



# Management Questions – Science Answers: Science to Management Forum Forest Science Chat Series

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Online

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# Mixedwood Regeneration Standards

- development and application -

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Research Chat Series

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## Stocking vs. Regeneration Standards

- Stocking standards evaluate site occupancy by acceptable species
- Regeneration standards usually include the concept of stocking, but typically include other elements aimed at achieving a desired future forest condition

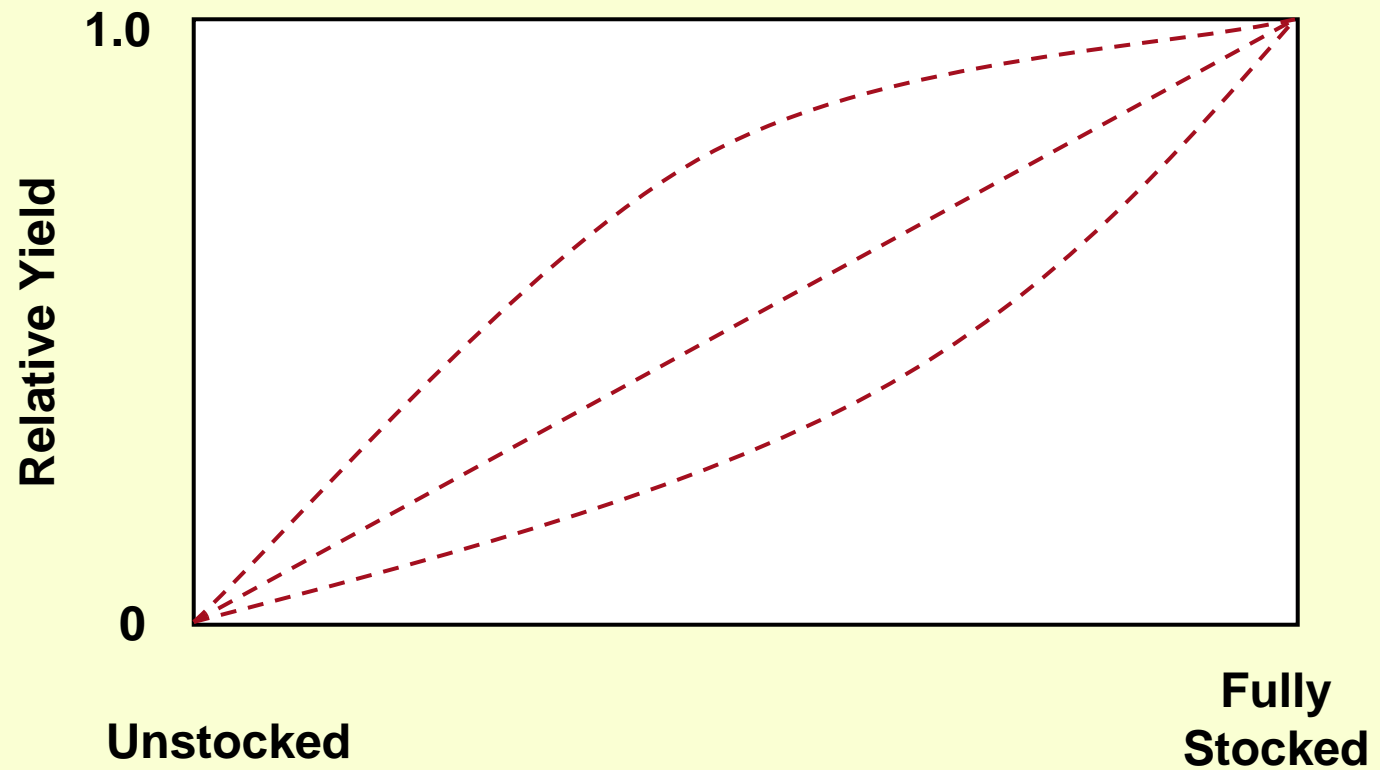


# Objectives vs. Standards

- Forest managers cannot operate without objectives and targets
- Objectives at one scale lead to standards at a smaller scale
- Standards that are not firmly embedded in explicit larger scale objectives can easily lead to unexpected outcomes



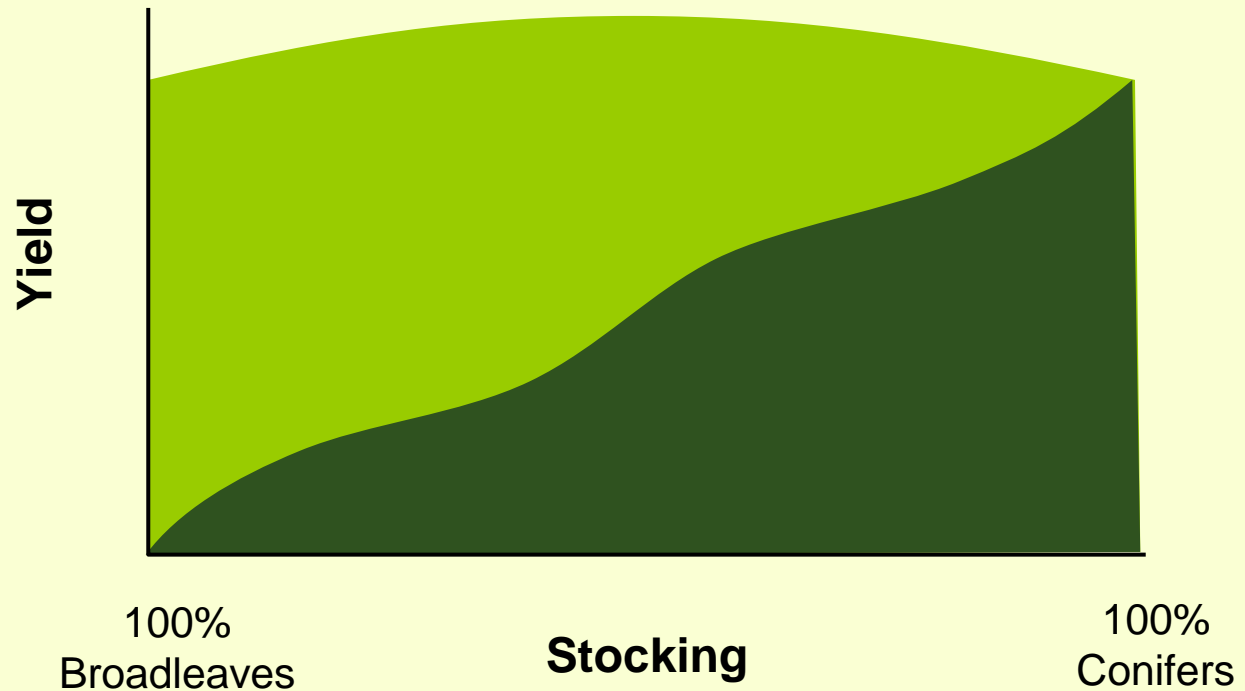
# Stocking: *Occupation of Growing Space*



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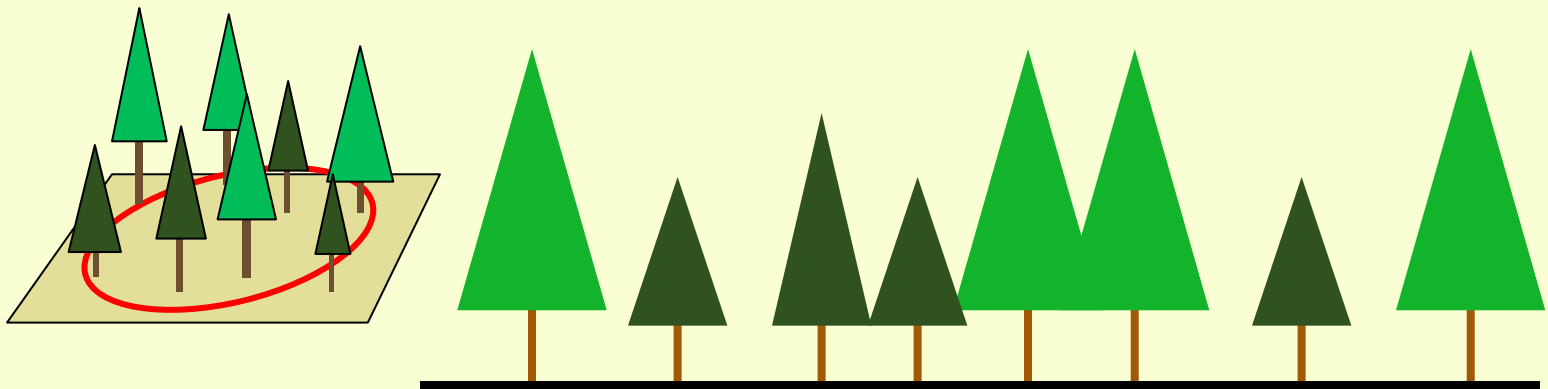


# Stocking: *Allocation of Growing Space*



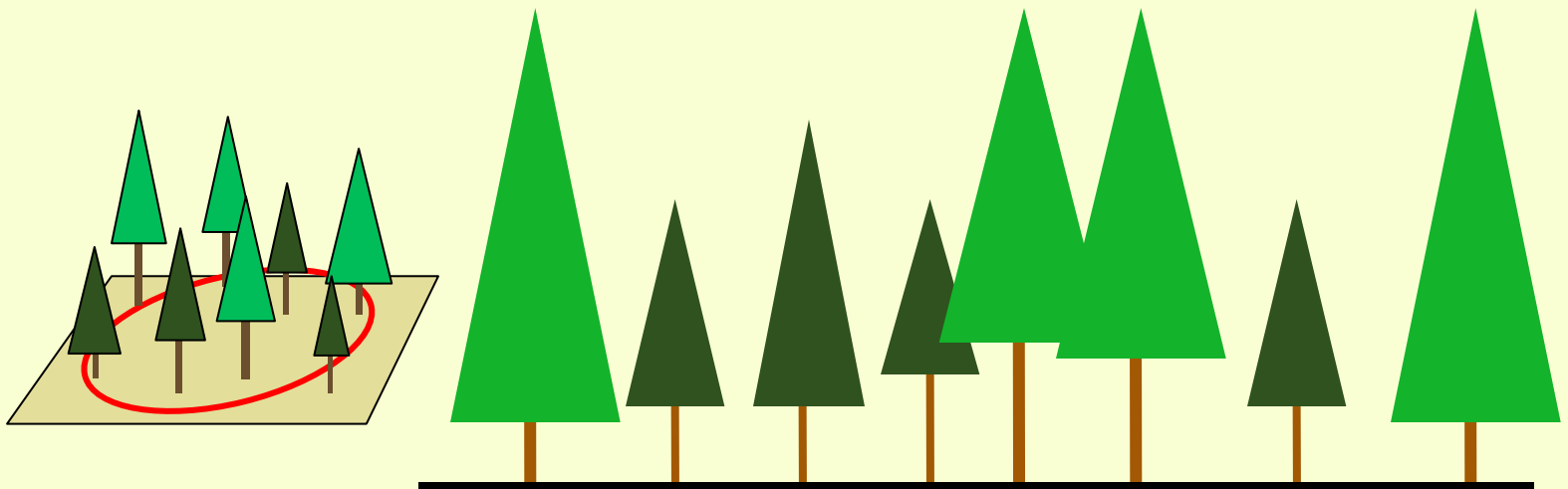
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# Growing Space Allocation - Conifers



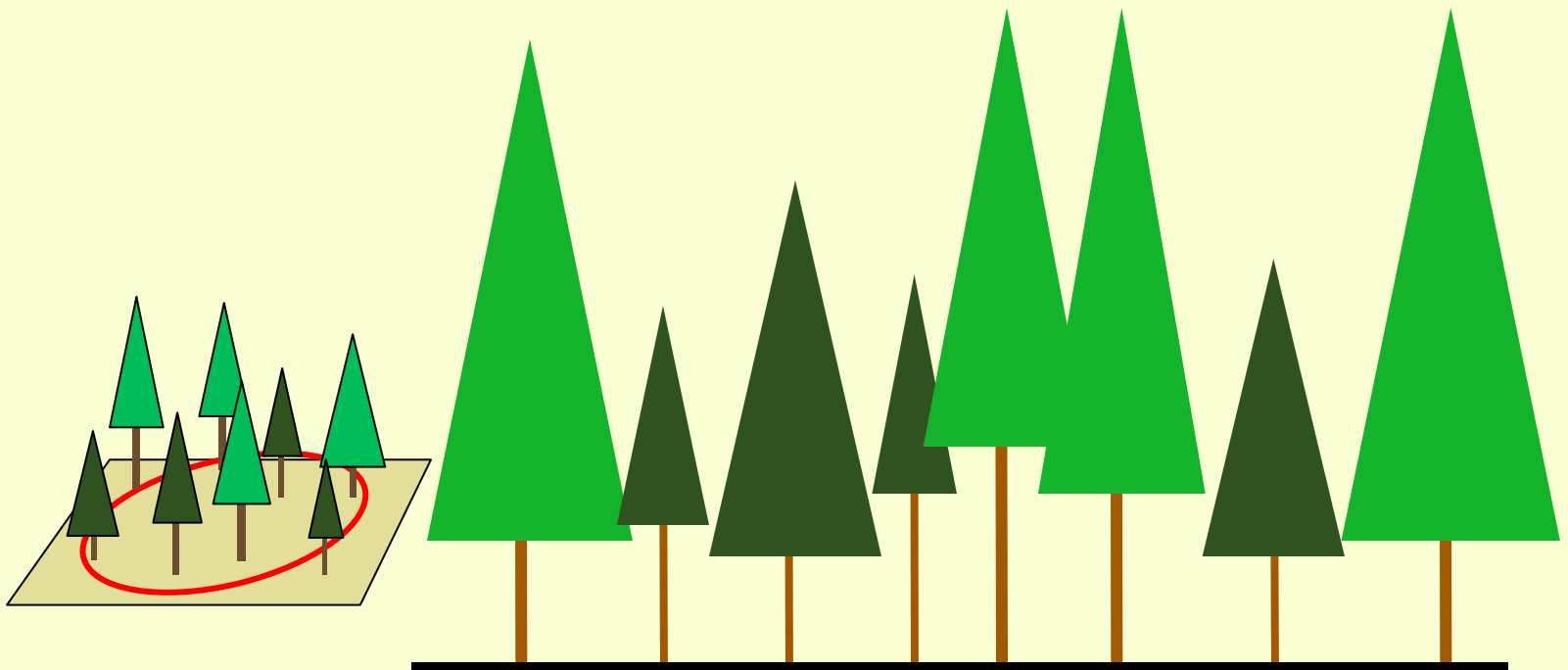
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# Growing Space Allocation - Conifers



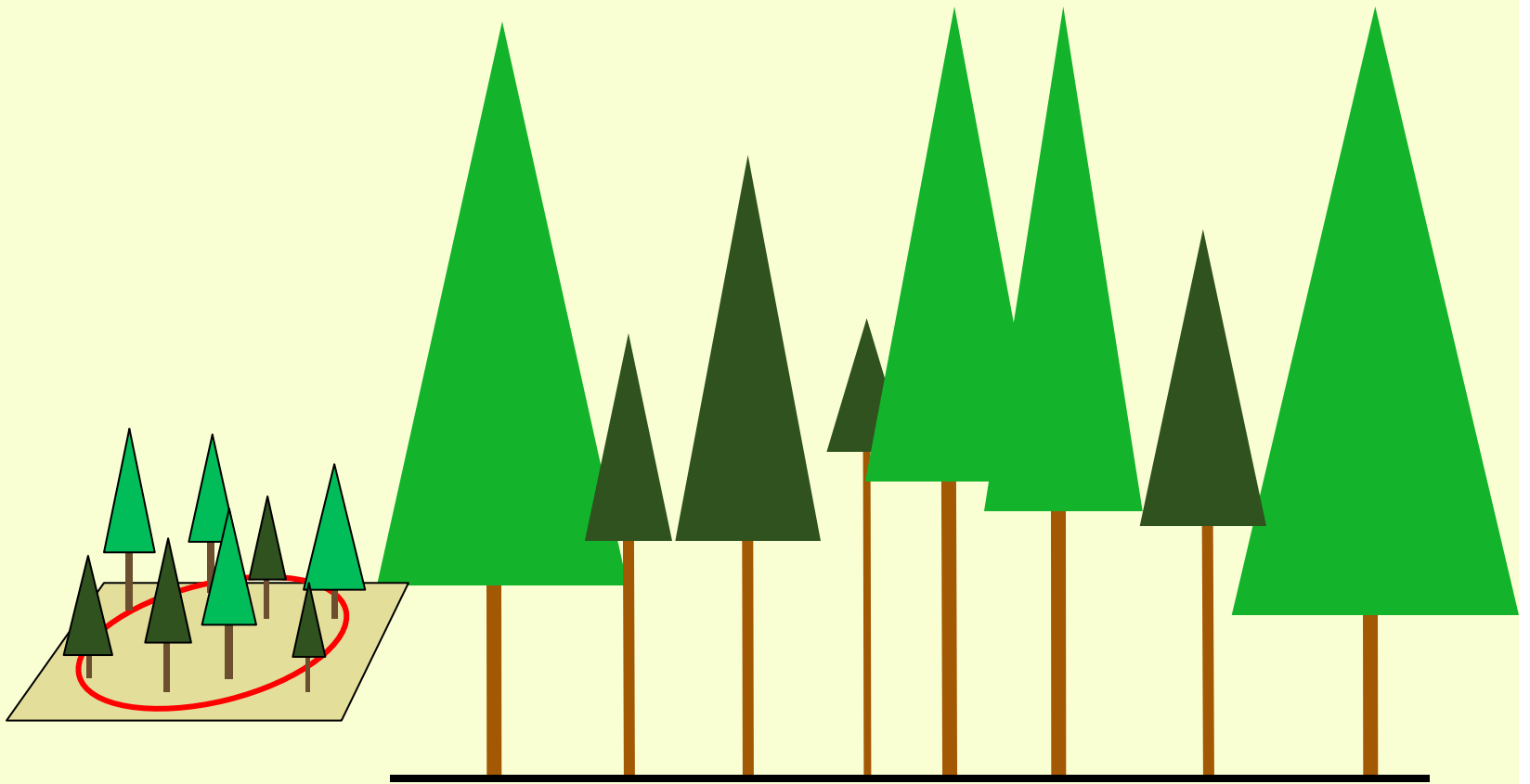
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# Growing Space Allocation - Conifers



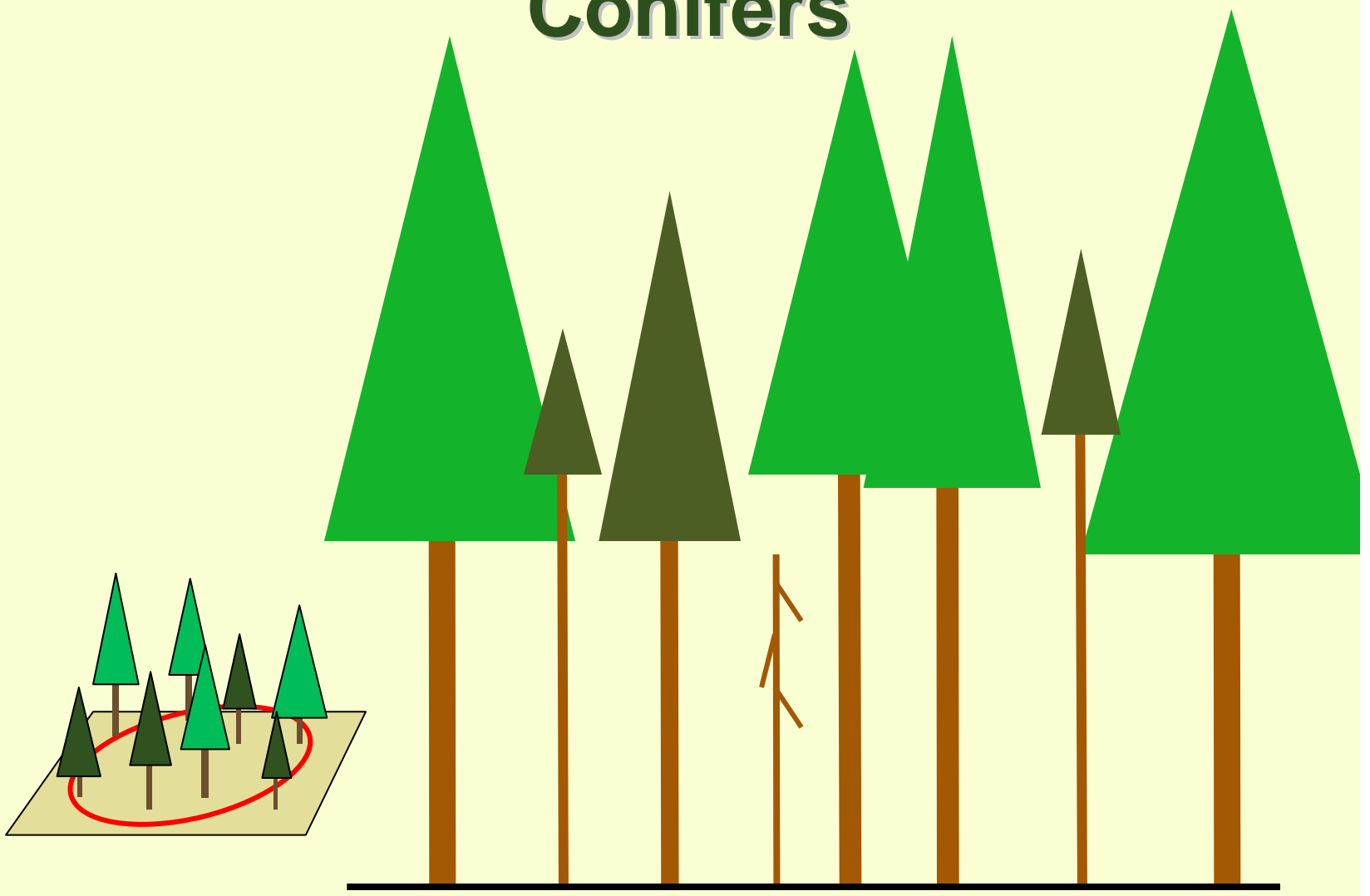
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# Growing Space Allocation - Conifers



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# Growing Space Allocation - Conifers



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# Growing Space Allocation - Mixedwoods



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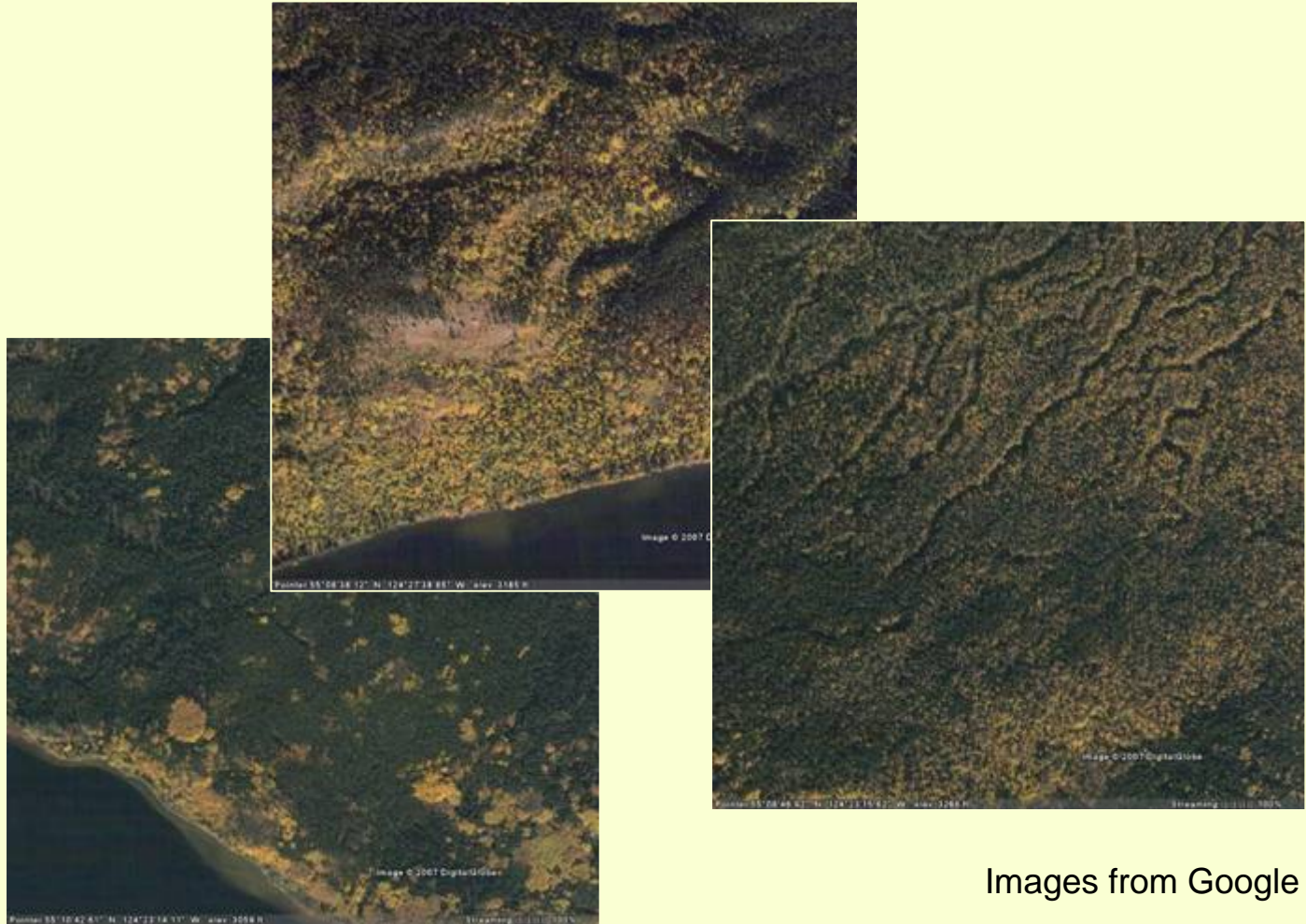




# Allocation: Why do we care?

- Timber values
  - Conifer >> Broadleaves
  - (most of BC)
- Habitat: varying quantities of broadleaves can greatly enhance habitat value
- Landscape pattern (fire risk, hydrology, aesthetics etc.)

# Variations in Allocation



Images from Google Earth

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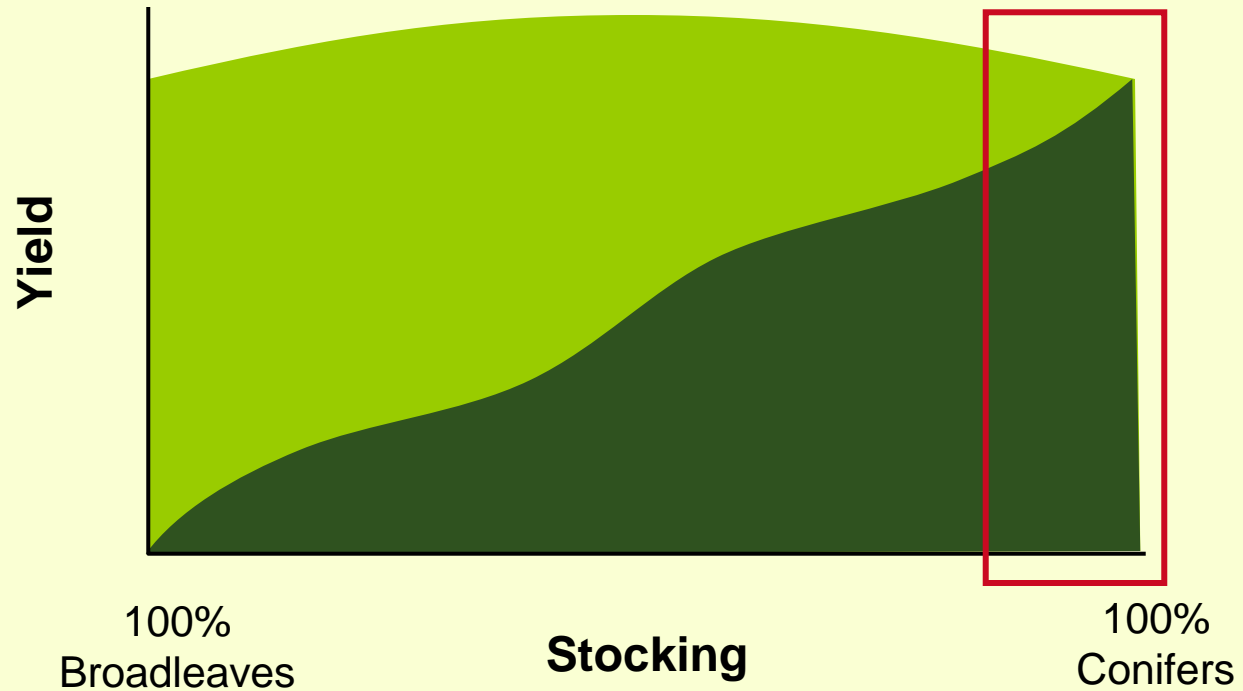


# Two Models for Mixedwood Standards

- **Tolerance Model**
- Primary emphasis on conifers
- Accept limited quantity of broadleaved trees
- One-size-fits-all
- **Management Model**
- Explicit objectives are set for both broadleaves and conifers
- Objectives are set at the landscape level



# Objective of Tolerance-Based Standards

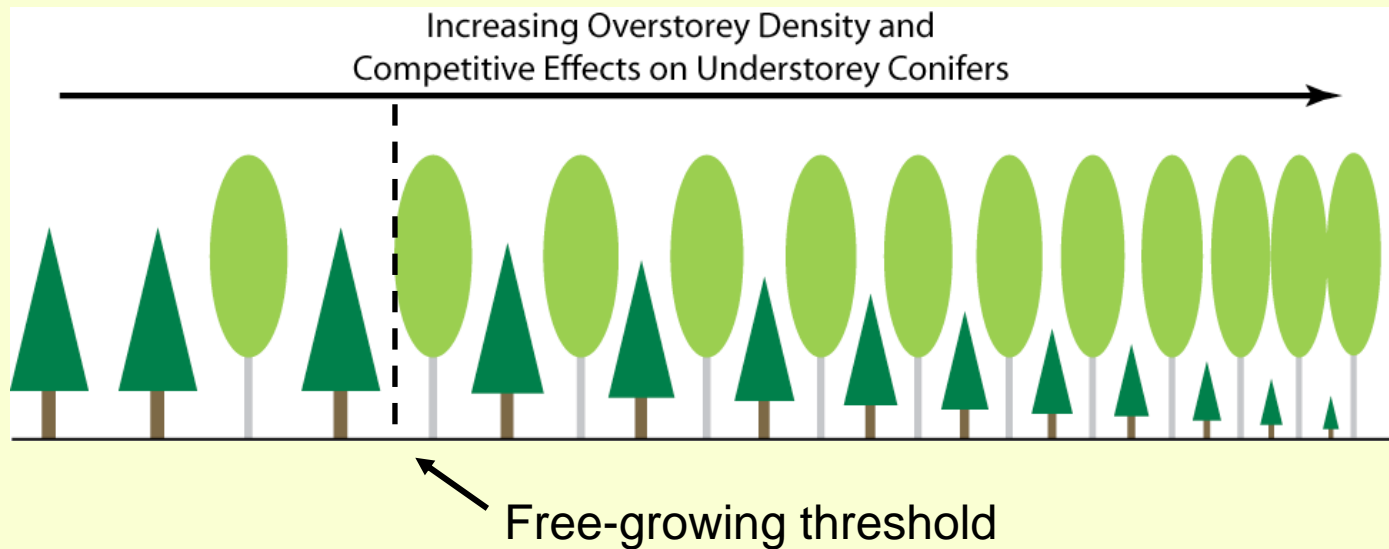


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# Historical Development of Tolerance-Based Standards

Early conifer standards could accept a certain quantity of non-free-growing conifers; didn't specify cause

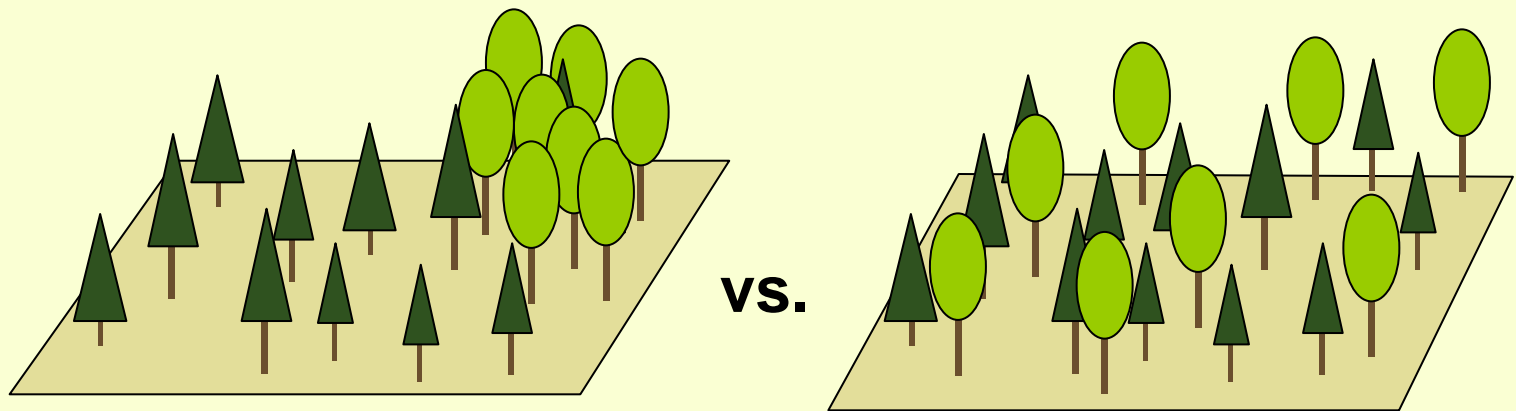


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# Historical Development of Tolerance-Based Standards

Explicit recognition of hardwoods started with proposals for density-based limits, but.....

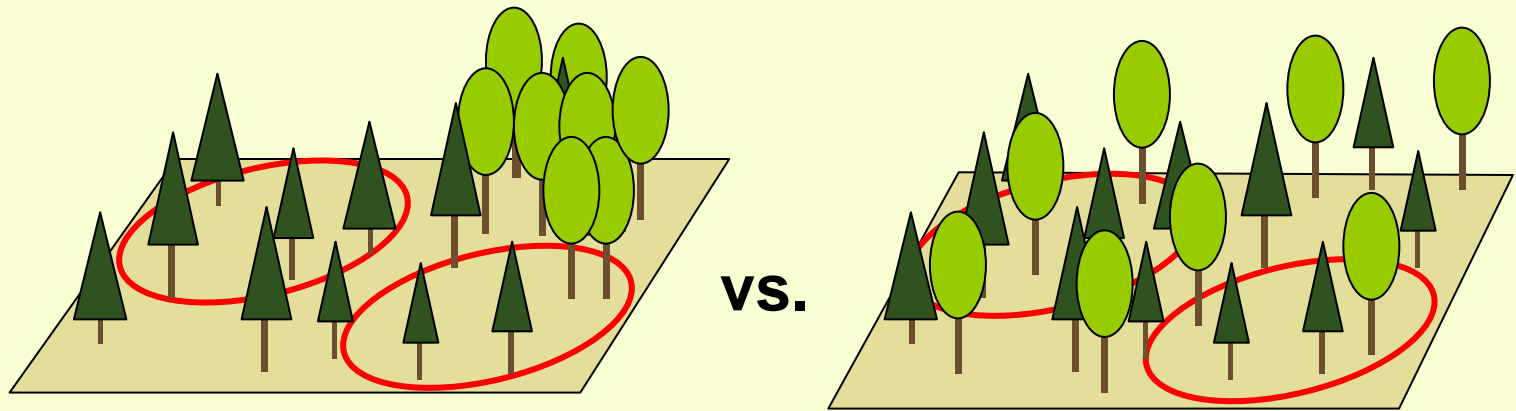


..... could not account for *allocation* of growing space



# Historical Development of Tolerance-Based Standards

Instead, we need to measure the stocking of the hardwoods!



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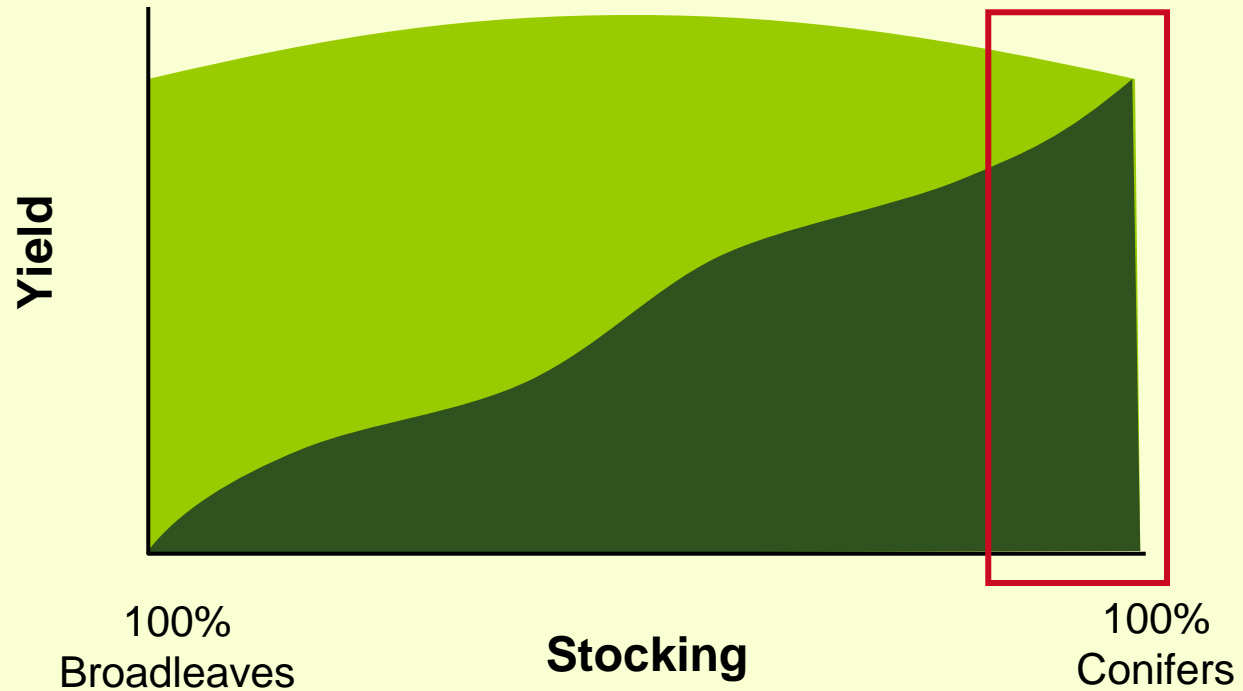


# Limitations of Tolerance-Based Mixedwood Standards

- Perpetuates anti-broadleaved bias
- Difficult to *require* a broadleaved component
- Difficult to scale to the landscape level



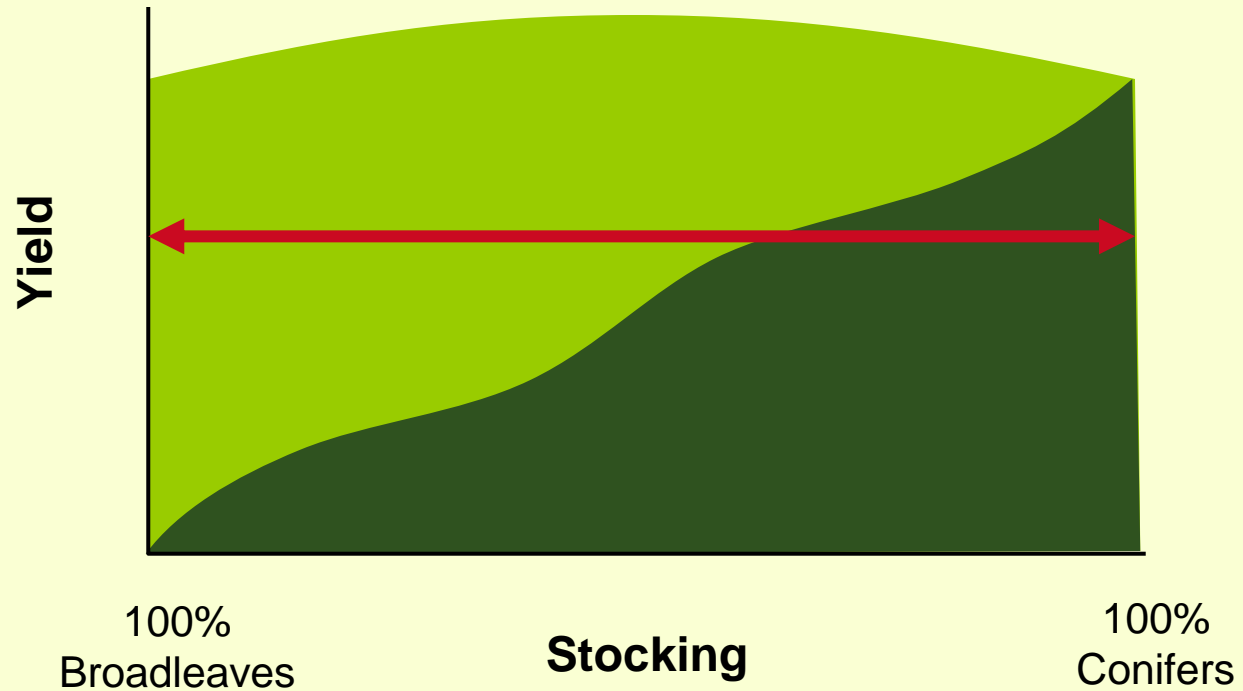
# Objective of Tolerance-Based Mixedwood Standards



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# Objective of Management-Based Mixedwood Standards



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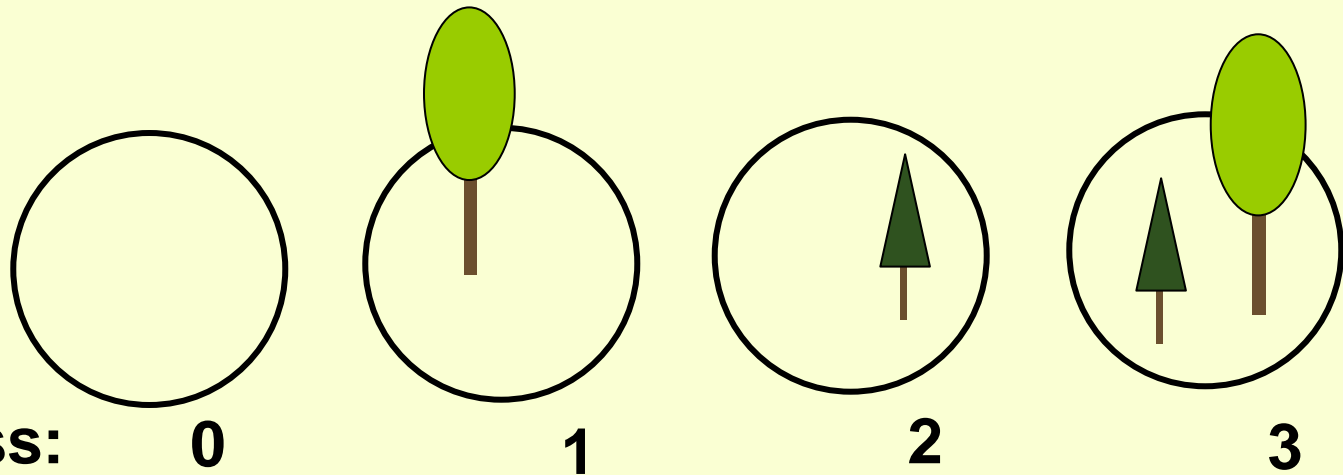
## Key Concepts:

- We want to plan for desired future forest condition.
- Need to predict future stand outcomes from regen stage assessments.
- Need to ***sum*** outcomes from individual stands ***to the landscape scale***



# Quadrat Surveys

- Simple survey procedure
- Four possible stocking outcomes for each quadrat
- Tally percent of plots in each stocking class ( $C_0$ ,  $C_1$ ,  $C_2$ ,  $C_3$ )





# Predictive Models

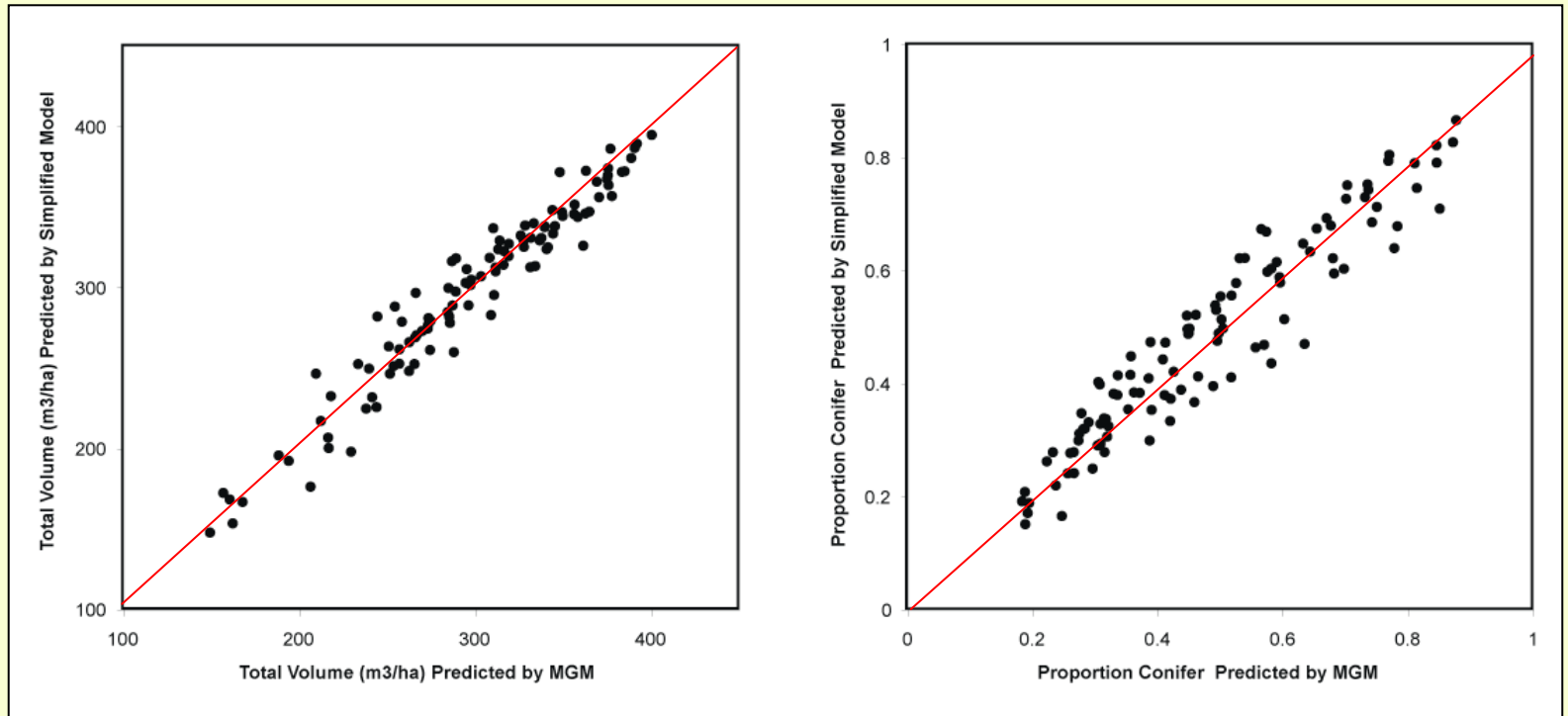
For Each Level of Site Index:

$$\text{Relative Yield} = f \left( C_0, C_1, C_2, C_3 \right)$$

$$\% \text{ Conifer} = f \left( C_0, C_1, C_2, C_3 \right)$$

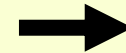
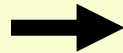


# Model Fit Results



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# Predicting Future Outcomes



**DONE !**

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## Operational Application

- Designed to complement MSQ surveys for conifer stands
- Produces equivalents of PMV and Maximum PMV; allows assessment against acceptability threshold
- Adds prediction of mixedwood Forest Type classes (C, CD, DC, D)
- Will work with same ledger systems as MSQ



## Example: Fort St. John Pilot Project

- Harvest volume targets (%) by species composition for each landscape unit based on historical occurrence
- Four species groupings:
  - >80% Conifer (C)
  - 50 to 80% Conifer (CD)
  - 50 to 80% Deciduous (DC)
  - > 80% Deciduous (D)



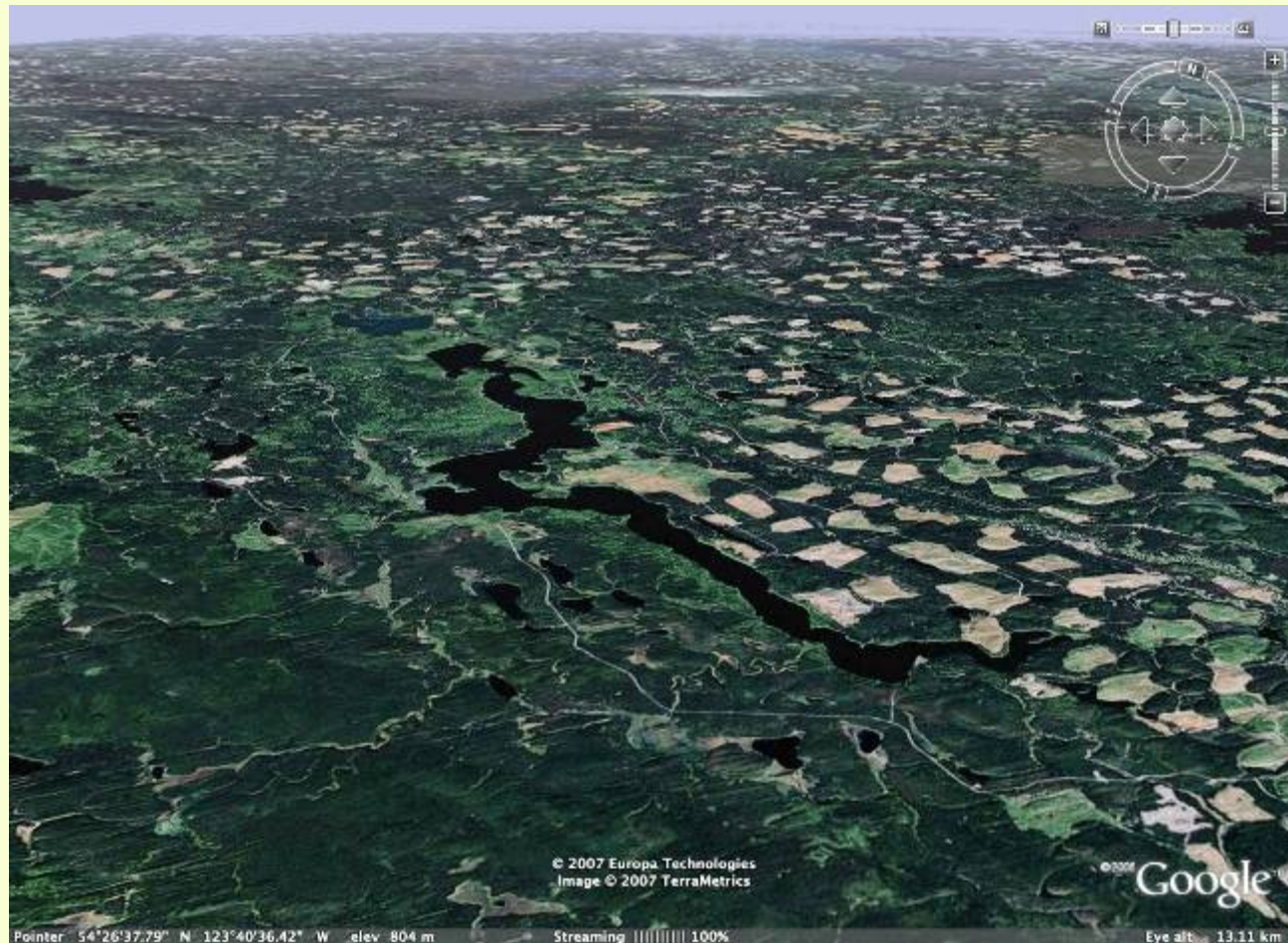
# Critical Milestone: SFMP

## Forest Management Goals by Cover Type

Landscape Unit	Forest Type	Current Status		FDP Status		Baseline Target Range	
		ha	%	ha	%	ha	%
Blueberry	Deciduous	140,289	37.10%	127,642	36.10%	30%	45%
	Deciduous Mixedwood	32,500	8.60%	30,582	8.60%	7%	10%
	Conifer Mixedwood	50,669	13.40%	48,969	13.80%	11%	16%
	Conifer	154,320	40.80%	146,757	41.50%	33%	49%
	<b>Total</b>	<b>377,778</b>	<b>100.00%</b>	<b>353,951</b>	<b>100.00%</b>		
Crying Girl	Deciduous	646	1.10%	646	1.10%	0.50%	2%
	Deciduous Mixedwood	706	1.20%	706	1.20%	0.50%	2%
	Conifer Mixedwood	1,205	2.00%	1,205	2.10%	1%	3%
	Conifer	58,390	95.80%	54,544	95.50%	93%	98%
	<b>Total</b>	<b>60,947</b>	<b>100.00%</b>	<b>57,101</b>	<b>100.00%</b>		
Graham	Deciduous	3,061	1.40%	3,061	1.40%	0.50%	2%
	Deciduous Mixedwood	1,724	0.80%	1,721	0.80%	0.50%	2%
	Conifer Mixedwood	3,866	1.80%	3,854	1.80%	1%	3%
	Conifer	205,996	96.00%	205,410	96.00%	93%	98%
	<b>Total</b>	<b>214,647</b>	<b>100.00%</b>	<b>214,046</b>	<b>100.00%</b>		

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# Landscape Planning



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## Concluding Remarks

- Current standards are based on a ***sustained yield*** model of forest administration
- Need new paradigm that embraces ***sustainable forest management***
- Key concept is ***desired future forest condition***
- Need to know (plan for) how every stand will contribute



## Concluding Remarks

“... regeneration standards should be a mechanism for achieving management objectives, and should not become the de facto management objectives on their own.”



# Questions?

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