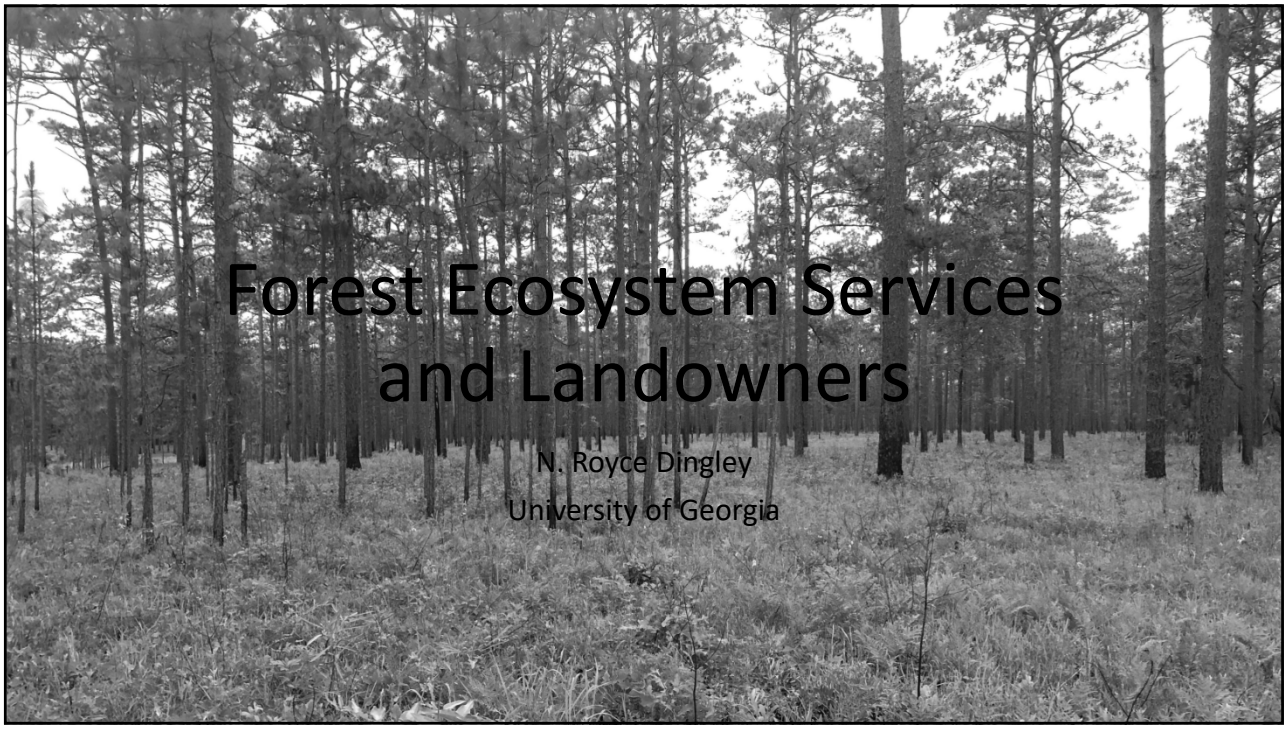
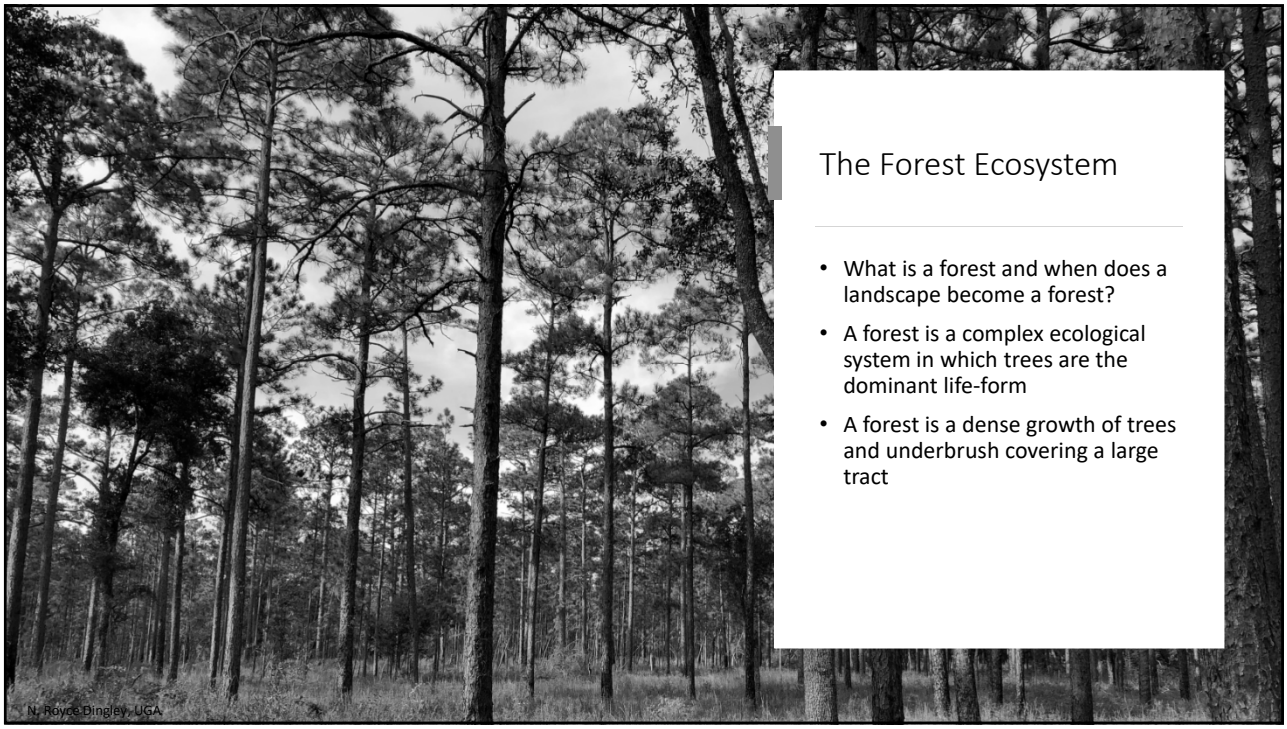


Forest Ecosystem Services and Landowners

N. Royce Dingley
University of Georgia

Outline

- The forest ecosystem
- Activity
- Types of ecosystem services
- Benefits of learning about ecosystem services
- Humans, landowners, and ecosystem services
- Case study

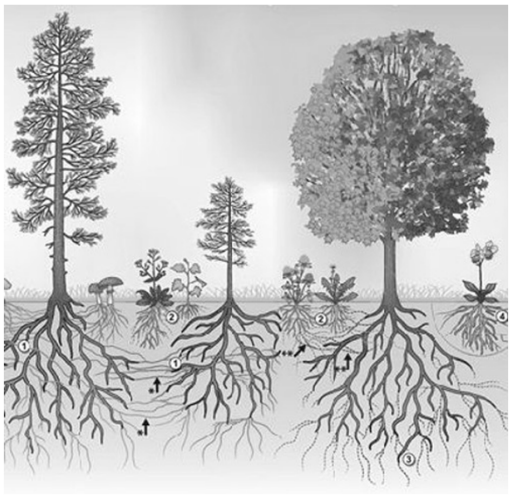


The Forest Ecosystem

- What is a forest and when does a landscape become a forest?
- A forest is a complex ecological system in which trees are the dominant life-form
- A forest is a dense growth of trees and underbrush covering a large tract

The Forest Ecosystem

- What is a forest ecosystem?
- The complex of living organisms, their physical environment, and all their interrelationships in a particular unit of space.



van der Heijden, M.G.A. et al. (2015), New Phytologist

How does this benefit you?

- In landowners' best interests to support ESS where they can
- The benefits of the language of ESS.
- Advocate for yourself using the language of ESS!
- Dollar value can be assigned to some ESS.

Provisioning Services

- The material or energy outputs from an ecosystem
- Food, forage, fiber, fresh water, and other resources

Regulating Services

- Benefits obtained through moderation or control of ecosystem processes
  - Local climate, air, or soil quality regulation
  - Carbon sequestration
  - Flood, erosion, or disease control
  - Pollination

Wikimedia Commons

Daniel X. O'Neil, Flickr

Supporting Services

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- Services that maintain fundamental ecosystem processes
  - Habitat for plants and wildlife
  - Maintaining genetic and biological diversity

Cultural Services

- The non-material benefits for human societies and culture
  - Opportunities for recreation and tourism
  - Aesthetic or artistic appreciation
  - Spirituality

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Humans, Landowners, and Ecosystem Services

- When we change the ecosystem, we can change the services.
  - Example: Converting a one-acre wooded plot to a one-acre flower garden
    - Provisioning services
    - Regulating services
    - Supporting services
    - Cultural services
- Different changes in ESS are not necessarily better or worse.

Photo Credit: David Stephens, Bugwood.org

M. Royce Dingley, LIGA

- Provisioning Services
  - Flowers
  - Fresh water
- Regulating Services
  - Climate regulation
  - Air quality
  - Soil quality
- Supporting Services
  - Higher diversity of field/meadow species (grasshoppers, field mice, etc.)
- Cultural Services
  - Ambiguous
  - Sunshine
  - Beauty of the flowers

- Provisioning Services
  - Timber
  - Fresh water
- Regulating Services
  - Carbon sequestration
  - Air quality
  - Soil quality
- Supporting Services
  - Higher diversity of tree insects
- Cultural Services
  - Ambiguous
  - Shade
  - Privacy


Photo Credit: David Stephens, Bugwood.org


Photo Credit: David Stephens, Bugwood.org

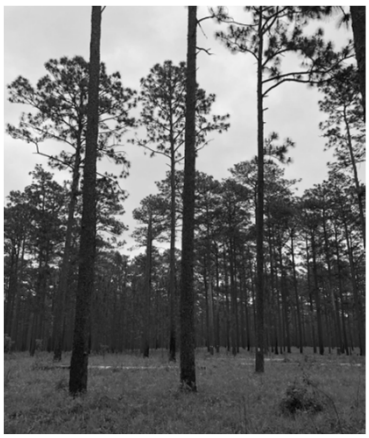
Case Study

- Many ESS are invisible to the human eyes.
- Insects are often overlooked unless they prove to be a pest.
- When observing our surroundings, we often look at eye level and ground level as we walk.
- Canopy Arthropods are a part of the food web.

The Goals

- **Expand current longleaf pine ecosystem knowledge**
- Document arthropods in longleaf canopy habitat
- Does the amount of insects change among longleaf pine ecological communities?
- Do specific insect groups change among longleaf pine ecological communities?

Longleaf Pine Ecosystems



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- The longleaf pine ecosystem is an incredibly diverse ecosystem.
- Longleaf ecosystems are burned every 1-5 years, creating an open canopy system.
- Trees can reach 100 feet tall making the canopy distinct from ground vegetation.
- Many ESS occurring here!

The Jones Center

- The Jones Center encompasses roughly 30,000 acres in SW Georgia.
- Three main ecological communities where longleaf pine are present
  - Flatwoods
  - Upland
  - Fluvial terrace

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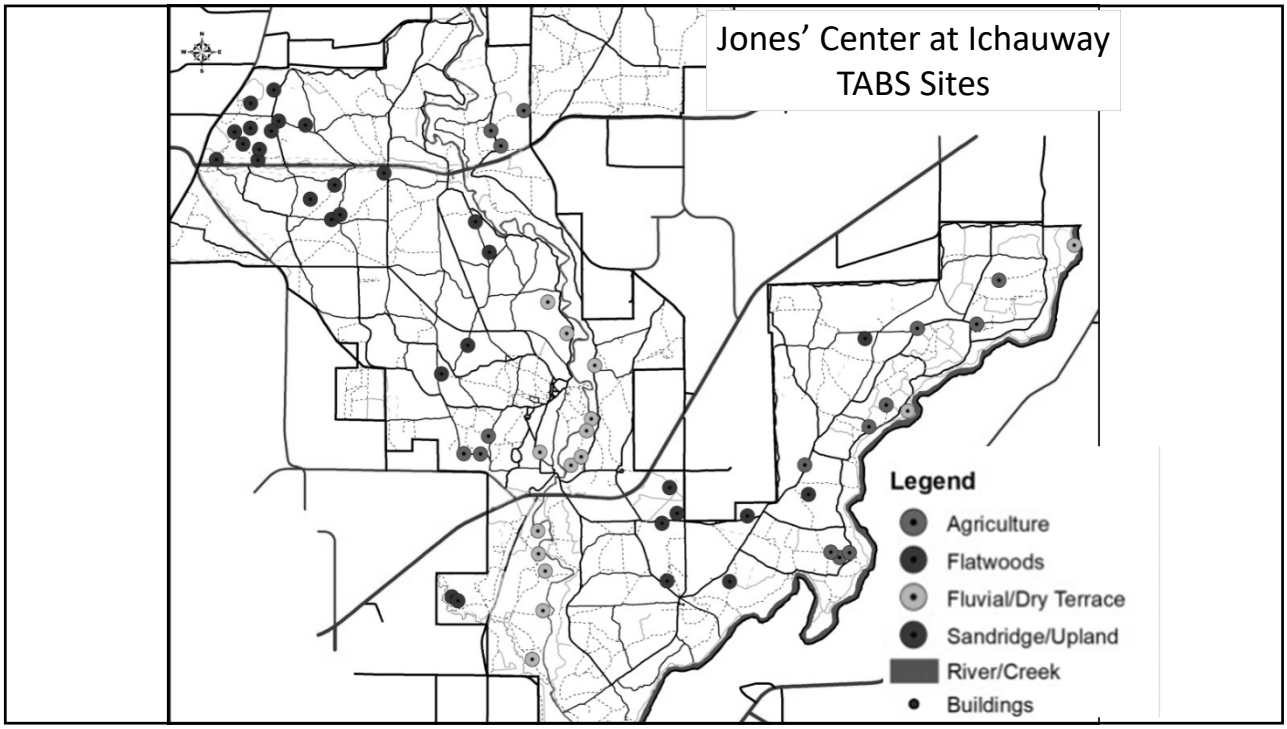
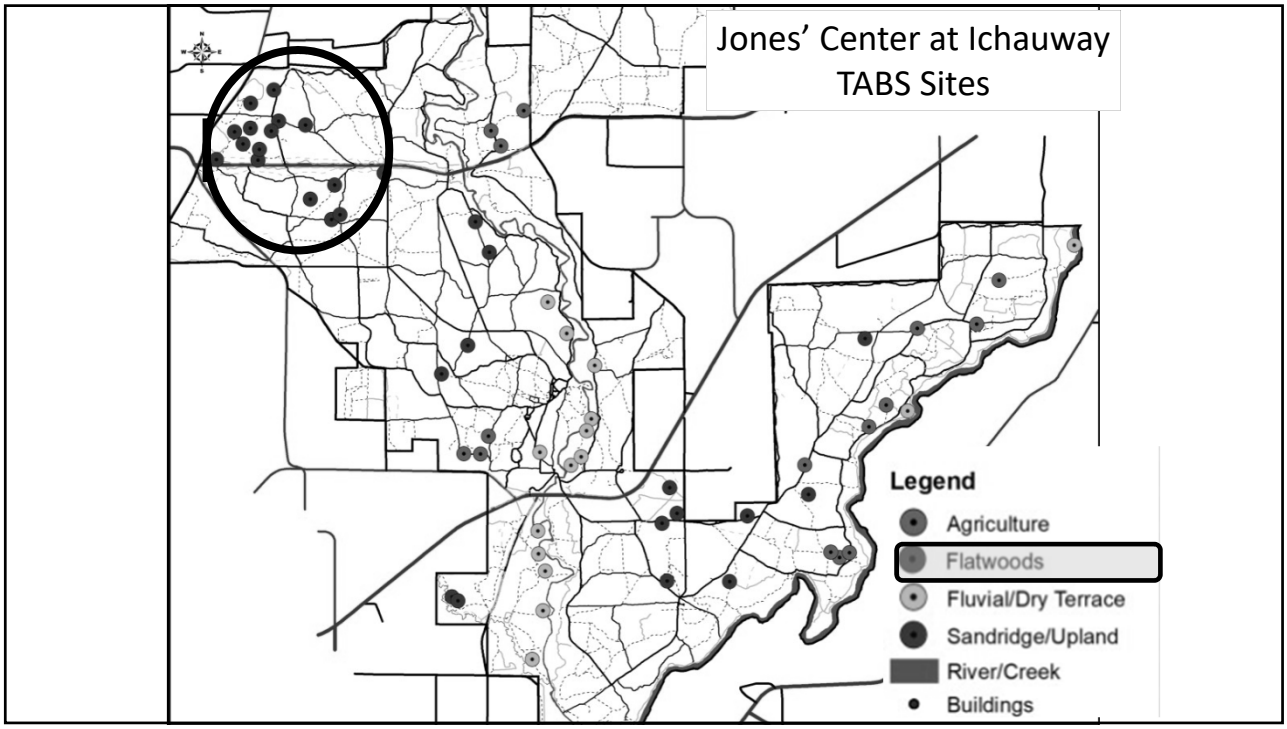

Jones' Center at Ichauway
TABS Sites
Legend
Agriculture
Flatwoods
Fluvial/Dry Terrace
Sandridge/Upland
River/Creek
Buildings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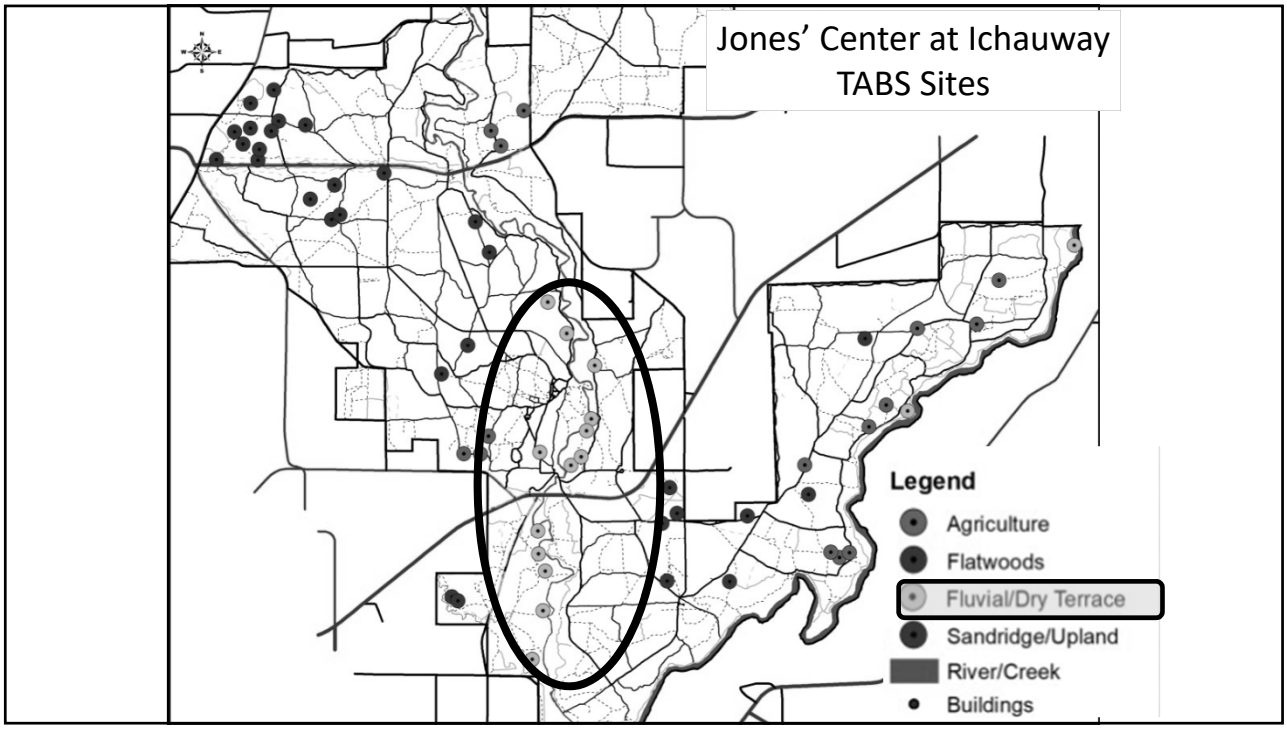
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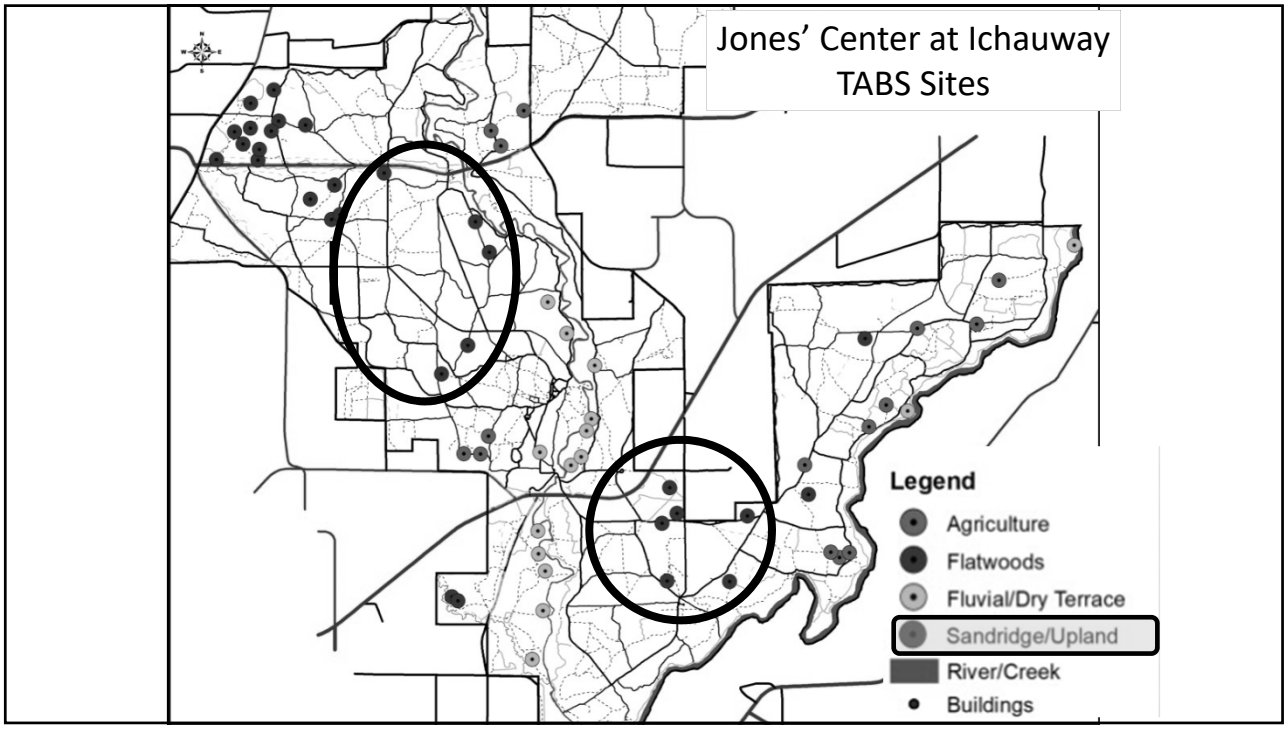
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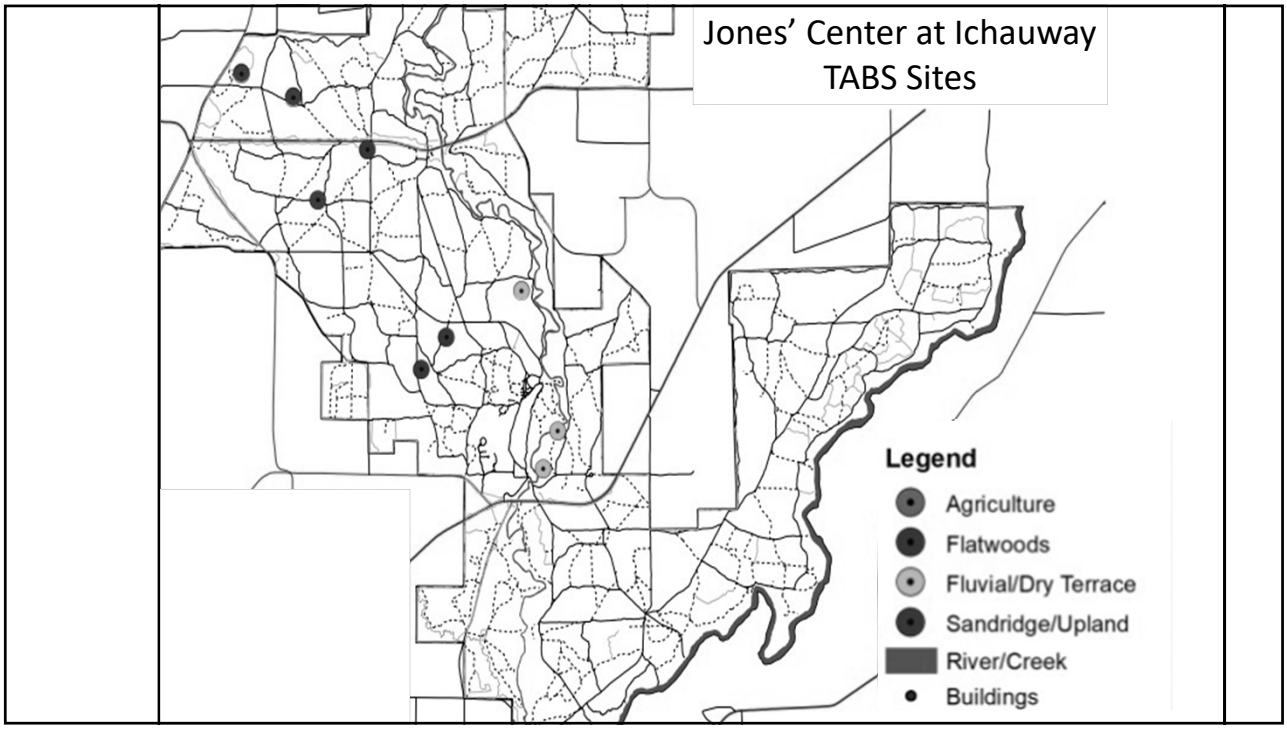

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Study Design

- Nine flight intercept traps in longleaf pine mid-canopies
- Three traps for each ecological community

Experimental Design

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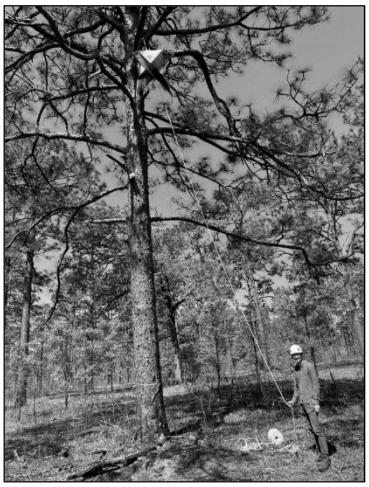
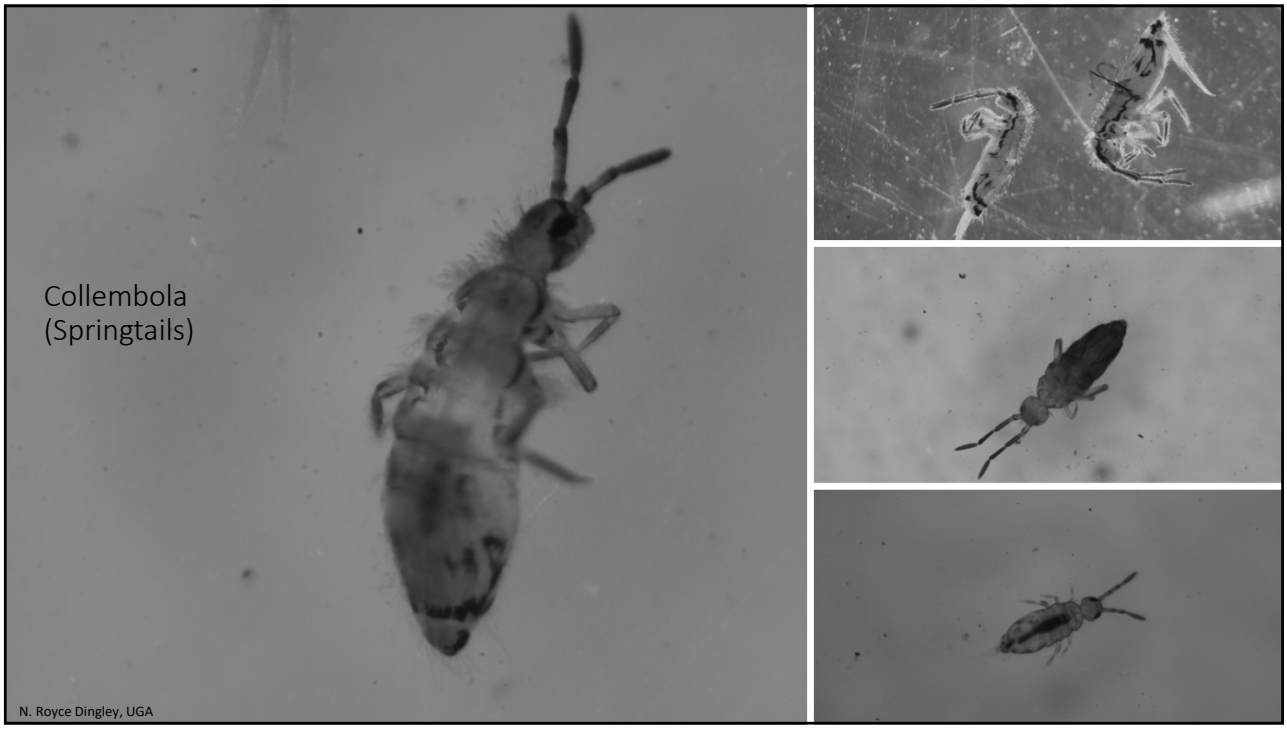


- Tree selection required big enough branches to climb the tree if needed
- Traps set for one week each month, from May – August
- Insects from traps were sorted into different groups

Results

- 4004 arthropods collected
- 34.3% - Flies (Diptera)
- 21.8% - Springtails (Collembola)

Order	Percent of Total
Flies	34.3
Springtails	21.8
Moths	17.4
True Bugs	6.2
Bees/Wasps	5.5
Beetles	5.2
Spiders/Others	4.4
Booklice	1.8
Caddisflies	1.6
Thrips	1.1
Lacewings	0.2
Grasshoppers	0.1
Roaches	0.1



Results

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- 34.3% - Flies (Diptera)
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	Order	Percent of Total
Multiple	Flies	34.3
Multiple	Springtails	21.8
Pollinators	Moths	17.4
Predators/Herbivores	True Bugs	6.2
Pollinators	Bees/Wasps	5.5
Multiple	Beetles	5.2
	Spiders/Others	4.4
	Booklice	1.8
	Caddisflies	1.6
	Thrips	1.1
	Lacewings	0.2
	Grasshoppers	0.1
	Roaches	0.1

Multiple = Decomposer, pollinator, food, herbivore, etc.

Results

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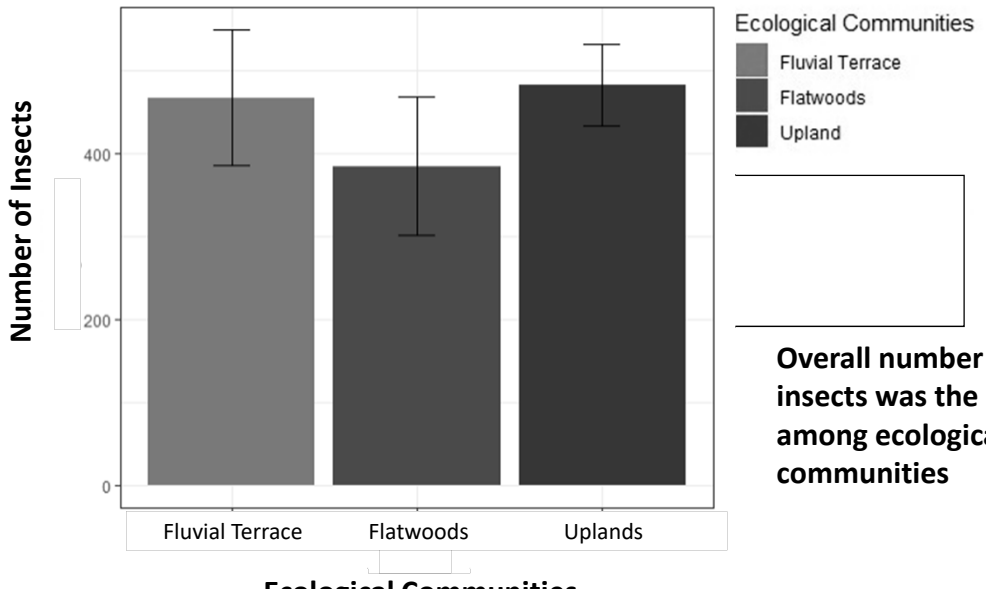
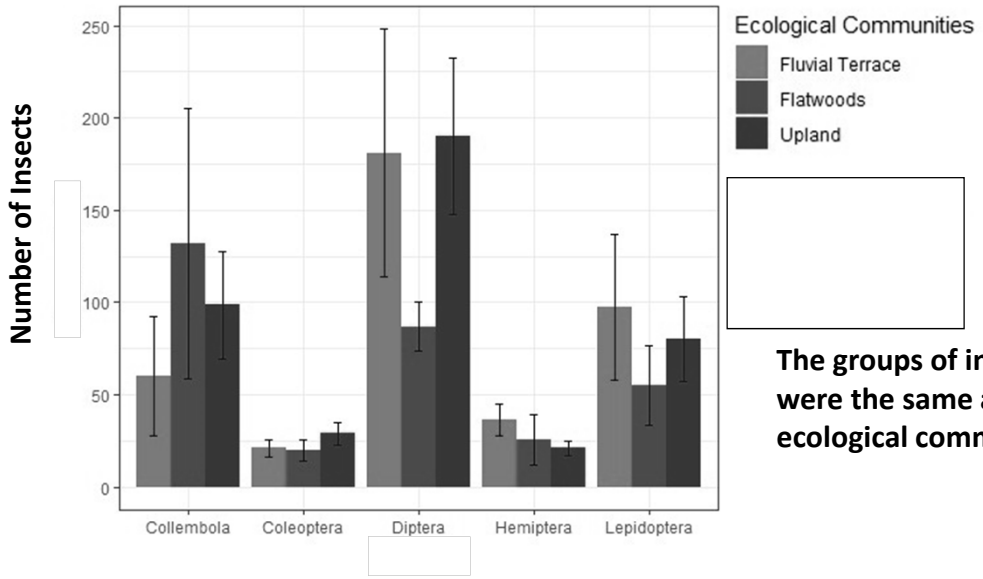
Overall Number of Insects in Longleaf Ecological Communities



Overall number of insects was the same among ecological communities

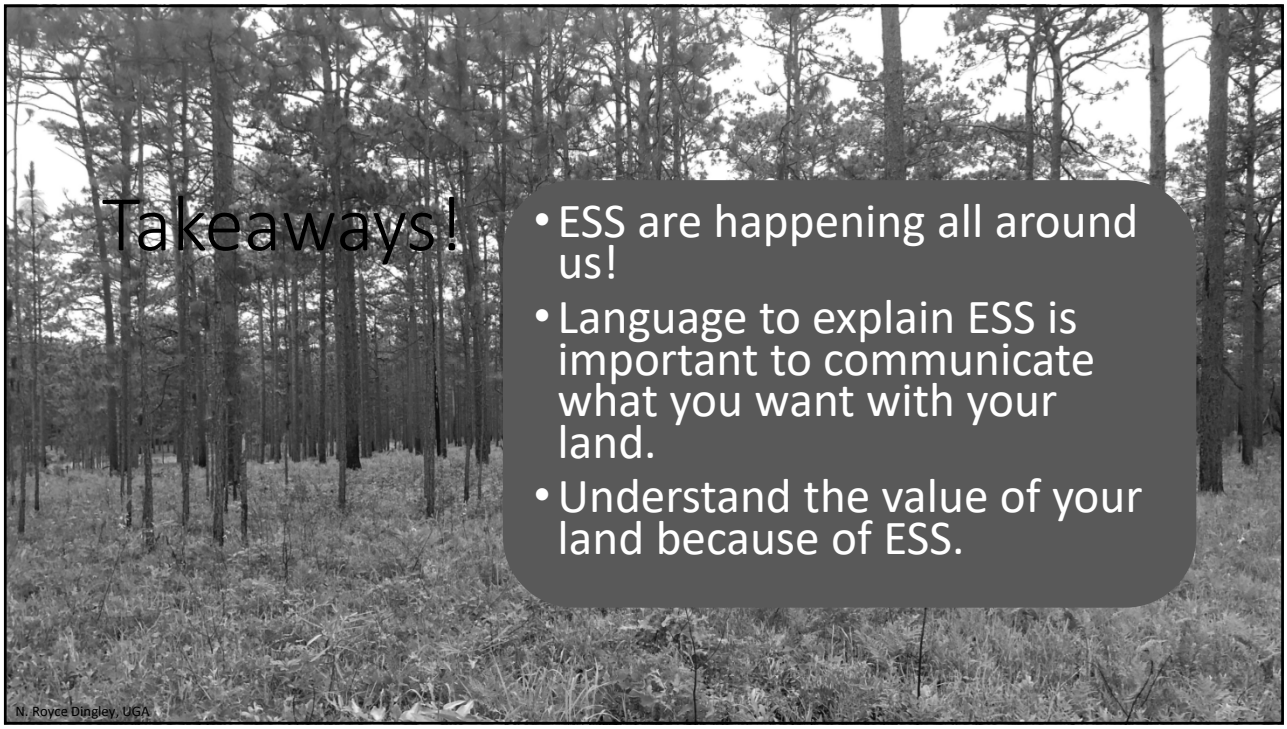
Insect Groups in Longleaf Ecological Communities



The groups of insects were the same among ecological communities

Conclusion & Next Steps

- No difference among ecological communities
- Identify specimens to family-level
- Springtails in the canopy … an interesting finding?
- Sets the stage for further studies


Takeaways!
• ESS are happening all around us!
• Language to explain ESS is important to communicate what you want with your land.
• Understand the value of your land because of ESS.
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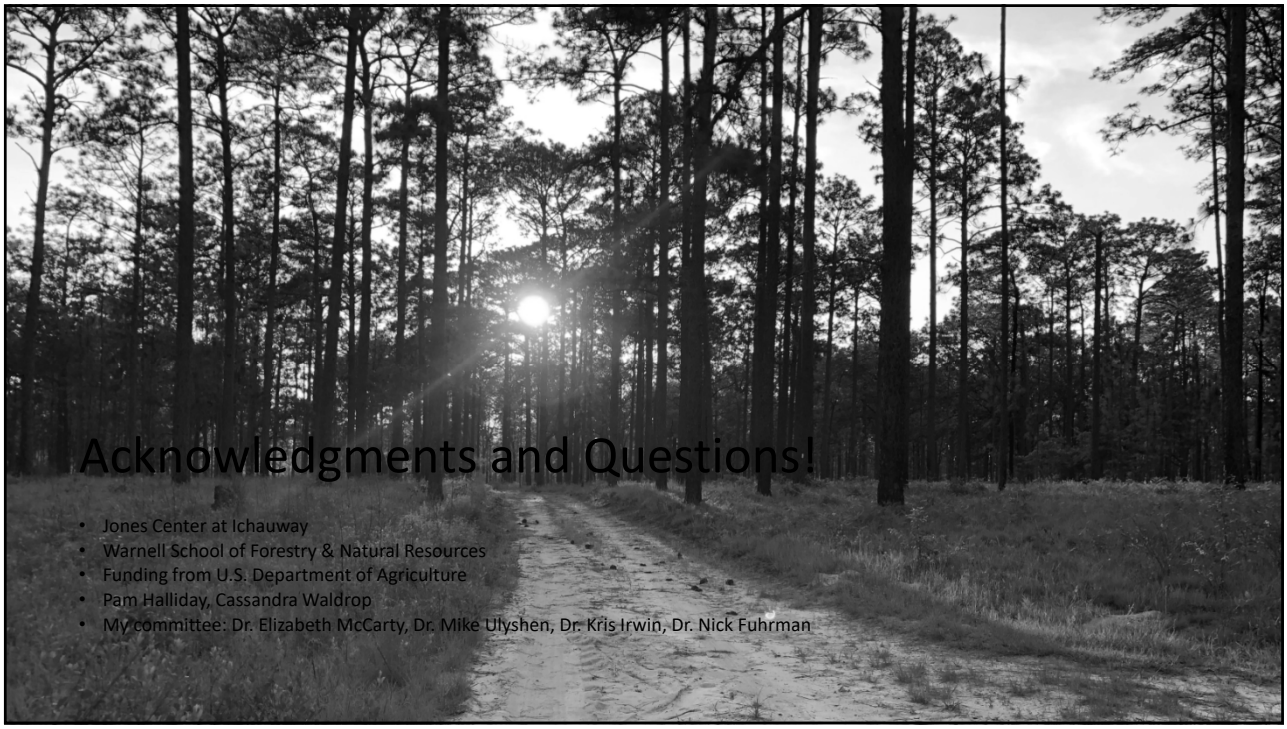
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