Carbon and Forest Management Work Group

Modifications to Scenarios and Model

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December 11, 2024 | 9 am – 3 pm

Meeting #10

Setting the Stage: the Proviso

- Conserve and manage older, carbon-dense, structurally complex forest stands located on DNR-managed lands
- Increase carbon sequestration and storage in forests and harvested wood products from DNR-managed forestlands
- Generate predictable beneficiary revenue
- Maintain timber supplies that support local industry
- Address economic needs in rural communities.

Addressed in the economic analysis



Modification Process

- Work group can provide ideas today and will have until **9 am on Monday, Dec. 16** to review slides and provide additional feedback.
- At the end of this discussion, members will provide their **top 3 priorities** for modifications.
- Scope of changes is **constrained by available time and budget**. Using work group feedback, DNR and ESSA will consider list of modifications as a whole and determine what can reasonably be accomplished.

What can be Changed?

Turn dials or adjust how scenarios are modeled

Harvest rotation length

Amount of thinning

Deferral of structurally complex, carbon-dense forest

Emphasis on silviculture

Things to Consider

- Stay focused on the proviso.
- Avoid difficult changes that are unlikely to change trajectories over time; ESSA will provide some feedback during discussions.

Scenarios

- **Scenario 1**: DNR current operations
- **Scenario 2**: Lengthen harvest rotation
- **Scenario 3**: Shorten harvest rotation
- **Scenario 4**: Significantly increase thinning
- **Scenario 5**: Lengthen harvest rotation, significantly increase thinning
- **Scenario 6**: Lengthen harvest rotation, significantly increase thinning, increase deferrals
- **Scenario 7**: Significantly increase thinning, increased emphasis on silviculture
- **Scenario 8**: Shorten harvest rotation, significantly increase thinning, increased emphasis on silviculture

Ideas from the November Meeting



Commercial Thinning (Model Adjustment)

The model assigns commercial thinning to any stand that is eligible for stand replacement harvest, meets the thinning volume threshold, and has not yet been thinned, ***regardless*** of stand age.

- **Adjustment**: Set a maximum age for a stand to receive a commercial thinning.
- **Estimated difficulty**: Low-medium

Commercial Thinning (Scenario Change)

For all scenarios that include significantly increase thinning component, the model performs one thinning entry per rotation for stands in general ecological management (GEM) lands.

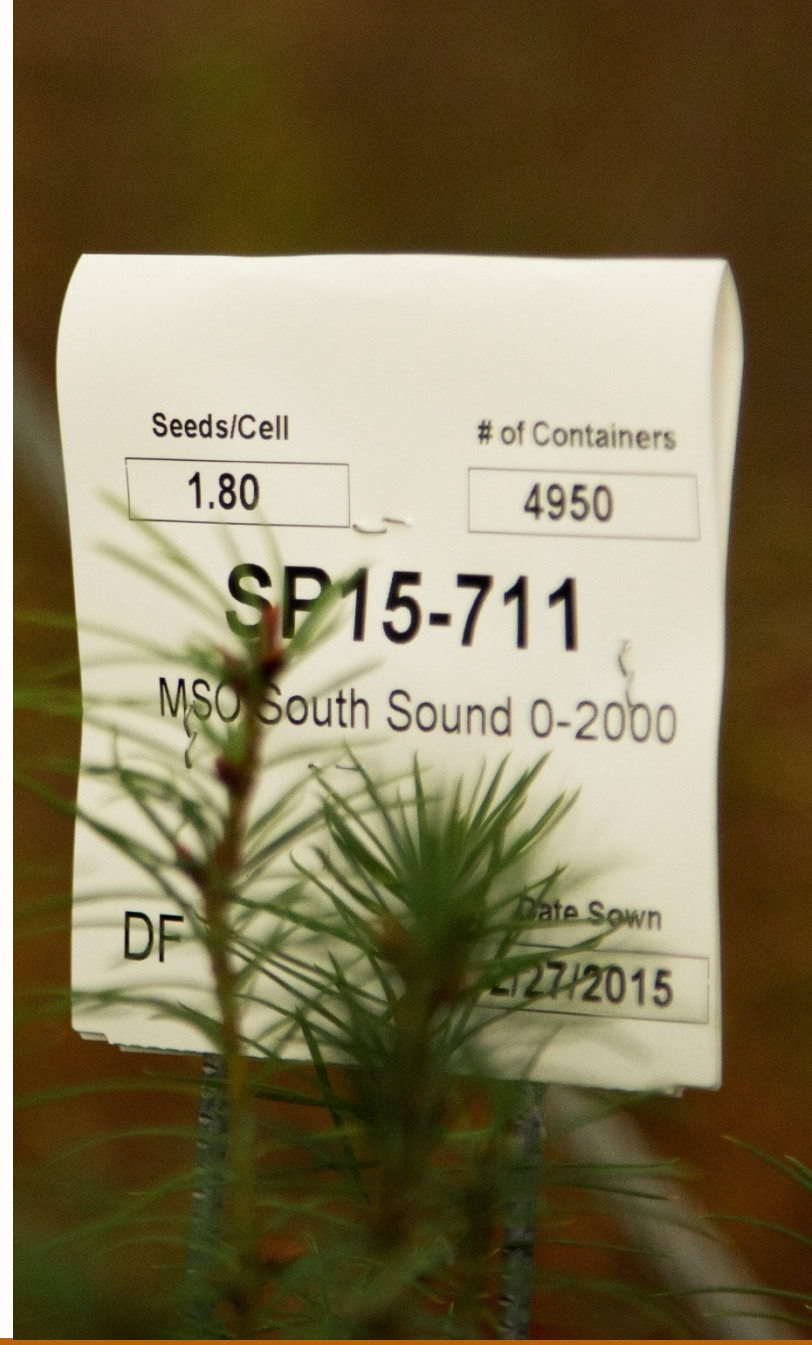
- **Scenario change:** Reduce the percentage of stands in GEM areas that receive a commercial thinning on some or all scenarios.
- **Estimated difficulty**: Low



Planting (Model Adjustment)

For the climate change scenarios, the model does not adapt planting to altered growing conditions.

- **Model adjustment:** Alter planting over time in response to climate change.
- **Estimated difficulty**: High



Adjust Harvest Levels (Model Adjustment)

ESSA constrained the model to the average, sold harvest volume in each county in the analysis area to represent current timber volumes.

- **Model adjustment:** Use current sustainable harvest level instead of harvest over past ten years, and break out by county
- **Estimated difficulty**: High

Harvest Levels (Model Adjustment, Option 2)

- ESSA constrained the model to the average, sold harvest volume in each county in the analysis area to represent current timber volumes.
- **Model adjustment:** Use current sustainable harvest level but apply by sustainable harvest unit instead of county
- **Estimated difficulty**: High



Increased Emphasis on Silviculture (Scenario change, ESSA Suggestion)

Currently, only Scenarios 6 and 7 include this component.

- **Scenario adjustment:** Incorporate this component into more scenarios.
- **Estimated difficulty**: Low

Summary of November Ideas

Idea	Difficulty Level Estimate	Potential Impact on Results
1. Set a maximum stand age for commercial thinning	Low-Medium	Low
2. Reduce proportion of stands in GEM areas that receive commercial thinning	Low	High
3. Modify planting as conditions change over time	High	High
4. Apply sustainable harvest level by county	Very high	Medium
5. Apply sustainable harvest level by sustainable harvest unit	Very high	Medium
6. Add enhanced silviculture to more scenarios	Low	Low

New Ideas for Revisions



New Ideas

Idea	Difficulty Level Estimate	Potential Impact on Results
7. (Specific to Idea 2) Alter thinning volume/area, particularly for the lengthening rotations + significantly increased thinning scenario	% area provided: Low Other metric provided: Medium to High (code changes required)	High
8. Explore wood product life cycle numbers. For example, literature review of wood products life cycle numbers.	Unknown	Low-Medium
9. Modify climate change related mortality	High	High
10. For Scenario 2, change the threshold for Site Class 3 and 4 from harvest volume to age to match Scenarios 5 and 6	Low	Low-Medium
11. Add increased emphasis on silviculture to Scenario 2	Low	Low
12. For scenarios with increased thinning, set a maximum age for thinning and reduce the area of stands being thinned (Ideas 1 and 2)	Medium	High

Data Requests

Request	Difficulty Level Estimate
Provide example yield curves and stand density estimates under climate change (e.g., to better understand what drives yield and stand density declines)	Low
Summarize rotation ages by scenario	Low
Provide example yield curves to track carbon dynamics over time in deferred stands	Low

Round Robin: Your Top Priorities

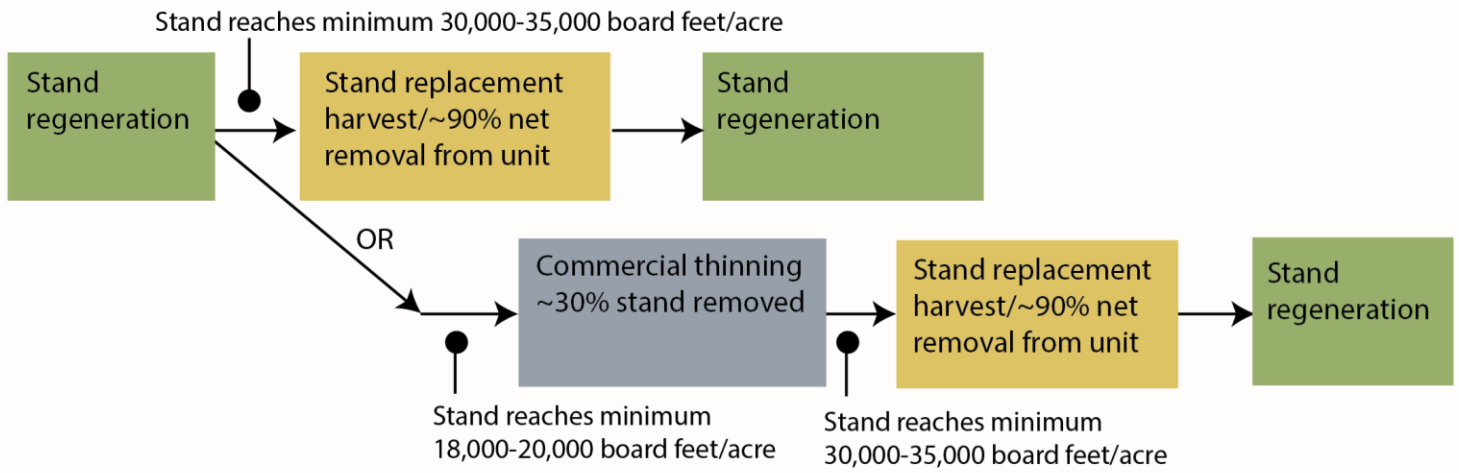


Supplemental Slides



Scenario 1: DNR Current Operations

GEM Areas



Riparian Areas

Commercial thinning (~30% of stand removed) after stand reaches 18,000-20,000 board feet/acre*

*Roughly 83 acres of riparian forest thinned per year in western Washington. Per the RFRS, riparian forests can be thinned only once.

Upland Areas

Commercial thinning (~30% of stand removed) after stand reaches 18,000-20,000 board feet/acre**

**Only one thinning entry will be modeled in upland areas to better align with HCP requirements.

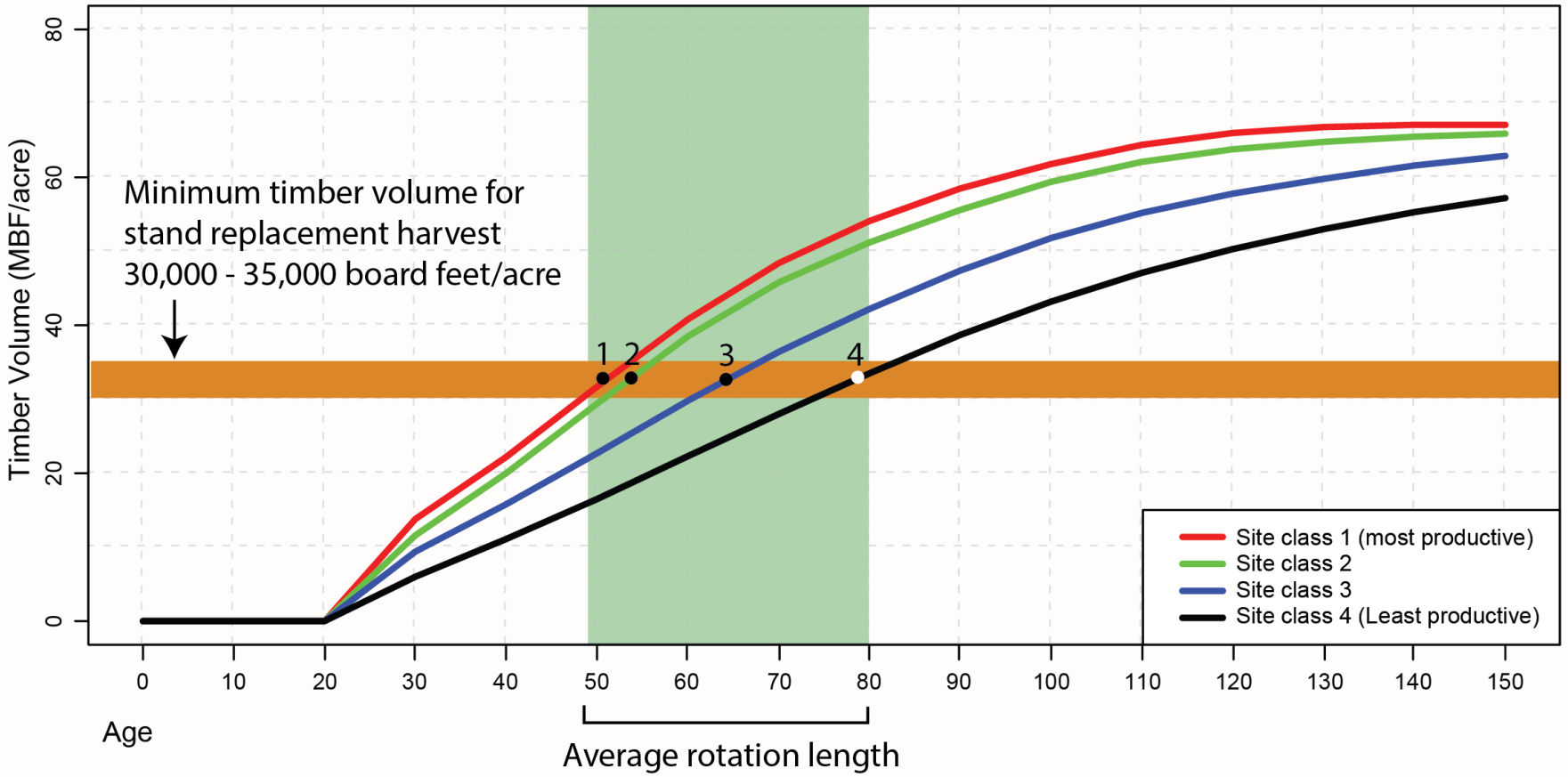
Scenario 1: DNR Current Operations

DNR current operations

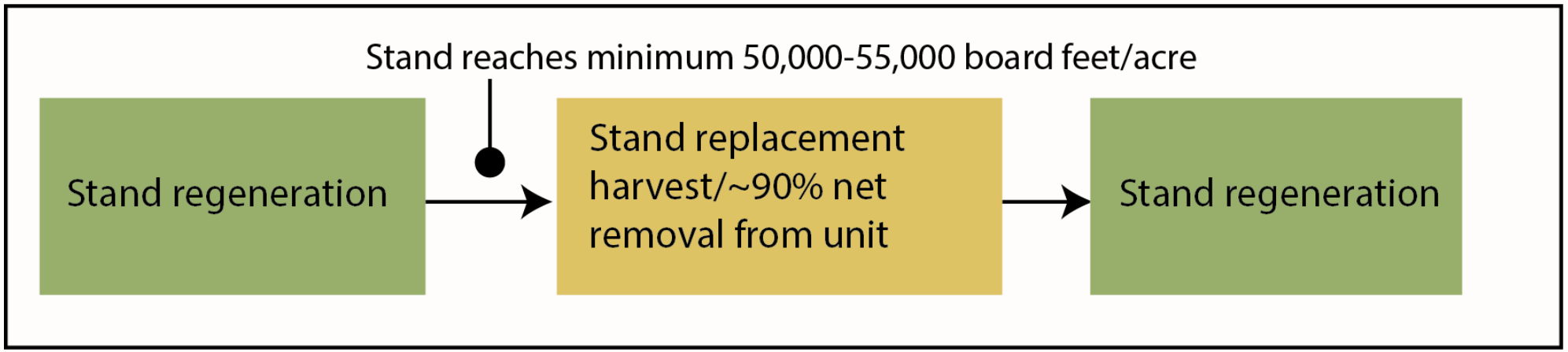
All four site classes based on minimum timber volume

Sample Douglas-fir yield curve, western Washington

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



Scenario 2: Lengthen Harvest Rotation



Scenario 2: Lengthen Harvest Rotation

Lengthen harvest rotation

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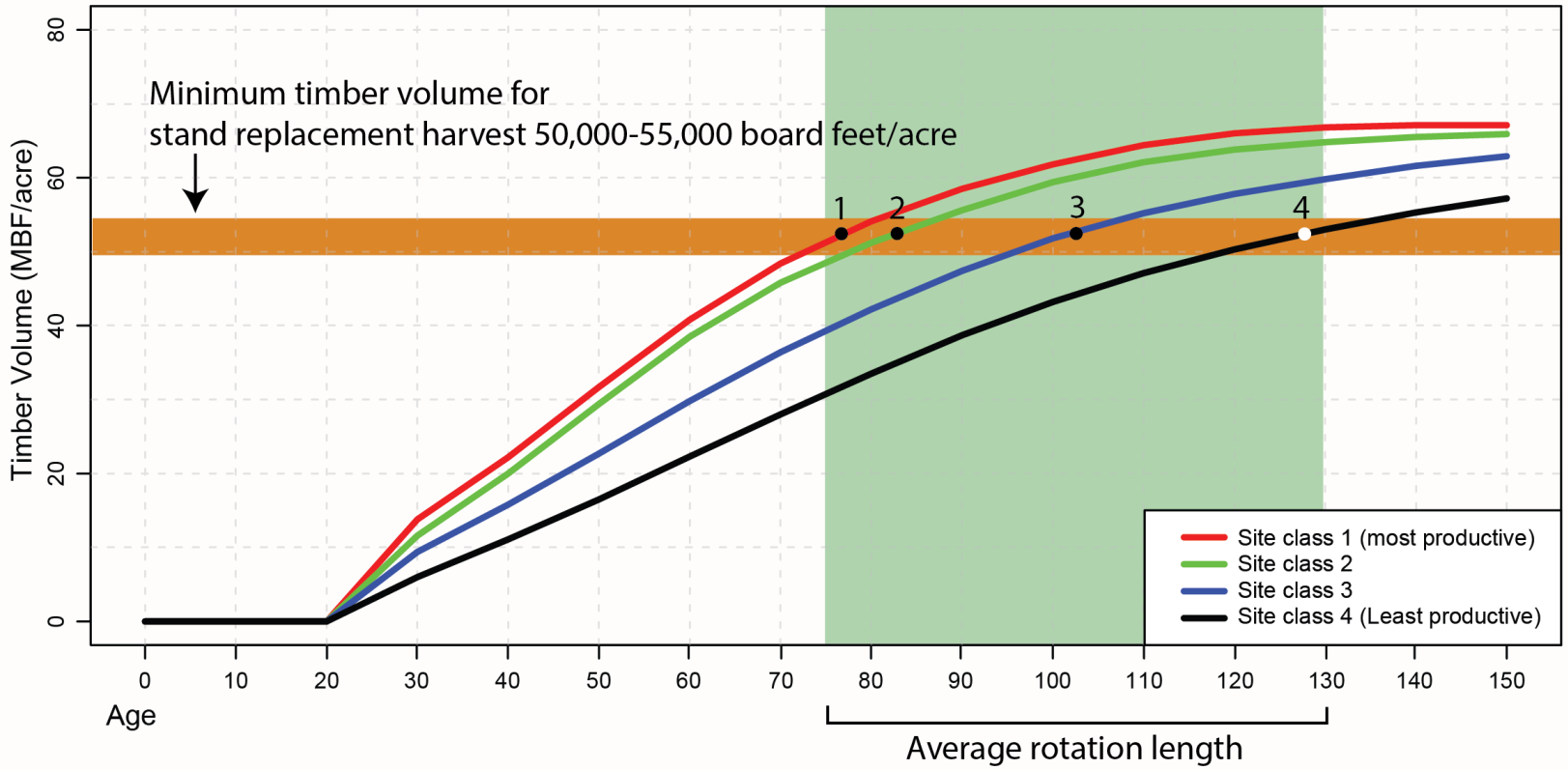
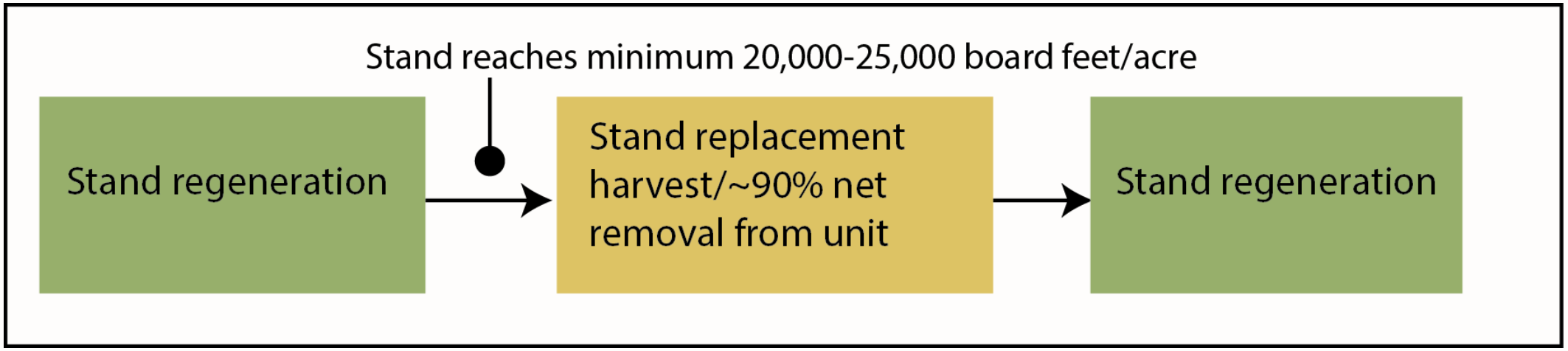


Scenario 3: Shorten Harvest Rotation



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Shorten harvest rotation

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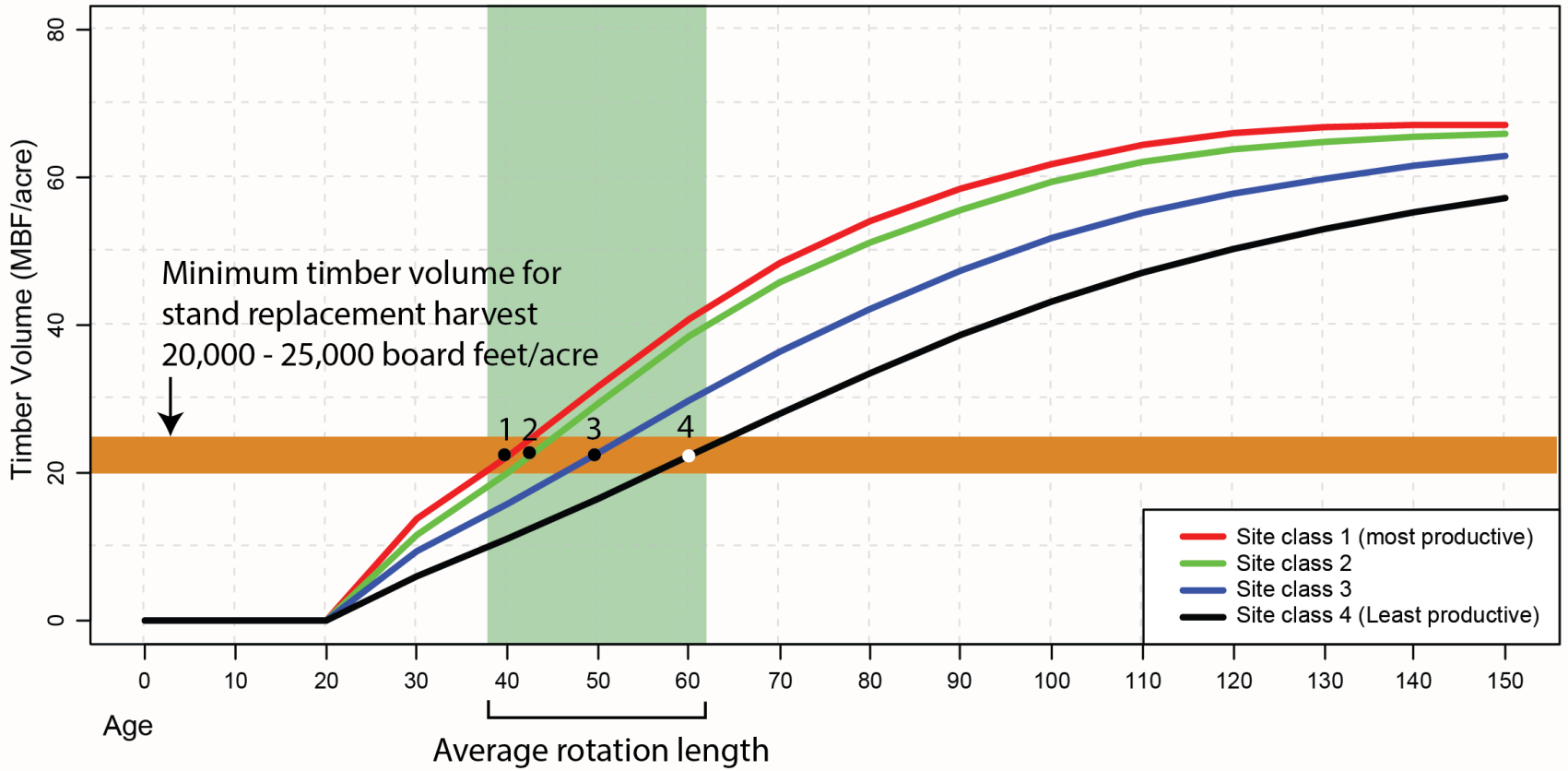
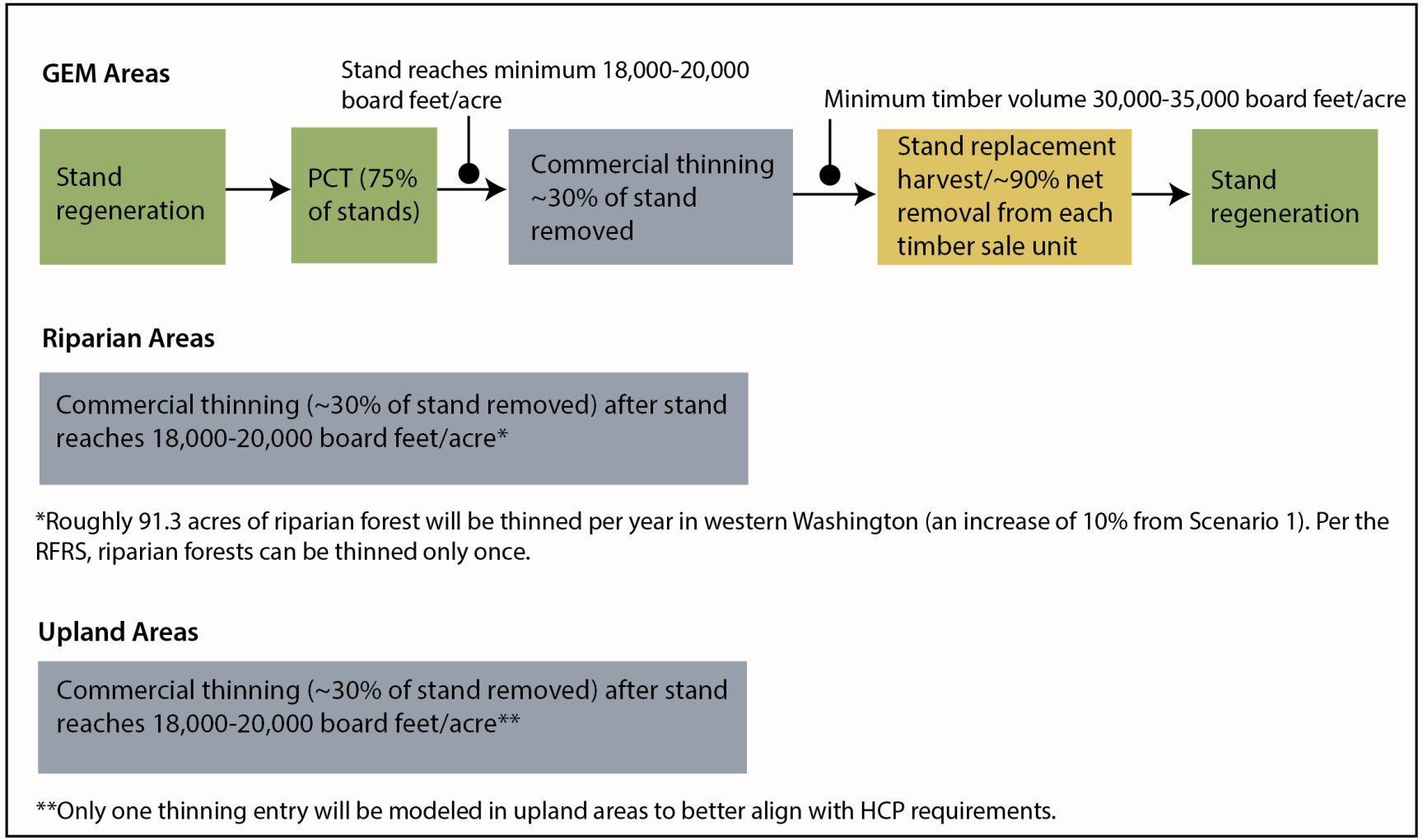


Scenario 4: Significantly Increase Thinning

- One thinning per harvest rotation
- Small increase in riparian thinning
- One thinning entry in upland areas
- Increase in PCT in GEM areas



Scenario 5: Lengthen Harvest Rotation and Significantly Increase Thinning

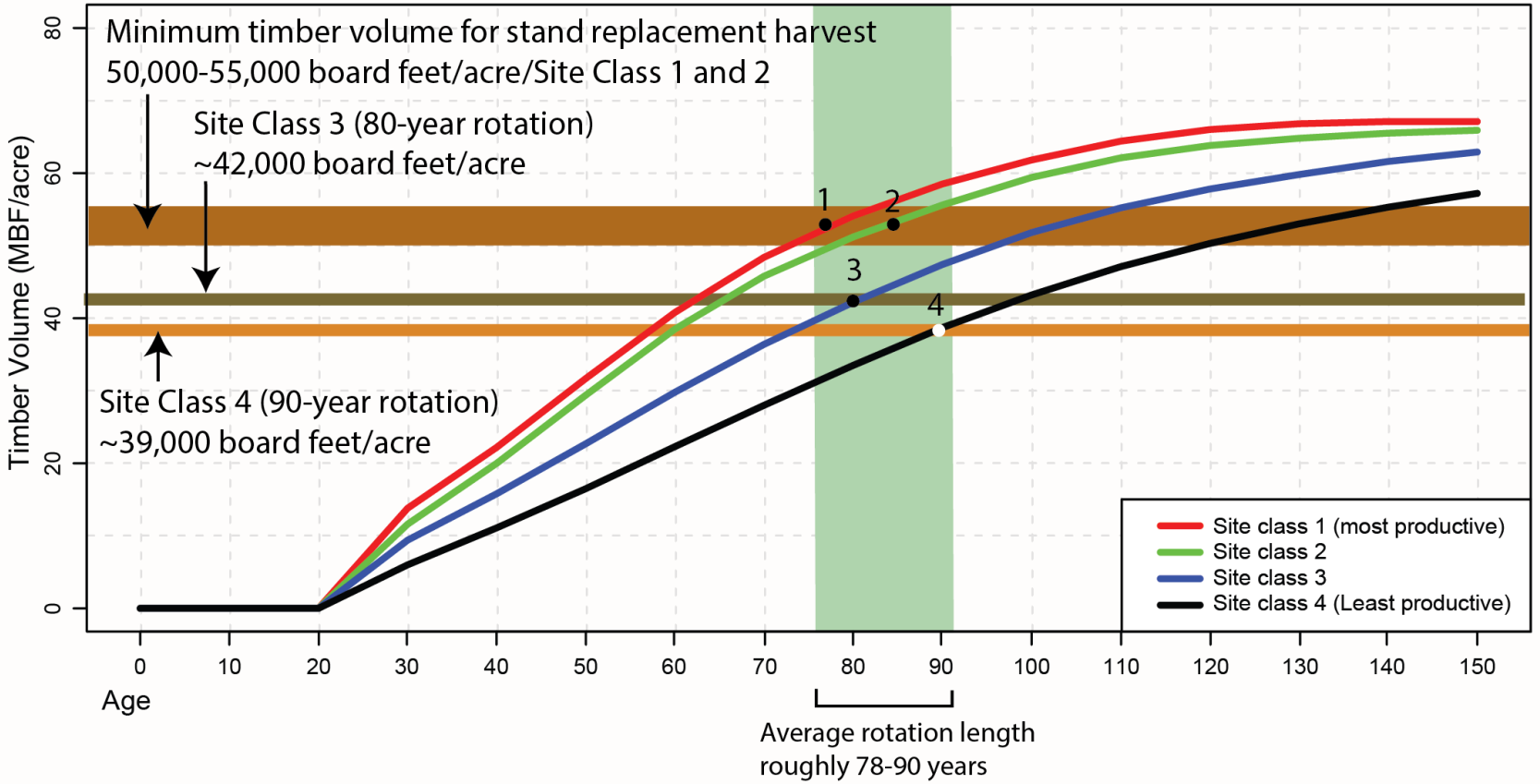
Lengthen harvest rotation

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

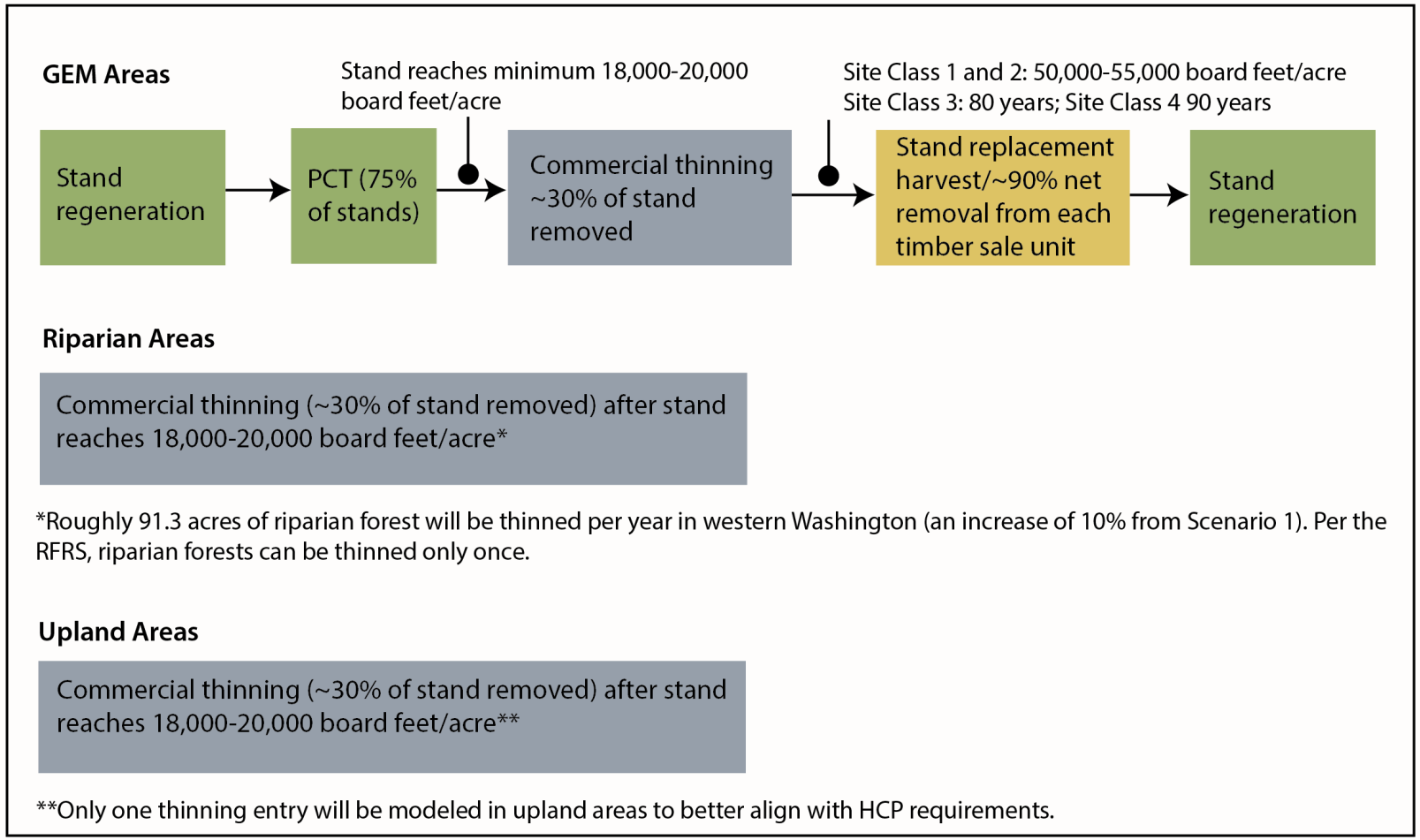
Yield curve generated from RSFRIS inventory plots and stratified using information from DNR's inventory



Scenario 5: Lengthen Harvest Rotation and Significantly Increase Thinning

Significantly increase thinning

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



Scenario 6: Lengthen Harvest Rotation, Significantly Increase Thinning, Increase Deferrals

Lengthen harvest rotation

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

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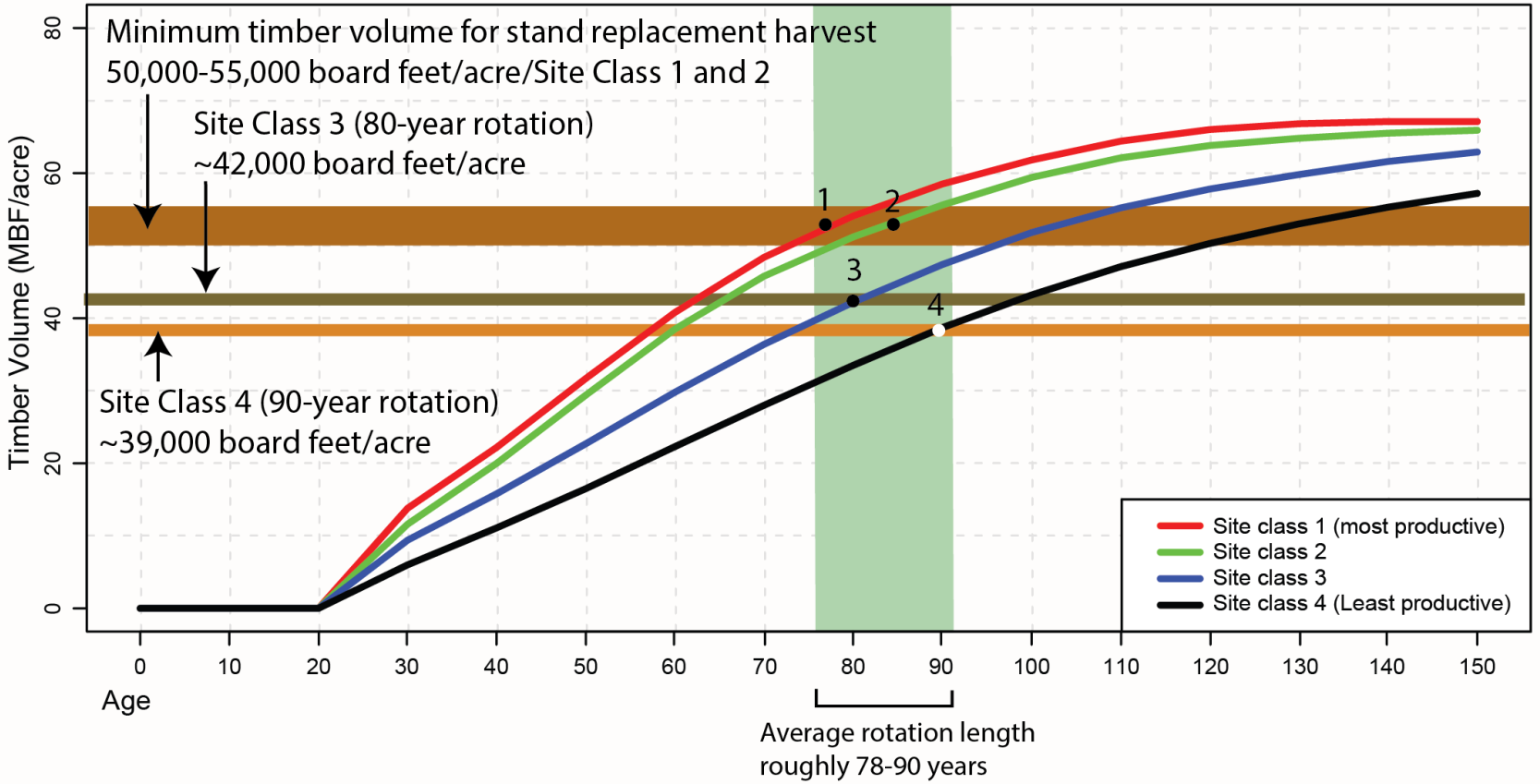

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Significantly increase thinning

- One thinning per harvest rotation
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GEM Areas

Stand regeneration → PCT (75% of stands) → Commercial thinning ~30% of stand removed → Stand replacement harvest/~90% net removal from each timber sale unit → Stand regeneration

Stand reaches minimum 18,000-20,000 board feet/acre

Site Class 1 and 2: 50,000-55,000 board feet/acre
Site Class 3: 80 years; Site Class 4 90 years

Riparian Areas

Commercial thinning (~30% of stand removed) after stand reaches 18,000-20,000 board feet/acre*

*Roughly 91.3 acres of riparian forest will be thinned per year in western Washington (an increase of 10% from Scenario 1). Per the RFRS, riparian forests can be thinned only once.

Upland Areas

Commercial thinning (~30% of stand removed) after stand reaches 18,000-20,000 board feet/acre**

**Only one thinning entry will be modeled in upland areas to better align with HCP requirements.

Scenario 6: Lengthen Harvest Rotation, Significantly Increase Thinning, Increase Deferrals

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 7: Significantly Increase Thinning and Increased Emphasis on Silviculture

Significantly increase thinning

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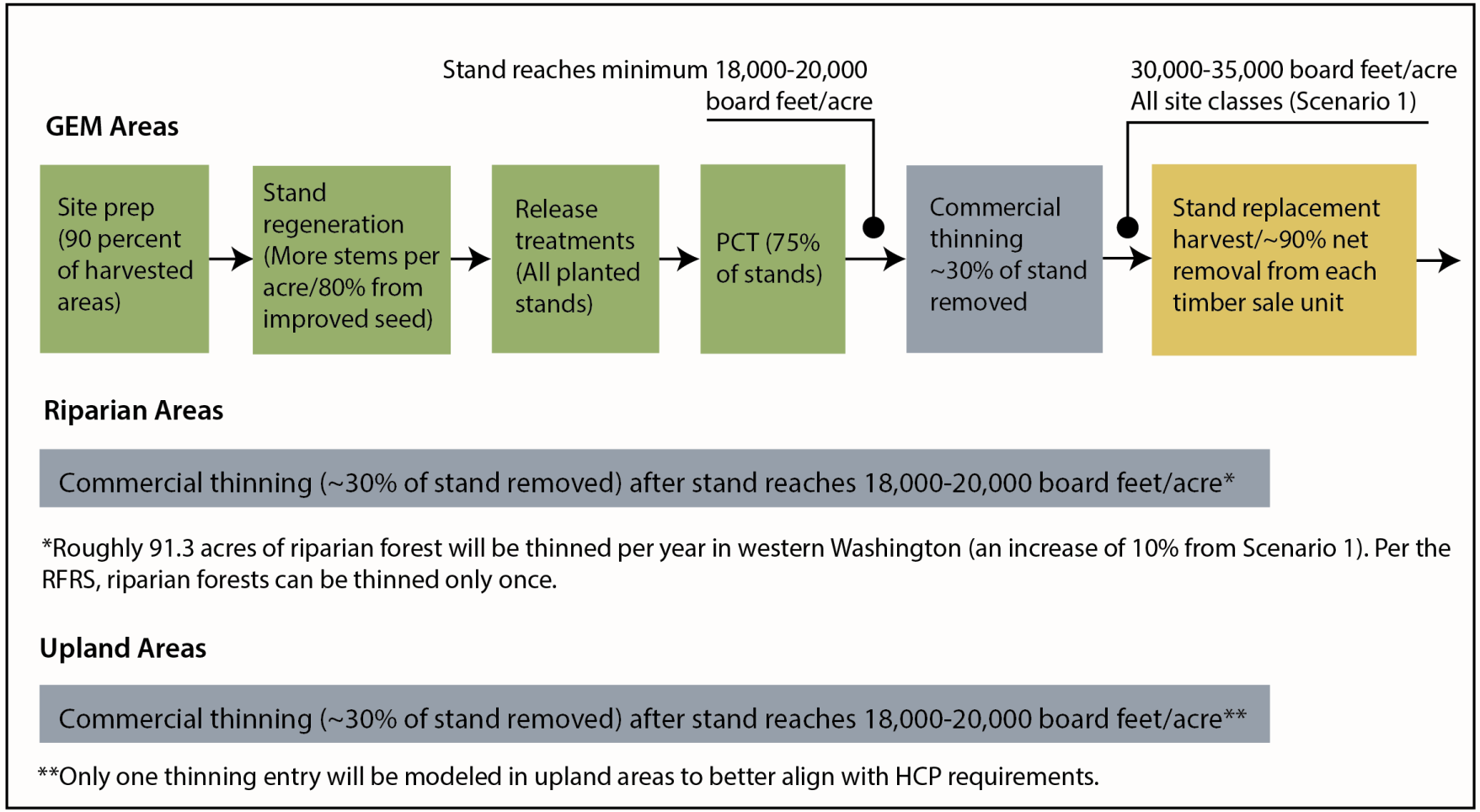
- Small increase in riparian thinning
- One thinning entry in upland areas
- Increase in PCT in GEM areas



Scenario 7: Significantly Increase Thinning and Increased Emphasis on Silviculture

Increased emphasis on silviculture

- 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
- 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.

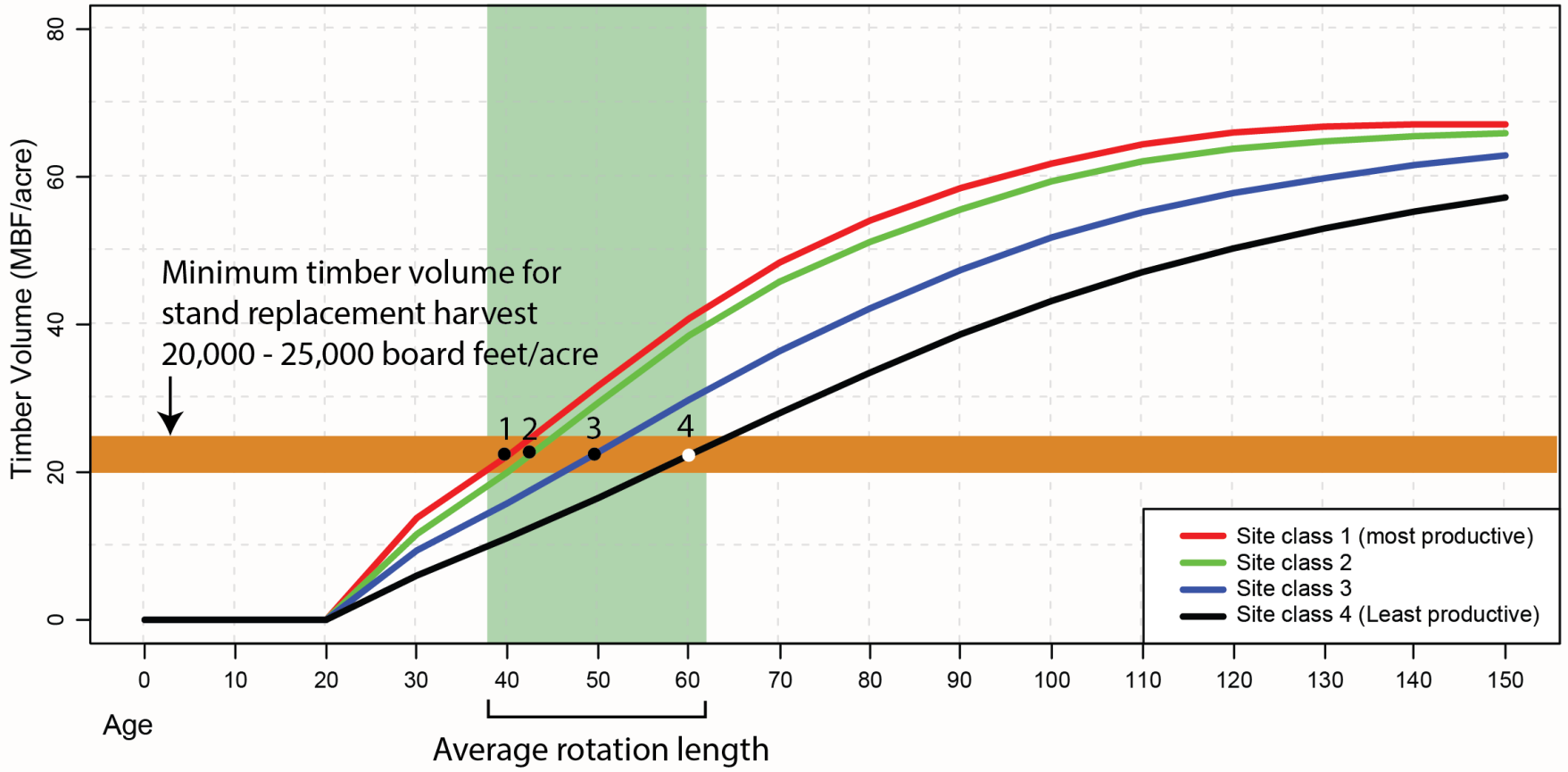
Scenario 8: Shorten Harvest Rotation, Significantly Increase Thinning, Increased Emphasis on Silviculture

Shorten harvest rotation

All four site classes based on minimum timber volume

Sample Douglas-fir yield curve, western Washington

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



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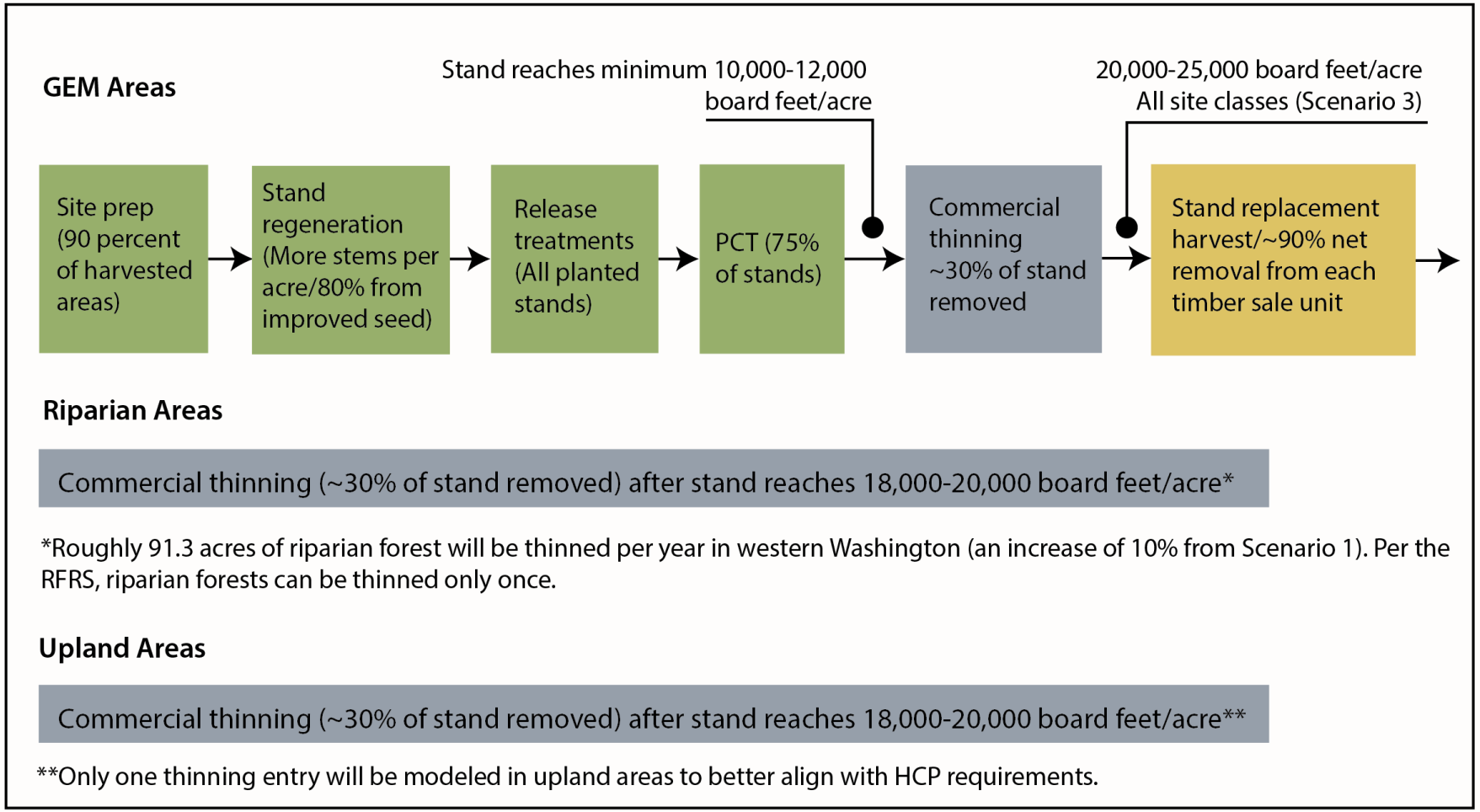

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- Conduct PCT on 75 percent of forest stands.