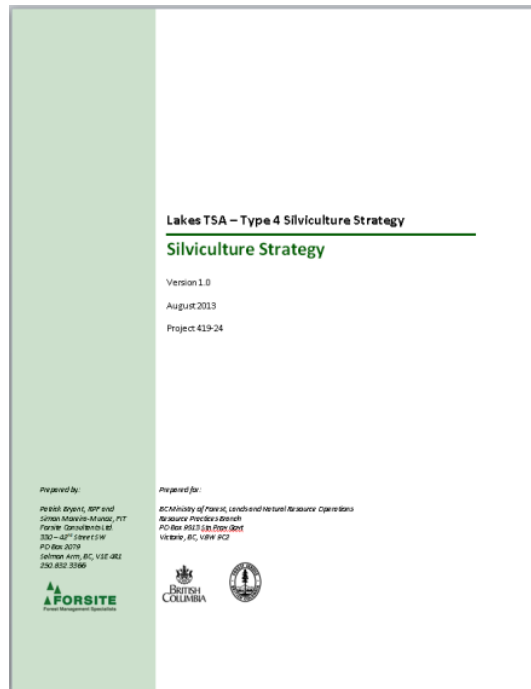


# 2013-14 FFT Fall Business Meeting

## Integrating Type 4 Silviculture Strategies into FFT Planning

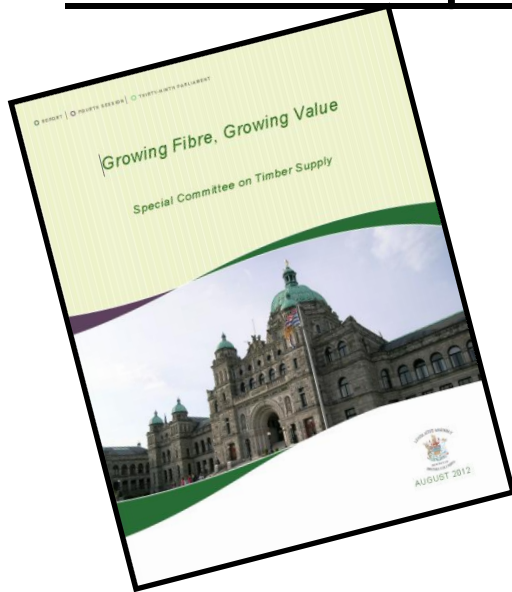


What the type 4's are telling us?  
Where they are taking us?

Paul Rehsler RPF  
Resource Practices Branch

# Project Overview

- Help government and licensees better understand the current and future timber and habitat supply situation- and what can be done to improve it.



## Recommendation 6.1d

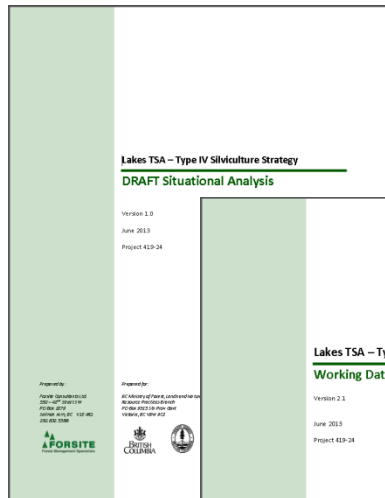
*“Complete a type 4 silviculture analysis for the Lakes TSA to guide the fertilization program and also to set other important silvicultural goals as well as to support setting goals for the management of wildfire risks in the TSA.”*

# Multiple Objectives

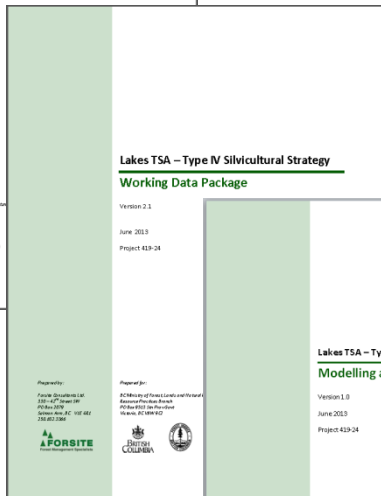
- Realistic, forward-looking assessment of timber and habitat supply under a range of scenarios
  - In-depth modeling
- Products that support operational implementation
  - Spatially explicit plan allowing for continual improvement
- Provide context information or indicators
  - Rationale for funding needs
- Link with other plans and strategies
  - Manage treatment risk
- While it looks like a plan, it is a process – which is KEY

# Deliverables

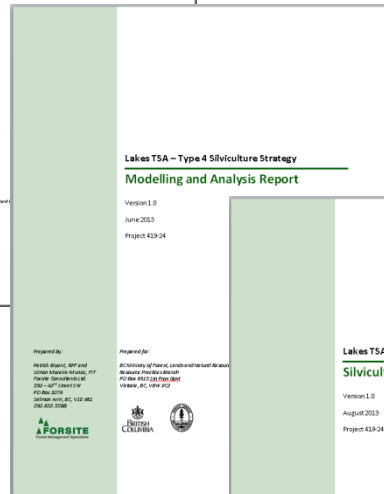
## Situational Analysis



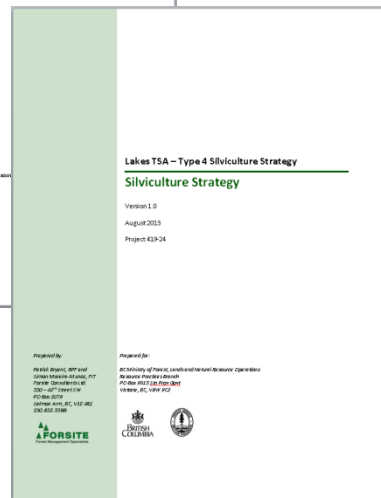
## Data Package



## Modeling and Analysis Report

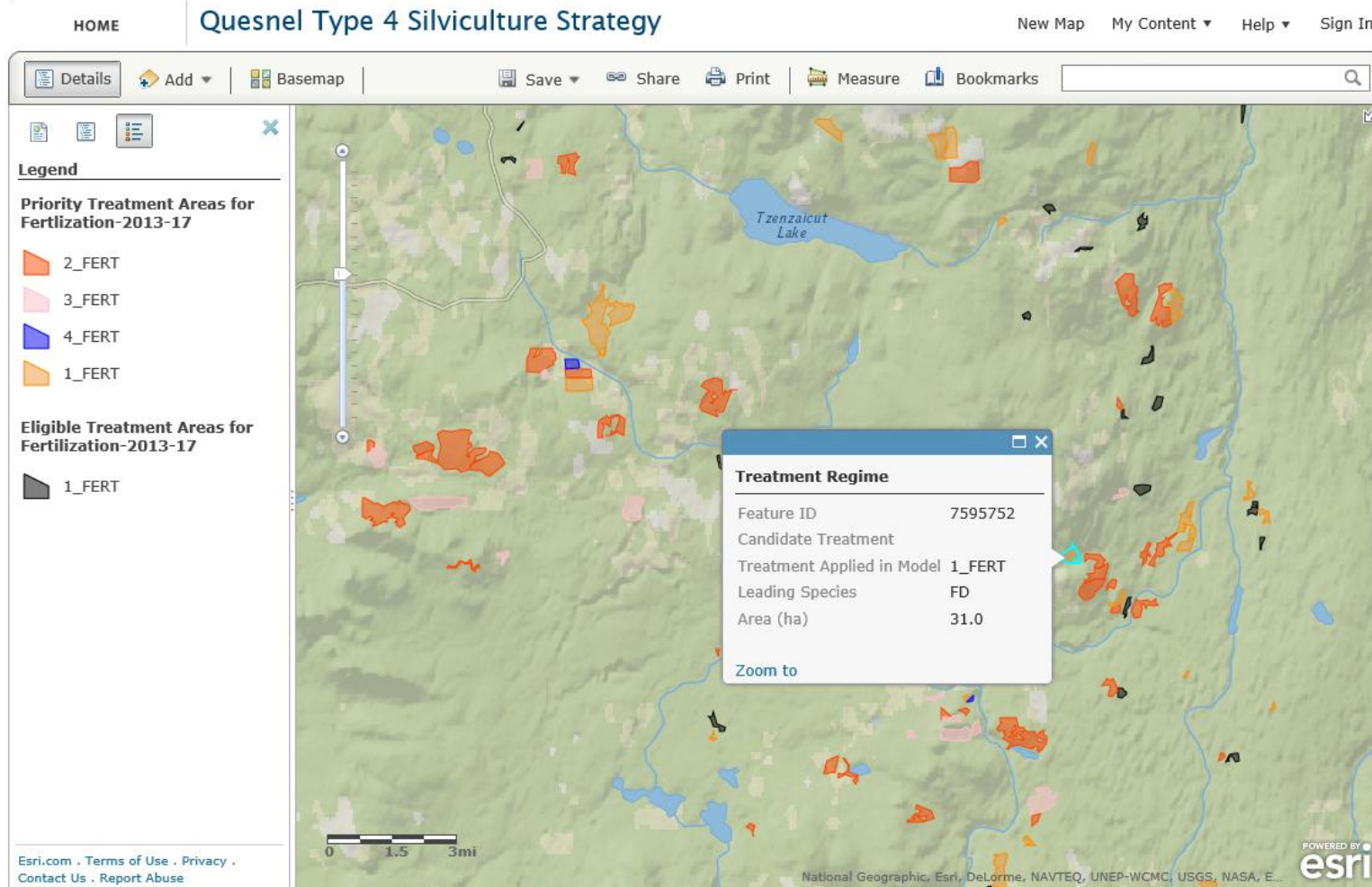


## Silviculture Strategy

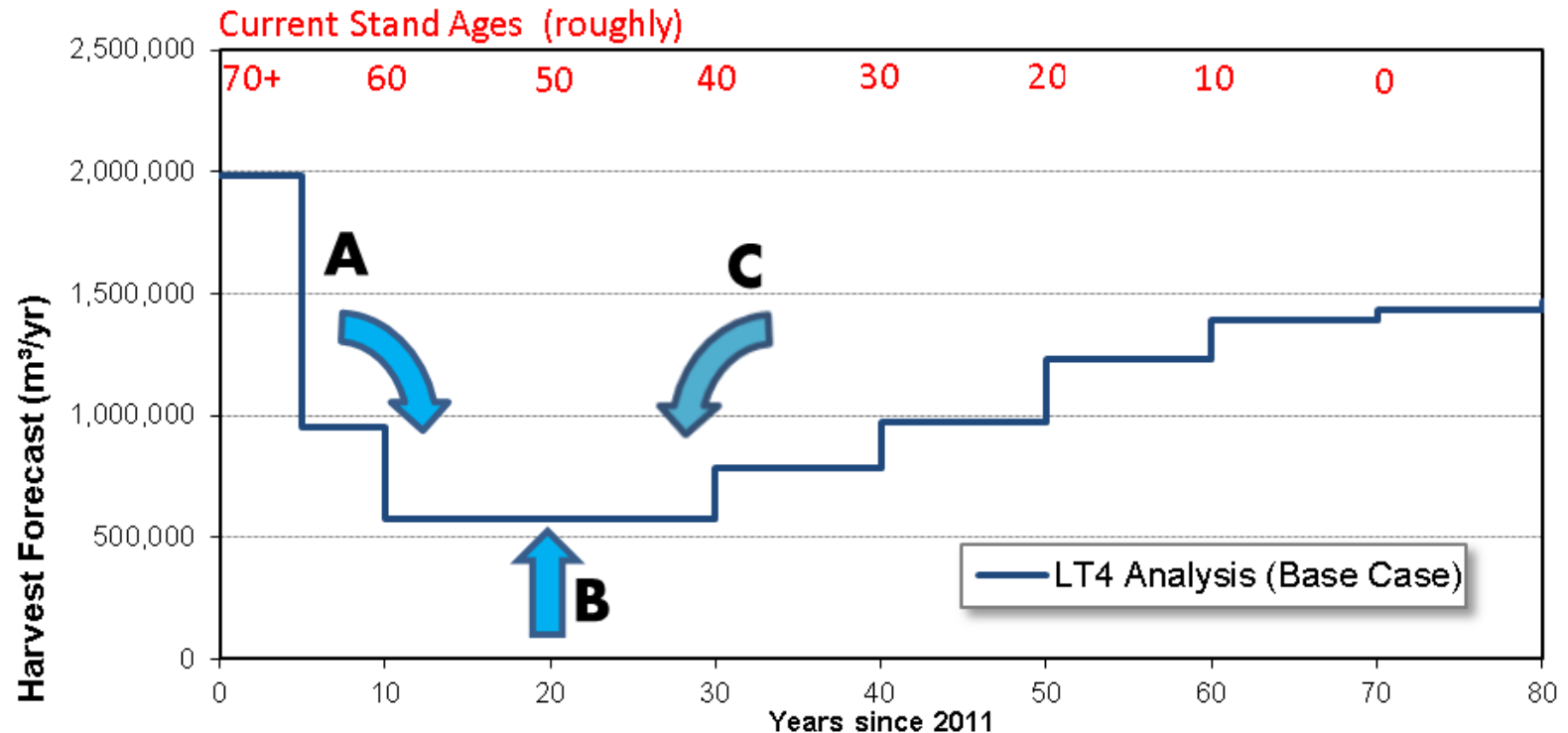


# Deliverables

<http://rpb.maps.arcgis.com/home/webmap/viewer.html?webmap=eb5020c4c131475fa155c6e446b1f54c>



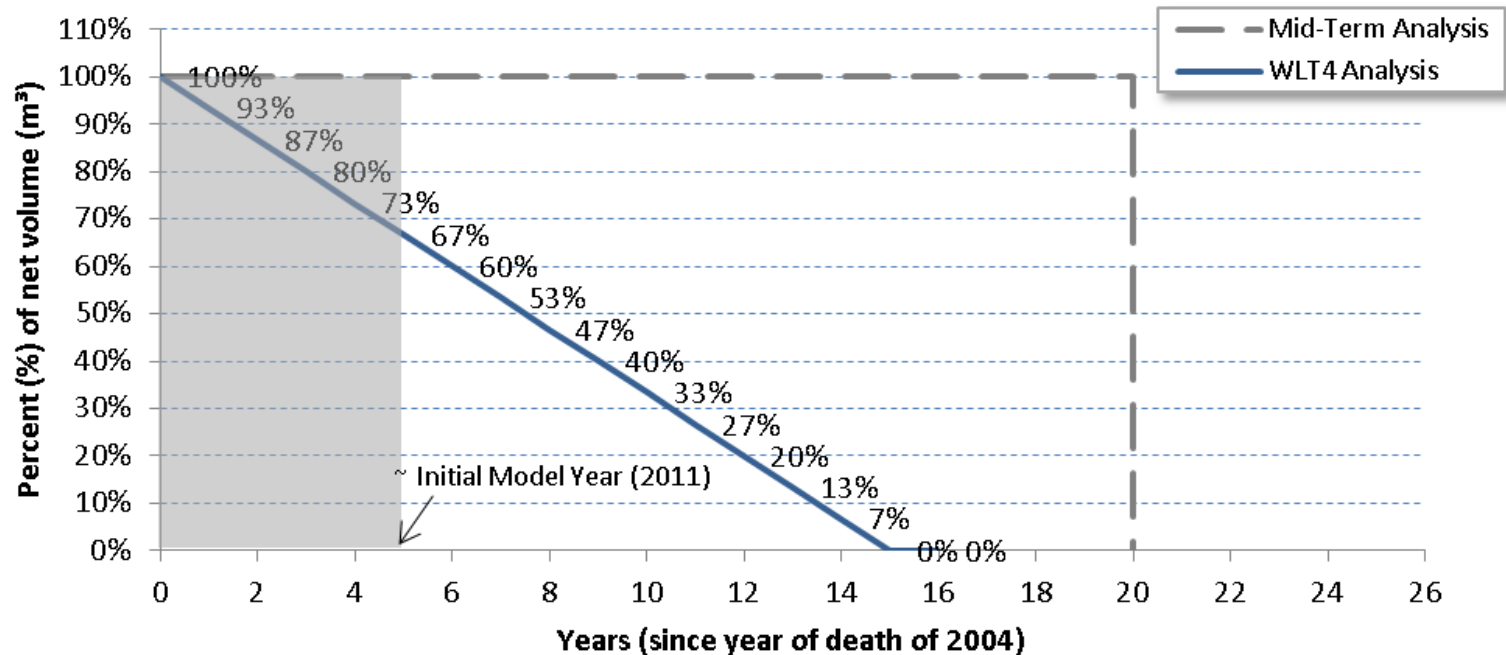
# Strategies – Approach



# What the Type 4s are telling us?

- What have we learned?
- **Changing harvest criteria has a significant impact on harvest flow and the mid term**
  - Minimum harvest criteria will impact flows as well as our future forest conditions and options
  - Shelf-Life assumptions – are they being realized?
  - Performance of MPB understory regeneration – do we have enough information to be confident?
  - Geographical location and local conditions create different outcomes.
  - Others

# Key Assumptions – Shelf Life





# Key Assumptions – Understory Regeneration

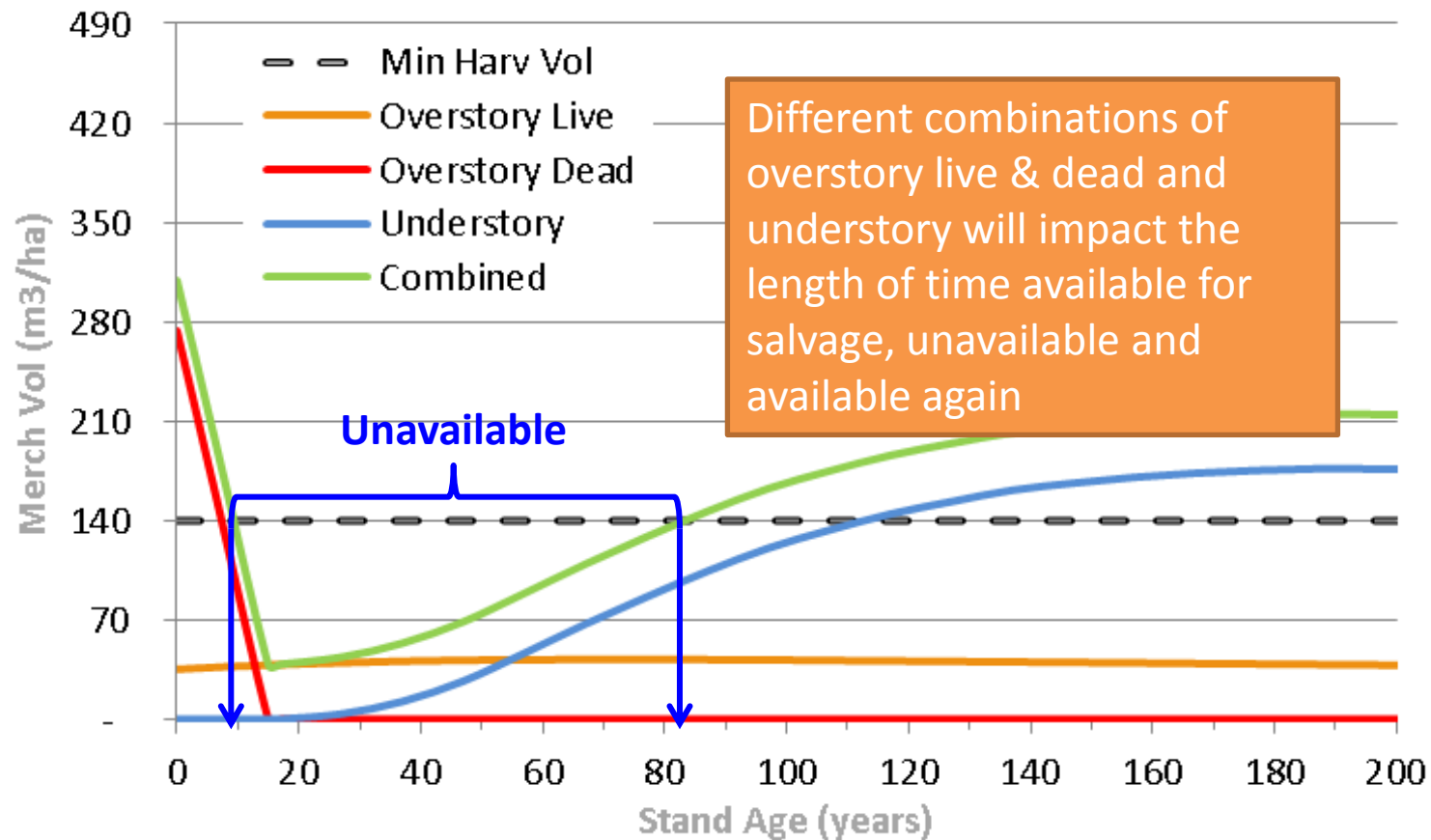
*Table 27 Density class and species compositions modelled for regenerating understory component*

BEC Zone	Species Composition	SI (m)	Low Density (200/ha)	Med Density (800/ha)	High Density (1600/ha)
ESSF	Sx 100	12	15%	10%	75%
MS	Pl 100	14	40%	20%	40%
SBPS	Pl 100	13	30%	25%	45%
IDF	Fd 75 Pl 25	15	30%	20%	50%
SBS	Sx 100	18	30%	25%	45%
ICH	Hw 100	16	25%	15%	60%

*From Thrower (2012)*

Only the MPB kill classes “60-79%” and “80-100%” have understory as per the table above.

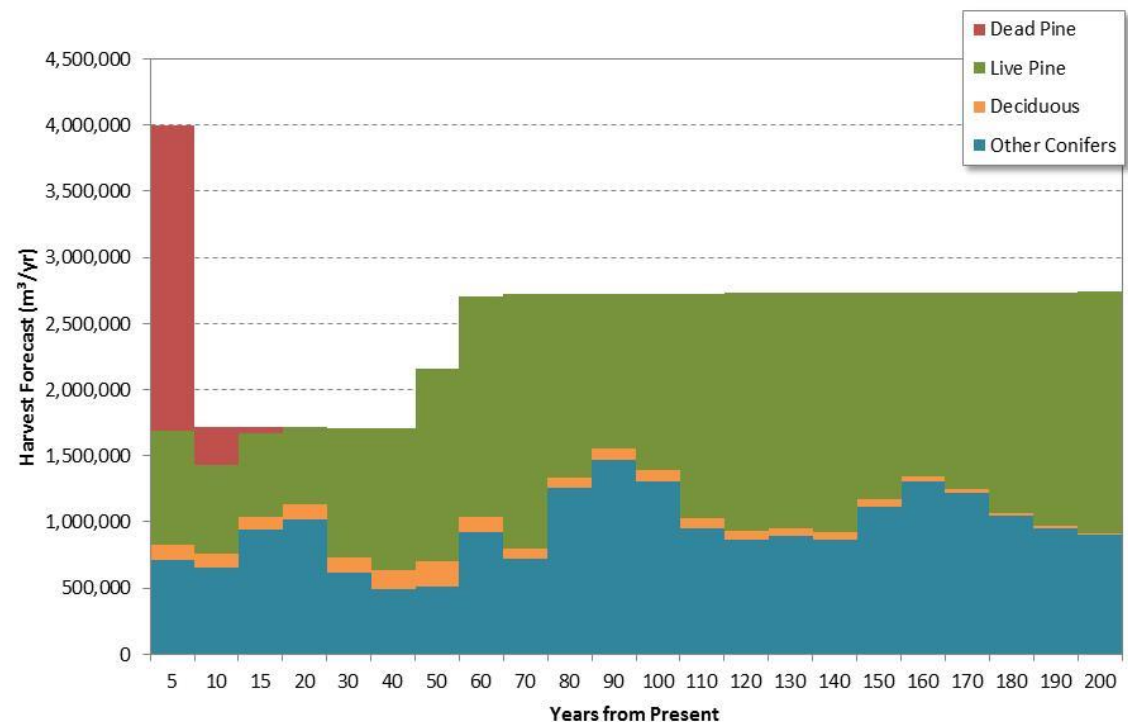
# Key Assumptions – MPB Dynamics



# Harvest Flow

- Harvest Volume by Stand Type in Quesnel TSA

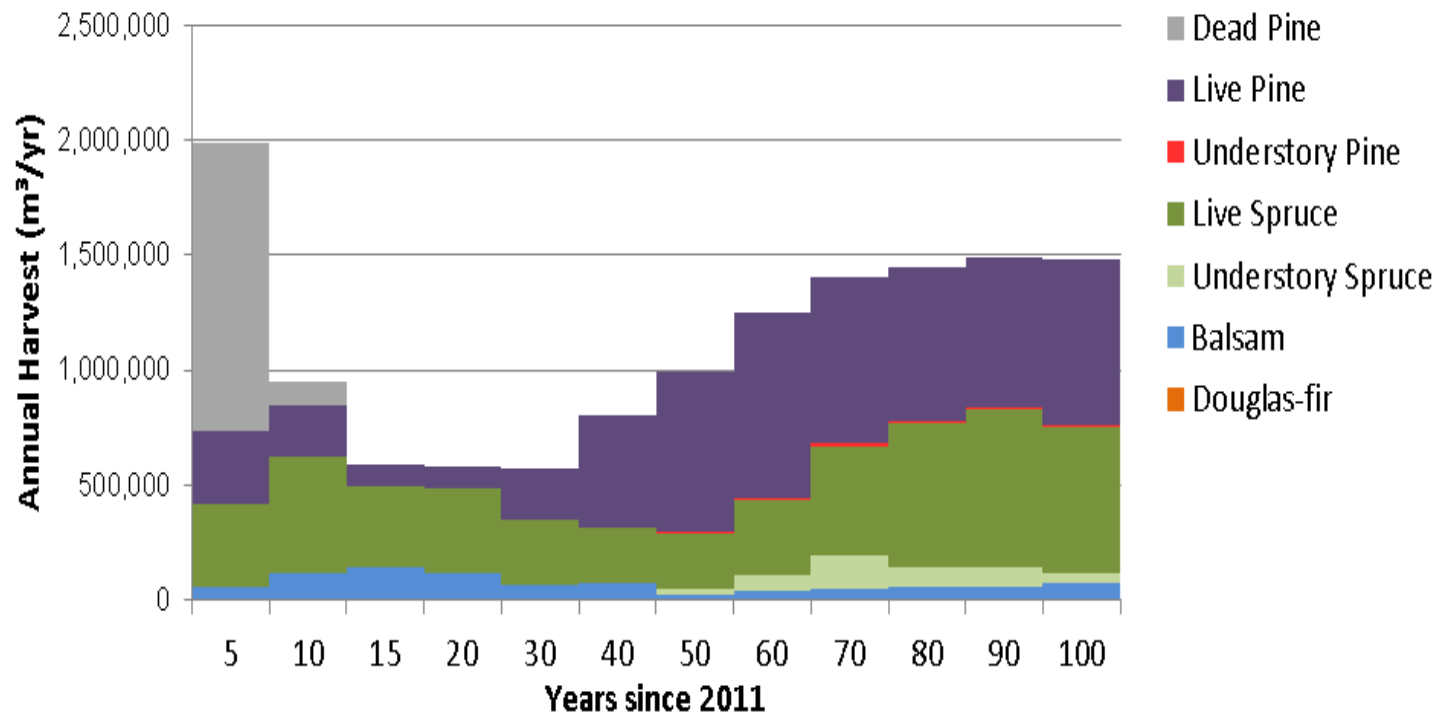
Dead PI  
Vol  
Salvaged  
= 26.8M  
(71% of  
time 0)



# Harvest Flow

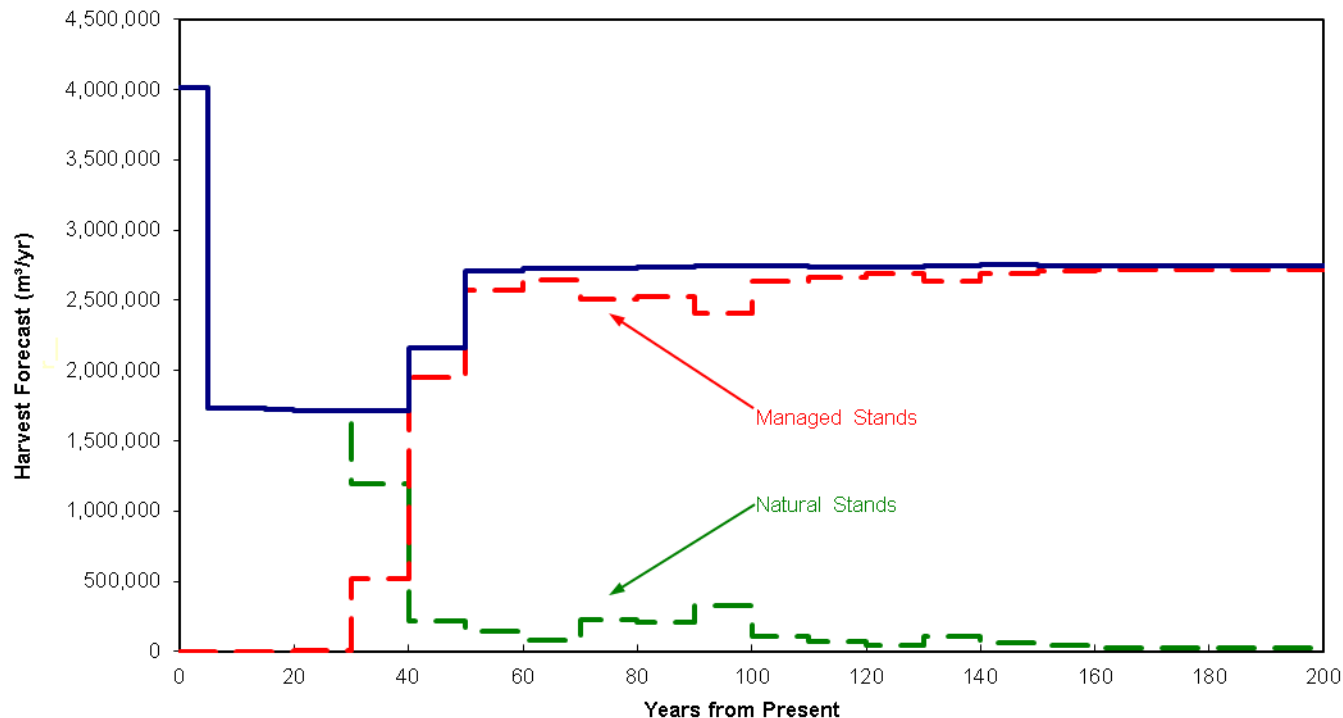
- Harvest Volume by Stand Type in Lakes TSA

In first 5-yr period (2011-2015), 79% of the harvest volume is pine (63% dead; 16% live), with spruce/balsam comprising the rest.



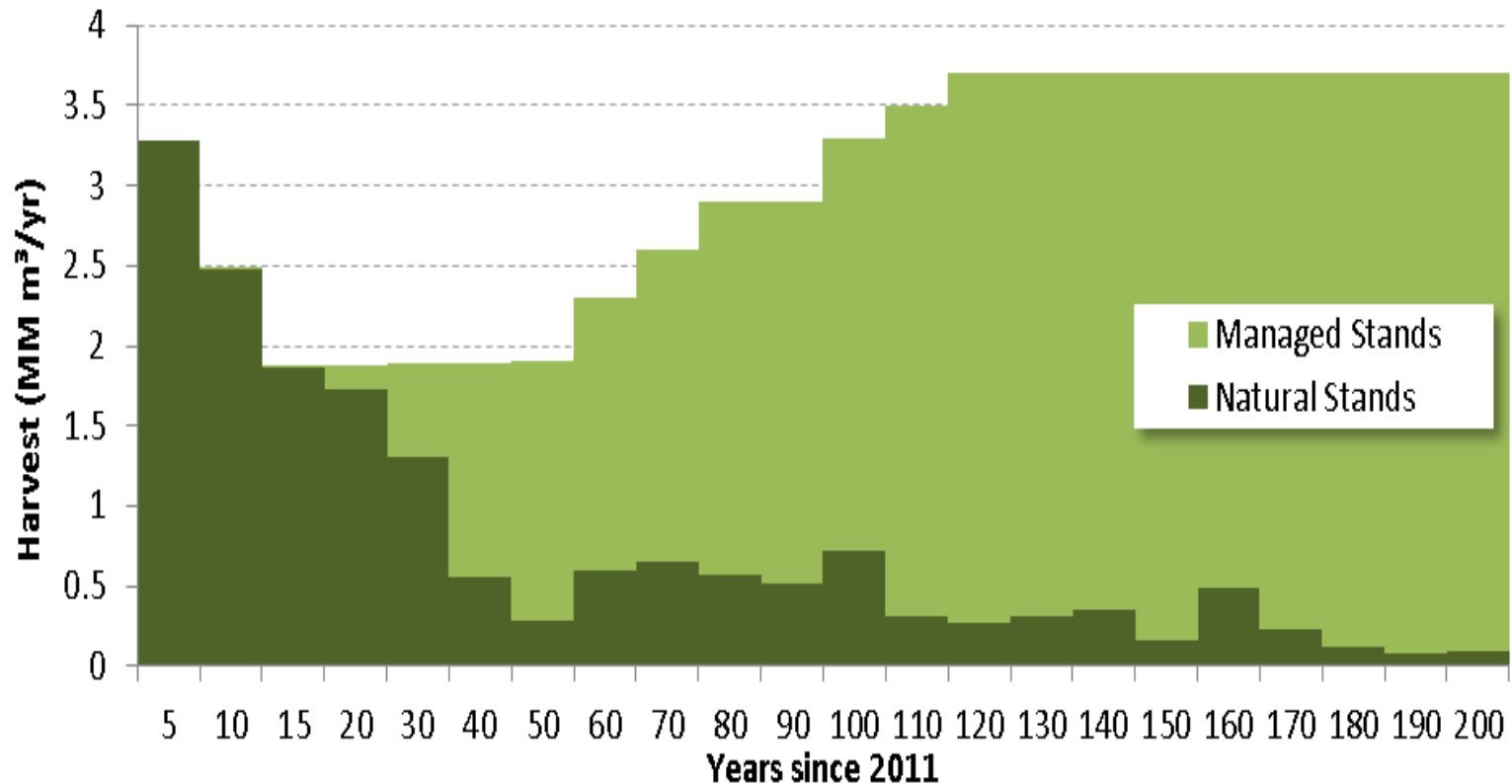
# Harvest Flow

- In Quesnel, harvest of managed stands starts in 30-40yrs, dominant by 40-50 yrs.



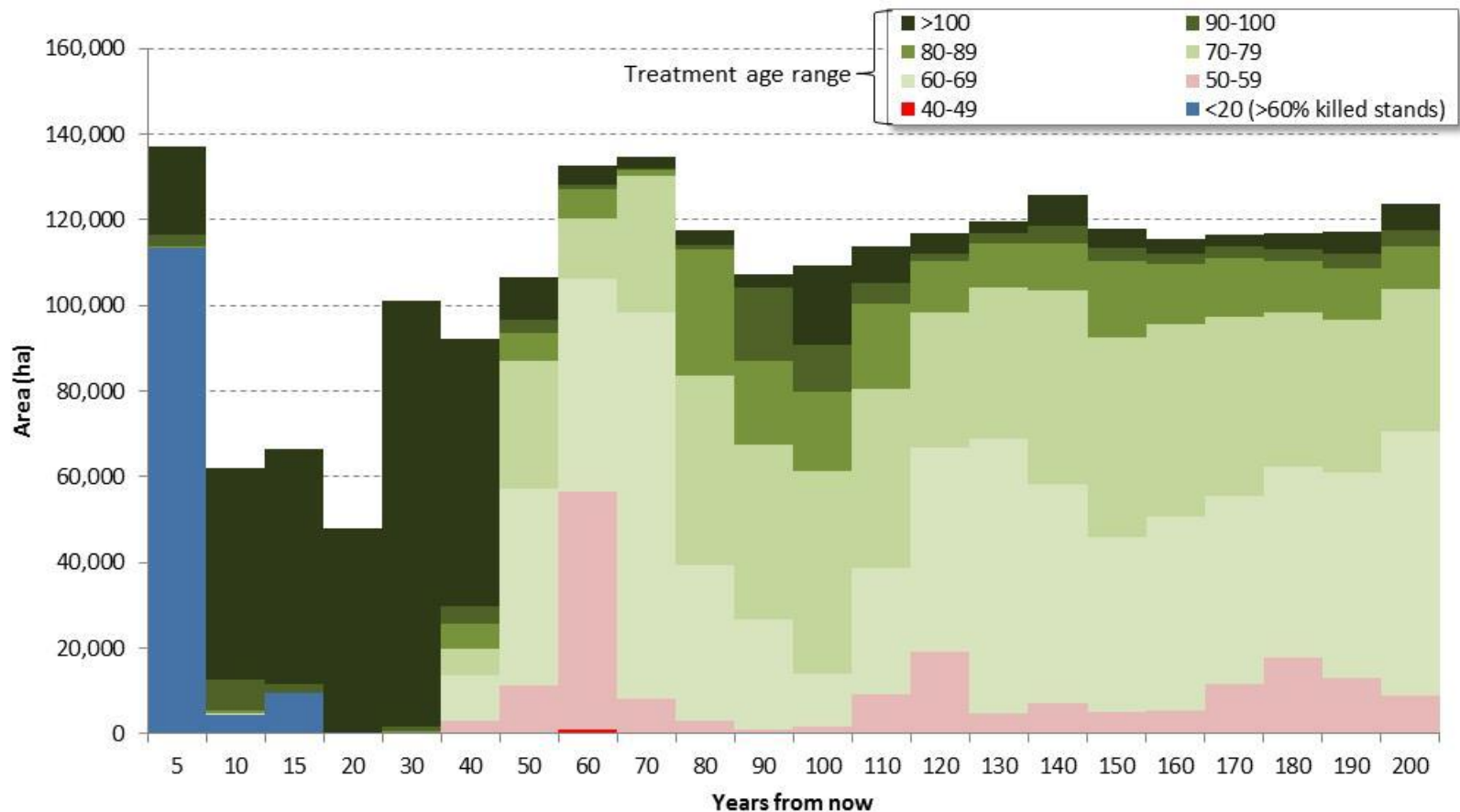
# Harvest Flow

- In Williams Lake, harvest of managed stands starts sooner, year 16-20, dominant by year 30.



# Harvest Ages

In Quesnel, 45% of area harvested will be stands < 60 years old in the mid term



# Harvest Ages

The question from the Type 4's is

What will these stands produce in the time frames identified?  
Will our stands produce what we expect?

A key element of the Type 4 is identifying what more we need  
to know to better manage our expectations.

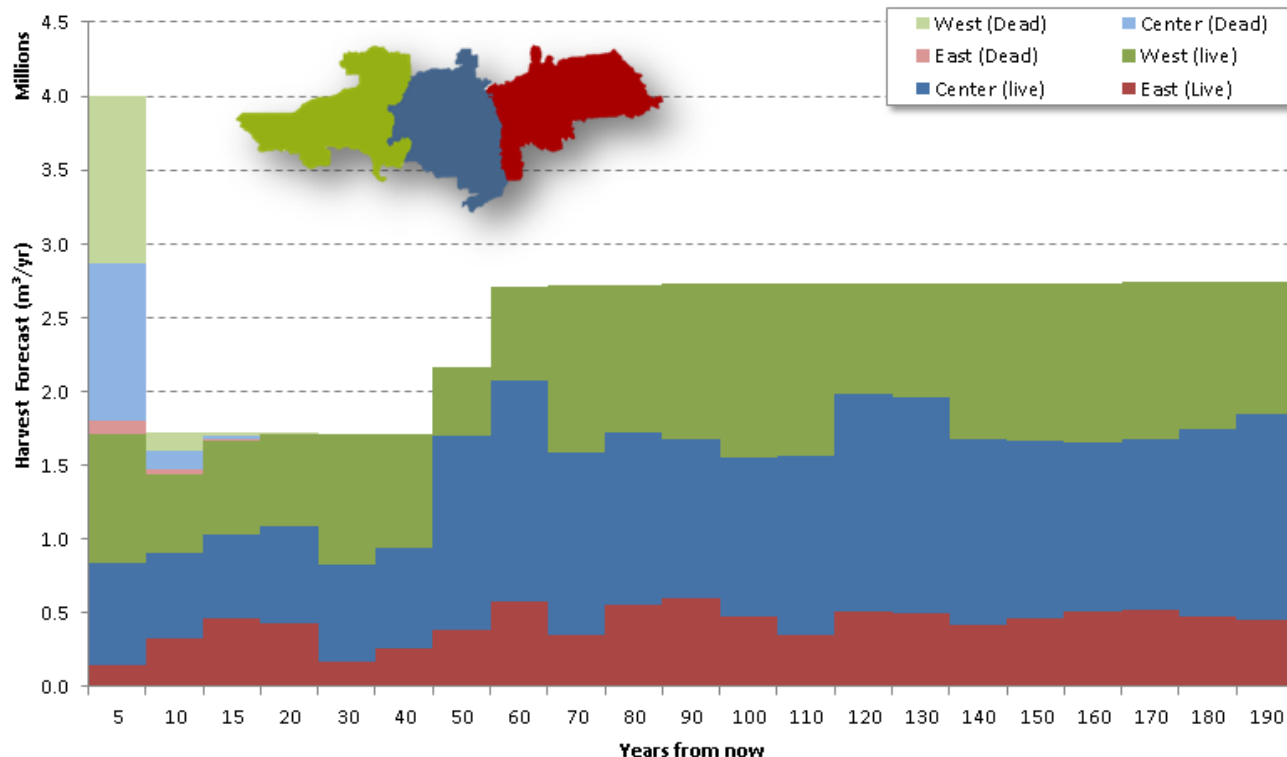




# Harvest Flow

## By Geographic Area in the Quesnel TSA

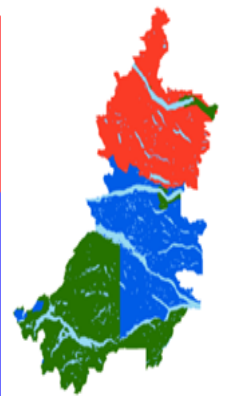
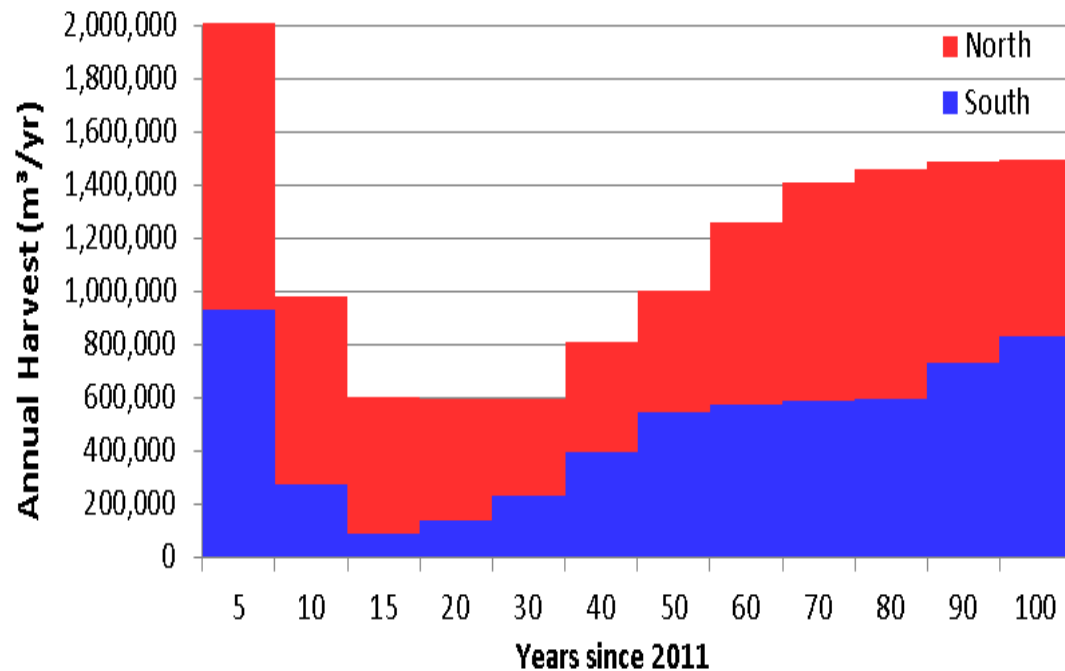
– First 5 yrs: 50% from West, 6% from East



# Harvest Flow

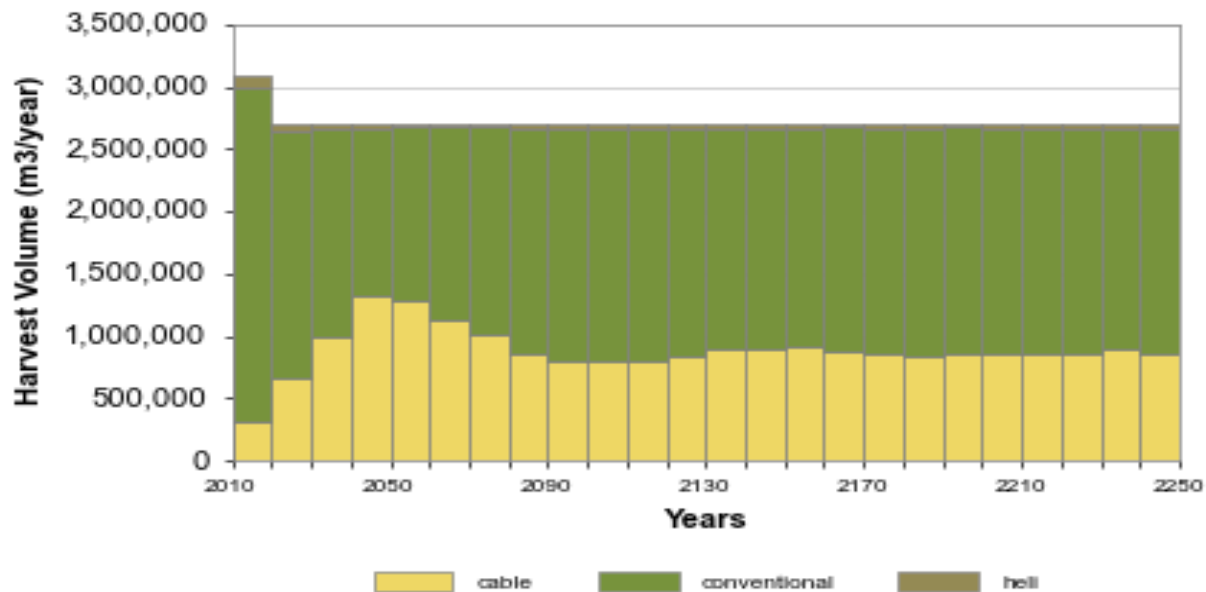
by Geographic Area in the Lakes TSA

74% of  
harvest  
is scheduled  
from the  
Northern  
LRMP Region  
in the  
mid term

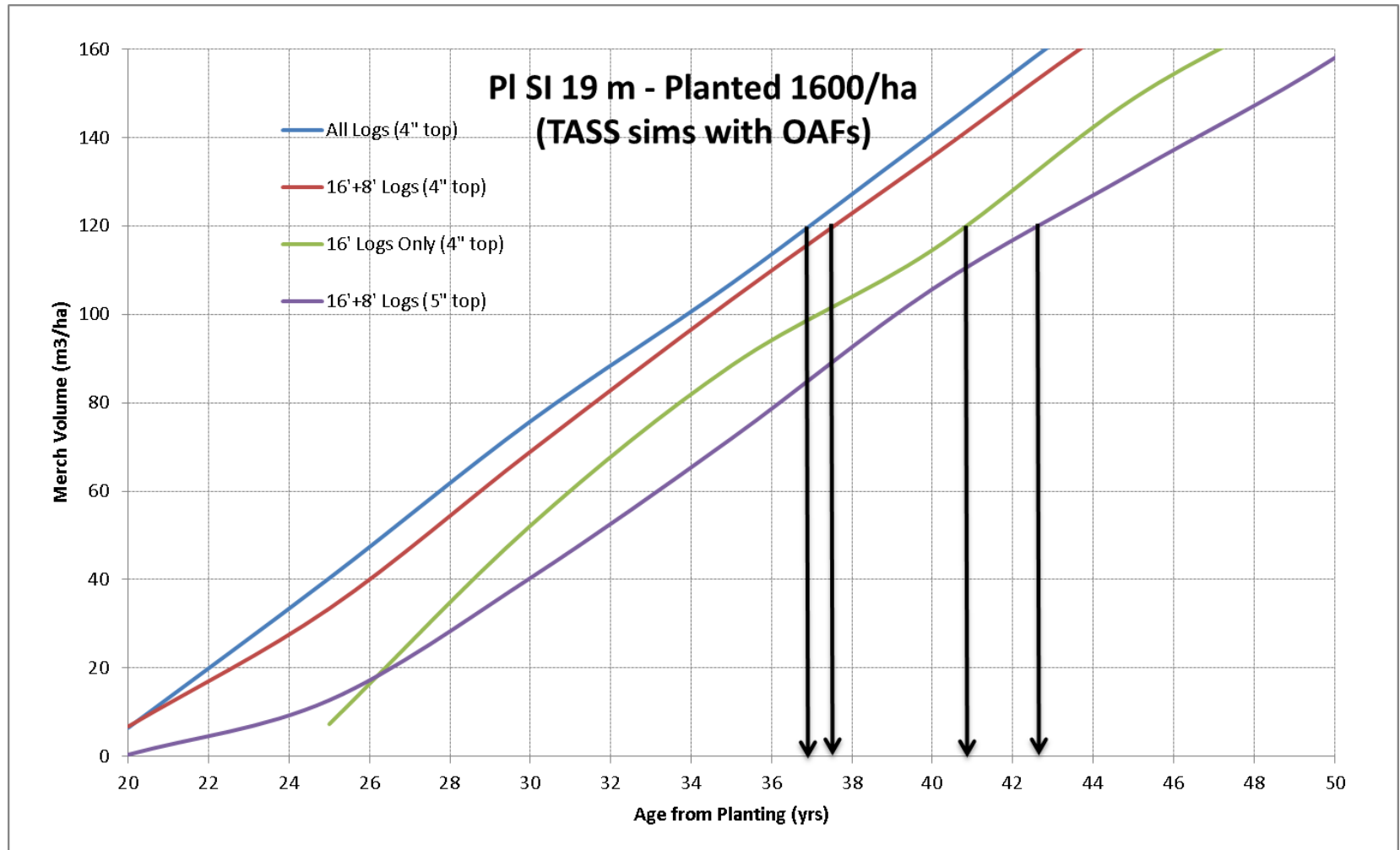


# Harvest volume by harvest method in the Okanagan TSA

- 49% cable harvesting in decade 4,
- Stepped up approach to facilitate transition
- Is this realistic?



# MHA's & Products



# Silviculture Treatments

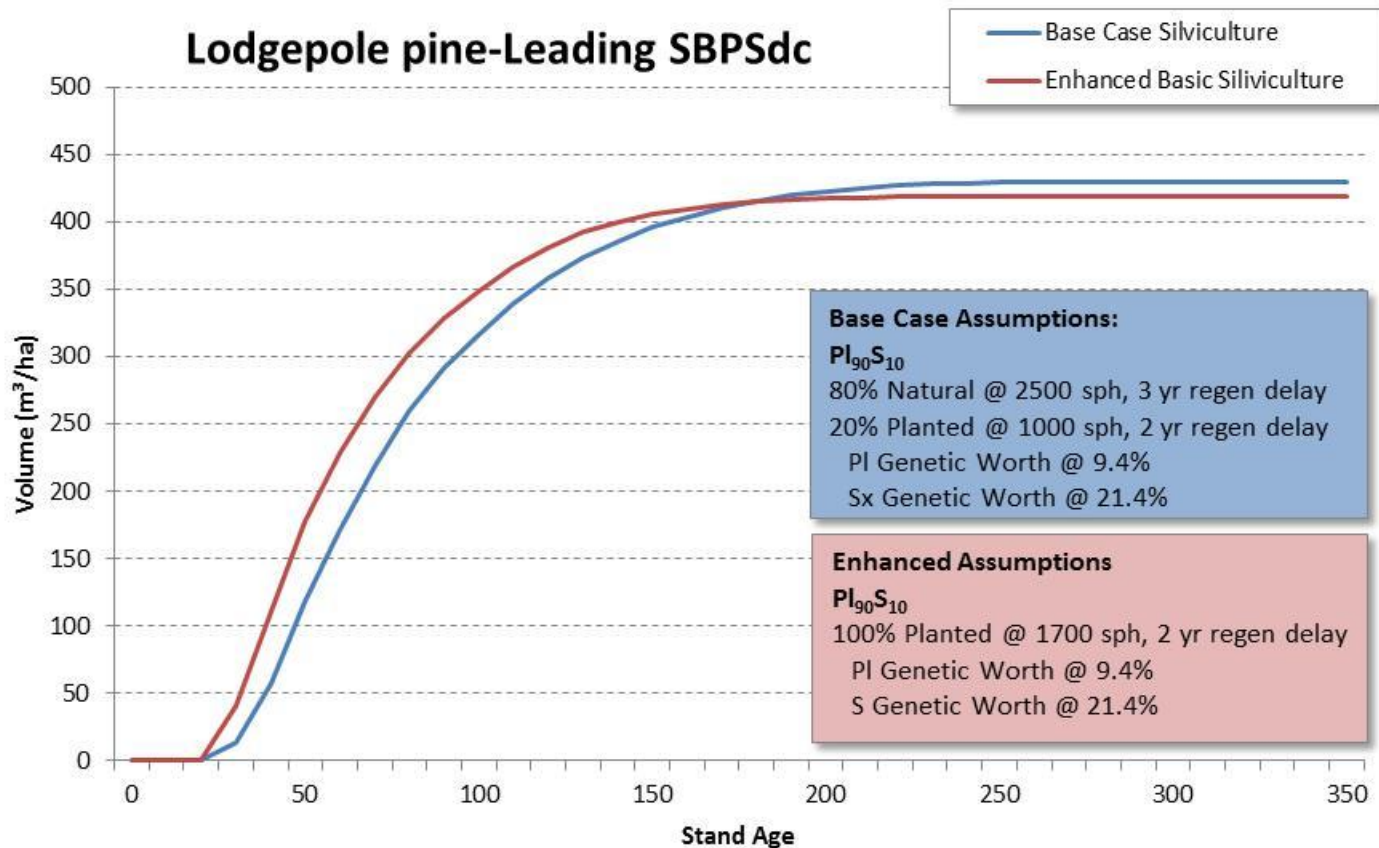
- Enhanced basic silviculture
- Fertilization – single and multiple application
- Pre Commercial Thinning w/wo fertilization
- Rehabilitation
- Partial cutting in constrained areas
- Composite mix of the strategies

# Strategy – Enhanced Basic Reforestation

- Purpose
  - Enhancing basic reforestation practices where current performance is not optimal (achieving minimum well-spaced trees/ha versus target well-spaced trees/ha).
- Benefits
  - Increase initial well-spaced stand densities and reduce stocking gaps
  - Expected to increase timber volume and quality
  - May benefit the back end of the midterm trough

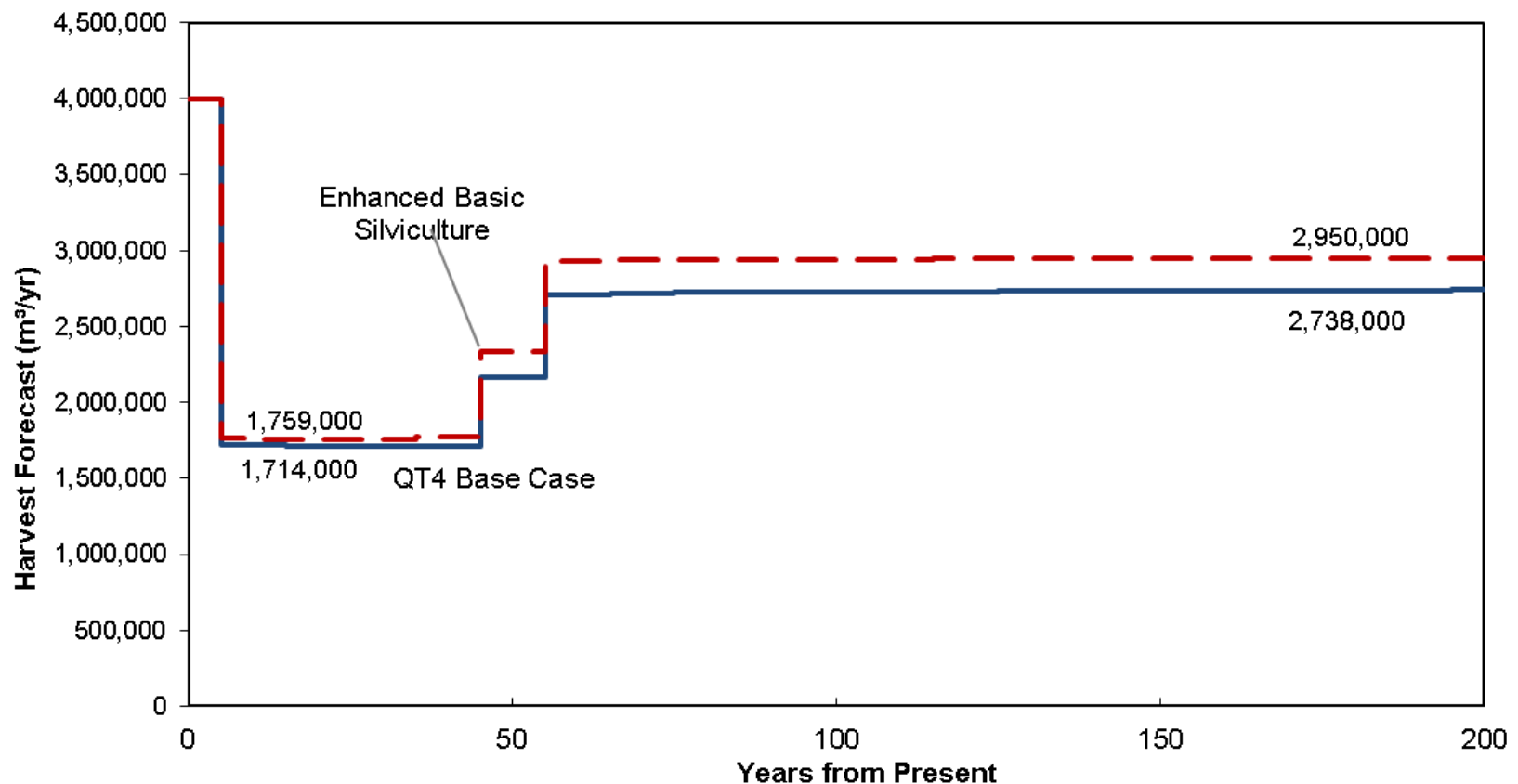
# Enhanced Basic Silviculture

- Stand Level Examples



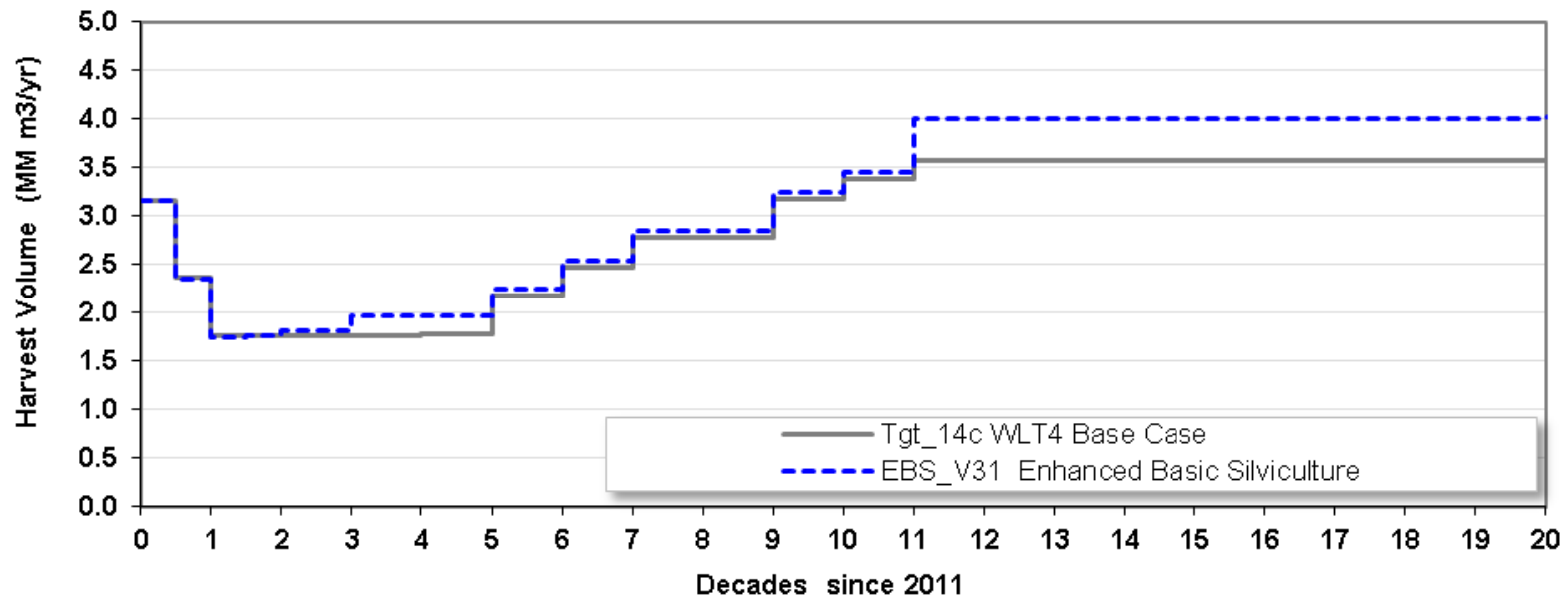
# Enhanced Basic Silviculture

- +45,000 m<sup>3</sup> in midterm + faster rise, 212,000 m<sup>3</sup>/yr in long-term





# Strategy: Enhanced Basic Reforestation



- Short (~)
- Mid (+5%)
- Rise (+2%)
- Long (+12%)

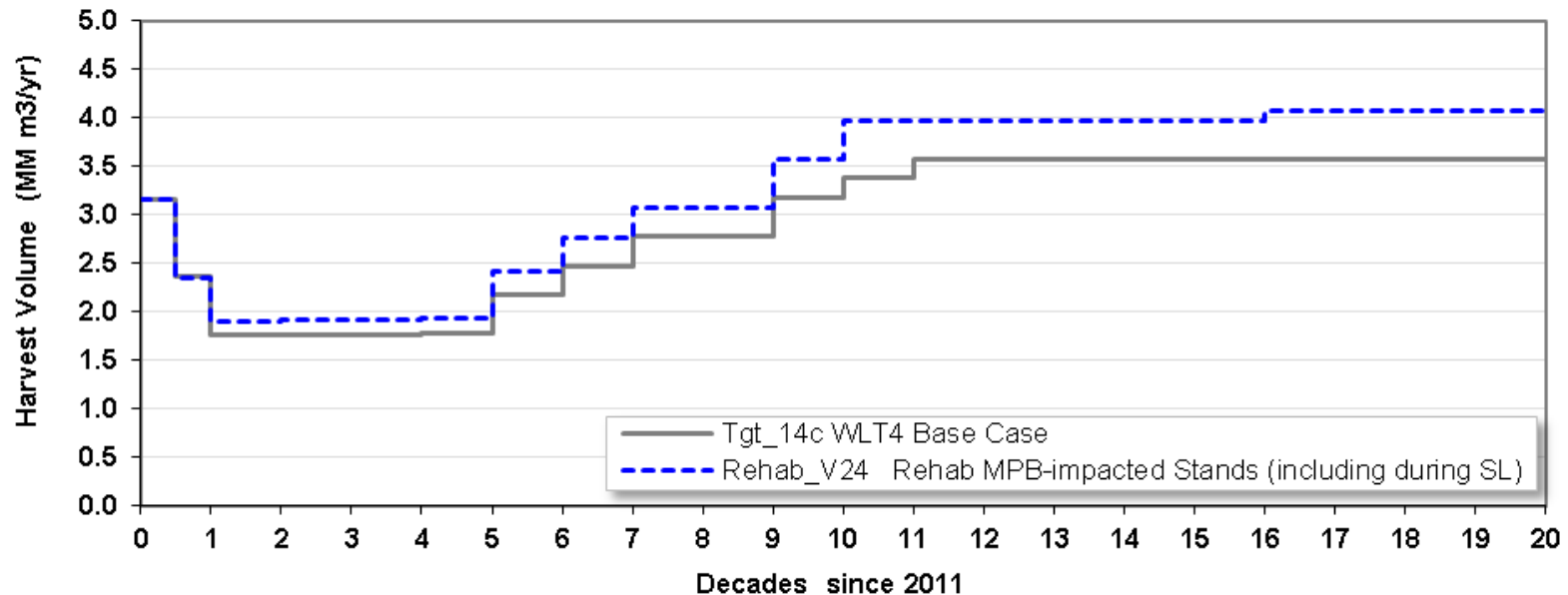
First stands are ready in 35-45 years as min harvest volumes are reached sooner.

Mid and long term benefit from enhanced yields. Little to no ACE effect.

# Strategies – Rehabilitate MPB-Stands

- Rehab MPB impacted stands with little or no salvage opportunity.
- Expect to increase late mid-term harvest levels.
- Recover some merch (green) volume in mid-term
- The long-term harvest levels significantly improved with regeneration for managed stands.
  - Improved OAFs, lower regeneration delay and select seed
  - Higher yields and min harvest volumes sooner

# Strategy: Rehabilitation

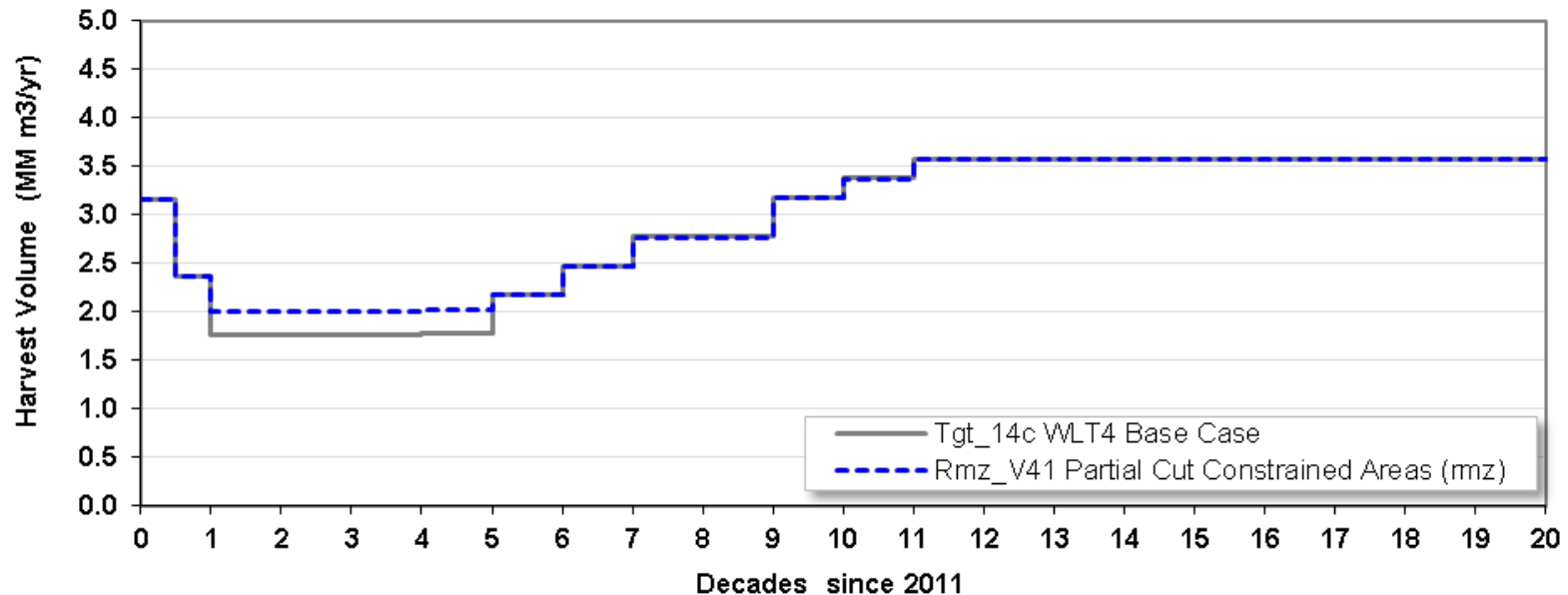


- Short (~)
- Mid (+8%) - volume at time of treatment + some THLB back in
- Rise (+13%) – Non merch stands brought back into production
- Long (+13%) – Non merch stands brought back into production

# Strategies – CT / PC Constrained Areas

- Commercial Thinning / Partial Cutting of Constrained Areas
  - A single removal of 1/3 of the volume
  - Stands currently constrained for visuals, lakeshore management, mature-plus-old seral and watershed ECA requirements.
  - Expect to increase the mid-term harvest level by offering some volume during periods of low volume availability.
  - **Maintain stand conditions to satisfy the non-timber values.**

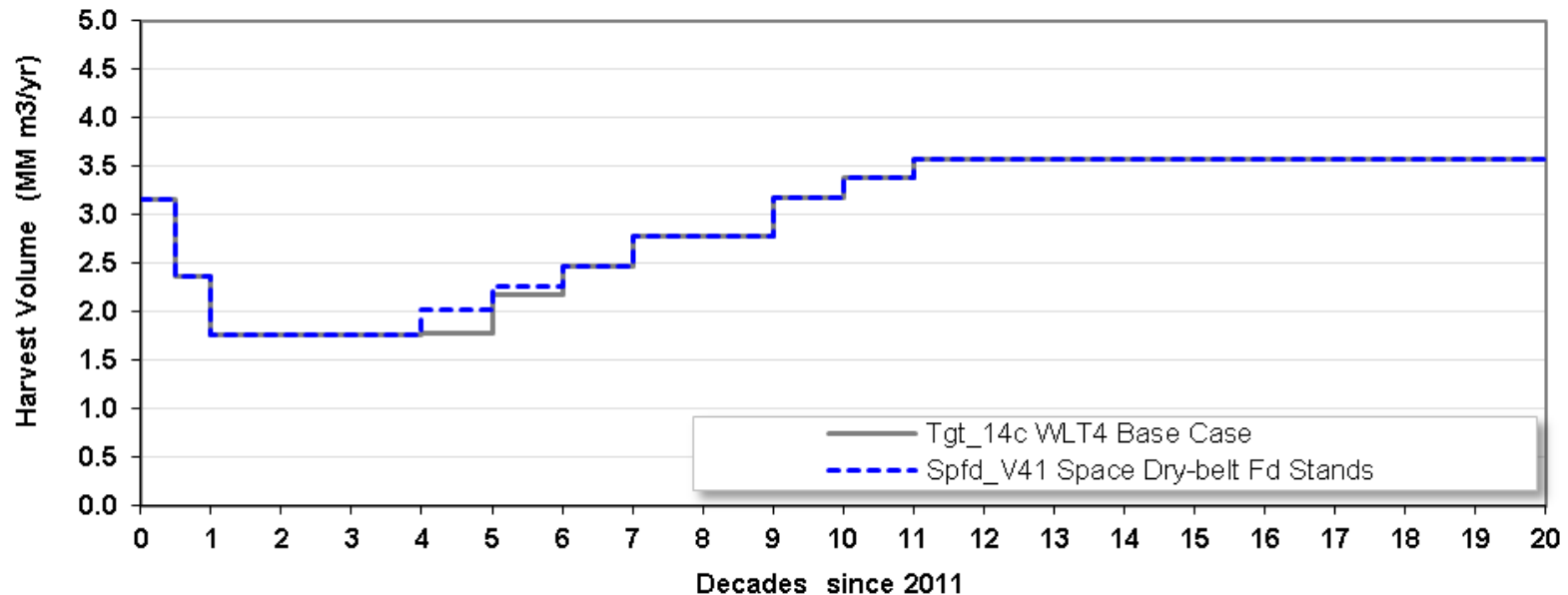
# Strategy: Partial Cut in Constrained Areas



- Short (~)
- Mid (+14)
- Rise (no attempt to improve)
- Long (no attempt to improve)

Significant improvement in midterm due to accessing stands that would otherwise not be available.

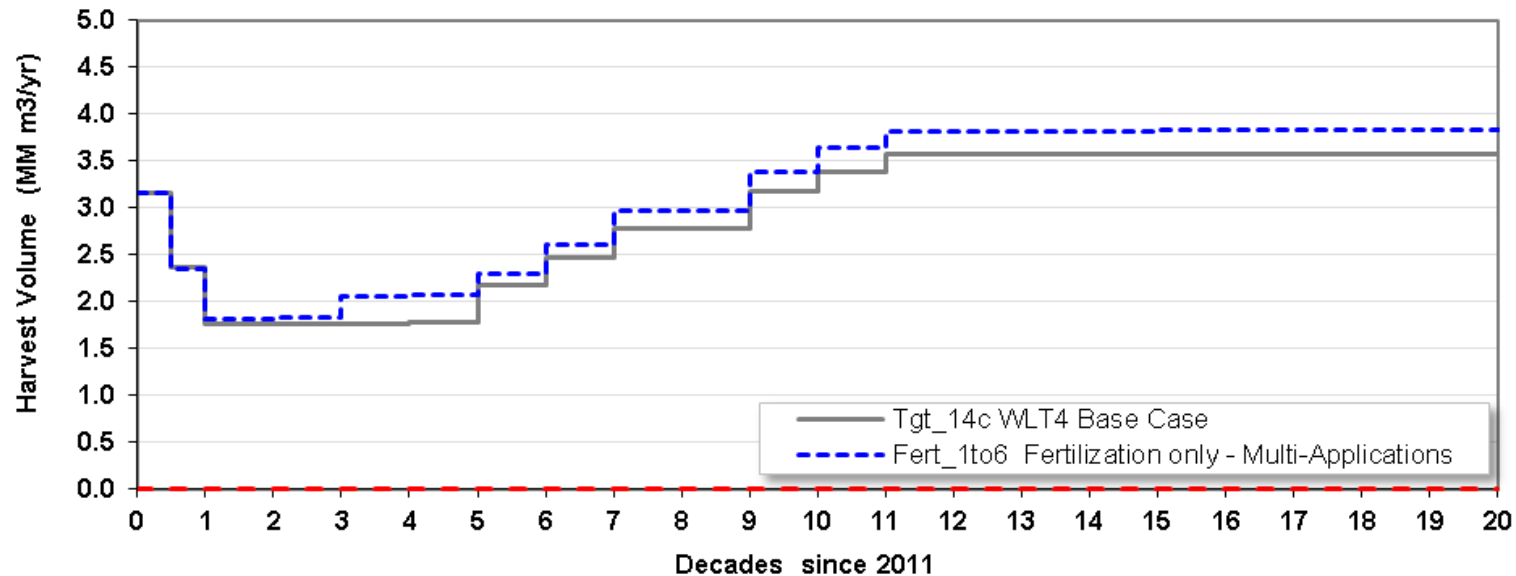
# Strategy: Spacing Dry-Belt Fd



- Mid (+3%)
- Rise (+1%)

Delayed response as have to wait 30 yrs after treatment to harvest.

# Strategy: Fertilization



- Short (~)
- Mid (0-10)
- Rise (+5%)
- Long (+8%)

# Strategies – PCT and Fertilize Pl Stands

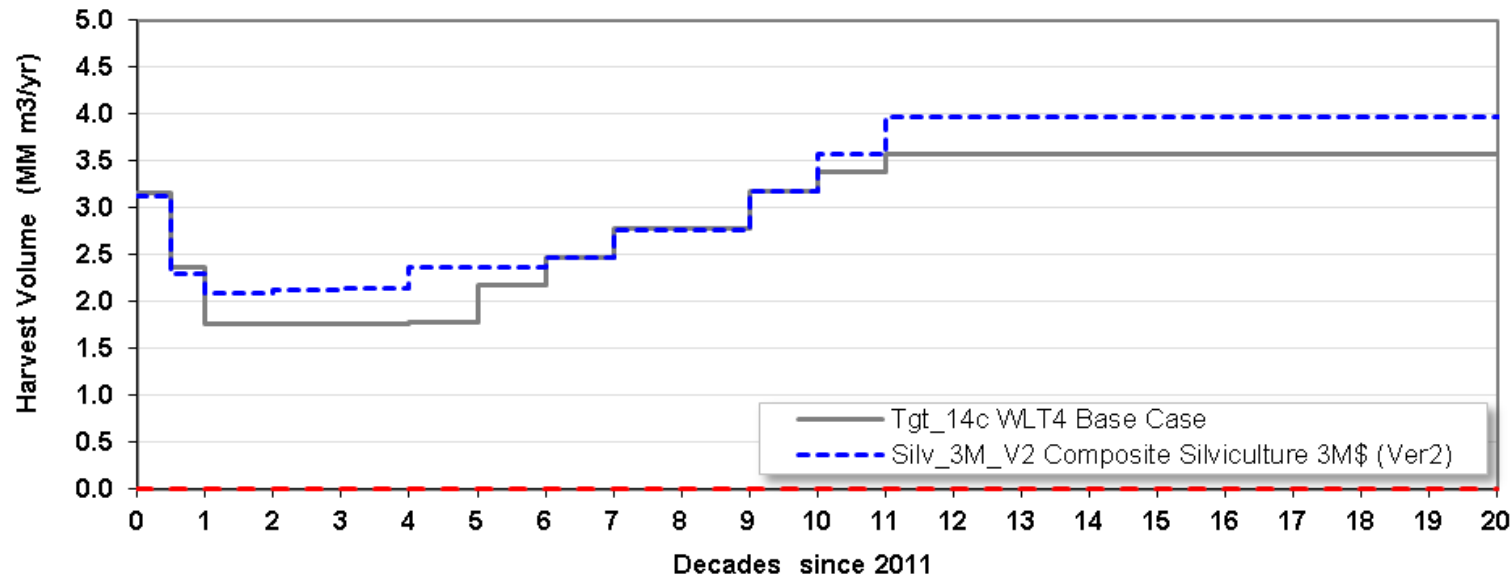
- Pre-commercial Thinning / Cleaning Dense Pine & Fertilization
  - improve stand quality/health/resilience through leave tree selection, increase stand volumes through fertilization and advance operability in these stands.
- Eligible stands:
  - Pl-leading; 10-20 years old (typically 6,000-20,000 sph)
  - Thin to target density of ~2,500 sph; Fertilize



# Strategy – Optimal Mix of Treatments

- Include all treatments
- Best mix of treatments and timing
- Subject to annual budgets:
  - Constrained                      \$2,000,000 - \$3,000,000
  - Preferred                         \$5,000,000 - \$7,000,000

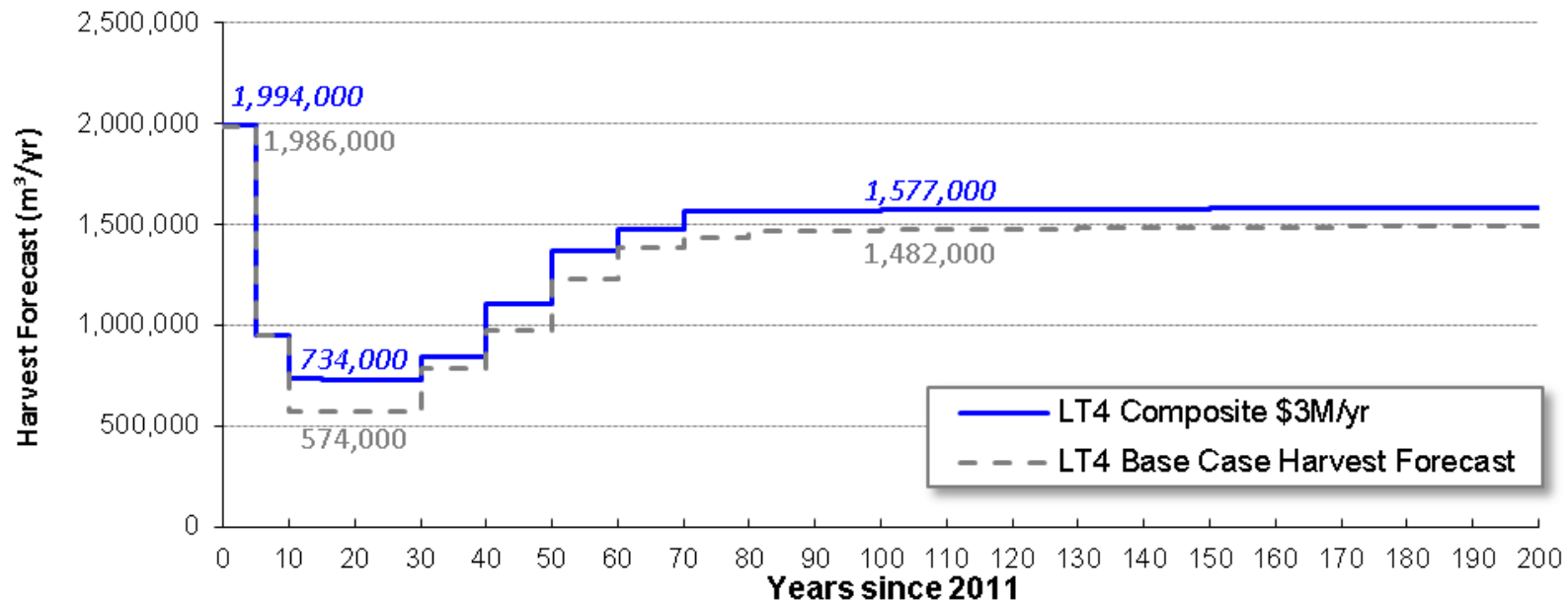
# Optimized Mix – \$3 Million/yr Budget in the Williams Lake TSA



- Short (~)
- Mid (+22%)
- Rise (+2%)
- Long (+11%)

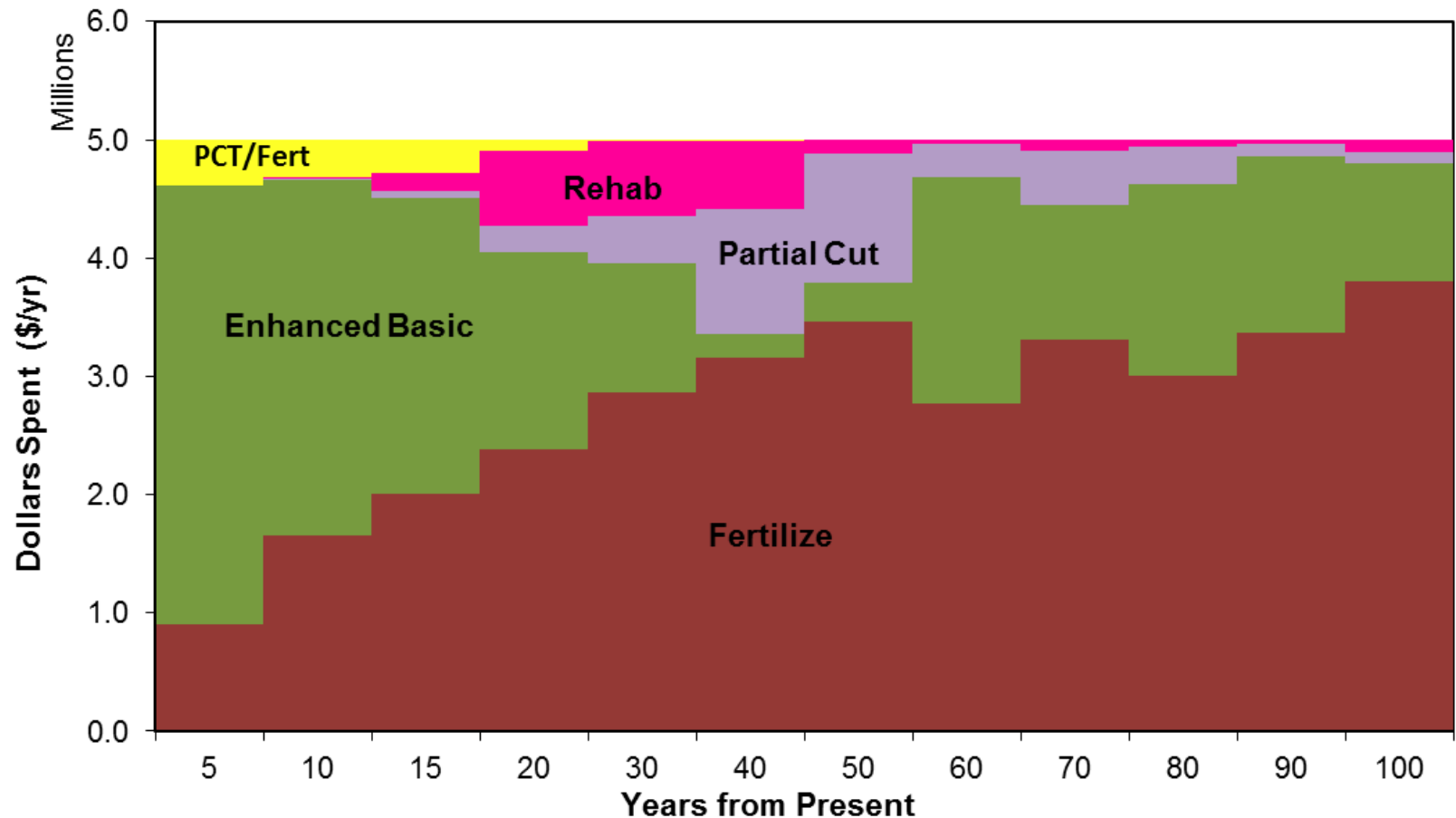
Midterm increased as priority over longterm.

# Optimal Mix – \$3 Million/yr Budget in the Lakes TSA

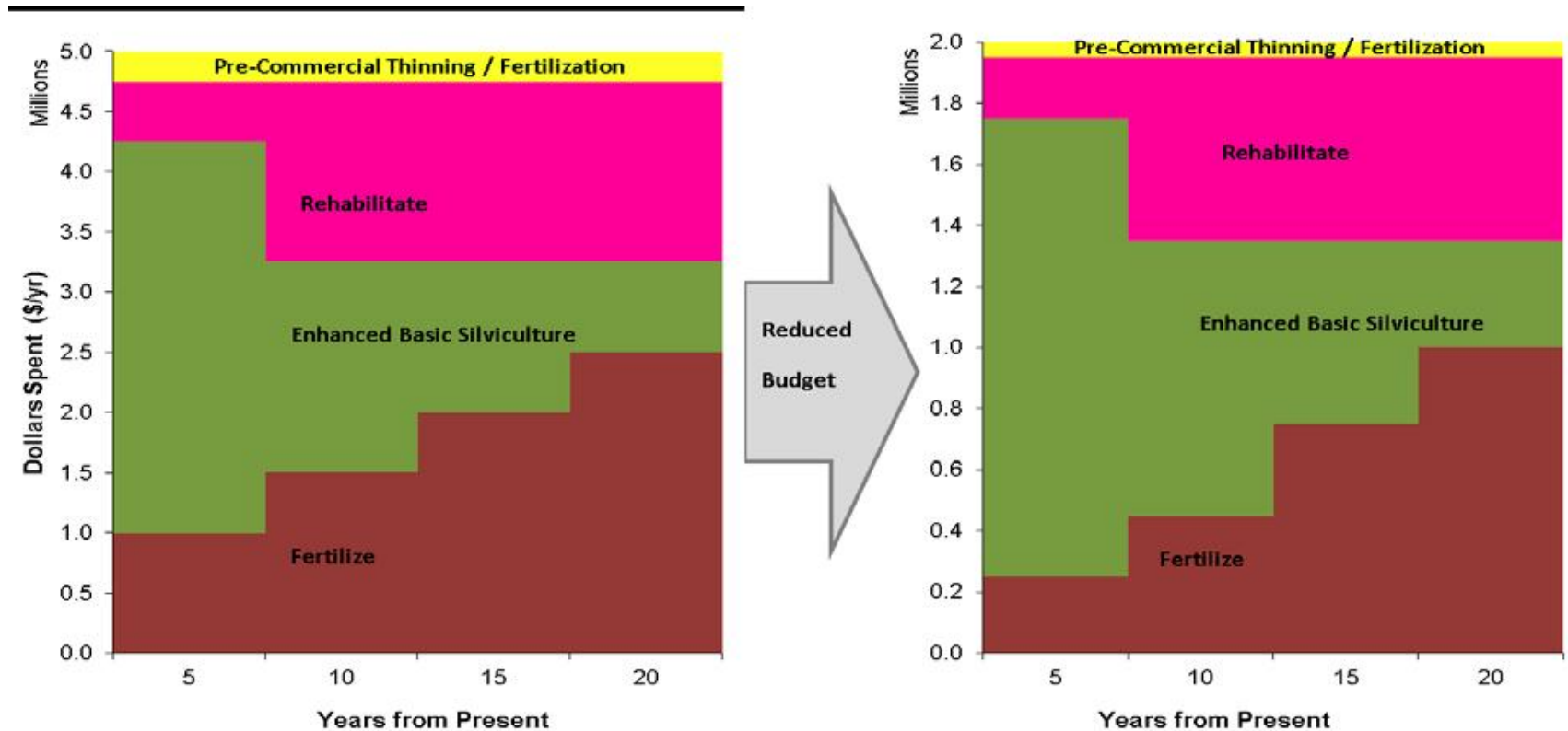


- Short (~)
- Mid (+28%)
- Rise (+10%)
- Long (+6%)
- Mid: Significant gains from rehab (green) and some fert
- Rise: Early rehab converts natural stands to high-producing managed stands
- Long: Increases landbase (stands otherwise unharvested)

# Preferred silviculture strategy in the Quesnel TSA

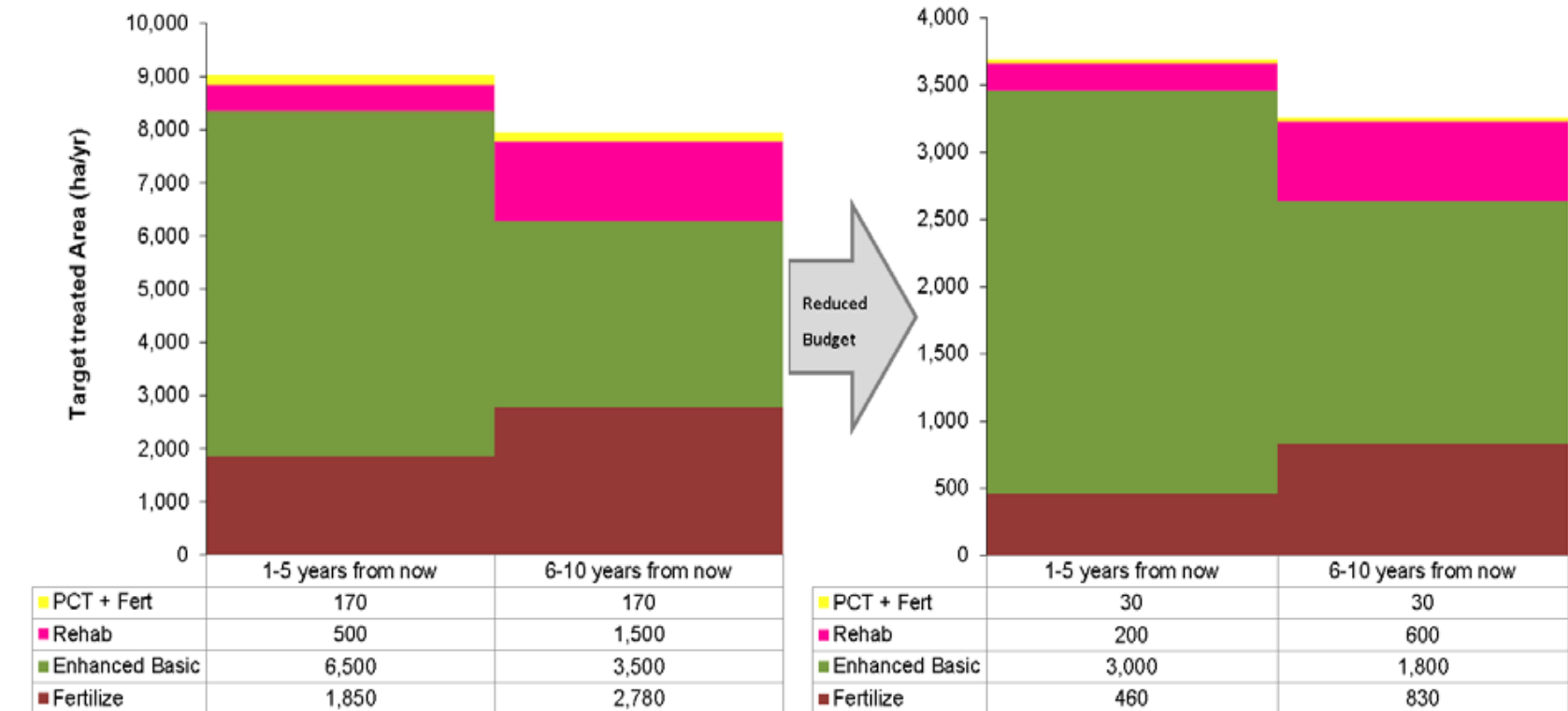


# Silviculture expenditure levels used to inform the tactical plan



# Target treatment area for the Tactical Plan

The silviculture expenditures levels used to inform the tactical plan for the next 20 years.



# Okanagan TSA Treatment Regime

Does not reflect all activities carried out in the TSA  
Includes only those activities modelled by this analysis.

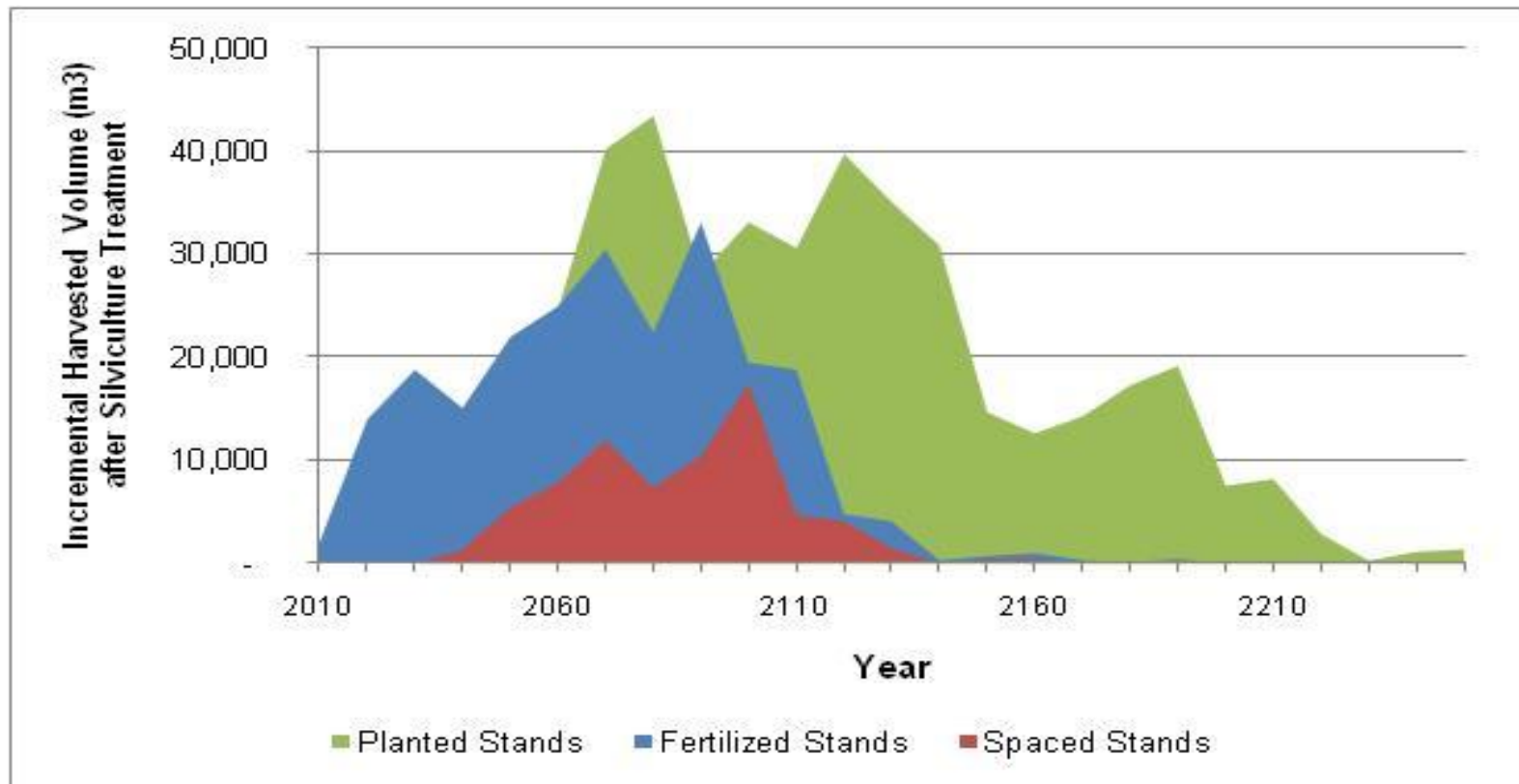
**Table 2.3: Treatment Regime Table<sup>2</sup>**

			2013	2014	2015	2016	2017
<b>Current Reforestation</b>	<b>Planting</b>	Ha	1,975	502	443	444	174
		\$\$	5,294,810	1,346,216	1,187,823	1,190,427	467,561
<b>Subtotal (\$\$)</b>			5,294,810	1,346,216	1,187,823	1,190,427	467,561
<b>Timber Supply Mitigation</b>	<b>Spacing</b>	Ha	173	88	157	143	162
		\$\$	259,532	132,380	235,148	215,088	243,519
	<b>Fertilization</b>	Ha	1,242	3,191	3,712	3,943	4,185
		\$\$	559,026	1,435,895	1,670,524	1,774,640	1,883,419
<b>Subtotal (\$\$)</b>			818,558	1,568,275	1,905,672	1,989,728	2,126,938
<b>TOTAL</b>			6,113,368	2,914,491	3,093,495	3,180,155	2,594,499

Where are the treatment areas?

# Timing and volume of harvest for stands treated in the Okanagan TSA

- Additional volume at 2025 and 2060 pinch points
- A new tool called “NSR Integrated Knowledge Engine” will be used for Integrated Decision Making / Authorizations

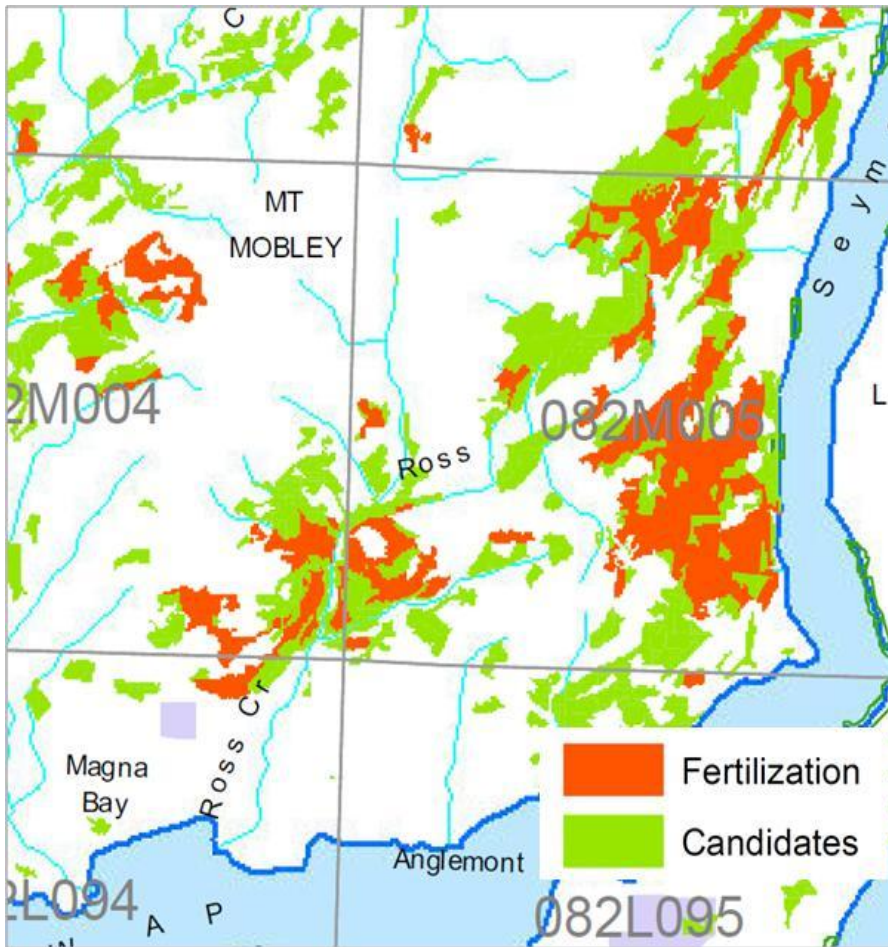




# Tactical Plans

- The spatial location of both eligible and priority stands is a key component of the tactical plan
- Eligible vs priority will give insight into types of stands prioritized for treatment

# Fertilization Treatment Map



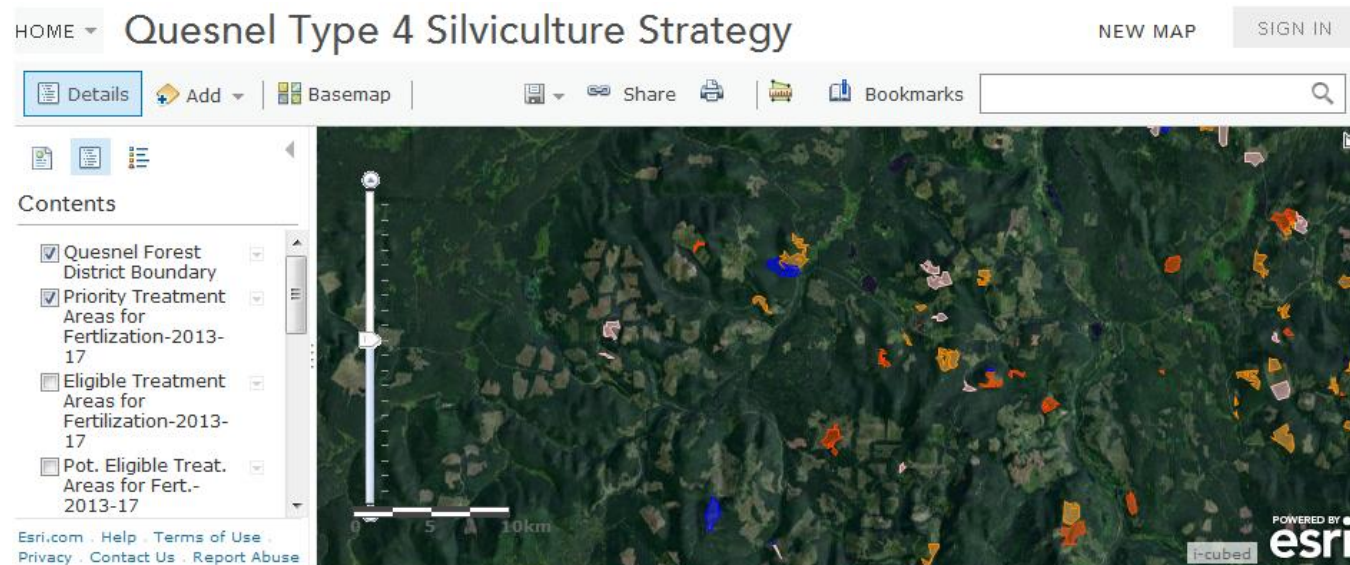
The model chose:

- Higher proportion of Spruce over Douglas fir and pine
- Heavily in the 30 – 50 yr old
- More wet belt ecosystems

Fertilization	
Eligible Area (ha)	61,316
Treated Area (ha)	16,274
Treated %	27%
\$million total (over 5 years)	7.32
\$million per year for 5 years	1.46

# Spatial Outputs

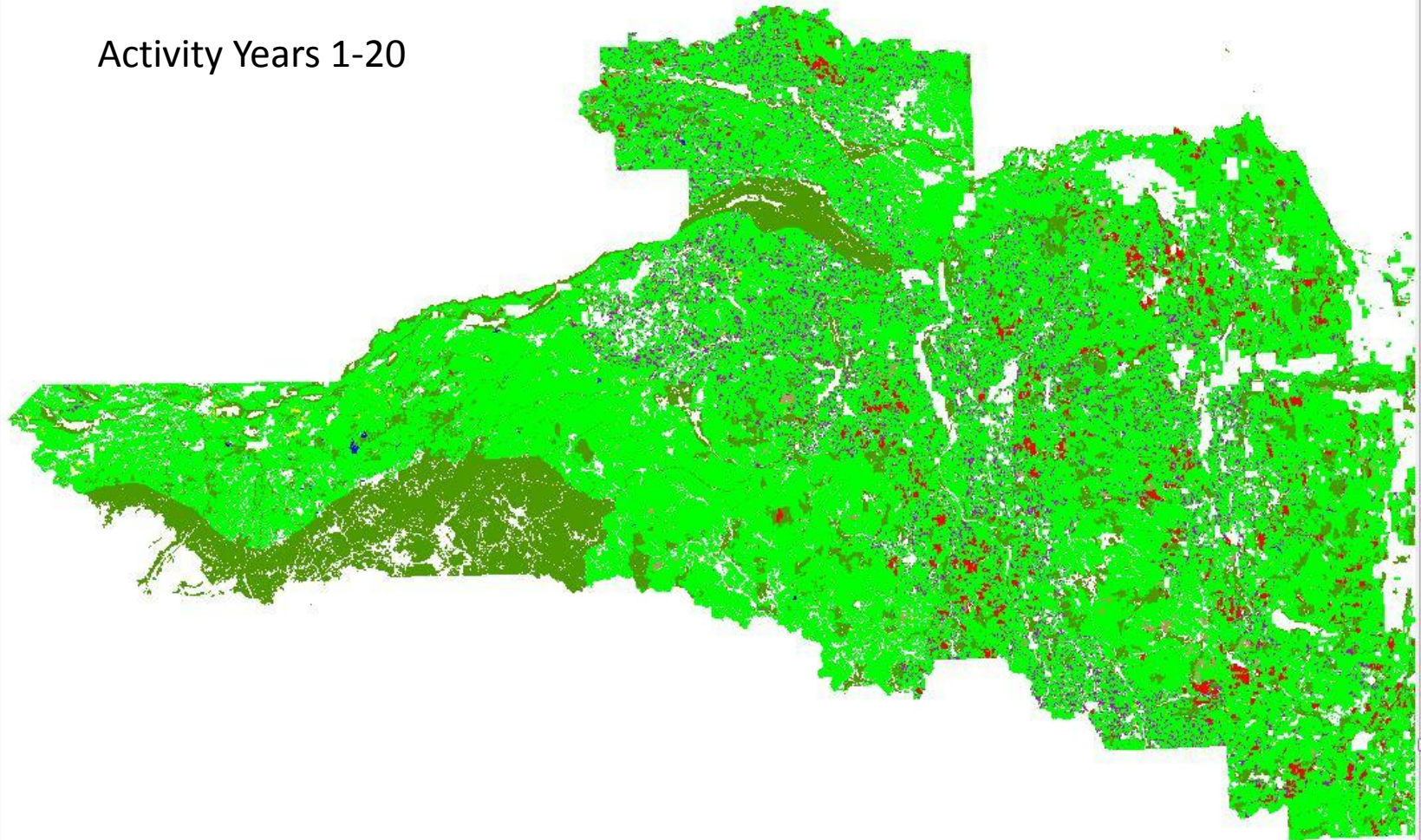
- Static maps
- ArcGIS Online
- ArcGIS for Desktop

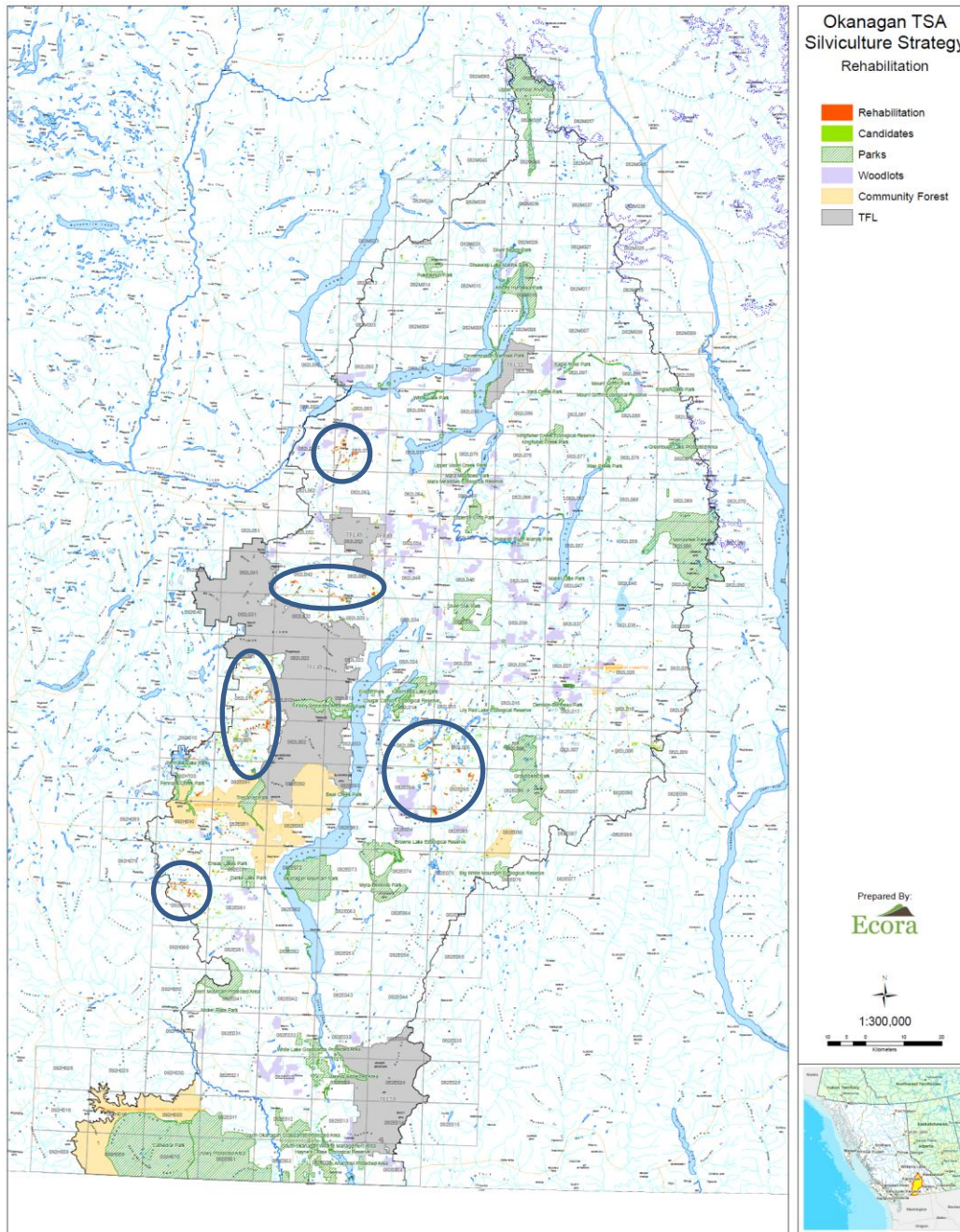




# Optimized Scenario

Activity Years 1-20



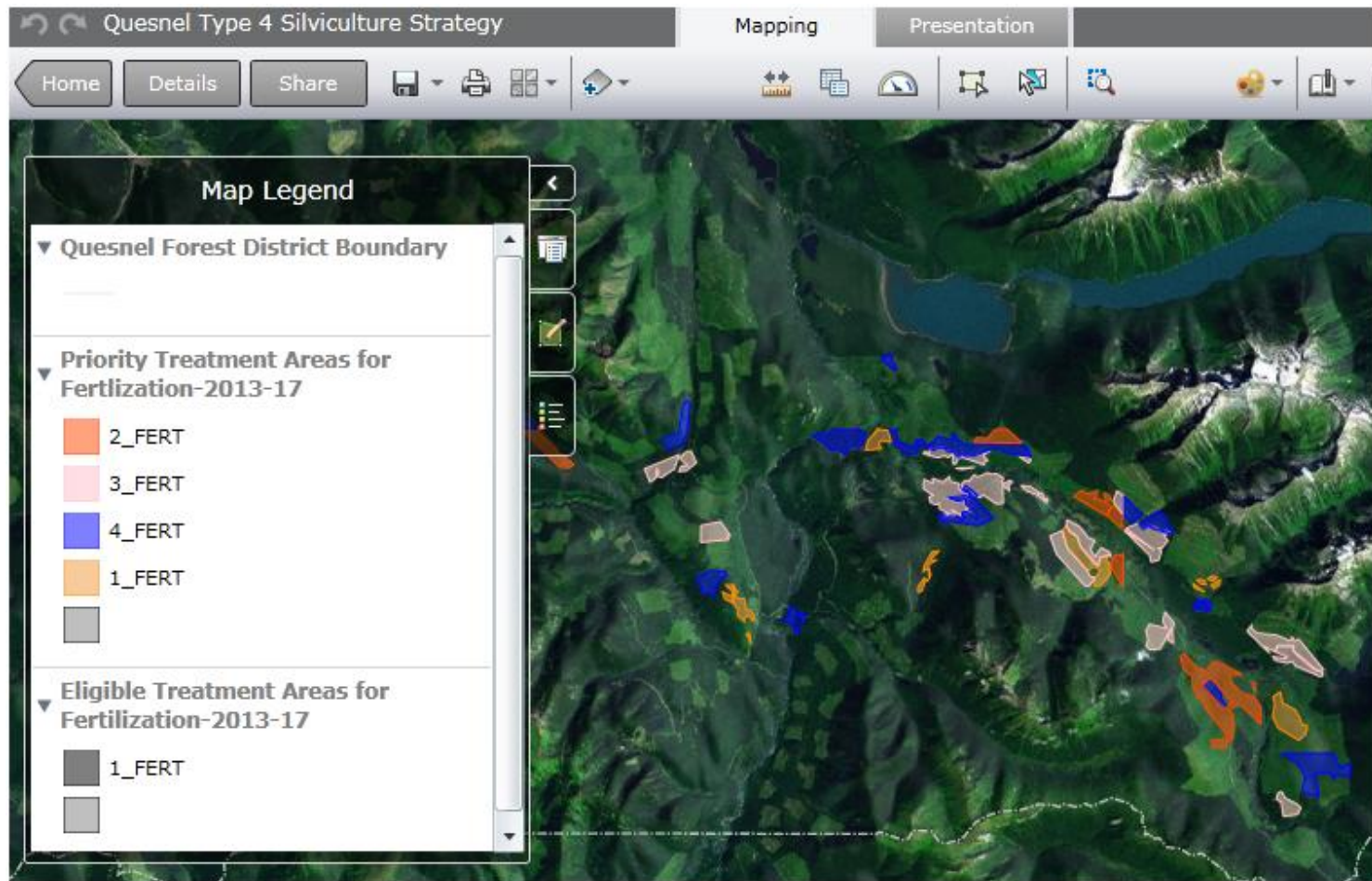


# Static maps

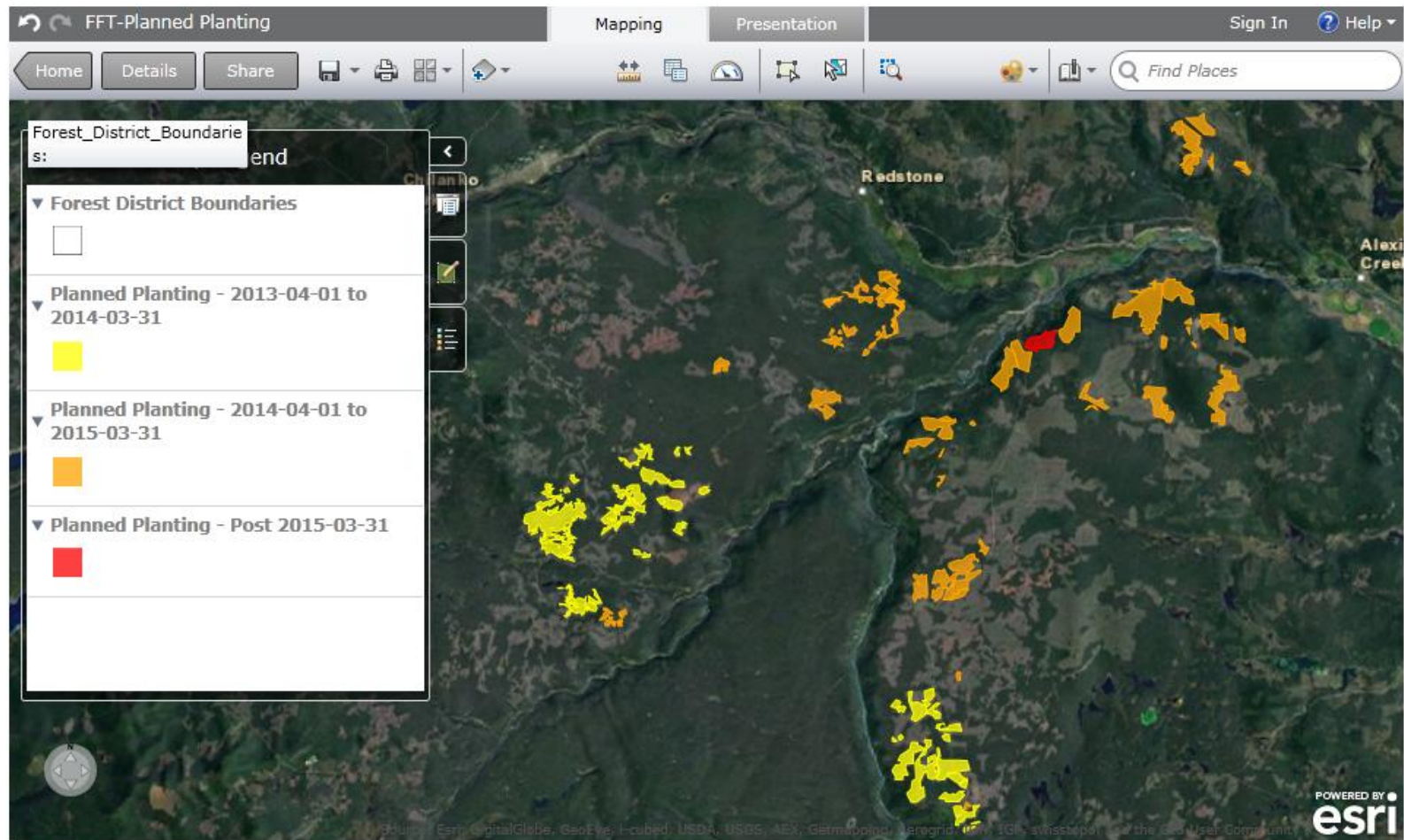
- For reports or wall maps for displays
- Shows overall opportunities
- General location of treatments areas



# ArcGIS Online



# FFT Program Maps



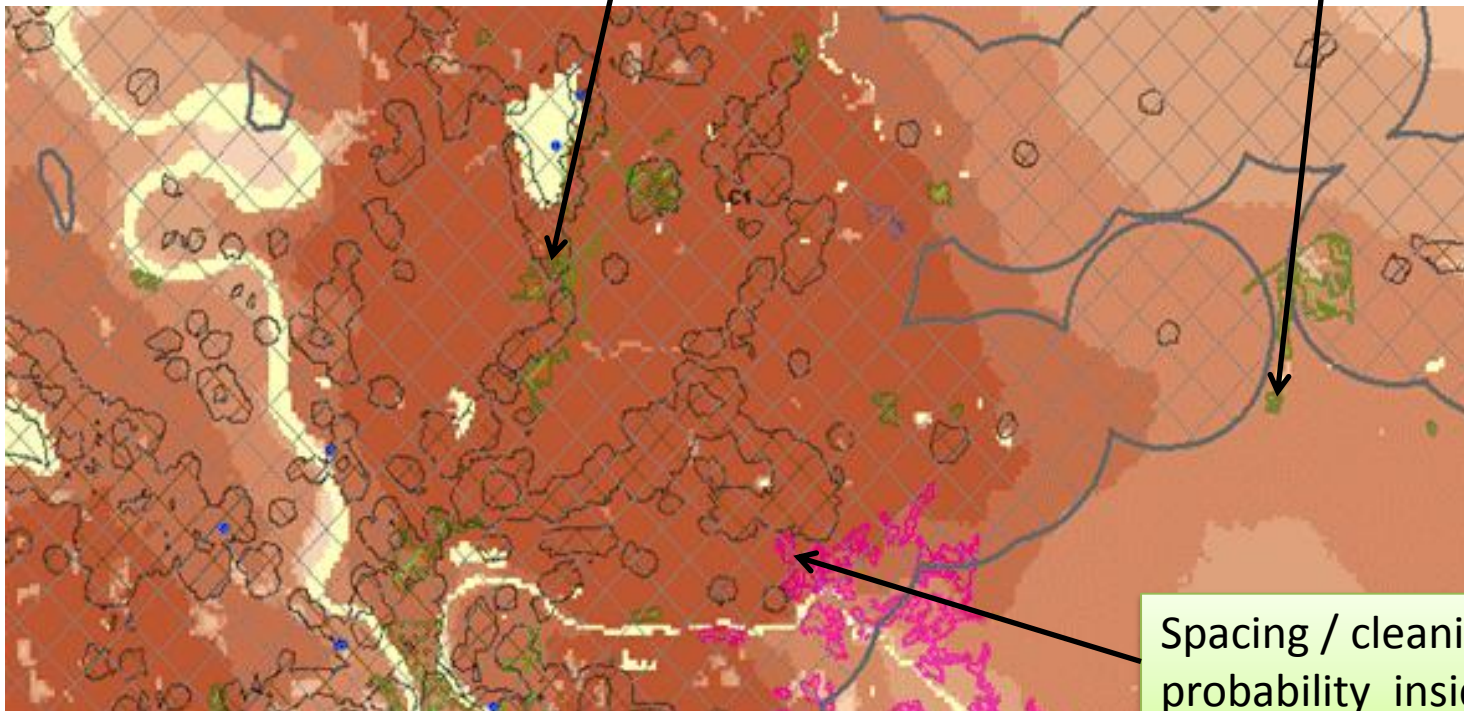


# Spatial overlays

Prioritize silviculture treatments considering wildfire management  
Burn probability, interface areas and candidate treatment area

Fertilization in high burn probability inside a WUI

Fertilization in moderate burn probability outside a WUI



Spacing / cleaning in high burn probability inside a WUI

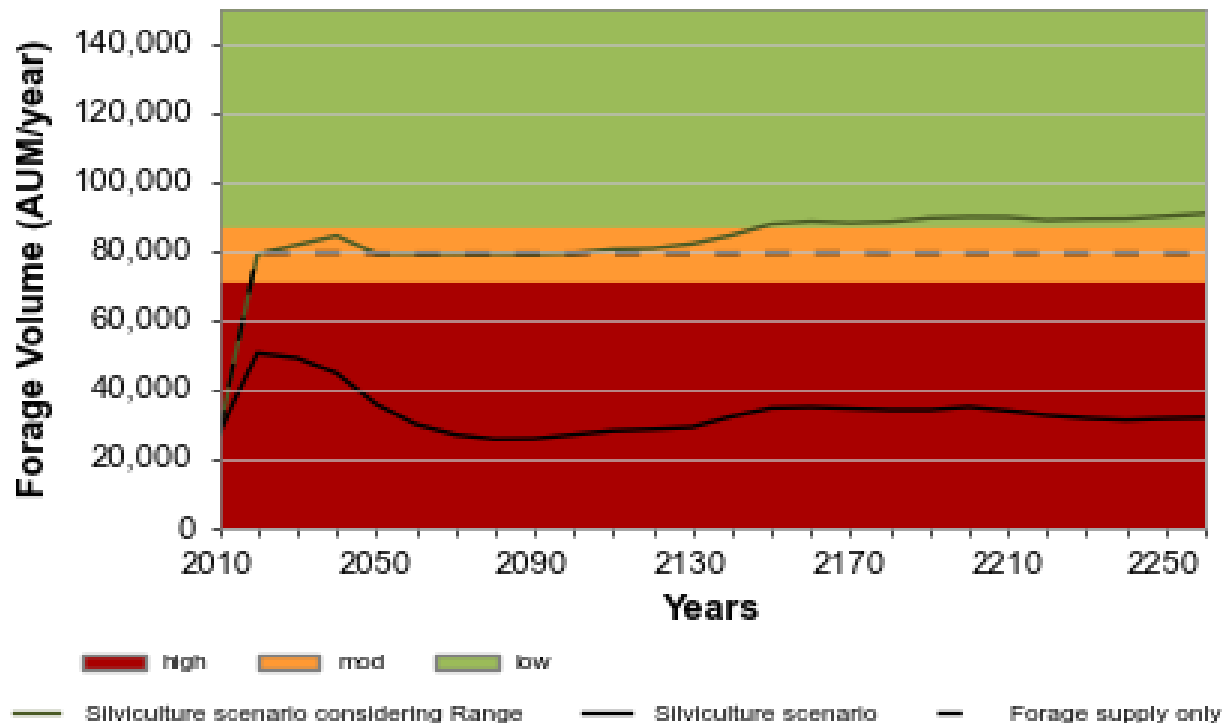


# Range – Forage Supply in the Okanagan TSA

- Forage supply analysis, to allow range to be considered
- Changes in forage supply are influenced by implementation of ‘range cut blocks’
- Type 1 Forage Cutblocks – moderately increase forage opportunities with standard tree stocking
- Type 2 Forage Cutblocks – enhanced forage opportunities with standard tree stocking
- Type 3 Silvo-pasture Cutblocks – high forage production, with 50% - 100% (75% average) of timber production at rotation
- Type 4 Forage Pasture Cutblocks – converted to permanent forage production

# Forage Supply Comparison

Is it possible to achieve AUM forage targets across the land base and if so, what is the best way to implement this?



# Range Cutblocks by Scenario

Scenario	Convention al Harvest (cc/pc)	Range cut- block type 1/2	Range cut- block type 3	Range cut- block type 4
Silviculture scenario	10,545	0	0	0
Silviculture considering range	9,298	521	108	426
Forage supply only	1,342	1,028	721	623

# Tree Species Deployment at the Landscape Level with consideration for Climate Change

BGC Zone	Desired Trend by Species								Comments
	PI	Sx	Fd	Lw	Cw	Hw	Pw	Py	
<b>ICHwk</b>	◇	↓	◇	◇	◇		◇	n/a	Maintain the trends for PI and Fd, may wish to limit Sx use - monitor. Maintain present trends, note the use of Pw and replacement of Cw.
<b>IDFmw</b>	↓	◇	↑	◇	◇	n/a	n/a	◇	Reduce level of PI use below harvest proportion. Maintain trend for Sx, promote Fd. Maintain present trend of increased use of Lw and reduced use of Cw. Promote Py where suited.
<b>MSdm</b>	◇	◇	↑	n/a	n/a	n/a	n/a	n/a	Maintain trends for PI and Sx, but do not increase Sx above the present proportion used. Promote use of Fd where suited. Use Lw where suited in a limited capacity.
<b>IDFdk</b>	↓	↓	↑	↓	n/a	n/a	n/a	↑	Reduce reliance on PI except on sites unsuitable for other species. Avoid planting Sx on zonal sites due to increased drought potential. Promote the use of Fd. Decrease or do not increase use of Lw, promote Py where suited.

# Type 4 Website

<http://www.for.gov.bc.ca/hfp/silstrat/index.htm>



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- [TSAs with Type 4 Silviculture Strategies](#)
- [Strategy Descriptions](#)
- [Other Current Projects](#)
- [Archives](#)
- [TSAs and TFLs Type 1, 2 and 3 Strategies](#)

### What are Type 4 Silviculture Strategies?

# Thank you

## District Champions

Agathe Bernard, Carolyn Stevens – Lakes & Morice

Brad Powell – Quesnel

Ted McRae, Katherine Ladyman – Okanagan

Bill Olsen, Doug McArthur – 100 Mile House

John Pousette, Alena Charlston , Cathy

Middleton, Andrew Tait– Prince George

Kerri Howse, Mark Hamm - Williams Lake

## Licensees

## BC Timber Sales

## RPB

Ralph Winter

Matt Leroy

Al Powelson

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FLNRO Regional Operations staff –

Ecology, Forest Health, Range, Habitat

Forest Analysis & Inventory Branch – TSR Analysts

Wildfire Management Branch - Fire Mgt Specialists

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FESL - Antti Makitalo, Jeff McWilliams

Symmetree - Bryce Bancroft

Forsite - Cam Brown, Pat Bryant