MPB Decision Support Tool (DST) Prototype Development

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MPB Ecology Program Workshop

4 topics to be Addressed:

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- *MPB Monitoring Program*

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- *MPB Monitoring Program*
- *MPB DST Development*

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- *MPB Monitoring Program*
- *MPB DST Development*
- *MPB DST Enhancement Plan*

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- *MPB Monitoring Program*

- *MPB DST Development*

- *MPB DST Enhancement Plan*

- *MPB DST Demo*

MPB Monitoring Program:

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- **Detailed Plot Monitoring Program**
  - Quantify tree and non-tree responses to MPB attack

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- **Basic Plot Monitoring Program**
  - Monitor the spread of MPB in attacked stands

MPB Monitoring Program:

- **240 existing PSP's selected from among SRD and Company plot programs**

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- **Selection Criteria:**
  - **Known to be in stands already attacked by MPB**
  - **Located in areas and stand types at high risk for MPB attack**

Detailed Plot Monitoring Program

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- **149 of 240 plots measured in 2008**

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- **20 of 149 remeasured in 2010**

Detailed Plot Monitoring Program

- **149 of 240 plots measured in 2008**

- **20 of 149 remeasured in 2010**

- **Assessed:**
  - **Trees, saplings, regeneration**
  - **Non-tree vegetation**
  - **Ecosite**
  - **MPB attack (# & location of pitch tubes)**
  - **Cone serotiny**
  - **Lichen presence and abundance**

Basic Plot Monitoring Program

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- **122 of 240 plots measured in 2009 or 2010**

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Basic Plot Monitoring Program

- 122 of 240 plots measured in 2009 or 2010

- 20 of 122 remeasured in 2010

- Assessed:
  - Abundance (number of trees) and Severity (number of pitch tubes) of MPB attack
  - Assessed in PSP's, and in stands surrounding PSP's

DST Development

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DST Objective is to:

" ……… project stand conditions under a range of mortality, secondary structure and regeneration scenarios …….. "

DST Development Steps

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1. **Describe Existing Stands**

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2. **Define Levels of MPB Attack**

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7. User Feedback and DST Enhancement

1. Describe Existing Stand Conditions

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	Stratum Number	Ecosite	Natural Region	
Drier	1	b, c	Any	Poorer
	2	d (c)	UF	
	3	d (c)	LF	
Mesic Moisture Regime	4	e (d)	SA/UF	
	5	e (d)	LF	
	6	f (e)	UF	Rich Nutrient Regime
	7	f (e)	LF	
Wetter	8	h (f)	Any	Poorer

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18 unique *'Stand Types'* across the 8 Strata

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1 layer vs 2 layer

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Species composition by layer

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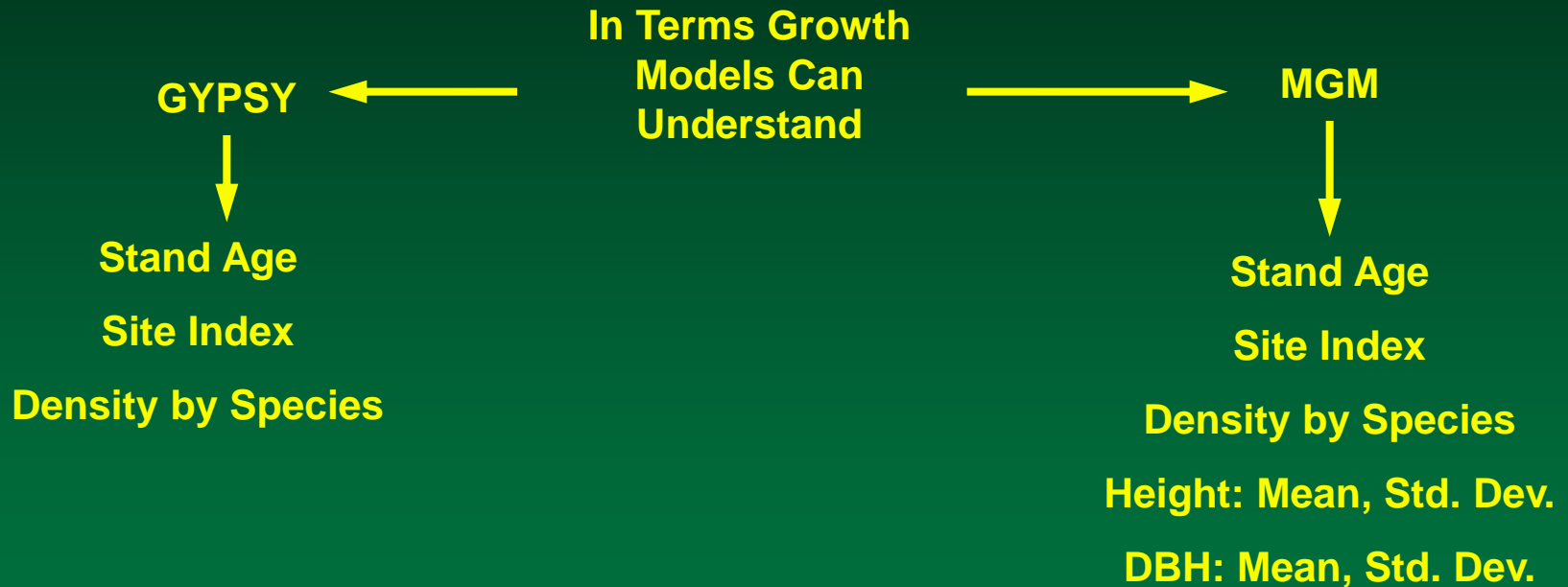
Attributes

1 layer vs 2 layer

Species composition by layer

Plot data and Ecosite Guides used for densities, heights, Site Index

1. Describe Existing Stand Conditions

In Terms Growth Models Can Understand

GYPSY ← **MGM** →

GYPSY

Stand Age

Site Index

Density by Species

MGM

Stand Age

Site Index

Density by Species

Height: Mean, Std. Dev.

DBH: Mean, Std. Dev.

2. Define Levels of MPB Attack

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0 %

25 % → 50 %

100 %

3. Define Salvage Treatments

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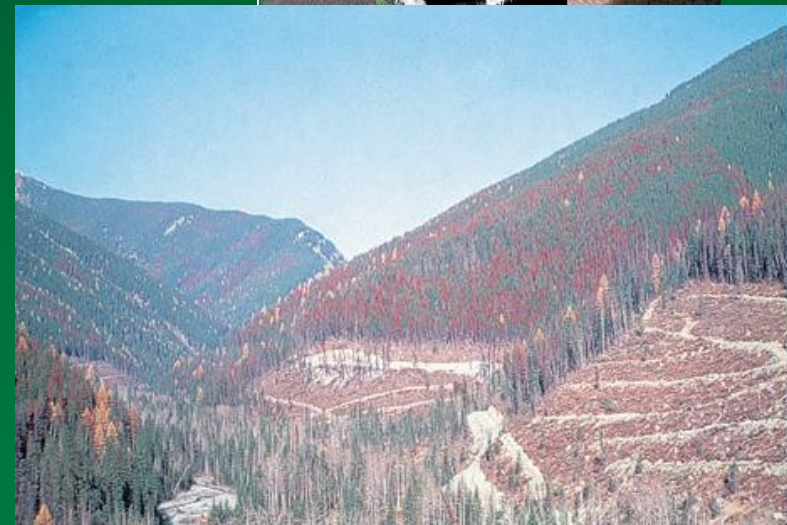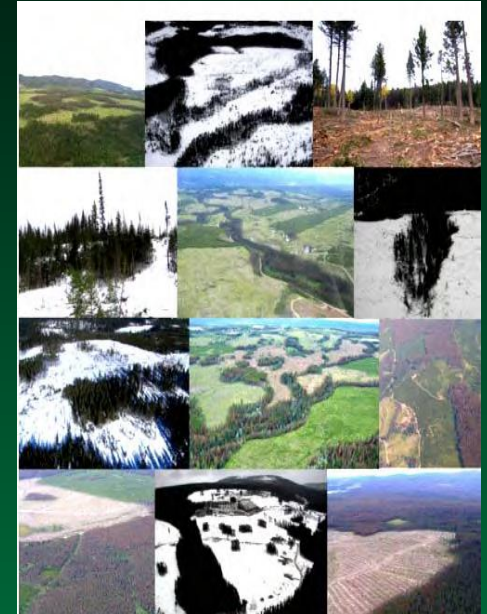
Yes:

Removal of all attacked trees, no matter the degree of attack

No:

No removal of trees, no matter the degree of attack

4. Define Regeneration Assumptions

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Where undisturbed by salvage, understory continues to grow

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Areas disturbed by salvage recruit natural *Pine* regeneration at rates observed in FGYA RLP study

4. Define Regeneration Assumptions

Option:

Supplemental planting of 2000 *Pine* trees/ha in salvage - disturbed areas
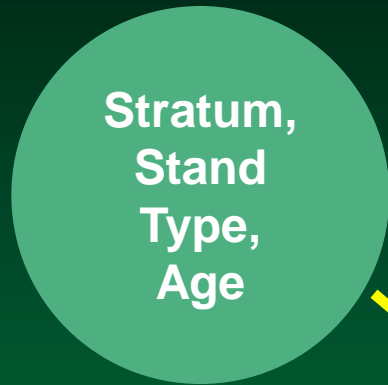
4. Define Regeneration Assumptions

Option:

Scarification / site preparation to promote natural regeneration
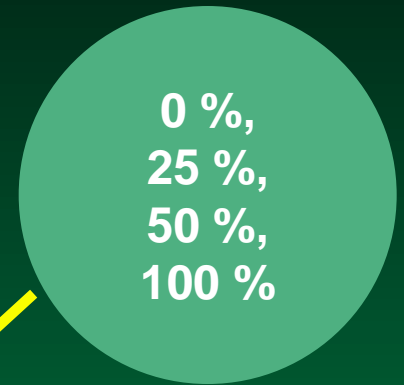
Only after salvage in 100% MPB attack

5. Post Attack Stand Projections

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Existing Condition

Beetle Kill

Stratum, Stand Type, Age

0 %, 25 %, 50 %, 100 %

Growth Projections

Alberta's Growth Models: GYPSY MGM

Natural, Planting, Site Prep

No, Yes
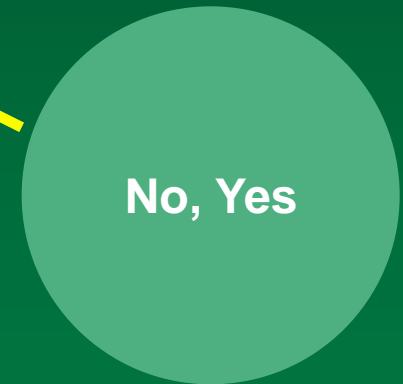
Regeneration Assumptions

Salvage Treatments

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- **Users are given User ID's and Passwords by System Administrator**

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- **Archived ' *Answer Database* ' containing results from all MGM and GYPSY projections**

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  - **Data Version**

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    - **Salvage + Supplemental Planting**
    - **Salvage + Supplemental Planting + Site Preparation (only for 100% Kill and Salvage)**

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- **Tabular and graphic output of:**

    - **Mensurational stand growth parameters for 100 year projection period**

    - **Wood quality parameters for first 10 years of projection**

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    - **Export results to Excel**

    - **Print results report to PDF**

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- **Enhancement Plan developed to address User Feedback issues**

DST Enhancement Plan

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Suite of Stand Types Available

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- **Sw and Fb understories not currently in DST**

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Suite of Stand Types Available

- **Sw and Fb understories not currently in DST**

- **'No Salvage' may become an important management prescription if Sw and Fb can be shown as important in supporting medium-term timber supplies**

DST Enhancement Plan

Applicability of Starting Conditions

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- **Currently no ability to enter 'custom' starting conditions to reflect local conditions**

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Regeneration response in Unsalvaged Stands

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DST Enhancement Plan

Regeneration response in Unsalvaged Stands

- Currently, no natural regeneration of Pl after MPB attack in the absence of Salvage

- Based largely on BC published literature

- Current assumptions are conservative and likely an under-estimate of natural regeneration expected after MPB

DST Enhancement Plan

Shelf-Life of MPB killed timber

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Shelf-Life of MPB killed timber

- **Currently, post-MPB Wood Quality parameters are based on published observations in BC**

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- **Anecdotal evidence that Alberta responses are different**

DST Enhancement Plan

Shelf-Life of MPB killed timber

- **Currently, post-MPB Wood Quality parameters are based on published observations in BC**

- **Anecdotal evidence that Alberta responses are different**

- **More severe Checking, faster Fall Down**

DST Enhancement Plan

Non-tree vegetation responses in MPB Stands

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- **DST does not currently report any non-tree vegetation responses after MPB**

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- **2010 field measurement provide first opportunity to describe non-tree vegetation response after MPB**

DST Enhancement Plan

Non-tree vegetation responses in MPB Stands

- DST does not currently report any non-tree vegetation responses after MPB

- 2010 field measurement provide first opportunity to describe non-tree vegetation response after MPB

- Use/application of non-tree vegetation trends have not been defined

DST Enhancement Plan

MPB attack and mortality assumptions

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- **DST currently only addresses 4 discrete levels of MPB attack (0, 25, 50, 100%)**

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MPB attack and mortality assumptions

- **DST currently only addresses 4 discrete levels of MPB attack (0, 25, 50, 100%)**

- **An intermediate level of 75 – 80% is required since that is a 'typical' level being observed in Alberta**

DST Enhancement Plan

Validation of GYPSY 3 Layers

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- **DST projections required a 3-layer version of GYPSY**

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- **GYPSY 3-Layers continues to be un-validated, and is not considered 'approved' by Aberta SRD**