

# Bird and invertebrate response to woody biomass harvest: Preliminary findings and future directions

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## A Collaborative Effort



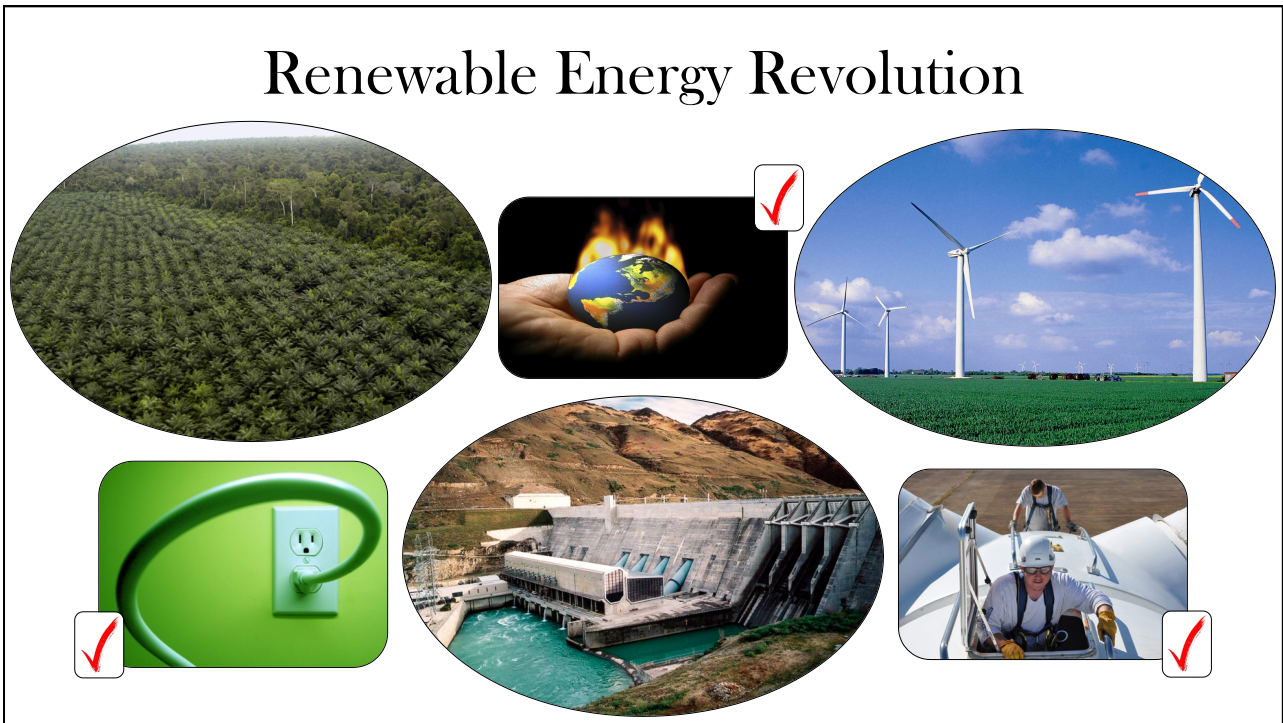
Global

Energy

**CRISIS**



Renewable Energy Revolution



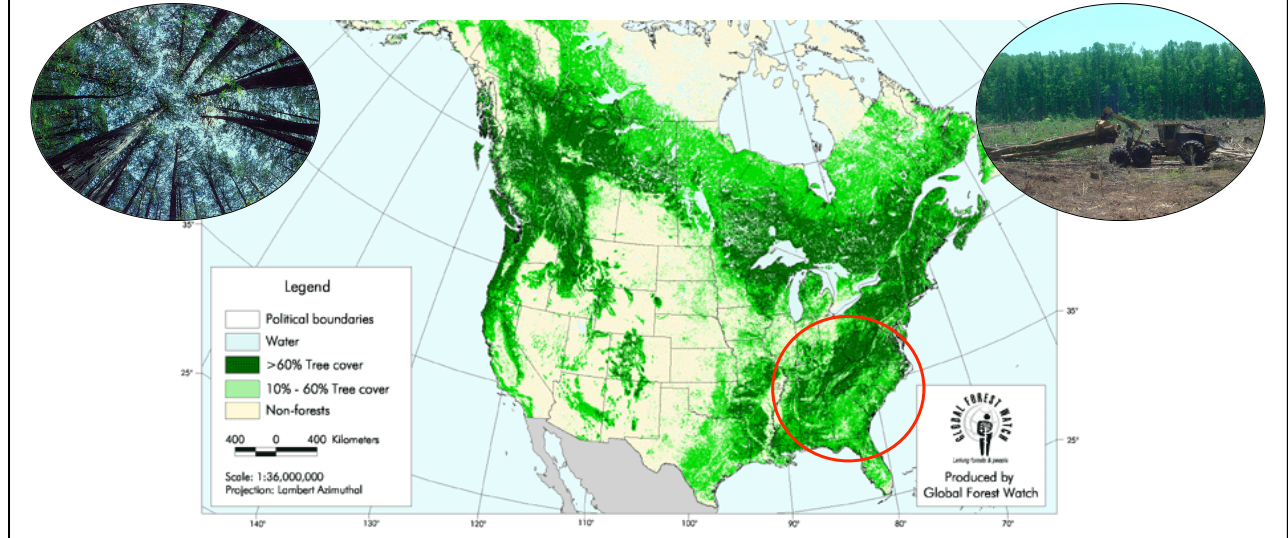
# Fifty Shades of Green



# Biomass may be converted to energy...



# Heavily Forested Areas → Logging = Harvest Residues (Woody Biomass)



## Harvest residues are down wood.



## Down wood provides habitat for birds...



## ...and invertebrates.



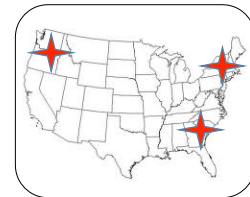
## QUESTION:

Will removing down wood through woody biomass harvest compromise bird and invertebrate habitat?

### Biomass Harvesting Guidelines\* (BHG)s...just in case



Designed to:  
*Protect*  
*Maintain*  
*Enhance*



Biodiversity

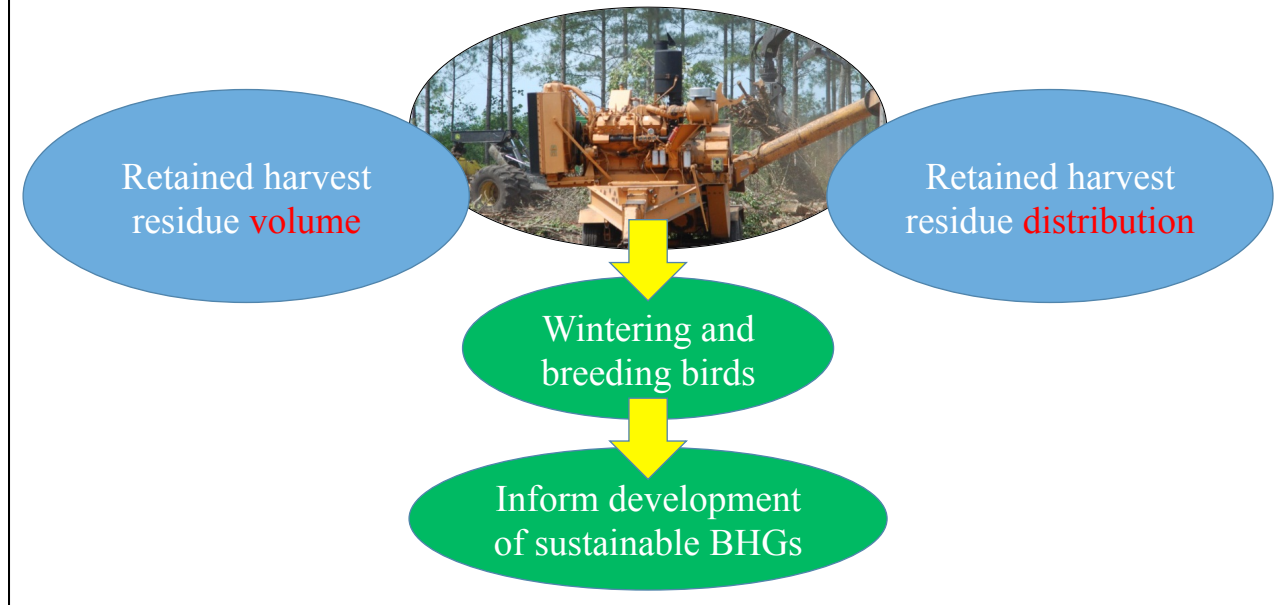


Site  
productivity

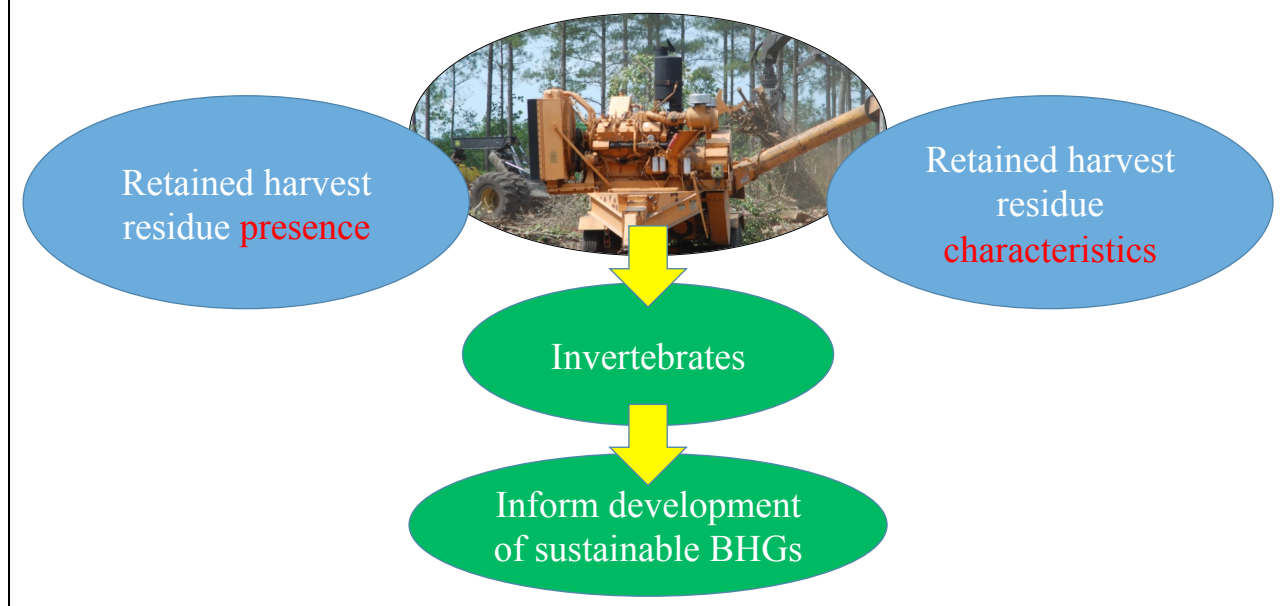
Wildlife habitat

\*Based on limited empirical data

## Project Objectives - Birds





## Project Objectives - Invertebrates




## Setting the Scene

NC  
(4 clearcuts)






Sheared



Atlantic Coastal Plain


GA  
(4 clearcuts)

Windrowed

- Intensively managed pine plantations
- Mechanical and chemical site prep
  - Replanted

## Treatments



X X X X	(15 CLUS) <span style="color: blue; font-size: 20px;">●</span>	(NO_BHG)	
X X X	(30 DISP)	X X X X	(15 DISP)
X X X	(30 CLUS)	(NO_BIO_HARV)	<span style="color: blue; font-size: 20px;">●</span>

● = logging deck

X  
X  
X  
X = retention zone

X Treatments ranged from 6 – 14 ha.

## Methods - Birds

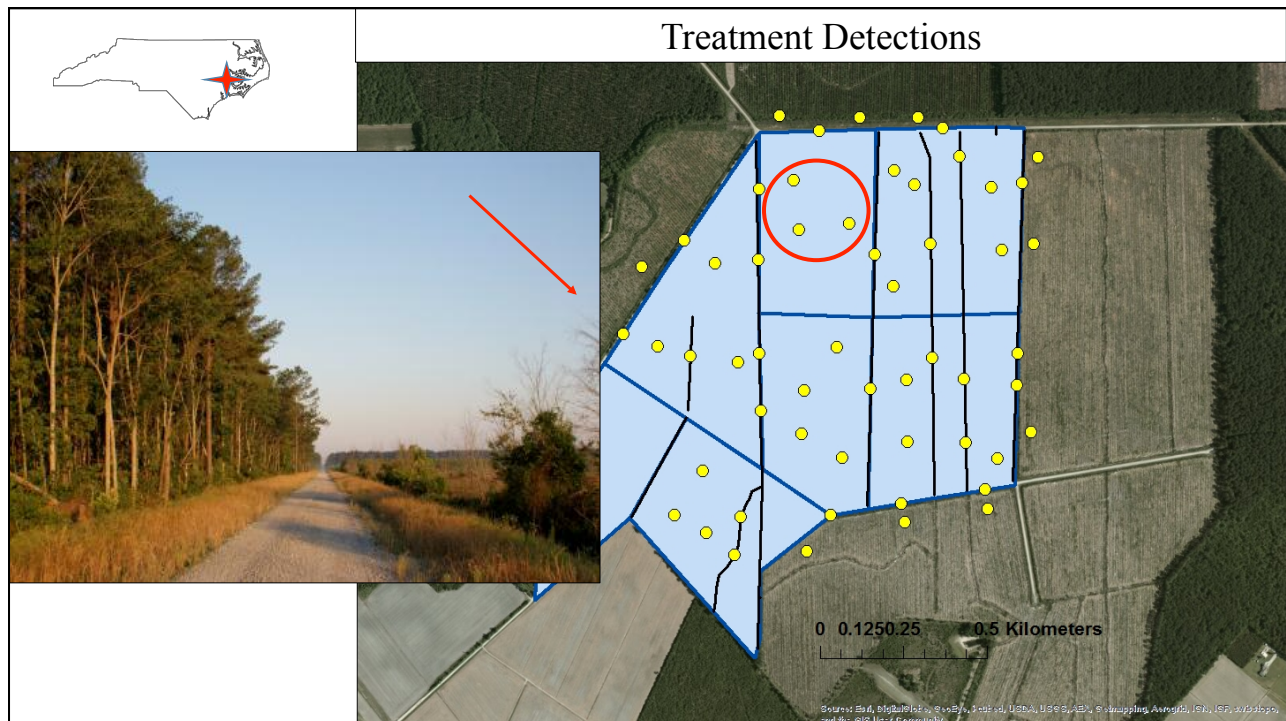
- We **counted birds** in clearcuts and adjacent edge and recorded their behavior and locations during winter (NC only) and the breeding season (NC & GA) of 2012 and 2013.
- We **measured horizontal and vertical vegetative cover** (grasses, forbs, woody vines, and woody vegetation)

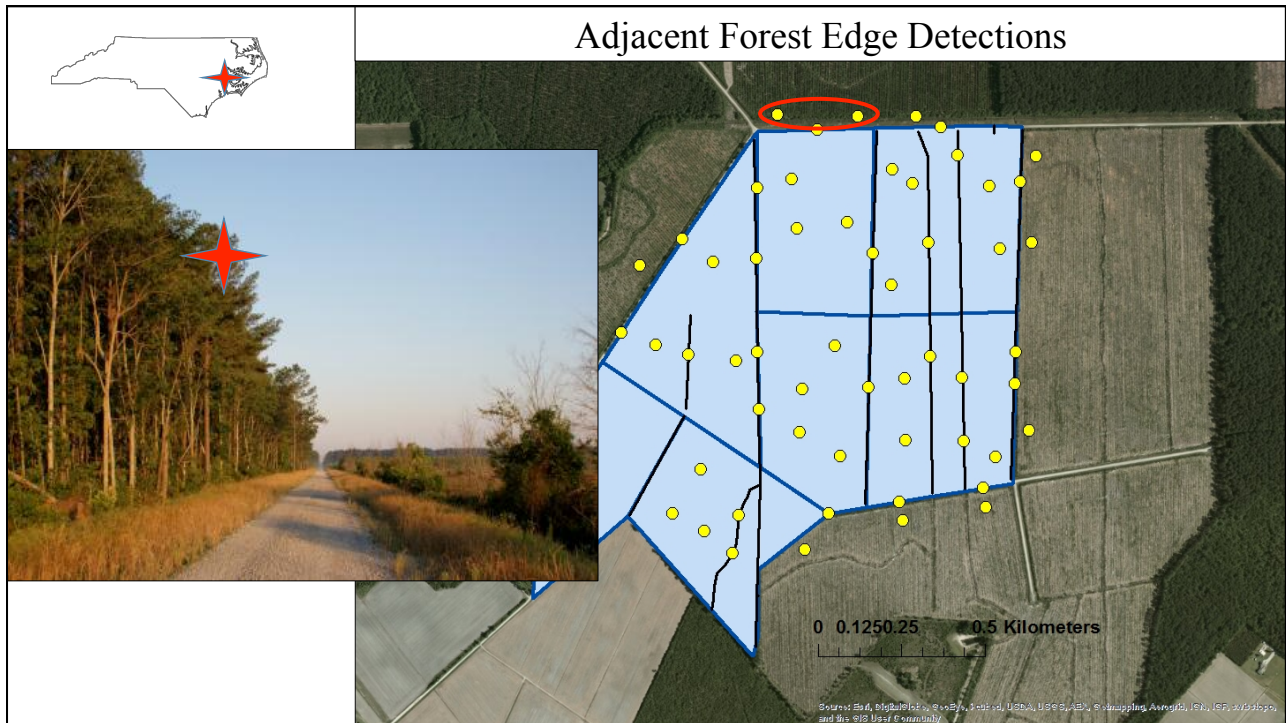
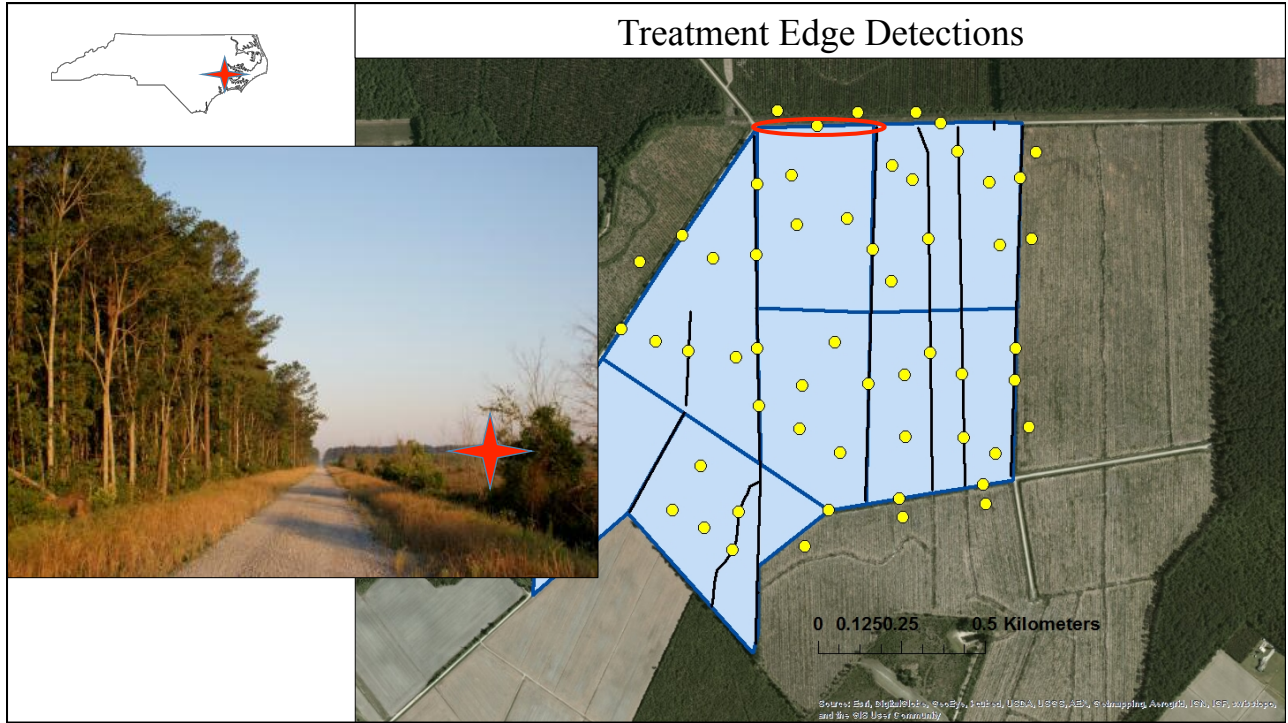


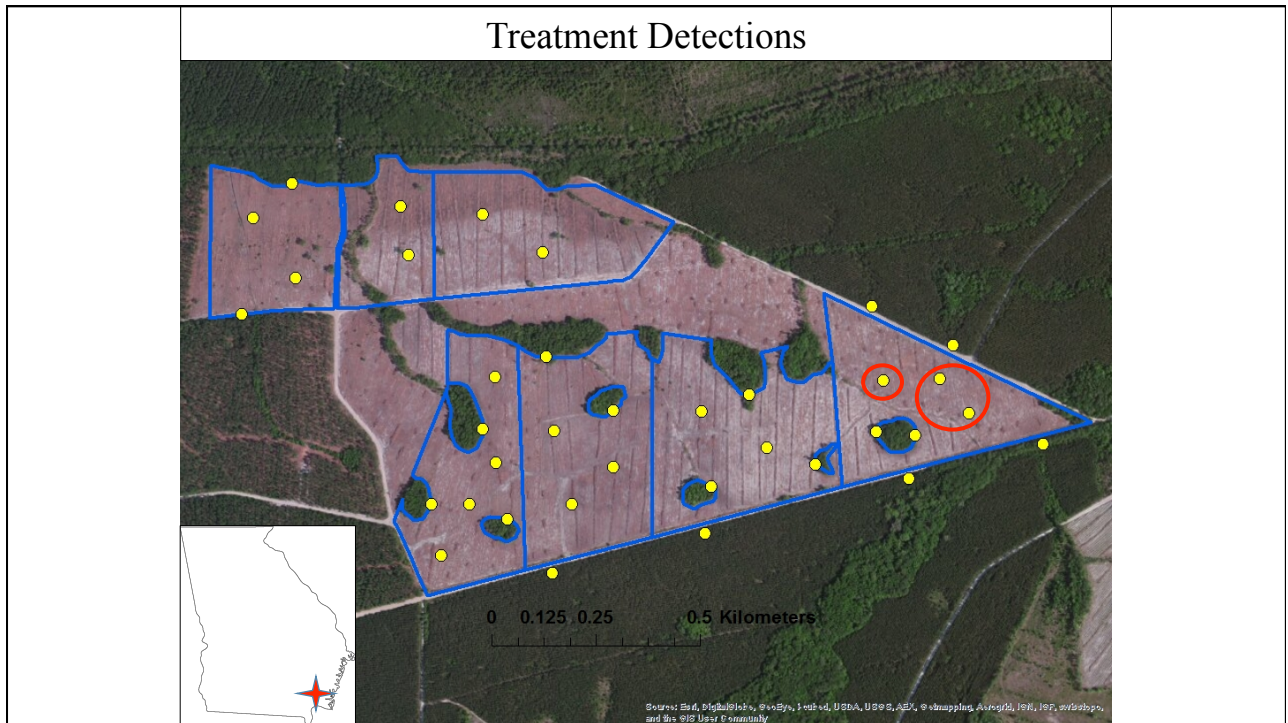
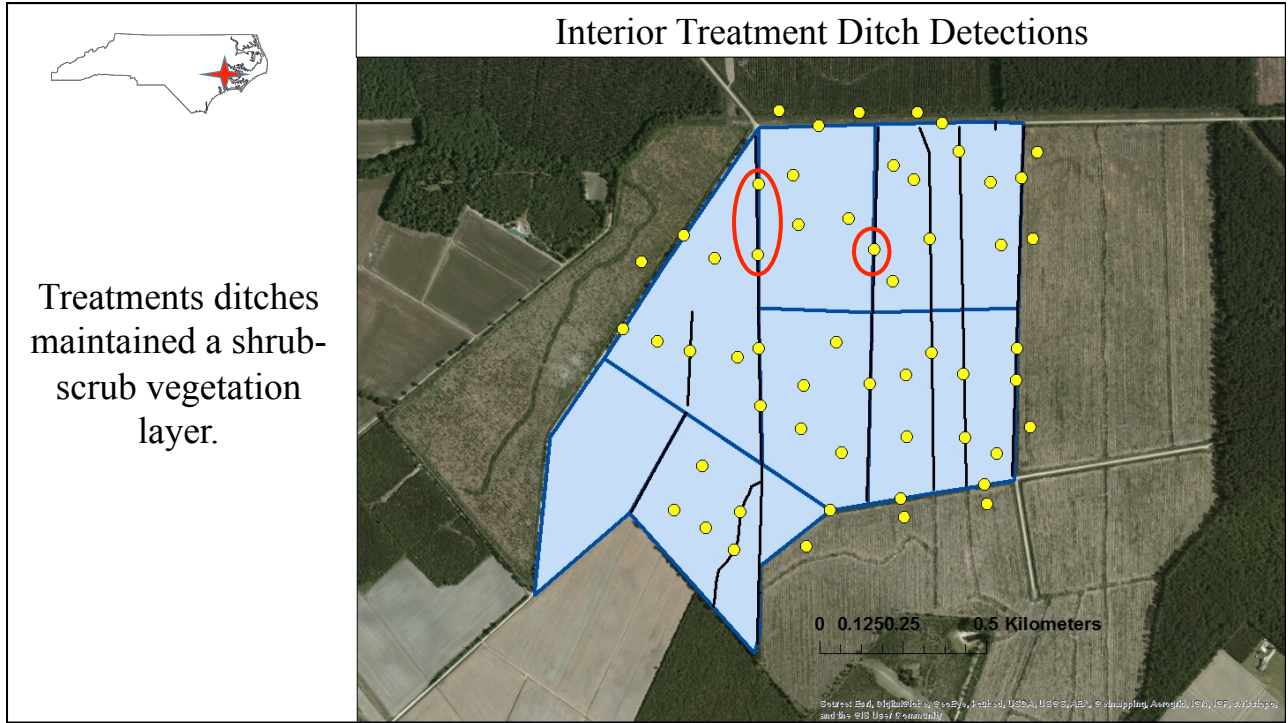
= 8 January – 28 February  
2012-2014

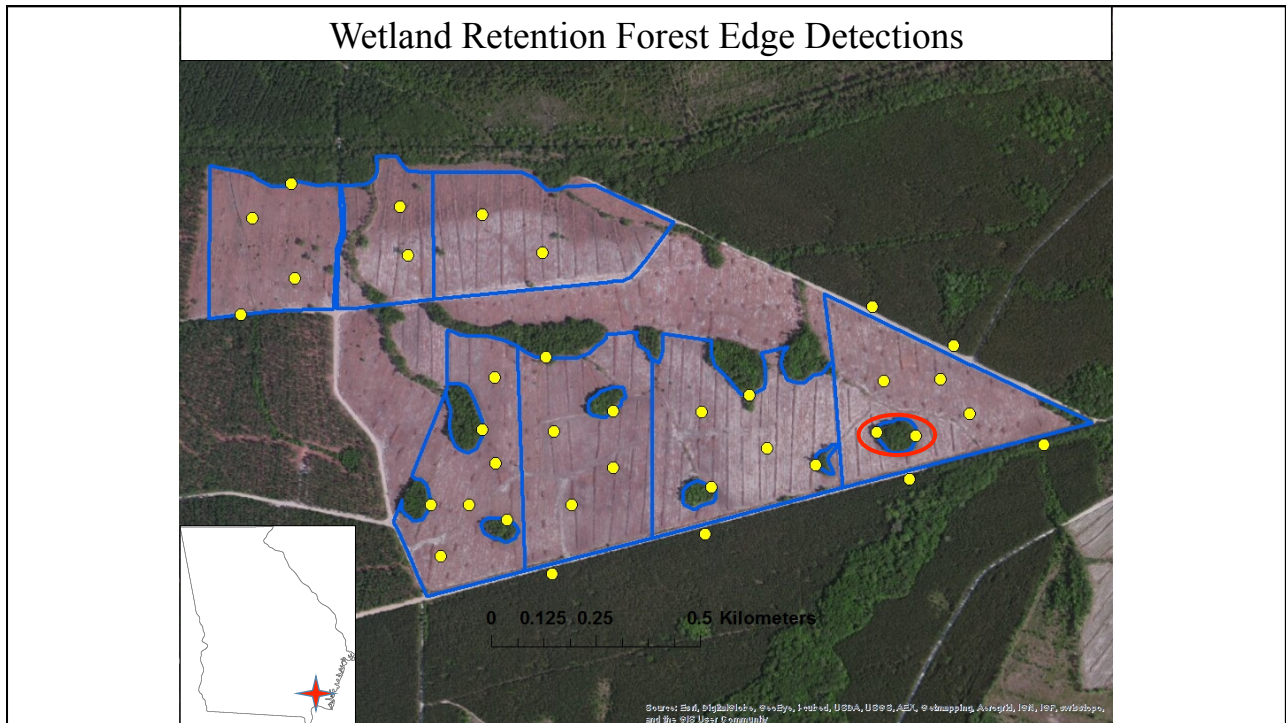
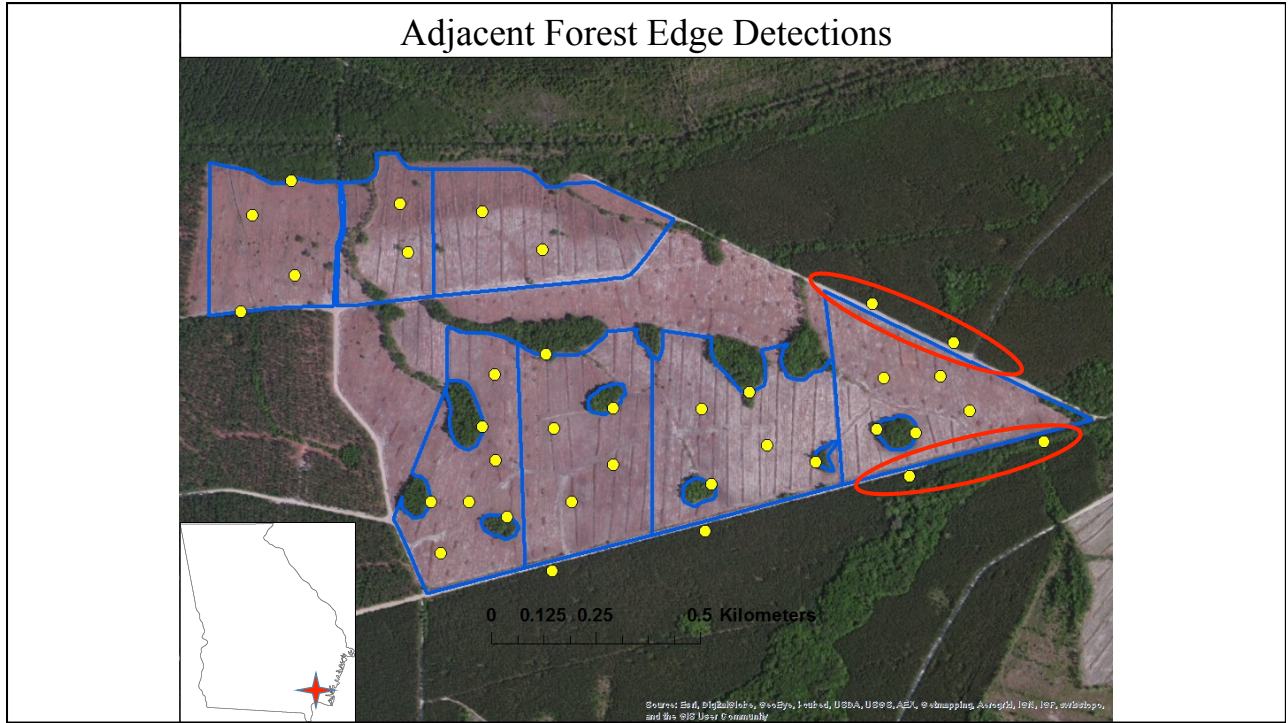


= 15 April – 15 July  
2012-**2014**





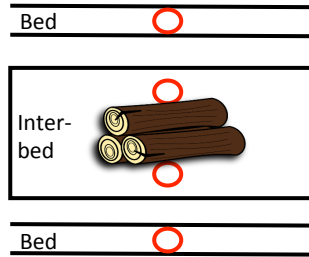




## Methods - NC Invertebrates

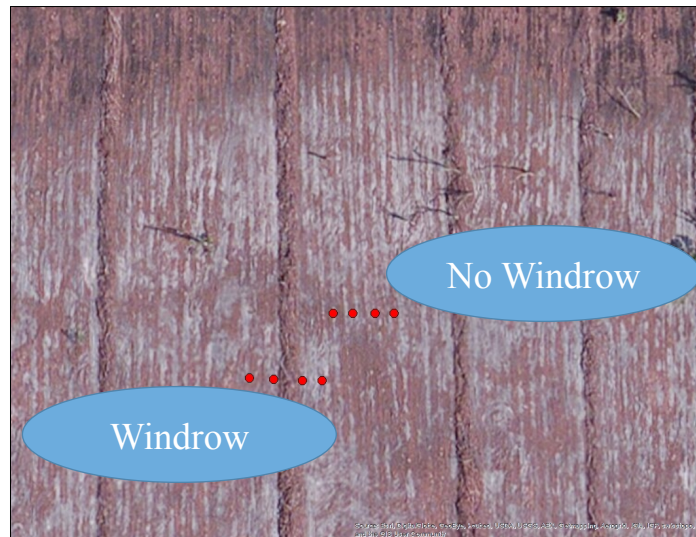


Pitfall Tapping  
 3 treatments =  
 1) Hardwood pile  
 2) Pine pile  
 3) No pile



## Methods - GA Invertebrates

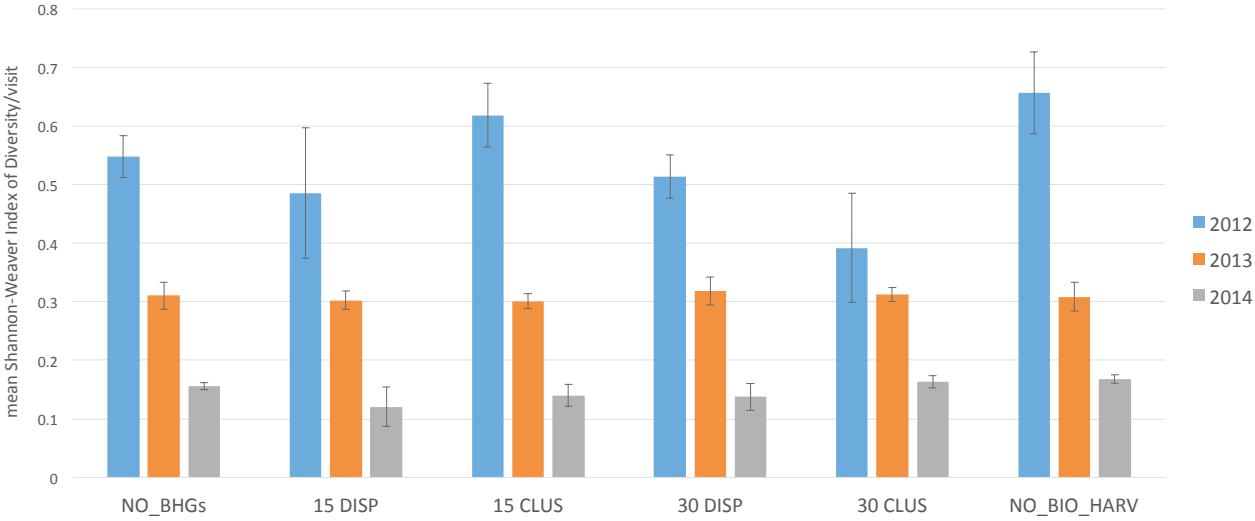
Pitfall Trapping  
 2 treatments =  
 1) Windrow  
 2) No windrow  
 (i.e., no large-diameter harvest residue)



# Preliminary Results - Winter Birds

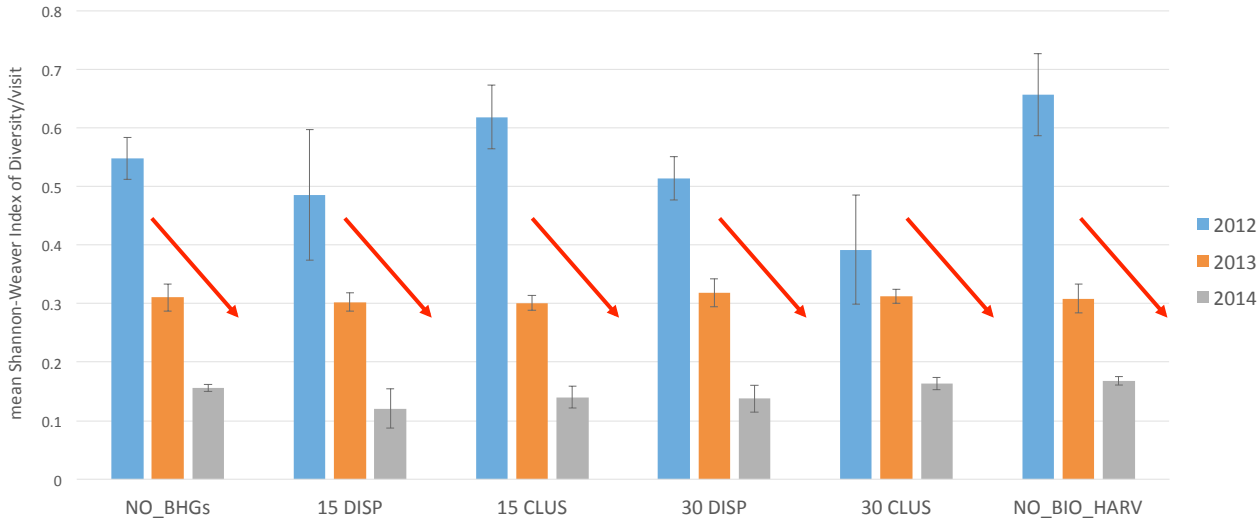


## Mean Shannon-Weaver Index of Diversity for winter birds/visit in treatments\*



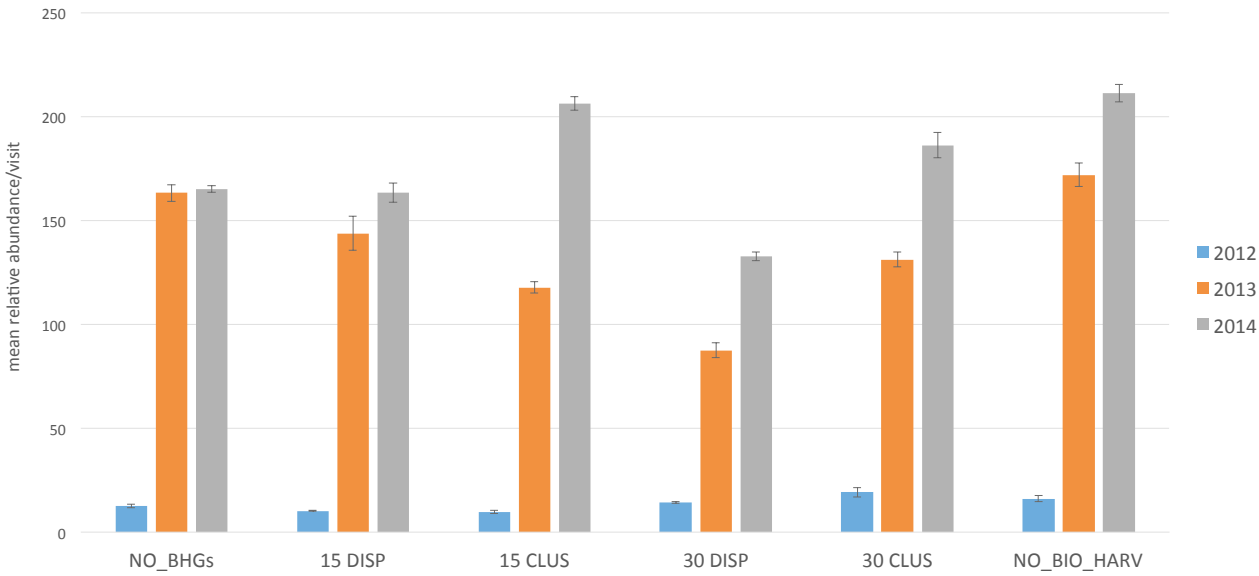
\*Preliminary results; Error bars = SE; Data collected in 4 clearcuts on Weyerhaeuser's J & W tract, Washington, North Carolina

### Mean Shannon-Weaver Index of Diversity for winter birds/visit in treatments\*

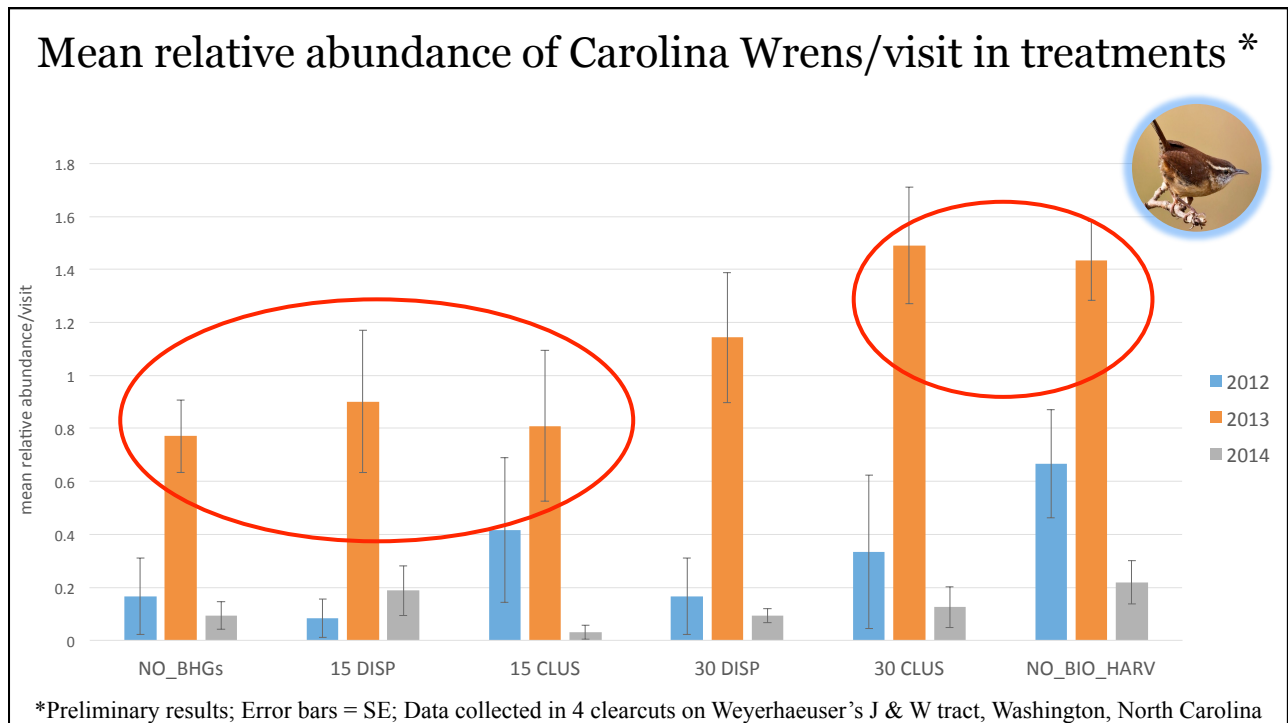
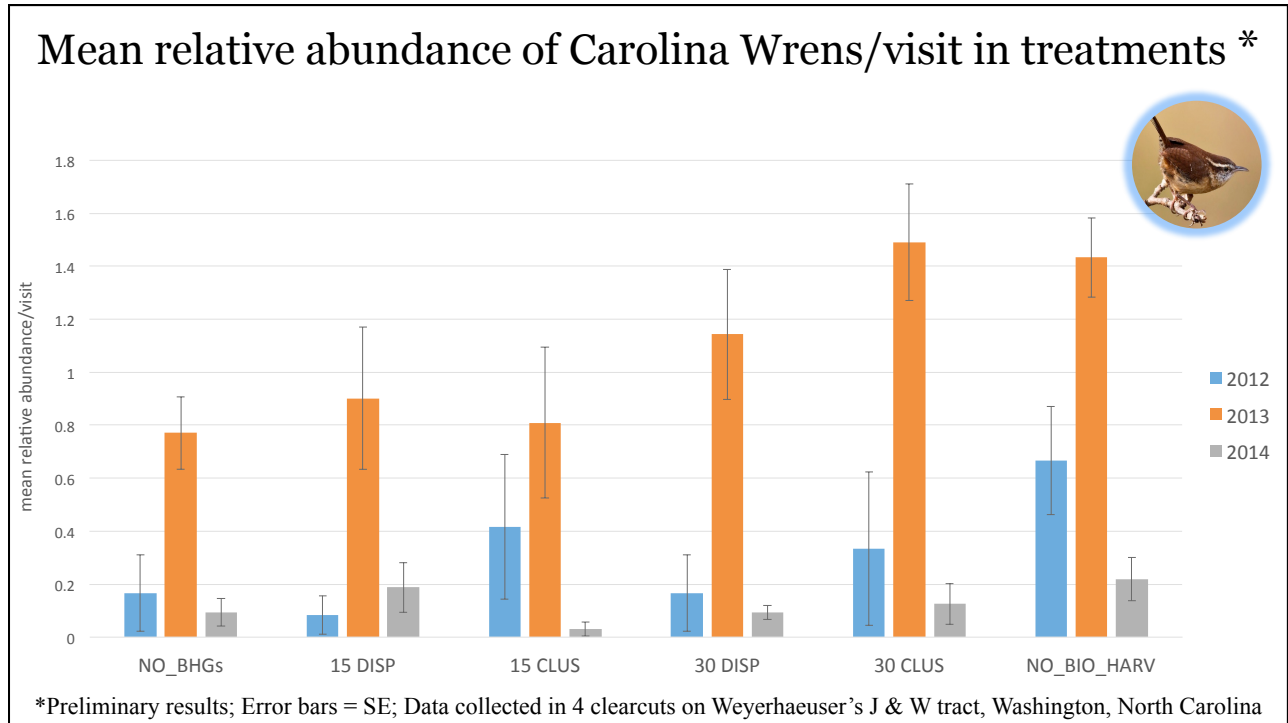


\*Preliminary results; Error bars = SE; Data collected in 4 clearcuts on Weyerhaeuser's J & W tract, Washington, North Carolina

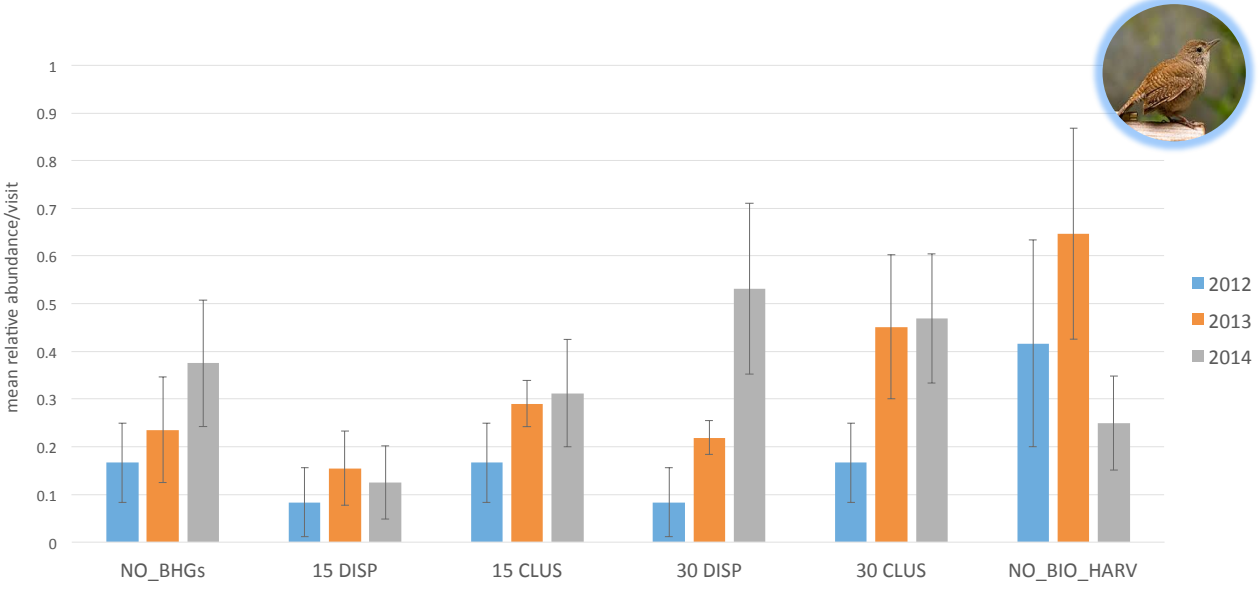
### Mean relative abundance of winter birds/visit in treatments \*



\*Preliminary results; Error bars = SE; Data collected in 4 clearcuts on Weyerhaeuser's J & W tract, Washington, North Carolina

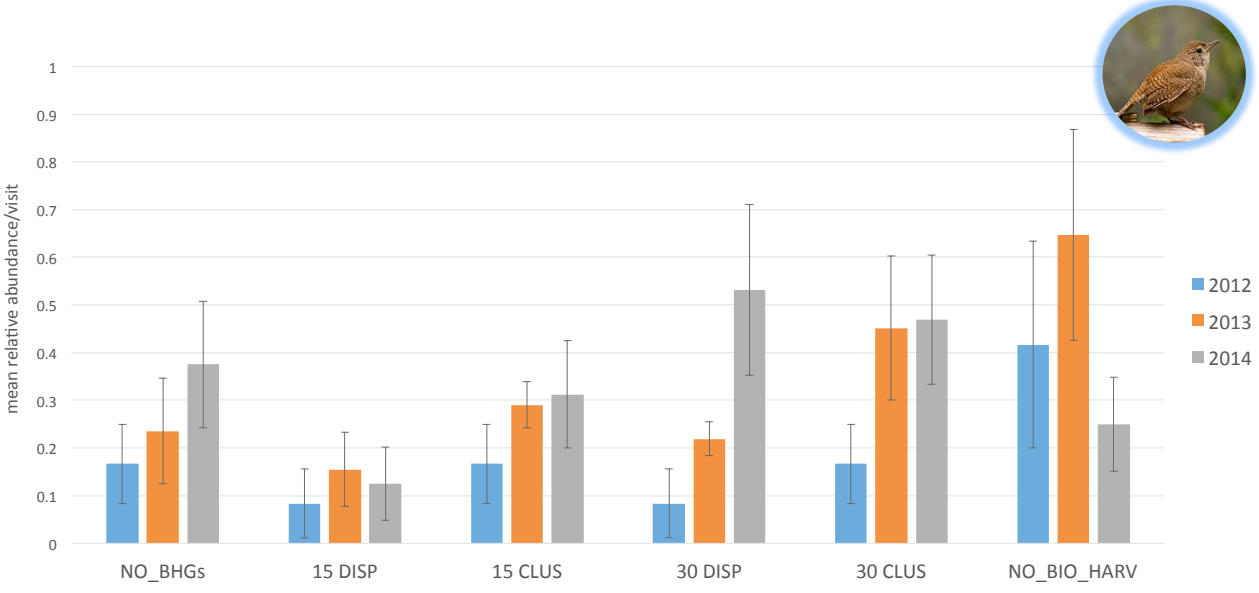


### Mean relative abundance of House Wrens/visit in treatments\*

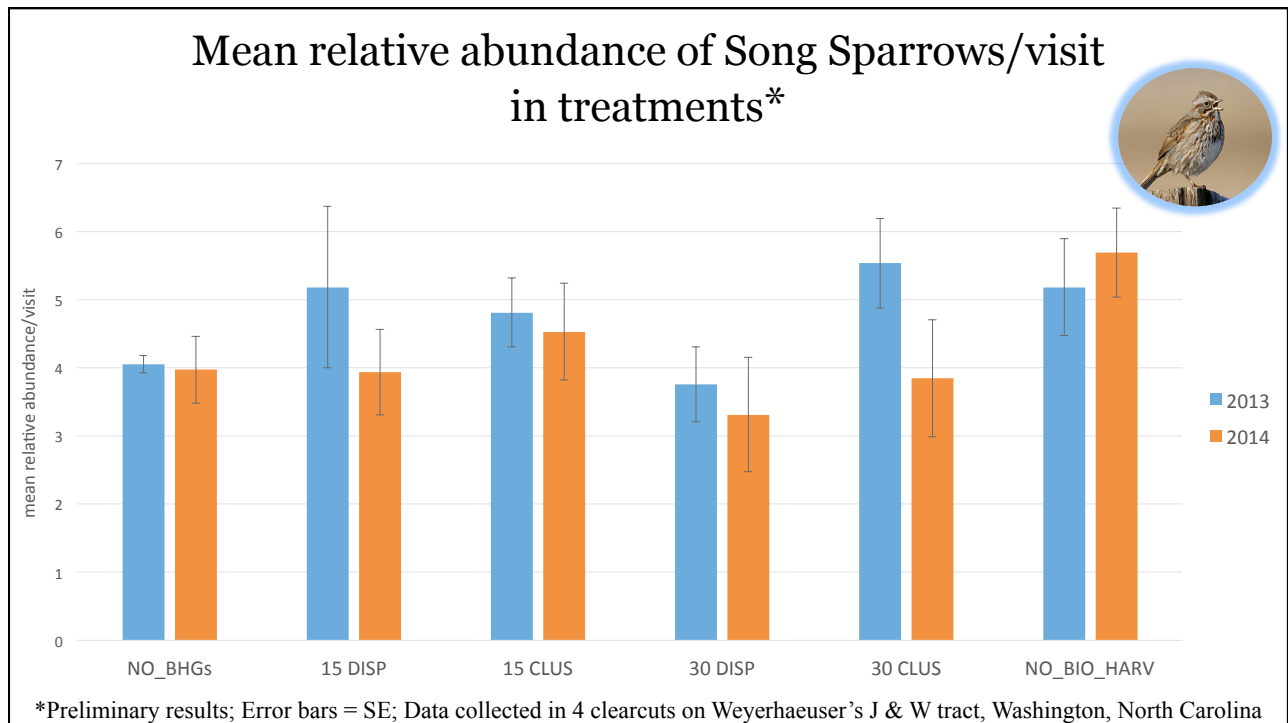
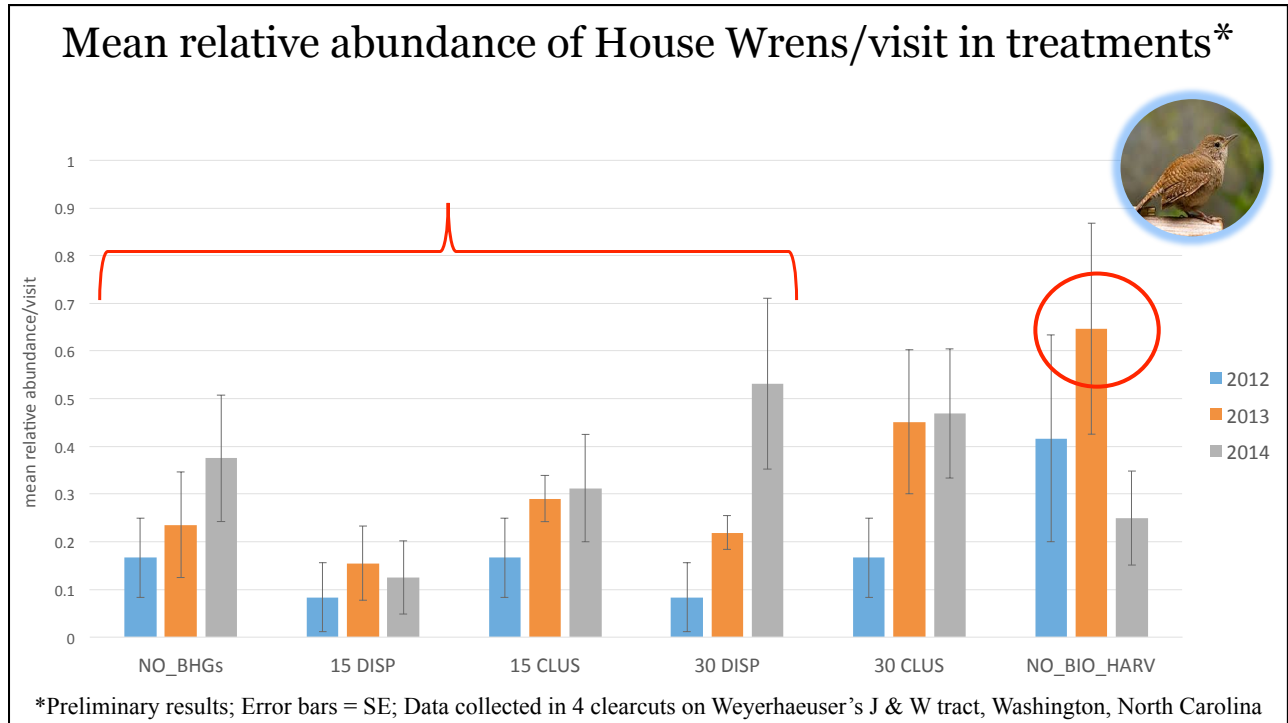


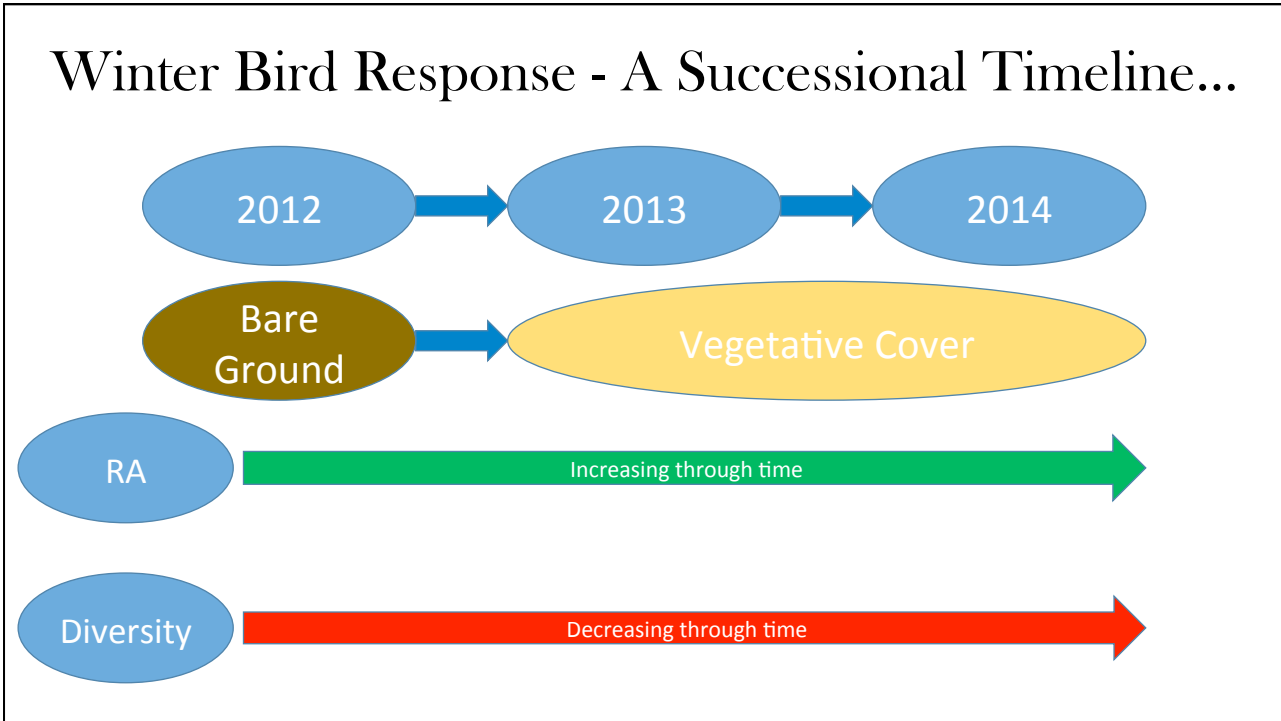
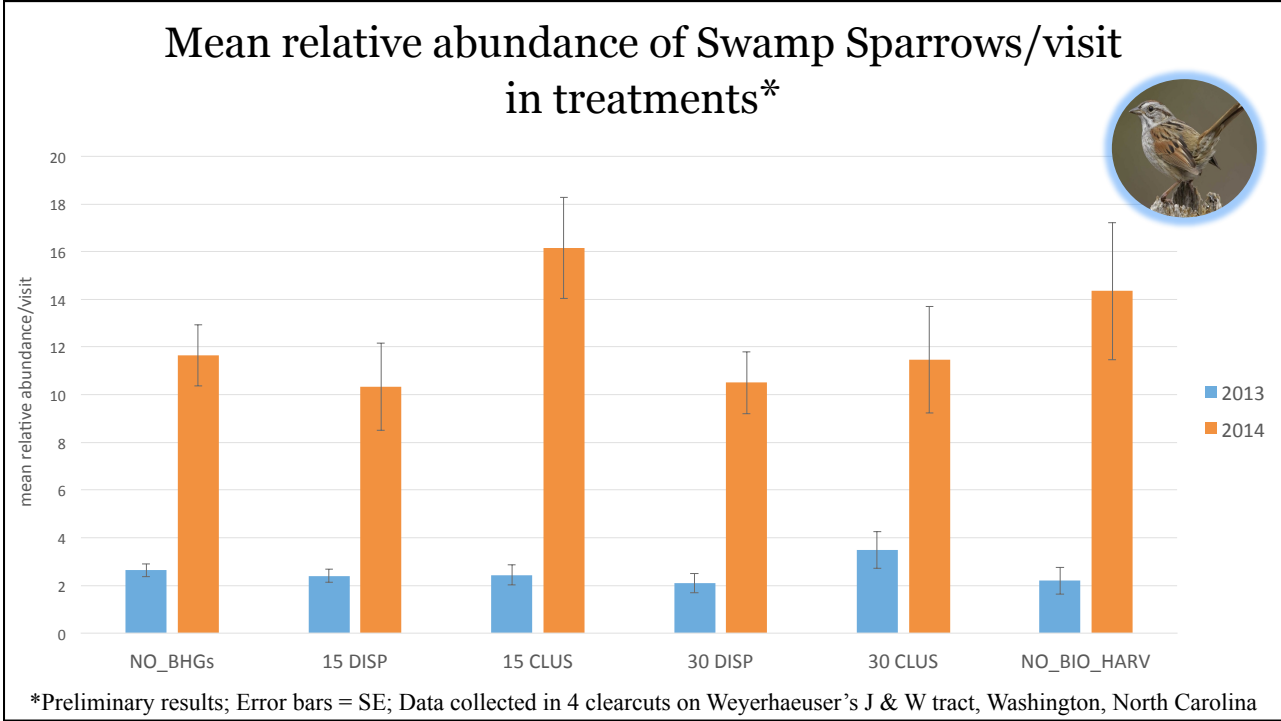
\*Preliminary results; Error bars = SE; Data collected in 4 clearcuts on Weyerhaeuser's J & W tract, Washington, North Carolina

### Mean relative abundance of House Wrens/visit in treatments\*

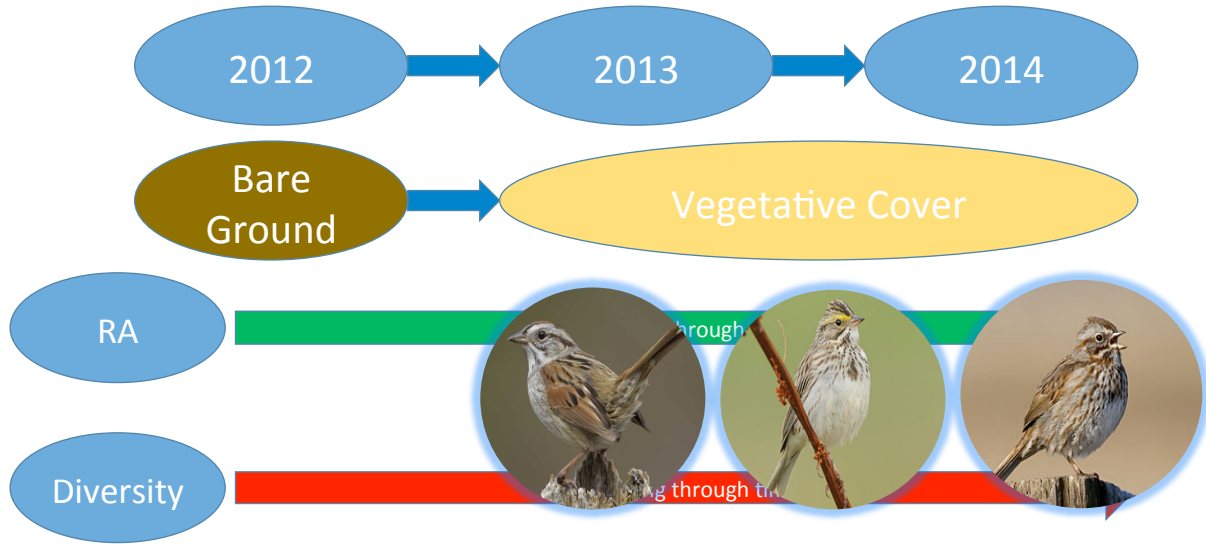


\*Preliminary results; Error bars = SE; Data collected in 4 clearcuts on Weyerhaeuser's J & W tract, Washington, North Carolina



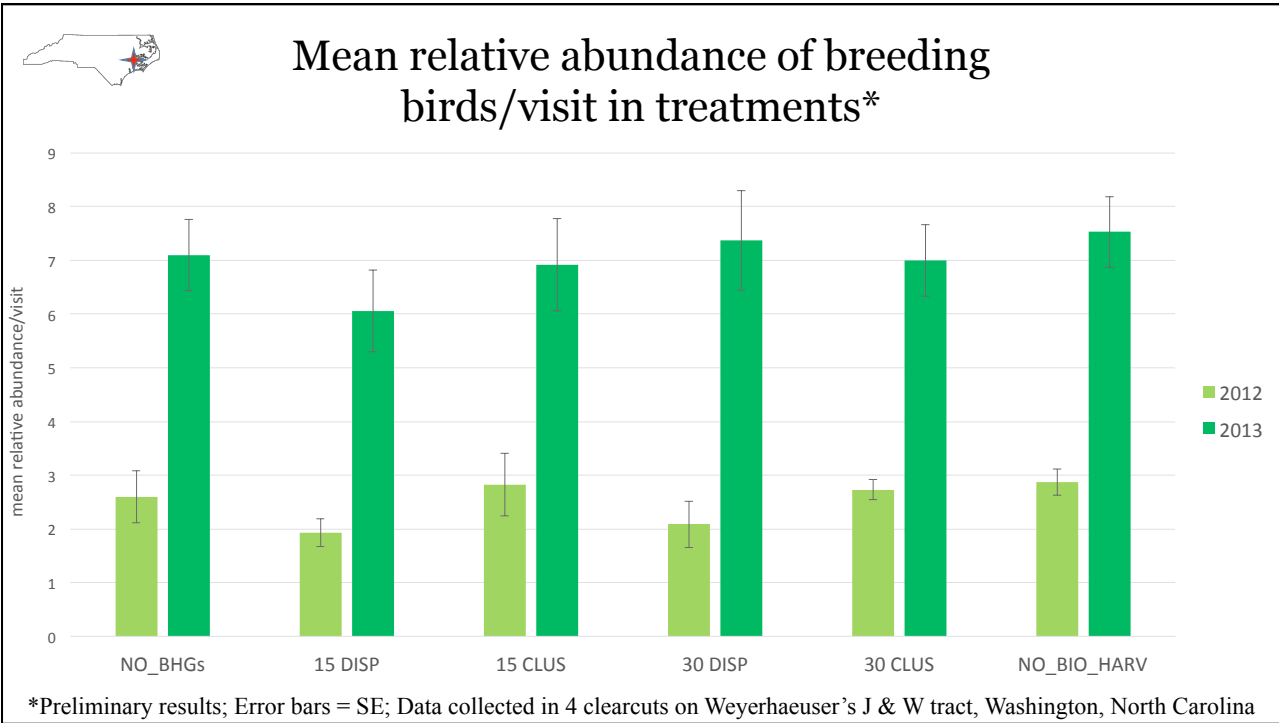
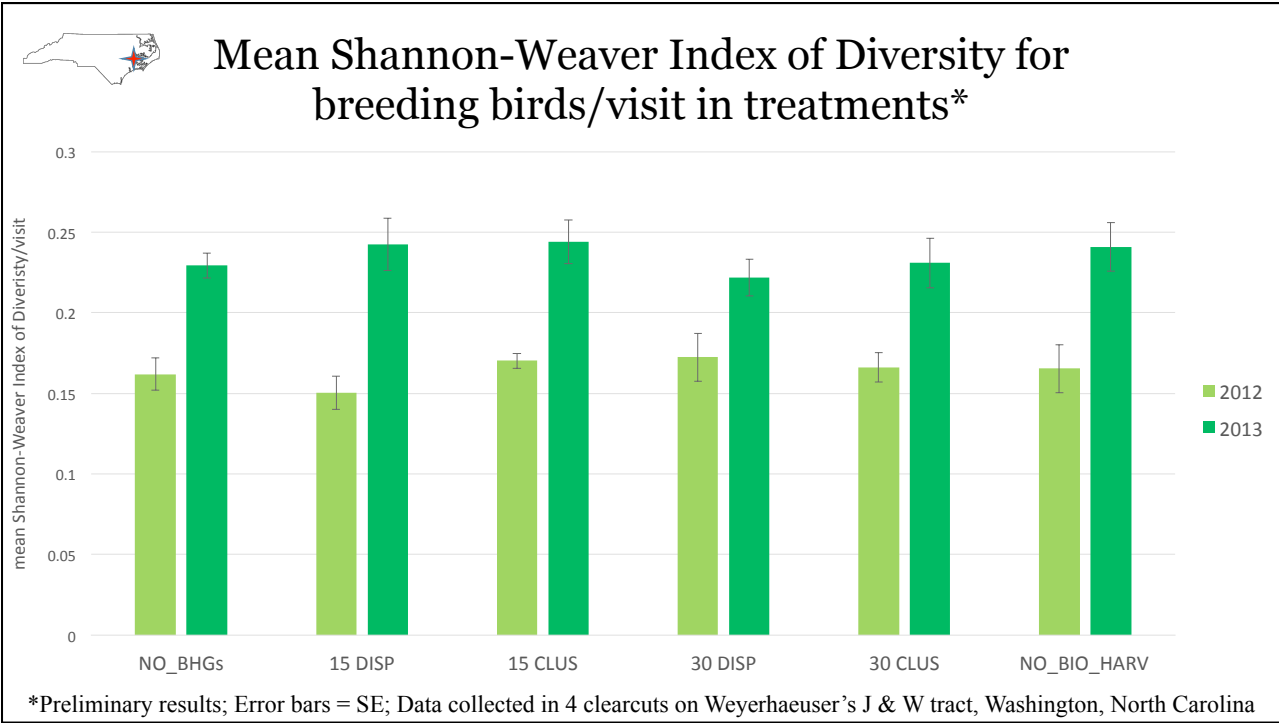


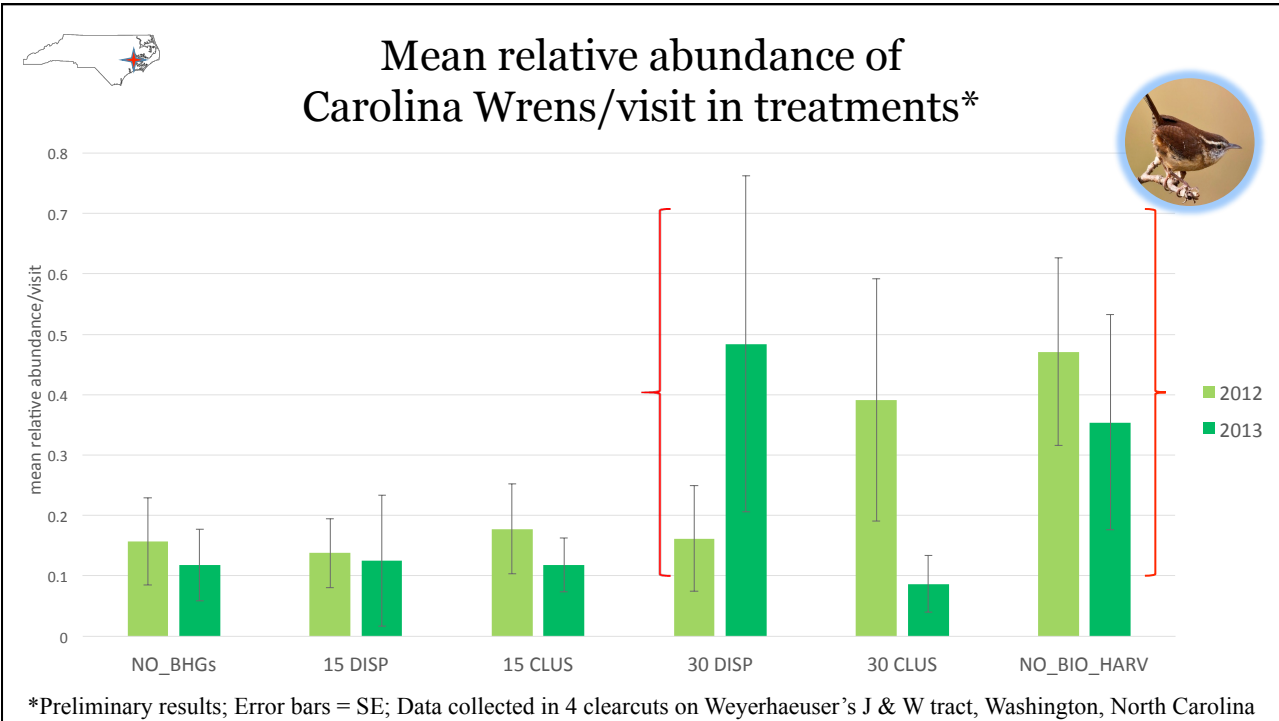
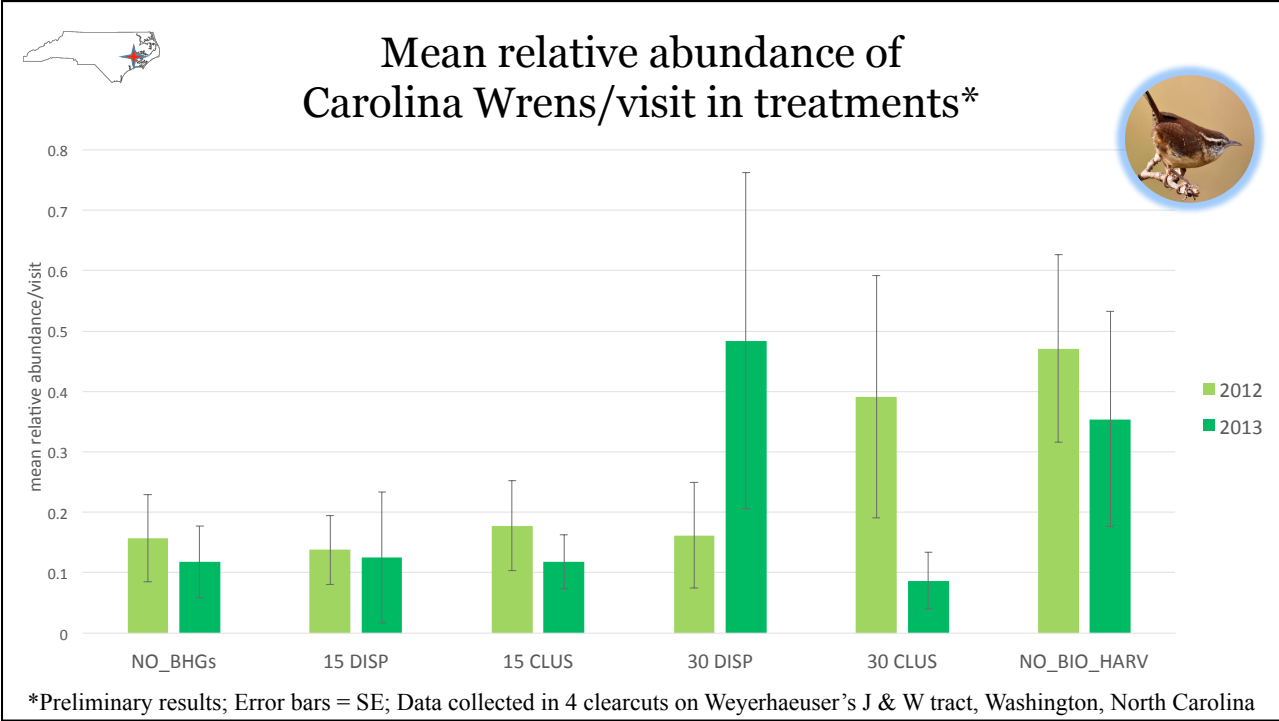
## Winter Bird Response - A Successional Timeline...

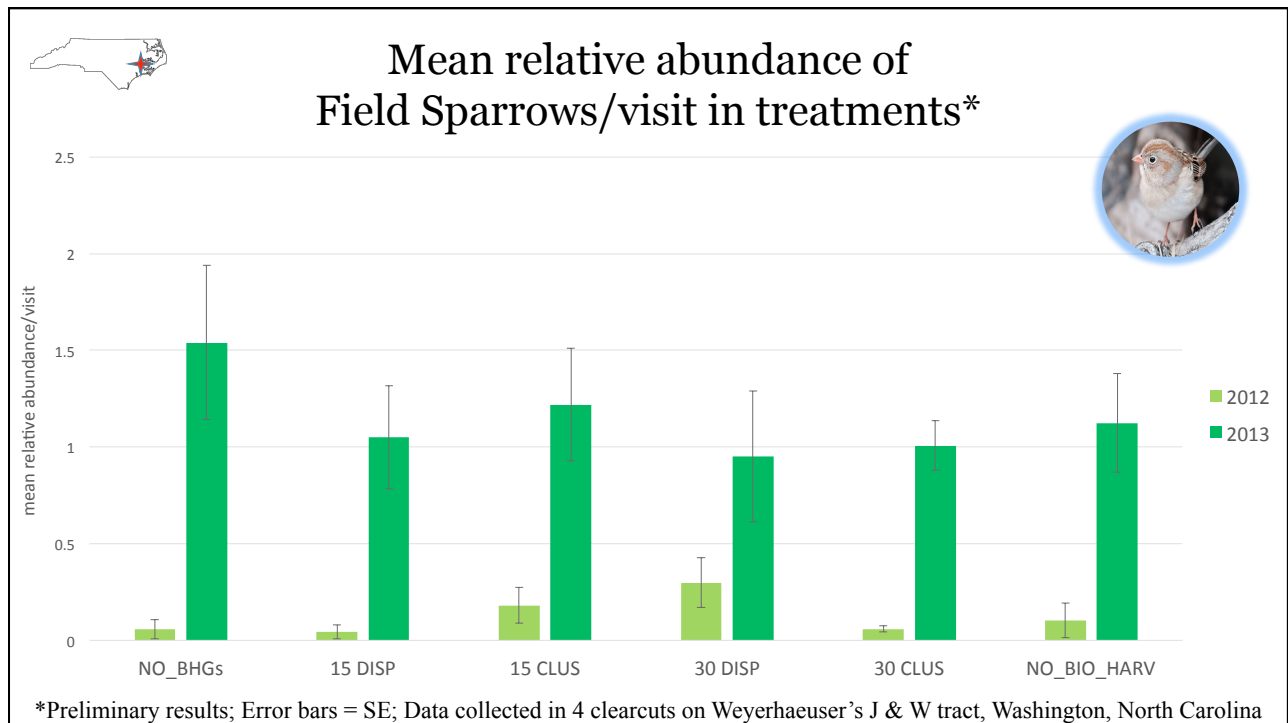
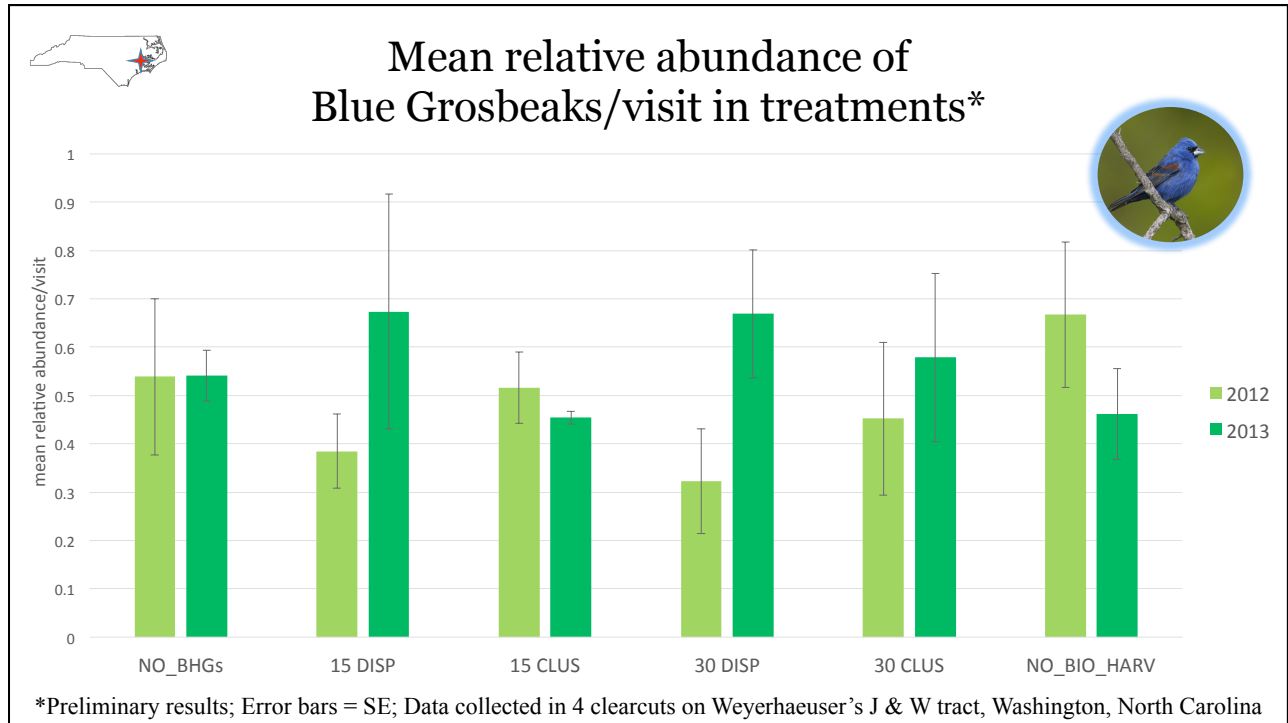


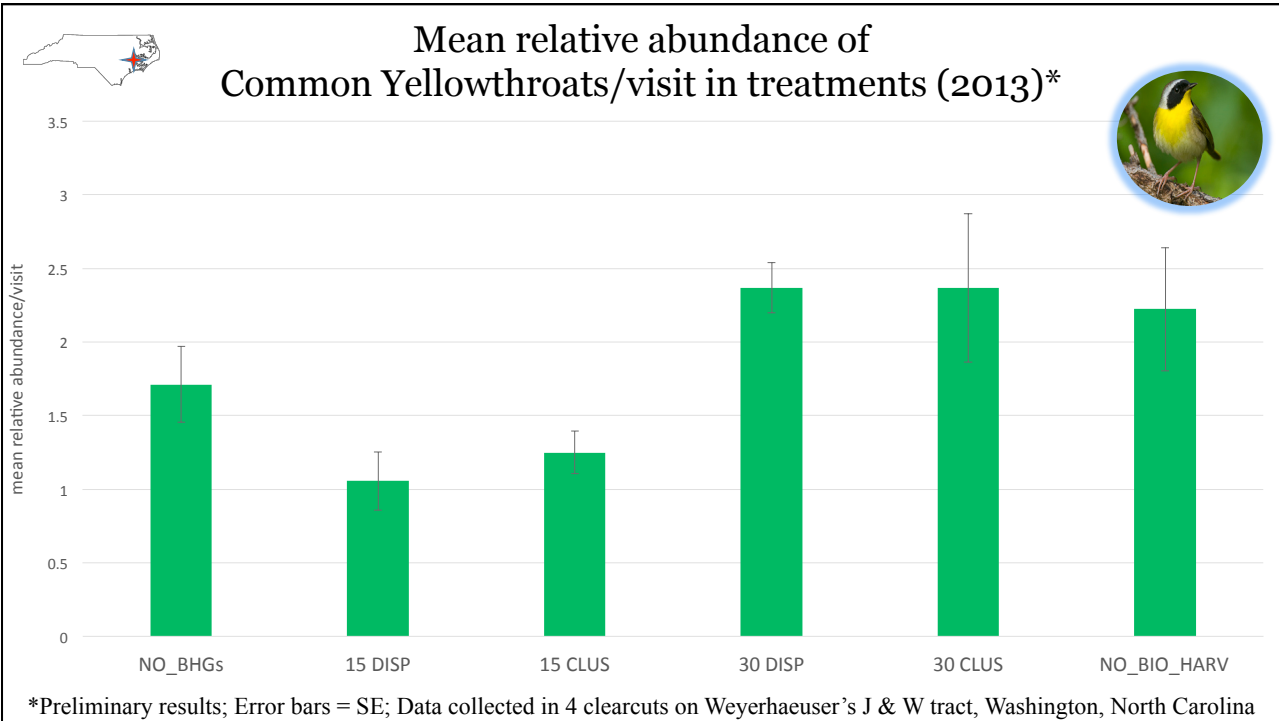
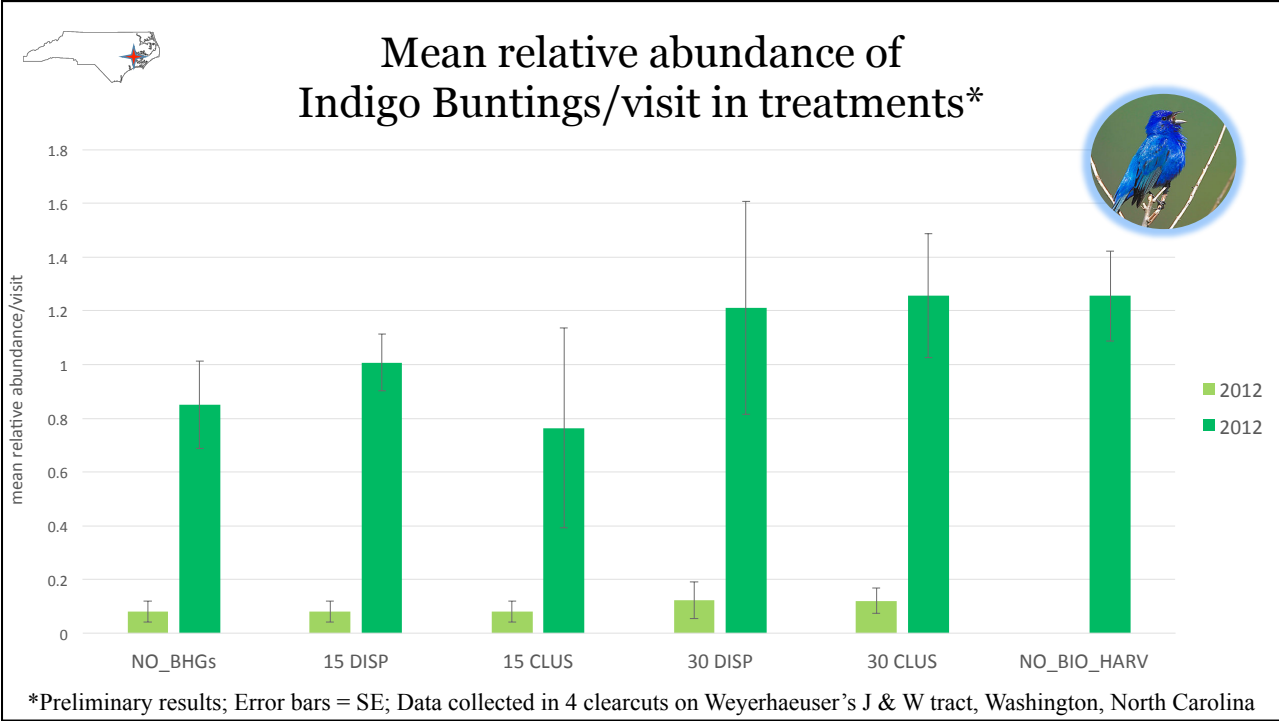
## Preliminary Results - Breeding Birds (NC)







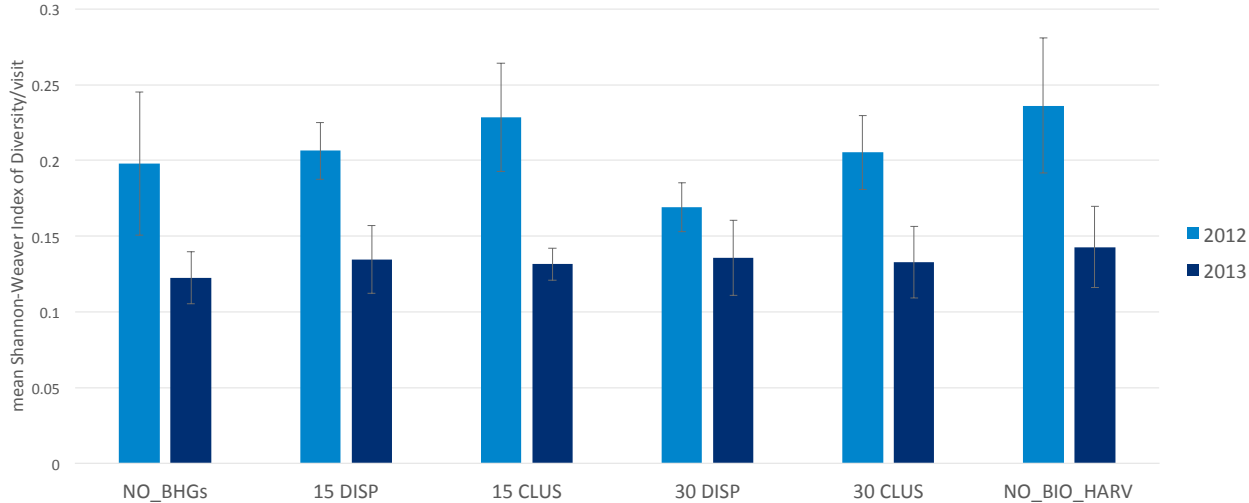




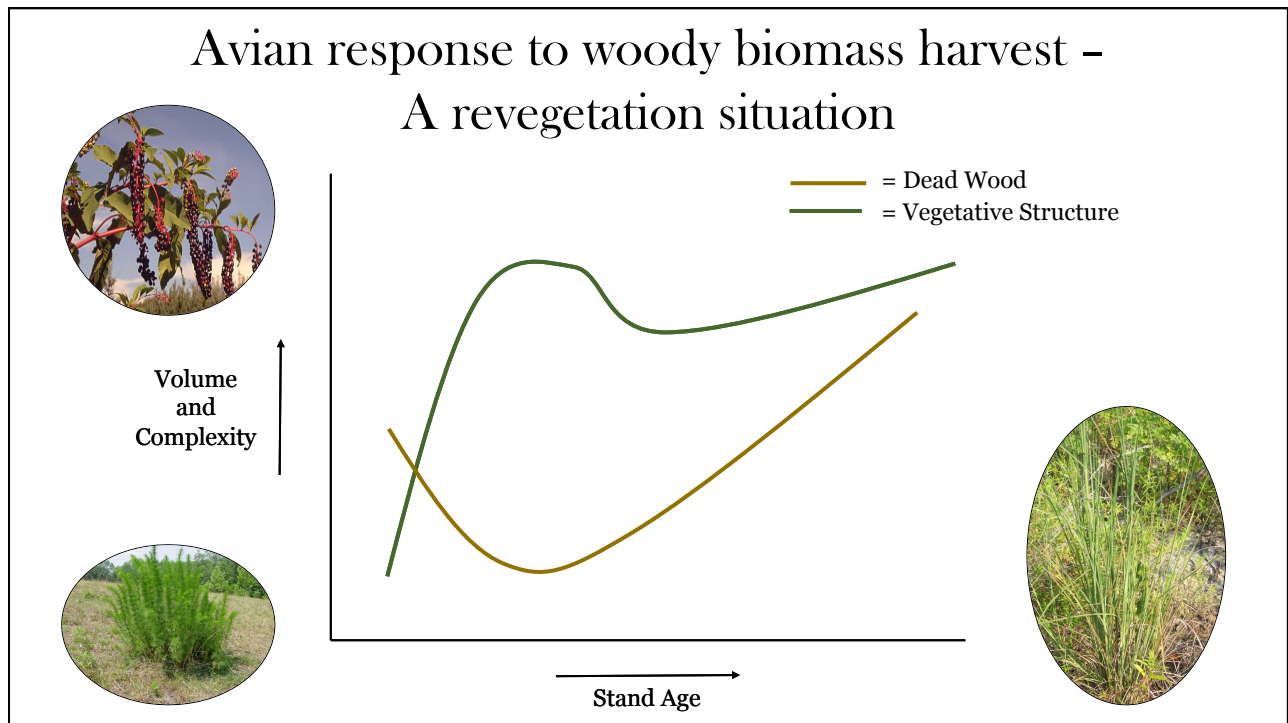
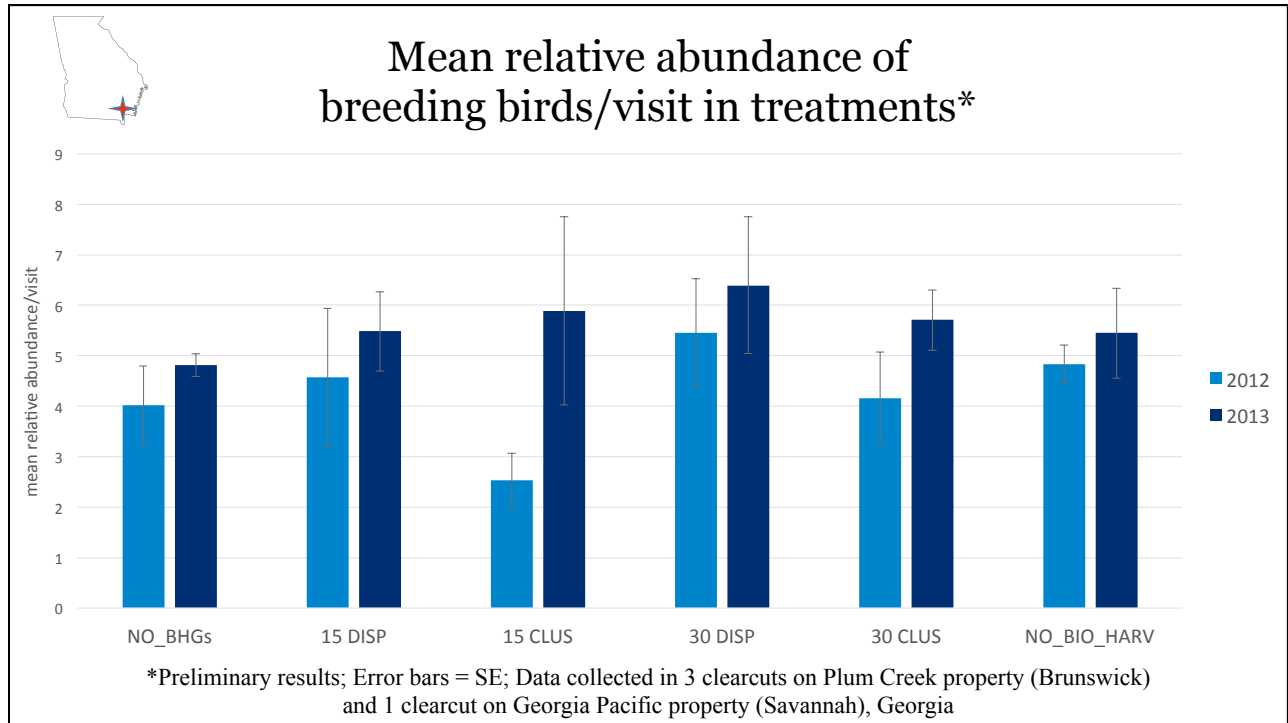
# Preliminary Results - Breeding Birds (GA)

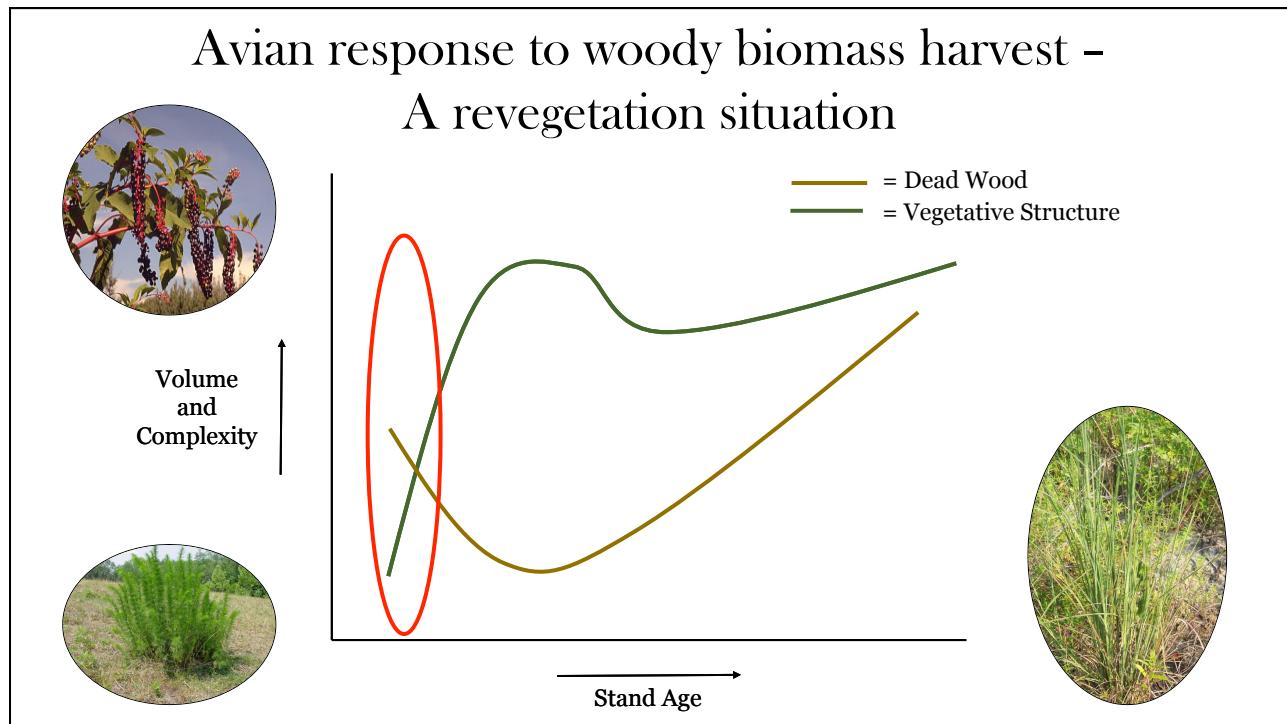


## Mean Shannon-Weaver Index of Diversity for breeding birds/visit in treatments\*



\*Preliminary results; Error bars = SE; Data collected in 3 clearcuts on Plum Creek property (Brunswick) and 1 clearcut on Georgia Pacific property (Savannah), Georgia



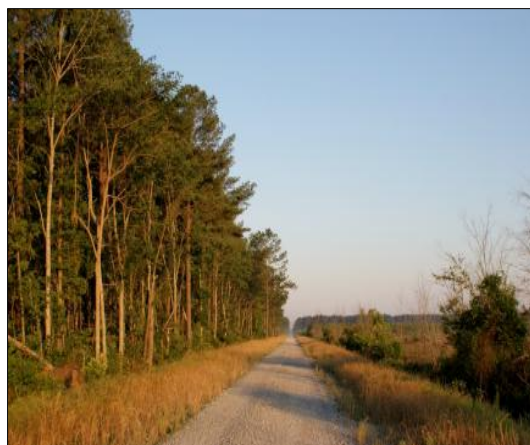


### Site Preparation

- Low concentration versus high concentration
- “Dinner in the stomach” effect

## Breeding Bird Discussion Summary

- Scale of landscape change
- Adjacency issues
- Site prep matters
- **VEGETATION**



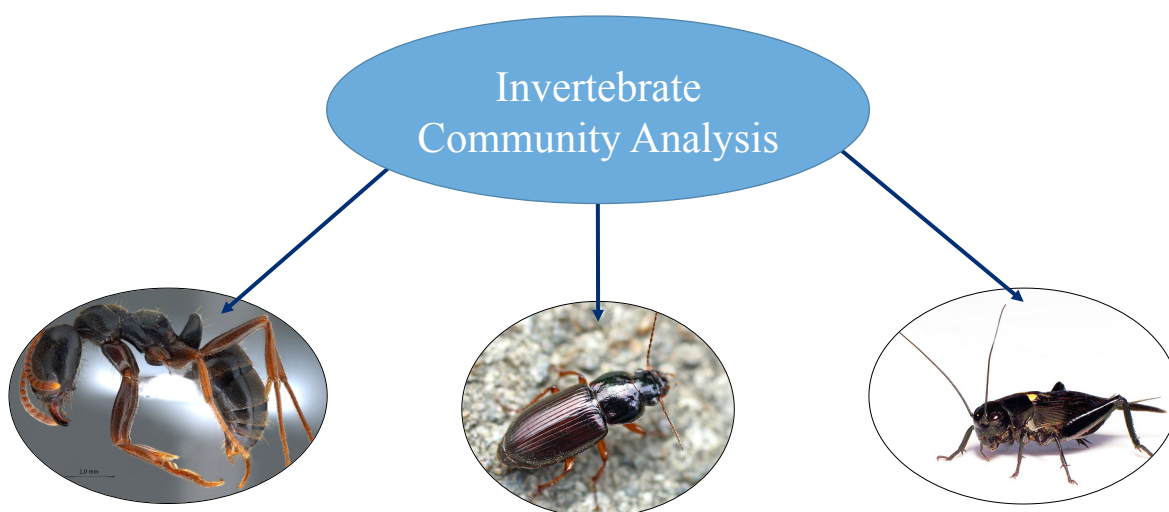
**Q:** What about the invertebrates??

**A:** Ask me in 10 years when I am done identifying them!!

## Invertebrates as bioindicators...

- Effective indicators (**THINK BOTTOM UP!!!**)
- Appropriate study organisms for small scale treatment effects
  - Are important food sources for vertebrates
- Tend to stay put (unlike some other animals I know)
- **Many groups closely linked to down wood**

## A multi-pronged approach to testing invertebrate response to woody biomass harvest...



The results presented in this webinar are preliminary.

