

Foothills Growth and Yield Association

**Robert Udell, R.P.F.
Program Lead**

**Foothills Research Institute AGM
October 15, 2008**

Outline

- ◆ **FGYA Organization**
- ◆ **Mission**
- ◆ **Relevance to FRI Mission and Goals 2007-12**
- ◆ **Priorities and Projects**



Foothills Growth and Yield Association

Foothills G&Y Ass'n (Est. April 1, 2000)

Organizational Status April 1, 2008

- ◆ **Chair – Dwight Weeks - Canfor**
- ◆ **Research and Development Associate – Dick Dempster, Ph.D.**
 - ◆ Applying his expertise to growing body of data and research information
- ◆ **Operations Director - Bob Udell**
 - ◆ Managing business and field operations of Association
 - ◆ Assisted by Sharon Meredith
- ◆ **Field Coordinator – Sharon Meredith**
 - ◆ Responsible for field operations and quality control, reporting to Udell



Foothills Growth and Yield Association

FGYA Steering Committee

- ◆ Dwight Weeks (Chair) – Canfor
- ◆ Bob Held – Sundre F.P.
- ◆ Doug Sklar – ASRD
- ◆ Ed Kulscar – Spray Lakes
- ◆ Greg Behuniak – Weyerhaeuser
- ◆ Gregg Branton – Alb. Newsprint
- ◆ John Huey – Sundance F.I.
- ◆ Murray Summers – Blue Ridge Lumber
- ◆ Richard Briand – Hinton F.P.
- ◆ Tim McCready – Millar Western
- ◆ Tom Archibald – Foothills Research Inst.

Mission and Mandate of the FGYA

Goal: Continually improve the assessment of lodgepole pine growth and yield in managed stands by:

1. Forecasting and monitoring responses to silvicultural treatments;
2. Facilitating the scientific development and validation of yield forecasts used by members in managing their tenures;
3. Promoting knowledge, shared responsibility and cost-effective co-operation.



Foothills Growth and Yield Association

Linkage to FRI 2007-12 Business Plan

FRI Goal One: Building a community of diverse and active partners working in natural resource management.

◆ FGYA is Diverse

- ◆ 9 sponsoring & Voting Companies*
- ◆ Alberta Sustainable Resource Development*
- ◆ Foothills Research Institute Board Representative*

◆ - And Active!

- ◆ Six research projects underway covering the range of Lodgepole pine in Alberta*
- ◆ Meets fundamental need for growth & yield forecasting*



Foothills Growth and Yield Association

Linkage to FRI 2007-12 Business Plan

FRI Goal Two: Identifying natural resource management issues at the landscape level that are common to our partnership

- ◆ ***Mountain pine beetle project underway (Project 7 MPB)***
 - ◆ *Managed under FRI's Mtn. Pine Beetle Ecology Program*

- ◆ ***Climate Change work beginning (project 2 RLP)***
 - ◆ *Collaborating with U of A (Andreas Hamman) on comparing 5-year Regenerated Lodgepole pine results to Alberta Climate Change model*

Linkage to FRI 2007-12 Business Plan

FRI Goal 3: Providing science-based tools and knowledge that is understandable and available to natural resource managers, policy makers, and the public.

- ◆ ***Project 2: Growth and yield of regenerated stands – 408 Plots***
- ◆ ***Project 3: Comparing regenerated stands to fire origin (PHSD Dialogues)***
- ◆ ***Project 4: Maintaining/ analyzing historic trials – 14 Installations***
- ◆ ***Project 5: Linking growth and yield to AVI at region level (SRD Project)***
- ◆ ***Project 6: Enhanced management of lodgepole pine***
 - ◆ *Lodgepole Pine Nutrition – 30 stands*
 - ◆ *Pine-aspen Density Management – 18 Stands*
- ◆ ***Project 7: Monitoring and Decision Support for Forest Management in a Mountain Pine Beetle Environment – 150 plots***



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Linkage to FRI 2007-12 Business Plan

FRI Goal 4: Broadly disseminating our knowledge.

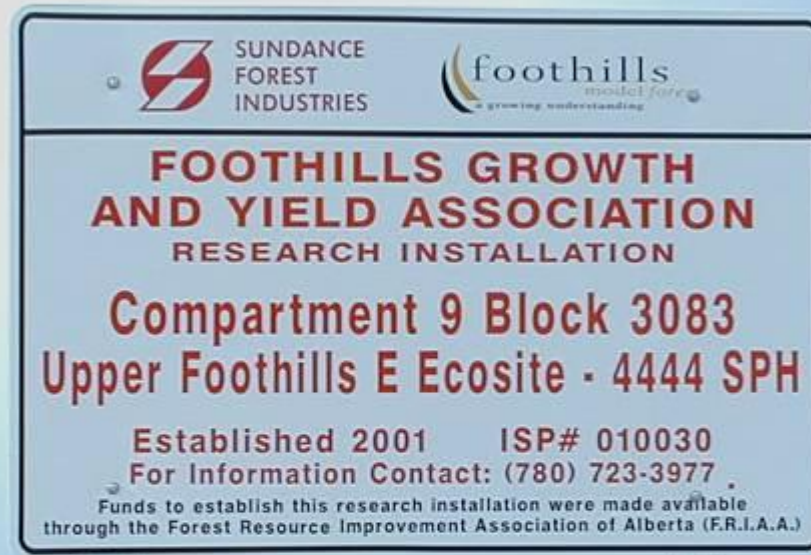
- ◆ ***Communications and outreach programs***
 - ◆ *Spring Technical Forum 2008*
 - ◆ *Two Quicknotes 2008*
 - ◆ *One Internal Technical Report on Pine/Aspen*
 - ◆ *New pine/aspen paper late 2008*
 - ◆ *Field Tours*
- ◆ **9 forest companies, other research cooperatives, universities and 2 levels of government collaborate in sharing information and support;**

FGYA Priority Research Areas and Projects 2008

- ◆ **Responses to planting, vegetation management and density regulation treatments in harvest-origin stands**
 - ◆ Project 2 – Regenerated Lodgepole Pine
- ◆ **Mortality, forest health and risk management in regenerated stands following harvest**
 - ◆ Project 2 – Includes climate impacts on regeneration performance
 - ◆ Project 7 – Monitoring and decision support, MPB
- ◆ **Investigations of spacing, tending, nutrition and thinning**
 - ◆ Project 4 – Historic Research Trials
 - ◆ Project 6 – Enhanced Management of Lodgepole Pine
two projects: Pine Nutrition; Pine/Aspen
- ◆ **Impacts of density management on wood quality over time**
 - ◆ New 2008 - No project at present

Major Trial 1: Lodgepole Pine Regeneration

408 long term monitoring plots across the range of pine in Alberta



Purpose of RLP Project

- ◆ **Forecast and monitor the growth and yield of harvest-origin lodgepole pine, in relation to :**
 - ◆ Site
 - ◆ Initial spacing of planted stock
 - ◆ Natural regeneration
 - ◆ Mortality
 - ◆ Vegetation control (weeding)
 - ◆ Density regulation (pre-commercial thinning)
- ◆ **Provide improved basis for forecasting achievement of establishment and performance targets**

Major Trial 1: RLP Plot Installations

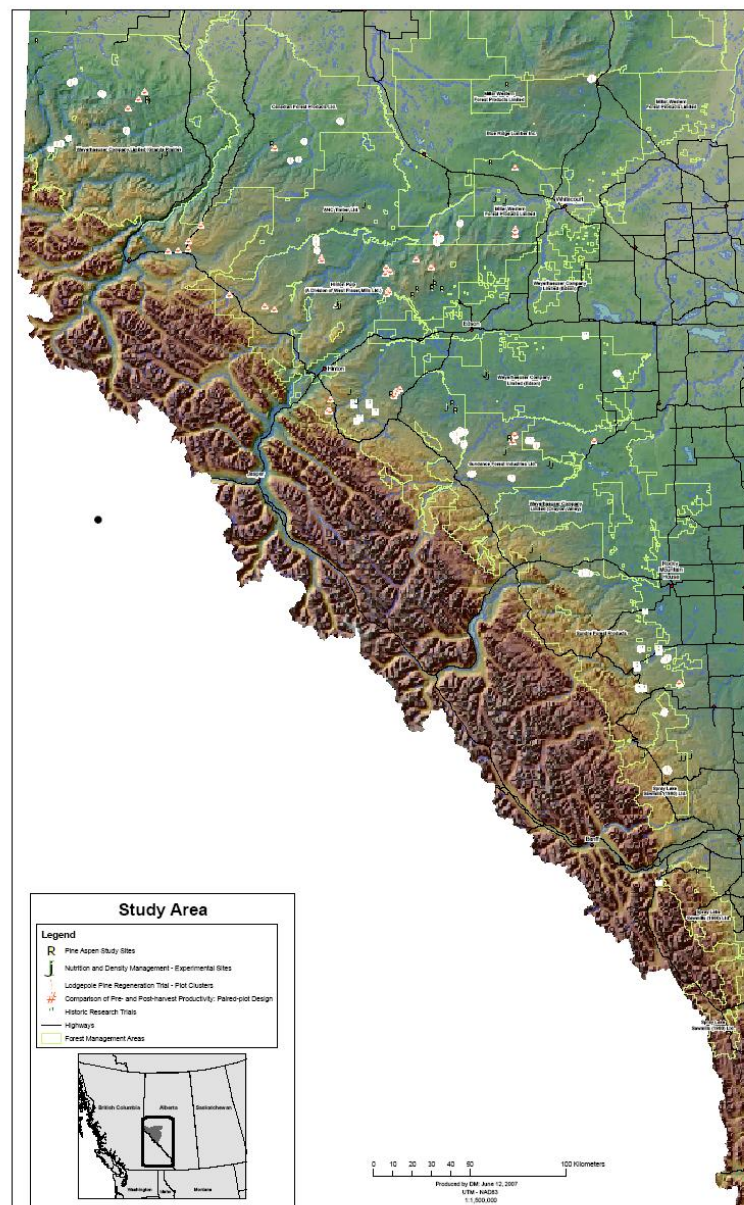
**408 Plots span the range
of Lodgepole Pine
in Alberta**

5 Year Results

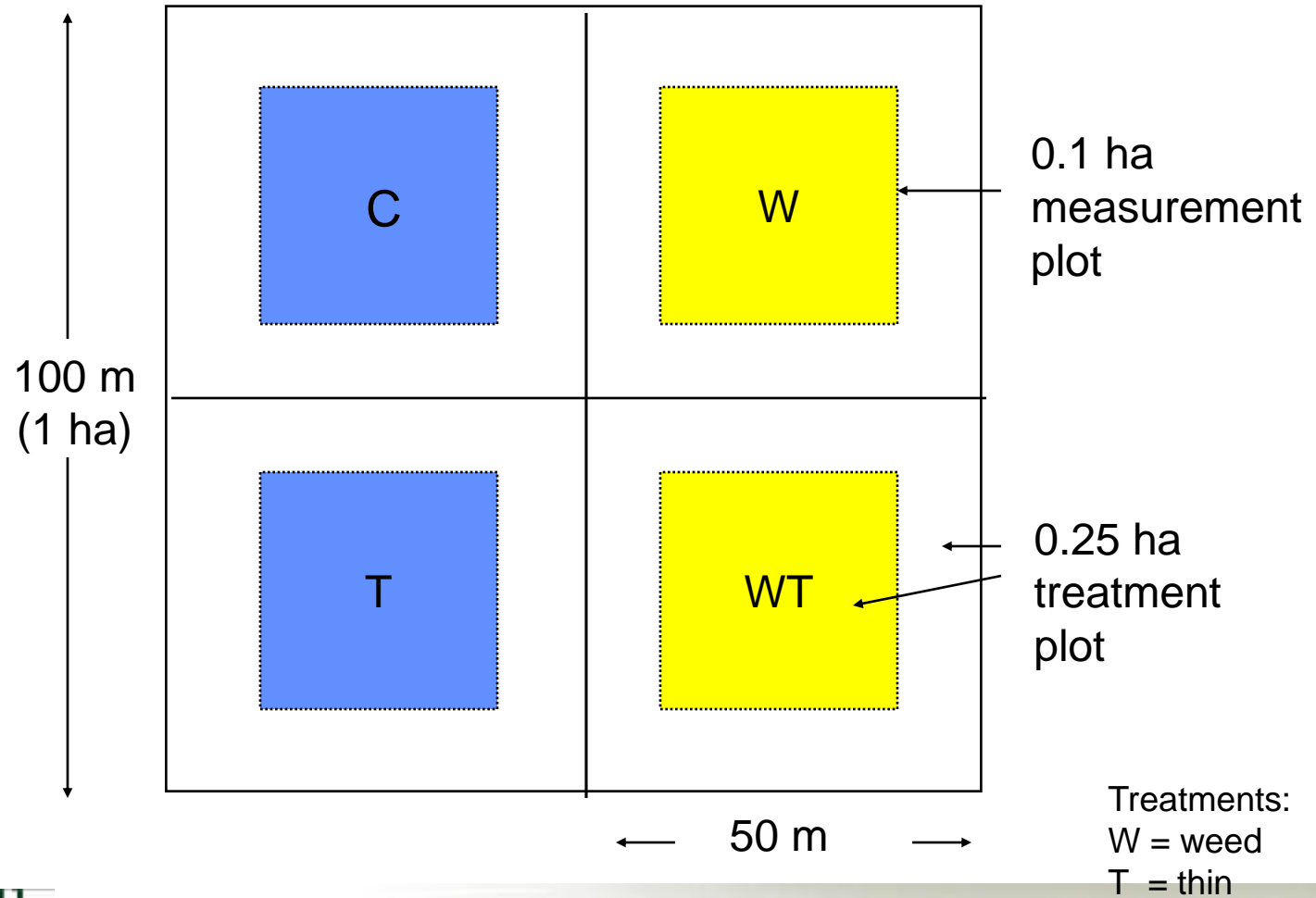
- Reported and Successfully modeled**

7 year Results

- Spring 2009**



Installation Layout

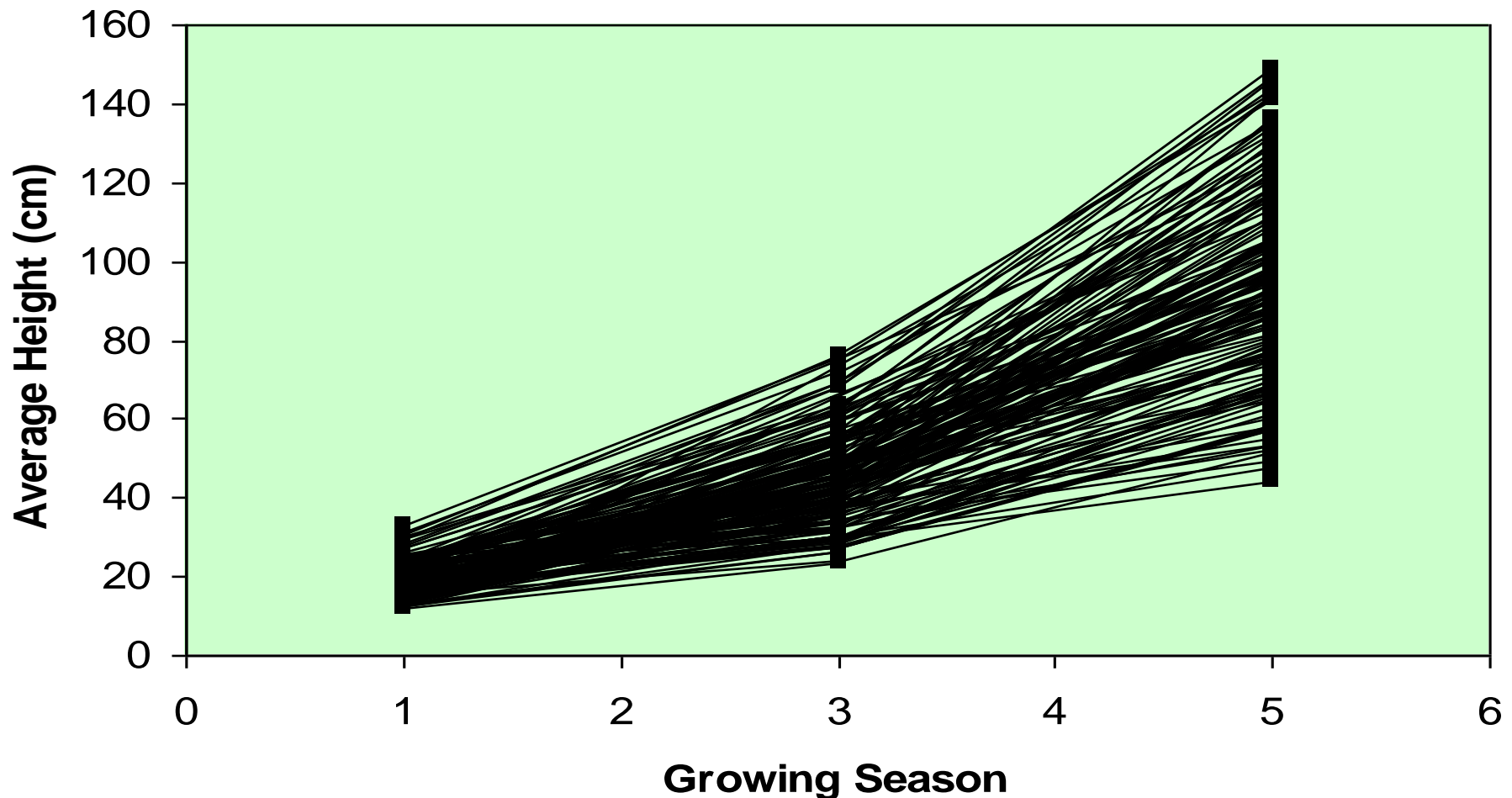


Research Strategy

- ◆ **Compare mortality and ingress results with other studies**
- ◆ **Relate mortality/ growth to climate variables**
- ◆ **Encourage academic participation in development and testing of mathematical models**
- ◆ **Encourage extension of model development to other species**
- ◆ **Expedite collection, loading and analysis of 7 year results**
- ◆ **Bring in silviculture experts to assist in interpretation/ application of results**

5 Year Results RLP (3 measurements)

Effect of Controlled Factors
(Site, Planting Density, Vegetation Management)



5 Year results: Weeding versus Leaving

Poor site - leave



Good site - leave



Poor site - weed



Good site - weed



5- Year Results: Highly Correlated Variables

◆ **Height and diameter growth:**

- ◆ Soil nutrient regime
- ◆ Site preparation method
- ◆ Site index (of fire-origin stand)
- ◆ Cultural Treatment (weed, thin)

◆ **Mortality**

- ◆ Site preparation method
- ◆ **Climate**
- ◆ Insects

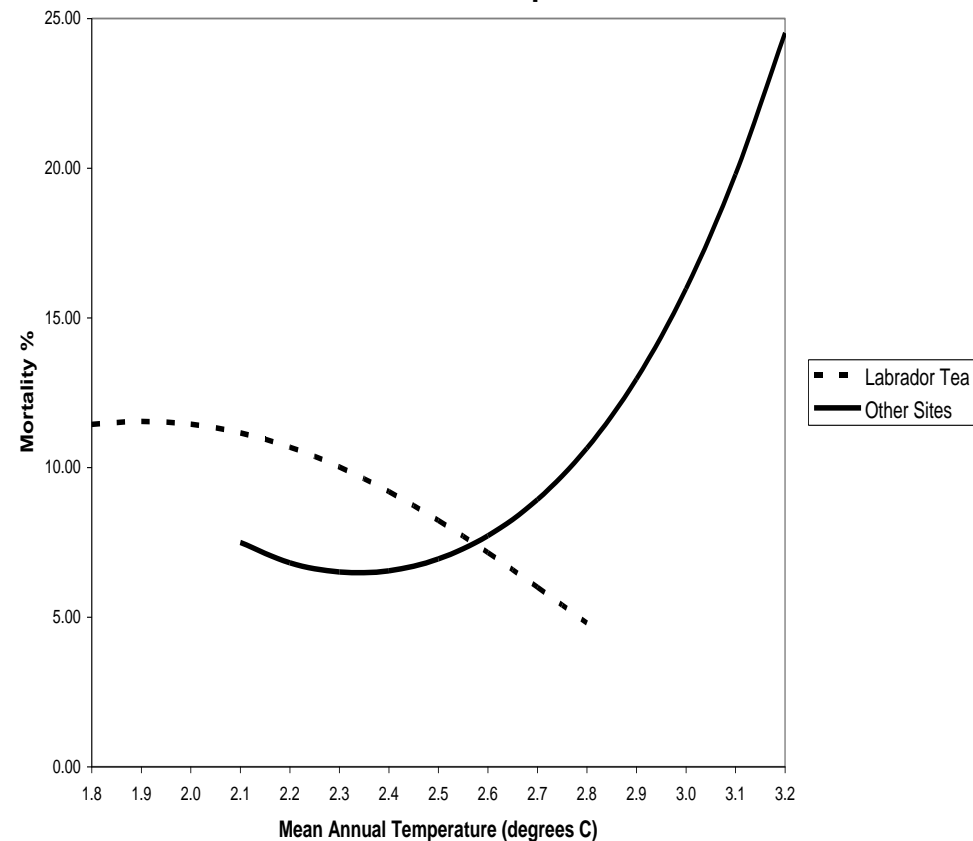
◆ **Natural regeneration**

- ◆ Site preparation method
- ◆ Initial cone count
- ◆ Latitude (-), elevation (+), slope percent (+)
- ◆ Size of deciduous competition
- ◆ Shrub-herb percent cover and height

Climate Change

- ◆ Impacts sustainability (+/-)
- ◆ Need to understand forest growth implications
- ◆ Preliminary analysis of RLP data underway
 - ◆ Trends are seen
 - ◆ More work required

Mortality as a function of Mean Annual Temperature



Major Trial 2: Historic Trials

14 old trials restored, measured and reported



Vos yeux se fixent sur le pin tordu de
Service canadien des forêts

Projet AMR: Dépouillage à 7 ans de pins tordus établis
après incendie près de la rivière Gregg, Site peu productif

Objectifs
Le projet vise à évaluer l'impact de la coupe
sélective sur la croissance des pins tordus
dans les forêts de montagne de la région de
la rivière Gregg, Site peu productif.

Données techniques
Projet AMR: Dépouillage à 7 ans de pins tordus
établis après incendie près de la rivière Gregg, Site peu productif

Données de terrain
Les données de terrain sont les suivantes:
Site peu productif, Site peu productif, Site peu productif

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Site peu productif, Site peu productif, Site peu productif

Canadian Forest Service
Historic Lodgepole Pine Silviculture Trials

PROJECT A186: Spacing of 7-year-old fire origin
lodgepole pine, Gregg River, Low productivity site.

Objectives
The study objectives were to determine the effect of
initial spacing on growth, survival, and yield
of lodgepole pine in a low productivity site.

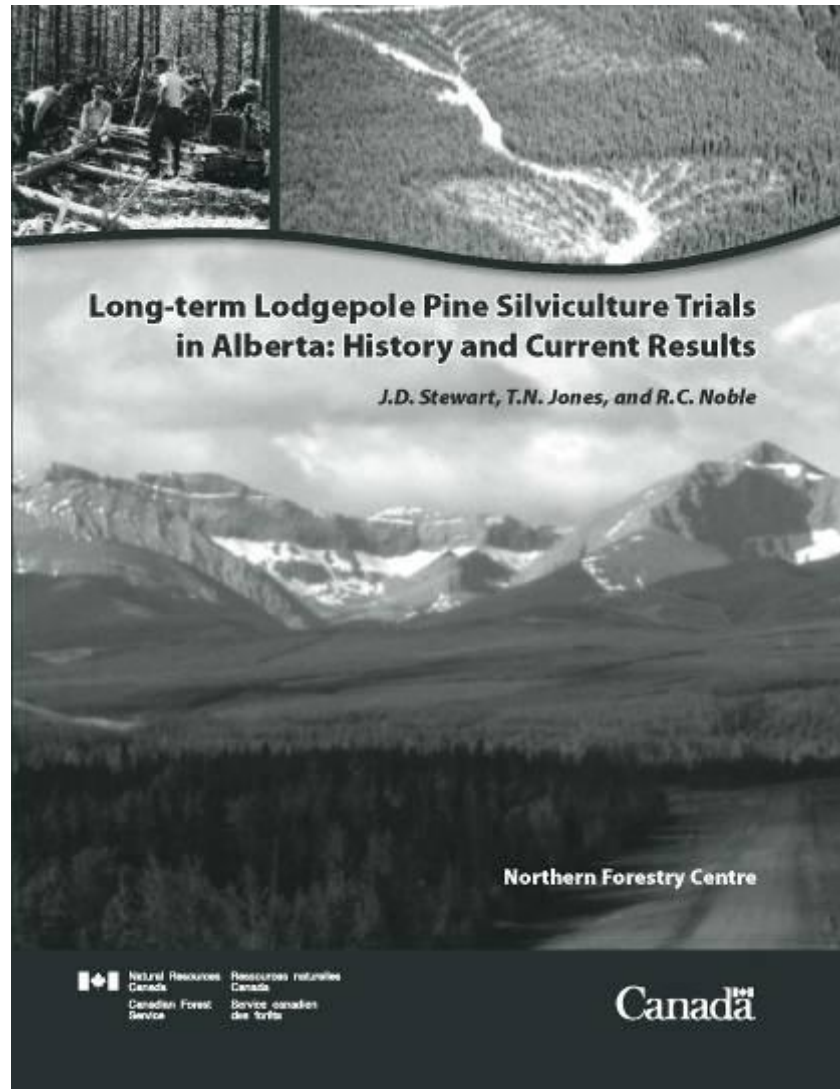
Treatments and Experimental Design
The study was conducted in 1980 on a low productivity site
near the mouth of the Gregg River. The study area
was divided into 10 plots, each 10 x 10 m.

Site Description
The study site is a low productivity site
near the mouth of the Gregg River. The study area
was divided into 10 plots, each 10 x 10 m.

Results to Date
The study has been conducted in 1980 on a low productivity site
near the mouth of the Gregg River. The study area
was divided into 10 plots, each 10 x 10 m.

Year	Plot	Survival (%)	Height (m)	DBH (cm)
1980	1	100	1.2	1.2
1980	2	100	1.2	1.2
1980	3	100	1.2	1.2
1980	4	100	1.2	1.2
1980	5	100	1.2	1.2
1980	6	100	1.2	1.2
1980	7	100	1.2	1.2
1980	8	100	1.2	1.2
1980	9	100	1.2	1.2
1980	10	100	1.2	1.2

Historic Trial Report 2006

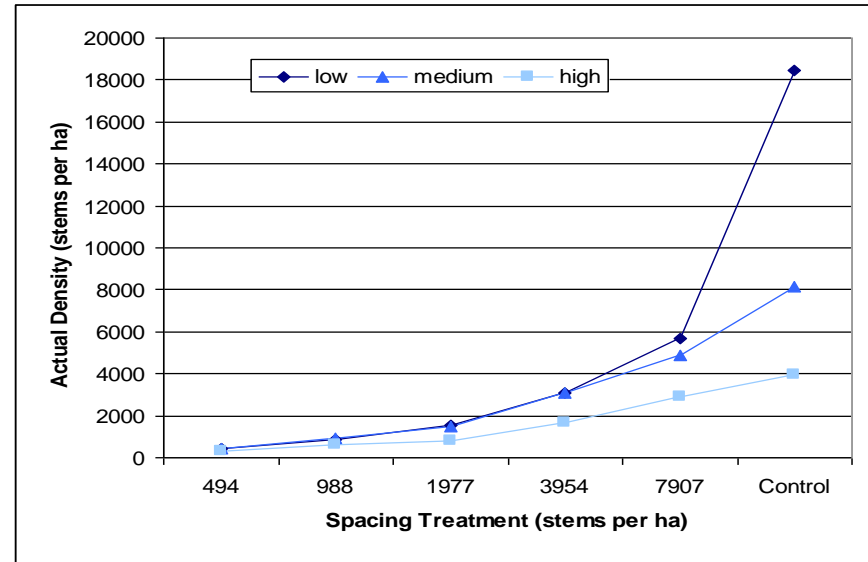


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Example: Gregg Trial Analysis 2007/08

- ◆ CFS Plots established in 7 year fire origin stand 1962
- ◆ Now 52 years old
- ◆ Simulates reforestation spacing
- ◆ Analysis underway
 - ◆ Quicknote #10 2008
- ◆ First results align with other studies, i.e.:

- ◆ Regenerated stands are more productive than fire origin
- ◆ Poor sites have greater response to treatment i.e. they do not self-thin
- ◆ Spacing may have negative effects on better sites – should place greater emphasis on site occupancy and competition control

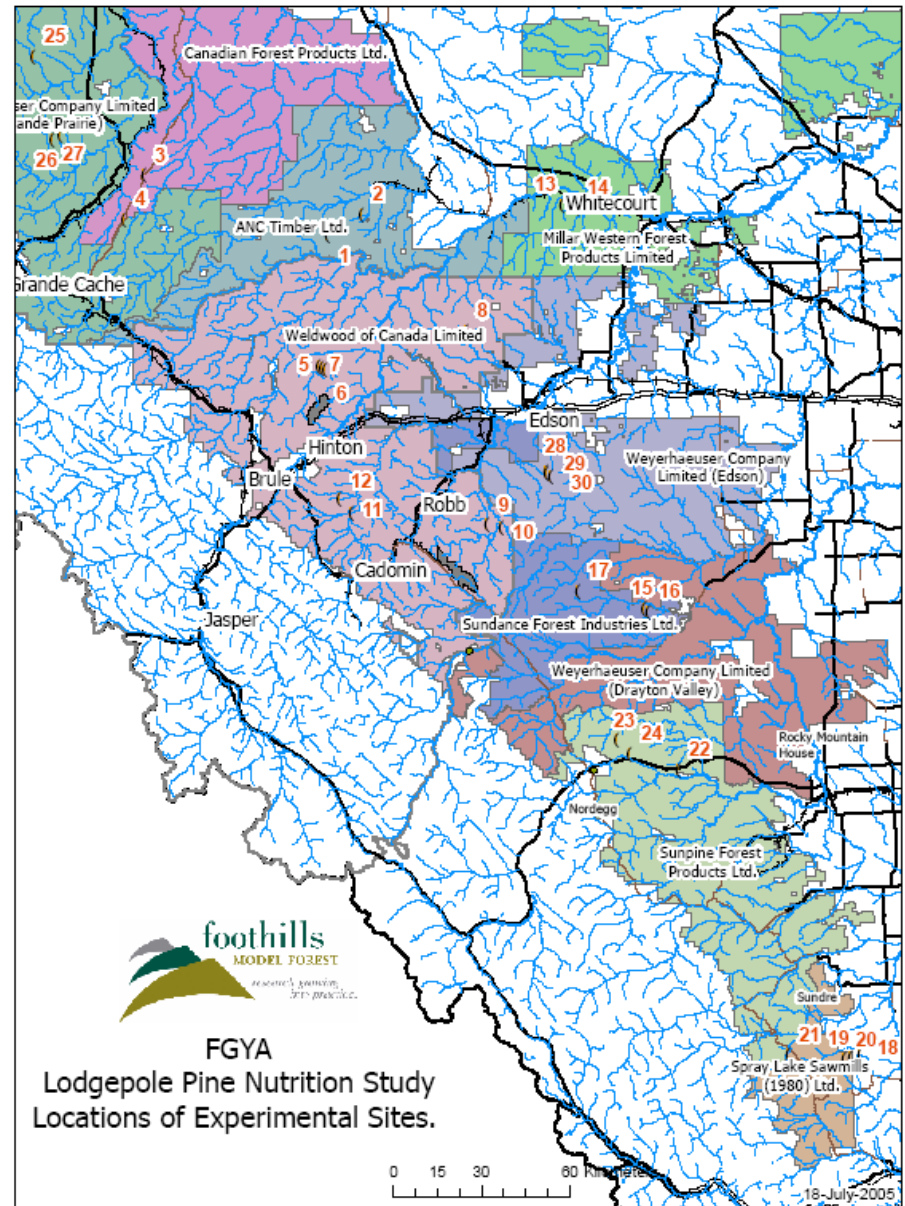


Major Trial 3: Enhanced Management of Lodgepole Pine

Sub- project 1: Nutrition and Density Management Studies

Subsampling and Treatment
of 15 young, 15 mid-to-late rotation
fire origin stands

Collaborative project with U of A
Vic Lieffers



Major Trial 3:

Subproject 1: Density Management

Questions:

1. Which stands/conditions respond best to thinning & fertilization?
2. What yield increases can be expected from them?



Major Trial 3:

Subproject 1: Nutrition

Questions:

1. Which stands/conditions respond best to fertilization?
2. What yield increases can be expected from them?



Major Trial 3: Enhanced Management of Lodgepole Pine

Sub- project 2: Lodgepole Pine Response to Aspen Competition

9 installations (2006,2007)
3 in each of 3 age classes
(10-20; 20-30; 30-40)

Collaborative project with U of A
Phil Comeau

Quicknote #11, 2008



Pine/aspen Trial Objectives/Questions

- ◆ **Develop models for estimating effects of amount of aspen on growth of lodgepole pine**
 - ◆ How serious are the effects of aspen and what are threshold densities?
 - ◆ Upper foothills vs lower foothills?
 - ◆ What variables (and CI's) are useful for modeling competitive effects?
 - ◆ Inter vs intraspecific competition?

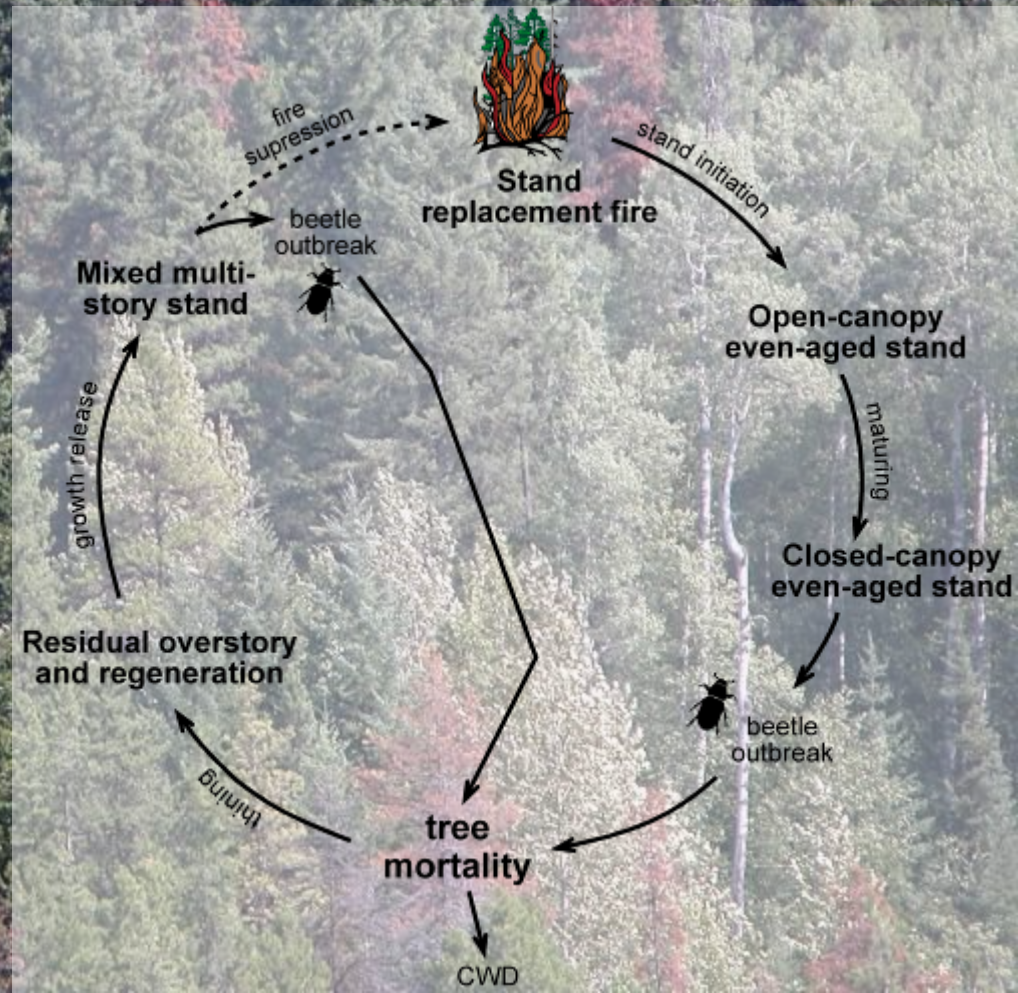
Major Trial 4: Regeneration Management in a Mountain Pine Beetle Environment

Managed by Program Lead, Mountain Pine Beetle Research, Foothills Research Institute

- ◆ Regeneration and stand development pathways and options will be more complex
 - ◆ Understanding them is critical to mitigation/ amelioration
- ◆ Seeking to maintain forest values and a viable forest enterprise
- ◆ Developing expert system / decision-support tools incorporating disparate information and knowledge;

..... we will be dealing with more complex stand conditions, responses and options.

The challenge:
Mitigate timber supply impacts using knowledge of growth and yield and stand dynamics following MPB infestation



Questions, comments?

Jack Wright, 1981

