Ecological Condition Model for the National Forests in Florida

Geospatially-Driven Land Management

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National Forests in Florida

- Approximately 1.2 Million Acres
- 405,000 acres of longleaf pine (current or historic natural communities)

What

- Spatial model developed to quantify current ecological condition of the forest's longleaf natural communities
- Goal:
  - Identify areas within longleaf natural communities that have a high priority for vegetation management activities
- Provide foundation for Prioritization Models
  - Prioritize treatment areas and activities
  - Balance restoration with maintenance
  - Increase management efficiency
- Status
  - Developed for all NFs in Florida
  - Implementation phase

Why?

- Clearly define ("quantify") "desired future conditions" (DFCs) for different natural communities to better inform management decisions
- Baseline assessment of ecological condition in order to:
  - Track changes through time
  - Make strategic management decisions- balancing restoration with maintenance activities
- Mid-level planning tool
  - Between Forest Plan and individual projects
- Collaboration/synergy
  - Internal: between staff areas
  - External: more open and transparent decisions

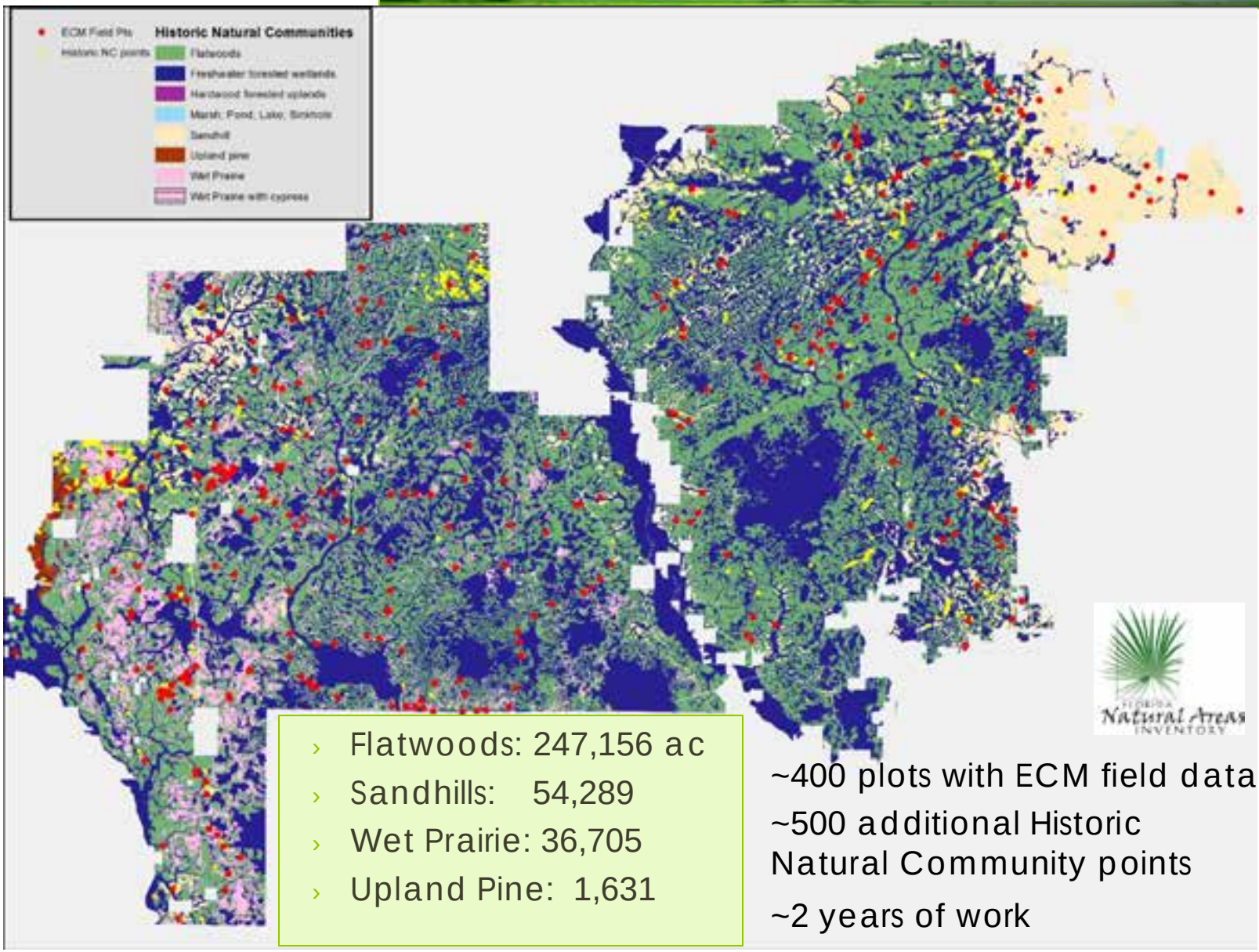
Ecological Condition Model

- Inputs:
  - Stand species & age (GIS Data)
  - Basal Area (Remote Sensing / LiDAR)
  - Canopy Density (Remote Sensing / LiDAR)
  - Midstory Density (Remote Sensing / LiDAR)
  - Shrub Density (Remote Sensing / LiDAR)
  - Fire History (GIS Data / Remote Sensing)
    - Number of fires
    - Time since last fire
    - Fire Severity
- Outputs:
  - Ecological Condition Tier Class (1-5)
    - For flatwoods, sandhills, wet prairies
    - Allows establishment of current condition thus setting course for management priorities to achieve DFC

Ecological Condition Model

- Ecological Condition Class
  - Tier 1: Excellent condition (old growth/near old growth), at DFC, maintained with prescribed (Rx) fire
  - Tier 2: Good condition, maintained with Rx fire
  - Tier 3: Fair condition, transitional, some restoration followed by Rx fire
  - Tier 4: Poor condition, multiple restoration activities required
  - Tier 5: Very poor condition, substantial restoration required
- Specific for each historic natural community type
  - e.g., 40-60 BA is ideal for Flatwoods, but not for wet prairie/savannah

Historic Natural Communities



- Flatwoods: 247,156 ac
- Sandhills: 54,289
- Wet Prairie: 36,705
- Upland Pine: 1,631

~400 plots with ECM field data

~500 additional Historic Natural Community points

~2 years of work

Wet Prairie


Excellent/Good Quality
080501_CPT077_HAFL3_00004


Fair Quality
080501_CPT068_HAFL3_00067


Poor Quality
080501_CPT068_HAFL3_00064


Very Poor Quality
Near 080501_CPT0106_HAFL3_00041

ECM Steps (In General)

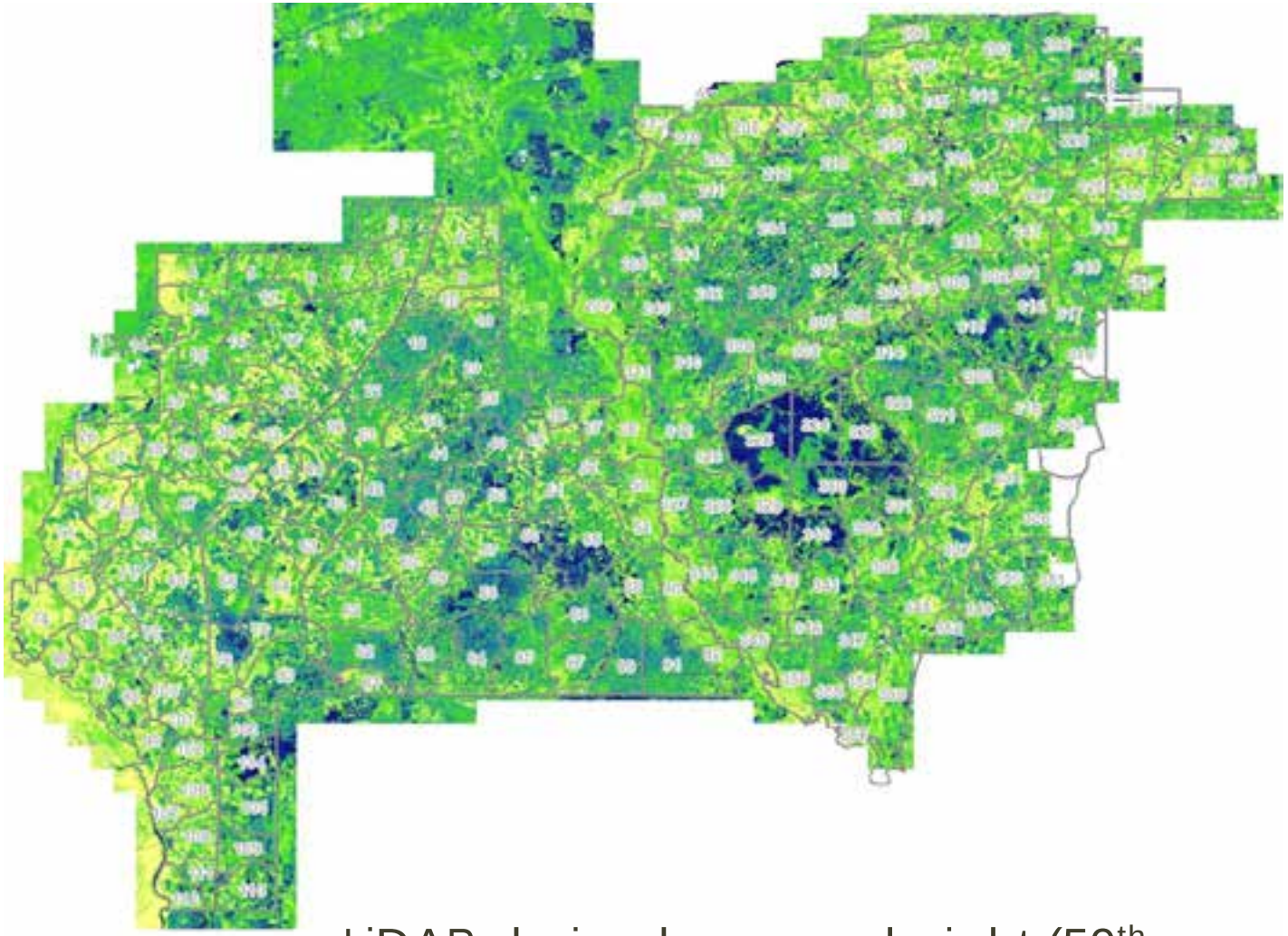
- Identify longleaf natural communities
- Assess current conditions vs. desired future conditions using ranked tiers
  - Separately evaluate
    - Canopy
    - Midstory
    - Shrub/Groundcover
  - Overall ECM Tier Class = Weighted average of all the above
- ID areas in "maintenance mode" and areas with restoration needs
- Use Current Condition and DFCs to prioritize management treatments w/in context of area (e.g., WUI, T&E species, NNIS, Timber, etc.)
  - Maintain good quality areas
  - Restore highest priority areas

Canopy Tiers

- Predominant Canopy Species
  - GIS - Stands: Forest Type
- Age
  - GIS - Stands: Age_Year
- Basal Area
  - LiDAR- Canopy Cover, Canopy Height percentiles
  - Relationship based on field data from FSVeg plots in sandhills and flatwoods
- Canopy Relative Density
  - LiDAR- RDgt45ft
  - Tier "break points" based on subset of ECM field plot data of predefined Tier classes

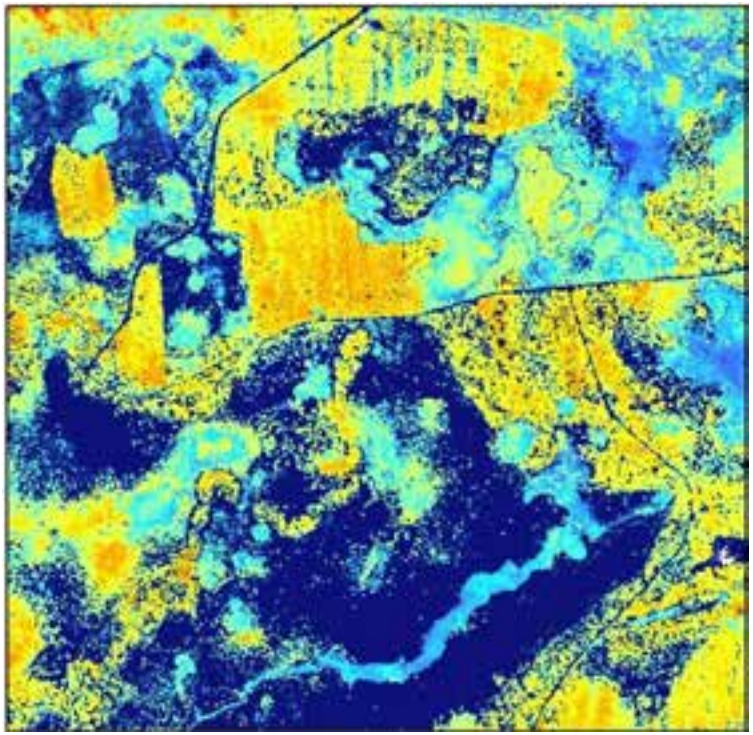
Airborne LiDAR Data

- 9 separate flights from 2007-2010

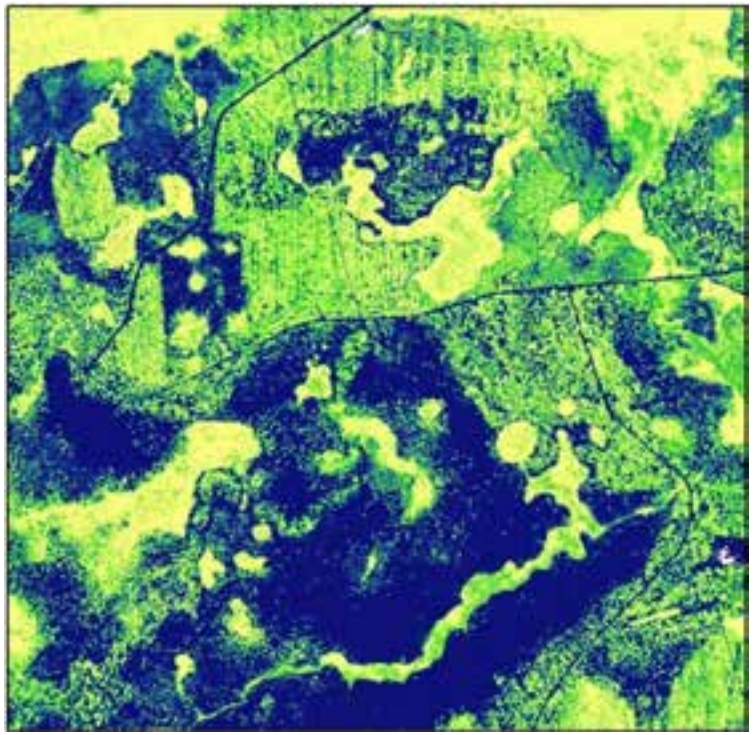


- LiDAR-derived canopy height (50th percentile)

LiDAR Products



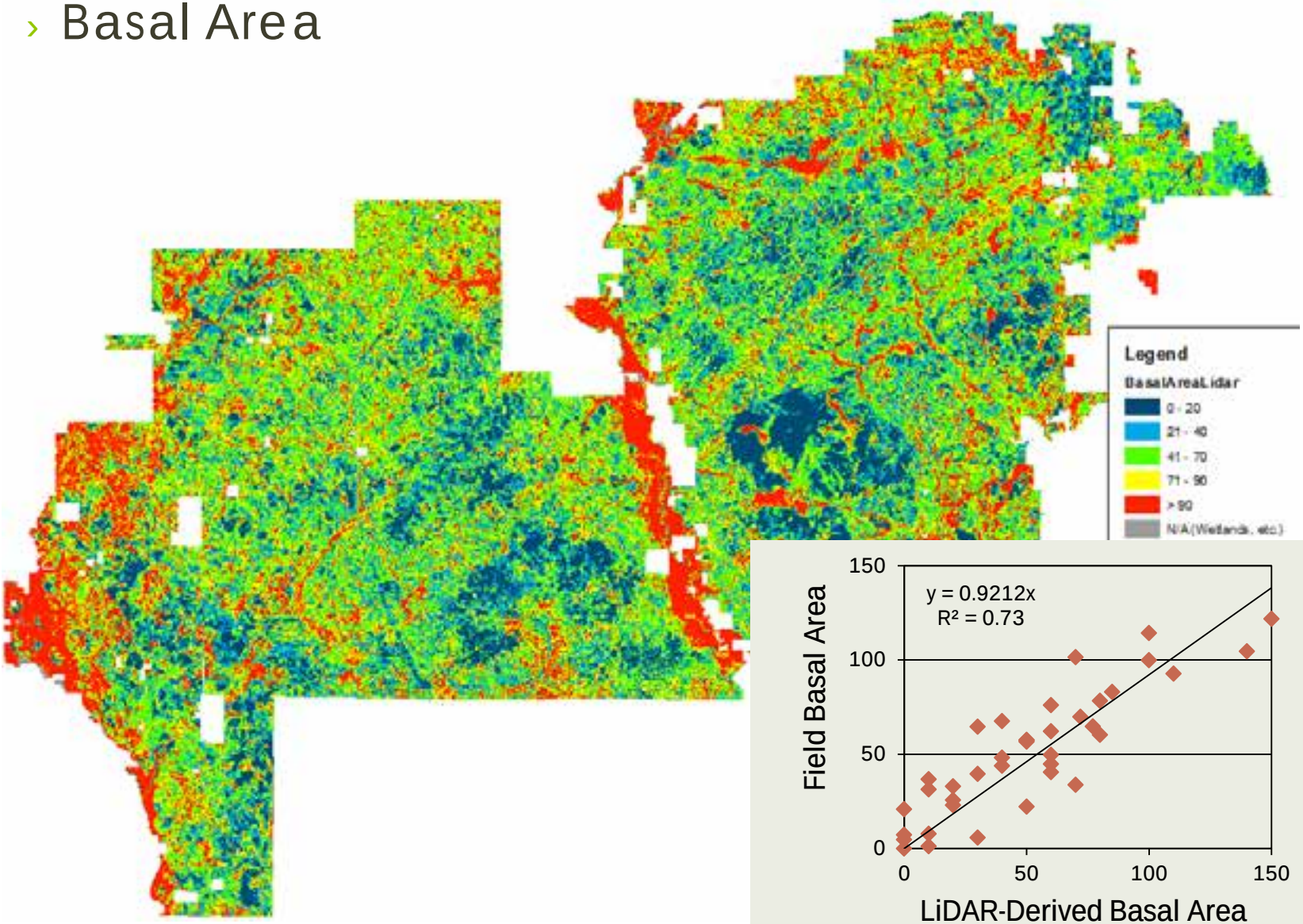
Max Canopy Height
Value
High : 115 ft
Low : 2 ft



Canopy Cover (5m)
Value
High : 100
Low : 0

Canopy Conditions

- Basal Area



Midstory Tiers

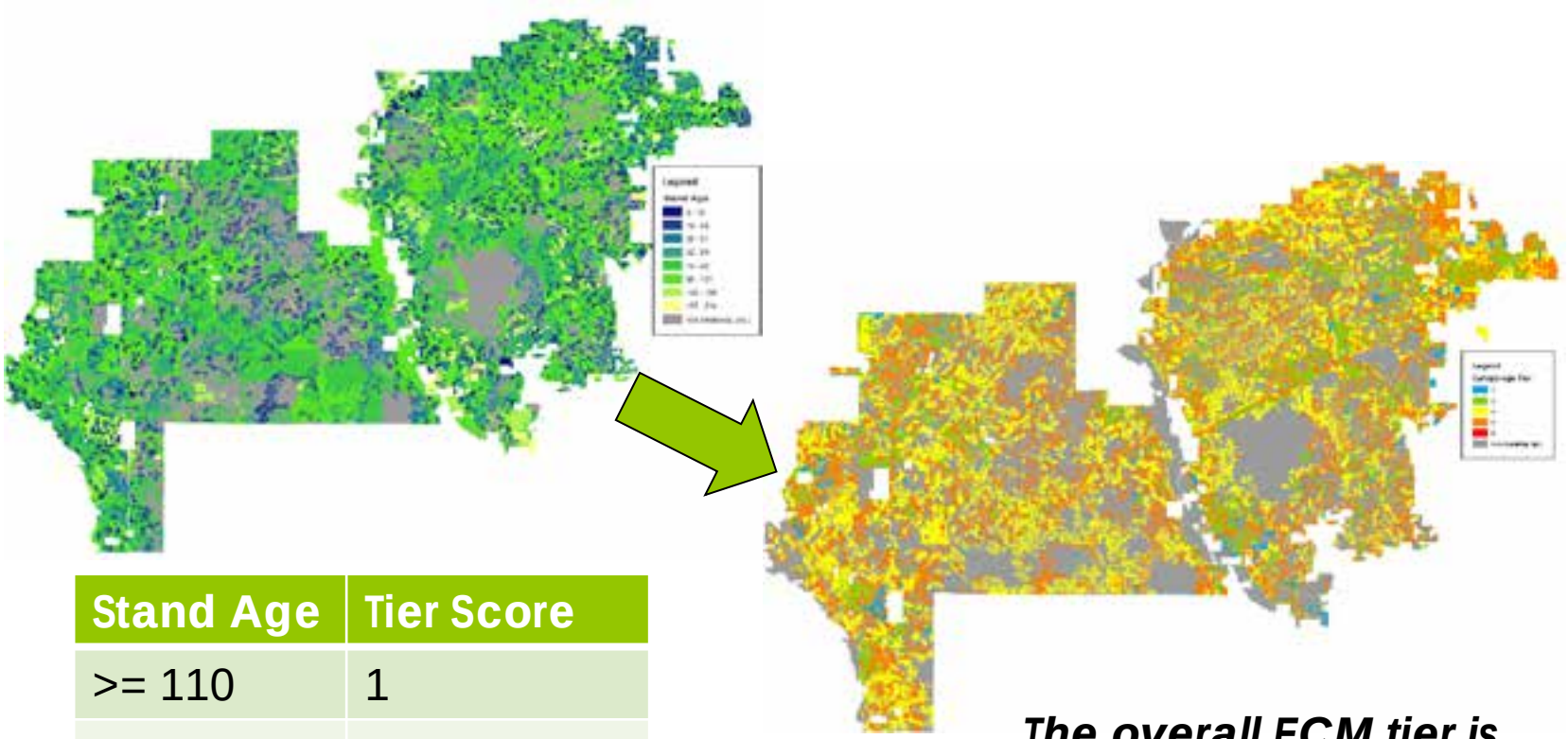
- Midstory relative density
  - LiDAR - RD20to45ft (*only for canopies > 45 ft*)
  - LiDAR - RD6to20ft
  - Tier "break points" based on subset of ECM field plot data
- Landsat derived hardwood estimate
  - Landfire Existing Veg Type (EVT)- Live Oak and all other HW types

Shrub/Ground Cover Tiers

- Shrub relative density
  - LiDAR - RD2to6ft
  - Tier "break points" based on subset of ECM field plot data
- Number of burns
  - At Burn unit level
- Years since last fire
  - At Burn unit level
- Remotely sensed total burn severity
  - From 1995-2010 Landsat data following MTBS (Picotte) methods
- Canopy Cover
  - LiDAR - CCgt2ft
  - Tier "break points" based on subset of ECM field plot data
- Basal Area
  - Tier "break points" based on subset of ECM field plot data
- Site preparation (Activities)
  - Mechanical site prep for planting/seeding

Cross-walk to Tier Scores

- ***Each sub-component is cross-walked into an ECM tier score***



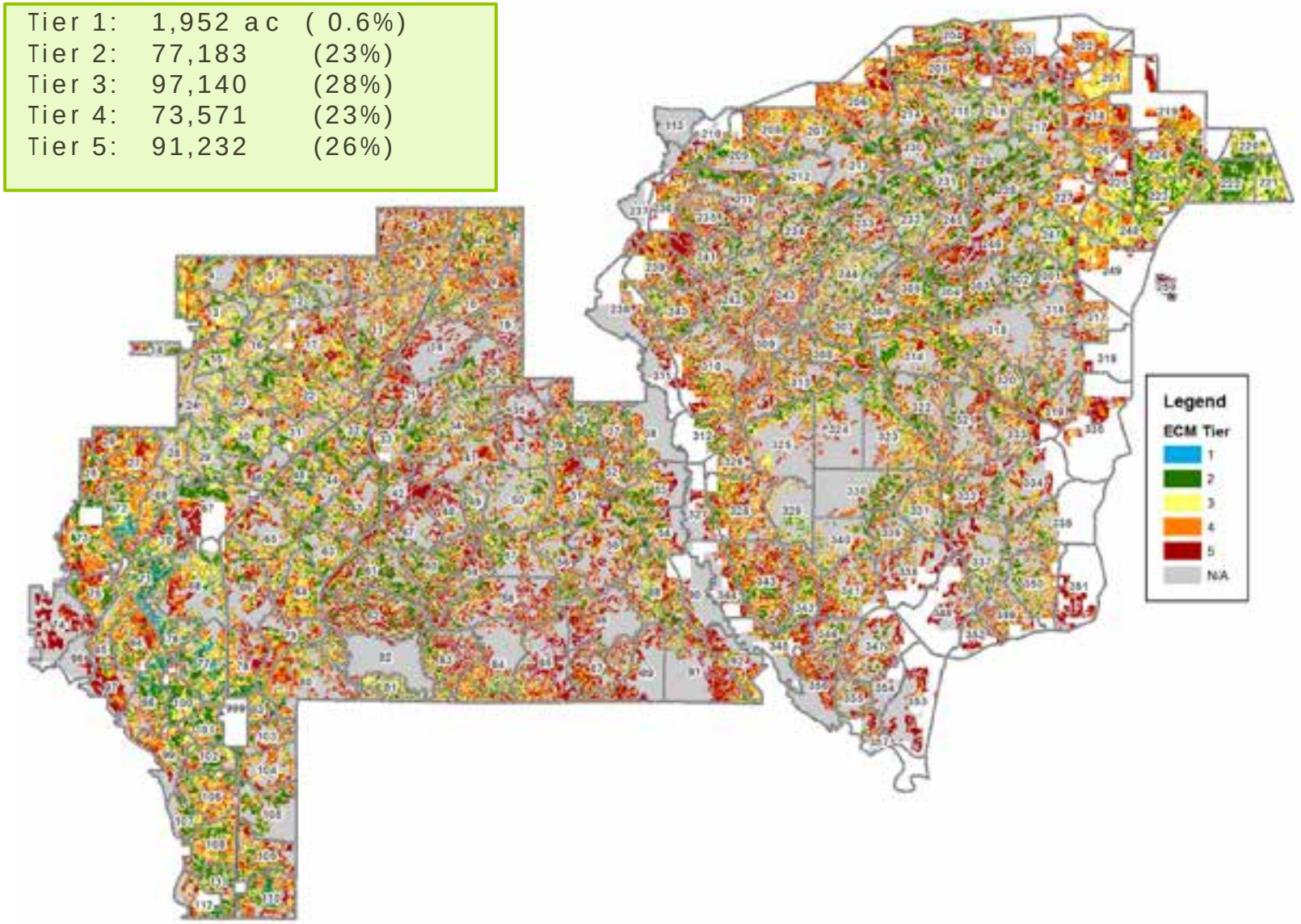
Stand Age	Tier Score
>= 110	1
90-109	2
60-89	3
<60	4

The overall ECM tier is then a weighted average from all subcomponents

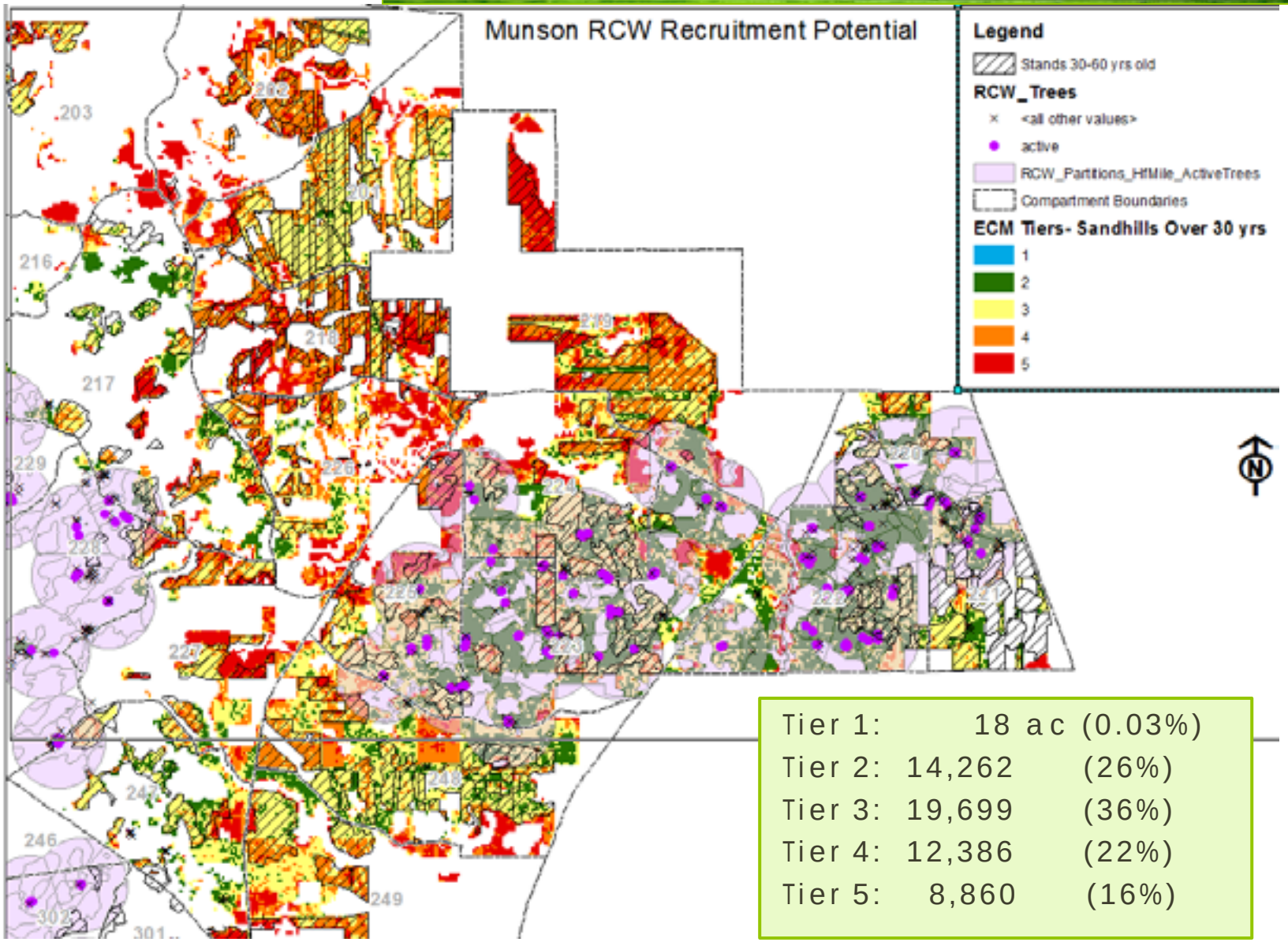
Preliminary Results

- ECM Tiers

Tier 1:	1,952 ac	(0.6%)
Tier 2:	77,183	(23%)
Tier 3:	97,140	(28%)
Tier 4:	73,571	(23%)
Tier 5:	91,232	(26%)



Priority Model Example Sandhills



Road Ahead

- Use ECM to prioritize future management activities
  - Fire (Rx)
  - Timber
  - Invasives
  - WUI
- Streamline modeling process (inputs & outputs)
- Operationalize

Summary

- ECM process results in interdisciplinary synergy
- Provides an essential mid-level planning tool
- Allows more open and transparent management decisions
- Facilitates collaboration with public/private agencies and stakeholders
- Facilitates development of DFCs and Objectives during Forest Plan revision
- Demonstrates management progress (e.g., annual monitoring report)

Questions?