Morice & Lakes

IFPA

Operational Adjustment Factor (OAF1)

Project Summary

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Background

- Relationship with TASS
- How does TASS work
- Why are operational adjustment factors required
- Obtaining accurate OAF1 values

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Operational Adjustment Factor Types

- There are two types of adjustment factor, (OAF), in TASS
  - **OAF1**, which addresses un-mappable stocking gaps , and
  - **OAF 2**, which is meant to address decay, waste and breakage and forest health concerns that are not static over the life of the stand

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OAF1 Net Downs

- OAF 1a: Non-productive areas-rock outcrops, swamps etc.
- OAF 1b: Management effects-espacement and non-commercial cover
- OAF 1c: Losses due to forest health factors
- OAF 1d: Losses due to random risk factors

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OAF1 Examples

The following photographs show some of the many factors associated with each of the OAF1 netdown types that can cause the yield in real stands to differ from the yield predicted by TIPSY. (Source: *OAF Photo Gallery, Ministry of Forests, Forest Practices Branch Web Site*)

OAF 1a

- Rock Outcrop

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OAF 1b

- Management Effects- (e.g. espacement)

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OAF 1c

- Losses due to Forest Health Factors

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OAF 1d

- Losses due to random risk factors (e.g excessive slash loading)

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Primary Objectives

- Collect sufficient data across the Bulkley, Morice, and Lakes Districts in order to obtain localized OAF1 estimates

- Obtain 50 OAF1 samples per biogeoclimatic site series representing at least 2% of the THLB in each district, concentrating on geographic areas not previously sampled

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Secondary Objective

- Test the sensitivity of the ground-based survey method to critical distance

Recent ground-based studies have continued to build upon the concept of critical distance by attempting to differentiate the various stocking gap causes in order to allow partitioning of OAF1 effects

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Critical Distance

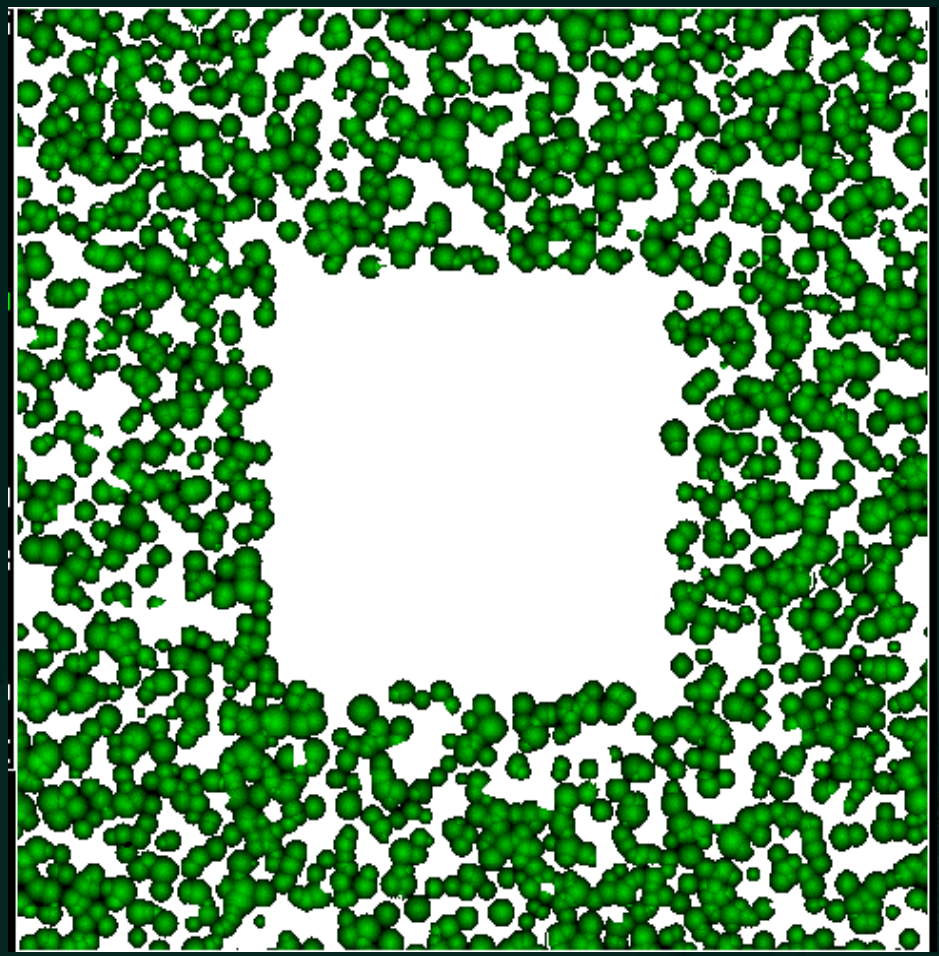
- Critical distance is an expression of the relationship between stocking holes in a stand and their impact on merchantable yield

- During a silviculture survey, the area currently unoccupied by trees cannot be assumed to be a stocking gap for 2 reasons:

  - ❖Tree crowns on the edge of a stocking gap grow into it, reducing the effect of the gap,

  - ❖TASS simulates the effects of stand density and incorporates some gaps at lower stocking levels.

Critical Distance



- A TASS generated stem map illustrating the distribution of stems around a hole (1874 stems/ha at 15 years of age). Circles around each tree represent the critical distance.

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Critical Distance Values

Species	Distance (m)
Lodgepole Pine (Pl)	2.7
White Spruce (Sw)	2.7
Interior Douglas-fir (Fdi)	3.6
Coastal Douglas-fir (Fdc)	3.6
Western Hemlock (Hw)	3.6
Sitka Spruce (Ss)	3.6
Western Red Cedar (Cw)	3.6

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Methods

- The Morice/Lakes IFPA administered the project and Laing & McCulloch FMS Ltd. conducted data sampling during the 2002 field season.

- Data were collected at each OAF1 sample point consistent with the procedures described in the *Ground Based Survey Methodology Report 2* (Martin 1998).

Sampling Modifications

- The ground-based method requires collecting sampling at every plot within the opening, however, in this project the objective was to describe OAF value by site series and the value for individual openings was not important
- No more than five samples per site series were allowed in any given cutblock
- The target number of samples for each site series was 50

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OAF1 Data Summary

- Distance to the first acceptable tree was measured in 0.1m increments from >2.0m through to 3.9 m to test the sensitivity of critical distance. Calculations for this report used the **2.7m critical distance**
- Plot information was collated in an Excel spreadsheet and sorted by site series and TSA
- The raw data on percent empty plots were converted to OAF1 values using a web-based OAF calculator produced by Forest Practices Branch.

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Results

- A total of 1264 point samples were obtained across the three TSAs between 2001 and 2002 (586 in 2001 and 678 in 2002)

Sampling Results

- Fifty or more samples were obtained on sixteen series as follows:
  - » SBSdk 01= 126 samples,
  - » SBSdk 05= 52 samples
  - » SBSdk 06= 55 samples
  - » SBSdk 07= 55 samples
  - » SBSmc2 01= 316 samples
  - » SBSmc2 01c= 40 samples
  - » SBSmc2 05/06= 176 samples,
  - » SBSmc2 09= 50 samples
  - » SBSmc2 10= 50 samples
  - » ESSFmc 01= 50 samples
  - » ESSFmc 04 = 50 samples
  - » ESSFmc 05/06= 50 samples
  - » ESSFmc 09/10= 56 samples
  - » ESSFwv 01= 50 samples
  - » ICHmc1 01= 57 samples
  - » ICHmc1 03= 50 samples

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Statistical Analysis

- A standard deviation for the random binomial variable *percent empty plots* (PEP = proportion of area in gaps) was calculated for each of the site series described previously using the formula SD = SQRT {(#empty plots/total plots x total plots) x [1 – (# empty plots/total plots)]}

- Standard deviation for the PEP values was used to determine corresponding OAF values using the MoF calculator (http://www.for.gov.bc.ca/hfp/OAF1/intro_calc.htm).

Findings

- OAF1 values for the site series with at least 50 plots established averaged less than 2% on a weighted average basis

- Overall, only 51 of 1264 plots (4.0%) had spacing gaps greater than 2.7m critical distance and only 18 of 1264 plots (1.4%) had spacing gaps between 3.6m and 4.0m critical distance

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Additional Findings

- Further analysis demonstrates that OAF1 estimates are sensitive to critical distance.
- When critical distances were decreased from 2.7m to 2.3m, OAF1 values increased by 1.0-9.0%.
- Increasing critical distances from 2.7m to 3.0m decreased OAF1 values by up to 2.4%.

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Discussion

- It is evident from the results obtained, that OAF1 values in planted stands are very unlikely to be as high as the 15% currently used as a default

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Recommendations

- The SBSdk/01/05/06, SBSmc2/01/01c/05/06/09/10, ESSFmc01/04/05/06, ESSFwv01, and ICHmc1 01/03 site series have been sufficiently sampled to form a conclusion for an appropriate OAF 1 value.
- Definitive conclusions can be reached for these areas as the site series in which sufficient data were collected represents a significant portion of the Bulkley, Morice, and Lakes TSAs and the geographic distribution of plots across these areas was reasonably wide.
- Licensees in the Bulkley, Lakes, and Morice TSAs should consider the value of OAF1 surveys in identifying opportunities for enhancing stocking to achieve optimum levels. This is particularly true for the ESSFmc 09/10 and SBSdk 07.

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Recommendations

It is recommended that an OAF1 value of 5% be considered for the following site series:

- SBSdk 01/05/06
- SBSmc2 01/01c/05/06/09/10
- ESSFmc 01/04/05/06
- ESSFwv 01
-

A value of 5% is recommended for the sites listed above based on the 2001 and 2002 field sampling programs and direction from timber supply branch. OAF values for site series representing less than 2% of the land base should be defaulted to the value used for the site series adjacent to it on the edatopic grid, to the extent that they fall into the same broad category of ecological condition (dry poor, mesic mesotrophic, and wet rich).

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Recommendations

- This figure (5%) is based on the combined results from the 2001-2002 OAF1 data in which an OAF1 value of 0–1.5% was repeatedly achieved on the aforementioned sites. It also incorporates direction from Albert Nussbaum that future risk must be considered
- For the SBSdk 07 and ESSFmc 09/10 site series, an OAF1 value of 10-15% is considered appropriate.
- It is anticipated that the recommended OAF values for the Bulkley, Lakes, and Morice TSAs will satisfy the Chief Forester's requirements for utilizing OAF values that deviate from the provincial defaults for future Bulkley TSA timber supply reviews

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