DYNAMICS OF MIXEDWOOD STANDS IN THE BLACK BROOK DISTRICT

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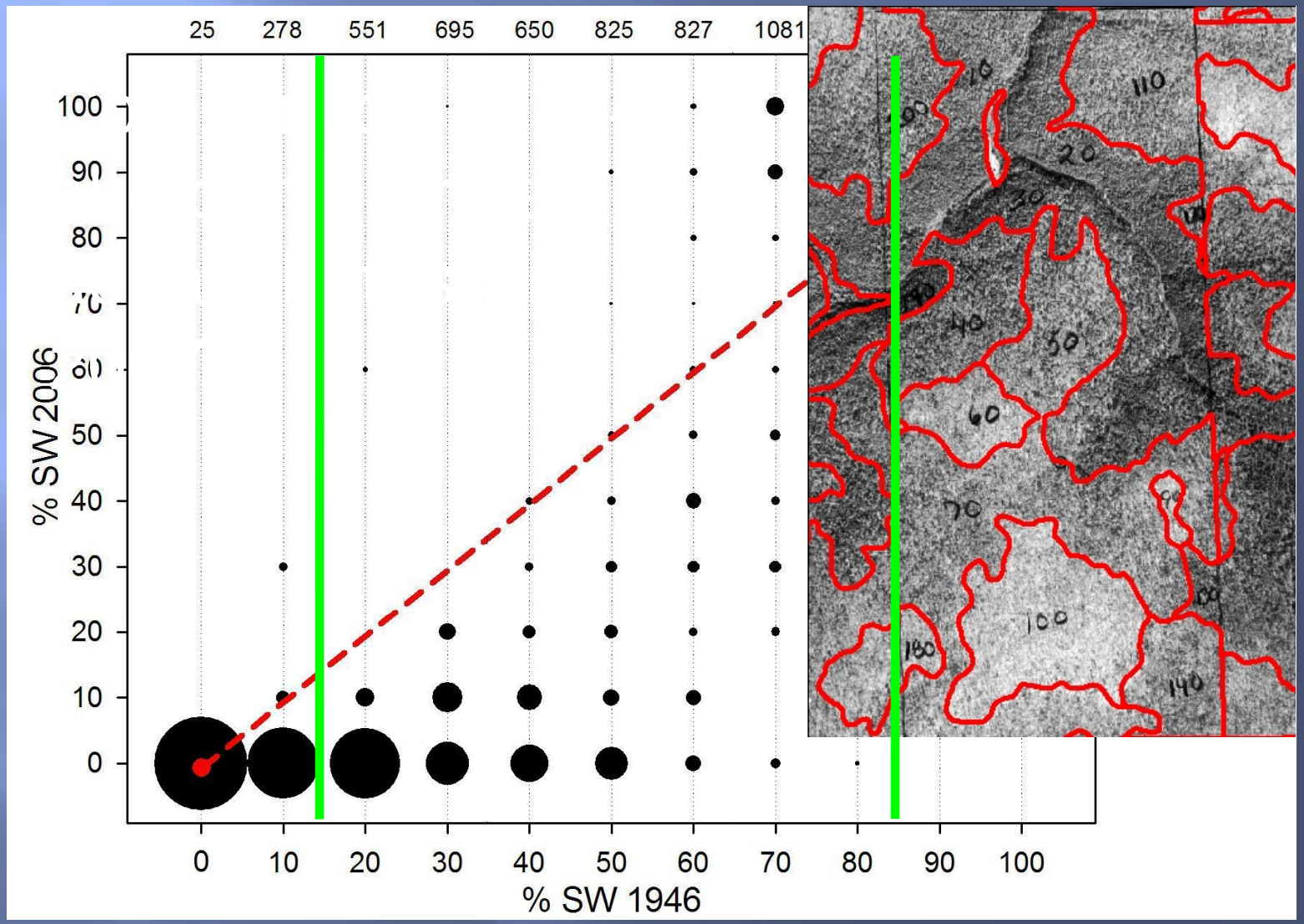
Background

1945 Stand Type	% Area by 2002 stand type			
	SWCE	SW	MW	HW
SWCE	**58**	18	10	14
SW	23	**29**	18	30
MW	13	13	**18**	56
HW	50	4	9	**37**

Etheridge et al. 2006

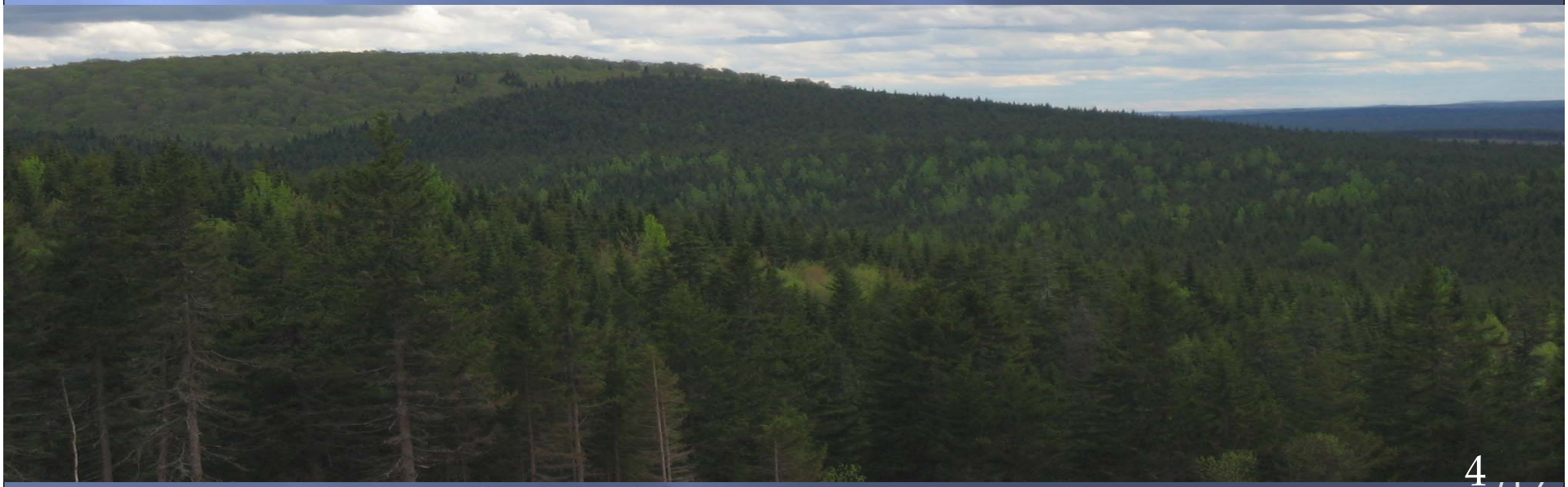
1945 Cruise maps vs. 2002 GIS inventory

Background


25
278
551
695
650
825
827
1081
100
90
80
70
60
50
40
30
20
10
0
% SW 2006
0
10
20
30
40
50
60
70
80
90
100
% SW 1946

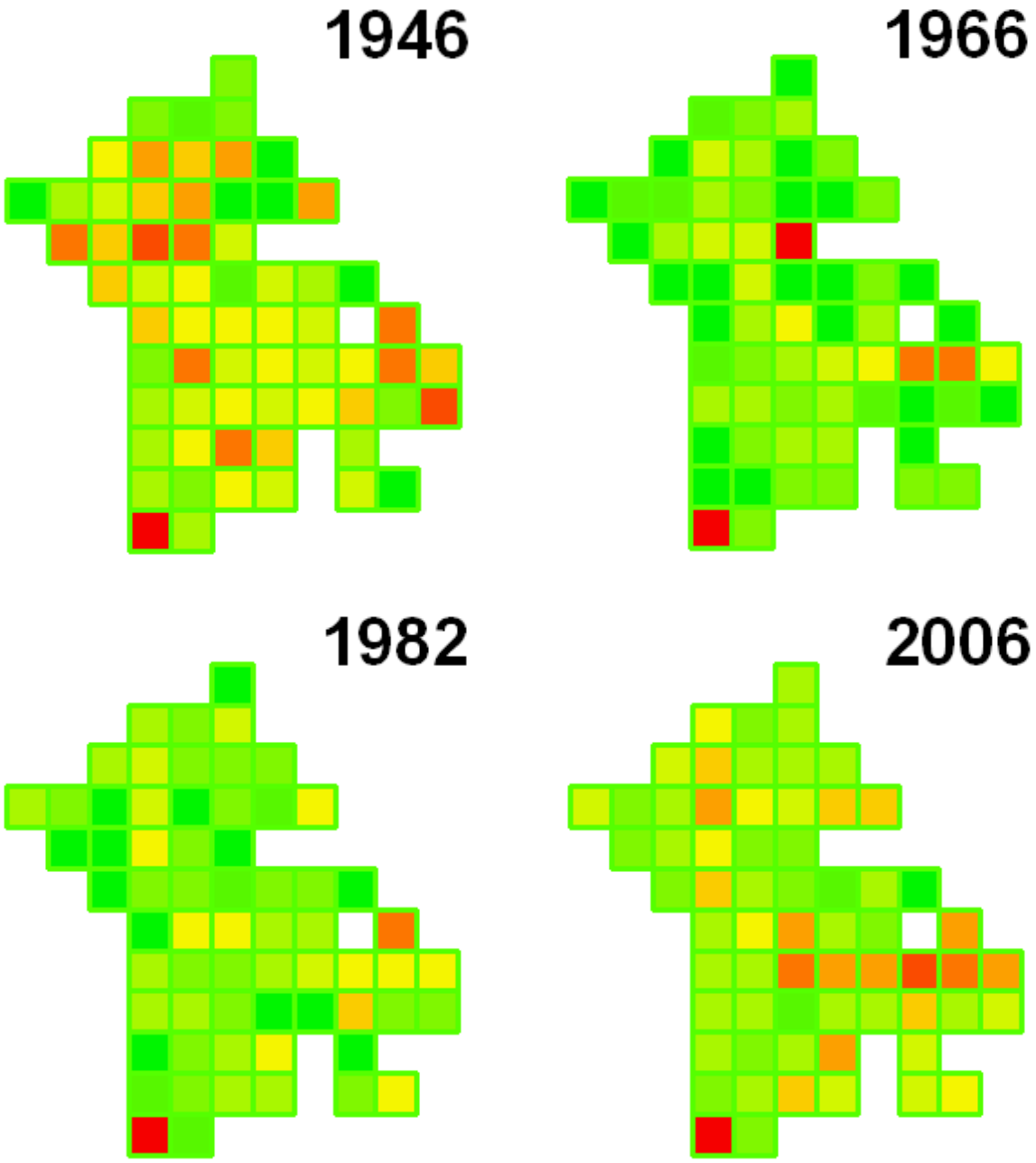
Objectives

1) Determine patterns of natural mixedwood stand dynamics from 1946-2006
2) Reconstruct the dynamics of natural mixedwood stands
3) Evaluate the potential changes in species composition under SBW outbreak scenarios



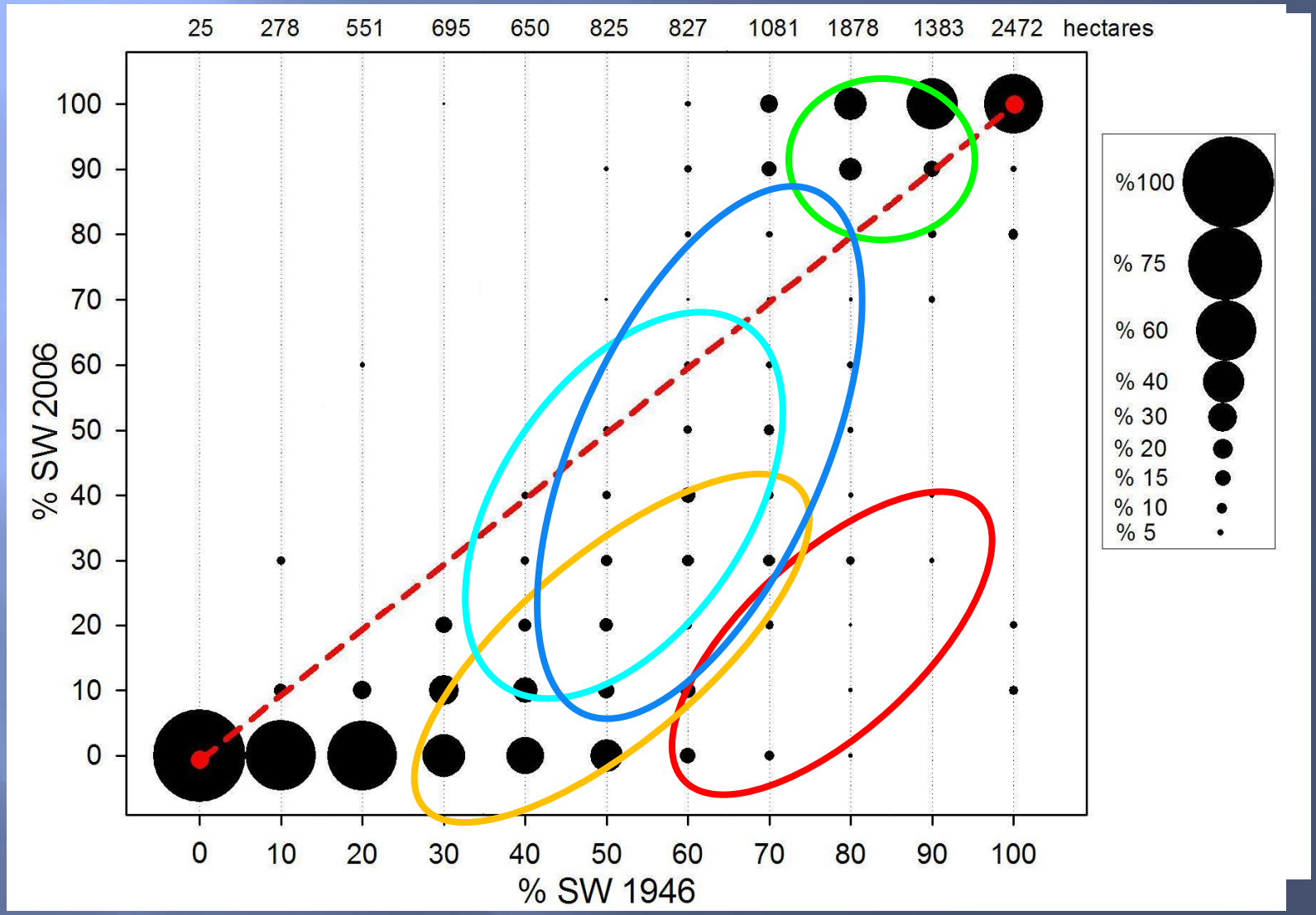
Determi

- Aeria
- 45 St
  - 194
  - Cha
- Meas
  - Sof
  - Har
  - Car
- 50 by

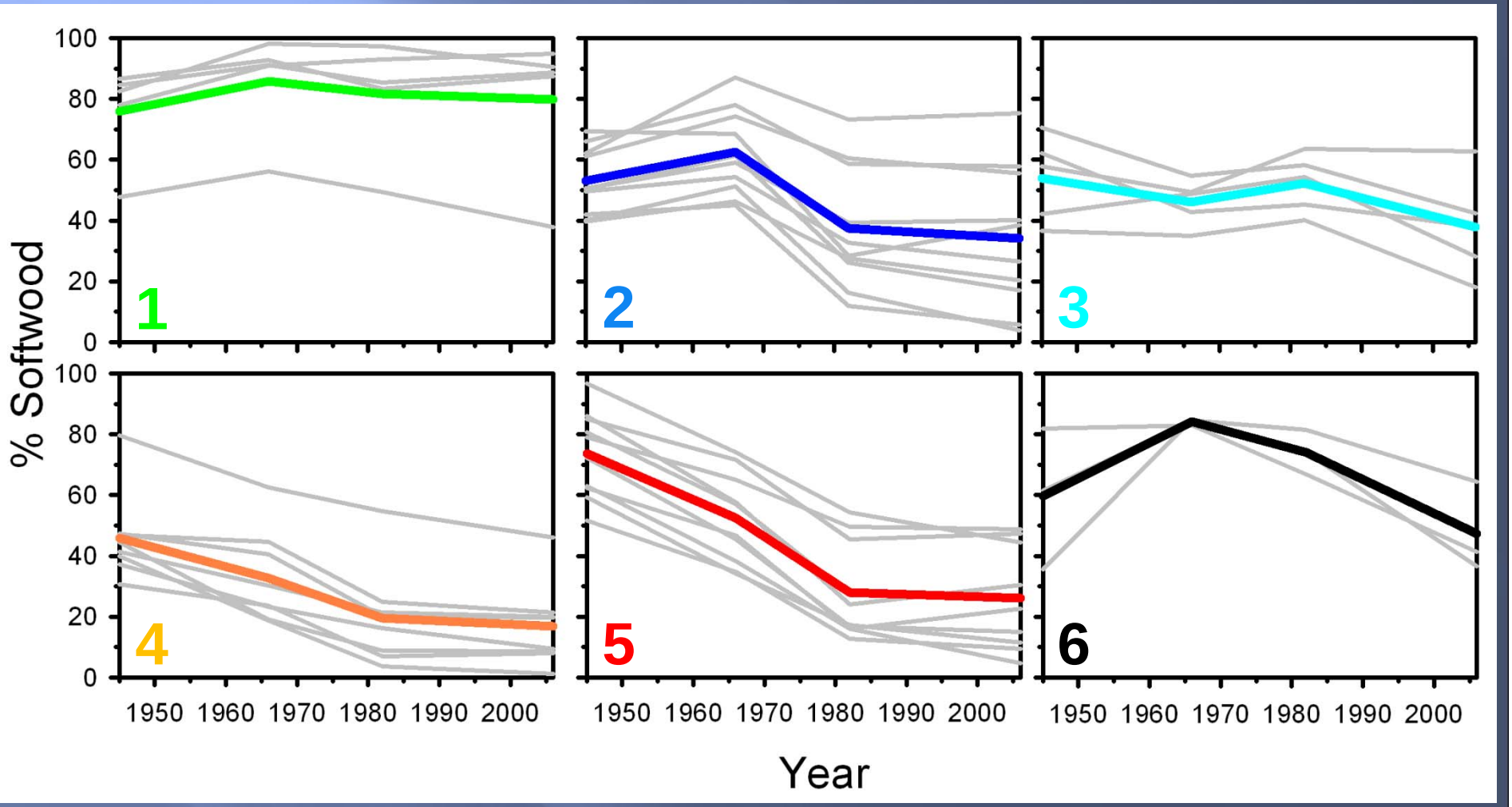


dwood

Determine the range of natural mixedwood stand dynamics 1946-2006



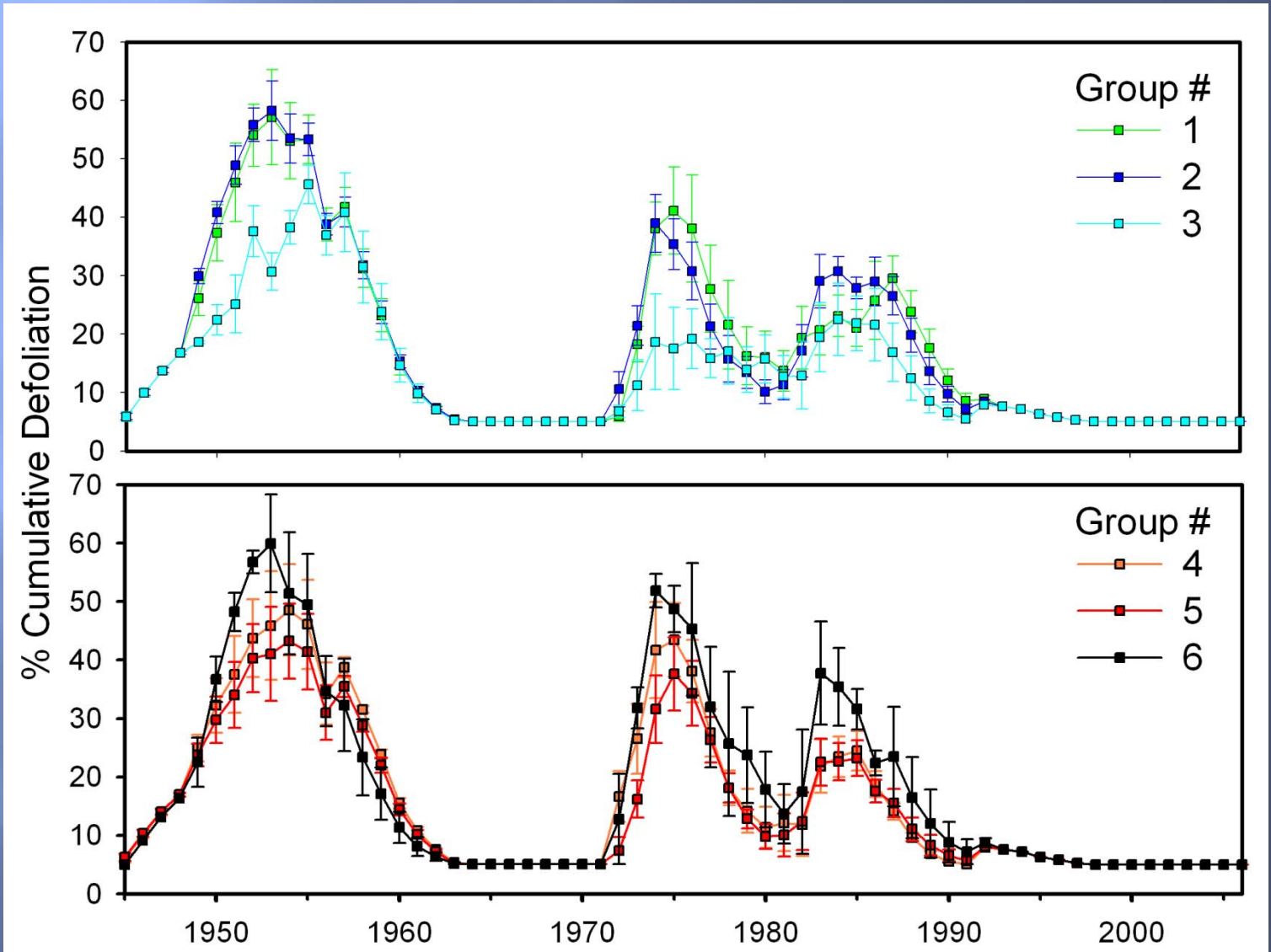
Determine the range of natural mixedwood stand dynamics 1946-2006



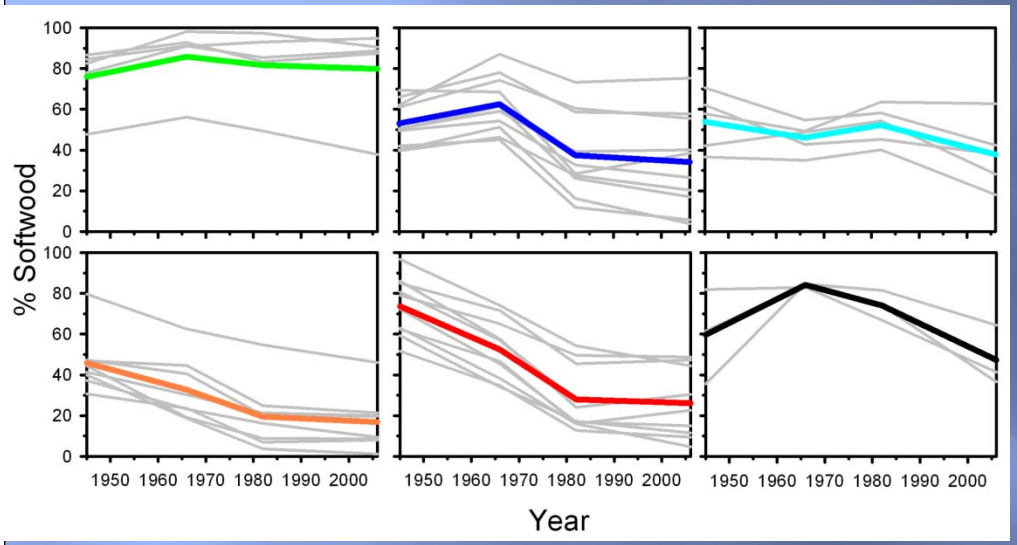
Determine the range of natural mixedwood stand dynamics 1946-2006

- What caused these differences in compositional patterns?
  - Natural disturbance
    - Spruce Budworm/Protection
    - Wind events
    - Dieback
    - Interactions
  - Stand structure
  - Site conditions

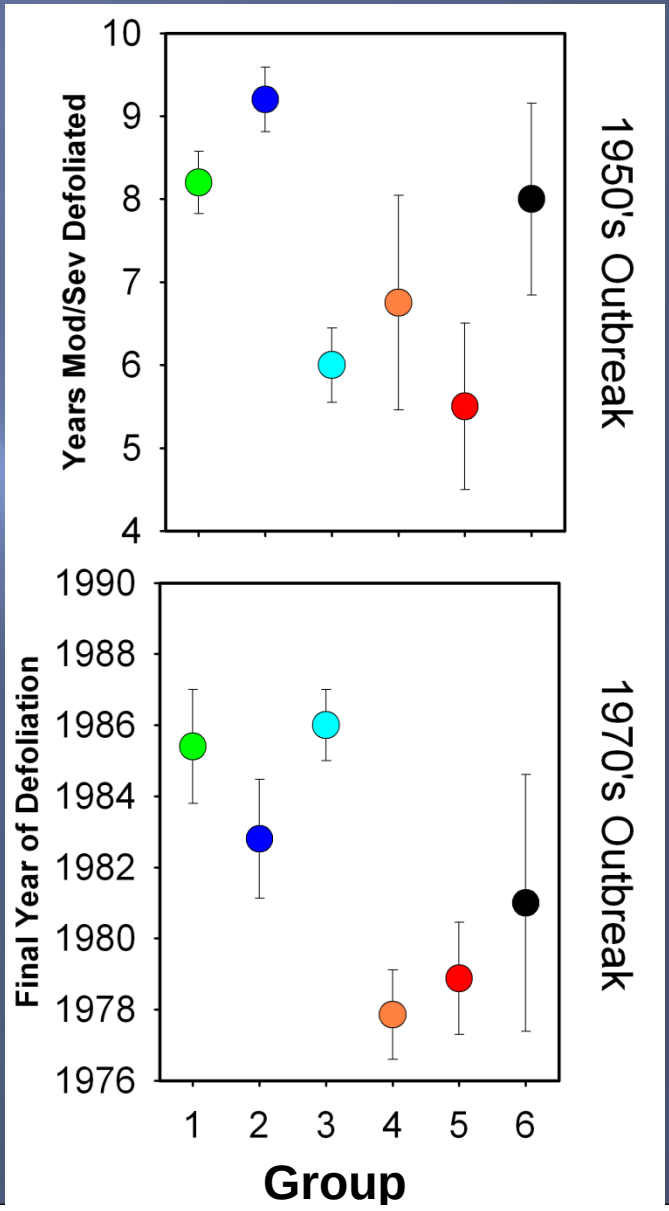
Spruce Budworm Defoliation



Spruce Budworm Defoliation

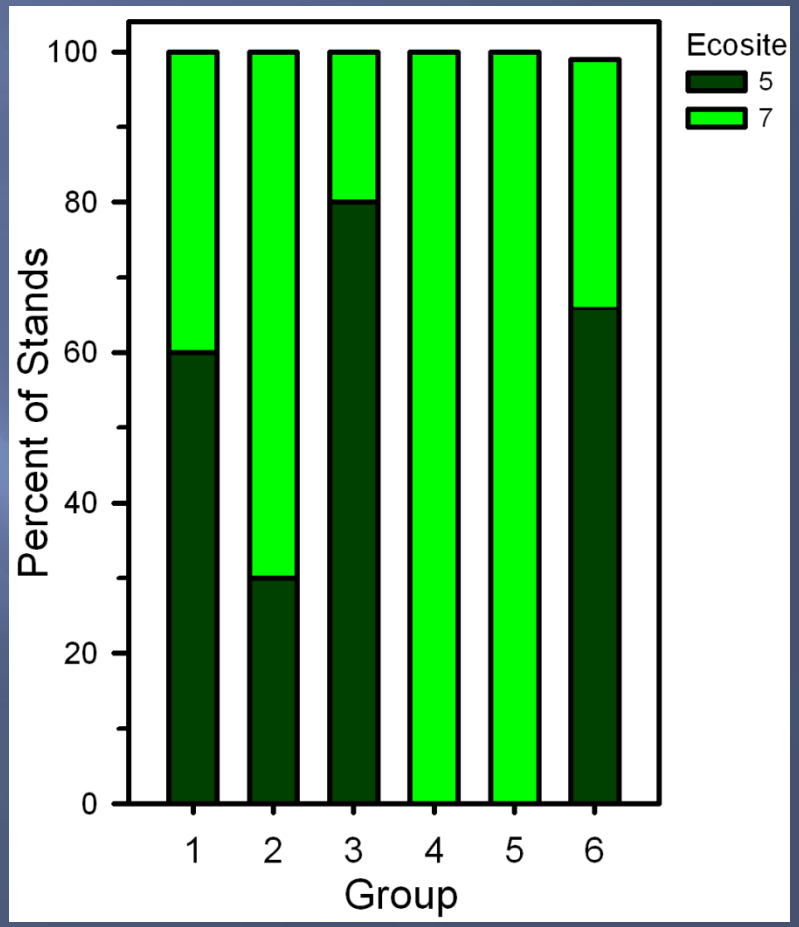


- Few significant differences between groups
  - Coarseness of defoliation maps
  - Species composition and stand structure following outbreak



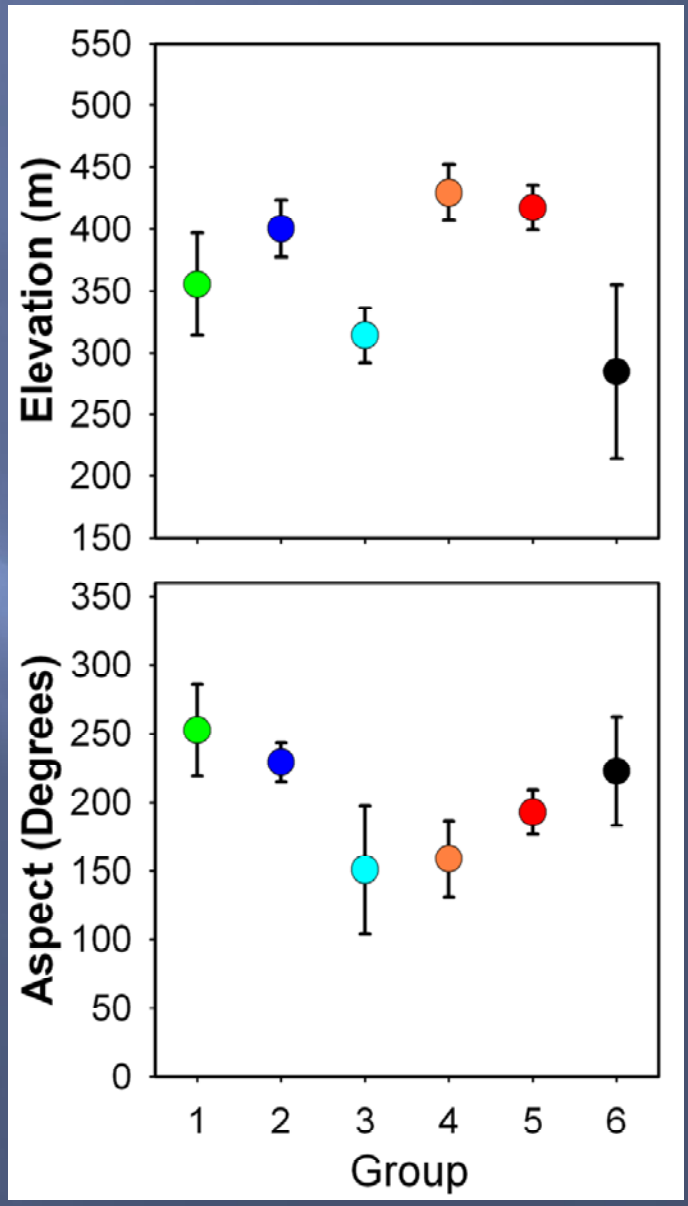
Site attributes

- Ecosite
  - 5 – Moderate nutrient regime
  - 7 – Rich nutrient regime
  - Ecosite 7 - more favorable for the establishment of hardwood



Site attributes

- Elevation
  - Groups of stands that experienced significant drops in softwood composition had higher elevations
- Aspect
  - Some differences in aspect may relate to growth conditions or susceptibility to windthrow



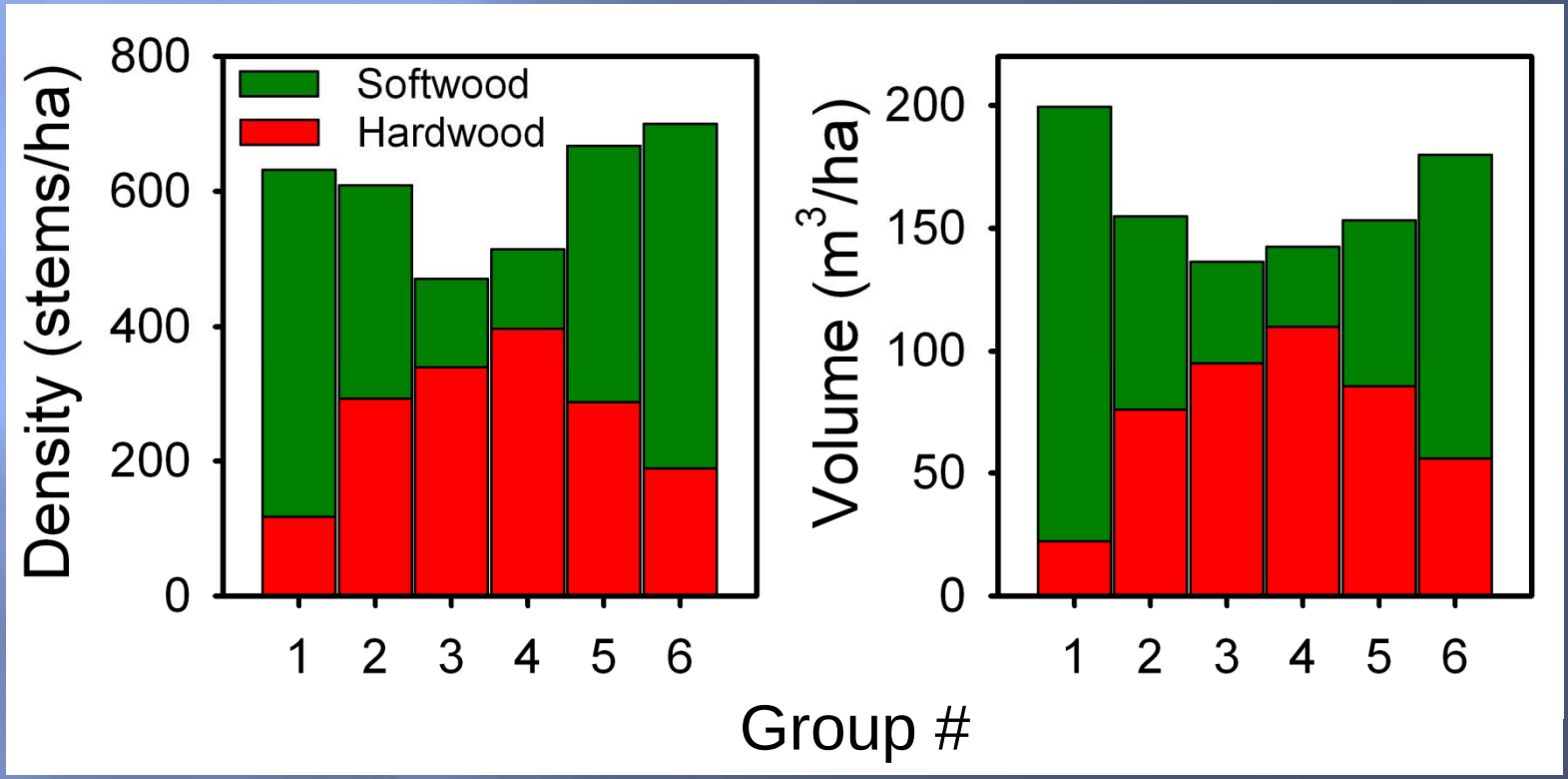
Reconstruct the dynamics of mixedwood stands

- Sampling
  - Three prism plots randomly selected within representative cells in each stand
  - Live and dead tree measurement
  - Cores extracted from balsam fir, spruce, and non-host species - ~20 cores per stand

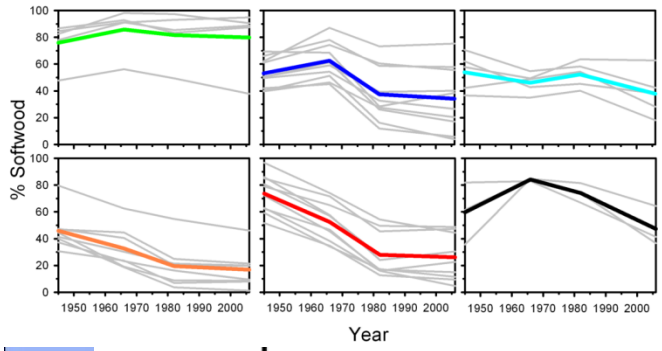
Reconstruct the dynamics of mixedwood stands

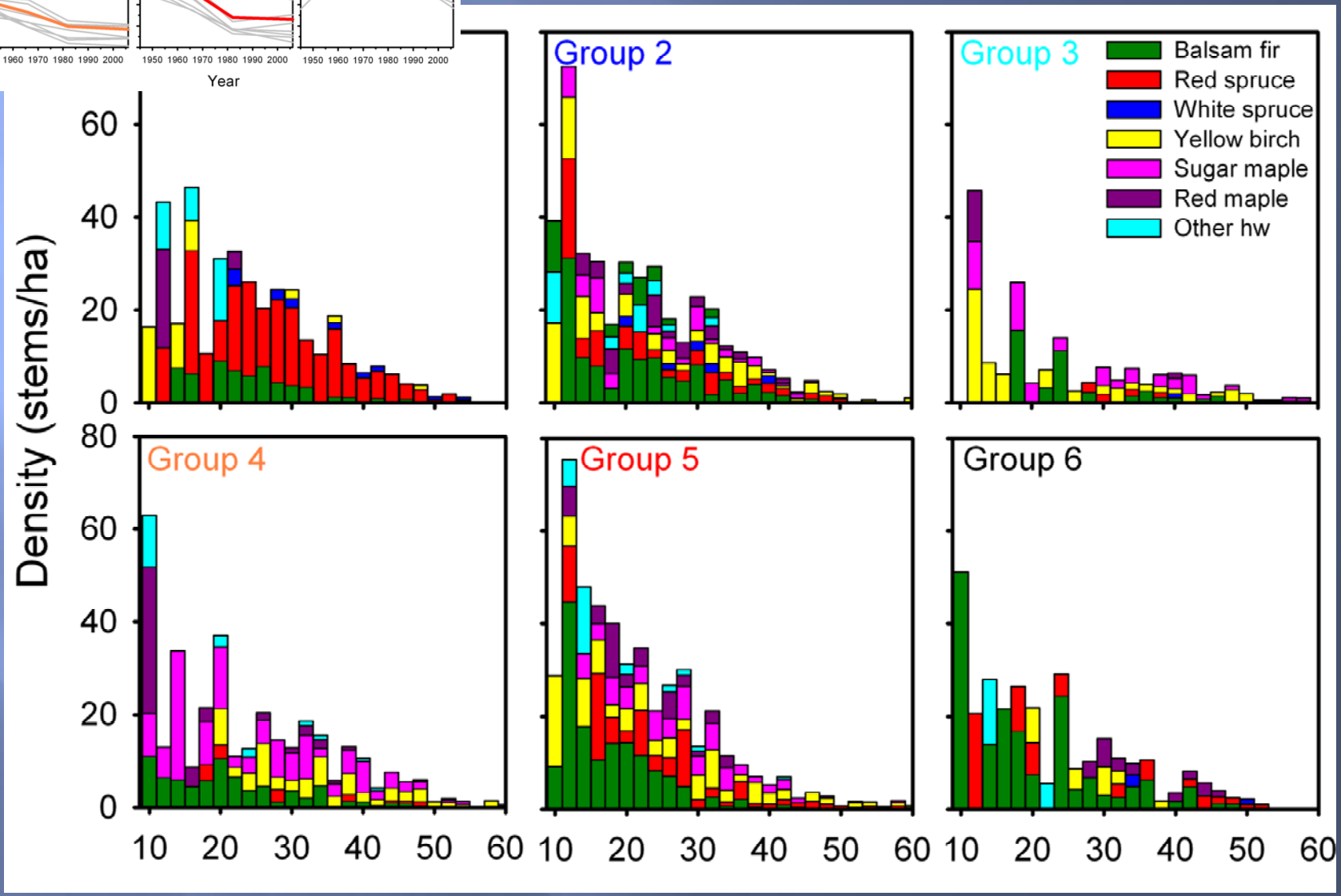
- Quantify budworm impact using host/non-host growth data
- Deadwood identification and crossdating
- Identify growth releases and recruitment
  - Disturbance
  - Growth following disturbance

Stand Data


Density (stems/ha)
800
600
400
200
0
Softwood
Hardwood
1
2
3
4
5
6
Volume (m3/ha)
200
150
100
50
0
1
2
3
4
5
6
Group #

Stand Data


% Softwood
Year
1950 1960 1970 1980 1990 2000


Density (stems/ha)
Group 2
Group 3
Group 4
Group 5
Group 6
Balsam fir
Red spruce
White spruce
Yellow birch
Sugar maple
Red maple
Other hw
0
20
40
60
80
10
20
30
40
50
60

Work to be completed

- Live tree and deadwood measurement and analysis

Questions?