



Ministry
of Forests



TYPE II SILVICULTURE STRATEGY DEVELOPMENT STANDARDS

Effective June 1, 2003

These standards apply, in addition to the General FIA Standards (FS 1001), to all Type II silviculture strategy development activities funded under the Forest Investment Account (FIA). A Type II strategy employs computer modelling of scenarios whereas a Type I strategy uses a workshop-based methodology.

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ARTICLE 1: GENERAL STANDARDS

Definitions

1.1 In this Schedule, the following words shall have the following meanings:

“Forest Structural Conditions” means defined forest successional stages based on factors such as tree species and size, percent canopy cover, and number of canopy layers;

“Habitat Elements” means those components of the environment, such as large live trees, snags, woody debris, cliffs, soil characteristics, etc., believed to most influence a wildlife species;

“Habitat Supply” means a predicted quantity of Habitat Elements or Forest Structural Conditions over time within a Management Unit;

“Managed Stand” means an existing or future stand that has been or is expected to be subjected to silvicultural practices which will substantially increase its yield over a naturally established stand on the same site;

“Management Unit” means an area of land having an allowable annual cut determined for it under the *Forest Act* and typically means a timber supply area or tree farm licence;

“Regionally Important Wildlife” means a species designated by the Ministry of Water, Land and Air Protection as important to a region of British Columbia and that relies on habitat requiring special management;

“Timber Supply” means a predicted quantity of timber of varying degrees of quality that may be available for harvesting over time within a Management Unit, after considering social objectives and the effects of management for other resources;

“Type II Silviculture Strategy” or **“Type II Strategy”** means a silviculture strategy developed in accordance with these standards;

“Wildlife Community” means the community of wildlife that normally exists or could exist in a forest stand of a particular type, structure, age, and biogeoclimatic category.

Objectives in Developing Strategies

- 1.2 A Type II Silviculture Strategy must meet the objectives of producing:
- (a) a fully rationalized plan to guide the expenditure of public silviculture funds to improve the future Timber and Habitat Supply of a Management Unit;
 - (b) Management Unit level reports having consistent format and content so that the information can be consolidated to regional and provincial levels as well as compared between units;
 - (c) information that can be utilized by industry and government in related decision-making processes;
(Examples: determining tree improvement and habitat improvement needs and priorities, assessment of the value of adopting certain silvicultural systems and management regimes for non-timber values.)
 - (d) silviculture regimes and associated standards that may potentially be adopted in forest stewardship plans as required standards for basic silviculture operations.

Strategy Development Process Overview

- 1.3 Except as may be otherwise approved by the Technical Contact, a Type II Strategy must be developed through the following general process.
- (a) A draft data package prepared in accordance with Article 3 is presented to a workshop of key stakeholders and qualified professionals.
 - (b) The data package is finalized and approved by the Recipient before modelling commences.
 - (c) Modelling analysis is undertaken and the results documented in a draft analysis report prepared in accordance with Article 3.
 - (d) Based on analysis findings and other relevant considerations, a draft silviculture strategy document is prepared in accordance with Article 3.
 - (e) The draft analysis report and silviculture strategy are presented to a workshop of key stakeholders and qualified professionals.
 - (f) Additional modeling analysis is conducted as necessary, including one or more scenarios representing the preferred or recommended combinations of silviculture activities.
 - (g) Key stakeholders reach consensus on a silviculture strategy for the management unit.
 - (h) The analysis report and silviculture strategy are finalized and approved by the Recipient.

Involvement of Key Stakeholders

- 1.4 The strategy development process must include workshops to which are invited key resource management and resource user stakeholders that may be materially affected by the outcome of the strategy, including representatives of:
- (a) provincial and federal government natural resource agencies;
 - (b) forest companies holding a major tenure as defined under the *Forest Act*; and
 - (c) First Nations that have a declared interest in all or part of the Management Unit, if appropriate to meeting the First Nations information-sharing requirements of the General FIA Standards (FS 1001).
- 1.5 While open public consultation is encouraged, it is only required where it is expected that proposed activities in a strategy will vary significantly in either the quantity or type of activity from levels experienced at any time over the past ten years in a Management Unit. In the absence of public consultation during strategy development, an adopted strategy may include how any public consultation is proposed to be carried out prior to implementing a proposed significant change.

Guiding Documents

- 1.6 Development of a Type II Strategy should take into consideration and be guided by:
- (a) the *Interim Incremental Silviculture Strategy for B.C.*;
(particularly the strategy's working targets – mitigating impending reductions in timber supply, increasing timber supply over the long-term, and ensuring that future timber supply consists of at least 10% premium quality logs)
 - (b) any existing Type I or Type II Silviculture Strategy for the Management Unit;
 - (c) any existing Habitat Supply analyses or strategies that are appropriate to the wildlife species that occur in the Management Unit;
 - (d) the report, *Habitat Supply Modelling for the Arrow Timber Supply Area* (Wilson et al, 2003);
(a template for analysis of Habitat Elements)
 - (e) any management plans for timber tenures issued within the Management Unit;
 - (f) any higher level plans as defined under the Forest Practices Code that apply to the Management Unit;
 - (g) reports from the most recent timber supply review (TSR) for the Management Unit;
 - (h) recent historical levels of incremental silviculture funding for the Management Unit; and
 - (i) any plan, issue, or matter a District Manager specifies to be taken into consideration.

ARTICLE 2: ANALYSIS STANDARDS**Key Assumptions**

- 2.1 The following key assumptions should be employed in all analyses.
- (a) Opportunity evaluation is not limited by factors such as the availability of funding, funding source, or the ability to deliver a program. However, the final adopted strategy must be plausible.
 - (b) "Normal" market conditions will prevail in terms of demand and prices for timber and fibre.
 - (c) A status quo timber harvesting land base, excepting substantial actual alienations since the last TSR may be taken into account in a "revised base case."

Analysis Methodology

- 2.2 Analysis methodology must:
- (a) observe all current Forest Practices Legislation requirements, unless a regional manager has approved otherwise;
(Where otherwise approved, deviations from Forest Practices Legislation standards must be clearly documented in the information package and suitable alternate forest conditions analyzed and illustrated in the analysis report.)
 - (b) follow existing Ministry timber supply concepts, harvest flow rules, and timber utilization standards;
(Where there is a significant deviation from these, the deviation must be clearly documented in the information package and approved by the Technical Contact.)
 - (c) start targeted timber harvest flows at current harvest levels unless there is a clearly defined rationale for deviation;
 - (d) project data and graphical information until a steady state harvest level or 200 years is reached, whichever is greater (the "planning horizon");
(However, the projected time period may need to be greater during modeling to confirm the steady state harvest level.)

- (e) where data and harvest planning are sufficient, preferably be capable of tracking and mapping the spatial location of harvested and/or silviculturally treated areas for at least the first 20 years of the planning horizon.

Required Scenarios

2.3 At a minimum, a data package must propose and an analysis report must include:

- (a) a scenario re-creating the latest timber supply review (TSR) base case to validate the data and the forest estate model;
- (b) a “revised base case” scenario, if necessary to reflect changes in information and practices since the last TSR;

(A revised base case must be done if land base, site index, or tree improvement information that is materially different from that in the latest TSR is used. Increased estimates for improved seed availability may be based on commenced tree breeding programs even though the seed itself may not yet be available. The subsequent scenarios (below) should build on and be compared to this “revised base case.”)
- (c) a scenario demonstrating the outcome of managing with only basic silviculture;

(Previous actual, but not planned future, incremental silviculture treatments should be recognized. Assume appropriate natural ingress with no density control except for maximum density spacing of basic silviculture stands with > 10 000 sph. This scenario should not include any planned backlog, incremental silviculture, or increased stand volumes due to tree improvement (other than for trees already in the ground.)
- (d) in those units having backlog and incremental silviculture opportunities (e.g., spacing, pruning, fertilizing, etc), scenarios of 100%, and 200% of recent backlog and incremental silviculture program funding levels;

(Individual activities within each program may vary from recent levels but each overall program total must be kept to the 100% and 200% levels.)
- (e) unless exempted by the Technical Contact, in those units where no timber-oriented scenario comes near to producing a long term harvest level having 10% premium log content, a scenario that reduces harvest levels to the extent necessary to produce a 10% premium log content;
- (f) in those units where no timber-oriented scenario reasonably meets a Habitat Supply target (see section 3.2(k)), a scenario that meets the Habitat Supply target;
- (g) if the scenario immediately above causes undue reductions in Timber Supply, a further Habitat Supply scenario that represents a reasonable trade-off between Habitat and Timber Supply objectives; and
- (h) a “preferred” scenario of the perceived optimal combination of silviculture activities (including but not limited to partial cutting, backlog reforestation, tree improvement, and incremental silviculture) required to achieve the desired forest level objectives for timber and habitat as best as possible within plausible funding levels.

ARTICLE 3: DOCUMENTATION STANDARDS

- 3.1 The development of a Type II Silviculture Strategy should be recorded in three documents – a data package, an analysis report, and a final report containing the adopted strategy. These documents should be prepared in accordance with the specifications contained in this article.

Data Package

3.2 A Type II Strategy data package is prepared in advance of modelling analysis and describes all the information that is material to the analysis. At a minimum it should contain:

- (a) a description of the Management Unit, including its location, total and proposed netted down forest landbase (including netdown criteria and area by criterion), current age class structure, current

timber quality profile (if available), and management emphasis zones together with the management objectives within each zone;

- (b) a description of the Timber and Habitat Supply issues to be addressed in the analysis (focusing on those on which silvicultural activities may affect);
- (c) unless exempted by the Technical Contact, the criteria to be used to define pullog, sawlog and premium quality logs;
- (d) historical levels of the silviculture program, by activity and year;
- (e) the structure of proposed timber supply and/or silviculture management analysis units, if any;
- (f) the yield and stand quality tables to be used for stands in different silvicultural states, and the stand models, criteria and assumptions used to generate them (including assumptions regarding expected total stand density at establishment, at free growing, and immediately before any incremental silviculture treatments, broken into appropriate stand density classes), together with evidence demonstrating that a model is suited to the proposed use;
- (g) a description of the timber management practices to be modelled in the analysis including utilization standards, minimum harvest ages, forest cover requirements, unsalvaged losses, decay, waste, and breakage, etc;
- (h) a brief description of the forest estate model to be used, together with evidence demonstrating that the model is suited to the proposed use;
- (i) a detailed description of the methodology to be used for incorporating natural disturbances outside of the timber harvesting land base into the projections made by the timber and habitat supply models;
- (j) definition of the short (always the first 1 – 20 years), medium (generally from 21 years until harvesting is primarily in managed 2nd growth stands), and long (generally a steady state harvest level) term time periods;
- (k) proposed Timber and Habitat Supply targets to be striven for in the analysis, including the priority and relative importance of each target;
 (Habitat Supply targets need only be stated for those wildlife species, communities, elements or conditions present within the Management Unit that are affected by timber harvesting or silviculture and should be based on the best available estimation of requirements. A rationale for the target should be included together with an indication of the confidence level (high, moderate or low) associated with the adequacy of the target towards meeting species or community needs.)
- (l) the silviculture scenarios to be evaluated (see minimum scenario requirements in section 2.3), including for each scenario
 - i) the approximate types, amounts, locations, timing, and unit and total cost of silvicultural activities, either individually or as a regime of treatments, as appropriate,
 - ii) a preliminary assessment of the extent of the treatment opportunity and the degree to which the scenario is expected to address the identified habitat and timber supply/quality issues (to demonstrate feasibility),
 - iii) where considered appropriate, proposed testing of the “sensitivity” of the scenario output to the input assumptions;
- (m) a proposed analysis methodology for optimizing or otherwise evaluating the financial efficiency, social benefits, and degree to which each scenario addresses the identified habitat and timber supply or quality issues;
- (n) Key assumptions to be employed in the analysis, in addition to or as may differ from the standard assumptions in section 2.1.

3.3 Unless otherwise approved by the Technical Contact, for the Habitat Supply component of the analysis, the data package must also contain:

- (a) the wildlife species or communities, Habitat Elements, and Forest Stand Structures proposed to be forecast, which at a minimum must include or represent (see reporting requirements in section 3.6)
 - i) snag habitat and downed-wood habitat,

- ii) each forest-dependent species designated by the Ministry of Water, Land and Air Protection as Regionally Important Wildlife that occur or potentially occur on the Management Unit,
 - iii) up to twenty additional forest-dependent species that occur or potentially occur on the Management Unit, that are practicable to model, and that are designated by the Ministry of Water, Land and Air Protection as red or blue-listed wildlife species and indicated by that ministry as the most important or significant species for modeling;
 - (b) an indication of the extent to which the above candidates represent the complete Habitat Supply requirements spectrum within the Management Unit;
 - (c) the level (e.g., management unit, landscape, ecosystem, habitat), to which each species, community, element or structure will be modeled;
 - (d) habitat requirements to be modeled, including requirements for connectivity between habitats as well as differing requirements across life-cycles;
 - (e) the forest cover attributes to be used as surrogates when direct habitat requirement data is unavailable; and
 - (f) a description of the forest estate/Habitat Supply model, or the combination of forest estate and habitat supply models or other Habitat Supply analysis methods to be used, together with evidence demonstrating that the models/analysis methods are suited to the proposed use.
- (Given the current early state in the development of habitat supply modeling, such information must be sufficient so that the model results can be assessed and used appropriately.)

Modelling and Analysis Report

3.4 The analysis report must show for each scenario:

- (a) graphical depictions together with supporting data of Timber Supply by decade over the planning horizon, of
 - i) forecast annual harvest volume,
 - ii) total and merchantable growing stock forecast within the timber harvesting land base,
 - iii) age class distribution at 50 year intervals or at intervals appropriate to depicting how the age class structure affects the Management Unit's harvest forecast,
 - iv) area and volume by leading tree species composition by biogeoclimatic ecosystem classification (BEC) variant for both inside and outside the timber harvesting landbase;
- (b) where possible, graphical depictions together with supporting data of Timber Supply by decade over the planning horizon, of
 - i) diameter distribution in 2 cm DBH classes, and
 - ii) unless exempted by the Technical Contact, log quality distribution showing pulplog, sawlog and premium log content;
- (c) for the total over years 1-5, 6-10, and by decade thereafter, data by silviculture activity (e.g., planting, spacing, etc.) by program (basic, backlog reforestation, incremental silviculture, and habitat management), for
 - i) the area treated,
 - ii) unit and total cost, and
 - iii) short-term jobs generated from doing the activity; and
- (d) a discussion of the items given in subsection 3.2(m).

3.5 For the "preferred" scenario, the analysis report should also include:

- (a) data for the annual average of the first 5 years, by activity and program, for
 - i) the area treated,
 - ii) unit and total cost,

- iii) short-term jobs generated from doing the activity,
 - iv) the anticipated stand level volume gain (m^3) from each activity, by the time period in which the gain is anticipated to be captured (time periods 1-20, 21-50, 51-100, 100+),
 - v) the anticipated positive or negative impacts on Habitat Supply for modeled wildlife species or community over similar periods to Timber Supply reporting; and
 - (b) the relative priorities of the silviculture activities and the basis for the priorities.
- 3.6 Unless otherwise approved by the Technical Contact, the analysis report must show, for the timber supply base case (or revised base case if one is generated) and the preferred scenario, graphical depictions together with supporting data by decade over the planning horizon, of
- (a) general Habitat Supply, by BEC variant, by location within and outside of the timber harvesting land base, as represented by
 - i) Forest Stand Structural Conditions in the form of seral stage distributions for forested land, by area in forest inventory age class groupings 1-2, 3-5, 6-7, 8 and 9,
 - ii) snag habitat, in the form of the average number of standing snags per hectare in groupings of ≥ 7.5 to < 30 cm and ≥ 30 cm,
 - iii) downed-wood habitat, in the form of classes of down wood per hectare of low (≤ 50 m^3/ha), medium (> 50 and ≤ 150 m^3/ha), and high (> 150 m^3/ha);
 - (b) specific Habitat Supply for the species identified in the data package (see section 3.3).

Silviculture Strategy

- 3.7 The adopted silviculture strategy should represent a consensus (wherever possible) of the key stakeholders as to what constitutes a plausible, cost-effective approach to the application of available silviculture funds to addressing the identified issues of a Management Unit.
- (The silviculture analysis report should be a key consideration in the process of finalizing the strategy but not the only consideration. Other considerations may include: modeling reliability and probability of outcome, common-sense judgment as to benefit-cost and financial efficiency, historical perspectives, stated or perceived funding source priorities, priorities and goals stated in the guiding documents, and operational realities.)
- 3.8 The silviculture strategy should include:
- (a) an executive summary;
 - (b) an introductory overview of the Management Unit, including the key descriptive data for the unit and its incremental silviculture history;
 - (c) a section focussed on resource issues that can be affected through silviculture, particularly those related to
 - i) Timber Supply, including a general discussion of the dynamics of supply, the current and forecast quality status and the identified opportunities to improve Timber Supply,
 - ii) Habitat Supply, including a general discussion of the key wildlife species and identified opportunities to increase Habitat Supply and quality;
 - (d) a summary discussion of the analysis scenarios relevant to the final chosen strategy, including a discussion as appropriate of the other considerations noted under section 3.7;
 - (e) the adopted silviculture strategy including
 - i) the objectives of the strategy, including plausible working targets for the quantity and quality of Timber and Habitat Supply,
 - ii) individual sub-strategies, broken out into programs of basic, backlog and incremental silviculture activities and habitat activities, including the silviculture regimes needed to implement each sub-strategy (a silviculture regime may cross over programs) and identification of the relevant stand types, densities and conditions before and after treatment at each stage of a regime, the total opportunity area, and the proposed annual area to be treated,

- iii) the recommended annual silviculture program by year or by average annual over the first five year period, broken out into basic, backlog and incremental silviculture program activities to meet timber and non-timber objectives, and each program's overall consequences for short-, medium-, and long-term habitat and timber supply,

(If relevant, indicate which parts of the program are necessary to achieve the assumptions regarding incremental silviculture in the current AAC determination for the Management Unit.)
- iv) for the recommended silviculture program, the information required in sections 3.4 to 3.6;
- (f) a regime table which identifies the recommended treatment regimes and priority treatments that should be used to deliver the strategy;
- (g) linkages to related activities where timing is critical, eg, road access, restoration and rehabilitation treatments, etc.;
- (h) an effectiveness evaluation program to ensure improvements over time as the strategy is implemented;
- (i) the need and plans for First Nations and public consultation, if any;
- (j) a summary of information and research that is needed to support or refine the silviculture strategy for the management unit; and
- (k) reference material used in the development of the strategy.

ARTICLE 4: SUBMISSION

Submission and Review

- 4.1 The Recipient must submit to the District Manager a copy of each document (data package, analysis and final report) within one month of it being completed.

Revision

- 4.2 The District Manager may request changes to a document or further analysis that in the District Manager's opinion will be necessary in order for him or her to officially endorse the ultimate strategy on behalf of the Province. Any endorsement will be confirmed in a letter from the District Manager to the Recipient.