



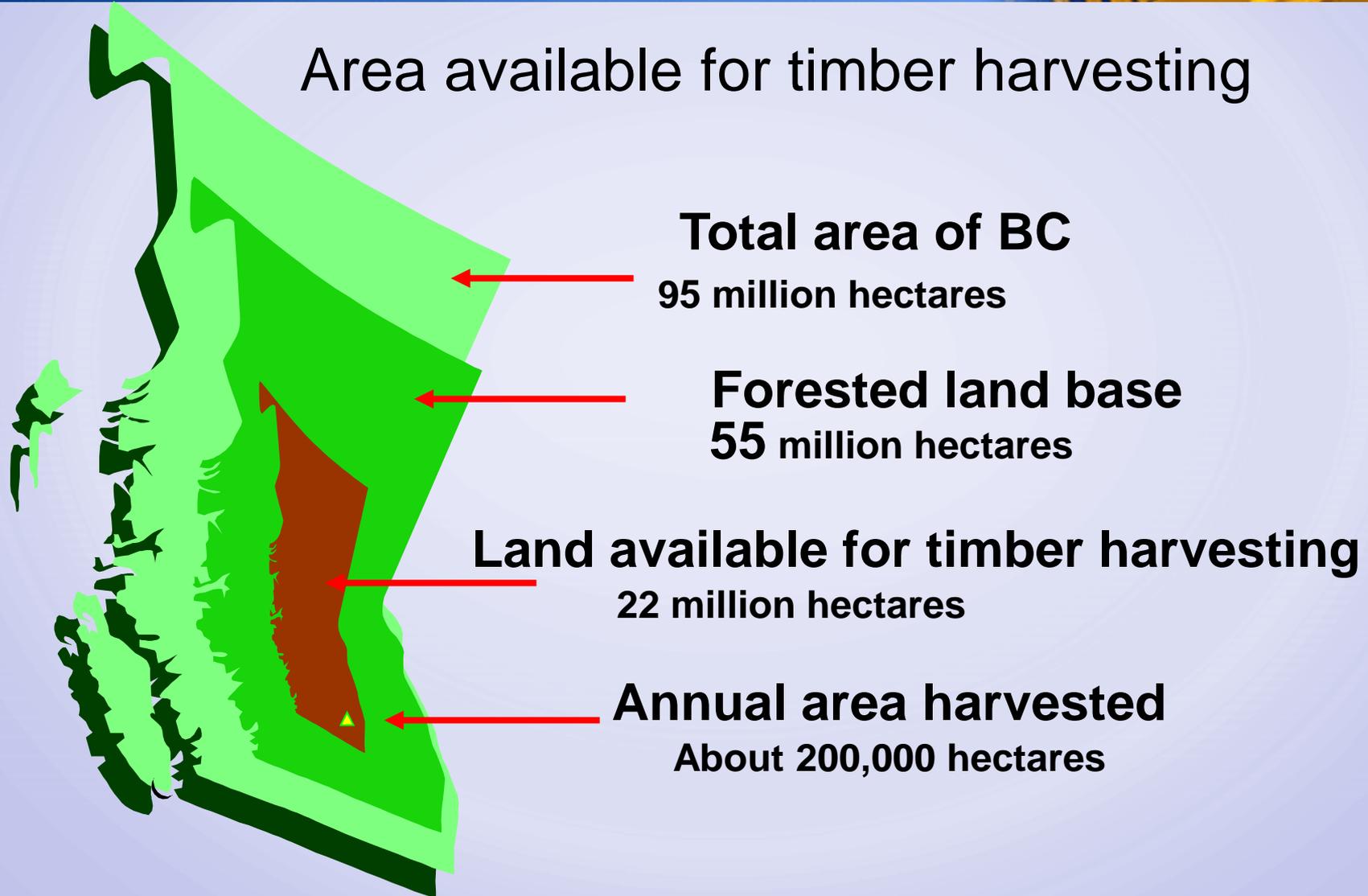
# **The Impact of Climate Change and the Mountain Pine Beetle Epidemic on Forest Work**

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Area available for timber harvesting



**Total area of BC**  
95 million hectares

**Forested land base**  
55 million hectares

**Land available for timber harvesting**  
22 million hectares

**Annual area harvested**  
About 200,000 hectares



## **Mountain Pine Beetle Outbreak: Summary**





## Summary Statistics

- Ministry annually updates current and projected kill estimates using provincial overview flight data and modelling.
- 53% of merchantable pine has now been killed.
- Worst year of infestation was 2004.
  - 140 million m<sup>3</sup> killed that year alone.
- To date ~ 723 million m<sup>3</sup> have been killed.
  - ~ 56% (752 million m<sup>3</sup>) of the provincial pine volume will be killed by 2017.



**What does 1 Million Cubic Meters of wood look like?**

**Now Imagine this pile 723 times bigger!**



Photo courtesy Alvesta Timber, Vida Oy. ( 5 Sweden)

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## Timber Supply Impacts of the MPB Outbreak

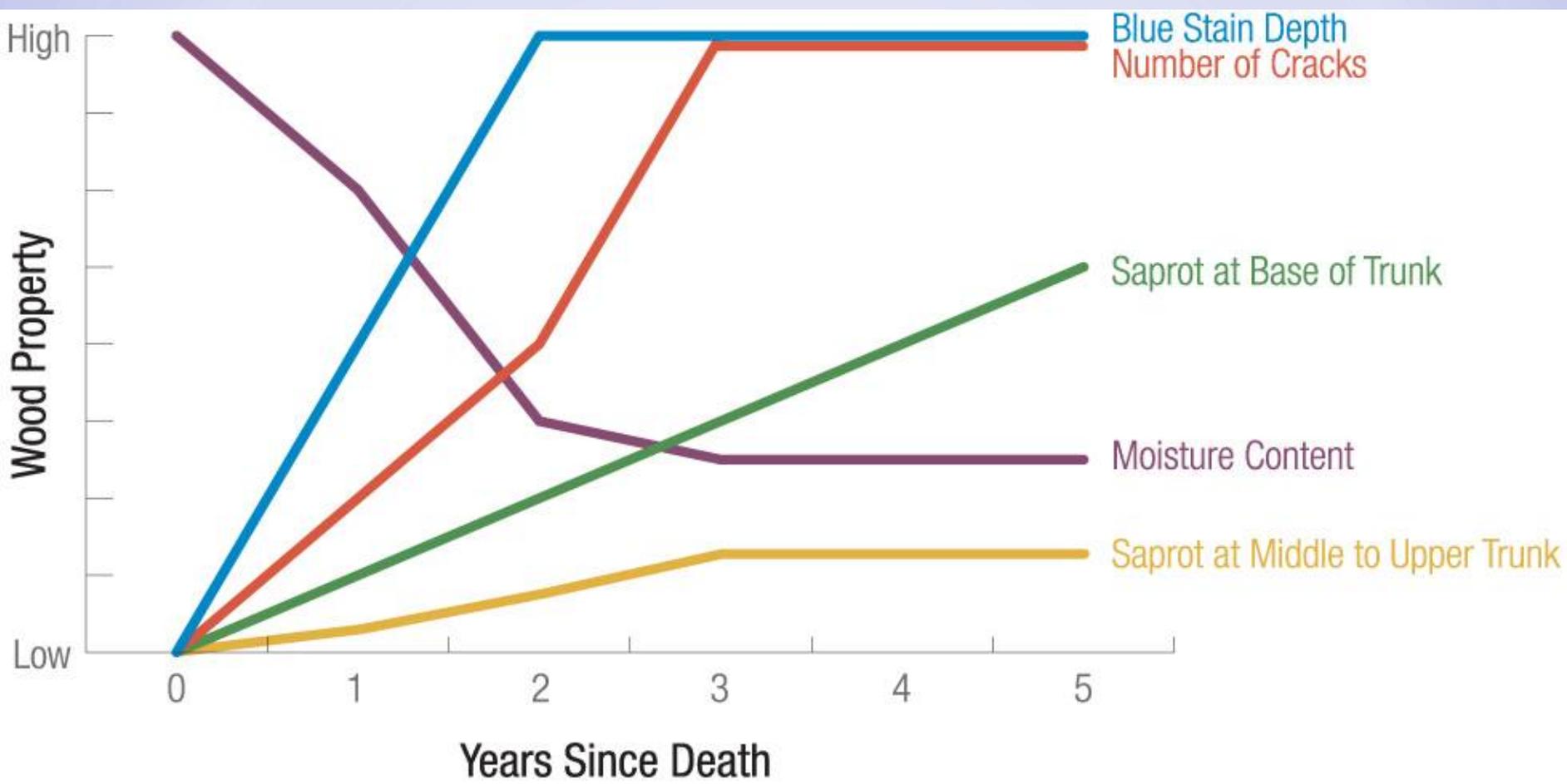




## MPB Log Properties

- Significant checking occurs in the first 2 to 3 years, rate of checking then slows but check depth continues to increase.
- Brittle: liable to break every time they are handled
- Invasion of blue-stain fungi is very rapid.
- Tree mortality can lead to sap rot within a year or two.
- Ambrosia beetles & woodborer known to infest trees within 2 years of mortality.

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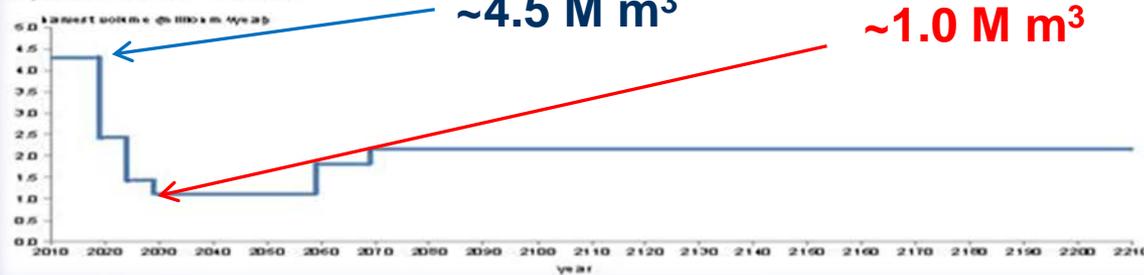


### Lakes TSA



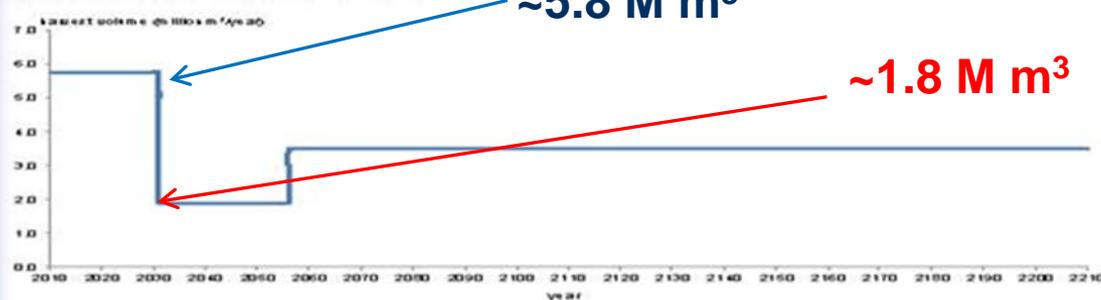
THLB Volume: 64% pine  
% Pine killed: 81%

### Quesnel TSA



THLB Volume: 67% pine  
% Pine killed: 76%

### Williams Lake TSA



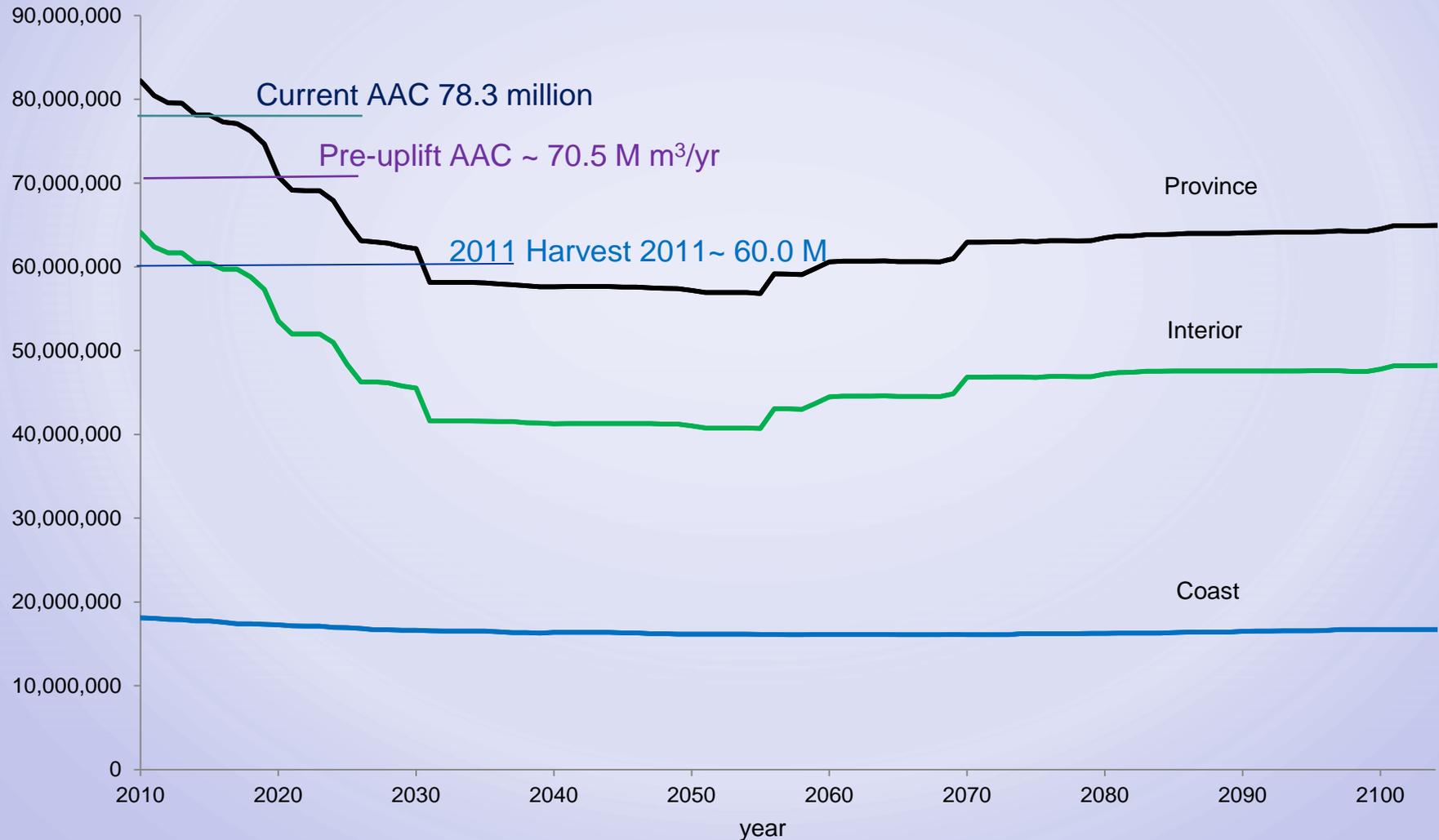
THLB Volume: 54% pine  
% Pine killed: 60%

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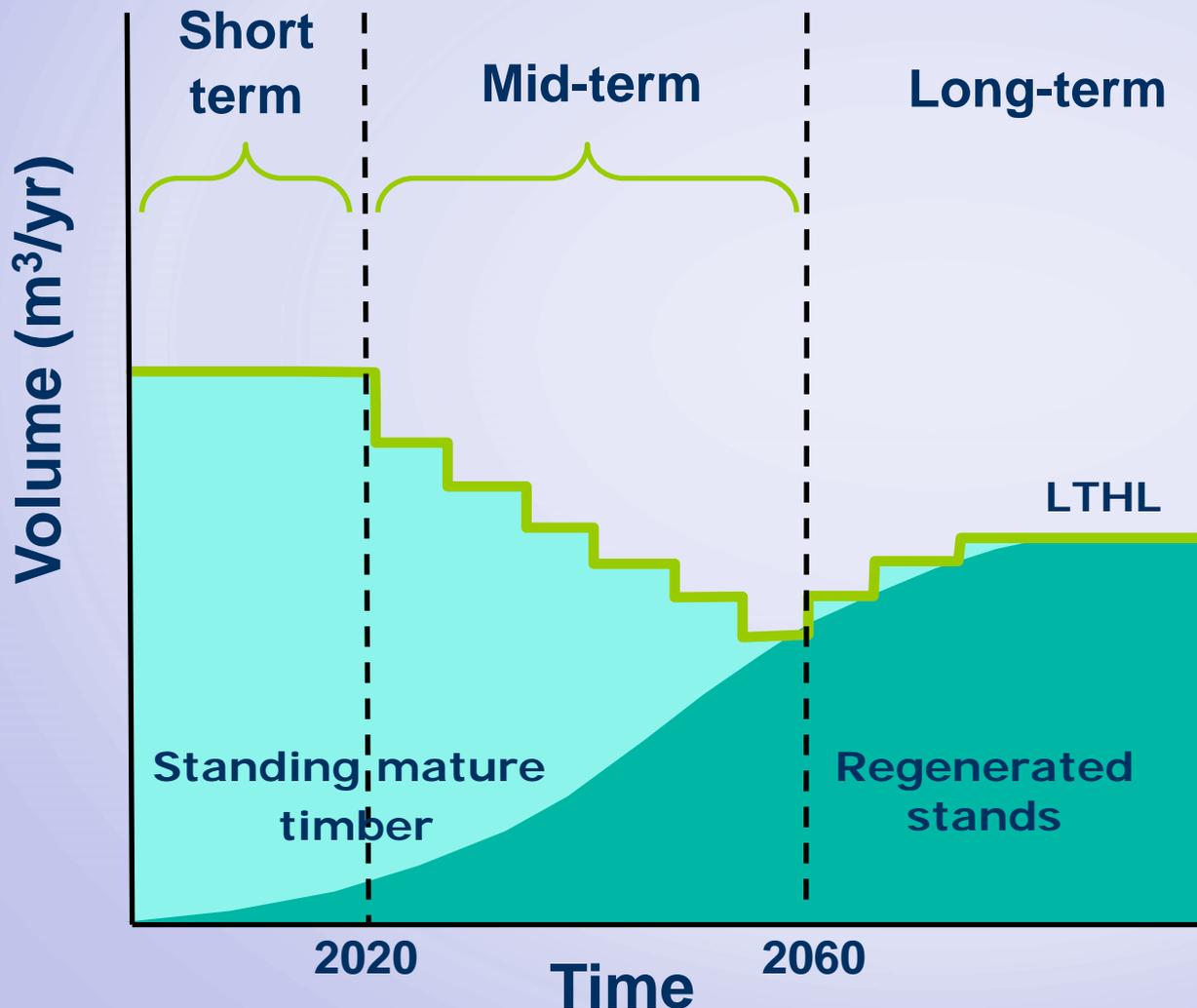


Projected Harvest Forecast  
(October 12, 2012)

harvest m<sup>3</sup>/year



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1. Strategic planning, surveys, forest inventory updates, mapping.
2. Re-establish fast growing plantations.
3. Rehabilitate where possible.
4. Silviculture treatments such as fertilization, spacing, brushing.
5. Ensure diversity.
6. Capitalizing on new information, opportunities and technology.



## Hydrology in Forests Attacked by Mountain Pine Beetle



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- >75% of the people in BC rely on surface water for domestic use, irrigation and industry.
- The primary hydrologic concern is the effect of extensive forest mortality and salvage logging on water supplies (quantity, timing and quality).
- Hydrologic response to changing vegetation will likely be compounded by climate change





## Expected hydrologic response to loss of forest cover:

- Increased water reaching, stored on, and flowing from hill slopes (reduced interception and evaporation, increased soil moisture)
- Increased spring and total annual stream flow volumes
- Earlier onset of snowmelt
- More rapid stream flow response to storms
- and with logging, the potential conversion of subsurface to surface water along expanded road networks

Depending on:

- the weather
- the watershed, and
- the extent of disturbance





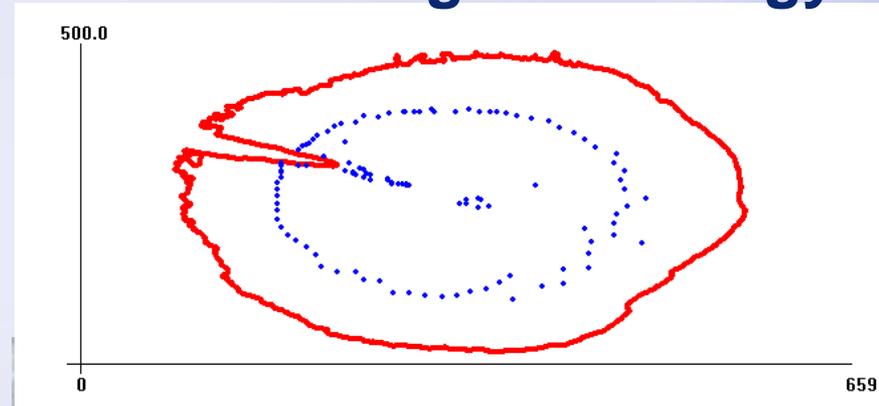
## Mountain Pine Beetle Driven Innovation

### New Products



**“Denim” Pine**

### New Scanning Technology





## Priorities for Solid Wood Products

1. Increase use of pine in traditional products (lumber/veneer)
  - Enable processing of more dead pine
  - Support marketability of products
2. Substitute pine into non-traditional markets
  - Use dead pine for OSB & MDF furnish
3. Encourage niche markets through technical assistance
  - Utility poles, log homes, value-added, *et al.*

# Transportation of MPB Logs

- Very low density MPB wood meant that log trucks were unable to haul a full “pay” load
  - Log trucks paid by ton, not by volume
- Investigated the safety and viability of methods to increase payloads
  - Determined that two options were able to safely increase volumes:
    - Increased bunk width (from 2.6 m to 2.9 m), and
    - Increased vehicle length (from 25 m to 27.5 m)





## **Safety Issues related to Forests Attacked by Mountain Pine Beetle**





## Worker Safety

Site risks: snags, ground condition

- Silviculture surveys
- Timber cruiser
- Block layout





## Examples of Changes Influencing Risk

- Traffic intensity on resource roads
  - Forestry, oil & gas and mining exploration
- Input material to mill has altered characteristics
  - Higher levels of dust and fine particulates: fire hazards





## Reducing wildfire risk in community interfaces through fuel management and mitigation strategies



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- All beetles active in BC (spruce, pine, fir and balsam).
- Predict higher levels of non-recoverable losses.
- More harvesting expected to have salvage focus.
- Striving for more diverse forests at tree, stand and landscape level.
- Adjusting species to accommodate climate change.
- Expecting to harvest some stands sooner to manage risks.



Damaging Agent	Hectares Affected	Damaging Agent	Hectares Affected
<i>Bark Beetles:</i>		<i>Diseases:</i>	
Mountain pine beetle	3,016,228	Venturia blight	641,982
Western balsam bark beetle	722,429	Larch needle blight	31,695
Spruce beetle	42,862	Dothistroma needle blight***	15,435
Douglas-fir beetle	21,001	Large-spored spruce-labrador tea rust	4,103
Young pine mortality	4,991	White pine blister rust	1,329
<b>Total Bark Beetles:</b>	<b>3,807,512</b>	Lophodermella needle cast	1,018
<i>Defoliators:</i>		Cottonwood leaf rust	159
Aspen leafminer	1,172,209	Root diseases****	153
Western spruce budworm	456,745	<b>Total Diseases:</b>	<b>695,874</b>
Forest tent caterpillar	198,932	<i>Abiotics:</i>	
Two-year-cycle budworm	74,891	Fire	97,444
Western blackheaded budworm	34,849	Drought	36,490
Unknown defoliators*	9,451	Flooding	19,794
Western hemlock looper	8,103	Post fire	14,270
Conifer sawfly	6,146	Windthrow	10,605
Birch leaf miner	2,832	Yellow cedar decline	9,525
Douglas-fir tussock moth**	2,144	Aspen decline	4,308
Large aspen tortrix	575	Slides	3,384
Pine needle sheathminer	517	Fume kill	391
Balsam woolly adelgid	415	Hail	206
Satin moth	102	Redbelt	153
Black army cutworm		Birch decline	125
<b>Total Defoliators:</b>	<b>1,967,913</b>	Frost kill	21
<i>Animals:</i>		<b>Total Abiotics:</b>	<b>196,716</b>
Bear	1,730		
Unknown animals	45		
<b>Total Animals:</b>	<b>1,775</b>		
<b>Provincial Total Damage:</b>		<b>6,669,788 ha</b>	

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Natural Resource Operations**



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**Спасибо вам  
Merci  
Thank-you**

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