Abstract

There are uncertainties associated with various forest management activities. Adaptive management is a preferred approach for dealing with these uncertainties. A long-term monitoring system is an essential component in any adaptive forest management approach. Growth and yield projection is a major component of forest management planning and AAC determination, and its monitoring at both a local and provincial level is of crucial importance to successful implementation of sustainable management of our forest resources.

Forest management agreement (FMA) holders in Alberta are required to provide growth and yield monitoring data in support of their detailed forest management plans (DFMPs). Currently, the few existing monitoring programs are not coordinated. Each program has a local focus covering a limited range of stand conditions. A coordinated program that covers a wide range of forest conditions is lacking at the provincial level.

A province-wide monitoring framework, covering a wide range of forest conditions in Alberta, was proposed for the main purpose of verifying growth and yield predictions. The framework includes three data collection systems. The first system, based on the 20-km grid proposed for the National Forest Inventory, is recommended for monitoring growth and yield predictions for untreated, natural-origin stands. This 20-km grid becomes the master grid of the monitoring framework. A denser grid (e.g., a 10-km, 5-km, or 1-km grid as dictated by the required sample size), generated from the master grid, is recommended for the second system for monitoring untreated, post-harvest stands. The third system is for monitoring silviculturally treated stands with the sample locations randomly selected from eligible stands. To compare site index estimates between natural-origin and post-harvest stands, paired plots are recommended whenever possible in the second system.

Currently, most forest management activities occur in 4 Natural Subregions (Upper Foothills, Lower Foothills, Dry Mixedwood, and Central Mixedwood) within the Green Area of Alberta. Due to cost constraints, all monitoring plots will be allocated in these 4 subregions initially. For each system, the number of plots in each subregion will be roughly proportional to the area of that subregion. In the first phase, 500 installations each for untreated natural-origin and post-harvest stands, and 250 installations for silviculturally treated natural-origin and post-harvest stands, are proposed. Data collected will allow us to determine optimal sample sizes.
For each installation, a nested plot design with 3 types of plots is recommended: a 400 m² large tree plot for trees ≥ 7.1 cm in breast height diameter; a 50 m² or 100 m² sapling plot for trees > 1.3 m in height and < 7.1 cm in diameter; and four 10 m² regeneration subplots for trees between 0.3 m and 1.3 m in height.

The proposed monitoring program would serve as a provincial-level framework for the coordinated and integrated collection of monitoring data, providing an opportunity for the forest industry and government agencies to develop joint monitoring programs. The system would be flexible enough to accommodate the specific needs and existing systems of cooperating agencies, while at the same time providing the data and information required to meet provincial reporting requirements. Cooperation would facilitate data sharing and potentially reduce the monitoring costs born by each agency. The grid and random selection systems already commonly in use in Alberta are incorporated into this proposal to facilitate the coordination of future monitoring programs developed by different agencies. Each agency would have the flexibility of choosing its own desired grid system, provided the base grid is used to generate any other grid.

The proposed monitoring protocol will be evaluated through a pilot program scheduled to start this year tentatively in the FMA area of the Canadian Forest Products Ltd. In total, 30 installations will be established.

Key words: growth and yield monitoring, sampling design.