

Levisa Fork Watershed Reforestation Project Final Report

A settlement project between the Sierra Club & Clintwood Elkhorn



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: View from Fishtrap Reservoir Wildlife Management Area reforestation site.

BACKGROUND

In September of 2008, the Sierra Club and citizen activist members of Kentuckians for the Commonwealth filed a complaint alleging that Clintwood Elkhorn Mining Company, a wholly owned subsidiary of TECO Coal, had violated the Clean Water Act by constructing an unpermitted, illegal valley fill in the Island Creek watershed of the Levisa Fork of the Big Sandy River (Figure 1). A consent decree was issued (May 2009) and approved (July 2009), stating that Clintwood Elkhorn would direct \$244,500 to the Kentucky Fish and Wildlife Foundation, acting as a fiduciary, to be used for stream restoration activities outlined in the "Stream Restoration Plan for Levisa Fork Watershed."

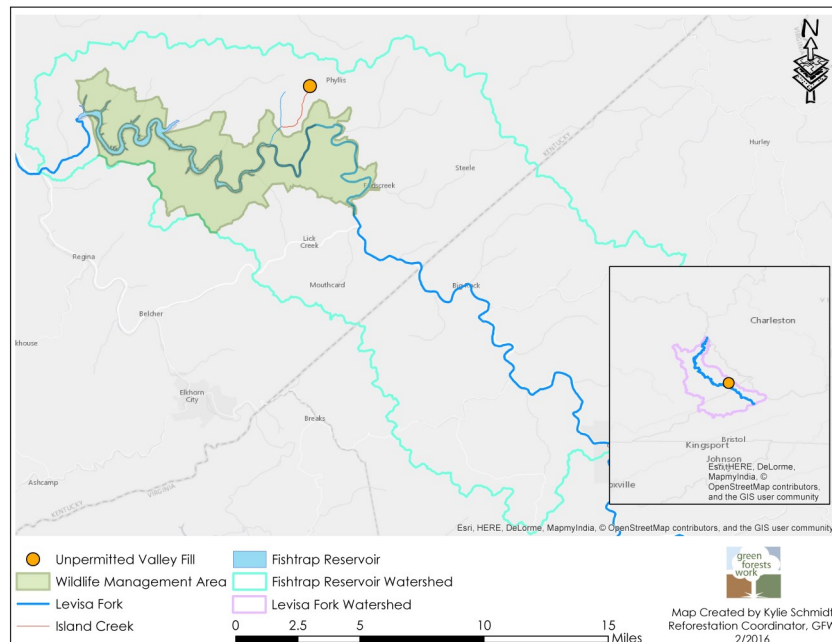


Figure 1. Unpermitted valley fill location within the FRWMA and greater Levisa Fork watersheds.

Prior to beginning stream restoration work for the consent decree, the Sierra Club and Clintwood Elkhorn collaborated with the Appalachian Regional Reforestation Initiative (ARRI) and Green Forests Work (GFW) to plant nearly 12,000 trees on approximately 23 acres of post-bond released mined land near the mining site subject to the consent decree at the Fishtrap Reservoir Wildlife Management Area (FRWMA). The Fishtrap Reservoir is owned by the US Army Corps of Engineers, but the reservoir and the surrounding 13,135 acres is managed by the Kentucky Department of Fish and Wildlife Resources (KDFWR). Clintwood Elkhorn paid for the site preparation (deep ripping), and Sierra Club members provided volunteer labor planting trees. Since the KDFWR was having trouble identifying streams that were suitable for restoration, the success of the ARRI/GFW project led to discussions about using the settlement money to conduct additional reforestation projects in the FRWMA so the settlement payment could result in a larger project because ARRI and GFW could leverage other funding sources and volunteer contributions.

The Sierra Club and Clintwood Elkhorn filed a joint motion (April 2011) that was accepted (June 2011) to modify the consent decree to change the purpose of the defendant's settlement payment from stream restoration to forest restoration using ARRI/GFW methodologies. To guide the reforestation activities, a "Fishtrap Reservoir Watershed Reforestation Project" description was issued by a representative of ARRI and included with the amendment.

Planting events at the FRWMA occurred until nearly all of the land that was suitable for reforestation had been planted. Areas that were originally intended to be reforested were determined unsuitable because of various factors such as the extent of natural reforestation that was already occurring, steepness of slopes, and extent of areas that KDFWR intended to maintain as grasslands for hunting and recreation. Because of this unforeseen loss of suitable acreage and due to effective budgetary management and extensive use of volunteer tree planters, \$146,225.35 of the original settlement remained unspent at the end of the spring 2013 planting season.

To exhaust the remaining settlement, a second amendment and revised "Fishtrap Reservoir Watershed Reforestation Project" plan was submitted (November 2013) and accepted (December 2013) to expand the project range to include any post-bond release surface mined lands within the Levisa Fork watershed.

Funds were transferred from the Kentucky Fish and Wildlife Foundation to Green Forests Work so reforestation could be conducted on land that is not managed by the KDFWR.

Three, new reforestation sites were identified: Pike County Airport, Floyd County, and Island Creek watershed (Figure 2). The results for each location and the collective results are discussed below. The following timeline summarizes the aforementioned events (Figure 3).

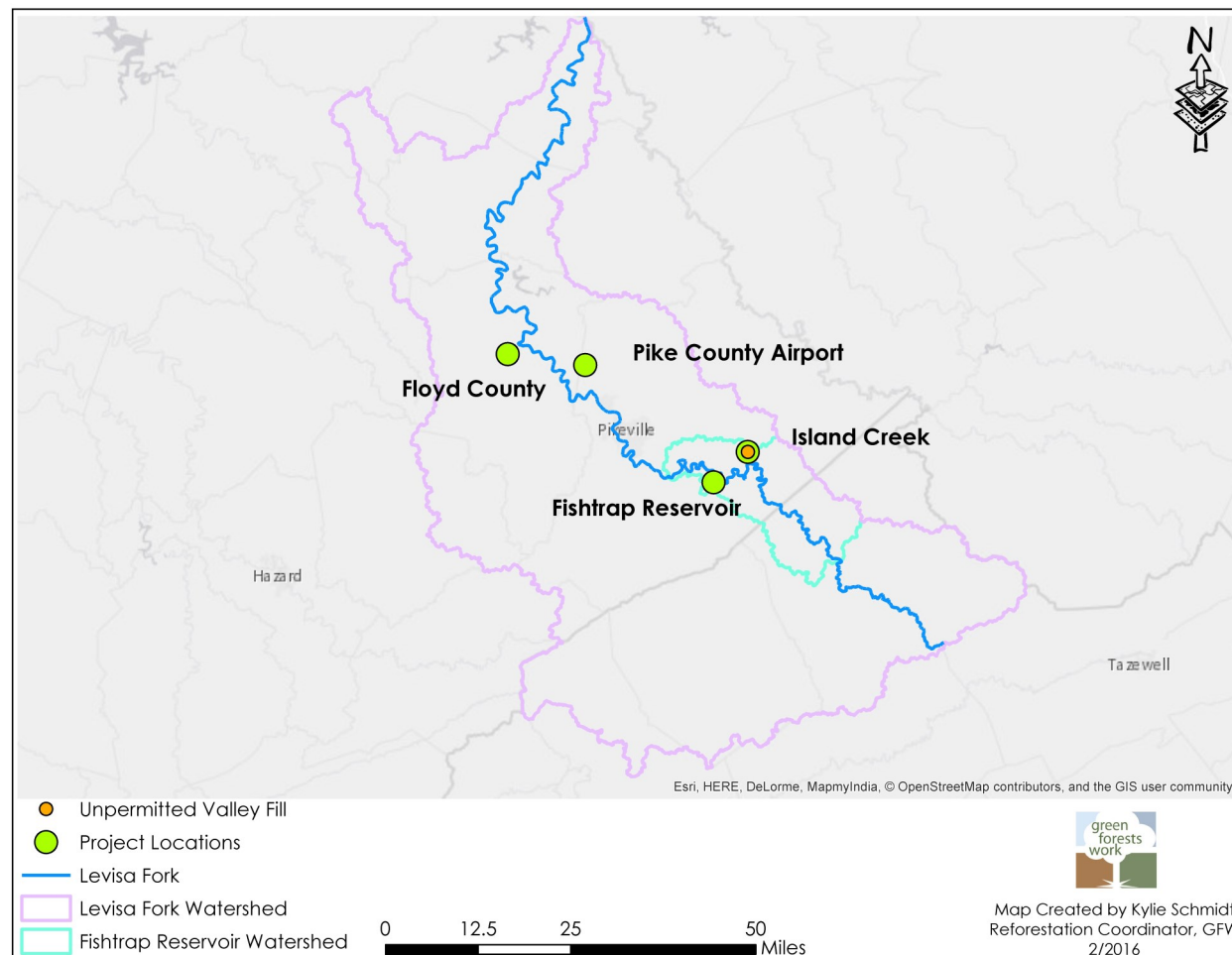


Figure 2. Project locations in relation to the Levisa Fork.

BACKGROUND: Project Timeline

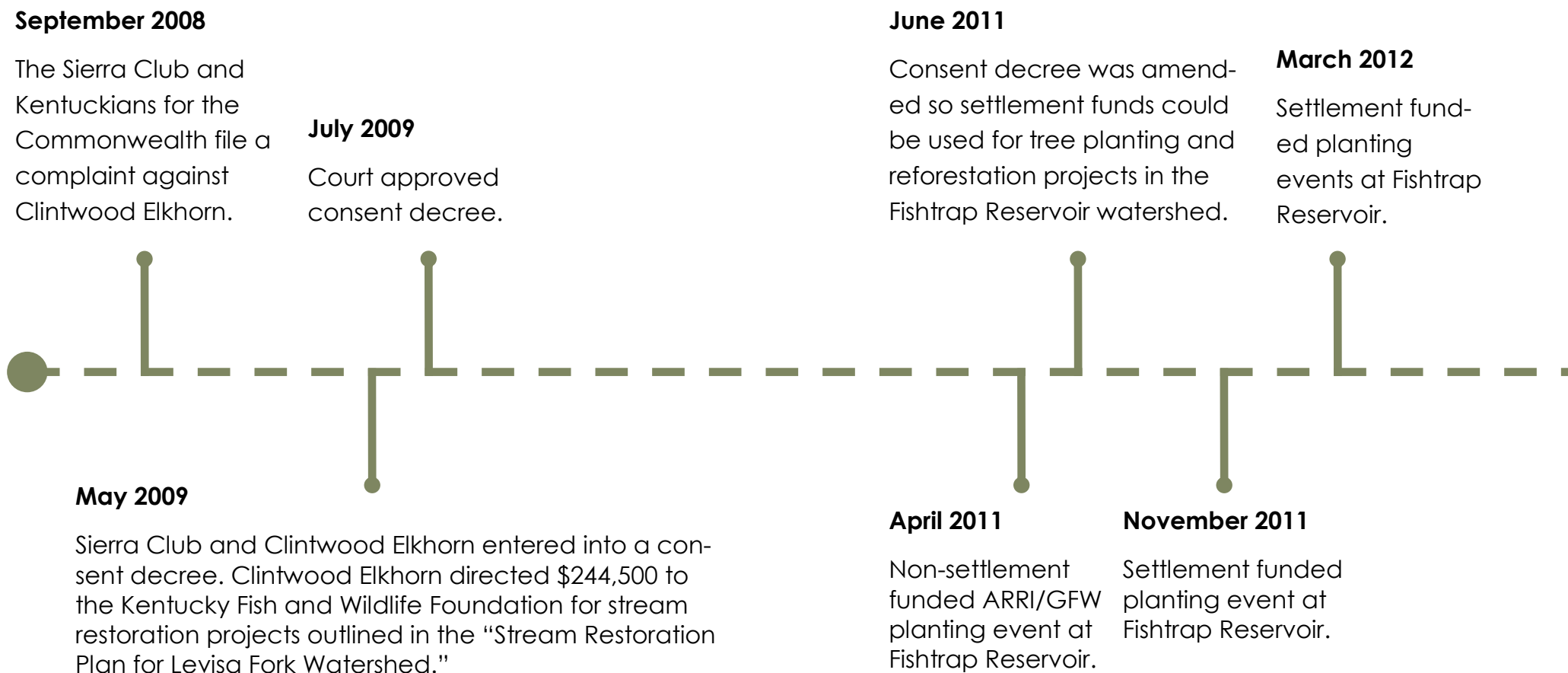
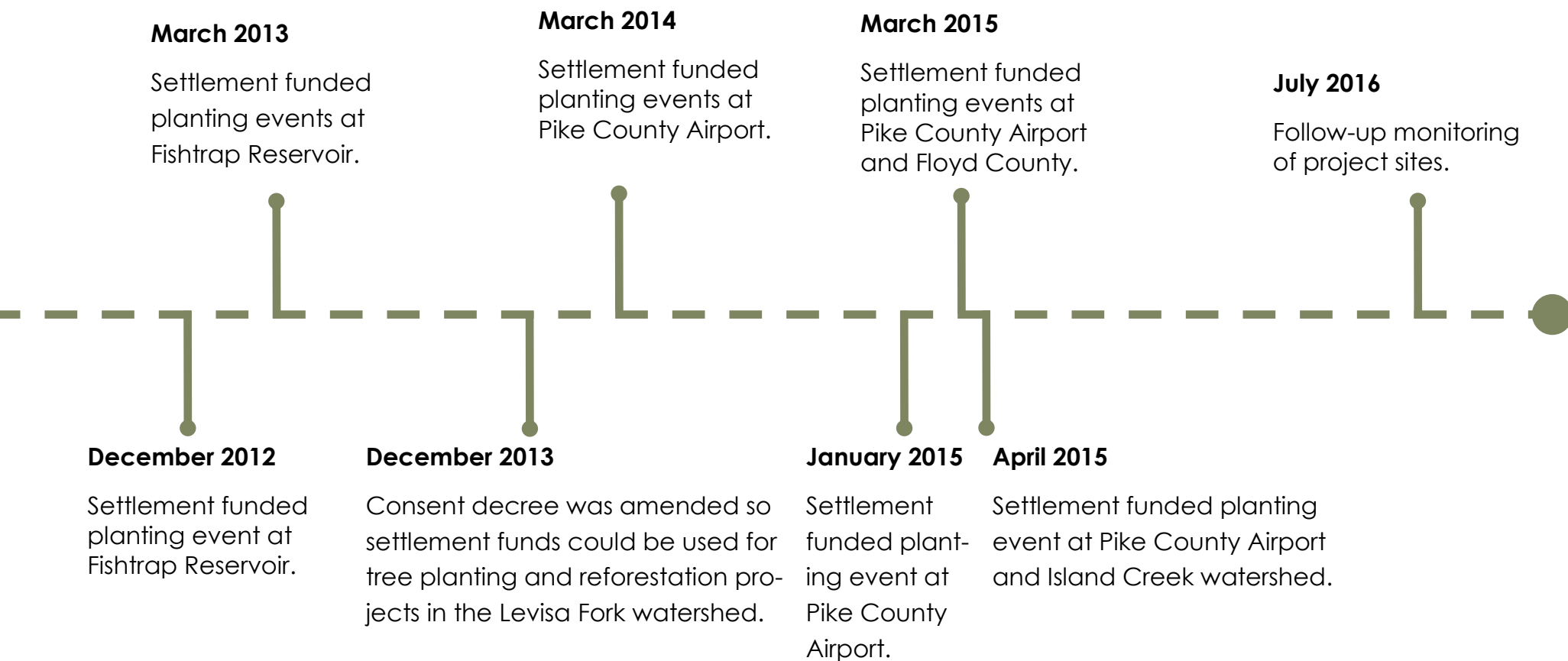


Figure 3. Project timeline.



BACKGROUND: Sierra Club's & TECO'S History with ARRI & GFW

The ARRI Science Team has estimated that approximately 750,000 acres of non-forested, unused post-bond release surface mined lands are available for reforestation in the Appalachian coal fields. A major part of ARRI/GFW's mission is public outreach and technical education to inform the coal industry, the environmental community, and the general public about the Forestry Reclamation Approach (FRA) and the processes of restoring active, abandoned, and legacy mines to healthy, productive forests.

Many years prior to the Settlement Agreement, Sierra Club members, Kentuckians For The Commonwealth members, and TECO Coal Company (TECO) employees learned about the benefits of mine land reforestation through ARRI/GFW presentations and through participation in numerous tree planting events, Arbor Day Ceremonies, informational meetings, and field trips.

Starting in 2009, Sierra Club volunteers have joined with other ARRI/GFW partners each spring to plant trees on multiple legacy mine sites across the coal fields of eastern Kentucky. Some of the sites planted include the Artie Ann Bates mountaintop mine site in Letcher County, the US Army Corp of Engineers mined property at Yatesville Lake in Lawrence County, the Larry York contour mine site in Morgan County, the Pine Mountain Settlement School abandoned coal refuse site in Harlan County, and the Robinson Forest surface mine site in Breathitt County. The successful relationship between the Sier-

ra Club and ARRI/GFW led to the recruitment of thousands of alternative spring break college students from all across the eastern and mid-western United States as volunteer tree planters over the years.

TECO and its subsidiaries, Premier Elkhorn Coal Company and Clintwood Elkhorn Coal Company, were the first coal companies in the nation to embrace the FRA on its active mining operations. Since 2005, TECO has partnered with ARRI/GFW to host Arbor Day Ceremonies and tree planting events where hundreds of local elementary, middle school, and high school students have been taught how to plant tree seedlings and the importance of forest reclamation and conservation. TECO has also voluntarily mitigated hundreds of acres of previously reclaimed mine sites where reforestation was not attempted or where the results were undesirable.

Thanks to the support from environmental and industry partners like the Sierra Club and TECO, ARRI/GFW has engaged over 14,000 volunteer tree planters, with approximately 7,800 of those volunteers being under the age of 24 years old. The Appalachian forest is one of the most beautiful in the world, and as one of the region's most valuable assets, it has played an integral part in the rich, cultural heritage of the mountain people. By working together, we are addressing the issue of significant forest fragmentation in our region by engaging people from all walks of life in the planting of trees on mine sites.

“Clintwood Elkhorn Mining LLC has a long commitment to environmental stewardship through reforestation of reclaimed coal mined lands. Clintwood was delighted to see this funding be used to reforest some of the older mined areas.”

-Chris Stanley, Clintwood Elkhorn Mining

“Being a volunteer with the project to reforest a MTR site has been such a positive experience for me. I believe trees bring healing to the land and have the promise to improve an area that has been so damaged. In an age when there are so many environmental challenges, the act of planting trees is one small way to make a difference for the better. In addition, working with other like minded people who care greatly about the environmental health of our state is an inspiration.”

-Mary Miller, Sierra Club Volunteer



RESULTS: Fishtrap Reservoir Wildlife Management Area

Reforestation activities began in the fall of 2011 after the consent decree was amended and concluded in spring 2014 (Figure 4). Over the four-year period, 114 acres were reforested during 16 volunteer events, planting a mix of nearly 83,000 high-value hardwoods and early successional shrubs (Table 1). Most of this planting was accomplished by nearly 960 volunteer tree planters from several different states and organizational affiliations, including the Sierra Club, various colleges and universities participating in Alternative Spring Break, church groups, and local high schools (Table 2, Figures 5-7). A few smaller areas were planted by professional tree planting crews. ARRI and GFW were able to obtain several in-kind donations that ultimately allowed more acres to be reforested (see Table 10 in Discussion). Monitoring at the site is expected to begin in 2016, possibly in the form of an internship for a college student.

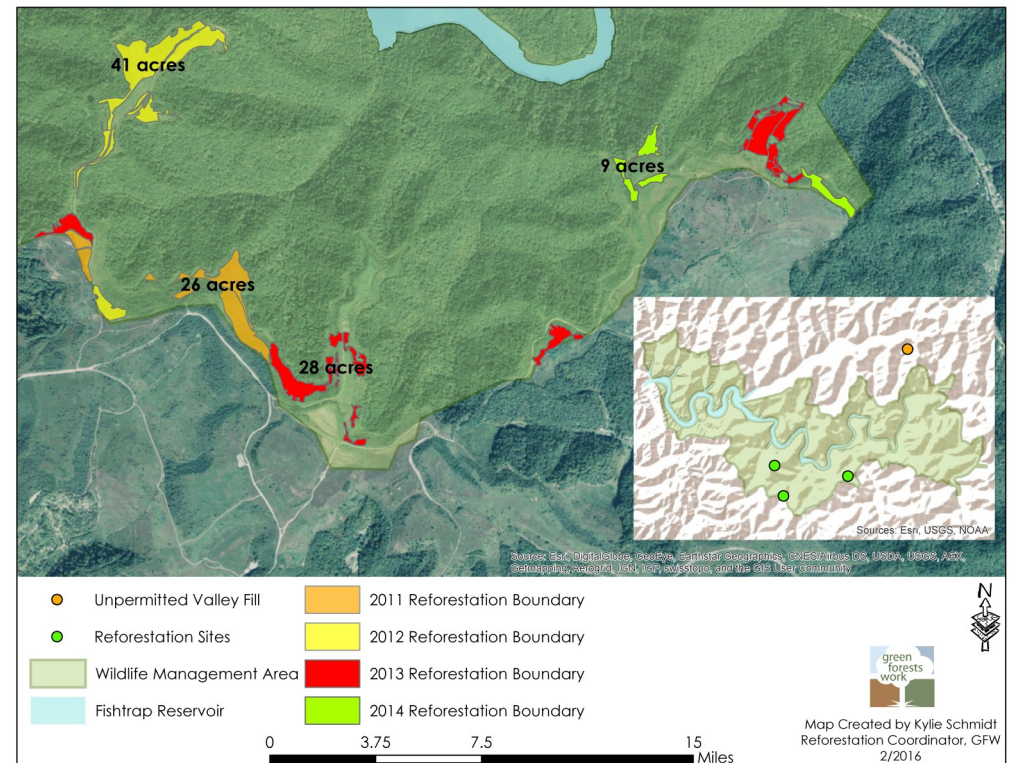


Figure 4. Fishtrap Reservoir reforestation areas.

Figure 5. Dr. Patrick Angel of the OSMRE giving volunteers an overview of mining reclamation, reforestation, and proper tree planting techniques at FRWMA.



Figure 6. Volunteers tree planters plant a mix of native hardwoods and shrubs on a ripped slope at FRWMA.



Korte Memorial

The March 17, 2012 planting event was given added meaning by serving as a memorial for Jack Korte. Jack, an English major, had written a passionate piece about the environmental effects of mountaintop removal shortly before his death. His family felt there was no better way to honor his memory than to support this event both financially and by volunteering along with other friends and family members. A memorial stone was placed at the site and surrounded with native containerized trees,

"The lush and fertile hardwood forests are decimated and replaced by non-native sometimes invasive grass, thereby altering the ecosystem forever. Biological diversity is sorely affected as the animals affected range from migratory birds to salamander populations but also black bears, hardwood trees, foxes, fish, and any animal that lives near the immediate mining site... Natural return of the forests to the post mountaintop mining sites occurs very slowly, as full restoration may not occur for hundreds of years."

—Jack Korte, "The Tragedy Of Mountaintop Removal"



Jack's father gave an opening speech for the event by the memorial stone (left). Jack's siblings commemorated their brother by volunteering at the event (right).

Event	Event Date	Acres Planted	Trees Planted	Number of Participants
1*	4/9/2011	23	16,100	80
2	11/5/2011	3	4,000	85
3	3/17/2012	13.6	9,275	127
4	3/24/2012	5.3	4,960	132
5	3/29/2012	0.25	20	4
6	3/30/2012	1.9	4,700	14
7	4/9/2012	12.2	14,450	1
8	12/8/2012	7.3	3,666	53
9	3/7/2013	4.4	2,210	26
10	3/13/2013	8.7	4,369	66
11	3/20/2013	5.3	2,661	37
12	3/24/2013	2.5	1,255	10
13	3/30/2013	5.3	2,662	49
14	4/6/2013	12.5	6,277	120
15	4/5/2014	6.6	4,500	120
16	4/6/2014	2.1	1,500	35
TOTAL		114	82,605	959

* Planting event was not funded using settlement, but Clintwood Elkhorn and the Sierra Club both contributed to the event.

Table 1. Fishtrap Reservoir planting events summary.

RESULTS: Fishtrap Reservoir Wildlife Management Area

Fishtrap Reservoir Reforestation Project: Volunteers, Partners, and Contractors

Alice Lloyd College	Harvard University	Saddleback College
American Bird Conservancy	Headwaters, Inc.	Saint John Fisher College
Anonymous Donor	Kentuckians for the Commonwealth	Samara
Appalachian Coal Country Team	Kentucky Department of Fish and Wildlife Resources	Samara of Berea College
Appalachian Regional Commission	Kentucky Division of Abandoned Mine Lands	Shaped By Water
Appalachian Regional Reforestation Initiative	Kentucky Division of Forestry	Sherwin Williams Paint Store
Appalachian School of Law	Kentucky Division of Mining Reclamation Enforcement	Sierra Club – Bluegrass Chapter
Appalshop	Kentucky Fish and Wildlife Foundation	Sustainable Morehead
Arbor Day Foundation	Korte Family	TECO
ArborGen	Let's Move Outside	The American Chestnut Foundation
Berea College	Letcher County Central High School	The Jobs Project
Bereans for Appalachia	Letcher County Central High School PRIDE Club	Tubex
Boy Scouts of America	Jigsaw Enterprises, LLC	Union Concrete, Division of RBS Inc.
Burning Man	Maurice and Mary Miller	United Nations Environmental Programme
Campus Christian Center	Merion Bros Monument Company, Martin, KY	United States Army Corps of Engineers
Clintwood Elkhorn Coal Company	Morehead State University	USDA, Forest Service-Timber and Watershed Laboratory
Conservation Services, Inc.	Mountain Justice	US Forest Service, Daniel Boone National Forest
Drew University	National Civilian Community Corps	United States Forest Service, USDA
Duke Energy	Native American Nations (Mary Garcia)	University of Baltimore
Eastern Kentucky University	Northeastern University	University of Connecticut
Final Grade Contracting	Northern Kentucky University	University of Kentucky
First Christian Church, Pikeville KY	Oberlin College	University of North Carolina
First Presbyterian Church of Pikeville, KY	Office of Surface Mining Reclamation & Enforcement, USDI	University of the Cumberlands
Gay Straight Alliance	Pike County School District	Virginia Department of Forestry
Green Forests Work	Radford University	Williams Forestry & Associates

Table 2. Fishtrap Reservoir reforestation project volunteers, partners, and contractors.

Species Planted *(not comprehensive)*

- White Oak
- Southern Red Oak
- Northern Red Oak
- Shagbark Hickory
- Sugar Maple
- Shortleaf Pine
- Red Chokeberry
- American Hawthorne
- American Hazelnut
- Roughleaf Dogwood
- Red-Osier Dogwood
- Alleghany Chinquapin
- Virginia Pine
- American Chestnut
- Chestnut Oak
- Black Oak
- Yellow Poplar
- Black Cherry
- Black Locust
- Red Mulberry
- Persimmon
- Shellbark Hickory
- Redbud
- Gray Dogwood
- American Plum
- Pawpaw
- Black Walnut



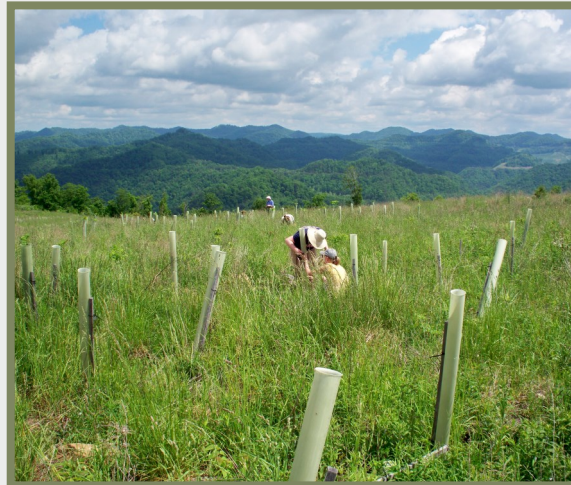
The Director of the Office of Surface Mining, Joe Pizarchik and a Boy Scout shelter an American chestnut (above). Volunteers direct-seeding a walnut plot (below).



Black Walnut Study:

Nursery Stock vs. Seed, With or Without Tree Shelters

The Fishtrap Reservoir reforestation site provided an opportunity to do a small study on the survival and growth (height and diameter) of black walnuts planted from seed versus those planted from nursery stock (1-0) and compare the effects of using or not using a tree shelter. The experiment was conducted by volunteer students from Berea College under the supervision of several researchers. The results indicated that the survival of Black Walnuts from seed is very similar to nursery stock and that seeds may not need tree shelters. These results are quite promising for this species and are important because planting from seed without shelters will reduce reforestation costs.



Students measure a plot with tree shelters (left). Students measure the height of a seedling without a shelter (right).

RESULTS: Pike County Airport

In 2014, The American Chestnut Foundation (TACF) used a Conservation Innovation Grant (CIG) from the Natural Resources Conservation Service to establish a 1 acre progeny test of TACF's "Restoration Chestnut 1.0" families and plant an additional 31.5 acres with mixed hardwoods and American chestnuts on a private landowner's property near the Pike County Airport (Figure 8). The landowner had been using the property for grazing cattle and hunting, but the success of the CIG project led to the desire for additional reforestation, providing a gateway for the settlement project.

In 2015, an additional 36.5 acres were reforested with a typical mix of hardwoods adjacent to the 2014 plot using settlement funds. The experimental nature of the 2014 CIG project inspired the landowner to do something a little different again, so 12 acres were reforested with high-fruited varieties (for human consumption as opposed to wildlife) of fruit, nut, berry, and medicinal trees and shrubs to establish a more short-term economic benefit (Figure 8).

There have been few projects that have tested the viability of establishing orchards on formerly mined lands, so this project could provide hope for a potential new, sustainable industry in Appalachia. It is anticipated that this nut and fruit orchard will be used to generate local jobs and produce

value added products and/or be sold to local restaurants or at the farmer's market. Monitoring of the orchard will begin in 2016, possibly in the form of an internship for a college student.

In total, approximately 80 acres were reforested by a combination of volunteers (315) and paid workers with over 56,000 trees and shrubs (Table 3, Figures 9-10). In an effort to create even more immediate local jobs, the non-volunteer tree planters were hired by placing

local newspaper advertisements. The project was a collaboration with 38 different volunteer groups, partners, and contractors, representing a wide range of organizations and initiatives (Table 4).

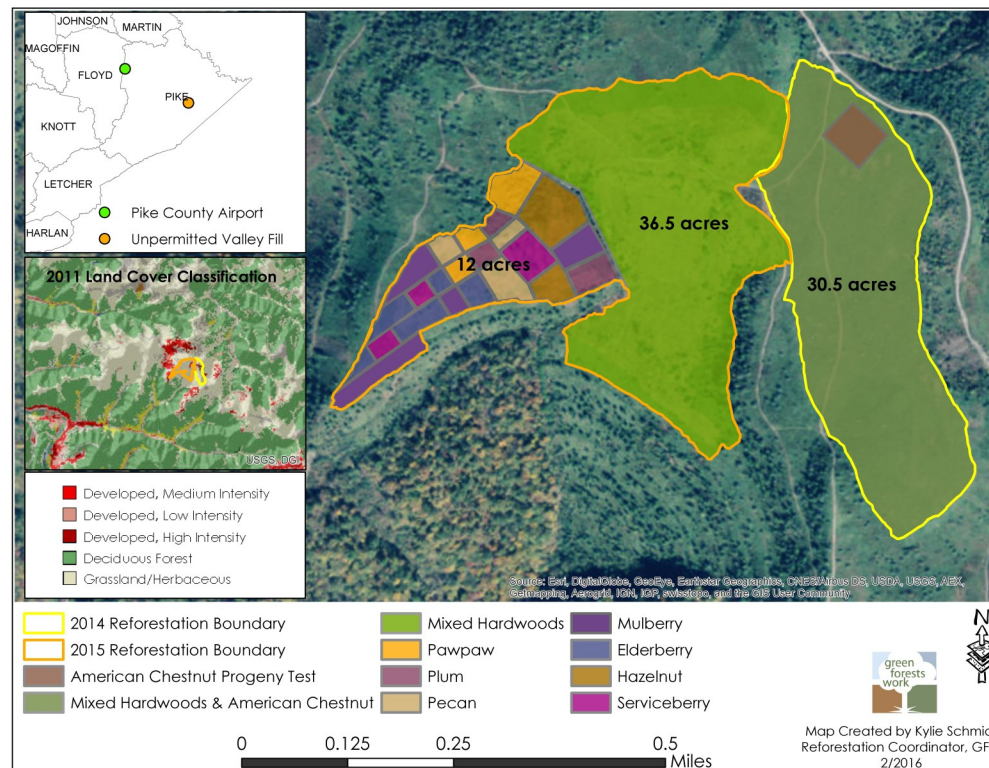


Figure 8. Pike County Airport reforestation areas.

Event	Event Date	Acres Planted	Trees Planted	Number of Participants
TACF CIG Project				
1	11/16/2013	4.7	3,876	50
2	3/6/2014	2.2	1,496	13
3	3/12/2014	3.7	2,516	23
4	3/13/2014	4.6	3,128	27
5	3/20/2014	4.6	3,128	40
6	3/22/2014	5	3,400	70
7	3/28/2014	3.4	2,312	10
8	3/29/2014	1.1	748	14
9	4/5/2014	1.2	816	23
Settlement Project				
10	1/29/2015	36	24,200	26
11	3/12/2015	12	10,500	14
12	4/22/2015	0.5	200	5
TOTAL		79	56,320	315

Table 3. Pike County Airport planting events summary.

Species Planted *(not comprehensive)*

- Chestnut Oak
- White Oak
- Sugar Maple
- Shagbark Hickory
- White Ash
- Shortleaf Pine
- Virginia Pine
- Black Oak
- Gray Dogwood
- Elderberry
- Persimmon
- Redbud
- Black Locust
- Hazelnut
- Plum
- Pawpaw
- Pecan
- Red Mulberry
- Serviceberry
- American Chestnut



The project area before reforestation occurred (above). Professional tree planters from Williams Forestry & Associates planting seedlings (below).



RESULTS: Pike County Airport

Pike County Airport Reforestation Project: Volunteers, Partners, and Contractors	
Appalachian Citizens Law Center	Kentucky Division of Abandoned Mine Lands
AmeriCorps	Kentucky Division of Forestry
Appalachian Regional Commission	Kentucky Division of Mining Reclamation Enforcement
Appalachian Regional Reforestation Initiative	Let's Move Outside
Appalachian State University	Letcher County Central High School
ArborGen	Mountain Justice
Berea College	Mountain Ridge, LLC
Bridgewater College	National Civilian Community Corps
Canisius College	Northeastern Illinois University
Drew University	Natural Resources Conservation Service
Enterprise Holdings Foundation	Office of Surface Mining Reclamation & Enforcement, USDI
Final Grade Contracting	Pike County Kentucky Soil and Water Conservation District
Floyd County District Court	Radford University
Green Forests Work	The American Chestnut Foundation
Headwaters, Inc.	United States Forest Service, Daniel Boone National Forest
Indiana University	University of Kentucky
Kentuckians for the Commonwealth	Warren Wilson College
Kentucky Department of Fish and Wildlife Resources	Williams Forestry & Associates

Table 4. Pike County Airport reforestation project volunteers, partners, and contractors.



Dr. Patrick Angel (OSMRE/ARRI) and Nathan Hall (GFW) give volunteers from Radford University a background on surface mining, reclamation, the importance of reforestation, and proper tree planting techniques. (left).

A student from the University of Kentucky enjoying volunteering at the planting event (right).



RESULTS: Floyd County

An organization in Floyd County that owns a large amount of surface mine land expressed an interest in ARRI and GFW, but they were unsure about the methodologies. Since gaining the trust and support of this organization could lead to thousands of acres of reforestation in the area, leading to a greater environmental benefit in the watershed in the long term, a pilot project was pursued. The organization and GFW/ARRI chose an 11.2 acre site in the middle of a large surface mine (Figure 10). Although the project area is a small portion of the surface mine, the strategic location provides a central, native seed source that can be dispersed to the surrounding area, facilitating natural regeneration in the surrounding grass/shrub land. Nearly 8,000 later-successional, hard-mast species, including American chestnuts, that were not likely to naturally invade the site were planted by a combination of professionals and volunteers from the Sierra Club – Bluegrass Chapter and students from Warren Wilson College (Tables 5-6). After the project is evaluated this year, the results will be shared with the organization and additional projects will be pursued.

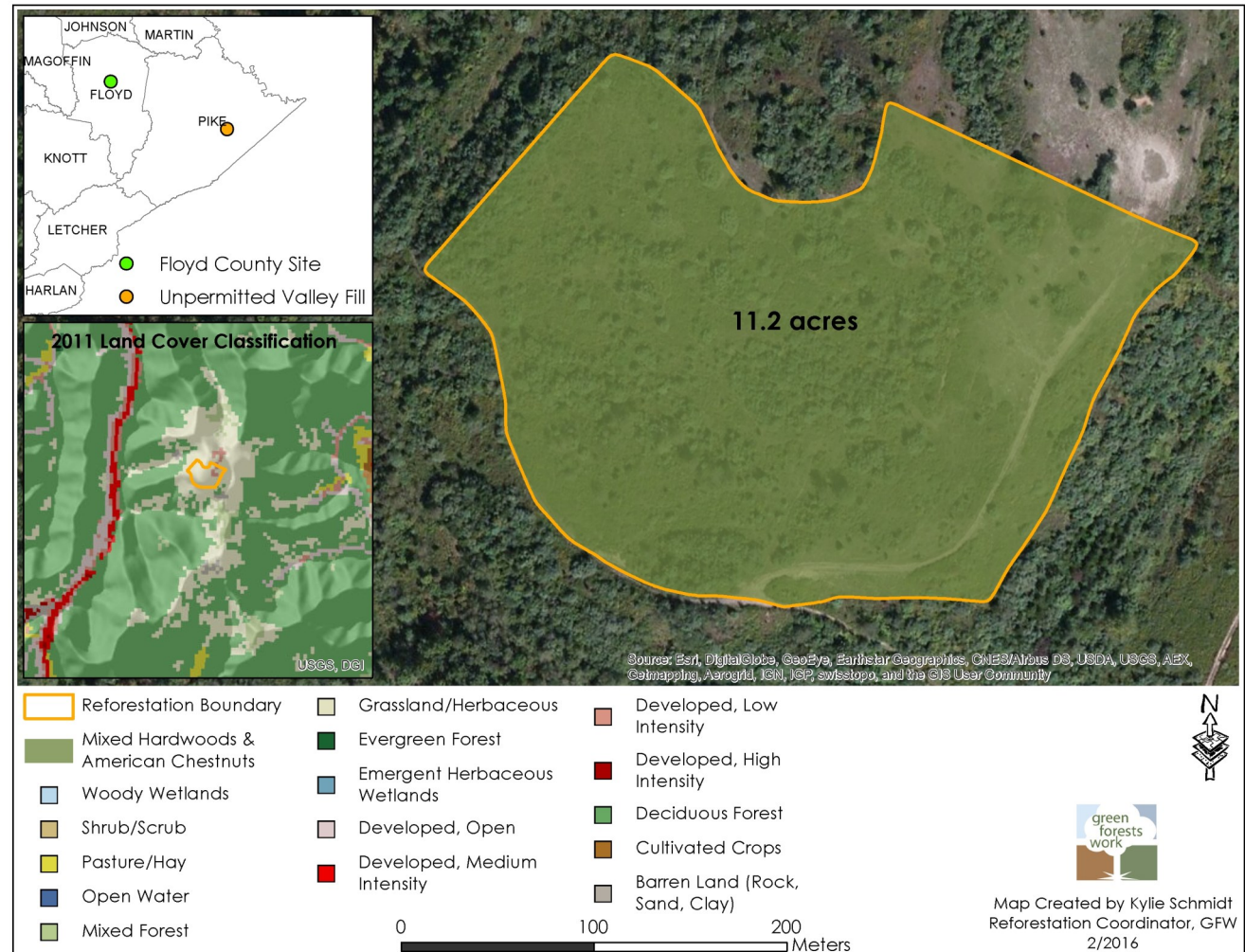


Figure 10. Floyd County reforestation area.

"It was an empowering experience to know that the trees we planted on a reclamation site could stand for decades. I'm hopeful that our work will let future generations enjoy roasting chestnuts on an open fire."

-Sydney Grange, Warren Wilson College sophomore

RESULTS: Floyd County

Event	Event Date	Acres Planted	Trees Planted	Number of Participants
1	3/2/2015	11.2	7,616	26
2	3/16/2015	0*	350	11
TOTAL		11.2	7,966	37

* This event was an inter-planting of American chestnuts and other species in the center of the 8'x8' planting grid.

Table 5. Floyd County planting events summary.

Species Planted *(not comprehensive)*

- White Oak
- Chestnut Oak
- Blackgum
- Black Oak
- Shagbark Hickory
- White Ash
- Sugar Maple
- Shortleaf Pine
- Virginia Pine
- American Chestnut

Floyd County Reforestation Project: Volunteers, Partners, and Contractors

AmeriCorps	Let's Move Outside
Appalachian Regional Commission	Mountain Ridge, LLC
Appalachian Regional Reforestation Initiative	Office of Surface Mining Reclamation & Enforcement, USDI
Green Forests Work	Sierra Club – Bluegrass Chapter
Kentucky Department of Fish and Wildlife Resources	The American Chestnut Foundation
Kentucky Division of Forestry	University of Kentucky
Kentucky Division of Mining Reclamation Enforcement	Warren Wilson College
Kinzer Drilling	Williams Forestry & Associates

Table 6. Floyd County reforestation project volunteers, partners, and contractors.



In addition to the seedlings that were planted by professionals, a group of Warren Wilson faculty and students planted a number of additional species including potentially blight-resistant American chestnuts provided by TACF (left).

The brush that was removed was pushed into piles at the reforestation boundary to create wildlife habitat (right).



RESULTS: Island Creek Watershed

This reforestation area may be small, but it may also be the most important, as it is located adjacent to the unpermitted valley fill in the Island Creek watershed (Figure 10). After Clintwood Elkhorn’s bond was released for the reclamation, 1,000 fruit, nut, and hardwood trees and shrubs were planted in the Island Creek watershed to provide a local orchard and improved aesthetics for the Island Creek community (Table 7). Because the site was recently reclaimed using the Forestry Reclamation Approach, no herbicide or ripping was needed—seedlings were planted directly in the soil. The ARRI/GFW project team firmly believed that some of the settlement funding should be used to benefit those who were most negatively impacted by the valley fill, but the opportunity was limited due to the lack of flat land as a result of the contour mining (Figure 11). The area that was interplanted was on a relatively less steep, un-ripped slope so it could be harvested more easily. Although 1.5 acres should provide a generous bounty for the residents of Island Creek, American chestnuts were planted in the residents’ yards to make up for the limited reforestation opportunity elsewhere in the watershed. In addition, TECO Coal has offered to donate the 1.5 acre interplanting area so that it can be properly managed and enjoyed in perpetuity. This project was a collaboration between the partners and contractors listed in Table 8.

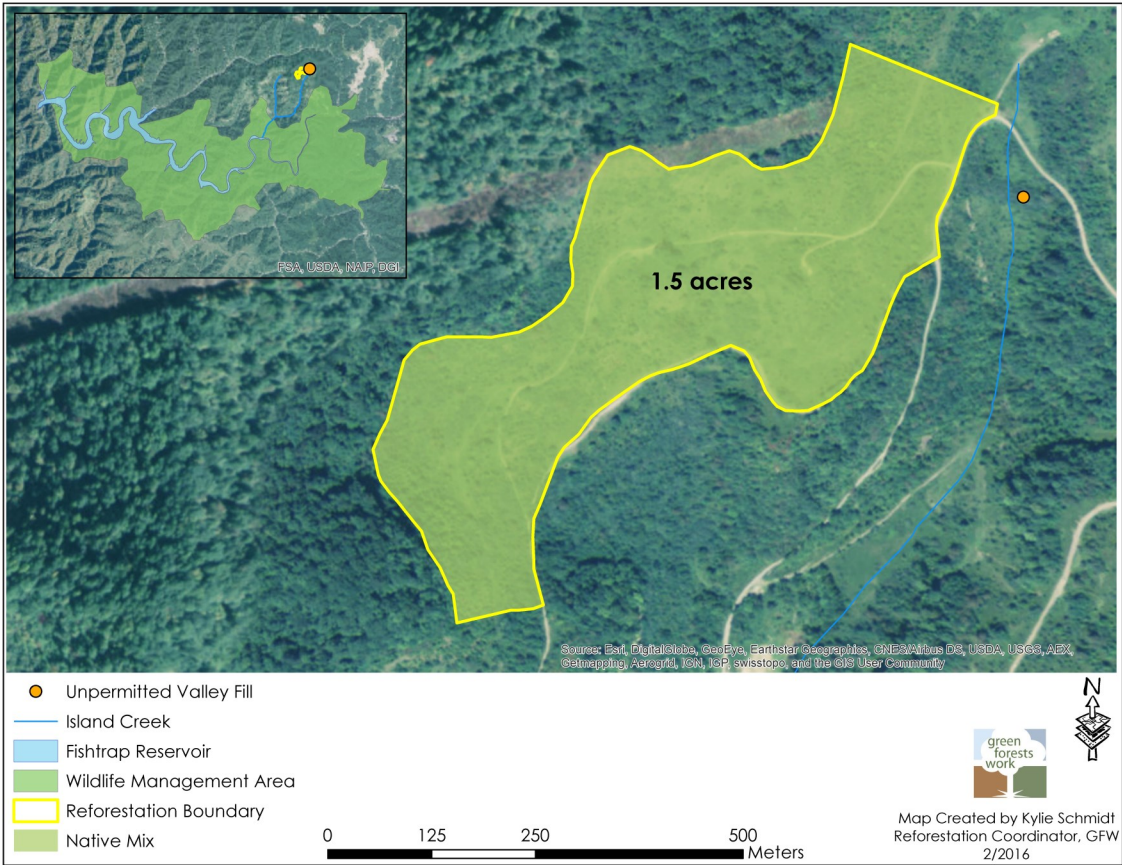


Figure 10. Island Creek water reforestation area.

Event	Event Date	Acres Planted	Trees Planted	Number of Participants
1	4/19/2015	1.5	1,000	3

Table 7. Island Creek Watershed planting event summary.

RESULTS: Island Creek Watershed



Figure 11. Active contour mining at the site subject to the consent decree.



Figure 12. Reforestation site after reclamation and prior to settlement planting.

Island Creek Watershed Reforestation Project: Partners and Contractors	
AmeriCorps	New Forest Services
Appalachian Regional Commission	Office of Surface Mining Reclamation & Enforcement, USDI
Appalachian Regional Reforestation Initiative	Sierra Club – Bluegrass Chapter
Green Forests Work	TECO Coal
Kentuckians for the Commonwealth	The American Chestnut Foundation
Kentucky Division of Mining Reclamation Enforcement	University of Kentucky

Table 8. Island Creek Watershed reforestation project partners and contractors.

DISCUSSION

In the “Levisa Fork Watershed Reforestation Project” document included with the first amendment to the consent decree, the goal was to reforest 180-210 acres total (60-70 acres per year from 2011-2013) at the FRWMA, where no brushing (removal of woody shrubs) was needed. However, only 91 acres in the FRWMA were found to be suitable for reforestation so additional sites had to be located. Some of the additional acreage selected for reforestation outside of the FRWMA had slightly higher reforestation costs/acre due to the necessity of applying herbicides and mechanically removing invasive exotic species to increase the likelihood of achieving reforestation success. The increased site preparation costs coupled with the necessity of contracting professional tree planters resulted in the reforestation of slightly less than the target goal of 180 acres (152.2 acres, 85%); although the de-

sired acreage was not achieved with the settlement funding, two related projects that laid the groundwork for the settlement projects resulted in 207 acres of reforestation in the Levisa Fork watershed (Table 9). To help cover some of these unexpected costs, the project team was able to leverage an additional \$5,420.43 in donations and in-kind contributions (Table 10).

In light of the circumstances, the project team believes that 85% of reforestation goal is still a success, especially because of the broader accomplishments that were achieved:

- The Floyd County project cultivated a valuable relationship that could lead to thousands of more acres of reforestation in the Levisa Fork watershed by future partnerships with the organization.
- The 13.5 acres of fruit and nut tree orchards that were established will continue to give back to the communities and hopefully serve as demonstration sites for the potential development of a sustainable, agriculture-based economy in Appalachia.
- Monitoring/management of these orchards and the other reforestation sites will provide opportunities for student internships and possibly local jobs.
- All of the reforestation sites can be used (and have been used) to educate future natural resources professionals about current techniques in reforestation and the environmental and socioeconomic benefits of mined land reforestation. Staff from the Natural Resources Conservation



DISCUSSION

Service toured the Pike County Airport site to learn Forestry Reclamation Approach techniques, and representatives from DOW Chemical visited the site to advise on the best protocol for herbicide applications on legacy mines.

- For all of the sites, equipment operators from the region were contracted to provide site preparation services and the majority of the seedlings were purchased from the Kentucky Division of Forestry, providing economic stimulus to the region. In addition, local tree planting labor was hired for the Pike County Airport site.
- The Island Creek watershed project led to a 1.5 acre donation of land offer by TECO, Coal. This area could be used for future orchard viability research and education and outreach.
- The FRWMA provided an opportunity for a research project on black walnuts, the results of which may influence decision-making for future reforestation projects by lowering reforestation costs.

Event Location	Acres Planted	Trees Planted	Number of Participants
Settlement Projects			
Fishtrap	91.0	66,505	879
Pike County Airport	48.5	34,900	45
Floyd County	11.2	7,966	37
Island Creek Watershed	1.5	1,000	3
TOTAL	152.2	110,371	964
Related Projects			
Fishtrap	23.0	16,100	80
Pike County Airport	30.5	21,420	270
TOTAL	54.5	37,520	350
ALL PROJECTS TOTAL	205.7	147,891	1,314

Table 9. Settlement projects and related projects summary.

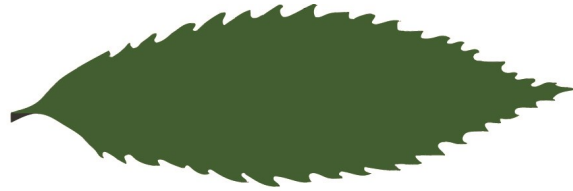
INCOME	
Settlement Balance ¹	\$126,884.85
Donations ²	\$ 5,420.43
In-kind Contributions ²	\$141,489.40
TOTAL INCOME	\$273,794.68
EXPENDITURES	
Contract Services	\$ (91,075.16)
Supplies	\$ (26,891.14)
Travel	\$ (342.00)
Administration	\$ (8,401.45)
Other	\$ (175.10)
TOTAL EXPENDITURES	\$ (126,884.85)

¹ Amount transferred from the Kentucky Fish and Wildlife Foundation to GFW

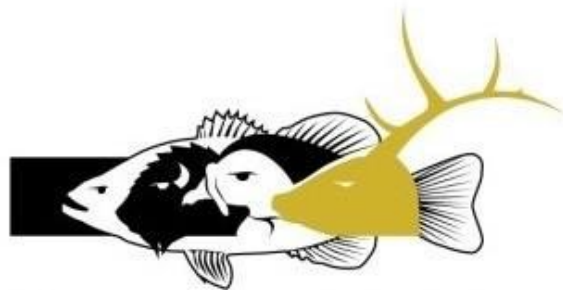
² Some of the donations and in-kind contributions occurred before the GFW was acting as fiduciary

Table 10. Project income and expenditures.

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