

Pinemap Outcome Themes





Increased carbon sequestration from silvicultural and genetic enhancement of productivity and efficiency of fertilizer use, and resilience to climate variability and disturbance.

A more robust and resilient forest-based economy in the Southeast U.S.



Public policy that supports sustainable management of planted pine under future climate scenarios.



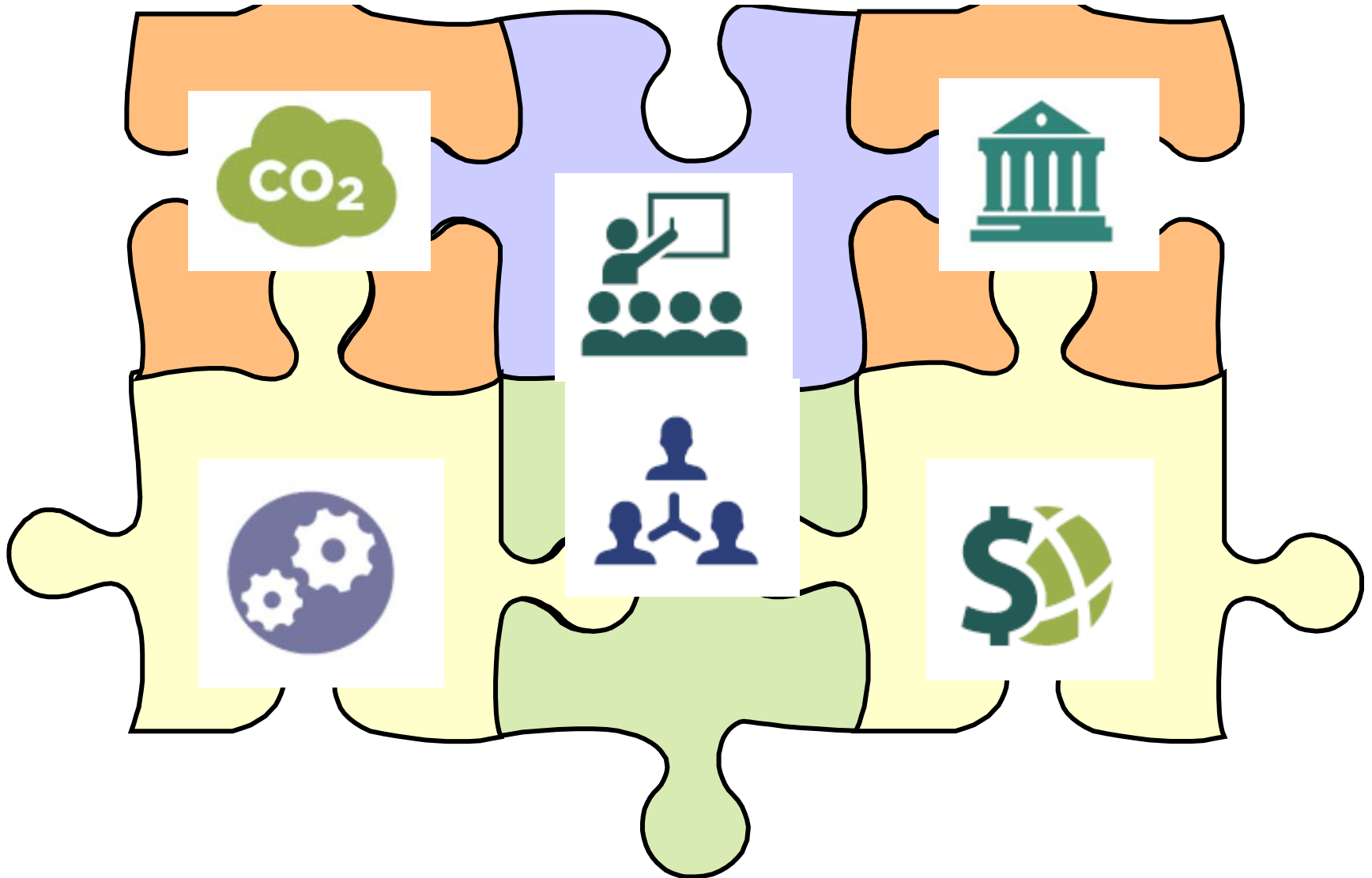
Engaged and literate public with the capacity to make informed, practical decisions related to climate, forest ecosystems, and forest management.

Enhanced capacity for regional, interdisciplinary collaboration among climate and forest scientists and Extension and education professionals.



Enhanced connections between corporate and noncorporate forest landowners and forestry and climate researchers and education and outreach professionals.

Pinemap Outcomes



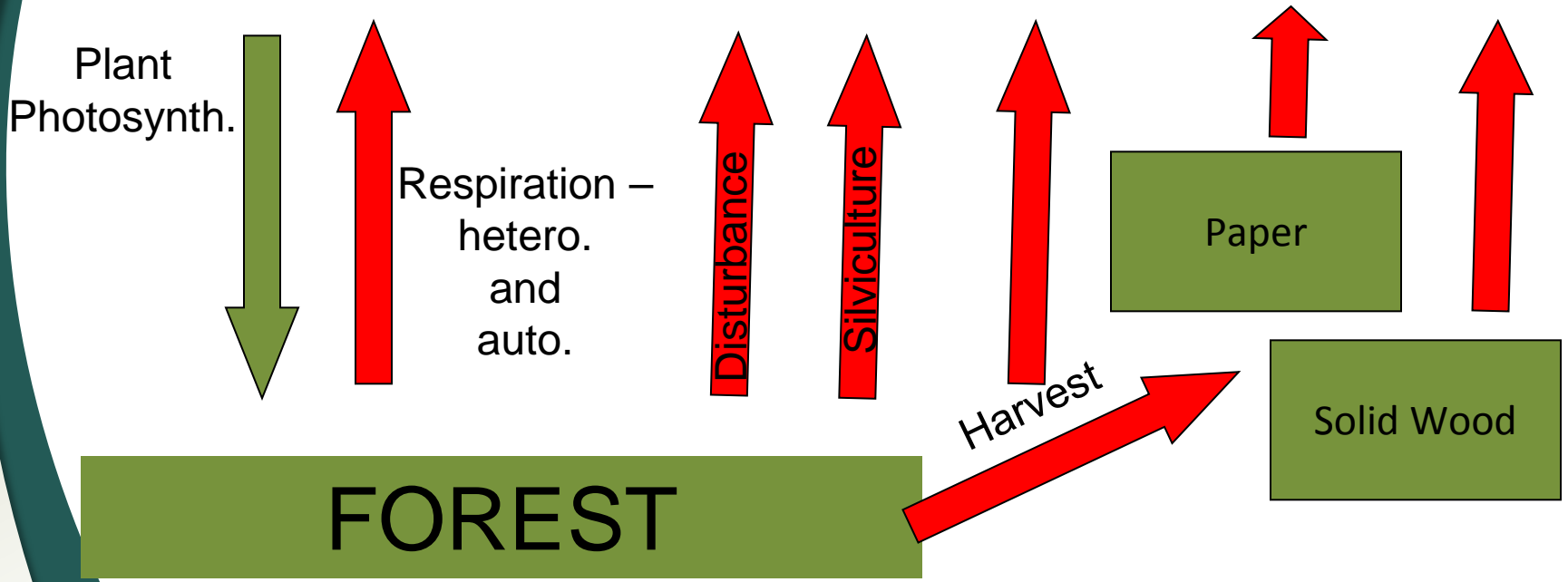


Increased carbon sequestration from silvicultural and genetic enhancement of productivity and efficiency of fertilizer use, and resilience to climate variability and disturbance.



Forest Management C Balance

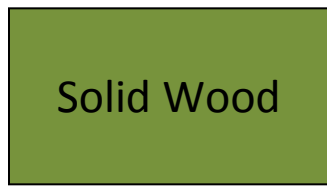
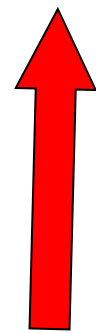
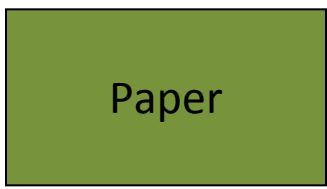
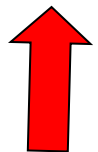
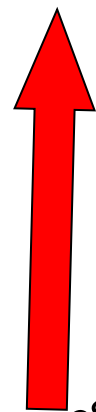
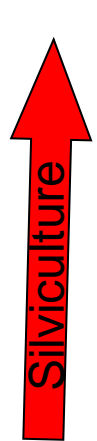
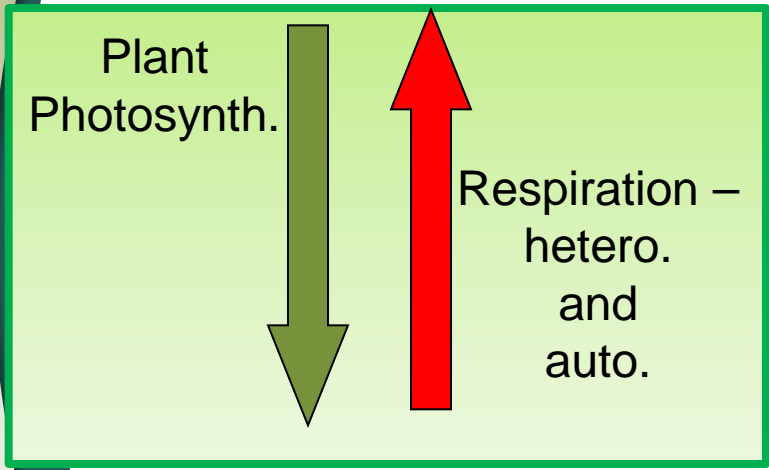
Atmosphere





Forest Management C Balance

Atmosphere



FOREST



CO₂ mitigation sub-themes

- Physiological and productivity responses to management and climate
- Responses of soil processes to management and climate
- Genetics of responses to management and climate
- Developing and enhancing models to simulate responses to management and climate



Physiology and productivity

- Growth and carbon relations responses to stress
 - Maggard et al. (OSU)
 - Pell and Samuelson (Auburn)
 - Wilson et al. (TAMU)





Physiology and productivity

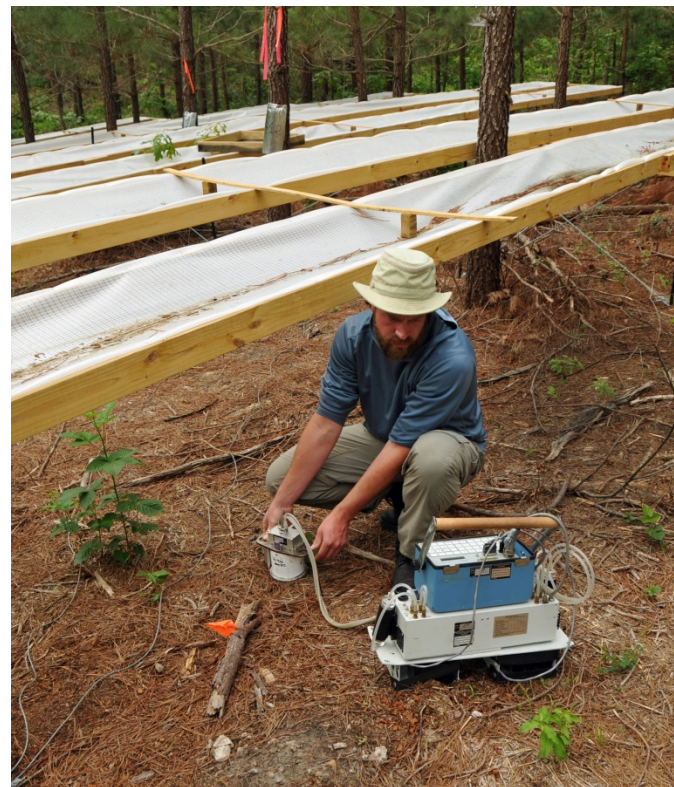
- Water relations responses
 - Wightman et al. (UF) – sap flow
 - Bartkowiak and Samuelson (Auburn) – sap flow
 - Lin et al. (NCSU) – stable isotopes
- Competing vegetation dynamics
 - Meeks et al. (NCSU)
 - Clark et al. (UGA)





Soil processes

- Soil respiration responses to soil moisture and fertility
 - Qi and Markewitz (UGA)
 - Ausmus et al. (OSU)
 - Meek et al. (OSU and TAMU)
 - Yang et al. (UGA)
 - McElligott et al. (VT)



Soil processes

- Partitioning heterotrophic and autotrophic respiration
 - Maier et al. (USFS)
 - Lin et al. (NCSU)
- Detritus decomposition and mineralization
 - Laviner and Fox (VT)





Genetics

- Seed deployment relationships
 - Zhang et al. (UF)
 - Koralewski et al. (TAMU)
 - Farjat et al. (NCSU)

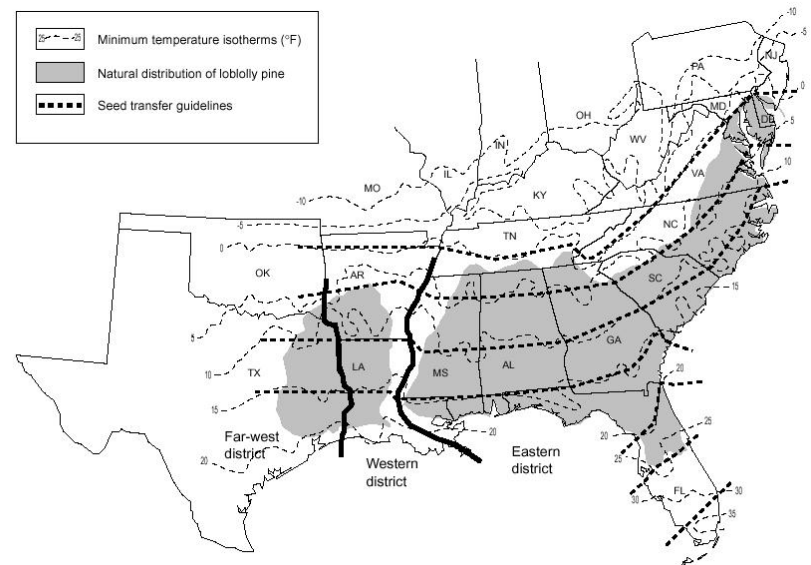


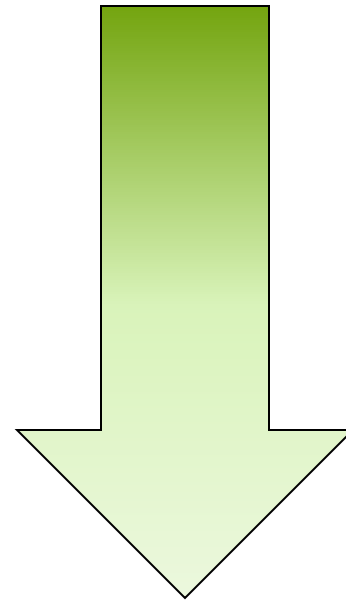
Figure 2—Loblolly pine distribution with seed transfer guidelines. Natural distributions of species adapted from Critchfield and Little (1966); minimum temperature isotherms from USDA (1990).



Genetics

- Genotyping and gene discovery
 - Townsend and Whetten (NCSU)
 - Whetten (NCSU)
 - Lu et al. (TAMU)

Genotype

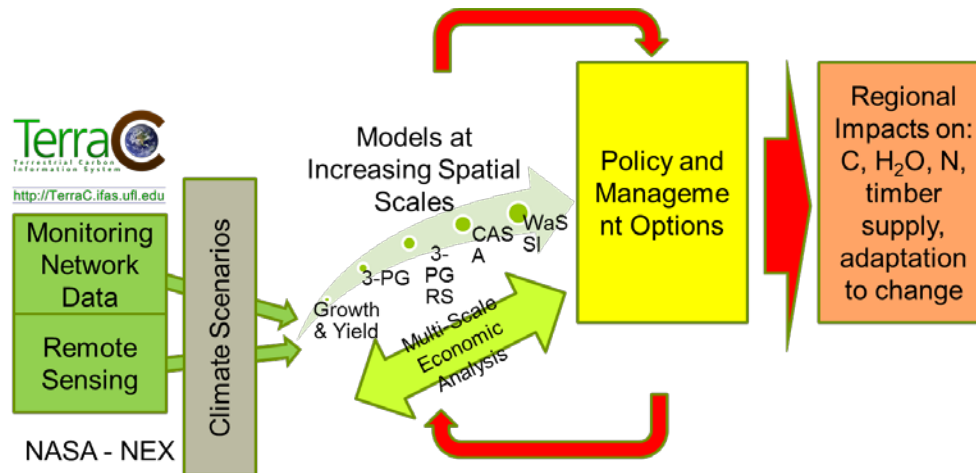


Phenotype



Modeling

- Subedi and Fox (VT) – 3-PG_{lob} fertility rating
- Gopalakrishnan et al. (VT) – extracting height from Lidar
- Ahlswede and Thomas (VT) – biophysical effects of forests
- Ross et al. (UF) – DayCent model
- Fang (NCSU) – CENTURY model





Engaged and literate public

Martha Monroe

Outcome Theme Session

PINEMAP 2014 Annual Meeting | May 14—16, 2014



Reaching the public



- PINEMAP helps to create an engaged and literate public with the capacity to make informed, practical decisions related to climate, forest ecosystems, and forest management.



Education audiences & activities

Forest landowners
Forest managers
Forest agencies

Cooperative Research Programs

State Extension Programs

Decision Support System

Undergraduate
students
Graduate students

UG Fellowship Program

Graduate Course & Activities

High school science
teachers
Secondary students

Southeastern Forests and Climate
Change – Project Learning Tree Module

Teacher Workshops & Website





Research underpins programs

- Are we achieving our objectives?
 - How do undergraduate students' attitudes about research change over their fellowship experience?*
 - Virginia Tech
- What is our baseline?
 - How do educators perceive climate change and are they willing to teach others about it?*
 - Extension faculty
 - Science teachers



*But no posters this year!



6 posters explore effectiveness

- **How well do our materials work?**
 - 28: Evaluating PLT secondary module
 - 29: Evaluating web tools
- **How should we communicate with audiences who might not want to listen?**
 - 31: Message framing with video for landowners
 - 30: Addressing cultural cognition
- **Can we enhance learners' attitudes and skills?**
 - 27: Hope
 - 32: Systems thinking





Enhanced Capacity &



Enhanced Connections

Eric Taylor

Outcome Theme Session

PINEMAP 2014 Annual Meeting | May 14—16, 2014



Outcome Themes



- *Enhanced capacity for regional, interdisciplinary collaboration among climate and forest scientists and Extension and education professionals.*



- *Enhanced connections between corporate and noncorporate forest landowners and forestry and climate researchers and education and outreach professionals.*



Outcome Themes



- Enhanced capacity for collaboration
 - Regional,
 - Interdisciplinary
 - Among climate and forest scientists
 - Among scientists and Extension /education professionals



- Enhanced connections to stakeholders
 - Corporate and noncorporate forest landowners
 - Forestry professional
 - Education and outreach professionals

Poster 34 - Needs Assessment

PINEMAP's Cooperative Extension Forester and State Agency Needs Assessment and Extension Delivery (Boby et. al.)

- Surveyed 138 Extension Specialists
- 70% need more on risk due to stressors
- 85% need more on health, vigor, and resiliency
- Want websites, webinars, workshops



Enhanced Connections
to Stakeholders

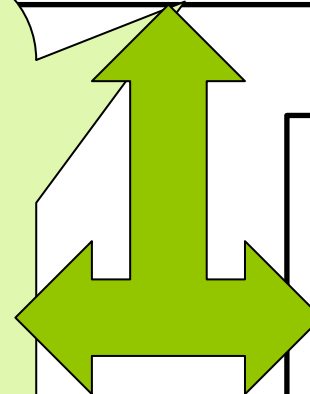
Poster 33 – Train the Trainer

1890 Land Grant Institutions and PINEMAP Climate Change Workshops (Idassi et. al.)

- Two workshops for 1890 agents
- Survey determined workshop agenda
- Tools to train wide-range of practitioners
- Participants satisfied



Enhanced Capacity
for Collaboration





Hide Tools

Text Direction

Getting Started ?

View Map Themes ?

- Boundaries
- Forests
- Forest Ecosystem Values
 - Total (\$/ac/yr)
 - Air Quality (\$/ac/yr)
 - Biodiversity (\$/ac/yr)
 - Carbon (\$/ac/yr)
 - Cultural (\$/ac/yr)
 - Watershed (\$/ac/yr)

Ecosystem Services ?

Step 1: Define Area of Interest

- Select County or Urban Area
 - Select county
 - Select town
- Select county
 -
- Draw polygon on map
 -

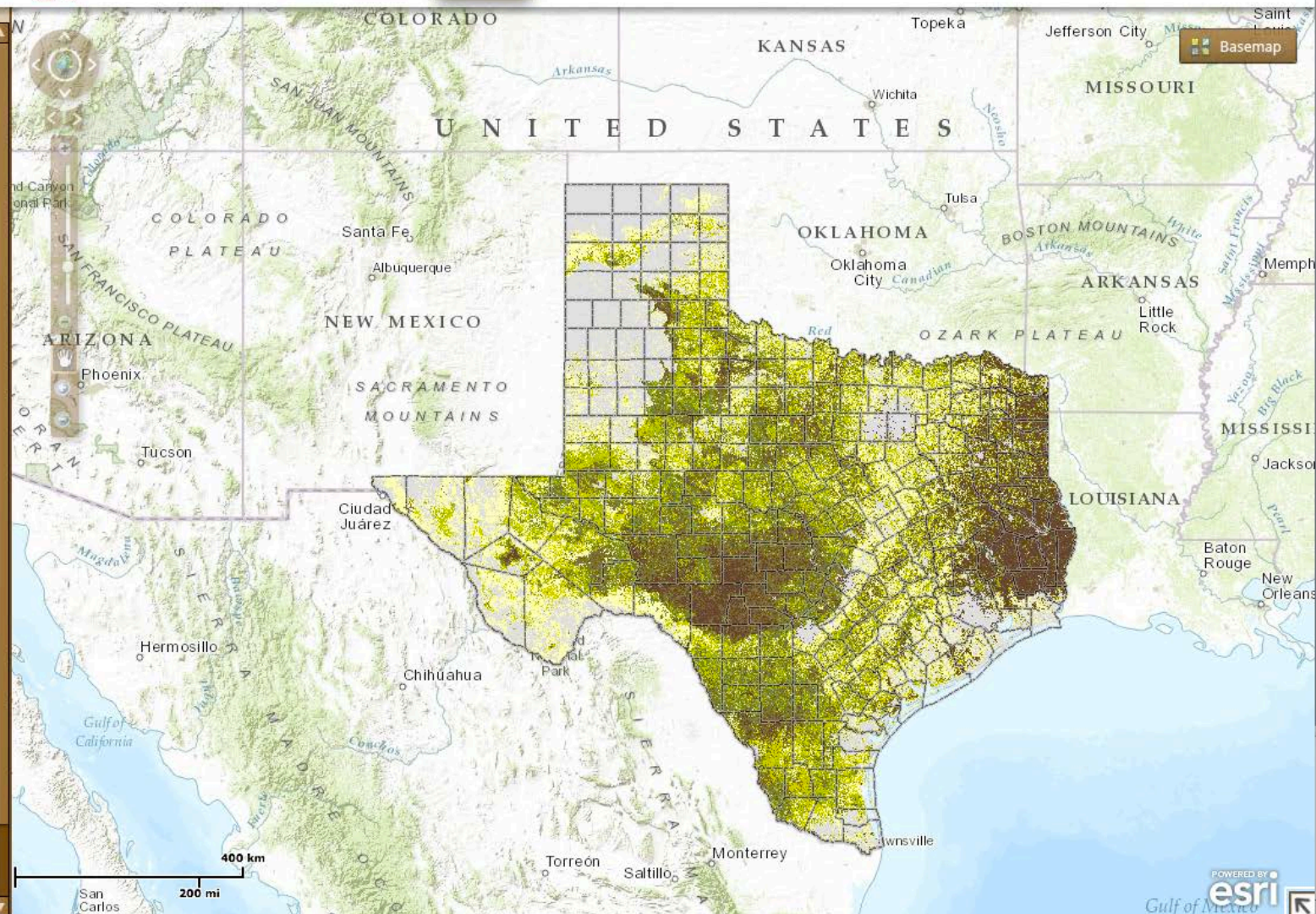
Step 2:

Transparency:

Step 3:

Standard Reports ?

Print Map ?





Hide Tools

Text Direction

Getting Started



View Map Themes



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Ecosystem Services



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Draw polygon on map

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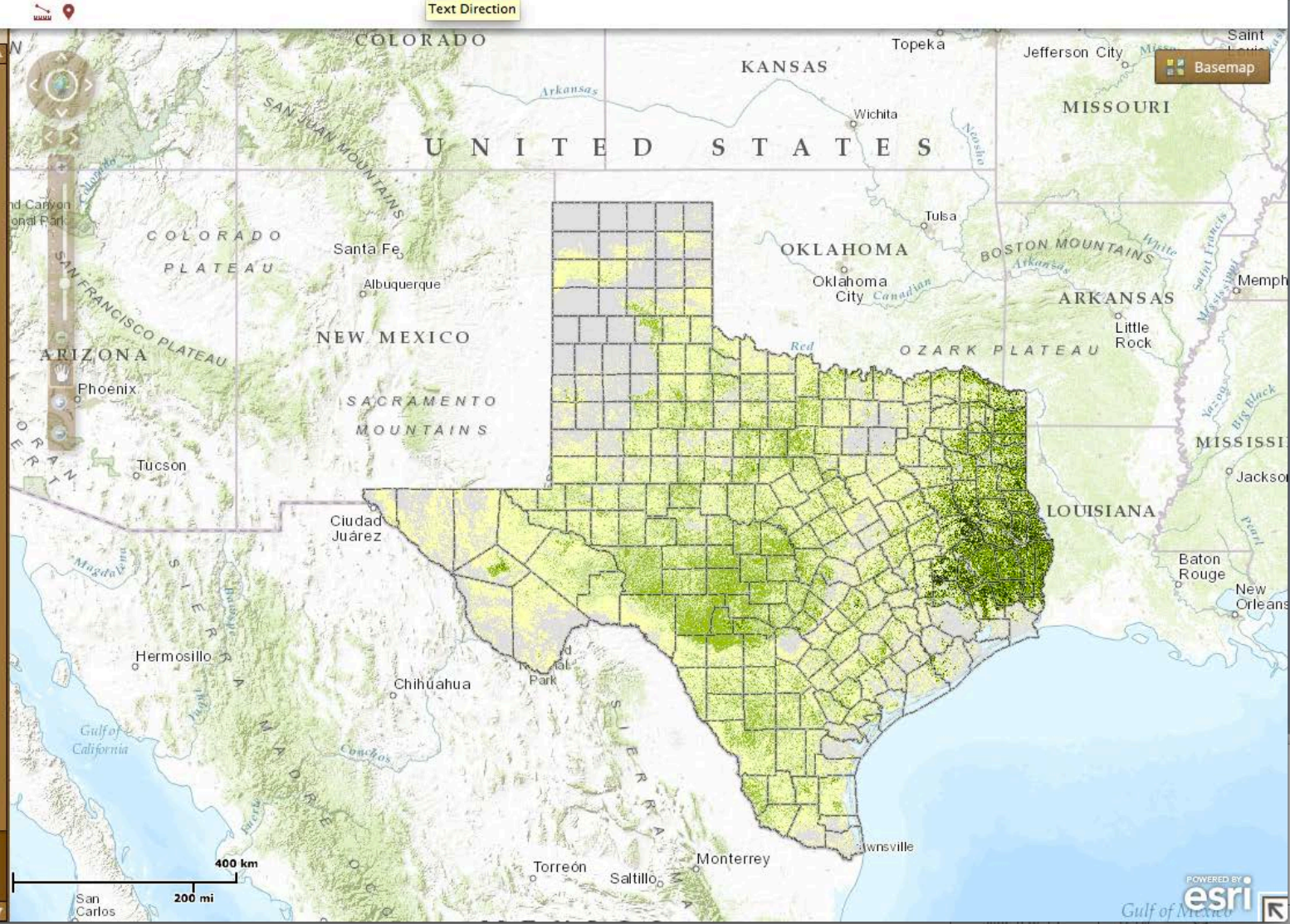
Transparency:

Step 3:

Standard Reports



Print Map





Hide Tools

Text Direction

Getting Started



View Map Themes



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Ecosystem Services



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- Draw polygon on map
 - Draw

Step 2:

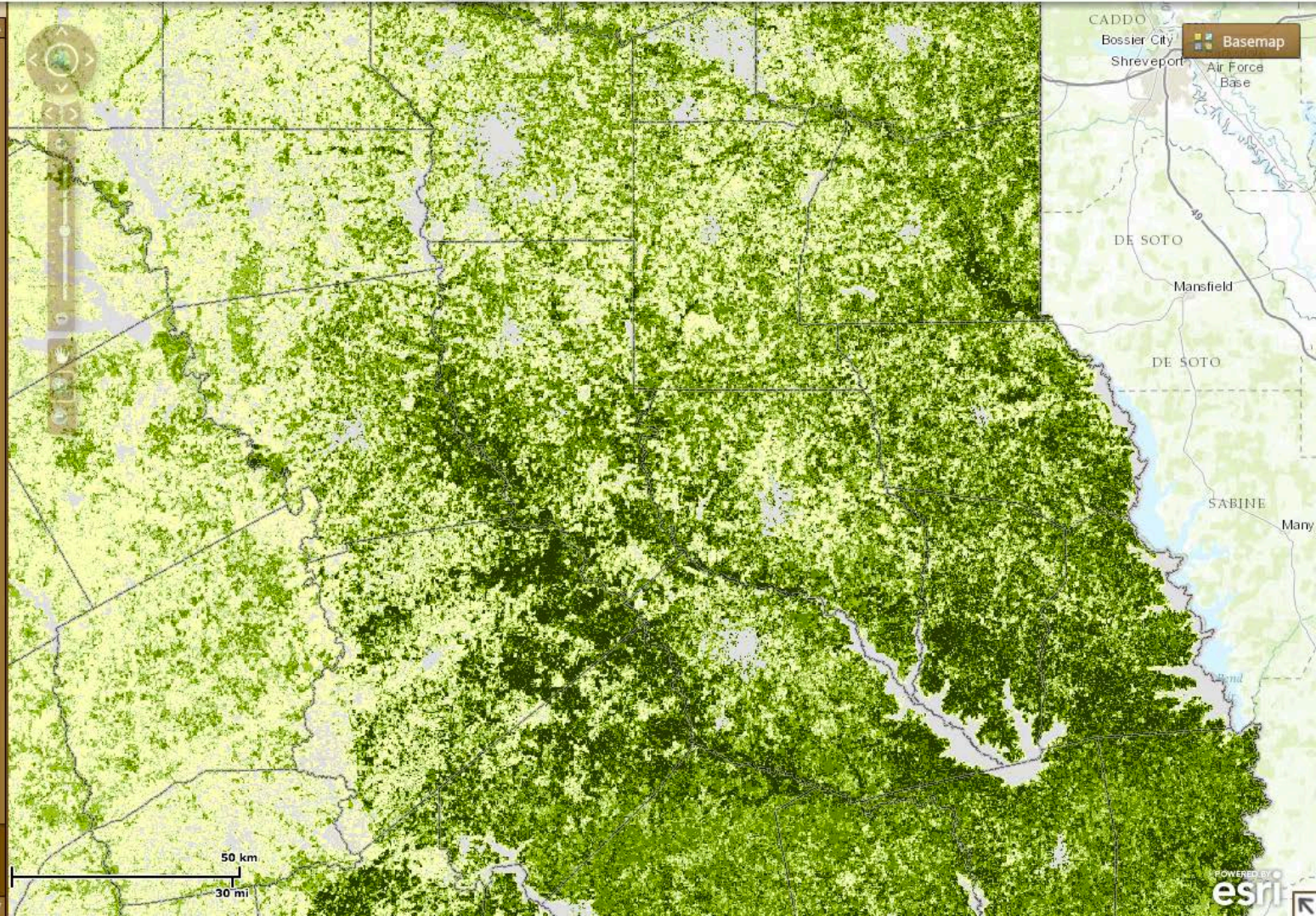
-
- Transparency:

Step 3:

Standard Reports



Print Map



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PINEMAP Professional Development Series: Climate Resources

Hal Needham, Department of Geography and Anthropology at Louisiana State University, discusses various web-based climate tools and resources helpful to natural ...

PINEMAP Professional Development Series: Nutrient Cycling and Nutrient Deficiencies in Production Trees

Are you a professional forester or resource manager interested in learning more about the eco-physiology of woodlands in the southeast and the best ...

PINEMAP Professional Development Series: Managing Fertilization Prescriptions

Are you a professional forester or resource manager interested in learning more about the eco-physiology of woodlands in the southeast and the best ...

PINEMAP Professional Development Series: Nutrient Cycling and Nutrient Deficiencies in Production Forests

Presented by Dr. Jeremy Stovall, Assistant Professor of Silviculture at Stephen F. Austin State University.

PINEMAP Professional Development Series: Tree Physiological Responses to Extreme Stress

Presented by Dr. Michael Tyree, Assistant Professor and Homer T. Rogers professorship of Eco-physiology at Louisiana Tech University.

PINEMAP Professional Development Series: Stand Establishment

Dr. Michael Blazier - Associate Professor and Forestry Research Project Leader at Louisiana State University.

PINEMAP Professional Development Series: Hurricanes in a Changing Climate

Presented by Dr. Barry Keim - Louisiana State Climatologist and LSU Professor of Geography and Anthropology.

PINEMAP Professional Development Series: Biology and Ecology of Temperature - Managing for Temperature and Water

Are you a professional forester or resource manager interested in learning more about the eco-physiology of woodlands in the southeast and the best ...

PINEMAP Professional Development Series: The Connection Between Water Stress and Plant Productivity

Are you a professional forester or resource manager interested in learning more about the eco-physiology of woodlands in the southeast and the best ...



Western Gulf Silvicultural Technology Exchange

[Home](#)[Speakers](#)[Agenda](#)[Venue](#)[Presentations](#)

WGSTE 2013

December 12, 2013

Pine Management: Extreme Stressors - New Strategies

OBJECTIVES

The cycle of extreme weather events currently experienced by the Western Gulf is causing greater stress to forest and impacting health and productivity. This conference will provide a basic understanding of:

- 1) climate variability and its impact on the Western Gulf forest region;
- 2) the physiological responses of those stressors at the tree and stand level;
- 3) silvicultural strategies to adapt to these conditions.

WHO SHOULD ATTEND

The Western Gulf Silvicultural Technology Exchange is geared towards professional foresters working in the Western Gulf region (Texas, Louisiana, Oklahoma, and Arkansas). Forest landowners with an intermediate understanding of silviculture will also benefit from this event.

[Download 2013 WGSTE Brochure](#)





PINEMAP

Decision Support System

Mapping the future of southern pine management in a changing world.

[Environment](#)

[Establishment](#)

[Management](#)

[Production](#)

Thinning

[Pests](#)

[Diseases and Vegetation](#)

[Nutrient Guidance](#)

Select a tool:

Thinning Decision Support Tool

To get started, enter some information about your stand and, if you want, define custom SDI thresholds for thinning.

Stand type:

Species:

Region:

Age: yr.

Density: trees per acre

Site Index: Base age: 25 years 50 years

or

Avg. height of dominant trees: ft.

Stand details based on your inputs:

Initial Tree Height: 2.02 ft.

Initial Basal Area: 0.000003 ft²/acre

Initial QMD: 0.0011 in.

Initial SDI: 0.00

Click the tabs below to view biological optimum thin times based on recommended or user-defined SDI thresholds.

Recommended Thresholds

User-Defined Thresholds



Mapping the future of southern pine management in a changing world.



Virginia Tech M.S. student Brett Heim uses a LI-COR 6200 to measure soil respiration underneath a throughfall exclusion structure at the Virginia Tier III site. Photo courtesy of John Seiler.

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Extension

The goal of the PINEMAP extension team is to disseminate emerging knowledge, practices, and PINEMAP decision support tools to enable corporate and non-corporate landowners to increase forest carbon sequestration, nitrogen fertilizer efficiency, and forest resilience under changing climate. In order to achieve this goal, the PINEMAP extension activities include the following:

- Develop partnerships among Extension foresters and state climatologists to build a regional network of climate Extension/outreach specialists. These teams of Extension foresters and state climatologists will collectively develop and review materials; provide oversight and advice to research and education activities; and develop and implement workshops to teach about climate variability and climate change impacts to local and regional forest industry and non-industrial private forest (NIPF) landowners



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Mapping the future
of southern pine
management in a
changing world

Drought and Southern Forests: The Importance of Forest Health and Resiliency

HEATHER DINON, RACHEL BURNETT, ERIC TAYLOR, RYAN BOYLES, WILLIAM HUBBARD,
MARK MEGALOS, SEAN BURNS, LESLIE BOBY

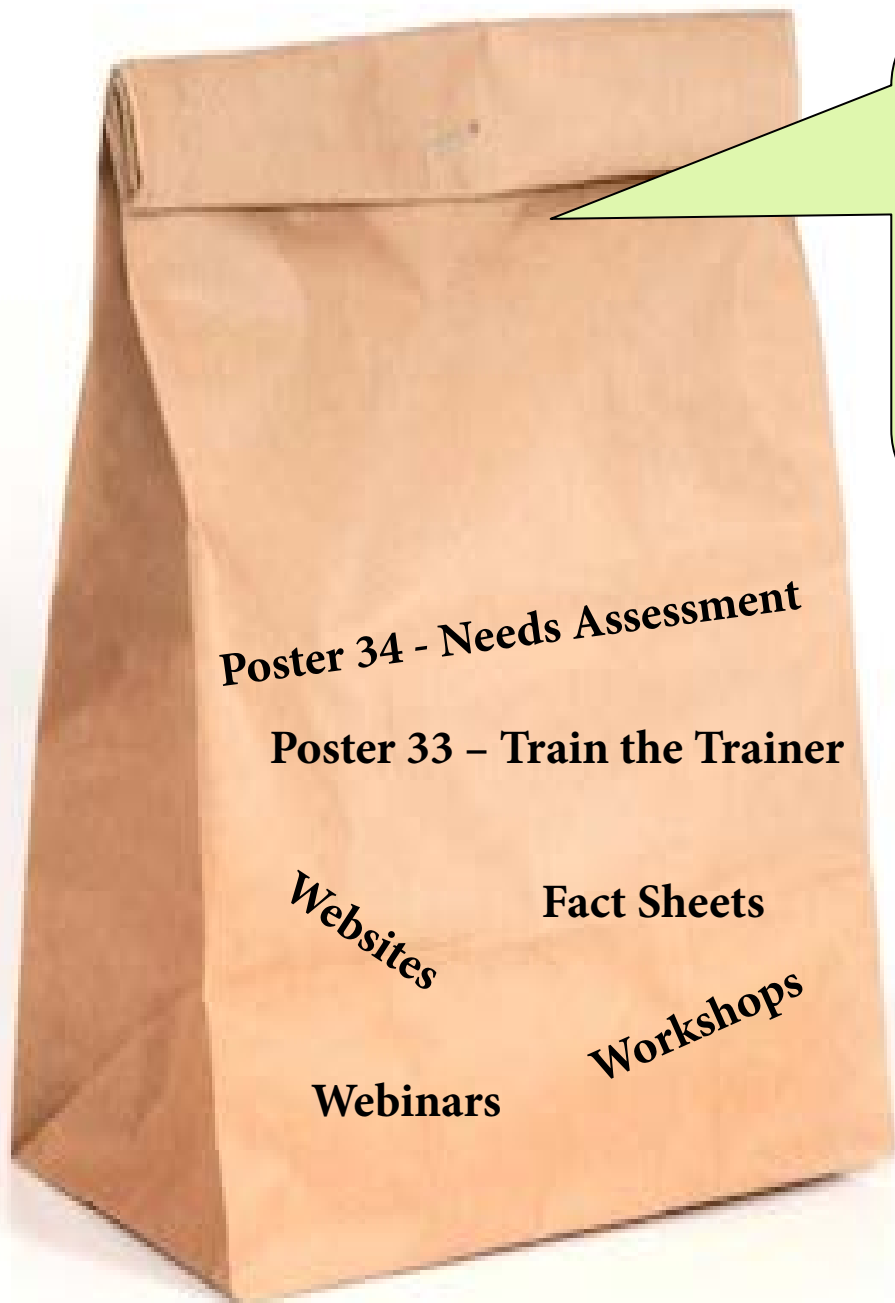
Drought has shaped southern forests in the past and will continue to influence health, productivity, and resiliency of forests in the future. However, drought does not impact all forests equally. Some forests resist drought effects and recover quickly. Other forests seem to suffer severely. What causes this phenomenon? This factsheet will define drought and its impacts to individual trees and forests as we explore the reason behind this question.

WHAT IS DROUGHT?

Drought is characterized by a shortage of precipitation over some time period to the extent that it causes impacts to a group, activity, or sector (NDMC, 2013). Drought is actually defined by impacts -- without them, it is just dry weather. Droughts are typically distinguished as having either short-term or long-term impacts, and these have different implications for forests.

Short-term drought occurs for periods of weeks to months in length and mostly affects vegetation. Short-term droughts are common during the growing season and can have a noticeable influence on understory forest vegetation, such as wildflowers, shrubs, and important wildlife browse plants.

Long-term drought occurs for periods of seasons to years in length and directly affects the hydrological cycle. Long-term drought can lag behind short-term drought, and can



Poster 35 – Team Science

*Exploring Team Science in PINEMAP
(Bartels et. al.)*

- Social network analysis
- Describe interactions among members
- Show cohesiveness and connection
- Enhanced capacity for collaboration



Posters

- Poster 33
1890 Land Grant Institutions and PINEMAP Climate Change Workshops
Joshua Idassi, Gwendolyn Boyd, Leslie Boby, Mark Megalos, Heather Dinon Aldridge, Martha Monroe, and William Hubbard
- Poster 34
PINEMAP's Cooperative Extension Forester and State Agency Needs Assessment and Extension Delivery
Leslie Boby, Jessica Ireland, Martha Monroe, William Hubbard, and Eric Taylor
- Poster 35
Exploring Team Science in PINEMAP
Wendy-Lin Bartels, Ricardo Mello, and Jessica Ireland



Public policy and Economy

Dr. Damian C. Adams
University of Florida

Outcome Theme Session
PINEMAP 2014 Annual Meeting | May 14—16, 2014



Public policy and Economy



Public policy that supports sustainable management of planted pine under future climate scenarios.



A more robust and resilient forest-based economy in the Southeast U.S.



Representative posters

★ Hyunjin An, Jianbang Gan, and Kathryn Clifton
Impact of Climate Conditions and Adaptation on Southern Pine Beetle Infestations

★ Puskar Khanal and Donald L. Grebner
Non-Industrial Private Forest Landowner obstacles to Forest Carbon Sequestration in the Southern United States





Impact of Climate Conditions and Adaptation on Southern Pine Beetle Infestations

- Southern pine beetle (SPB) a major concern for working forests
- SPB life history/population largely climate-driven
- Study investigates the relationship between climate factors and southern pines beetle risk using econometric model
 - Climate change → SPB range, population growth, survival → additional economic damages
- Expected SPB infestations 2020-2099 in 11 Southern states using Generalized Linear Model
 - AL, AR, FL, GA, LA, MI, NC, SC, TN, TX, VA
 - GLM improves on traditional linear model





Impact of Climate Conditions and Adaptation on Southern Pine Beetle Infestations, cont'd

- Simulation results:
 - ↑ SPB risk: Warm spring and min. winter temp.
 - ↓ SPB risk: Humid spring/winter and warm fall; Removing infested trees (salvage)
- Change in risk depends on location-specific factors and time
 - GCMs suggest mean temp. ↑ in US South (↑ SPB risk), *BUT*
 - Precipitation ↑ in some locations/time periods (↓ SPB risk)





Non-Industrial Private Forest Landowner obstacles to Forest Carbon Sequestration in the Southern US

- Southern US forests a significant C sink → role in CC mitigation
 - Lowest cost and highest volume carbon sequestration opportunity
 - Could sequester ~ 400 million tCO₂e yr⁻¹ in Southeast
- Non-industrial private forest (NIPF) dominant timberland ownership in US South
- Understanding NIPF landowner obstacles to managing for C sequestration
 - Better forest management decisions
 - More effective CC mitigation policies





Non-Industrial Private Forest Landowner obstacles to Forest Carbon Sequestration in the Southern US, cont'd

- Study id's NIPF obstacles to manage for C sequestration using survey data and factor analysis
- Implemented regional mail survey Fall 2013 to 5,110 randomly-selected NIPF landowners; 15% RR
 - 10 southern states (all S. states but Tennessee)
 - Included willingness to sequester C, demographics
- Factor analysis
 - Major underlying obstacles affecting willingness to sequester C
 - Major obstacles described by four latent factors
- Potential obstacles to effective carbon sequestration policies in the South





Other ongoing work by Policy and Economics aim

- **Regional market impacts based on business-as-usual assumptions**
 - Integration of welfare impacts into regional timber market model (SRTS)
- **NPV and regional market impacts of altered disturbance risks**
 - Impacts of CC on the economics of loblolly pine and slash pine with hurricane risk using generalized Reed model
 - Wildfire forecasts under 9 downscaled climate and socio-economic scenarios using 3-stage heckman model; uncertainty profile for ecoregions by year using Monte Carlo analysis





Other ongoing work by Policy and Economics aim, cont'd

- **Bioeconomic modeling of nontimber market ecosystem services**
 - Species richness prediction model using FIA data and plot-level remeasurement
 - Bayesian models to predict C, timber and biodiversity → management regimes for FIA units
 - Nonparametric model for efficiency of ES provision by forest plots under CC → optimal levels of C sequestration, timber volume and biodiversity values
 - Genetic algorithm to analyze plot-level trade-offs among C, timber, understory biodiversity





Other ongoing work by Policy and Economics aim, cont'd

- **Bioeconomic modeling of nontimber market ecosystem services, cont'd**
 - Integrating watershed-level WaSSI water yield output → model optimal management with ecosystem services
 - Willingness to pay for forest-based water quality services using survey data and econometric model
- **Assess policies and programs that may affect C mitigation in planted pine forests**
 - Descriptive analysis of market-based programs and policies likely to impact C mitigation
 - Landowner preferences for C program features
 - Public preferences for conservation program features





Other ongoing work by Policy and Economics aim, cont'd

- Integrating output with Decision Support System
- Helping develop management scenarios framework
- Integrating models across PINEMAP Aims (e.g., 3PG)
- Informing educational and Extension program materials

Thank you!

