

Impacts of Early and Intermediate Silviculture Treatments on the Compositional Dynamics of a Long-Term Experiment

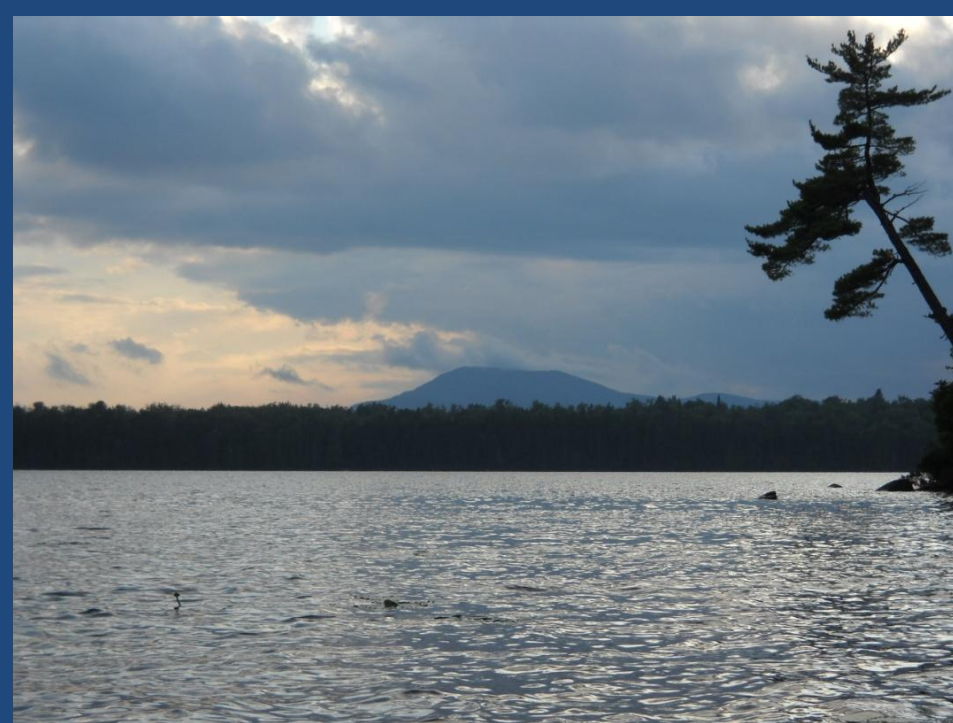
Matt Olson & Bob Wagner

School of Forest Resources

University of Maine

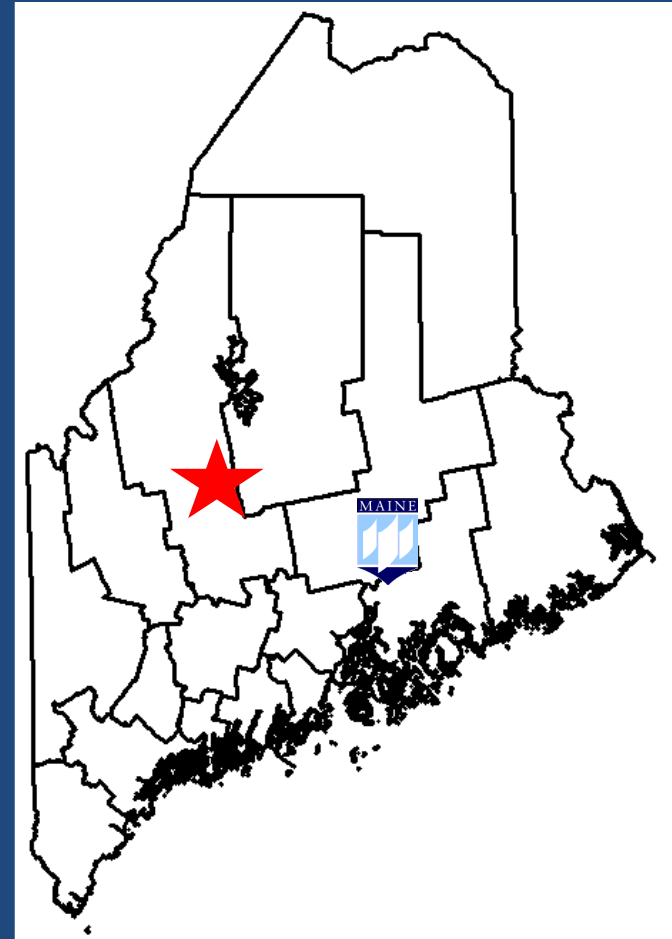


The Austin Pond Study



Study Location & Site Description

- Bald Mt. Township,
Somerset County,
Maine
- Plum Creek property
- Study site:
 - 40-yr-old MW forest
 - Gently sloping
 - Outwash soils
 - Moderately well to
poorly drained



Site and Treatment History

- **1969 – Mature SW-dominated forest**
- **Winter 1969-70 – Commercial clearcutting**
- **August 1977 – Herbicide trial established**
 - **Shrub/HW control and conifer release**
 - **2 reps of 12 herbicides, 1 water only, and 1 control**
 - **1st wave of experimental treatments**

Austin Pond Study

July 1978

1 year after herbicide treatment



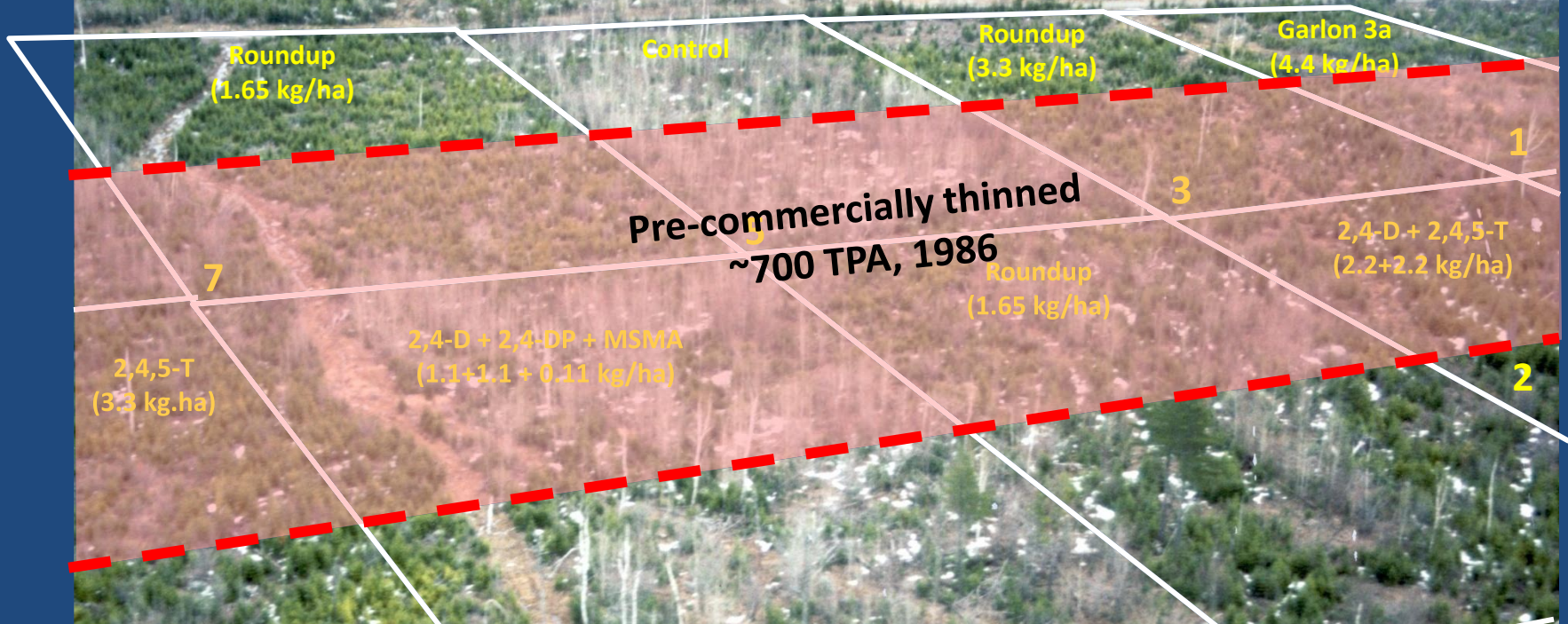
Site and Treatment History

- 1969 – Mature SW-dominated forest
- Winter 1969-70 – Commercial clearcutting
- August 1977 – CFRU herbicide trial
- **1986 – Pre-commercial thinning**
 - **2nd wave of experimental treatments**

Austin Pond Study

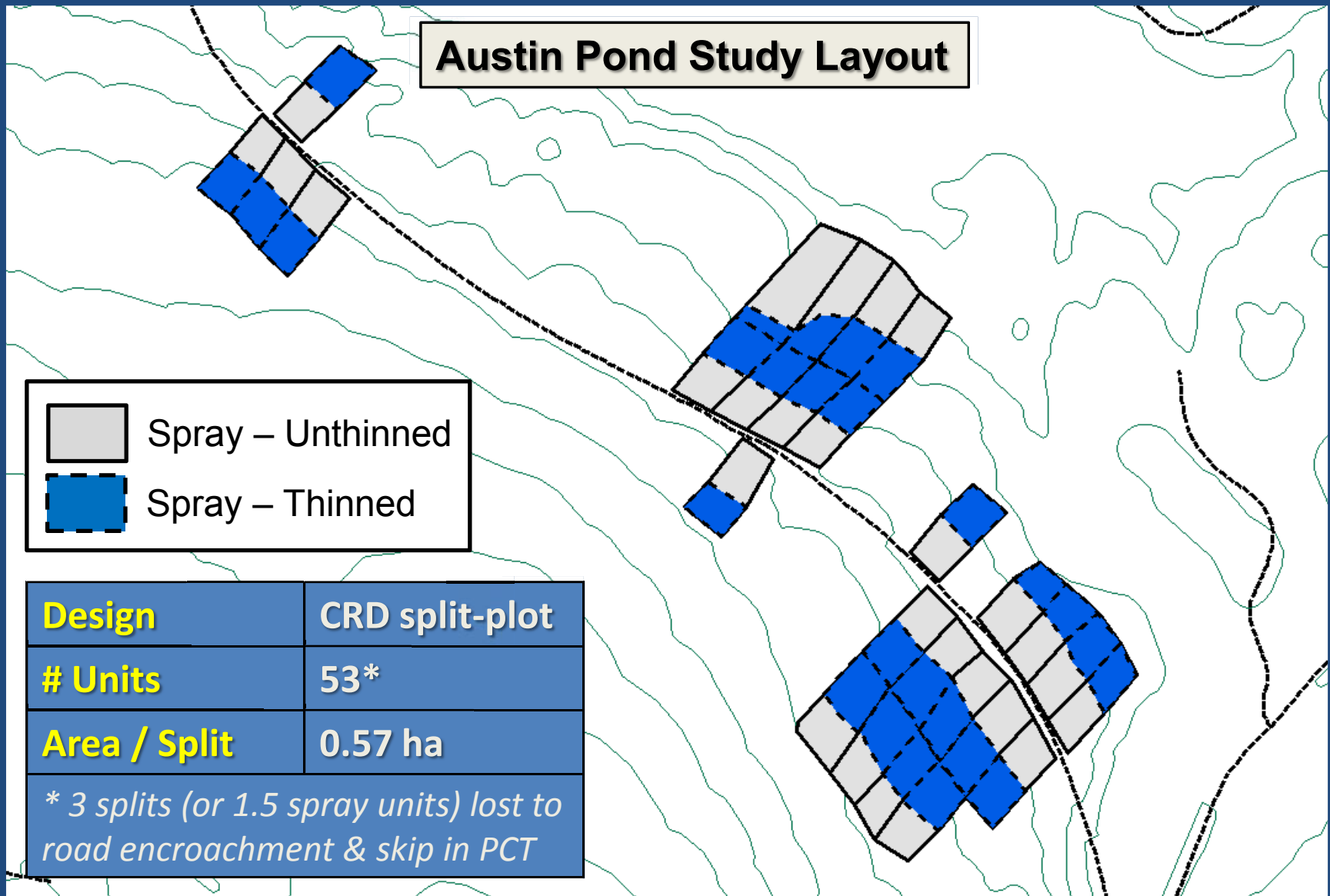
April 1984

7 years after herbicide treatment



Produced an experiment with all combinations of herbicide treatments both with and without PCT

Overlay of Two Experimental Treatments



Experimental treatments have initiated a range of developmental trajectories at the stand level

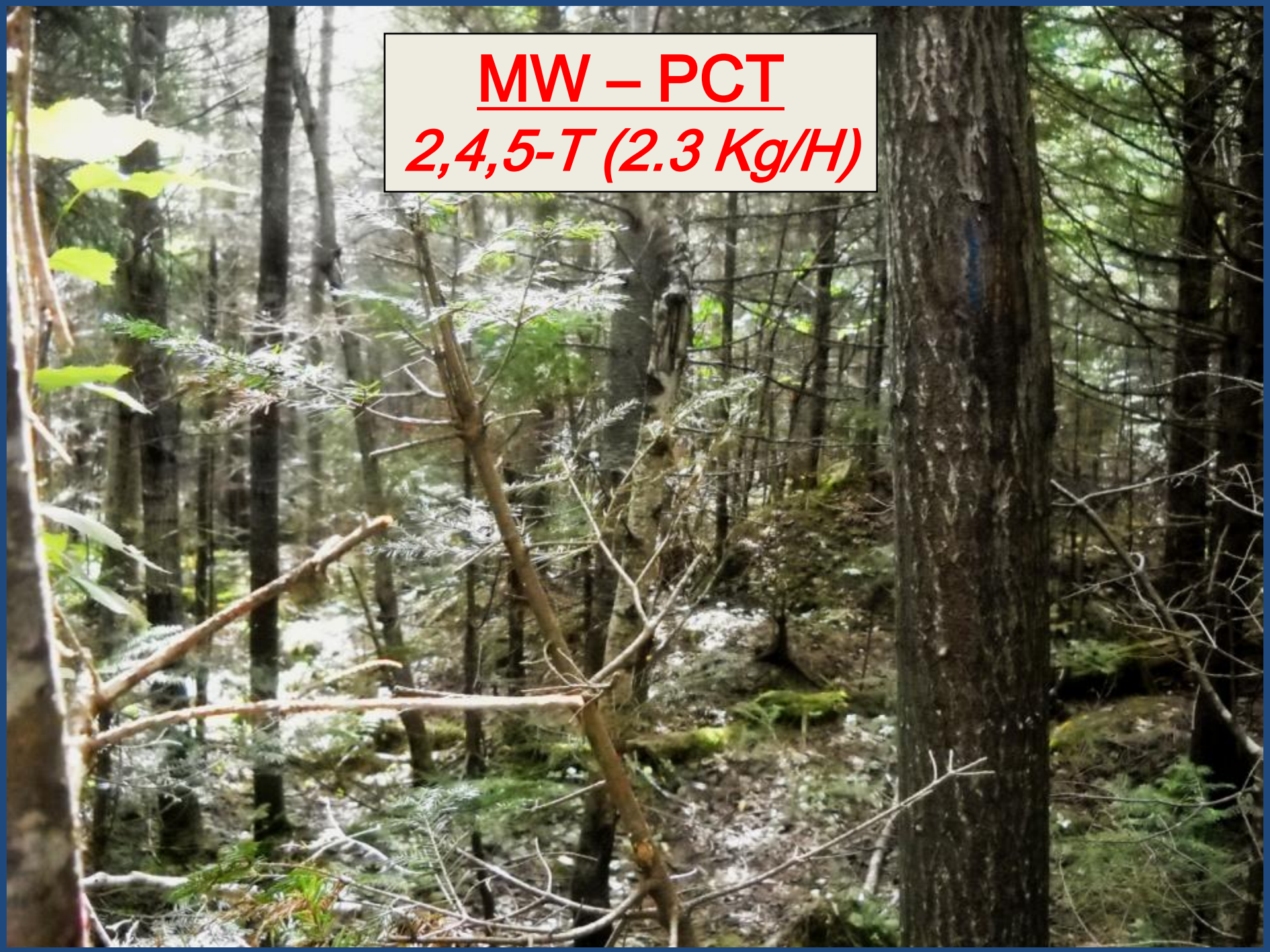
The Austin Pond Study contains five, mid-rotation stand types

HW - No PCT

Control



MW – PCT
2,4,5-T (2.3 Kg/H)



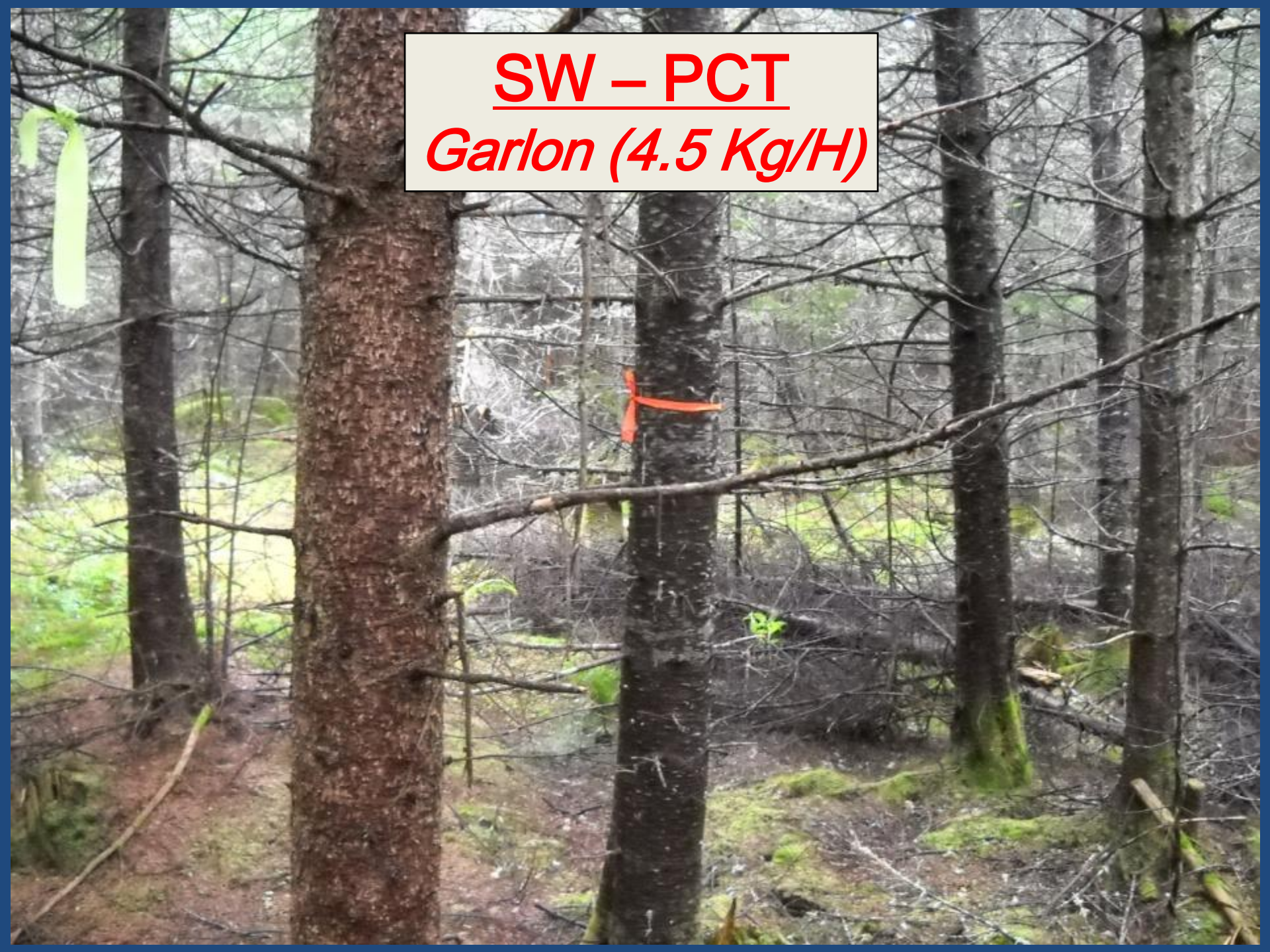
MW - No PCT
D + T (2.3+2.3 Kg/H)



SW - No PCT
Roundup (3.4 Kg/H)



SW – PCT
Garlon (4.5 Kg/H)



Compositional Dynamics

- Study objective:
 - Assess impact of treatments on long-term compositional dynamics not structural changes
 - species-level & softwoods
- Approach:
 - Compile long-term data chronologically to reconstruct compositional dynamics
 - 10 spray TRTs w/ & w/out PCT

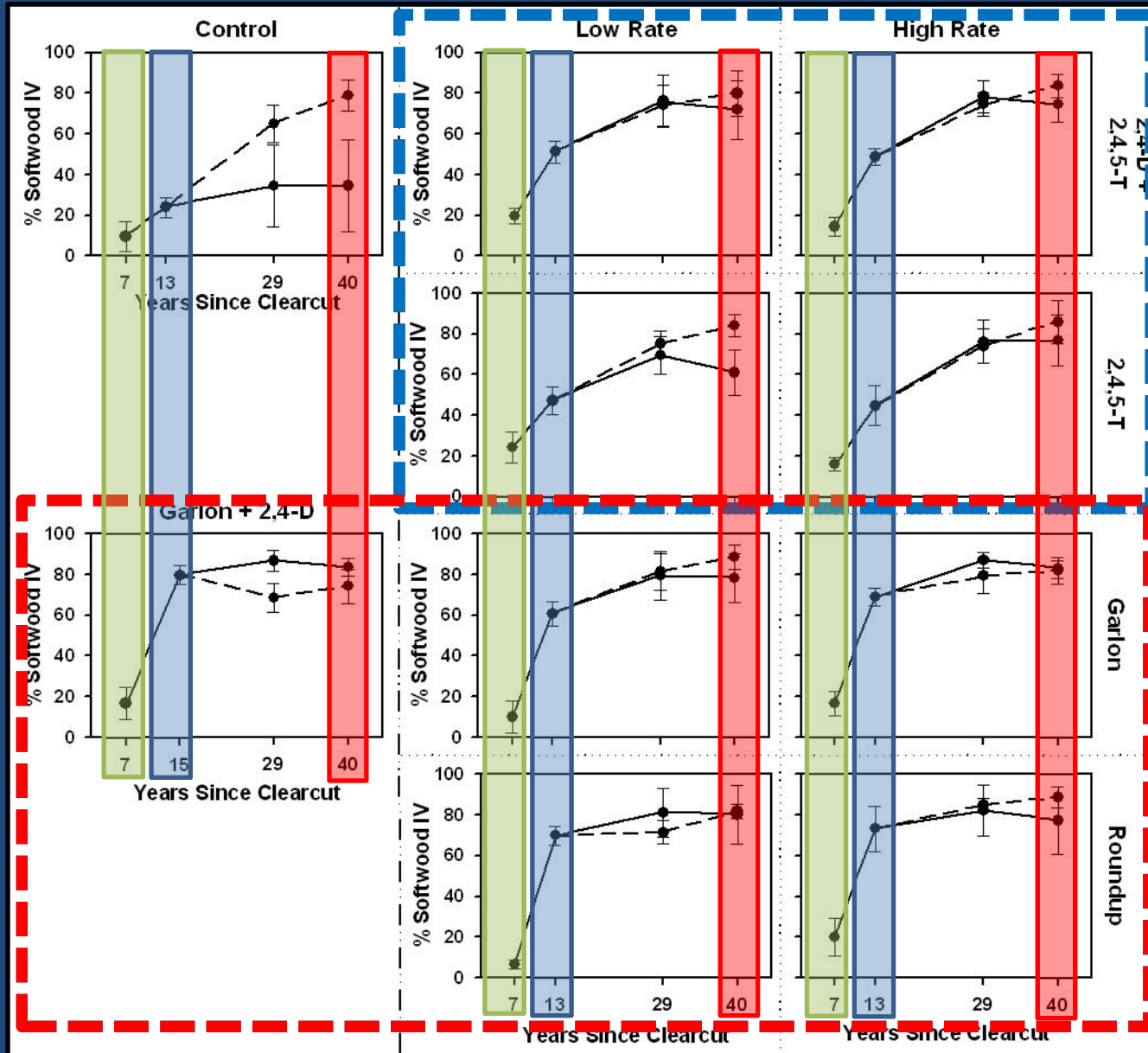
Study design for Reconstruction: The Data

Date	Purpose	Years after TRT	Notes
July 1977	Pre-treatment assessment	7 yrs post-CC,	Sample points followed until 1979
Autumn 1983	Herbicide efficacy	13 yrs post-CC 6 yrs post-spray	Sample points used once; no repeated measures
Summer 1999	Assess long-term TRT effects	29 yrs post-CC 22 yrs post-spray 13 yrs post-PCT	Established permanent sample points (PSP)
Summer 2010	Assess long-term TRT effects	40 yrs post-CC 33 yrs post-spray 24 yrs post-PCT	Repeated measurements of PSPs est'd in 1999

Study Design for Reconstruction: Spray TRTs

Spray Treatment	Application Rate (Kg/H, ae)	Rate Type
2,4-D + 2,4,5-T	1.1 + 1.1	Low
	2.3 + 2.3	High
2,4,5-T	2.3	Low
	3.4	High
Triclopyr (Garlon)	2.3	Low
	4.5	High
Glyphosate (Roundup)	1.7	Low
	3.4	High
Garlon + 2,4-D	2.3 + 2.3	NA
Control – no spray	NA	NA

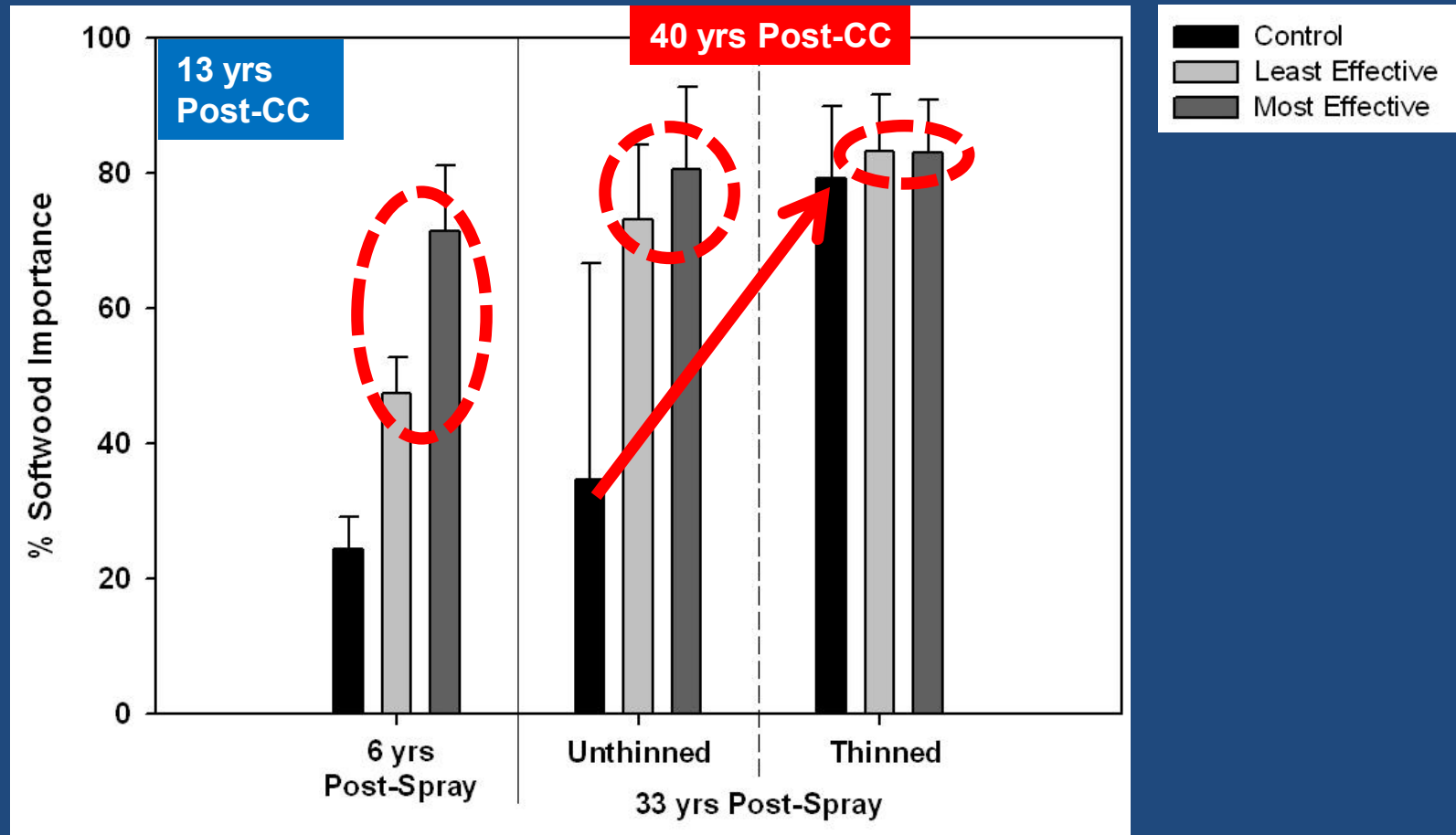
Softwood Dynamics



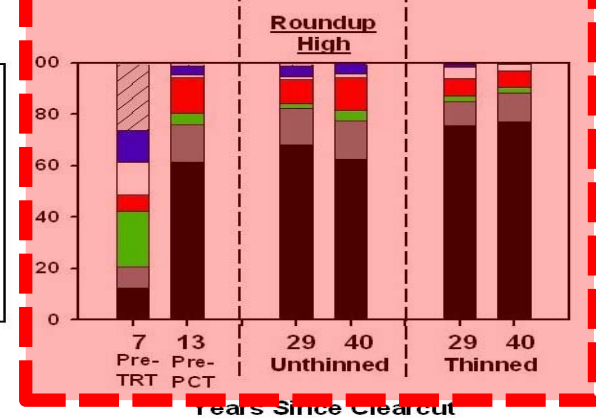
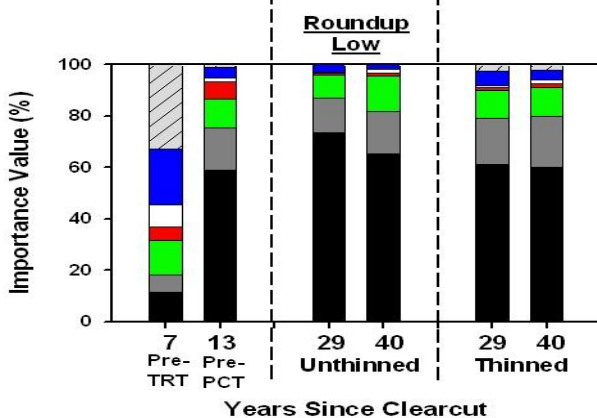
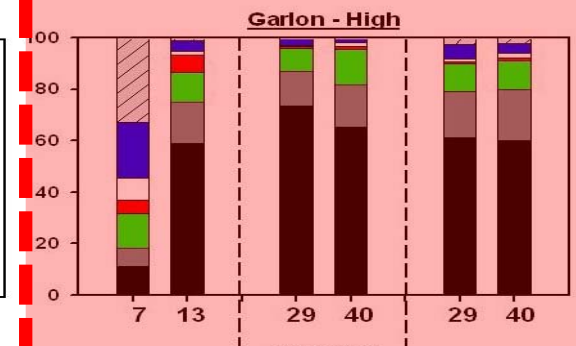
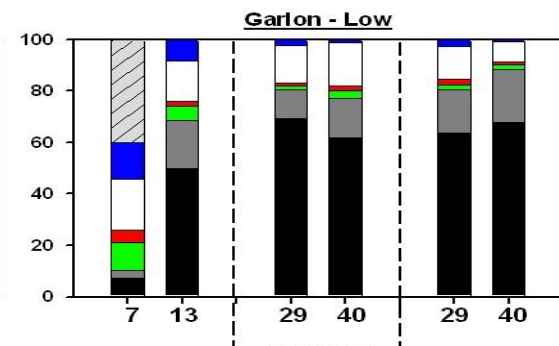
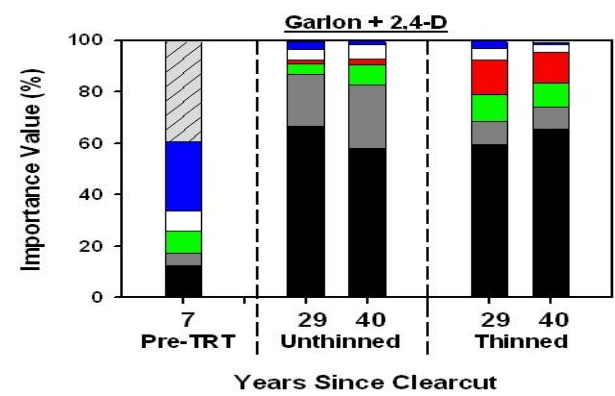
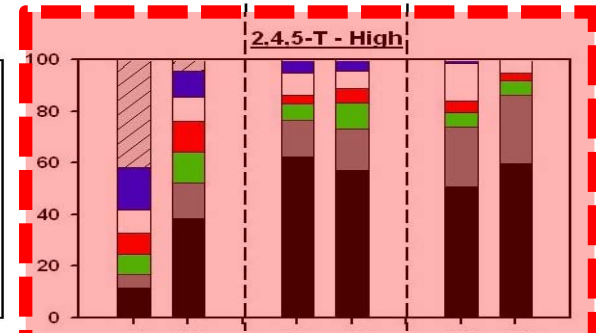
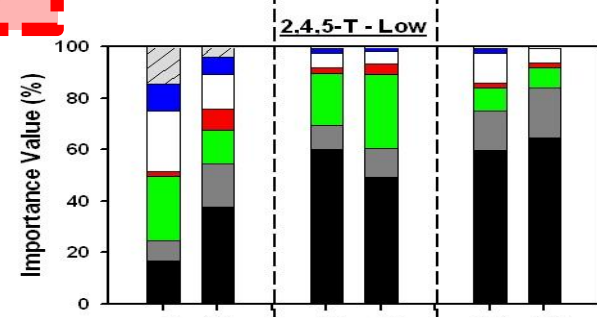
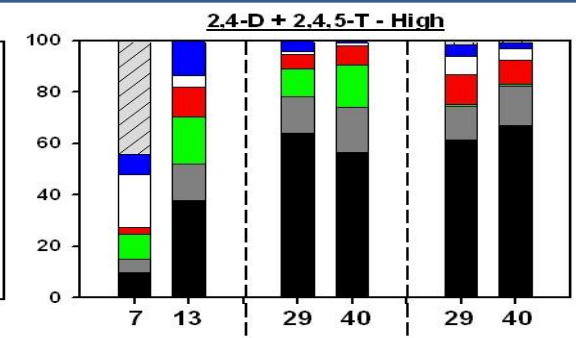
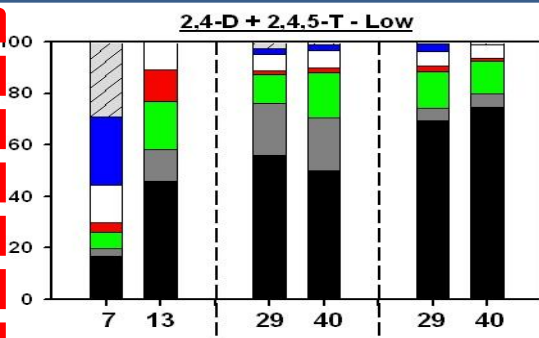
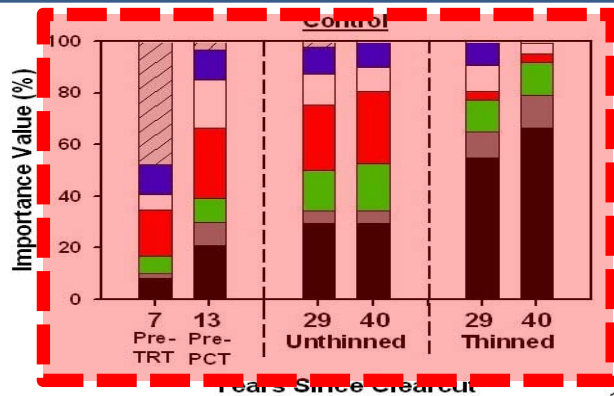
— Unthinned
 - - - PCT

Error bars = ± 2 SEs

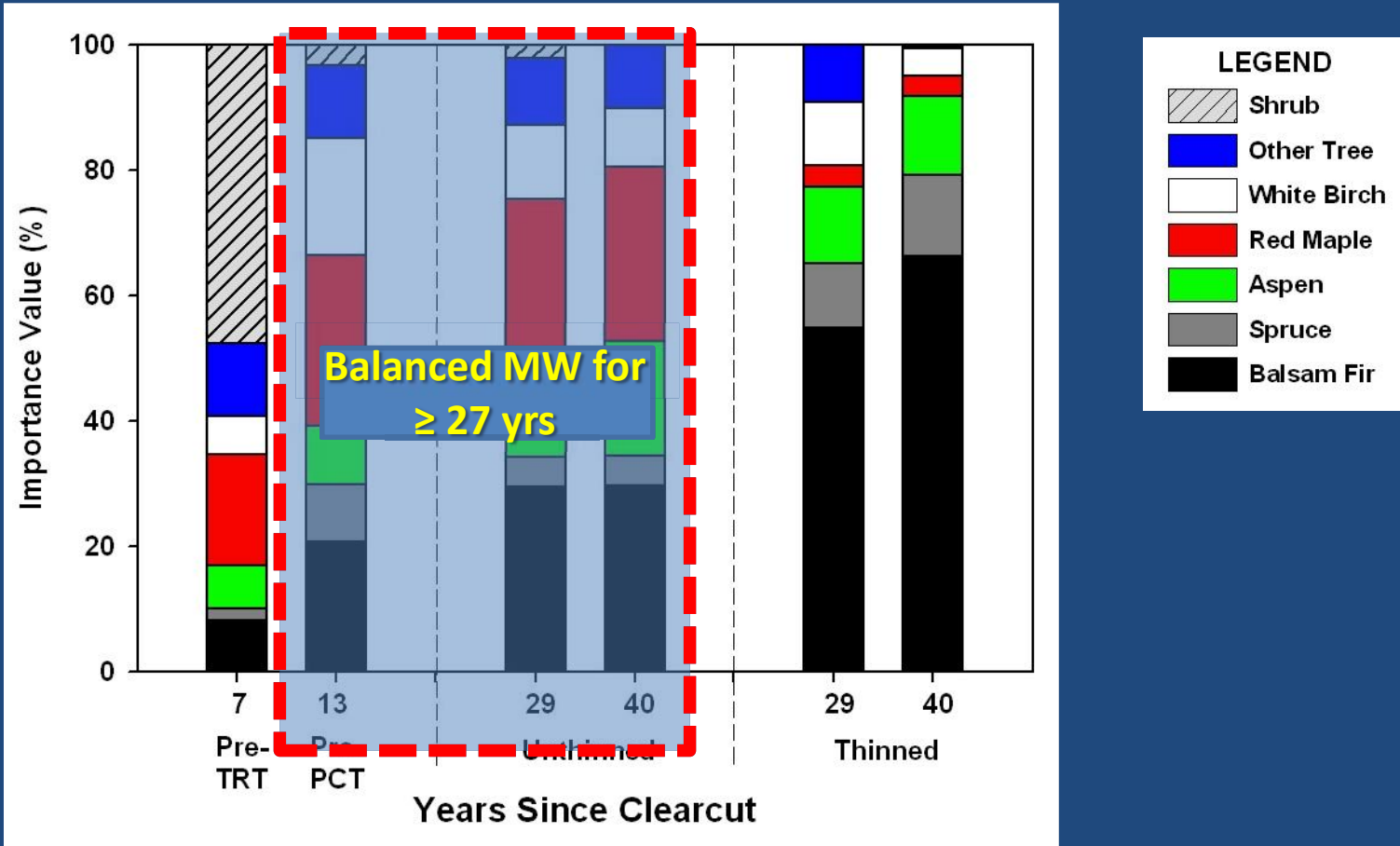
Treatment effects: Short-term vs Long-term



Error bars = ± 2 SEs

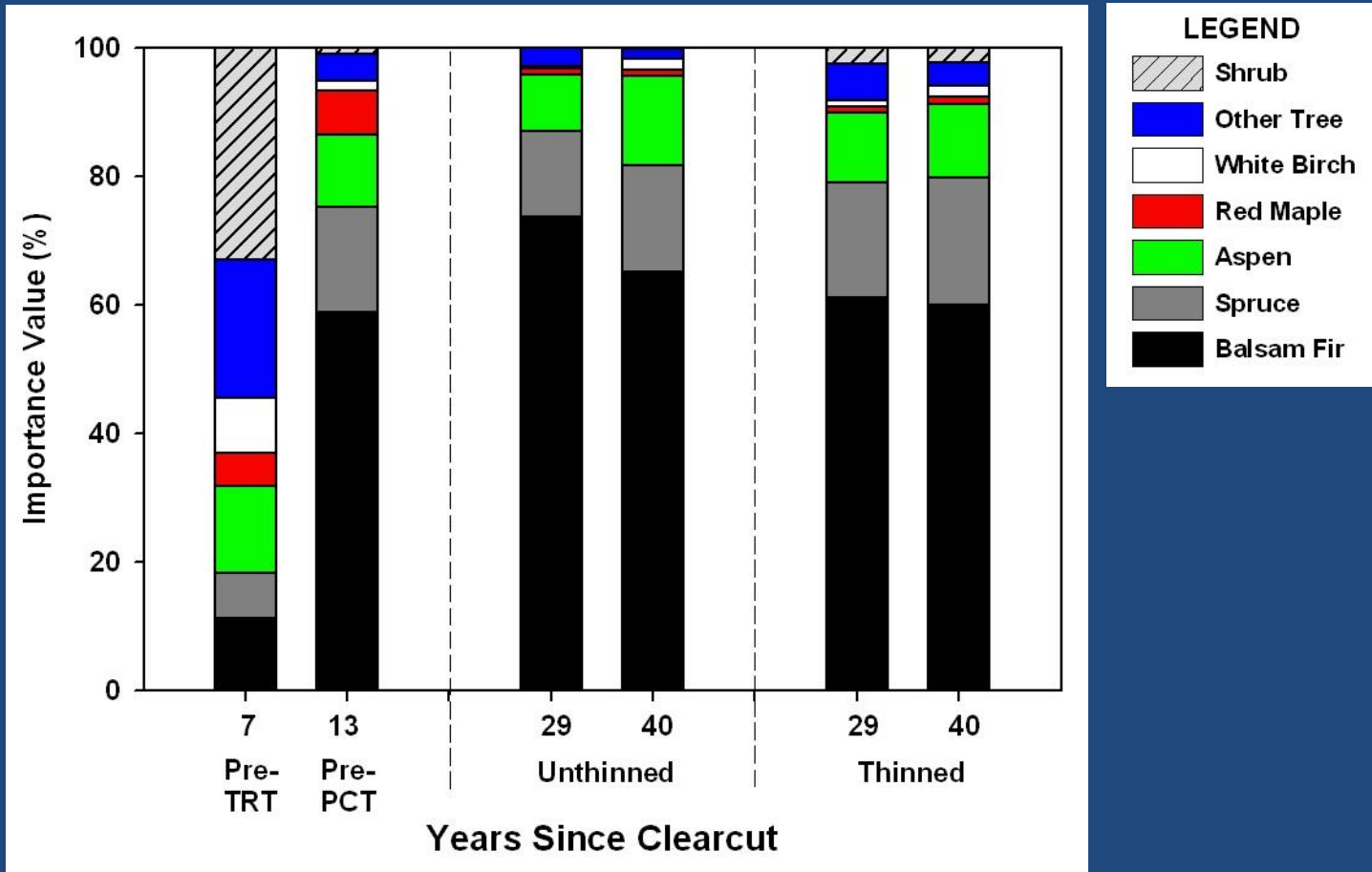


Control



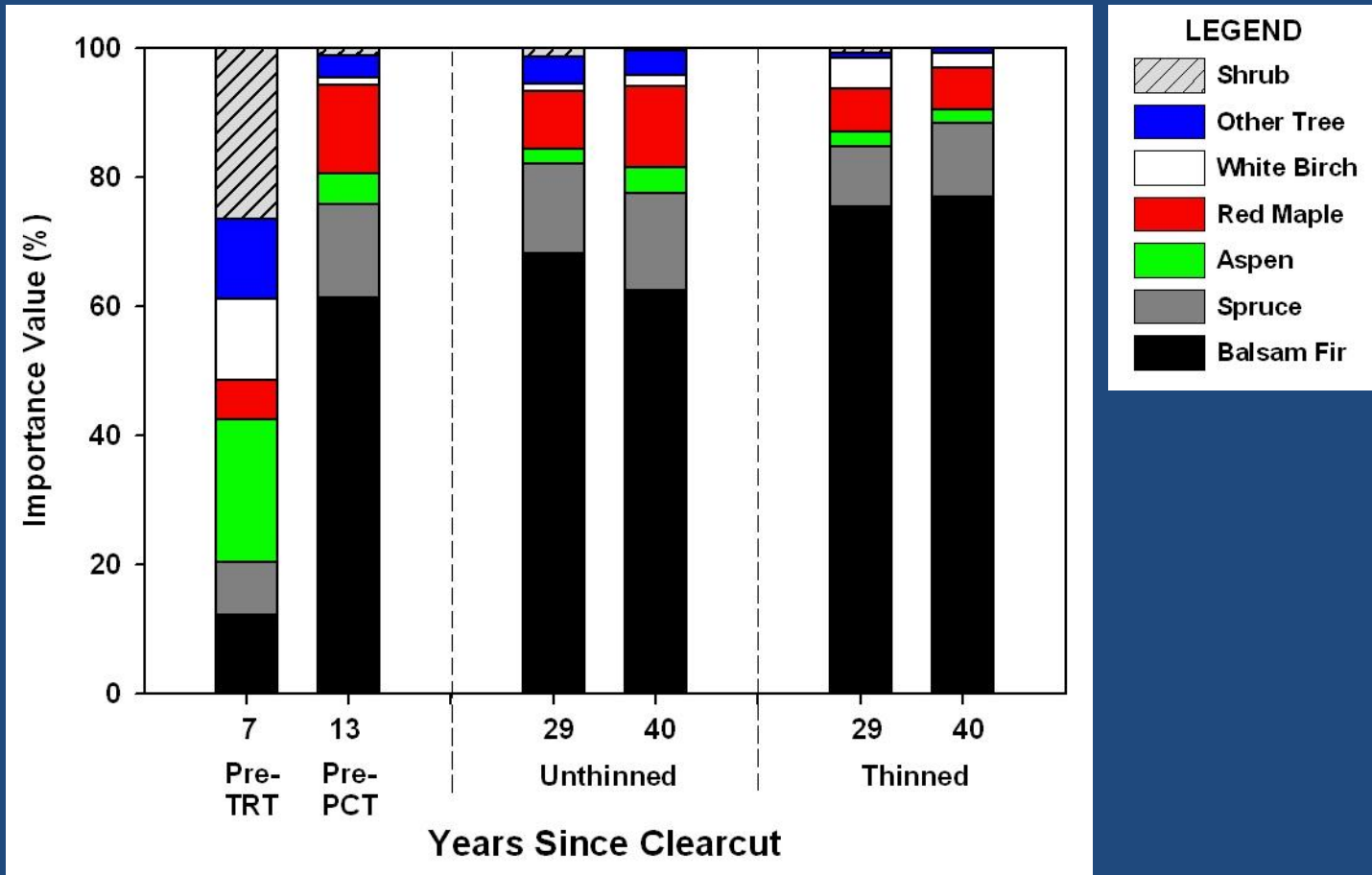
- Softwood composition increased naturally – unthinned control

Garlon - High



- Red maple a minor component
- Garlon selects against red maple
- Aspen is less impacted

Roundup - High



- Aspen a minor component
- Roundup selects against aspen
- Red maple is less impacted

Conclusions & Future Directions

- Spray treatments & PCT have favored softwood dominance – objective of TRTs
- Long-term softwood composition increased naturally – pattern in unthinned controls
- Differences in spray selectivity has impacted long-term compositional pathways
 - Shifts in minor species – HWs
- Next step: Add-in analysis of structural dynamics
 - Developing a manuscript on 40-yr stand dynamics
- Future direction: Overlay a 3rd wave of treatments
 - Discussion has been underway since Sept 2009

Acknowledgements

- **Funding: USFS & CFRU**
- **Collaborators**
 - John Brissette, USFS-NRS
 - APS future directions group
- **Plum Creek**
- **2010 field crew**
- **Max McCormack**
- **Many folks involved in the Austin Pond Study over the years**

Thanks for your time

