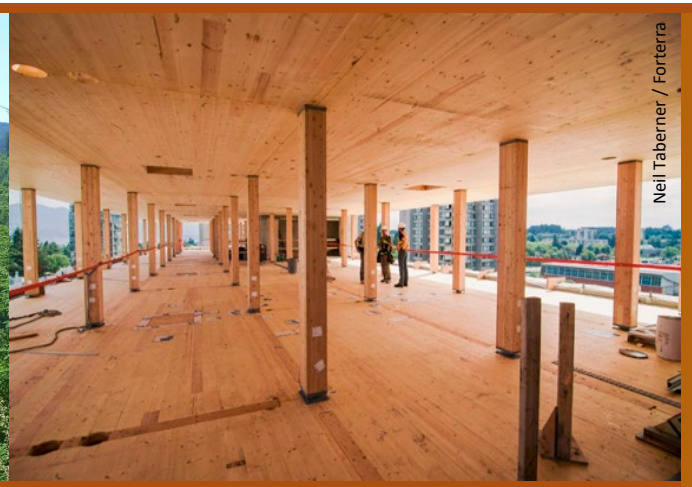
Carbon and Forest Management Work Group

Scenarios



Neil Taberner / Forterra

May 8 | 9 am – 3 pm

Meeting #7

Background Information

Site Class

- 79 percent of state trust lands in GEM areas are Site Class 2 or 3:
  - Site Class 1: 5%
  - Site Class 2: 41%
  - Site Class 3: 38%
  - Site Class 4: 12%
  - *Site Class 5 and 6: 4%*
- In the scenarios, DNR did not specify rotation lengths for Site Class 5 or 6 because there are few acres on the landscape and the growing conditions are poor. These "low" sites tend to have glacial till, glacial drift over bedrock, or gravel alluvium, and are rarely productive enough to actively manage for timber harvest.



Difference Between Scenarios 6 and 7

Built into multi-dial scenarios to meet the intent of the proviso to "conserve and manage" carbon-dense, older, structurally complex forest. Both defer 100% of the following in GEM areas:

Scenario 6

Older, "carbon-dense," structurally complex forest as DNR defines them in the *Policy for Sustainable Forests**

Scenario 7

Work-group selected forests: Forests 80 years old and older (query uses age as a surrogate for structure)

*Only definition of structurally complex forest recognized by DNR

Structurally Complex Forest

For scenario development, using the definition of structurally complex stand in the 2006 *Policy for Sustainable Forests (PSF)**:

> A forest in the 'botanically diverse' 'niche diversification' or 'fully functional' stage of stand development. Forests in these phases have varying sizes of trees, understory vegetation and lichen, downed wood and snags, etc.

*Only definition of structurally complex forest recognized by DNR

Stand Characteristics

Botanically diverse ➔ Niche diversification ➔ Fully functional

- Snags, large pieces of down woody material, and gaps in upper tree canopy form as original trees die out.
- Understory develops and diversifies in species and tree diameter.
- Shade-tolerant trees eventually reach upper tree canopy.

Stages			Stand-level Variable and Associated Threshold Value									
							Management Activity					
Summarized	Detailed		QMD	Canopy Layer	RD	Stand Age	BioThin Age	Years Since BioThin	Thin Age	Years Since Thin	Snag Ratio1	CWD
Ecosystem Initiation	Ecosystem Initiation		<2									
Competitive Exclusion	Sapling Exclusion		>=2									
	Pole Exclusion		>5									
		or							>0	>=0		
	Large Tree Exclusion		>11									
		or	>11						>0	>=0		
	Understory Development		>=2	>1								
		or	>=2		>=MaxRD							
		or	>=2			>MaxRD Age						
		or	>=2				>0	>=0				
Structually Complex	Botanically Diverse		>=2	>1								
		or	>=2	>1		>=MaxRD Age+60						
		or	>=2	>1			>0	>=0				
		or	>=2	>1	>=MaxRD							
		or	>=2		>=MaxRD	>=MaxRD Age+60						
		or	>=2		>=MaxRD		>0	>=0				
		or	>=2			>=MaxRD Age+60	>0	>=0				
		or	>=2				>0	>5				
		or	>=2	>1		>MaxRD Age						
		or	>=2			>=MaxRD Age+60						
		or	>=2			>MaxRD Age	>0	>5				
	Niche Diveris-ification		>=2	>1		>=MaxRD Age+80					>0.07	>2400
		or	>=2	>1		>=MaxRD Age+80	>0	>0				
		or	>=2	>1			>0	>5				
		or	>=2		>=MaxRD	>=MaxRD Age+80					>0.07	>2400
		or	>=2		>=MaxRD	>=MaxRD Age+80	>0	>0				
		or	>=2		>=MaxRD		>0	>5				
		or	>=2			>=MaxRD Age+80					>0.07	>2400
		or	>=2			>=MaxRD Age+80	>0	>0				
		or	>=2			>MaxRD Age	>0	>5				
		or	>=2			>=MaxRD Age+80	>0	>=0			>0.07	>2400
		or	>=2			>=MaxRD Age+80	>0	>0				
		or	>=2				>0	>5			>0.07	>2400
	Fully Functional		>=2	>1		>=MaxRD Age+160					>0.07	>2400
		or	>=2	>1		>=MaxRD Age+160	>0	>0				
		or	>=2	>1			>0	>40				
		or	>=2		>=MaxRD	>=MaxRD Age+160					>0.07	>2400
		or	>=2		>=MaxRD	>=MaxRD Age+160	>0	>0				
		or	>=2		>=MaxRD		>0	>40				
		or	>=2			>=MaxRD Age+160					>0.07	>2400
		or	>=2			>=MaxRD Age+160	>0	>0				
		or	>=2			>MaxRD Age	>0	>40				
		or	>=2			>=MaxRD Age+160	>0	>=0			>0.07	>2400
		or	>=2			>=MaxRD Age+160	>0	>0				
		or	>=2				>0	>40			>0.07	>2400

Work-Group Selected Forests

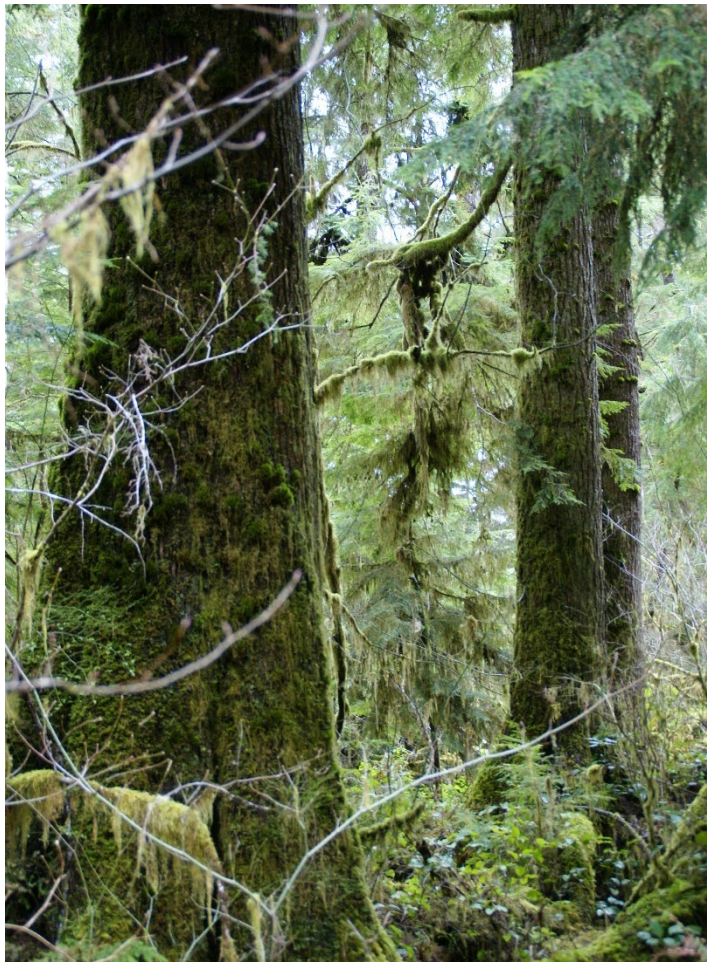
Query uses **stand age of 80+** as a surrogate for structure

- Mirrors approach used in the HCP.
- As noted in Franklin et. al. 2002, "The maturation stage typically begins at 80-100 years and may persist for 100-150 years in naturally regenerated Douglas-fir stands."
- Query will include all older, "carbon-dense," structurally complex forest as DNR defines them in the *Policy for Sustainable Forests.**
- Estimated 66,725 acres in GEM areas.

*Only definition of structurally complex forest recognized by DNR

More on Deferrals

- Deferred from stand replacement harvest indefinitely.
- May be thinned for forest health or other ecological objectives if needed.
- Forests not already deferred for other objectives.
- Excludes the 2,000 acres being deferred under Section 1 (b) of this budget proviso.



Scenarios

Scenarios at a Glance

Scenario	Components					
	Scenario 2 Amended (lengthen rotations)	Scenario 3 (shorten harvest rotations)	Scenario 4 Amended (increase thinning)	Scenario 6 (PSF defined deferrals)	Scenario 7 (PSF defined plus WG selected deferrals)	Scenario 9 (increased silviculture)
Scenario with "friendly amendments"						
Scenario 8 (2a+4a)	✓		✓			
Scenarios pending from April 10 meeting						
Scenario 10 (2a+4a+7)	✓		✓		✓	
Scenario 11 (4a+9)			✓			✓
New scenarios developed since the April 10 meeting to address concerns of work group members						
Scenario 12 (2a+4a+6+9)	✓		✓	✓		✓
Scenario 13 (2a+4a+7+9)	✓		✓		✓	✓
Scenario 14 (3+6+9)		✓		✓		✓
Scenario 15 (2a+4a+9)	✓		✓			✓
Scenario 16 NEW (3+4a+9)		✓	✓			✓

Scenario with Friendly Amendment

Scenario 8

2a

Lengthen harvest rotation

+

4a

Significantly increase thinning



Scenario 8 (2a+4a)

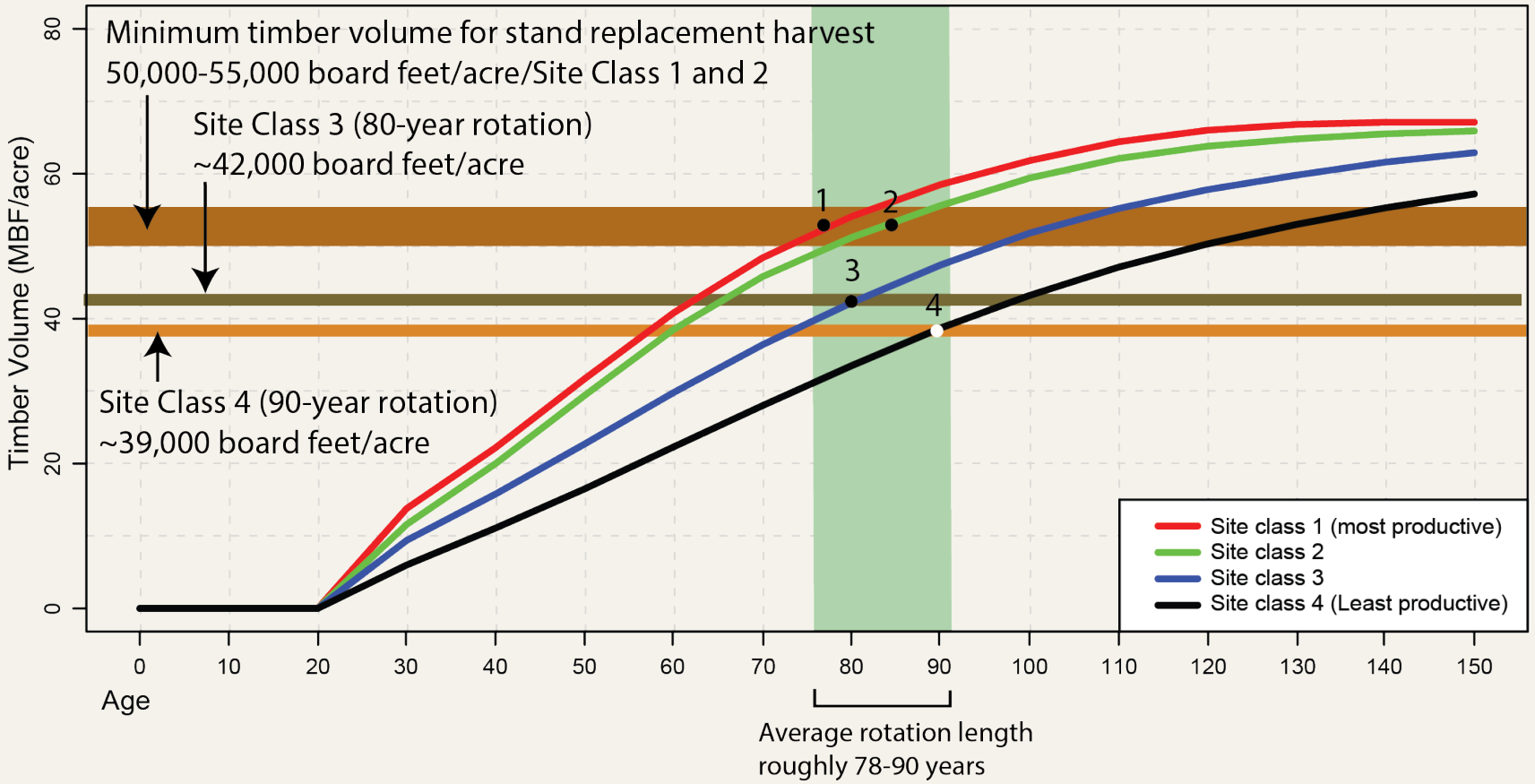
Lengthen harvest rotation (Scenario 2a)

Site Class 1 and 2 rotation based on minimum timber volume.

Site class 3 and 4 rotations based on AGE.

Sample Douglas-fir yield curve, western Washington

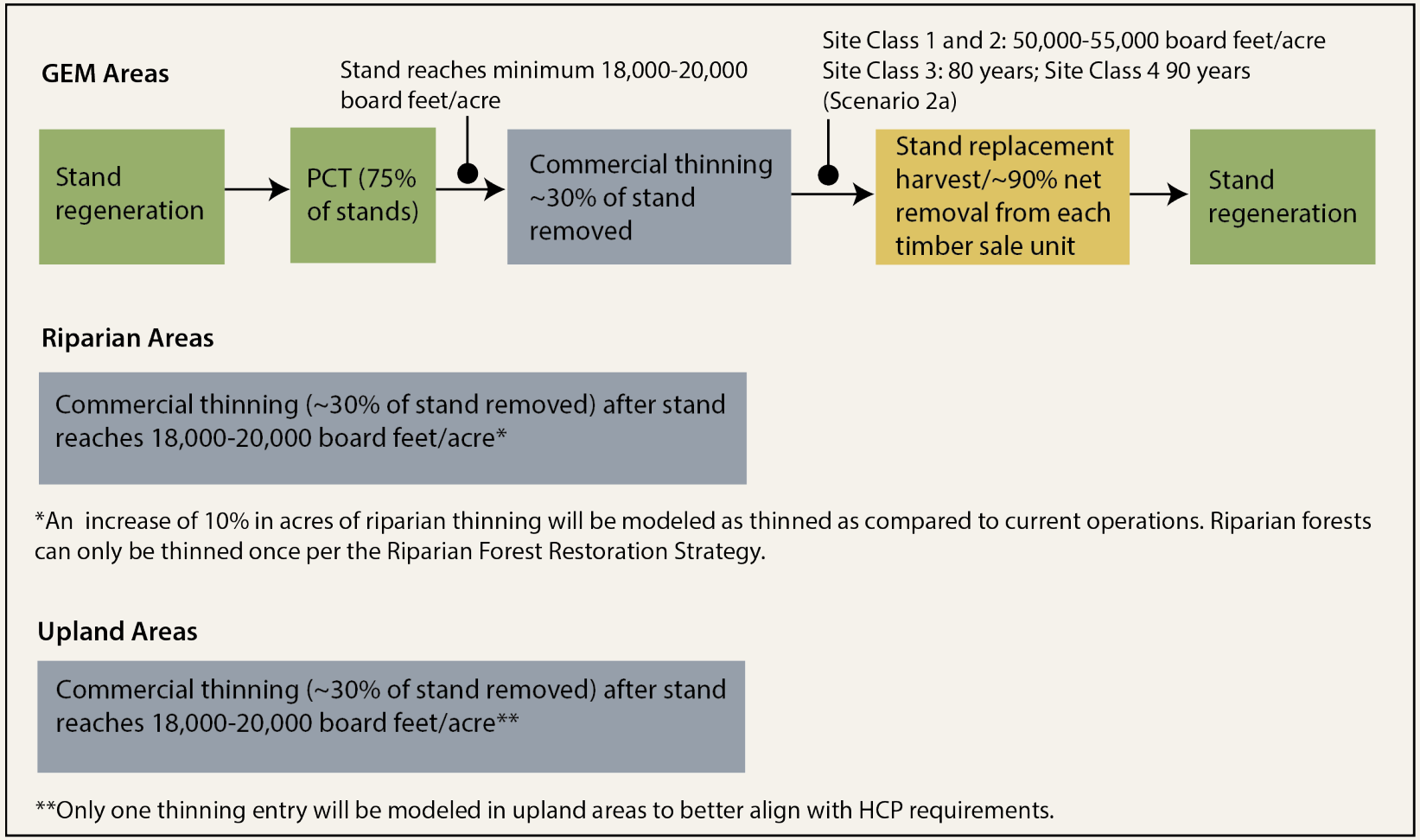
Yield curve generated from RSFRIS inventory plots and stratified using information from DNR's inventory



Scenario 8 (2a+4a)

Significantly increase thinning (Scenario 4a)

- Riparian thinning: An increase of 10% in acres from current management.
- One thinning entry in uplands.



Scenario Pending from April 10 Meeting

Scenario 10 (includes friendly amendment)*

2a
Lengthen harvest rotation

+

4a
Significantly increase thinning

+

7
Deferrals

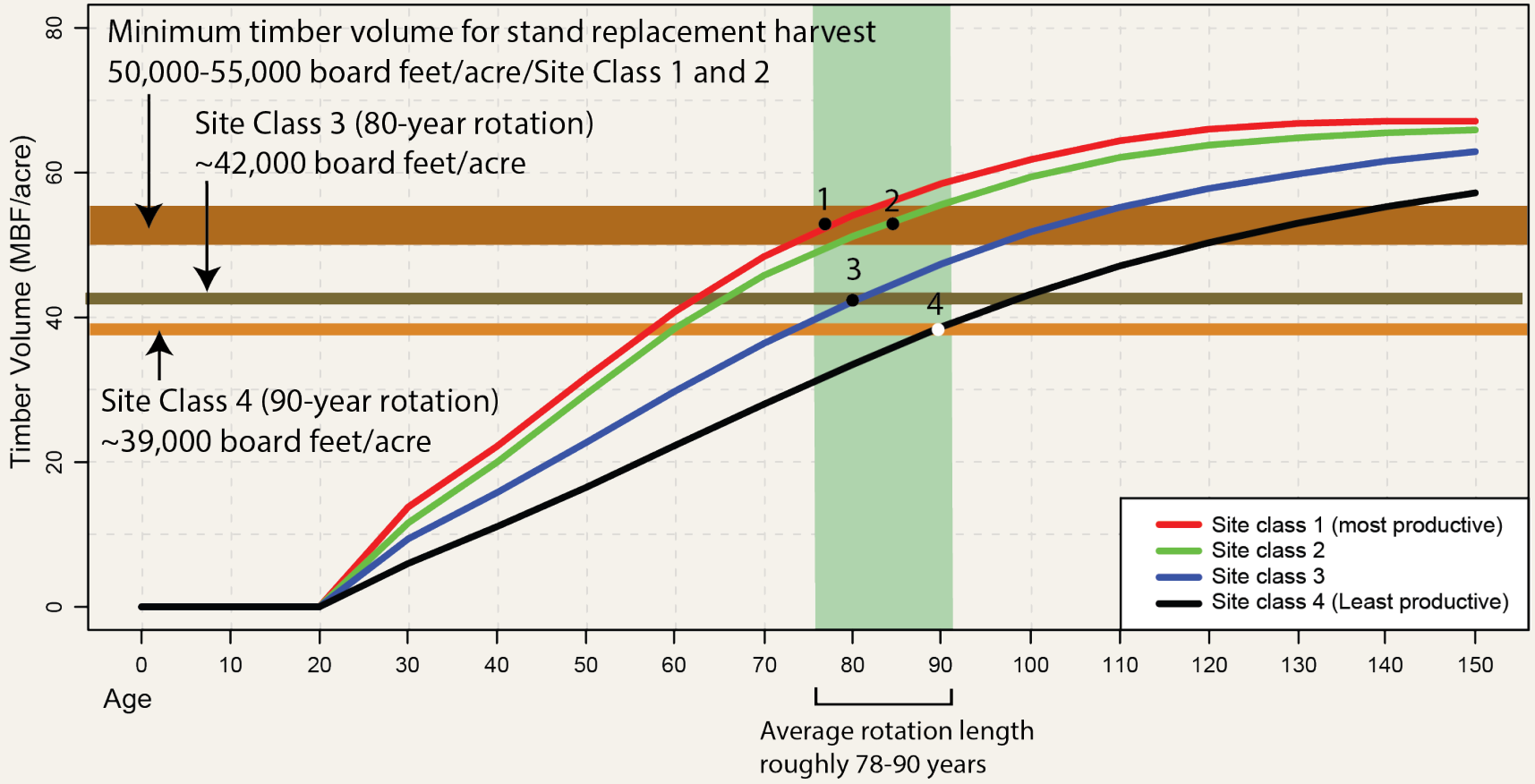
*To see the original version of this scenario, refer to presentation for Meeting 6.5

Scenario 10 (2a+4a+7)

Lengthen harvest rotation (Scenario 2a)

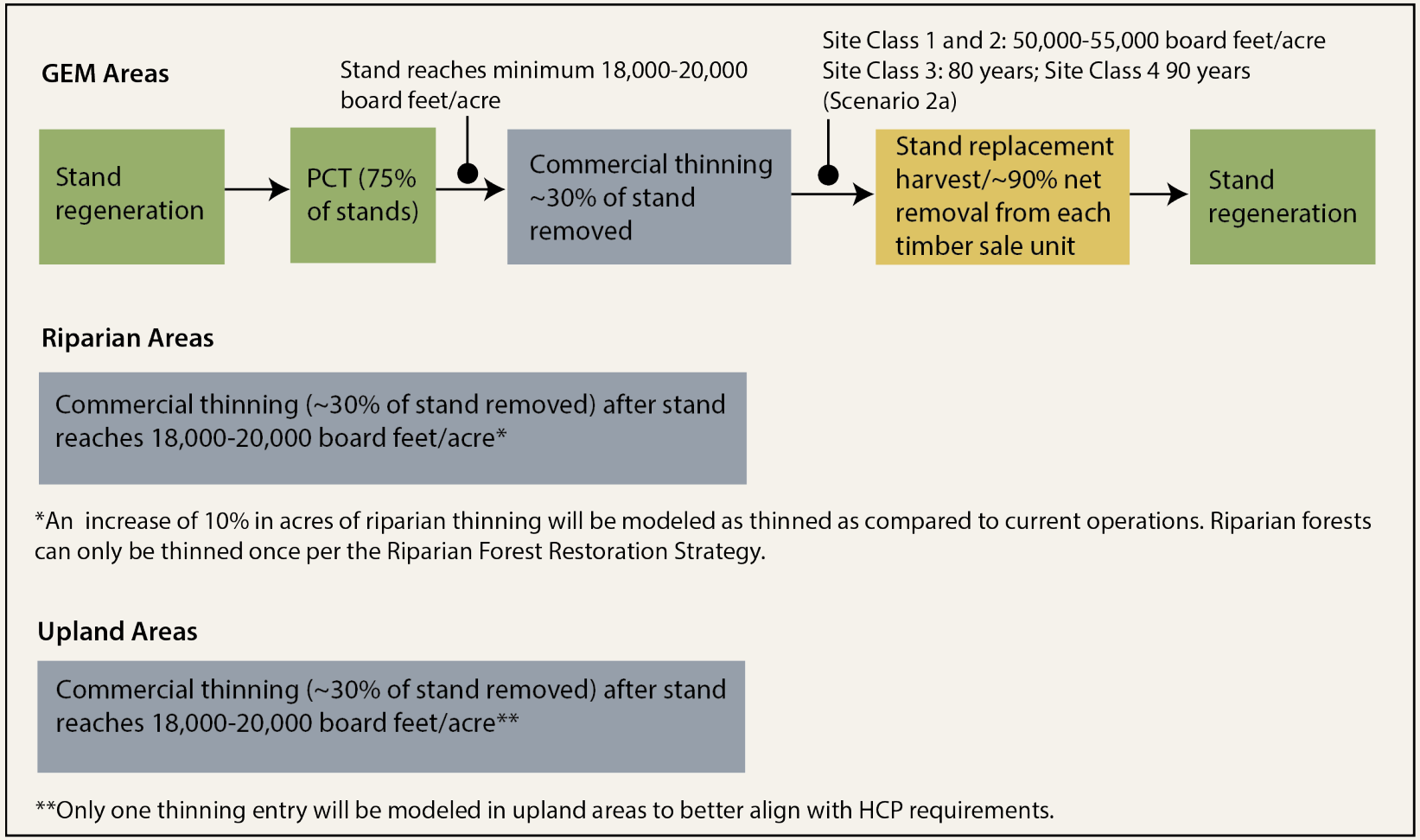
Sample Douglas-fir yield curve, western Washington

Yield curve generated from RSFRIS inventory plots and stratified using information from DNR's inventory



Scenario 10 (2a+4a+7)

Significantly increase thinning (Scenario 4a)



Scenario 10 (2a+4a+7)

In GEM areas, defer 100% of work-group selected forests (Scenario 7):

- Forest stands at least 80 years old and older (query uses age as a surrogate for structure).
- Query will include older, "carbon-dense," structurally complex forest as DNR defines them within its *Policy for Sustainable Forests**.

*Only definition of structurally complex forest recognized by DNR



Scenario 11

4a

Significantly increase thinning

+

9

Increased emphasis on silviculture

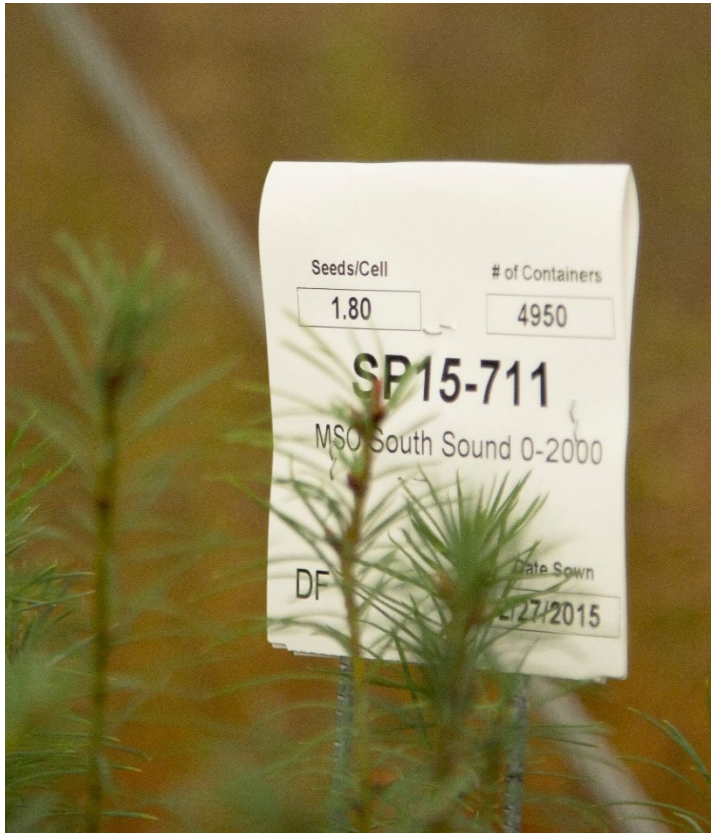


Scenario 11 (4a+9)

Increased Emphasis on Silviculture (Scenario 9)

- Roughly 80 percent of the seedlings DNR plants will be grown from improved seed stock (current percentage roughly 60 percent).
- Vary planting density by species:
  - Coastal low elevation sites: 400 TPA western hemlock
  - Mixed species stands: 275 Douglas-fir and 50 western hemlock
  - High elevation sites: 440 TPA noble fir

All sites will also experience infill from natural regeneration.



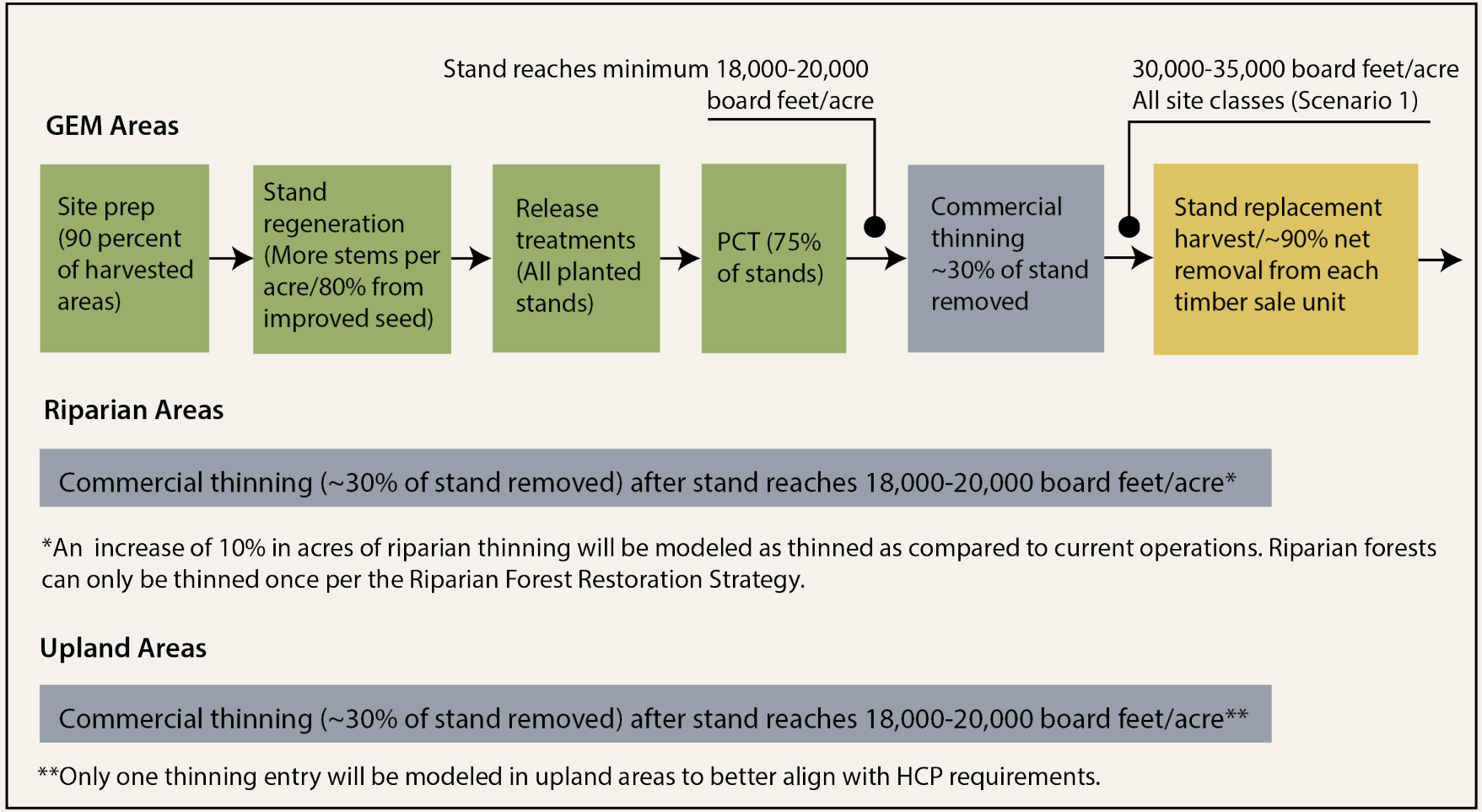
Scenario 11 (4a+9)

- Increase site preparation from 75 to 90 percent of planted acres.
- Increase release treatments from 75 to 100 percent of planted acres.
- Conduct PCT on 75 percent of forest stands.

Scenario 11 (4a+9)

Significantly increase thinning (Scenario 4a)

Increased emphasis on silviculture (Scenario 9)



New Scenarios

Scenario 12

2a

Lengthen harvest rotation

+

4a

Significantly increase thinning

+

6

Deferrals

+

9

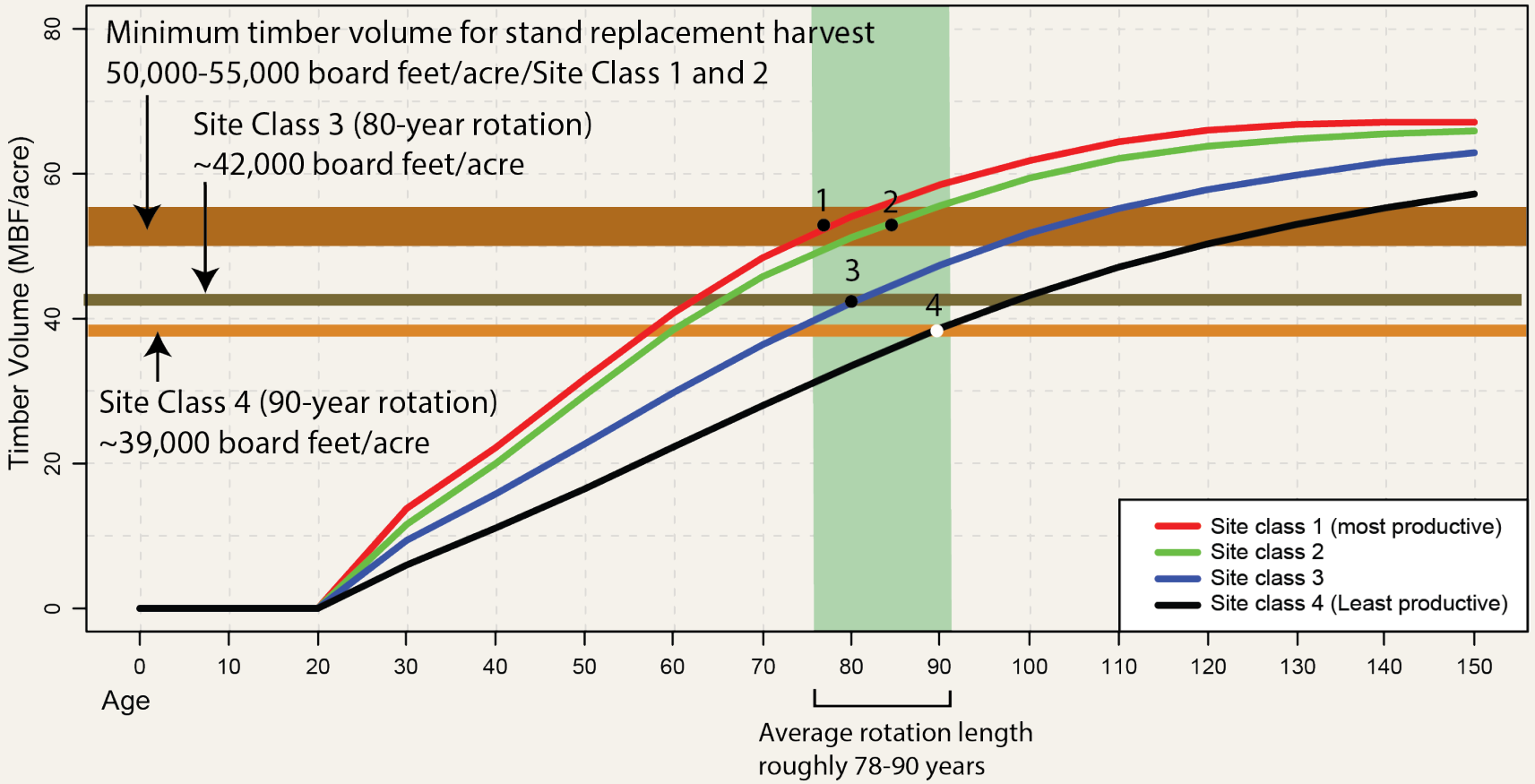
Increased emphasis on silviculture

Scenario 12 (2a+4a+6+9)

Lengthen harvest rotation (Scenario 2a)

Sample Douglas-fir yield curve, western Washington

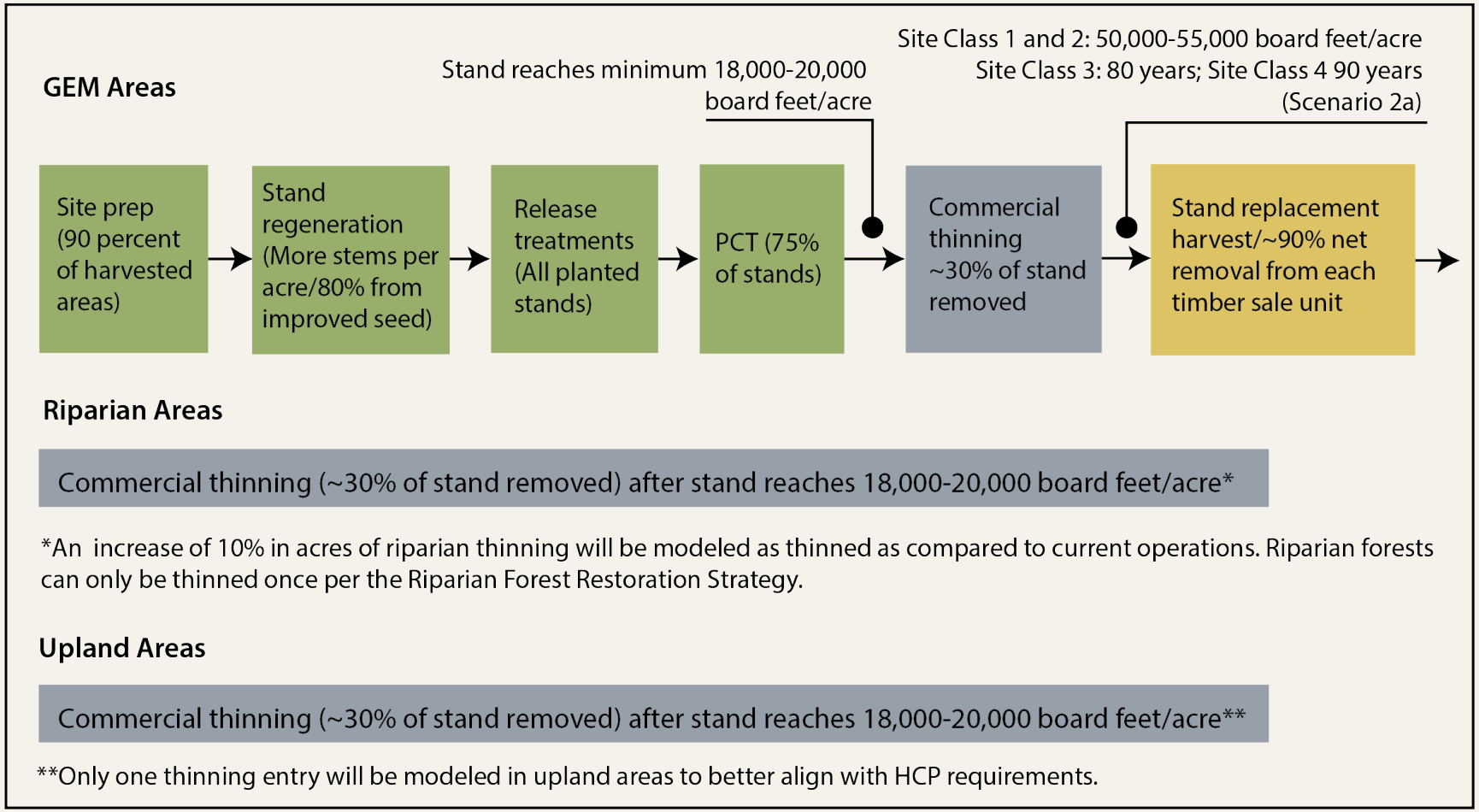
Yield curve generated from RSFRIS inventory plots and stratified using information from DNR's inventory



Scenario 12 (2a+4a+6+9)

Significantly increase thinning (Scenario 4a)

Increased emphasis on silviculture (Scenario 9)



Scenario 12 (2a+4a+6+9)

In GEM areas, defer 100% of the following forest types (Scenario 6):

- Older, "carbon-dense," structurally complex forest as DNR defines them within its *Policy for Sustainable Forests.**

*Only definition of structurally complex forest recognized by DNR



Scenario 13

2a

Lengthen harvest rotation

+

4a

Significantly increase thinning

+

7

Deferrals

+

9

Increased emphasis on silviculture

Scenario 13 (2a+4a+7+9)

****Scenario 13 is the same as Scenario 12 except for deferrals****

In GEM areas, defer 100% of work-group selected forests (Scenario 7):

- Stands at least 80 years old and older (query uses age as a surrogate for structure).
- Query will include older, "carbon-dense," structurally complex forest as DNR defines them within its *Policy for Sustainable Forests.**

*Only definition of structurally complex forest recognized by DNR

Scenario 14

3
Shorten harvest rotation

+

6
Deferrals

+

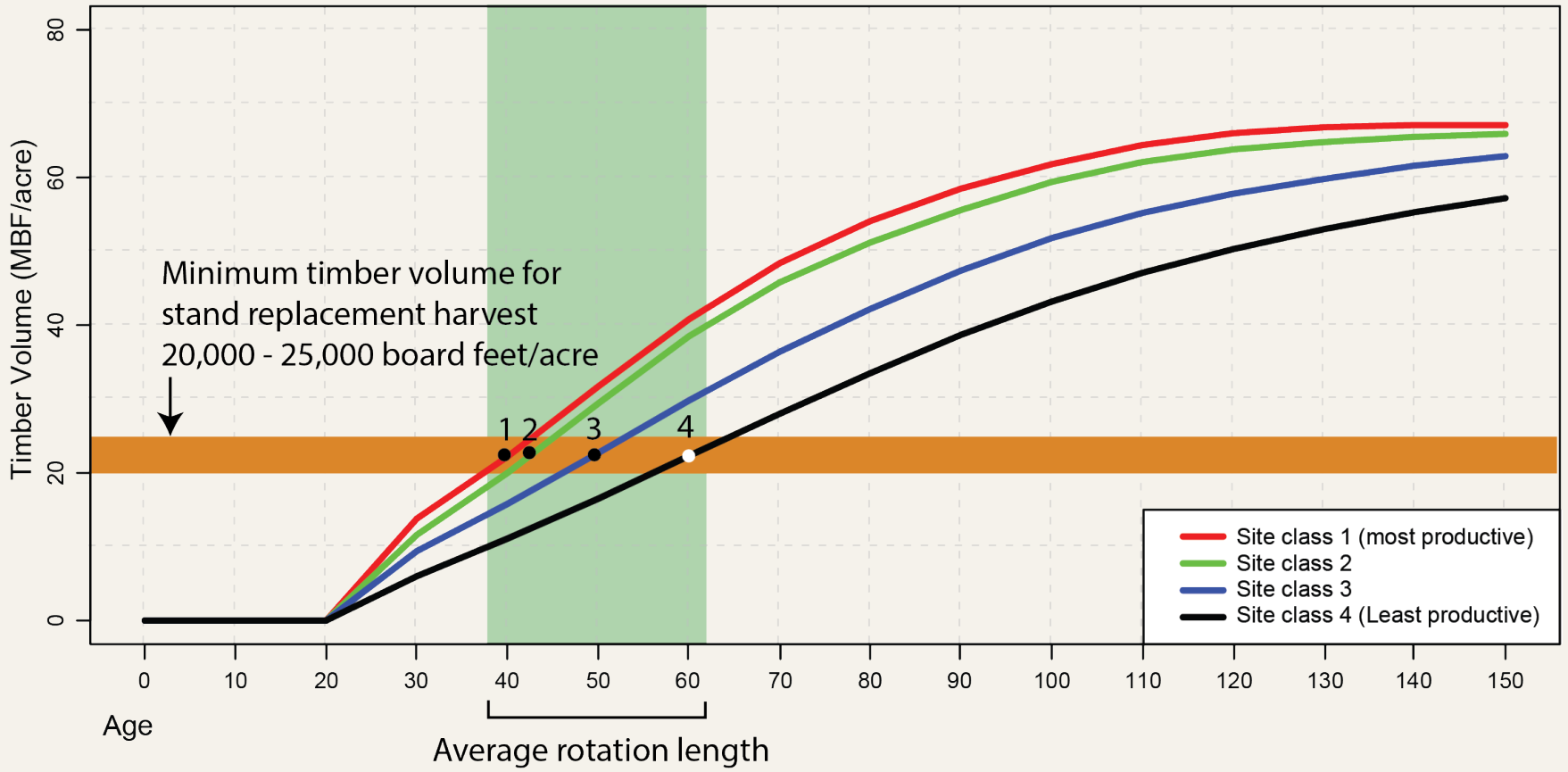
9
Increased emphasis on silviculture

Scenario 14 (3+6+9)

Shorten harvest rotation (Scenario 3)

Sample Douglas-fir yield curve, western Washington

Yield curve generated from RSFRIS inventory plots and stratified using information from DNR's inventory

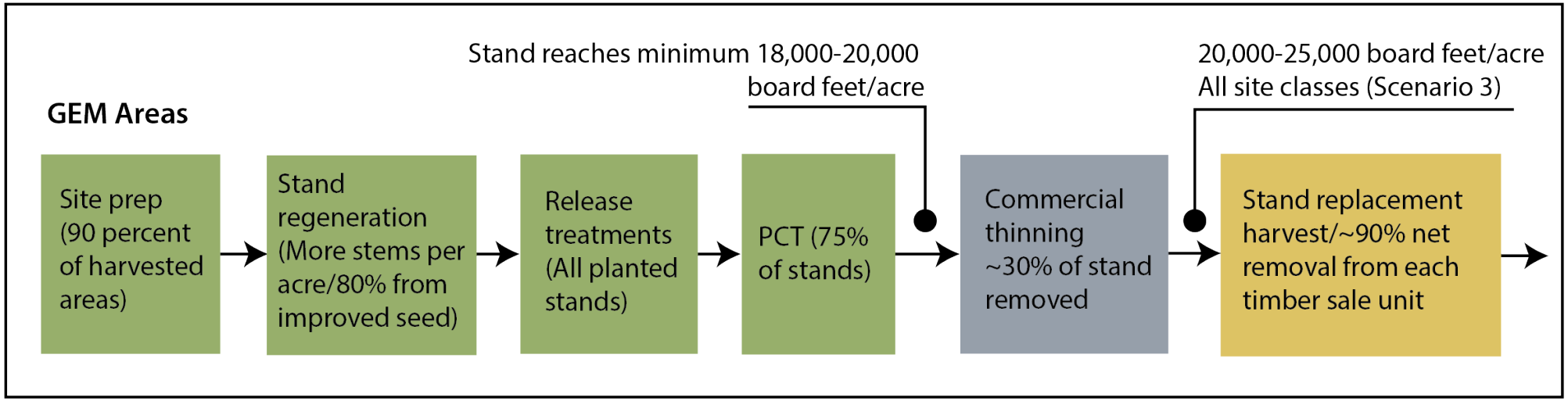


Scenario 14 (3+6+9)

In GEM areas, defer 100% of the following forest types (Scenario 6):

- Older, "carbon-dense," structurally complex forest as DNR defines them within its *Policy for Sustainable Forests.**

Increased emphasis on silviculture



*Only definition of structurally complex forest recognized by DNR

Scenario 15

2a

Lengthen harvest rotation

+

4a

Significantly increase thinning

+

9

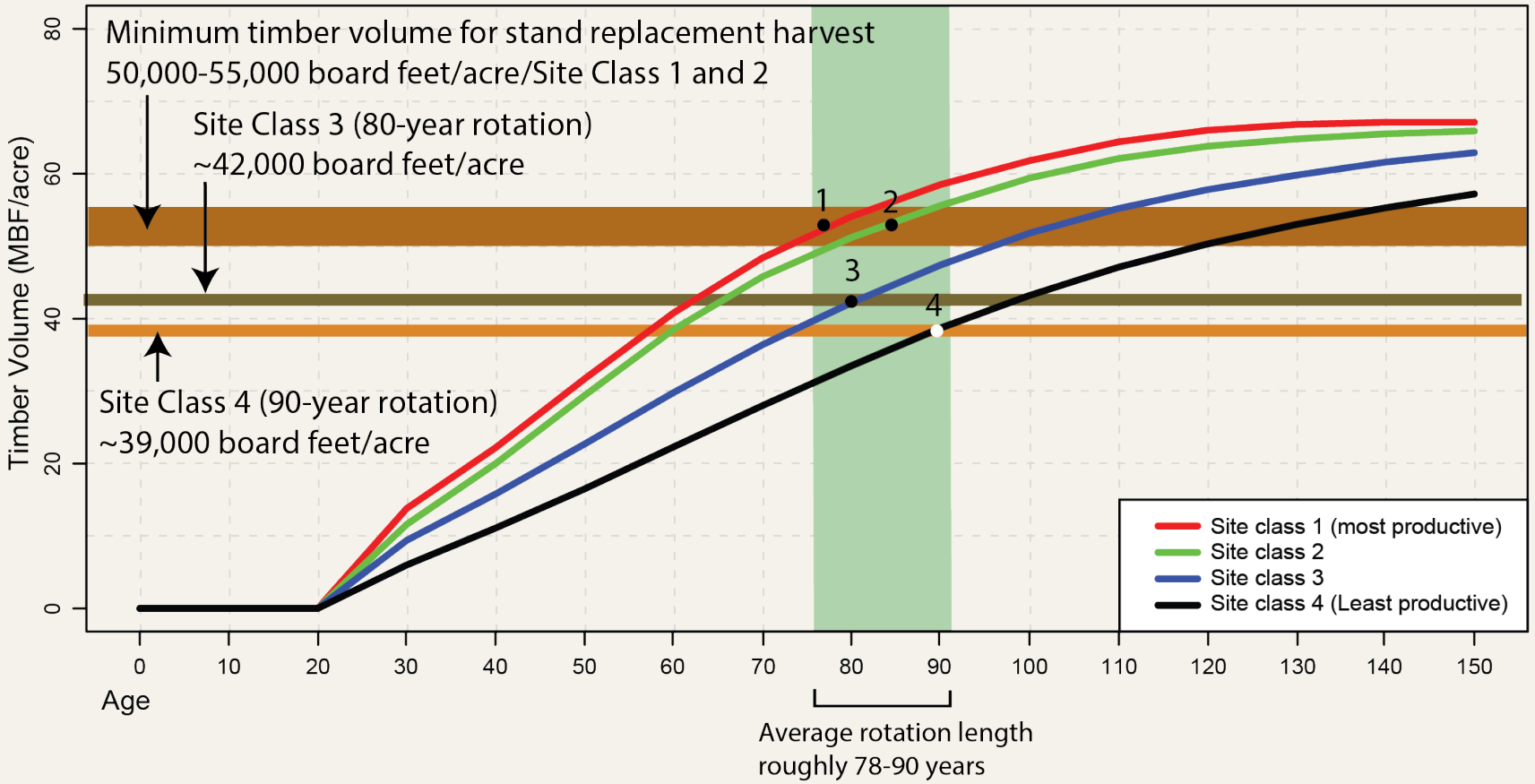
Increased emphasis on silviculture

Scenario 15 (2a+4a+9)

Lengthen harvest rotation (Scenario 2a)

Sample Douglas-fir yield curve, western Washington

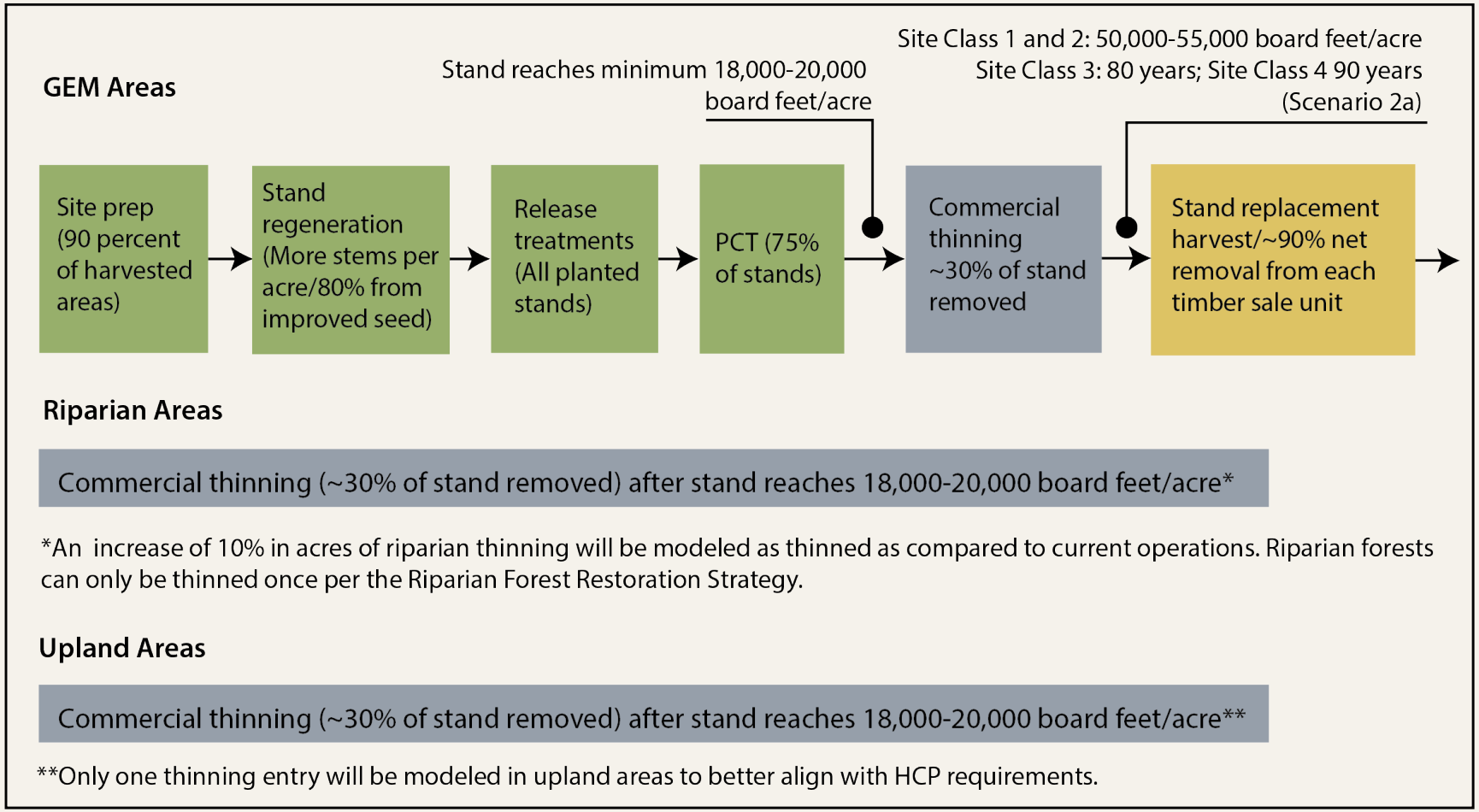
Yield curve generated from RSFRIS inventory plots and stratified using information from DNR's inventory



Scenario 15 (2a+4a+9)

Significantly increase thinning (Scenario 4a)

Increased emphasis on silviculture (Scenario 9)



Scenario 16 (NEW/ Includes friendly amendment)*

3
Shorten harvest rotation

+

4a
Significantly increase thinning

+

9
Increased emphasis on silviculture

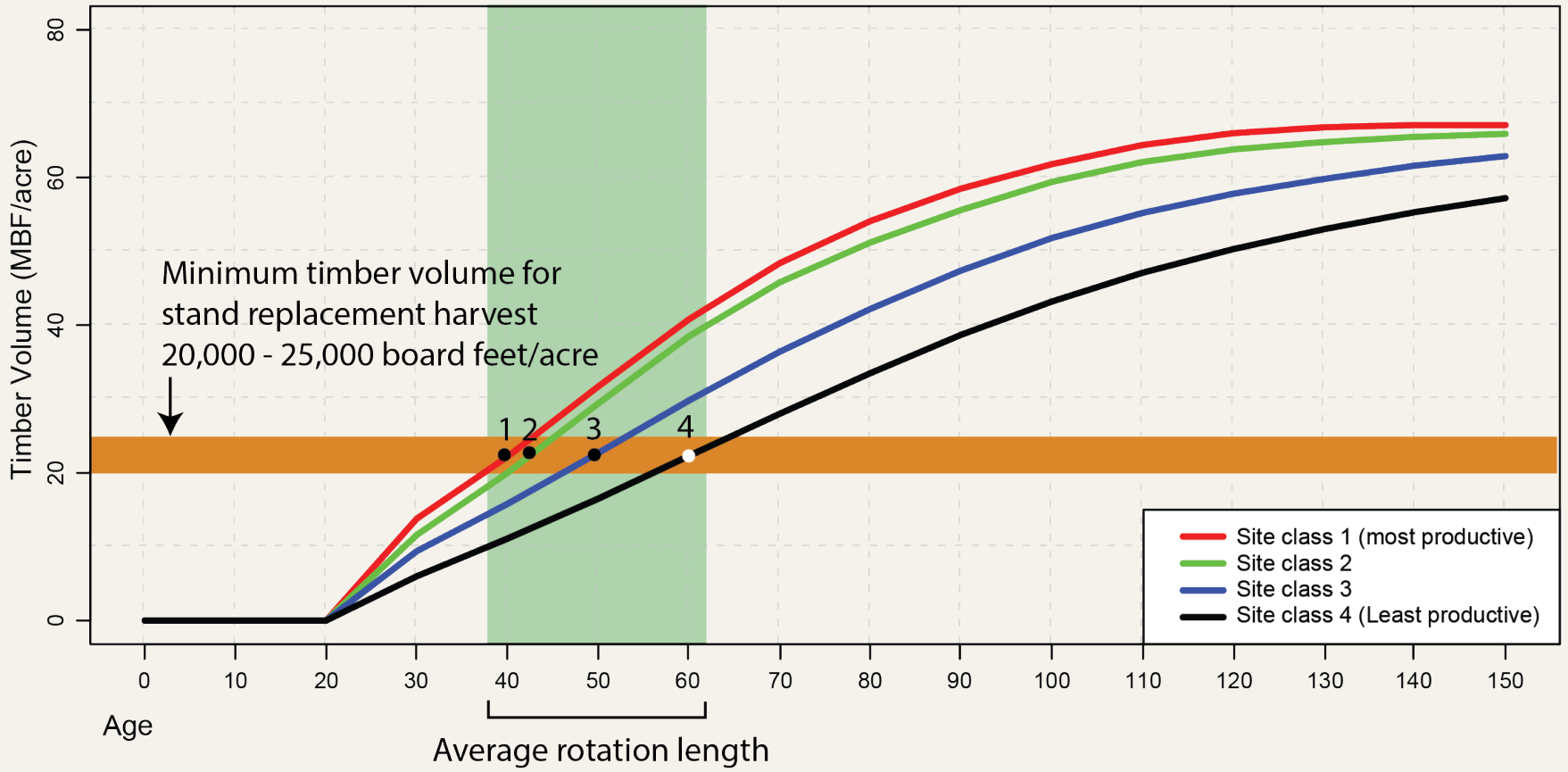
*To see the original version of this scenario, refer to presentation for Meeting 6.5

Scenario 16 (3+4a+9)

Shorten harvest rotation (Scenario 3)

Sample Douglas-fir yield curve, western Washington

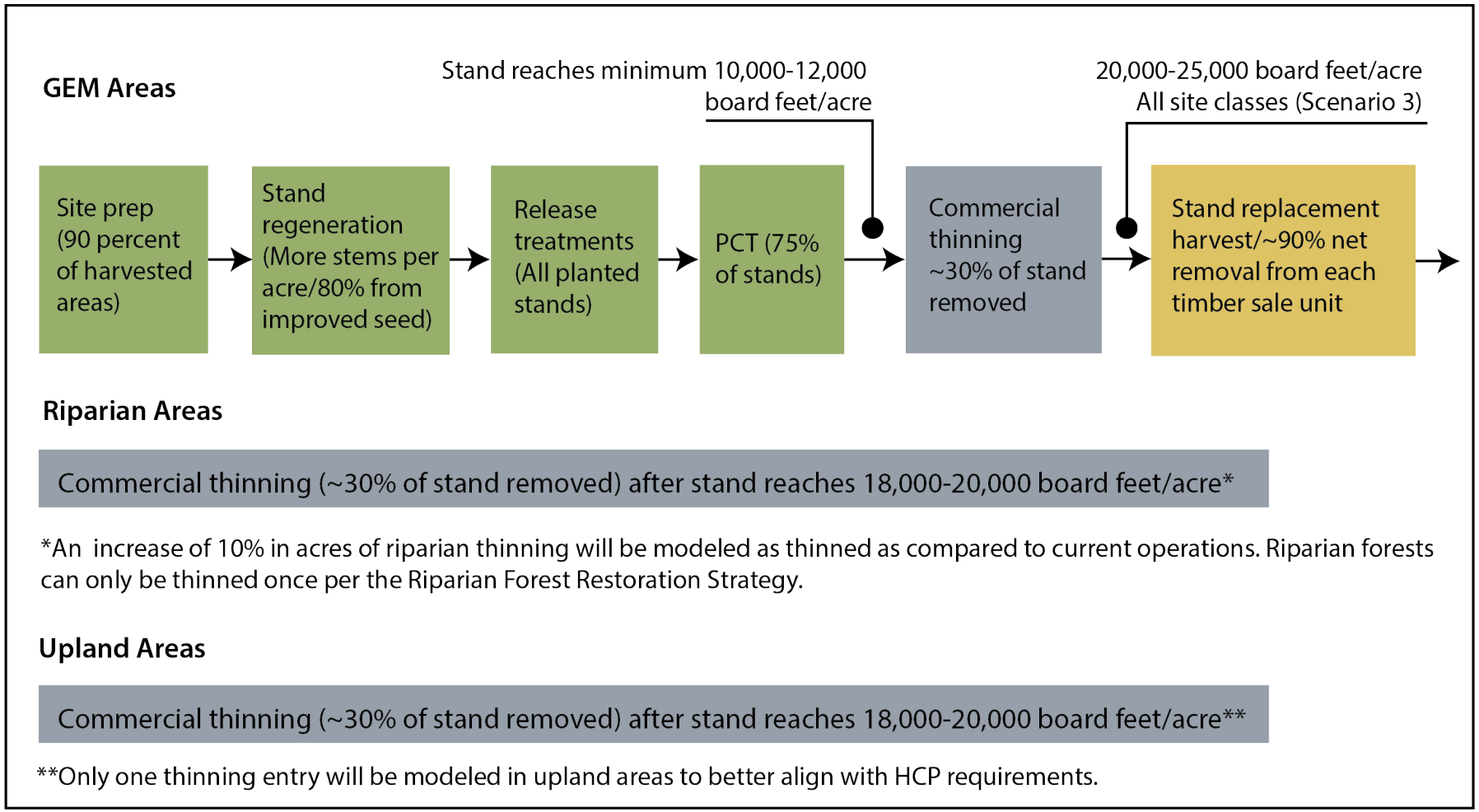
Yield curve generated from RSFRIS inventory plots and stratified using information from DNR's inventory



Scenario 16 (3+4a+9)

Significantly increase thinning (Scenario 4a)

Increased emphasis on silviculture (Scenario 9)



Round Robin

Voting Results

The work group elected to model the following four scenarios:

- Scenario 8 (2a + 4a)
- Scenario 10 as amended during meeting (2a + 4a + 7)
- Scenario 11 (4a + 9)
- Scenario 16 as amended during meeting (3 + 4a + 9)

These scenarios are in addition to Scenarios 1 through 4, which were adopted at a previous work group meeting.