

Foothills Growth and Yield Association



A successful collaboration.

Foothills Growth and Yield Association (FGYA) is a collaboration of nine Alberta forest companies who continually improve forecasting and validation of managed stand growth and yield, particularly of lodgepole pine. Projects are selected based on their utility for stand level forecasting, their scientific defensibility, relevance and value to forest managers, and their cost effectiveness. Field projects include:

1. Lodgepole pine regeneration (2000-2010) - The FGYA installed 408 field plots across the forested landscape of Alberta to annually measure, monitor and forecast the development of lodgepole pine regenerated after harvesting. This is providing important insight into the early development of regenerated stands which is of high value in many ways including the development of regeneration standards for Alberta and examining the impacts of climate change on early stand development and mortality (see sidebar).
2. Comparison of pre-harvest and post-harvest stand development (2002-2004) - The FGYA completed a comparison of pre-harvest and post-harvest site indices, presenting the final report of this work in 2004 at a major international forestry conference.
3. Cooperative management of historic research trials (2001- ongoing) - The In 2001, the FGYA visited a number of abandoned Canadian Forest Service growth and yield trials, concluding that they should be reclaimed as invaluable resources for forecasting, monitoring, and demonstrating the effects of nutrition and density management. These are maintained, measured and analyzed under an agreement with the Canadian Forest Service and Alberta Sustainable Resource Development.



4. Regional yield estimators (2002-2006) - The Association cooperated with Alberta Sustainable Resource Development, which wished to link growth and yield models to the Alberta Vegetation Inventory, enabling Alberta Sustainable Resource Development to report credibly on both the current state of provincial timber resources, and their rate of growth.
5. Enhanced management of lodgepole pine (2004-2009) - This project is focused on filling information gaps in nutrition and density management of both fire-origin and post-harvest stands, with two subprojects in (a) pine nutrition and density management in young and mid-rotation stands, and (b) pine-aspen density management following harvest and reforestation.
6. Regeneration management in a mountain pine beetle environment (2008-2010) - High levels of infestation and mortality in the lodgepole pine forests of Alberta are expected, yet the knowledge with which to address post-infestation treatment is rudimentary. The objective of this project is to provide tools for assessing treatment options (e.g. salvage, partial-cutting, site preparation, re-planting, fertilization, density management) and their growth and yield implications, for pure and mixed-species lodgepole pine stands attacked by mountain pine beetle.

Effects of Climate on Mortality of Young Planted Lodgepole Pine

The FGYA has examined the linkage between pine mortality and climate change using five years of data from the Regenerated Lodgepole Pine plots established between 2000 and 2002. Results show a strong correlation between changes in mean annual temperature and the high levels of mortality observed in the first five years of the trial.

Forest companies and the Province make heavy investments in forest regeneration which are exposed to silvicultural risks and losses in the short-term, and climate appears implicated in these losses

Incorporation of climate variables into regeneration models may provide a significant improvement in our ability to forecast mortality and survival. This has practical implications because:

- Knowledge of probable mortality is key to operational decision-making regarding achievement of regeneration performance targets;
- It was previously feared that mortality would be too chaotic and random for prediction;
- Localized values for climate data can be easily calculated for any opening in Alberta providing the geographic location (latitude, longitude and elevation) is known.

Climate effects on mortality may be both direct (e.g. summer drought, winter desiccation) and indirect (i.e. resulting from climate affecting pathogen dynamics or pre-disposing trees to pathogens). On all sites except the poor, wet "Ledum" sites mortality increased with increasing average temperatures.

Increasing temperatures appears to improve growing conditions for Lodgepole pine on cold, wet sites..

On all other sites, increasing temperature appears to degrade lodgepole pine survival after planting.

Foothills Research Institute is a leader in developing innovative science and knowledge for integrated resource management on the forest landscape through diverse and actively engaged partnerships.

The Foothills Research Partnership Ltd. landbase is located in west-central Alberta, and is based in the resource community of Hinton, some three hours west of Edmonton. It covers roughly 2.75 million hectare (27,500 square kilometres), and embodies Jasper National Park of Canada, the Willmore Wilderness Park, and the Forest Management Area of Hinton Wood Products, a Division of West Fraser Mills Ltd. It also includes some provincial "crown forest management units" and the Hinton Training Centre's Cache Percotte Training Forest. Within its boundaries are three forest areas—boreal, montane, and sub-alpine—and many forest uses including timber, petroleum, and coal extraction, tourism, and recreation.

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