Daniel Boone National Forest: Pine Creek Church Road Reforestation Project

Final Report

Mission

Green Forests Work's (GFW) mission is to re-establish healthy and productive forests on formerly mined lands in Appalachia

Vision

GFW's vision is to create a renewable and sustainable multi-use resource that will provide economic opportunities while enhancing the local and global environment. By converting reclaimed, non-native grasslands and scrublands into healthy, productive forestland, GFW is effectively addressing two needs of the region.

Our reforestation projects provide jobs for equipment operators, nursery workers, and tree planters, and improve the environment by eradicating exotic species and restoring ecosystem services. With the help of our partners and volunteers, this vision is quickly becoming a reality...

Since 2009, we have planted more than 1.83 million trees on more than 2,900 acres, but there are nearly one million acres left to reforest.

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Twenty year old research plots on a surface mine in Breathitt County Kentucky show how the Forestry Reclamation Approach allows native forests to be re-established after reclamation.

Front Cover: Volunteers from Angel's Envy, Lexington Football Club, and Missouri Institute of Science and Technology

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BACKGROUND

Project Description

This project was a collaborative effort between the Arbor Day Foundation, Daniel Boone National Forest (DBNF), Green Forests Work (GFW), The American Chestnut Foundation (TACF), and the Appalachian Regional Reforestation Initiative (ARRI) to convert approximately 29 acres of strip mined land (Figure 1) into forestland to restore the original forest composition and make the site more productive for wildlife. The land was converted to hay/pastureland as a part of the revegetation plan in the mining permit. Due to the heavy compaction and non-native grasses on the mined areas, natural tree regeneration was limited and would not have occured in a reasonable timeframe without intervention.

This project was intended to restore mixed mesophytic forests and associated wildlife habitat on lands affected by surface coal mining in eastern Kentucky. Not only will the project bring back the forests, but the proximity of the site will provide opportunities for educational outreach for those interested in mineland reforestation. As an outdoor classroom, the site may be utilized to: 1) demonstrate the ability to restore native oak-hickory forests on compacted mined lands in a state of arrested natural succession; 2) evaluate and demonstrate techniques for removing and controlling an exotic shrub species (autumn olive; *Elaeagnus umbellata*) that is abundant on the post mining landscape; 3) establish experimental plantings of American chestnut (*Castanea dentata*) and evaluate their suitability for reforestation on surface mines; 4) showcase reforestation and habitat restoration techniques that can be readily adopted and are both practical and economical; 5) provide to interested parties results and data generated from the project.

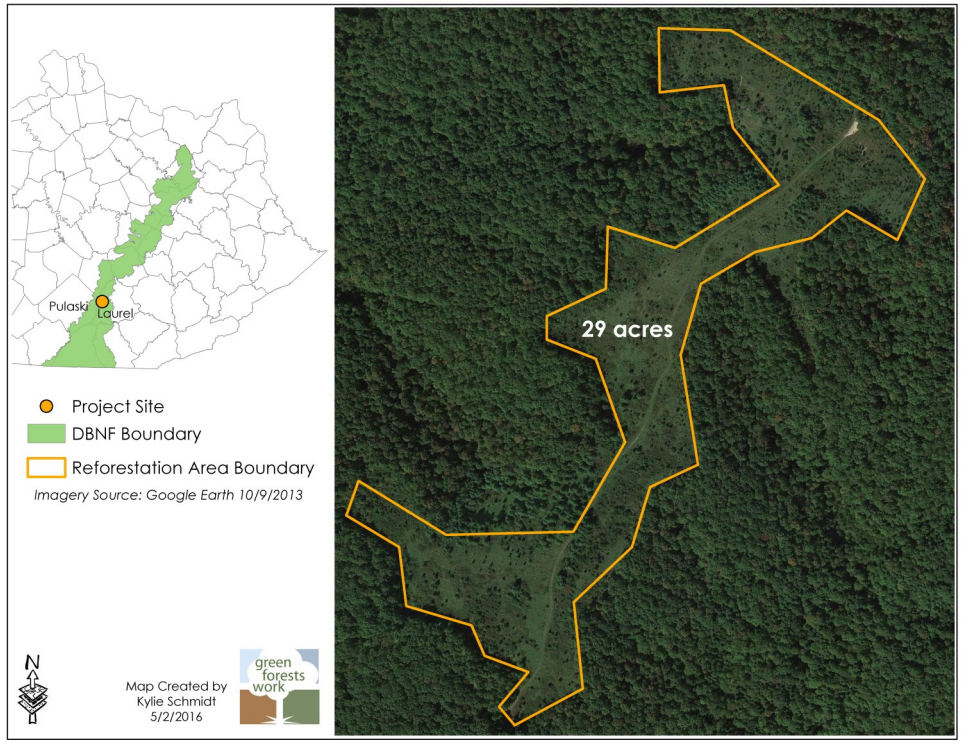

Figure 1. Project site.

Project Goals

The DBNF White Oak Reforestation site provides a good setting for reestablishing forests on lands affected by surface mining. The site is surrounded by a second-growth mature oak-hickory forest that contains many important wildlife species and suitable habitat to support them (Figure 2). Whereas, the reforestation site exhibits an early succession habitat dominated by ex-

otic plant species growing in excessively compacted spoils (Figure 3). The reforestation site is level to gently rolling and located on a ridge-top landscape position. The reforestation goal will be to restore an oak-hickory community suitable for Cerulean Warbler (*Dendroica cerulean*) and several bat species including: Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*) and Rafinesque's big-eared bat (*Corynorhinus rafinesquii*). Exfoliating bark from white oak species and hickory will benefit the bat species, while also providing suitable habitat for the warbler. Important hardwood species for the KY woodland industry (e.g. white oak) will be planted to demonstrate the potential of these often neglected lands for providing future timber revenue. Reforestation activities at this site will also be performed to remove exotic species, decompact spoil, provide early successional habitat for birds, and provide water quality benefit through erosion reduction. Planting of the Restoration 1.0 American chestnut will also be performed in this area.

Figure 2. Second-growth mature oak-hickory forest surrounding the project site.

Figure 3. Exotic grasses and shrubs dominate the project site.

MILESTONES

November 2015: Site Preparation

GFW accepted a proposal from Mountain Ridge, LLC to remove the unwanted vegetation (Figure 4), scrape the top 2-4 inches of soil to remove the seed-bank since herbicides were not permitted (Figure 5), and deep rip (Figure 6) approximately 29 acres. The contractor performed the work during the month of November using D6 dozers for the brushing and sod removal and a D9 equipped with dual shanks for the ripping. The unwanted vegetation was pushed into brush piles around the perimeter of the site to create wildlife habitat (Figure 7).

Figure 5. A bulldozer removes the top 2-4 inches of soil to remove the seed-bank.

Figure 4. A bulldozer removes the unwanted vegetation.

Figure 6. A D9 dozer rips the soil 4-feet deep.

Figure 7. A variety of birds have already been spotted utilizing the brush piles for food and shelter.

Why didn't we use herbicide?

The Forest Service requested that herbicides not be used. As such, a new technique was developed to remove unwanted vegetation and seed sources by removal of the sod layer. Future monitoring will take place to study the effectiveness of removing the top 2-4 inches of soil at preventing unwanted vegetative growth.

Project site after brush removal

MILESTONES

March & April 2016: Planting Events

In March and April of 2016, four volunteer events and a professional planting were conducted, resulting in the planting of 20,047 trees (Tables 1-2; Figures 8-10). A total of eight volunteer groups (Table 3) and 17 partners were reached (Table 4).

Event	Event Date	Event Type	Acres Planted	Trees Planted	Volunteer Participants	Professional Participants
1	3/11/2016	Volunteer	1	600	11	2
2	3/30/2016	Volunteer	2	1,350	46	12
3	4/2/2016	Volunteer	4	5,042	50	10
4	4/2016	Professional	22.3	12,605	0	3
5	4/23/2016	Volunteer	1	450	13	3
Total			**30**	**20,047**	**120**	**30**

Table 1. Planting events summary.

Figure 8. Volunteers are instructed on proper tree planting techniques and educated on the site history and the benefits of reforestation prior to every planting event.

Figure 9. Boy Scouts helped prepare the seedlings and planting buckets in addition to planting trees.

Figure 10. Mary Miller with the Sierra Club and GFW Reforestation Coordinator, Kylie Schmidt, team up together to plant trees.

Dr. Chris Barton takes a group photo with Angel's Envy Bourbon volunteers. Angel's Envy provided financial assistance to support white oak reforestation.

Tiffany Heim, AmeriCorps volunteer, takes a group photo with students from Emory University.

Angel's Envy volunteers share a laugh while planting seedlings.

Sierra Club volunteers.

DISCUSSION

Species	Number Planted	Source	Percent of Total
White Oak	5,500	Kentucky Division of Forestry	27%
Black Oak	2,000	Arborgen	16%
	1,200	Kentucky Division of Forestry	
Chestnut Oak	1,600	Kentucky Division of Forestry	14%
	1,300	Arborgen	
Northern Red Oak	1,000	Kentucky Division of Forestry	8%
	700	Arborgen	
Shortleaf Pine	1,500	Kentucky Division of Forestry	7%
Shagbark Hickory	1,200	Tennessee Division of Forestry	6%
Yellow Poplar	1,000	Arbogen	5%
Black Cherry	1,000	Kentucky Division of Forestry	5%
Wild plum	655	Kentucky Division of Forestry	3%
2-0 Gray Dogwood	600	Kentucky Division of Forestry	3%
Mockernut Hickory	300	Tennessee Division of Forestry	1%
American Chestnut	292	Indiana Division of Forestry	1%
Sassafras	200	Kentucky Division of Forestry	1%

Table 2. Species planting and corresponding source and percentage.

The target acreage goal (23) was exceeded, resulting in the planting of 29 acres. Future projects are being pursued with the National Forest Service in the surrounding area. The proximity of the project site to I-75 made it ideal for volunteer events and for future education and outreach opportunities.

Volunteer Groups
Angel's Envy
Berea College
Boy Scouts of America
Emory University
Lexington Football Club
Missouri Institute of Science and Technology
Pisgah Presbyterian Church
Sierra Club
South Laurel High School

Table 3. Planting event volunteer groups.

Partners
AmeriCorps
Angel's Envy
Appalachian Regional Reforestation Initiative
Arbor Day Foundation
Brad and Shelli Lodge Stanback
Brian Jarvinen, New Forest Services
Green Forests Work
Kentucky Division of Forestry
Kentucky Division of Mining Reclamation Enforcement
Let's Move Outside!
Mountain Ridge, LLC
Office of Surface Mining Reclamation and Enforcement
The American Chestnut Foundation
United States Department of Agriculture, Forest Service-Daniel Boone National Forest
University of Kentucky, Appalachian Center
University of Kentucky, Department of Forestry

Table 4. Planting event partners.

PARTNERS

AMERICORPS

ANGEL'S ENVY
BOURBON WHISKEY
FINISHED IN PORT WINE BARRELS

ARRI

KENTUCKY DIVISION OF FORESTRY

THE AMERICAN CHESTNUT FOUNDATION®

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

University of Kentucky®