportionate share of the partition. Currently, BCTS is managing 175,868 cubic metres (m^3) per year of allowable annual cut in the TSA from which I calculate its proportionate share of the partition to be 66,981 m^3 per year of cedar. Accordingly, the maximum harvest of cedar under licences issued by BCTS in the TSA during the term of this order is 334,905 m^3. I expect BCTS to take the necessary steps in order to be able to demonstrate that the harvest of cedar has been restricted in this manner.

Sincerely,

Doug Donaldson
Minister

Attachment: Ministerial Order Number 75.02 (2) – 01/TSA 25

Ministry of Forests, Lands,
Natural Resource Operations
and Rural Development

Office of the Minister

Mailing Address:
PO BOX 9049 Stn Prov Govt
Victoria, BC V8W 9E2

Telephone: (250) 387-6240
Fax: (250) 387-1040
Website: www.gov.bc.ca/for

BC Timber Sales Haida Gwaii Yellow-Cedar Management Strategy

March 2, 2018

BCTS has developed a management strategy for Yellow-cedar, to support a sustainable future for this culturally and ecologically important species on Haida Gwaii. Yellow-cedar is currently exhibiting decline throughout Haida Gwaii, as observed through both local knowledge and scientific research. BCTS recognizes the threat of Yellow-cedar decline and the importance of this species to the Haida Nation, and is committed to the Yellow-cedar management strategy, which will continue to develop and adapt as new information becomes available and policies are established.

BCTS Haida Gwaii Yellow-cedar management strategy:

1. Manage Sales Schedule[1] in accordance with the partition established by the Chief Forester as part of the 2012 Haida Gwaii Allowable Annual Cut determination:
    - Ensure that the annual sale of Western Redcedar and Yellow-cedar, does not exceed 38% of total volume of all species sold
2. Engage with individuals knowledgeable on the topic of Yellow-cedar decline, at least annually, including:
    - Haida and local knowledge holders
    - Staff and specialists associated with local licensees, the District and Forest Improvement and Research Management Branch
    - Researchers currently studying Yellow-cedar decline on Haida Gwaii and the coast
3. Review available literature pertaining to Yellow-cedar decline in the Pacific Northwest and consider findings in forest management decisions.
4. Develop and execute a monitoring program for Yellow-cedar representation in Cedar Retention on an annual basis, including:
    - Analyzing data

[1] BCTS establishes a Sales Schedule, that details when BCTS's annual available volume will be sold throughout the fiscal year.

- Communicating results with the District and the Haida Nation
- Look for opportunities to collaborate and engage with the Haida Nation

5. Plant Yellow-cedar, proportionate to the percent Yellow-cedar contributed to the pre-harvest cedar composition
    - i.e. if Yellow-cedar is 50% of the pre-harvest cedar composition, then plant Yellow-cedar equal to 50% of the total number of cedar planted
    - Consider climate change implications for Yellow-cedar regeneration
6. Investigate potential Yellow-cedar seed source and cone collection opportunities for Haida Gwaii Yellow-cedar
    - Support a BCTS-funded seed collection on Haida Gwaii, to grow Yellow-cedar hedges for cuttings
    - Consider Yellow-Cedar seed from an off-island site that represents climate change projections for Haida Gwaii, as approved by the Haida Nation
7. Develop a Yellow-cedar management strategy to address Yellow-cedar decline on Haida Gwaii

BCTS Haida Gwaii Western Yew Best Management Practices

BCTS Haida Gwaii Field Team

January 2019

BC Timber Sales has developed best management practices for the management of Western Yew on Haida Gwaii. This document has been developed to provide guidance for BCTS staff, contractors and licensees to implement Objective 8 of the Haida Gwaii Land Use Objective Order (HGLUOO) and considers the findings of the Council of the Haida Nation's (CHN) Western Yew Monitoring Report (2016). It details the management practices that will guide BCTS operations, from initial planning through to the post-harvest assessment and subject to change as new information becomes available.

Planning – During the block planning phases, BCTS will work with multi-phase contractors to ensure:

- A Cultural Feature Identification (CFI) survey is conducted by a CHN certified surveyor in the early stages of the block development
- The coordinates of all yew stems and yew patches are recorded as per the CFI survey manual
- Initial block layout is adjusted to manage yew features in accordance with HGLUOO and the BCTS FSP.
- New information (i.e. research, licensee feedback, etc.) is considered in block design

Application review – As part of the application review process, BCTS will:

- Submit the completed CFI survey to the Haida Gwaii Natural Resource District (District) and the CHN at a minimum of 30 days prior to submission of the Cutting Authority application to ECAS and will include a georeferenced map
- Include the CFI survey in the submission to the Solutions Table
- Engage in an intergovernmental process if required, as per the HGLUOO

Advertisement – When BCTS blocks are advertised for sale as part of a Timber Sale Licence (TSL), BCTS will include the following in the TSL package:

- Detailed Site Plan and Harvest Plan maps that clearly identify the location of yew Stand Level Retention (SLR) stems and patches
- Wording in the TSL Highlights document that recommends operational considerations for the protection of yew, focusing on the single stems that are located within the harvest area, which includes the Net Area to be Reforested (NAR) or road Right of Way (ROW).

Harvest operations – BCTS will use the TSL pre-work meeting to communicate the following harvesting strategies to maximize retention of yew patches and individual trees:

- Review the yew stem locations identified on the Harvest Plan Map
- Fall and yard away from yew stems
- Retain non-merchantable stems around yew trees

- Design skidding and yarding operations to avoid or minimize yew trees
- Where it is not practicable to retain yew stems within the harvest area:
    - cut stumps at least 1.2m above the point of germination to encourage coppicing above deer browse height
    - Report stems cut to the BCTS Conformance Technician

Harvest and post-harvest inspections – BCTS will monitor Yew retention conformation during harvest operations and will complete a post harvest assessment to verify yew retention

- When yew stems are reported cut, BCTS will notify the Cultural Wood Access Program of their location.

Annual reporting – BCTS will report all identified western yew at the solutions table submission.

Adaptive Management and Continual Improvement – BCTS will participate in adaptive management and continual improvement by:

- Reviewing feedback from the CHN, District and TSL holders that may help in further increase western yew retention within BCTS's operating areas
- Considering new information as it become available
- Conforming to changes in legislation as they evolve
- Supporting further monitoring and data collection efforts
- Sharing information with the Haida Gwaii Natural Resource District, the CHN and other licensees when applicable

Operating Procedures for Cultural Wood Access for Monumental Cedar Under the Haida Gwaii Land Use Objectives Order.

1. A licensee notifies the Haida Gwaii Cultural Wood Access Permit (HGCWAP) coordinator of any monumentals that are within development areas once the block layout is complete.

2. If the removal of monumentals that are < or > 120 cm dbh is required for road access, other infrastructure, or to address a safety concern and if no other practicable alternative exists then any monumental cedar harvested will be provided to the HGCWAP process pending review from the Haida Gwaii Solutions Table, in coordination with the HGCWAP coordinator.

3. If monumentals are identified for harvest, there are made available use by the HGCWAP process.

4. HGCWAP coordinates safe & timely, viewing of monumental cedar with the applicant and licensees.

5. Applicant has the opportunity to harvest the monumental themselves before harvesting begins or have the Licensee harvest it for them. Alternately the HGCWAP would work out a logging cost with the Applicant. Then the applicant would pick up the monumental from the logging block or have the licensee transport to the dry land sort.

6. All identified monumentals within the harvest area will be felled by fallers with coastal experience and monumental size cedar and transported with care to prevent damage or to not render them ineffective for cultural use.

7. Within 30 days of falling monumental trees, the HGCWAP coordinator and all licensees will determine the length of time the monumental trees will be available for HGCWAP process and sign a joint letter of agreement stating the time frame.

8. If the monumental trees are not removed within the agreed upon timeframe, they will be scaled and become part of licensee regular harvest program.

9. Any identified monumentals left in reserves or excluded from the development area whether impacted by windthrow or left standing, are to be made available for use by the HGCWAP process and in coordination with CHN/FLNR (Ministry Of Forests, Lands and Natural Resource Operations) monitoring program.

10. HGCWAP process coordinators to work with all licensees try to ensure equal proportions of monumentals are selected from each tenure.

BCTS Best Management Practice for Haida Gwaii Monumental Cedar

BCTS Haida Gwaii Field Team

January 2019

BC Timber Sales has developed best management practices (BMP) for Haida Gwaii monumental cedar that are felled by a Timber Sales Licence (TSL) holder. Monumental cedar is defined in the Haida Cultural Feature Identification (CFI) Survey Manual, and objectives are set for monumentals under section 9 of the Haida Gwaii Land Use Objectives Order (HGLUOO). The harvest area includes the net area to be reforested (NAR), road right of way (ROW) and special use permit (SUP) areas associated with the TSL. This BMP document is meant to compliment the Haida Gwaii Cultural Wood Access Permit (HGCWAP) Process, developed by Council of the Haida Nation (CHN) in partnership with the Haida Gwaii Natural Resource District (HGNRD) and is subject to change as new information becomes available.

Planning – During the block planning phases, BCTS will work with multi-phase contractors to ensure:

- A CFI survey is conducted by a CHN certified surveyor in the early stages of the block development
- The coordinates of all monumentals are recorded as per the CFI survey manual
- Initial block layout is adjusted to manage monumentals in accordance with HGLUOO and the BCTS Forest Stewardship Plan (FSP)
- New information (i.e. research, HGCWAP process feedback, etc.) is considered in block design

Application review – As part of the application review process, BCTS will:

- Submit the completed CFI survey to the HGNRD and CHN a minimum of 30 days prior to submission of the Cutting Authority application to ECAS. A georeferenced map is to be included.
- Include the CFI survey in the submission to the Solutions Table
- Engage in an intergovernmental process if any monumentals are scheduled for harvest within the boundaries of the proposed harvest area, as per the HGLUOO

Notification of HGCWAP:

- Upon completion of the IGP, the HGCWAP coordinator will be notified of any monumentals planned for harvest within the harvest area

TSL Advertisement – When BCTS blocks are advertised for sale as part of a Timber Sale Licence (TSL), BCTS will include the following in the TSL package:

- Detailed Site Plan and Harvest Plan maps for all blocks, which clearly identify the location of all monumentals within the development area (including retention and harvest areas)
- Cruise compilation that is reduced for designated monumentals that will be delivered to the HGCWAP and excluded from the volume advertised in the TSL

- Monumentals designated for harvest will not be buffered
- TSL Highlights document that states monumentals designated for HGCWAP are identified as reserved trees in the TSL, and:
    - A template Forest Act Section 52 authorization application for the felling of the designated monumentals under s52 as an agent of the crown
    - A template Direct Award Contract to the Licensee for harvest and delivery of the monumentals, which contains the following information:
        - The location to which designated monumentals will be delivered
        - The marking specifications for the felled monumentals

Pre-work – Once the TSL is awarded a pre-work will be conducted prior to the commencement of TSL operations, which will involve:

- A review of the TSL Highlights document
- Identification of the location of any monumentals within the harvest area
- An explanation of the BCTS HGCWAP process

Harvest – when the TSL is active (after the pre-work is conducted up until the TSL is closed or expires), BCTS and the TSL holder will follow the respective procedures described below:

- The TSL holder will:
    - Initiate and adhere to the BCTS HGCWAP process, by following these steps:
        1. Contact the HGCWAP coordinator and BCTS conformance technician when falling commences in a harvest area that contains a monumental
        2. Coordinate a time to view a monumental within the harvest area with the HGCWAP coordinator and applicant, at least 5 days before falling the monumental
        3. As authorized under the TSL or separately under a Forest Act s52 authorization, fall monumentals using fallers experienced in felling cedar of monumental size on the west coast
        4. As part of a direct award contract, mark and delivery felled monumentals as per the specifications in the TSL Highlights
        5. For each monumental felled and delivered, report the block name, monumental identification number, delivery date and location and confirmation of delivery to BCTS
- BCTS will:
    - Complete conformance checks as per the BCTS Chinook Business Area's Environmental Management System, which includes monitoring of the TSL holder's compliance with the HGCWAP process.

Annual reporting – As part of BCTS's HGLUOO annual reporting, BCTS will submit a summary of all monumental cedar delivered to the HGCWAP. Retained monumentals will be reported as part of the solutions table submission.

Adaptive Management and Continual Improvement – BCTS will participate in adaptive management and continual improvement by:

- Reviewing feedback from the CHN, HGNRD and TSL holders that may improve the effectiveness and efficiency of BCTS operations in regard to the HGCWAP process
- Considering new information as it become available
- Conforming to changes in legislation as they evolve
- Sharing information with the HGNRD, the CHN and other licensees when applicable

Haida Gwaii Forest Stewardship Plan Implementation Agreement

October 10, 2018

The undersigned Parties commit to working collaboratively and as per individual Forest Stewardship Plan (FSP Results or Strategies), to ensure the Haida Gwaii Land Use Objectives Order targets are met. In particular, FSP implementation as it relates to Cedar Stewardship Areas, Upland Stream Areas, Sensitive Watersheds, Ecological Representation and Marbled Murrelet Nesting Habitat. Individually and when required collectively, the Parties will conduct inventory assessments, determine proportional targets, and establish tracking and reporting mechanisms that demonstrate achievement of FSP Results or Strategies.

By signing this agreement, the Parties agree to work collaboratively to ensure:

1. Haida Gwaii Land Use Objectives Order targets are met consistent with Forest Stewardship Plan (FSP) Results or Strategies including but not limited to Cedar Stewardship Areas, Upland Stream Areas, Sensitive Watersheds, Ecological Representation and Marbled Murrelet Nesting Habitat. Within the TFLs, the targets will be based on proportional tenure area; while in the TSA, targets will be based on Allowable Annual Cut (AAC) apportionment.
2. The Parties will complete analyses (independently for area based tenures, including FLTC A87661; or as a group for volume based tenures. The Parties will provide annual reports to the Province (MFLNRORD) and the Council of the Haida Nation (CHN), and will report individually and as a group depending on the HGLUOO/FSP requirement.
3. Proposed development area information is shared at least annually with the effected Parties in shared Landscape Units (e.g. watersheds, and/or watershed sub units, Cedar Stewardship Area harvesting).
4. Manage the cedar (red and yellow) harvest volumes as set by the Chief Forester's partition within the TSA.
    a. The volume of cedar will be changed in accordance with new AAC determinations.
    b. Each Party will submit to the CHN and the MFLNRORD, a cedar (red and yellow) harvest volume report for cedar harvested on TSA 25 in the previous calendar year consistent with the Chief Forester's cedar partition.
    c. Individual Cedar Management Strategies will be provided by the Parties as to how each Party will manage and report their portion of the partition.

The term of this agreement will be from the date signed and will remain in place for the duration of the Parties' FSPs approved in 2018, until such time as a new agreement is reached or the agreement is cancelled by the Parties.

This agreement may be amended from time to time with mutual consent of the Parties.

Additional Parties may join this agreement with the mutual consent of the Parties.

Licensee	Authorized Signatory & Title	Signature	Date
Taan Forest Unit 3 Hwy 16 Commercial Cent Box 1384 Skidegate, BC V0T 1S1 Ph: (250) 559-2337 Fx: (250) 559-2367	Jeff Mosher, RPF Planning Manager		Oct 10, 2018
Husby Group 6425 River Road Delta, BC V4K 5B9 Ph: (604) 940-1234 Fx: (604) 940-1236	Rob Sandberg, RPF VP Forestry & Engineering		OCT 10/18
BC Timber Sales – Chinook Business Area 46360 Airport Road Chilliwack, BC V2P 1A5 Ph: (604) 702-5723 Fx: (604) 702-5711	Tom Johnson, RPF ~~Woodlands Manager~~ A/ Timber Sales Mgr		Nov. 09/18
A&A Trading Ltd. 1210-1111 Melville St. Vancouver, BC V6E 3V6 Phone: (604) 684-2107 Fax: (604) 689-0977	Dave Marquis, RPF Forestry Manager	David Marquis	Oct 15, 2018

BC Timber Sales Haida Gwaii Public Engagement Strategy

August 2018

BC Timber Sales (BCTS) has developed a public engagement strategy to proactively engage with the communities of Haida Gwaii. This communication strategy outlines BCTS's commitment to:

- improve the frequency and diversity of opportunities for communication between BCTS and the communities,
- improve public awareness of the BCTS organization, planning and operations,
- facilitate the exchange of information and ideas to and from the communities, and
- enhance BCTS's understanding of the communities' interests and needs.

BCTS's Haida Gwaii Communications Strategy is as follows:

1. Share block shapes on the BCTS FSP webpage (https://www.for.gov.bc.ca/bcts/areas/TCH/TCH_FSP.htm) as part of a 30-day Information Sharing process, prior to submission of blocks to the Solutions Table.

2. Produce a development plan map that is updated annually and made available in the following ways:
    a. digital maps will be posted on the BCTS Haida Gwaii Forest Stewardship Plan (FSP) web page,
    b. printed copies will be provided to all Village and Band offices as well as the Moresby Island Management Council,
    c. staff will be available to review the maps with the public at the District Office (1229 Oceanview Drive, Queen Charlotte) during regular business hours (8:30-12:00PM, 1:00-4:30PM), and
    d. maps will be presented annually at BCTS planning and operational meetings.

3. Host BCTS Development and Operational meetings in at least four Haida Gwaii communities on an annual basis, which will cover:
    a. an introduction to the BCTS organization and mandate,
    b. BCTS Haida Gwaii operational planning and developments,
    c. a summary of BCTS operations on Haida Gwaii over the past 5-years, and
    d. an opportunity for open discussion between BCTS staff and the public.

4. Participate in public engagement initiatives such as public tours, Haida Gwaii Forestry Information Sessions and educational field trips and class presentations, when possible.

5. Produce and publish a BCTS Timber Sale Licence Status Table on the BCTS FSP webpage that informs the public of BCTS active operations including: TSL location, block names, Licensee name, harvest start date and end date, and TSL issue and closure date. This table serves to inform and the public of the location of BCTS operations and connect them with licensees.

6. Install signage on each cutblock that displays the cutblock name, the harvested and retained forest area, date of logging and planting details.

7. Initiate public consultation processes related to Forest Stewardship Plan renewal and major amendments, which may include public meetings and or a time frame for the public to submit comments and questions for consideration by BCTS.

Chinook Business Area SFMS (EMS/SFI) Procedures for Public & Client Enquiries/Complaints/Potential Issues Procedure

Enquiries/Complaints/Potential Issues with respect to the EMS or SFI may come from a variety of sources:

- A Phone call
- By E-mail
- From a submitted Certification Public Comments Form which is accessed by the public via the Certification Initiatives web page.

All client and public complaints or potential issues are to be recorded and resolved.

Examples that would require recording and follow up action plans: Agency or public bring forward an issue concerning SAR, a client brings forward an issue to do with the block or road design, complaint about road issue such as siltation, etc.

Note: Enquiries/complaints/issues that arise through FN consultation, FSP referrals, Safety issues, and business contractual issues will be managed through different processes and do not need to be recorded within LRM ITS.

Business Area Staff will:

1. Document all relevant EMS/SFI external enquiries/complaints or potential issues by recording the information within LRM ITS Client/Public Issues with appropriate action plan(s):

- Date
- Person receiving the inquiry or complaint (issue owner)
- Area of the enquiry/complaint or potential issue (EMS- i.e. ERP, EFP's, Manual etc. or SFI i.e. SFMP etc.)
- Functional Area (Harvesting, Silv. Etc.) & Activity (Road Constr., harvesting etc.)
- Source of the enquiry/ complaint or potential issue (name & phone number)
- Description of the complaint or potential issue. (Issue Description)
- Comments/recommendations

2. Create action plan(s) as appropriate:
    - record any actions/responses taken immediately and
    - record/track any actions that require follow up

3. If the enquiry/complaint or potential issue is outside the expertise of the BCTS Staff, they will forward it to a Manager, Supervisor or the CSO for resolution if necessary.

4. The CSO will bring enquiries and or complaints forward to the Business Area SFMS (EMS/SFI/Safety) Committee that may require further research, follow-up and/or resolution.

5. The CSO will forward any enquiry/complaint or potential issue to the Provincial Certification Officer as appropriate for consideration and resolution.

6. The CSO will roll up the data base prior to the annual (fiscal) BA Management Review for consideration as part of that review.

ISO 14001-Reference

Clause 4.4.3 Communication

With regard to its environmental aspects and environmental management system, the organization shall establish, implement and maintain a procedure(s) for

a) internal communication among the various levels and functions of the organization;

b) receiving, documenting and responding to relevant communication from external interested parties.

The organization shall decide whether to communicate externally about its significant environmental aspects, and shall document its decision. If the decision is to communicate, the organization shall establish and implement a method(s) for this external communication

HAIDA GWAII NATURAL RESOURCE DISTRICT
DISTRICT MANAGER POLICY
Subject: Management of Visual Quality Objectives

SECTION I - Stewardship Policy for Managing Visual Resources on Haida Gwaii

SCOPE:

The following guiding principles will be used by the statutory decision makers on Haida Gwaii in operational plan determinations with respect to the management of visual quality objectives. By setting out these expectations, it is anticipated that prescribing foresters and reviewing foresters will be able to prepare and review prescriptions and/or plans that follow the intent of currently established Visual Quality Objectives.

PURPOSE:

The purpose of this policy is to communicate the guiding principles that the district manager will use to structure his determination processes when making a statutory decisions regarding Visual Quality Objectives in the Haida Gwaii Natural Resource District.

PRINCIPLES:

This guidance is meant to describe the requirements for visual resource management on Haida Gwaii, and is based on current scientific literature. It is expected that individual prescriptions will include site specific strategies designed to achieve these visual objectives and reflect local site and stand conditions.

Guiding Principles for Management of Visual Quality:

1) Along with the definitions provided under section 1.1 of the FPPR for the categories of visually altered forest landscapes, ***percent alteration limits*** for clear-cutting should be used to interpret each category. Implicit with the scale of alteration limits is the requirement for following visual design principles.

    (a) Preservation = 0%

    (b) Retention = 0% - 1.5%

    (c) Partial Retention = 1.6% - 7%

    (d) Modification = 7.1% - 18%

    (e) Maximum Modification = 18.1% - 30%

These percent alteration numbers must be applied to a readily distinguishable landform. These percentages were not derived for application against entire landscape scenes composed of multiple landforms. These percentages apply to the visible green portion of the landscape in perspective view. Major areas of exposed rock, ice patches, and non-forested alpine are excluded from the calculation.

2) ***Landform*** can be defined as a distinct topographic feature on the surface of the earth that is three dimensional in form i.e. has a length, height and width. For purposes of effectiveness evaluation, only mid-ground landforms (1-8 km) are assessed. Typically, harvesting in the background (greater than 8 km) is not readily distinguishable. Harvesting in the foreground (less than 1 km) is often best evaluated by ocular assessment of visual design quality or apparency as opposed to landform scale.

3) Partial Cut alterations are typically not reliably predicted by scale of landform alteration. One procedure for evaluating partial cut alterations is provided in the FREP Protocol for Visual Quality Effectiveness Evaluation. It provides a "visual equivalent to clearcut" percent alteration number based on volume removed and residual tree height. Alternatively, an ocular based evaluation of the partial cut harvesting consistency to VQO definition can be simply made.

SECTION II - Guidelines to Assist Prescribing Foresters in the Development of Management Strategies Which Will Achieve the Desired Outcomes for Visual Resources on Haida Gwaii

Significant Public Viewpoint

This term is used extensively in the Forest Planning and Practices Regulation (FPPR) Section 1.1, but is not defined. For the purpose of providing clarity: "A significant public viewpoint means: a place or location on the water or land that is accessible to the public, provides a viewing opportunity and has relevance to the landscape being assessed".

Examples of significant public viewpoints that might be considered when completing a visual impact assessment would include (but are not limited to): a stretch of highway or waterway leading toward a harvest unit, a highway rest stop, a recreation site or park, marine anchorage, a group of homes, a settlement/community/town or a tourist‐related commercial enterprise. It is important to review the location(s) offering the best or most direct view of the alteration. This may not necessarily be a viewpoint that provides a stationary or stopping location.

Landform vs. Landscape

The term *landform* was used under the Forest Practices Code to define the unit against which to measure and evaluate forest alterations. The word *landscape* appears in the Categories of Alteration definitions in the Forest Planning and Practices Regulation Section 1.1. All Ministry of Forests, Lands and Natural Resource Operations research is based on landform, therefore landform is the most appropriate unit against which to measure VQO accomplishment. Landform may be defined as a distinct topographic feature on the surface of the earth that is three dimensional in form i.e. has a length, height and width. Landforms are generally defined by ridgelines, shorelines and skylines. Recognized examples include (but are not limited to); hills, mountains and ridges. Landforms often occur in different distance zones (foreground, midground and background). These distance zones are usually distinct landforms because they are usually separated by incised valleys, creek draws or topographic breaks.

Measuring perspective scale of alteration for the purposes of visual impact assessments is done relative to individual landforms as opposed to broader landscape scenes or panoramic views composed of multiple landforms.

Visual Landscape Design

Implicit with meeting the legal definitions of VQO and scale of landform alteration guidelines is the requirement of carrying out and following the principles of visual landscape design. Visual design is the process which develops physical options to meet the VQO. It is a creative process that involves working with the visual patterns and forces of nature to guide changes to the landscape in ways that meet the needs of society, both aesthetically and economically. Design is the development of on-the-ground strategies to meeting VQOs and the integration of these solutions into operational plans. The process is outlined in the Ministry's Visual Landscape Design Training Manual, 1994.

Size and scale

Reference to scale serves two purposes in visual resource management. They provide a tool for practitioners to estimate the levels of alteration on a landform (in perspective view) and provide the means by which to model current management in Timber Supply Analyses (planimetric view). While the intent in FRPA is to focus on the qualitative definitions, scale cannot be ignored, as it is a strong predictor of both public preference and visual quality.

The Visual Impact Assessment Guidebook, (Second Edition January 2001) table 3, contains numerical ranges by Visual Quality Class that have been used operationally since 1996 to guide the scale of alteration for clear-cutting on landforms. The numbers in the Guidebook were derived through multiple research projects. In the absence of direct guidance in FPPR 1.1, the percent landform alteration ranges from the guidebook (see below) describe appropriate levels of scale by VQO.

Table 1. Comparison of Scale of Alteration (as per FPPR 1.1) and Percent Alteration Limits as per the VIA Guidebook

VQO	Scale	Percent Alteration [a, b]
Preservation	Very small	0%
Retention	Small	0% - 1.5%
Partial Retention	Medium	1.6% - 7%
Modification	Large	7.1% - 18%
Maximum Modification	Very Large	18.1% – 30%

[a] *Percent alteration numbers must be applied to a readily distinguishable landform. These percentages were not derived for application against entire landscape scenes.*

[b] *These percentages apply to clear-cut harvesting in contrast to the visible green portion of the landscape in perspective view. Major areas of rock and ice patches are excluded from the calculation.*

Relying on numerical ranges in the absence of legally established FPPR definitions could also result in an incomplete interpretation of Visual Quality Objectives. Evaluation of Visual Quality Objectives considers the scale of the landform, the percent alteration, quality of the visual design, ***and*** the consistency to the legal definition.

Professional Reliance

Some level of visual impact assessment may be required in order for a professional to know that the results and strategies prescribed in the FSP will be consistent with visual quality objectives for an area. As outlined in the Visual Impact Assessment (VIA) guidebook, released previously as part of the Forest Practices Code, the level and detail of the assessment that would be reasonable will depend on a number of factors, e.g. visual sensitivity, numbers of people and their level of concern, viewing opportunities and established VQO.

It may be prudent for the professional to carry out a full VIA in those situations where the following conditions are present: restrictive VQO, highly sensitive landscape, areas of local concern and large number of viewers. A full VIA of harvest block(s) could include digital terrain modelling, photographic panoramas and TRIM contour mapping with viewpoints identified, scale of landform alteration calculation, visual force analysis, and an assessment of design qualities from all significant public viewpoints.

Though only a portion of the aforementioned information reflects legal requirements under the *Forest & Range Practices Act*, this policy will be used to frame my statutory and non-statutory expectations regarding future determinations related to Visual Quality Objectives in the Haida Gwaii Natural Resource District. It is also my expectation that forest development under the current Forest Stewardship Plan be consistent with the spirit and intent of this new direction.

April 17, 2013

Leonard Munt, District Manager Date
Haida Gwaii Natural Resource District

LEGISLATIVE REFERENCES:

- Section 149(1)(b) of the *Forest and Range Practices Act*
- Section 150.3 of the *Forest and Range Practices Act*
- Section 1.1 of the *Forest Planning and Practices Regulation*
- Section 9.2 of the *Forest Planning and Practices Regulation*
- Section 22.1(2)(b)(i)(j) of the *Forest Planning and Practices Regulation*
- Section 23(2)(g) of the *Forest Planning and Practice Regulation*
- *Visual Impact Assessment Guidebook*, Second Edition

OTHER REFERENCES:

ABCFP. 2012. Non-Statutory Expectations Series – A Description of Non-Statutory Expectations and the Practice of Professional Forestry. 9pp. http://www.abcfp.ca/regulating_the_profession/documents/guideline_NSE_Description_of_Non-Statutory_Expectations_Professional_Forestry.pdf

ABCFP. 2012. Non-Statutory Expectations Series - Applying the Obligation to Weigh and Balance in Professional Service. 9pp. http://www.abcfp.ca/regulating_the_profession/documents/guideline_NSE_Guidance_Weigh_and_Balance.pdf

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B.C. Ministry of Forests, Forest Practices Branch. 2008. Protocol for Visual Quality Effectiveness Evaluations Procedures and Standards. Forest and Range Evaluation Program, B.C. Min. For. Range and B.C. Min. Env., Victoria, B.C. http://www.for.gov.bc.ca/ftp/hfp/external/!publish/frep/indicators/Indicators-VisualQuality-Protocol-Nov2008.pdf

Forest Practices Board 2010. VQO Assessment Considerations. 6pp. http://www.fpb.gov.bc.ca/ARC123_VQO_Asssessment_Considerations.aspx

Forest Practices Branch. 2009. Visual Resource Management Interpretations. 3pp. B.C. Ministry of Forest, Lands and Natural Resource Operations. http://www.fpb.gov.bc.ca/ARC123_FRPA_General_Bulletin_Visual_Resource_Mgmt_Interpretations.pdf

File: FOR-16240-00

April 10, 2013

To: All Licensees

Dear Licensees:

The intent of this letter is to bring to your attention local monitoring results and to provide clarification on the expectations in the Statutory Decision Making process regarding the approval of operational planning strategies for visual quality management in the Haida Gwaii Natural Resource District.

As you know, the Province and the Council of the Haida Nation monitor a range of values under the *Forest and Range Practices Act* (FRPA) and the Haida Gwaii Land Use Objectives Order (HGLUOO) through the Forest & Range Evaluation Program (FREP) and other integrated monitoring initiatives. Over the last three field seasons, 12 Visual Quality Effectiveness Evaluations have been completed by the Haida Gwaii Integrated Stewardship Team.

A preliminary review of these results has identified that Visual Quality Objectives have only been fully met 58% of the time. This result coupled with unsolicited public feedback with respect to the visual quality of local development has emphasized a need to revisit and clarify the intent of the currently established Visual Quality Objectives (VQOs) for the Haida Gwaii Natural Resource District.

It is recognized that every landform and situation is different, but without consistent and measurable interpretation of the District VQOs, it is difficult to implement strategies that meet the intent of FRPA and the current ecosystem based management paradigm. The attached district policy is meant to help practitioners' understand how I interpret the currently established VQOs and how future applications for operational planning will be considered.

Ministry of Forests, Lands, and Natural Resource Operations

Haida Gwaii Natural Resource District

Location:
1229 Oceanview Drive
Queen Charlotte BC

Mailing Address:
Box 39
Queen Charlotte BC V0T 1S0

Tel: (250) 559-6200
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Section I identifies key principles for the management of visual quality which include unambiguous definitions of *percent alteration* and *landform*. Section II provides guidance to resource professionals that is consistent with Provincial Policy and current scientific literature.

Please consider this information in your future development plans as it forms an integral component to effectiveness evaluation, compliance inspection programs and timber supply analysis on Haida Gwaii. If you have any questions or if further clarification is needed, please contact Sean Muise, Stewardship Forester, at 250-559-6200 (Sean.Muise@gov.bc.ca).

Yours truly,

Leonard Munt
District Manager
Haida Gwaii Natural Resource District

Attachment: Stewardship Policy for Managing Visual Resources on Haida Gwaii

TECHNICAL MEMORANDUM

To: Tom Johnson
Woodlands Manager, Chinook Business Area
BC TIMBER SALES
46360 Airport Road
Chilliwack, B.C. V2P 1A5

From: Drew Brayshaw, Ph.D., P.Geo.

Date: August 25, 2017

RE: Hydrologic Effects of Forest Harvest in Wetland-predominant Watersheds, Graham Island, Haida Gwaii

Introduction

BC Timber Sales' Chinook Business Unit (BCTS) requested that Statlu Environmental Consulting Ltd. (Statlu) comment on the expected hydrologic effects of forest harvesting in watersheds that are partially to predominantly wetland. BCTS manages forest lands that include a significant component of wetlands in the Naikoon Landscape Unit on the northeast part of Graham Island on Haida Gwaii. Recent harvest plans from BCTS in the area near Pure Lake and Drizzle Lake, south of Masset and east of Masset Inlet, have prompted a request for clarification of the hydrologic effects of harvesting in these wetland-predominant watersheds. Specific requests were received for the proposed Blocks WAT001 and NAD001, but BCTS is interested in general clarification of the effects of harvesting in and near wetlands and wetland-dominant watersheds, not just with respect to these two proposed blocks.

Overview of Wetland Hydrology

Wetlands are ecosystems characterized by permanent or seasonal ground saturation. There are many types of wetlands, with varying degrees of associated tree species and forest cover; wetlands can vary from predominantly treed to treeless. Bogs are typically acidic wetlands dominated by sphagnum moss species, which produce peat as they decay, and which receive water dominantly

or exclusively from precipitation, while fens are basic wetlands which receive water from groundwater flow (NWWG, 1997). Bogs, fens and forests exist in a state of dynamic equilibrium. On the north coast of British Columbia, in regions such as the Hecate Lowland and Queen Charlotte Lowland where annual precipitation is high and topography is subdued, bogs are the most common wetland type. Forests or forested areas tends to occur on relatively well-drained sites such as ridges and floodplains, while sphagnum-dominated bogs occupy relatively poorly-drained topographic depressions and plateaus, and other wetland types occupy intermediate position. The natural frequency of soil disturbance can determine whether intermediate sites are bogs or forests. Windthrow that results in upturned root wads and that occurs more frequently than once in about three hundred years can maintain a forest by breaking up the accumulation of organic soil, while if the disturbance is less frequent, the increasing accumulation of organic matter retains water and suppresses forest productivity, making a bog (Banner et al, 2005).

Because bogs receive water inputs primarily from precipitation, their water is low in minerals (NWWG, 1997) and consequently, biologic productivity is low. This environment favours the dominance of sphagnum moss, which creates and maintains low-pH water containing dissolved organic acids and tannins. Although productivity is low, the total amount of carbon stored in organic matter in bogs is very high because of the accumulation of peat (NWWG, 1997). Other types of wetlands, including mires and fens, are intermediate between forests and bogs and have higher productivity but lower carbon storage than bogs. Over time, ecological succession can lead to undisturbed fens becoming bogs (NWWG, 1997; Huntley, 2009; Howie and van Meerveld, 2013).

The accumulation of peat within bogs and the low hydraulic conductivity of peat gives most bogs a slightly raised or domed shape. The water table is at or just below the surface. This enhances the contribution of precipitation to the bog's water and reduces other inputs (NWWG, 1997; Howie and van Meerveld, 2013). The combination of low topography, low hydraulic conductivity, and thick peat accumulation means that water flow through bogs is very slow, minimizing seasonal variation in downstream runoff.

Within any given watershed, the combination of topography, climate, elevation, precipitation, and the history of past disturbances therefore combine to create a mosaic of ecosystems which change over time. In the Naikoon Landscape Unit, most watersheds therefore exhibit this ecosystem mosaic, with patches of pure forest, patches of pure wetland, and patches intermediate or transitional between pure forest and pure wetland, with the proportions changing over time in

response to changes in climate (temperature, precipitation, and wind events) and disturbance history.

Potential Hydrologic Effects of Forest Harvesting

Forest harvesting can affect hydrology by changing canopy interception, evapotranspiration, and short- and long-wave radiation balance. Additionally, road construction for harvesting or log hauling can result in drainage diversion, downstream drainage concentration, and increased flow of groundwater to the surface. These effects can combine to increase peak flows and mean flows, change the timing of flows, and increase or decrease low flows. Additionally, erosion and sedimentation from harvesting can result in downstream aggradation or degradation as well as changes to water quality (Hudson and Horel, 2007; Campbell, 2008; Alila et al., 2009). The potential effects of forestry on hydrology are cumulative, non-linear, and reversible. They are cumulative because the effects can be combined: harvesting two 10-ha cutblocks is the same as harvesting one 20-ha cutblock. They are non-linear because the watershed response to logging varies with cumulative effect: below 20% to 30% of watershed area, there is minimal effect, while at levels of 50% or more of watershed area, very significant effects can occur (Campbell, 2008). Finally, they are reversible because as previously harvested cutblocks are replanted and regrow mature trees, the effects of past harvest diminish (Hudson and Horel, 2007; Floyd, 2012). Some watersheds are more sensitive to others to disturbance from forestry, depending on factors like aspect, gradient, climate, elevation, and proportion of non-forested land present.

The cumulative effects of forest harvest and forest recovery are described using the metric of effective clearcut area, or ECA. ECA accounts for hydrologic recovery by reducing the cumulative area that is effectively clearcut as hydrologic recovery occurs: a 10 ha cutblock that has recovered 50% of its hydrologic function relative to an unlogged stand can be considered as 5 ha (10 * 0.5) of effective clearcut. ECA levels can be computed for each cutblock and plantation stand within a watershed and summed to express ECA as a proportion of watershed area in order to evaluate cumulative impacts and to facilitate comparison between watersheds. Non-forestry disturbances of the forest canopy, such as windthrow, landslides and fires, can also be incorporated into ECA analysis.

In addition to ECA, evaluations of road density (km of road per km^2 of watershed area) are a necessary component of evaluating hydrologic risk to watersheds from cumulative forest development (Campbell, 2008).

General Hydrologic Effects of Harvesting in Wetland-Forest Complex Watersheds

A multiyear study of the effects of forest harvesting on, near, and in wetland-dominant watersheds was conducted near Prince Rupert between 1997 and 2005 (Banner et al, 2005). Important insights from this study were that, because bogs are dependent on precipitation inputs, rather than surface water or groundwater inputs, they are at least partially isolated from the effects of harvesting adjacent forests. Therefore, harvesting adjacent forested uplands can occur without directly affecting bogs. However, harvesting downslope of raised bogs can increase water outflow from the bog (resulting in the bog drying out) and extensive harvesting upslope of bogs can increase the water table in the bog by increasing groundwater flow to the bog, providing additional nutrients to the bog, thus shifting it from a bog to a more nutrient-rich fen. Additionally, forest roads can have effects on bogs if they divert or block inflow or outflow from the bog or increase sedimentation to the bog. (Banner et al. 2005; Huntley, 2009).

Other wetland types such as fens respond similarly to bogs with respect to forest harvesting, with the differences relating to the source of water for the wetland. Fens, for instance, which depend on groundwater flow for their water, are more sensitive to disturbances in the groundwater level or flow regime than are bogs, which receive their water predominantly from precipitation.

Because wetlands have slow groundwater speeds, thick organic deposits and little inorganic sediment present, they are inherently more resistant to hydrologic disturbance than are forests. Hence, a watershed that is half forest and half wetland, for instance, should experience a lower level of effects following disturbance than would a comparable watershed of the same size that is 100% forested. The wetland provides a reservoir that buffers downstream hydrologic impacts.

Specific Hydrologic Effects of Proposed BCTS Harvesting in Wetland-Predominant Watersheds of the Naikoon Landscape Unit

BCTS has committed through the Haida Gwaii Land Use Objectives Order (LUOO) to maintain watershed ECA levels at or below 30%. This LUOO applies to all of the proposed harvesting in the Naikoon Landscape Unit.

The forest stands that are presently planned for harvest (as Blocks WAT001 and NAD001) are cedar-leading units on high ground such as ridges between lower-lying wetland units. Given the proposed ECA levels, and the position of the proposed logging on higher ground above the bogs, I expect that the proposed harvesting, and other similar harvesting which may be proposed in future or in other similar areas, can occur while maintaining a low level of hydrologic hazard.

From discussions with BCTS staff I understand that planned roads will be constructed using overland construction (hence with no excavation of ditches) and a hydrologically appropriate density of adequately sized drainage structures. As long as road construction maintains an appropriately low road density (1 km of road per km^2 of watershed area or less) and sediment production from the road running surface is managed, hydrologic hazard from road construction should also remain low. Roads should be hydrologically deactivated through revegetation and by removal of drainage structures and installation of cross-ditches once harvesting and log hauling has been completed.

Conclusion

At the proposed harvest level and at the recommended road density, the total hydrologic hazard to and downstream of the wetlands within the watersheds where harvesting is planned will remain low. I expect that at the proposed level of harvest, detectable downstream impacts such as increased flooding or decreased low flows will not occur. If effects do occur, they will be limited to transitory increases in the level of the water table of the wetlands, which will revert to their pre-harvest levels as second growth plantations become established. Roads should be deactivated and allowed to revegetate after harvesting and yarding are completed.

Prepared by:
Statlu Environmental Consulting Ltd.

Reviewed by:

Drew Brayshaw, Ph.D.,P.Geo.
Senior Hydrologist and Geoscientist

Joanna Borzecki, B.Sc., GIT
Hydrologist and Geoscientist

Statlu prepared this memorandum in a manner consistent with current provincial standards and on par or better than the level of care normally exercised by Professional Geoscientists and Professional Agrologists currently practicing in the area under similar conditions and budgetary constraints. Statlu offers no other warranties, either expressed or implied.

References

Alila, Y, P Kuras, M Schnorbus, R Hudson 2009. Forests and floods; a new paradigm sheds light on age-old controversies. Water Resources Research 45, 24 pp.

Banner A, P LePage, J Moran, and A de Groot (eds), 2005. Pattern, process and productivity in hypermaritime forests of coastal British Columbia: a synthesis of 7-year results. BC Ministry of Forests, Forest Science Program, Special Report 10.

Campbell, D 2008. Sproat Lake Watershed Assessment Update. Unpublished technical report for BC Timber Sales by Ministry of Forests and Range Coast Forest Region. 36 pp.

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National Watersheds Working Group, 1997. The Canadian Wetland Classification System, Second Edition. B Warner and C Rubec (eds.) Wetlands Research Centre, University of Waterloo.

Chinook Business Area WATER DISRUPTION EMERGENCY RESPONSE PLAN FOR Community and Domestic Consumptive Use Watersheds

for BCTS Client Use

Scope and Purpose

This ERP applies to BCTS clients (Licensees, Permittees and Contractors) and their workers involved in forest practices within Chinook BA community and domestic consumptive watersheds. The purpose of this ERP is to prevent and respond to water disruption (from sedimentation, spills, or interrupted flows) resulting from BCTS-authorized activities.

Preparedness Roles and Responsibilities

- ☑ Know the names of and contact information for water users within the area of active operations. Ensure this information is on site and available to workers (*refer to attached contact list*).
- ☑ Know the field location of applicable points of diversion (PODs) and associated infrastructure as identified on project maps, site plans, and assessments.
- ☑ Be familiar with applicable prescriptions (for example: site plans, road designs, drainage plans, riparian management prescriptions, terrain stability and soil erosion assessments, harvest plans) when working in and around drainage areas connected to PODs including protocols for changing site conditions. Review during office and field pre-work discussions. Minimize soil disturbance.
- ☑ Ensure adequate sediment control tool kit (e.g. filter fabric, hay bales, rock for armoring etc.) is available on site and workers are aware of their roles and responsibilities for sediment abatement.
- ☑ Conduct periodic emergency response drill(s) and or test(s) related to disruption of water, based on employee knowledge and experience and seasonal and site conditions.
- ☑ Monitor activities, site and weather conditions, and water turbidity for possible impacts occurring to water quality and stream conditions associated with PODs.
- ☑ Ensure potentially-affected water users and BCTS are advised of planned water interruptions or potential sediment increases as a result of activities.
- ☑ Report to BCTS any amount of unexpected soil movement or any quantity of material spill or equipment fluid leaks within the watershed area.

Initial Response (Water Disruption Events)

1. Evaluate: Assess worker safety, hazards, & determine cause of disruption.
2. Take Control: If the disruption is a result of a forest practice, **STOP WORK.**
3. Take Action: Consider removal of POD intake and/or bypassing POD. Implement sediment abatement measures (sediment control kit).
4. Notification: Contact affected water user(s) and BCTS representatives as soon as possible.
5. Document details of the incident and response measures on CHK-009 *Incident Report Form and* submit to BCTS.
6. Work Co-operatively with BCTS, other agencies, and water users to investigate incidents and to implement measures to restore disrupted water supply quickly, thereby minimizing impacts on water users.

BCTS BC Timber Sales Chinook

SUSTAINABLE FORESTRY INITIATIVE

BCTS Chinook Business Area
GROUND BASED HARVESTING GUIDELINES

In the event of any discrepancy between these guidelines and contractual, legal and regulatory requirements related to forest practices or safety, the latter shall prevail.

This document provides guidelines for best management practices to be considered during ground based harvesting activities. Most statements are recommendations only unless required by legislation or the Environmental Management System.

SHUTDOWN STANDARDS

STOP WORK and contact your Supervisor and BCTS if any part of the plan is unclear, or if you believe the work cannot be completed safely or may cause negative environmental impacts.

Ground based operations should cease if the Wet Weather Shutdown thresholds are met

OR

BEFORE the following conditions develop:

- water is transporting visible siltation or sediment towards streams, Fisheries Sensitive Features (FSFs), lakes or Marine Sensitive Features (MSFs); or
- excessive rutting of 15cm or greater depth is occurring.

ADVISE YOUR SUPERVISOR AND BC TIMBER SALES WHEN SHUTDOWN OCCURS

SAFETY FIRST

1. **As per Section 26.2 of the Occupational Health & Safety (OH&S) Regulations, forestry operations must be planned and conducted in a manner that is safe for all workers.**
2. **Daily ground based harvesting operations must be planned to ensure that hazards specific to ground based equipment operations are communicated and a written plan to address or avoid such hazards are in place.**
3. **Slope Limitations for logging equipment, contained in Section 26.16 of the OH&S Regulations, must be adhered to during all ground based operations.**

KNOW YOUR PLAN

1. All areas that are authorized for harvest under a timber sale license must have a signed Site Plan prepared by a Registered Professional Forester. All harvesting operations should be conducted in accordance with the Site Plan. Where the plan cannot be carried out and the SP must be amended, it must be completed and approved by the TSM prior to the activity taking place.
2. If the ground based machine operator considers the weather and/or site conditions are such that work cannot be completed in compliance with these guidelines, **operations must stop**.
3. The person conducting ground based operations must have an up-to-date harvest plan map or site plan map, complete with stream classifications and authorized crossings.
4. The person conducting ground based operations must have had a thorough pre-work and must understand the plan and potential environmental impacts of their work.
5. Stop work in the immediate area when a stream or other feature not identified on the map is encountered. Notify your supervisor and BC Timber Sales.

GROUND-BASED HARVESTING OPERATIONS

1. Employ knowledgeable, trained and experienced ground based equipment operators.
2. If a stream is **not visible** to a machine operator, the operator should ask their supervisor to flag the stream.
3. Do not remove or disturb stable natural material in a stream or embedded in a stream bank, or a root system that contributes to stream bank stability and fish habitat, during harvesting or stream cleaning.
4. Ground based operating areas should be confined to benches or flat terrain wherever possible to avoid sidecutting and sidecasting. Sections of discontinuous sidecutting may on occasion be used to join benches. **Always apply the manufacturer's standards for capacity and limitations.**
5. Excessive rutting (i.e. 15cm deep, 2 meters long and 30cm wide or greater) is to be avoided **where practicable**.
6. **Brush matting and/or puncheon should be used when working on high sensitivity ground (wet and/or fine textured soil) susceptible to rutting and/or compaction. Brush matted/punched trails should be left plantable.**
7. Stumping, cutting, or filling should be avoided to mitigate site disturbance on or beside the trail.
8. Trail cuts should not exceed 30 cm **where practicable** and should be re-sloped after use to manage the overall soil disturbance within the block. (soil disturbance should not exceed the limits as prescribed within the SP). Mitigating site impact has a higher priority than a steady alignment and grade.
9. Reduce the number of passes on trails (1-3 passes) by planning refueling, maintenance and loading operations.
10. Natural drainages should be maintained with cross drains where:
    - ♠ channelization down a length of trail could occur in heavy rains,
    - ♠ water will accumulate in a low spot.
11. A person engaging in ground-based operations:
    - ♠ must not deposit soil or slash in a stream, wetland, lake or fisheries-sensitive zone, or in a position where the soil or slash can be transported by water into any of these watercourses,
    - ♠ must maintain natural surface drainage patterns,
    - ♠ must mitigate subsurface seepage water being intercepted by trails and diverted into areas that would not naturally have received the water.

STREAMS AND STREAM CROSSINGS

1. Maintaining water quality is the primary concern.
2. Do not fuel or service machinery within a Riparian Management Area of a stream or wetland, or within 30m of a lakeshore.
3. Maintain the prescribed machine free zones (MFZ) identified in the Site Plan and as shown on the operational map(s). Where MFZ's have not been identified, the machine operator should maintain a minimum 5 meter MFZ (16 feet) distance from any stream bank, floodplain, or wetland.
4. **Proposed temporary stream crossings are identified in the site plan and are shown on the operational map(s). The use of an alternate crossing (s) will require an amendment to the plan by a Registered Professional Forester.**
5. Locate, construct and use a temporary stream crossing in a manner that:
    - ♠ protects the stream channel and stream bank, immediately above and below the stream crossing, and mitigates disturbance to the stream channel and stream bank at the crossing;
    - ♠ mitigates damage to understory vegetation;
    - ♠ does not disturb stable natural material that is in a stream or embedded in a stream bank; and
    - ♠ maintains natural drainage patterns and mitigates surface soil erosion, soil displacement, and sedimentation.
    - ♠ Minimizes the number of temporary crossing locations.
    - ♠ Minimize the number of passes on a temporary crossing location
6. Any material used to construct a temporary stream crossing must be removed upon completion of harvesting.

TRAIL REHABILITATION

A PERSON REHABILITATING A TRAIL NEEDS TO DOTHE FOLLOWING:

- ♠ remove brush mats or puncheon,
- ♠ fluff up and de-compact the trail,
- ♠ re-establish natural surface drainage; place some woody debris randomly over exposed mineral soil, leaving the trail so that it can be revegetated. A mix of organic material and mineral soil is preferred.

TECHNICAL MEMORANDUM

To: BC Timber Sales, Strait of Georgia and Chinook Business Areas
From: Drew Brayshaw, Ph. D., P. Geo.

Date: March 15, 2018

RE: Wet Weather Shutdown Criteria for Worker Safety – Operational Guidelines

This document outlines the recommended procedure to determine whether or not forestry operations should be shut down due to adverse weather conditions which present a risk to workers and equipment. It is intended to be used by BC Timber Sales' staff, licensees, and contractors to help determine safety shutdown procedures for field workers. It is only intended to protect worker safety with respect to landslides, debris flows, and other hazardous geotechnical phenomena and was not designed to address, for example, environmental shutdown criteria to protect water quality or fish habitat.

When to Use the Shutdown Criteria

Shutdown criteria apply when work sites or access routes are located on, downslope of, or are exposed to landslide-prone terrain, as defined in the guidance document. Workers are exposed to terrain stability hazards not only at the work site but also along access routes that reach the work site. Accordingly shutdown criteria apply not only to work sites such as cutblocks and roads under construction, but also roads used for access to and from these work sites, except for public highways. Shutdown criteria apply to all BCTS staff and contractors and provide guidance to licensees.

Workers should check forecasts and predicted/reported rainfall totals before travelling to the work site. Environment Canada provides forecasts and measurements of rainfall of varying accuracy for all of the areas of the TSG and TCH business areas. These forecasts are available online, are broadcast, and are updated several times per day. Where forecasts and measurements do not accurately reflect conditions at the work site, they typically underestimate, rather than overestimate, actual rainfall experienced on site. If predicted or recorded rainfall for the day from the Environment Canada weather forecast exceeds the listed shutdown thresholds, it is likely

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unsafe to travel to the work site, and there is no need to expose workers to additional hazards by requiring them to check the rain gauge at the work site. If predicted rainfall for the day, for example, is 80 mm, and the shutdown criteria for the job site is 50 mm/24 hr, it is unnecessary to check an on-site rain gauge: assume that it is not safe to work that day.

How to Use These Shutdown Criteria

The wet weather shutdown criteria are based on a zone model, with five zones identified based on climate criteria, and a sixth zone based on *identified unstable conditions*. The five climatic zones are based on mean annual precipitation (Table 1). The sixth zone recognizes the presence of unstable conditions warranting special measures and extra caution to protect worker safety which may be present in any climatic zone. It can and will be identified by BCTS staff before work takes place. Determination of the applicable climatic zone will also be made by BCTS staff or planning and development contractors before work begins. The applicable zone and associated shutdown thresholds can be included within the project particulars (e.g. Contract, License etc.).

Refer to Table 1 to determine shutdown criteria for 12-, 24-, 48- and 72-hour time periods for the appropriate zone. Temperature and precipitation will be measured at the job site using a rain gauge and thermometer. Total rainfall measured by the gauge and air temperature are to be recorded at the start and end of every work shift (at minimum, twice a day).

Table 1: Shutdown Criteria by Zone within the TSG and TCH Business Areas

Zone	Zone (annual precipitation)	Time Period			
		At start of or before end of shift (12-hr)	24-hr	48-hr	72-hr
1	Very wet (3000 mm to 4000 mm or more)	60 mm	100 mm	150 mm	200 mm
2	Wet (2500 mm to 3000 mm)	50 mm	80 mm	120 mm	160 mm
3	Average (1500 mm to 2500 mm)	40 mm	70 mm	100 mm	130 mm
4	Dry (750 mm to 1500 mm)	30 mm	50 mm	80 mm	110 mm
5	Very dry (less than 750 mm)	20 mm	30 mm	50 mm	80 mm
6	Identified Unstable Conditions	10 mm	20 mm	30 mm	40 mm

Table 1 assumes that rainfall will be measured in the gauge located at the work site. Rain gauges are usually located near where workers enter the job site. It is expected that in some forestry settings, there may be a considerable elevation range between the elevation of the rainfall gauge and the highest elevation at which work is taking place, and that more rainfall may occur at higher elevations than is measured at the gauge. The shutdown criteria incorporate this assumption.

Modifiers to Shutdown Criteria

Numerous factors other than direct rainfall can contribute to slope instability, including snow melt (either from rain-on-snow precipitation, high temperatures, or both), high winds, blocked drainage structures or diverted drainage upslope, long-term antecedent precipitation, earthquakes, and other less probable events. To account for these factors without requiring multiple difficult and potentially inaccurate calculations, a simpler system is used. Potential additional risk factors beyond simple rainfall totals are listed below. The presence of one or more of these additional risk factors cause the zone number used to determine the shutdown criteria to change. Each additional risk factor present increases the zone number by one. For instance, a project is located in Zone 2 which has a 24 hr. threshold of 80 mm. A storm brings 60 mm of rainfall in 24 hours, accompanied by both warm temperatures with snow present (one factor) and rain falling on snow (one factor). Zone 2 is therefore shifted to Zone 4 (base of 2, plus two for additional risk factors). The measured 60 mm of rainfall is greater than the 24-hr shutdown value of 50 mm in Zone 4, so work shuts down.

The presence of, and number of, additional risk factors should be noted and recorded at the same time that precipitation and temperature are recorded at the gauge. In cases where weather conditions change quickly, such as if intense precipitation falls, or if recorded values are close to a shutdown threshold, it may be necessary to check the rainfall gauge more than twice a day to determine if unsafe conditions are occurring.

The additional risk factors beyond rainfall totals are:

- Rain falling on snow at the job site;
- Warm temperatures (greater than 5 °C at the gauge) with snow present on the ground at the job site;

For these two conditions, any snow, even small amounts of patchy snow, at the job site is counted as snow. Small amounts of snow at a job site indicate larger amounts of snow upslope.

- High winds (windspeed reported or predicted >60 km/h, or visibly breaking branches or causing windthrow) at job site;
- Very wet conditions (defined as any period of 21 days or longer with precipitation recorded on every day). Periods longer than 21 days do not increase the very wet conditions hazard further;
- Visibly high stream flow (ditches full and overflowing onto roads, culverts discharging at capacity, culverts blocked by debris flow and diverting water to adjacent streams, floodwater present on adjacent highways, etc.)
- Earthquakes of magnitude 5.0 or greater within last week, reported with epicenter within 50 km of job site.

If the presence of additional risk factors increases the zone beyond Zone 6, i.e. beyond the *identified unstable conditions* zone, work should shut down regardless of whether or not the rainfall shutdown value has been exceeded, and should remain shut down until the additional risk factors are no longer present or until a qualified professional approves a return to work.

Other Shutdown Criteria

In addition to shutdowns resulting from the exceedance of rainfall criteria, workers and supervisors should remain aware of other indicators of geotechnical instability. These can include, but are not limited to:

- Pulses of sediment-laden water in streams, especially in gullies,
- Streams suddenly drying up when conditions are otherwise wet,
- Constant small rock falls,
- Cutslope slumps that block ditches and/or roads,
- Tension cracks appearing in road fills or slopes,
- Fresh avalanches, landslides or debris flows or their deposits observed that were not present during the last shift,
- Anchor stumps pulling out of wet ground during cable yarding,
- Diverted streams with flow appearing in new stream courses that were previously dry.

If any of these indicators of instability are observed, work should shut down until a qualified professional can be brought in to determine if it is safe for work to proceed.

Resumption of Work Following Shut Down

Once shutdown criteria have been exceeded, work should remain shut down for at least 24 hours after the hazardous conditions end. In the case of 48-hour or 72-hour rainfall criteria being exceeded, work should remain shut down for at least two days (48 hours) after shutdown criteria have been exceeded. If workers and supervisors believe it is safe for work to resume before the recommended 24- or 48-hour period is over, they should consult a qualified professional to confirm and document this before resuming work.

Yours truly

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Chinook Invasive Plant BMP

BCTS Chinook Invasive Plant Best Management Practice (BMP)

Contents

BCTS Chinook Invasive Plant Best Management Practice (BMP)

Record of BMP Update(s):

1. May 16, 2019: updated Haida Gwaii plant list. Inclusion of BMP review and update process.
2. January 30, 2019: addition of Haida Gwaii IPMA Plant List (Appendix D)
3. November 9, 2018: formatting changes and changing Cengea to Land Resource Manager (LRM)
4. November 9, 2016:
    - added the requirement for machine washing prior to movement of the equipment to a new area of activity. This was driven by requests by stakeholder groups prior to the submission of replacement FSPs in 2017.
    - addition of the Powell River field team
    - deletes references to the Forest Stewardship Council (FSC).
    - align this BMP with the FSP 'Measure' for controlling the introduction spread of invasive plants.
5. February 24, 2104: update ISCBC name and requirement for certification that seed mixes and straw bales are weed free. Provide updated link to Forestry Best Practices document

Frequency of review and update of this BMP:

This BMP and the attached IPMA Plant Lists will be reviewed for updates annually.

Operating areas covered by the Chinook Invasive Plant BMP

1. BCTS Operations in the Chilliwack, Squamish, Powell River, and Haida Gwaii Forest Districts
2. BCTS Operations in TFL's within the 4 districts noted above
3. Any other land tenure in which BCTS operates as a forest land management partner with 3rd party entities; e.g., Community Forests, First Nation Woodland Licences, etc.

Reference sources for BMP development

This BMP reflects the best science and information to date related to controlling the spread and/or introduction of invasive plants. Knowledge used to guide the development of this BMP is based upon information obtained from the Invasive Species Council of BC (ISCBC); "Best Practices for Preventing the Spread of Invasive Plants during Management Activities, Nov 2013)" and from the Ministry of Forests, Lands and Natural Resource Operation's Invasive Plant program (MFLNRO).

Legislative and policy requirements concerning Invasive Plants

BCTS Chinook's requirement to manage for invasive plants is driven by two impetuses:

1. Forest and Ranges Practices Act and related Invasive Plant Regulation
2. 3rd party certifications via the Sustainable Forestry Initiative

Primary Objective of Invasive Plant BMP

1. To stop the spread and/or introduction of Invasive Plants to meet legal and 3rd party certification obligations
2. To educate the staff and Licensees, Permittees, and Contractor about how to stop the introduction and/or spread of invasive plants

Limitations to the control of the introduction and/or spread of Invasive Plants

Due to the extent of existing populations of invasive plants within BCTS' operating areas it is not possible or prudent to attempt to manage for the introduction and spread of all invasive plants on a species by species basis. Though the guidance of expert advice available on the ISCBC web site and through consultation with invasive plant experts in MFLNRO, BCTS Chinook is taking a 3-pronged approach:

1. That the control of the introduction and spread of invasive plants is best managed though the occupation of newly disturbed soils with approved agronomical suitable grass seed 'sodgrass' mixture(s);
2. That as experience with invasive plants and their autecology continues to increase, that grass seeding efforts will focus solely on protecting Sensitive Sites[1]. These Sensitive Sites equate to:
    - Riparian areas, lake, wetlands, bogs
    - Wildlife habitat areas (WHAs)
    - Endangered ecosystems; e.g., Garry oak complexes
    - Ungulate winter ranges
    - Areas of FN spiritual use/plant collection
    - Culturally significant areas; parks and ecological reserves
    - Other areas as defined by 'experts' and/or stakeholders
3. That equipment must be washed to remove visible plant material, and, soil/dirt prior to entry into the activity site where disturbed soil has been, or will be, created.
    a. Washing can be conducted at any vehicle washing facility. This BMP will not require the individual to conduct water collection at the washing facility.
    b. Washing cannot occur in the field unless water containment activities are present and contaminated ('dirty') water is removed from the site

Foundation of the Chinook BA's Invasive Plant BMP

Noting the extensive range and diversity of invasive plants in Chinook's operating areas, the Chinook BA is focusing on eliminating the potential for IP spread/introduction via machine washing and grass seeding disturbed soils. Legally the Chinook BA is only required to manage for invasive plants as identified in the Forest and Range Practices Act (FRPA) Invasive Plant Regulation but, through the removal of potential seed bed via grass seeding, and, by washing equipment prior to entering work areas it is felt that these methods will limit the introduction and/or spread all invasive plants.

It is also understood that very few invasive plants can thrive under a closed canopy situation where light is limited therefore there is no need to grass seed any portions of a forest operations that will see a closed canopy established either naturally or artificially post disturbance unless there is an adjacent IP that can thrive in closed canopy conditions.

Steps to mitigating the introduction and spread of Invasive Plants

1. When designing activities that will create disturbed soils staff and/or contractors will ensure that measures are outlined in any professional plans that specify how to stop the spread and/or introduction of IPs. This will include;

a) Noting the location, species, and methods of reproduction for the plant in the vicinity of proposed activities resulting in disturbed soils
b) Outlining steps that limits the introduction and/or spread of IPs including;
    - the timing of grass seed application(s)
    - the need, if any, for washing of equipment
    - direction not to store of equipment in areas of infestation
    - no use of material from infested soils
    - maintain records of grass seeding location and timing

2. Timing of Grass Seeding:
    a) Ensure that grass seed is applied during a time of the season where germination has the best probability of success;
    b) Inspect for grass seeding germination success in early spring of the following year to ensure a viable grass seed source prior to the spring flush of plants in the area.
    c) Where germination levels cover less than 80% of the treatment area, one additional grass seeding will occur.
3. Newly disturbed soils in the following areas will not be grass seeded if:
    a) soils that will be occupied by seedlings as part of the Net Area to be Reforested (NAR), or,
    b) there are no known IPs within 500m of the disturbed soils
4. Grass seed **must be** applied where:
    a) Disturbed soils are created due to forest harvesting or road construction/maintenance activities subject to "3" above
    b) Where disturbed soil has been created within 20 m of the high water mark of any stream, wetland or lake regardless of "3" above
    c) The forest harvesting or road construction/maintenance activity is within RMA of adjacent water bodies that can transport reproductive plant material downstream to other locales
5. Types of acceptable grass seed
    a. The minimum standard for grass seed is Common Number 1 Forage Mixture specifications as defined by the Canada Seeds Act.
    b. In respect to(a.) above the Grass Seed must be ecologically suitable or compatible to the sites being seeded
    c. The grass seed mixture can not contain **any** of the banned seed as defined in Appendix B
    d. The grass seed mixture should be a 'sod grass' mixture.

Example grass seeding scenarios

1. A TSL Holder **is building a new road** into a proposed block location off of an existing mainline with established invasive plants along the mainline network and his tenure requires that he maintain the existing road:
    a. The Licensee **must grass seed** where the new construction has occurred
    b. The Licensee **does not have to grass seed** along the mainline if none of the existing invasive plants pose a risk to a Sensitive Site based upon their autecology. In this case, even though grading, etc can create new disturbed soil (seed beds) because the invasive plants have already been established along the mainline in essence the activities are not introducing or spreading the invasive plants, rather, there may simple be a redistribution of existing IPs along an already infested corridor.
2. A TSL Holder is using an existing mainline to access his timber. Under his permit/road tenure he is required to maintain the road including grading, culvert maintenance, etc, **but there will be no new construction activities**. There are established invasive plants along the mainline but none that pose a risk to a Sensitive Site based upon their autecology. In this case, even though grading, etc can create new disturbed soil (seed beds) because the invasive plants have already been established along the mainline in essence the activities are not introducing or spreading the invasive plants rather, there may simple be a redistribution of existing IPs along an already infested corridor.
3. A Contractor is replacing a bridge/culvert along a mainline and the mainline has established invasive plants along it. One of the invasive plants that has already become established along a portion of the mainline **poses a threat to riparian habitat** based upon its autecology. The contractor **must grass seed the new disturbed soil related to the bridge/culvert replacement project**.

Future direction of grass seeding

As individuals responsible for developing operational plans become more comfortable with the identification and related autecology of invasive plants, and with the identification of Sensitive Sites, grass seeding will only be required when there is the possibility that an activity will create a situation where invasive plants can spread into the Sensitive Site. Until such time, grass seeding will be required to be done as per the direction and clarifications above.

This BMP will be updated to reflect this future direction at such time as it is felt that the understanding of plant identification and autecology, and Sensitive Site identification, are sufficient to ensure that there is a minimal risk to the Sensitive Sites.

General rules concerning the type of grass seed mix to use

- Minimum grass seed standard in the Chinook BA is a seed that will meet or exceed '*Canada Common Number 1 Forage or better*' mixture specifications as defined by the Canada Seeds Acts; sod grass mixtures are mandatory in the Chinook BA

- When ordering seed be sure to specify if you are seeking a coastal seed mix or an interior seed mix, or in Haida Gwaii, the Haida Gwaii seed mix.
    - Example interior operating areas include:
        - Squamish Forest District: Pemberton and points north and east
        - Chilliwack Forest District: Spuzzum and points north and east

- use *sod grasses* for erosion control, restoration works, or to occupy disturbed soils (seed beds) within close proximity to established invasive plant populations.
- for erosion control & restoration planned in areas free of invasive plants then agronomic *bunchgrasses* allow for native vegetation to in-fill (between the bunches).
- The section below "Appropriate Seed Mix" lists the latest recommendation for seed mixes based upon biogeoclimatic zones (BEC). These mixtures can be more expensive and harder to come by but will provide an overall better ecological result and should be used where practicable.
- Below is also a listing of banned seed **that must be adhered to** due to their invasive qualities or other environmental risks they pose.
- Suggested seeding rate: 50 kg/ha
- Suggested fertilization rates: 250 kg/ha

Licensees, Permittees and Contractors obligations

1. Always grass seed as per examples above if creating disturbed soil unless otherwise directed in Site Plans or by ministry staff
2. Ensure that you are fully appraised of invasive plants within your proposed area of operations by your ministry representative during pre-works
3. Ensure that you are fully appraised of your grass seeding requirements by your ministry representative during pre-works
4. Follow the scenarios above to understand where grass seeding should occur if not discussed at your pre-work(s) and/or documented with Site Plans.
5. Ensure that your staff are fully aware of problematic invasive plants and any grass seeding requirements
6. Review Forestry Best Management Practices (BMP) T.I.P.S.
    a. http://www.for.gov.bc.ca/hra/Publications/invasive_plants/Forestry-BP-09-11-2013-WEB.pdf

For more detailed information concerning Invasive Plant management review the Chinook Invasive Plant Process map and related SOP

- Internal staff: https://www.for.gov.bc.ca/bcts/areas/TCH/TCH_ems-internal.htm
- External contractors and LPC's: https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification/ems-sfm

Chinook BA IP BMP effectiveness monitoring

Roads:

Integral to the road maintenance activities is the requirement to monitor to ensure that any grass-seeding that has occurred has been successful. Where grass seeding has failed additional grass seeding will take place. Any additional spread of IP's will be noted and reported through the "Report-A-Weed" tool on the IAPP web site. The requirement to monitor grass seeding or follow-up treatments is scheduled in LRM.

Silviculture:

Silviculture activities play a limited role in stopping the spread of IPs. The primary objective is to ensure plantations reach "free-growing" status within legislated timelines and as the plantation grows IPs are outcompeted for sunlight and nutrients and their spread is halted. During surveys any new locations of IPs are recorded and reported through the "Report-A Weed" tool of the IAPP web site.

Where to go for additional information

1. The Invasive Plant Council of BC has great resources on their web site and it should be referred to on an ongoing basis.

2. The *Global Invasive Species* database is a new database that was created with the aim of increasing awareness about invasive alien species and to facilitate effective prevention and management activities. It is managed by the Invasive Species Specialist Group of the Species Survival Commission of the IUCN – World Conservation Union. http://www.issg.org/database/welcome/

Appendix A: Appropriate Seed Mixes by BEC

BEC Zone	Recommended Native Seed Mixture Constituents	Recommended Agronomic Seed Mixture Constituents
IDFww	➢ **Junegrass**[B] ***Koelaria macrantha*** ➢ **Rocky Mountain fescue**[B] ***Festucasaximontana*** ➢ **Idaho fescue**[B] ***Festuca idahoensis ssp. idahoensis***	➢ **Annual rye**[B] ***Loliummultiflorum*** ➢ **Perennial rye**[B] ***Loliumperenne*** ➢ **Hard fescue**[B] ***Festuca trachyphylla*** ➢ Red fescue[S] *Festuca rubra*
CDFmm *(Garry Oak Ecosystems only)*	➢ **Roemer's fescue**[B] ***Festuca idahoensis ssp. roemeri*** ➢ **California oatgrass**[B] ***Danthonia californica*** ➢ **California brome**[B] ***Bromuscarinatus*** ➢ **Blue wildrye**[B] ***Elymusglaucus*** - No legumes to be included	N/A
CDFmm *(excluding Garry Oak Ecosystems)*	➢ **California brome**[B] ***Bromuscarinatus*** ➢ **Blue wildrye**[B] ***Elymusglaucus*** ➢ **Native red fescue**[S] ***Festuca rubra ssp. arenicola*** ➢ Canada bluegrass[S] *Poacompressa* ➢ Spike bentgrass[S] *Agrostisexarata* ➢ Hair bentgrass[B] *Agrostisscabra* ➢ Slimstem reedgrass[B] *Calamagrostis stricta* ➢ Tufted hairgrass[B] *Deschampsia cespitosa* ➢ Slender hairgrass[B] *Deschampsiaelongate*	➢ **Red fescue**[S] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ **Perennial rye**[B] ***Loliumperenne*** ➢ **Annual rye**[B] ***Loliummultiflorum*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
CWH "dry" (subzones: xm, ds, dm, ms, mm, ws)	➢ Same as immediately above, except: **1.** Replace **California brome** ***Bromus carinatus***[B] with **Alaska brome**[B] ***Bromus sitchensis*** **2.** On wet sites, **Alaska brome**[B] ***Bromus sitchensis*** is reduced to 25% by weight and Tufted hairgrass[B] *Deschampsia cespitosa* is increased to 10% by weight.	➢ **Red fescue**[S] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ **Perennial rye**[B] ***Loliumperenne*** ➢ **Annual rye**[B] ***Loliummultiflorum*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
CWH "wet" (subzones: wm, vm, wh, vh)	➢ Same as immediately above, except: 1. Replace **Native red fescue** ***Festuca rubra***[S] ***ssp. arenicola*** (e.g. 20%) with **Native red fescue** ***Festuca rubra***[S] ***ssp. pruinosa*** (e.g. 20%)	➢ **Red fescue**[S] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*
MH (subzones: mm, wh)	➢ **Native red fescue**[S] ***Festuca rubra ssp. pruinosa*** ➢ **Alaska brome**[B] ***Bromussitchensis*** ➢ **Blue wildrye**[B] ***Elymusglaucus*** ➢ **Tufted hairgrass**[B] ***Deschampsiacespitosa***	➢ **Red fescue**[S] ***Festucarubra*** ➢ **Red top**[S] ***Agrostisgigantea*** ➢ Alsike clover[L] *Trifolium hybridum* ➢ Red clover[L] *Trifolium pratense* ➢ White clover[L] *Trifolium repens*

[S] = sodgrass [B]= bunchgrass [L]= Legume

Appendix B: Grass seed species that should not be included in seed mixtures

☐ Alfalfa *(Medicago sativa)* ☐ Annual bluegrass (*Poa annua)* ☐ Barnyardgrass (*Echinochloa crusgalli)* ☐ Bermuda grass *(Cynodon dactylon)* ☐ Birdsfoot trefoil (*Lotus corniculatus)* ☐ California poppy (*Eschscholzia californica*) ☐ Cheatgrass or Downy brome (*Bromus tectorum*) ☐ Colonial bentgrass or Brown top *(Agrostis capillaris)* ☐ Couchgrass *(Elymus repens)* ☐ Creeping bentgrass *(Agrostis stolonifera)* ☐ Crested wheatgrass *(Agropyron cristatum)* ☐ Dames rocket *(Hesperis matronalis)* ☐ Dandelion *(Taraxacum officinale)* ☐ Fall rye *(Secale cereale)* ☐ False brome *(Brachypodium sylvaticum)* ☐ Flat pea *(Lathyrus sylvestris)* ☐ Foxglove (*Digitalis purpurea)* ☐ Foxtail barley *(Hordium jubatum)* ☐ Golden clover *(Trifolium aureum)* ☐ Green bristle grass *(Setaria viridis)* ☐ Green foxtail (*Setaria viridis*) ☐ Hairy vetch *(Vicia villosa)* ☐ Hedgehog dogtail (*Cynosurus echinatus)* ☐ Johnsongrass *(Sorghum halpense)*	• Jointed goatgrass *(Aegilops cylindrical)* • Kentucky bluegrass *(Poa pratensis)* • Lovegrass (*Eragrostis minor)* • Meadow foxtail *(Alopecurus pratensis)* • Perennial peavine *(Lathyrus latifolius)* • Purple nutsedge *(Cyperus rotundus)* • Quack grass (*Elymus repens)* • Queen Annes Lace *(Daucus carota)* • Reed canary grass (*Phalaris arundinacea*) • Scentless chamomile (*Matricaria maritima*) • Shasta daisy *(Leucanthemum x superbum)* • Silver hairgrass (*Aira caryophyllea)* • Smooth brome (*Bromus inermis*) • Soft brome (*Bromus hordeaceus)* • Subterraneum Clover *(Trifolium subterraneum)* • Sweet vernalgrass (*Anthoxanthum odoratum)* • Timothy (*Phleum pratense)* • Velvetgrass (*Holcus latatus*) • White sweetclover (*Melilotus alba)* • Wild oats (*Avena fatua*) • Wild proso millet (*Panicum miliaceum*) • Yellow hairgrass *(Aira praecox)* • Yellow nutsedge *(Cyperus esculentus)* • Yellow sweetclover *(M elilotus officinalis)*

**species listed above are either invasive, too persistent, attract wildlife (forage), a wildfire hazard or have been proven to provide minimal cover*

Appendix C: Road and road management activities

The spread of invasive plants and noxious weeds is a significant issue in projects that involve soil disturbance. Earth moving activities contribute to the spread of weeds through movement of seeds and propagules contained in transitory soils. Prevention is the least expensive and most effective way to halt the spread of such plants. The three pillars of prevention for earth moving projects include:

1. Education of workers about the importance of managing weeds on an ongoingbasis.

- Properly identify plants on the Northwest Invasive Plant Council's Haida Gwaii Invasive Plant Management Area Plant List- training, brochures etc.
- Ensure that they know where the high risk sites are (i.e. sites that that you aim toprotect)
- Ensure that they understand that storage areas, equipment yards and gravel pits are staging areas for IPs
- Actively use IAPP Application to record and monitor priority plants - it can be as simple as entering the species code, the area of the infestation (ha), location (UTM easting/northing and zone), density and distribution codes.
- Encourage staff to forward their ideas about measures that can be incorporated into future projects and strategic plans that prevent seeds or propagules from spreading and establishing new or bigger populations.

2. Prevention practices - minimizing the spread by controlling seed and/or plant part dispersalvectors:

- Where possible, avoid moving weed-infested gravel, rock and other fill materials to relatively weed free locations.
- Inspect and clean equipment of plant seed or propagules from clothing and/or equipment by dislodging and containing associated water, mud and dirt at designated cleaning stations or in the field (e.g. excavator operators can get most of the dirt from undercarriages, if they have been working among infestations, by spinning the machine 90 degrees, dropping a blade to elevate one track. He can then spin his track to remove the bulk of the material and use a narrow trenching shovel to remove the remainder. Repeat the process for the other track. Localize accumulations for ease of future treatment.)
- Keep roadside infestations away from road surfaces so that seeds and plant parts are not inadvertently transported by vehicles and equipment.
- Maintain soil, subgrade or surfacing material that is being moved during road construction as free of weeds as possible.
- Promptly re-vegetate disturbed areas adjacent to, or known to be at risk from priority IP establishment using an appropriate combination of scarification, grass seeding (native seed or a coastal agronomic seed that is a grade of Common #1 Forage Mixture or better), fertilizer, and/or mulch.

Appendix D

Haida Gwaii IPMA Plant List

Haida Gwaii IPMA Plant list, dated 2019. Source: http://nwipc.org/files

Red font indicates species has been identified within the IPMA

REDRR	High Priority	Lower Priority
Bighead knapweek	Common tansy	Bull thistle
Butterfly bush	Bohemian knotweed	Canada thistle
Cutleaf blackberry	Gorse*	Common burdock
Cypress spurge	Himalayan blackberry*	Common comfrey*
Diffuse knapweed	Himalayan knotweed	Oxeye daisy
English holly*	Japanese knotweed	Yellow toadflax
English ivy*	Scotch Broom*	Bladder campion
Garden yellow loosestrife*	Spotted hawkweed	Common bugloss
Himalayan balsam	Tansy ragwort*	Meadow goat's-beard
Marsh plume thistle	Yellow archangel	Mossy stone crop
Mountain bluet	Yellow flag iris	Scentless chamomile
Orange hawkweed	Dalmatian toadflax	
Spotted knapweed	Giant knotweed	
St. John's wort	Hoary Cress	
Yellow hawkweed	Sulphur cinquefoil	
Baby's-breath		
Bishop's Goutweed		
Black knapweed		
Blueweed		
Brown knapweed		
Chicory		
Field scabious		
Giant hogweed		
Greater knapweed		
Hoary alyssum		
Leafy spurge		
Meadow knapweed		
Mouse-eared hawkweed-**Prov. EDRR**		
Nodding thistle		
Plumeless thistle		
Purple loosestrife		
Russian knapweed		
Russian thistle		
Scotch thistle		
Whiplash hawkweed		
Wild carrot		
Wild chervil		
Wormwood		
Yellow floating heart		
*Garden yellow loosestrife sample to be collected 2019	*Gorse outside containment polygon around Sandspit	*Common comfrey near agriculture
*English holly & ivy outside of gardens	*Himalayan blackberry outside of VQC	
	*Scotch broom outside of containment	
	*Tansy Ragwort outside of containment	

Invasive Plants Management Process Standard Operating Procedure (DRAFT)

Updated: April 01, 2018 to change Cengea to LRM

PURPOSE

To define the various steps that are required to occur at different operational stages and identify the individuals who are responsible to undertake these steps to effectively manage for invasive plants (IP).

SCOPE

This Standard Operating Procedure (SOP) covers all aspects of forestry planning and block/road development, the signing and sealing of the applicable Site Plan, and implementation. It includes relevant business area staff, licensees, and contractors working for BCTS.

Important Information Sites

Invasive Alien Plant Program (IAPP): This website will be utilized to identify known occurrences of invasive plants: http://www.for.gov.bc.ca/HRA/Plants/application.htm.

Report-A-Weed Tool: Utilize this site to report new occurrences of invasive plants: http://www.for.gov.bc.ca/HRA/Plants/raw.htm

Note: this SOP is linked to the IP Process Design Map.

PROCEDURE	RESPONSIBILITY
Stage 1: Block Planning IP Management	
• Ensure blocks have passed initial economic viability test; i.e. ensure it meets *PP Done* test.	*Planning Forester* *Practices Forester*
• Confirm location of potential cut block and associated road networks	*Practices Forester*
• Check IAPP website to determine if any IP have been mapped within area of proposed activity. Record any findings of relevant IP.	*Practices Forester*

• Determine management options for each IP discovered in IAPP application:
  ○ Discuss with Planning Officer/Forester, Area Forester/Woodlands Supervisor and/or Woodlands Manager to see if there are any previous commitments related to species management;
• If no management recommendations available consult with Qualified Professional
  ○ Discuss Qualified Professional's recommendations with Area Forester/Woodlands Supervisor and Woodlands Manager
	Practices Forester
	Multiphase/TFL Forester
	Planning Forester
	Qualified Professional

• Review BA IP listing to determine potential IP species in area of proposed activity.
  ○ Make list of potential IP species that could be encountered
  ○ If uncertain about potential of IP in area of proposed activity have the area field reviewed by a Qualified Professional.
	Practices Forester
	Multiphase/TFL Forester
	Qualified Professional

• Update and/or review IP tracking form and attach to IP Block/Road Activity in Land Resource Manager (LRM) with other relevant documents and comments.	*Practices Forester* *Multiphase/TFL Forester*

PROCEDURE	RESPONSIBILITY
• Determine if block planning should proceed based upon management recommendations	*Practices Forester* *Multiphase/TFL Forester* *Planning Officer*

• During field review collect basic coarse ecological information necessary to assist with use of IAPP database
  ○ BEC, subzone, variant
  ○ Primary forest cover/landscape attributes
• If uncertain about potential IP prior to field visit engage Qualified Professional during field visit
• Detail any IP located in field and discuss management options with Area Forester/Woodlands Supervisor, Woodlands Manager and/or a Qualified Professional
• Update IAPP website with new information using Report-A-Weed tool:
  ○ UTM Zone
  ○ UTM Easting
  ○ UTM Northing
  ○ Species
  ○ Observation Date
  ○ Area (m^2)
  ○ Location
  ○ Name and e-mail address
  ○ If uncertain of identification, take a photo of the plant and state in comments that this has been done.
• Determine if proposed activity should occur based upon IP recommendations
	Practices Forester
	Multiphase/TFL Forester
	Qualified Professional

Stage 2: Block/Engineering Layout Pre-work (Multiphase/TFL)	
• Confirm location of proposed block or road	*Practices Forester* *Multiphase/TFL Forester* *Operations Technician*
• Summarize findings from block planning stage if applicable for handover to multiphase staff/contractor(s).	*Operations Technician*
• Prior to pre-work meeting, check IAPP website to determine if any new IP have been mapped within area of proposed activity prior to pre-work meeting ○ Record any findings of relevant IP	*Multiphase/TFL Forester* *Operations Technician*
• Update IP tracking form and attach to IP Block/Road Activity in LRM with other relevant documents and comments	*Operations Technician* *Multiphase/TFL Forester*
• Provide IP summary to contractor with any IP management recommendations including those from Qualified Professionals where available	*Operations Technician*

PROCEDURE	RESPONSIBILITY

• Discuss how contractors IP field investigations should be documented
  ○ In site plan under relevant R/S
  ○ As supporting document to Site Plan
  ○ In the SP declaration letter
  ○ Private filing with documentation available upon request
	Practices Forester

• Review capabilities of IAPP and Report-A-Weed websites with contractor; reports, maps, reference material, etc. • Provide copy of Chinook Invasive Plant Strategy BMP	*Operations Technician*
• Operations Tech to communicate with multiphase contractor during monthly progress meetings Re: any new IP found	*Operations Technician*
Stage 3: Field Work Quality Assurance (Inspection)	
• Select blocks for review based on risks to sensitive areas as defined in BMP	*Practices Forester*
• Review pre-work (Multiphase/TFL) notes and material, including IP management strategies	*Operations Technician* *Practices Forester*
• Check IAPP website utilizing to determine if any new IP have been mapped within area of proposed activity prior to pre-work meeting. Record any findings of relevant IP.	*Operations Technician* *Practices Forester*
• Review district IP reports to be familiar with potential IP to ease identification in field	*Operations Technician* *Practices Forester*
• Where uncertain about potential for IP in proposed area of activity, engage Qualified Professional to jointly conduct field review.	*Operations Technician* *Practices Forester* *Qualified Professional*
• Ensure previously identified IP are adequately managed • Record any new IP found in field and discuss management recommendations with multiphase Forester/Practices Forester • If uncertain about management recommendations seek input from Qualified Professional	*Operations Technician* *Practices Forester* *Qualified Professional*
• Update IP tracking form and attach to IP Block/Road Activity in LRM with other relevant documents and comments	*Operations Technician* *Practices Forester* *Multiphase/TFL Forester*

PROCEDURE	RESPONSIBILITY
Stage 4: Site Plan/Road Site Plan Quality Assurance	

• Site Plan prepared by multiphase or in-house
• Site Plans peer reviewed:
  • Review IAPP website to check for any new IP occurrences
  o If new IP found determine management requirements with QP input as deemed necessary
  o Refine SP/field work to incorporate new IP finding(s) if block still economically viable
  • BA staff should review Site Plan to ensure IP has been considered and management options minimize IP spread.
  • Review IP management options detailed in SP to ensure consistency with previous BA commitments
  • Review any submissions by qualified professional(s) to ensure that they have been properly incorporated into the Site Plan and block/road engineering
  • Seek corrections if inconsistencies or errors/omissions discovered
  • Confirm documentation is present, if required, in relation to IP and associated reports and recommendations.
	Practices Forester
	Multiphase/TFL Forester

• Update IP tracking form and attach to IP Block Activity/Road Activity in LRM with other relevant documents and comments	*Practices Forester* *Multiphase/TFL Forester*

• Annual, detailed BA risk-based review of Site Plan population
  • Focus on any high risks to sensitive areas that may have been previously identified by BA Planning section
  • Confirm documentation is present, if required, in relation to IP and associated reports and recommendations.
	Practices Forester
	Operations Technician

Stage 5: TSL/Contract Package Preparation	
• During preparation of TSL package, review any IP specific details that must be addressed in TSL or contract documents to ensure they are adequately incorporated into plan.	*Operations Technician* *Multiphase/TFL Forester*
Stage 6: TSL/Contract Pre-work	
• Review any IP specific details in Site Plan with Licensee including discussions around how IP management options were integrated into the block/road engineering and related Site Plans • Include details on grass seeding and monitoring requirements, as well as road maintenance activities.	*Forest Technician* *Operations Technician*

• Provide summary of species characteristics to TSL Licensee to enable additional identification of new occurrences in the field
  o IP name; Latin, common
  o Pictures
  o Reports
	Forest Technician

PROCEDURE	RESPONSIBILITY
Stage 7: Conformance Quality Assurance (Inspection)	
• Review relevant plans and IP descriptions/information to familiarize self with potential species	*Forest Technician*
• Review relevant plans to ensure thorough understanding of how IP species habitat needs were to be addressed in the field.	*Forest Technician*
• Check operations to ensure consistency with legal plans.	*Forest Technician*
• Where deviations from the plan have occurred that impact IP follow standard conformance process. ○ Ensure appropriate agencies have been notified.	*Forest Technician*
• Ensure non-conformances and/or potential non-compliances have been entered into the EMS Issue Tracking System and Action Plan has been developed.	*Forest Technician*
• Return to field for follow-up inspection(s) to ensure any Action Plans/mitigation strategies have been implemented	*Forest Technician*
Stage 8: Post Disturbance IP Activities (Harvesting & Road activities)	

• Roads
  • Review IP tracking form information in LRM to familiarize self with potential IPs
  • Schedule follow-up monitoring of grass seeding effectiveness in Resources
  • Reschedule follow-up treatment and monitoring where an effective results not achieved
  • Complete Resources tracking form and update IAPP web site using "Report-A-Weed" tool when invasive plants have spread beyond last reported location as a result of grass seeding failure
	Forest Technician
	Engineering Technician
	Contractor

• Silviculture
  • During silviculture surveys review IP tracking form information in Resources to familiarize self with potential IPs
  • Complete Resources tracking form and update IAPP web site using "Report-A-Weed" tool when invasive plants have spread beyond last reported location.
	Forest Technician
	Operations Technician
	Practices Forester
	Contractor

Chinook Business Area
Invasive Plants
Standards/Specifications

Revised March 14, 2018

INVASIVE PLANTS

1. The Contractor must follow the BCTS Chinook Business Area Invasive Plant (IP) process for all block planning, block layout, road layout and road inspection projects.

2. The Contractor must be knowledgeable of Chinook Business Area priority invasive plant(s) and their related phenology and ensure grass seeding recommendations consider the ecology of the area in which grass seeding is to occur.

3. Field findings must be noted in plans submitted to the Chinook Business Area and must include measures to mitigate the introduction and/or spread of the invasive plant(s). The contractor must provide recommendations consistent with the Invasive Species Council of BC "Forestry Operations T.I P.S.".

4. Any invasive plant(s) previously unreported must be reported by the Contractor to the BC Invasive Alien Plant Program (IAPP) – "Report-A-Weed" application.

5. The Invasive Plants Tracking Form must be completed. The IP Tracking Form must be saved as an Adobe PDF file and attached in CENGEA/LRM under the Block Details - Invasive Plant Assessment activity line item.

6. The contractor, on an annual basis must submit a summary report indicating the reports submitted to the IAPP database.

BCTS Chinook Invasive Species Program
Best Management Practices

Update(s): This is a new program to the BCTS Chinook Business Area (BA).

The Program includes:

1. the training requirements for implementation of the Program
2. the reporting requirements and available tools for delivery of the Program
3. a priority species list as set out by BC Inter-Ministry Invasive Species Working Group

The primary objective is to observe and report occurrence of Invasive Species to BC Inter-Ministry Invasive Species Working Group and participate in the Working Groups Early detection and rapid response (EDDR). The intent of EDRR is to prevent the establishment and subsequent spread of newly arriving invasive species into BC.

Operating areas covered by the Chinook Invasive Species Program

1. BCTS Operations in the Chilliwack, Squamish, Powell River and Haida Gwaii Forest Districts
2. BCTS Operations in TFL's within the 4 Districts noted above
3. Any other land tenure in which BCTS operates as a forest land management partner with 3rd party entities; e.g., Community Forests, First Nation Woodland Licences, etc.

The BCTS Chinook Invasive Species Program is coordinated in conjunction with the BCTS Chinook Invasive Plant Program and includes invasive mammal, fish amphibians/reptiles, insects/spiders.

Reference sources for the Invasive Species Program

This Program reflects the current information to date as it relates to the occurrence and potential occurrence of invasive species in British Columbia. Knowledge used to guide the development of this Program is based upon information obtained from the Invasive Species Council of BC (ISCBC) *Invasive Species Strategy for British Columbia* (May 2013) and the BC Inter-Ministry Invasive Species Working Group's *Invasive Species Early Detection and Rapid Response Plan for British Columbia* (November 2014).

Legislative and policy requirements concerning Invasive Species

BCTS Chinook's requirement to manage for invasive plants is driven by:

1. Sustainable Forestry Initiative 3rd party certifications

There are several pieces of federal and provincial legislation that indirectly govern invasive species. These include:

1. *Wildlife Act* (Provincial)
2. *Controlled Alien Species Regulation* (Provincial)
3. *Aquatic Invasive Species Regulation* (Federal)
    - Applies to Asian Carp (4 species) and Zebra and Quagga mussels

BCTS Chinook BA Invasive Species Program Objectives:

1. To identify and report invasive species that occur or potentially occur within the BCTS Chinook Business Area
2. To educate the staff about how to identify and report invasive species during normal forest duties
3. Limit the introduction and spread of invasive species

Limitations to the control of the introduction and/or spread of Invasive Species

Due to the extent of existing populations of invasive species within BCTS' operating areas it is not possible or prudent to attempt to manage for the introduction and spread of all invasive species on a species by species basis. Though the guidance of expert advice available on the ISCBC, BCTS Chinook is taking measures to limit the introduction and spread of specific invasive species by ensuring key vectors of spread are reduced and rapid reporting to the BC Inter-Ministry Invasive Species Working Group. Early detection is key.

Foundation of the Chinook BA Invasive Species Program

Noting the extensive range and diversity of Invasive Species in Chinook's operating areas, the Chinook BA will actively participate in the management of Invasive Species *Invasive Species Early Detection and Rapid Response Plan for British Columbia* through a program of observe and report. Additionally, the introduction and spread of Invasive Species will be mitigated through the washing of both machinery and watercraft that are used in primary forestry activities. Legally the Chinook BA is only required to manage for invasive plants as identified in the Forest and Range Practices Act (FRPA) Invasive Plant Regulation.

Steps to mitigating the introduction and spread of Invasive Species

1. Implementation of the program will be done through training of all staff and directly supervised contractors to understand the background to reduce the risk of introduction or spread, priority species, reporting requires and methods to stop the introduction or spread of invasive species. This will include:
    a. the development of a training package that will posted on The BCTS Chinook BA website
    b. a brief background on the Priority Species as set out by BC Inter-Ministry Invasive Species Working Group
    c. the methods to reduce the risk of the introduction or spread of invasive species
    d. the use of Web Based Reporting Applications (https://www.for.gov.bc.ca/hra/invasive-species/index.htm) as well as reporting requirements, or
    e. via pre-work sessions for Licensees, Permittees, or, Contractors

2. When machinery is brought onto the work site the TSL Holder or contractor must ensure that is clean of soil and vegetative material. This is consistent the BCTS Chinook BA Invasive Plant Best Management Practices. The Invasive Species Program protocol for cleaning machinery is as follows:

Equipment must be washed/cleaned to remove visible plant material, and, soil/dirt prior to entry into the activity site where disturbed soil has been, or will be, created.

a. Washing can be conducted at any vehicle washing facility. This BMP will not require the individual to collect water at the washing facility.
b. Washing cannot occur in the field unless water containment facilities are present and contaminated ('dirty') water is removed from the site

The vector for transmittal of some species such as the Argentine Ant can be through infested soil or plant material. Adhering to this protocol will reduce the risk of introduction or spread of terrestrial based Invasive Species as well as Invasive Plants.

3. That all watercraft, vessels, used moorings or any other materials that will enter a waterbody will adhere the following;
    a. Clean- Absent of visible Aquatic Invasive Species or attached vegetation, dirt, debris or surface deposits including mussel shells or residue on the watercraft, trailer, outdrive or equipment that could mask the presence of attached mussels
    b. Drained- To the extent practical, all water drained from any live-well, bait-well, storage compartment, bilge area, engine compartment, deck, ballast tank, water storage and delivery systems, cooler or other water storage area on the watercraft, trailer, engine or equipment
    c. Dry- No visible sign of standing water, or in the case of equipment, wetness on or in the watercraft, trailer, engine or equipment.

    The vector for transmittal of water born species such zebra mussels are watercraft or material than have been operated and/or been in infested water. Watercraft/materials that have only been in BC waters or waters from a non-contaminated state present a low risk for introduction of invasive species (aquatic mollusks) but adherence to the clean boat procedure will prevent introduction/spread of invasive aquatic plants. https://www.for.gov.bc.ca/hra/invasive-species/bringboattoBC.htm

    As well, further information can be found at https://www.for.gov.bc.ca/hra/invasive-species/cleandraindry.htm

Licensees Permittees and Contractors notification

1. Ensure all field staff are aware of the observation and reporting program for Invasive Species in the BCTS Chinook Business Area.
2. Ensure all staff are aware of the machine and boat cleaning requirement for the Invasive Species Program.

For more detailed information concerning Invasive Plant management, review the Chinook Invasive Plant SOP and BMP documents:

- https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification/ems-sfm

Water Based Activities

Given that most of BCTS Chinook's operations are land based when conducting water based activities both staff and contractors must be made aware of these aquatic invasive species listed in Appendix A; e.g., when using freshwater or marine vessels, and/or, when conducting dives related to log dumps, etc., to aid in reporting any related sightings

Where to go for additional information

1. BC Inter-Ministry Invasive Species Working Group Website https://www.for.gov.bc.ca/hra/invasive-species/index.htm

    a. Priority Species List https://www.for.gov.bc.ca/hra/invasive-species/priority.htm

    b. Report Invasive Species https://itunes.apple.com/us/app/report-invasives-bc/id1004208197?mt=8

    c. Invasive Species Early Detection and Rapid Response Plan for British Columbia https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_EDRR_IS_Plan.pdf

    d. Zebra and Quagga Mussel Early Detection and Rapid Response Plan for British Columbia https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_ZQM_EDRR_Plan.pdf

Appendix A

Priority Invasive Species for reporting to IAPP database

Invasive Species	*Scientific name*	Group	Habitat	General Distribution	Web Link
Eastern Grey Squirrel	*Sciurus carolinensis*	Mammal	inhabit deciduous and mixed forests in B.C., along with urban areas.	Lower Mainland, Okanagan, Vancouver Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Eastern_Grey_Squirrel_alert.pdf
Feral Pig	*Sus scrofa*	Mammal	adaptable to a variety of habitat types but are limited by deep snow, prefer riparian areas with sufficient water	Lower Mainland, Vancouver Island, Thompson-Okanagan, Peace, Chilcotin, Kootney	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/feral_pig_alert.pdf
Nutria	*Myocastor coypus*	Mammal	commonly found in marshes, wetlands, slow-moving streams and sloughs prefers freshwater but occasionally found in brackish habitats.	Lower Mainland, Fraser Valley, Southern Vancouver Island, Gulf Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Nutria_alert.pdf
Asian Carp Family	**Bighead carp** *Hypophthalmichthys nobilis* **Silver carp** *Hypophthalmichthys molitrix* **Grass carp** *Ctenopharyngodon idella)* **Black carp** *Mylopharyngodon piceus*	Fish	prefer to spawn in areas of consistent water flow to aid in egg development prefer to spawn in areas of consistent water flow to aid in egg development	There have been no reports of Asian carp in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/asian_carp_alert.pdf
Bitterlings	*Rhodeus spp.*	Fish	found in ponds, lakes, marshes, muddy and sandy pools and backwaters of rivers habitats where freshwater mussels exist	There have been no reports of Bitterlings in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Bitterling_alert.pdf

Invasive Species	*Scientific name*	Group	Habitat	General Distribution	Web Link
Bullheads	*Ameiurus spp.*	Fish	slow streams and rivers with high vegetation; along with lakes, lagoons and ponds. tolerate waters with low oxygen concentrations and high temperatures	Lower Mainland, Okanagan, Vancouver Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Bullhead_alert.pdfChan
Channel Catfish	*Ictalurus punctatus*	Fish	found in deep pools and lakes prefer warmer waters for spawning	Channel Catfish have not been reported in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Channel_catfish_alert.pdf
Goldfish	*Carassius auratus*	Fish	streams and pools, ditches, and ponds areas where there is submerged aquatic vegetation wide range of temperatures and oxygen levels, and are unaffected by ice cover	Lower Mainland, Vancouver Island, Southern Interior	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Goldfish_alert.pdf
Gobies	**Round Gobies** *Neogobius melanostomus* **Monkey Gobies** *Neogobius fluviatilis* **Tubenose Gobies** *Proterorhinus marmoratus* **Amur Gobies** *Rhinogobius similis*	Fish	different habitats depending on species type **Round Gobies** prefer waters with rocky and sandy bottoms **Monkey Gobies** found in a wide range of temperature in both fresh and brackish water **Tubenose Gobies** prefer waters near the shores of lakes and rivers Little is known about the preferred habitat of **Amur Gobies**.	No Distribution Available	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Gobies_alert.pdf

Invasive Species	*Scientific name*	Group	Habitat	General Distribution	Web Link
Largemouth Bass	*Micropterus salmoides*	Fish	shallow lakes, ponds, and rivers warmer waters, near vegetation and debris	Lower Mainland, Vancouver Island, Okanagan, Thompson and Kootney Regions	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Largemouth_bass_alert.pdf
Smallmouth Bass	*Micropterus salmoides*	Fish	shallow lakes, ponds, and rivers warmer waters, near vegetation and debris	Lower Mainland, Vancouver Island, Okanagan, Thompson and Kootney Regions	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Largemouth_bass_alert.pdf
Oriental Weatherfish	*Misgurnus anguillicaudatus*	Fish	primarily found in rivers, lakes, swamps, ponds, rice fields and field ditches mud or silt substrates in shallow depths prefer stagnant or slow flowing water	Lower Fraser Valley, specifically in the Alouette River system	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Oriental_Weatherfish_alert.pdf
Sankeheads	*Family Channidae*	Fish	lakes, ponds, streams, and ditches, in shallow water with vegetation tolerance to varying temperatures and water quality conditions	One report of Snakehead in 2012, in the Lower Mainland	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Snakehead_alert.pdf
Tench	*Tinca tinca*	Fish	slow-moving water with vegetation and mud substrate can withstand low temperatures and varied oxygen levels	Osoyoos, Christina, Skaha, Okanagan lakes and Pend d'Orielle	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Tench_alert.pdf

Invasive Species	***Scientific name***	**Group**	**Habitat**	**General Distribution**	**Web Link**
Western Mosquitofish	*Gambusia affinis*	Fish	slow-flowing water, in vegetated ponds and lakes and pools in streams. can also be found in brackish water	Western Mosquitofish have not been reported in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Western_Mosquitofish_alert.pdf
White Cloud Mountain Minnow	*Tanichthys albonubes*	Fish	prefer slow moving waters with thick vegetation water temperatures as low as 5 degrees Celsius.	White Cloud Mountain Minnows are not present in B.C	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/White_Cloud_Mountain_Minnow_alert.pdf
Yellow Perch	*Perca flavescens*	Fish	freshwater lakes, ponds, pools of creeks, rivers, along with brackish waters	Lower Mainland, Vancouver Island, Pend d'Oreille, Thompson, Kootenay, Okanagan	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Yellow_perch_alert.pdf
African Clawed Frog	*Xenopus laevis*	Amphibians and Reptiles	aquatic habitats such as rivers, lakes, ponds, marshes, rain pools, and swamps manmade waters, including reservoirs, dams, flooded pits, ditches, and wells They prefer stagnant pools and slow flowing streams, appearing to thrive best in eutrophic waters	There have been no reports of African Clawed Frogs in B.C	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/African_clawed_frog_alert.pdf
American Bullfrog	*Lithobates catesbeiana*	Amphibians and Reptiles	prefer warm, weedy ponds and lakes also be found in ditches and slow moving streams	Vancouver Island between Victoria to Campbell River, west to Port Alberni, some Gulf Islands, Lower Mainland, Okanagan and Kootenay	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/American_bullfrog_alert.pdf

Invasive Species	*Scientific name*	Group	Habitat	General Distribution	Web Link
European Wall Lizards	*Podarcis muralis*	Amphibians and Reptiles	ground-dwelling, often found on rock faces, open woodlands areas of human development (stone and wood piles, concrete and brick walls, railways, roadsides)	Southern Vancouver Island, West Vancouver, Osoyoos	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/European_Wall_Lizard_alert.pdf
Red-eared Slider	*Trachemys scripta elegans*	Amphibians and Reptiles	freshwater habitats including rivers, swamps, ponds and ditches; with slow current, muddy bottoms and dense vegetation	Lower Mainland, southern Vancouver Island, Southern Interior	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Red-eared_slider_alert.pdf
Apple Maggot	*Rhagoletis pomonella*	Insects and Spiders	habitats where host fruits are found including cultivated/ agricultural land, managed forests, plantations/orchards, urban areas, and natural terrestrial areas.	Coastal B.C, Fraser Valley, Vancouver Island, Gulf Islands, and the city of Prince George.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/apple_maggot_aler.pdf
Argentine Ant	*Linepithema humile*	Insects and Spiders	top soil, under debris, or within manmade structures prefer moist areas and warm temperatures	Southern Vancouver Island (Victoria)	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Argentine_ant.pdf
Asian Long-Horned Beetle	*Anoplophora glabripennis*	Insects and Spiders	urban agricultural, rural and forested regions in/on host trees such as: Acer (Maple) Salix (Willow), Populus (Poplar), Betula (Birch), Aesculus (Horsechestnut), Albizia (White Silk), Celtis (Hackberry), Cercidiphyllum (Katsura), Koelreuteria (Goldenrain Tree), Platanus (Plane or Sycamore), Sorbus (Mountain Ash), and Ulmus (Elm)	There have been no reports of Asian Long-horned Beetles in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Asian_long_horned_beetles.pdf

Invasive Species	*Scientific name*	Group	Habitat	General Distribution	Web Link (Further Information)
Balsam Wooly Adelgid	*Adelges piceae*	Insects and Spiders	found on true fir trees (Abies) in natural forests, planted forests, and urban areas low elevation sites with good growing conditions (adequate water and nutrition) high elevation forests	coastal forest zones of B.C. Fraser Valley, Vancouver Island, Cascades Forest District (Coquihalla area) and the town of Rossland	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/balsam_woolly_adelgid_alert.pdf
Asian Clam	*Corbicula fluminea*	Other Invertebrates	found in brackish to freshwater rivers, lakes, streams, canals and reservoirs sediment surface or slightly buried in silt, sand or gravel substrates	Four confirmed locations in the Lower Fraser River one in the Pitt River two in the Coquitlam River one lake on Southern-Vancouver Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Asian_clam_alert.pdf
Chinese Mystery Snail	*Cipangopaludina chinensis*	Other Invertebrates	prefers low flowing freshwater rivers, streams and lakes Found partially buried in soft, muddy or silty substrates	five lakes on Southern Vancouver Island four confirmed reports in downtown Victoria one confirmed report in a lake near Mission	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Chinese_mystery_snail_alert.pdf
Red Swamp Crayfish	*Procambarus clarkia*	Other Invertebrates	variety of freshwater habitats including rivers, lakes, ponds, streams, canals, marshes, swamps, and ditches with organic debris and muddy to sandy substrates tend towards warm, shallow, slow moving waters	There have been no reports of Red Swamp Crayfish in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Red_swamp_crayfish_alert.pdf

Invasive Species	***Scientific name***	**Group**	**Habitat**	**General Distribution**	**Web Link (Further Information)**
Rusty Crayfish	*Orconectes rusticus*	Other Invertebrates	inhabit lakes, ponds and streams that provide year-round suitable water quality (well oxygenated and temperatures from 0-39°C prefer clay, silt, sand, gravel and rock substrates	There have been no reported occurrences of Rusty Crayfish in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Rusty_crayfish_alert.pdf
Zebra Mussle Quagga Mussel	*Dreissena polymorpha* *Dreissena bugensis*	Other Invertebrate	Freshwater attach to most substrates including sand, silt, and harder substrates optimal temperature for spawning is between 18-28°C	There have been no reported introduction of live quagga or zebra mussels into B.C. lakes or waterways.	https://www.for.gov.bc.ca/hra/invasive-species/musselfacts.htm

BCTS
BC Timber Sales

Climate Change Action Strategy

Introduction

BC Timber Sales (BCTS) is a government agency responsible for marketing crown timber in British Columbia. Sound forest stewardship is highlighted within the business principles and priorities outlined in the BCTS Strategic Plan.

Purpose of the Climate Change Action Strategy

To foster the adoption of climate change mitigation and adaptation actions into BCTS business processes while ensuring consistency and alignment with the Ministry of Forests, Lands and Natural Resource Operations (FLNRO) Service Plan and associated Provincial and FLNRO climate change strategies and action plans.

BCTS Climate Change Action Strategy Components

BCTS' Climate Change Action Strategy addresses both mitigation to reduce climate change impacts and adaptation to respond to a changing climate, it consists of:

- the BCTS Climate Change Action Plan which identifies the actions at the Business Area, Nursery Services and Headquarters levels that BCTS will take in the short, mid, and long term to address climate change, including the associated costs/benefits and resource requirements of the actions;

- a Community of Climate Change Leads in BCTS Business Areas, Nursery Services, and Headquarters that work together to develop, implement, and monitor the BCTS Climate Change Action Plan; and

- Climate Change Communication Tools (web-site, SharePoint site, training, updates) to support BCTS' staff awareness of current climate change information that affects BCTS' business and available tools to take action.

BCTS
BC Timber Sales

Climate Change Action Strategy

BCTS Climate Change Action Strategy Guiding Principles

While achieving BCTS' mandate and efficiently using available staff and funding resources, BCTS will follow the following guiding principles in taking climate change action:

- Make Change Happen – by incorporating climate change objectives and actions into field operations and raising staff awareness of climate change and the potential effects on our business.

- Lead by Example – by participating in provincial and FLNRO climate change adaptation initiatives.

- Embrace Uncertainty – by enabling staff to practice sustainable forest management in an uncertain future climate.

- Be Proactive – by incorporating climate change into all aspects of the annual operating plan.

- Foster Innovation – by being creative in our approaches to mitigating and adapting to climate change and by enabling forest resilience and adaptation. By developing and implementing clear, concise, science-based, measurable and verifiable climate change mitigation and adaptation actions.

- Seek Collaboration – by enhancing communication with our clients, local communities and governments to further understand climate change, related terminology and any local known effects. By pursuing synergies with government and other entities to take effective climate change action.

- Be Adaptive – by applying LEAN approaches to improve our business practices as more climate change information is available.

- Be a Climate Change Action Champion – by providing policy direction, guidance, communications, and outreach on climate change action to clients, stakeholders and partners.

February 2, 2015

Chief Forester's Standards for Seed Use

Ministry of Forests, Lands, Natural Resource Operations
and Rural Development

Diane Nicholls
Chief Forester

Approved November 20, 2004
Effective Date April 1, 2005

Includes all previously approved amendments

Amendments Established April 5, 2018 (in red)
with Effective Date of August 6, 2018

CONTENTS

1. DEFINITIONS

1 In these standards:

"Act" means the *Forest and Range Practices Act*;

"area of use" means the area of use determined for a tested parent tree under section 5.3.2 (d) (ii);

"**BEC unit**" means the Province of British Columbia's Biogeoclimatic Ecosystem Classification zone, subzone and variant (where variant is applicable), as published by DataBC at: https://catalogue.data.gov.bc.ca/dataset/biogeoclimatic-ecosystem-classification-bec-map, and as amended from time to time;

"Branch" means Forest Improvement and Research Management Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development;

"breeding value" means a comparative measure of genetic value for a specific trait of a parent tree, based on the observed or predicted performance of the parent tree's progeny relative to the average performance of the progeny of other trees of the same species, as determined in accordance with section 5.4;

"**CBST**" means climate based seed transfer;

"CBST area of use" means an area of use composed of one or more BEC units where a lot may be planted;

"clonal value" means a comparative measure of genetic value for a specific trait of a parent tree, based on the observed performance of cuttings produced from the parent tree relative to the average performance of cuttings produced from other trees of the same species, as determined in accordance with section 5.4;

"collection area" means the area within a natural stand from which seeds or vegetative material are collected for the purpose of producing a lot;

"custom lot" means a lot that qualifies for registration as a lot collected from tested parent trees, where an election is made to register it as a custom lot;

"cutting" means a tree grown from vegetative material;

"donor plant" means a seedling grown from seeds that are either collected from a parent tree or taken from a registered seedlot, where the seedling is used to produce vegetative material;

"effective population size" means a measure of the genetic diversity of a lot collected from parent trees, based on the respective parental contributions of the parent trees to the lot;

"family" means seedlings grown from seeds collected from a single tree;

"genetic worth" means a measure of a lot's genetic worth, with respect to a specific trait, as determined in accordance with section 7.2 (a);

"lot" means a seedlot or vegetative lot;

"natural stand" means a stand of trees that was established through natural regeneration;

"natural stand seed planning zone" means a seed planning zone identified in Table 2.1 of Appendix 2;

"origin" means the following:

a) in the case of a lot registered as a lot collected from a natural stand within British Columbia, the location of the collection area, as denoted by
   i) the natural stand seed planning zone in which the collection area is located,
   ii) the mean elevation of the collection area, recorded in metres,
   iii) the mean latitude of the collection area, recorded in degrees, minutes and seconds,
   iv) the mean longitude of the collection area, recorded in degrees, minutes and seconds, and
   v) the BEC unit in which the collection area is located;

b) in the case of a lot registered as a lot collected from a superior provenance,
   i) the collection area criteria specified in Appendix 5 for the species and provenance of the lot, and
   ii) the mean elevation of the collection area, recorded in metres;

c) in the case of a lot registered as a lot collected from untested parent trees within British Columbia, the location of the natural stands from which the parent trees were selected, as denoted by
   i) the natural stand seed planning zone in which the stands are located,
   ii) the mean elevation of the stands weighted by the proportional parental contribution to the lot of the parent trees selected from these stands, recorded in metres, and
   iii) the mean latitude of the stands weighted by the proportional parental contribution to the lot of the parent trees selected from these stands, recorded in degrees, minutes and seconds;

d) in the case of a lot registered as a lot collected from tested parent trees within British Columbia,
   i) if the parent trees have at least one area of use that is the same for all of the parent trees, the area of use that is the same for all of the parent trees, or
   ii) if parent trees do not have at least one area of use that is the same for all of the parent trees, the area denoted by
      A) the tested parent tree seed planning zone, or latitude range within a tested parent tree planning zone, referred to in section 5.2.2.1 (e) (ii) (A), and
      B) the overlap in the elevation ranges referred to in section 5.2.2.1 (e) (ii) (B);

e) in the case of a lot registered as a custom lot,
   i) the tested parent tree seed planning zone that
      A) applies to the area of use that is the same for all of the tested parent trees that contributed to the lot, or
      B) applies under section 5.2.2.1 (e) (ii) (A) to all of the tested parent trees that contributed to the lot,
   ii) the mean elevation of
      A) the natural stands from which those parent trees that were not bred from other parent trees were selected, and
      B) the areas of use determined for those parent trees that were bred from other parent trees,

      weighted by the proportional parental contribution to the lot of those parent trees, recorded in metres, and
   iii) the mean latitude of
      A) the natural stands from which those parent trees that were not bred from other parent trees were selected, and
      B) the areas of use determined for those parent trees that were bred from other parent trees

      weighted by the proportional parental contribution to the lot of those parent trees, recorded in degrees, minutes and seconds;

f) in the case of a lot registered as a lot collected from a natural stand outside of British Columbia,
   i) the collection area criteria specified in Table 6.1 of Appendix 6 for the species of the lot, and
   ii) the mean elevation of the collection area, recorded in metres;

g) in the case of a lot registered as a lot collected from parent trees outside of British Columbia, the parent tree criteria specified in Table 6.2 of Appendix 6 for the species of the lot and the seed orchard at which it was collected;

"parent tree" means a genetically unique tree of a known source that is

a) selected for specific traits, and

b) bred or cloned for the purpose of producing seeds or vegetative material;

"parental contribution" means the genetic contribution of a parent tree to a lot, based on

a) the male or female gametic contribution of the parent tree to a seedlot, or

b) the proportion of the vegetative material in a vegetative lot that comes from the parent tree;

"person" means a person referred to in section 2.1, unless the context requires otherwise;

"plantation" means a stand of trees established by planting;

"production facility" means a facility at which vegetative material is produced, collected or stored, and includes cutting hedges, stool beds, nurseries and laboratories;

"ramet" means a cutting grown from vegetative material collected from a parent tree, where the cutting is used to produce seeds or vegetative material;

"register" means to register a lot under Part 5, in order to use that lot to establish a stand under section 29 of the Act, and **"registered"** has a corresponding meaning;

"seed" means germplasm derived through sexual reproduction that is used to grow a tree;

"Seed BEC unit" means:

a) for lots collected from natural stands within BC, the BEC unit of origin for the stand, and,

b) for lots collected from:

i. natural stands located outside of BC,

ii. parent trees located within BC; and

iii. parent trees located outside of BC,

the BEC unit assigned by the Branch;

"seed orchard" means a collection of parent trees maintained for the purposes of producing seeds;

"Seed Planning and Registry System" means the information system maintained by the Branch to record information respecting lots;

"seed planning zone" means a natural stand seed planning zone or a tested parent tree seed planning zone;

"seedling" means a tree grown from seed**;**

"seedlot" means seeds that are collected and assembled as a lot for the purposes of registration under Part 5;

"stand" means a natural stand or a plantation;

"superior provenance" means a collection area within a natural stand identified in Appendix 5;

"tested parent tree" means a parent tree, of a species identified in Table 2.2 of Appendix 2, that falls within one of the following categories:

a) a parent tree from which seeds were collected to grow seedlings, where these seedlings have been tested in accordance with the requirements of sections 5.3. and 5.4 to determine

i) an area of use for the parent tree, based on the genetic suitability of the seedlings for the area, and

ii) breeding values for the traits for which the parent tree was selected, based on the performance of the seedlings;

b) a parent tree from which vegetative material was collected to grow cuttings, where these cuttings have been tested in accordance with the requirements of sections 5.3. and 5.4 to determine

i) an area of use for the parent tree, based on the genetic suitability of the cuttings for the area, and

ii) clonal values for the traits for which the parent tree was selected, based on the performance of the cuttings;

c) a parent tree that is a seedling selected from a family, where the parent tree and its family have been tested in accordance with the requirements of section 5.3 and 5.4 to determine

i) an area of use for the parent tree, based on the genetic suitability of the parent tree and its family for the area, and

ii) breeding values for the traits for which the parent tree was selected, based on the predicted performance of the parent tree's progeny, extrapolating from its own performance and the performance of its family;

"tested parent tree seed planning zone" means a seed planning zone identified in Table 2.2 of Appendix 2;
"transfer limits" means the limits referred to in Part 8 that determine where seedlings or cuttings may be planted, based on the registered lot from which the seedlings or cuttings originated;
"Tree Seed Centre" means the Tree Seed Centre maintained by the Branch;
"untested parent tree" means a parent tree that is not a tested parent tree;
"vegetative lot" means vegetative material that is collected and assembled as a lot for the purposes of registration under Part 5;
"vegetative material" means plant tissue or a plant part, derived through asexual reproduction, that is used to grow a tree.

2. APPLICATION

2.1 These standards apply to

a) a person who uses seeds or vegetative material for the purposes of establishing a stand under section 29 of the Act,

b) a person who registers seeds or vegetative material for use by a person referred to in paragraph (a), or

c) a person who requests an identification number for a parent tree, or submits information regarding a parent tree, so that seeds or vegetative material collected from that parent tree may be registered.

3. PURPOSE

3.1 The purpose of these standards is to maintain the identity, adaptability, diversity and productivity of the Province's tree gene resources by

a) establishing criteria for the registration of seedlots and vegetative lots used to establish a stand under section 29 of the Act, and

b) regulating the storage, selection, use and transfer of registered lots.

4. EFFECTIVE DATE

4.1 These standards take effect four months after the later of

a) December 1, 2004, or

b) the date on which notice of these standards is published in the *Gazette*.

5. REGISTRATION

5.1 General Requirements

5.1.1 A person may apply to have a lot registered by

a) submitting an application form to the Branch, which form must

i) contain the applicable information specified in Appendix 1, and

ii) be signed by the person who owns the lot, or a person authorized to act on that person's behalf, and

b) in the case of a seedlot, submitting the seedlot itself to the Tree Seed Centre for storage and testing in accordance with Part 6.

5.1.2 A seedlot referred to in section 5.1.1 (b) must be submitted in a container that has a tag on both the inside and outside of the container clearly identifying the species of the lot and the application form to which it relates.

5.1.3 Subject to this Part, upon receipt of an application form submitted under section 5.1.1,

a) the Branch may assign a pending registration number to the lot in respect of which the application form was submitted, and

b) if the requirements referred to in section 5.1.4 are met, the Branch must

i) register the lot in respect of which the application form was submitted by either assigning a registration number to the lot, or confirming the pending registration number, if any, referred to in paragraph (a), and

ii) maintain a record of the registration number of the lot, the information contained in the application form and, in the case of seedlots, the results of tests conducted by the Tree Seed Centre under section 6.4 or 6.5.

5.1.4 The Branch must assign or confirm a registration number under section 5.1.3 (b) if the following requirements are met:

a) the information contained in the application form is complete and accurate;

b) the lot complies with the requirements of this Part and Part 6;

c) in the case of a seedlot, the tests conducted by the Tree Seed Centre under section 6.4 confirm that

i) the seeds in the lot have a moisture content greater than or equal to 4 per cent and less than or equal to 9.9 per cent, and

ii) the lot contains at least 97 per cent pure seed by weight.

5.1.41 The Branch must assign a Seed BEC unit for lots collected from:

a) natural stands outside of BC,

b) parent trees located within BC; and

c) parent trees located outside of BC.

5.1.42 The Branch must assign or confirm an orchard identification number for lots collected from an orchard or production facility located within or outside BC.

5.1.43 The Branch must make available information assigned in 5.1.41 and 5.1.42, in the Seed Planning and Registry System.

5.1.5 The Branch must make information recorded under section 5.1.3 (b) (ii) available to a person who requests this information.

5.1.6 The owner of a registered lot, a person authorized to act on that person's behalf, or a person employed by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, may request an amendment to information respecting that lot recorded under section 5.1.3 (b) (ii), if

a) the person identifies an error in the recorded information and provides information to verify the error, or

b) the ownership of the lot changes and the person provides information respecting the change in ownership.

5.1.7 Upon receipt of a request under section 5.1.6, the Branch must

a) amend the information recorded under section 5.1.3 (b) (ii), if the Branch is satisfied that the amendment is necessary or appropriate having regard to the information provided in support of the request, and

b) record the nature of the amendment and the date on which it was made.

5.1.8 The following types of lots must not be registered:

a) a lot consisting of both seeds and vegetative material;

b) a lot consisting of seeds or vegetative material collected from a plantation that consists of trees other than parent trees;

c) a lot consisting of seeds or vegetative material collected from both

i) natural stands, and

ii) plantations, seed orchards or production facilities;

d) a vegetative lot that consists of both vegetative material collected directly from a parent tree, without using donor plants, and vegetative material collected from donor plants grown from seeds collected from a parent tree;

e) a lot consisting of seeds or vegetative material that has been subjected to genetic modification through mutagenesis, a recombinant DNA technique or other related methods;

f) a lot that is collected from outside of British Columbia that does not meet the requirements in Appendix 6.

5.1.9 A lot collected from both tested parent trees and untested parent trees may only be registered as either

a) a lot collected from tested parent trees, or

b) a lot collected from untested parent trees,

depending on whether the requirements of section 5.2.2.1 (g) (i) or (ii) have been met.

5.1.10 A lot that consists of seeds or vegetative material multiplied through the application of somatic embryogenesis, tissue culture or other biotechnological processes may only be registered if seedlings or cuttings produced through these biotechnological processes have been tested and evaluated in the field for adaptability, survival, health, quality and growth, in accordance with generally accepted scientific methodology over a period of time that is consistent with this methodology.

5.1.11 Vegetative material taken from donor plants grown from a registered seedlot is deemed to be part of the registered seedlot and does not have to be registered as a vegetative lot.

5.1.12 If a seedlot submitted under section 5.1.1 (b) is not registered under this Part, it must be returned to the person who submitted it for registration.

5.1.13 A lot that was registered under section 3 of the Tree Cone, Seed and Vegetative Material Regulation, prior to its repeal, continues to be registered as if it meets the requirements of this Part.

5.2 Collection Criteria

5.2.1 Lots collected from natural stands within British Columbia

5.2.1.1 In order to be registered as a lot collected from a natural stand within British Columbia, the lot must consist of seeds or vegetative material collected from trees other than parent trees in accordance with the following requirements:

a) the seeds or vegetative material, as applicable, must have been collected from a minimum of 10 trees, of the same species, that are located in a natural stand within British Columbia;

b) the trees referred to in paragraph (a) must all be located within

i) a single BEC unit, and

iii) a collection area with a radius no greater than 8 kilometres.

5.2.1.2 Despite section 5.2.1.1 (b) and (c), at the request of a person who submits an application under section 5.1.1, a lot consisting of seeds or vegetative material collected from a natural stand may be registered as a lot collected from a superior provenance if

a) the requirement in section 5.2.1.1 (a) has been met, and

b) the collection area from which the lot was collected meets the following criteria:

i) the elevation range of the collection area must fall within the range specified in Table 5.1 or 5.2 of Appendix 5 for the species and provenance of the lot;

ii) if applicable, the latitude and longitude of the centre point of the collection area must meet the requirements specified in Table 5.1 or 5.2 of Appendix 5 for the species and provenance of the lot;
iii) the collection area must meet the additional criteria specified in Table 5.1 or 5.2 of Appendix 5 for the species and provenance of the lot.

5.2.2 Lots collected from parent trees within British Columbia

5.2.2.1 In order to be registered as a lot collected from parent trees within British Columbia, the lot must consist of seeds or vegetative material collected in accordance with the following requirements:

a) the seeds or vegetative material, as applicable, must have been collected from parent trees, of the same species, to which identification numbers have been assigned under section 5.3.3 (b);
b) in the case of a seedlot, the seeds must have been collected from the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;
c) in the case of a vegetative lot collected directly from parent trees, without using donor plants, the number of parent trees must not be less than the greater of
    i) whichever of the following applies:
        A) 20 parent trees, if the vegetative material is collected from tested parent trees;
        B) 40 parent trees, if the vegetative material is collected from untested parent trees or a combination of tested and untested parent trees, and
    ii) the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;
d) in the case of a vegetative lot consisting of vegetative material collected from donor plants grown from seeds collected from parent trees,
    i) the vegetative material must have been collected from at least
        A) 30 donor plants, if the donor plants were produced from seed collected from tested parent trees, or
        B) 200 donor plants, if the donor plants were produced from seed collected from untested parent trees or a combination of tested and untested parent trees, and
    ii) the number of parent trees from which the donor plants were produced must not be less than the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;
e) in the case of a lot entirely collected from tested parent trees,
    i) the parent trees must have at least one area of use that is the same for all of the parent trees, or
    ii) if the parent trees do not have at least one area of use that is the same for all of the parent trees,
        A) each parent tree must have at least one area of use located within
            I) a tested parent tree seed planning zone, or
            II) a latitude range within a tested parent tree planning zone,

            that is the same as the zone or latitude range within which at least one area of use for the other parent trees is also located, and
        B) the elevation ranges for the areas of use referred to in clause (A) must overlap;

f) in the case of a lot collected entirely from untested parent trees, the parent trees must have been selected from natural stands meeting the following criteria:
   i) all of the stands must be located within the same natural stand seed planning zone;
   ii) the range between the lowest and highest elevation of each of the stands must be no greater than the range specified in Appendix 4 for
      A) the species referred to in paragraph (a), and
      B) the natural stand seed planning zone referred to in subparagraph (i);
   iii) the range between the northernmost and southernmost latitude of each of the stands must be no greater than the range specified in Appendix 4 for
      A) the species referred to in paragraph (a), and
      B) the natural stand seed planning zone referred to in subparagraph (i);

g) in the case of a lot collected from both tested and untested parent trees,
   i) to register it as a lot collected from tested parent trees, the following requirements must be met:
      A) the parental contribution of the tested parent trees must represent at least 70 per cent of the total parental contribution of all parent trees to the lot;
      B) the requirements of paragraph (e) must have been met with respect to the tested parent trees;
      C) the locations of the stands from which the untested parent trees were selected, as specified under section 5.3.2 (c) (i), must all be within
         I) the area of use that is the same for all of the tested parent trees, if paragraph (e) (i) applies to the tested parent trees, or
         II) the area of use and elevation range that complies with the requirements of paragraph (e) (ii), if that paragraph applies to the tested parent trees, and
   ii) to register it as a lot collected from untested parent trees, the following requirements must be met:
      A) the parental contribution of the tested parent trees must represent less than 70 per cent of total parental contribution of all parent trees to the seedlot;
      B) the requirements of paragraph (f) have been met with respect to the untested parent trees;
      C) the areas of use for the tested parent trees, as specified under section 5.3.2 (d) (ii), must encompass the locations of the stands from which the untested parent trees were selected.

5.2.2.2 A person who submits an application under section 5.1.1 may elect to have a lot registered as a custom lot if the lot meets the requirements in section 5.2.2.1 for registration as a lot collected from tested parent trees within British Columbia, in which case the lot will be subject to the standards that apply to custom lots instead of the standards that apply to lots registered as lots collected from tested parent trees within British Columbia.

5.2.2.3 If a lot has been registered as a custom lot, the person who submitted the application under section 5.1.1 in respect of that lot may elect to have the lot re-registered as a lot collected from tested parent trees within British Columbia, in which case the lot will no longer be registered as a custom lot.

5.2.2.4 If a lot has been registered as a lot collected from tested parents tree within British Columbia, the person who submitted the application under section 5.1.1 in respect of that lot may elect to have the lot re-registered as a custom lot, in which case the lot will no longer be registered as a lot collected from tested parent trees within British Columbia.

5.2.2.5 Despite section 5.2.2.1 (c) and (d), the requirements of those paragraphs do not apply to a vegetative lot collected solely from tested parent trees that are hybrid poplar (Ax).

5.2.2.6 Despite section 5.2.2.1 (f) (i), seeds or vegetative material collected entirely from untested parent trees, of the same species, that are

a) Grand fir (Bg), Coastal Douglas-fir (Fdc), or Western white pine (Pw), selected from natural stands within the Georgia Lowlands (GL) Natural Stand Seed Planning Zone and the Maritime (M) Natural Stand Seed Planning Zone, may be included in the same lot, or

b) Sitka spruce (Ss) selected from natural stands within the Georgia Lowlands (GL) Natural Stand Seed Planning Zone and the Maritime (M) Natural Stand Seed Planning Zone, outside of the Haida Gwaii, may be included in the same lot.

5.2.3 Lots collected from outside of British Columbia

5.2.3.1 In order to be registered as a lot collected from outside of British Columbia, the lot must consist of seeds or vegetative material collected in accordance with the following requirements:

a) the seeds or vegetative material, as applicable, must be collected from
   i) a natural stand of a species identified in Table 6.1 of Appendix 6, or
   ii) parent trees of a species identified in Table 6.2 of Appendix 6, located at a seed orchard specified in Table 6.2 for that species, where the parent trees
      A) have been assigned unique parent tree identifiers, and
      B) meet the parent tree criteria specified in Table 6.2 for the applicable species and seed orchard;

b) in the case of a lot collected from a natural stand, the seeds or vegetative material, as applicable, must have been collected from a minimum of 10 trees of the same species located within a collection area meeting the following requirements:
   i) the collection area must have a radius no greater than 8 kilometres,
   ii) the collection area must fall with the elevation limits specified in Table 6.1 of Appendix 6 for the applicable species,
   iii) the range between the lowest and highest elevation of the collection area must be no greater than the range specified in Table 6.1 of Appendix 6 for the applicable species,
   iv) the collection area must meet the additional criteria specified in Table 6.1 of Appendix 6 for the applicable species;

c) in the case of a seedlot collected from parent trees, the seeds must have been collected from the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;

d) in the case of a vegetative lot collected from parent trees,
   i) the parent trees must be tested parent trees,
   ii) if the vegetative material was collected directly from parent trees, without using donor plants, the number of parent trees must not be less than the greater of
      A) 20 parent trees, or
      B) the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;
   iii) if the vegetative material was collected from donor plants grown from seeds collected from parent trees,
      A) the vegetative material must have been collected from at least 30 donor plants, and
      B) the number of parent trees from which the donor plants were produced must not be less than the minimum number required to achieve an effective

population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7.

5.3 Parent Tree Information and Identification Numbers

5.3.1 A person may apply to have an identification number assigned to a parent tree by submitting an application form to the Branch, which form must

a) contain the information required under section 5.3.2, and
b) be signed by the person submitting the application form.

5.3.2 An application submitted under section 5.3.1 must contain the following information:

a) the species of the parent tree and whether it is an untested parent tree or a tested parent tree;
b) the specific traits for which the parent tree was selected and the breeding values or clonal values for those traits, as determined in accordance with section 5.4;
c) in the case of an untested parent tree,
    i) the location of the natural stand from which the parent tree was selected, which location must be within British Columbia, as denoted by the following:
        A) the natural stand seed planning zone within which the stand is located;
        B) the elevation of the stand, recorded in metres;
        C) the latitude and longitude of the stand, recorded in degrees, minutes and seconds,
    ii) the methodology used to determine the breeding values referred to in paragraph (b),
    iii) the date on which the parent tree was selected, and
    iv) the age of the parent tree on the date referred to in subparagraph (iii);
d) in the case of a tested parent tree,
    i) either
        A) the location of the natural stand from which the parent tree was selected, if the parent tree was not bred from other parent trees, as denoted by
            I) the information referred to in paragraph (c) (i), in the case of a tested parent tree selected from a natural stand located within British Columbia, or
            II) the elevation of the stand, recorded in metres, and the latitude and longitude of the stand, recorded in degrees, minutes and seconds, in the case of a tested parent tree selected from a natural stand located outside of British Columbia, or
        B) the pedigree of the parent tree, if the parent tree was bred from other parent trees, as denoted by
            I) the identification numbers assigned to the parent trees from which it was bred, if identification numbers have been assigned to those parent trees under this Part, or
            II) the unique parent tree identifiers assigned to the parent trees from which it was bred, if identification numbers have not been assigned to those parent trees under this Part,
    ii) one or more areas of use determined for the parent tree, based on field trials of the genetic suitability of seedlings grown from seeds or cuttings grown from vegetative material collected from the parent tree, each of which areas of use must be denoted by
        A) either
            I) a single tested parent tree seed planning zone, or
            II) a latitude range within a single tested parent tree seed planning zone, and
        B) an elevation range, recorded in metres,
    iii) the methodology used to determine
        A) the breeding values or clonal values referred to in paragraph (b), and
        B) the areas of use referred to in subparagraph (ii),
    iv) the locations at which the field trials referred to in subparagraph (ii) were conducted, as denoted by

A) the mean latitude and mean longitude of the area on which the field trials were conducted, recorded in degrees, minutes and seconds, and
B) the mean elevation of this area recorded in metres,

v) the year in which seedlings or cuttings used in the field trials referred to in subparagraph (ii) were planted, the year in which these seedlings or cuttings were measured, and the age of the seedling or cuttings at the time they were measured, recorded as the number of years from sowing, in the case of seedlings, or rooting, in the case of cuttings, and

e) the name of, and contact information for, the person who
   i) selected the parent tree,
   ii) determined the breeding values or clonal values referred to in paragraph (b),
   iii) determined the areas of use referred to in paragraph (d) (ii),
   iv) conducted the area of use field trials referred to in paragraph (d) (ii), and
   v) conducted the breeding value or clonal value field trials referred to in section 5.4.2.

5.3.3 Upon receipt of an application form submitted under section 5.3.1,
a) the Branch may assign a pending identification number to the parent tree in respect of which the application form was submitted, and
b) if the requirements of section 5.3.4 are met, the Branch must
   i) assign an identification number to the parent tree in respect of which the application form was submitted, or confirm the pending identification number, if any, referred to in paragraph (a), and
   ii) maintain a record of the identification number referred to in subparagraph (i) and the information referred to in section 5.3.2.

5.3.4 The Branch must assign or confirm an identification number under section 5.3.3 (b) if
a) the information contained in the application form is complete and accurate, and
b) the methodology referred to in section 5.3.2 (c) (ii) or 5.3.2 (d) (iii), as applicable, is consistent with generally accepted scientific methodology.

5.3.5 The Branch must make information recorded under section 5.3.3 (b) (ii) available to a person who requests this information.

5.3.6 The person who submits an application under section 5.3.1, a person authorized to act on that person's behalf, or a person employed by the Ministry of Forests, may request an amendment to information recorded under section 5.3.3 (b) (ii), in respect of that application, if
a) the person identifies an error in the recorded information and provides information to verify the error,
b) the person wishes to change the status of an untested parent tree to that of a tested parent tree and the information required under section 5.3.2 (d) is submitted in support of the request, or
c) new test results are available respecting a tested parent tree that affects the information previously submitted under section 5.3.2 (d) and these results are submitted in support of the request.

5.3.7 Upon receipt of a request under section 5.3.6, the Branch must
a) amend the information recorded under section 5.3.3 (b) (ii), if the Branch is satisfied that the amendment is necessary or appropriate having regard to the information provided in support of the request, and
b) record the nature of the amendment and the date on which it was made.

5.3.8 For the purposes of these standards, a parent tree and its ramets are deemed to be the same parent tree.

5.3.9 If an identification number was assigned to a parent tree before these standards come into force,

a) the identification number will continue to apply to that parent tree as if it were assigned under section 5.3.3 (b), and
b) information recorded by the Branch with respect to that parent tree is deemed to have been recorded under section 5.3.3 (b) (ii).

5.4 Determining Breeding Values or Clonal Values

5.4.1 Subject to section 5.4.8, a breeding value for a trait of an untested parent tree must be determined by predicting the performance of the parent tree's progeny, based on all available information about

a) the traits for which the parent tree was selected, including, if applicable, field trials conducted with respect to these traits for tested parent trees of the same species,
b) the environment of the natural stand from which the parent tree was selected, and
c) the quantitative or population genetics of the parent tree's species, including the species' reproductive strategies,

and comparing this predicted performance to the average performance of progeny of other trees of the same species growing in the area denoted by the transfer limits in Appendix 4 that apply to

d) the species of the parent tree, and
e) the natural stand seed planning zone in which the stand from which the parent tree was selected is located, as if this zone is the zone of origin referred to in Appendix 4.

5.4.2 Subject to section 5.4.6 and 5.4.8, a breeding value or clonal value, as applicable, for a trait of a tested parent tree must be determined through field trials in accordance with generally accepted scientific methodology, over a period of time consistent with the methodology, based on the applicable criteria in sections 5.4.3 through 5.4.5.

5.4.3 In the case of a tested parent tree from which seeds were collected and grown into seedlings for the purpose of testing the parent tree, a breeding value must be based on the observed performance of the seedlings in field trials conducted in British Columbia, within the parent tree's area of use, relative to the average performance of seedlings grown from seeds collected from other trees of the same species growing in natural stands located within the parent tree's area of use.

5.4.4 In the case of a tested parent tree that was selected from a family, a breeding value must be based on the predicted performance of the parent tree's progeny, extrapolating from its own observed performance and the observed performance of its family in field trials conducted in British Columbia, within the parent tree's area of use, relative to the average performance of seedlings grown from seeds collected from other trees of the same species growing in natural stands located within the parent tree's area of use.

5.4.5 In the case of a tested parent tree from which vegetative material was collected and grown into cuttings for the purpose of testing the parent tree, a clonal value must be based on the observed performance of the cuttings in field trials conducted in British Columbia, within the parent tree's area of use, relative to the average performance of cuttings grown from vegetative material collected from other trees of the same species growing in natural stands located within the parent tree's area of use.

5.4.6 In the case of a tested parent tree that contributes to a custom lot, breeding values must be determined in accordance with section 5.4.1 as if the tree is an untested parent tree, for the purpose of determining the genetic worth of the custom lot under section 7.

5.4.7 Despite sections 5.4.3 through 5.4.5, when determining a breeding value or clonal value for a trait of a tested parent tree from outside of British Columbia, performance may be assessed in field trials conducted outside of British Columbia, provided the results of the field trials can be used to assess performance relative to the average performance of seedlings grown from seeds, or cuttings grown from vegetative material, as applicable, collected from other trees of the same species growing in

natural stands located within the area denoted by the transfer limits that apply under section 8.7 to a lot collected from those parent trees.

5.4.8 If a breeding value or clonal value for a trait of a parent tree cannot be determined in accordance with sections 5.4.1 through 5.4.7, then, for the purpose of determining genetic worth under section 7, the trait is deemed to have a breeding value and clonal value of zero.

6. STORAGE AND TESTING OF REGISTERED LOTS

6.1 In order to register a vegetative lot, a person must ensure that before registration, and after registration until such time as the vegetative material is used to establish a stand under section 29 of the Act, the lot is stored at a production facility that

a) uses storage methods that maintain the identity and integrity of the lot, including the applicable collection criteria, and
b) keeps accurate records with respect to the lot.

6.2 In order to register a seedlot, a person must ensure that

a) the manner in which the cones containing the seeds are stored, prior to and during processing, including the methods used to process the cones, maintains the identity and integrity of the lot, including the applicable collection criteria,
b) the manner in which the seeds themselves are processed maintains the identity and integrity of the lot, including the applicable collection criteria, and
c) the facility at which the seedlot is stored, prior to submission to the Tree Seed Centre under section 5.1.1 (b),
    i) uses storage methods that maintain the identity and integrity of the lot, including the applicable collection criteria, and
    ii) keeps accurate records with respect to the lot.

6.3 If a seedlot submitted to the Tree Seed Centre under section 5.1.1 (b) is registered under Part 5, the registered seedlot must continue to be stored at the Tree Seed Centre and continue to undergo testing in accordance with section 6.6 (b).

6.4 The Tree Seed Centre must, in accordance with generally accepted scientific methodology, test a seedlot submitted under 5.1.1 (b) for the following:

a) the total weight of the lot, and
b) based on samples taken from the lot,
    i) the percentage of pure seeds in the lot,
    ii) the average weight of seeds in the lot,
    iii) the average moisture content of seeds in the lot, and
    iv) the germination capacity of the seeds in the lot.

6.5 In addition to the tests referred to in section 6.4, the Tree Seed Centre may test a seedlot submitted under 5.1.1 (b) for the presence of fungi, disease or pests, if such tests are considered necessary, having regard to the species of the lot, the size of the lot, the collection or processing methods used to produce the lot, or other applicable criteria.

6.6 While a registered seedlot is stored at the Tree Seed Centre, the Tree Seed Centre must

a) ensure the storage conditions at the Tree Seed Centre maintain the optimum physical quality of the seeds in the lot,
b) conduct such tests referred to in sections 6.4 and 6.5 as are required, on an ongoing basis, to assess the physical quality of the seeds in the lot, and
c) update the information recorded under section 5.1.3 (b) (ii) to reflect the latest results of tests conducted under paragraph (b).

6.7 A person who stores a registered seedlot at the Tree Seed Centre, or a person who purchases or obtains the seedlot or a portion of the seedlot from that person, may withdraw the seedlot, or a portion of the seedlot, by submitting a request to the Tree Seed Centre either
- a) in writing, or
- b) through the Seed Planning and Registry System.

6.8 If a person
- a) withdraws a seedlot, or portion of a seedlot, under section 6.7,
- b) does not use all of the withdrawn seeds to establish a stand under section 29 of the Act, and
- c) proposes to use the unused seeds at a later date to establish a stand under section 29 of the Act,

then that person must return the unused seeds to the Tree Seed Centre.

7. SELECTION AND USE OF SEEDS AND VEGETATIVE MATERIAL

7.1 In this Part, **"time of selection"** means
- a) in the case of seeds, the time at which a person submits a request under section 6.7 to withdraw a registered seedlot, or a portion of registered seedlot, from the Tree Seed Centre, and
- b) in the case of vegetative material, the time at which a person removes a registered vegetative lot, or portion of a registered vegetative lot, from the production facility at which it is stored.

7.2 For the purposes of section 7.3,
- a) the genetic worth of a lot is
  - i) the genetic worth determined in accordance with Appendix 7, based on the parental contribution and breeding values or clonal values of the parent trees, if the lot was collected from parent trees,
  - ii) zero, if the lot was collected from trees other than parent trees, unless subparagraph (iii) applies, or
  - iii) the applicable genetic worth specified in Appendix 5, if the lot was collected from a superior provenance, and
- b) a person is able to acquire a registered lot, or portion of a registered lot, referred to in section 7.3 (a) (ii) if
  - i) the lot or portion of a lot is identified in the Seed Planning and Registry System as
    - A) surplus, and
    - B) having a genetic worth of 5 per cent or greater, and
  - ii) the cost of acquiring the lot or portion of a lot would be considered fair by a reasonable, knowledgeable person.

7.3 For the purpose of establishing a stand under section 29 of the Act, a person must select a registered lot, or portion of a registered lot, that, at the time of selection, has a genetic worth of 5 per cent or greater for the species and trait that best achieves the forest management objectives for the stand, if
- a) at the time of selection, that person either
  - i) owns, or
  - ii) is able to acquire,

  a registered lot, or a portion of a registered lot, that has the requisite genetic worth,
- b) the lot or portion of a lot contains sufficient seeds or vegetative material, as applicable, to produce enough seedlings or cuttings to plant the area on which the stand is to be established, and
- c) the area on which seedlings or cuttings are to be planted complies with the transfer limits that apply to the lot under Part 8.

7.4 When using seeds or vegetative material from a registered lot collected from parent trees, for the purposes of establishing a stand under section 29 of the Act, a person must use seeds or vegetative material, as applicable, that are representative of the contribution of the parent trees to the lot.

7.5 Despite section 7.4, a person may use vegetative material collected from a single parent tree to establish a hybrid poplar stand, if the stand does not exceed 10 hectares.

7.6 When using seeds from a registered seedlot for the purposes of growing donor plants to produce cuttings for the purpose of establishing a free growing stand under section 29 of the Act, a person must use at least 200 seeds that are representative of the lot to grow those donor plants.

8. SEED TRANSFER

8.1 In this Part:

a) **"area"** means the net area to be reforested referred to in section 29 of the Act;

b) **"agreement"** means

i) a major licence or community forest agreement to which section 29 (1) of the Act applies, or

ii) a woodlot licence to which section 29 (3) of the Act applies;

c) **"fiscal year"** means the period beginning on April 1st of one year and ending on March 31st of the following year;

d) **"management unit"** means a tree farm licence area or timber supply area;

e) **"small operator"** means the holder of an agreement with an annual allowable cut of 5,000 cubic metres or less;

f) **"timber sales licence"** means a timber sales licence to which section 29 (2) of the Act applies.

8.2 General Requirements

8.2.1 Seedlings or cuttings must be planted on areas that comply with either the geographically based seed transfer standards described in section 8.3 or the climate based seed transfer standards described in section 8.4.

8.2.2 Despite this Part, a person, other than a timber sales manager, who is required to establish a stand under section 29 of the Act is required to ensure that 95 per cent of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of that person with respect to all agreements held by that person in a single management unit, comply with the requirements of sections 8.3 or 8.4.

8.2.3 Despite this Part, a timber sales manager who is required to establish a stand under section 29 of the Act is required to ensure that 95 per cent of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of the timber sales manager,

a) with respect to all timber sale licences located within a single management unit, or

b) with respect to a specific timber sales licence, if it is not located within a management unit,

comply with the requirements of sections 8.3 or 8.4.

8.3 Requirements that apply if Geographically Based Seed Transfer Standards will be used under 8.2.1

8.3.1 Seedlings or cuttings grown from a lot registered as a lot collected from a natural stand within British Columbia must be planted on areas that comply with the transfer limits in Appendix 3 that apply to the lot, based on its species and origin.

8.3.2 Seedlings or cuttings grown from a lot registered as a lot collected from untested parent trees within British Columbia must be planted on areas that comply with the transfer limits in Appendix 4 that apply to the lot, based on its species and origin.

8.3.3 Seedlings or cuttings grown from a lot registered as a lot collected from a superior provenance must be planted on areas that comply with the transfer limits in Appendix 5 that apply to the lot, based on its species and origin.

8.3.4 Seedlings or cuttings grown from a lot registered as a lot collected from tested parent trees within British Columbia must be planted on areas within

a) the area of use in Appendix 2, or
b) the tested parent tree seed planning zone, or latitude range within a tested parent tree planning zone, and the overlap in elevation ranges,

that constitute the origin of the lot.

8.3.5 Seedlings or cuttings grown from a lot registered as a custom lot must be planted within

a) the tested parent tree seed planning zone referred to in paragraph (e) (i) of the definition of "origin," and
b) the elevation and latitude transfer limits in Appendix 4 that apply to
    i) the species of the lot, and
    ii) the natural stand seed planning zone that encompasses the largest proportion of the tested parent tree seed planning zone referred to in paragraph (a), as if this natural stand seed planning zone is the zone of origin referred to in Appendix 4,

applied to the weighted mean elevation and weighted mean latitude referred to in paragraph (e) (ii) and (iii) of the definition of "origin."

8.3.6 Seedlings or cuttings grown from a lot registered as a lot collected from

a) a natural stand, or
b) parent trees,

outside of British Columbia must be planted on areas that comply with the transfer limits in Table 6.1 or 6.2 of Appendix 6 that apply to the lot, based on its species and origin.

8.3.7 Despite this Part, if a lot collected from parent trees within British Columbia was registered under section 3 of the Tree Cone, Seed and Vegetative Material Regulation, prior to its repeal, a person, at his or her sole discretion, may choose to follow either

a) the applicable transfer limits referred to in this Part, or
b) the transfer limits that applied to the lot at the time it was registered.

8.3.8 Despite this Part, in areas of use within LW1 and LW2 tested parent tree seed planning zones as identified on the Chief Forester's Standards for Seed Use website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

a) a person, other than a timber sales manager, who is required to establish a stand under section 29 of the Act, may plant up to 10 per cent western larch seedlings, of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of that person, with respect to all agreements held by that person in a single management unit, and
b) a small operator may plant up to 10 percent or 5,000 western larch seedlings, whichever is greater, of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of that person with respect to that agreement.

8.3.9 Despite this Part, a timber sales manager who is required to establish a stand under section 29 of the Act may plant up to 10 per cent western larch seedlings of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of the timber sales manager,

a) with respect to all timber sale licences located within a single management unit, or

b) with respect to a specific timber sales licence, if it is not located within a management unit, in areas of use within LW1 and LW2 tested parent tree seed planning zones as identified on the *Chief Forester's Standards for Seed Use* website at: https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

8.4 Requirements that apply if Climate Based Seed Transfer Standards will be used under 8.2.1

8.4.1 Seedlings or cuttings grown from a registered lot must be planted on the CBST Area of Use identified for the tree species and Seed BEC unit in the "CBST Areas of Use for British Columbia" document located at the *Chief Forester's Standards for Seed Use* website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use.

8.4.2 The Branch must make available "CBST Areas of Use for British Columbia" referenced in 8.4.1, in the Seed Planning and Registry System.

APPENDIX 1 – REGISTRATION INFORMATION

The following information must be included in an application form submitted under section 5.1.1 for the purpose of registering a lot.

1 Applicant and owner

1. Name, address and phone number of individual submitting application
2. Name, address and phone number of person (individual or corporate) owning the lot or a portion of the lot
3. In the case of multiple owners, portion of the lot owned by each

2 General information about lot

2.1 Description of lot

1. Species
2. Type of lot: (a) seedlot or (b) vegetative lot
3. Registration sought: (a) lot collected from a natural stand within British Columbia; (b) lot collected from a superior provenance; (c) lot collected from untested parent trees within British Columbia; (d) lot collected from tested parent trees within British Columbia; (e) custom lot; (f) lot collected from a natural stand outside of British Columbia; (g) lot collected from parent trees outside of British Columbia

2.2 Cone storage and processing, seed processing and interim storage for seedlots

1. Name and address of facility at which the cones containing the seeds were stored
2. Dates on which the cones were stored at the facility referred to in #1
3. Name and address of facility at which the cones and seeds were processed
4. Dates on which the processing of the cones and seeds was carried out
5. Name and address of the facility at which the seedlot was stored prior to registration
6. Dates on which the seedlot was stored at the facility referred to in #5

3 Lots collected from natural stands within British Columbia

3.1 Collection area information for lots collected from natural stands, including superior provenances

1. Provenance name of collection area or closest geographic feature identified on a map (e.g., Birch Island)
2. Radius of collection area in kilometres
3. Mean latitude of collection area in degrees, minutes and seconds
4. Mean longitude of collection area in degrees, minutes and seconds
5. Collection area map in digital spatial format
6. Mean, lowest and highest elevation of collection area in metres
7. BEC unit in which collection area is located
8. Natural stand seed planning zone in which collection area is located
9. If the answer to #8 is the Maritime (M) Natural Stand Seed Planning Zone, is collection area on Haida Gwaii, the Mainland or Vancouver Island?

3.2 Additional collection area information for superior provenances

1. Does the collection area meet the criteria set out in Appendix 5? Yes or No

3.3 Collection information

1. Start and end dates of collection
2. Collection method: (a) felled trees; (b) squirrel caches; (c) tree climbing; (d) aerial
3. Number of trees from which the lot was collected
4. If the lot is a seedlot, volume of cones collected in hectolitres
5. If the lot is a vegetative lot, number of cuttings
6. Name and address of person (individual or corporate) who collected the lot

3.4 Storage of vegetative material from natural stands

1. Name, address and phone number of the facility at which the lot is being stored

4 Lots collected from parent trees within British Columbia

4.1 All lots collected from parent trees

1. Identification numbers of all parent trees contributing to the lot
2. Effective population size of the lot
3. Does the lot consist of seeds or vegetative material multiplied through the application of biotechnological processes? Yes or No
4. If the answer to #3 is Yes, confirm the following:
   - seedlings grown or cuttings derived from seeds or vegetative material produced through these biotechnological processes were tested and evaluated in the field (describe the methodology used)
   - the seeds or vegetative material, as applicable, were not subjected to genetic modification

4.2 Seedlots collected from parent trees

1. Name, address, phone number and identification number of the seed orchard at which the lot was collected
2. Start and end dates of collection
3. Volume of cones collected in hectolitres
4. The female and male gametic contribution of each parent tree contributing to the lot
5. The methodology used to determine the female and male gametic contribution of each parent tree
6. Was pollen contamination present in the seed orchard? Yes or No
7. If the answer to #6 is Yes, provide the following:
   - Proportion of contaminant pollen, expressed as a percentage of the total amount of pollen pollinating the parent trees
   - Methodology used to determine the proportion of contaminant pollen
8. Was the lot produced through controlled crosses? Yes or No

4.3 Vegetative lots collected from parent trees

1. Name, address, phone number and identification number of the production facility at which the lot was collected
2. Name, address and phone number of the production facility at which the lot is being stored, if different from the facility referred to in #1
3. Start date of collection
4. If the lot was collected directly from parent trees, without using donor plants, the number of parent trees
5. If the lot was collected from donor plants grown from seeds collected from parent trees, the number of donor plants
6. The total number of cuttings or propagules collected from each parent tree
7. The total number of all cuttings or propagules in the lot

5 Lots collected from outside British Columbia

5.1 Lots collected from natural stands

1. Does the collection area meet the criteria set out in Table 6.1 of Appendix 6? Yes or No
2. Provenance name of collection area or closest geographic feature identified on a map (e.g., French Butte)
3. Mean latitude of collection area in degrees, minutes and seconds
4. Mean longitude of collection area in degrees, minutes and seconds
5. Mean, lowest and highest elevation of collection area in metres
6. Start and end dates of collection
7. Collection method: (a) felled trees; (b) squirrel caches; (c) tree climbing; (d) aerial
8. Number of trees from which the lot was collected
9. If the lot is a seedlot, volume of cones collected in hectolitres
10. If the lot is a vegetative lot, number of cuttings
11. In the case of a vegetative lot, the name, address and phone number of the facility at which the lot is being stored
12. Name and address of person (individual or corporate) who collected the lot

5.2 Seedlots collected from parent trees

1. Does the seedlot consist of seeds collected from parent trees located at a seed orchard identified in Table 6.2 of Appendix 6? Yes or No (Identify orchard by orchard identification number, if one has been assigned)
2. Do the parent trees meet the parent tree criteria set out in Table 6.2 of Appendix 6? Yes or No
3. Description of the parent trees contributing to the lot, including their unique parent tree identifiers
4. Start and end dates of collection
5. The female and male gametic contribution of each parent tree contributing to the lot
6. The methodology used to determine the female and male gametic contribution of each parent tree
7. Effective population size of the lot
8. Has a breeding value been determined for a trait of the parent tree using the applicable criteria set out in section 5.4 of the standards? Yes or No
9. If the answer to #8 is Yes, specify trait, the breeding value for that trait and the methodology used to determine the breeding value
10. Was pollen contamination present in the orchard? Yes or No
11. If the answer to #10 is Yes, provide the following:
    - Proportion of contaminant pollen, expressed as a percentage of the total amount of pollen pollinating the parent trees
    - Methodology used to determine the proportion of contaminant pollen
12. Was the lot produced through controlled crosses? Yes or No
13. Does the lot consist of seeds multiplied through the application of biotechnological processes? Yes or No
14. If the answer to #13 is Yes, confirm the following:
    - seedlings grown or cuttings derived from seeds produced through these biotechnological processes were tested and evaluated in the field (describe the methodology used)
    - the seeds were not subjected to genetic modification

5.3 Vegetative lots collected from parent trees

1. Does the vegetative lot consist of vegetative material collected directly from parent trees, or from donor plants grown from seeds collected from parent trees, located in a seed orchard identified in Table 6.2 of Appendix 6? Yes or No (Identify orchard by orchard identification number, if one has been assigned)
2. Name, address and phone number of the facility at which the lot is being stored, if different from the seed orchard referred to in #1

3. Do the parent trees meet the parent tree criteria set out in Table 6.2 of Appendix 6? Yes or No
4. Description of the parent trees contributing to the lot, including their unique parent tree identifiers
5. Start and end dates of collection
6. The total number of cuttings or propagules collected from each parent tree
7. The total number of all cuttings or propagules in the lot
8. Effective population size of the lot
9. If the lot was collected directly from parent trees, without using donor plants, the number of parent trees
10. If the lot was collected from donor plants grown from seeds collected from parent trees, the number of donor plants
11. Does the lot consist of vegetative material multiplied through the application of biotechnological processes? Yes or No
12. If the answer to #11 is Yes, confirm the following:
    - cuttings grown from vegetative material produced through these biotechnological processes were tested and evaluated in the field (describe the methodology used)
    - the vegetative material was not subjected to genetic modification

APPENDIX 2 – SEED PLANNING ZONES

Seed planning zone (SPZ) spatial data may be downloaded or viewed on the DataBC website at: https://data.gov.bc.ca/ except for tested parent tree seed planning zones LW1 and LW2 which are found at the *Chief Forester's Standards for Seed Use* website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

Natural Stand Seed Planning Zones

The seed planning zones for all species of natural stands are identified by the codes and names set out by region in Table 2.1.

Table 2.1 Natural Stand Seed Planning Zones

Region	SPZ Code	SPZ Name
Coast	GL	Georgia Lowlands
	M	Maritime
	SM	Submaritime
Interior	BB	Big Bar
	BLK	Bulkley
	BSH	Bush
	CHL	Chilcotin
	CP	Central Plateau
	CT	Cariboo Transition
	DK	Dease Klappan
	EK	East Kootenay
	FIN	Finlay
	FN	Fort Nelson
	HH	Hudson Hope
	MGR	McGregor
	MIC	Mica
	MRB	Mt. Robson
	NCH	Nechako
	NST	Nass Skeena Transition
	QL	Quesnel Lakes
	SA	Shuswap Adams
	TOA	Thompson Okanagan Arid
	TOD	Thompson Okanagan Dry
	WK	West Kootenay

Tested Parent Tree Seed Planning Zones

The areas of use determined for tested parent trees for use within British Columbia are located within a Tested Parent Tree Seed Planning Zone. The tested parent tree seed planning zones are identified by the codes and names set out in Table 2.2 and Table 2.3.

Tested parent tree areas of use are described at the *Chief Forester's Standards for Seed Use* website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

Tested parent tree area of use spatial data (also known as seed planning units) may be downloaded or viewed on the DataBC website at: https://data.gov.bc.ca/

Table 2.2 Tested Parent Tree Seed Planning Zones

Species		SPZ Code	SPZ Name
Code	Name		
Cw	Western Redcedar	M	Maritime
Dr	Red Alder	M	Maritime
Fdc	Coastal Douglas-fir	GL	Georgia Lowlands
		M	Maritime
		SM	Submaritime
Fdi	Interior Douglas-fir	CT	Cariboo Transition
		EK	East Kootenay
		NE	Nelson
		PG	Prince George
		QL	Quesnel Lakes
		PGC	Prince George / Cariboo Transition
		QLN	Quesnel Lakes / Nelson
Hw	Western Hemlock	GL	Georgia Lowlands
		M	Maritime
Lw	Western Larch	EK	East Kootenay
		NE	Nelson
		NEK	Nelson / East Kootenay
Pli	Interior Lodgepole Pine	BV	Bulkley Valley
		CP	Central Plateau
		EK	East Kootenay
		NE	Nelson
		PG	Prince George
		TO	Thompson Okanagan
		BVC	Bulkley Valley / Central Plateau
		BVP	Bulkley Valley / Prince George
		CPP	Central Plateau / Prince George
		PGN	Prince George / Nelson
		TON	Thompson Okanagan / Nelson
Pw	Western White Pine	GL	Georgia Lowlands
		M	Maritime
		KQ	Kootenay Quesnel
Py	Ponderosa Pine	SI	Southern Interior
Ss	Sitka Spruce	GL	Georgia Lowlands
		M	Maritime

Table 2.2 Tested Parent Tree Seed Planning Zones

Species		SPZ Code	SPZ Name
Code	**Name**		
Sx	Interior Spruce (White, Englemann and their hybrids)	BV	Bulkley Valley
		EK	East Kootenay
		NE	Nelson
		PG	Prince George
		PR	Peace River
		TO	Thompson Okanagan
		BVP	Bulkley Valley / Prince George
		NEK	Nelson / East Kootenay
		PGN	Prince George / Nelson
		TON	Thompson Okanagan / Nelson
Yc	Yellow-cedar	M	Maritime

Table 2.3 Tested Parent Tree Seed Planning Zones for Climate Change

Species		SPZ Code	SPZ Name
Code	**Name**		
Lw	Western Larch	LW1	Lw Climate Change 1
		LW2	Lw Climate Change 2

APPENDIX 3 – LOTS FROM NATURAL STANDS

In this Table:
"SPZ" means natural stand seed planning zone;
"BGC zone" means biogeoclimatic zone;
"QCI" means Queen Charlotte Islands.

Species			Maximum range between lowest and highest elevation of collection area *(metres)* Sections 5.2.1.1(c)	Transfer Limits Section 8.2			
Code	Common name	SPZ of Origin		May be used within the following range (up/down) from mean elevation of origin *(metres)*	May be used within the following range (north/south) from mean latitude of origin *(degrees)*	May be used within the following range (east/west) from mean longitude of origin *(degrees)*	May be used within the SPZ of origin. In addition, may be used in other SPZs identified below, subject to any specified conditions
Ba[1]	Amabilis fir	M	300	+400 / -300	2°N / 2°S	No limit	SPZ of origin only
		SM	300	+400 / -300	2°N / 2°S	No limit	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+400 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Bg	Grand fir	GL	250	+300 / -200	2°N / 2°S	No limit	M
		M	250	+300 / -200	2°N / 2°S	No limit	GL
		SM	200	+200 / -200	2°N / 2°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+300 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Bl	Subalpine fir	M	200	+400 / -200	2°N / 2°S	No limit	SPZ of origin only
		SM	250	+500 / -200	2°N / 2°S	No limit	SPZ of origin only
		All Other SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Cw[2]	Western redcedar	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M	400	+600 / -400	3°N / 3°S	No limit	GL
		SM	300	+500 / -300	2°N / 2°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Fdc	Coastal Douglas-fir	GL	350	+350 / -350	3°N / 2°S	No limit	M
		M	350	+350 / -350	3°N / 2°S	No limit	GL
		SM	350	+350 / -350	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin

Species			Maximum range between lowest and highest elevation of collection area *(metres)*	Transfer Limits Section 8.2			
Code	**Common name**	**SPZ of Origin**	**Sections 5.2.1.1(c)**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from mean latitude of origin** *(degrees)*	**May be used within the following range (east/west) from mean longitude of origin** *(degrees)*	**May be used within the SPZ of origin. In addition, may be used in other SPZs identified below, subject to any specified conditions**
Fdi	Interior Douglas-fir	All Interior SPZs South of 52°, except EK	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Interior SPZs North of 52° and EK	150	+400 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Hw[1]	Western hemlock	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M – other than QCI	300	+300 / -300	3°N / 3°S	No limit	SPZ of origin only
		M – QCI	300	+300 / -300	3°N / 3°S and no further north than latitude 54°30'	No limit	SPZ of origin only
		SM	200	+200 / -200	2°N / 2°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+300 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Lw	Western larch	All SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ
Plc	Coastal lodgepole pine	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M	250	+300 / -200	2°N / 2°S	No limit	GL
		SM	150	+200 / -100	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
Pli	Interior lodgepole pine	SM	200	+500 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
		Interior SPZ South of 56°	200	+500 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
		TOA	[between 1300 to 1600 m elevation]	+500 / -100	No limit	No limit	BB
		TOD	[between 1200 to 1400 m elevation]	+500 / -100	No limit	No limit	BB
		Interior SPZ North of 56°	125	+350 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Py	Ponderosa pine	All SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	SM and Interior SPZ if used within the BGC zone of origin

Species			Maximum range between lowest and highest elevation of collection area *(metres)*	Transfer Limits Section 8.2			
Code	**Common name**	**SPZ of Origin**	**Sections 5.2.1.1(c)**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from mean latitude of origin** *(degrees)*	**May be used within the following range (east/west) from mean longitude of origin** *(degrees)*	**May be used within the SPZ of origin. In addition, may be used in other SPZs identified below, subject to any specified conditions**
Pw	Western white pine	GL	700	+700 / -700	No limit	No limit	M
		M	700	+700 / -700	No limit	No limit	GL
		SM	700	+700 / -700	No limit	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	700	+700 / -700	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Ss	Sitka spruce	GL	250	+400 / -200	4°N / 1°S	No limit	M
		M – other than QCI	250	+400 / -200	4°N / 1°S	No limit	GL
		M - QCI	250	+400 / -200	No limit	No limit	SPZ of origin only and only on QCI
		SM	200	+300 / -200	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
Sx	Interior Spruce (White, Englemann and their hybrids)	SM	300	+600 / -200	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	300	+600 / -200	2°N / 1°S	5°W / 2°E	Interior SPZ if used within the BGC zone of origin
Sxs	Sitka x interior spruce	All SPZs	200	+200 / -200	2°N / 1°S	No limit	SPZ of origin only
Yc	Yellow-cedar	M (≤ 1100 m)	300	+600 / no limit down	4°N / 3°S	No limit	SPZ of origin only
		M (> 1100 m)	300	+ 500 / - 300	4°N / 3°S	No limit	SPZ of origin only
		SM	300	+500 / -300	2°N / 2°S	No limit	SPZ of origin only
		All Other SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Other	Other species	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M	250	+300 / -200	3°N / 2°S	No limit	SPZ of origin only
		SM	200	+200 / -200	1.5°N / 1.5°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+300 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin

[1] Ba and Hw – transfer of seed more than 200 m downward is discouraged
[2] Cw – transfer of seed more than 300 m downward is discouraged

APPENDIX 4 – LOTS FROM UNTESTED PARENT TREES

In this Table,
"SPZ" means natural stand seed planning zone;
"QCI" means Queen Charlotte Islands.

Species			Natural Stand Criteria Section 5.2.2.1 (f)		Transfer Limits Section 8.3		
Code	**Common name**	**SPZ of Origin**	**Maximum range between lowest and highest elevation** *(metres)*	**Maximum range between northernmost and southern-most latitude** *(degrees)*	**May be used within the following range (up/down) from weighted mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from weighted mean latitude of origin** *(degrees)*	**May be used within the following SPZs, subject to any specified conditions**
Ba	Amabilis fir	M	600	4	+300 / -300	2°N / 2°S	M
		SM	600	4	+300 / -300	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Bg	Grand fir	GL	500	4	+300 / -200	2°N / 2°S	GL or M
		M	500	4	+300 / -200	2°N / 2°S	M or GL
		SM	400	4	+200 / -200	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Bl	Subalpine fir	M	400	4	+200 / -200	2°N / 2°S	M
		SM	500	4	+300 / -200	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Cw	Western redcedar	GL	No limit	No limit	No limit	No limit	GL
		M	800	6	+400 / -400	3°N / 3°S	M
		SM	600	4	+300 / -300	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Fdc	Coastal Douglas-fir	GL	700	5	+350 / -350	3°N / 2°S	GL or M
		M	700	5	+350 / -350	3°N / 2°S	M or GL
		SM	700	3	+350 / -350	2°N / 1°S	SM
Fdi	Interior Douglas-fir	All Interior SPZs South of 52°, except EK	500	No limit	+300 / -200	No limit	SPZ of origin only
		All Interior SPZs North of 52° and EK	300	No limit	+200 / -100	No limit	SPZ of origin only

Species			Natural Stand Criteria Section 5.2.2.1 (f)		Transfer Limits Section 8.3		
Code	**Common name**	**SPZ of Origin**	**Maximum range between lowest and highest elevation** *(metres)*	**Maximum range between northernmost and southern-most latitude** *(degrees)*	**May be used within the following range (up/down) from weighted mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from weighted mean latitude of origin** *(degrees)*	**May be used within the following SPZs, subject to any specified conditions**
Hw	Western hemlock	GL	600	6	+300 / -300	3°N / 3°S	GL
		M – other than QCI	600	6	+300 / -300	3°N / 3°S	M
		M – QCI	600	No limit	+300 / -300	3°N / 3°S and no further north than latitude 54°30'	M
		SM	400	4	+200 / -200	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Lw	Western larch	All SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Plc	Coastal lodgepole pine	GL	500	4	+300 / -200	2°N / 2°S	GL
		M	500	4	+300 / -200	2°N / 2°S	M
		SM	300	3	+200 / -100	2°N / 1°S	SM
Pli	Interior lodgepole pine	Interior SPZ South of 56°4'	400	No limit	+300 / -100	No limit	SPZ of origin only
		Interior SPZ North of 56°	250	No limit	+150 / -100	No limit	SPZ of origin only
Py	Ponderosa pine	All SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Pw	Western white pine	GL	1400	No limit	+700 / -700	No limit	GL or M
		M	1400	No limit	+700 / -700	No limit	M or GL
		SM	1400	No limit	+700 / -700	No limit	SM
		All Other SPZs	1400	No limit	+700 / -700	No limit	SPZ of origin only
Ss	Sitka spruce	GL	500	5	+300 / -200	4°N / 1°S	GL or M
		M – other than QCI	500	5	+300 / -200	4°N / 1°S	M or GL
		M – QCI	500	No limit	+300 / -200	No limit	M and only in QCI
		SM	400	3	+200 / -200	2°N / 1°S	SM
Sx	Interior Spruce (White, Englemann and their hybrids)	SM	600	3	+400 / -200	2°N / 1°S	SM
		All Other SPZs	600	No limit	+400 / -200	No limit	SPZ of origin only
Sxs	Sitka x interior spruce	M, SM	400	3	+200 / -200	2°N / 1°S	SPZ of origin only
		All Other SPZs	400	No limit		No limit	SPZ of origin only

Species			Natural Stand Criteria Section 5.2.2.1 (f)		Transfer Limits Section 8.3		
Code	**Common name**	**SPZ of Origin**	**Maximum range between lowest and highest elevation** *(metres)*	**Maximum range between northernmost and southern-most latitude** *(degrees)*	**May be used within the following range (up/down) from weighted mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from weighted mean latitude of origin** *(degrees)*	**May be used within the following SPZs, subject to any specified conditions**
Yc	Yellow-cedar	M (≤ 1100 m)	600	7	+400 / no limit down	4°N / 3°S	M
		M (> 1100 m)	600	7	+300 / -300	4°N / 3°S	M
		SM	600	4	+300 / -300	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Other	Other species	GL	500	5	+300 / -200	3°N / 2°S	GL
		M	500	5	+300 / -200	3°N / 2°S	M
		SM	200	3	+200 / -200	1.5°N / 1.5°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only

APPENDIX 5 – SUPERIOR PROVENANCES

In Tables 5.1 and 5.2, with respect to genetic worth:
"G" means growth;
"R" means pest resistance.

Table 5.1 Lodgepole Pine Superior Provenances

Species			Collection Area Criteria Section 5.2.1.2 (b)				Genetic Worth Section 7.2 (a) (iii)	Transfer Limits Section 8.4	
Code	Common name	Provenance	Located within the following elevation range *(metres)*	Latitude of centre point of area *(degrees / minutes)*	Longitude of centre point of area *(degrees / minutes)*	Additional criteria		May be used within the following natural stand seed planning zones	May be used within the following range (up/down) from mean elevation of origin *(metres)*
Pli	Interior Lodgepole Pine	Bowron River	620 – 720	53° 54'	122° 00'	Within natural stands located within an 8 km radius of the latitude and longitude of centre point of area	G+03	MGR*	+500 / -200
								CHL, CP, CT, MGR*, MRB, NCH, QL	+300 / -200
		Canoe Creek	840 – 940	50° 42'	119° 11'			SA*	+500 / -200
								SA,* TOA, TOD, WK	+300 / -200
		Cartwright Lake	1120 – 1220	50° 49'	116° 26"			EK*	+500 / -200
								BSH, EK*, MRB, SA, TOA, TOD, WK	+300 / -200
		Champion Lakes	950 – 1050	49° 11'	117° 35'			WK*	+500 / -200
								BSH, EK, TOA, TOD, WK*	+300 / -200
		China Valley	1080 – 1180	50° 44'	119° 30'			TOD*	+500 / -200
								SA, TOD*, TOA	+300 / -200
		Inonoaklin Creek	530 – 630	49° 54'	118° 12'			WK*	+500 / -200
								BSH, EK, SA, TOD, WK*	+300 / -200
		Jackfish Creek	410 – 510	58° 32'	122° 42'			FN*	+400 / -200
								DK, FN*	+200 / -200
		Joe Rich Creek	1020 – 1120	49° 48'	119° 05'			SA*	+500 / -200
								SA*, TOA, TOD	+300 / -200
		Larch Hills	730 – 830	50° 42'	119° 11'			SA*	+600 / -200
								BSH, EK, SA*, TOD, WK	+400 / -200

Species			Collection Area Criteria Section 5.2.1.2 (b)				Genetic Worth Section 7.2 (a) (iii)	Transfer Limits Section 8.4	
Code	**Common name**	**Provenance**	**Located within the following elevation range** *(metres)*	**Latitude of centre point of area** *(degrees / minutes)*	**Longitude of centre point of area** *(degrees / minutes)*	**Additional criteria**		**May be used within the following natural stand seed planning zones**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*
		Marl Creek	900 – 1000	51° 31'	117° 11'			BSH*	+500 / -200
								BSH*, EK, MRB, SA, TOA, TOD, WK	+300 / -200
		Lossie Creek	1110 – 1210	50° 27'	118° 54'			SA*	+500 / -200
								SA*, TOA, TOD, WK	+300 / -200
		Nechako River	680 – 780	54° 01'	124° 31'			NCH*	+500 / -200
								BLK, CP, MGR, MRB, NCH*, QL	+300 / -200
		Oie Lake	940 – 1040	52° 00'	121° 12'			CT*	+500 / -200
								BB, BLK, CHL, CT*, MGR, MRB, NCH, QL	+300 / -200
		Settlers Road	990 – 1090	50° 31'	115° 44'			EK*	+500 / -200
								BSH, EK*, MRB, SA, TOA, TOD, WK	+300 / -200
		Telkwa Low	470 – 570	54° 39'	127° 03'			BLK*	+500 / -200
		Udy Creek	1050 – 1150	53° 01'	123° 14'			CHL*	+500 / -200
								BB, BLK, CHL*, CT, MRB, NCH, QL	+300 / -200
		Wentworth Creek	1010 – 1110	50° 58'	120° 20'			TOD*	+500 / -200
								BB, TOA, TOD*	+300 / -200
		Whittier Creek	710 – 810	53° 07'	122° 42'			NCH*	+500 / -200
								CHL, CT, MGR, MRB, NCH*, QL	+300 / -200

*Seed planning zone of origin

Table 5.2 Interior Spruce, Sitka Spruce and Yellow-cedar Superior Provenances

Species			Collection Area Criteria Section 5.2.1.2 (b)					Transfer Limits Section 8.4		
Code	**Common name**	**Provenance**	**Located within the following elevation range** *(metres)*	**Latitude of centre point of area** *(degrees / minutes)*	**Longitude of centre point of area** *(degrees / minutes)*	**Additional criteria**	**Genetic Worth Section 7.2 (a) (iii)**	**May be used within the following natural stand seed planning zones**	**May be used within the following elevation range** *(metres)*	**May be used within the following latitude range** *(degrees)*
Ss	Sitka spruce	Big Qualicum	1 – 100	n/a	n/a	Within natural stands located in coastal plain drainages between 49° 42' (Comox) and 49° 12' (Nanoose Bay) on Vancouver Island	R+64	M, GL	1 – 500	48° – 55°
		Haney	1 – 300	n/a	n/a	Within natural stands located within the UBC Malcolm Knapp Forest and between Kanaka Creek and Alouette River north of Haney	R+64	M, GL	1 – 500	48° – 55°
Sx	Interior Spruce (White, Englemann and their hybrids)	Birch Island	400 – 500	n/a	n/a	Within natural stands located along the North Thompson River between 51°35' (Vavenby) and 51°39' (Clearwater)	G+03	BSH, MGR, MIC, MRB, SA, QL	1 – 1000	No limit
		Horsefly	800 – 1000	52° 25'	121° 25'	Within natural stands located within a 15 km radius of the latitude and longitude of centre point	G+02	BSH, CP, MGR, MRB, SA, QL	400 – 1000	No limit
Yc	Yellow-cedar	Waukwass	700 – 800	50° 29'	127° 18'	Within natural stands located within a 2 km radius of the latitude and longitude centre point	G+02	M	0 – 1100	48° – 52°

APPENDIX 6 – NON-BC SEED SOURCES

Table 6.1 Non-BC Natural Stands

Species		Collection Area Criteria Section 5.2.3.1 (b)			Transfer Limits Section 8.7 (a)		
Code	**Common name**	**Elevation limits** *(metres)*	**Maximum range between lowest and highest elevation** *(metres)*	**Additional criteria**	**May be used within the following natural stand seed planning zones**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*	**May be used within the following latitude range** *(degrees)*
Bp (Bn)	Noble fir	≥ 700	300	Within natural stands located north of 45° in Washington or Oregon, USA	M, SM	+300 / -400	48° – 52°
Fdc	Coastal Douglas-fir	No limit	350	Within natural stands located north of 46° in Washington or Oregon, USA	GL, M	+350 / -350	48° – 52°
Ss	Sitka spruce	≤ 200	250	Within natural stands located within 30 km of Pacific Ocean in Washington or Oregon, USA	M Queen Charlotte Islands only	+300 / no limit down	No limit

Table 6.2 Non-BC Parent Trees (Seed Orchards)

Species		Seed Orchard	Parent Tree Criteria Section 5.2.3.1 (a) (ii) (B)	Transfer Limits Section 8.7 (b)		
Code	**Common name**			**May be used within the following parent tree seed planning zones**	**May be used within the following elevation range** *(metres)*	**May be used within the following latitude range** *(degrees)*
Bp (Bn)	Noble fir	Weyerhaeuser's Sequim Seed Orchard in Washington, USA	Tested or untested parent tree selected from natural stands located north of 45° at an elevation ≥ 700 m	M	+300 / -400 from the weighted mean elevation of parent tree stands*	48° – 52°
Fdc	Coastal Douglas-fir	Weyerhaeuser's Rochester Seed Orchard and Sequim Seed Orchard in, Washington, USA and its Medford Seed Orchard in Oregon, USA	Tested parent tree selected from natural stands located north of 46° or bred from other tested parent trees that have been tested and found suitable north of 46°, °and established in the Cascade low, Longview Low, Vale Low and Twin Harbors Low blocks at the identified Weyerhaeuser seed orchards	GL, M	0– 700	48° – 52°
		Weyerhaeuser's Sequim Seed Orchard in, Washington, USA, and its Turner Seed Orchard in Oregon, USA	Tested parent tree selected from natural stands located north of 46° or bred from other tested parent trees that have been tested and found suitable north of 46°, and established in the Longview High, Cascade High and Cascade -Vale High blocks at the identified Weyerhaeuser seed orchards.	M	700-1200]	48° – 52°
Pw	Western white pine	Dorena Seed Orchards, Oregon, USA	Tested or untested parent tree selected from natural stands located in Washington or Oregon	M	0 – 1000	No limit
		Bingham Seed Orchards, Moscow, Idaho, USA	Tested or untested parent tree selected from natural stands located in Washington or Idaho	KQ	400 – 1400	No limit
				M	1000 – 1400	No limit

* The elevation range transfer limit for Noble fir is based on the mean elevation of the natural stands from which the parent trees were selected, weighted by the proportional parental contribution to the lot of the parent trees, recorded in metres.

APPENDIX 7 – PARENTAL CONTRIBUTION, EFFECTIVE POPULATION SIZE AND GENETIC WORTH

1. Parental Contribution

1.1 Vegetative lot

The parental contribution (P_i) of a particular parent tree to a vegetative lot is determined in accordance with the following formula:

$P_i = X_i / X_n$

where:

X_i = total number of cuttings or propagules collected from parent tree *i* in the lot
X_n = total number of cuttings or propagules collected from all parent trees *n* in the lot

1.2 Seedlots

The parental contribution (P_i) of a particular parent tree to a seedlot is determined in accordance with the following formula:

$P_i = (F_i + M_i) / 2$

where:

F_i = female gametic contribution for parent tree *i* as determined below
M_i = male gametic contribution for parent tree *i* as determined below

Determining F_i

The female gametic contribution of a particular parent tree is determined in accordance with the following formula:

$F_i = X_i / X_n$

where:

X_i = seed contribution of parent tree *i* as determined in accordance with generally accepted scientific methodology
X_n = total seed contribution of all parent trees *n*

Determining M_i

The male gametic contribution of a particular parent tree is determined in accordance with the following formula:

$M_i = Y_i / Y_n$

where:

Y_i = pollen contribution of parent tree *i* as determined in accordance with generally accepted scientific methodology
Y_n = total pollen contribution of all parent trees *n*

2. Effective Population Size

The effective population size (*Ne*) for a lot collected from parent trees is determined in accordance with the applicable formula set out below.

2.1 Unrelated parent trees

The *Ne* for lots collected from parent trees that are not related to each other is determined in accordance with the following formula:

$Ne = 1 / \sum(P_i^2)$

where:

P_i = parental contribution for parent tree *i* as determined in accordance with the formula set out in
(a) section 1.1 if the lot is a vegetative lot, or
(b) section 1.2 if the lot is a seedlot

2.2 Related parent trees

The *Ne* for lots collected from parent trees where two or more of the parent trees are related to each other is determined in accordance with the following formula:

$Ne = 0.5 / \sum(P_i P_j c_{ij})$

where:

P_i = parental contribution for parent tree *i* as determined in accordance with the formula set out in
(a) section 1.1 if the lot is a vegetative lot, or
(b) section 1.2 if the lot is a seedlot

P_j = parental contribution for parent tree *j* as determined in accordance with the formula set out
(a) section 1.1 if the lot is a vegetative lot, or
(b) section 1.2 if the lot is a seedlot

c_{ij} = coefficient of relatedness (co-ancestry) between parent tree *i* and parent tree *j* as determined below

Determining c_{ij}

If parent tree *i* and parent tree *j* are the same, then $c_{ij} = 0.50$

If parent tree *i* and parent tree *j* have the same parent trees, or if parent tree *i* is the parent of parent tree *j* or vice versa, then $c_{ij} = 0.25$

If parent tree *i* and parent tree *j* share one common parent tree, then $c_{ij} = 0.125$

If parent tree *i* and parent tree *j* are not related in any way, then $c_{ij} = 0$

3. Genetic Worth

In this section, **"pollen contamination"** means pollen, originating from a natural stand outside a seed orchard, that contributes to the pollination of female cones on parent trees in the orchard.

The genetic worth (*GW*) for lots collected from parent trees is determined in accordance with the applicable formula set out below.

3.1 Vegetative lots

The *GW* for a vegetative lot collected from parent trees is determined in accordance with whichever of the following formulas applies:

$GW = \sum P_i CV_i$ or $GW = \sum P_i BV_i$

where:

P_i = parental contribution for parent tree *i* as determined in accordance with section 1.1
CV_i = clonal value of parent tree *i*
BV_i = breeding value of parent tree *i*

In the case of a vegetative lot registered as a custom lot, a breeding value determined in accordance with the requirements of section 5.4.6 of the standards is always used to calculate *GW*.

3.2 Seedlots

The *GW* of seedlots collected from parent trees is calculated in accordance with the applicable formula set out in sections 3.2.1 through 3.2.3 below.

In the case of a seedlot registered as a custom lot, a breeding value determined in accordance with the requirements of section 5.4.6 of the standards is always used to calculate *GW*.

3.2.1 Seedlots produced in a seed orchard without pollen contamination

The *GW* for seedlots produced in seed orchards not subject to pollen contamination is determined in accordance with the following formula:

$GW = \sum BV_i (F_i + M_i) / 2$

where:

BV_i = breeding value of parent tree *i*
F_i = female gametic contribution of parent tree *i*
M_i = male gametic contribution of parent tree *i*

3.2.2 Seedlots produced in a seed orchard with pollen contamination

The *GW* for seedlots produced in seed orchards subject to pollen contamination is determined in accordance with the following formula:

$GW = \sum\{(PC \times BVCP) + BV_i [F_i + M_i (1\text{-}PC)]\} / 2$

where:

PC = the proportion of contaminant pollen, expressed as a percentage of the total amount of pollen pollinating parent tree *i*, as determined in accordance with generally accepted scientific methodology
BVCP = breeding value of contaminant pollen as determined in accordance with generally accepted scientific methodology
BV_i = breeding value of parent tree *i*
F_i = female gametic contribution of parent tree *i*
M_i = male gametic contribution of parent tree *i*

3.2.3 Seedlots produced through a controlled cross of parent trees in a seed orchard

The *GW* for seedlots produced through a controlled cross where two or more parent trees are mated, and pollen from all other sources is excluded, is determined in accordance with the following formula:

$$GW = \sum n_{ij} [(BV_i + BV_j) / 2] / n$$

where:

BV_i = breeding value of parent tree *i* from which cones or seeds are collected
BV_j = breeding value of parent tree *j* contributing to the pollen mix as determined below
n_{ij} = number of cones or seeds from parent tree *i* crossed with pollen from parent tree *j*
n = total number of seeds or cones of all parent trees

Determining BV_j

If the pollen used in the controlled cross is collected from a single parent tree, BV_j is the breeding value of that parent tree.

If the pollen used in the controlled cross is collected from two or more parent trees, BV_j is the mean breeding value of the pollen mix, as determined in accordance with the following formula:

$$BV_j = \sum BV_k w_k / w$$

where:

BV_k = breeding value of parent *k* contributing to the pollen mix
w_k = the volume or weight of parent *k* contributing to the pollen mix
w = the total volume or weight of the pollen mix