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**Silviculture Strategy Workshop**  
**Prince George, B.C.**  
**January 17<sup>th</sup> and 18<sup>th</sup>, 2012**



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## **Past and Existing Silviculture Strategies**

- **A Type 1 Strategy in March 2000.**
- **An update in March 2003 to incorporate the changes resulting from TSR II and the MPB epidemic.**
- **Another update in March 2006 to further address the MPB epidemic.**
- **Type 2 Strategy completed in March 2008.**

## Methodology

- 1. Key issues**
- 2. Review and revise (?) objectives relative to the key issues.**
- 3. Review key silviculture strategies and, where necessary, revise or delete regimes or develop new regimes.**
- 4. Research and development of additional potential strategies and treatment regimes.**

## **Methodology Cont'd**

- 5. Evaluation and Analysis of the key scenarios and selection of a preferred strategy.**
- 6. Development of an updated 5-year silviculture program.**
- 7. Compilation of a draft report to be reviewed by selected constituents.**
- 8. Finalization of report and strategy.**

## Methodology Cont'd

### ■ Analysis

- Forest estate modeling.
- Forest-level models input.
- Stand level economics needs discussion (NPV).

## Methodology Cont'd

- **Stand level economics may not work for mid term mitigation.**
- **Discount rate.**
- **Differences in NPVs more relevant than details.**
- **Financial rotation?**

## **Prince George TSA Overview**

### **Previous Analysis and Identification of Key Issues**

# TSA Overview

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- **Large TSA with a total area of almost 8 million ha**
- **THLB around 3 million ha depending on the analysis;**
  - **land withdrawals;**
  - **economic operability definition**



# TSA Overview

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Analysis	Ft. St. James	Vanderhoof	Prince George	Total
TSR 2	1,326,164 ha	784,670 ha	1,277,341 ha	3,388,145 ha
Expedited				3,325,683 ha
FESL 2008	1,228,777 ha	751,205 ha	1,323,259 ha	3,303,241 ha
TSR 4	978,917 ha	739,757 ha	1,377,451 ha	3,096,125 ha

# TSA Overview

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**THLB 3,096,125 ha**

**Most significant netdown factors reducing THLB after non-forest etc:**

- **not economical (939,390 ha), problem forest types(143,945 ha)**
- **ungulates (127,941 ha), riparian and WTP (353,759 ha), terrain (162,149 ha)**
- **parks**

# TSA Overview

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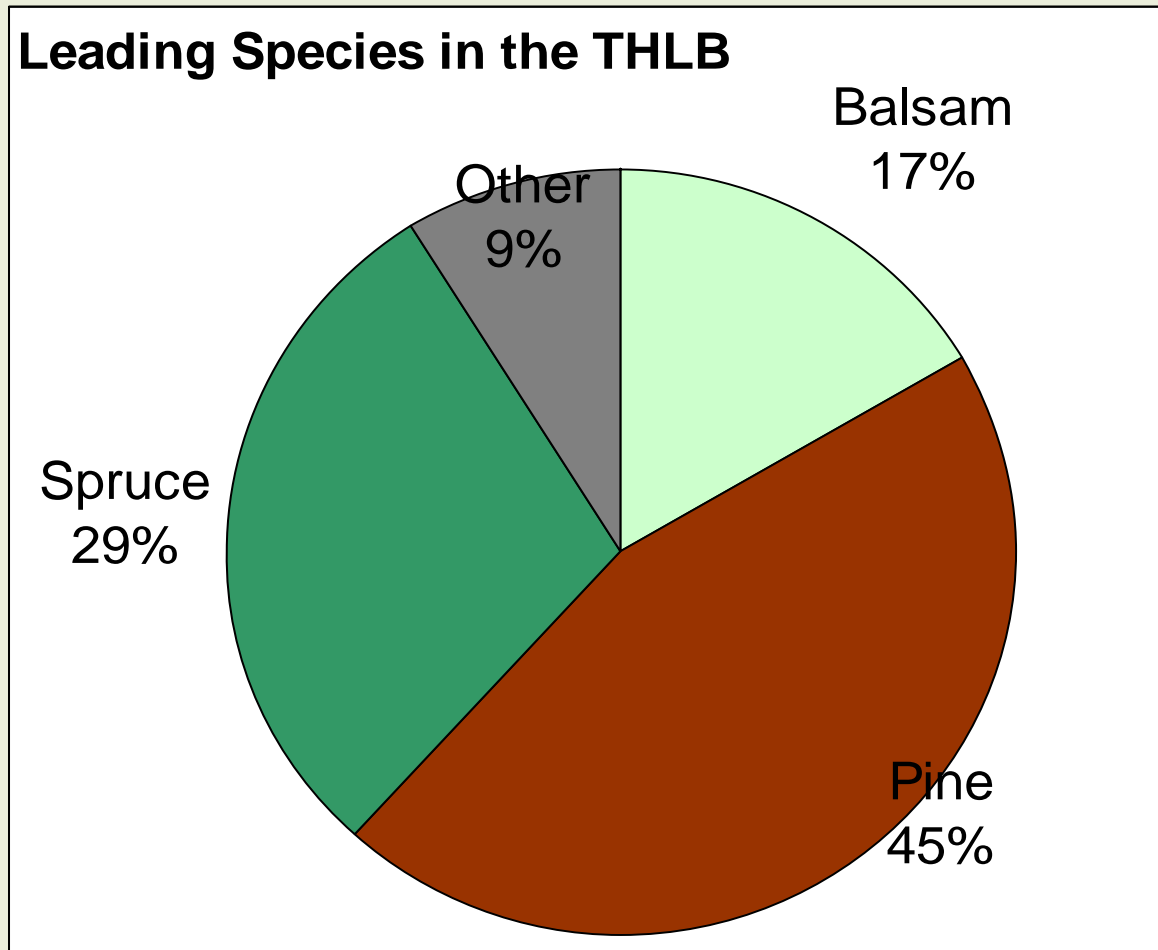
## History of the AAC

# TSA Overview

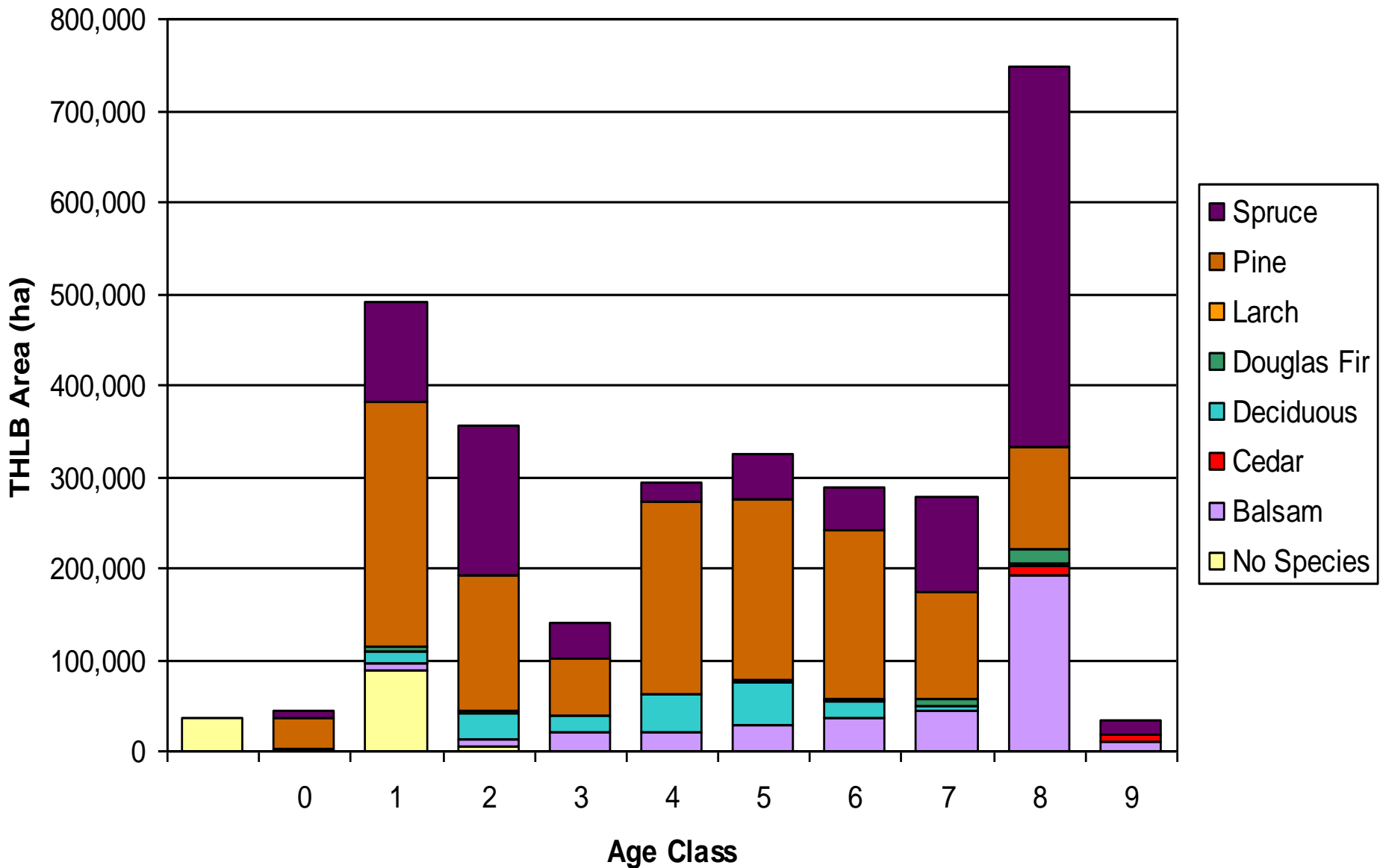
Year	AAC m <sup>3</sup>	MPB Uplift	Partitions
1996	9,363,661		C/H 290,000
2002	12,244,000	3,000,000	C/H 110,000 deciduous 160,000 Supply Block A 400,000
2004	14,944,000	5,700,000	C/H 110,000 deciduous 160,000 Supply Block A 400,000
2011	12,500,000	3,256,000	C/H 23,000 deciduous 160,000 Non pine etc 3.5 million

# TSA Overview

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# TSA Overview



# TSA Overview

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## Timber Supply

# TSA Overview

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## Statements from 2008:

- **Prince George TSA does not have a big mid-term timber supply problem. Large growing stock in Fort St. James.**
- **Social and economic problem.**
- **Constraints: no growing stock locally, old growth, economically available timber (Ministry analysis, large impact).**
- **Harvest attacked pine stands, immediate rehab ☺**



# TSA Overview

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## **Antti's dogma:**

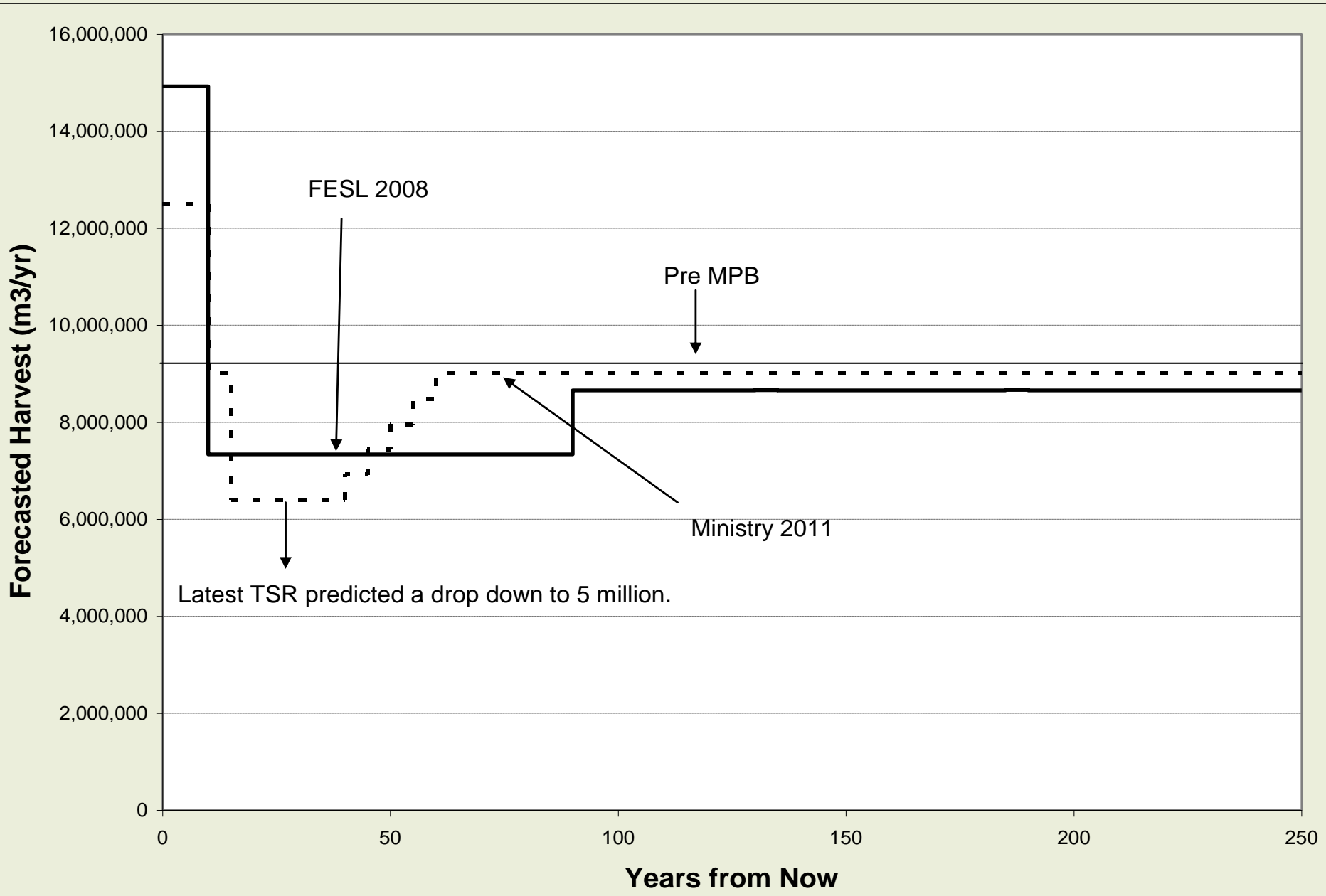
- **The timber in Vanderhoof will run out due to the accelerated harvesting of the infested pine stands, or the decaying of those stands that will not get harvested.**
- **In the Prince George Forest District, the future harvest is heavily constrained by the PG TSA old growth order.**
- **This leaves only one option: if the TSA is to maintain its timber supply at reasonable levels a large portion of the harvest in the late short term and medium term must come from the Fort St. James Forest District. Also, a significant portion of this harvest is going to be balsam.**

# TSA Overview

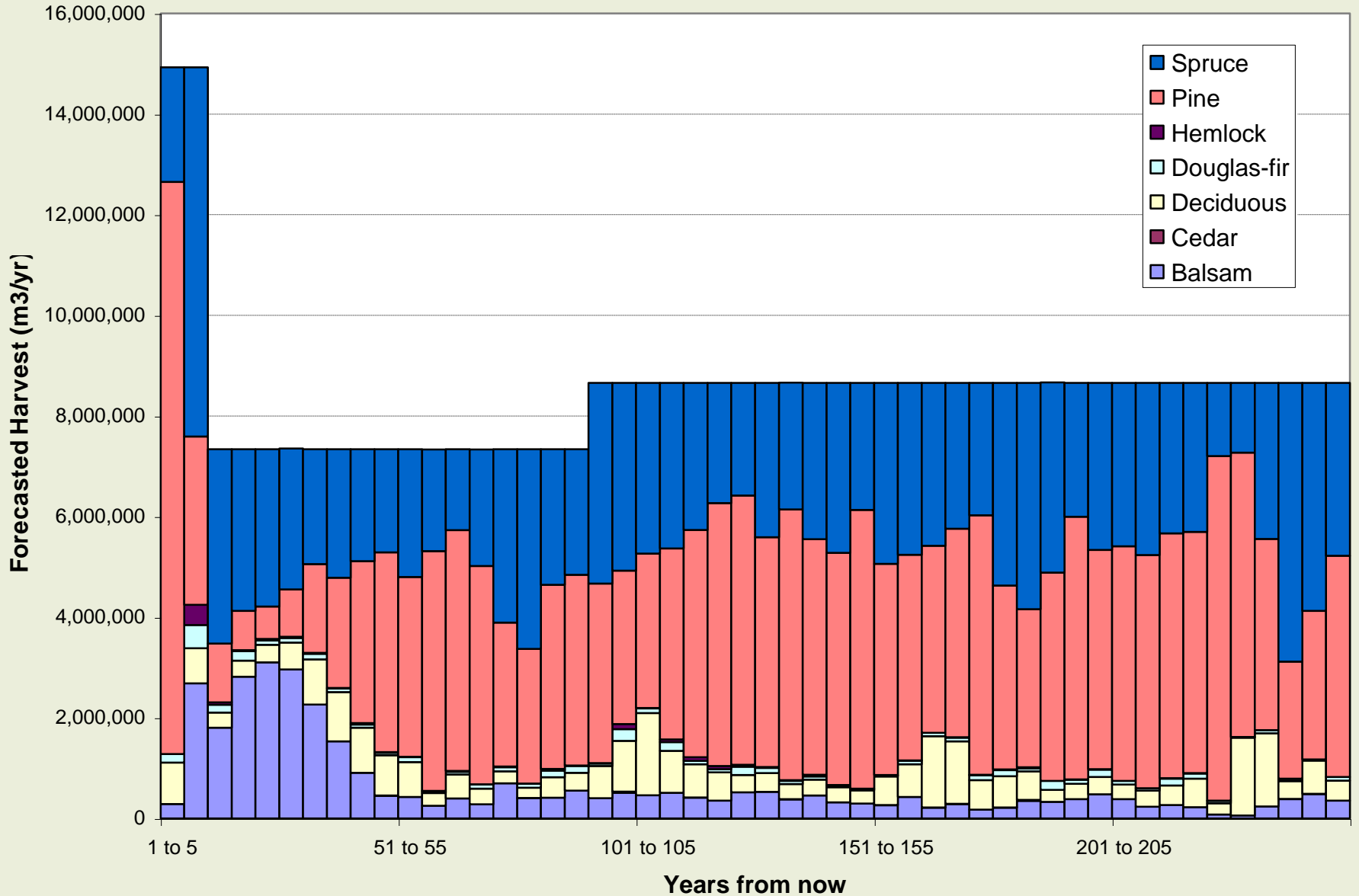
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- **MPB is most important issue affecting timber supply.**
- **Several past analyses have predicted the impact.**
- **In spite of differences in analyses, similar trends.**
- **Depending on the analysis the mid term is predicted to be between 6.4 million and 7.3 million and the long term between 8.7 million and 9.2 million.**
- **Differences caused by G&Y, THLB, shelf life assumptions.**

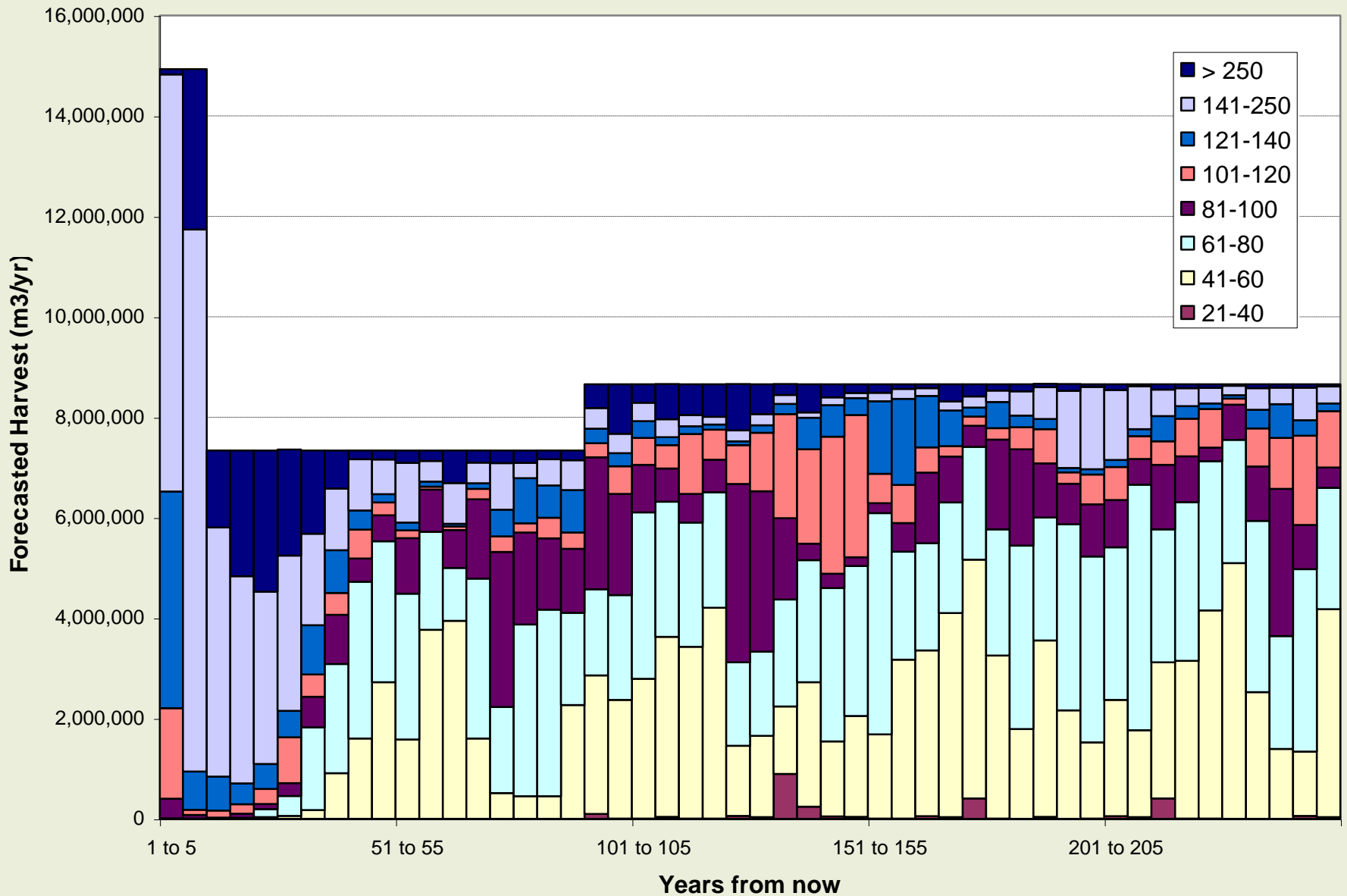
# TSA Overview



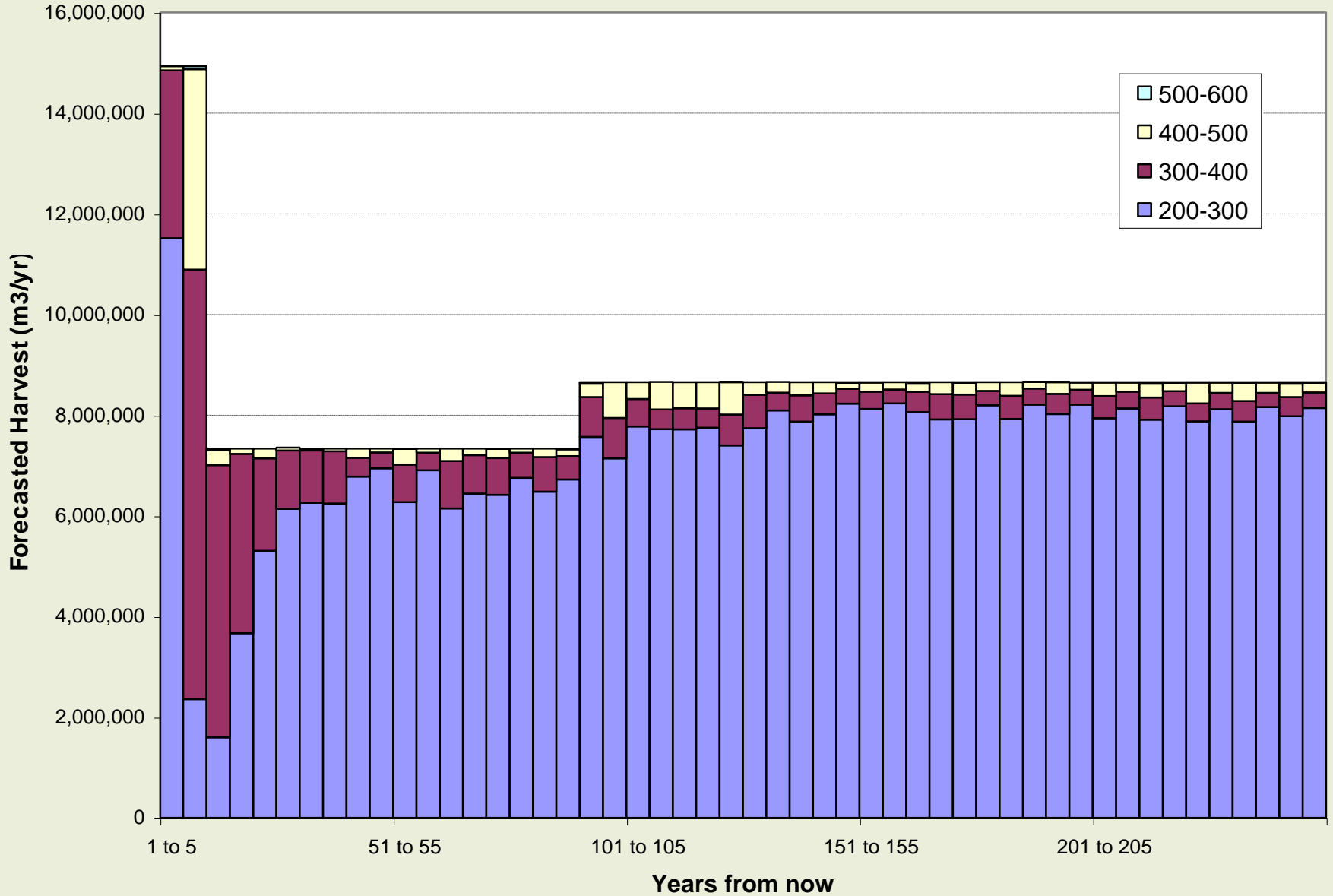
# TSA Overview



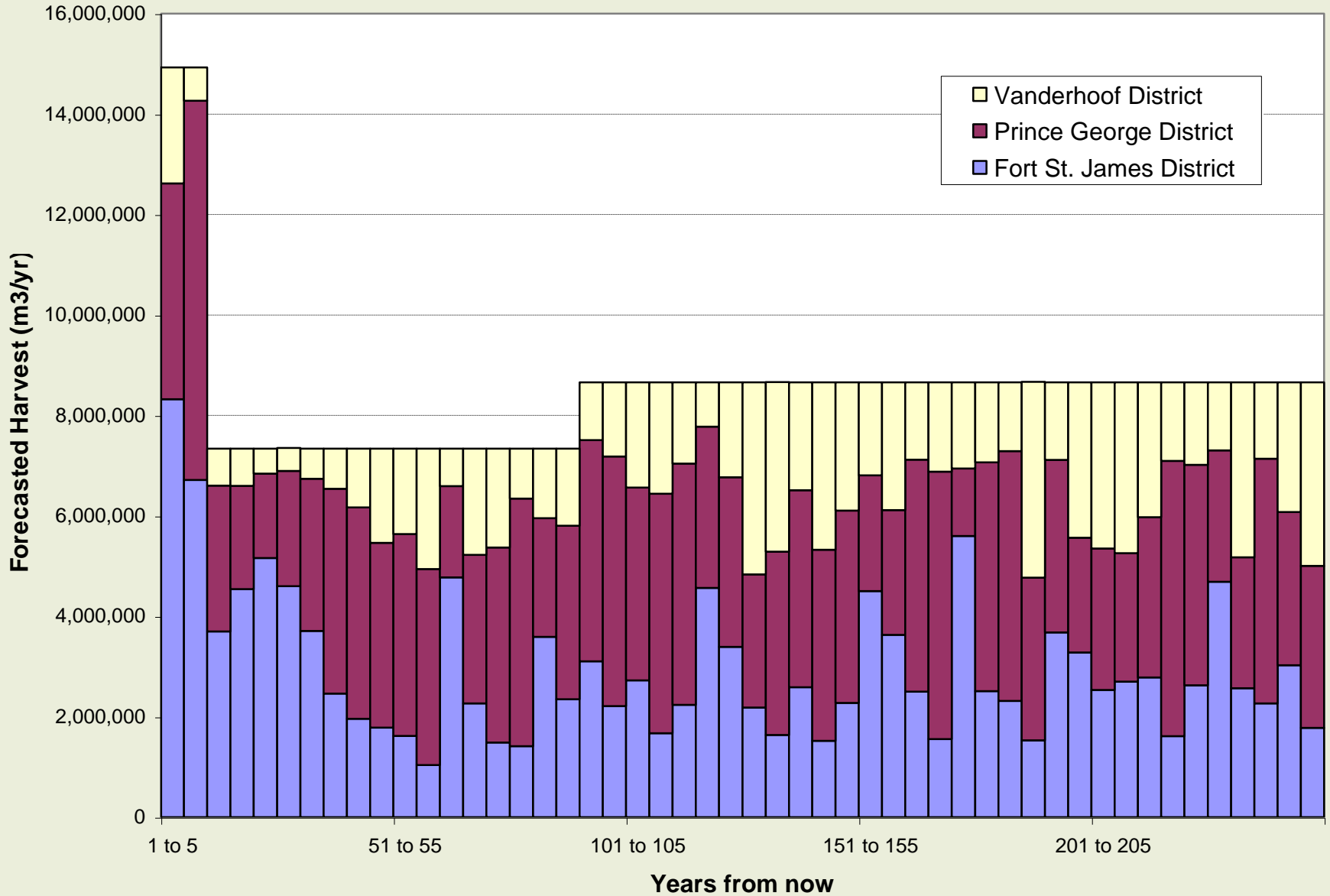
# TSA Overview



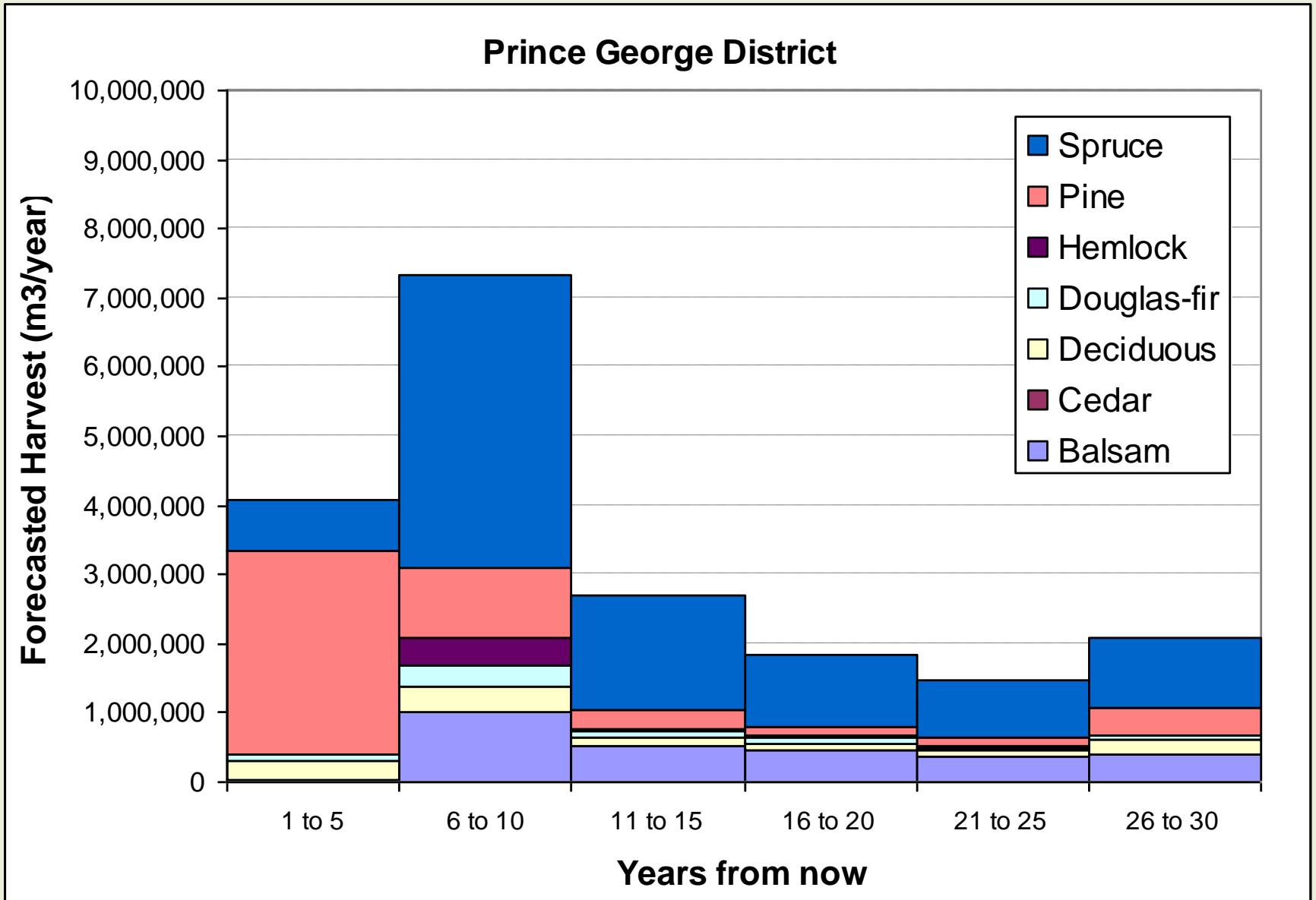
# TSA Overview



# TSA Overview



# TSA Overview

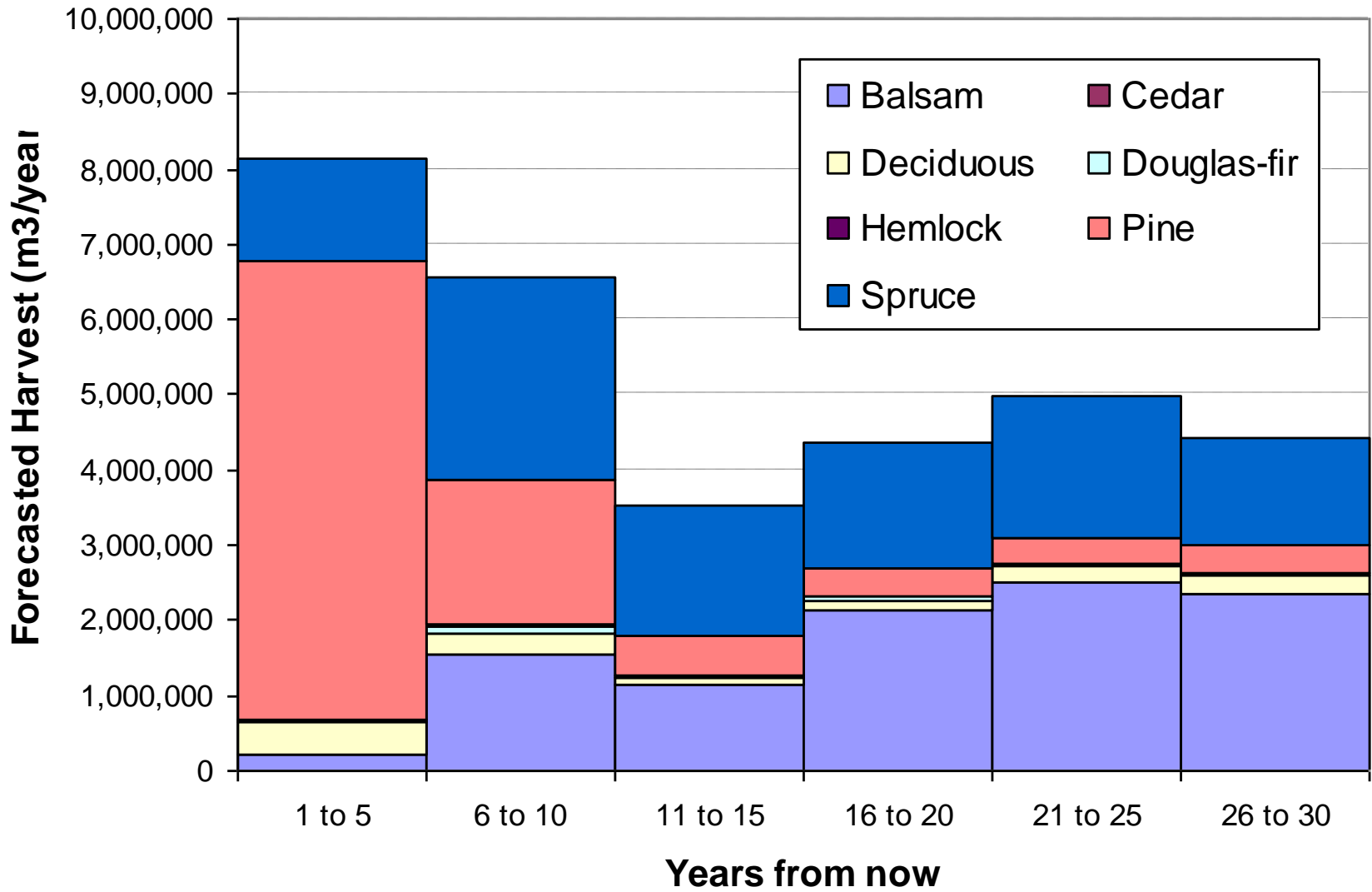






# TSA Overview

## Fort St. James District

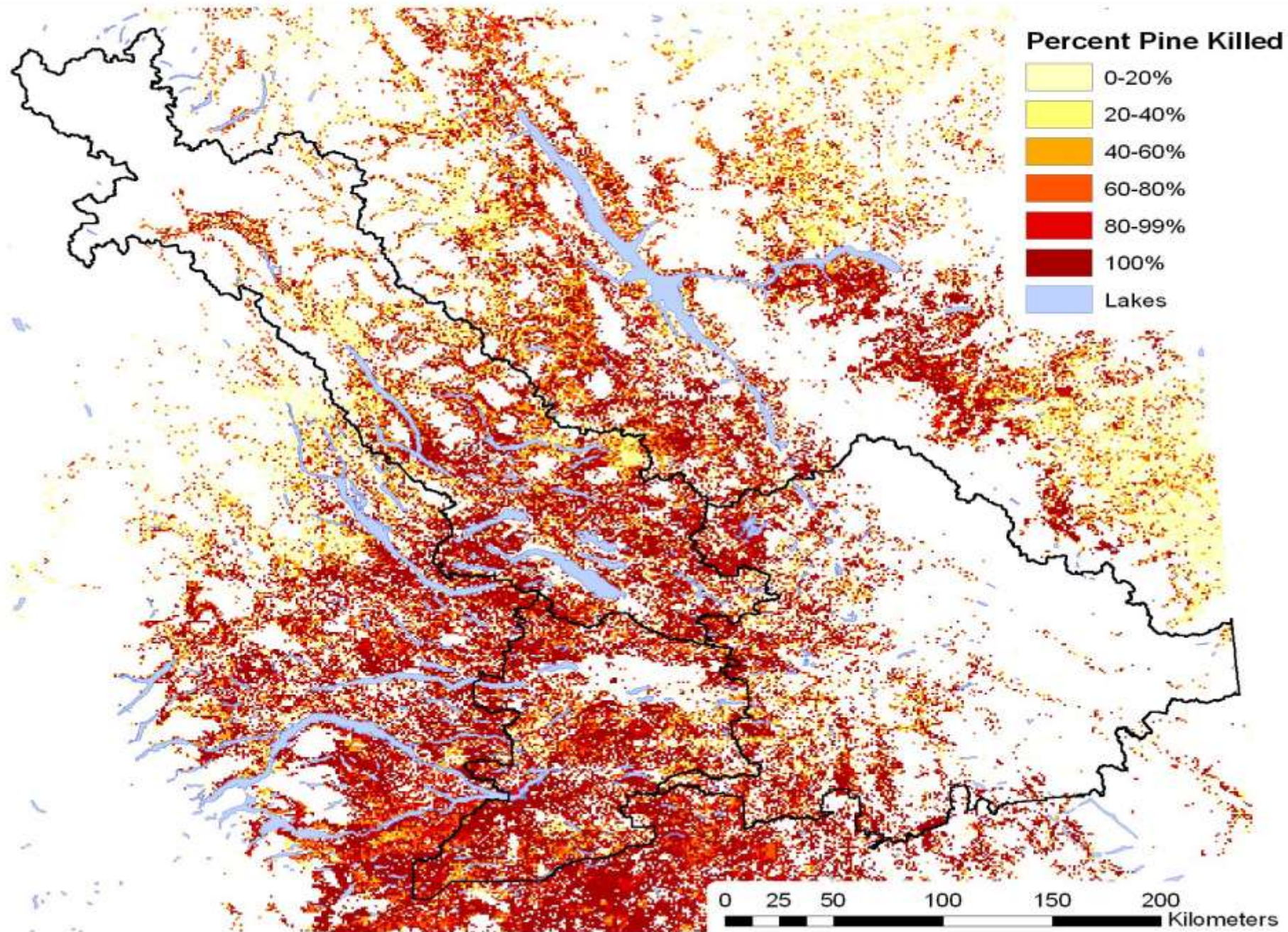


# Key Issues

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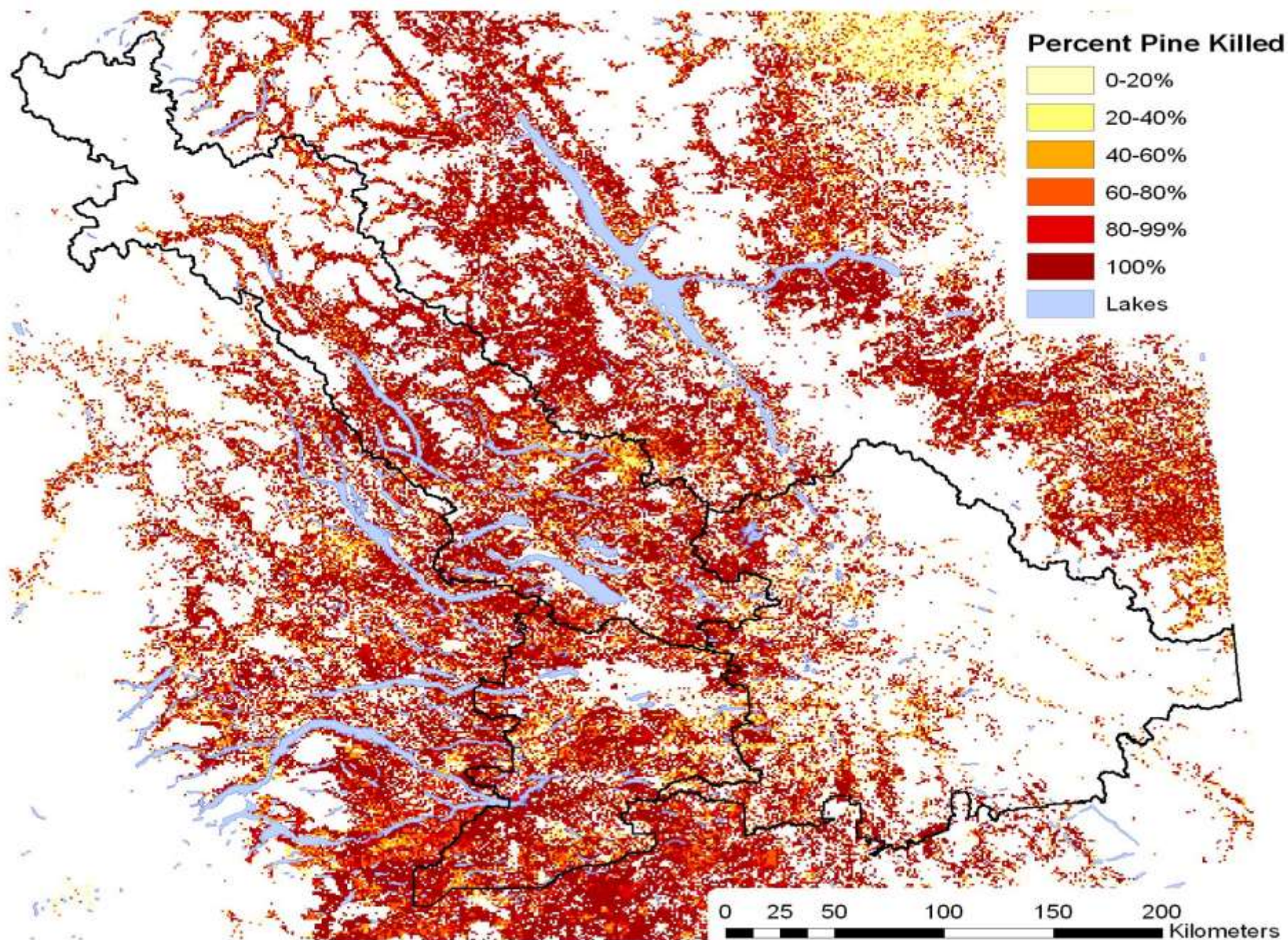
MPB Implications  
“Shelf Life”

# Mountain Pine Beetle Cumulative Kill, 2010

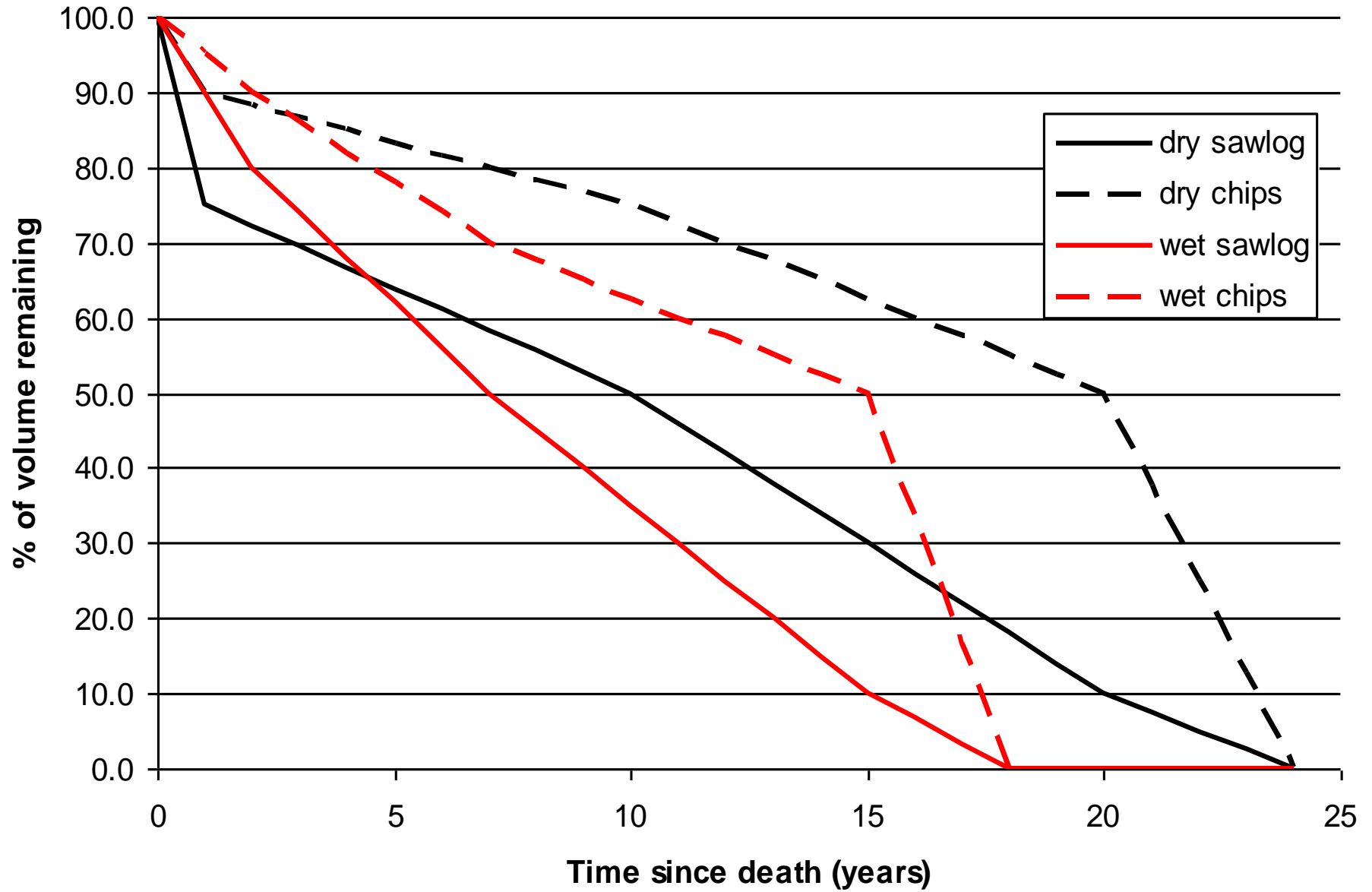




# Mountain Pine Beetle Cumulative Kill, 2026 (projected)



# MPB Implications, shelf life





# MPB Implications, shelf life

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- **Varies depending on area and end use.**
- **Harvesting of stands that have been dead up to 10 years occurs.**
- **Stands tend to blow down before end of shelf life.**
- **After 10 years, harvest opportunities diminish.**
- **Timber supply projections rely on continued harvest of pine leading stands.**
- **Silviculture cost may limit salvage, not logging cost.**

# MPB Implications

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- **Unsalvaged pine stands; the less the better.**
- **Focus on pine has been generally successful.**
- **AAC vs. Harvest**

Category	2006	2,007	2,008	2009	2010	2011
AAC		14,944,000	14,944,000	14,944,000	14,944,000	12,500,000
Harvest		12,664,212	11,483,426	10,941,650	11,245,628	10,804,670
Surplus		2,279,788	3,460,574	4,002,350	3,698,372	1,695,330
% of AAC		85%	77%	73%	75%	86%
% Pine	72%	72%	76%	77%	74%	



# MPB Implications

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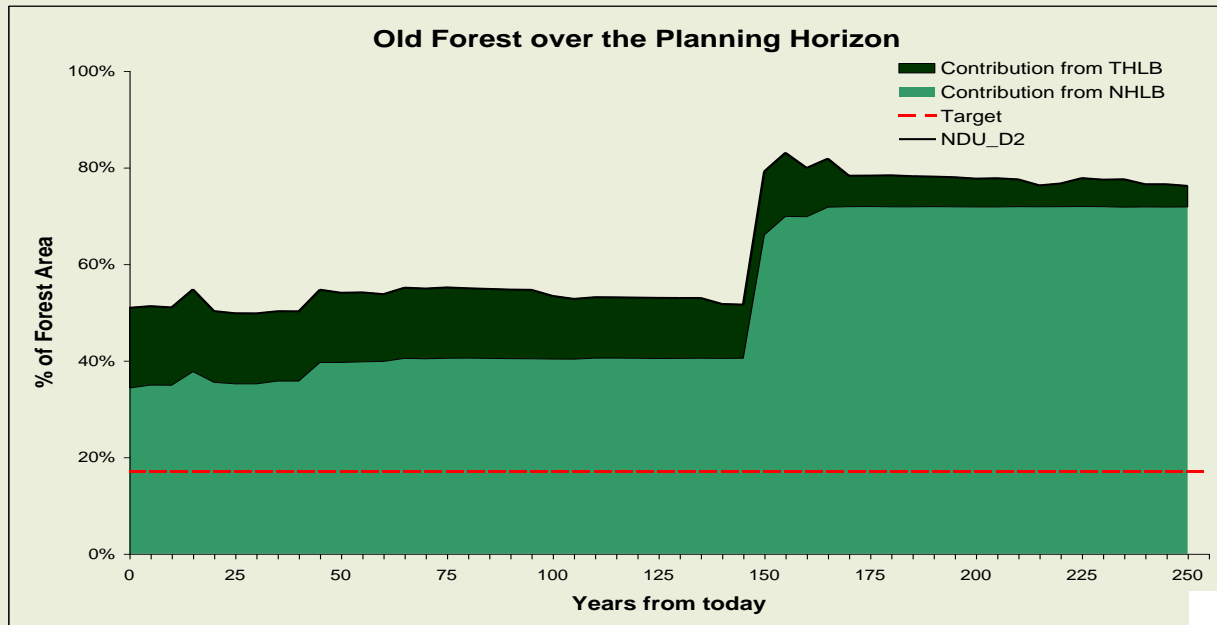
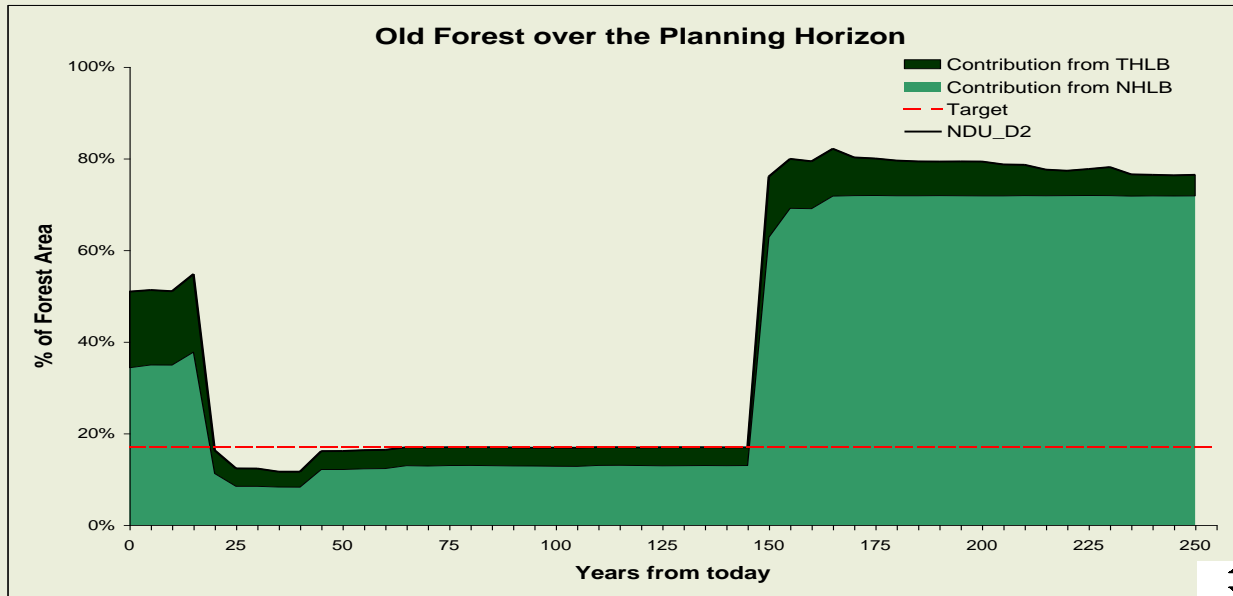
- **Ministry predicts that that 160 million m<sup>3</sup> will still come from salvaging pine stands. Reasonable assumption?**
- **Fort St. James pine.**
- **This would leave approximately 70 million m<sup>3</sup> (200,000 ha, representing 500,000 m<sup>3</sup> in annual cut in the long and medium term) unsalvaged.**
- **Harvesting attacked pine stands and immediately rehabbing them would have a positive impact on timber supply. 7% mid-term impact in FESL 2008 analysis.**
- **Biofuel pipedream.**
- **Fire threat.**

# Land Base Constraints

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- **No growing stock locally (mostly Vanderhoof, to some extent PG).**
- **Old growth targets over the TSA.**
- **Old growth targets locally. At the TSA level, the PG OGO has a small impact, locally its impact is significant.**
  - **In the Prince George Forest District the mid term timber supply is dependent on older non-pine leading conifer stands.**
- **How long is old dead pine considered old?**

# Land Base Constraints



# Land Base Constraints

- Highlighted units predicted to constrain timber supply**

NDU/Merged Biogeoclimatic Units	Unit Label	CFLB (ha)	THLB (ha)	Target Area (ha)	Old Area (ha)	Surplus/Deficit (ha)	Old (ha), Dead Pine not old	Surplus/Deficit
Boreal Foothills - Mountain ESSFmv 2	A1	7,031	0	2,320	5,484	3,163	4,745	2,425
<b>McGregor Plateau ESSFwk 2</b>	<b>A2</b>	<b>15,782</b>	<b>8,472</b>	<b>4,103</b>	<b>7,109</b>	<b>3,005</b>	<b>7,108</b>	<b>3,004</b>
McGregor Plateau SBS mk 1	A3	69,757	55,520	8,371	28,076	19,705	23,063	14,692
<b>McGregor Plateau SBS wk 1</b>	<b>A4</b>	<b>227,722</b>	<b>180,609</b>	<b>59,208</b>	<b>58,141</b>	<b>(1,067)</b>	<b>54,494</b>	<b>(4,714)</b>
<b>Moist Interior - Mountain ESSFmv 3</b>	<b>A5</b>	<b>14,085</b>	<b>10,106</b>	<b>4,085</b>	<b>4,019</b>	<b>(66)</b>	<b>2,048</b>	<b>(2,037)</b>
<b>Moist Interior - Mountain ESSFwk 1</b>	<b>A6</b>	<b>16,388</b>	<b>12,203</b>	<b>4,752</b>	<b>7,365</b>	<b>2,613</b>	<b>7,266</b>	<b>2,513</b>
Moist Interior - Plateau SBS mh	A7	4,268	2,091	726	1,246	521	1,246	521
<b>Moist Interior - Plateau SBS mc 2</b>	<b>A8</b>	<b>9,306</b>	<b>6,902</b>	<b>1,117</b>	<b>2,198</b>	<b>1,081</b>	<b>476</b>	<b>(641)</b>
Moist Interior - Plateau SBS mw	A9	34,157	26,384	4,099	5,208	1,109	2,710	(1,388)
Moist Interior - Plateau SBS wk 1	A10	40,565	31,567	6,896	14,741	7,845	12,907	6,011
<b>Moist Interior - Plateau SBS dw 2</b>	<b>A11</b>	<b>129,857</b>	<b>100,431</b>	<b>15,583</b>	<b>31,507</b>	<b>15,924</b>	<b>12,829</b>	<b>(2,754)</b>
Moist Interior - Plateau SBS dw 3	A12	161,537	116,907	19,384	35,179	15,795	18,270	(1,115)
Moist Interior - Plateau SBS mk 1	A13	361,246	266,708	43,349	99,889	56,540	60,182	16,833
Wet Mountain ESSFwk 2	A14	124,795	21,405	62,398	95,354	32,957	95,342	32,945
Wet Mountain ESSFwk 3	A15	16,375	105	13,755	10,541	(3,214)	10,541	(3,214)
<b>Wet Mountain SBS wk 1</b>	<b>A16</b>	<b>35,545</b>	<b>25,331</b>	<b>9,242</b>	<b>14,466</b>	<b>5,224</b>	<b>14,401</b>	<b>5,159</b>
<b>Wet Mountain SBS vk</b>	<b>A17</b>	<b>120,103</b>	<b>65,750</b>	<b>60,052</b>	<b>83,409</b>	<b>23,358</b>	<b>82,763</b>	<b>22,712</b>
Wet Trench - Mountain Eswcp	A18	2,212	57	1,770	1,643	(127)	1,640	(129)
Wet Trench - Mountain ESSFwk 2	A19	63,629	14,032	30,542	51,395	20,854	51,279	20,737
<b>Wet Trench - Mountain ESSFwk 3</b>	<b>A20</b>	<b>97,570</b>	<b>6,852</b>	<b>78,056</b>	<b>80,457</b>	<b>2,401</b>	<b>80,334</b>	<b>2,277</b>
<b>Wet Trench - Mountain ESSFwk 1</b>	<b>A21</b>	<b>116,871</b>	<b>60,961</b>	<b>56,098</b>	<b>66,784</b>	<b>10,687</b>	<b>66,574</b>	<b>10,476</b>
<b>Wet Trench - Valley ICH wk 3</b>	<b>A22</b>	<b>28,287</b>	<b>14,221</b>	<b>14,992</b>	<b>17,361</b>	<b>2,370</b>	<b>17,177</b>	<b>2,185</b>
<b>Wet Trench - Valley ICH vk 2</b>	<b>A23</b>	<b>151,965</b>	<b>69,051</b>	<b>80,541</b>	<b>91,413</b>	<b>10,872</b>	<b>91,086</b>	<b>10,545</b>
<b>Wet Trench - Valley SBS wk 1</b>	<b>A24</b>	<b>135,470</b>	<b>104,945</b>	<b>40,641</b>	<b>35,281</b>	<b>(5,360)</b>	<b>32,509</b>	<b>(8,132)</b>
<b>Wet Trench - Valley SBS vk</b>	<b>A25</b>	<b>159,117</b>	<b>97,637</b>	<b>73,194</b>	<b>69,302</b>	<b>(3,892)</b>	<b>66,080</b>	<b>(7,114)</b>

# Land Base Constraints

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- **Age Class Distribution**
- **The small size of age class 3 limits forest management options to some extent. Age class 2.**
- **Quality of Stands Currently AC 1, 2 and 3**
- **From 30 to 35 years on 30% and later 60% of harvest predicted to come from pine leading stands. Does the quality of these plantations support this?**
- **20% to 40% of mid term timber supply is predicted to come from balsam leading stands. Fort St. James.**

# Land Base Constraints

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- **Ungulates and Visuals not significant constraints.**

# Timber Quality

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**What is Quality?**



# Timber Quality

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## Factors

- **Dead pine stands – recovery and quality in the short term**
- **Remaining non-pine stands – short and mid-term quality**
- **Existing immature pine and other – mid-term quality**
- **Minimum harvest criteria – mid-term quality**
- **Future markets for forest products- short to long term**
- **Forest health and fire protection affect above**



# Timber Quality

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## Current Situation

- **Depends on the operation, OSB in 100-mile 70 m<sup>3</sup>/ha**
- **Recover going down but pine still useable in PG TSA**
- **Piece size down to 0.2 m<sup>2</sup> for pine, 0.13 – 0.14 in some TSAs**
- **Spruce pressures**
- **Pulp**

# Timber Quality

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## Future

- **Desires depend on operations; stud vs. larger products**
- **No management explicitly for quality in TSA; tenure security**
- **Full site occupancy, healthy stands important**
- **Planting densities and future options**
- **Desired future condition?**
- **Fibre rather than piece size?**

# Timber Quality

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## Future

- **Is reforestation generally successful?**
- **Are current planting/growing densities producing the quantity and quality of timber supply that is acceptable?**
- **How do we “guarantee” that the timber that we depend on in the near future is resilient and protected? Fire, pests.**
- **Smaller piece sizes may buy timber supply, but at what cost?**

# Existing Strategies

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## Type 1 and Type 2

**Mitigate the effects of the MPB epidemic on the timber supply through incremental silviculture.**

- **Prompt rehabilitation of NRL areas**
- **Increase the growth and yield of natural non-pine leading stands**
- **Increase the growth and yield of existing non-pine leading managed stands**
- **Pine likely ok now**
- **Assess current backlog and impeded stands and treat where necessary/beneficial**

# Existing Strategies

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## Type 1 and Type 2

**Manage the fire risk to timber supply caused by the MPB epidemic.**

- **Prompt rehabilitation of NRL areas**
- **Prescribed burning**
- **Fire breaks, general planning considering fire risk**

# Existing Strategies

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## Type 1 and Type 2

**Initiate a review of basic silviculture practices in the context of the MPB epidemic and future risks of pests and diseases.**

- **Planting/regeneration densities**
- **Species composition**

# Existing Strategies

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## Type 1 and Type 2

**Keep options open for the future.**

- **Planting/regeneration densities**
- **Species composition**
- **Density control**
- **Fertilization**

# Existing Strategies

## Type 1 and Type 2

**Targets unreasonable given the potentially available funding.**

Activity	Rank	Year 1 ha	Year 2 ha	Year 3 ha	Year 4 ha	Year 5 ha	Total ha
NRL Reforestation Strategy	A	500,000	0	0	0	0	500,000
NRL Reforestation	A	5,000	10,000	20,000	20,000	20,000	75,000
Backlog Surveys-reclassification and treatment scheduling, survey of impeded strands included.	A	50,000	50,000	10,000			110,000
Fert. spruce leading stands	B	2,000	2,000	2,000	2,000	2,000	10,000
Backlog impeded stands	B	2,500	2,500	1,000			6,000
Backlog NSR	B	1,000	1,000	500			2,500
Repressed stand surveys	C	5,000			0	0	5,000
Repressed stand treatments	C	500	500				1,000
Total		566,000	66,000	33,500	22,000	22,000	709,500



# Existing Strategies

## Type 1 and Type 2

**Targets unreasonable given the potentially available funding.**

Activity	Rank	Year 1 \$	Year 2 \$	Year 3 \$	Year 4 \$	Year 5 \$	Total \$
NRL Reforestation Strategy	A	250,000	0	0	0	0	250,000
NRL Reforestation	A	6,500,000	13,000,000	26,000,000	26,000,000	26,000,000	97,500,000
Backlog Surveys- reclassification and treatment scheduling survey of impeded stands included.	A	1,650,000	1,650,000	330,000	0	0	3,630,000
Fert. spruce leading stands	B	972,000	972,000	972,000	972,000	972,000	4,860,000
Backlog impeded stands	B	2,475,000	2,475,000	990,000	0	0	5,940,000
Backlog NSR	B	990,000	990,000	495,000	0	0	2,475,000
Repressed stand surveys	C	165,000	0	0	0	0	165,000
Repressed stand treatments	C	650,000	650,000	0	0	0	1,300,000
Total \$		13,652,000	19,737,000	28,787,000	26,972,000	26,972,000	116,120,000



# Existing Strategies

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## The Minister's Discussion Paper

- **Maintain or improve forest and range health, resiliency and diversity.**
- **Maximize value of the diversity of forest and range products over the longer term:**
  - **Maintain genetic diversity.**
  - **Facilitate adaptation to climate change.**
  - **Increase the ability of BC's forest and range ecosystems to sequester carbon.**



# Existing Strategies

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## The Minister's Discussion Paper and the FMP Idea

### Objectives for:

- **Species at the landscape**
- **Retention at the landscape**
- **Timber (AAC)**
- **The Land Based Investment Strategy**

# Existing Strategies

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## Licensee SFM Plans



# Potential Strategies

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- **The stands and sites targeted for treatments**
- **What will residual stands look like**
- **Costs**
- **Timber supply and quality impacts (timing and magnitude)**
- **Desired future condition**
- **Difficulties or uncertainties**

# Potential Strategies

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## 1. Basic Reforestation

- **Planting versus natural regeneration**
- **Initial densities**
- **Species mixes (ecology, productivity and reliability)**
- **Genetically improved seed**

# Potential Strategies

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## 2. Reforestation of Unharvested MPB Stands

- **Non-starter?**
- **If treated, which ones?**
- **What treatments at what cost?**

# Potential Strategies

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## 3. Backlog Reforestation and Treatment of Impeded Stands

- **How significant?**
- **Protection of previous investments makes sense**



# Potential Strategies

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## 3. Fertilization

- **Likely the most attractive option to increase timber supply.**

# Potential Strategies

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## 4. Density Management

- Juvenile spacing
- Commercial thinning
- May not be on top of list.
- Future