



Monitoring and Decision Support for Forest Management in an MPB Environment

Project Overview

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Objective and Strategy

- **Provide decision support to forest managers assessing silvicultural treatment options for stands attacked by mountain pine beetle in Alberta.**
 - **Use best available information to make projections from baseline measurements of PSPs across the range of susceptible stand conditions**
 - **Monitor PSPs to assess attack status and compare predicted with actual stand development**

Milestones - 2007

- Expert panel on lodgepole pine stand dynamics following MPB
- Tour of MPB affected areas in the Prince George Forest District of BC
- Proposal developed and awarded funding under FRIAA Provincial Projects Initiative



Milestones - 2008

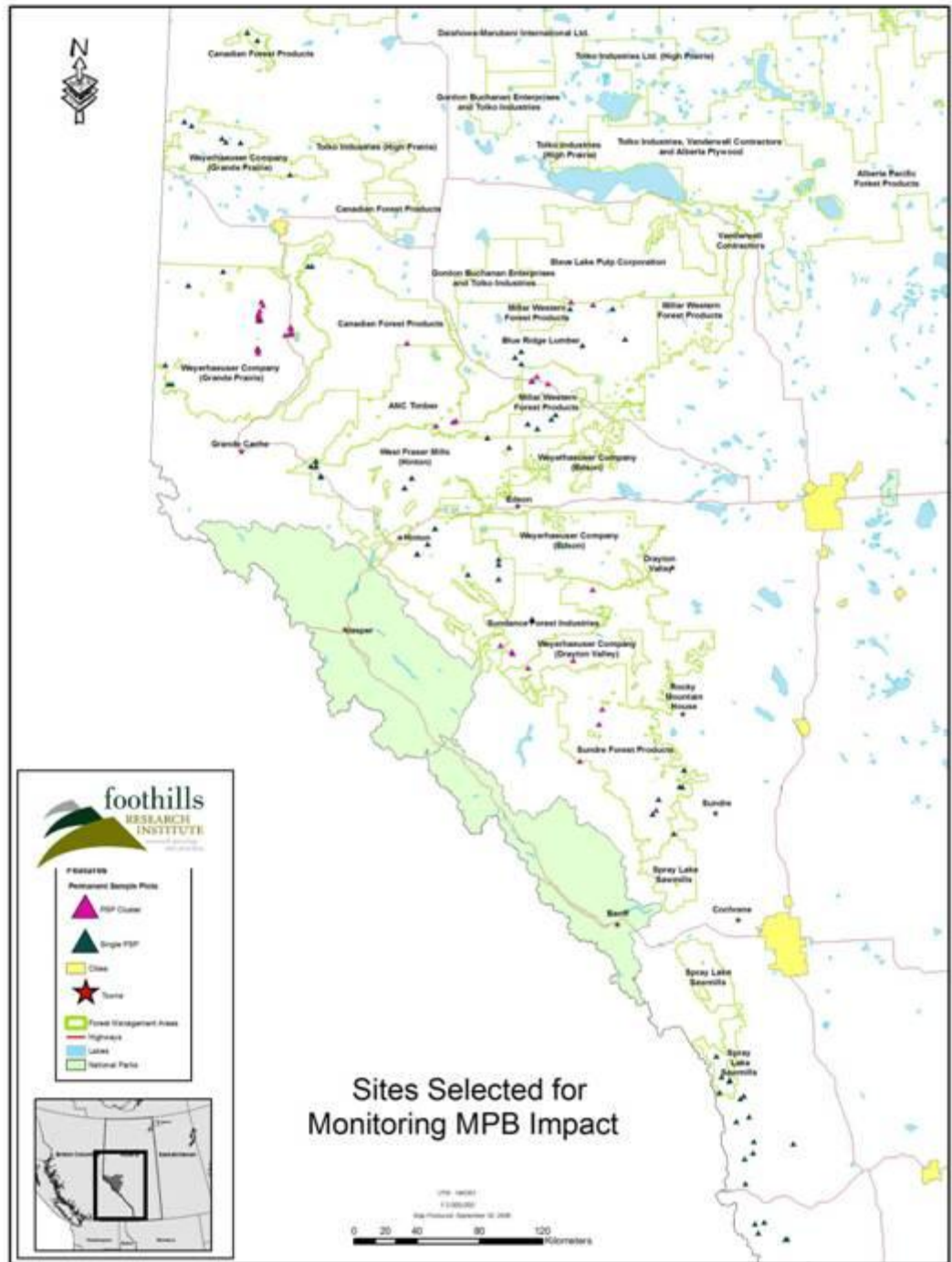
- **Pre-compilation of existing data and selection of candidate plots**
- **Assessment of supplementary data requirements**
- **Baseline supplementary field measurements and field checks for plot infestation status**
- **Compilation of existing and new data - database development**
- **Dendro-chronological measurements and analysis**

Milestones - 2009

- **MPB-silviculture decision tools workshop**
- **Revision of work plan in response to workshop and advance of infestation**
- **Specifications developed and contract awarded for preliminary Decision Support Tool (DST)**
- **Expanded monitoring schedule, necessitated by increased beetle activity, designed, funded (by FRIAA Fire Hazard Reduction and Forest Health Program) and initiated**
- **Prototype DST development**

Baseline Information

- **Network of 240 existing permanent sample plots (PSPs) established**
- **Metadata assembled for all 240 plots**
- **Assembly of detailed baseline information for 150 plots:**
 - **Compilation of the most recently available measurements collected by the plot owners**
 - **Supplementary measurements of site, saplings, regeneration, non-tree vegetation, tree mortality, arboreal lichens, and cone serotiny**



Monitoring

- **“Basic” monitoring to measure level of MPB attack and tree mortality. Schedule based on:**
 - Previous reports of infestation in the plot and / or surrounding stand
 - Regional over-wintering success in 2008-2009 and summer status updates 2009
- **“Detailed” measurements at 2-year intervals following attack will assess:**
 - Level of MPB attack and tree mortality
 - Survival / growth response of understorey trees
 - New tree regeneration
 - Effects of MPB attack on cone serotiny and seed viability
 - Changes in cover of non-tree vegetation

Monitoring Schedule – Number of Plots by Year

Year	2009	2010	2011	Total
Basic	89	62	89	240
Detailed	0	23	62 *	85

* Preliminary estimate based on those plots that either:

- Have already been confirmed as infested
- Had beetle attack reported in the surrounding stand in 2008
- Are in areas that incurred extreme over-wintering survival in 2008-09
- Are in areas that incurred high levels of both 2008-09 over-winter survival and summer 2009 flight activity

Monitoring Results 2009 to Date (percentage of plots attacked and stage of attack)

Priority class*	% of plots attacked	% distribution of attacked trees by attack stage			
		Green	Fader	Red	Grey
1	85.0	72	9	17	1
2	60.7	78	14	3	4
3	9.7	97	0	0	3
Total	46.8	76	10	12	2

*** Priority classes:**

1. Extreme 2008-2009 over-wintering success
2. High over-wintering success AND infestation previously reported in area
3. Infestation previously reported in area OR high over-wintering success

Decision Support Requirements

Forecast post-attack stand development

- **Taking into account:**
 - pre-attack stand structure (characterized from baseline PSP data)
 - mortality levels
 - silvicultural treatment options
- **Predicting:**
 - shelf-life and fall-down of killed timber
 - regeneration rates
 - growth of residual stand and regeneration
 - non-tree vegetation responses

Preliminary DST Development

- **Utilizing existing Alberta and BC growth models**
- **Drawing on:**
 - **CFS studies of shelf-life and falldown**
 - **Papers on seed release, recruitment and overstorey establishment (primarily from BC)**
 - **FGYA models for post-harvest regeneration performance (for post-salvage scenarios)**
 - **Expert opinion**
- **Contract awarded to The Forestry Corp**
- **Prototype scheduled for March 31, 2010**
- **Completion by June 30, 2010**



Postscript:
It's not just MPB that we should be concerned about!

