

Haida Gwaii Forest Stewardship Plan Supporting Information

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1.0 Preamble

This FSP Supporting Information document is meant to assist reviewers in the FSP approval process. Where necessary, rationales have been provided for results and strategies within the FSP that may require added clarification and background info, in order for FSP reviewers to more fully understand the intent and direction proposed by the Plan Holders.

It should be noted that this document is not meant to be an implementation guide for eventual FSP users. As the FSP is a multi-participant plan, each Plan Holder will need to develop their own procedures and processes to ensure that the Plan is effectively implemented. Information may be sourced from this Supporting Information document to develop individual procedures, but this document will not be sufficient to implement the FSP.

2.0 Application

Protected Area Impacts

In general, it is understood that Plan Holder operations must factor in adjacent landholders and that operations within Plan Holder tenures should not adversely affect areas outside of the Plan area, including Parks or Protected Areas. As such, Plan Holders will plan their operations to factor in adjacent landholders and the values that may potentially be affected. Any management strategies or actions implemented to protect adjacent landholders will be confined to the Plan area (i.e., treatments will not occur outside of the FSP Area).

Where Plan Holders operate in close proximity to other stakeholders or landholders, the standard approach taken will be to contact the stakeholder/ landholder early in the development process and work proactively to ensure that stakeholder/ landholder concerns are considered.

Legal Surveys

Where Plan Holders propose development areas in the vicinity of a Protected Area or other property/ tenure boundary, it is incumbent on the Plan Holder to ensure they are not operating outside of the Plan area and that they do not encroach on Protected Areas or other tenures. This is a requirement established under the Forest Act, and is not an objective to be addressed under the FSP. As property/ tenure boundaries are spatially defined using Global Positioning System (GPS) information, it is expected that when Plan Holders commence development adjacent a Protected Area or other property/ tenure boundary, the first issue that will be addressed is the location of the tenure boundaries using commercial grade GPS equipment. In addition to spatially locating boundaries, Plan Holders will typically contact potentially affected stakeholders and work collaboratively to ensure that their management concerns are addressed (e.g., offer to meet with BC Park Representatives to field check Park boundary locations).

3.0 Results & Strategies

Land Use Objectives (LUO s. 3-23)

Cultural Objectives

LUO s. 4

The Council of the Haida Nation has developed a competency based program (open to Haida and non-Haida) that caters to the LUO requirements. Certified surveyors need to pass a written and practical examination (65% minimum on both to pass). Examinations are 1.5 days in length and include testing for CMT identification, monumental cedar identification, cultural plant identification, survey methodology, and standards and ecosystem classification.

Version 1 of the Cultural Feature Identification Standards (CFIS) Manual was recently released in January 2011. The CFIS program also includes a quality assurance/ audit aspect to ensure that the quality of surveys remains consistently high. Approximately 10% of Surveys will receive full audits, annually.

Tracking Ledger

The current “inventory of Cedar Stewardship Areas” is established under the LUO. Where Plan Holders propose to harvest within a Cedar Stewardship Area (CS Area) they will track the depletions, as outlined in the FSP. In order to ensure all commitments are met, Plan Holders will maintain a ledger to track the additions/ removals to the baseline inventory noted above. Although the Ledger has yet to be developed, it will likely be a database (e.g., Excel spreadsheet or GIS layer), and may also have mapping elements (i.e., GIS), in order to track both the hectares of CS Area harvested by LU, as well as a spatial representation to identify areas.

As the FSP requirements in regards to CS Areas are applicable to the FSP Holders as a group, each Plan Holder will be required to provide input into the Ledger.

Haida Traditional Heritage Features

LUO s. 5

Applicable HTHFs

The Council of the Haida Nation’s Cultural Features Identification Survey manual indicates that where potential HTHFs are identified during a survey an independent Archaeological Impact Assessment (AIA) will be required/ conducted. Where AIAs are completed, it is standard practice for the archaeological report to indicate the cultural significance of features that are identified. Therefore, the AIA will be considered the source for determining the significance of the identified feature and whether it is ultimately considered an HTHF (i.e., is listed in Schedule 2 of the LUO and is determined to be of continued cultural significance to the Haida Nation).

Karst

“Karst Features” are identified in the LUO as Class 2 HTHFs, and have results specified specific to the LUO Objectives for HTHFs. Under the LUO, Karst Features are not well defined and would therefore include all potential karst occurrences.

However, “Karst Resource Features” have also been established under GAR, and includes a more specific definition. Additional results have been specified for the FRPA requirements.

For clarity, if a karst occurrence meets the definition of Karst Resource Feature as designated under the GAR Order, it will also be managed to the higher standard, which will ensure that it is not damaged or rendered ineffective, regardless of any intergovernmental processes that may be completed under the LUO Objective for HTHFs.

Haida Traditional Forest Features

LUO s. 6

Class 2 HTFFs

To be consistent with the LUO, the establishment of stand level retention will be one of the strategies employed to maintain the integrity of the HTFF. The use of stand level retention will be at the discretion of the signing Forester and will be detailed in the Site Plan. Additional strategies for protecting and maintaining the integrity of the HTFF are also provided.

Strategies to Protect Class 3 HTFFs

Where Class 3 HTFFs are identified within a Development Area, Plan Holders will protect the HTFF occurrences within stand level retention (e.g., no-harvest zones, management zones), to the extent practicable. To be clear, the strategy is not to create new areas of stand level retention in order to protect Class 3 HTFF occurrences, but rather to use the retention that has already been established for other objectives to protect Class 3 HTFFs.

Therefore, the number of Class 3 HTFFs that are protected within stand level retention will be variable and could potentially range from 0-100% retention of Class 3 HTFFs within a given development area.

The protection of the Class 3 HTFFs will be at the discretion of the signing Forester and will be detailed in the Site Plan.

Cedar Retention
LUO s. 7

15% Cedar Retention Requirements

Several comments were received regarding the results proposed in the first draft of the FSP for the 15% cedar retention objective. One of the recurring issues was the proposal to base the percentage of cedar retention on inventory information gathered from the cruise for the development area. The concept of using the cruise was meant to provide a consistent and transparent process for calculating how much cedar (measured in stems per hectare) were to be retained, allowing for easier application, interpretation and compliance review.

However, reviewers felt that the cruise concept was problematic and inconsistent with the LUO. The next most logical source of information that is consistently available for meeting the 15% cedar retention objective is to use inventory mapping information. Therefore, Plan Holders have developed strategies in the FSP to meet the objective, based in calculating the weighted cedar retention requirements using the inventory mapping information available. An example to illustrate the calculations is provided in Figure 1, below.

Figure 1: 15% cedar retention calculation example

Sample Development Area

Development Area = 35.0ha, consisting of 3 inventory polygons

Polygon A= 15.0ha - Inventory= C₁₀

Polygon B = 10.0ha - Inventory= H₅B₅

Polygon C = 10.0ha - Inventory = H₅C₅

No-harvest zones established for Type I Fish Habitat= 3.5ha (Inventory = C₁₀)

Monumental Cedar No-harvest zone= 2.5ha (Inventory = H₅C₅)

Weighted Cedar Content Calculation

The weighted pre-harvest cedar composition for the Development Area is calculated as follows:

Cedar % = (sum areas of inventory polygons * associated % cedar content)/area of Development Area
= [(Polygon A* Cw inv. for A) + (Polygon B * Cw inv. for B) + (Polygon C * Cw inv. for C)]/
area of Development Area
= [(15.0ha*100%) + (10.0ha*0%) + (10.0ha*50%)]/35.0ha
= [(15.0 + 0 + 5.0ha)]/35.0ha
= 20.0ha/35.0ha
= 57% = pre-harvest combined cedar content for the Development Area (or 20.0ha, measured in area)

Therefore, as the Development Area is > 10.0ha and the combined pre-harvest cedar content is > 30%, the 15% cedar retention requirement applies.

Calculation of Cedar Area Required

In order to meet the cedar retention requirement, Plan Holders must retain a minimum of 15% cedar, measured in hectares, consistent with the FSP Strategies. For the example above, the minimum cedar retention area required would be calculated as follows:

The minimum Cedar Retention Area required = 15% * the weighted cedar content for the Development Area.
As calculated above, the weighted cedar content was 57%, or 20.0ha
= 15%*20.0ha
= 3.0ha

Therefore, for the Development Area, 3.0ha of cedar area must be reserved (i.e., 3.0ha of C₁₀ inventory; or 6.0ha of H₅C₅).

Establishing Cedar Reserves

In this example, there are two retention areas already established. The sum of the weighted cedar retention areas associated with the established retention areas is calculated as follows:

Cedar content for Type I Fish Habitat no-harvest zone = (area* cedar inventory for polygon)
= 3.5ha*100%
= 3.5ha

Cedar content for Monumental Cedar no-harvest zone = (area* cedar inventory for polygon)
= 2.5ha*50%
=1.25ha

Therefore, the total weighted area of existing cedar retention areas = 3.5 + 1.25ha = 4.75ha

Given that there are > 3.0ha of cedar retention areas established for the Development Area and that both of the designated cedar retention areas are greater than 1.0ha in size, for this example, provided that the prescribing Forester confirms that the cedar retention stands contain a range of diameters of cedar that are representative of the pre-harvest stand, all of the strategies for the 15% cedar retention requirement are deemed to be met.

With regards to the strategy committing to retaining a range of cedar which is representative of the pre-harvest area, the intent is for Plan Holders to implement this in the same way that licensees currently use to establish Wildlife Tree Patches. In essence, it will be left to the prescribing Forester to ensure that the cedar retention stands that are selected to meet the 15% cedar retention requirement are representative of the pre-harvest stands and this should be documented within the Site Plan.

20% Cedar Regeneration Requirements

While the general intent from the LUO for this objective is fairly straightforward, the implementation is more complicated. In order to attempt to produce the most clear and consistent results, Plan Holders have proposed basing the determination of “composition” based on stems per hectare (as indicated in the cruise compilation), rather than a volumetric approach (use of sph is consistent with previous MSSc procedures).

The requirements under LUO s. 7(3) are linked to the Stocking Standards as well. Under previous FSPs there have been minimum stocking standards for cedar (i.e., MSSc) for some site-series. However, under this FSP, the MSSc concept has been replaced by the Cedar Retention strategy and left out of the Stocking Standards.

Cedar obligations will be declared within the Ministry of Forests (MOF) RESULTS system, similar to other obligations (the same milestone date as Free Growing). Given that the LUO cedar obligation is a new requirement (different from the MSSc concept) there may be some clarification required between Plan Holders and the MOF to ensure that obligation submissions occur as intended.

Specific rationales for Cedar Retention objective are provided (by FSP section) as follows:

6.11 Where development areas have pre-harvest cedar (western redcedar and yellow cedar) composition greater than 20% in the harvested area, as indicated in the cruise compilation (measured in percent of cedar sph, not including dead potential or dead useless), then the Plan Holder will regenerate the area according to the minimum post-harvest cedar composition and strategies listed below, subject to Section 6.12.

In regards to the use of stem per hectare (sph) versus volume (m³) or basal area (m²), it was thought that sph would provide the most accurate picture of what was located (found) on site and would be consistent with previous MSSc procedures. Using volume or basal area may have resulted in varying percentages for similar blocks. With regards to the removal of dead potential and dead useless from the cruise information (i.e., net-merch volume), it was determined that they should not be included in the calculation, as they are no longer contributing to the Mean Annual Increment of the site. This portion of the LUO objective is focussed on cedar regeneration, in essence, replacing live trees with live trees. Using the net-merch volume is the most logical and consistent approach for achieving the objective.

The cedar commitment will be determined on a cutblock by cutblock basis. The cedar regeneration requirement for a cutblock will be calculated by multiplying the NAR times the appropriate Minimum Post-Harvest Cedar Composition, as indicated in Table 8, below. Location of planted cedar within the cutblock will be at the discretion of the prescribing Forester, and consistent with approved stocking standards.

Table 8: Minimum Post-Harvest Cedar Composition, Based on Pre-Harvest Cedar Composition

Pre-harvest Cedar Composition %	Minimum Post-Harvest Cedar Composition (sph)
20-29	100
30-39	150
40-49	175
50-59	200
60-69	250
70-79	300
80-89	350
90-100	400

The Net Area to Reforest (NAR) is used as this is the only area that will be restocked. All reserves and NPUNN will not be restocked. Table 8 was established based on the former Cedar Policy for the Haida Gwaii Forest District, with the top two pre-harvest composition categories being increased from what the Policy stated.

The location for planting the required cedar has been left up to the prescribing Forester so that he or she can maximize site productivity, and plant the cedar in the most desirable locations.

a) Plan Holders will strive to meet the cedar commitment through planting and/ or natural regeneration.

The use of naturals will be encouraged, and will count towards the final survey of cedar.

b) Where deer browse hazard is moderate to high, planted cedar trees will be protected. Protection measures may include coning, scented deterrents, or caging.

c) For areas that have been planted with cedar, where the cedar content falls below 80% of the Minimum Post-Harvest Cedar Composition requirement, the area will be fill-planted once. The cedar content will be assessed using Plan Holder survey information

Plan Holders are committed to protecting planted trees as well as monitoring plantations for survival. The 80% survival target was established as a reasonable benchmark to initiate fill planting. By allowing up to 20% mortality of planted cedar, Plan Holders are afforded a reasonable amount of operational flexibility. The 20% lee-way in survival will also temper any variation or anomalies that come about during surveys.

d) Cedar acceptability criteria will be as follows:

i) Regenerated cedar will only be accepted if they are of good form and vigour (refer to Appendix B).

ii) Regenerated cedar will only be accepted if they are $\geq 1.2m$ tall..

Acceptability criteria are provided to support the fact that Plan Holders are working to establishing the cedar regen such that they will be reasonably expected to form part of the future stand. While the cedar obligation is not part of a Free-Growing Survey, the acceptability criteria are much the same. Acceptability criteria are based on the Free Growing tree damage criteria as defined in the Ministry of Forests Guide to Establishment to Free Growing Guidebook for the Vancouver Forest Region-V2.3¹ (2000), for even aged stands (Appendix 5, pgs. 96-101 of the Guidebook).

The 1.2m minimum height is provided to ensure that the cedar regen is above deer browse height and beyond the need for protection.

¹ <http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/FREE/EFG-Van-print.pdf>

e) The cedar regeneration obligation due-date will be no sooner than 6 years, and no later than 20 years, post-harvest commencement. Plan Holders will complete cedar obligation surveys and data will be declared within the Ministry of Forests RESULTS system.

Should the full cedar regen obligation not be fully met at the time of assessment, the amount of cedar regenerated will be accepted, provided that a) through c) from above have been completed, and the obligation will be deemed to have been met, with no further actions required

While the cedar obligation resembles a free-growing survey in some aspects, the cedar obligation is a different and stand-alone obligation and will be managed accordingly. The obligation due date has been established such that Plan Holders are encouraged to meet the cedar regen obligation as early as possible, but are still provided enough time to allow for fill planting and stand tending activities, if required.

The use of the RESULTS system will provide a secure and accessible location for the data of the regenerated cedar. It already exists, and no new software will be required for tracking.

It should be noted that while there will be a minimum post-harvest cedar composition calculated for the block, the final amount of cedar established may not always meet the requirement. Provided that the Plan Holder has shown due diligence in attempting to re-establish a cedar composition (i.e., planted, protected, surveyed, fill planted once) then the obligation will be deemed fulfilled based on the amount of cedar that have been established.

6.12 The cedar regeneration requirement for a given cutblock may be lower than those set in Section 6.11 above, provided that the new requirement is consistent with the outcome of a completed intergovernmental process.

An intergovernmental process option was added to the Cedar Regen Section, to allow Plan Holders the option of addressing exceptional circumstances, similar to other objectives established under the LUO.

Aquatic Habitats (LUO) & Riparian Areas (FRPA)

LUO s. 11, 13, FPPR s. 8, FPPR s. 47

Stream Riparian Classifications and Management – LUO vs. FRPA

There is significant “overlap” between the requirements under the LUO and FRPA (including the FPPR). For most objectives, reconciling the differences between the LUO and FRPA is fairly straightforward. However, there is significant conflict between the LUO and FRPA in regards to stream classification, and to a lesser extent, stream management requirements.

The LUO and FRPA both establish stream classification systems, which do not correlate 100% of the time. Both the LUO and FRPA also establish reserve and management zones, which again, do not correlate (FRPA zones are measured in metres and LUO zones are measured in tree-lengths, which are linked to site series and seral stage). Lastly, the LUO and FRPA both establish restrictions and management requirements within riparian areas, but again, these do not necessarily correlate.

Table 1, below provides a brief comparison of the riparian requirements between the LUO and FRPA. For analysis purposes, the tree-length height for LUO streams was assumed to be 40m, based on an average tree-height for zonal sites across all BEC units and seral stages. If anything, this assumption is conservative, as most riparian areas are likely richer than zonal sites, resulting in taller tree-heights.

Table 1 shows that in most cases, the riparian reserve requirements meet or exceed those established under FRPA, especially for Type I and II Fish Habitat streams.

Table 1: LUO vs. FRPA Stream Management Comparison

	Stream Class	RRZ / No-Harvest Zone	RMZ	RMA	RMZ BA Retention
Comparable large fish stream classes and management zones (LUO vs. FRPA)	FRPA - S1	50m	20m	70m	0-100
	FRPA - S2	30m	20m	50m	0-100
	FRPA - S3	20m	20m	40m	0-100
	LUO - Type I Fish Habitat	2.0 Tree-lengths (80m)	-	2.0 Tree-length (80m)	N/A
Comparable small fish stream classes and management zones (LUO vs. FRPA)	FRPA - S4	-	30m	30m	0-100
	LUO - Type II Fish Habitat	1.0 Tree-length (40m)	0.5 Tree-length (20m)	1.5 Tree-lengths (60m)	~100%
Comparable “non-fish” stream classes and management zones (LUO vs. FRPA)	FRPA - S5	-	30m	30m	0-100
	FRPA - S6	-	20m	20m	0-100
	LUO - Upland Stream	-	-	30m	N/A

Two realistic options exist when trying to develop results/ strategies to address both the LUO and the FRPA objectives: follow the LUO only, or try to develop a process to simultaneously meet the conflicting objectives of both the LUO and FRPA.

Given the level of complication involved when comparing the LUO vs. FRPA approaches; the fact that field personnel will routinely have to deal with these issues; the fact that the riparian/ aquatic objectives under the LUO and FRPA are addressing the same value (i.e., riparian values); the fact that the LUO has been recently developed based on several years of research and broad consultation; and the fact that the requirements under the LUO are by and large more stringent, the most logical approach is to choose to follow the LUO only, as the over-riding set of objectives.

To this end, this FSP has been developed to address all of the stream riparian requirements using the LUO approach only.

Wetlands & Lakes

In regards to riparian values for wetlands and lakes, the level of conflict between the LUO and FRPA is far less and can be realistically reconciled. Therefore, where wetlands and lakes meet the definition of Type I or II Fish habitat, they will be managed as such. However, in all other cases, wetlands and lakes will be managed as per FRPA (and FPPR) requirements.

Upland Stream Areas

LUO s. 13

Hydrological Recovery

In the Upland Stream section of the Plan, the term “hydrologically recovered” is used when referring to Upland Stream Areas. Hydrological recovery will be determined by applying a consistent methodology when completing the analysis. The intent is for Plan Holders to use one of the two methods proposed in the Draft Timber Supply Review data package prepared by the Joint TSR Technical Working Group, quoted below:

1. “In the base case, 7-metre tall stands will be considered 90% hydrologically recovered. This measure was used in the 2009 DSP timber supply analysis³ and the 2007 timber opportunity analysis⁴. The FSSAM model requires that age constraints are used for tracking hydrologic recovery, as opposed to heights alone. To achieve this, an area weighted averaged site index will be determined within each sensitive watershed (listed in Schedule 7) and then Site Tools (v. 3.3) will be used to determine the age to reach the specified heights.”
2. “Recovery curves from the Ministry of Forests research branch technical report 032. This categorizes precipitation regimes of Rain on Snow (defined for analytical purposes as CWHwh2 and MH biogeoclimatic zones), and Rain Dominated (CWHwh1 and vh2) and regenerated tree heights of 23 metres and 28 metres respectively. “

As Plan Holders have committed to working collaboratively in managing the objectives for Upland Streams and Sensitive Watersheds, the method for determining hydrological recovery will be consistently applied and will be documented in advance.

Inventory & Tracking Ledger

Prior to initiating developments within one of the designated watershed-sub-units, Plan Holders will complete an analysis to determine the “baseline inventory” of Upland Stream Area and the proportion that is not hydrologically recovered. The analysis is meant to be a GIS exercise that produces a tabular summary of areas that are hydrologically recovered or not, as well as a spatial element to illustrate the results. These two outputs will form the basis for the Tracking Ledger.

In order to ensure all commitments are met, Plan Holders will maintain the Ledger to track the hydrological status of the watershed sub-unit. Although the Ledger has yet to be developed, it will likely be a database, and may also have mapping elements (i.e., GIS). In order to ensure that commitments are met, the Ledger is meant to be kept current (i.e., any harvesting or changes to hydrological recovery should be added to the Ledger on an ongoing basis), with a complete update (and likely a review as well), annually at a minimum.

Watershed Assessments

Where Plan Holders propose to harvest such that <70% of a watershed sub-unit is hydrologically recovered, they have committed to ensuring that watershed assessment is completed by a qualified professional. Given that the Plan Holders are exceeding the “default” threshold of 70%, a more stringent assessment of the watershed sub-unit is required (i.e., more detailed and involved than the baseline inventory completed under FSP Section 6.24, described in the preceding section). Therefore, the “watershed assessment” is meant to be detailed in nature and will be completed by a qualified professional (e.g., similar to a Coastal Watershed Assessment Procedure).

High-Humidity Microclimates

The Plan includes a result in regards to stream channels in Upland Stream Areas that are incised, have steep gradients and support riparian plant communities that are dependent on high-humidity microclimates.

The key pieces in determining whether a stream supports a riparian plant community that is dependent on a high-humidity microclimate is two-fold. First, the stream must possess characteristics sufficient to produce the high-humidity microclimate. Second, the diagnostic high-humidity dependent plant community must be present. These two factors are interdependent, and therefore Plan Holders must consider both when identifying these unique Upland Stream channels.

³ Fall, A. J. Sunde, N. Reynolds. 2009. Haida Gwaii Detailed Strategic Planning Decision-Support. Analysis of the 2009 Strategic Land-Use Objectives.

⁴ BC Ministry of Forests and Range. August 2007. Timber Harvesting Opportunities Arising from the Implementation of the Proposed Land Use Zones and EBM Provisions - Haida Gwaii Strategic Land Use Agreement of May 29, 2007

As a general guide, the following is provided:

Riparian Plant Community

- on creek sidewalls and adjacent trees plant communities will consist of ferns, herbs and shrubs that are dependent on moist/ wet soils (e.g., maidenhair fern, lady fern, and salmonberry); as well as an abundance of bryophytes that are dependent on high moisture levels.

Stream Channel Characteristics

- Streams are typically 1-3m wide, with bedrock-rock substrates and are generally steep (>20% slope) and broken/ irregular with step-pool structure.
- Channels are typically deeply incised (similar to a gully, sidewalls >3m, side-slope >50%) and rock controlled, with minimal soils, thus leaving minimal potential for erosion or debris flows.
- Channels typically contain waterfalls and a spray/ mist is produced or will be during high water flow, creating a cooler microclimate (noticeable on a warm day).
- Usually shaded by trees or oriented such that shade is produced within the reach, regardless of canopy closure.

Sensitive Watersheds

LUO s. 14

Inventory & Tracking Ledger

Prior to initiating developments within one of the designated sensitive watersheds, Plan Holders will complete an analysis to determine the “baseline inventory” for the watershed, including determining the current ECA. The analysis is meant to be a GIS exercise that produces a tabular breakdown of the ECA, as well as a spatial element to illustrate the results. These two outputs will form the basis for the Tracking Ledger.

In order to ensure all commitments are met, Plan Holders will maintain the Ledger to track the ECA for the watershed. Although the Ledger has yet to be developed, it will likely be a database, and may also have mapping elements (i.e., GIS). In order to ensure that commitments are met, the Ledger is meant to be kept current (i.e., any harvesting or changes to ECA should be added to the Ledger on an ongoing basis), with a complete update (and likely a review as well), annually at a minimum.

Watershed Assessments

Where Plan Holders propose to harvest such that exceed the prescribed ECAs for a sensitive watershed, they have committed to ensuring that watershed assessment is completed by a qualified professional. Given that the Plan Holders are exceeding the “default” ECA, a more stringent assessment of the watershed is required (i.e., more detailed and involved than the baseline inventory completed under FSP Section 6.28, described in the preceding section). Therefore, the “watershed assessment” is meant to be detailed in nature and will be completed by a qualified professional (e.g., similar to a Coastal Watershed Assessment Procedure).

Biodiversity

Ecological Representation

LUO s. 16

Representation Analysis

The representation analysis proposed by the Plan Holders is meant to be a GIS oriented exercise to determine the baseline inventory of ecosystems, based on the best information available (i.e., the “Ecological Representation analysis conducted during Detailed Strategic Planning by the Joint Technical Working Group 2010”).

Tracking Ledger

In order to meet the LUO Objectives, Plan Holders will maintain a ledger to track the additions/ removals to the baseline ecosystem inventory discussed above, including areas that have been designated for recruitment. The ledger will likely be a database, with mapping elements (i.e., GIS), in order to track both the hectares of ecotypes reserved by LU, as well as a spatial representation to identify areas set aside to meet the representation requirements.

Marbled Murrelet Nesting Habitat

LUO s. 19

Inventory

The “inventory” is meant to be an office exercise to clarify the Marbled Murrelet nesting habitat that has been identified, and what nesting habitat has been reserved. The “inventory” is not meant to be a field analysis to identify or refine nesting habitat. The inventory analysis will be based on the best information available (i.e., the “Ecological Representation analysis conducted during Detailed Strategic Planning by the Joint Technical Working Group 2010”).

Tracking Ledger

In order to meet the LUO Objectives, Plan Holders will maintain a ledger to track the additions/ removals to the baseline Marbled Murrelet nesting habitat inventory discussed above. The ledger will likely be a database, with mapping elements (i.e., GIS), in order to track both the hectares of nesting habitat reserved by LU, as well as a spatial representation to identify areas set aside to meet the nesting habitat requirements.

Northern Goshawk Habitat

LUO s. 20

Qualified Professional Assessments

The concept of using qualified professionals to assess nest sites was added to ensure that the best habitat is identified by Plan Holders in order to maximize the biological value of the nest area.

Restricted Activities

As the restricted activity zones have the potential to significantly impact forest operations, especially where nests are close to major roads, the Plan Holders have committed to having nest sites assessed by qualified professionals. Where the assessment determines that the nest site is inactive, the restricted activity zone will not be required. The assessment completed by the qualified professional:

- 1) will be completed within the Goshawk Breeding Season, and
- 2) will be re-assessed each breeding season, unless Plan Holders elect to maintain the restricted activity zone, regardless of nest use, and
- 3) will consider the various Northern Goshawk nest uses, nest fidelity and the best information available with regards to Northern Goshawk recovery strategies.

Great Blue Heron Nesting Habitat

LUO s. 21

The concept of using qualified professionals to assess nest sites was added to ensure that the best habitat is identified by Plan Holders in order to maximize the biological value of the nest area.

As the restricted activity zones have the potential to significantly impact forest operations, especially where nests are close to major roads, the Plan Holders have committed to having nest sites assessed by qualified professionals. Where the assessment determines that the nest site is inactive for three consecutive years, the restricted activity zone will not be required. The assessment completed by the qualified professional will be completed:

- 1) within the Great Blue Heron Breeding season, and
- 2) will be re-assessed each breeding season, unless Plan Holders elect to maintain the restricted activity zone, regardless of nest use.
- 3) will consider the various Great Blue Heron nest uses and the best information available with regards to Great Blue Heron habitat management.

Annual Reporting and Data Submission

LUO s. 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17 and 23

Throughout the FSP, Plan Holders have committed to submitting documentation and digital spatial data to the Council of the Haida Nation and to the Province of BC, on an annual basis. For clarity, a December 31st deadline was chosen, as this is typically a slower time operationally, as well as administratively.

While the LUO does provide some specifics in terms of “digital spatial data”, at the time of Plan submission, the specifics of how the information submission will work is not clear (e.g., file format, content). The Plan Holders each maintain their own data management and mapping systems, however, these all follow generally accepted industry standards. As such, the Plan Holders should be able to provide the data/ information, in a manner that meets the Council of the Haida Nation and the Province of BC’s needs.

It should be noted that there is a significant increase in cooperative planning required under the LUO and this FSP. In order to effectively meet these planning requirements, Plan Holders will likely need information from the Council of the Haida Nation and the Province of BC to feed into the planning process. This will essentially make the information and data transfer between the Plan Holders and the Council of the Haida Nation and the Province of BC a two-way process. To this end, the Plan Holder will work with both the Council of the Haida Nation and the Province of BC to determine the appropriate data formats and contents and make the information exchanges beneficial for all interested parties.

It should be noted, that while the LUO uses the term Province of BC, at the time of Plan submission, the specific government agency(s) is/ are yet to be determined.

Objectives Prescribed Under FRPA

Temperature Sensitive Streams

FPPR s. 53

There are no temperature sensitive streams designated in the Plan Area. Should a temperature sensitive stream be designated, Plan Holders will follow the practice requirements under FPPR s. 53.

Community Watersheds

FPPR s. 8.2

Watershed Assessment & Tracking Ledger

Prior to initiating developments within one of the designated Community Watersheds, Plan Holders will ensure that a watershed assessment is completed. This assessment is meant to be detailed in nature and will be completed by a qualified professional (e.g., similar to a Coastal Watershed Assessment Procedure). The outputs from the watershed assessment will form the basis for the Tracking Ledger.

In order to ensure all commitments are met, Plan Holders will maintain the Ledger to track the developments within the watershed. Although the Ledger has yet to be developed, it will likely be a database, and may also have mapping elements (i.e., GIS). In order to ensure that commitments are met, the Ledger is meant to be kept current (i.e., any harvesting or hydrological status should be added to the Ledger on an ongoing basis), with a complete update (and likely a review as well), annually at a minimum.

Maximum Cutblock Size & Adjacency
FPPR s. 64, 65

While the exemption included for cutblock size and adjacency is not technically a result or strategy, it is included and numbered in order for Plan Holders to consistently and effectively implement the FSP and meet the established practice requirements. By keeping this section in the FSP, Site Plan development and due diligence for operational planning will be much more straightforward.

Conditional Exemption for Eden Lake LU

Since 2007, Husby Forest Products has had a conditional approval in their FSP for the Eden Lake LU that allowed them to declare adjacency achieved when a cutblock met Free-growing, rather than a 3m height. Table 2 below identifies the cutblocks where the conditional green-up approval was utilized, rather than 3m heights, to allow adjacency to be met and give Husby access to the surrounding timber.

Recent analysis for the preparation of the Haida Gwaii FSP found that 7 out of a total of 68 cutblocks that were created since the approval of the original Husby FSP in 2007 utilized this strategy to allow access to adjacent timber (i.e., approximately 10% of the time). Further review of the information shows that where the reduced green-up was used, the tree heights of the blocks were such that they would likely have met the 3m green-up heights within 1-2 years of the date of the survey. On an interesting note, there were also a few instances where the Free-Growing heights were taller than the typical 3m green-up which required Husby to wait for a longer period of time than typical.

Given the fact that the 3m green-up height was reached shortly after the reduced green-up was declared, it is unlikely that there were any significant adverse effects to the drainages where the conditional exemption was utilized. Furthermore, the overall use of the reduced green-up height has been spread evenly over Eden Lake operating area so the affects to particular drainages have been minimized.

With the pressures on the landbase for harvesting activities increasing, the conditional green-up height allowed Husby to ensure more consistent timber volumes to sustain our operations.

Table 2: Husby Cutblocks in the Eden Lake LU, where a reduced Green-up height was used

New Adjacent Cutblock (encumbered by adjacency)	Tree Height (m) from Free Growing Surveys	Greened-up Block
DAV628	2.7	TOR031
ROY302	2.0	ROY041
DAV639	2.0	TOR037
ROY324	2.0	ROY041
LIG231	2.4	LIG046
NAD517	2.4	NAD021
NAD509	2.4	NAD021

Windthrow Management & Management Prescriptions

It is recognized that windthrow is a significant management issue within the Plan Area. Although objectives are not clearly established in legislation for windthrow management, the Plan Holders have included the following information to illustrate the intent and commitment to managing windthrow in relation to their development activities.

For all cutblock areas, Plan Holders will complete windthrow assessments. The assessments will be completed to the generally accepted industry standards and will include a consideration of both windthrow hazard and consequence criteria, resulting in an overall windthrow risk rating. Additionally, the windthrow assessment:

- a) will be signed-off by a qualified professional; and
- b) will be used to develop management prescriptions for appropriate areas, particularly management zones or no-harvest zones, based on knowledge of prevailing winds and resource features in the area.

As noted above, windthrow assessments will be completed to generally accepted industry standards. While different Plan Holders may use different tools to complete windthrow assessments, in general, windthrow assessments are expected to be informed by current information such as:

- BCTS Windthrow Manual: A Compendium of Information and Tools for Understanding, Predicting and Managing Windthrow on the BC Coast (Zielke, Bancroft, Byrne and Mitchel, 2010), available at:

http://www.for.gov.bc.ca/ftp/tch/external!/publish/EMS2/Supplements/BCTS_Windthrow_Manual.pdf

While the Windthrow Manual referenced above is a BCTS document, it is relevant to all Plan Holders and is considered industry standard and current information, as quoted in the preface on pg. 4:

This manual represents the best currently available information for windthrow in BC, focusing on the Coast. It reviews and explains the mechanics, prediction, and management of windthrow in forestry operations. It brings together numerous tools and guidelines in one package and explores them with examples to reflect our current understanding of these concepts.

Examples of Windthrow Assessment Field-cards and Summary Forms (Taan Forest) are provided in Appendix B.

As noted above, management prescriptions with regards to windthrow will be based on information from the windthrow assessment. It should also be noted that windthrow assessment methods and associated management prescriptions may be informed by monitoring information and results that are available, including Forest and Range Evaluation Program (FREP) reports and information.

Tracking Ledgers - General

The concept of maintaining a Ledger has been proposed within the FSP to track the requirements associated with Cedar Stewardship Areas, Upland Streams, Sensitive Watersheds, Ecological Representation, Marbled Murrelet nesting habitat and Community Watersheds. While the specifics of the “Ledgers” are yet to be developed, in general they will be developed and populated with the baseline information generated from analysis, as discussed for the objective in question. The Ledgers will may be tabular (i.e., Excel spreadsheets or similar database application) and/ or include GIS/ spatial elements, as deemed appropriate.

The intent for the Ledgers is to provide a clear picture of the baseline/ existing status of the element in question and allow Plan Holders and Ministry of Forests staff to understand and track the progress of forest operations and planning. The Ledger should form part of the due diligence system, as well as being a planning tool for meeting FSP obligations.

Adaptive Management – General

Throughout the FSP, where Plan Holders are proposing to manage resource values beyond “default” thresholds established under the LUO or FRPA, additional commitments have been outlined, such as completing intergovernmental processes, as well as commitments to develop and implement Adaptive Management (AM) plans.

While the term Adaptive Management Plan is defined under the LUO, the details of what might be involved in an AM Plan are yet to be determined. In general AM can fall under two potential categories, as described in the Forest for Tomorrow Extension Note #1: Introduction to Adaptive Management⁵:

- a) Passive AM - is an approach whereby, faced with uncertainty, managers implement the alternative they think is ‘best’ (with respect to meeting management objectives), and then monitor to see if they were right, making adjustments if desired objectives are not in fact met.
- b) Active AM - is an experimental approach whereby, when faced with uncertainty, managers implement more than one alternative as concurrent experiments to see which will best meet management objectives. It is characterized by “actively probing” the system in order to distinguish between competing hypotheses (where the different hypotheses suggest different “optimal” actions). The key is that there are alternatives that can be more confidently compared.

“Active AM is the preferred approach to use when there is a high level of uncertainty about the effectiveness of the management actions to meet the management goals and objectives and when learning quickly is more important. Passive AM is a less costly choice that may be most practical when there is little uncertainty about the management action, or when the institutional structure prevents management experimentation”.

While AM Plans will be the responsibility of the Plan Holders, should they choose to manage beyond “default” thresholds, this does not mean that Plan Holder cannot involve or incorporate existing programs and knowledge. For example, the Ministry of Forests has maintained the Forest and Range Evaluation Program (FREP)⁶ for a number of years. FREP is a long-term program designed to:

- assess the effectiveness of FRPA and its regulations in achieving stewardship objectives
- determine if forest and range policies and practices are achieving government’s objectives, with a priority on environmental parameters, and consideration for social and economic parameters, where appropriate
- identify issues regarding the implementation of forest policies, practices and legislation as they affect achieving stewardship objectives
- implement continuous improvement of forest management in British Columbia

The FREP program has produced a number of valuable publications to date that would be very pertinent to an AM Plan/ program. A such, Plan Holders will consider the FREP information currently available and will also consult with local MOF staff involved in FREP to help develop and implement any AM Plans.

Finally, in most instances within the FSP, the commitment to develop and implement an AM Plan is in addition to the requirement to complete an intergovernmental process. Where this is the case, the details of the AM Plan itself will be included within the intergovernmental process, ensuring that all parties involved are informed, and that where possible, the AM Plan may include participants other than just the Plan Holders (e.g., MOF, Council of the Haida Nation).

⁵ Forest For Tomorrow – Extension Note #1: Introduction to Adaptive Management (April 2008):
http://forestsfortomorrow.com/fft/sites/default/files/Forests-for-Tomorrow-%20ExtNote1_Apr-29-2008.pdf

⁶ FREP homepage: <http://www.for.gov.bc.ca/hfp/frep/>

4.0 Measures to Prevent Impact on Natural Range Barriers

For the purposes of this FSP, forage refers to forage for Range purposes only. As of the submission date of this FSP, there are no Range activities on the FSP area. As there are no objectives for forage, there are no results or strategies that relate to forage.

Measures to prevent impact on natural range barriers are not submitted in the FSP as there currently are no agreements under FRPA within the Plan Area.

5.0 Stocking Standards

Stocking Standards - General

The Stocking Standards proposed within the FSP are based on the Reference Guide for FDP Stocking Standards⁷ (MOF, November 2010), as well as stocking standards from the currently approved FSPs for the Plan Area, and the experience and local knowledge of Foresters who work in the Plan Area.

Single Entry Dispersed Retention System Standards

Stocking standards for “variable” basal area retention (e.g., contiguous openings with >5 to <40m²/ha) have also been included. Situations and circumstances have been included to describe where the Single Entry Dispersed Retention System stocking standards are to be applied. The intent is for the SEDRS stocking standard to be used to maintain the timber supply in areas that are otherwise constrained. Refer to Table 3, below for a full listing of which stocking standards apply, depending on opening size or basal area retention.

As the Single Entry Dispersed Retention harvesting system approach is relatively new on the Haida Gwaii, the application of the SEDRS stocking standards have been limited to a maximum of 10% of the AAC for the Plan Area. It is acknowledged that the SEDRS stocking standards will need to be reviewed in the next 5 years (i.e., at the end of the term of the FSP), including a review of any Timber Supply impacts.

It should be noted that the SEDRS stocking standards presented here are based on the work done by the Coast Region FRPA Implementation Team – Silviculture Working Group, as presented in the “Single Entry Dispersed Retention System Stocking Standard Discussion Paper” (November 2009)⁸. The stocking standards presented here are intended to be consistent with the direction provided in the SEDRS Stocking Standard Discussion paper.

Stocking Standards Application

It should be noted that prior to harvesting timber under the Single Entry Dispersed Retention System, Plan Holders will need to clearly delineate the objectives for the harvest area, including specifying the stocking standards, acceptable leave tree characteristics and basal area retention targets. Once harvesting is complete, the Plan Holders will need to do a post-harvest evaluation of the Standards Unit and assess the timber retained. Where “first pass” harvesting does not meet the requirements set-out on the applicable stocking standard, then additional harvest entries may be required (including subsequent re-evaluation).

⁷ http://www.for.gov.bc.ca/hfp/silviculture/stocking_stds.htm

⁸ <http://www.for.gov.bc.ca/rco/stewardship/CRIT/>

Table 3: Stocking Standards Application

Contiguous Opening Size for Standard Unit (ha)	Standard Unit Basal Area Retention (m ² /ha)	Applicable Stocking Standard
0.1 - 0.9	> 5 to < 40	SEDRS
0.1 - 0.9	≤ 5	Even-Aged ⁹
≥ 1.0	≥ 40	-
≥ 1.0	> 5 to < 40	SEDRS
≥ 1.0	≤ 5	Even-Aged

Ecologically Acceptable Species

Ecologically suitable species are provided in the stocking standards in Appendix C. The suitability/ acceptability of regeneration will be determined in the field by a Qualified Professional based on site-specific soil moisture, nutrient, aspect and elevation characteristics and tree performance in response to the site. Tree species that are ecologically suitable and commercially valuable are listed in the standards provided in Appendix C

It should be noted that while the concept of preferred and acceptable species was commonly used in previous FSPs, recently tenure holders have moved away from this prescriptive approach and moved towards allowing the prescribing Forester determine the appropriate species selections for a site (as detailed within the Site Plan), based on the ecologically suitable species for the ecotype, as detailed within the FSP stocking standards. It should also be noted that the Establishment to Free Growing Guidebook: Vancouver Forest Region¹⁰ (MOF. V2.3, October 2007) states that both “Preferred” and “Acceptable” species, “are ecologically suited to the site” (pg. 6-7). The difference between “Preferred” and “Acceptable” has to do with management activities, not ecological suitability. For the stocking standards for this FSP, the ecologically suitable species for a given BEC unit are simply a combination of the “Preferred” and “Acceptable” species.

Plan Holders do not intend to change the way that they manage their silviculture obligations under the proposed stocking standards. Prompt reforestation efforts will be maintained, with planting being the primary mode of reforestation. Prescribing Foresters will focus on matching the most appropriate tree species to the reforestation sites, without compromising the economic value of future stands (i.e., match the best tree species to the given site; avoid conversion of cedar stands to hemlock).

Given that Plan Holders must ensure that crop trees (at Free Growing) must be of good form and vigour, free from competition, and expected to remain so, it can reasonably be expected that Plan Holders will manage reforested areas such that tree species are well suited/ adapted to their sites.

Minimum Stocking Standard Cedar Content (MSSc)

One of the changes in the proposed stocking standards, from previous FSPs, is the elimination of the Minimum Stocking Standard for cedar (MSSc). As discussed under the Cedar Retention strategy (LUOs. 7) above, while the MSSc will be eliminated, the concept of maintaining cedar in the regenerating stands has been carried forward and it is estimated that the amount of cedar planted will actually increase under the new FSP, compared with previously approved FSPs.

⁹ Where a small opening (0.1-0.9ha) is associated with a larger partial cut standard unit, the SEDRS standard may apply.

¹⁰ <http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/FREE/EFG-Van-print.pdf>

Free-Growing Heights

Free-Growing heights have been established based on previously approved FSPs, as well as local knowledge and experience. While some Free-Growing heights may deviate from FDP stocking standard guides, at the time of Free-Growing the trees must still be of good form and vigour, ensuring that they are well adapted to their sites. Additionally, the trees that are accepted at Free-Growing must be reasonably expected to continue growing well and be part of the stand at rotation age (i.e., be above brush competition and no longer under deer browse pressure).

As Free-Growing declarations must be signed-off by Registered Professional Foresters or Registered Forest Technologists, there is a professional reliance safeguard in place to ensure that crop trees are well suited to their growing sites and expected to remain so into the future.

Sitka Spruce (Ss)

Free-Growing heights for Sitka Spruce are reduced as indicated given the reduction in brush competition (as a result of deer browse). While the height requirement is reduced, the performance expectations are still such that acceptable trees must be of good form and vigour and reasonably expected to continue growing well.

Red and Yellow Cedar (Cw and Yc)

Free-Growing Heights for cedar are provided, consistent with the cedar regeneration objective, above. While cedar Free-Growing heights are reduced from FDP stocking standard guides, the performance expectations are still such that acceptable trees must be of good form and vigour and reasonably expected to continue growing well. Furthermore, the 1.2m minimum height will ensure that the cedar are above deer browse height.

Minimum Inter-tree Distance Exceptions

Exceptions to the standard 2.0m inter-tree distance have been included for situations where plantable spots may be limited in availability. By reducing the minimum inter-tree distance Plan Holders will be able to utilize the best available growing sites, ensuring effective reforestation is achieved. While the minimum inter-tree distance is reduced for the listed scenarios, in practice, the area to which this reduction applies will be minimal (i.e., the reduced distance will be the exception, rather than the rule).

Mixed Conifer – Hardwood Management

Red alder has been included as an ecologically suitable species for some BEC units. For these situations, the intent is for Plan Holders to identify the hardwood management strategies and stocking standards within the Site Plan, prior to harvesting. For the development area, separate stocking standards for conifers and red alder are to be assigned (based on a 0.25ha minimum stratum size). Where red alder is the leading species, the hardwood stocking standard will be applied. Where red alder is not the leading species, it will not be accepted as a crop tree.

As mixed hardwood management is relatively new on the Haida Gwaii, the application of the hardwood stocking standards has been limited to a maximum of 200ha per year, for all of the Plan Holders combined. It is acknowledged that the hardwood stocking standards will need to be reviewed in the next 5 years (i.e., at the end of the term, of the FSP), including a review of any Timber Supply impacts.

Free Growing Survey System

Development areas will be pre-stratified into appropriate polygons assigning alder or conifer stocking standards and surveyed as separate strata, consistent with standard survey procedures and the Site Plan.

All alder and conifer plots will be tallied separately, according to the respective stocking standards, to determine the overall achievement of stocking and reporting of inventory labels for each stratum within the development area.

The mixed-wood stocking standards have been prepared, based on the work done by the Coast Region FRPA Implementation Team – Silviculture Working Group, as presented in the paper, “Hardwood Management in the Coast Forest Region¹¹” (July 2011). The stocking standards presented here are intended to be consistent with the direction provided in the Hardwood Management paper.

¹¹ http://www.for.gov.bc.ca/rco/stewardship/CRIT/CRIT_publications.htm

Appendix A: Sample Windthrow Assessment Field Cards and Summary Forms

Figure 2: Sample Windthrow Assessment Summary Form - Taan Forest (pg. 1)



Windthrow Assessment Summary Form

File: Block/ Area File

Operation: _____ Cutblock: _____ Date: _____

	High	Moderate	Low	Boundary Segment					
				FC	FC	FC	FC	FC	FC
Hazards Criteria									
1. Soil Drainage	Poor	Moderate	Well Drained						
2. Topography	Upper slope; ridge	Any other topography	Valley bottom perpendicular to prevailing winds						
3. Rooting Depth	Shallow (<0.4m)	Moderate (0.4-0.8m)	Deep (>0.8m)						
4. Crown Sail	Large	Medium	Small						
5. Species Composition	Hw, Ba	Cw, Dr	Fdc						
6. Stand Structure	Even; dense	Uneven dense; even moderately dense	Uneven open; even open; uneven moderately dense						
7. Root Rot	Heavy	Moderate	Low						
8. Blowdown History/ Adjacent Blocks	Frequent	Moderate	Low						
9. Boundary Orientation to Prevailing Winds (refer to diagram below)	Exposed	Transitional	Protected						
Overall Hazard Rating									
Consequence Criteria									
10. Water Quality	Domestic intake within 100m	Domestic intake 100-200m	Domestic intake >200m						
	Fish habitat	Downstream fish habitat	S5, S6 streams only						
11. Terrain Stability	unstable	Potentially unstable	No terrain issues						
12. Resource Features	Karst with use	Karst	No karst						
	Bear den, raptor nest, CMT	Adjacent WTP, OGMA or WHA	No feature present						
13. Public Values	Recreation site within 70m	Recreation site 70-100m	Recreation site >100m						
	Park or private property within 50m	Park or private property 50-100m	Park or private property >100m						
	Public access routes within 50m	Public access routes 50-100m	Public access routes >100m						
Overall Consequence Rating									

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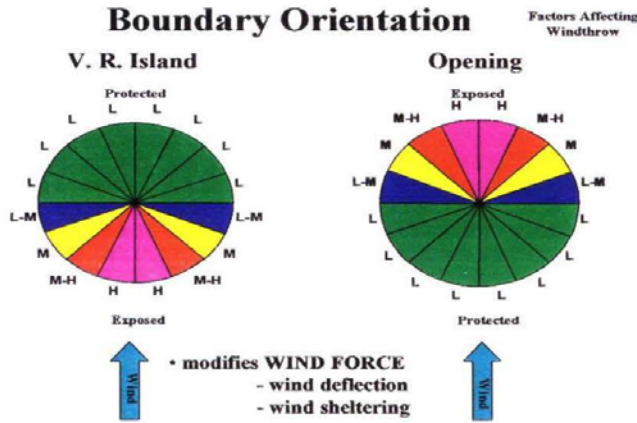
Figure 3: Sample Windthrow Assessment Summary Form - Taan Forest (pg. 2)



File: Block/ Area File

Windthrow Assessment Summary Form

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONTROLLED. CHECK TEAL INTRANET (IFS STANDARD - FORMS & CHECKLISTS) TO ENSURE YOU ARE USING THE MOST RECENT VERSION.



Risk Matrix:

Consequence	Hazard		
	<input type="checkbox"/> L	<input type="checkbox"/> M	<input type="checkbox"/> H
<input type="checkbox"/> L	L	L	M
<input type="checkbox"/> M	L	M	H
<input type="checkbox"/> H	M	H	H

Windthrow Treatment Prescription:

Boundary Segment	Risk Rating	Prescription


Sign off: (Indicates checklist items have been addressed)

Assessment Completed by: _____

Review Completed by: (e.g., Contract Planning Representative) _____

Instructions: Evaluate entire block boundary (external and internal boundaries) for Hazard and Consequence ratings. Provide L, M or H ranking for each criteria for each boundary segment. Determine risk rating using the matrix. Show risk rating on map (H red, M yellow, L green). Map must indicate direction of damaging winds. Boundary segments should be numbered in sequential order.

Figure 4: Sample Windthrow Assessment Field-card - Taan Forest



Windthrow Assessment Form

Cutblock or Road ID _____

Boundary Segment(s) _____

Assessors Name _____ Date Completed _____

Wind Direction: Primary (1*) _____ Secondary (2*) _____

A. Wind Force Hazard

1. Topographic Exposure

Crest Shoulder
 Saddle Other Topography Bowl
 Upper Slope Valley bottom/perpendicular to prevailing winds

2. Boundary Orientation

1* Windward Sub-parallel Lee
 2* Windward Sub-parallel Lee

3. Fetch Distance

> 5 Tree Lengths 2-5 Tree Lengths < 2 Tree Lengths

4. Stand Attributes

Uniform-High Density Uniform-Moderate Density Uniform-Low Density
 Taller than Average Uneven-High Density Uneven-Moderate Density
 Intermediate Shorter than Average

5. Tree Attributes

Taller than Average Average Shorter than Average
 Large Dense Crowns Moderately Dense Crowns Small Open Crowns
 High Moderate Low

C. Overriding Hazard

1. Windthrow within the stand

Extensive Minor None
 Moderate

2. Windthrow along adjacent edges

Extensive Minor None
 Moderate

3. Pit / Mound Topography

Extensive Minor None
 Moderate Moderate Low
 High

B. Overturning Hazard

1. Tree Attributes

Low Taper Moderate Taper High Taper
 No Butt Flare Large Butt Flare Large Butt Flare
 Root or Stem Rot No Root or Stem Rot

2. Rooting Depth

Shallow (<0.4m) Moderately (0.4-0.8m) Deep (>0.8m)

3. Soil Drainage

Poor Imperfect Good
 High Moderate Low

D. Overall Windthrow Hazard

susceptibility of a stand to endemic windthrow (by gale force winds that have a recurrence interval of 5-10 years)

Wind Force Hazard (from Part A)

	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
Overturning Hazard (from Part B)	<input type="checkbox"/> L <input type="checkbox"/> L <input type="checkbox"/> M <input type="checkbox"/> M	<input type="checkbox"/> L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/> H	<input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/> H <input type="checkbox"/> H

Consequence

Low (forest loss/damage, minor erosion)
 Moderate (damage to non-fish streams, gully sidewalls, wildlife habitat, visual impacts)
 High (damage to fish streams, domestic water quality, large landslides, safety)

E. Final Windthrow Risk

Note: If the Overriding Hazard Indicator from Part C (e.g., existing natural Windthrow or Windthrow in similar area harvested in the vicinity of the cutblock) is greater than the hazard rating indicated by the Wind Force and Overturning Hazard sections (Part D), then the Overriding Hazard prevails.

Note: Determination of Consequence is a subjective approach. As a general guideline, moderate consequence can refer to damage to non-fish bearing streams or gullies while high consequence can refer to damage to fish bearing streams, water supplies, etc.

	Overall Windthrow Hazard (Part D) OR Overriding Hazard (Part C)		
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
Consequence	<input type="checkbox"/> L <input type="checkbox"/> L <input type="checkbox"/> M <input type="checkbox"/> M	<input type="checkbox"/> L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/> H	<input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/> H <input type="checkbox"/> H

Assessment Summary and Recommendations:

Note: Data collected for the purposes of this form represents field observations at the time of data collection

August 2010
August 2010