Green Forests Work

Restoring Ecosystem Services and Creating Economic Opportunities on Surface Mines across Appalachia

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Pre-SMCRA
Black Walnut, Southern Indiana
Pre-SMCRA
White Oak, Southern Illinois
Pre-SMCRA
Loblolly Pine, Western Kentucky
Reforestation was commonplace but... so were human safety and environmental issues...
Water quality problems

Hazardous landforms
Toxic or acid-producing material on the surface
Surface Mining Control and Reclamation Act of 1977 (SMCRA – Public Law 95-87)

- Standardized reclamation practices
- Provided oversight to state agencies
  - Focused on slope stability, eliminating landslides, and reducing sediment runoff
  - Approximate Original Contour (AOC)
  - Post-mining land use (PMLU)
  - Required that mining companies put up a monetary bond before mining commenced
Pre-SMCRA Meets Post-SMCRA
What Happened?

- In an effort to achieve landform stability and prevent landslides, spoils were repeatedly graded which created a highly compacted surface.

- Compacted spoils inhibit root penetration, gas exchange and water infiltration which results in high seedling mortality, increased runoff and poor water quality.

- Thick covers of aggressive grasses and legumes also competed with trees for nutrients, water, and sunlight.

- This led to a widespread failure of tree planting projects and disincentives for reforestation. Mining firms became very skilled at creating grasslands: efficient, cheap, successful in achieving bond release.
Tree planting failures became commonplace
7 year-old red oak
Where once were forests...

Hay/Pastureland PMLU became widespread
Where once were forests...

750,000 - 1,000,000 acres across Appalachia were converted from forest to other land uses
Land-Use Change

- 1,700,000 acres bond released
- 700,000 acres currently permitted
These unmanaged grasslands often become colonized by invasive, exotic species.
The Appalachian Regional Reforestation Initiative

- ARRI’s goals:
  - Plant more high value native hardwoods
  - Increase seedling survival and growth rates
  - Expedite the establishment of forest habitat and speed up natural succession

- Created by OSMRE, ARRI works with the active mining industry, state regulatory agencies, academics, citizen’s groups, et al.
The Forestry Reclamation Approach (FRA)

- Leave 4 feet of the best available growth medium on the surface
- Avoid compaction
- Lightly seed tree-compatible groundcovers
- Plant a variety of trees
  - Early successional trees
  - High-value hardwoods
- Use proper tree planting techniques
17 year-old FRA Planting - KY
2007 FRA Planting - WV

7 year-old oak and poplar on an FRA site
Guy Cove site 2009 - before planting
Guy Cove site in 2017
What can be done about this?

750,000 – 1,000,000 acres in need of restoration
Green Forests Work

- 501(c)(3) offshoot of ARRI
- Mission: To re-establish healthy and productive forests on formerly mined lands across Appalachia
- Implements a “Modified” Forestry Reclamation Approach on Legacy mines
- Legacy mines – post-SMCRA, reclaimed to land uses other than forest
Green Forests Work

- Started as a petition to WH to stimulate the economy in Appalachia by creating jobs
- Continued anyway with no funding
- Appalachian Regional Commission
- 501(c)(3) est. in 2013
- Relies on grants, donations, and partnerships to implement projects on public and private lands
Modified FRA

- Control unwanted vegetation
  - Mechanical
  - Chemical
- Mitigate compacted ground
- Plant a variety of trees
- Use proper tree planting techniques
Unwanted vegetation - Mechanical control
Mitigate Compaction:
Ripping a compacted site
Plant a variety of trees
Green Forests Work

- Focused on improving two aspects of Appalachia
  - “Environmental Infrastructure”
    - Restoring ecosystem processes and services that native forests provide
  - Creating Employment and Economic Opportunities
    - Immediate creation of local jobs
    - Future opportunities by restoring a forest-based economy
Green Forests Work

- Restoration of Ecosystem Services
  - Forest habitat restoration
    - Terrestrial, avian, and aquatic benefits
    - Pollinator benefits
  - Improved hydrology and water quality
    - Ripping increases infiltration, reducing runoff and buffering watersheds from storm events
    - Tree cover increases ET, reducing loading
  - Improved air quality
    - Increased particulate interception
    - Climate change mitigation through C-sequestration
Reducing Forest Fragmentation

Map Created by Kylie Schmidt 5/2/2016

Imagery Source: Google Earth 10/9/2013

Project Site
DBNF Boundary
Reforestation Area Boundary

29 acres
Improving Hydrology
Pollinator Benefits
GFW-ARRI Projects 2009-2020

- 390 projects/events
- 10 States
- >17,000 volunteers
- 100s of partners
- 4,985 acres reforested
- 3,139,647 trees planted
Green Forests Work

- Job creation for seed collectors, equipment operators, nursery workers, tree planters, et al.
- Secondary industries (hospitality, retail, transportation, service)
- Future economic opportunities
  - Forest management
  - Timber production
  - Non-timber forest products
  - Eco-asset credits (carbon, N & P, et al.)
  - Tourism and recreation
Green Forests Work

Seed collectors and tree nursery workers
Green Forests Work

Equipment operators
Conservation Legacy

ACC Crew

Planting Wetlands
Conservation Legacy

ACC Crew

Sowing Native Grasses and Wildflowers
Why Forests?

- $9.1 billion in direct economic contribution.
- 28,408 jobs in the forest industry and an estimated 57,750 jobs overall.
- EKY – opportunities for 14,000 additional jobs with $2.4 billion value added.
- Regenerative economy!
The estimated number of coal jobs in Kentucky as of April 2017 is less than 4,000. This is the lowest number since 1898.
Why Now?

County Economic Status in Appalachia, Fiscal Year 2018
(Effective October 1, 2017 through September 30, 2018)

The Appalachian Regional Commission uses an index-based county economic classification system to identify and monitor the economic status of Appalachian counties. See the reverse side for a description of each economic level.

Map Created: August 2017
Data Sources:
Income data: U.S. Bureau of Economic Analysis, REIS, 2015
Poverty data: U.S. Census Bureau, American Community Survey, 2011–2015
“... the act of planting a tree reconnects the human spirit to the beauty and importance of the natural world – the basis for all life on Earth”.

2004 Nobel Peace Prize Laureate Wangari Maathai