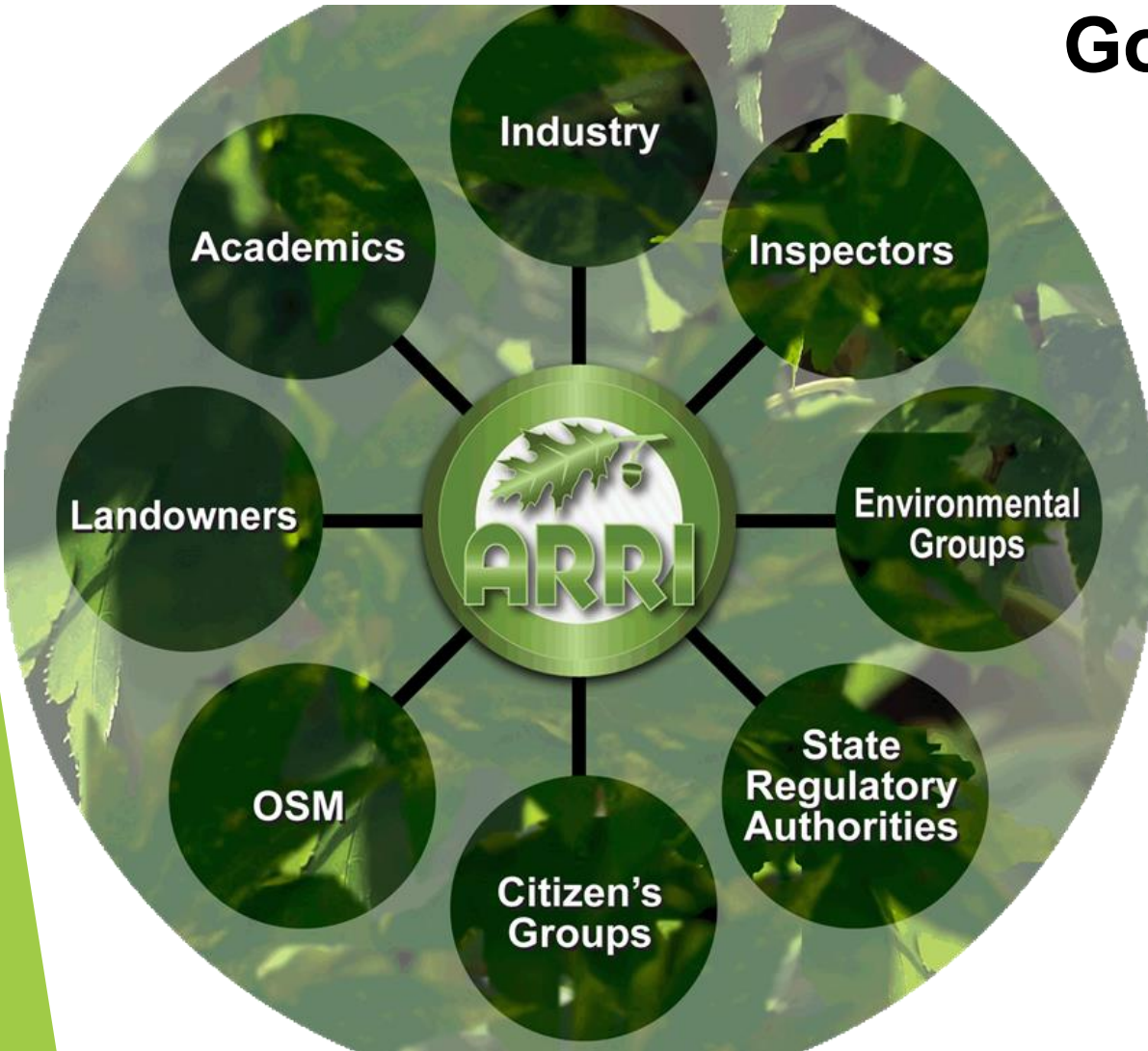




LAURA BRAY, PENNSYLVANIA ENVIRONMENTAL COUNCIL
ERIC OLIVER, PA DEPARTMENT OF ENVIRONMENTAL PROTECTION

ARRI Partnership



Goals:

- Plant more high-value hardwood trees on reclaimed coal mined lands in Appalachia
- Increase the survival rates and growth rates of planted trees
- Expedite the establishment of forest habitat through natural succession

Brief History of Mining in PA

- Pre-SMACR
 - Abandoned mine lands
 - Shoot 'n shove
 - Minimal revegetation requirements
- Surface Mining Control and Reclamation Act of 1977(SMCRA)
 - OSMRE
 - AML Fund
 - Stability achieved by Approximate Original Contour (AOC)

Unintended Consequences of SMCRA

- Severe soil compaction
- Competition from aggressive ground cover
- Mining operations moved away from forestry reclamation
- Without management invasive, exotic species thrive
- Arrested succession

03/31/2010

POOR MATERIAL IN GROWTH MEDIUM



COMPACTED SOIL



COMPETITION FROM GROUND COVER, SHRUBS AND TREES



IMPROPER SPECIES PLANTED



IMPROPER PLANTING TECHNIQUES



CONSUMPTION FROM WILDLIFE



An aerial photograph of a mine reclamation site. The landscape is characterized by several large, rectangular, terraced pits or basins, some of which are filled with dark material, possibly coal or ore. The surrounding areas are a mix of brown, dry earth and patches of green vegetation, indicating ongoing reclamation efforts. The overall scene shows a complex of earthworks and mining infrastructure.

ARRI Reimagines Reclamation

- In the 80's, researchers began developing a method of reclamation that would allow both stability and tree growth
- By 2004, numerous scientific studies supported what became known as the Forestry Reclamation Approach (FRA)
- After making progress with the active, ARRI members began to look back at the sites reclaimed under SMCRA that led to their establishment, so called "legacy" mines.

Classification of Mine Lands



Active Mining Operations (Title V)



Abandoned Mine Land (Title IV)

Hazardous,
concern to public
health



Legacy Surfaces Mines

Reclaimed to meet legal
standards, differing PMLU,
disrupts the ecosystem

THE APPALACHIAN REGIONAL REFORESTATION INITIATIVE



FORESTRY RECLAMATION APPROACH (FRA)

5-STEP PROCESS:

- 1: Create best possible Growth Medium
w/ materials on permit area**
- 2: Loosely Place to Avoid Compaction***
- 3: Use A Tree Compatible Ground Cover**
- 4: Planting Techniques**
- Plant Proper Species of Trees**
- 5: Use Proper Tree**

***On legacy sites, the soil has been
compacted and is loosened by deep tilling,
typically by a ripping shank on a bulldozer.**



Reforestation Benefits

- **Biodiversity**
- **Wildlife Habitat**
- **Improved Water Quality**
- **Carbon Sequestration**
- **Education & Outreach**
- **Local Economic Benefits**



PEC'S REFORESTATION PROGRAM

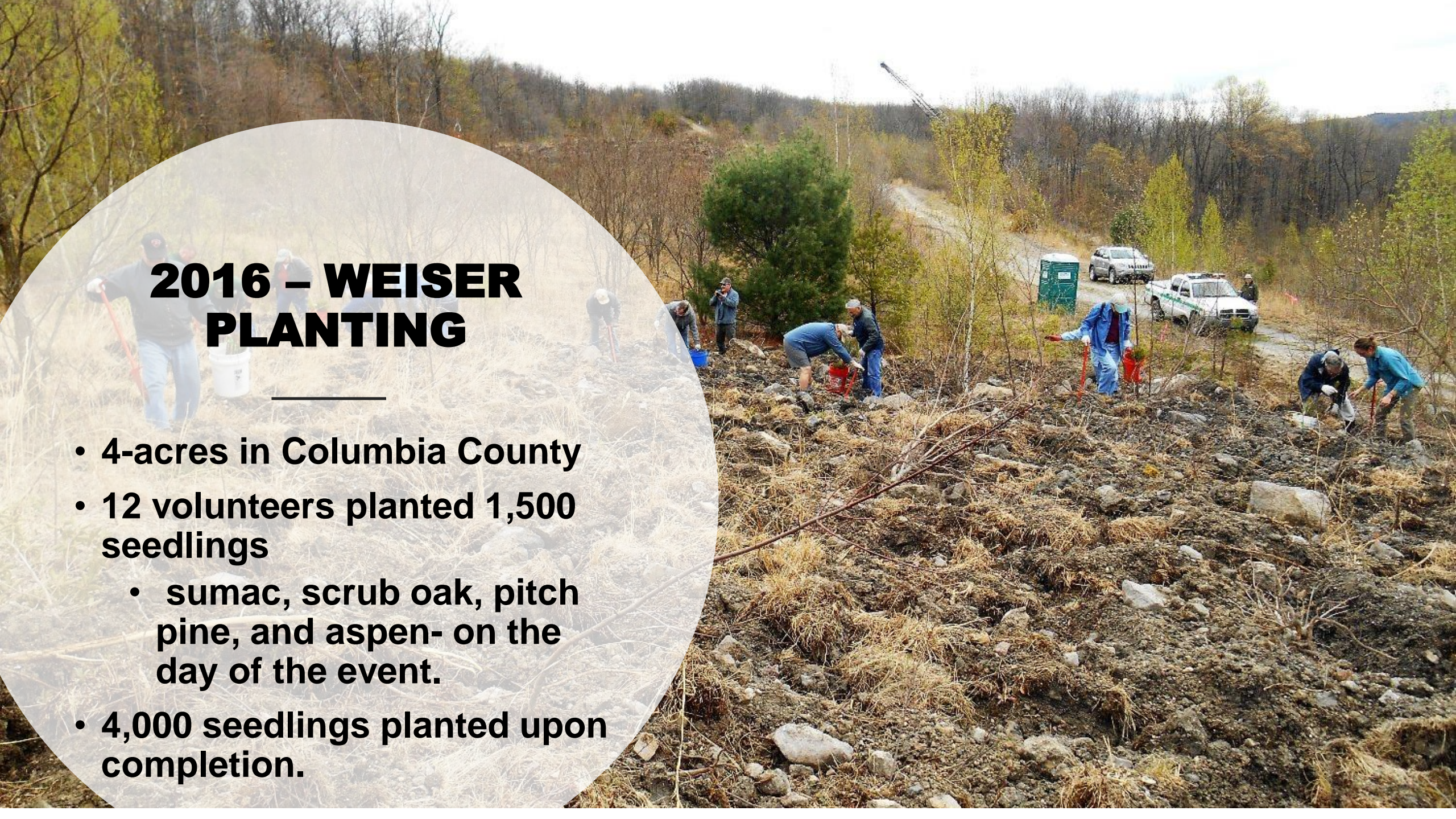
- **3 years, 3 districts, 6 project sites**
- **Planted over 22,000 seedlings on 26 acres on PA state forest land**
- **65 acres in planning for 2019**





2016 – WEISER PLANTING

- 4-acres in Columbia County
- 12 volunteers planted 1,500 seedlings
 - sumac, scrub oak, pitch pine, and aspen- on the day of the event.
- 4,000 seedlings planted upon completion.



2017 - WEISER PLANTING

- 4.8- acres in Columbia County
- 128 volunteers in two days
- 3,600 seedlings
 - 1400 quaking aspen
 - 800 pitch pine
 - 59 table mnt pine
 - 1300 scrub oak
 - 50 restoration 1.0 chestnuts





Earth Day Tree Planting

PINCHOT STATE FOREST

APRIL 21ST & 22ND, 2017

9:00 AM TO 2:00 PM

**AVONDALE HILL ROAD, PLYMOUTH TOWNSHIP,
LUZERNE COUNTY**

THIS FIELD SHOULD BE FILLED WITH TREES.

**COME PLANT OVER 7,000 SEEDLINGS
AND HELP CREATE 10 ACRES OF FOREST.**

**BOOTS OR STURDY SHOES REQUIRED. SUPPLIES AND FOOD PROVIDED.
RSVP TO PALMIRA MILLER | 570-592-7876 | PMILLER@DECPA.ORG**

**EARTH DAY EVENT IN CONJUNCTION WITH
KEEP PENNSYLVANIA BEAUTIFUL HELD BY THE
PENNSYLVANIA ENVIRONMENTAL COUNCIL AND PA DCNR**

2017 – PINCHOT PLANTING

- **10-acres in Luzerne County**
- **392 volunteers over two days**
- **7,000 seedlings planted**
 - **3000 quaking aspen**
 - **4000 white pine**
 - **480 chestnut oak**
 - **150 northern red oak**
 - **500 restoration 1.0 chestnuts**

2018 – WEISER PLANTING

- 4- acres in Colombia County
- 69 Volunteers
- 4,100 Seedlings Planted
 - 1, 000 Pitch Pine
 - 1,000 Scrub Oak
 - 1,000 Bigtooth Aspen
 - 50 Staghorn Sumac
 - 450 Common Elderberry
 - 500 Silky Dogwood
 - 100 Restoration 1.0 Chestnut



2018 – PINCHOT PLANTING

- 2.6-acres in Luzerne County
- 70 volunteers
- 3,100 Seedlings Planted
 - 500 big tooth aspen
 - 1,000 black locust
 - 500 quaking aspen
 - 150 virginia pine
 - 850 white pine
 - 100 restoration 1.0 Chestnut



2019- Round Knob Planting

- **33-acres of private land in Huntingdon County**
- **Contaminated drainage of 20-40 GPM**
- **Bond forfeiture**
- **DEP installing passive water treatment**
- **Supplemental funding for ARRI Reforestation**




Q. What's missing from this picture? **A.** About 2000 trees ...and you!

Weiser State Forest


EARTH DAY TREE PLANTING

April 20, 2019
9:00 am - 1:00 pm

 Boots or sturdy shoes required

 Supplies & food provided

 RSVP: Laura Bray
412-481-9400
lbray@pecpa.org

 Register: pecpa.org/weiser

Q. What's missing from this picture? **A.** About 3,200 trees ...and you!

Moshannon State Forest

EARTH DAY TREE PLANTING

May 4, 2019
9:00 am - 2:00 pm

 Boots or sturdy shoes required

 Supplies & food provided

 RSVP: Laura Bray
412-481-9400
lbray@pecpa.org

 Register: pecpa.org/moshannon





2019 – MOSHANNON PLANTING

- 3 sites, totaling approximately 55 acres
- National Fish and Wildlife Foundation Central App. Stewardship Program
- Restoring young forest habitat to create wildlife habitat for golden-winged warbler



Coal Mined Lands

- Abandoned Mine Lands (Pre-SMCRA)
- Permitted/Reclaimed Sites (Post-SMCRA, bond released)

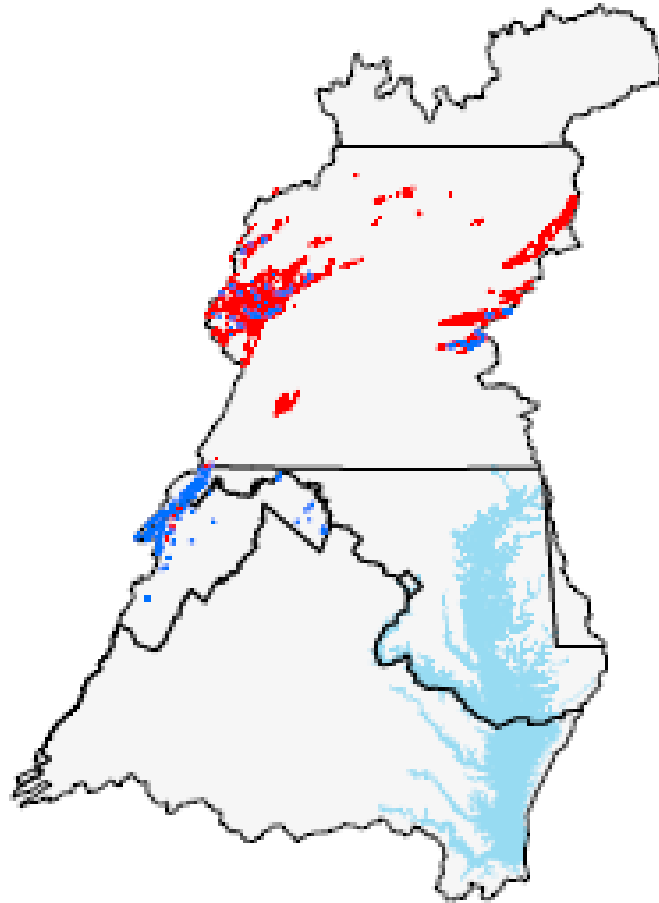


Figure 3.1. Known locations of coal mined lands in the Chesapeake Bay watershed. Source: Map compiled by Tim Culbreth (MD-DNR) from State sources.

Focal Bird Areas

- Golden-Winged Warbler Habitat
- Cerulean Warbler Habitat

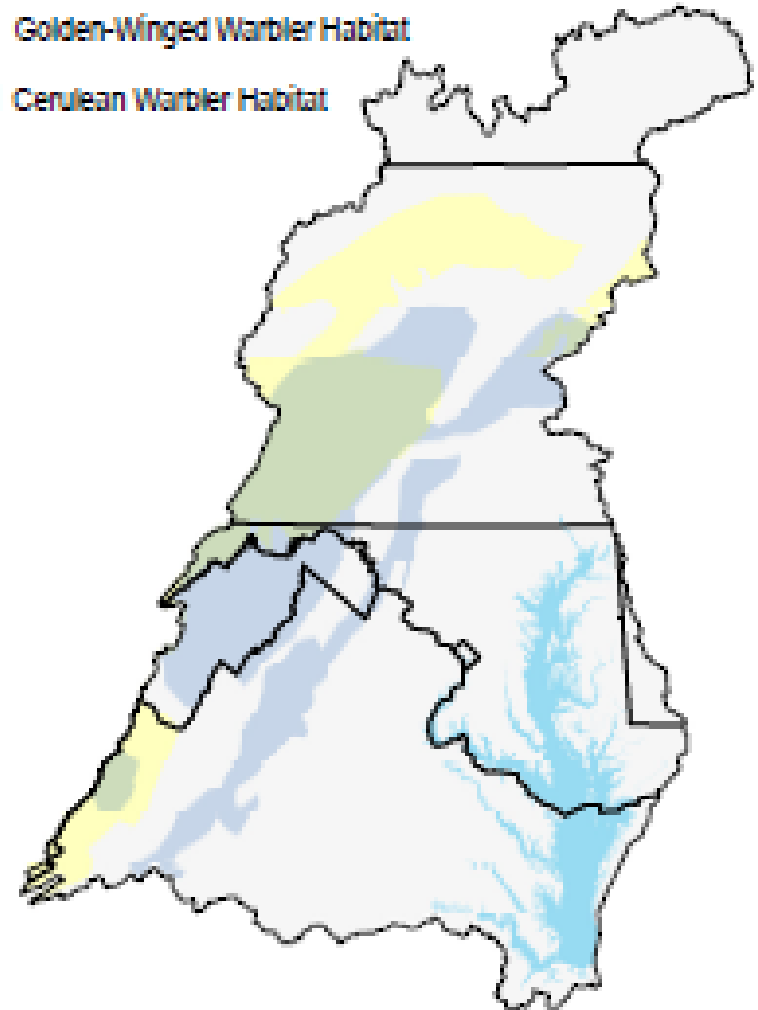


Figure 3.2. Priority habitat for key warbler species in decline overlaps considerably with mine lands. Source: Appalachian Mountain Joint Venture

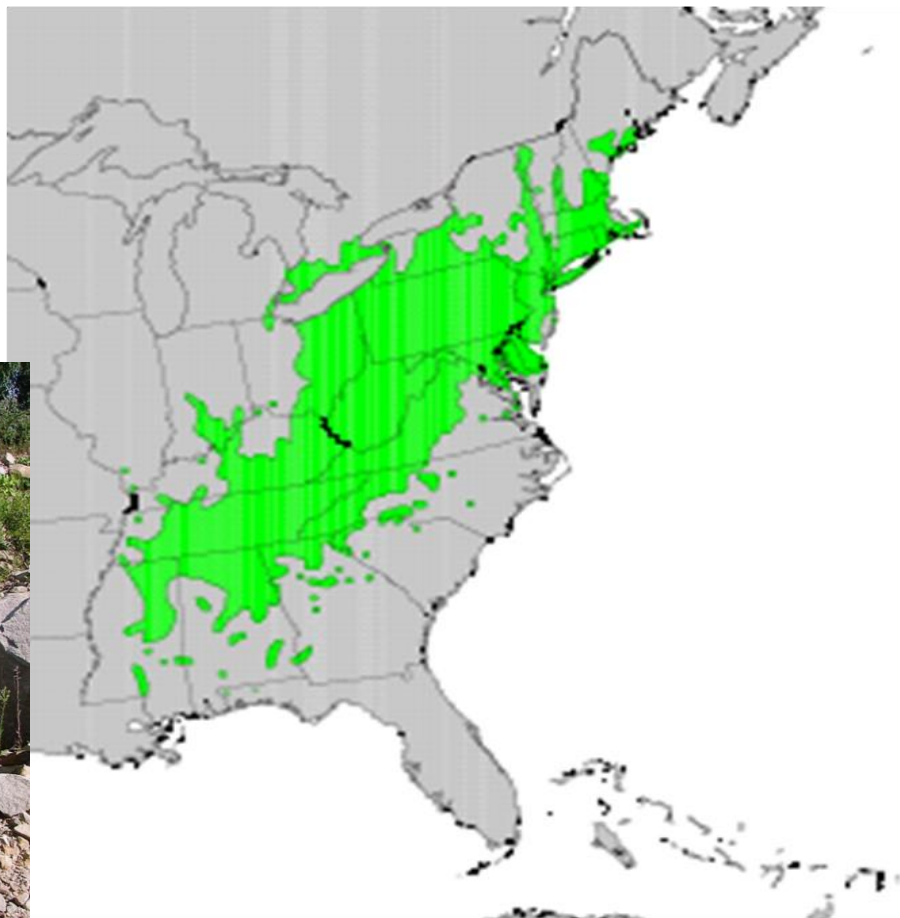




THE
AMERICAN
CHESTNUT
FOUNDATION®

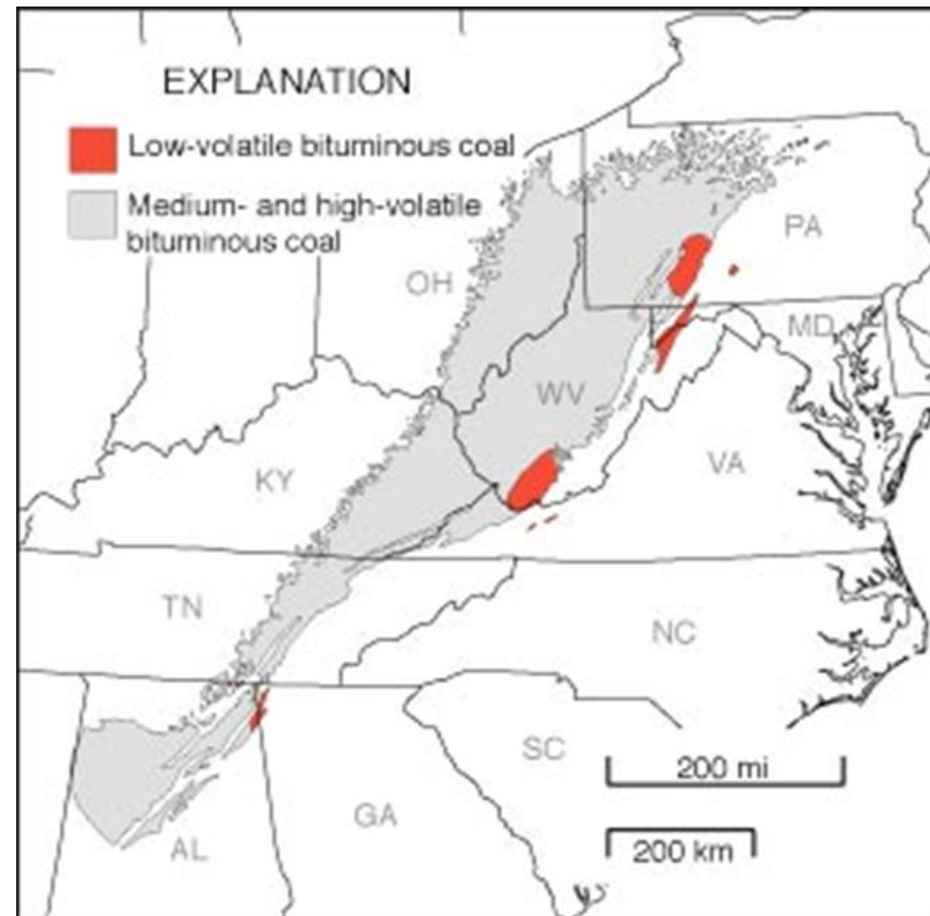


Natural range of American chestnut



Native range of American chestnut. From Little, E.L., Jr., 1977, Atlas of United States trees, volume 4, Minor Eastern Hardwoods: U.S. Department of Agriculture Miscellaneous Publication 1342, 17 p., 230 maps.

Extent of Appalachian Coal Basin



www.pubs.usgs.gov/fs/fs115-99/

Partnerships, Funders, and Sponsors

- Foundation for Pennsylvania Watershed
- Richard King Mellon Foundation
- National Fish and Wild Life Foundation
- Pennsylvania Forestry Association
- Keep PA Beautiful
- Audubon Pennsylvania
- IUP
- Volunteers



ARRI Works

FORWARD... to get coal operators, landowners and reclamation specialists to adopt the FRA on **active operations and AML sites**

BACKWARD... to enhance past reclamation efforts through site prep and supplemental tree planting on **“legacy mine sites”**

ARRI Regional Accomplishments

- ▶ 300 legacy mine land projects from '09-'17
- ▶ 3,339 acres
- ▶ 2,090,631 seedlings planted
 - ▶ Includes professional and volunteer planters
- ▶ 16,476 participants/volunteers
- ▶ 102,941 participant volunteer hours
- ▶ 8,847 volunteers 24 years old and younger
- ▶ 145 projects on public lands
- ▶ 158 projects on private lands
- ▶ 828 partner organizations

Final Thoughts



This technology increases survival rates and growth rates of trees, increases overall productivity, and promotes natural invasion and succession of plant and animal communities.



It takes time to reestablish native forests, but it's in our best interest.



Advocate, advocate, advocate for ARRI.



Resources and support are available.

THANK YOU

<http://arri.osmre.gov>