

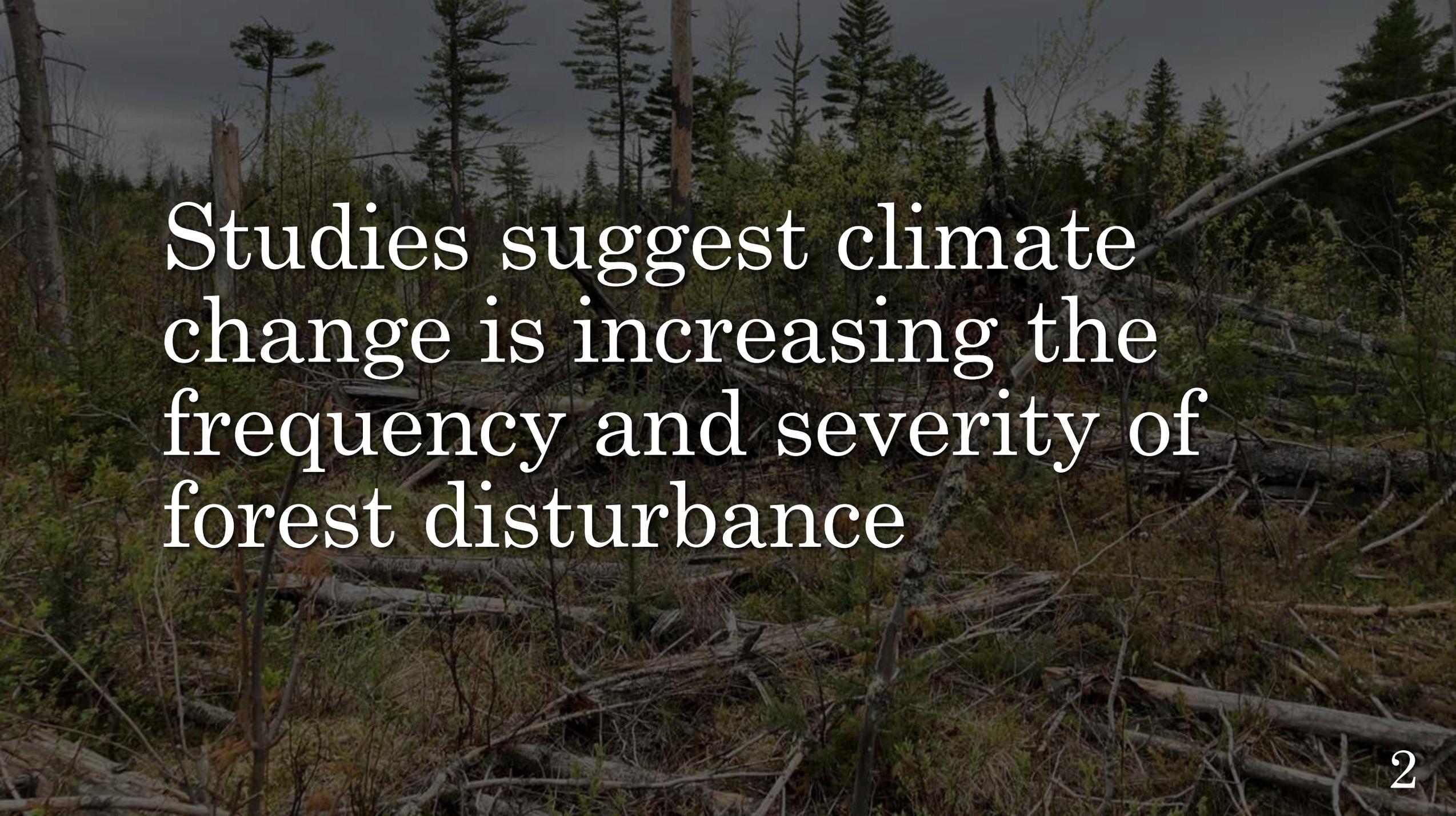


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Collaborators: Dr. Shawn  
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D'Amato and Dr. Nicole  
Rogers

# Regeneration Response to Salvage Logging Following Tornado Disturbance



Studies suggest climate change is increasing the frequency and severity of forest disturbance



## Management Response: Salvage Logging

Removal of  
commercially  
valuable wood  
following a natural  
disturbance

DAVID B. LINDENMAYER,  
PHILIP J. BURTON, AND JERRY F. FRANKLIN



SALVAGE LOGGING  
AND  
ITS ECOLOGICAL  
CONSEQUENCES

# Salvage logging remains controversial

## *Pros:*

- Avoid economic losses
- Reduce risk of insect population explosions
- Reduce fire risk

## *Cons:*

- Damage soils (compaction, rutting)
- Loss of substrate for deadwood dependent species
- Impede tree regeneration and forest recovery



# Research Questions

- Does salvage logging alter regeneration abundance and species composition?
- Do blowdown and salvage conditions influence browse pressure?
- Does salvage logging influence microclimate conditions?

# Study Site: Baxter State Park Scientific Forest Management Area (SFMA), Maine

- Tornado July 2013
- Damaged 200-ha conifer forest

Partial salvage operation winter 2013-2014

- Two papers published



## Forest structure following tornado damage and salvage logging in northern Maine, USA

Shawn Fraver, Kevin J. Dodds, Laura S. Kenefic, Rick Morrill, Robert S. Seymour, and Eben Sypitkowski

Response of bark beetles and woodborers to tornado damage and subsequent salvage logging in northern coniferous forests of Maine, USA

Kevin J. Dodds<sup>a,\*</sup>, Marc F. DiGirolomo<sup>a</sup>, Shawn Fraver<sup>b</sup>



Control



Blowdown



Blowdown + Salvage

“Treatments”

# Sampling Approach

## Overall:

- 48 plots total, 16 sampled per “treatment”

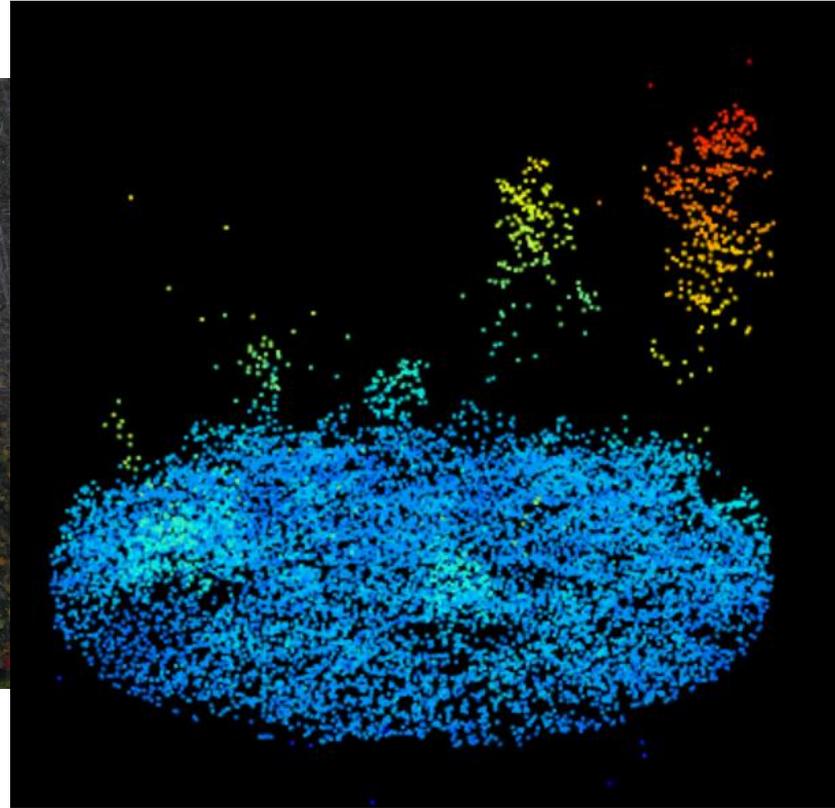
## Tree Regeneration:

- 4 subplots per plot
- Diameter, species, browse assessment

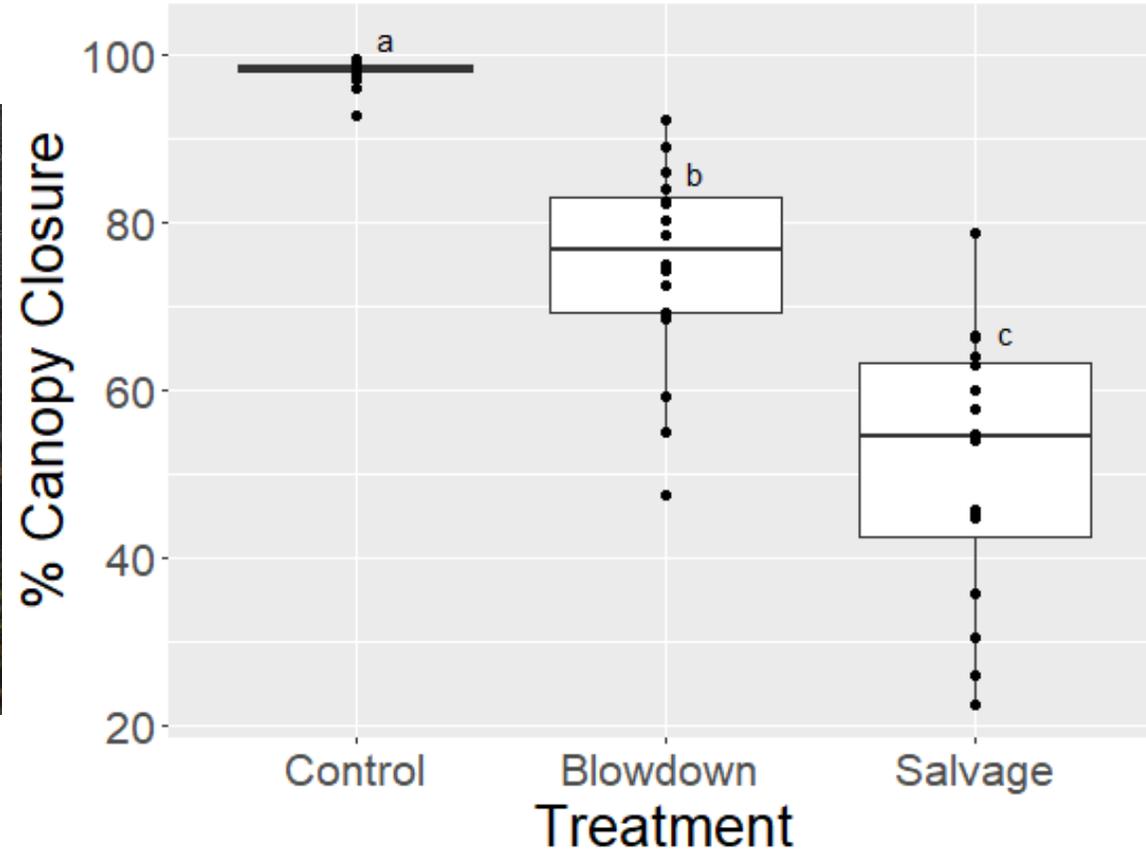
## Structure:

- LiDAR
- 100 m woody debris transect per plot
- Height, diameter, decay class, species





Ex: LiDAR Imagery - Salvage Plot



Canopy closure differs across all  
“treatments”

# Salvage and blowdown tree regeneration similar in composition and abundance

DBH Size Classes:

1: <2.5 cm

2: 2.6 – 5 cm

3: 5.1 – 7.5 cm

4: 7.6 – 10 cm

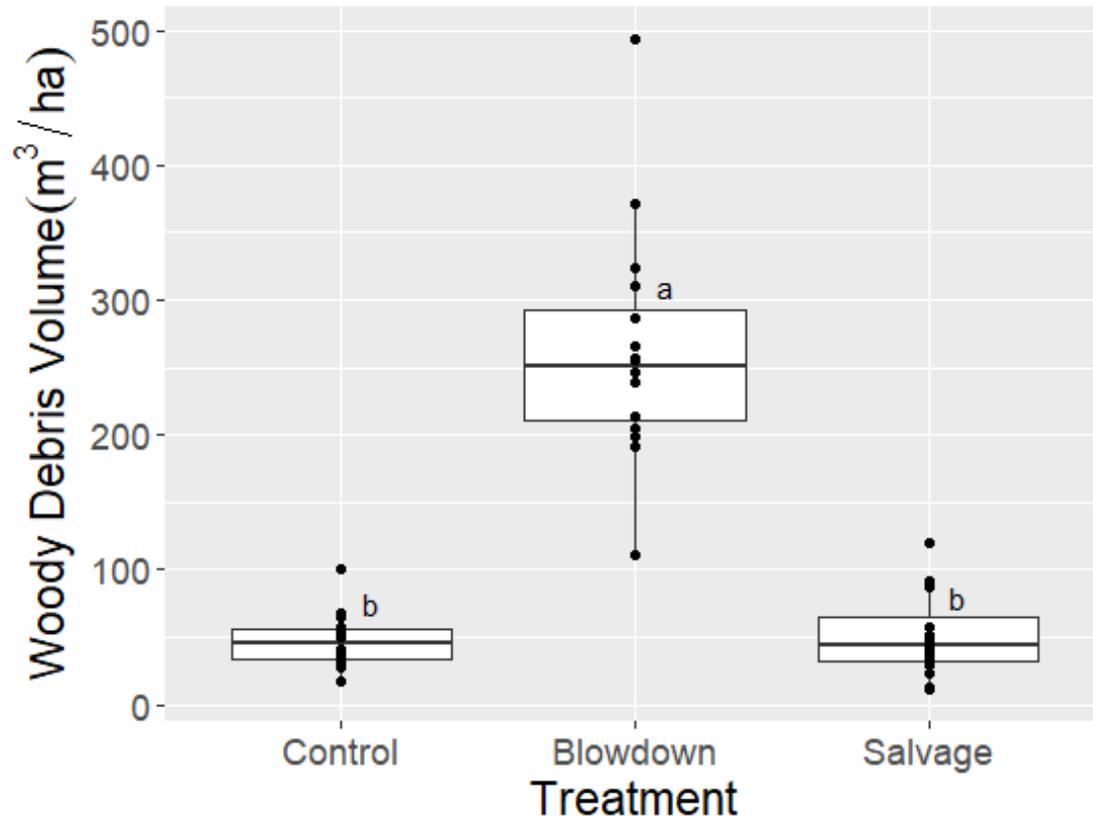




## Caging Effect

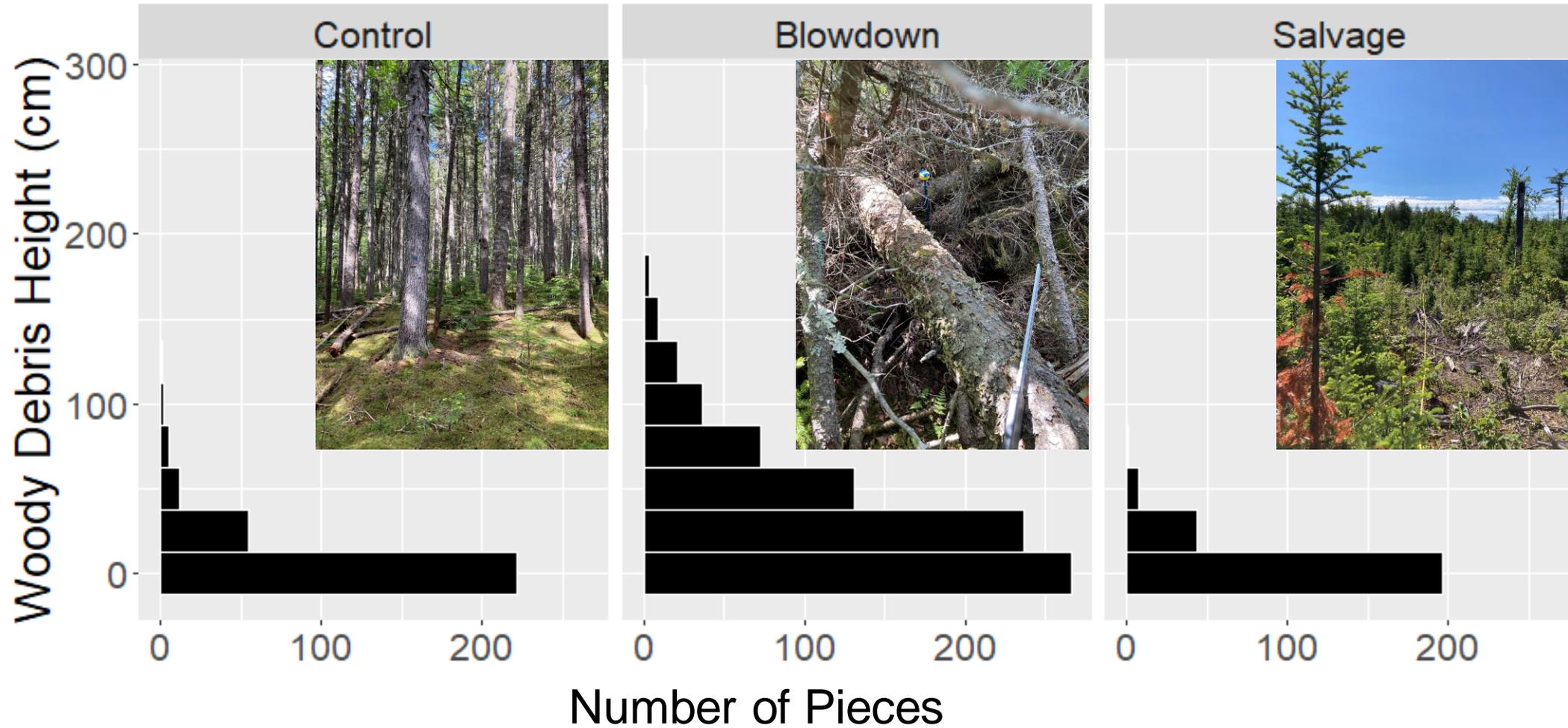
Hypothesis:  
Greater woody  
debris volume  
and height  
reduces browse



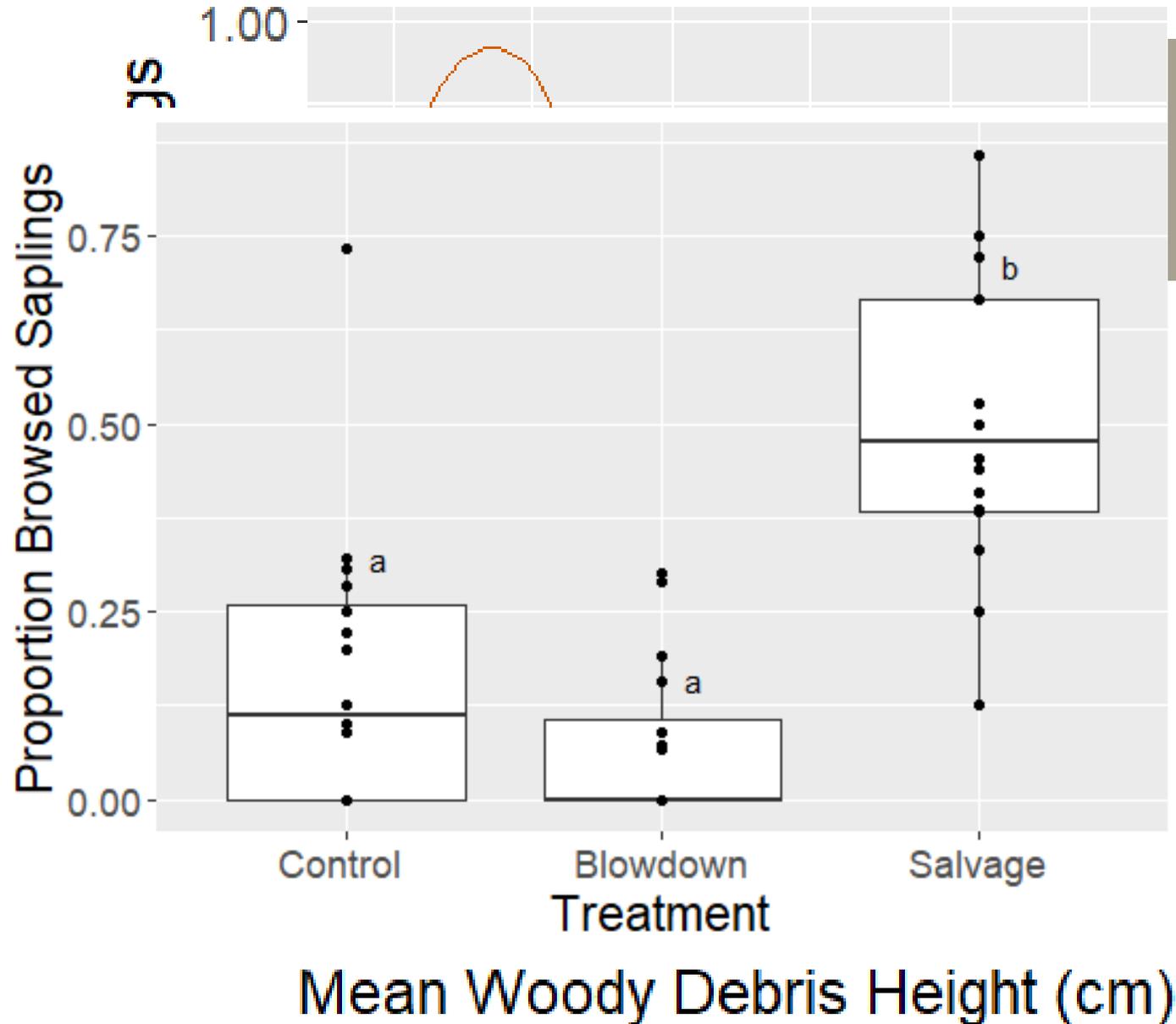


Greater woody debris volume in  
blowdown

# More elevated woody debris in blowdown



# Evidence of Caging Effect



Less browse in...

- Plots with greater woody debris volume
- Plots with greater woody debris height
- Blowdown plots

# Conclusions

## Tree Regeneration:

- No clear abundance or compositional differences between salvage and blowdown

## Structure:

- Blowdown has greater woody debris height and volume

## Browse:

- Damage more severe in salvaged areas

## Microclimate:

- Pending analysis





Woody debris impedes access by moose and reduces browse.



# Acknowledgements

Collaborators: Dr. Shawn Fraver, Dr. Anthony D'Amato, Dr. Nicole Rogers  
Funding: Maine Agricultural and Forest Experiment Station, US Forest Service

SFMA: Nava Tabak, Deidra George, SFMA Research Committee

Statistical Assistance: Dr. Jay Wason III

LiDAR Assistance: Dave Sandilands

Field Assistants: Dylan DePalma, Eli Forman, Frances Killea, Tyler Locke, Zoe Read, Nava Tabak, Chloe Tilley



Questions?

