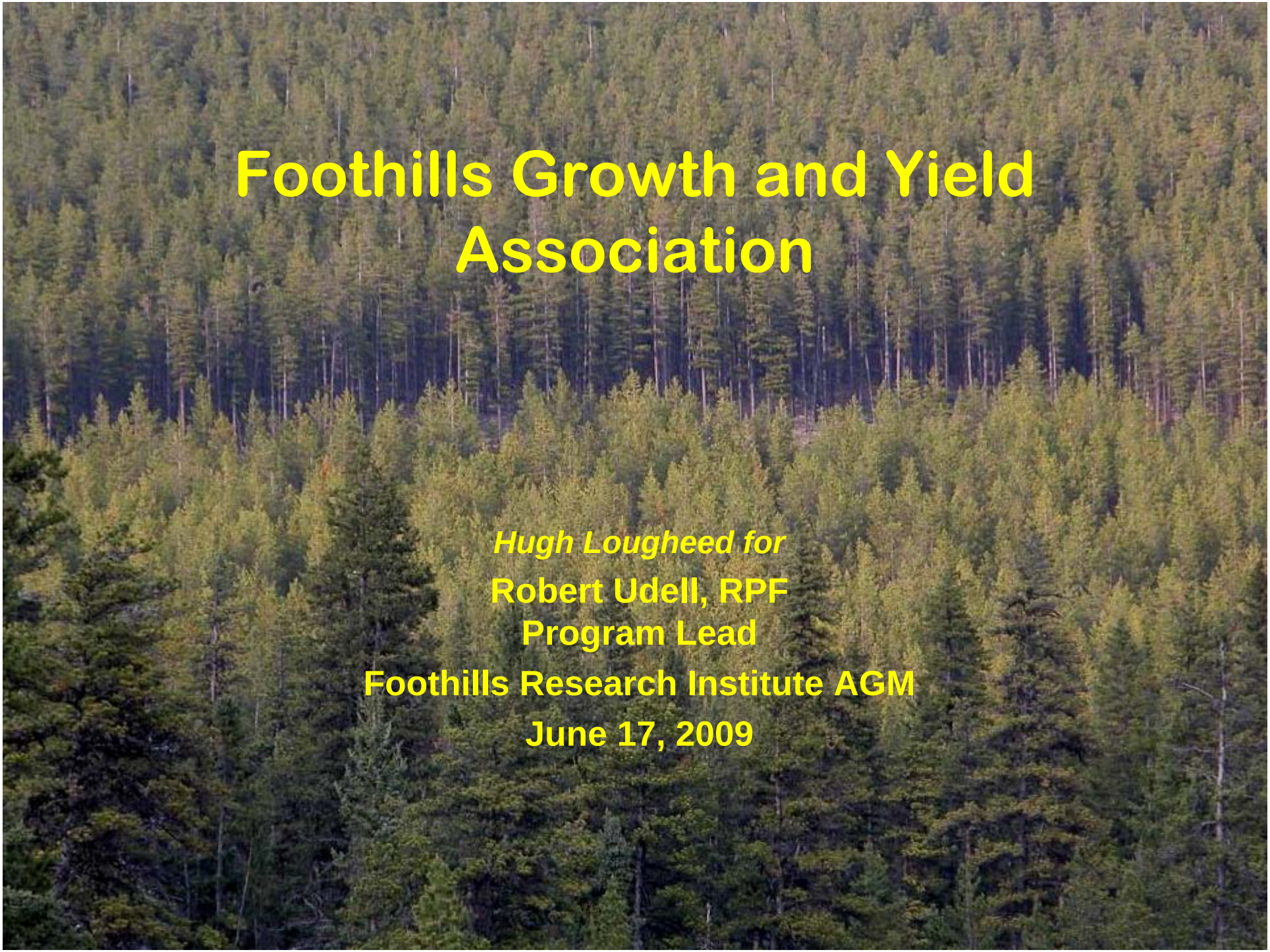


Foothills Growth and Yield Association

Hugh Lougheed for

Robert Udell, RPF

Program Lead

Foothills Research Institute AGM

June 17, 2009

Outline

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

Foothills G&Y Association (April 1, 2000) Organizational Status April 1, 2009

- **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 Hugh Lougheed
- **Field Coordinator – Rand McPherson**
  - Responsible for field operations and quality control, reporting to Udell

FGYA Steering Committee

- Dwight Weeks (Chair) – Canfor
- Bob Held – Sundre Forest Products
- Robert Stokes – ASRD
- Ed Kulscar – Spray Lakes
- Greg Behuniak – Weyerhaeuser
- Greg Branton – Alberta Newsprint
- John Huey – Sundance Forest Industries
- Tim Burns – Blue Ridge Lumber
- Richard Briand – Hinton Forest Products
- Tim McCready – Millar Western
- Murray Summers – Foothills Research Institute Board

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.

Linkage to FRI 2007-12 Business Plan

FRI Goal 1: Building a community of diverse and active partners working in natural resource management.

- ***FGYA is Diverse***
  - *9 sponsoring and 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*

Linkage to FRI 2007-12 Business Plan

FRI Goal 2: 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 Mountain Pine Beetle Ecology Program*
- ***Climate Change work beginning (Project 2 RLP)***
  - *Collaborating with U of A (Andreas Hamann) on comparing 5- and 7-year Regenerated Lodgepole Pine trial results to Alberta Climate Change model (ClimateAB)*

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: RLP - 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*

Linkage to FRI 2007-12 Business Plan

FRI Goal 4: Broadly disseminating our knowledge.

- ***Communications and outreach programs***
  - *Spring Technical Forum 2008*
  - *Three Quicknotes 2008/09*
  - *Two Information Notes (5-year crop performance, MPB sampling protocol)*
  - *One Interim Technical Note on Climate and Mortality*
  - *One Internal Technical Report (aspen impact on pine growth)*

- **9 forest companies, other research cooperatives, universities and 2 levels of government collaborate in sharing information and support**

FGYA
Priority Research Areas and Projects 2009

- **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 and Density; Pine/Aspen Competition
- **Impacts of density management on wood quality over time**
  - New 2008 - No project at present

Project 2: Lodgepole Pine Regeneration

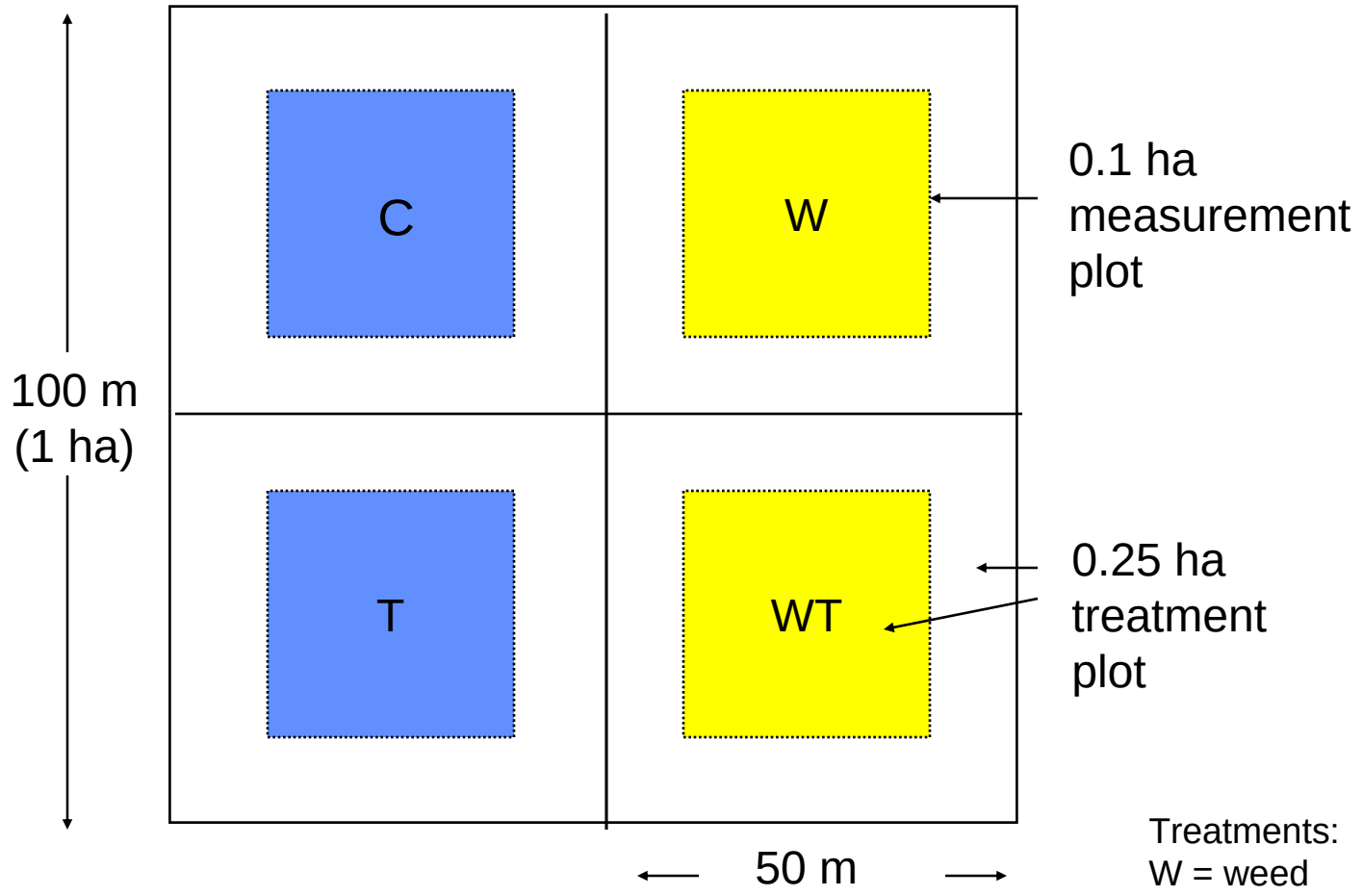
408 long term monitoring plots across the range of lodgepole pine in Alberta

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**

Installation Layout – Split-plot

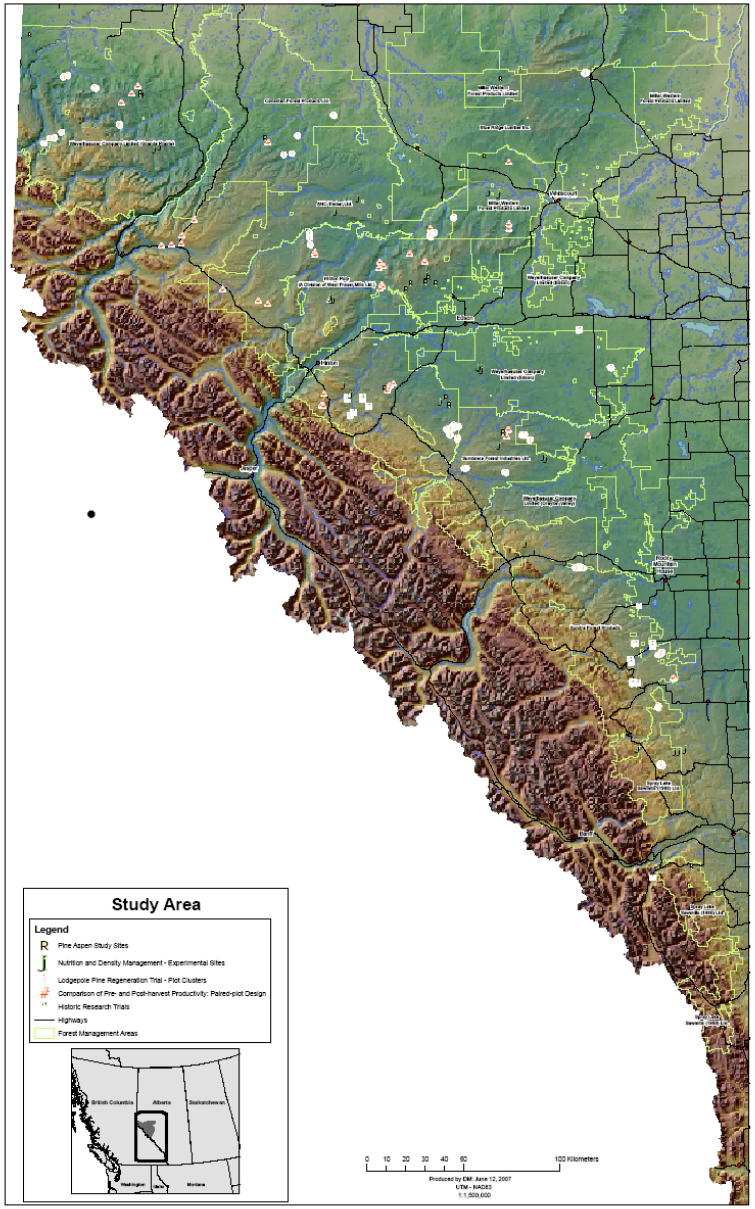


Project 2: RLP Plot Installations

408 Plots span the range of Lodgepole Pine in Alberta

5 Year Results
- **Reported and Successfully modeled**

7 year Results
- **Summer 2009**

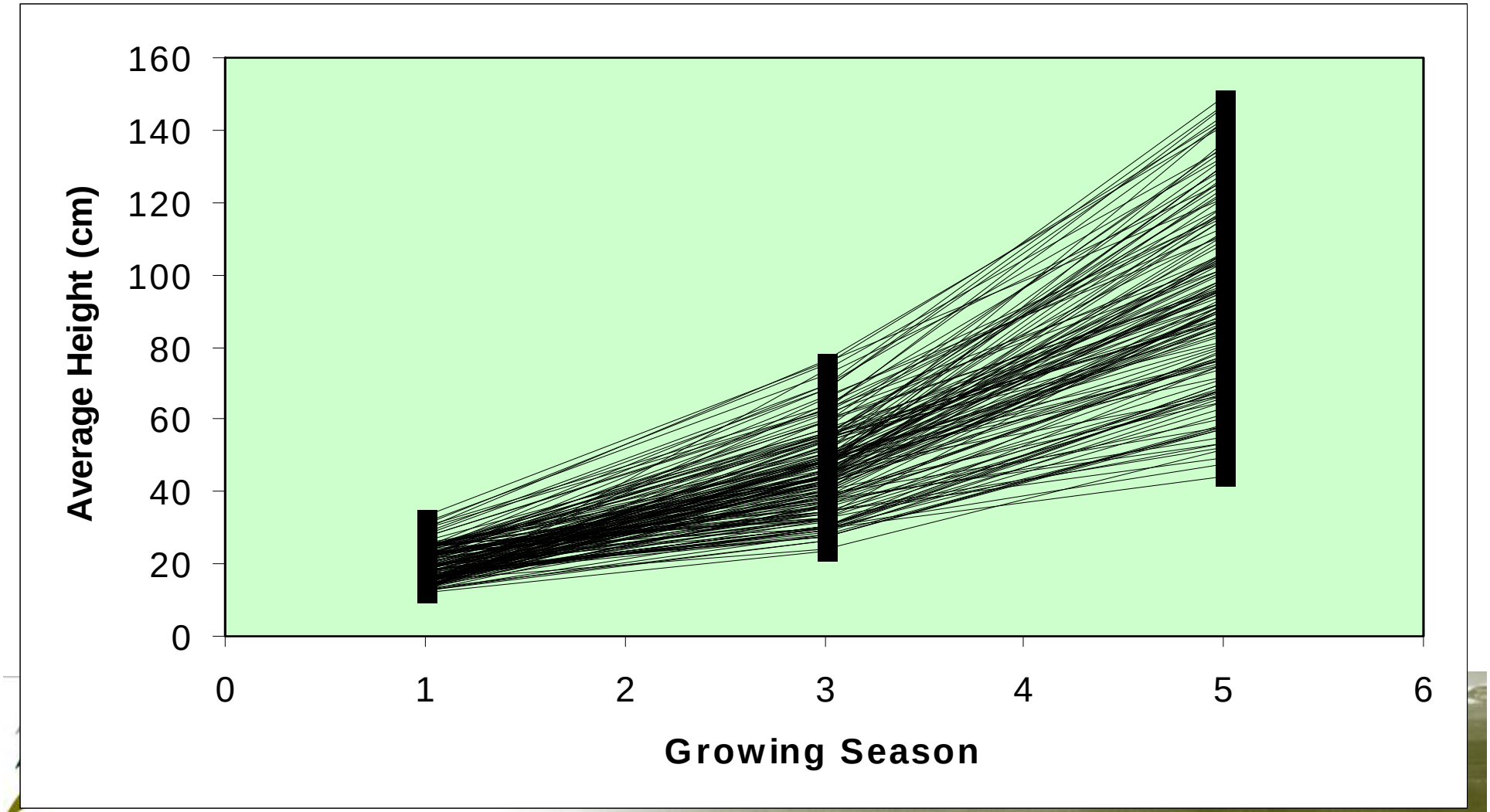


Research Strategy

- **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: Weed versus Leave

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

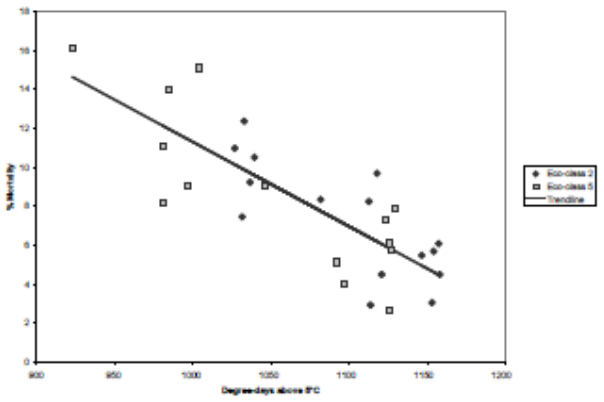
Climate Change

- **Impacts sustainability (+/-)**
- **Need to understand forest growth implications**
  - Prediction of regeneration success
  - Silvicultural investment risks
  - Implications of climate change for silvicultural practice
- **Preliminary analysis of RLP data, "Interim Technical Note, February 2009"**
  - Trends identified (poor v. medium-rich sites)
  - More work required (relative trends in natural regeneration)

Mortality as a function of Mean Annual Temperature

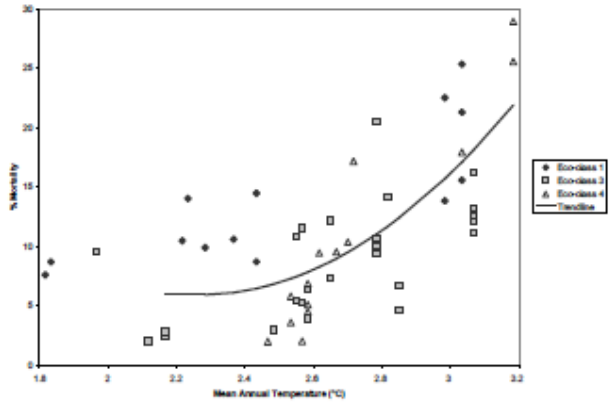
Ledum (poor)

Figure 1. Trend of mortality with temperature on *Ledum* sites after 5 growing seasons



Other (medium-low to rich)

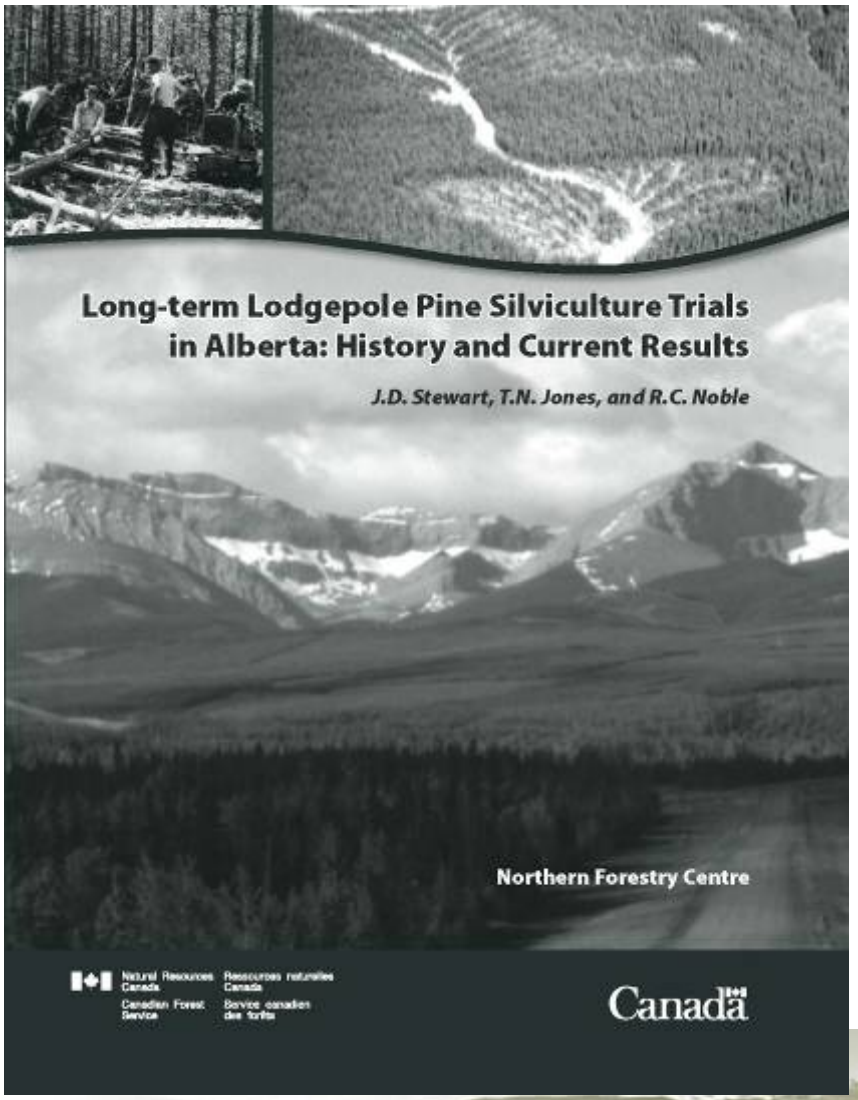
Figure 2. Trend of mortality with temperature on all other sites after 5 growing seasons



Project 4: Historic Trials

14 old trials restored, measured and reported

Historic Trial Report 2006



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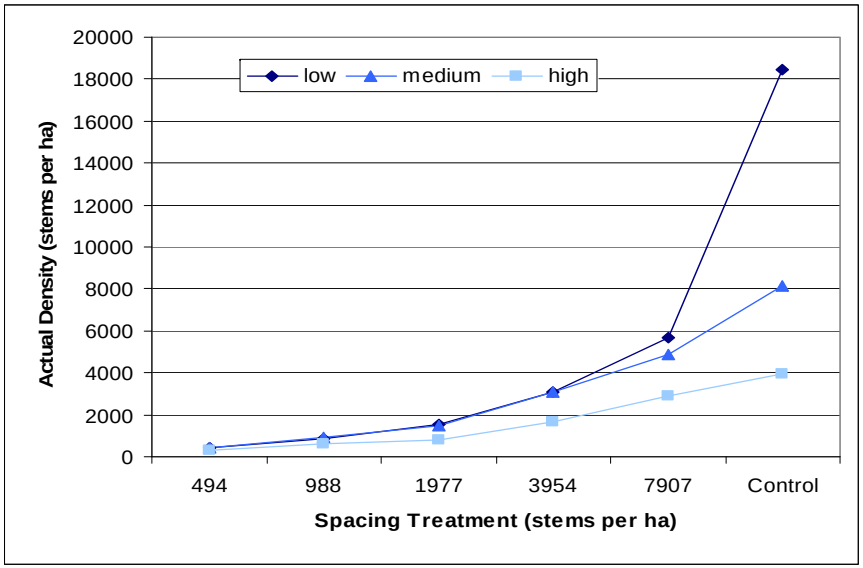
research growing into practice.

Foothills Growth and Yield Association

Example: Gregg Trial Analysis 2007/08

- **CFS Plots established in 7 year old fire origin stand in 1963**
- **Now 52 years old**
- **Simulates reforestation spacing**
- **Analysis**
  - Quicknote #10, April 2008
- **Results align with other studies:**
  - Regenerated stands are more productive than fire origin where densities are moderated and with improved site occupancy
  - 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

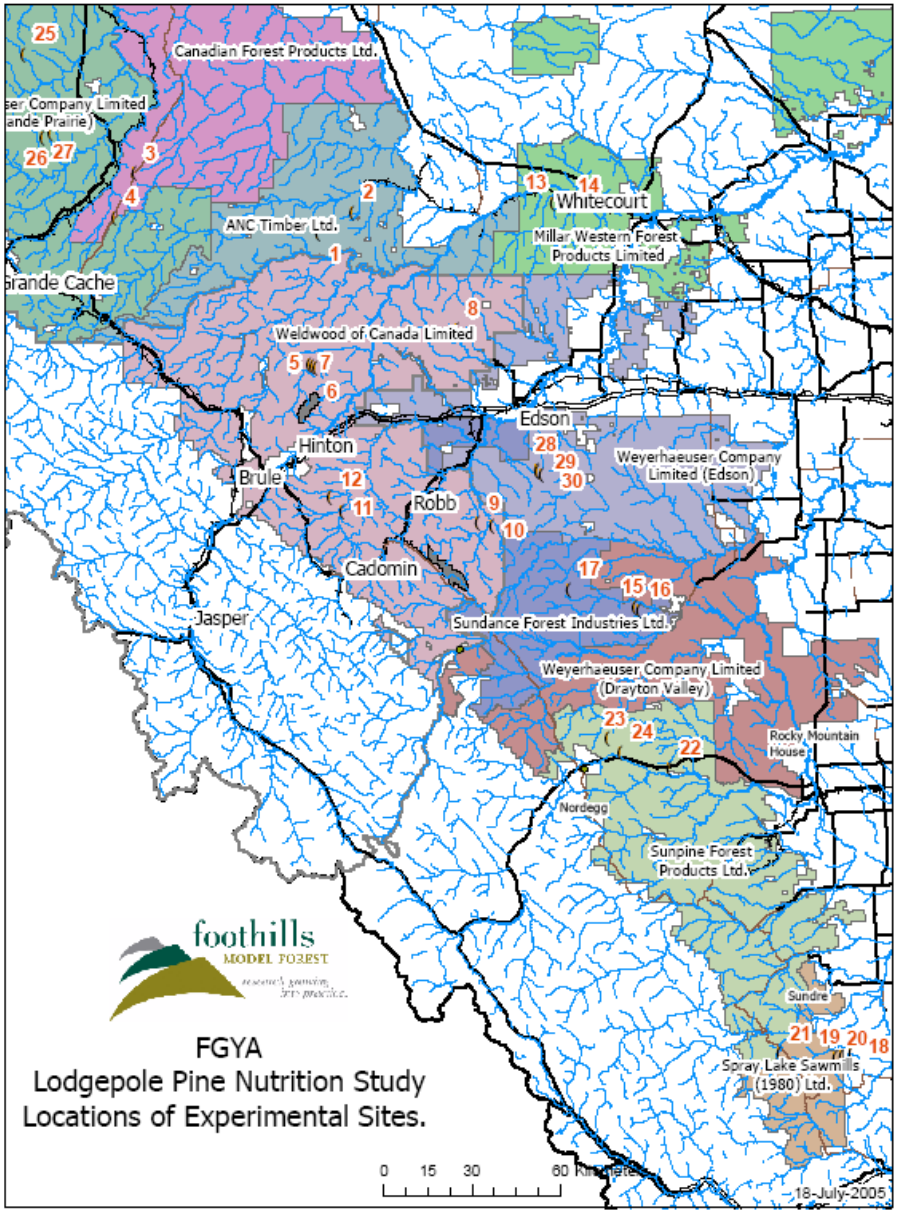


Project 6:
Enhanced Management of Lodgepole Pine

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



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Project 6, Subproject 1
Nutrition and Density Management

Questions:

1. **Which stands/conditions respond best to fertilization?**

2. **What yield increases can be expected from them?**

Project 6:
Enhanced Management of Lodgepole Pine

Sub- project 2: Lodgepole Pine Response to Aspen Competition

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

Collaborative project with U of A
Phil Comeau

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?

Project 6:
Enhanced Management of Lodgepole Pine

Sub- project 2: Lodgepole Pine Response to Aspen Competition

Quicknote #11, 2008

Aw impacts Pl diameter growth more in LF sites

Pl intraspecific competition > impact on diameter growth than Aw

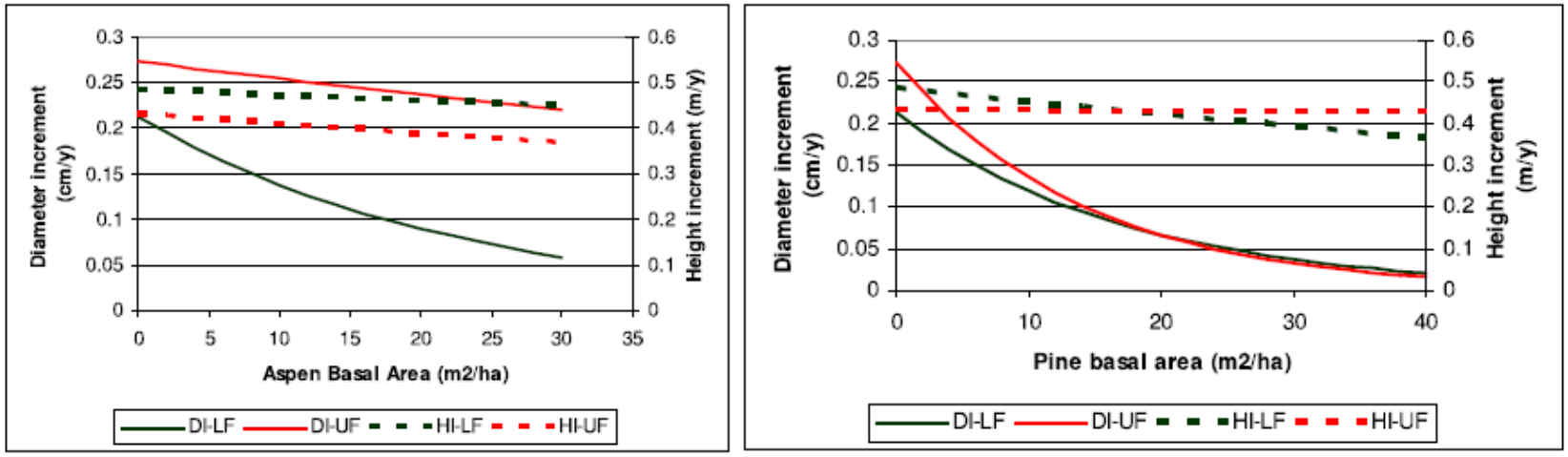


Figure 1. Illustration of aspen and pine effects on diameter and height increment.

Project 7: Regeneration Management in a Mountain Pine Beetle Environment

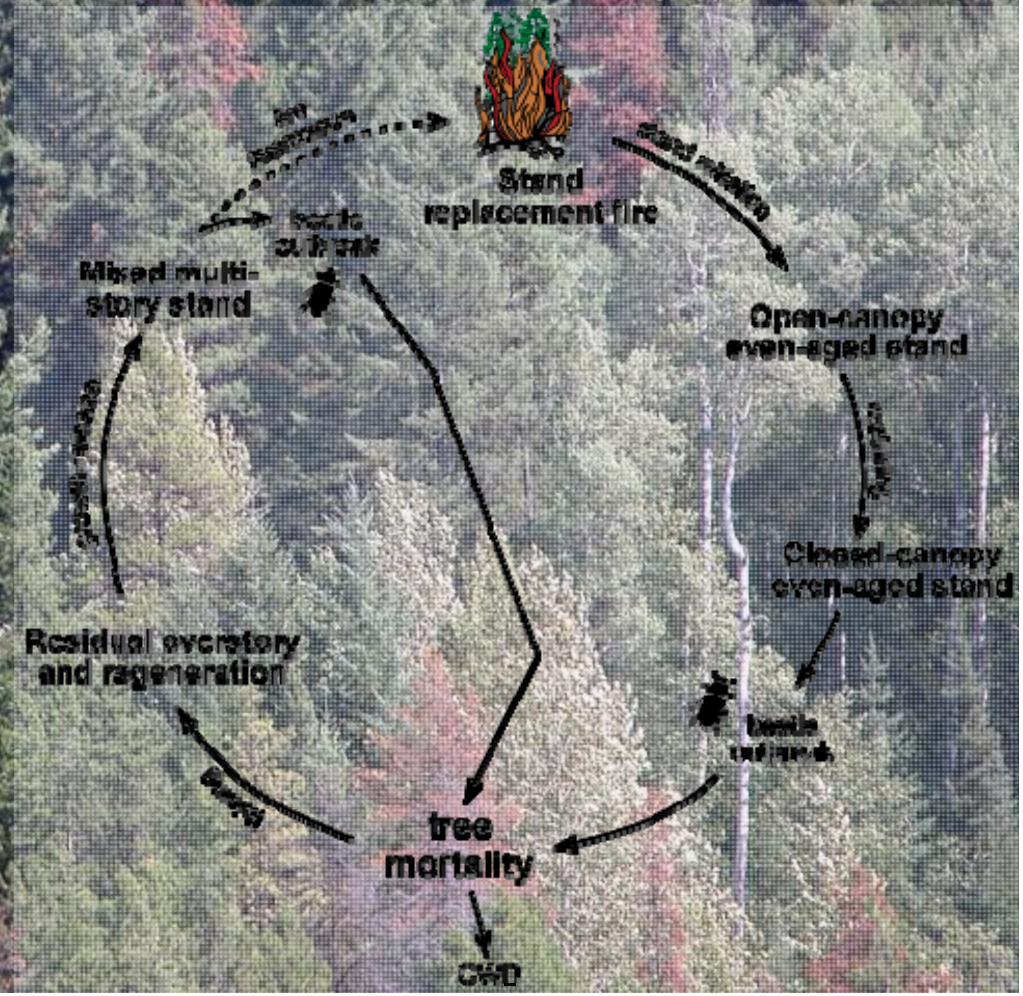
Managed by Program Lead, Mountain Pine Beetle Research, Foothills Research Institute

- 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 & yield and stand dynamics following MPB infestation



Questions, comments?