

# Measuring FRA Success in Appalachia

**2008 ARRI Conference  
Mined Land Reforestation  
Logan, WV  
August 5-7, 2008**

**Patrick Angel and Jim Burger**



Office of Surface Mining



Virginia Tech Forestry

# Our goals:

Plant more high-value hardwood trees...

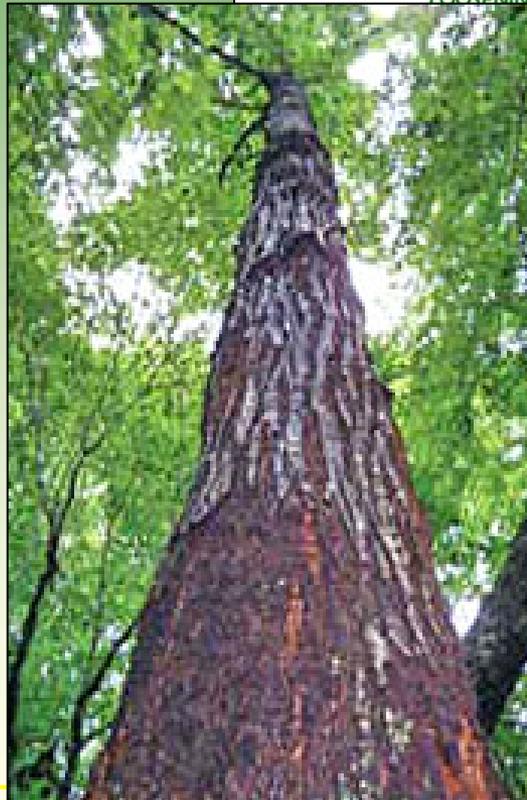
increase the survival rates and growth rates of planted trees...

and expedite the establishment of forest habitat through natural succession

---

# Spreading the FRA through...

- Arbor Day Events
- SMI Signing Ceremonies
- Reforestation Awards
- Videos
- TV and Radio
- Newspaper
- ARRI Newsletter
- ARRI Website
- ARRI Advisories
- FRA Training
- Partnerships

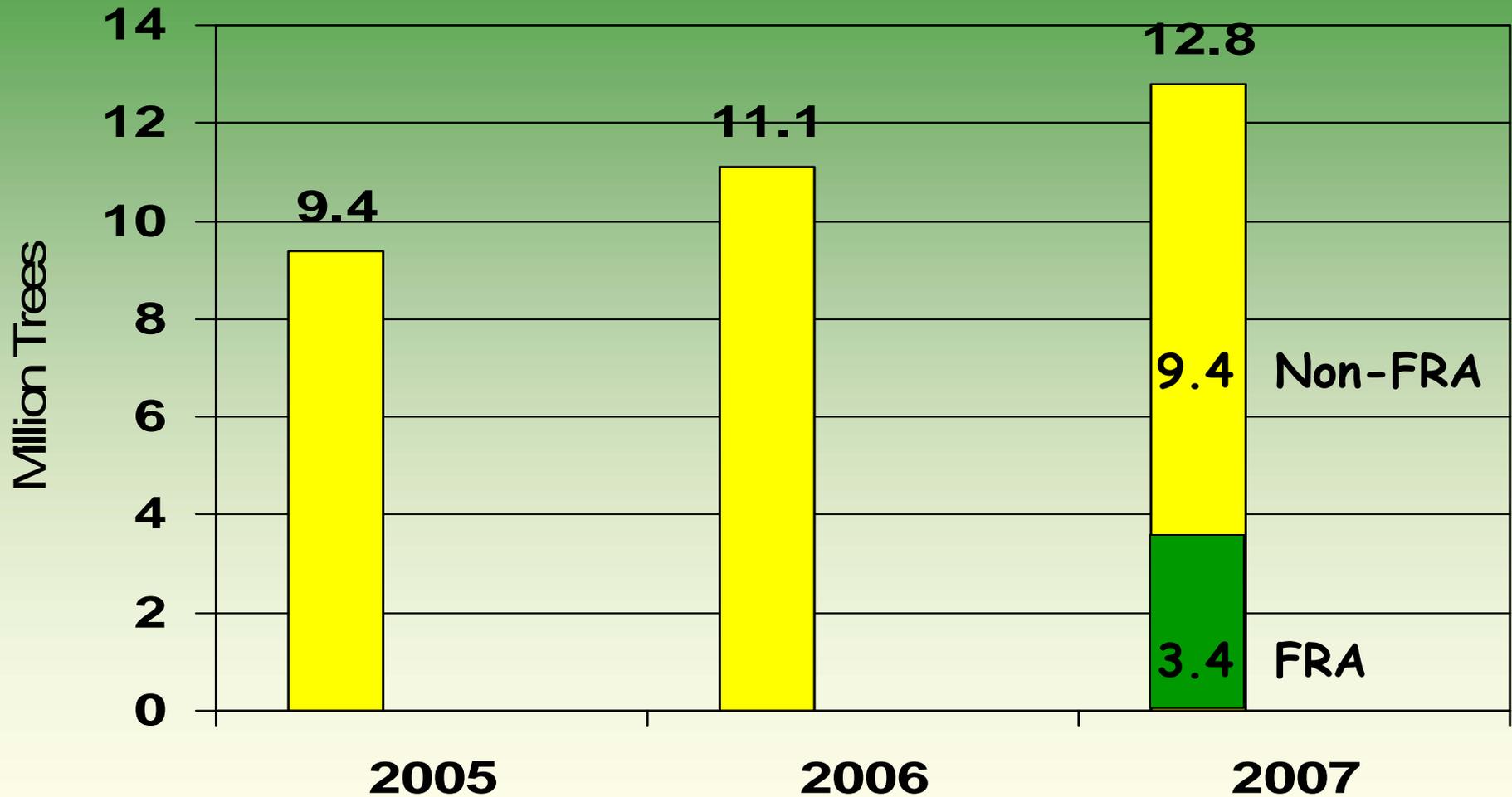


American chestnut



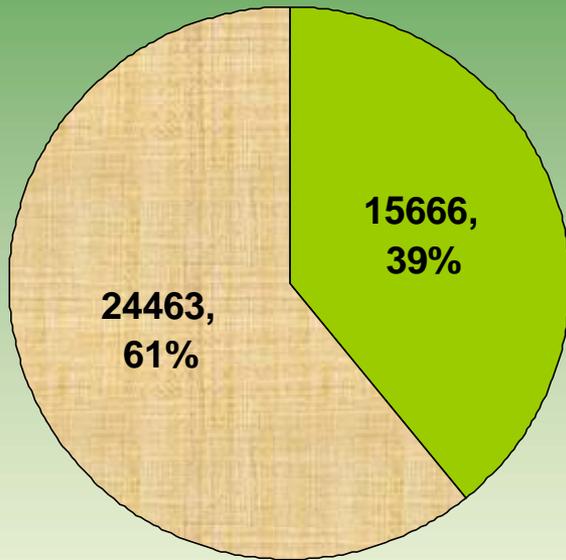
Cerulean Warbler

# Number of trees planted in ARRI states in 2005, 2006, and 2007



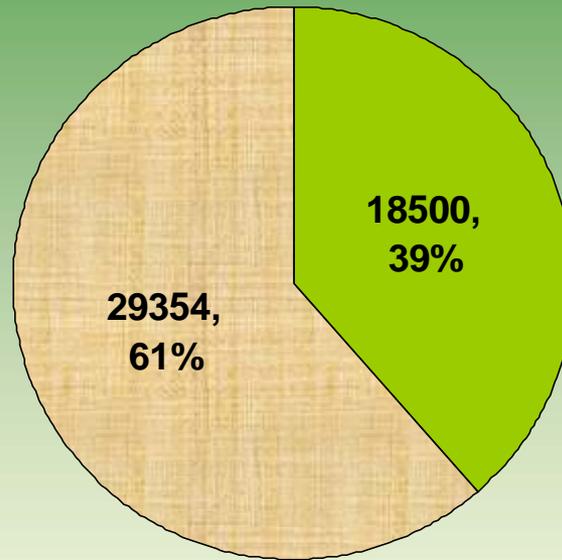
# Land reclaimed in ARRI states in 2005, 06, and 07

## 2005



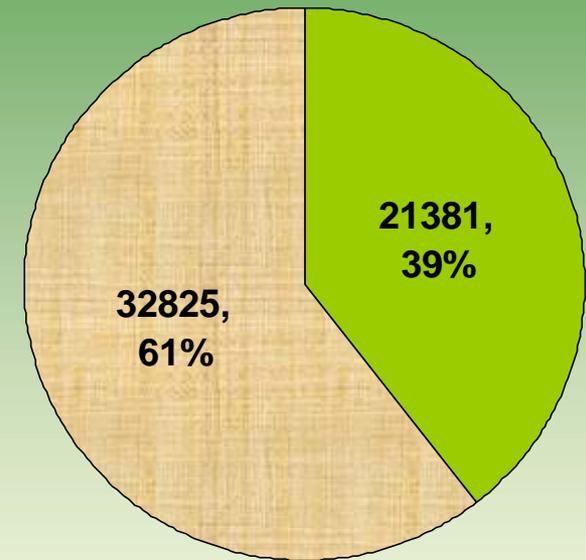
Total acres reclaimed =  
40,129

## 2006



Total acres reclaimed =  
47,854

## 2007



Total acres reclaimed =  
54,206

 Land reclaimed with trees

 Land reclaimed without trees



To stop, turn, and reverse direction of a fully loaded supertanker traveling at 16 knots, the captain needs...

...at least 20 minutes

...5.5 miles to stop

...a turning circle of 2 miles

# FRA on Abandoned Mine Land Projects









# Third year percent survival by spoil type for all species at UK's Bent Mountain Research Complex

	<b>BROWN</b>	<b>GRAY</b>	<b>MIXED</b>
<b>Green ash</b>	97 (a)	96 (a)	96 (a)
<b>Red Oak</b>	77 (ab)	80 (a)	73 (b)
<b>White Oak</b>	100 (a)	100 (a)	93 (b)
<b>Yellow- poplar</b>	70 (a)	72 (a)	65 (a)
<b>All species</b>	86 (a)	88 (a)	81 (b)

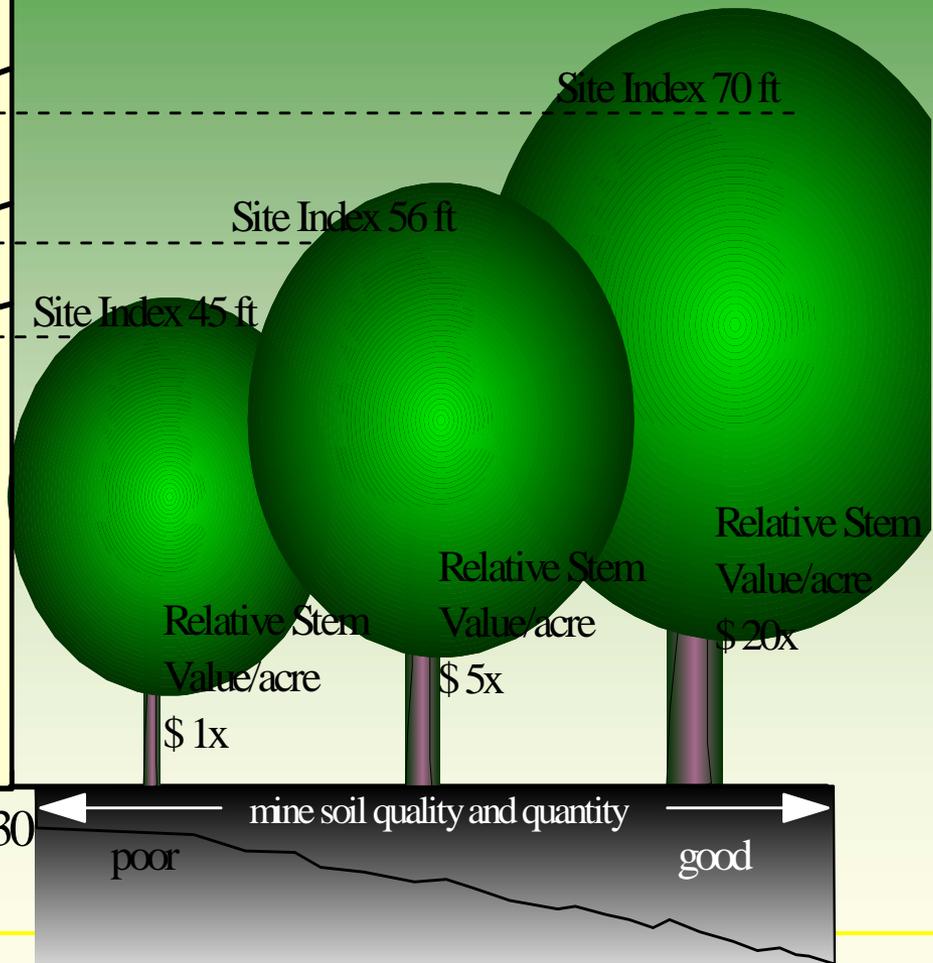
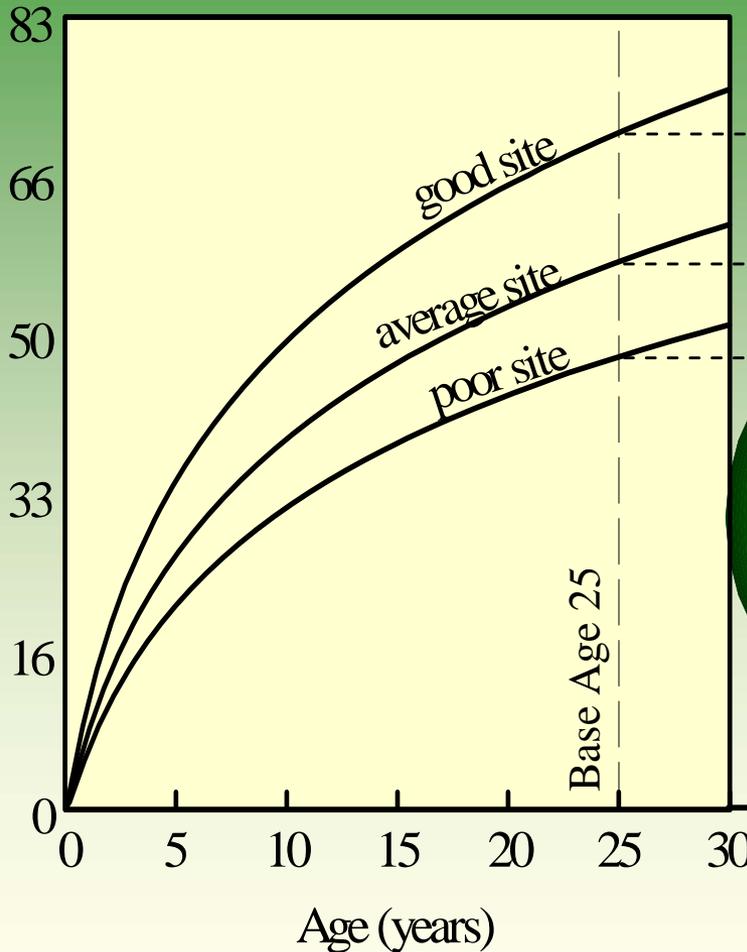
Comparisons are made between spoil types for each species. Spoil types with the same letter are not significantly different at  $p = 0.05$  level.

# Site Index

The total height to which the dominant trees of a given species will grow on a given site at some index age, usually 25 or 50 years

# Site Index

Tree Height (ft)



Study conducted by Jim Burger, Virginia Tech



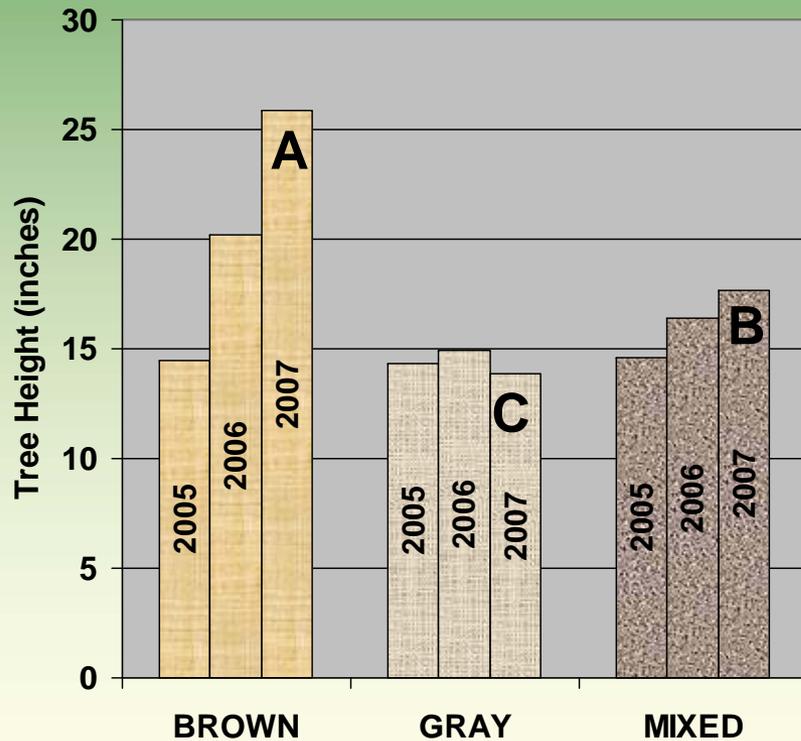
2007



2008

# Tree Height

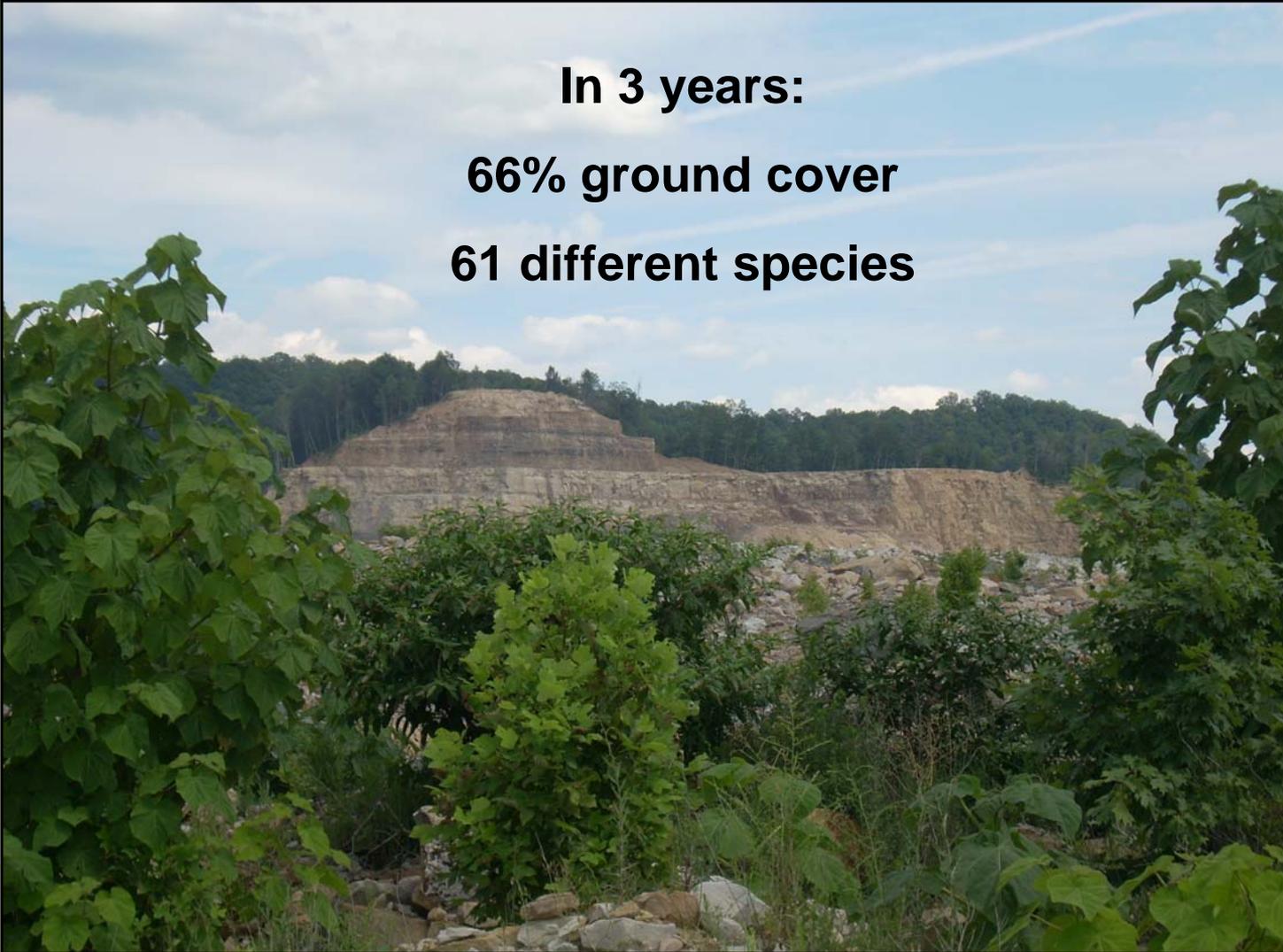
## Research Comparisons



## White Pine Productivity Standard



# Natural succession



**In 3 years:**

**66% ground cover**

**61 different species**

# The Forestry Reclamation Approach

- Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone and/or the best available material
  - Loosely grade the topsoil or topsoil substitutes established in step one to create a non-compacted growth medium
  - Use native and non-competitive ground covers that are compatible with growing trees
  - Plant two types of trees – early succession species for wildlife and soil stability, and commercially valuable crop trees
  - Use proper tree planting techniques
-

# Questions

