

Reforestation



What if Custer had trees?



Wow!



Outcomes 1977

SMCRA Regulations

Operators – View Point

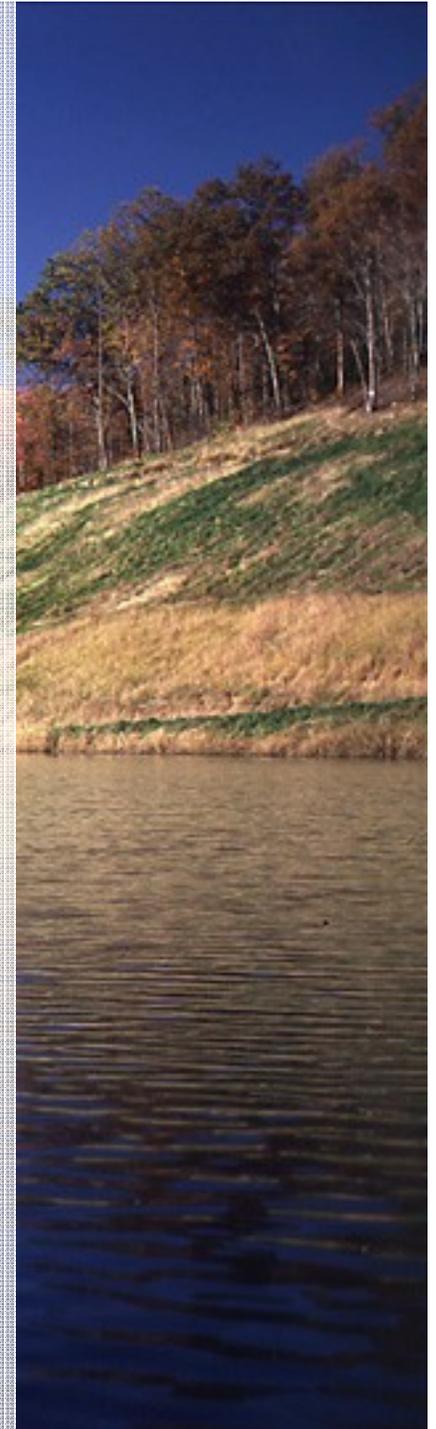
Major Problem – Stability & Siltation

-Solutions

- Increased compaction & diverted drainage
 - Reduced moisture in fills
 - Minimized slides
- Quick ground cover: grasses & legumes

-Improved Stability – Resultant Factors

- Less moisture in backfill material
- Shale on surface out slopes (minimal topsoil – mountains)
 - Less permeable
 - Surface runoff increased
 - More rills and gullies
 - More sedimentation
 - Filled ponds with sediment – dip ponds
- Increased compaction
 - Great for grasses and legumes
 - Stunted tree growth



Outcome 1977 SMCRA

Operators – View Point

- **No Visible Rocks or Boulders – Smooth Surface**
 - Rewarded & challenged dozer operators
 - Efficiently hiding rock & smoothest surfaces
 - Definition of pride
 - Having the smoothest surface with no sandstone rock showing!
 - Used shale and B/C horizon on out slopes – Buried Sandstone
 - Favorable response -reclamation inspections

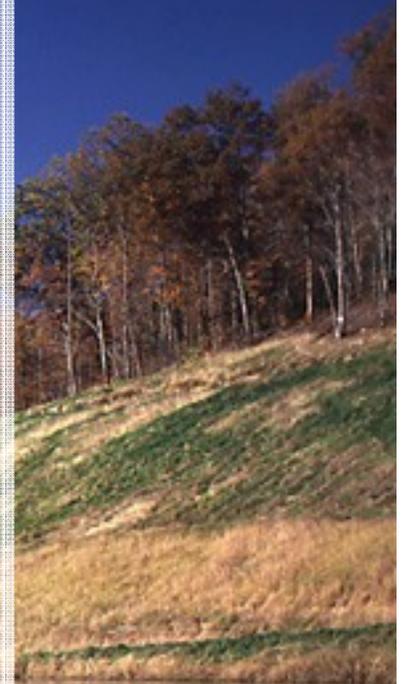
- **Quick Vegetative Cover**
 - Grasses and Legumes – outstanding cover
 - Quick cover
 - Minimize siltation
 - Theory
 - Minimize rills and gullies
 - Minimize sedimentation
 - Improve stability

Outcome 1977 SMCRA

Operators – View Point

- **Oversights–Bonding Company & Corporate**
 - Goal: smooth surfaces & quick vegetation
 - Favorable report - Lower bonding cost
 - Photo oversight pictures
 - Smooth surface with vegetative cover - Positive response
 - Minimal vegetative cover or boulders
 - Generate negative reports
 - Operation personnel - Go under punishment

- **Bond Releases –ASAP**
 - Grasses grow easily – minimal maintenance
 - Trees difficult – continuous replanting
 - Vegetative cover too dense - No sunlight – No trees
 - Excessive compaction – No trees
 - Bond releases simpler, life easier - grasses & legumes



Outcome 1977 SMCRA (cont.)

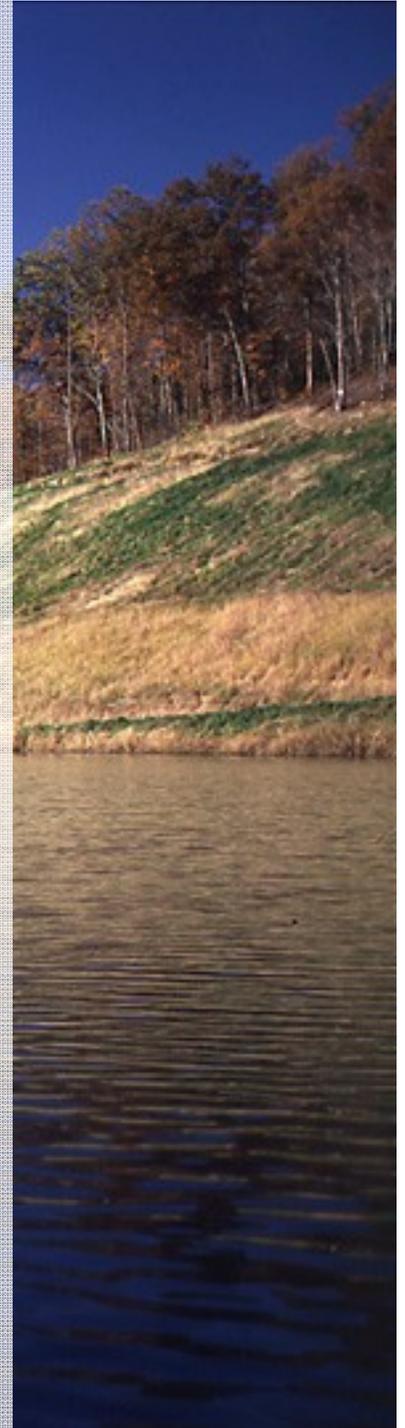
Operators – View Point

▪ **Regulatory Agencies**

- Demanded Smooth Surfaces – no rocks
 - Bury sandstone
 - Shale and B/C horizons - use on out slopes
- Immediate dense ground cover
- Compaction for stability
- Received violations if:
 - Not densely vegetated – grasses & legumes
 - Rocks visible
 - Rills & gullies visible
 - Highwall slumped

▪ **End Result – Failure to Grow Trees – Why?**

- Excessive vegetative cover
- Excessive compaction
- Wrong soil mixture
 - Excessive Shale or clay B/C horizon soils on out slopes
 - Sandstone buried



Picture of Smooth Compacted Reclamation Grasses & Legumes



White Oak Area in Tennessee

- Remining site – Mining started 1991
- Overburden – acidic, high iron, high manganese
- Miles unreclaimed premine highwall
- Extremely poor water quality





← **Low Ph 3-4**

← **High Iron
High Manganese**

← **Overburden
Ph 4-4.5**



Test Plot – Mined 1999 & Reclaimed
Area compacted – rock trucks ran over site
Dozer ripped grassed mine area - Feb, 2004
Problem: Trees – require non compacted material
and minimal grasses cover
Tress Planted March, 2004
No Volunteer Trees

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Test Plot-Same Area – Different View

Test Plot – Same Area – Another View



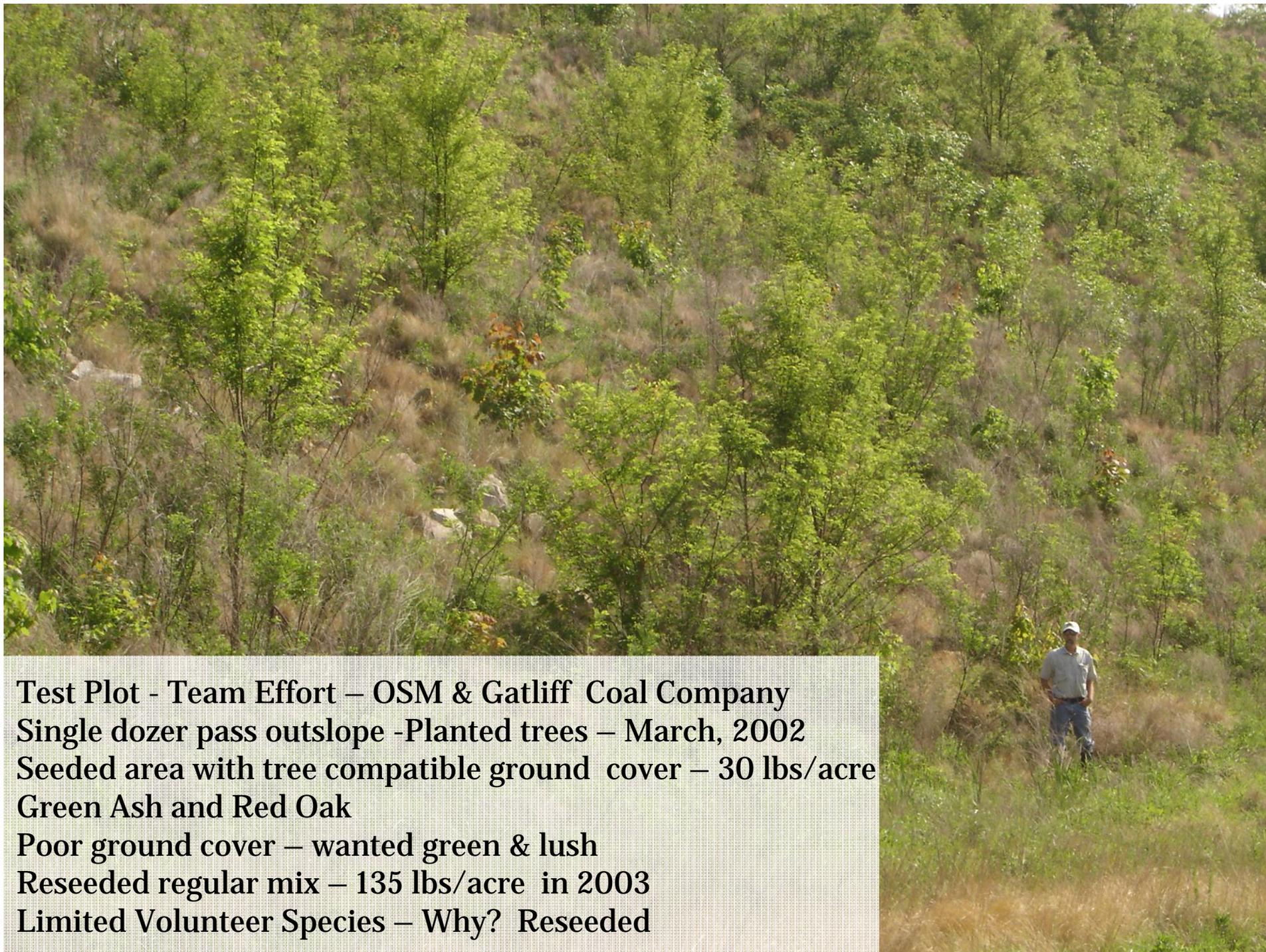
Pin Oak

White Ash





Test Plot
North slope – minimal sun
Steep slopes – minimal compaction
Normal grass/legume mix
Trees planted –March, 2001



Test Plot - Team Effort – OSM & Gatliff Coal Company
Single dozer pass upslope -Planted trees – March, 2002
Seeded area with tree compatible ground cover – 30 lbs/acre
Green Ash and Red Oak
Poor ground cover – wanted green & lush
Reseeded regular mix – 135 lbs/acre in 2003
Limited Volunteer Species – Why? Reseeded

A man wearing a white long-sleeved shirt and a white baseball cap stands in a rocky, cleared area. The ground is covered with large, light-colored rocks and smaller debris. In the background, there are several trees, some of which appear to be newly planted. The overall scene is outdoors, likely in a wooded or hilly area. A semi-transparent text box is overlaid on the center of the image.

Area 14
End Dump Rock Truck
Single Pass
Minimal grasses
Trees Planted 2003 & 2004

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Area 14
End Dump Rock Truck
Single Pass
Minimal grasses
Trees planted 2003 & 2004
90 – 95% sandstone



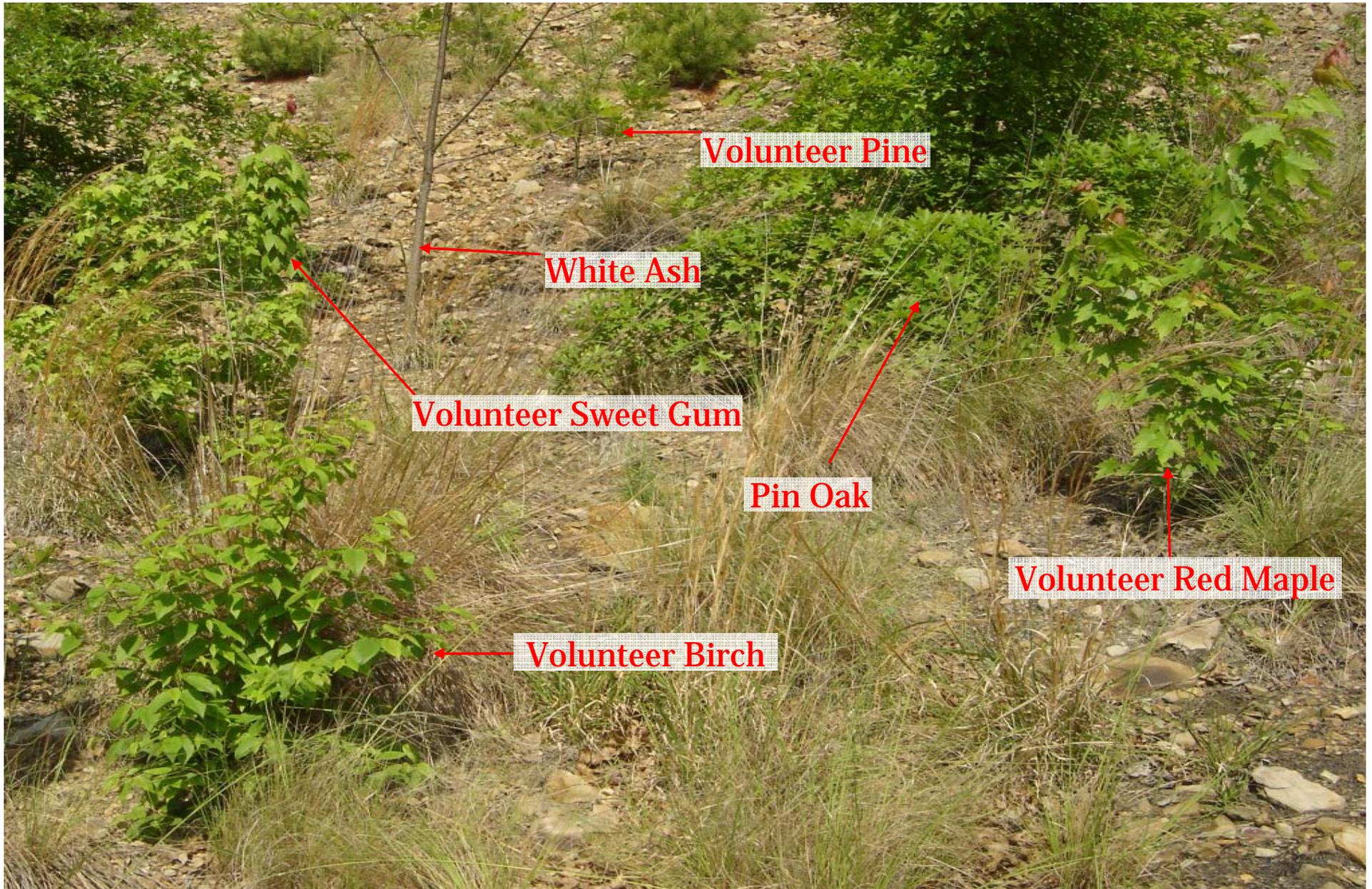
Area 14
End Dump Rock Truck
Single Pass Grading
Minimal grasses
Trees planted 2003 & 2004
90 – 95% sandstone

2007 5 17

A photograph of a wooded area with a person in the background and a text overlay. The text overlay is a white rectangular box with a grid pattern, containing the following text:

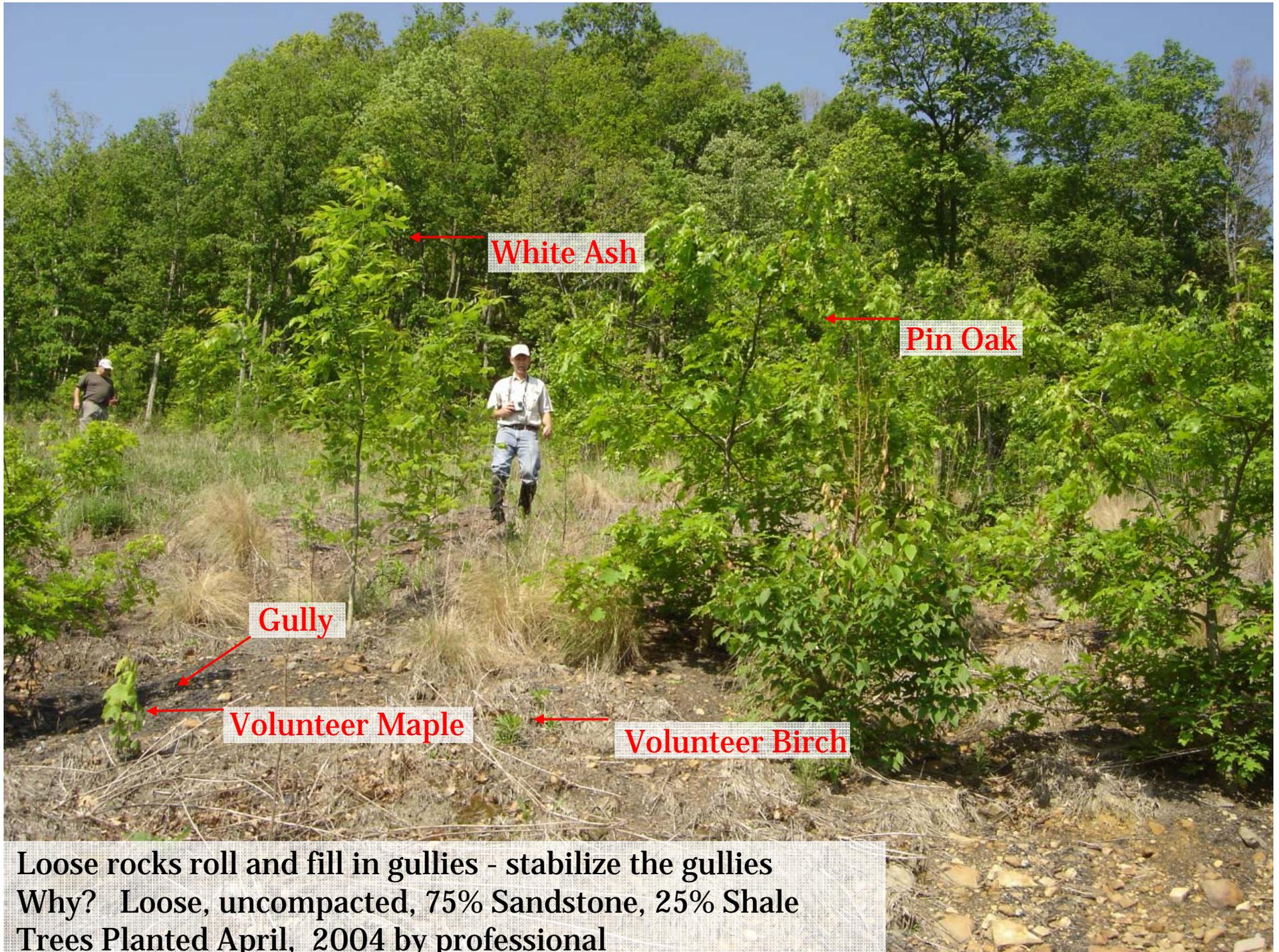
Area 14
Single Pass
Minimal grasses
Trees planted 2003 & 2004

The background shows a dense forest of green trees under a clear blue sky. In the foreground, there is a rocky, cleared area with some dry grass and small green plants. A person wearing a white cap and a dark shirt is visible in the middle ground on the left side.



Permanent vegetative cover – trees
Goal – get trees to grow
Tree planted by professional

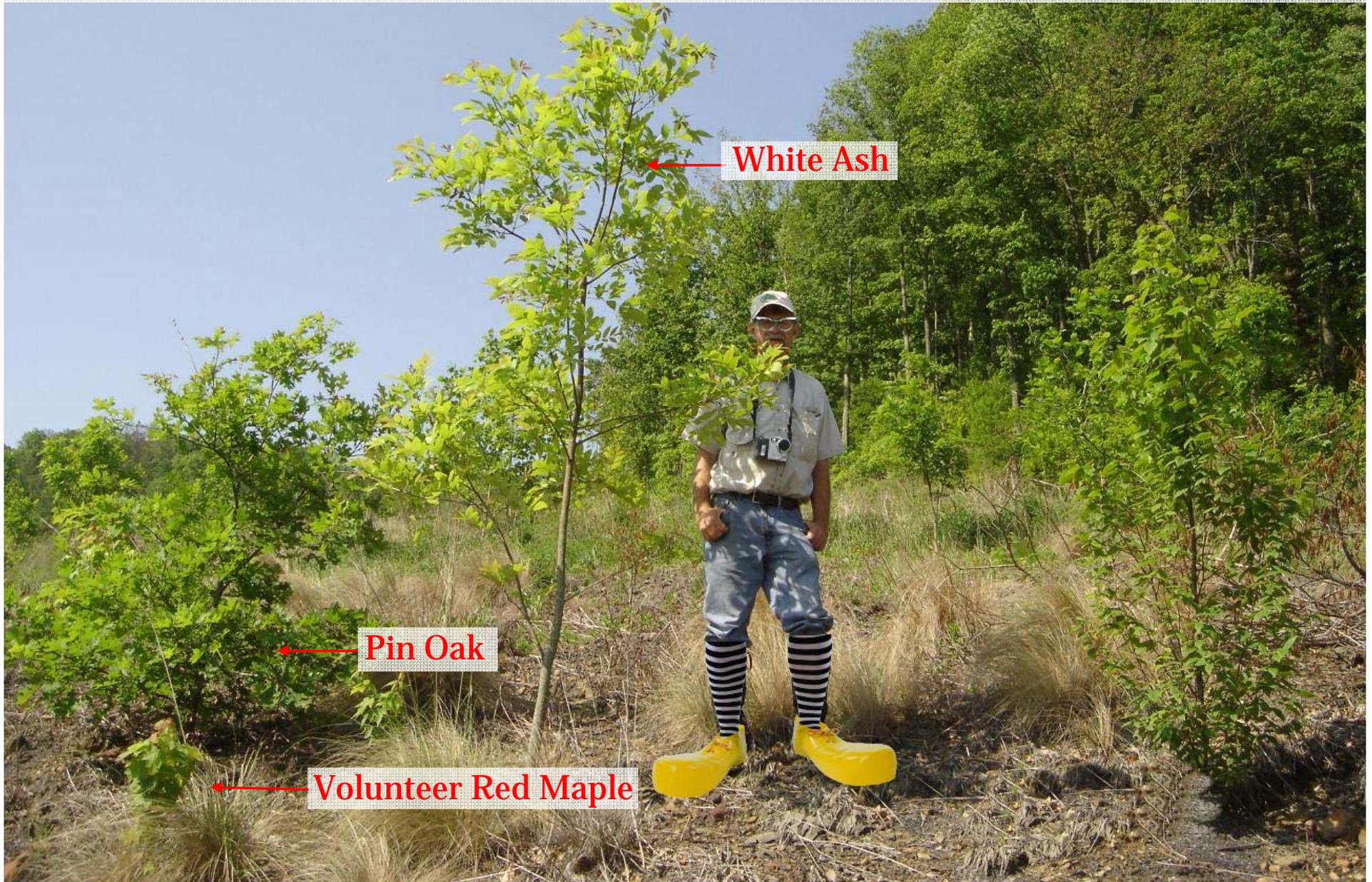
Grass – immediate erosion control
85% Sandstone, 15% Shale
Trees Planted - April 2004



Loose rocks roll and fill in gullies - stabilize the gullies
Why? Loose, uncompacted, 75% Sandstone, 25% Shale
Trees Planted April, 2004 by professional

Permanent vegetative cover – trees
Goal – get trees to grow
Tree planted by professional

Grass – immediate erosion control
Surface -85% Sandstone, 15% Shale
Tress Planted - April 2004



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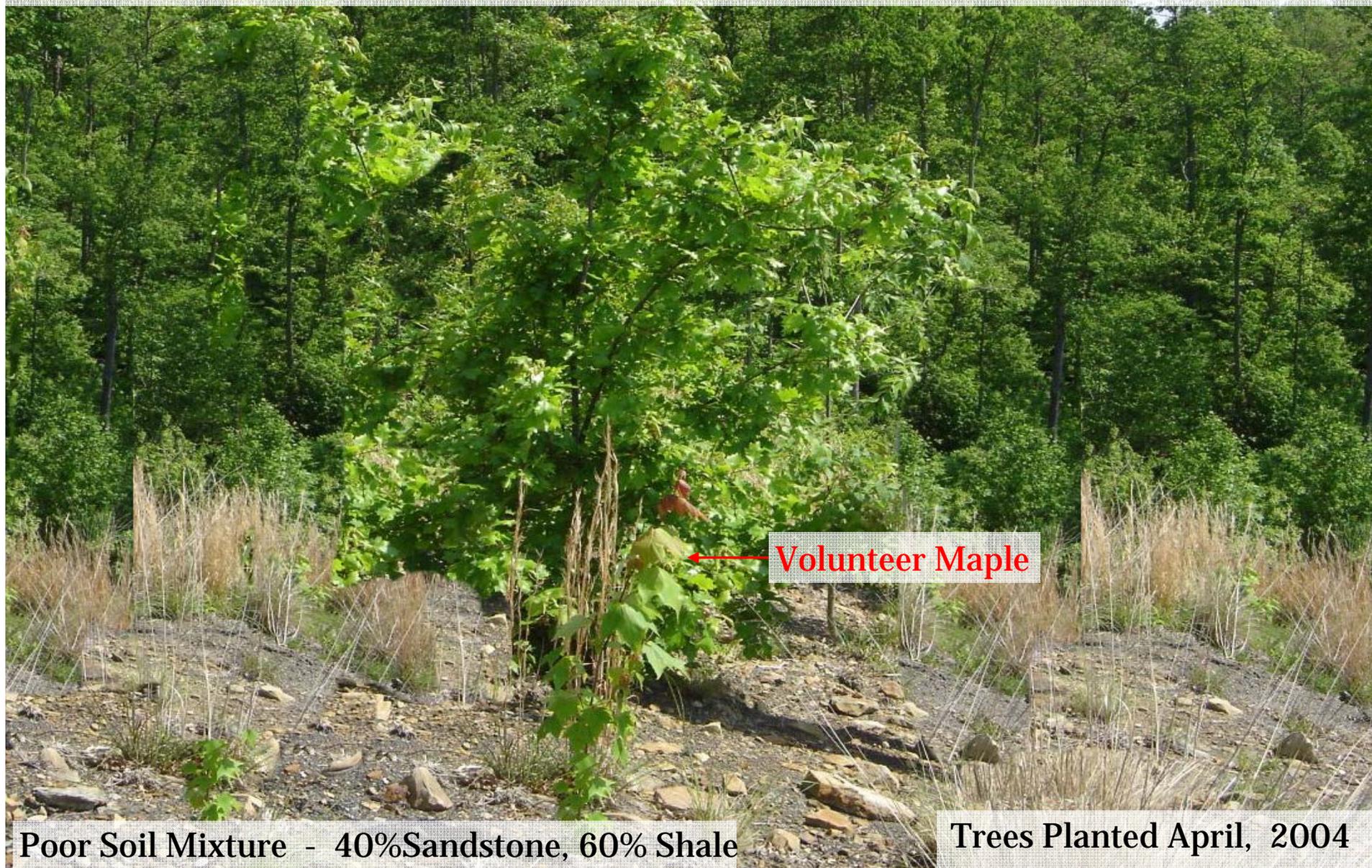


← Pin Oak

← Northern Red Oak

Trees planted
April, 2004

A new ground cover rule change in the Tennessee Federal Program eliminated the 80% ground cover standard. If erosion is controlled and the ground cover supports the post mining land use, a lower standard can be approved in the permit.

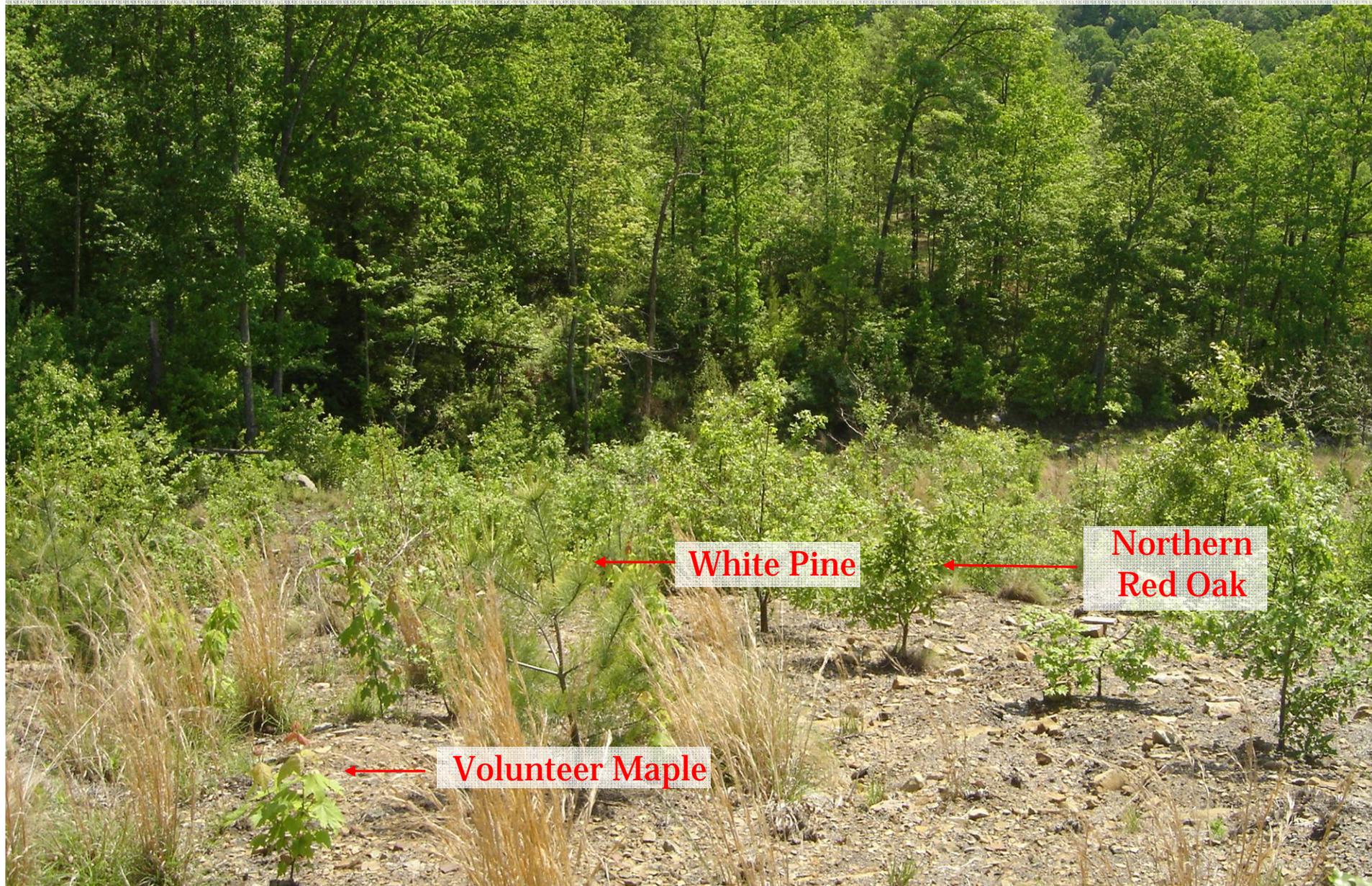


Poor Soil Mixture - 40% Sandstone, 60% Shale

Trees Planted April, 2004

Trees planted April, 2004
Seeded with grasses – 30 lbs to acre
Did not reseed grasses

Shale 40% Sandstone 60%





**If ground cover does not take
Leave alone, Do not reseed!
In 5 years- forest
April, 2004 Picture - May 2007**



Trees grow better on slopes – less compaction
Proper soil mixture – 70% Sandstone, 30% Shale
Out slopes 17°
Trees planted April, 2004