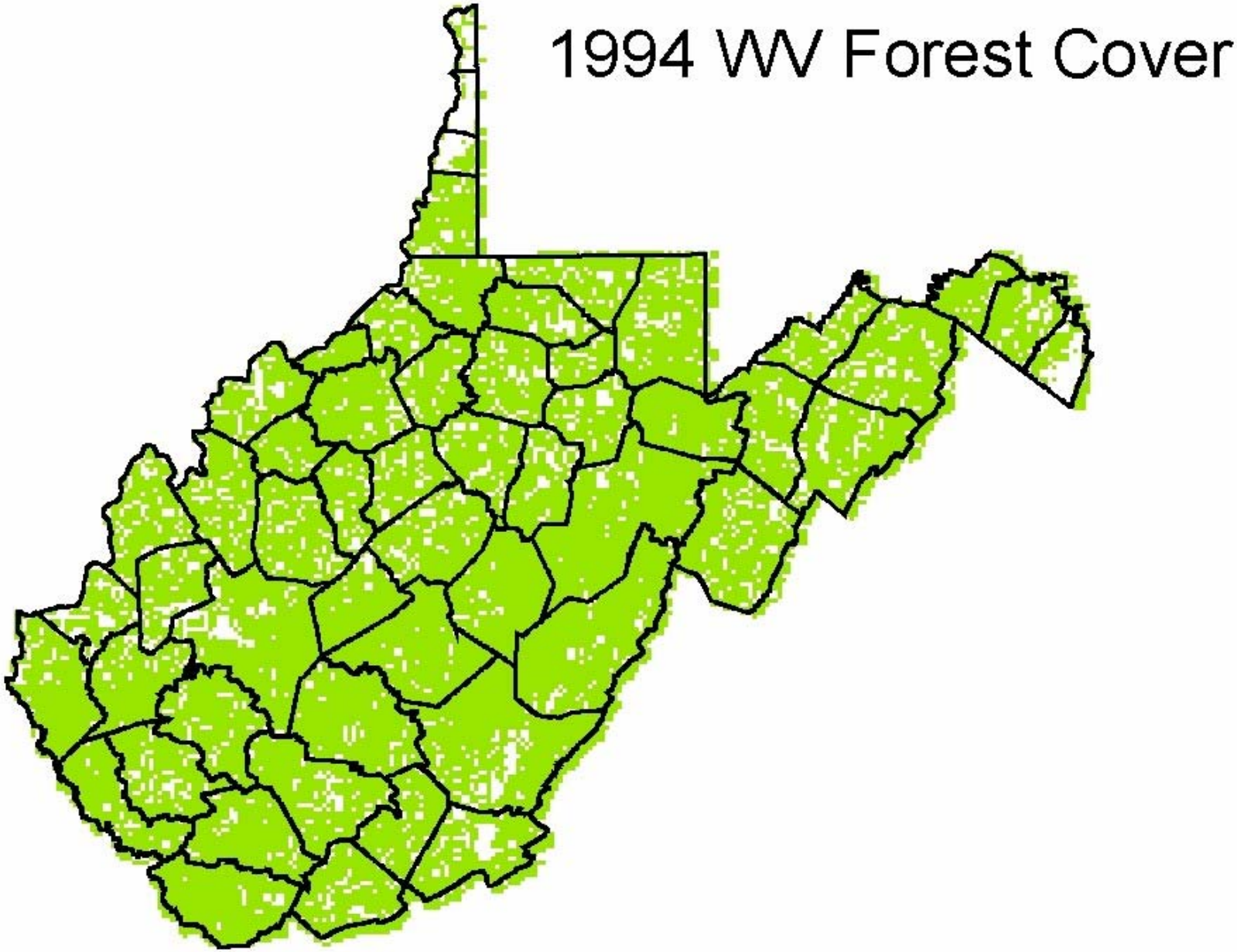
INFLUENCE OF GROUNDCOVER ON REFORESTATION

West Virginia is

- Predominantly mountainous terrain.
- 78% forested.

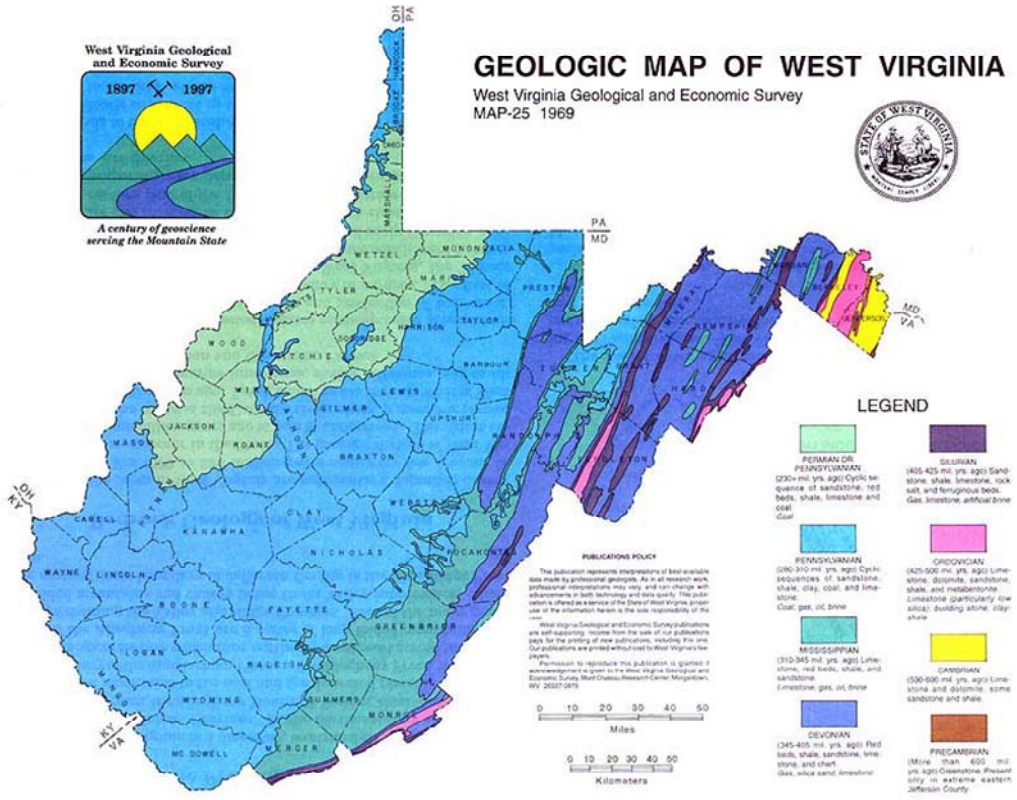
Not just any old forest.
This is the Eastern Deciduous Forest!

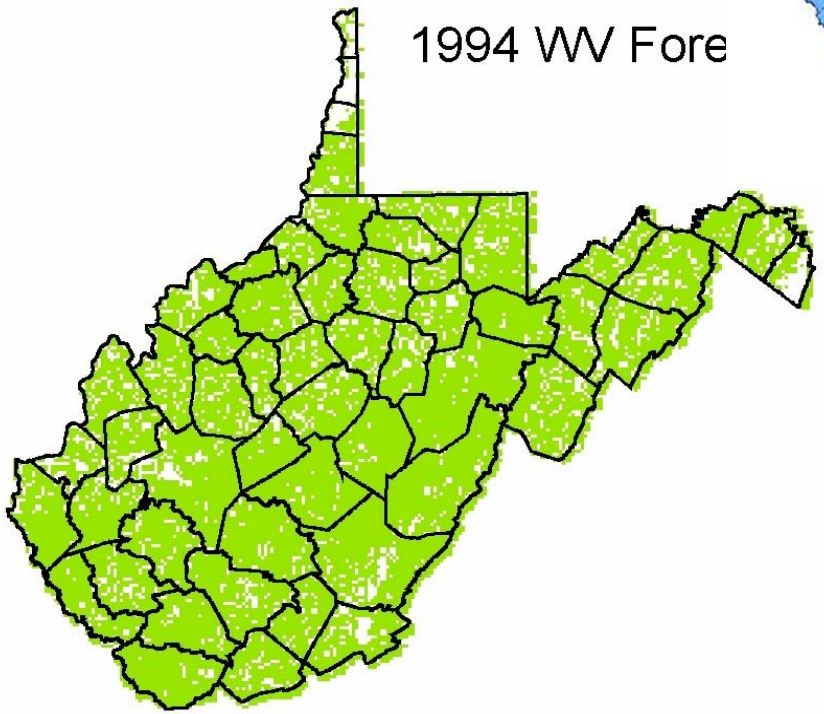

1994 WV Forest Cover

West Virginia Forestry Industry
Provides jobs for over 30,000 people
Contributes $3.5 billion yearly to economy

West Virginia has COAL!

Forests and Coal



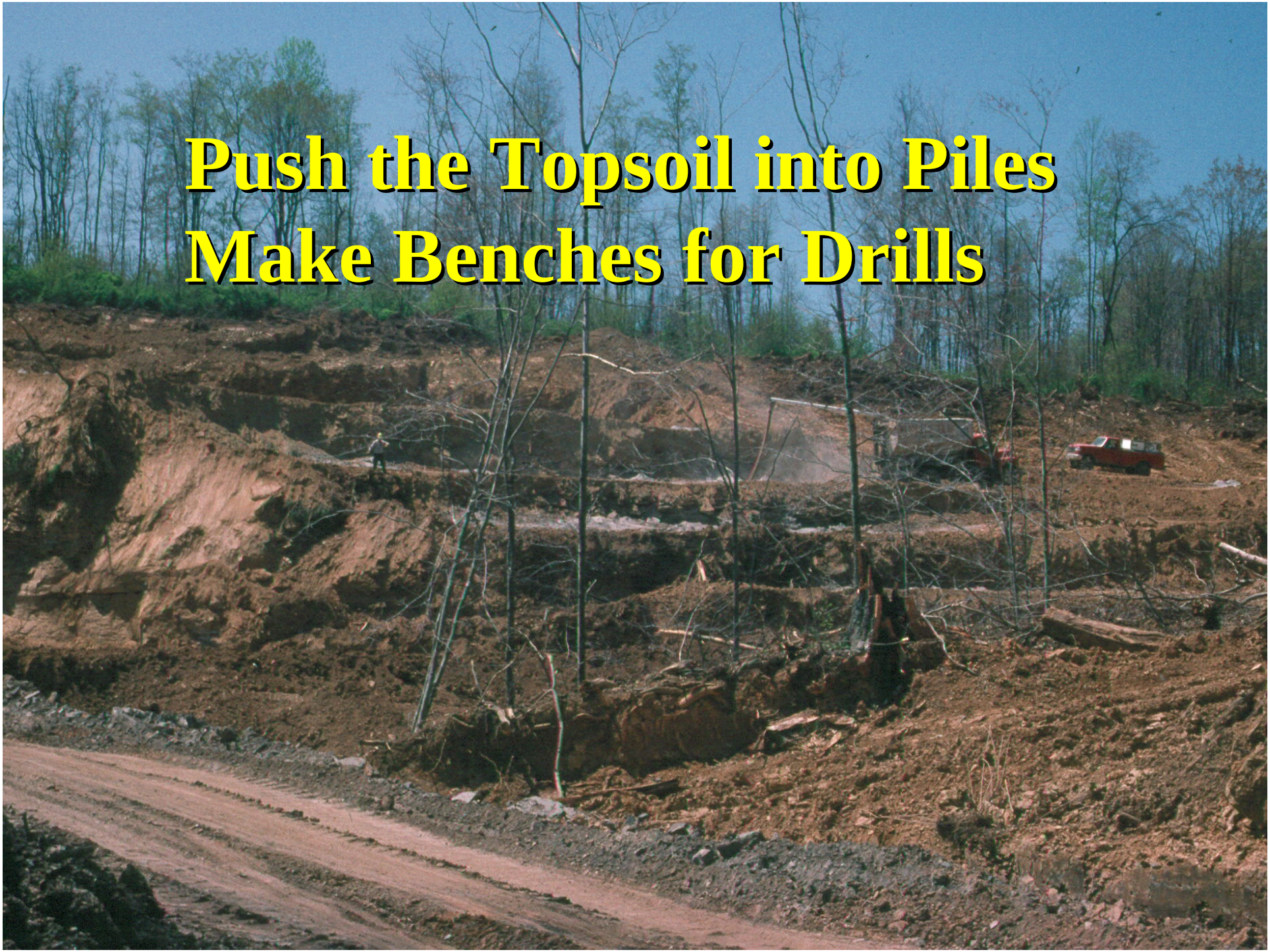


Deep Mining follows the coal from the outcrop and removes the coal from under the mountain (60%).

Surface Mining disturbs the land surface to get to the coal.

SURFACE MINING PROCESS

Take the Trees Off


Push the Topsoil into Piles
Make Benches for Drills

Drill and Blast
Remove Overburden
2006 10 5

Remove the Coal

Back haul the material and dump

Or place material by dragline random spoiling placement

Grade material to AOC,
this can be compacted for stability

Some slopes are steeper than others!

Backfill and Topsoil

“Tracking In” is practiced for ….

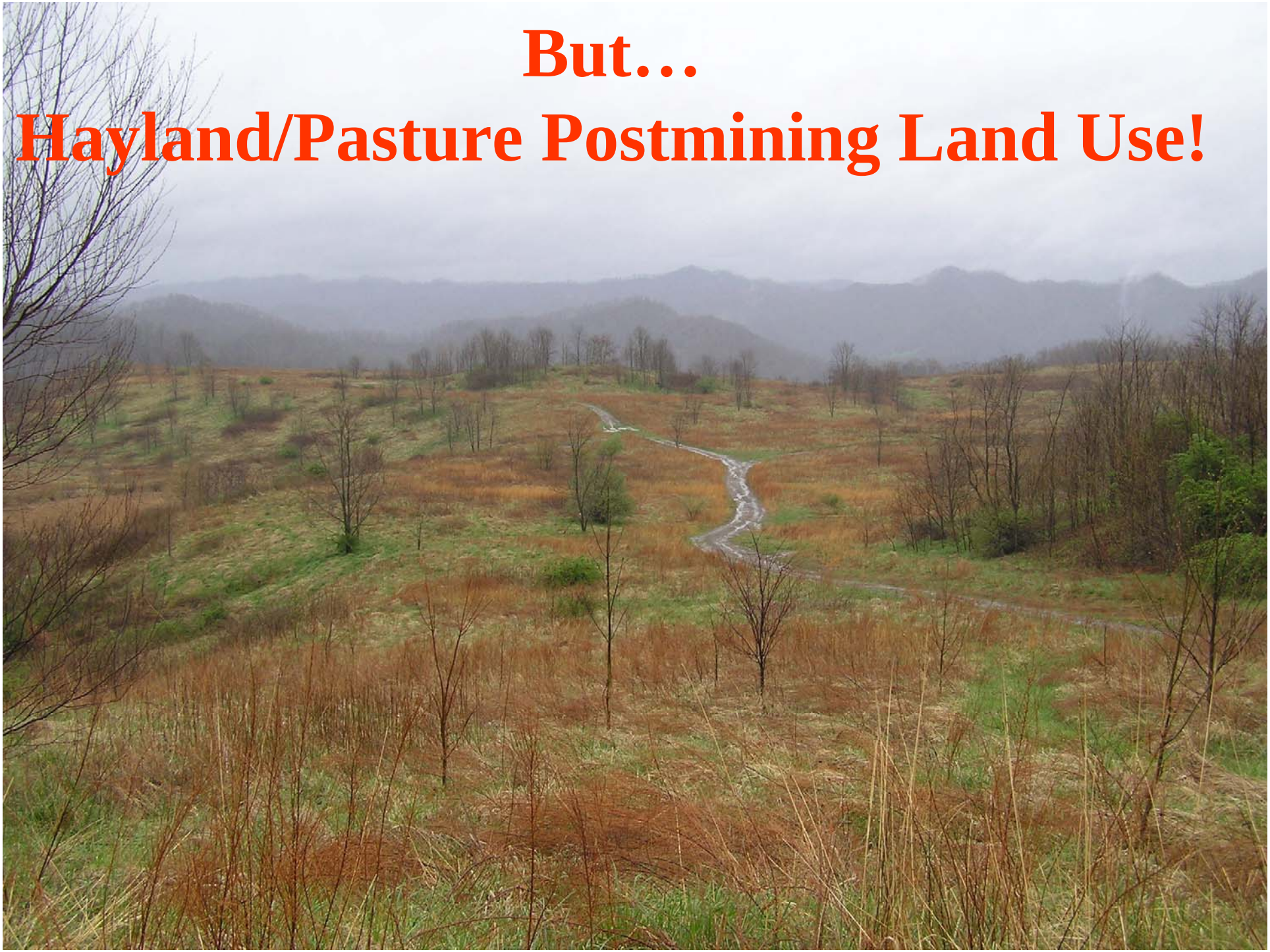
REVEGETATION
Topsoil, Lime, Fertilizer, Mulch, Groundcover
Heavy Rates!

Large, open expanses of pastures

Productive post-mining farm uses

Fast economic returns

But…
Hayland/Pasture Postmining Land Use!



But what about the pre-mining land use?

Serious groundcover
No trees ever?

Grass and Invasive Shrub Wasteland

Reversion to Forest

How Long?

Worse yet, a monoculture of useless plants!

Or something that could have been transplanted with good trees earlier!
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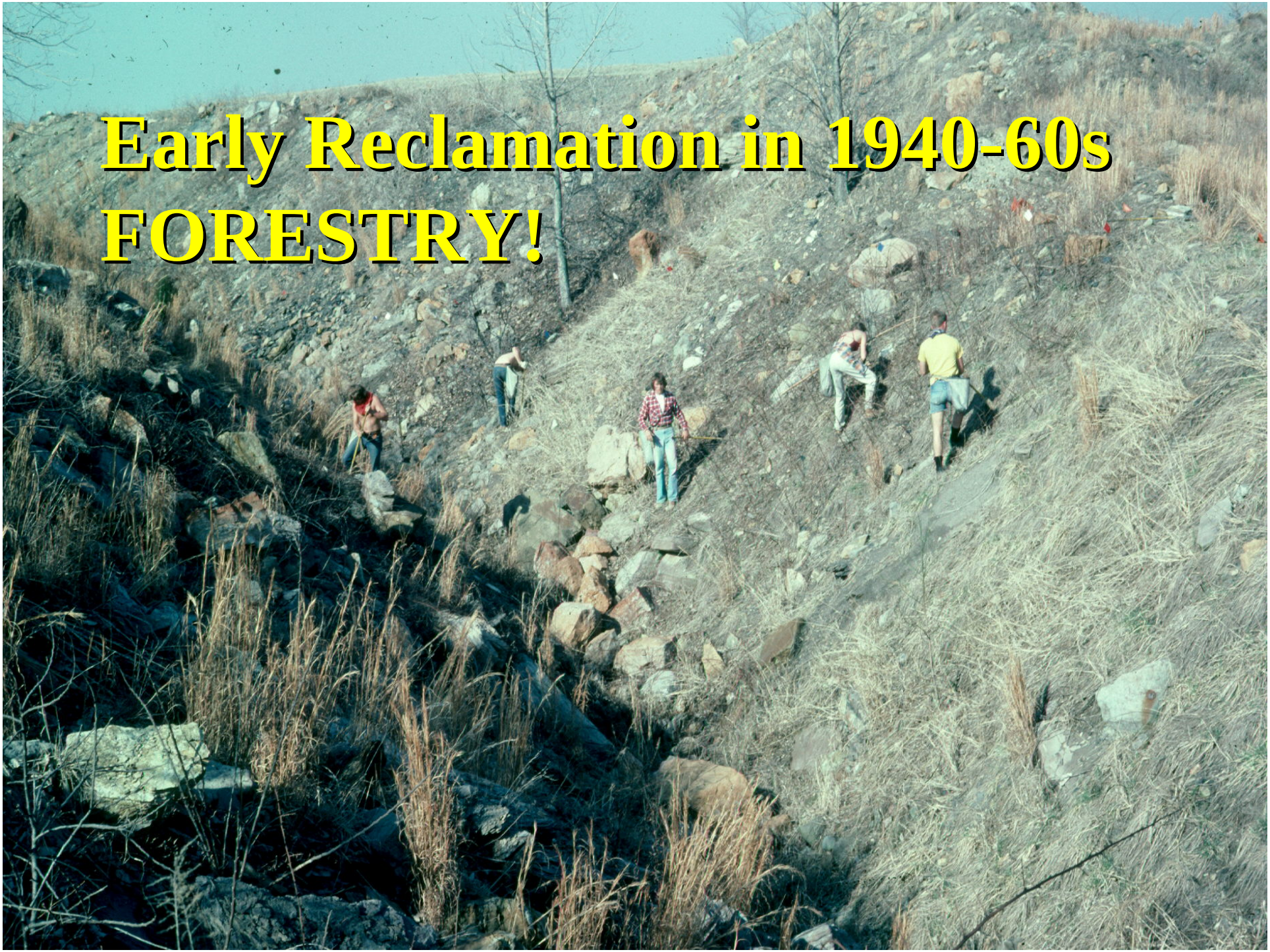
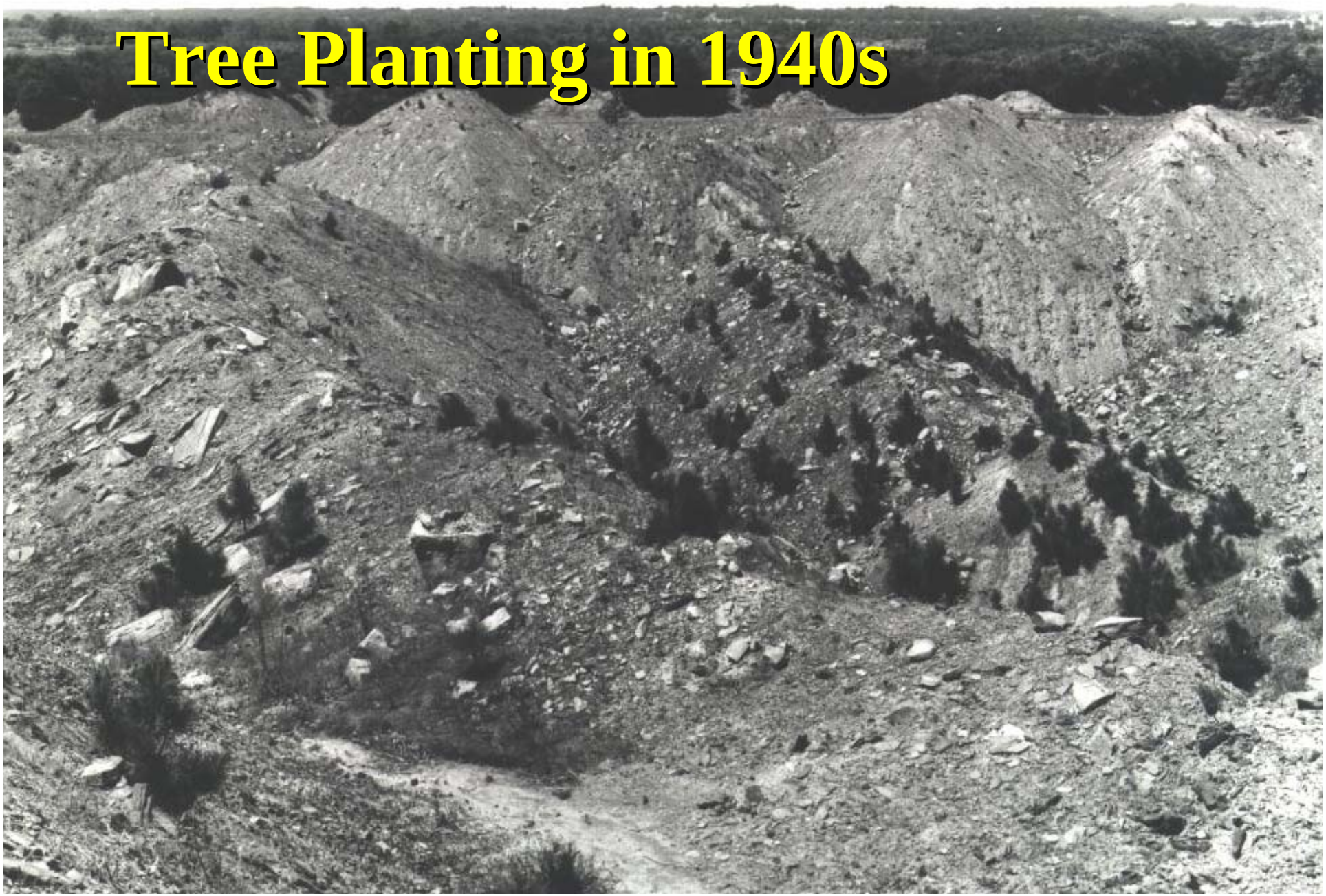
SMCRA requires:

- Backfill, compact, and regrade to approximate original contour.

- Restore affected land to similar … higher or better use.


Early Reclamation in 1940-60s
FORESTRY!

Tree Planting in 1940s



Abandoned Mined Land
Natural Reclamation to Trees

Some of these old mined sites have the best tree growth!

Old uncompacted contour jobs

Readily revert back to trees!

Reforestation Initiative

4 C's of Reforestation

1. Composition of material
2. Compaction
3. Competition
4. Consumption

1. Composition of Material

Sandstone vs Shale

1. Composition of Material

Brown vs Gray Sandstone

Reclamation materials
can come from
any interval

Experimental Plots

Trees grow in both!
But…how well?

2. COMPACTION!

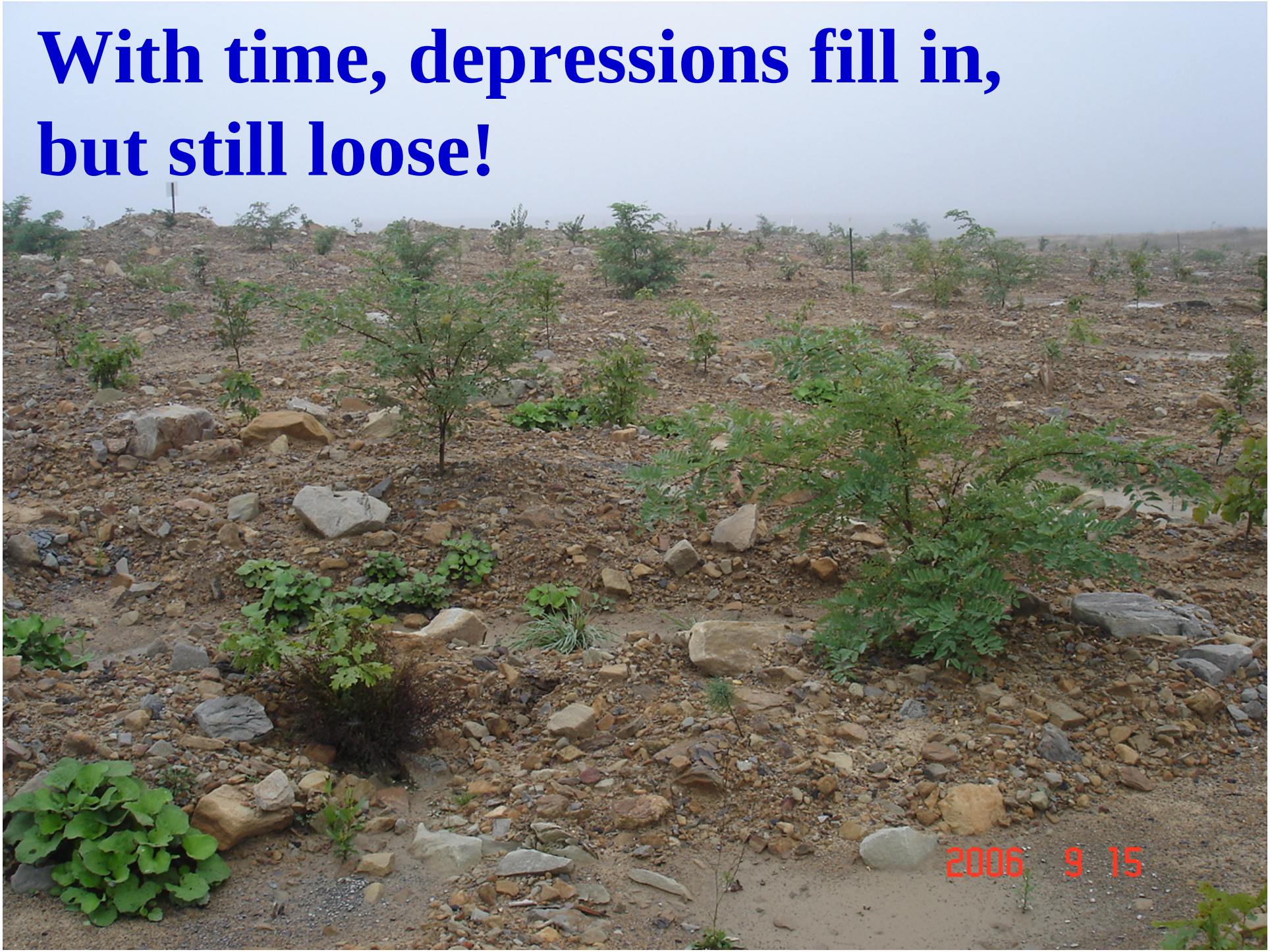
We don’t need a smooth surface.
AUG 21 2003

Stockpile Topsoil and Roll Over

Only ONE pass!
AUG 6 2003

Ideally, end dump soil,
knock off tops with dozer

With time, depressions fill in, but still loose!



Compacted site

Uncompacted Site

4. Consumption

Heavy Groundcover brings rodents

Deer nibbling

Ash, Cherry, Walnut, Poplar
are browsed
2006 8 1

All kinds of predators

3. Competition
from Groundcover

Heavy Groundcover will hinder trees

Rodent Heaven

Competition?

Competition? What Species?

Competition?

Too much compaction
Too much groundcover

Find the Oak!

Mtntop Tree Recolonization
Material pushed over side
No seeded groundcover
Recolonization

Where groundcover <u>had been seeded</u> on the flat top, trees were still almost nonexistent.

Where groundcover <u>had not been seeded</u> and material pushed over the side, trees had colonized and formed a forest! <u>Both 22 years old.</u>

Patriot Tree Growth Study
5 tree species
Heavy Groundcover
Ripping
Seeds and Seedlings
2006 8 1

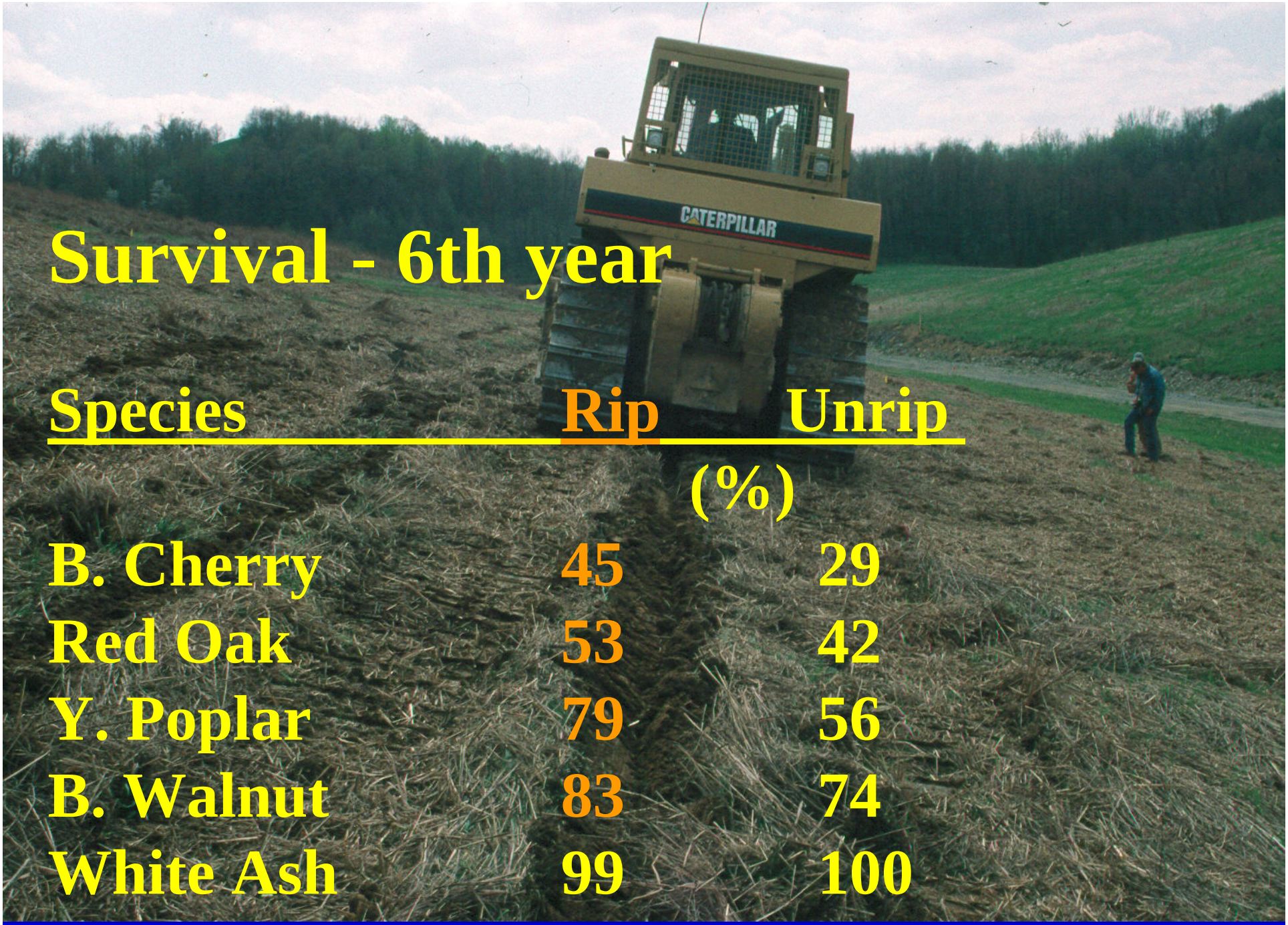
Dense Herbaceous Cover

Ripping to break apart groundcover

CONCLUSION

Seedling Survival after 6 yrs

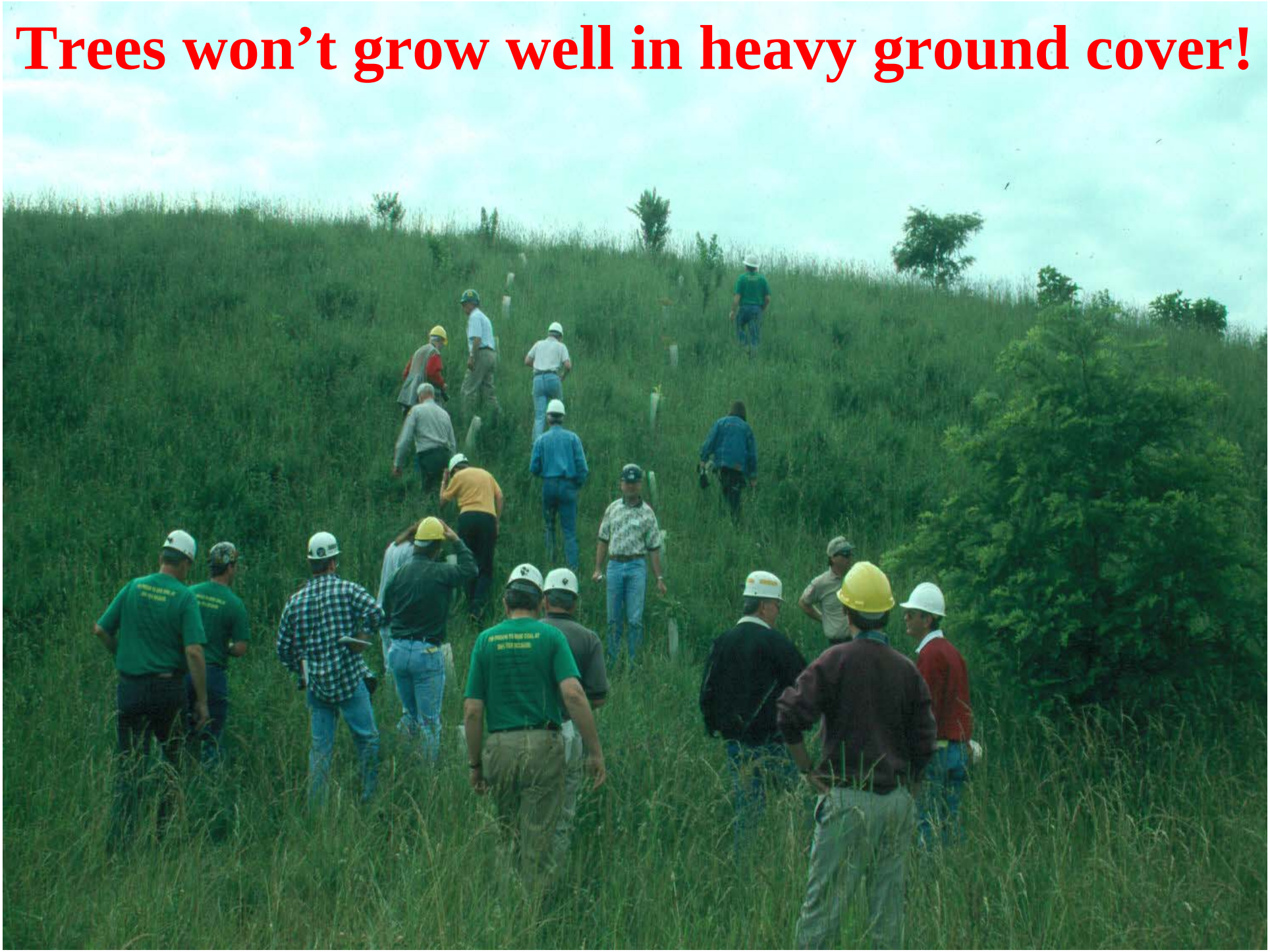
Black Cherry - 40%
Red Oak – 50%
Yellow Poplar – 65%
Black Walnut - 80%
White Ash – 100%



Survival - 6th year

Species	Rip	Unrip
	(%)	
B. Cherry	45	29
Red Oak	53	42
Y. Poplar	79	56
B. Walnut	83	74
White Ash	99	100

Trees won’t grow well in heavy ground cover!



Arch-Samples Reforestation

16 species

Gray vs Brown SS

Compaction vs Uncompacted

Reduced Groundcover

Native and surrounding species are filling in around the trees without seeding.

ICG Eastern Reforestation

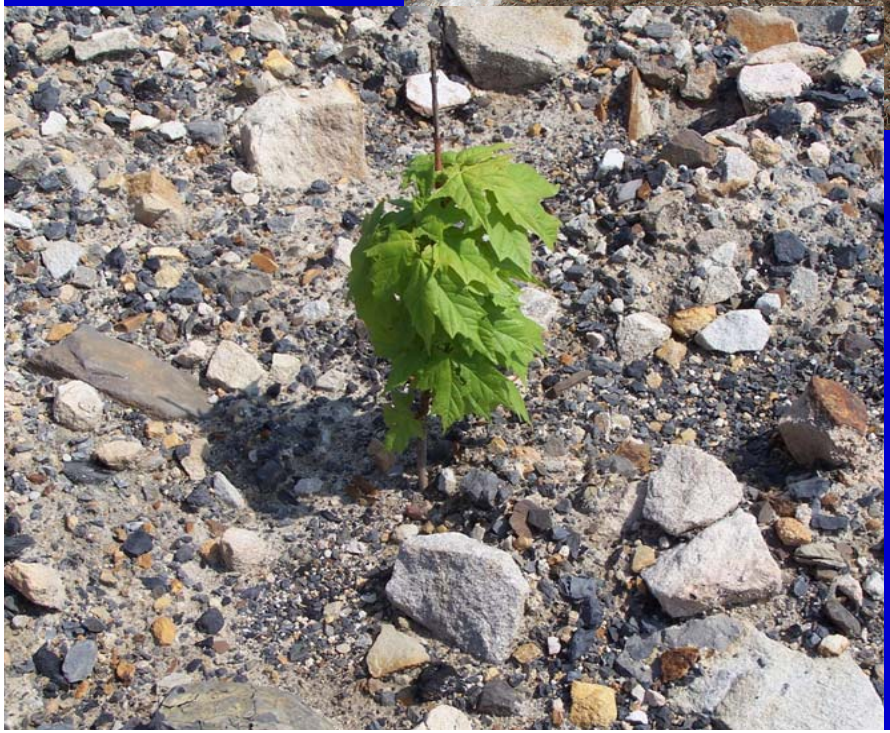
Mountaintop Study

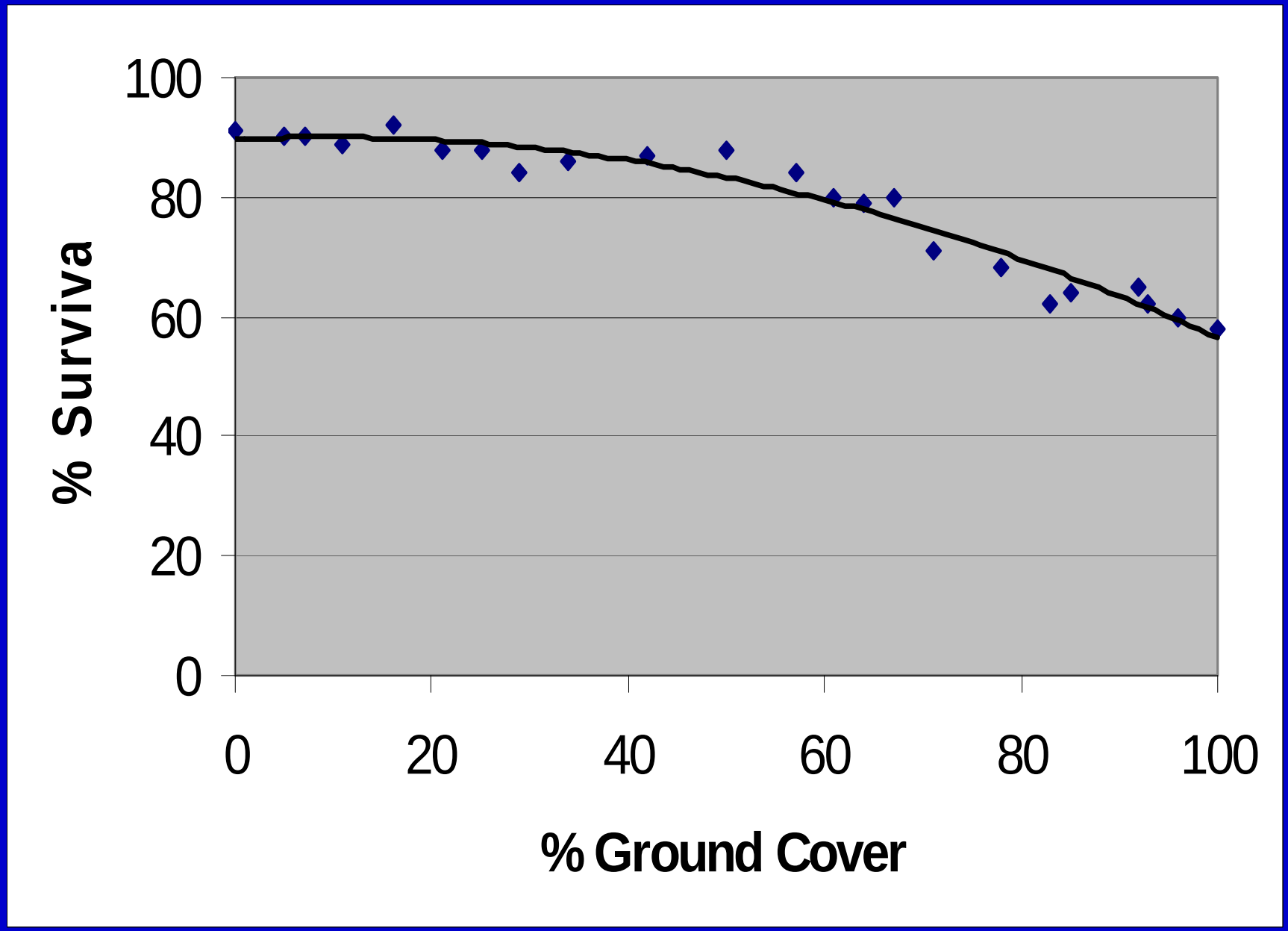
Loose End-dumped Material

Brown vs Gray Sandstone

Sawmill Waste vs None

Sawmill waste was “slung” with backhoe.




100
80
60
40
20
0
% Surviva
0
20
40
60
80
100
% Ground Cover

SEP 24 2003

Must get away from…
-Smooth and Compacted Surfaces
-Heavy, Tall, Aggressive Groundcover
2006 8 1

Must have…
Rough and Uncompacted Surfaces
Light and Uncompetitive Groundcover
2007 7 31

4 Cs of

REFORESTATION

1. Composition of Material
2. Compaction
3. Competition
4. Consumption

SOLUTIONS

1. Sandstone (Gray or Brown)
   Topsoil – How much?
2. Rough Grading
3. Low and Light Groundcover
4. Do not use annual grains.

Let’s put trees back!
2007 7 31