2016 MPB and Stand Rehabilitation Research Forum and Field Tour

Field Tour Guide, May 12

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May 10, 11 and 12, 2016 Grande Prairie, Alberta

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Mountain Pine Beetle Rehabilitation Trial

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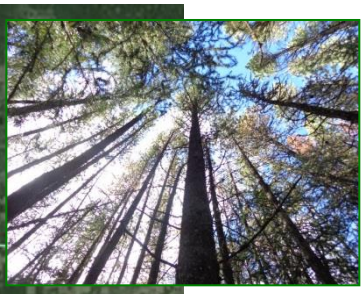

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Mountain Pine Beetle Rehabilitation Trial

STOP 1) Introduction to MPB Affected Stand Candidates: Derek Sidders, CWFC/CFS

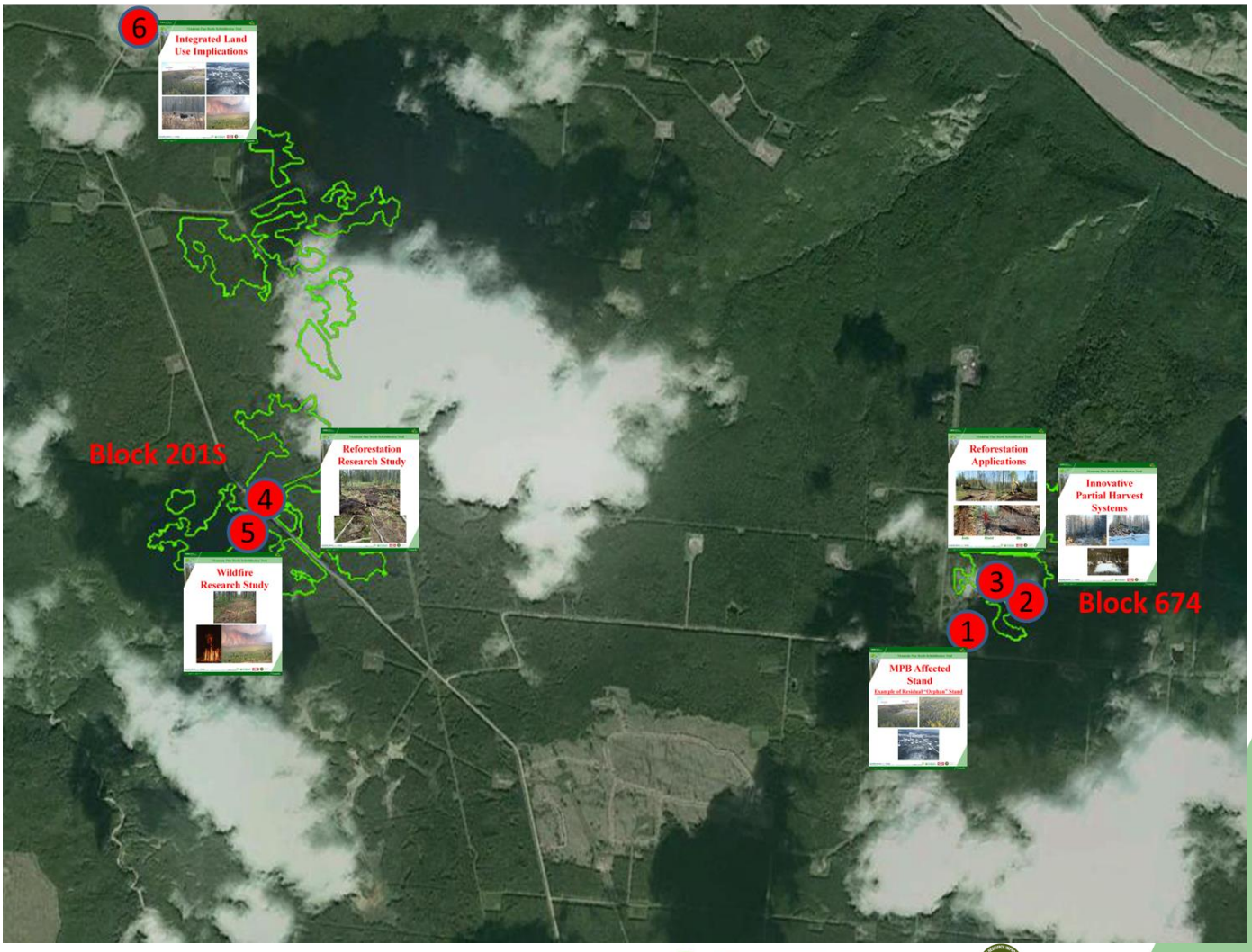
STOP 2) Innovative Partial Harvest Systems Design: Tim Keddy, CWFC/CFS and Dean Marshall, Spectrum Resources Group

STOP 3) Reforestation Applications: Derek Sidders, CWFC/CFS

STOP 4) Reforestation Research Study, Ellen Macdonald and Julie Steinke, U of Alberta

STOP 5) Wildfire Research Study: Fuel and Ignition: Hugh Wallace, U of Alberta

STOP 6) Integrated Land Use in MPB Affected Stands: All Participants
AND Stand Dynamics after MPB Attack: Sharon Meredith, Forest Growth Organization of Western Canada (FGrOW)

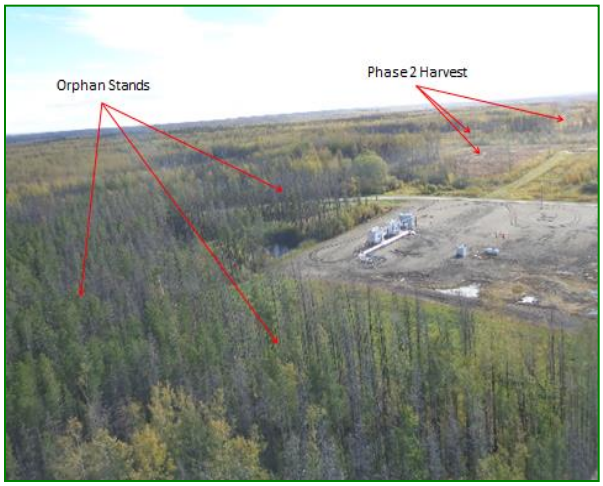


Mountain Pine Beetle Rehabilitation Trial

Stop 1

MPB Affected Stand

Example of Residual "Orphan" Stand



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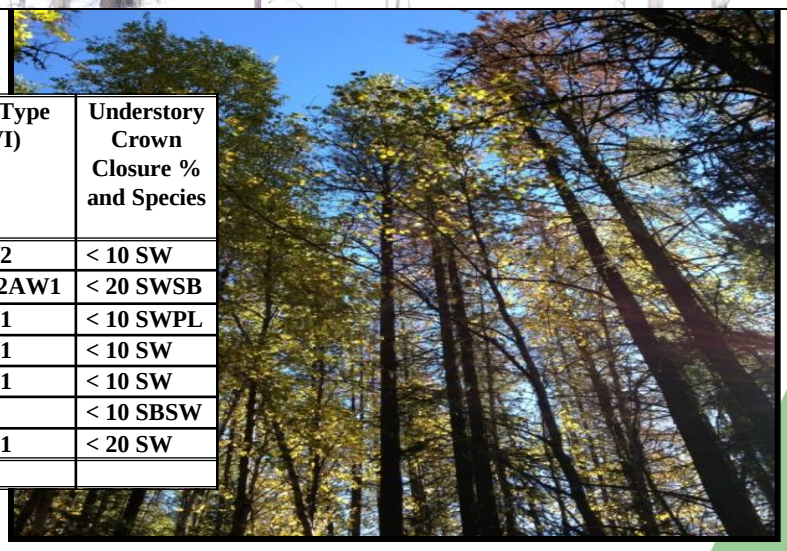
Pre-harvest Stand Characteristics



RTU #	Estimated Area (ha)	Average Height m	LP Crown Mortality Estimate %	Stand Type (AVI)	Understory Crown Closure % and Species
R430182	38.40	20	60	PL8AW2	< 10 SW
R430201	100.00	21	83	PL7SW2AW1	< 20 SWSB
R431576	32.90	20	60	PL9AW1	< 10 SWPL
R440674	33.40	19	70	PL9AW1	< 10 SW
R460931	22.10	19	60	PL9AW1	< 10 SW
R460371	146.5	21	70	PL10	< 10 SBSW
R472988	78.0	20	65	PL9AW1	< 20 SW
Total	451.3				

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Stop 2
Innovative Partial Harvest Systems

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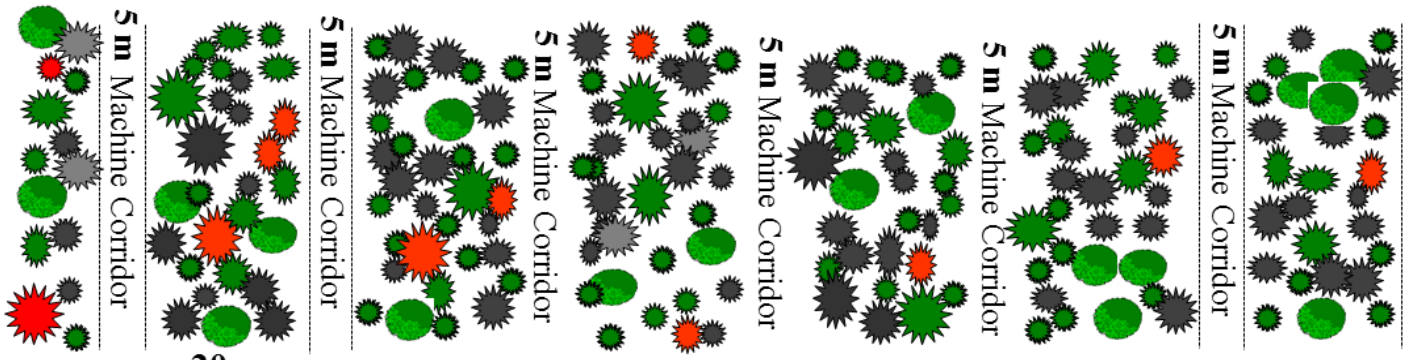
Wind Direction

Mountain Pine Beetle Rehabilitation
Selection Harvesting

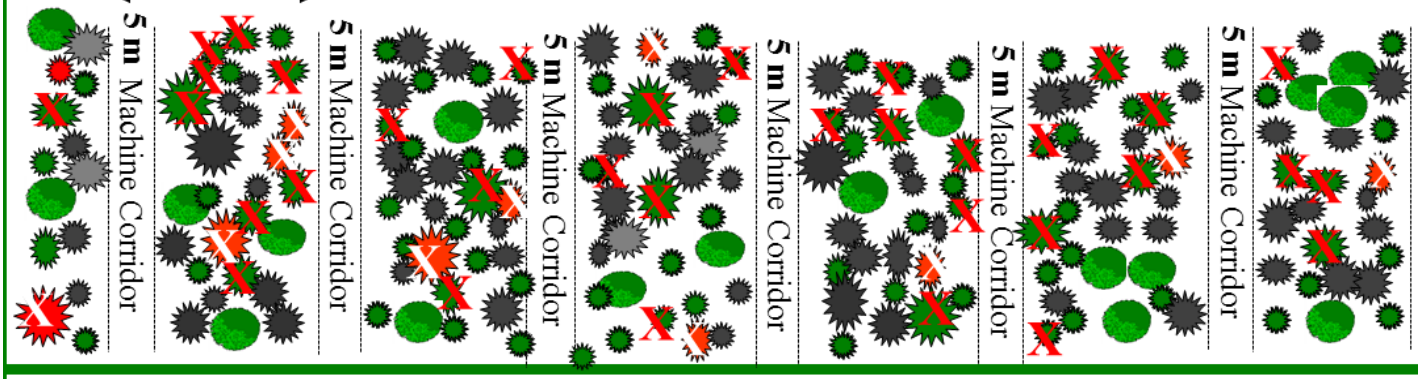
Feller Buncher and Grapple Skidder, Full Tree
with 5m wide designated machine corridors at 20 m Intervals, Center to Center

Full-Tree Harvesting System

Pre-Harvest



Post-Harvest



Haulroad

Selection Strip
15 m

Remove ALL the following Lodgepole Pine:

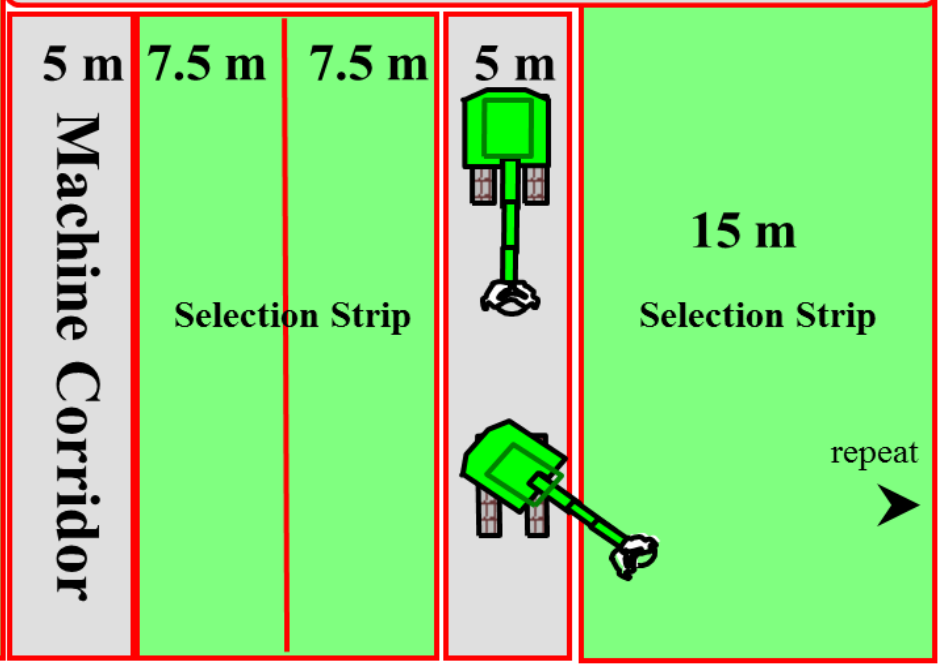
1) Green Beetle Active Attack Trees

2) Green and Red Trees Greater than 20 cm DBH

3) Green Trees closer than 3 metres apart

4) Knock Down Dead Trees Impacting Spruce or Aspen (Poplar)

Landing
30 m Wide, 25 m Deep



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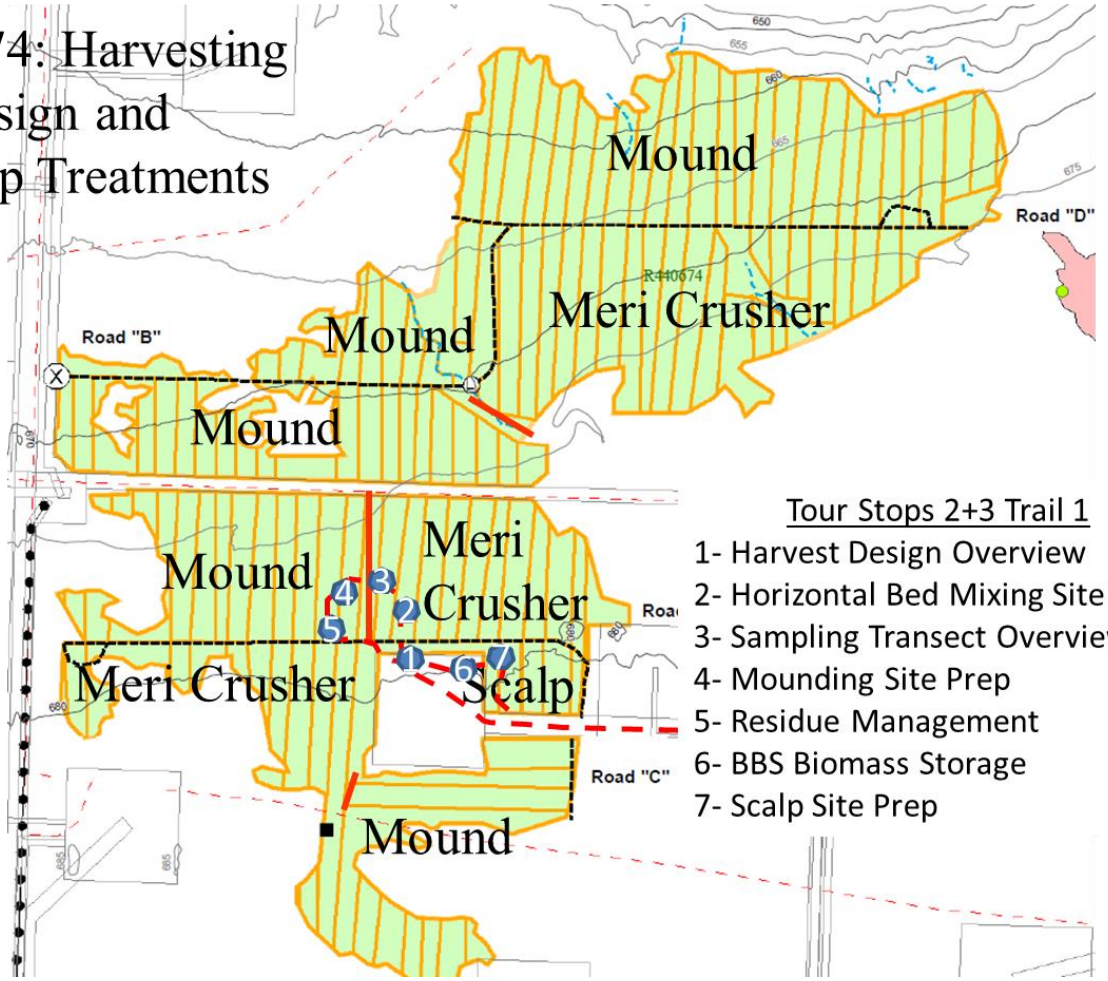
Block 674: Harvesting Design and Site Prep Treatments



Tour Stops 2+3 Trail 1

1- Harvest Design Overview
2- Horizontal Bed Mixing Site Prep
3- Sampling Transect Overview
4- Mounding Site Prep
5- Residue Management
6- BBS Biomass Storage
7- Scalp Site Prep

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Stop 3

Reforestation Applications

Scalp ***Mound*** ***Mix***

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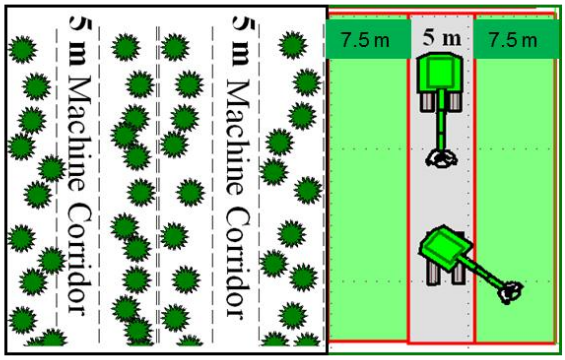
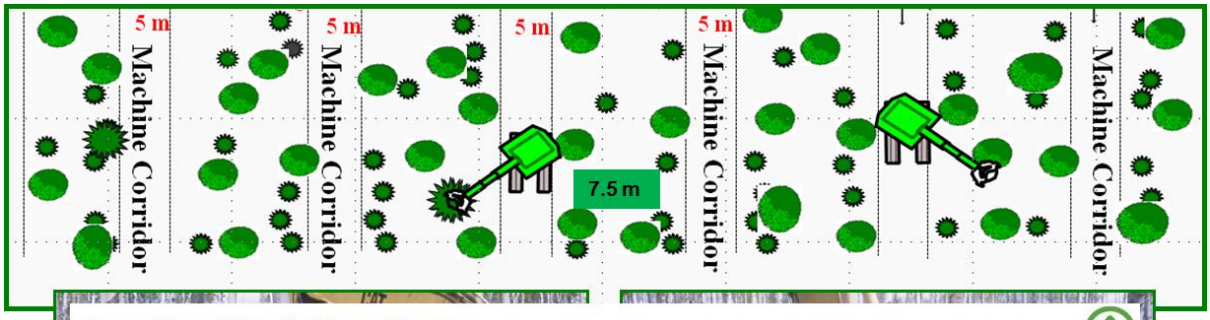
Mountain Pine Beetle Stand Rehabilation Project: Site Preparation Field Guide Prepared by the Canadian Wood Fibre Centre




Post-harvest



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Excavator with Mixing Tool


Mixing Tool Creating Patch


Scalp Treatment


Planting in Invert

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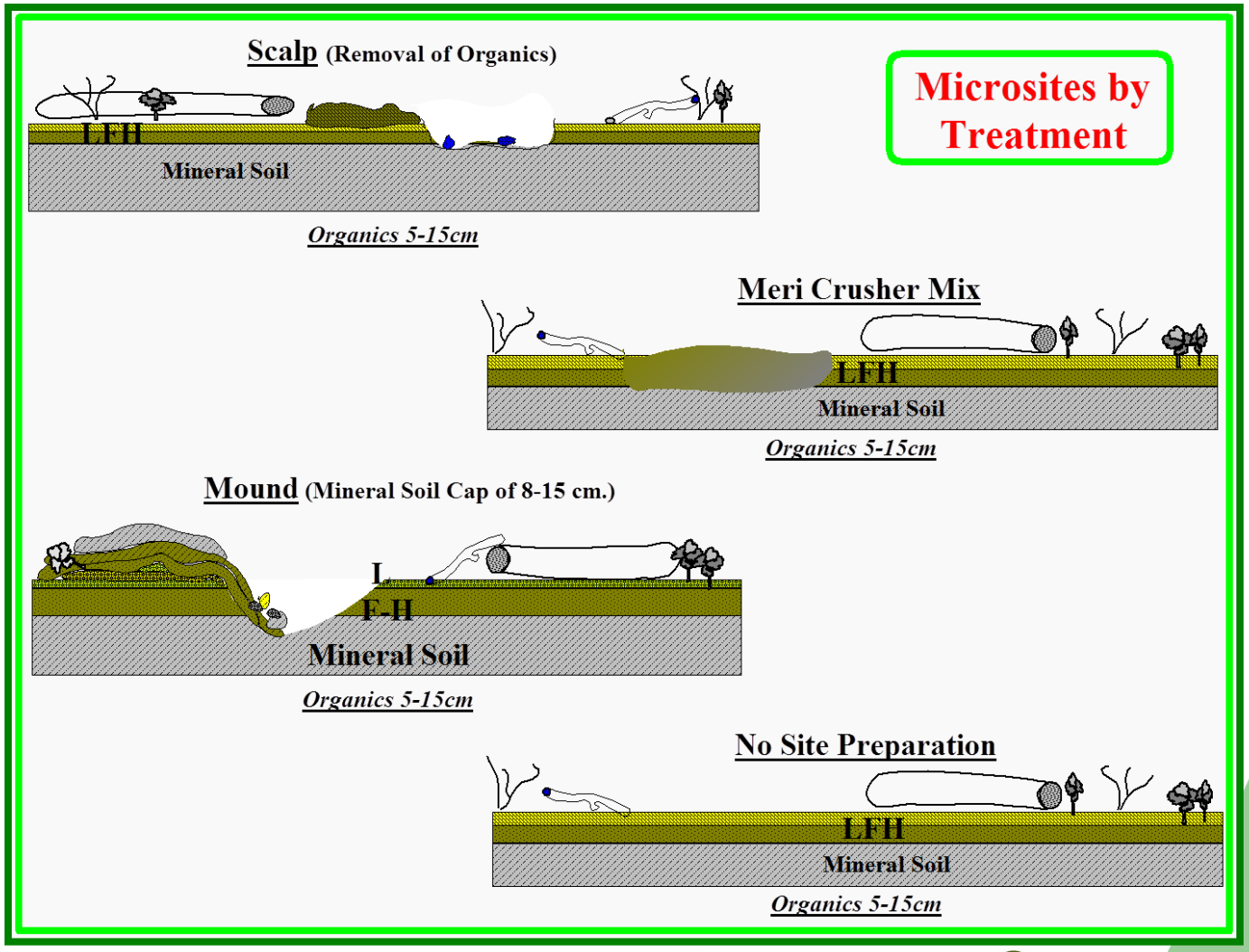
Site Preparation Methodology

Prime Mover: A tracked excavator with site preparation attachments including a mounding bucket with scalping tines and a 1.4 m Meri-crusher horizontal drum high-speed mixing tool.

Operating sequence: The excavator with site prep tool will operate from the machine corridors, working from the farthest point from the landing, back to the landing. The operator will reach into the retention strip and create planting patches in the natural openings with a prescribed spacing of 3 metres between patch centres. As the machine moves down the machine corridor planting patches are created on the corridor with one on each of the two outside edges and one in the centre at a spacing of 3 metres between patches. **Landings**: Once the machine corridors and retention strips serviced by a landing are complete, the landing is site prepared using a 3 metre by 3 metre spacing.



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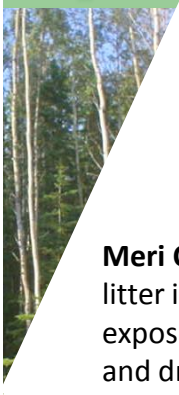

Medium Mound: To prepare a medium mound, the operator will push away the ground litter in a 1.5-2 metre strip using the back side of the mounder, followed by scalping down into the soil and drawing the mounding head towards the excavator inverting the organic layer with mineral soil capping to a depth of 8-15 cm creating a planting patch of 1 metre by 1.2 metre in size.

Meri Crusher Mix: To prepare a high speed mix patch, the operator will push away the ground litter in a 1.5 metre strip using the back side of the Meri Crusher. This is followed by mixing the exposed patch of organics and mineral soil by placing the high speed mixing head into the ground and drawing the mixer towards the excavator creating a 15-20 cm deep mixed planting patch of 1.2 metre (long) by 1.4 metre (width) in size.

Scalp: To prepare a scalp, the operator will push away the ground litter in a 1.5-2 metre strip using the back side of the mounder, followed by scalping down through the organic layer to the mineral soil and drawing the mounding head towards the excavator pulling back the organic layer exposing a 1 meter by 1.2 meter patch of exposed mineral soil. The lower dark humus layer and mineral soil are acceptable planting patches.

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Stop 4

Reforestation Research Study

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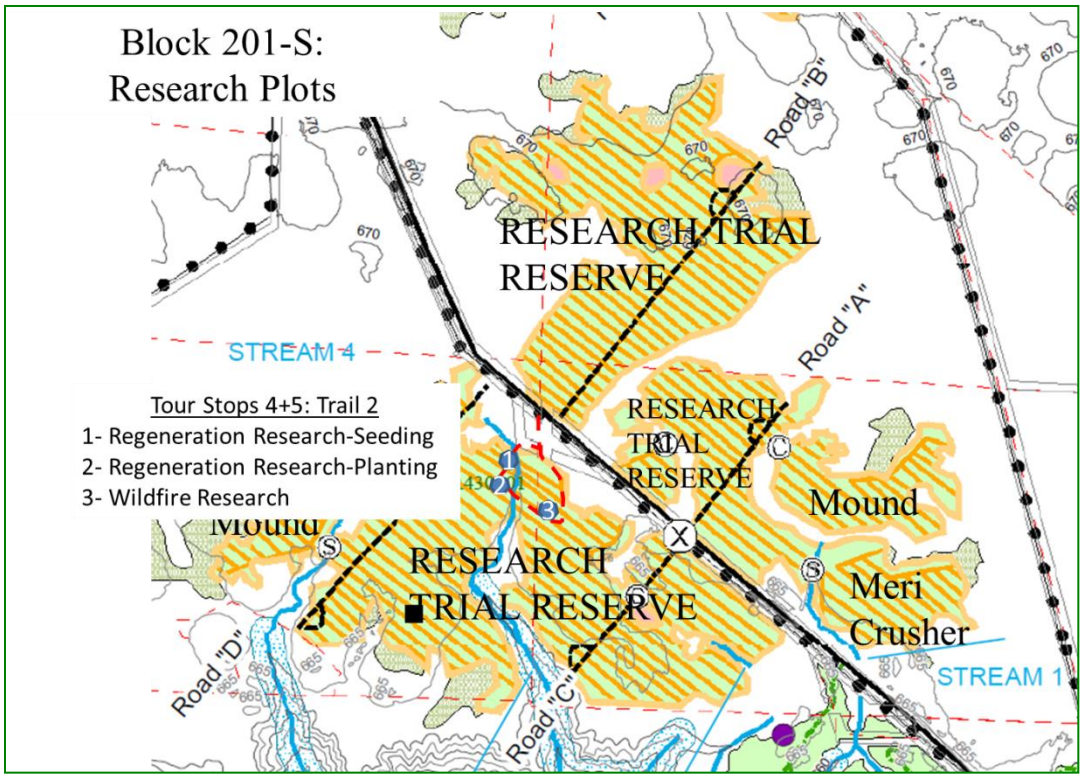

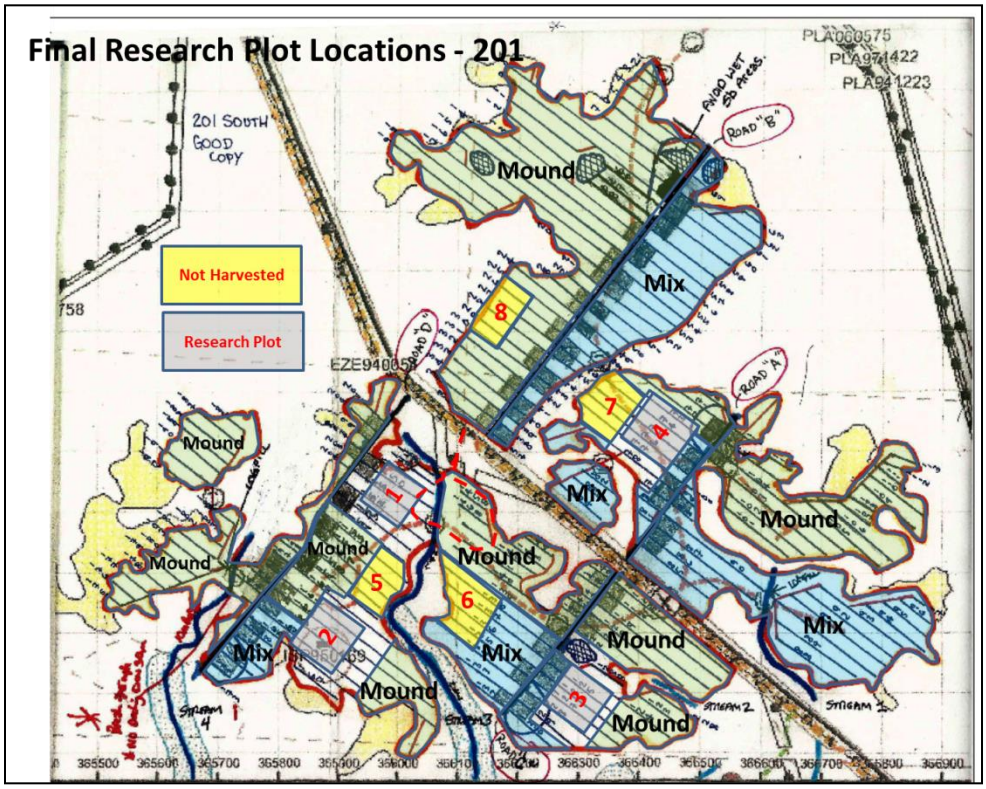

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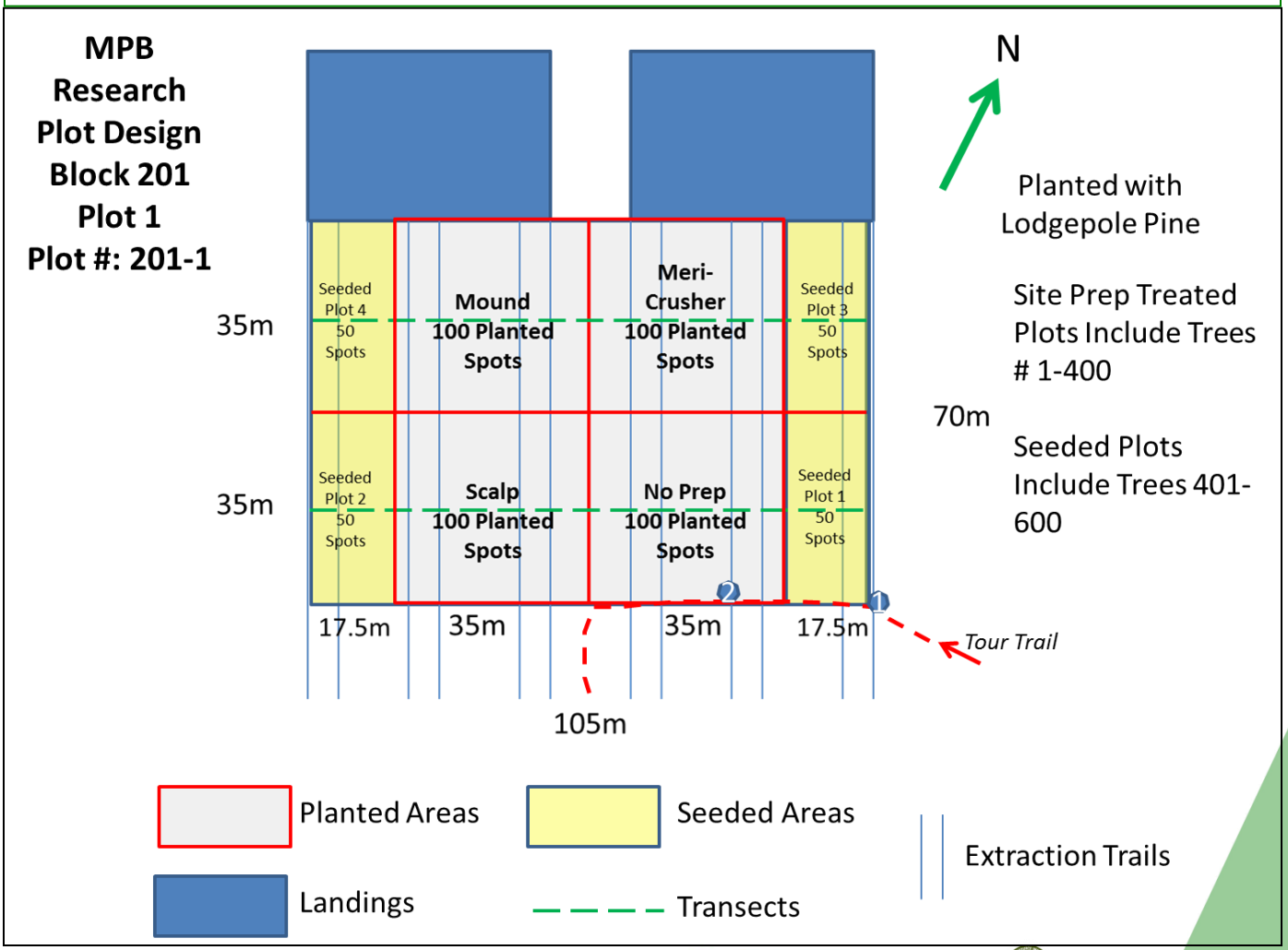
Beyond Beetle: Opportunities for natural regeneration of lodgepole pine following partial harvesting of MPB-affected stands

Julie Steinke, Ellen Macdonald, Vic Lieffers, Lori Schroeder
Department of Renewable Resources, University of Alberta

Availability of suitable regeneration microsites is likely the most serious limitations to natural establishment of conifers in pure pine stands that have been killed by MPB. Rehabilitative treatments such as partial harvesting and mechanical site preparation can create the thin organic and exposed mineral soil microsites needed for germination and initial establishment of lodgepole pine while increasing light penetration to the forest floor, which will stimulate growth of seedlings. This field experiment was established through co-operation between the Canadian Wood Fibre Centre (Canadian Forest Service – Edmonton), Canadian Forest Products, and Alberta Agriculture & Forestry. Lodgepole pine stands which had experienced ~ 50% mortality due to MPB attack were partially harvested. Standing dead trees were left as a seed source and to serve as a future supply of coarse woody debris. Areas were treated with mechanical site preparation including: scalp, mix, mound and unprepared control. We sowed seeds in different microsites within each of these site preparation treatments and in different naturally-occurring microsites in un-site-prepared areas in partially harvested forest and in unharvested control. Germination and survival of seedlings will be examined as a function of partial harvesting and microsite.



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Stop 5

Wildfire Research Study: Fuel Monitoring and Ignition Vulnerability

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Assessing the fire risk in regeneration treatments for Mountain Pine Beetle affected stands

Mike Flannigan, Professor of Fire Science,
and Hugh Wallace, Graduate Student
Department of Renewable Resources; University of Alberta

Mountain Pine Beetle (MPB) has devastated millions of hectares in British Columbia in recent years and now the invasive MPB is making inroads into Alberta. This leads to the question what is the best post-attack management strategy for lodgepole pine stands. A number of mechanical treatments are being examined in separate but related studies including partial thinning and full tree clearcut and chip. These treatments will change the type and amount of fuel on the forest floor as well as the amount of solar radiation and wind that will reach the forest floor. These changes will influence the fire risk. The fire risk for untreated stands (control) as well as for the treatments (4 replicates) will be assessed using the CanFire model. The CanFire model will evaluate the differences in fuel moisture, fuel load in the control stands as well as the treatments to determine the impact on fire behaviour including depth of burn, rate of spread and fire intensity. The CanFire model will also determine the changes in fire risk over time using observations as well as simulated data from succession models. Field testing of sustained combustion will also be undertaken using a standard 2 minute match drop test (drop a match and see if there is flaming combustion after 2 minutes).

We will test the hypothesis that there will be a short-term increase in risk of wildfire in the treated stands but this risk will decline quickly over time. The results from this study will provide information on what thinning levels are required to reduce the risk of crown fires (very difficult to manage) and additional changes in treatments to reduce the fire risk.

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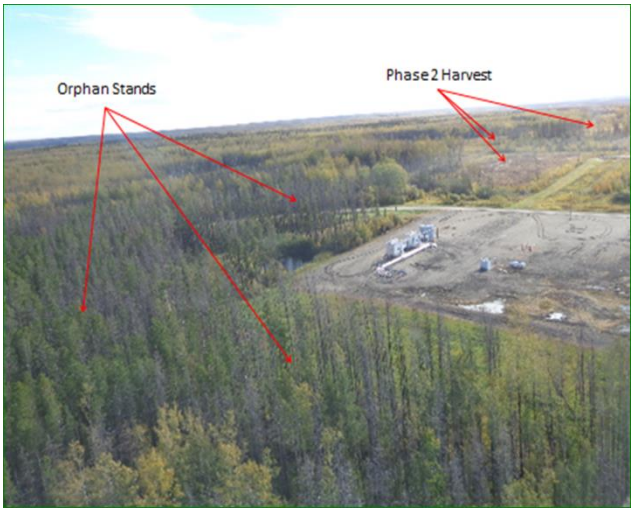
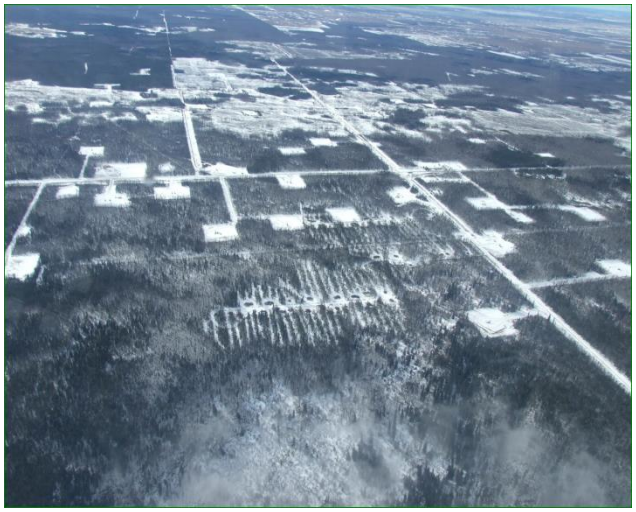
Stop 6

Integrated Land Use Implications





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Mountain Pine Beetle Rehabilitation Trial

Stand Dynamics after MPB Attack

W.R. Dempster and S.D. Meredith

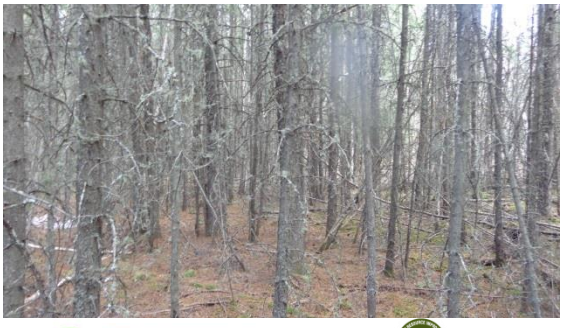
Forest Growth Organization of Western Canada

The rationale for this project originated during a multi-agency tour of MPB affected areas in B.C. in July 2007. Managers attempting to mitigate the impact of mountain pine beetle disturbance on timber recognized the importance of retaining a monitoring network of undisturbed permanent sample plots and buffer areas that have been disturbed by MPB. These would provide the basis for answering questions around changes in stand composition and growth after MPB attack.

This project, which is being undertaken by the Forest Growth Organization of Western Canada, is a continuation of a project begun by the fRI Mountain Pine Beetle Ecology Program and the Foothills Growth and Yield Association 2008. 240 existing PSPs were reserved from harvest to allow monitoring for MPB attack. The current focus is on monitoring changes in 63 plots attacked by MPB in the Grande Prairie and Whitecourt forest areas before 2010. On these plots, post-attack development will have been assessed repeatedly over a 7-year-plus period by 2016.

Field measurements include: measurement of saplings and regeneration for all conifer and broadleaf tree species; assessment of shrubs, herbs, grass, floor mosses, ground lichens, un-decayed wood, bare ground, and important caribou and grizzly bear food species; ground cone counts and tree cone serotiny assessment; identification and condition assessment of attacked trees and trees that have died since the last measurement, including cause of death, level of attack, and fall-down; and assessment of arboreal lichens.

The information collected and analysed will be used to inform timber supply analysis and operational planning through the improved development of stand regeneration and growth models forecasting post-disturbance conditions.



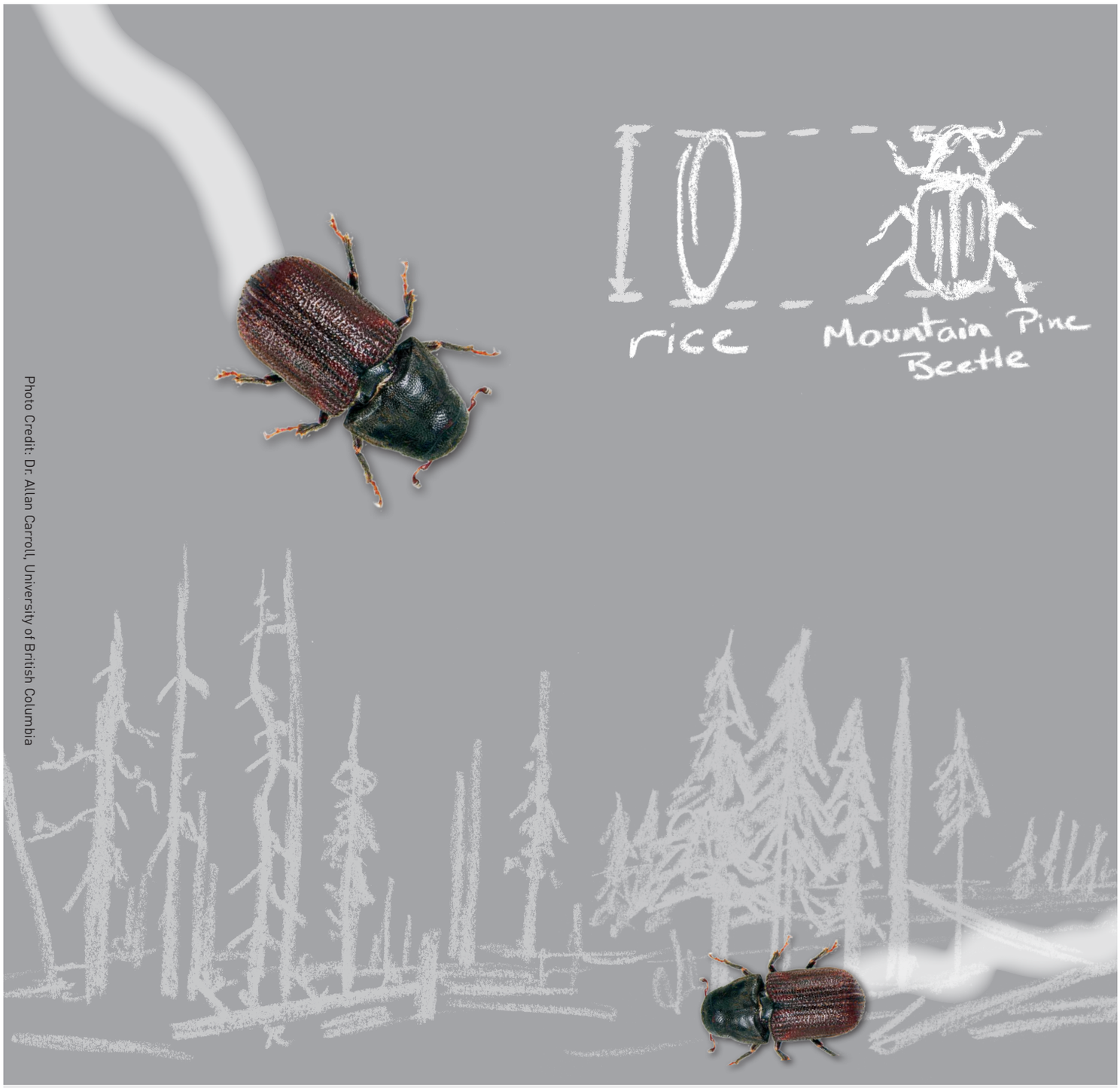


Photo Credit: Dr. Allan Carroll, University of British Columbia

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