# Cerulean Warbler Breeding Habitat Characteristics

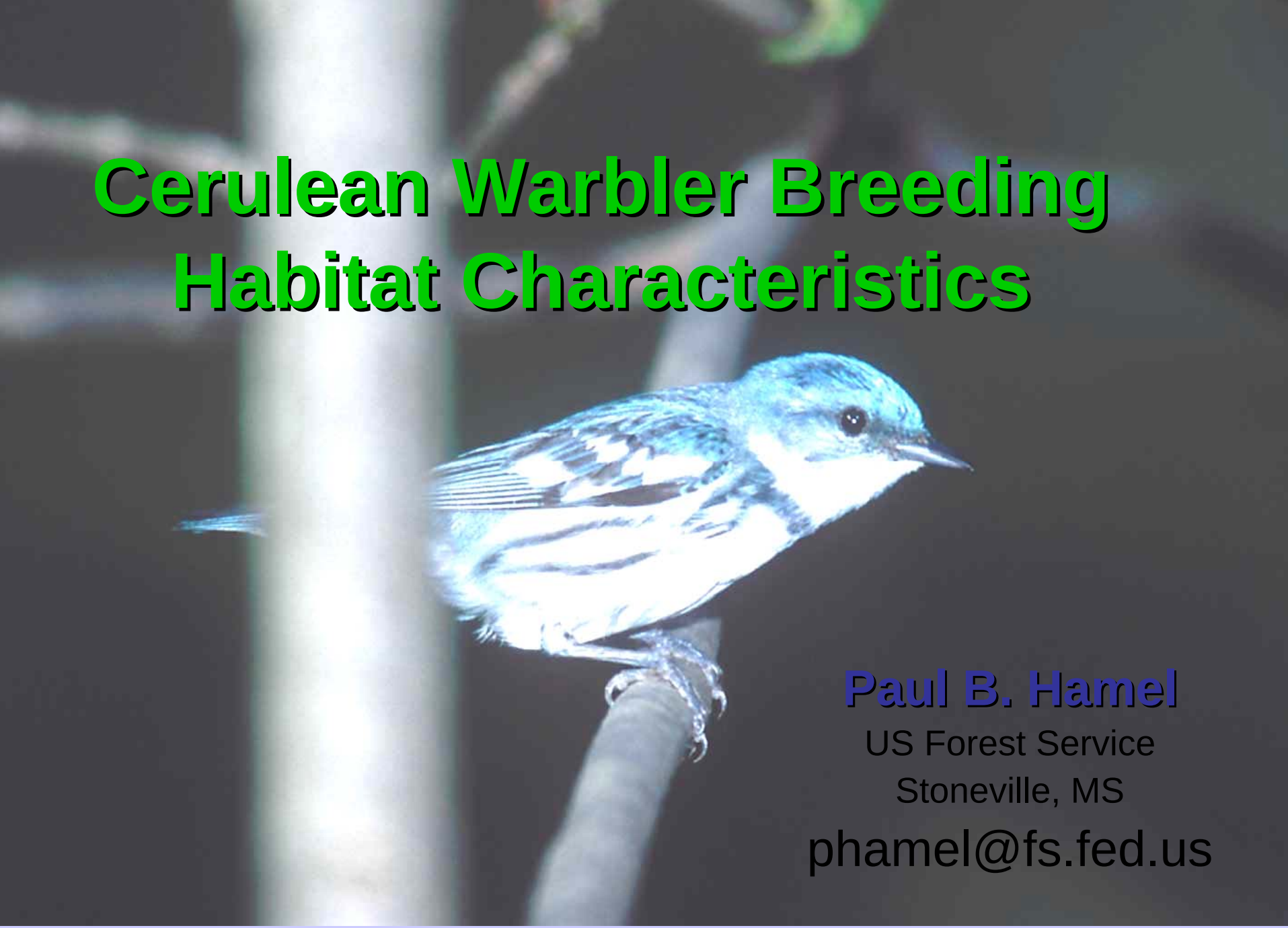

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Photo © Roger Eriksson

# Regional Variation on Common Themes

- Tract Size / Area Sensitivity
  - Varies regionally
- Bimodal Site Types
- Variety of Tree Species Regionally,
  - May be more restricted locally
- Big Trees
- Tall Trees
- Heterogeneous canopy structure

# Habitat Associations of Cerulean Warblers

## Scale Description

regional,
physiographic
forest type,
topographic,
edaphic,
successional stage,
stocking
tree species and size,
nest vicinity, and
nest microsite

Rangewide

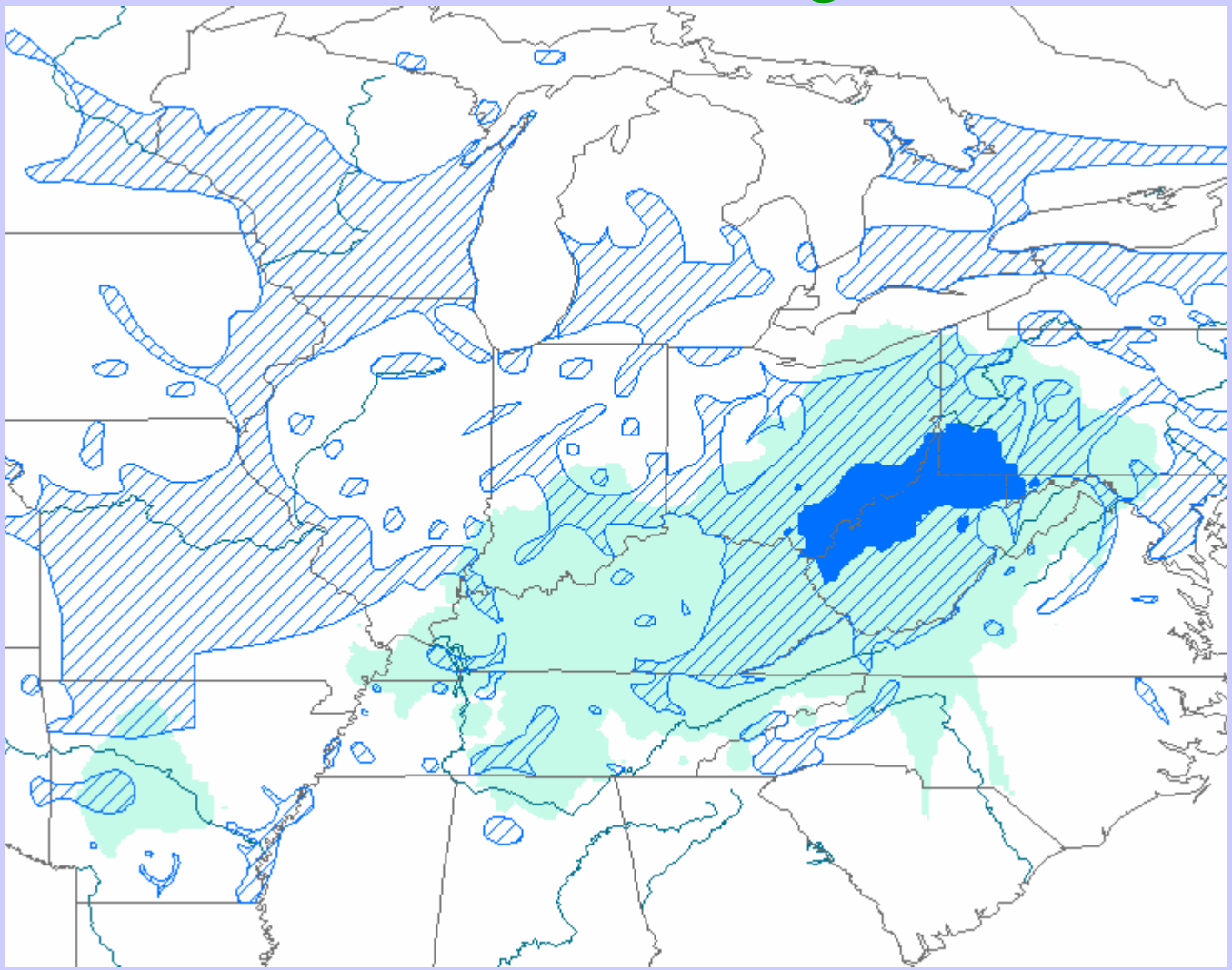
Regional

Landscape

Stand

Home range /microsite

# Breeding Distribution is Dynamic within the Range



**Occurrence at High Significance 1966-2003**

- At least 1 year
- Every year
- Range from Dunn and Garrett 1997

Data of Jennifer Baldy, Univ. of Memphis Thesis, 2005

**Forest Managers** in the **Central Hardwoods** are the **Primary Stewards** of **Cerulean Warbler** Breeding Habitat

# Landscape-scale Relationships

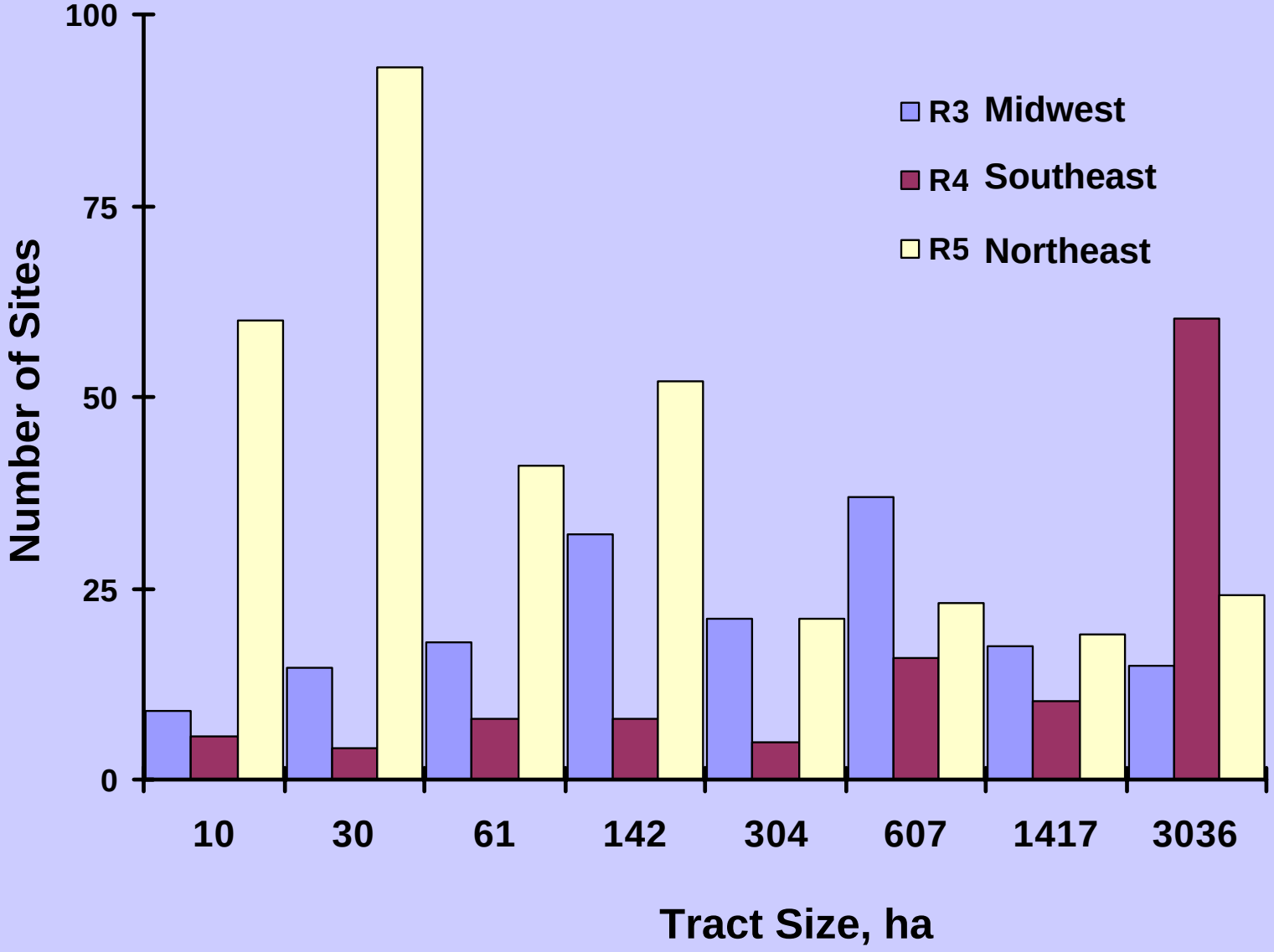
- Largely forested landscapes
  - eg.  Cumberland Mountains, TN- 85% forested

and/or

- Large forest patch size
  - 700 ha- MD (Robbins et al 1992)
  - 1600 ha- Miss. Alluvial Valley (Hamel)

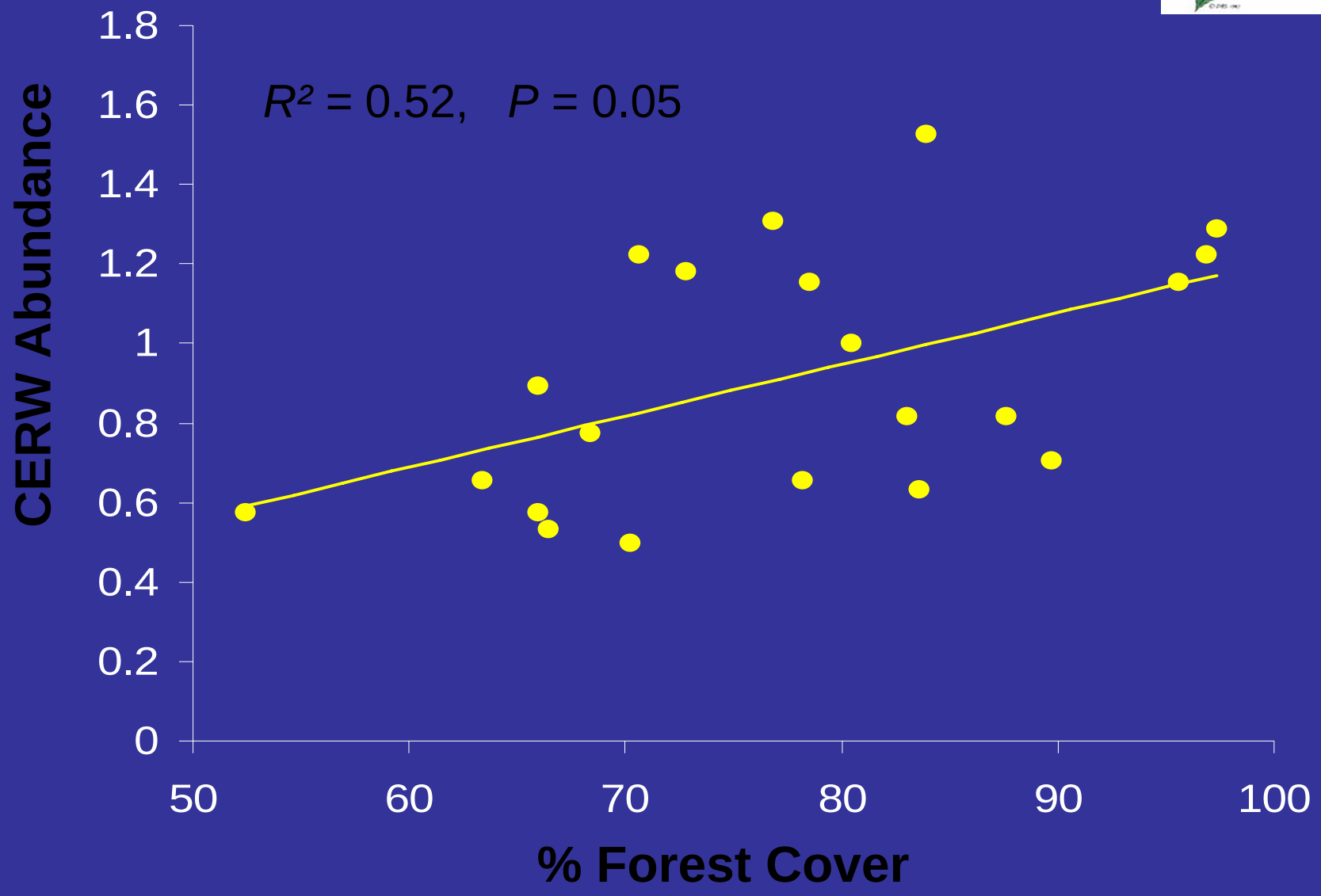
- Regional variation in sensitivity

# Tract Size Utilization

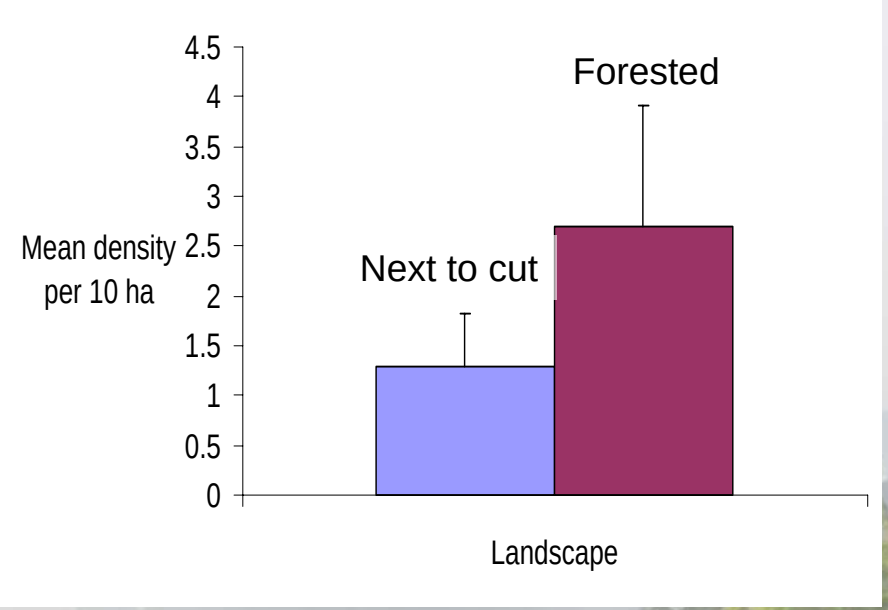


# Forest Cover in Landscape

(Bosworth 2003)

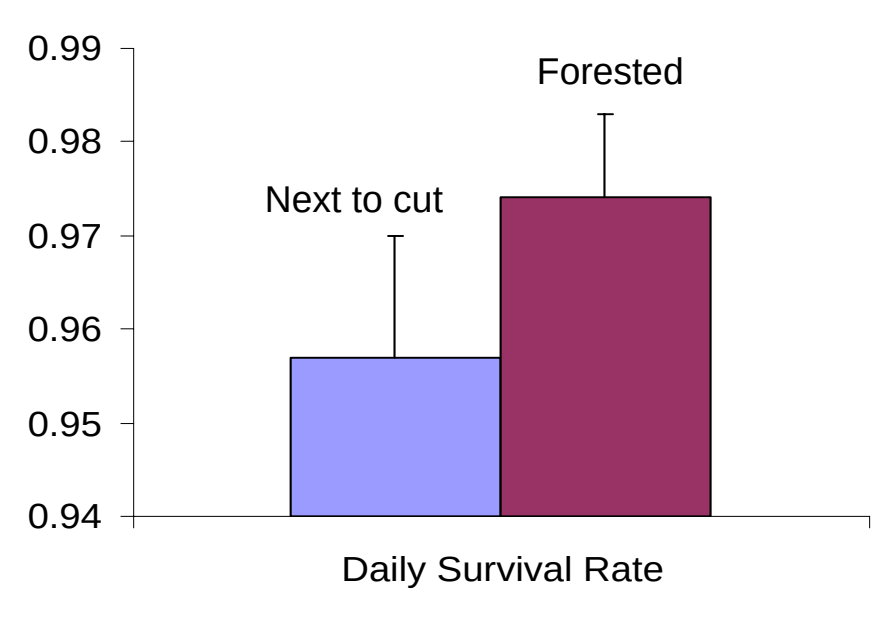


Preliminary data from 2004-05 suggest that density and nest survival rates may be lower in forests adjacent to recent clearcut compared to more forested landscapes.



Bakermans and Rodewald, in progress

(Check back in the summer)



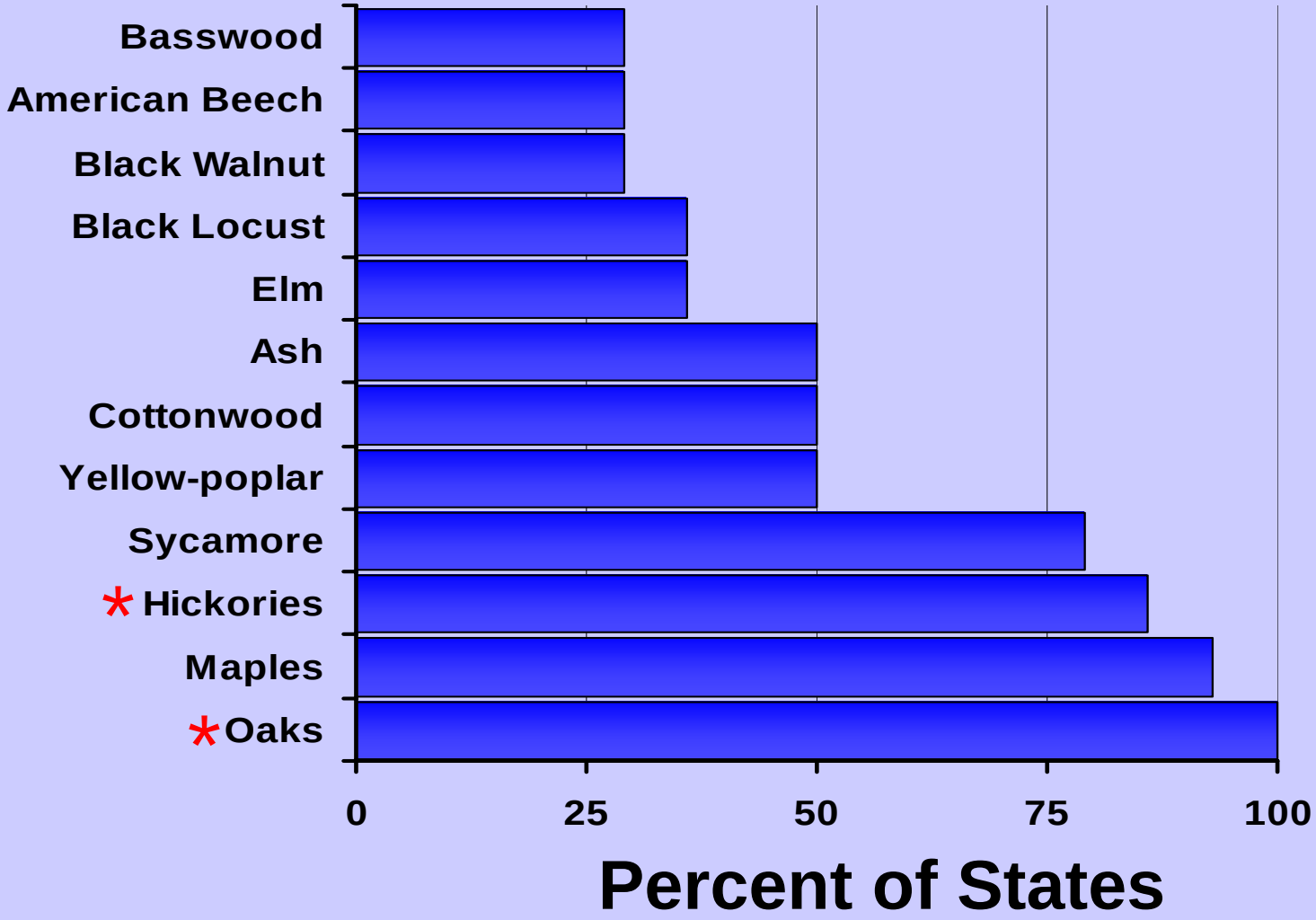
# Habitat Relationships: Landscapes

- Area sensitivity
  - 1,780 ac (Robbins et al 1992)
  - 4,000 ac in MAV (Hamel)
- Regional variation in sensitivity
- Edge avoidance varies

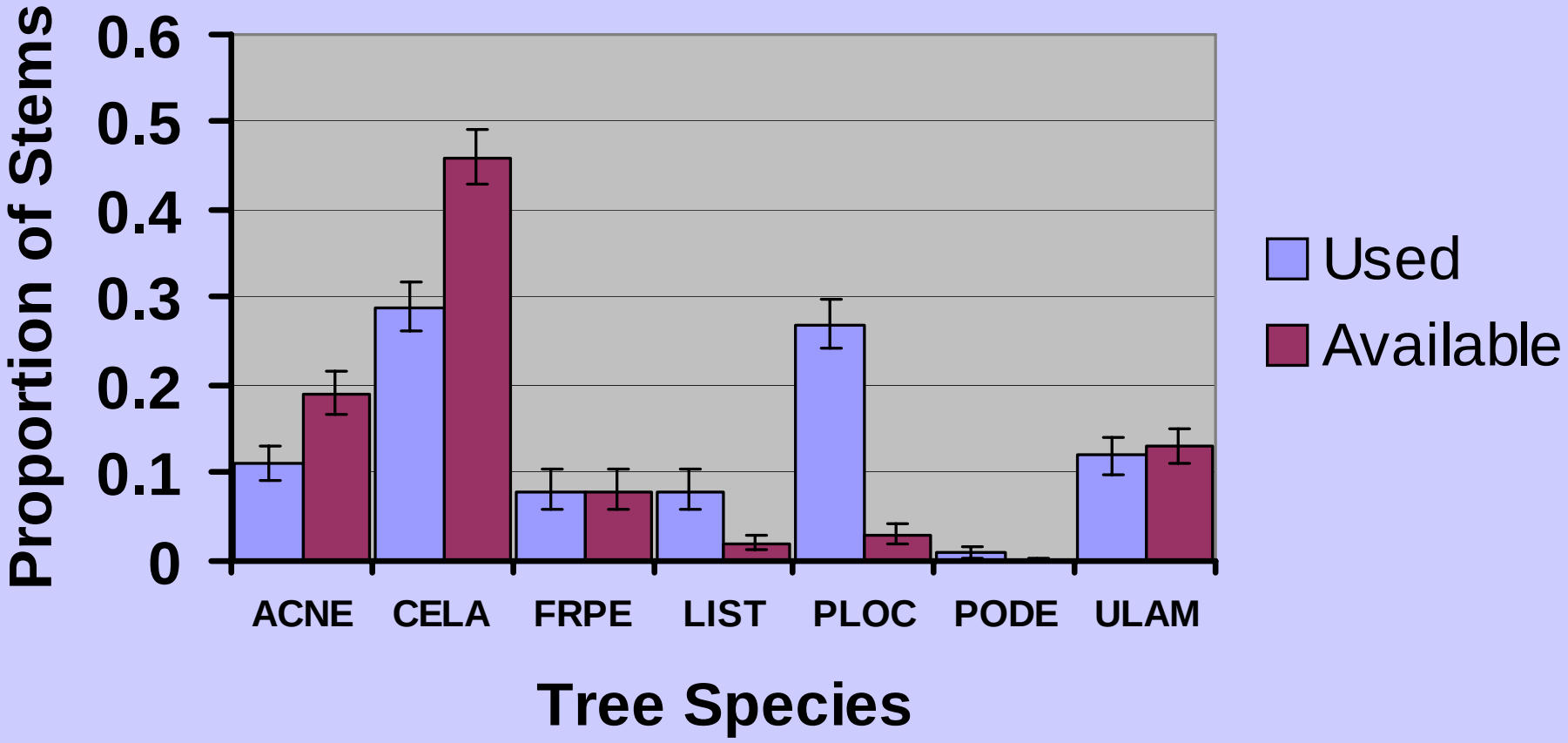
# Forest type

- Eyre (1980) lists 49 Eastern forest cover types
- Cerulean Warblers have been confirmed to nest in nominate tree species of 33
- **Forest cover type use is selective within a locality**
- **Forest cover type use varies across localities**

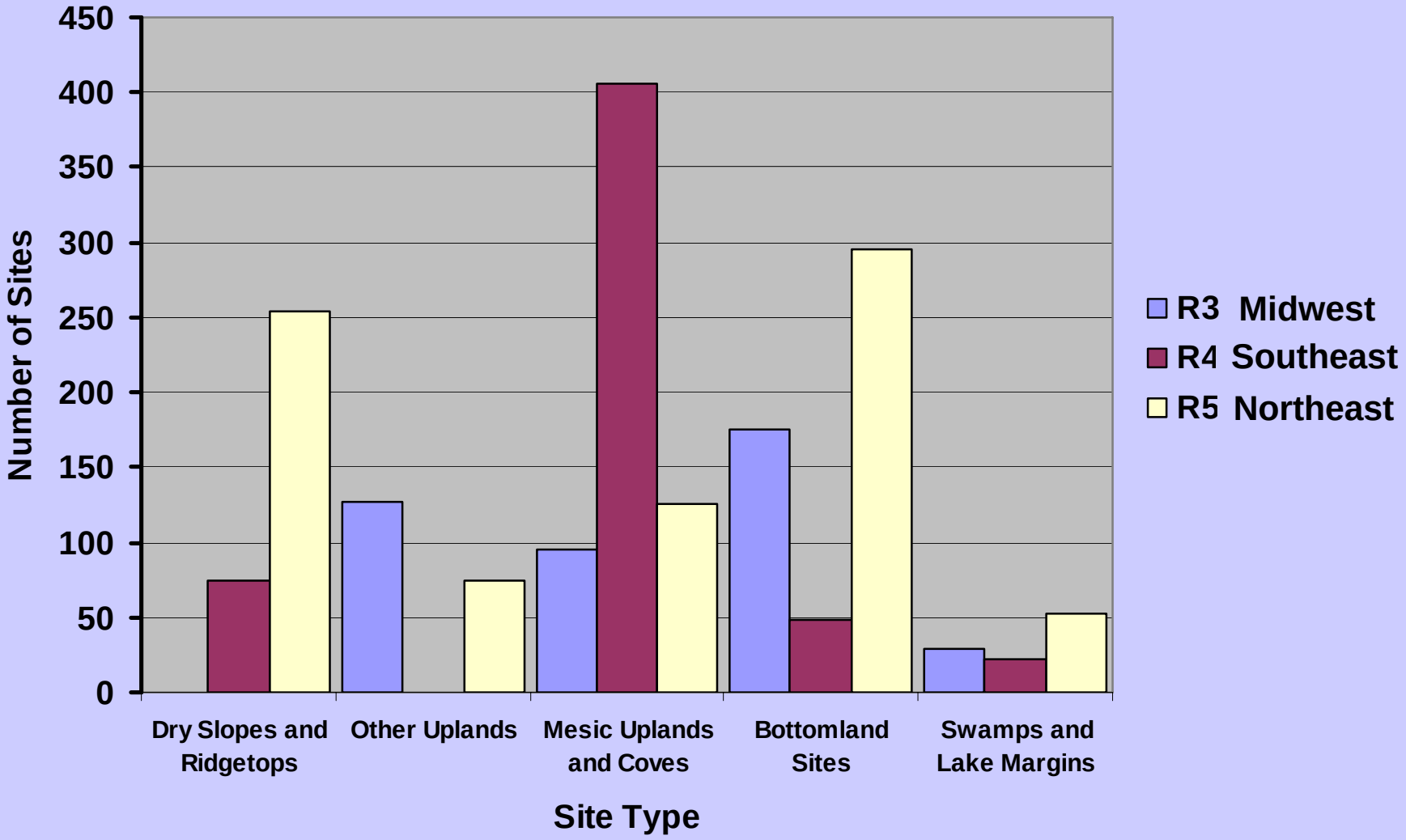
# Tree species use



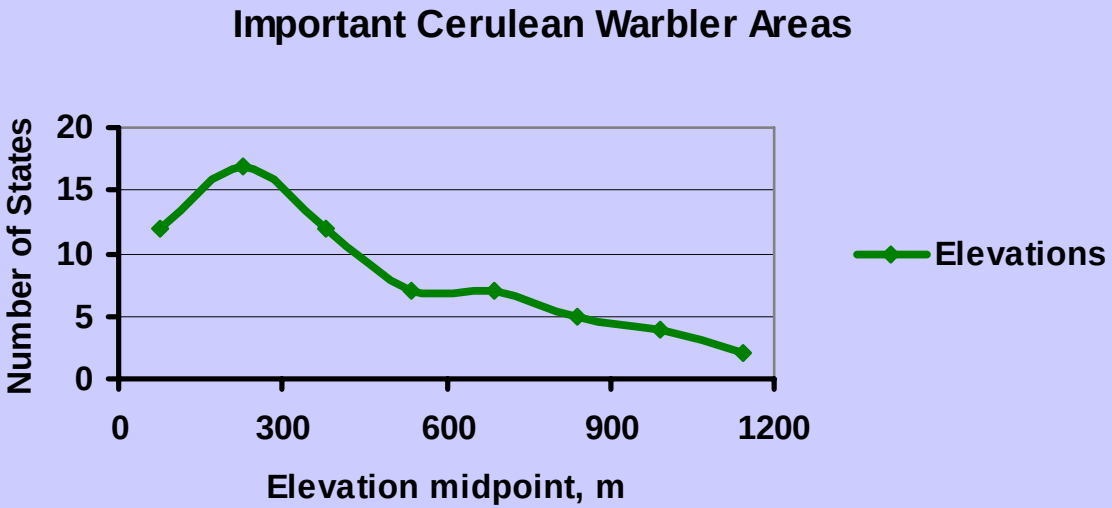
# Cerulean Warbler on Desha Site
# Tree Availability vs Use

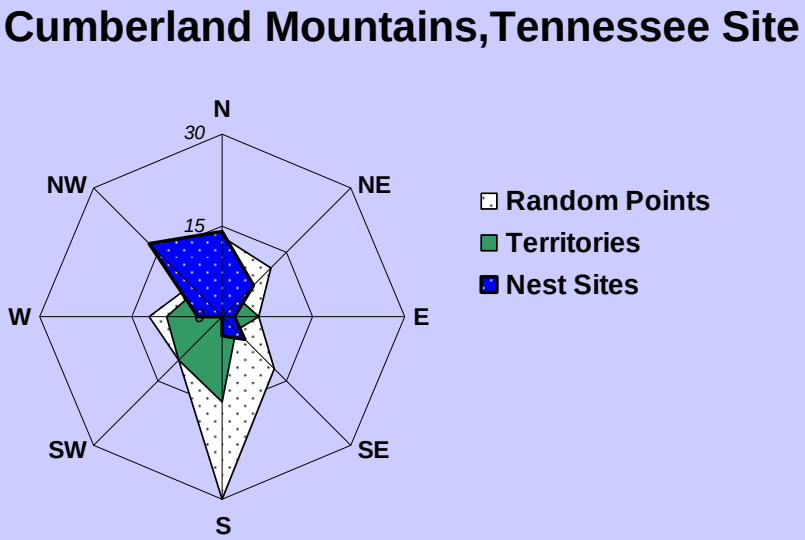


# Topographic situations



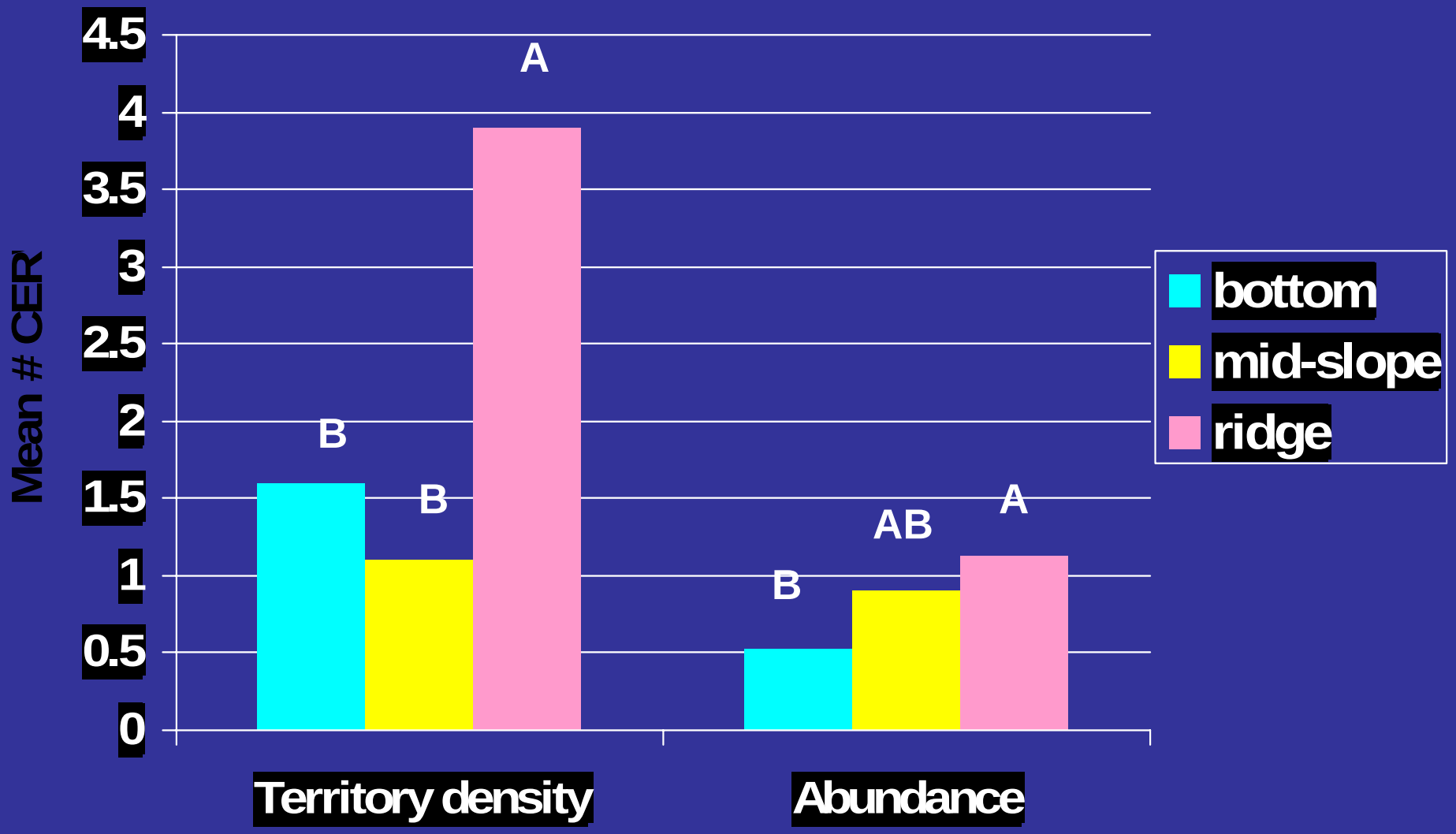
# Elevation and aspect



# Slope position

## (Weakland, Wood, Bosworth)

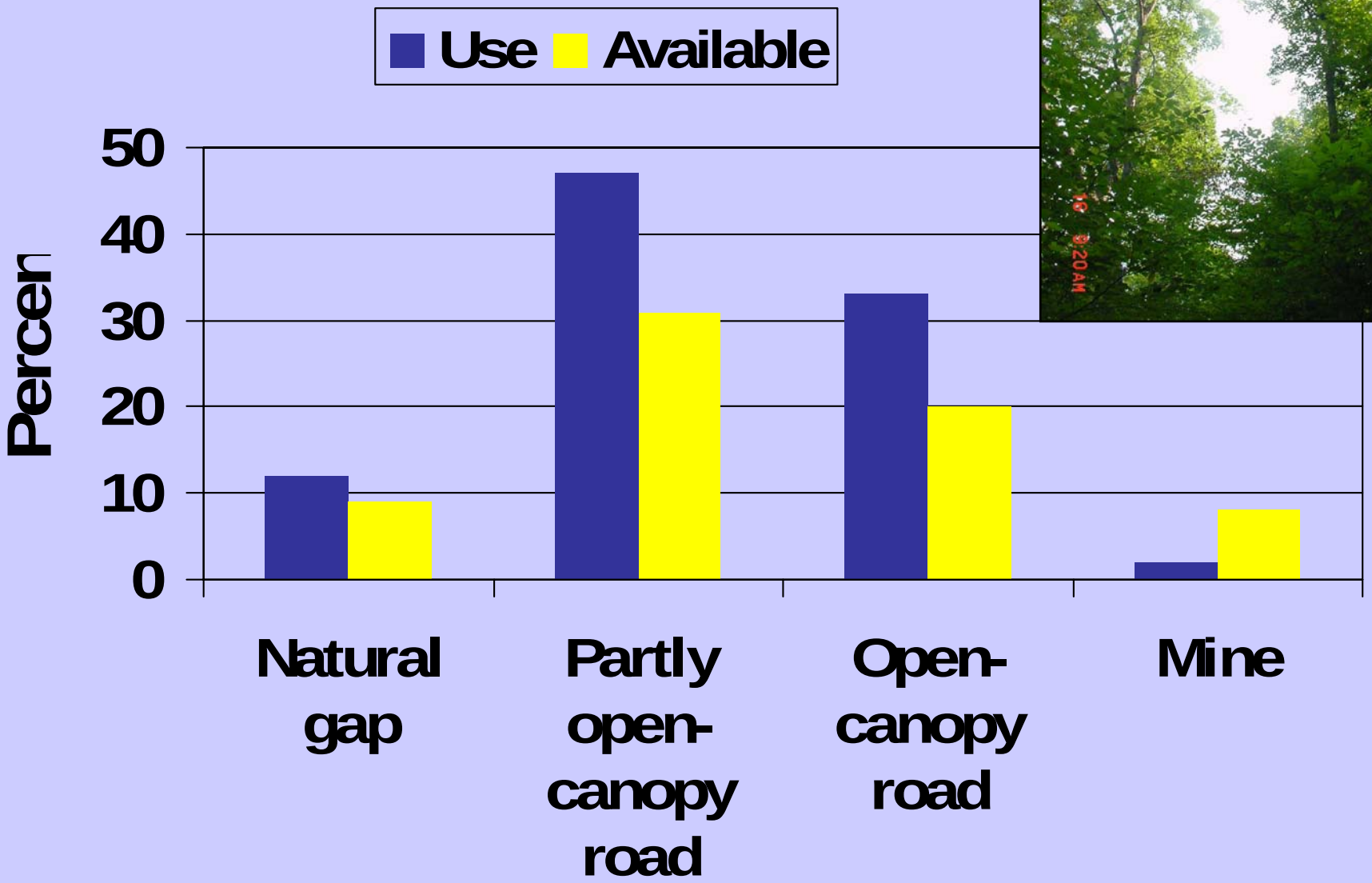


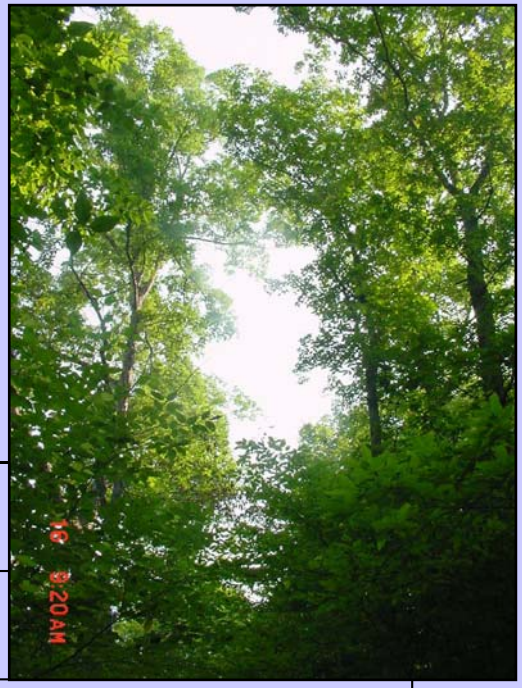
# Edge Effects?

- Reduced density (Wood et al.) and possibly reduced productivity in areas adjacent to hard edges.
- Effective distance unknown
  - Needs to be documented for different forest management types
- Importance of canopy gaps?
  - Canopy heterogeneity vs. canopy gaps

# Use of edge types

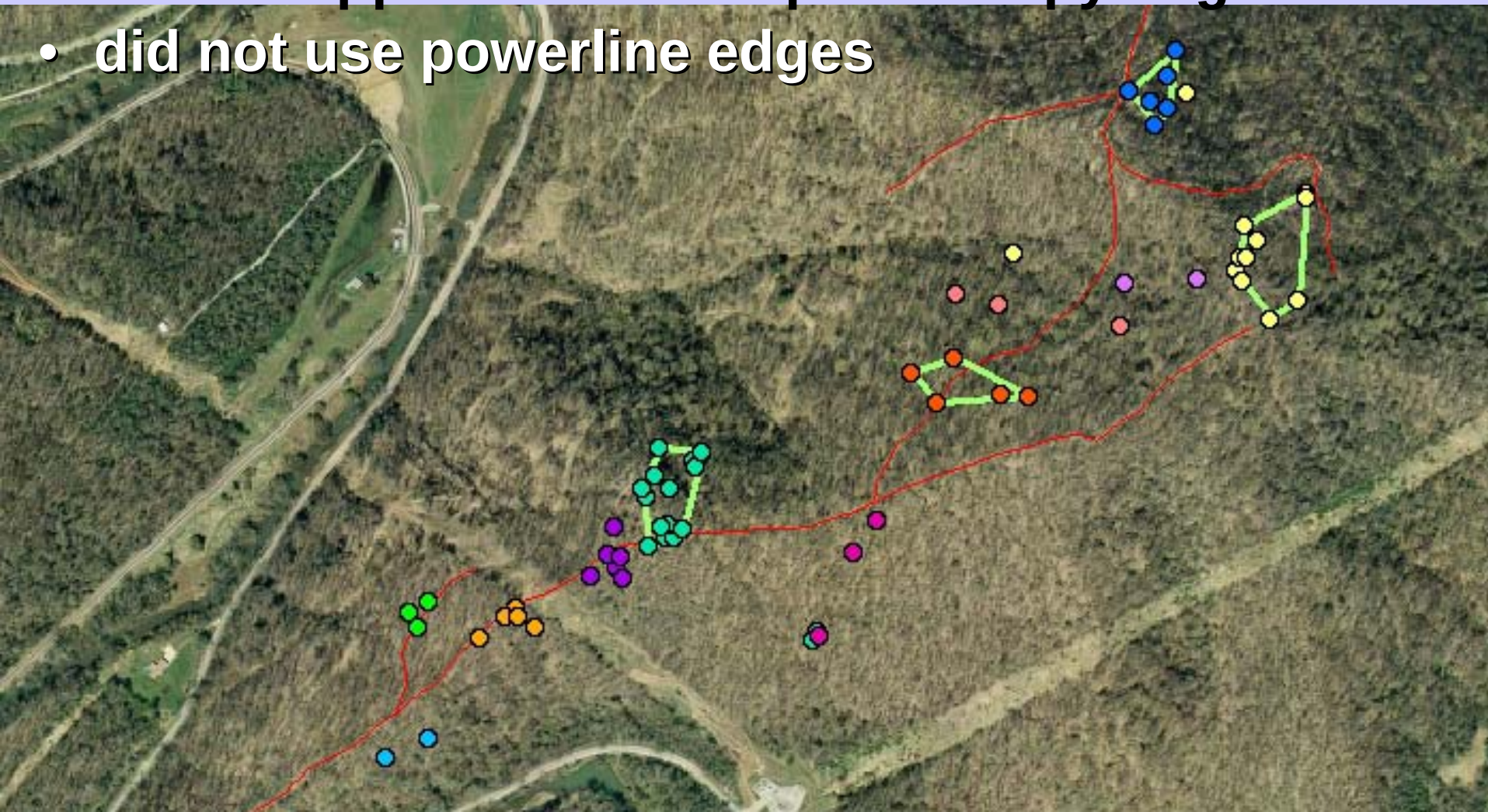
(Weakland and Wood 2005)



# Edge vs. Gaps

- **Territories included canopy gaps / trails**
- **did not appear to avoid open-canopy edges**
- **did not use powerline edges**



# Successional stage

- Cerulean Warblers occur in areas dominated by sawtimber sized trees

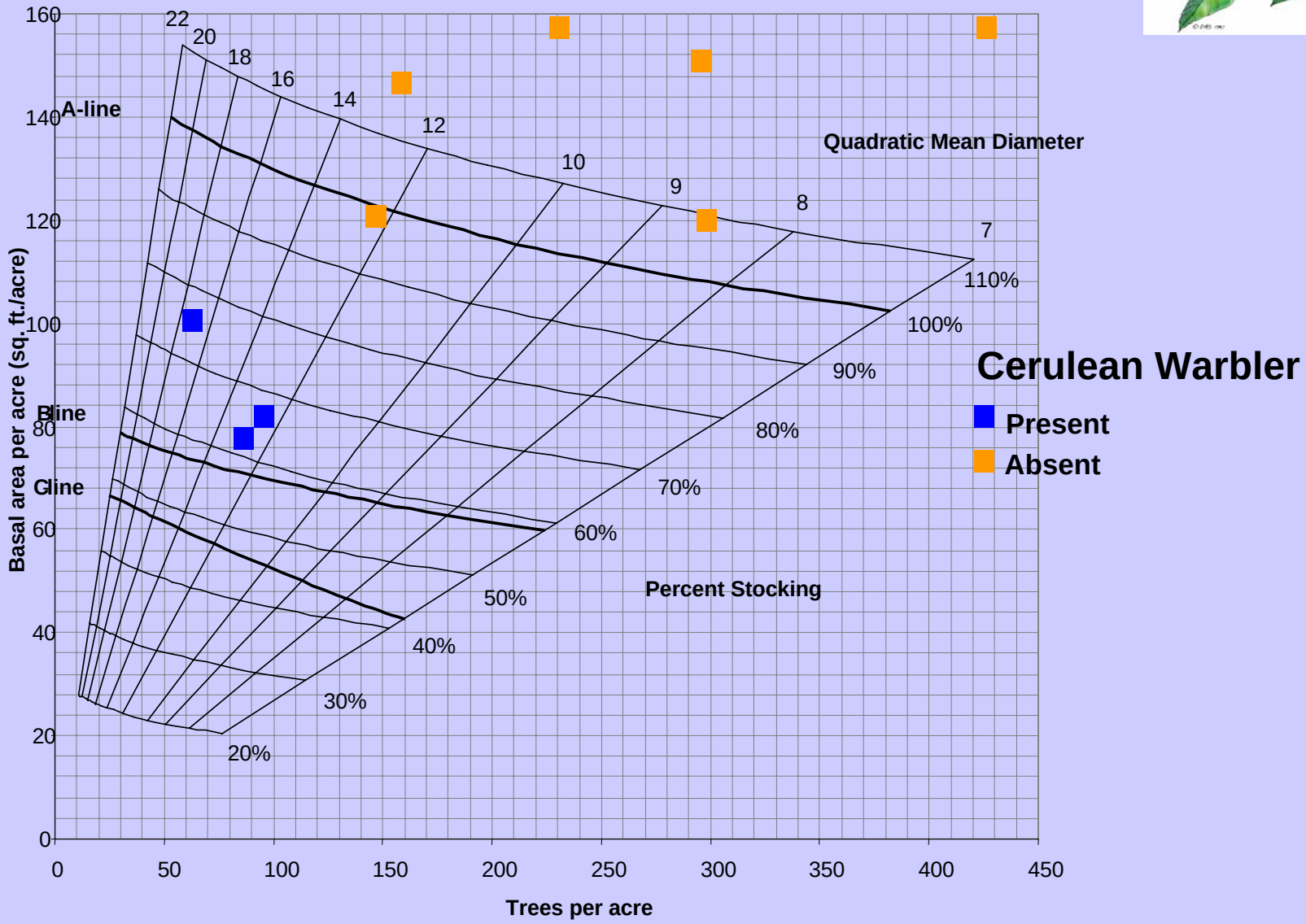
- Dominant trees may be
  - Shade Intolerant, pioneer species
  - Shade Tolerant, later successional species

- But they are always big trees

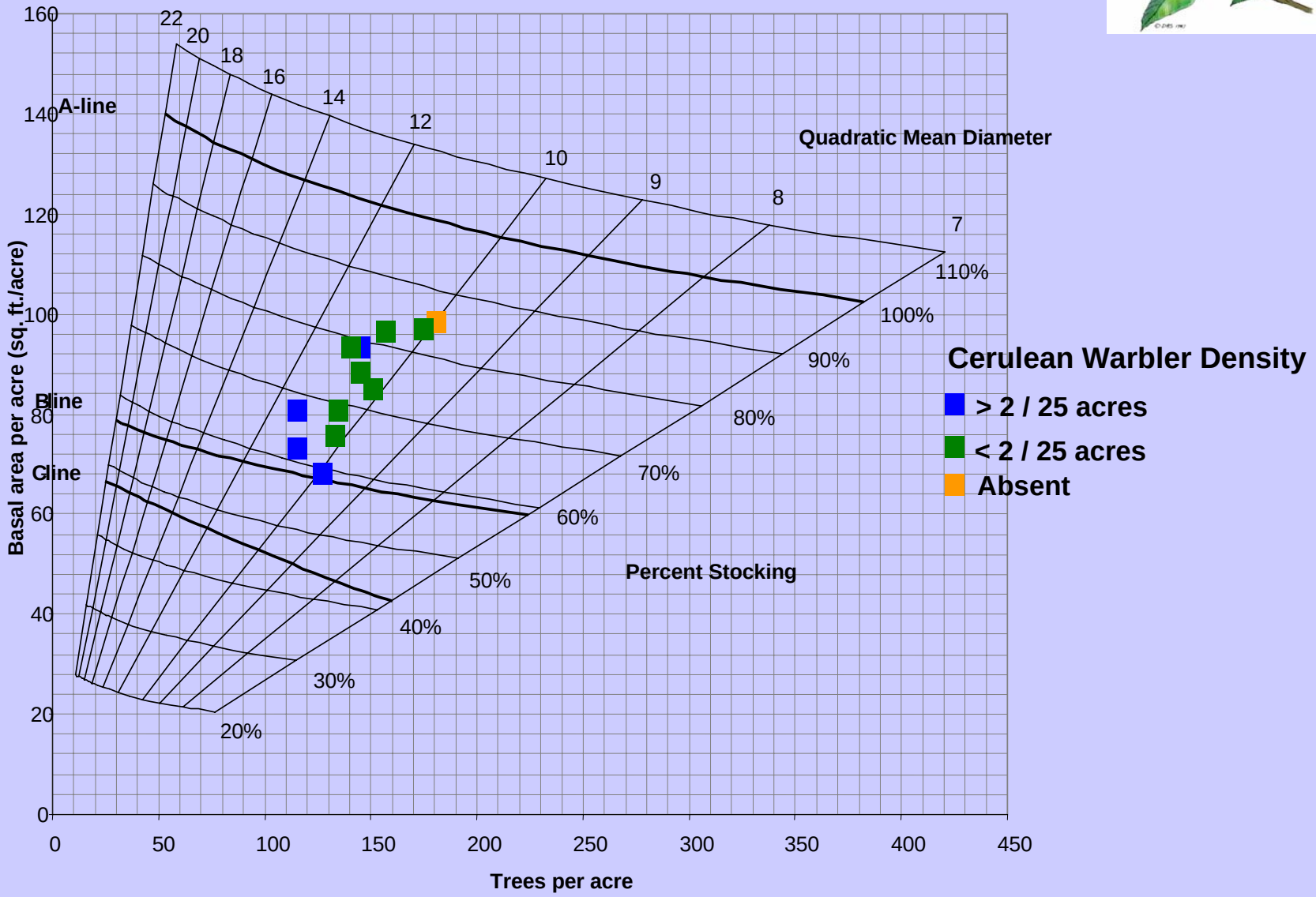
# Stand Stocking

- Relates tree number and tree size to available light and growing space in a predictable way
- Foresters understand this concept implicitly
- Ornithologists generally do not
- Conservationists often miss the point that tree growth means that habitats are in continuous change

# Stocking of Cerulean Warbler Study Sites in Allegheny Hardwoods, Pennsylvania

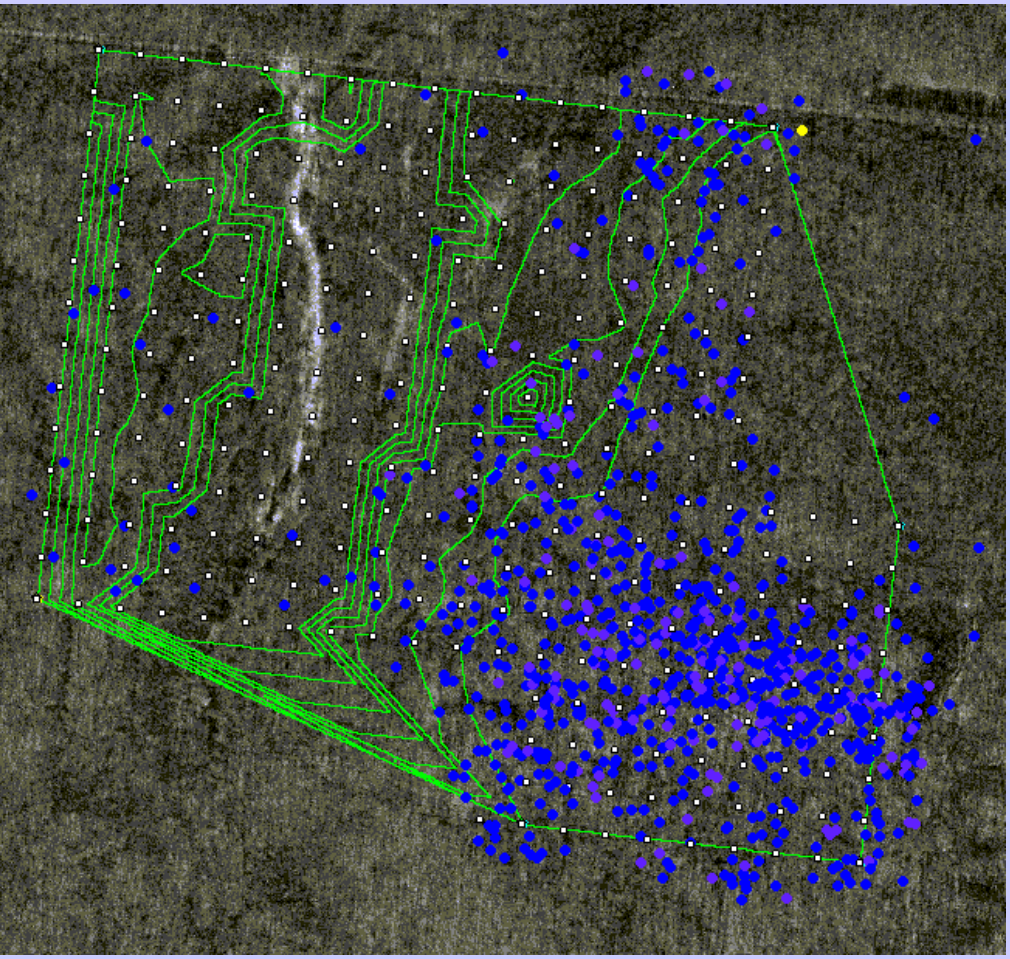


# Stocking of Cerulean Warbler Study Sites in Southern Ohio

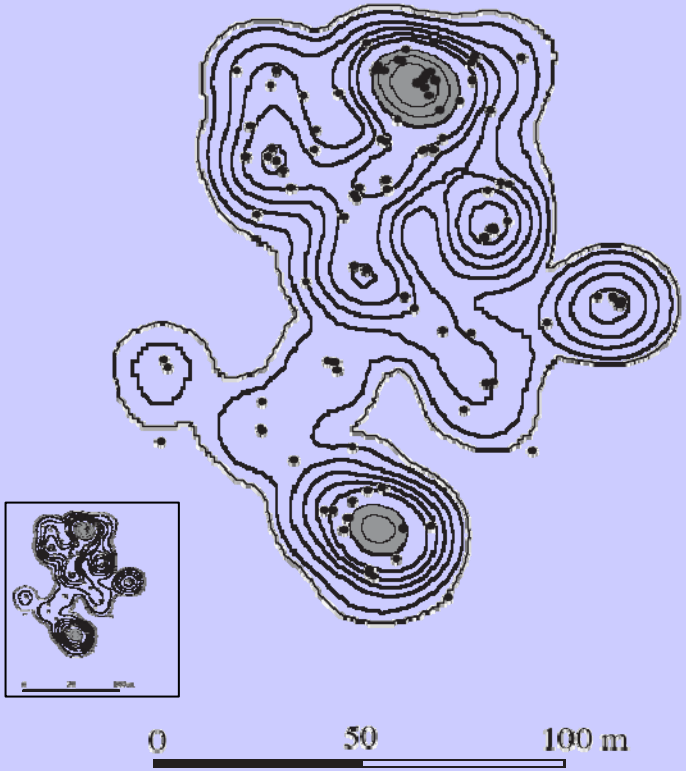


# Spatial distribution within stands

Meeman Shelby Forest SP & WMA, TN

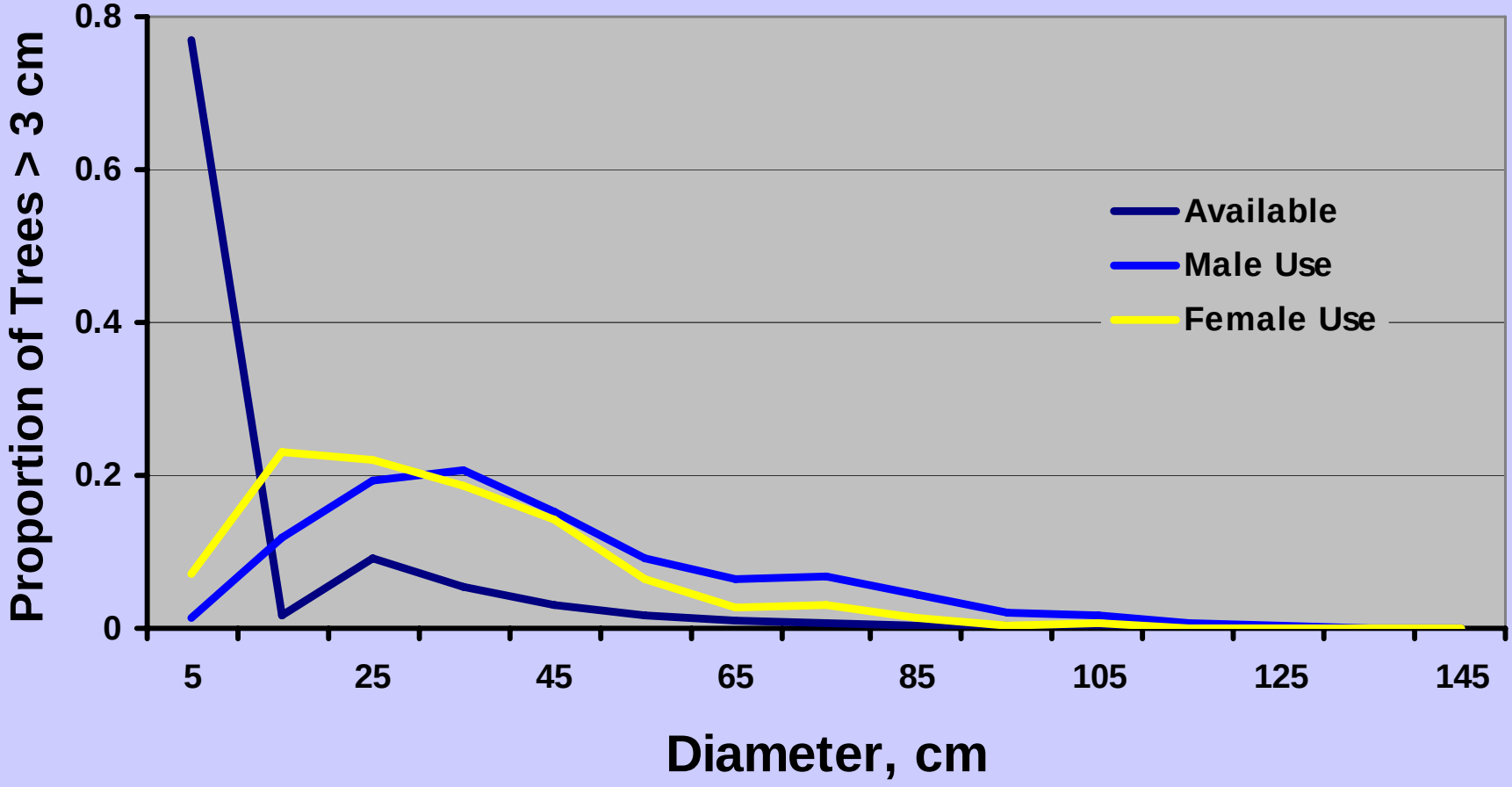


Ontario



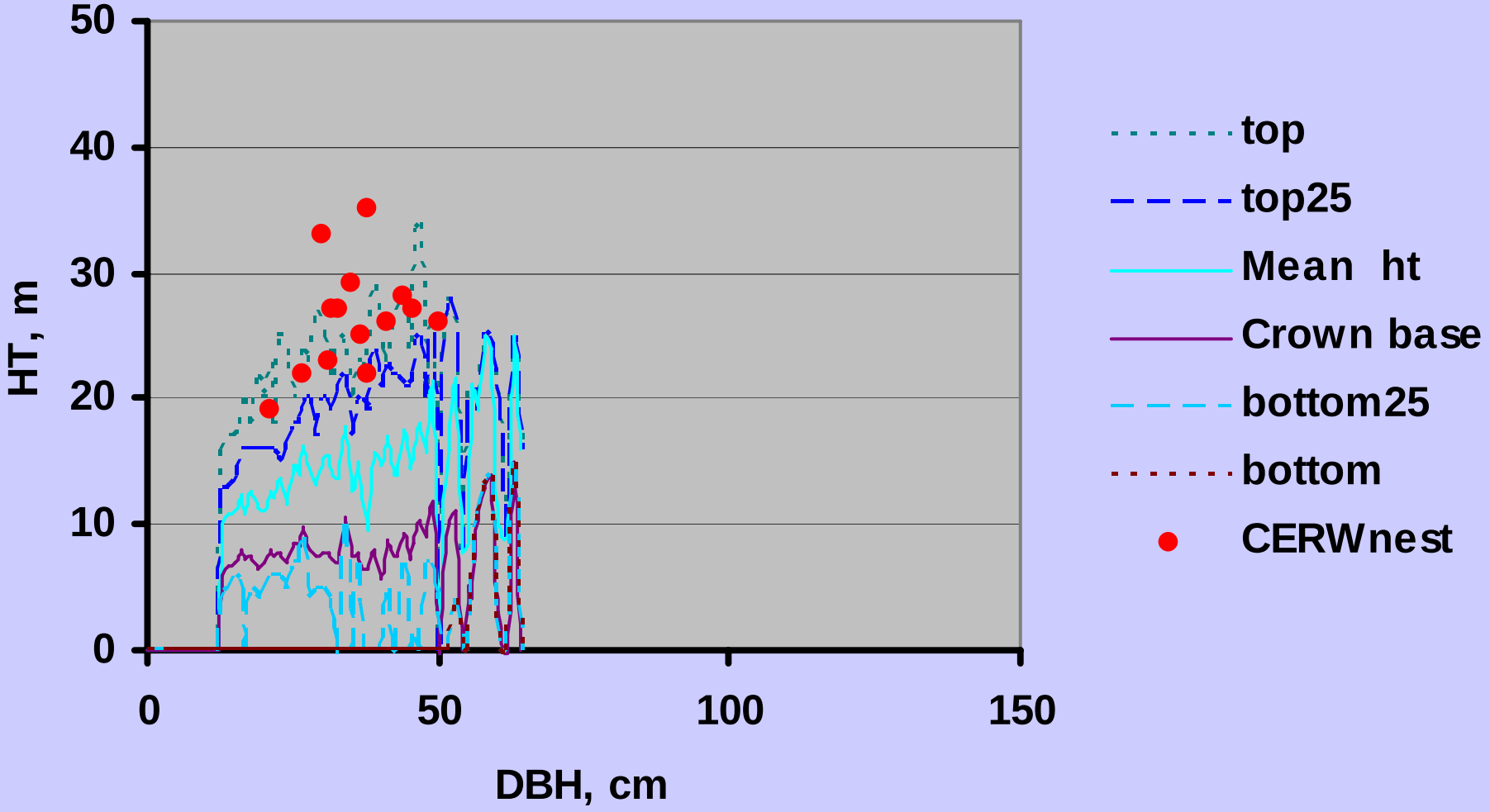

*From Barg et al., Journal of Animal Ecology* 2005 **74:**139–149,Fig. 1

# Tree size

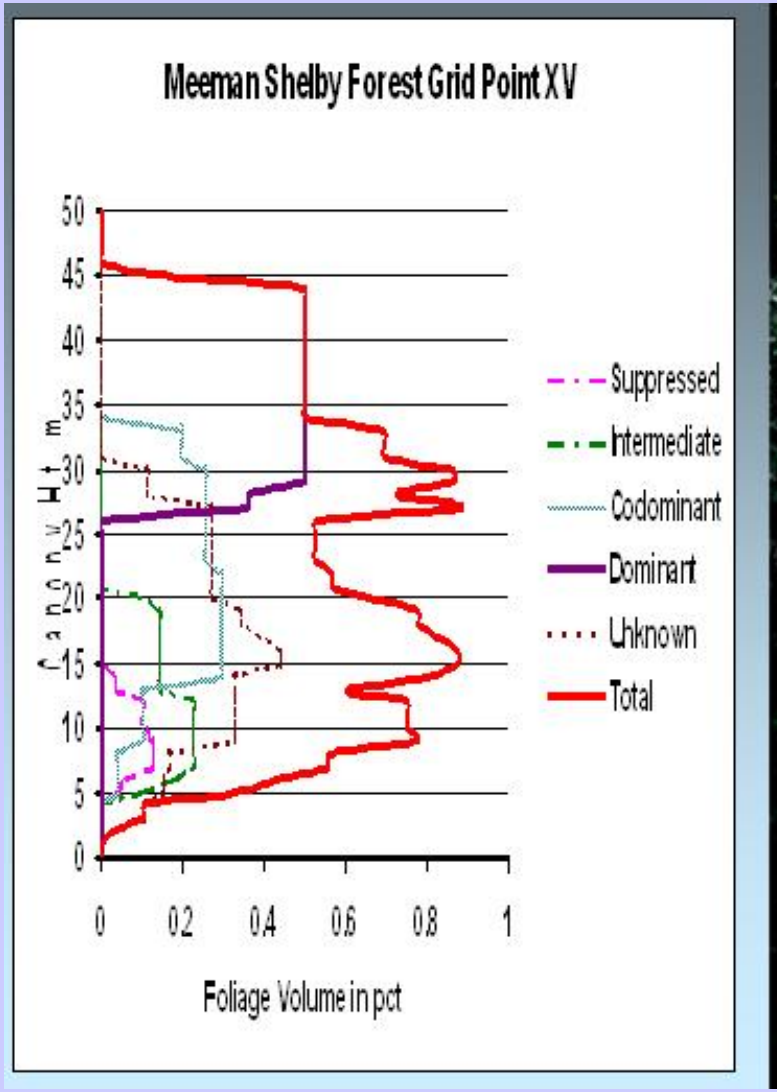


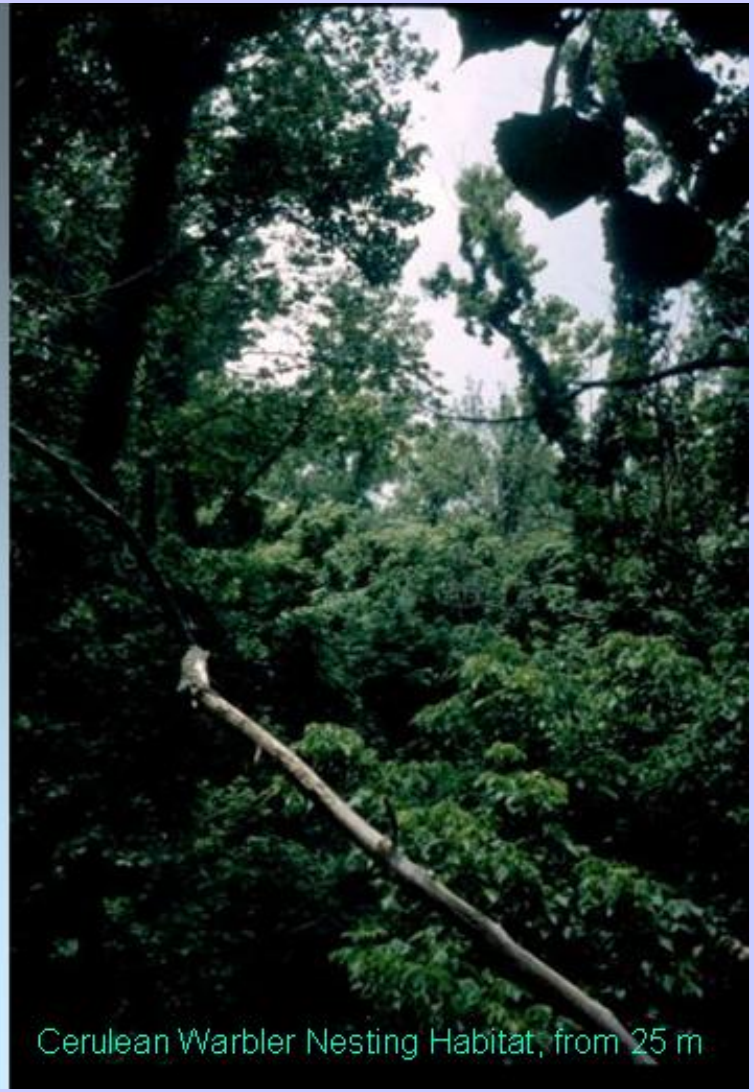

Cerulean Warbler use of trees in Mississippi Alluvial Valley sites,
N=3690 used, >200,000 available

# Boxelder in the MAV, from SOFIA, 2002

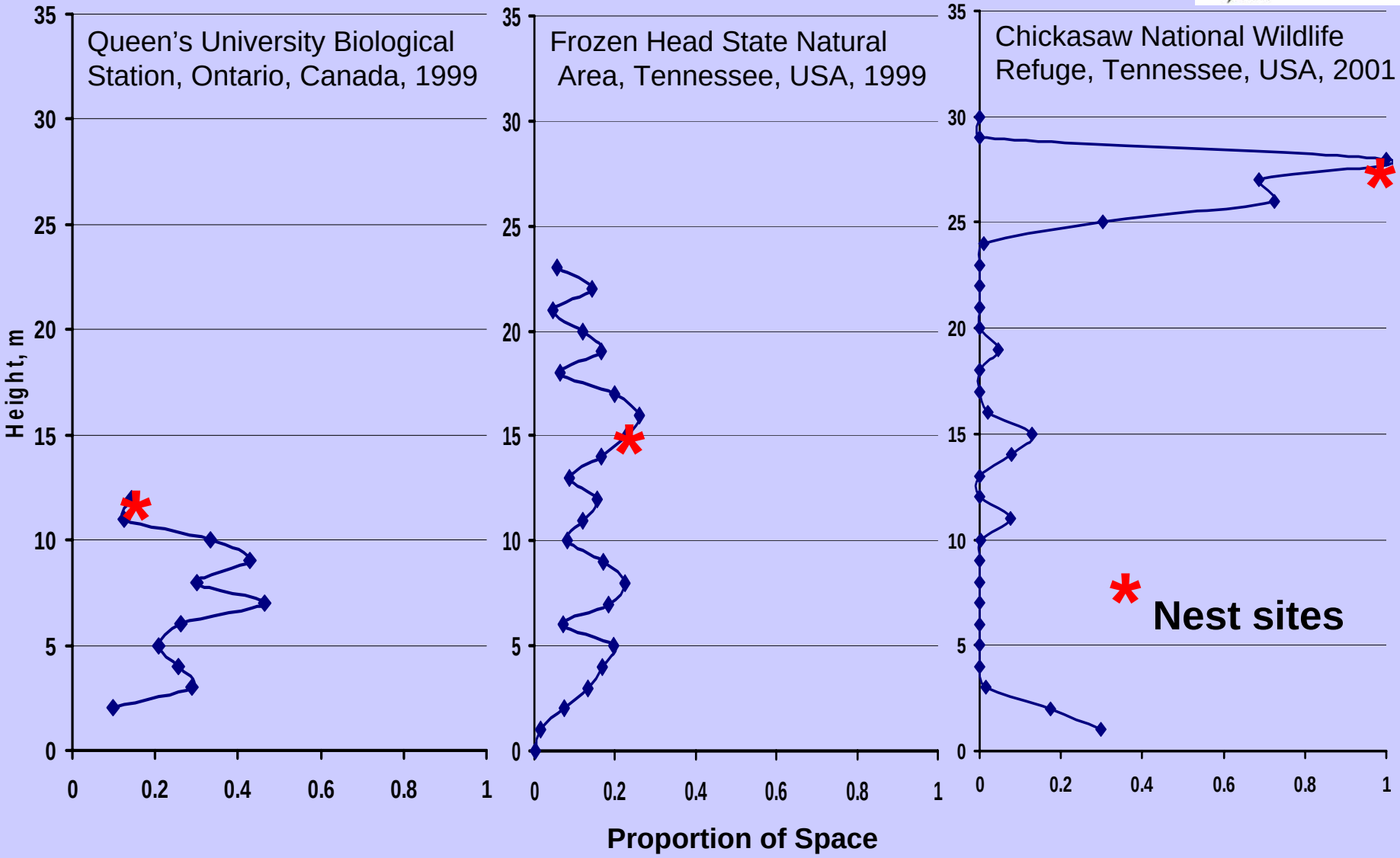


# Habitat Relationships: Forest stand structure



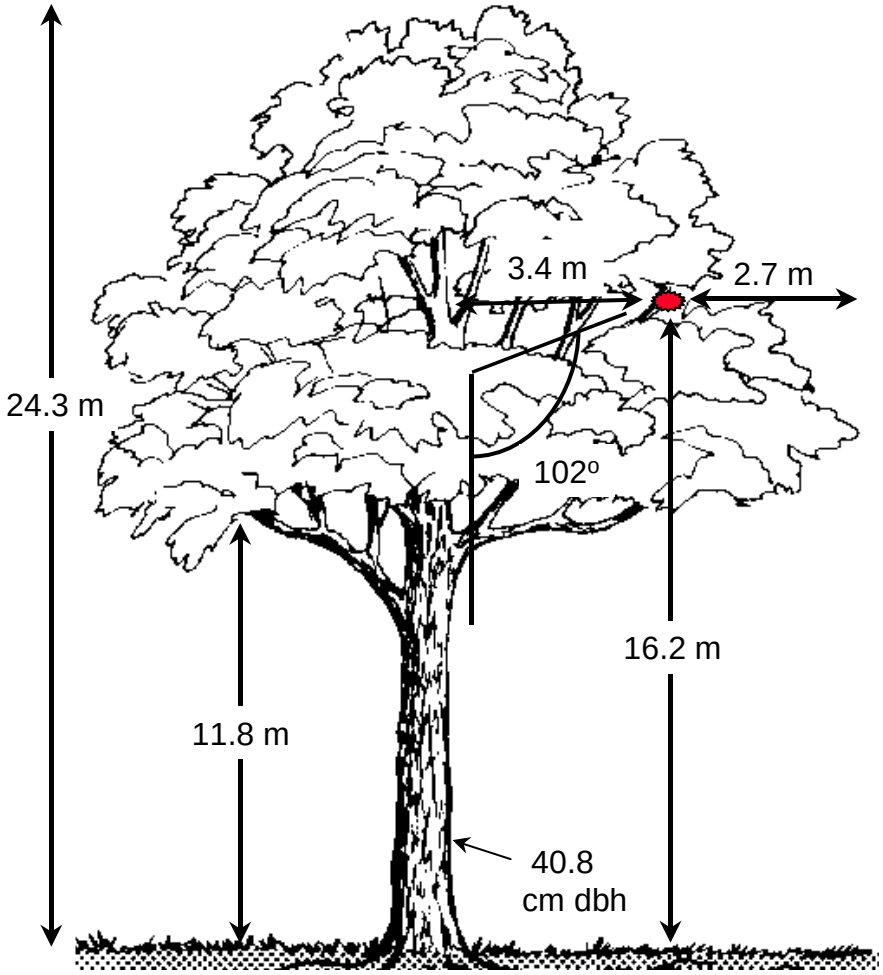



# Vertical Vegetation Structure at Nests varies with Location



# Nest site

Figure 2: Mean nest site characteristics of 49 Cerulean Warbler nests, Cumberland Mountains, Tennessee, 1996-1998.

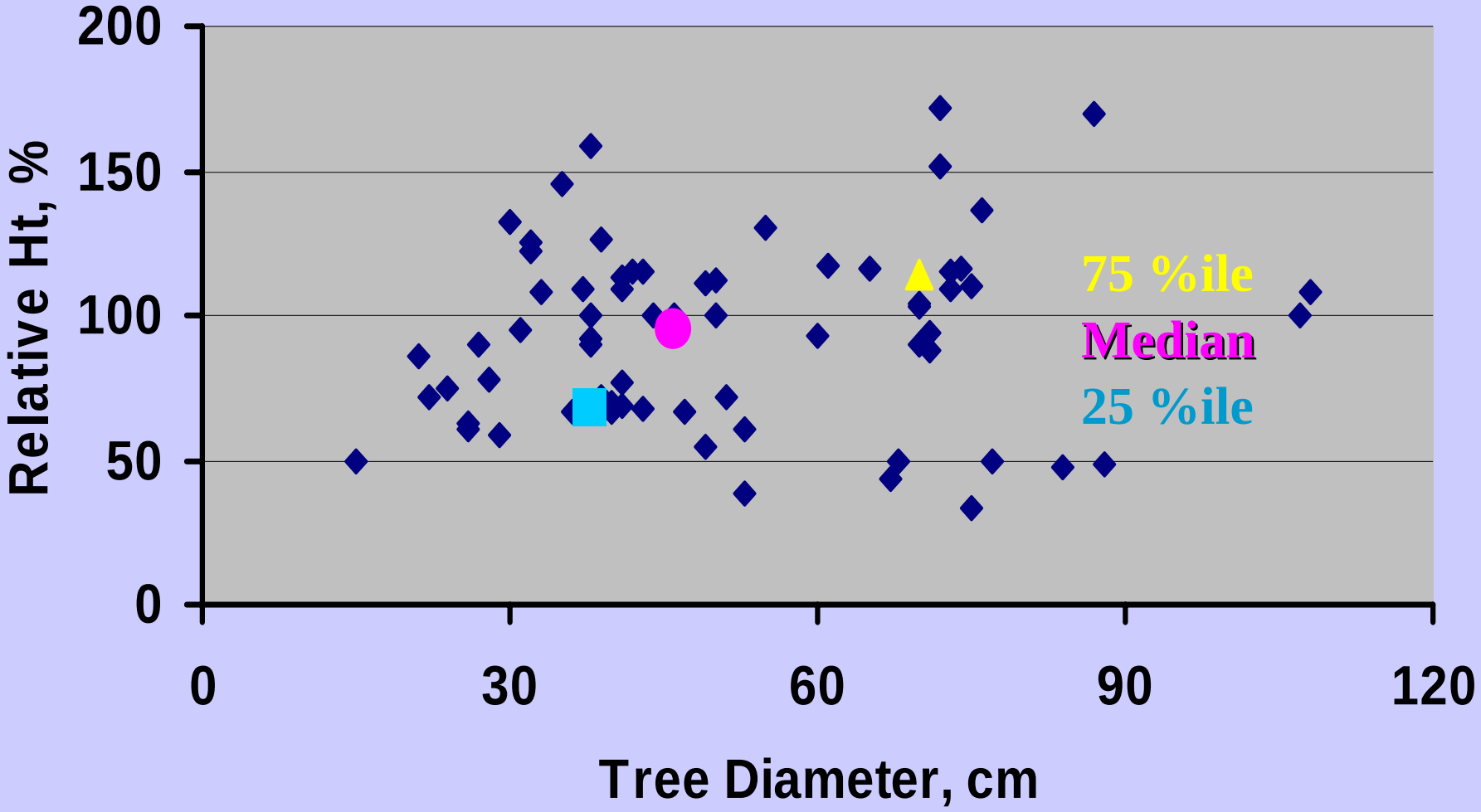



# Nest Tree Characteristics

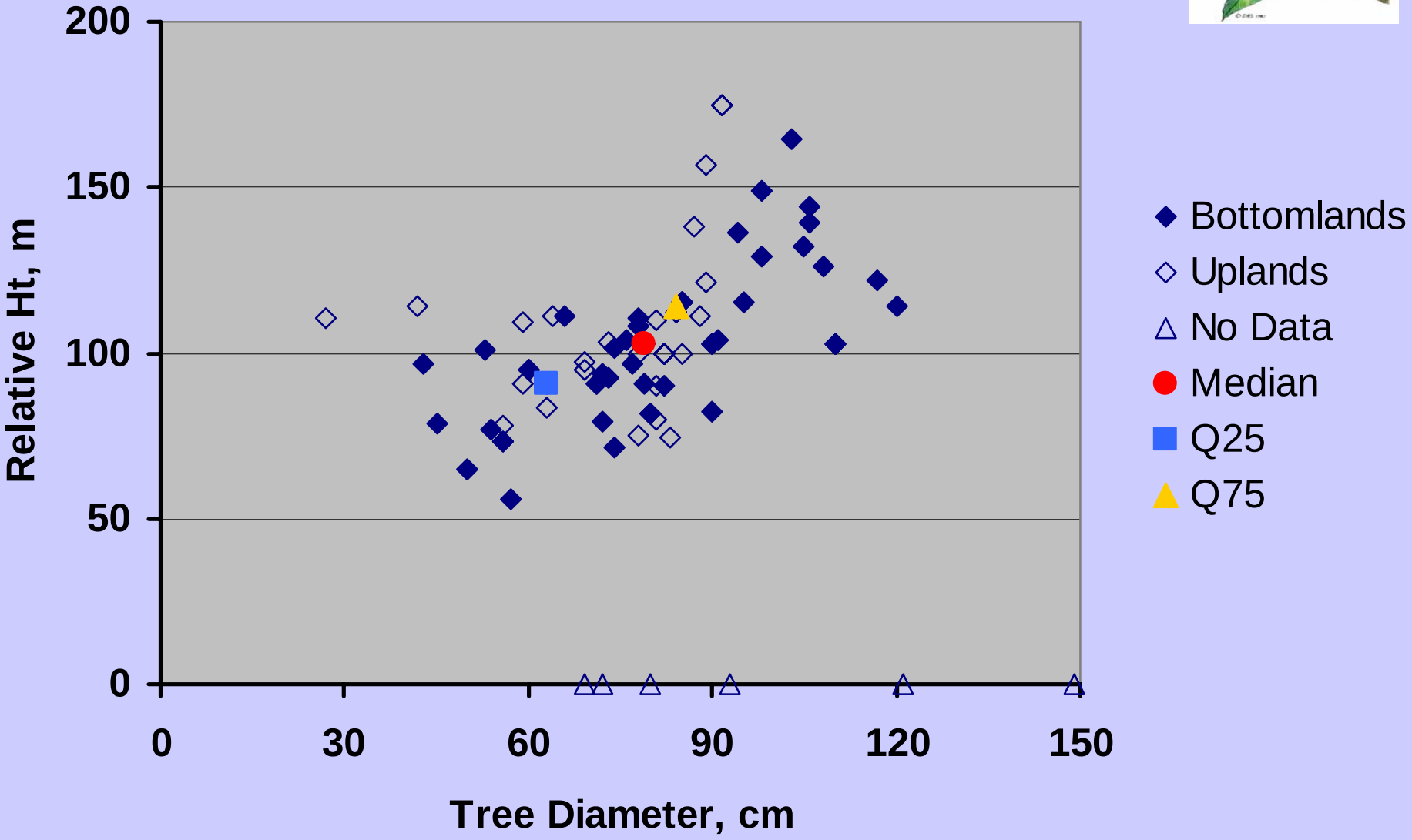
# Cerulean Warbler Nest Trees in the LMAV

| | Chickasaw | Desha | Meeman | Total |
|---|---|---|---|---|
| **Nests** | 19 | 19 | 28 | 66 |
| **Tree Species** | 8 | 4 | 9 | 14 |
| **Tree Height, m** | 29 +/- 1.7 | 28 +/- 2 | 31 +/- 1.4 | 30 +/- 1 |
| **Nest Height, m** | 18 +/- 1.2 | 17 +/- 1.2 | 20 +/- 1.3 | 19 +/- 0.74 |
| **Tree DBH, cm** | 58 +/- 6 | 55 +/- 5 | 46 +/- 3 | 52 +/- 2.6 |
| **Nest from Bole, m** | 6.2+/-0.8 | 3.5+/-0.5 | 3.4+/-0.3 | 4.2+/-0.35 |
| **Crown Radius Test** | **Open grown** | No data | **Open grown** | |

# Cerulean Warbler Nest Trees, Mississippi Alluvial Valley 1992-1998



# Roost Trees of Cerulean Warblers in LMAV

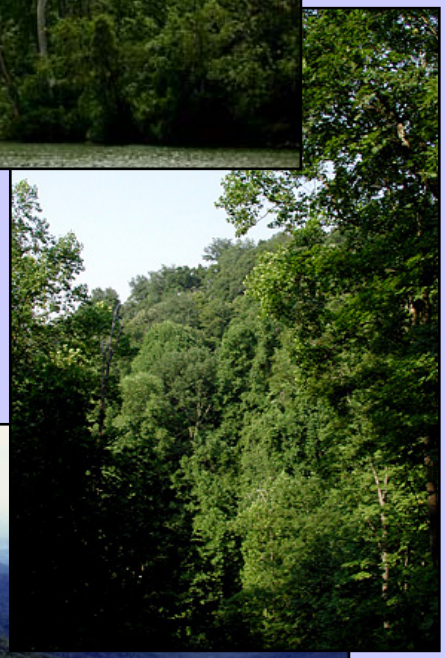


Song post tree

**Broadcast Arena may be common denominator in male habitat selection**

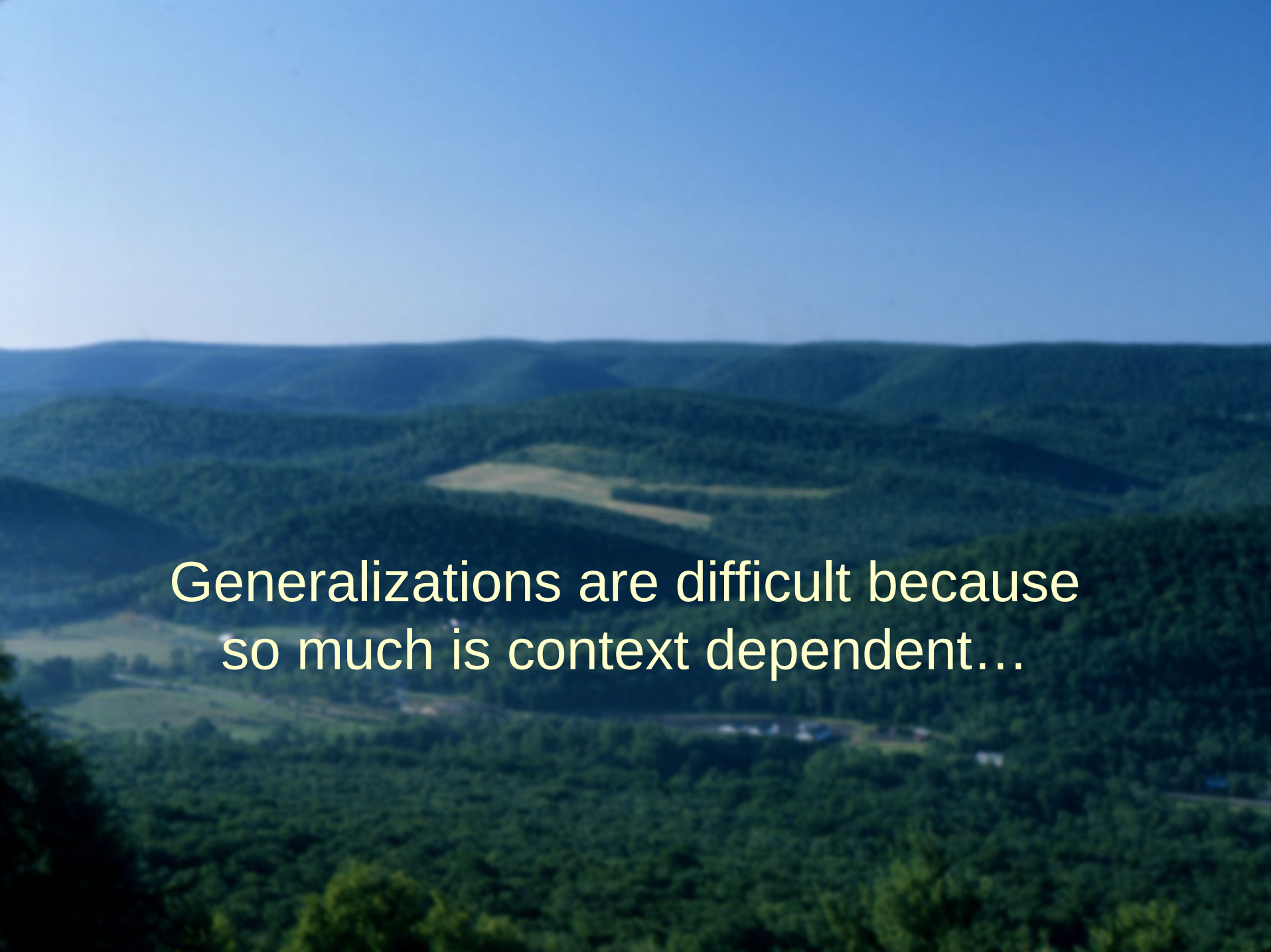
# General Habitat Relationships

- Large tracts of mature deciduous forest
- Ridge tops, floodplain and mesic cove forests.
- Common denominator = emergent, structurally diverse canopy

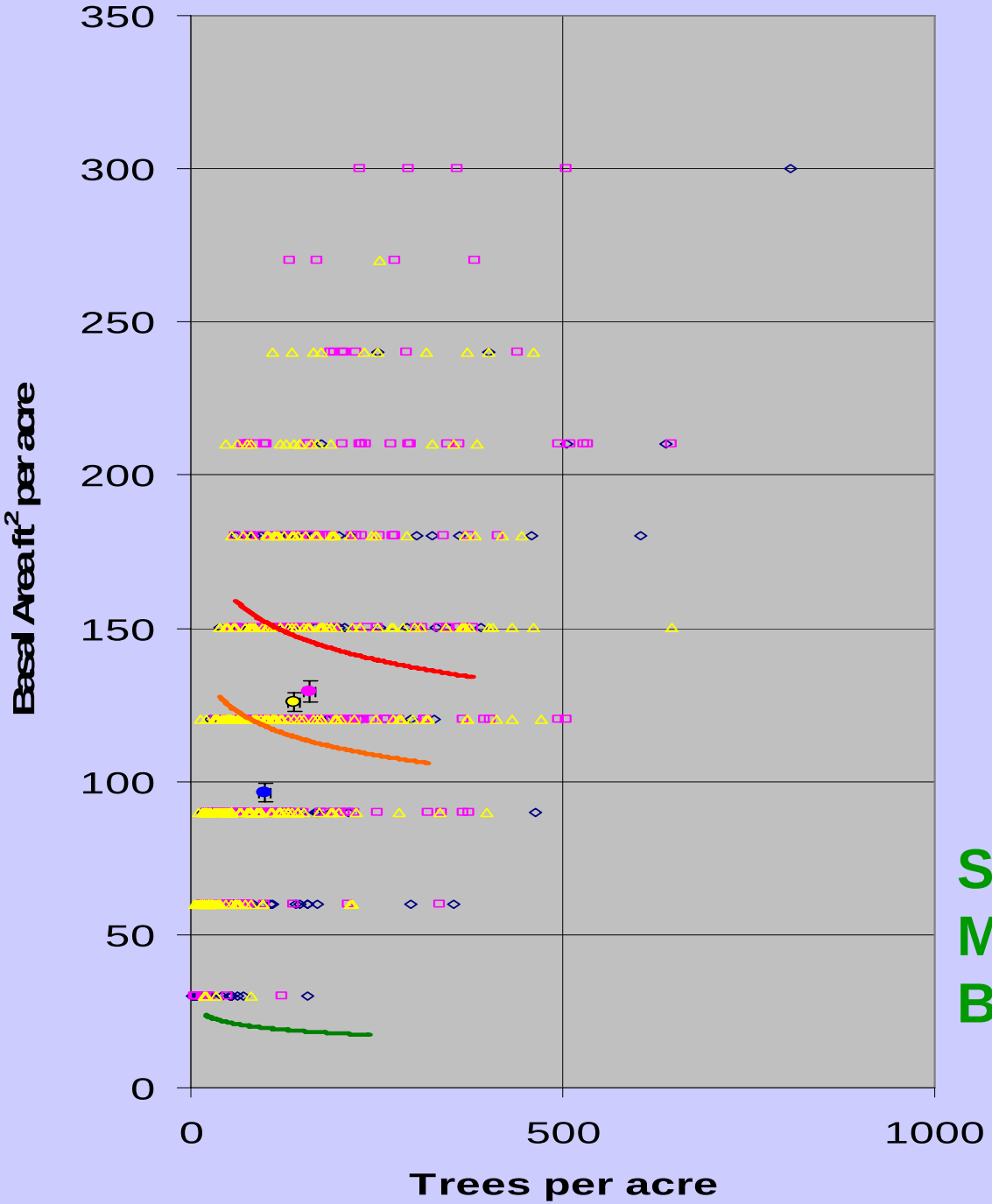


# Suggestions

- Common features of habitats reflect the birds' biology
- Regional variations reflect external limiting factors, e.g., parasitism and predation
- Preliminary Finding, Cerulean Warblers in the LMAV occur in very productive sites
- Effect of climate change should not be overlooked


Generalizations are difficult because
so much is context dependent…

# More on habitats during migration and nonbreeding residency periods later

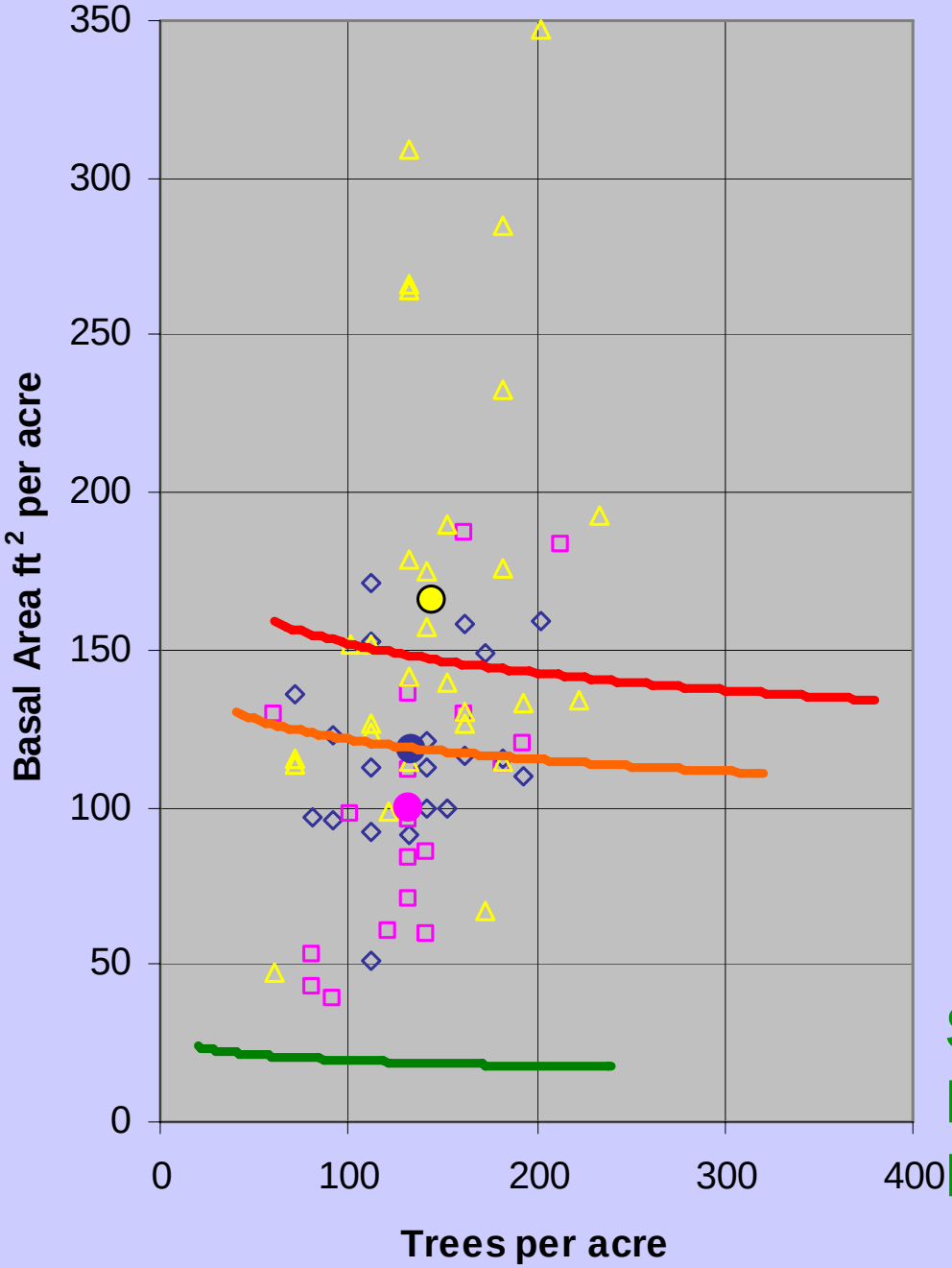



20
100
120
% Stocking

CHK
DES
MEE
CHK mean
DES Mean
MEE Mean
Study Site

# Stocking of Study Grids Mississippi Alluvial Valley Bottomland Hardwoods

# Stocking at Cerulean Warbler Nest Sites




- CHK
- DES
- MEE
- CHK Mean
- DES Mean
- MEE Mean

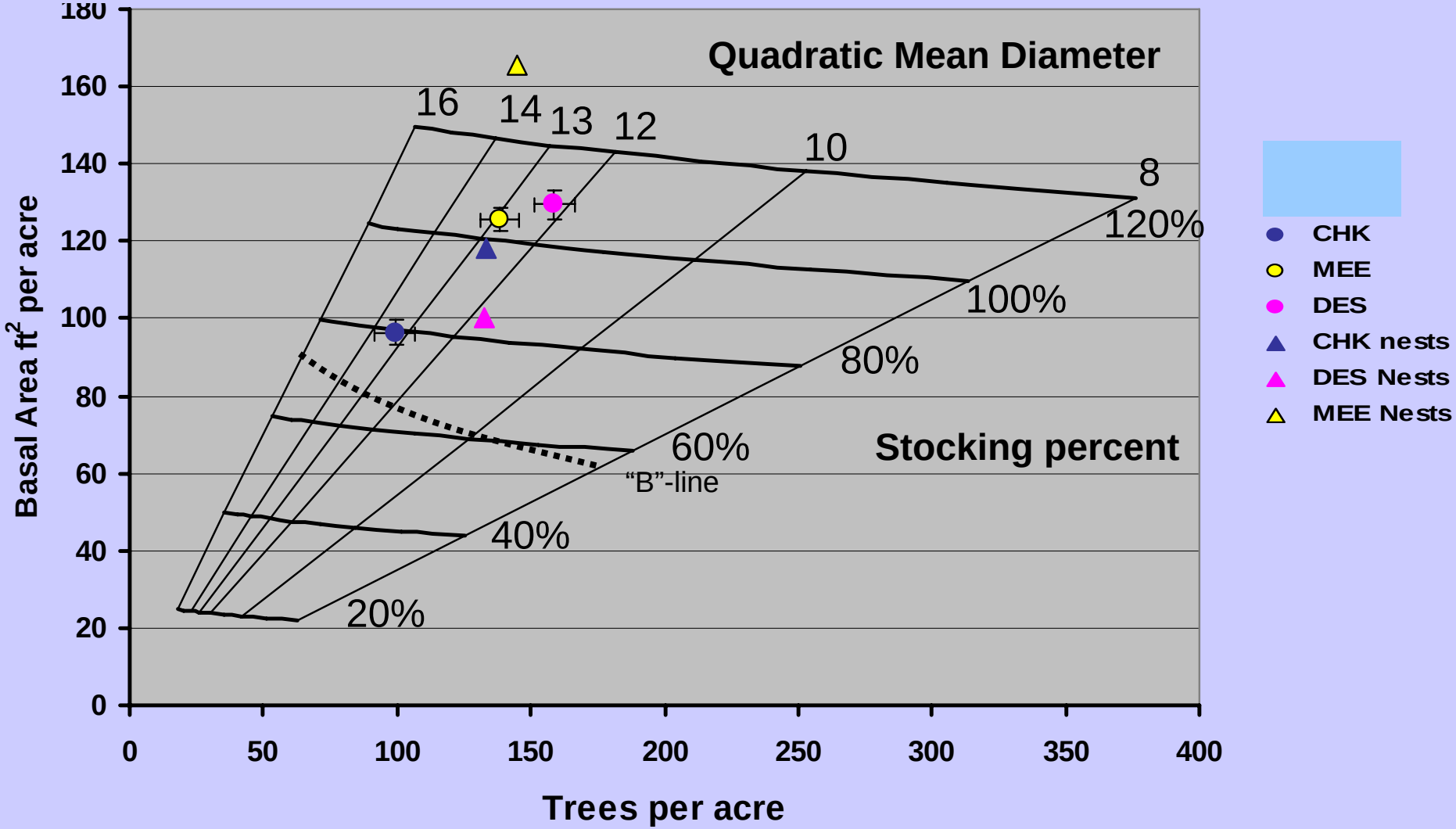
Study Site

- 120
- 100
- 20

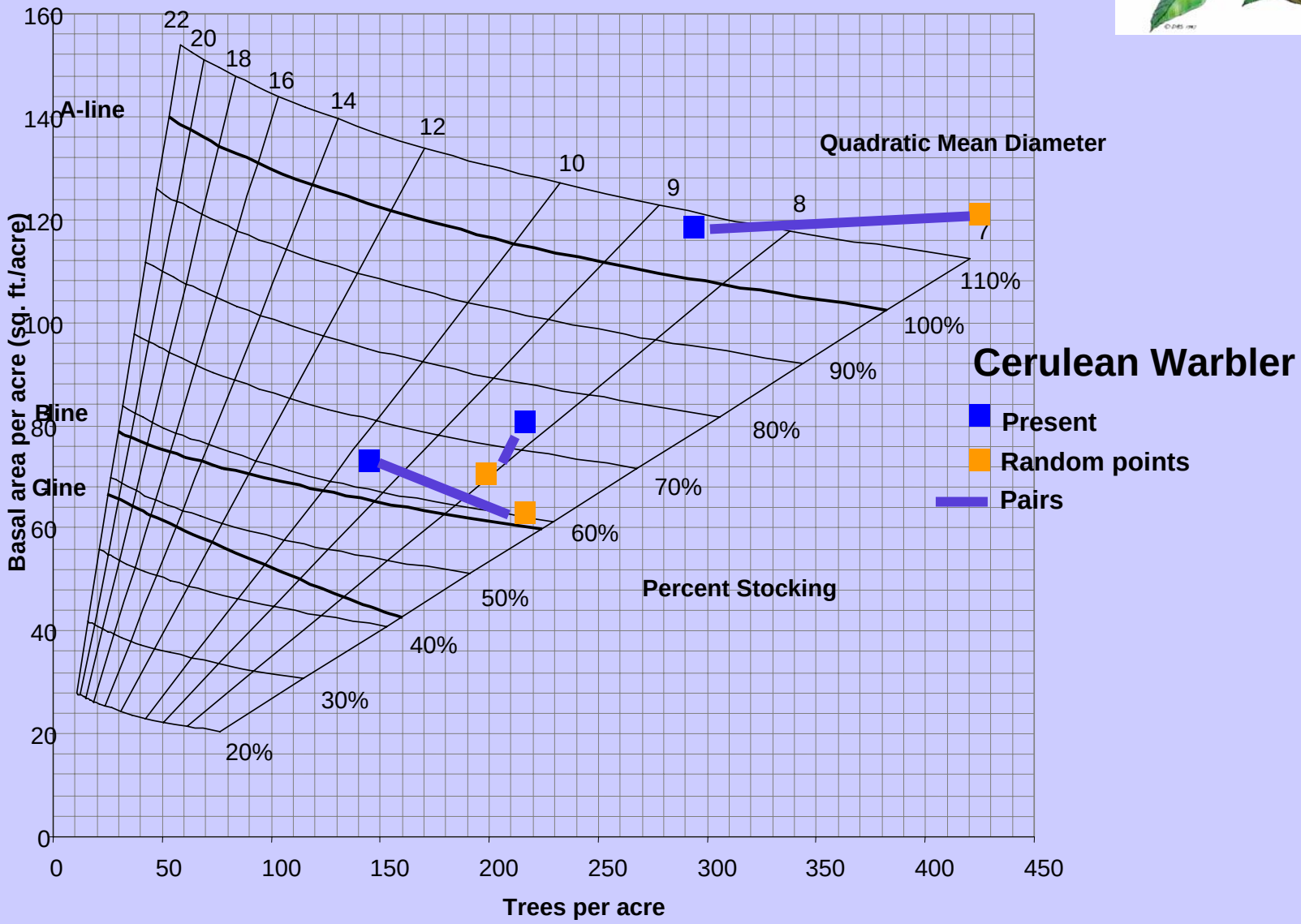
% Stocking

**Same Study Sites In Mississippi Alluvial Valley Bottomland Hardwoods**

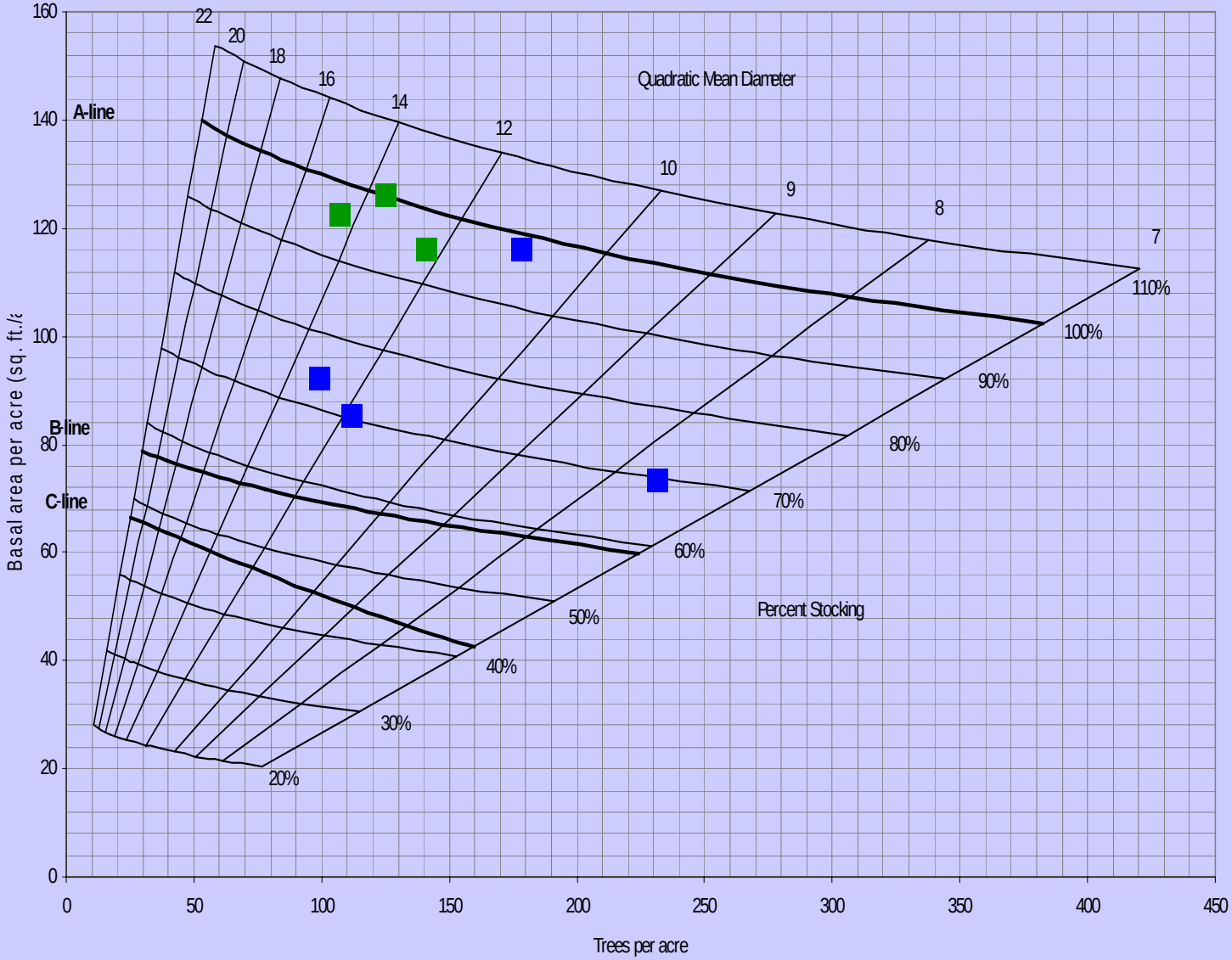
# Stocking of Cerulean Warbler Study Sites in Mississippi Alluvial Valley



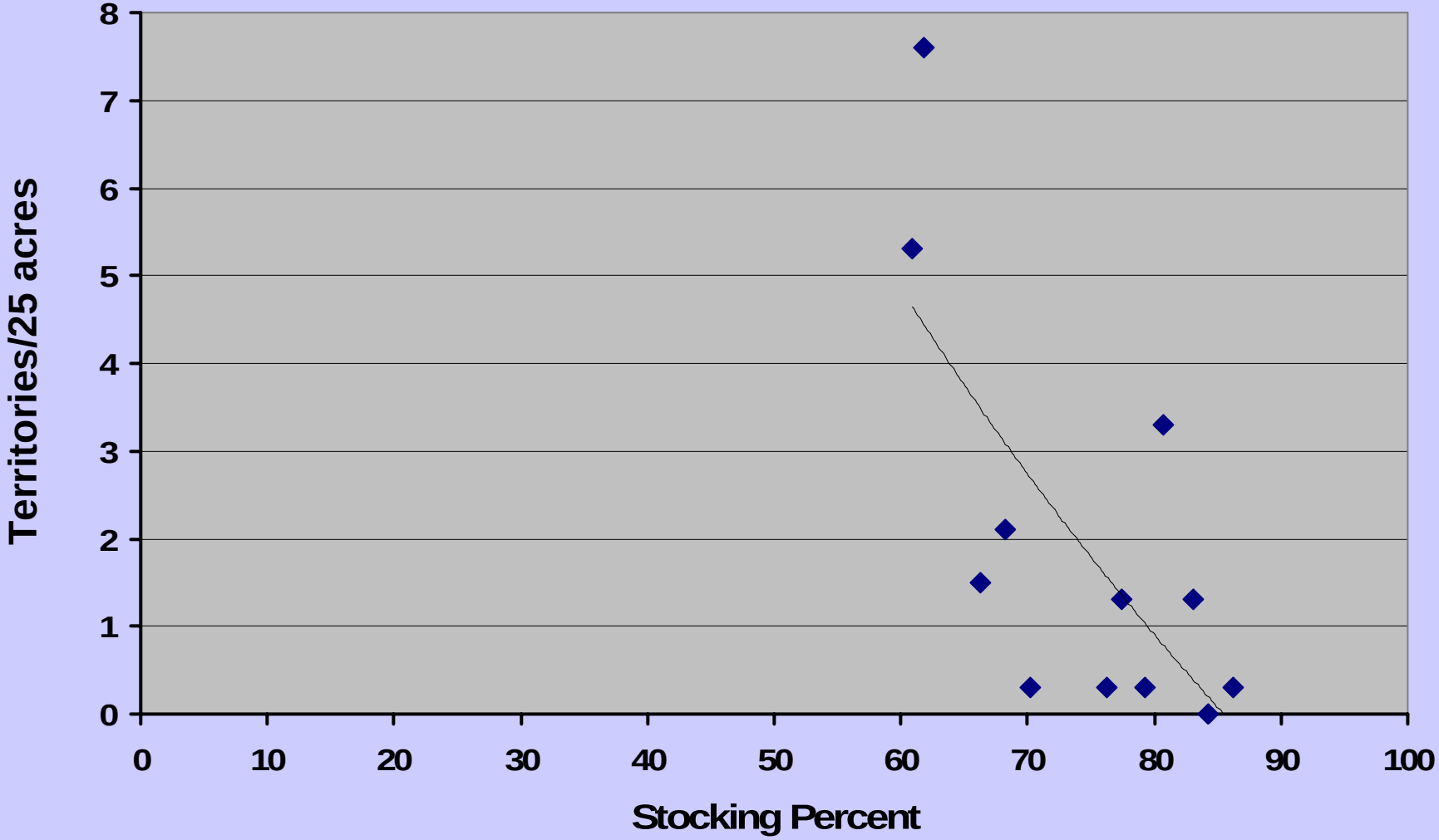
# Stocking of Cerulean Warbler Study Sites in Southern Indiana



# Stocking of Cerulean Warbler Study Sites in Eastern Tennessee




**Study Site**

- **Royal Blue WMA**
- **Sundquist WMA**

# Cerulean Warblers in Southern Ohio, 2004-2005