

# Continuing Project

## Assessing & Mapping Regional Variation in Site Productivity

CAFS.19.75

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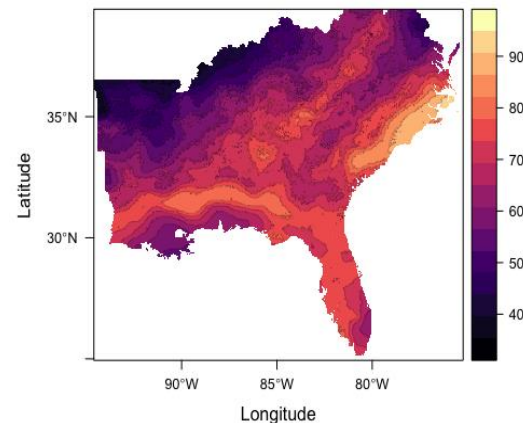
North Carolina State University and University of Georgia



# What drives site productivity and how do we make predictions?

## Objectives

1. Develop a consistent and biologically meaningful metric of potential site productivity
2. Relate soils, geology, and environmental variables to predict site productivity
3. Map across major forest regions



Major Soil Group	
A	Clay
B	Fine Loamy
C	Coarse Loamy
D	Spodic
E	Silty
F	Deep Subsoil (Grossarenic, > 40 in)
G	Deep Sand (> 80 in)
H	Histosol/Organic

Depth Code (inches)	
0	unknown (0-20)
1	0 – 5
2	5 – 10
3	10 – 20
4	20 – 40
5	40 – 80
6	None within 80 in

Drainage	
E	Excessively Drained
D	Somewhat Excessively Drained
W	Well Drained
M	Moderately Well Drained
S	Somewhat Poorly Drained
P	Poorly Drained
V	Very Poorly Drained

Modifier 1: Nature of Surface	
d	Dark surface
y	Silty
e	Eroded
g	Gullied
r	Rocky
o	Other or NA

Modifier 2: Nature of Subsoil	
a	Alfic
m	Mica
x	Mixed
k	Kaolinitic
p	Plastic/smectitic/vertic
i	Siliceous (sandy)
o	Other or NA

Modifier 3: Limitations (A or B Horizon)	
w	Ponded Water
f	Floods (fluvic)
l	Lamella
s t u	Root limited (densic, lithic, paralithic) (<10, 10-20, 20-40 in)
v	Root limited 40-80 in
q	Restrictions within 40 inches (fragic, cemented, plinthic)
c	Alkaline, calcareous
n	Salt affected (natric)
o	Other or NA

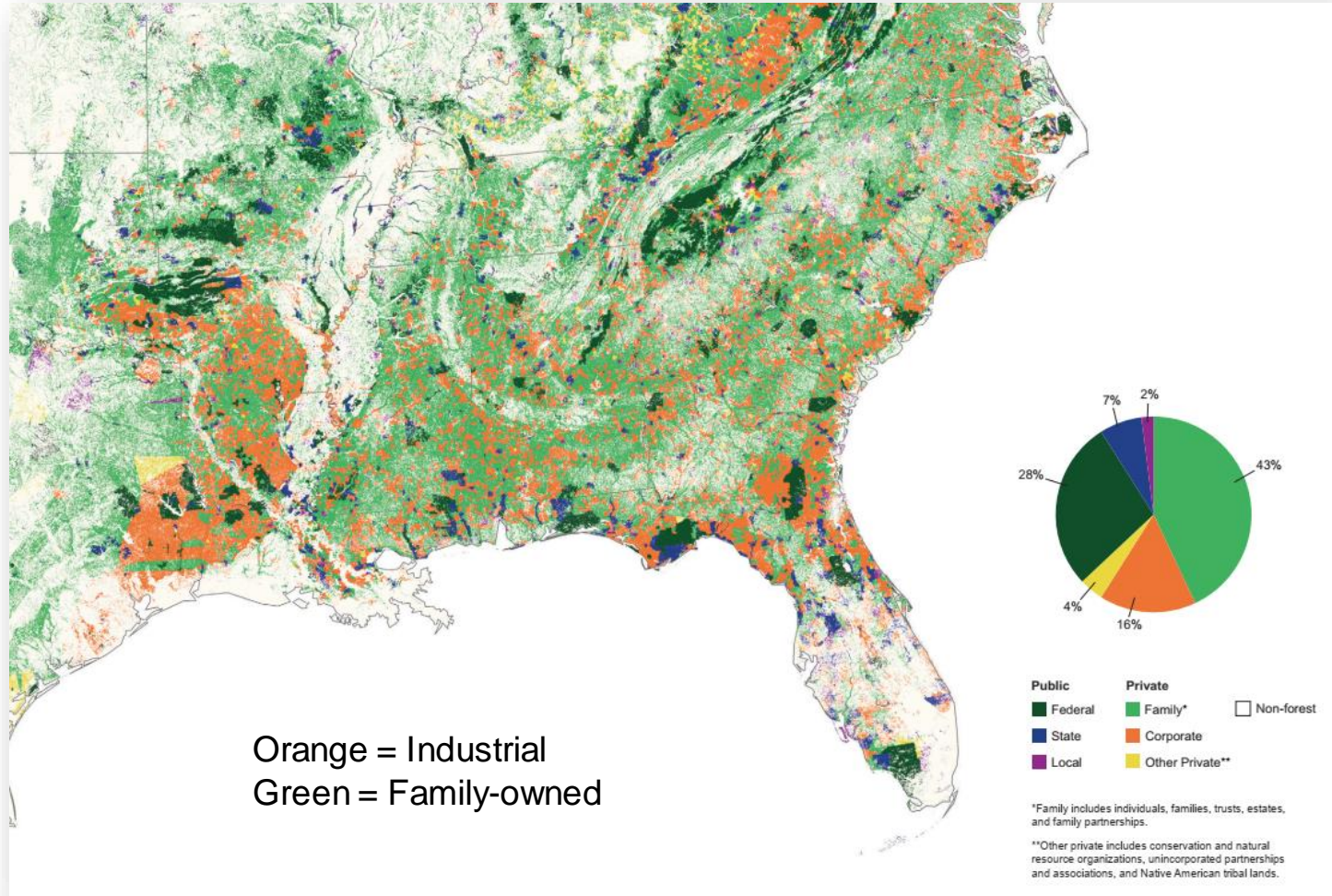
Geo Code	
Pa	
Al	
Dw	
Lb	
Ws	
Am	
Au	
Ct	
Fl	
Ch	
Vk	
Yg	
Jk	
Cb	
Wx	
Md	
Bb	
Ba	
Av	
Sa	
Cs	
Ms	
Fs	
Lo	
Gg	
Le	
Sh	
St	
Lm	
Sc	
Bg	
Um	
Sr	
Mr	
Ui	

Physiographic Province	
AF	Atlantic Coastal Plain Flatwoods
GF	Gulf Coastal Plain Flatwoods
SC	Southern Coastal Plain
WG	Western Gulf Coastal Plain
LP	Mississippi Valley Loess Plain
BP	Blackland Prairie
SH	Sandhills
PD	Piedmont
MT	Mountains
AA	Alluvium

**Classification based on:  
Site Productivity Optimization of Trees  
“SPOT” codes**



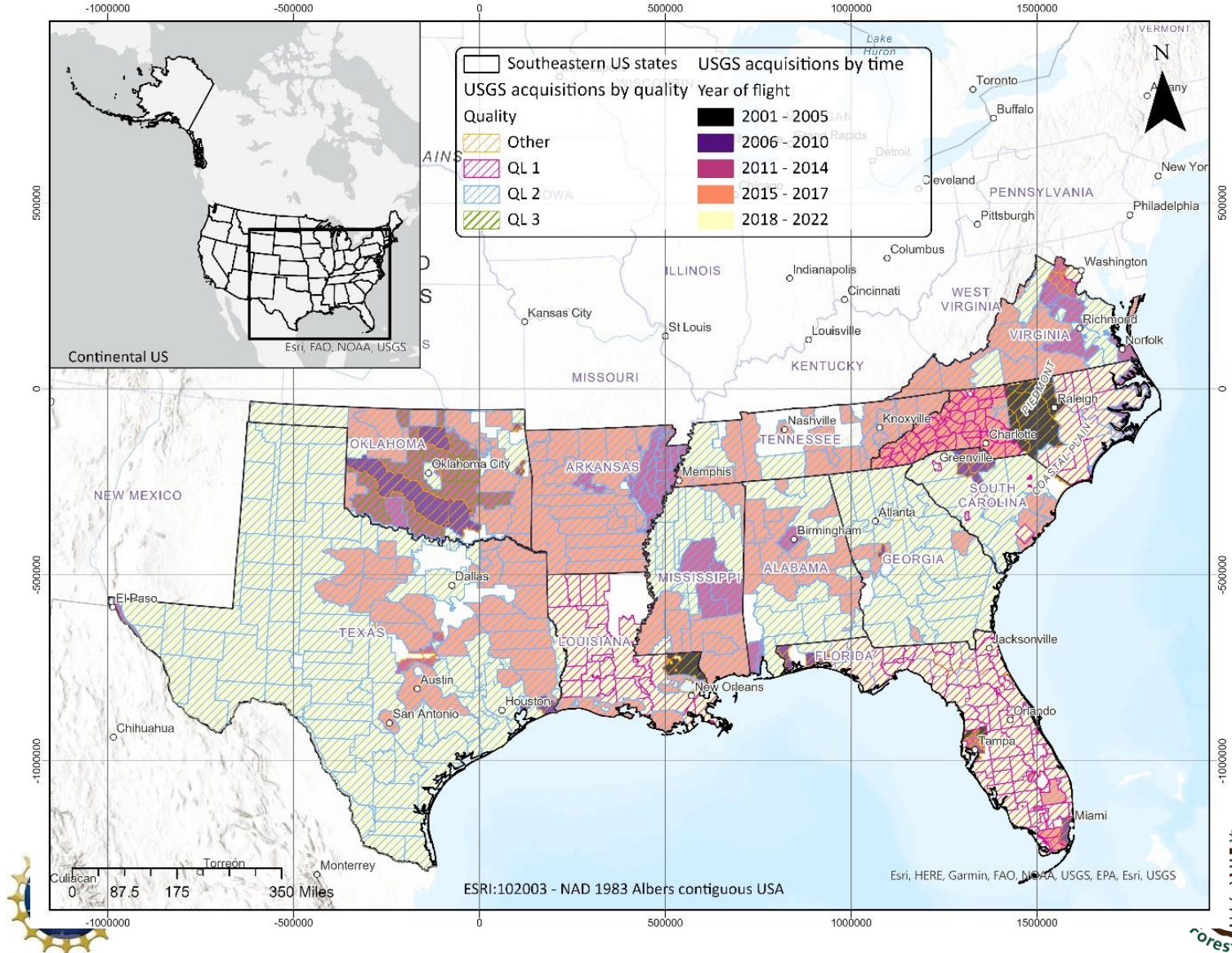
# FIA plots by SPOT for “base” SI (natural vs planted)



1,562 unique codes



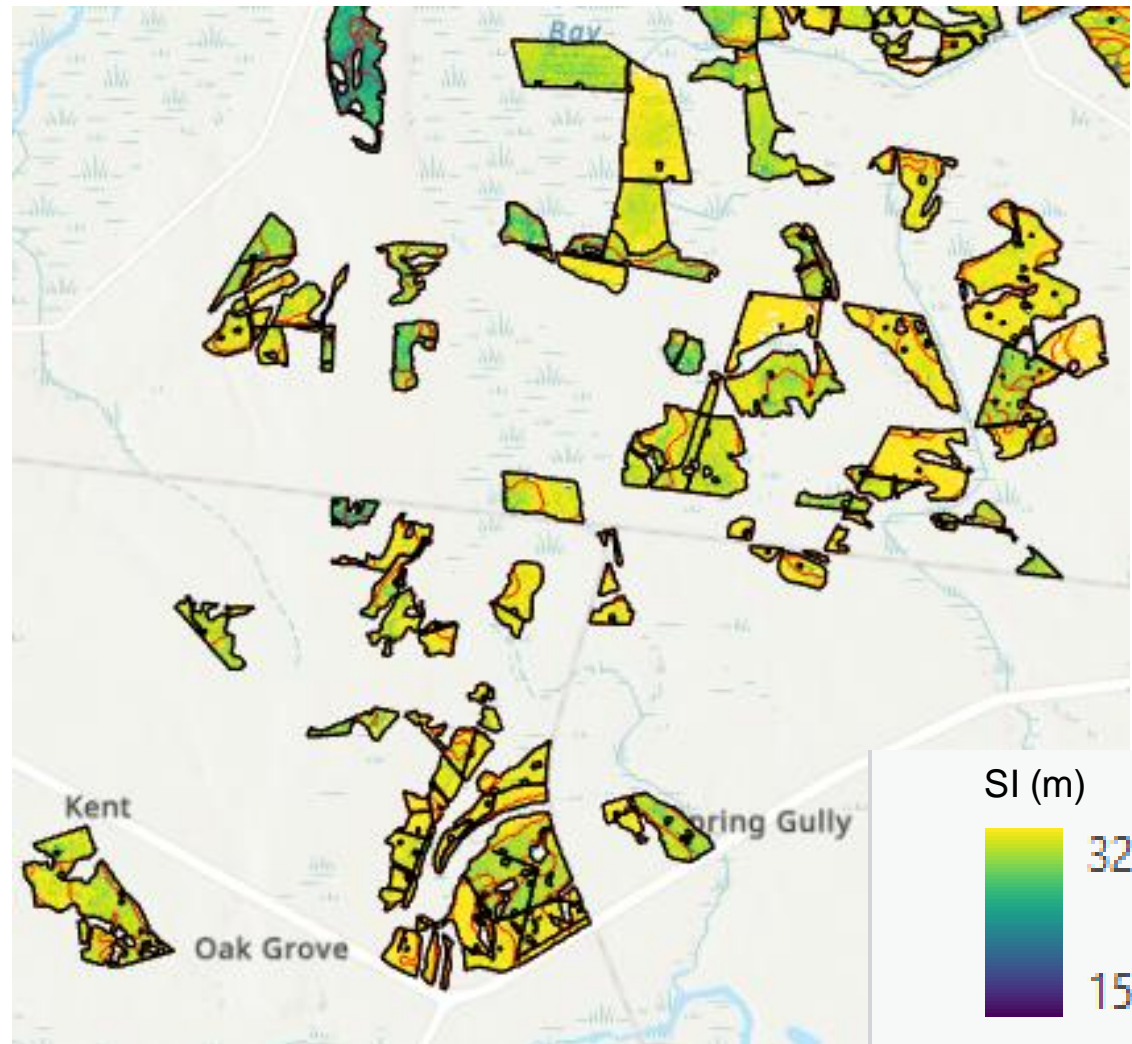
# Member stands + age + Publically Available LiDAR Data = Industrial Site Index



# Develop maps of observed and range of productivity across SEUS

Extracting SI by  
SPOT code from  
USGS data

6,254 unique  
codes



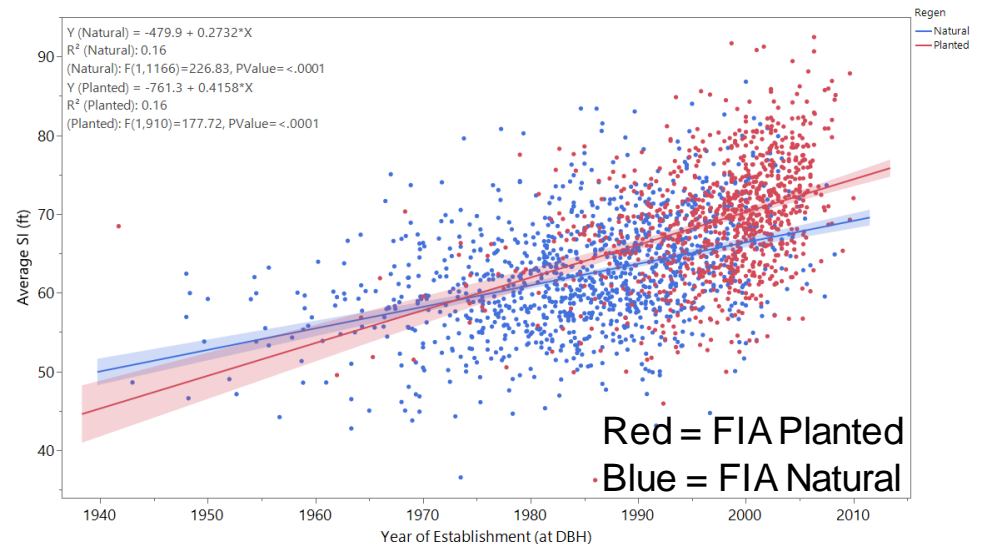
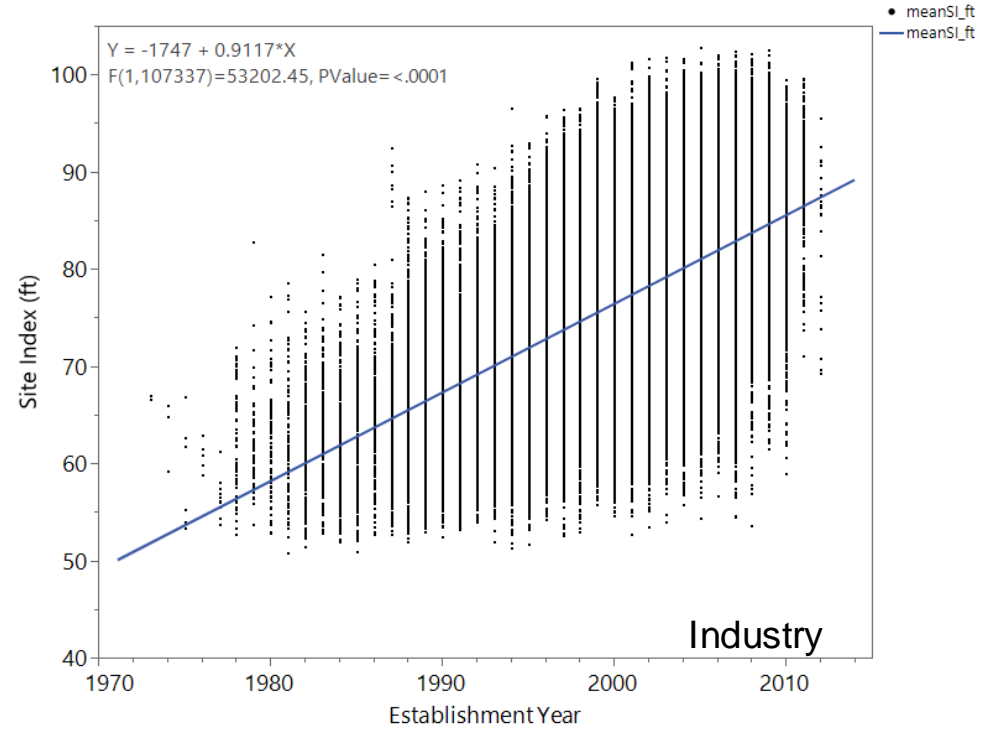
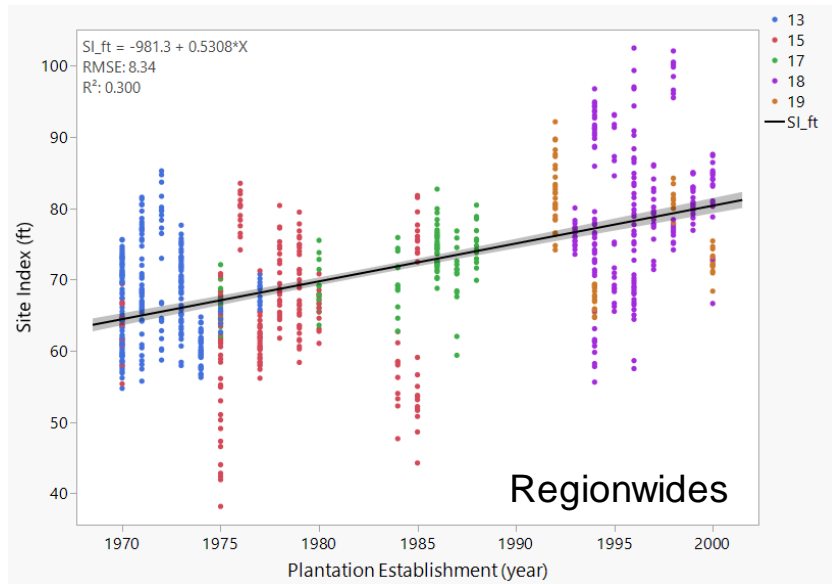
# Site Index improving per year:

FIA Natural 0.3 ft

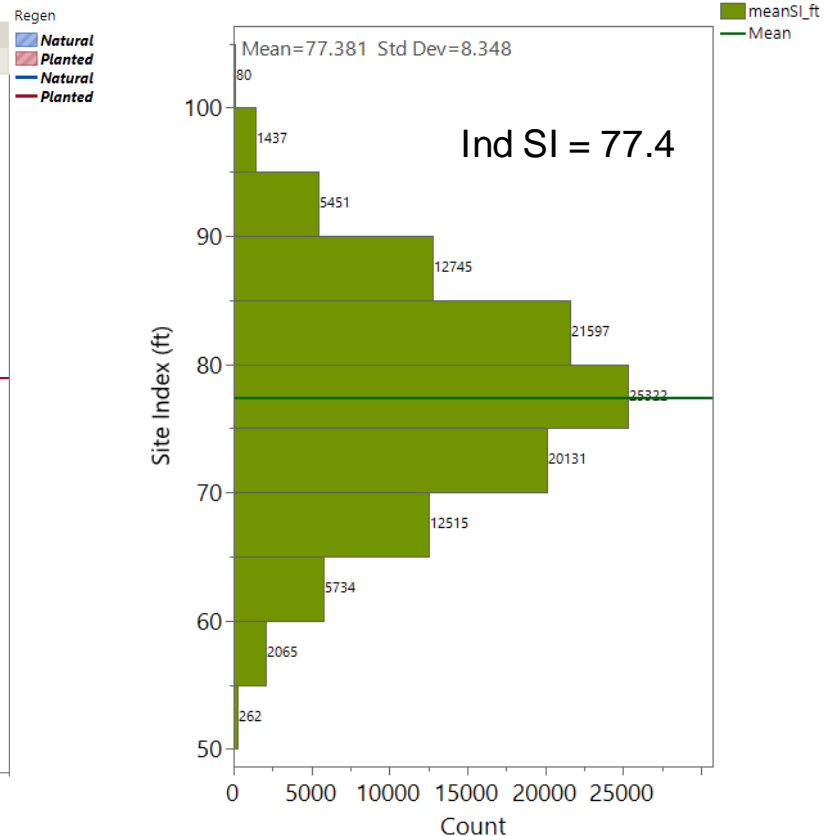
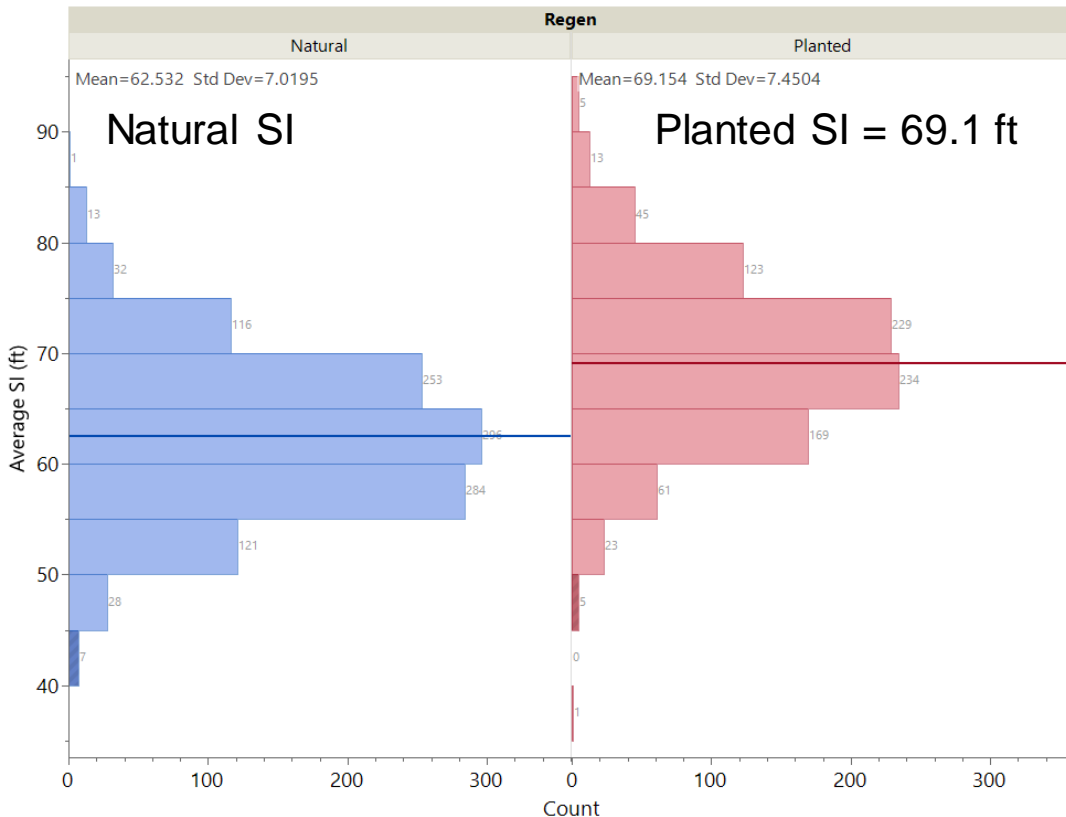
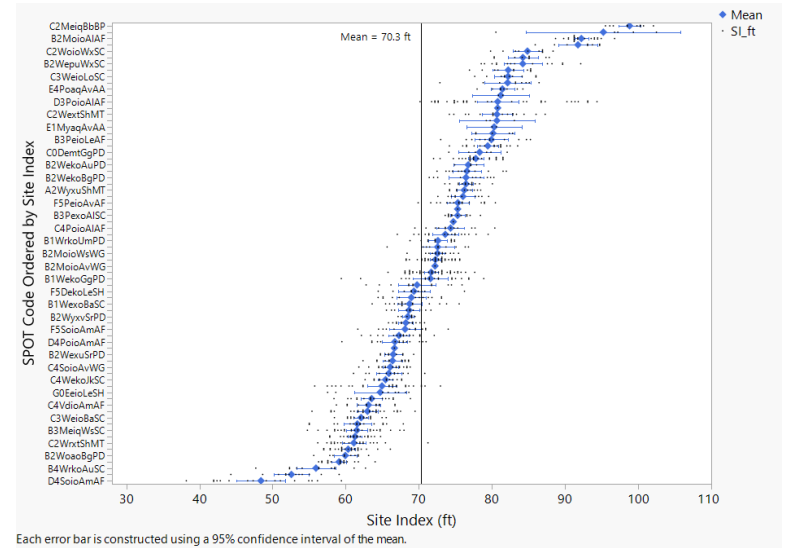
FIA Planted 0.4 ft

RW: 0.5 ft

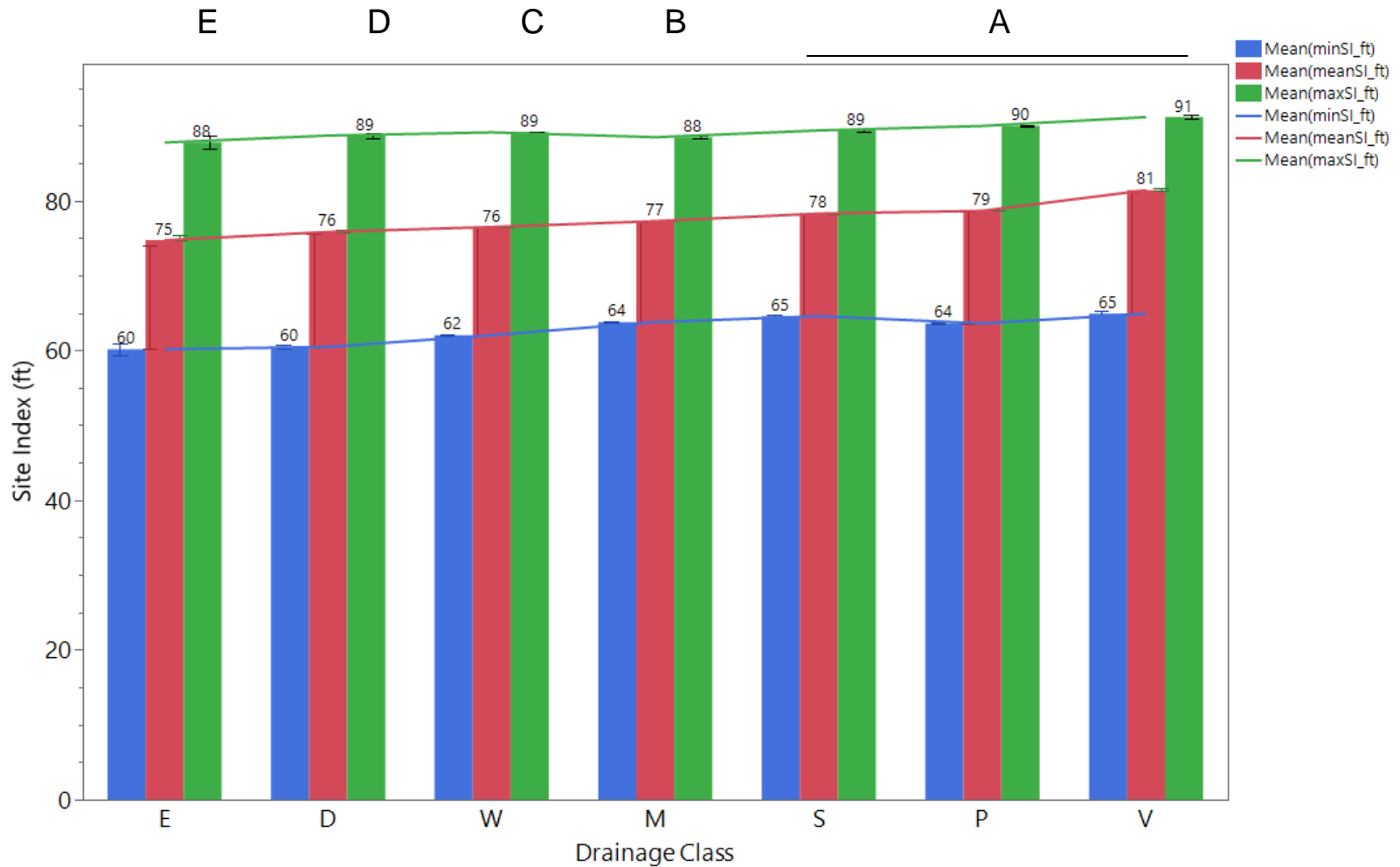
Industrial: 0.9 ft



Average Site Index:  
 FIA Natural 62.5 ft  
 FIA Planted 69.1 ft  
 RW: 70.3 ft  
 Industrial: 77.4 ft



# Industry SI by Drainage Class



# Timeline - Updated

- ✓ Year 1 (2020): Data gathering and compilation of forest soil map units and available stand data
- ✓ Year 2-4 (2021-2023): Spatial modeling and model comparisons of site productivity and drivers

## Year 4-5

- ✓ Collect USGS data across SEUS for large-scale site index mapping
- ✓ Map base and potential site productivity  
Develop web-based interface

## Year 5

Incorporate LAI into productivity modeling,

