An Assessment of Tree Condition and Worker Safety Concerns in Mountain Pine Beetle-killed and Fire-damaged Pine Stands in Central BC

Project Conducted By: Manning, Cooper & Associates Prince George, BC
Project Goal

• Evaluate the effectiveness of the provincial *Wildlife/Danger Tree Assessment* process in pine beetle-killed and fire-damaged stands

• Quantify tree condition in these types of stands over a range of site conditions in the SBS zone of central B.C.
Study Area

- Beetle-killed and fire-damaged pine stands in the Fort St. James, Vanderhoof, Nadina, Prince George and Quesnel FDs

- 58 fixed-radius plots installed in these stands:
  - 36 in MPB-killed
  - 22 in fire-damaged
Study Design

- MPB sites stratified by:
  - Time-since-death
    0-3 yrs, 3-5 yrs, 10+ yrs
  - Soil moisture: dry or moist (mesic)
Study Design

- Fire-damaged sites stratified by:
  - Time-since-death
    - 0-3 yrs, 3-5 yrs, 10+ yrs
  - Fire intensity
    - Medium (BUI 40-70)
    - High (BUI 70+)
RESULTS

536 individual tree assessments:

- 321 in MPB
- 215 in fire
Destructive Sampling

45 trees destructively sampled to determine internal tree condition

- 27 in MPB
- 18 in fire
MPB-killed Trees

- Mostly class 4 or 5 trees after 5 yrs time-since death
- Only larger coarse limbs remaining
- Bark loosening and starting to fall off
Defects on Beetle-killed Trees
(n=35)

- 57% Secondary Tops
- 20% Root or Basal Damage
- 14% Dead Limbs
- 9% Stem Damage
Danger Trees in MPB-killed Sites

• Only 7 trees (2%) confirmed to be DANGEROUS
• All these were in MOIST sites >20 yrs time-since-death
• All were dangerous due to ROOT or BASAL CONDITION failure
Basal Condition Failure (at right)
Fire-damaged Stands

Most common defects:

- Stem damage from fire scarring
- Burned out roots
Danger Trees in Fire-damaged Sites

• Only 9 trees (4%) rated DANGEROUS
• All these occurred on HIGH INTENSITY fire sites
• How long ago the fire occurred did not influence degree of damage or danger
CONCLUSIONS

1. No MPB-killed trees were observed to have defects or decay patterns directly attributable to pine beetle.

2. MPB-killed trees eventually rot away at the root collar/ground level → eventually uproot or break off like an old fence post due to long cycle of wetting/drying and secondary fungal or bacterial agents.
CONCLUSIONS

3. Appears that beetle-killed pine on DRIER sites can remain standing with MINIMAL HAZARD for at least 10-20 years after death

4. The defect criteria and failure/danger thresholds defined in the current WDTAC standard are accurate and reliable
CONCLUSIONS

5. All tree defects in this study were rated for Level 3 disturbance work activities (i.e., most harvesting and heavy machinery related activities)

- For Level 1 activities (most silviculture work), tree defects must be more “severe” than at LOD 3 in order to receive a Danger rating.

- It is likely that some trees rated “D” in this study would have been SAFE for LOD 1 work.
RECOMMENDATIONS

1. Follow current WDTAC standards for work activities in MPB-killed and fire-damaged stands

- Provincial WDTAC courses exist for harvesting and silviculture, and wildland fire operations

- Consult the WTC website for more information on these courses

www.for.gov.bc.ca/hfp/training/00016/index.htm
2. For silviculture activities (except mechanical site prep.) in beetle-killed stands on MOIST or WETTER sites which are >15 YEARS since death:

- Either cease work activities when wind speeds exceed 20 km/h, or reassess the site to Level 3 disturbance
Acknowledgements

- Thanks to the Wildlife Tree Committee of BC for initiating and supporting this project

- Funding was provided by the MoFR Forest Practices Branch, through the Forests For Tomorrow Initiative