



DayCent Calibration at the PINEMAP Tier 3 Monitoring Network

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Modeling Workflow

Site Characterization

Weather data (1980 – 2012)

min/max temperature, precipitation

Soil data

sand/silt/clay fraction, bulk density, field capacity, wilting point, KSat, SOM, pH

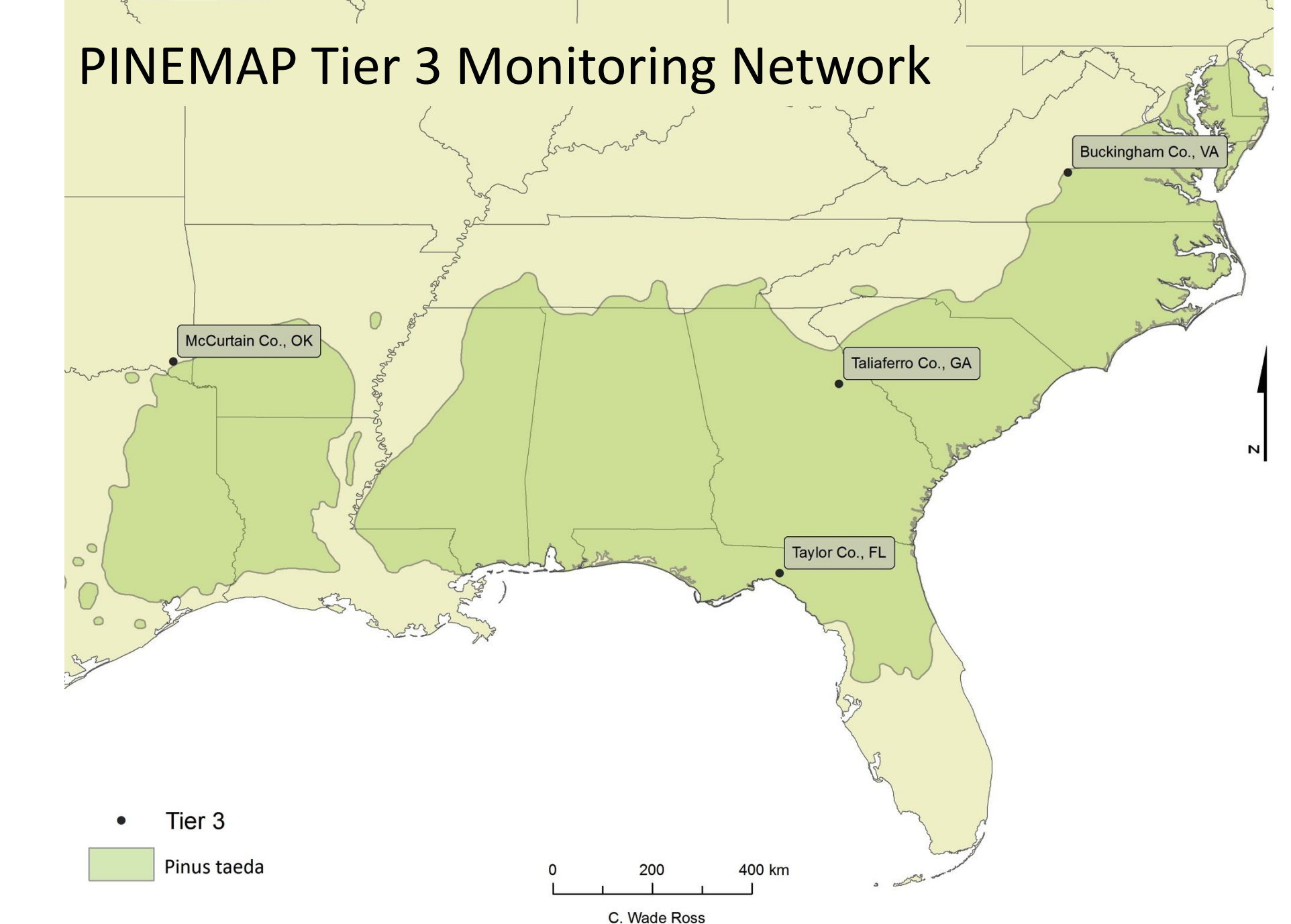
Plant data

production rates, C: nutrient ratios, C allocation, L:N ratio, phenology

Management information

Is the system tilled, fertilized, burned, etc?

Current Site Characterization	Florida	Georgia	Oklahoma	Virginia
Annual mean annual precip. (inches)	56.9	46.5	52.4	45.1
Annual mean max. temp. (°F)	79.8	74.2	74.0	68.2
Annual mean min. temp. (°F)	56.3	50.3	50.1	44.6
% Sand	97	44	63	27
% Clay	2	15	11	20
% Silt	1	41	26	53
Bulk density (g cm ⁻³)	1.85	1.45	1.53	1.38
% soil organic matter (SOM)	1.7	0.75	1.75	1.25
pH	4.6	5.5	5.5	5.2



Calibration

Critical parameters include the following:

Soil water

leaching, evapo-transpiration, field capacity, wilting point, Ksat

Production

potential growth rates, C:N ratio, N availability, senescence, phenology, temperature response

SOC

decomposition rates and C:N ratios

Percent difference between observed and simulated values (2002 – 2012)

	Florida	Georgia	Oklahoma	Virginia
aNPP (aboveground net primary production)	1.7	1.0	14.1	7.9
Total NPP	9.4	7.2	10.7	8.4
Soil org. carbon (SOC)	60.9	151.3	15.1	149.8

- Simulated aboveground NPP agrees very well with Tier 3 estimates
- Simulated belowground NPP agrees well with Tier 3 estimates
- SOC is currently being over-estimated by DayCent

Re-calibrate with site specific data

- Field measured soil properties, including texture, bulk density, SOC content, and pH will be critical for improving model performance.
- SOM sub-model needs further investigation
- Once model output is satisfactory at Tier 3 sites, region wide runs across the Tier 2 network can begin
- Soil respiration data is needed for model calibration

Evaluation

NPP

Simulated NPP agrees very well with Tier 3 estimates (2002 – 2012)

SOC

- Simulated SOC is currently overestimated compared to SSURGO based estimates
- Site specific soil parameters will improve model performance

