

# Spruce Restoration Beyond Planting Trees

Shane Jones  
USDA Forest Service  
Monongahela NF, Greenbrier RD





# Original Spruce Forest



Fig. 2—Red spruce trees dwarf the lumberjacks who are soon to cut them.  
Cheat Mountain, Pocahontas County on lands of the West Virginia  
Pulp and Paper Co., 1910. Courtesy Mrs. Emory P. Shaffer.

- Spruce-influenced Climax Forest
- Single tree canopy gap formation
- Structural heterogeneity
- Abundant Down wood
- Decadence
- Old Forest Mycorrhizal fungal community
- Deep organic horizon
- Headwater sponge

# Original Spruce Forest







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Pre-exploitation forest  
structure similar to Pacific  
Northwest?

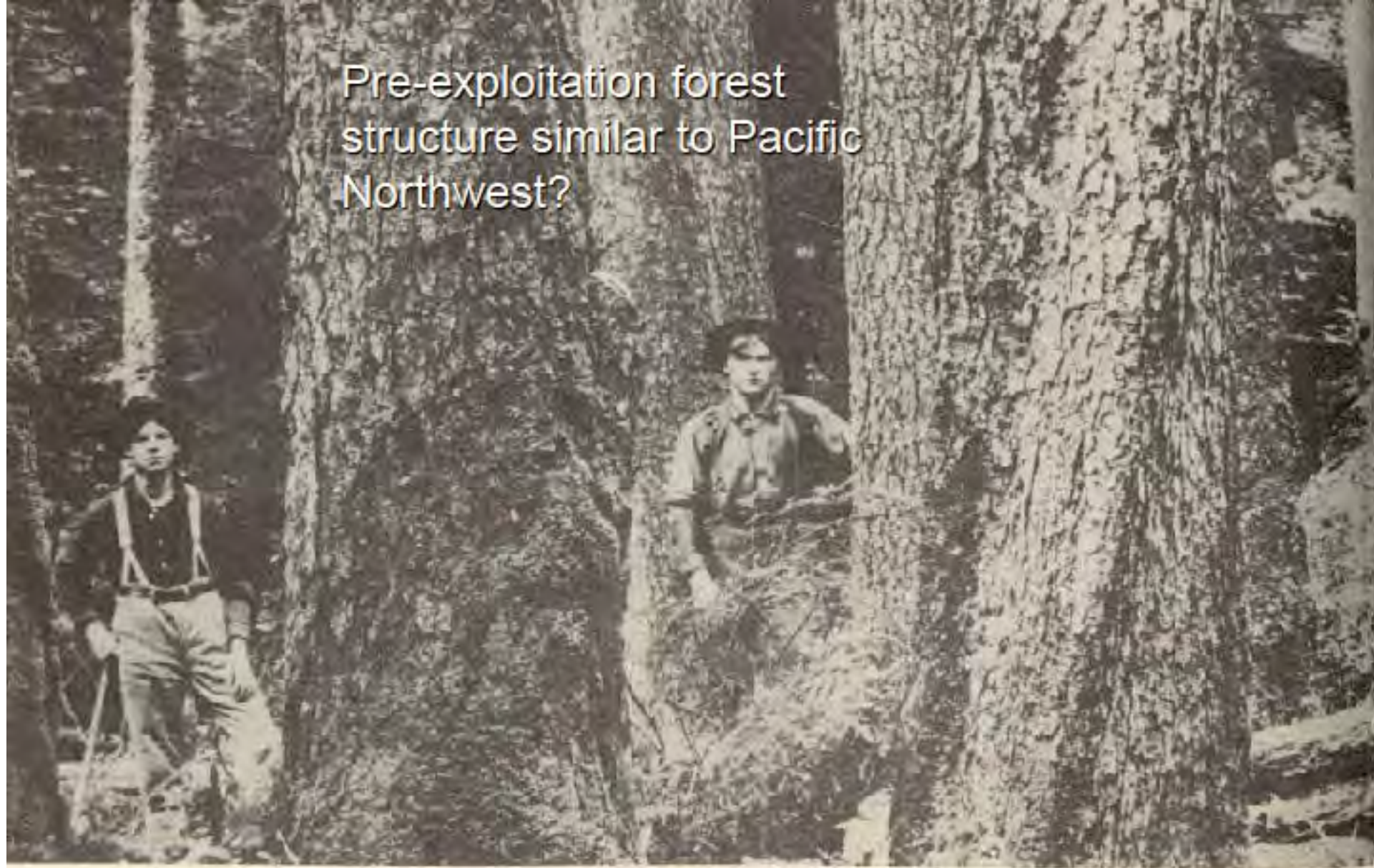


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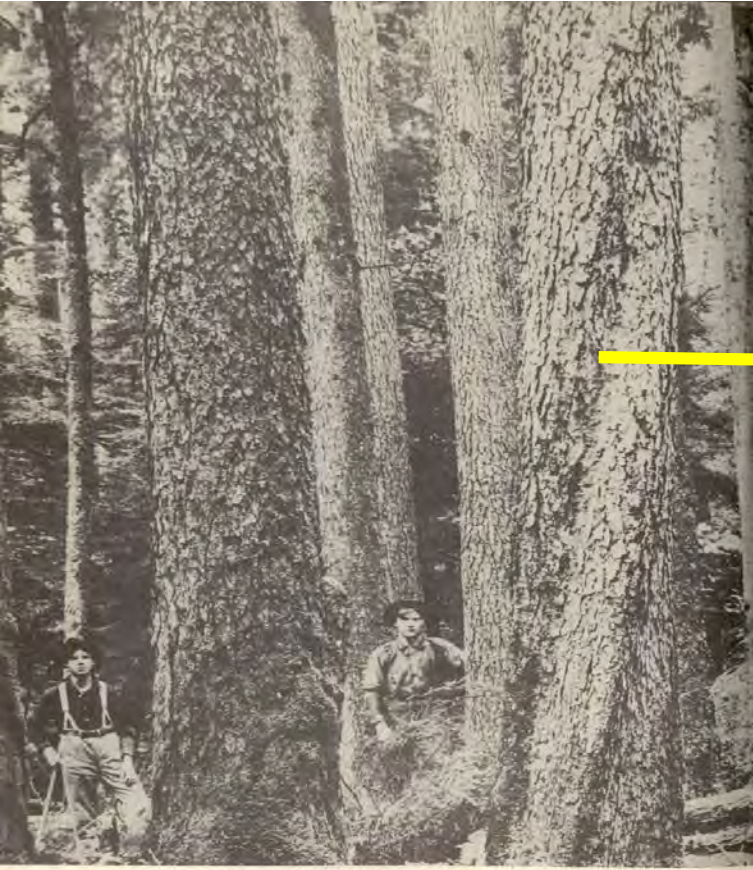
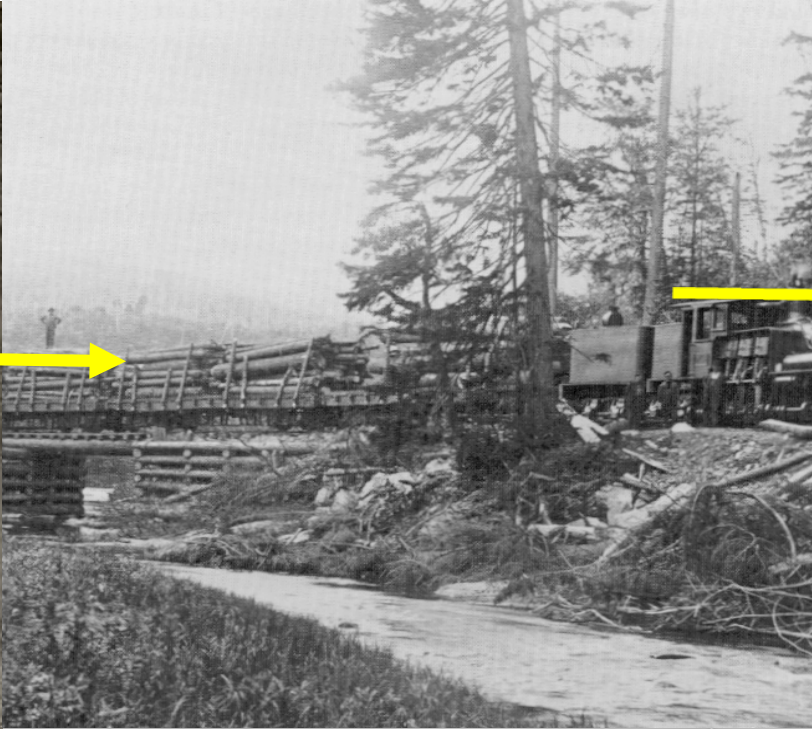


Fig. 2—Red spruce trees dwarf the lumberjacks who are soon to cut them.  
Chest Mountain, Pocahontas County on lands of the West Virginia  
Pulp and Paper Co., 1910. Courtesy Mrs. Emory P. Shaffer.





# The Consequence (besides progress)

- *Forests removed and smoldered for years.*
- *Pittsburgh flooded...*
- *Majority of area regenerated to a hardwood dominated system*
  - *Lacks structure (even-aged)*
  - *Lacks composition*
  - *Lacks function (above ground and below ground)*



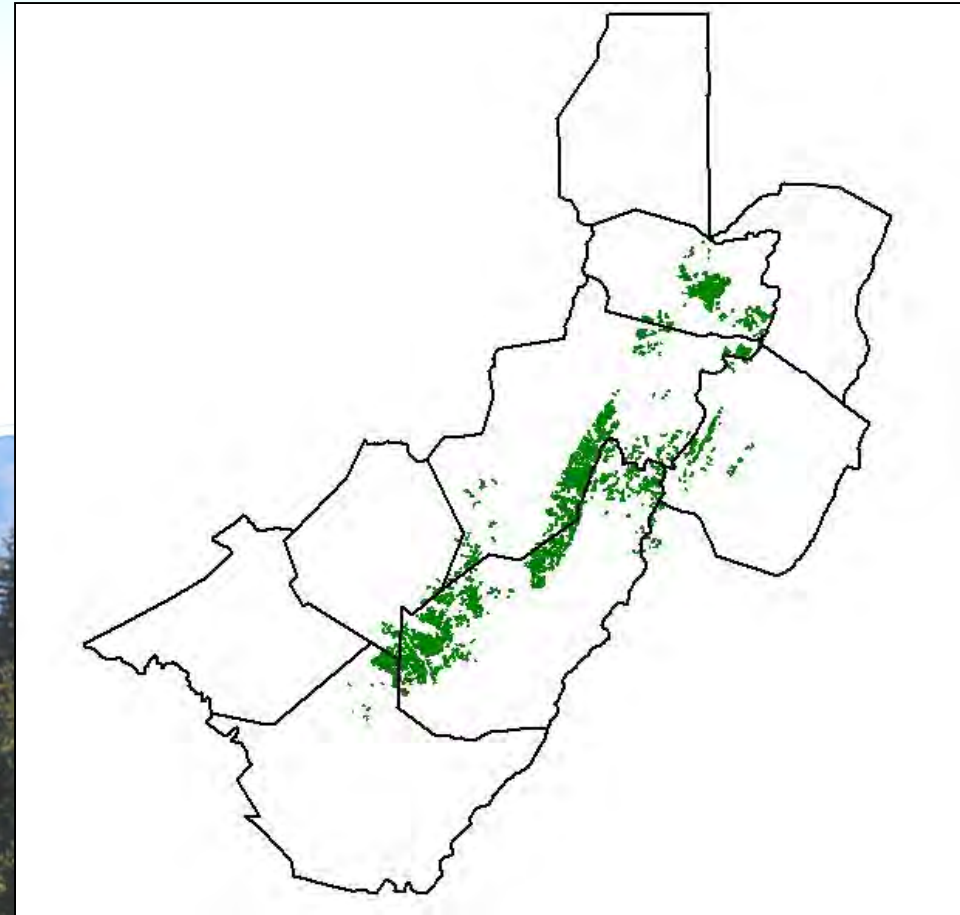


**1900-1910**



**250,000 ha of red spruce forest  
and 250,000+ ha of northern  
hardwood forest with red spruce  
component.**

**1988**



**20,000 ha of red spruce forest  
and unknown amount of  
northern hardwood forest with  
red spruce component at  
present.**



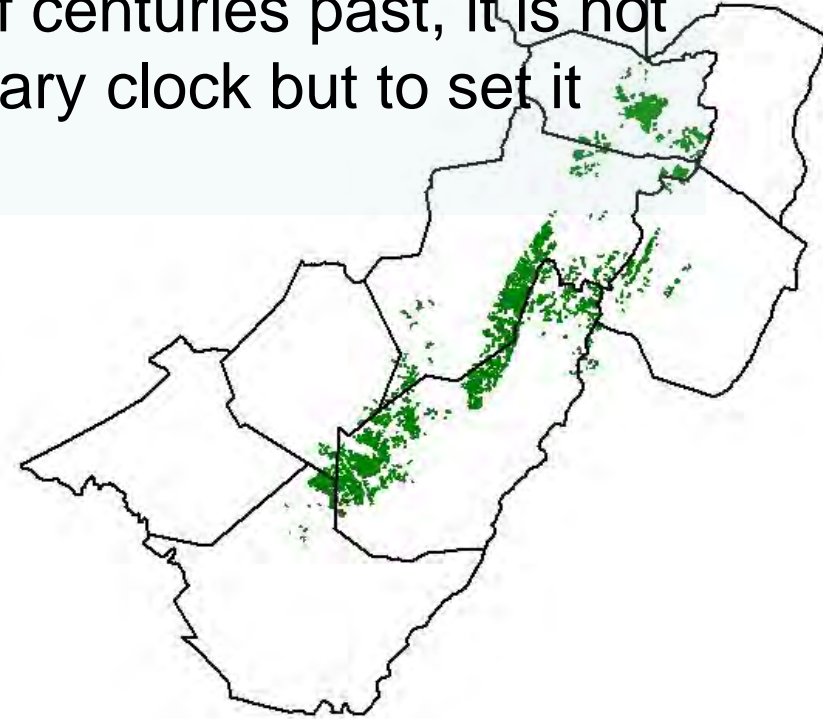
**1900-1910**



“...restoration uses the past not as a goal but as a reference point for the future. If we seek to recreate...communities of centuries past, it is not to turn back the evolutionary clock but to set it ticking again.”

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# What Makes Good Spruce Forests?

- Composition (Spruce)
  - Spruce-influenced ecosystem
    - High Biodiversity
    - Drives above and Below-ground Ecological Processes
    - Folistic epipedons
    - Headwater Sponge
    - Cool, moist microclimate
    - Fungal Communities
- Structure (Old Forest)
  - Decadence
  - Heterogeneity
  - “Unevenagedness”
  - Complexity
  - Single-tree Canopy Gaps
  - Snags
  - Downed Wood
  - Fungal Communities



# So What is Spruce Restoration, anyway...

Thoughtful management actions (be it active or passive) in the right places to protect or enhance composition (spruce) and structure (trend towards a climax forest). Ideally, this work can be combined with other priorities to achieve multiple objectives (something in it for everyone!!)....



# Spruce Restoration ain't just planting trees...

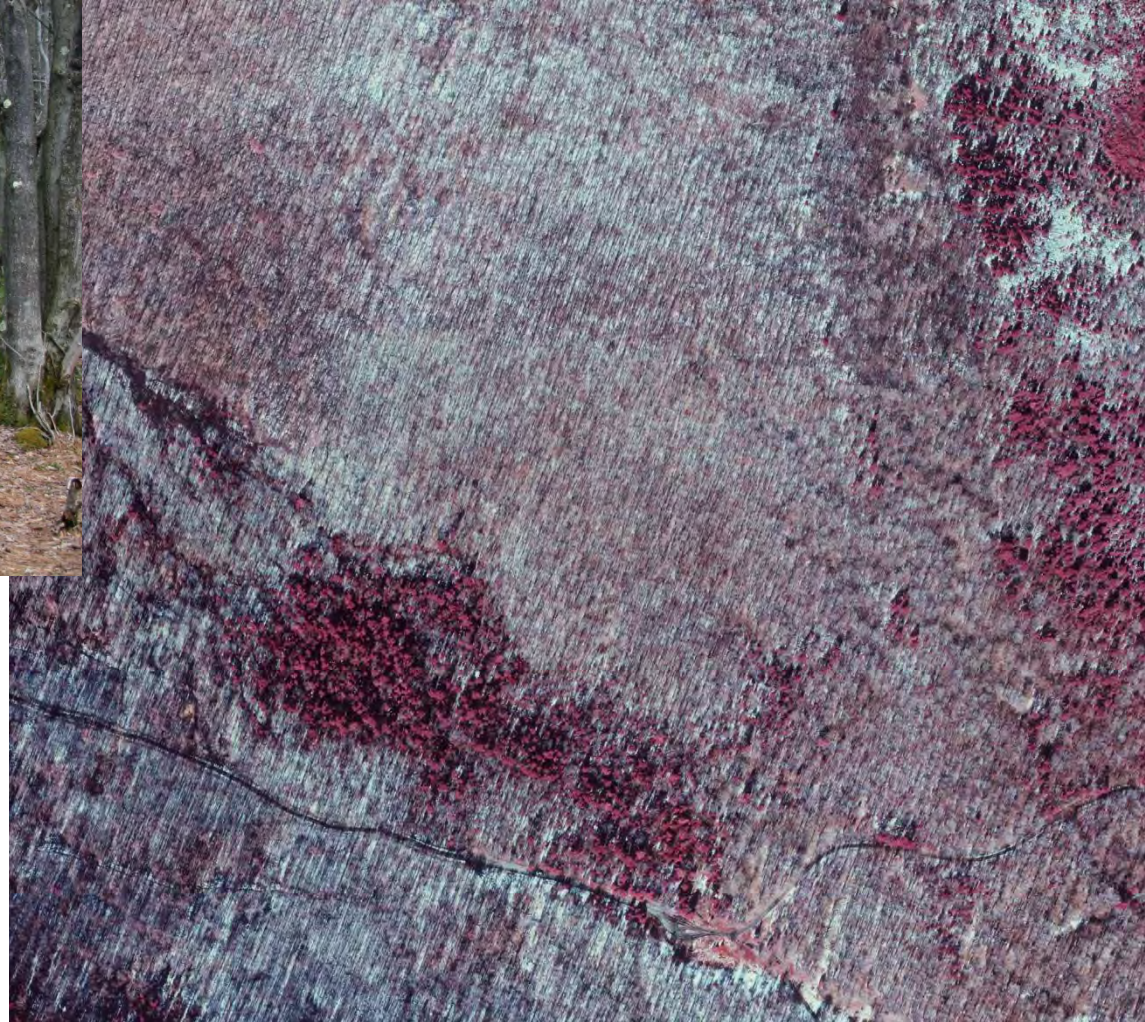
- Spruce Release in Mature Forests (and snag creation)
- Mineland Restoration
  - Integrate with Mineland Restoration to make 'reforestation'(ARRI) 'restoration'...
- Mulcher Work
  - Integrate with Early Successional Habitat Management



# Even-aged Hardwood Dominated Forest



Scattered Spruce in  
under/mid story





# Spruce Commercial Restoration Upper Greenbrier (Middle Mt.)

## ACTIVE MGMT

- Commercial
  - Use timber management to improve structure and get spruce to overstory faster (and generate restoration revenue)
- Noncommercial
  - Partner with TNC to get boots on the ground (ERT)

## PASSIVE MGMT

- Protect remnant patches of spruce to preserve spruce habitat and relict soil features (Folistic epipedons).....



# Upper Greenbrier North Commercial Restoration

- Status
  - Red pine plantations sold
  - Prepping hardwood stands to sell



# Overview

- The Mower Tract is approximately 40,000 acres of National Forest Land purchased in the 1980's on Cheat Mt., WV.
- Site contains one of the largest Red Spruce communities south of Maine.
- High Allegheny plant community contains 145 state rare plant species, including 60 critically imperiled species, 56 imperiled species and 29 vulnerable species.



Red Spruce  
(*Picea rubens*)



# The Other Problem

- About 2,500 acres of the Mower Tract was contour mined in the 1980s.
- Site was reclaimed to pasture and forest.
- Forest consisted of red pine and Norway spruce plantations.
- Plantations are stunted in areas and contain little to no understory plant diversity.
- Pastures exhibit typical “arrested succession”.





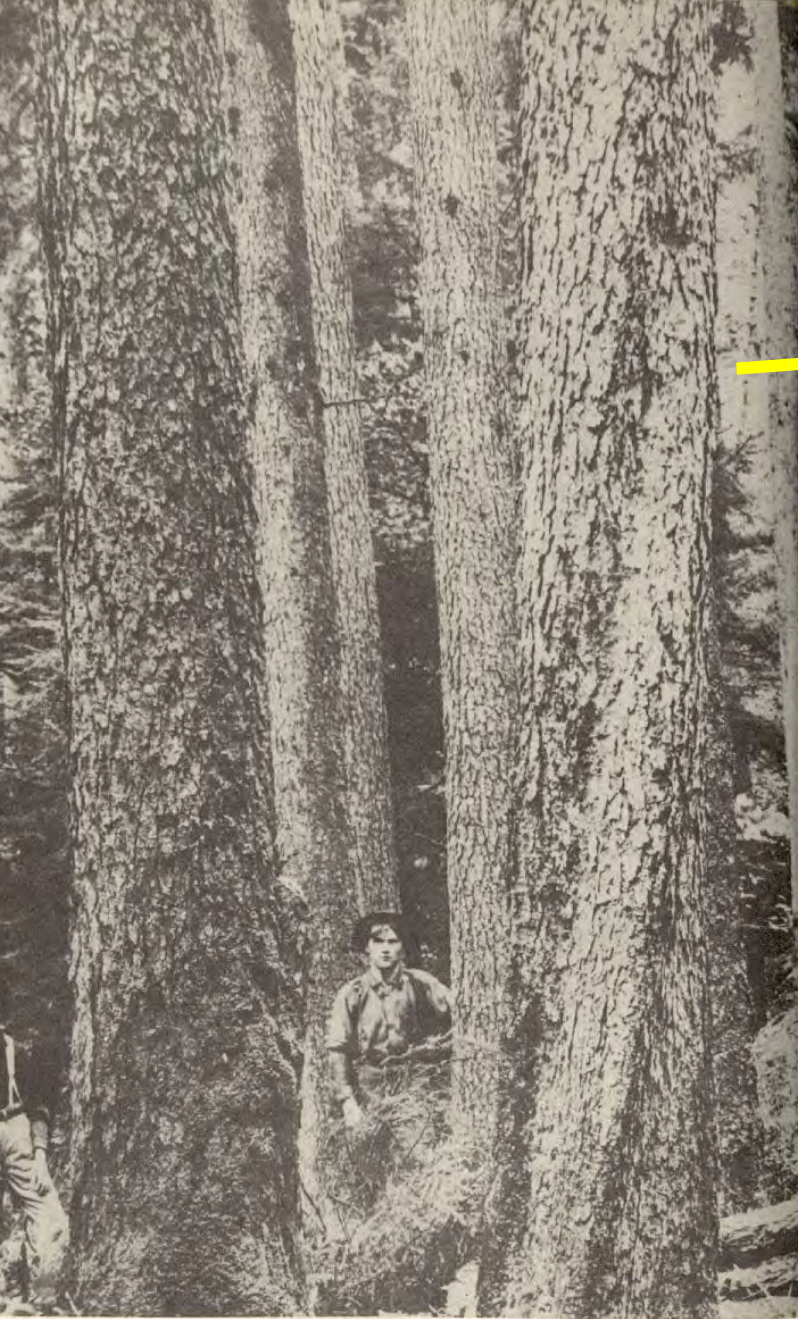


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# Post-Mining Landscapes



Pine Plantation



Pasture



# Not Reforestation, Restoration!

Something in it for everyone  
Nonconsumers and Consumers



Spruce Restoration  
Native Plant Restoration  
Healthy Headwaters  
ESH habitat















# Outcomes

- Over 200,000 native trees and shrubs (100K+ red spruce) have been planted on over 600 acres of reclaimed land at the Mower Tract.
- Over 1,000 wetlands have been created on the site.
- Over 300 volunteers have participated in tree planting events.
- About \$1 million has gone back to the region via contracts for equipment, tree planters and seedlings.
- NEPA for an additional 1,500 acres has been approved and we hope to complete the project over the next 5-7 years.





# Early Successional Habitat Partnership

## RGS, WVDNR, WVDOLF, FS



RUFFED GROUSE  
SOCIETY









Working Across Boundaries  
AKA – Adjunct Staff, Workforce  
Multiplier, etc. ...



RUFFED GROUSE  
SOCIETY

