

Roads, Decking and Processing Area Assessment

Purpose

The Roads, Decking and Processing Area Assessment is intended to provide the forest companies (timber disposition holders) with direction on how to assess and manage road, decking and processing areas' timber supply impacts within the Al-Pac Forest Management Agreement (FMA) area.

Scope

The roads, decking and processing areas in a cutblock generally occupy a contiguous area and will be collectively referred to as temporary roads in this document. Roads that are under a Public Lands Disposition will not be included. The Timber Supply Analysis includes all forest operators in the FMA; therefore this assessment applies to all operators on the FMA. These terms detail the mechanisms that will be used to determine temporary road/deck/processing area reforestation losses and incorporate the results into the Timber Supply Analysis (TSA), as required. The assessment includes openings that have a clock start including and greater than April 30, 2003. These data will be used in the next TSA in ~2011.

Forest Management Plan Requirements:

Alberta Sustainable Resource Development's (SRD) Forest Management Plan decision requested the following:

Al-Pac shall develop a monitoring and reporting program to quantify productive forestland base losses due to roads and decking areas.

In order to do so, data from in-block roads must be able to show:

- Sufficient stocking, density and height yield
- Suitable height growth.

The sampling design used to investigate the status and growth of in-block roads will be comprised of two separate programs with different objectives. A temporary sample plot program will look at static information on stocking, density and height yield, while a permanent sample plot program will be used to examine height growth over time.

Background

The Alberta Forest Management Planning Standard refers to losses of productive lands due to temporary roads and landings. Regeneration Survey methods are not designed to identify plots on temporary roads and under normal circumstances the only plots that are identified, as being on a road or decking area are ones that are not stocked.

Regeneration standards (Alberta Regeneration Survey Manual or Alternative Regeneration Standards) have a minimum requirement for tree acceptability and stocking based on the declared reforestation objective for that opening.

Forest Operators on the FMA are will estimate the yield impact of temporary roads by accumulating reforestation data during regeneration surveys.

Procedures – Temporary Sample Plots

The intent of this procedure is to determine the area in temporary roads in a Forest Management Unit (FMU) and then calculate the stocking level of that area. Any stocking percent less than the approved SRD regeneration standard will be deducted from the regenerated yield curves defined in the next approved Al-Pac FMA area Forest Management Plan.

Temporary Road Area

Temporary road areas are currently collected during regeneration surveys by measuring length and averaging widths periodically along the centerline. The traditional ground survey will continue using this method.

In the aerial regeneration survey the temporary road could be all or part of one or several NSR, CSR or SR polygons. The temporary road polygon will not necessarily be the same polygon as the strata being sampled, but temporary road polygons can easily be delineated during stratification and will be recorded for the purpose of determining area and identifying potential road plots.

Plot Collection

The plots will be standard regeneration survey plots. The minimum plot intensity for the temporary road sample will be 2.77 plots per ha. These plots will be collected during the establishment survey.

Plots that fall completely within the road and landing area, during the ground or aerial survey, will be designated as temporary road plots on the survey forms. These plots will be included in all regeneration survey calculations for the opening and, in addition, will be used for temporary road stocking assessments. When the survey is complete and prior to leaving the opening the surveyor or interpreter will divide the number of temporary road plots by the temporary road area. If the intensity is less than 2.77 plots per ha., supplemental plots will be created to increase the intensity above 2.77 plots per hectare of temporary road area.

The ground surveyor will add supplemental plots to every survey grid line crossing the temporary road, starting with the second line from the tie point until the 2.77 plots per hectare or greater intensity is obtained. The supplemental plots will be placed at the midpoint between temporary road edges (including decking areas) as measured along the survey line.

The aerial regeneration survey interpreter will add supplemental plots to the LSP photo by selecting the midpoints between the current outer plots, starting along the flight line and continuing clockwise until sufficient supplemental plots are obtained.

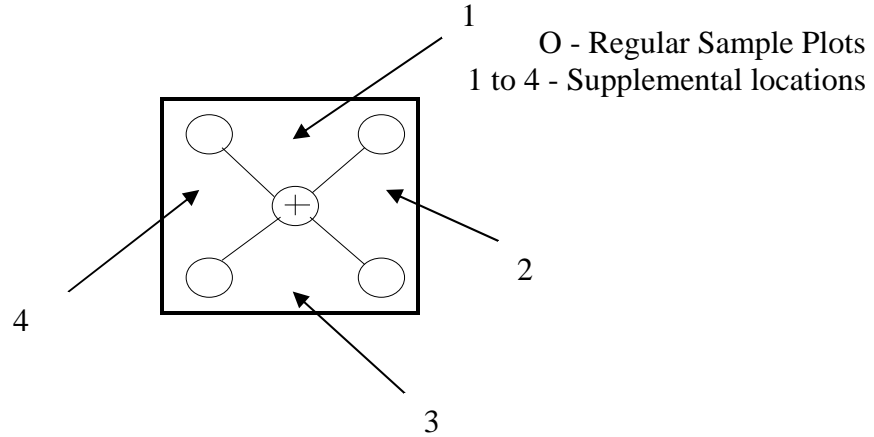


Figure 1. LSP Photo Sample Design Showing Supplemental Plot locations Numbered by Sampling Priority

The supplemental plots will be recorded on the bottom of the tally sheet after the regeneration survey plots, will be identified as road only plots, and will not contribute to the regeneration survey calculation for the opening.

Data Analysis Options

Stocking and density may be assessed as follows:

1. Block Level Assessment. Normal regeneration surveys include sampling on in-block roads, and all plots are used to assess stocking and other key variables over the entire block. The assumption is that if blocks are stocked, it means that in-block roads do not negatively affect stocking of the block (validating an indirect assumption that the in-block roads are sufficiently restocked); the same applies to the contribution of plots to average density for the block.
2. In-Block Road Assessment. In-block road data will be pooled across all blocks, to assess whether in-block roads independently achieve an appropriate level of stocking and density.

Height yield may be assessed by:

1. In-Block Road Assessment. Pooling of all in-block road data across all blocks to calculate overall height yields relative to height targets for yield strata.
2. In-Block Roads vs. Blocks. Pooling of all in-block road data across all blocks to compare height yields on in-block road plots relative to plots within blocks.

Comparisons of in-block roads relative to block areas will take into account the fact that roads are often planted at least one year following initial block planting.

Permanent Sample Plots

Permanent sample plot data will be used to assess height growth over time on in-block roads relative to height growth within blocks.

Sampling Population

The sample population for PSPs will be the same as for TSPs, with the following exceptions:

- 1) Blocks where in-block roads were not regenerated will be excluded, since the goal is to assess regenerated in-block road productivity in terms of height growth; and
- 2) PSPs will be established when blocks are 5 years old; therefore the population will also be restricted to 5 year old blocks. The following table illustrates the three-year PSP program.

Strata	Season of Harvest	Year I	Year II	Year III	Year III	Totals
Deciduous	Summer	1	2	2	1	6
	Winter	2	3	1		6
DC / CD	Summer	1	1	1	-	3
Mixedwoods	Winter	1	1	1	-	3
White Spruce	na	1	1	1	-	3
Black Spruce	na	1	1	1	-	3
Jack Pine	na	1	1	-	-	2
TOTALS	-	8	10	7	1	26

Sampling Design

Sampling a range of stand conditions is desirable. Stands will be randomly selected with probability of selection proportional to stand area. Stand attributes will be examined to ensure that a range of species and road treatments are sampled. Road type (based on season of harvest - winter/summer) will also be a consideration in deciduous block selection.

26 blocks will be selected for sampling over three years. Within each selected block, three 100 m² plots will be established at pre-selected random locations along in-block roads. Three additional 100 m² plots will be randomly located within each block, creating three plot pairs per block.

Plots will be 100 m² in size. The plots within the block will be circular, with a 5.64 m in radius. The plots on in-block roads will be rectangular in shape, with actual dimensions varying in order to occupy the entire width of the in-block road. For example, 10m x 10 m or 5 m x 20 m or 7.5 m x 13.3 m, and so on. Plots will be offset if they do not capture a minimum of 5 trees of the species of interest. A circular, 10 m² (1.78 m radius) plot will be centered within each 100 m² plot for density estimates.

Data Collection

The intent of these plots is to assess tree height growth rates on in-block roads relative to that of blocks. As such, the level of detail in data collection will be tailored to address this question. The following data will be collected at each measurement or re-measurement period:

Plot Data

- slope
- aspect class (N, NE, E, SE, S, SW, W, NW)
- slope position

Within the 100 m² plot:

- the total height of the largest diameter tree by species (Top Height)
- the total height of ten randomly selected trees by species (Average Height)
- no tree tagging or stem mapping

Within the 10 m² plot:

- tally of the number of stems by species (no height class): actual count up to 10, 11-30, 31-100, 100+

Plots will be established five years after harvesting. Re-measurement will occur at 10, 20, and 30 years after harvesting.

Timber Supply Analysis

At the initiation of the next Timber Supply Analysis (TSA), the temporary road survey plots that have accumulated since the previous TSA will be sorted into the major forest strata as dictated by new regenerated yield curves (i.e. D, DC, CD, C) by FMU. Each stratum would be representative of a regenerated yield curve or groups of similar regenerated yield curves.

Each plot's stocking will be calculated based on the standards applicable to the opening survey. The total stocking for all the temporary road plots in a population will be calculated as the percentage of plots with satisfactory stocking. The temporary road-stocking shortfall (%) is the difference between the calculated stocking for the population and the required stocking standard from the Alberta Regeneration Survey Manual or the SRD approved Alternative Regeneration Standard.

The area of the roads and landings will be divided by the total area of the openings included in the survey population to give an average temporary road area (%) for the regenerating population. The stocking shortfall percent times the temporary road area percent will give a yield curve reduction factor to represent the temporary road landbase losses. The temporary road factors will be used to adjust each regenerating yield curve within the new TSA model.