Bird Response to Forest Management

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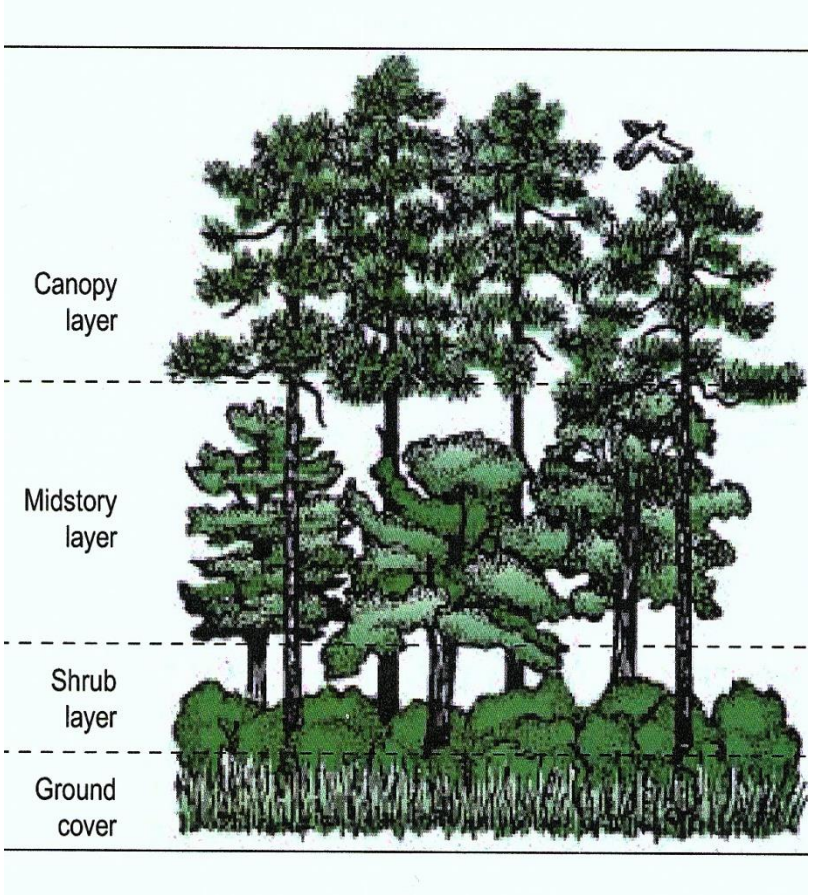
Practices Relevant to FLLP

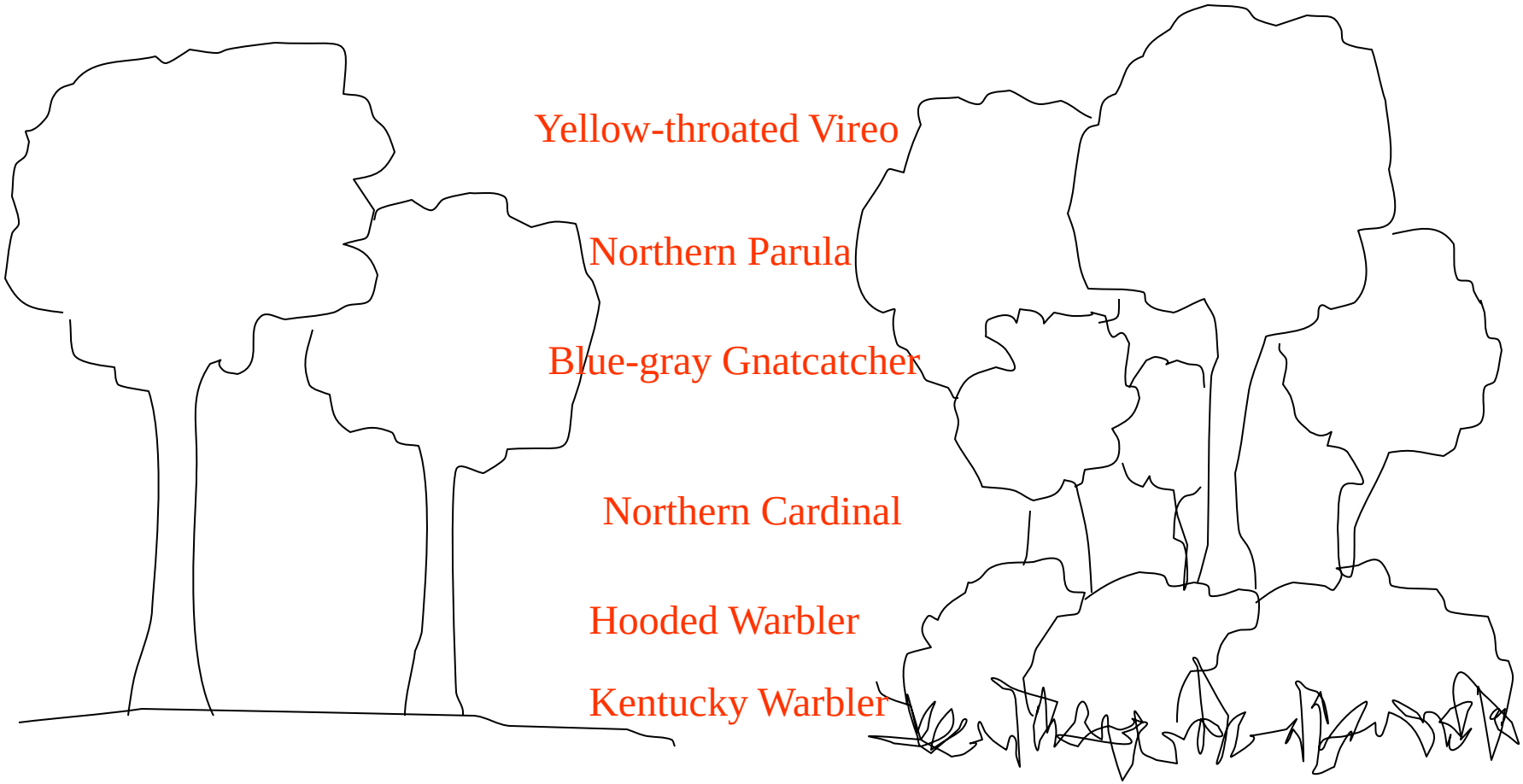
- **Canopy openings**
- **Crop tree release**
- **Snag creation – girdling or injection**
- **Prescribed fire**
- ***Focus on hardwoods***

Vertical Structure is Critical

- **Different birds use different forest layers**
- **Ground and shrub cover important for many birds/young**
- **Influenced by mgt.**



Foliage Height Diversity and Birds



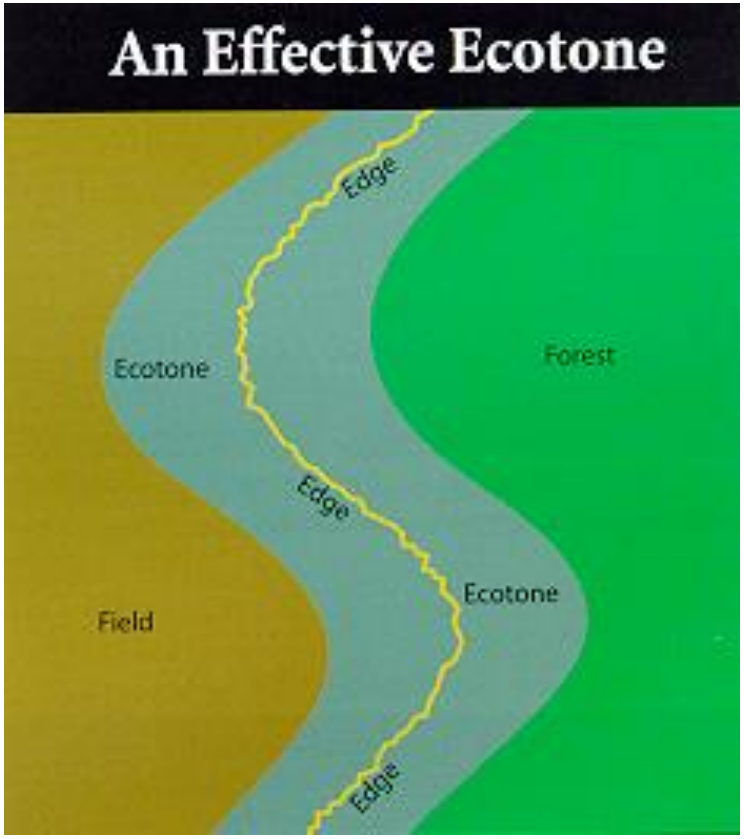
Simple Structure

Complex Structure


The Exception

Horizontal Structure

- **Where two stand types or ages meet is an Edge**
- **Edges often selected**
  - **simultaneous access to 2 habitat types**
  - **increased vertical structure**
  - **more food?**
  - **favorable microclimate?**



Negative Edge Effects: Cowbirds and Corvids

- **Cowbirds parasitize nests near edges**
- **Nest predation greater near edges**

In the Southeast?

- **See Kilgo and Moorman (2004)**
  - **Fewer cowbirds in region**
  - **More forested landscapes relative to Midwest**
  - **Understory & shrub-nesters affected most**
  - **Cowbirds respond to edge**
- **Worse in urban and agricultural landscapes**

Cowbird nestling in hooded warbler nest

Edge Avoidance

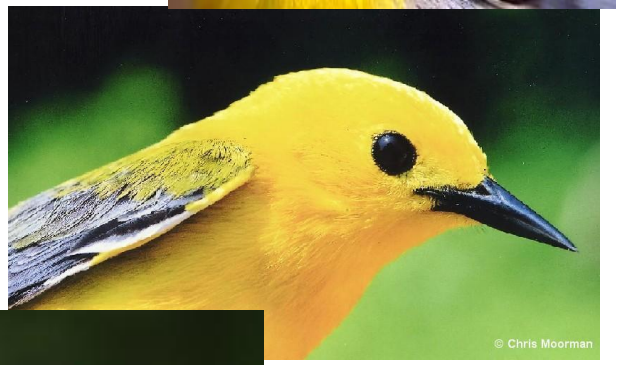
- **Some species are area-sensitive**
  - **Early and late succession obligates**
- **Edge-avoidance as the mechanism for some**
  - **ACFL avoids openings/larger canopy gaps**
  - **REVI favors canopy gap edges**

Red-eyed Vireo

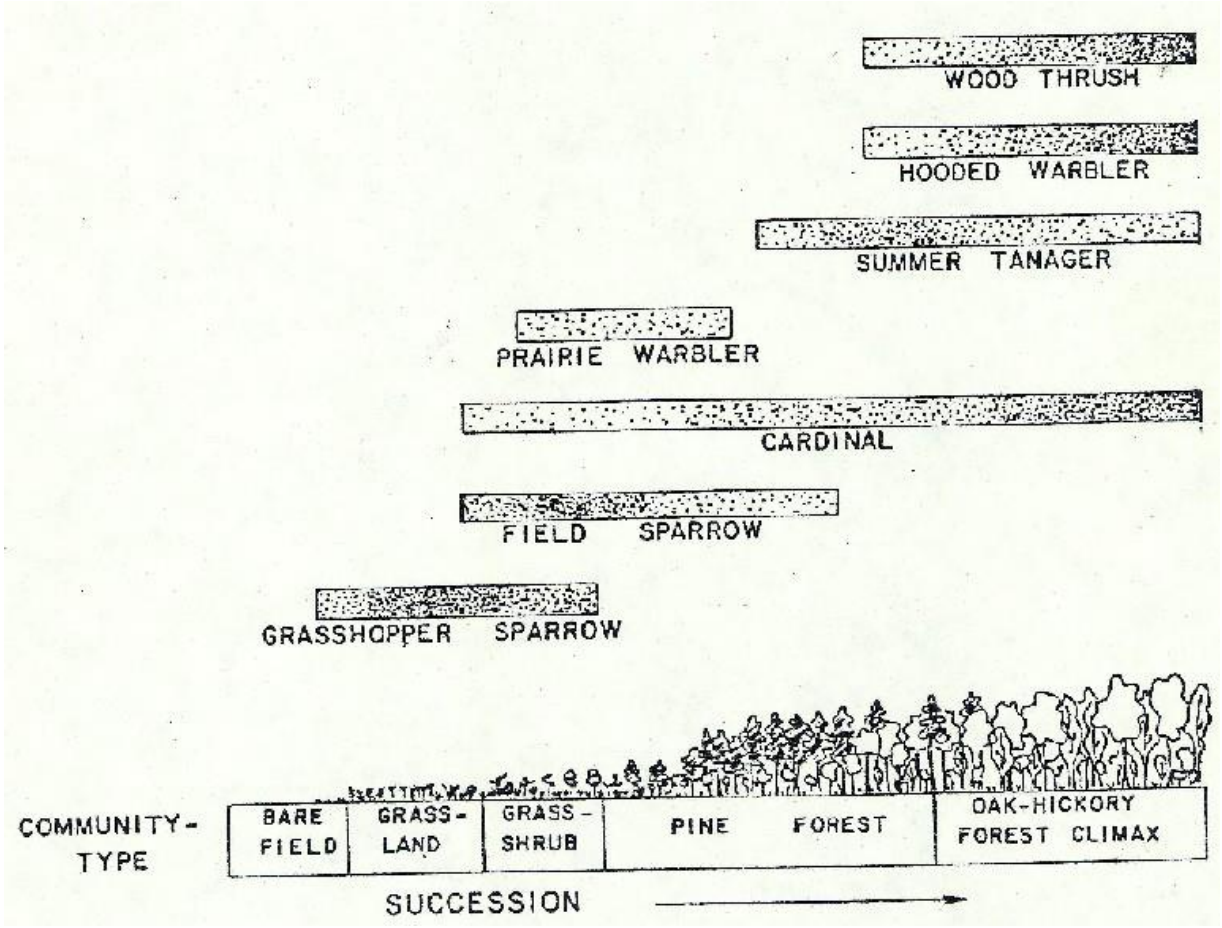
Birds Specialize
Community Type

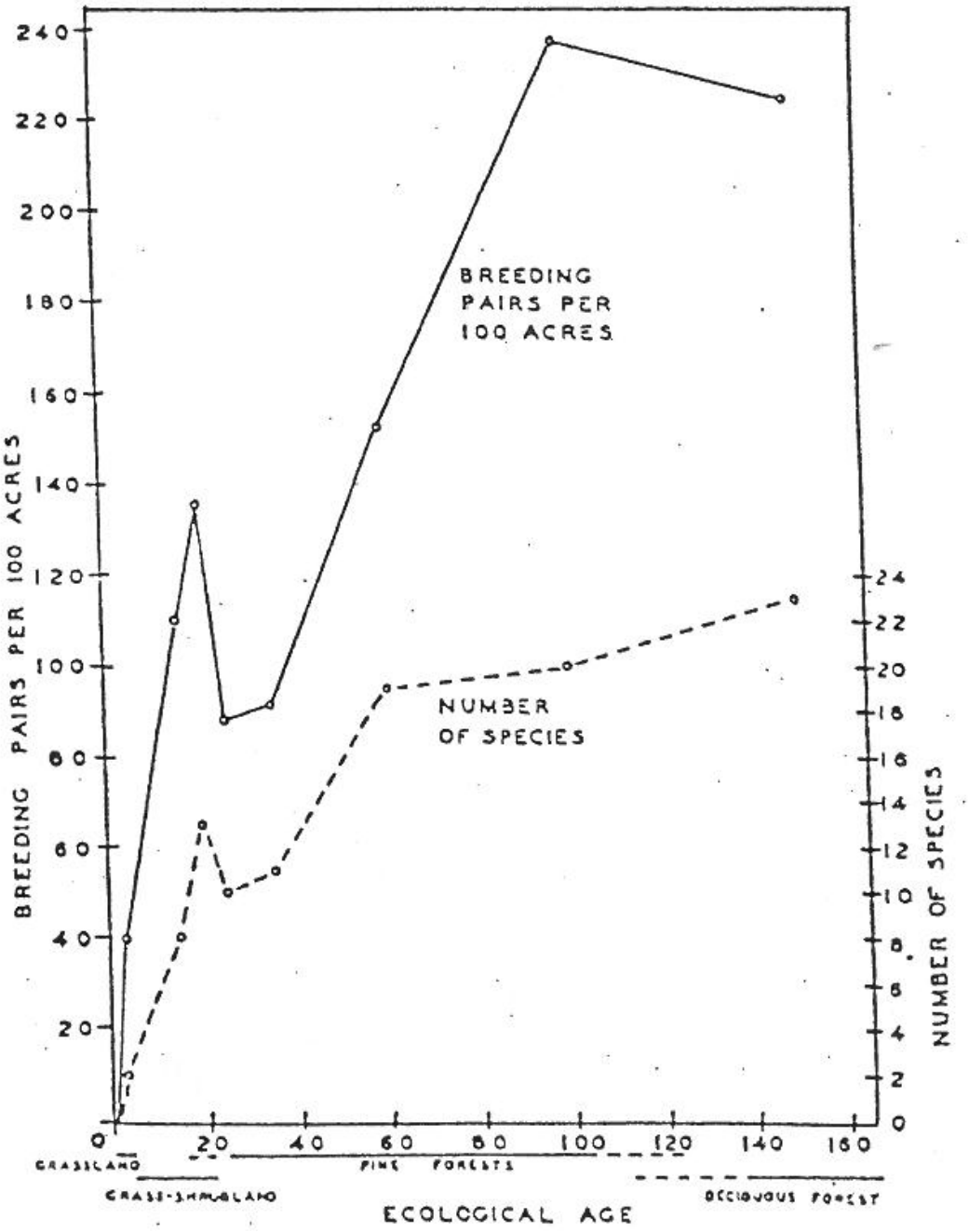
- **Upland Hardwood**
- **Bottomland Hardwood**
- **Gum/Cypress Swamp**
- **Upland Pine/Mixed P-H**
- **Pine Savannah**

- **ELEVATION (3000’)**



Birds Specialize
Seral Stage



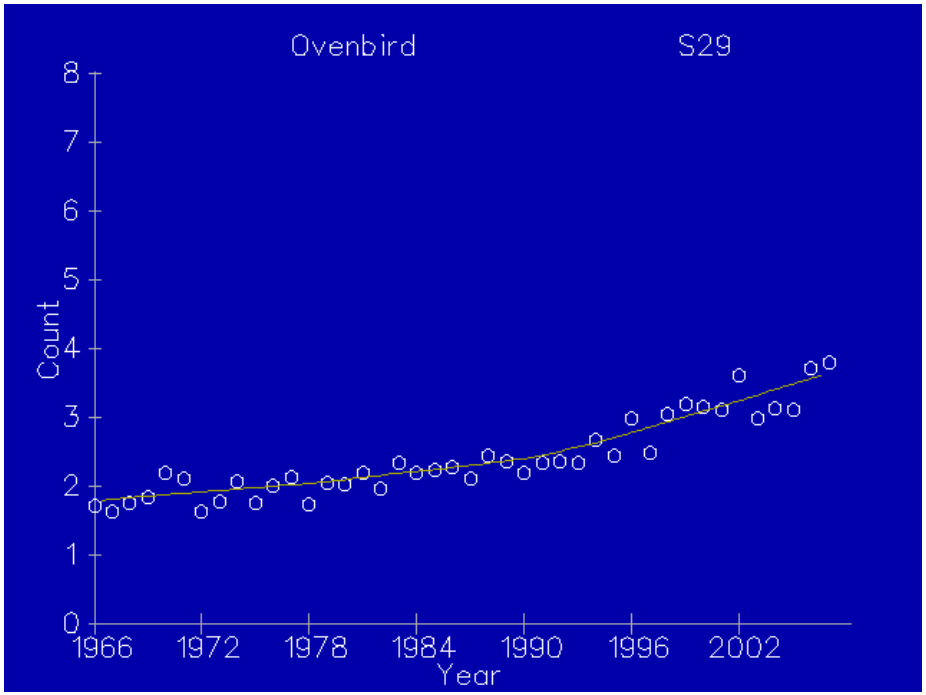

BREEDING PAIRS PER 100 ACRES
NUMBER OF SPECIES
BREEDING PAIRS PER 100 ACRES
NUMBER OF SPECIES
240
220
200
180
160
140
120
100
80
60
40
20
0
24
22
20
18
16
14
12
10
8
6
4
2
0
0
20
40
60
80
100
120
140
160
GRASSLAND
GRASS-SHRUBLAND
PINE FORESTS
DECIDUOUS FOREST
ECOLOGICAL AGE

Regeneration Harvest and Birds

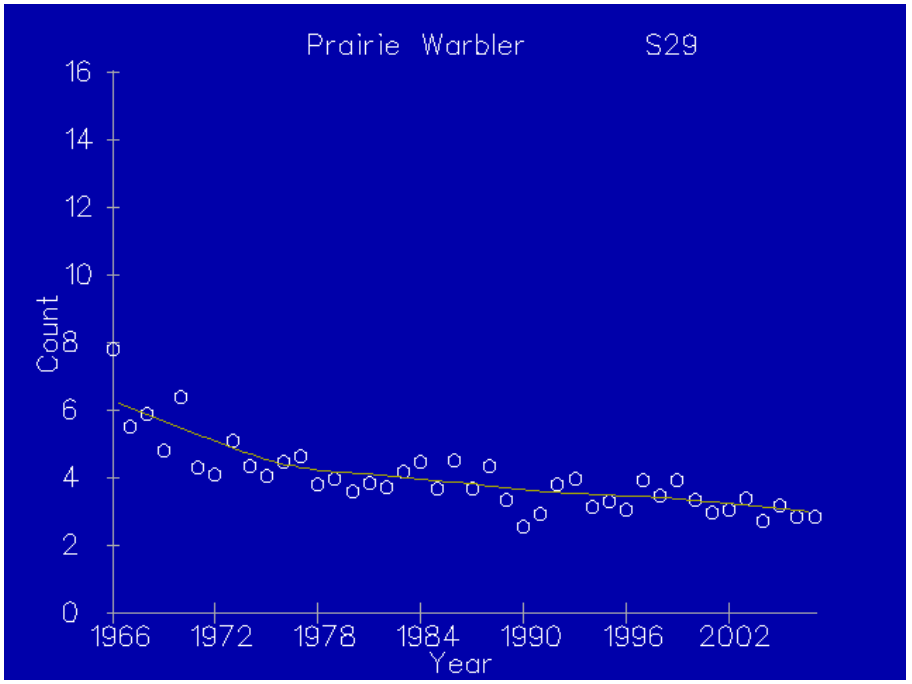
	Clearcut	Shelter-wood	Group selection	Single-tree	Uncut (>50)
Prairie Warbler	******	**			
Common Yellowthroat	******	***	*		
Indigo Bunting	*****	***	**	*	
Red-eyed Vireo	*	**	******	*****	*****
Hooded Warbler			**	**	*
Ovenbird		*	**	**	***

**From Annand and Thompson, JWM 61:159-171*

What are Your Focal Species?



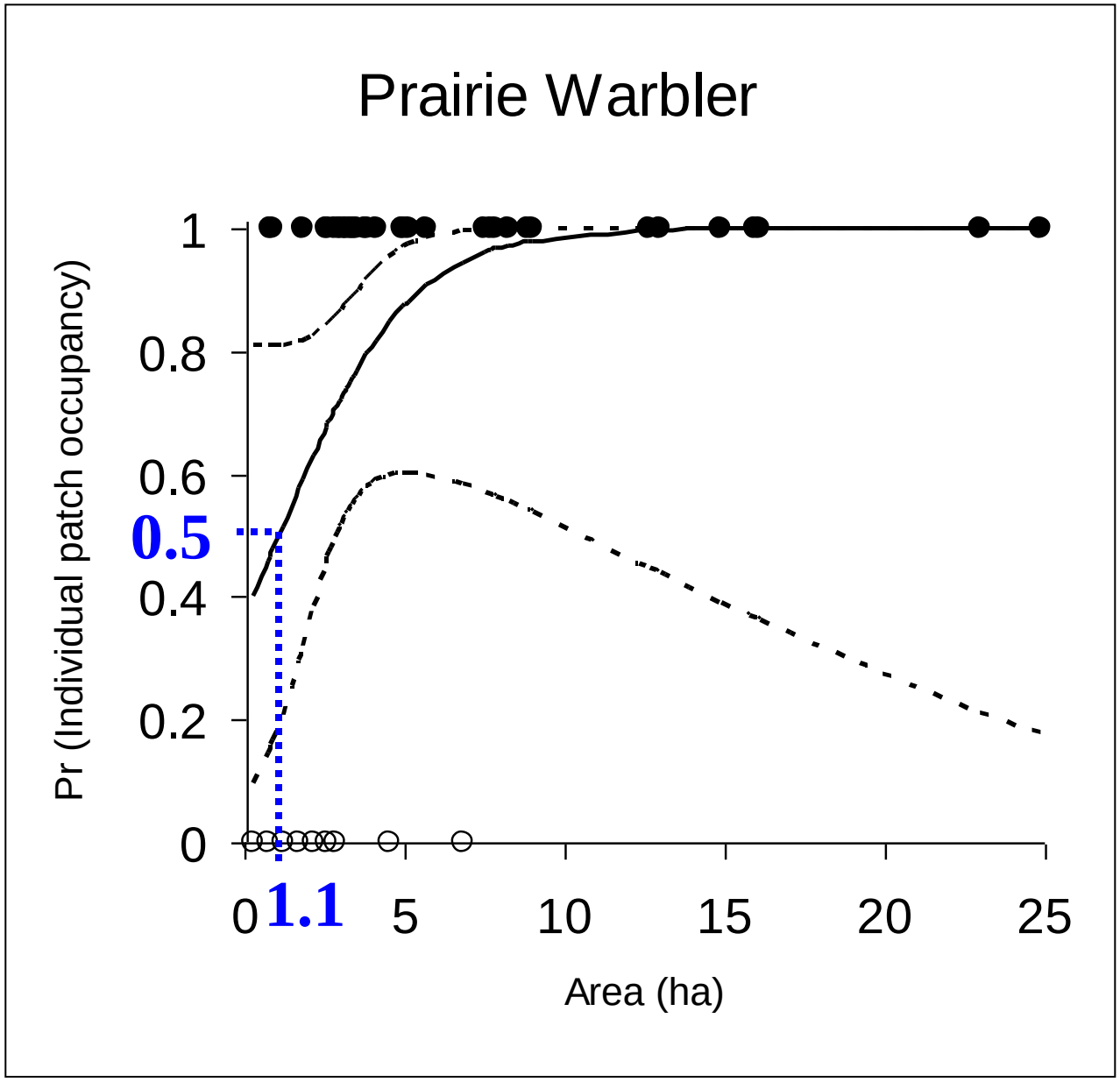
Population trends for Piedmont



Early-Seral/Shrub-Scrub

- **Depend on disturbances**
  - **timber harvest and prescribed fire**
  - **natural disturbance**
- **Understory nesters**
- **Small window of suitability**

Prairie Warbler is area-sensitive and may require patches >12 acre


Prairie Warbler
Pr (Individual patch occupancy)
1
0.8
0.6
0.5
0.4
0.2
0
0
1.1
5
10
15
20
25
Area (ha)

Late-succession Songbirds

- Require “mature” forest for breeding
  - Age is less important than structure
  - But 2 often correlated (i.e., snags, gaps)
- Many require “interior” habitat
- Most still depend on disturbance
  - Treefall gaps
  - Fire

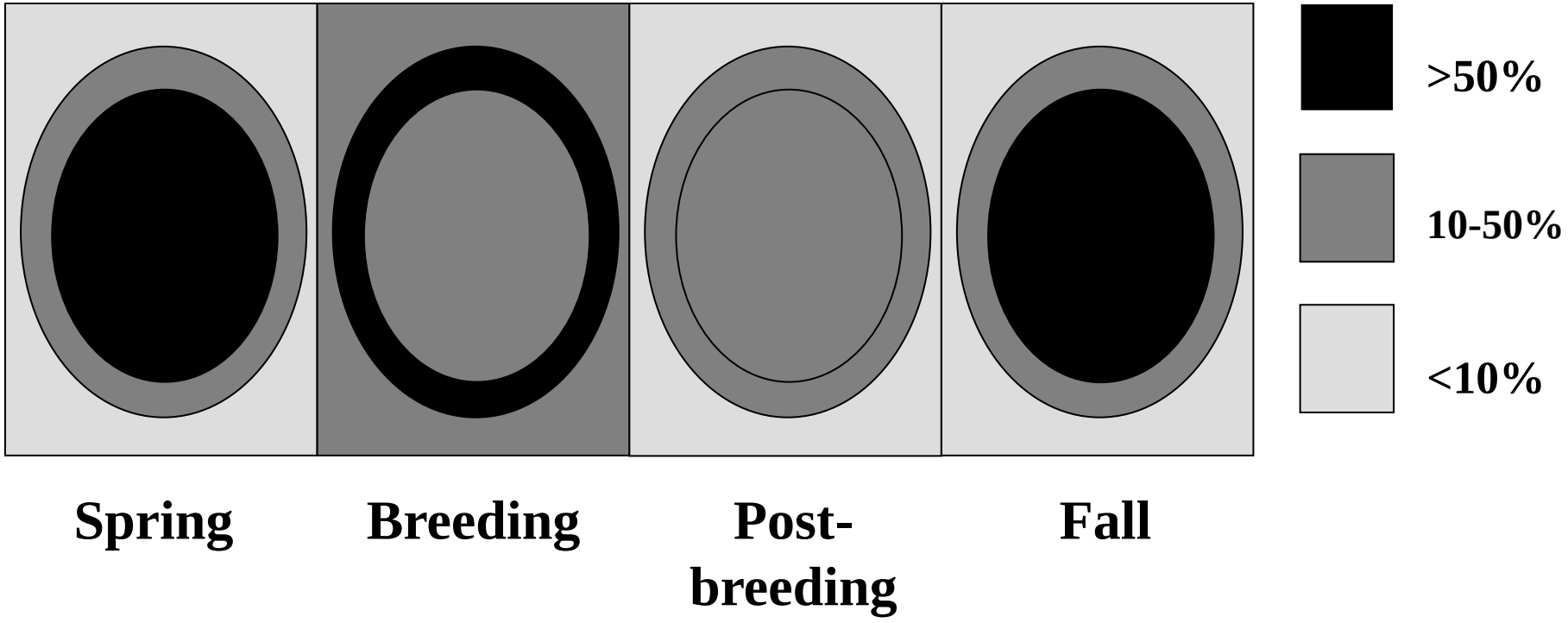
Canopy-gap Specialists

Canopy-gap Specialists

- **Understory nesters**
- **Canopy breeders (interior-edge) also congregate around canopy gaps**

Northern parula attracted to edges of canopy openings

Chronology of Gap Use



Why Seasonal Shifts?

- **Forest breeders move to disturbed forest outside of breeding**
- **Protective Cover?**
  - **Naïve fledglings**
  - **Molting adults**
  - **Migrants in unfamiliar areas**
- **High fruit or arthropod abundance?**
- **Favorable micro-climate?**

Wood Thrush

South Carolina Studies

- **Breeding season**
  - **More species/individuals in largest openings**
  - **Forest-interior birds neutral, except ACFL**
- **Fall Migration**
  - **More interior birds in openings and edges**
- **Four seasons**
  - **Least use of openings during breeding**
  - **High use during migration seasons**
  - **Related to cover rather than arthropods**

Group Selection

- **Intent to regenerate**
- **Greatest stand-level bird diversity**
- **Smaller than patch cuts (<1 acre)**
- **Mimics canopy gaps**
- **Maintains canopy**
- **Requires frequent entry**

1-acre group-selection opening

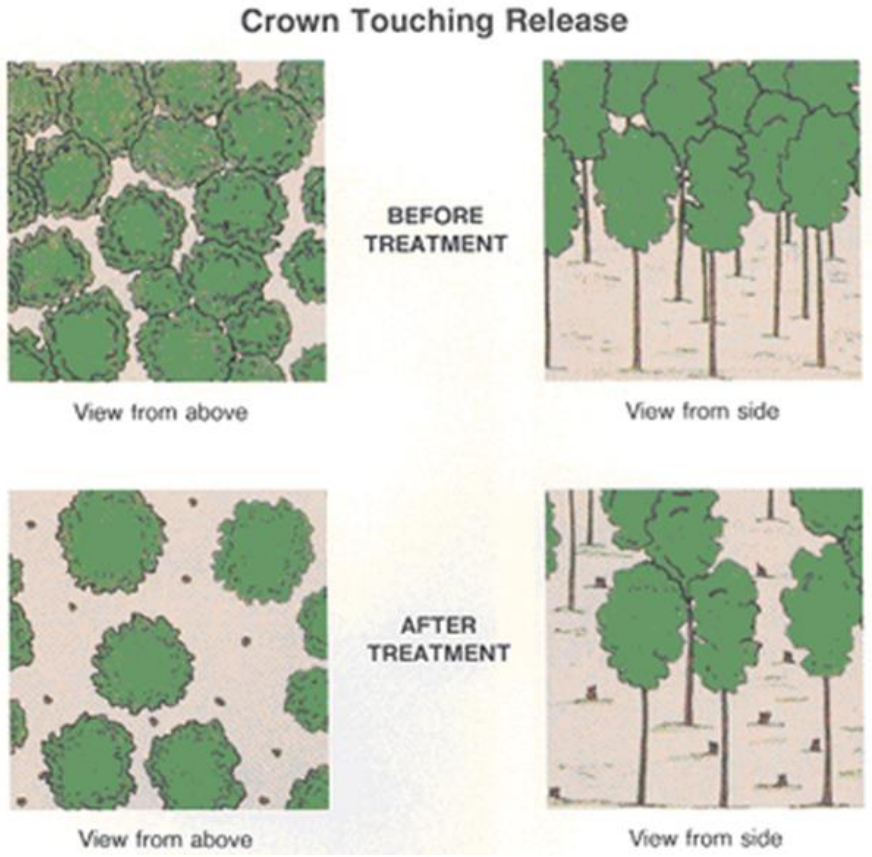
How large? How many?

- **> 0.5 acre for regen & early seral birds**
- **≥ 0.15 acre for some birds (NOPA, REVI)**
- **Size interacts with number of openings**
- **>25% canopy openings/basal area reduction**

1-acre group-selection openings in bottomland hardwoods

Crop-tree Release/Imp. Cuts

- Increase sunlight & vertical structure
- Improve silvicultural conditions
  - Favor oaks, poplar
- Increase mast
- Create snags



Southern Snag Ecology

	Snag Age (Years)					
	1	2	3	4	5	6
Lob. Pine	100	64	37	20	5	4
Short. Pine	100	64	42	24	13	5
Red Oaks	100	73	34	23	14	2
White Oaks	100	66	51	28	19	0
Y. Poplar	100	75	57	36	14	4
Snags w/ Cav.	1	1	3	7	8	35

**From Moorman et al. FEM 118:37-48*

How Many Snags?

- **Estimated #/acre for “average” population**
  - **McComb et al. 1986**
- **5-10” dbh**
  - **0.91 in pines**
  - **0.77 in hardwoods**
- **10-20” dbh – 0.41**
- **>20” dbh – 0.06**

Red-headed Woodpecker

Fire and Nesting Birds

- **Avoid burning large areas during nesting**
- **But, birds re-nest**
- **Only 1 of 30 turkey nests burned**
- **2 of 121 Bachman's sparrow nests burned**

Frequency and Season?

- **What are focal species?**
- **What are desired structural conditions?**

Burning in Hardwoods

- **Don’t burn under closed canopy**
  - **>20% canopy openness**
- **Return intervals range from 2-7 years**
- **Low fire intensity to limit bole damage**
- **Dormant-season burns … mostly**
- **Late, growing-season fire for better woody control**