

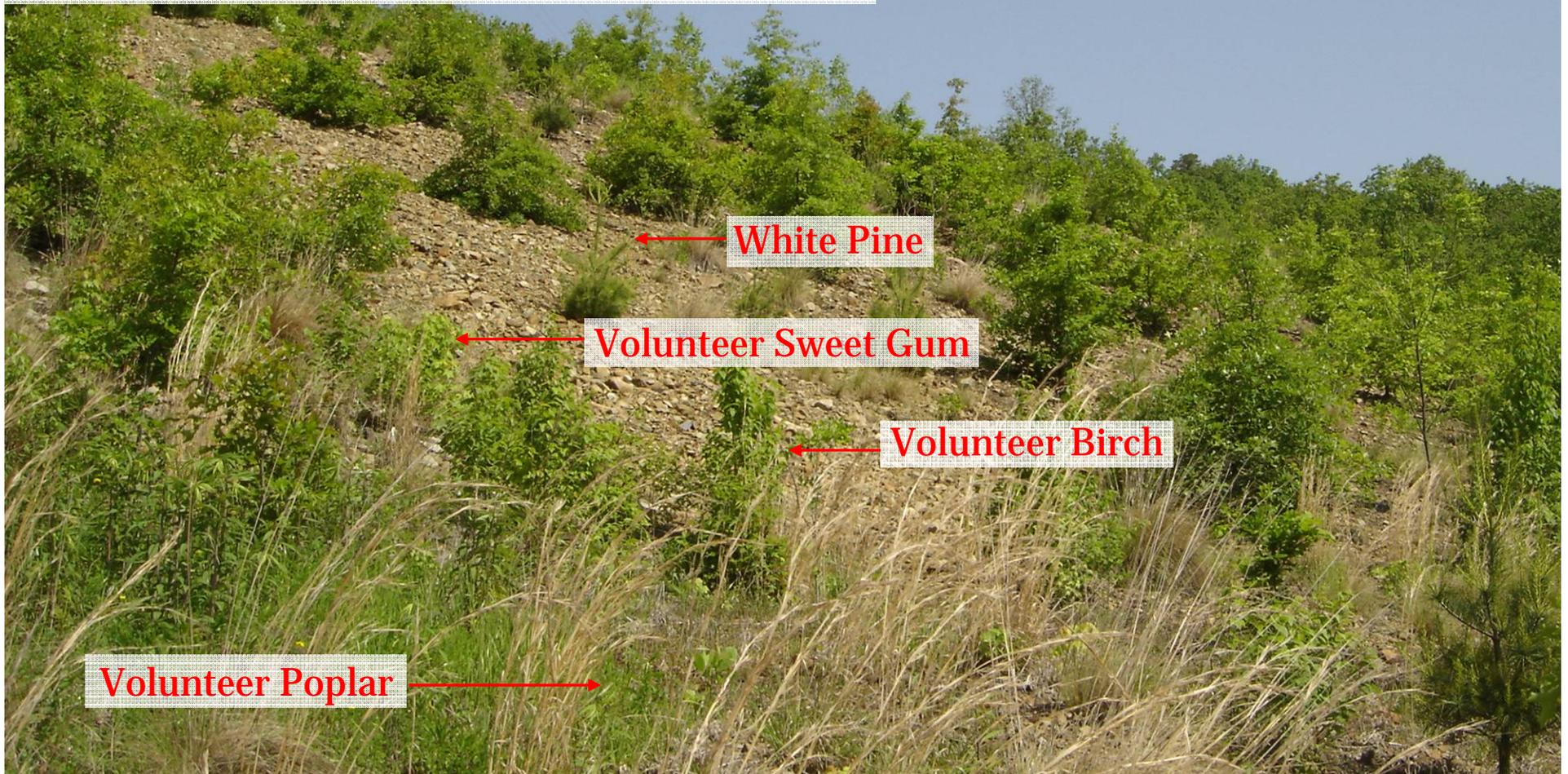


**If ground cover does not take
Leave alone. Do not reseed!
Trees planted April, 2004**



**Proper soil mixture – 70% Sandstone, 30% Shale
Trees planted April, 2004**

Trees grow better on slopes – less compaction
Proper soil mixture – 70% Sandstone, 30% Shale
Out slopes 15°
If ground cover does not take, leave alone!
Do not reseed
In 5 years – forest
Hire a professional tree planter
Trees planted April, 2004



Shale Verses Sandstone

Grass Verses Minimal Seeding

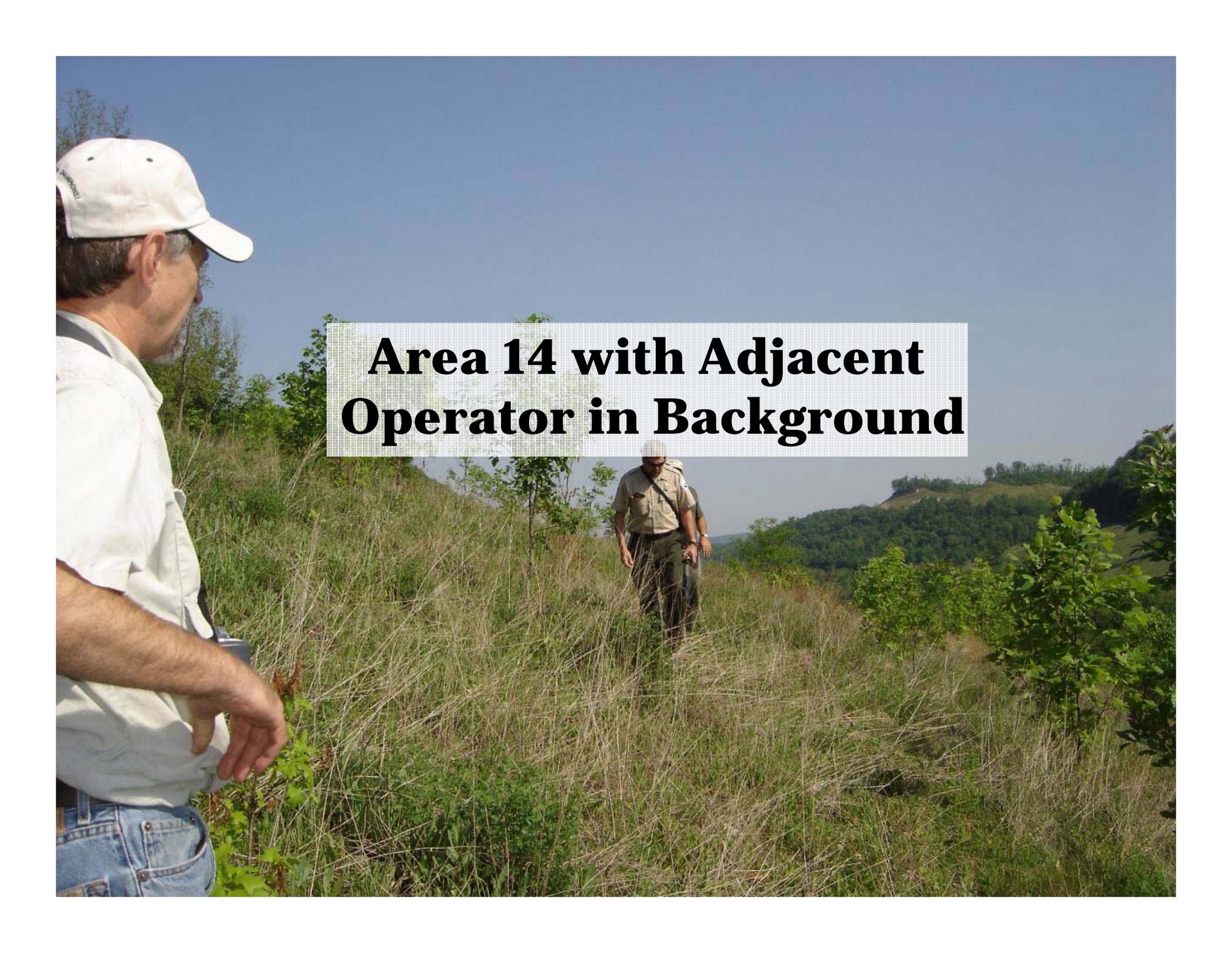


Shale Backfill Minimal Sandstone
Trees Planted 2003

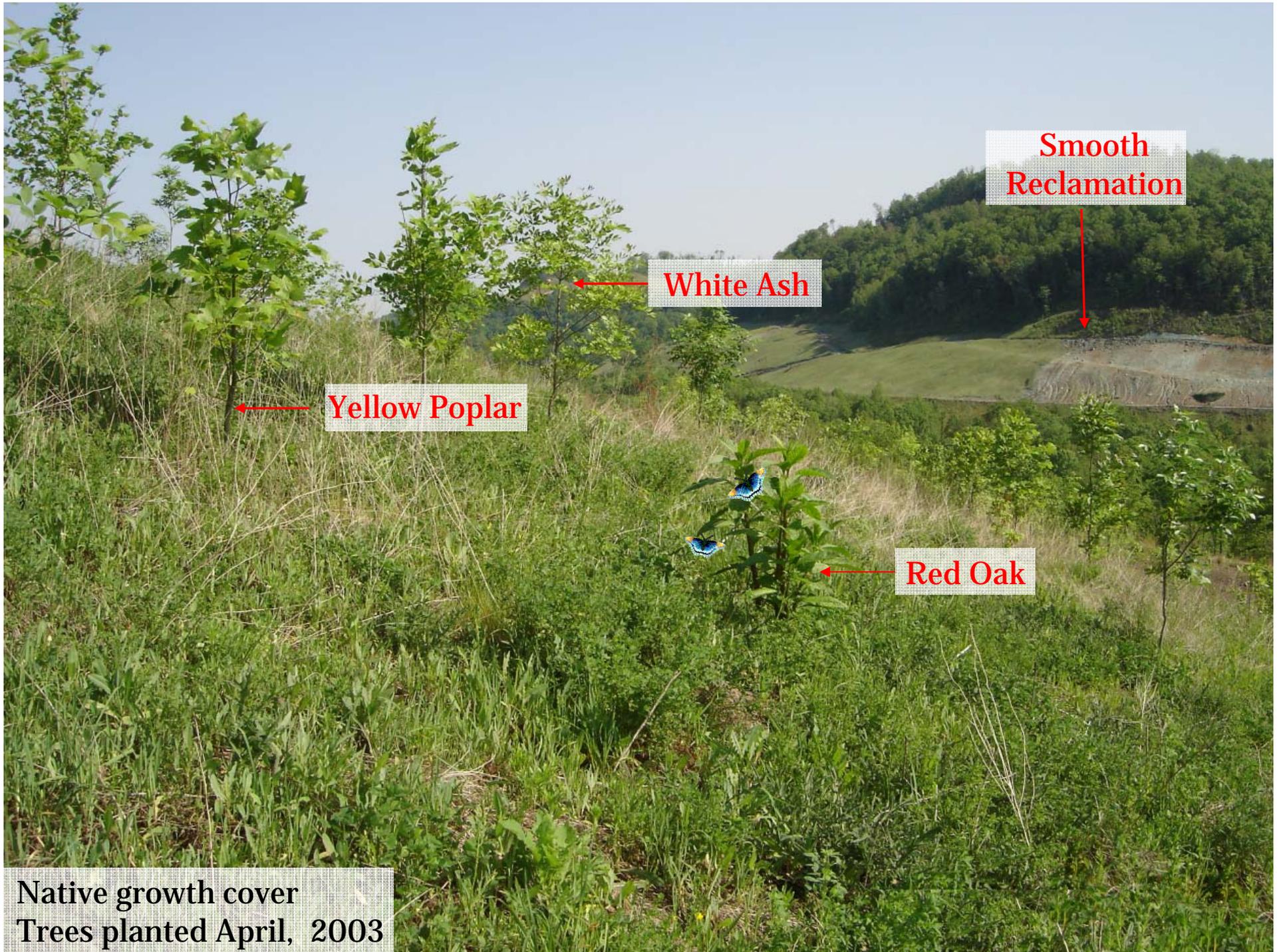


Sandstone Backfill Minimal Shale
Trees Planted 2003

Grasses & Legumes had same seed and mixture



**Area 14 with Adjacent
Operator in Background**



Smooth
Reclamation

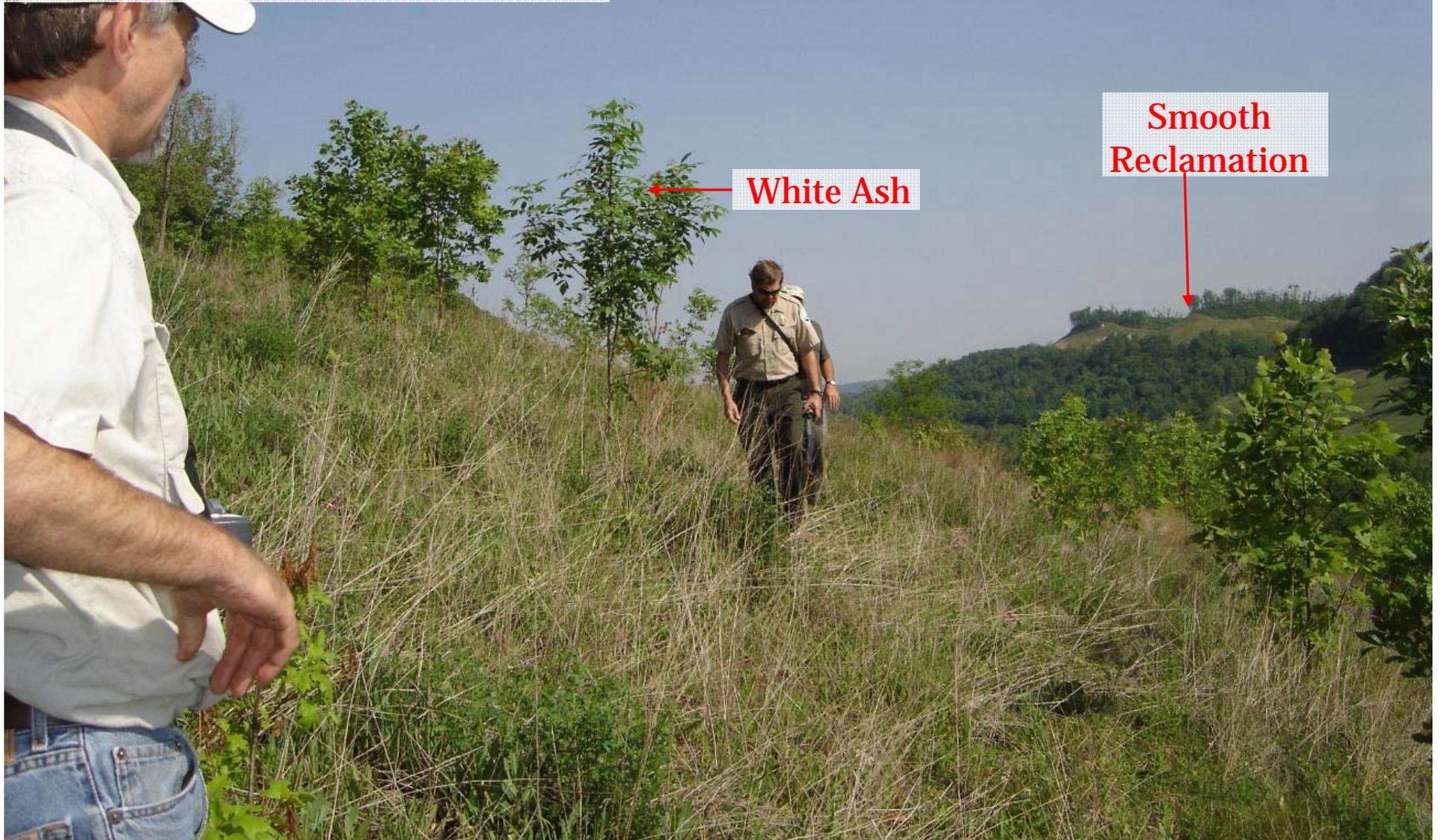
White Ash

Yellow Poplar

Red Oak

Native growth cover
Trees planted April, 2003

Excessive vegetation
Trees do not grow as well
Survival substantially less
Native volunteer species do not grow
Trees planted April, 2004



White Ash

Smooth
Reclamation

Area Mined 1988
No trees on out slopes
Why? Compacted, Shale
Seeded: grasses & legumes



Native Reforestation
“Nature Restoring Itself”

**Material Storage Area – Reclaim Deep Mine
Single Pass Graded with Dozer
No Grass, Legumes
No Trees Seeded or Planted**



**Volunteer Reforestation
Mined & Placed 1997**



**Volunteer Reforestation
Mined & Placed 1997**



**Volunteer Reforestation
Mined & Spoiled 1997
Note: 95% Sandstone – Leveled by Dozer –in single pass**



**Maximum age of trees – 10 years
Volunteer Reforestation
Mined & Placed 1997**



**Volunteer Reforestation
Mined & Spoiled 1997**



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Volunteer Reforestation
Mined & Placed 1997**



**Positive and Negative
Attitudes Toward Reforestation**

Obstacles to Reforestation

- **Attitude Regulators**
 - Favor grasses & legumes
 - Smooth out slopes
 - Compacted material
 - Full vegetative cover – no bare spots
 - Quick dense cover
 - Logic – Stability, Minimize siltation
 - Minimize rills & gullies
 - **End result-can't get trees to grow**



Reforestation vs Grasses & Legumes



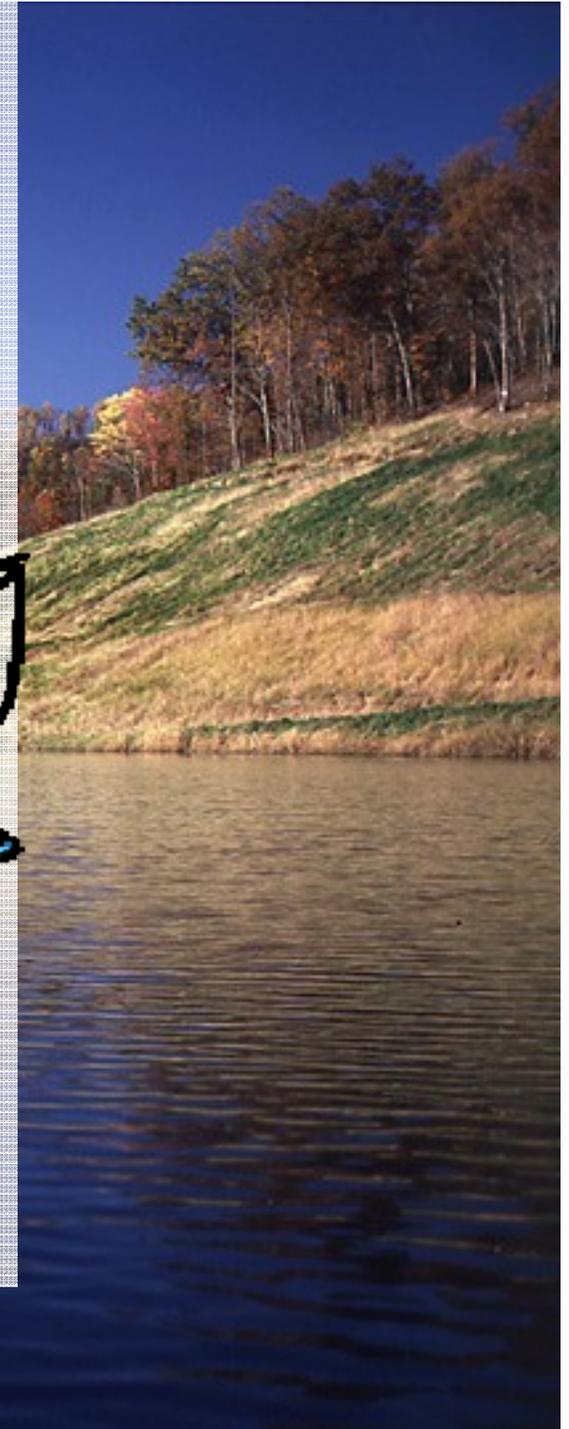
Mine Area
Reforestation



Mine Area
Grasses & Legumes

Obstacles of Reforestation

- **Environmental Groups & News Media**
 - Minimal Vegetative Cover – Negative Attitude
 - Photographs – Negative Publicity
 - Flyovers - Portray Poor Public Image
- **Fish & Wildlife & Specific Species Group**
 - Feed Areas - Minimal Trees
 - Sufficient Trees – Exist Already
 - Want More Diversity
- **Surface Property Landowner**
 - Prefer grasses
 - Off road vehicles & recreation activitie
 - Raise cattle & goats
 - Development – housing or hunting cabin
 - No interest 40 to 60 year forest**



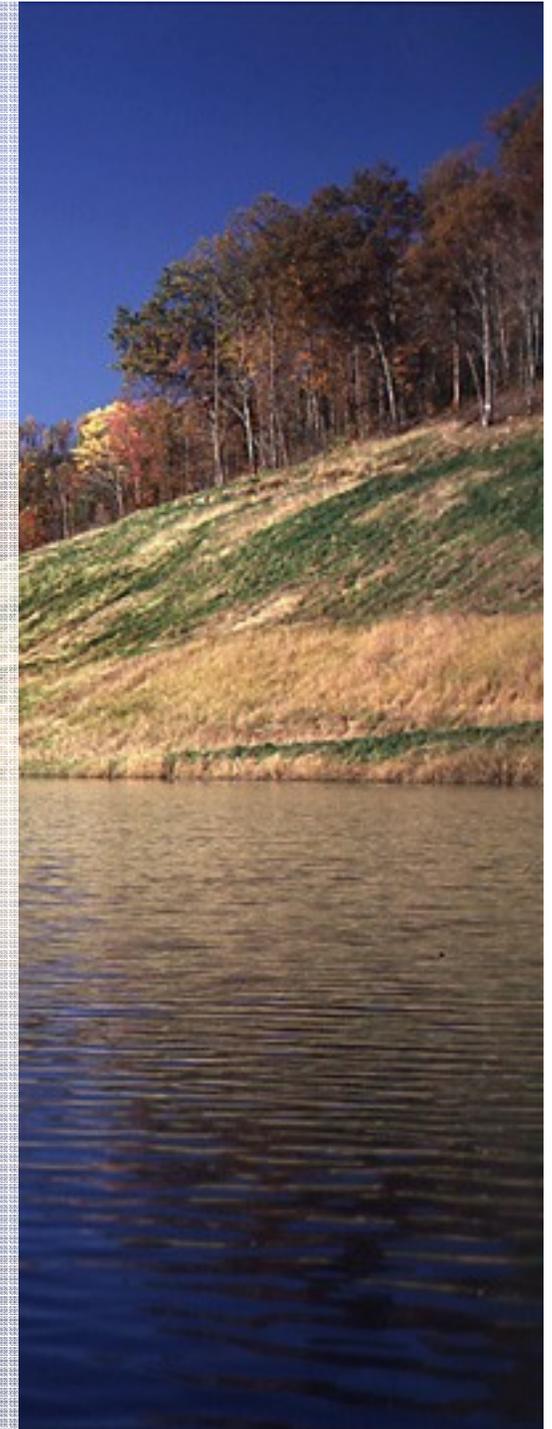
Positive Aspects

Reforestation

- **Why Reforestation at White Oak**
 - Favorable attitude - jointly
 - OSM
 - Tennessee Division of Water
 - Surface Land Owner – Timber Company

- **Equipment and Supply Savings**
 - Less dozer time required – Reclamation
 - Reduced grading – Single pass
 - More time for equipment to produce coal
 - Savings \$1,450/acre

- **Less Seeding, Fertilizer, Lime**
 - Saving of \$250 to \$300/Acres
 - Grasses prefer a ph 7
 - Trees -ph<6 and even below 5 grow better
 - Improved use for marginal soils
 - Minimal reseeding



Positive Aspects (cont.)

- **Unexpected Result**

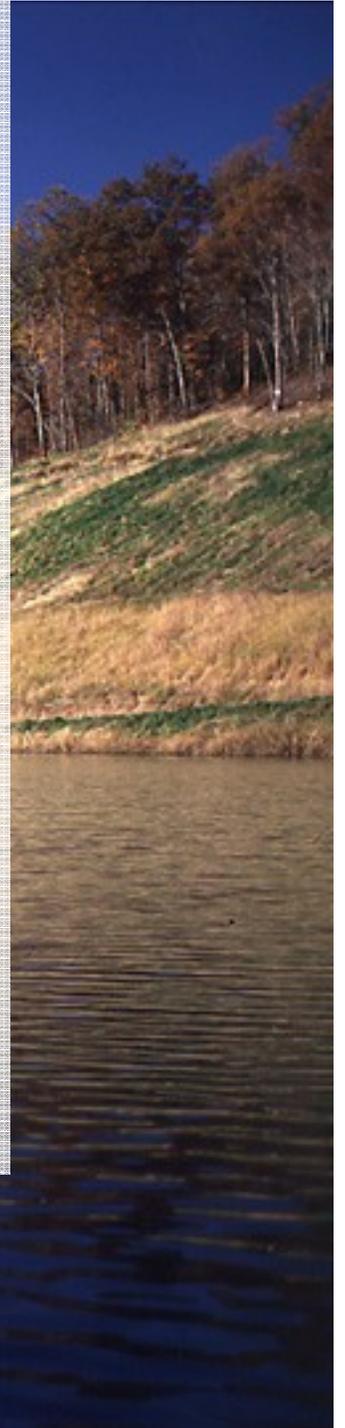
- Ponds – No sediment removal from ponds
- Minimal pond maintenance
- Savings from \$5,000 - \$25,000/pond

- **Potential for Less Sedimentation**

- **Minimize Shale or B/C Horizon on Outslope**

Trees: 60 – 90% Sandstone 10% to 40% Shale

- Need Scientific Research Community to verify & document
- Less erosion
- Slower runoff
- Improved moisture infiltration
- Material permeability
- Less pond sedimentation or siltation
- Improved tree growth



Positive Aspects (cont.)

- **Profitable Post Mining Land Use – Commercial Forest**

- Future timber production
- Aesthetics & environmental diversity
- Improved wildlife habitat
- Possible carbon capture (Sequestration)
 - Photosynthesis – carbon is stored in cellulous
 - Potential: up to 300 tons/acre – Mature forest
 - Carbon credits being traded CCX (Climate Control Exchange) on the: Chicago Mercantile Exchange

- **Investment in the community**

- Improved use - Marginal soils
- Where difficult for grasses – trees grow well

- **Downside**

- Slightly greater potential – for lower ph runoff
- More moisture in backfill – more permeable
- Potential leaching - iron and manganese from overburden

Cost

- **Cost Savings**

- Reduced grading – single pass

- Savings of \$1,450/acre

- Fewer gullies and rills - Why?

- Slower runoff

- Surface more uneven

- Material uncompacted with loose surface

- Soil more permeable

- Improved water table

- Less seed and fertilizer

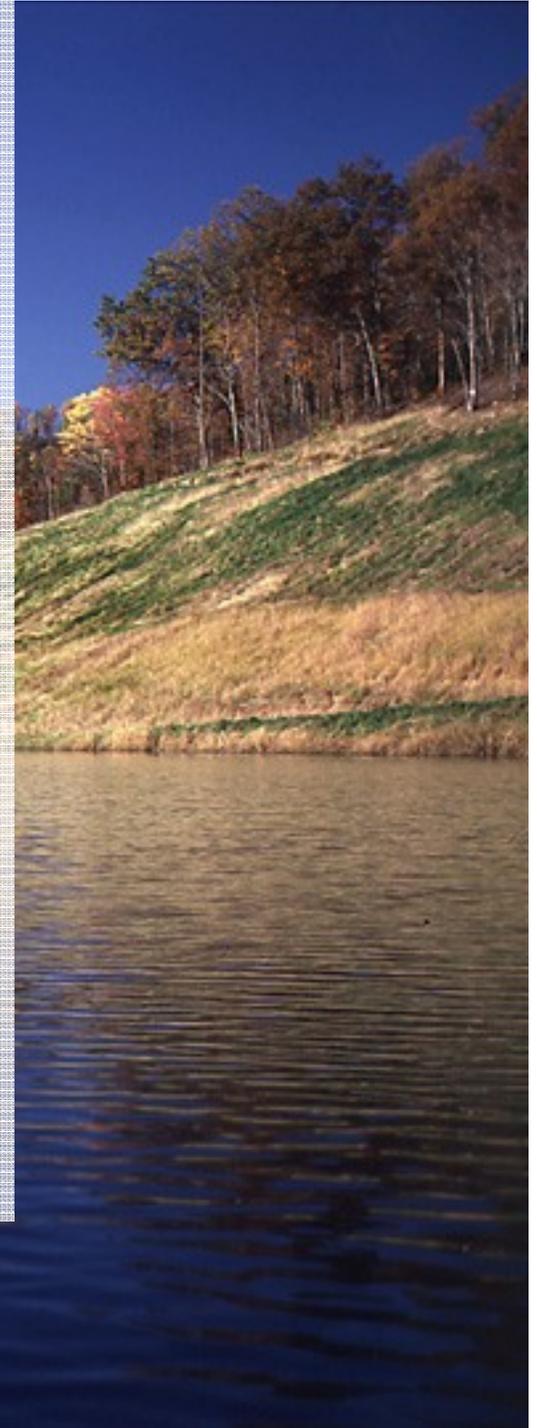
- Saving \$250 to \$300/acre

- Minimal reseeding

- Less siltation

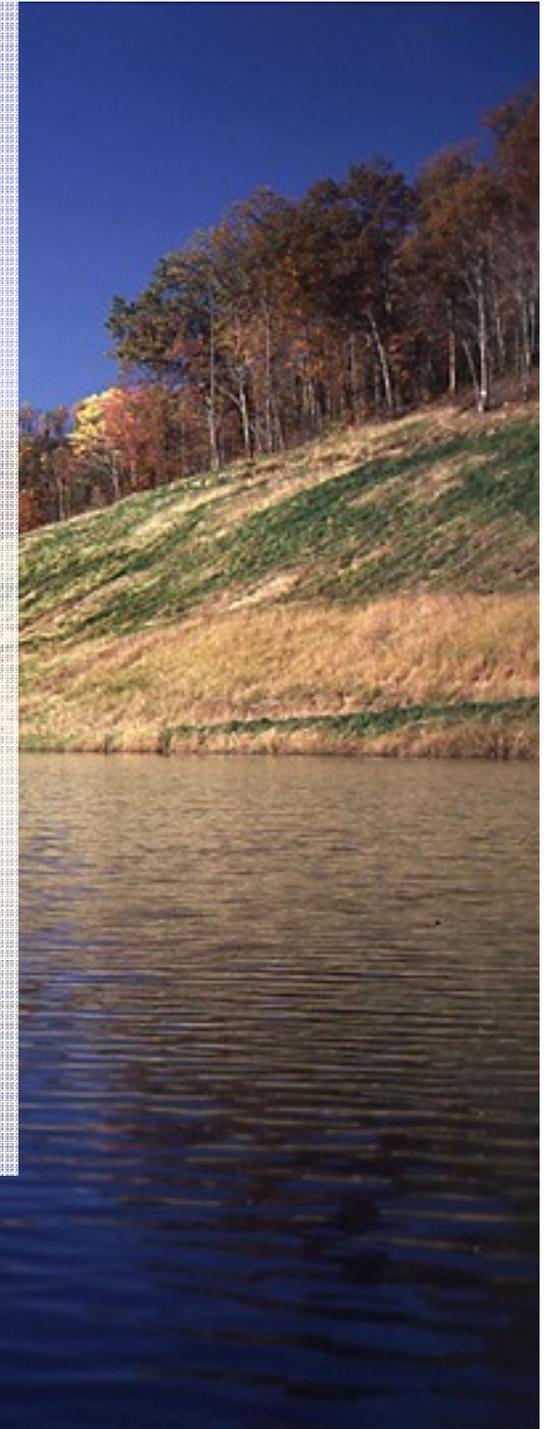
- No pond dipping required

- \$5,000 to \$25,000/pond



Cost

- Additional Cost
 - More Time Consuming – Management/Planning
 - Change standard parameter permitting process
 - Unwillingness to Change
 - **“We’ve Always Done It This Way”**
 - Engineering & Permitting Personnel
 - Operating Personnel
 - Regulators
 - Inspectors
 - Media
 - Educate Operating Personnel
 - Management
 - Foreman & Superintendent
 - Re-educate Equipment Operators



Summary

▪ **Reforestation Compatibility - Recommendations**

- **Discuss with all parties early**
 - **Be sure all parties are on same page**
- **Proper blend of sandstone and shale on surface**
 - **60% to 90% Sandstone**
 - **10% to 40% Shale or B/C soil horizons**
- **Rough ground surfaces – more permeable**
 - **Roots penetrate more easily**
- **Single pass to minimize compaction**
 - **Keep rubber tired equipment off areas**
- **Less aggressive ground covers**
 - **Minimize grasses and legumes**
- **Hire a professional tree planters**
- **Requires ground cover rule change**
 - **“80% ground cover” to “control erosion & support post mining land use”**



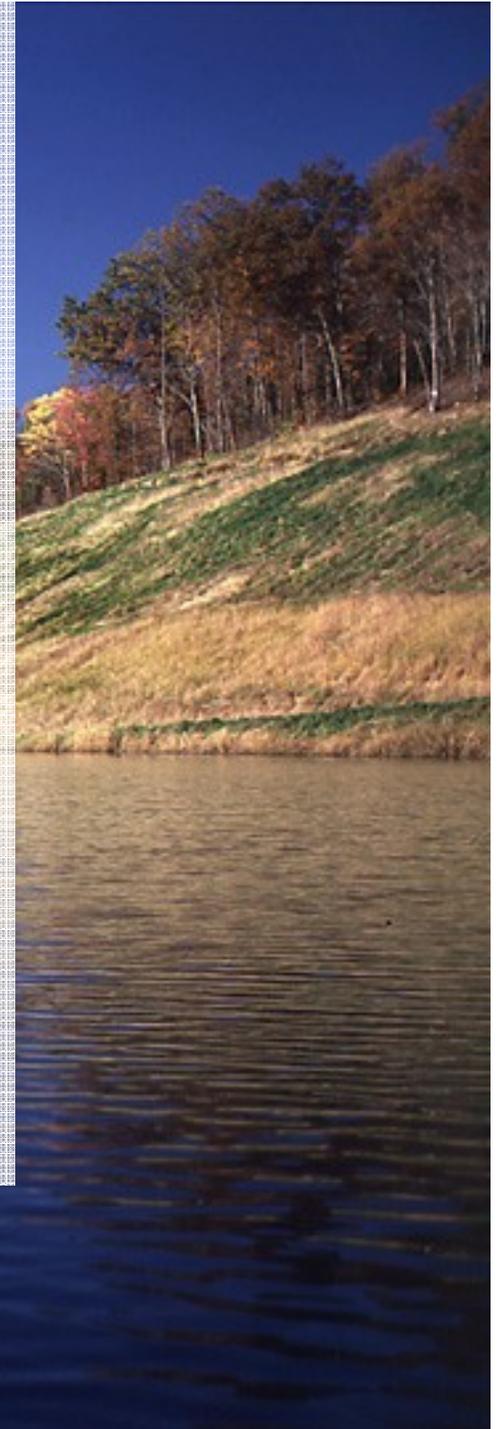
Summary (cont)

- **Carbon Credits**
 - **Potential marketing tool to sell coal**

- **Forestry Carbon Emission Offsets**
 - **Traded on Chicago Mercantile Exchange**
 - **Chicago Climate Exchange (CCX)**
 - **392,000 Forestry Offsets Issued**
 - **2 Forestry Offset Projects – Illinois**

- **Requires**
 - **Offset Project Registration, Verification & Crediting**
 - 1. Submit Project Proposal to CCX**
 - 2. Obtain Project Verification**
 - 3. Register as a CCX offset Provider or Offset Aggregator**
 - 4. Receive CCX CFI Contract for Project Offsets**
 - CFI – Carbon Financial Instrument**

CCX Website: www.chicagoclimatex.com





The End

The End

