

Appalachia Ohio Collaborative Forest Landscape Restoration Project

**Oak-hickory Ecosystem Restoration to Support Sustainable
Appalachian Communities**

**USDA Forest Service
Wayne National Forest
Eastern Region**

February 2011

Executive Summary

Dominant forest type(s): oak-hickory

Total acreage of the landscape: Athens Unit=269,173 **Total acreage to receive**
Ironton Unit=316,639 **treatment:** 20,734

Total number of NEPA ready acres: 15,376 **Total number of acres in NEPA process:** 5,358

Description of the most significant restoration needs and actions on the landscape: The Appalachia Ohio Collaborative Forest Restoration Project proposes ten years of projects, spanning 173,136 acres of NFS lands inside two landscape scale Management Units within the larger context of public-private forest landscapes in Appalachia Ohio (Attachment G: Map 1). Terrestrial restoration projects on 20,734 acres of NFS lands include: invasive species treatments, timber stand improvement and understory restoration, and oak regeneration. Watershed reclamation projects within the 116 square mile Monday Creek watershed will focus on 59 acres of NFS lands and include: mine portal closures, subsidence fills, replacement of water courses to landform surface, chemical treatment of water, decommissioning of illegal OHV trails, non-native invasive species treatments and native plantings.

Description of the highest priority desired outcomes of the project at the end of the 10 year period: At the end of a decade, aquatic life will be restored to a free-flowing 27 mile long Monday Creek, a tributary to the upper Ohio River. Forest landscapes will have stands dominated by oak and hickory with diverse mixtures of canopy tree species, more complex tree age and size structure, and heterogeneous mid-stories, under stories and groundcover. Forest Management Indicator Species including pileated woodpecker, cerulean warbler, worm-eating warbler, and Louisiana waterthrush will have viable, if not source, populations. The federally listed as endangered Indiana bat will benefit from improved forest condition, in particular in the area around the Priority III Hibernaculum. *Ailanthus altissima* (tree-of-heaven) will not be present in the canopy and non-native invasive plants will occupy less of the landscape.

Description of the most significant utilization opportunities linked to this project: The employment and labor benefits for commercial forest products are estimated at \$1,357,500.

Name of the National Forest, collaborative groups, and other major partner categories involved in project development: Wayne National Forest (WNF); Monday Creek Watershed Collaborative: Monday Creek Restoration Project, Ohio Department of Natural Resources (ODNR) Division of Mineral Resource Management, U.S. Army Corp of Engineers, Ohio Environmental Protection Agency, U.S. Fish & Wildlife Service, Ohio University, U.S. Office of Surface Mining Columbus Office; Ohio Forest Resources Partnership: ODNR Division of

Forestry, USDA Natural Resources Conservation Service Ohio, USDA Forest Service Northern Research Station, USDA Forest Service State & Private Forestry Northeastern Area and The Nature Conservancy's North American Science.

Describe the community benefit including number and types of jobs created: Local communities and businesses will recognize and celebrate a sense of place associated with the WNF. A potential of 74 jobs will be created in performing the proposed work. Water quality and abandoned mine land issues will be improved in the Monday Creek Watershed, improving water quality in the Upper Ohio River and ultimately the Mississippi Basin and Gulf of Mexico.

Total amount requested in FY11: \$1.75M **Total amount requested for life of project:** \$20.6M

Total amount provided as Forest Service match in FY11: \$1.29M

Total dollar amount provided as Forest Service match for life of project: \$14.65 M

Total amount provided in Partnership Match in FY11: \$400,000

Total amount provided in Partnership Match for life of project: \$4.0M

Total in-kind amount provided in Partnership Match in FY11: \$67,000

Total in-kind amount provided in Partnership Match for life of project: \$570,400

Time frame for the project (from start to finish): 2011-2020

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Ecological, Social and Economic Context: Ohio's rebounding forests and watersheds are currently at a crossroads. The dominant oak systems are no longer flourishing and are gradually being displaced by more mesic, more shade-tolerant and fire-intolerant tree species. Watersheds no longer support diverse aquatic life or provide safe drinking water. Forest health is being impacted by non-native invasive plant and insect species and air pollution compounded by impacts of climate change. Historical fire regimes have been suppressed and fire response changed by altered vegetation structure and composition.

Ohio has been inhabited by humans for thousands of years. It was one of the centers of pre-historic human occupation by the Woodland Indian Cultures followed by historic Indian inhabitants including the Delaware, Shawnee, and Wyandotte tribes. Southeastern Ohio was largely utilized as hunting grounds between the permanent Indian villages found along the Scioto River to the west and the Muskingum River to the east. Native Americans frequently burned the forests of eastern North America to facilitate game hunting and to enhance the growth of herbaceous plants (Goebel and Hix, 1996). Ohio was the western frontier in the late 1700's. Settlement by Euroamerican pioneers began in earnest starting in the Marietta area at the confluence of the Muskingum and Ohio Rivers and rapidly radiated westward from there. The clearing of land for agriculture was restricted to fertile floodplains of larger river systems and was the first wave of land impact. The landscape was permanently changed and altered during the late 1800's through most of the 20th century as Ohio's natural resources were exploited to fuel the nation's industrial revolution. This shift from agrarian family settlements to large-scale extractive industries disrupted the local Appalachian economy and began the impoverishment of the region. Some of the nation's earliest coal mining took place in the two watersheds that now comprise the Athens Management Unit of the WNF. Forest cover changed from 95% pre-settlement to a low point of 12% in the 1940's. The establishment of the WNF brought relief to distressed and tax delinquent lands and protection to major watersheds in the upper Ohio River Valley (Attachment G: Map 1 and 2).

Family forests comprise more than 70% ownership of Appalachia Ohio's forests. The region includes some of the nation's highest levels of poverty along with an independent mind-set distrustful of government or outside involvement. Because most of Ohio's forest land is held by thousands of private landowners, decisions by these owners will have a great influence on Ohio's future forests. The large amount of forest land in small private holdings makes it difficult to deliver government programs and makes forest management less economical. Without a landscape level approach to ecosystem restoration, forest composition will continue to shift away from oak-hickory, invasive species will occupy more of the landscape, biological diversity will continue to be lost and forests will lose their resiliency and ability to respond to future conditions of climate change.

Current condition: Dominant forest systems on WNF include mixed oak and oak-hickory, mixed mesophytic and riverine forests. Prior to European settlement, these systems had diverse mixtures of canopy tree species, complex tree age and size structure, and heterogeneous mid-stories, under stories and groundcover. This diversity and complexity was evident both within stands and throughout the landscape. In contrast, today's forests typically exhibit canopy dominance by a few species, uniform age and size structure and homogenous under stories of shade-tolerant woody species, low herbaceous diversity and the presence of non-native invasive species. Past coal mining has impacted area watersheds by making many non-functioning: much of the water is lost below ground and what is left above cannot sustain aquatic life (Ohio EPA, 2011). Other watersheds that still support life have been hydrologically altered so that riverine forests are no longer connected to their aquatic systems and aquatic organism passages have been compromised by road and stream crossings. WNF has 121 miles of designated Off-Highway Vehicle (OHV) trails and it is estimated that just as many, if not more, unauthorized or illegal user-created trails also exist.

Oaks remain a dominant canopy species, however, their relative dominance has been steadily declining since 1968, while the relative dominance of species like maple and yellow poplar have steadily increased (Widmann et al., 2006). One of the historically dominant canopy species, the American chestnut, has been extirpated except for some remaining sprout stumps. Overall forest condition has been degraded from repeated high-grading harvest practices as evidenced by poor structure, low levels of light on the forest floor, undiversified age class structure and distribution, lower quality timber and lack of biological legacies. Biological legacies are attributes that help a forest system remain resilient, including genetic diversity, seed banks, nurse logs, old clones of medicinal and root herbs, diverse herbaceous layer and source populations of birds and mammals. Non-native invasive species are common and are interfering with oak regeneration and displacing native species. Levels of *Ailanthus altissima* (tree-of-heaven) in Appalachia Ohio are low compared to areas further south (USFS Forest Inventory Analysis, 2010). Appalachia Ohio will soon reach the "tipping point" for this species if a concerted, region-wide effort is not undertaken to eradicate it.

Historically, oak forests were maintained through a combination of periodic canopy-level disturbances and surface fires. Today, the majority of Ohio's forests are classified in fire regime condition class III (FRCC III), which indicates a high departure from reference conditions (LANDFIRE, 2010). The few areas that approximate reference conditions (FRCC I) are located primarily in Lawrence and Gallia counties on the Ironton Unit (Attachment G: Map 4), where recent wildfire activity has been greatest. Another related factor is the type of forest systems that occur in those counties which support drier, nutrient-poor sites that more readily support periodic fire.

Today, forests represent 30% of Ohio's land cover. The largest ownership group of forest land is the family forest group which owns 73% of Ohio's forests, with an average parcel size of 50 acres. Other private landowners hold 15%, and governments hold the remaining 12% of forests in Ohio. Nationally Ohio is 7th in population yet ranks 47th in public land. Most of these forest resources are located in the southeastern part of the state in what is known as Appalachia Ohio. This region is considered part of central Appalachia, a political, cultural, and bioregional classification that includes southeastern Ohio, eastern Kentucky, and most of West Virginia.

Ohio's forest resources provide many ecological, economic and social benefits and services. Economically, Ohio ranked sixth nationally in gross domestic product from the manufacturing of furniture and related products (US Dept. Commerce), and contributed \$15.1 billion to Ohio's economy, employing more than 119,000 people (Letson et al, 2006). Ohio consistently ranks in the top ten nationally for non-timber products such as maple syrup, medicinal herbs and Christmas trees. More importantly, Ohio's forests provide a suite of social benefits ranging from ecosystem services to leisure and recreational activities, as well as the setting for the unique Appalachian culture.

Summary of Landscape Strategy: Appalachia Ohio is characterized by a network of rough, irregular hills and hollows going out in all directions. The proposed project area (Attachment G: Map 2) falls within two state priority forest landscapes (1.5 M acres total) located in the heart of Appalachia Ohio where a variety of restoration efforts are already underway (Attachment G: Map 1). These two state priority forest landscapes were identified through Ohio's Forest Resource Assessment and include a combination of family forest lands and seven state forests including the newly acquired Vinton Furnace State Experimental Forest & Wildlife Management Area. Also included are two State Wildlife Action Plan forest landscape focal areas and two management units of WNF, the focus of this proposal. The proposed collaborative effort will result in a meaningful impact on oak-hickory and watershed restoration in Appalachia Ohio and has the potential to become a model for the Central Appalachia.

Oak-hickory forests and their associated plants and animals are a major component of the Appalachia Ohio landscape. The diverse ownerships in these landscapes require an all-lands approach. WNF offers perhaps the best opportunity to model landscape level land management but also needs to be a good neighbor and do its part. It is critical to support increased work on private lands; each side needs each other to succeed. The proclamation boundaries that describe the two WNF management units that are the focus of the proposed strategy include 27% NFS lands. The 2006 WNF Land and Resource Management Plan is a framework designed to restore at a landscape scale, unique habitats not available elsewhere in the state. Landscape scale vegetation management projects were specifically planned in the Historic Forest and Forest and Shrubland Mosaic Management Area designations because they

represent habitats that were once common but are now very scarce across Appalachia Ohio. Oak-hickory forest restoration and watershed reclamation represent core components of Plan implementation. Many of the same Forest Plan goals and objectives are shared by our partners and this has catalyzed partnerships and collaboration as an established way of doing business.

The **2010 Statewide Forest Resource Strategy for Ohio** (<http://ohiodnr.com>) is a strategic planning document that will guide all state forestry activities by the ODNR Division of Forestry, including programs with funding from USDA Forest Service State and Private Forestry grants and USDA Natural Resources Conservation Service Ohio forestry practices through Farm Bill programs. The 2006 WNF Land and Resource Management Plan was one of the planning documents consulted during the development of the Statewide Strategy.

The 2010 Statewide Forest Resource Strategy for Ohio is framed around six key issues, as well as the important benefits and services that Ohio forests provide. The six key issues for forests in Appalachia Ohio include: 1) sustainable forest management on all forest lands, 2) public benefits from Ohio's forests, 3) conservation of soil and water resources, 4) conservation of biological diversity, 5) health and vitality of Ohio's forests and 6) forest fragmentation and land use conversion. This Statewide Strategy will help guide forestry programs in the state to effectively and efficiently address these issues. Priority forest maps are a critical tool to support strategic direction. The Statewide Strategy is intended for use by partner organizations and agencies to complement existing planning documents and tools and will serve as an organizing framework for the **Ohio Forest Resources Partnership**. The Ohio Forest Resources Partnership was recognized in 2009 as a group recipient for the *Two Chiefs' Partnership Award*. These awards recognize exemplary projects from the Forest Service, USDA Natural Resources Conservation Service, State Forestry Agencies, and Conservation Districts that have worked collaboratively to support conservation and forest stewardship.

The Collaborative Forest Landscape Restoration Strategy outlined in this proposal will leverage core restoration work and existing partnerships to accomplish in ten years what would take 20-25 years under current funding trends. The leveraged funding would accomplish more restoration in a shorter timeframe, and also give additional momentum and incentive for formalizing collaborative processes, finding efficiencies and striving toward an all-lands approach. This schedule of priority treatments will allow us to step up implementation of our 2006 Plan. The Forest Plan is substantially based on the need for active ecosystem restoration. Monitoring and evaluation to date has shown we have made good progress on restoration (Table 1) but much more needs to be done, particularly for the activities in this proposal, to meet the Plan's goals and desired future conditions. At the current level of funding we will not make a meaningful impact, even collectively, nor will we be able to fully implement the Forest Plan.

The proposed oak-hickory restoration activities are focused in two types of Management Areas of the 2006 WNF Plan: Historic Forest and Forest-Shrubland Mosaic (Chapter 3, Page 11-22). A link is provided here to the desired future conditions and management direction for these Management Areas:

http://fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_005626.pdf

The watershed reclamation work proposed is part of a broader strategy for mine remediation on all land ownerships in the Monday Creek watershed. This strategy is documented in the Monday Creek Feasibility Study (2005) which can be found at the following link:

www.lrh.usace.army.mil/projects/current/mondaycreek

The fate of forests, watersheds and humans are inextricably linked. Even though forests are rebounding in the Eastern United States, urgent questions remain regarding the socioecological processes that got them there, how both human and natural systems have changed in the process, and ultimately, the limits of forest sustainability. **A National Science Foundation study** has just begun (2010) by Ohio State University, Ohio University and the Forest Service Northern Research Station Delaware Lab to generate information about pressing social and environmental issues including rural poverty, ecological change, and management of public forests. With the assistance of these strong partners, we will continue to incorporate the best available science into our adaptive management framework.

Proposed Treatments: The Appalachia Ohio Collaborative Forest Restoration Project proposes ten years of projects, spanning 173,136 acres of NFS lands on two Management Units (316,639 and 269,173 acres respectively) within the larger context of public-private forest landscapes in Appalachia Ohio (Attachment G: Map 1). Terrestrial restoration projects on 20,734 acres of NFS lands include: invasive species treatments, timber stand improvement and understory restoration, and oak regeneration. Landscape scale vegetation management projects were chosen in the Historic Forest and Forest and Shrubland Mosaic Management Area designations because they represent habitats once common but now scarce across Appalachia Ohio. These areas were chosen both for their desired future condition oak-hickory restoration objectives and their consolidated federal land ownerships. NEPA Decisions have been signed for the Buckhorn, Pine Creek, and Gore-Greendale landscape vegetation management projects. NEPA decisions remain for the Buckeye and Bailey's landscape vegetation management projects (Attachment G: Maps 3-4). We plan to focus our oak-hickory and watershed restoration efforts on these landscapes for the next decade.

Watershed reclamation projects within the 116 square mile Monday Creek watershed focus on 59 acres of NFS lands and include: mine portal closures, subsidence fills, replacement of water courses to landform surface, chemical treatment of water, decommissioning of illegal OHV

trails, non-native invasive species treatments and native plantings. The project areas in the Monday Creek Watershed were selected by the Monday Creek Collaborative as they systematically work from upper to lower sub-watersheds. NFS lands provide a cohesive ownership pattern between federal, state and private lands within the watershed. NEPA is completed for all watershed reclamation projects.

Restoration Goals, Objectives and Treatments:

I. Restore, establish and maintain oak-hickory forest systems in appropriate landscape positions.

- A. Timber stand improvement prior to harvest to control shade-tolerant mid-stories.
Treatments: prescribed fire, herbicide, mechanical or combination of all three
- B. Timber stand improvement after harvest to increase oak composition in young stands.
Treatments: mechanical
- C. Removal of over story to ensure stand development.
Treatments: commercial thinning, shelterwood, clear cut
- D. Eradication of *Ailanthus altissima* (tree of heaven) from the over story canopy.
Treatments: herbicide

II. Restore aquatic life to Monday Creek.

- A. Restore free-flowing tributaries.
Treatments: create 11 natural stream channels, fill 11 subsidences, 10 aquatic organism passage crossing
- B. Improve water quality.
Treatments: 10 steel slag beds, 4 limestone leach beds, 1 lime doser, 10 low head dams, decommission 200 miles illegal OHV trails

Table 1. Ecosystem restoration efforts completed on WNF lands from 2006-2010

Restoration Treatments	Completed
Non-native invasive species treatments	1,759 acres (includes re-treatments)
Illegal OHV trails closed	131 miles
Prescribed fire	4,704 acres
Timber stand improvement	5,890 acres
Watershed reclamation	142 acres
Aquatic organism passage	15 crossings
Stream restoration	10.75 miles
American chestnut reclaimed lands plantings	14 acres
Re-introduction American burying beetle	679 pairs
Roads decommissioned	32 miles

Timber stand improvement, harvest and prescribed fire: WNF staff and our partners have participated in introductory training led by the Forest Service Northern Research Station on the Oak SILVAH decision-support system for prescribing regeneration treatments for mixed oak forests in our region. We are actively applying the body of research that supports this system (Brose et. al, 2008) as the best available science. The key to successful oak-hickory forest restoration is to establish advanced regeneration of oak and hickory seedlings prior to over story removal. This is accomplished by removing shade tolerant woody species in the under and mid-stories of stands 60-120 years old using herbicide, prescribed fire, and mechanical treatments or a combination of all three. For stands already harvested, mechanical release of oak and hickory saplings ensures their representation in the future stand. Release treatments typically are applied after canopy closure around 10 years of age and can have resulting benefits up to age 30.

Once advanced regeneration is established in mature stands, over story removal is necessary for stand regeneration and development. This will be accomplished through commercial thinning, shelterwood harvest or clear cutting depending upon stand objectives. If the over story is not removed, advanced regeneration stems of oak and hickory lose vigor within 10-25 years. At least 20% of timber harvests will be implemented with partners through Stewardship Agreements. While there is currently no old growth on the Wayne National Forest, this proposal is consistent with composition objectives in the Forest Plan that will lead to areas of old growth and old forest in the future.

Past natural events and the near 100 years of fire suppression have left parts of the forest with considerably higher amounts of dead and down vegetation than what would have been found

prior to suppression policy. The average dead and down vegetation on WNF is more than 20 tons per acre compared to 6.4 tons per acre (Anderson fuel models) that would occur in a restored system. Under current conditions in and around the forest, there is a strong likelihood for the occurrence of stand replacing fires. High intensity stand replacing fires can occur under extreme conditions due to storm damage and past suppression policies. Uncharacteristic fires are addressed using a full suppression strategy. This strategy includes using bulldozers, engine, and hand crews. Due to the small size of the Wayne, we regularly request outside resources to assist with fire suppression. Due to the high percentage of urban interface, Wayne NF suppresses all fires that occur.

The majority of Ohio's forests are classified in Fire Regime Condition Class III which indicates a high vegetation departure from its reference condition. WNF is working to document the effects of prescribed fire in southeastern Ohio in an attempt to get a better understanding of what restoration results can be obtained under different forest stand conditions. Toward this end, the WNF Fuels Specialist and Forest Ecologist have defined restoration objectives for prescribed burning for each of the Forest Plan Management Areas. Using an adaptive management framework, information will be organized and used to refine a set of prescriptions that will help guide restoration in the future. Information will be organized primarily from the WNF but will also be gathered as feasible from state and federal lands across the Southern Tier National Forests.

Natural fire regimes will be re-established over time using frequent prescribed fire in combination with mechanical and herbicide treatments. In order to restore a project area to a Fire Regime Condition Class I, prescribed fire must be applied every 2 to 3 years until desired conditions are met. Once desired conditions are achieved, it is anticipated that the frequency of prescribed fire application would drop to once every 7 to 10 years. Restoration prescriptions include a variety of objectives coupled with other treatments and do not necessarily mimic the historic fire regime. It will take at least a decade of restoration burns and treatments to help forests back into alignment.

Under restored conditions, it is anticipated that less intense fires would occur as well as a reduced chance of stand replacing fires. Fires will likely be low intensity and of short duration with potentially higher rates of spread. Additionally, emissions from fires in the restored state will likely be less and of much shorter duration than they are under the current conditions. These changes will be a result of an increase in light fuels and a reduction of heavy dead and down fuels as well as more volatile fuels (greenbriar) that currently cover large areas of the forest. In a restored landscape, fire will be utilized to maintain the landscape in a more historical condition. With the anticipated lower intensity short duration fire in the restored

condition, fire could be used to meet resource objectives while ensuring private property is not affected.

Community Wildfire Protection Plans are incorporated in current plans and will be in future plans. Most of the communities in and around the forest have current wildfire protection plans and include the use of prescribed fire to reduce risk. Long-term cost reduction would include the need to bring in fewer resources from outside the Forest due to less intense fires and management of fires to achieve ecosystem benefits and maintain fire dependant ecosystems

Table 2. Additional Timber Stand Improvement (TSI), Timber Harvest and Prescribed Fire Proposed FY2011-FY2020

Activity/Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
TSI Acres	885	885	885	885	885	885	885	885	885	885
Harvest Volume (CCF)	0	2800	2800	2800	4200	4200	5600	5600	5600	5600
Harvest (acres)	0	300	300	300	400	400	500	500	500	500
Prescribed fire (acres)	0	310	620	930	1395	1860	2015	2325	2635	3100

Non-native invasive species: Non-native invasive species treatments will be applied in conjunction with timber stand improvement treatments as invasives are encountered. Treatments for *Ailanthus altissima* will also be coordinated “across the fence” with interested private landowners that have Forest Stewardship Plans through coordination with State Service Foresters. A region-wide effort to aerially map (80,000 acres annually) and prioritize treatments for *Ailanthus*, initiated in 2010 between the Divisions of Forestry and Wildlife, WNF and Forest Service Northern Research Station Delaware will provide the regional collaborative framework to eradicate this species from Appalachia Ohio. Restoring with native plants (seeding, transplants) will be incorporated in invasive treatment areas where native re-establishment is limited.

Table 3. Non-native Invasive Species (NNIS) Treatments Proposed FY2011-FY2020

Activity/Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
NNIS treatments (acres)	450	2,650	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500

Watershed reclamation treatments: Watershed reclamation treatments will focus on 58 acres within the Monday Creek watershed on the Athens Management Unit. Over the next five years, all remaining subsidences and blocked channel control projects (11 remaining) will be completed. This will significantly reduce the source of acid mine drainage and put water courses back on the landscape surface. Additional water chemical treatments are planned including: installation of 10 steel slag beds, 4 limestone leach beds, installation of 1 limestone doser and 10 low head dams. Strategic placement for

all treatments on private and NFS lands has already been determined collaboratively by the partners. 200 miles of illegal OHV trails will be restored, blocked and signed in both the Monday Creek watershed on the Athens Unit and the Pine Creek watershed on the Ironton Unit. At least ten aquatic organism passage crossings will be improved on the Athens or Ironton Units.

Table 4. Additional Illegal OHV Trail closures and Aquatic Organism Passage Crossings

Activity/Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Illegal OHV trail closure (mi)	20	20	20	20	20	20	20	20	20	20
Aquatic Organism Passage (crossings)	1	1	1	1	1	1	1	1	1	1

Collaboration and Multi-party Monitoring: The Ohio Forest Resources Partnership has been working together for a number of years but more formally since the signing of a Memorandum of Understanding in 2008 between the WNF, USDA Natural Resources Conservation Service Ohio and the Ohio Division of Forestry. In 2009, the partnership, including Forest Service Northeastern Area State & Private Forestry, was the recipient of the *Two Chief's Partnership Award* for our unique cooperative partnership protecting public and private forestland in Appalachia Ohio. Two other long-term partners formally joining us for the Collaborative Forest Landscape Restoration Program proposal are the Forest Service Northern Research Station and The Nature Conservancy's North American Science. The WNF, USDA Natural Resources Conservation Service Ohio, Ohio Division of Forestry and Forest Service Northeastern Area State & Private Forestry hold a joint leadership team meeting annually as well as meeting as-needed during the course of the year. WNF meets annually with Forest Service Northern Research Station Delaware Lab to coordinate research needs and share management efforts and timelines. WNF and The Nature Conservancy's North American Science have joint project statements of work incorporated into annual staff performance measures. More details as well as contact information for members of the partnership can be found in Attachment C along with a signed letter of commitment in Attachment D.

Other noteworthy partners also working within the project area are two non-native invasive species efforts. One effort is being led by the **Iron Furnace Cooperative Weed Management Area** (ironfurnacecwma.org), co-located with the boundaries of the WNF Ironton Management Unit of WNF. The Iron Furnace Cooperative Weed Management Area (CWMA) was established in 2006 and is the state's first and only CWMA. A second group of partners called the **Southeast Ohio Non-native Invasive Species Partnership** is interested in establishing additional cooperative weed management areas in southern Ohio. One of their focal areas is centered on the Athens Management Unit where they are coordinating cross-boundary outreach and treatments with State Service Foresters and USDA Natural Resources Conservation Service District Conservationists. Members of the Ohio Forest Resources

Partnership are also participants in both of these non-native invasive partner efforts. The CWMA project areas are shown on the regional map (Attachment G: Map 1).

The Monday Creek Watershed Collaborative is based on more than a decade of collaboration between the Monday Creek Restoration Project grassroots non-profit organization, WNF Watershed Team, Ohio Division of Mineral Resources Management and local citizens along with assistance from the Army Corp of Engineers, Ohio Environmental Protection Agency, Ohio University, and the U.S. Office of Surface Mining. In 1998, the collaborative was the recipient of the *Forest Service National Rural Community Assistance Spirit Award*. The unregulated early coal mining practices in this watershed have left a legacy of devastation including 270 miles of polluted, collapsed and captured streams and a highly disturbed landscape from more recent strip mining. Over ten million construction dollars for abandoned mine land remediation has already been left in the ground, 45% of which came from partner funding sources. So far, 23 miles of Monday Creek has been returned to a pH above 6.5 and now supports fish life for the first time in living memory. The Collaborative meets monthly; further details as well as contact information for representative members can be found in Attachment C along with a signed letter of commitment in Attachment D.

WNF Leadership has identified establishment of Multi-party Monitoring Frameworks as a priority for Fiscal Year 2012. The above described partnership efforts will serve as the foundation for two frameworks, one focusing on multi-party monitoring for watershed reclamation and another for oak-hickory forest ecosystem restoration. Relevant connection and coordination will be made between the two frameworks, particularly as the watershed reclamation work is ready to move into a second phase of aquatic ecosystem restoration. A framework has not yet been developed in part due to the re-establishment beginning in 2006 of an active timber program on the WNF. Also, the Ohio Forestry Division recently earned dual forest certification (2010). Development of a landscape scale, multi-party monitoring framework is a logical next step for forest managers working in Appalachia Ohio.

WNF is also a participant in an oak ecosystem restoration initiative led by the Forest Service Eastern Region in partnership with the Forest Service Northern Research Station to assist with Plan implementation on the southern tier forests. This effort is focused on an adaptive management approach whereby National Forests and the Prairie can collectively benefit through project networking by employing standardized methods of project layout and data collection, allowing participants to test and compare different restoration techniques through shared data for a given forest type. A workshop was held Spring of 2010 on the Vinton Furnace Experimental Forest in southeastern Ohio to formally initiate this effort. WNF has offered to be a pilot Forest as part of this effort.

WNF is working to develop an integrated vegetation management program with project level effectiveness monitoring. The WNF Vegetation Management Program just completed its fourth year of timber sale operations after a ten year period of inactivity due to pending litigation followed by a planning period for the 2006 Forest Plan. WNF has also integrated non-native invasive species work with other vegetation management and is in the process of transitioning its fire emphasis from an operational focus to prescribed fire in support of vegetation management. As WNF approaches its fifth year of Plan implementation, existing wildlife and vegetation monitoring already in place is being assessed and organized into a landscape level framework. Joint monitoring with the Ohio Division of Wildlife and National Wild Turkey Federation is already taking place for turkey, woodcock, bobwhite quail, bobcat and bear. A regional effort started in 2010 between the Ohio Divisions of Forestry and Wildlife, Northern Research Station Delaware Lab and WNF spans state, federal and private lands in Appalachia Ohio to map infestation and prioritize treatments for *Ailanthus altissima* (tree-of-heaven).

Additional multi-party monitoring frameworks are potential for both state and private forestlands in southeastern Ohio. The Ohio Division of Forestry received dual forest certification under FSC and SFI for state forest lands in 2010. Monitoring will be a key part of maintaining certification. A 2009 private lands certification study conducted by the Ohio Division of Forestry presented several viable options, including a group certification program under the existing Ohio Forest Tax Law program. Non-governmental organizations like the partnership between Rural Action and Mountain Association for Community Economic Development (MACED), are also promoting certification on private forest lands as part of carbon offset programs (see website: <http://www.appalachiancarbonpartnership.org/>).

WNF is currently engaged in Watershed Reclamation with several partners that could serve as the foundation for our proposed multi-party monitoring framework. These partners include: The Monday Creek Restoration Project, Ohio University, U.S. Fish & Wildlife Service, Ohio Environmental Protection Agency, Ohio Department of Natural Resources Division of Mineral Resource Management and the U.S. Army Corp of Engineers. The building blocks for a multi-party monitoring effort are established. Monitoring information collected by the partners includes water chemistry and aquatic habitat indicators used to measure the effectiveness of combined efforts to restore aquatic life to Monday Creek. Chemical and biological monitoring efforts are updated and shared with all parties through the Non-Point Source Monitoring Project Website <http://www.watersheddata.com/>.

The Collaborative Forest Landscape Restoration Program could greatly improve opportunities to organize multiparty monitoring efforts in Appalachia Ohio. WNF and its partners recognize

that a diverse and coordinated monitoring team is more cost effective, transparent and credible and increases accessibility of data to researchers and stakeholders (USDA Forest Service, 2004).

Utilization: The primary objective of restoration treatments on WNF is to restore and maintain the oak-hickory forest type. During the last 50 years a dense midstory and understory of shade tolerant species such as the maples and beech have developed. This creates a dense shade in the understory where oak and hickory seedlings cannot compete and develop. Therefore, the primary treatment is to remove the midstory and understory, and create some canopy gaps to allow oak seedlings to establish and develop. While prescribed fire and herbicides will be used to control the understory, commercial timber sales will be the primary tool to remove the mid-story and create canopy gaps.

These timber sales will produce more pulpwood than our average sales. With an emphasis on removing the midstory, it is estimated that about 50% of the sale volume will be pulpwood. The estimated increase in pulpwood production of 20,000 CCF over 10 years (valued at \$196,000) will be easily absorbed by the local timber industry. There are currently 3 plants (1 paper mill, 1 corrugated cardboard mill, and 1 oriented strand board mill) that use pulpwood in large quantities within a 100 mile radius of the WNF. There is enough competition for pulpwood that one or more of these facilities often come up short on supply and need to bring in pulpwood from outside the immediate area. In addition to these markets, a strong mulch market has developed over the last 10 years. However, there is currently no market for biomass for energy operations in our area. The saw timber produced by this proposal (approximately 20,000 CCF, valued at \$1.2 M) will be easily absorbed by one or more of the over 50 sawmills within a 100 mile radius of the forest. While these mills produce everything from pallets and blocking to veneer, the primary products will be flooring and cabinet stock. There are no plans to remove any products that do not meet saw timber or pulpwood specifications. The climatic conditions on the WNF ensure the rapid decomposition of this type of material. Therefore, it does not contribute to a fuel loading issue. WNF plans to apply the value of the material removed to both KV and Stewardship receipts to accomplish timber stand improvement and non-native invasive species treatments.

WNF leadership is open to exploring opportunities with interested partners to sustainably utilize biomass as an alternative energy source. The Forest Supervisor has provided letters of support for two organizations that submitted applications for a Woody Biomass Utilization Grant to the Forest Service State and Private Forestry Forest Products Laboratory in Madison, Wisconsin including Fuel Procurement & Management Biomass Group, LLC in 2006 and The National Network of Forest Practitioners in 2007. Leadership met in February, 2011 with Carbon Cycle Engineering LLC, a group of private investors in the Athens area interested in

developing a biomass aggregation facility to process and market energy from woody and cellulose feed stock. WNF is also exploring a project called *Truetown Seep Acid Mine Drainage Remediation: preliminary engineering design system pilot feasibility study*. A major component of this project includes a bio-electric treatment system that will treat the water as well as recover pollutants to produce valuable by-products to cover the cost of operation and maintenance. This project has the potential to advance small bio-electric plant technology for small rural areas in Central Appalachia.

Benefits to Local Economies: The most important benefits of implementing this proposal are environmental and social. Fish and other aquatic life will return to streams that will no longer be orange from acid mine drainage. This will benefit the local people and environment, as well as the larger Hocking River watershed in southeastern Ohio, and water quality in the Ohio and Mississippi Rivers and Gulf of Mexico. Tourism will increase in this scenic area where the water condition has previously been a deterrent. Citizen stewardship will increase as local people's hopes are renewed for their waters and lands. Maintenance of the oak-hickory ecosystem, along with significant reductions in invasive plant species, will provide wildlife and other benefits important to the Appalachian way of life, as well as attracting hunters, visitors and retirees. An additional important benefit will be ecosystems that are more resilient and better adapted for climate change.

Unemployment rates have historically been high in Appalachia Ohio; preserving existing job opportunities is as important as creating new jobs in this natural resource-dependent region. This proposal will retain local capacity in the commercial forest product sector, and increase local capacity to do watershed and invasive species restoration work. The number of trained and available loggers has been decreasing, and a steady to increasing supply of timber is needed to keep this occupation alive. The contracts associated with this proposal would be a combination of timber sales, Stewardship contracts and agreements, and service contracts that traditionally are awarded locally, with most benefits staying in local communities. Contracts provided through this effort might be the difference for existing loggers to work year-round instead of on a more limited seasonal basis.

This project, if funded, will directly benefit local communities since most of the associated work will be contracted. The employment and labor benefits (direct, indirect, and induced) are detailed in Attachment E and total \$1,357,506 for commercial forest products and \$692,955 for other project activities for the 10-year period. The majority of the 74 jobs provided will be full time, with an estimated 40% year round and 60% seasonal.

A key source of trained workers and potential contractors for the planned work are graduates of the Ohio Woodlands Job Corps. The Ohio Division of Forestry received \$4.4 million in 2009 and 2010 through the American Recovery and Reinvestment Act for projects to improve woodlands on state forests. An Ohio Woodlands Job Corps was created that provided training, certification, and work experience to 130 conservation workers as they performed treatments including invasive species control, timber stand improvement, wildfire training, trails and road restoration and tree planting. This project accelerated restoration on state lands near the WNF and we would like to follow this with an accelerated effort on NFS lands. The Ohio Woodland Job Corps created a trained workforce of local woodland vendors including both youth and adult entrepreneurs in southeast Ohio.

Ohio is one of the leading states in the country for the amount of Natural Resource Conservation Service Farm Bill landowner incentive funds dedicated to forest management. Restoration work on federal and state lands also inspires intermingled private owners to seek opportunities through the Farm Bill and other programs.

As part of this proposal, we would provide workshops on how to sign up for and submit bids on federal contracts, targeting Ohio Woodland Job Corps graduates and other small businesses in the local area. We would also use best value criteria to ensure that local economic benefit is a significant criterion in contract award.

Youth groups that receive training related to this proposal include Hocking College students who work on WNF mine remediation projects and AmeriCorps employees who perform water quality monitoring through Rural Action, a local nonprofit.

Funding Plan:

The Collaborative Forest Landscape Restoration Strategy outlined in this proposal will leverage core restoration work and existing partnerships to accomplish in ten years what would take 20-25 years under current funding trends. The leveraged funding would also give additional momentum for formalizing collaborative processes, finding efficiencies and striving toward an all-lands approach.

Funding for multi-party monitoring is included in the matching funds (regular Forest Service appropriations) and partner funds for this proposal. As part of the proposal, a framework for

multi-party monitoring will be established in 2012. We may adjust the proposal for future years if regular appropriations and partner funding cannot cover the planned monitoring.

Table 1 in the *Proposed Treatments* section lists restoration efforts completed on the Wayne National Forest over the past five years. Investments in restoration of the Monday Creek watershed over the past ten years include \$6.43M of Forest Service and ECAP funding, and \$4.94M of partner funding. The Wayne National Forest successfully competed for over \$7 million in American Reinvestment and Recovery Act (ARRA) funding in 2009-10. Besides jobs creation, most of the awarded projects involved restoration work on the National Forest: \$1.4 million for hazardous fuel reduction projects that included non-native invasive species treatment, \$2 million for ecosystem/watershed enhancements that included aquatic organism passage projects, road maintenance (\$800,000), trail maintenance (\$1.3 million), sewer system upgrade and dam repairs (\$400,000) and a mine remediation watershed project (\$800,000).

Attachment A provides more detail about the projected restoration accomplishments over the next ten years. The matching funding is based on what the Forest Service and partners have invested in recent years. An explanation of what we are including in some of the performance measures follows:

- Acres of forest vegetation established: most of our regeneration is natural, what we have included here is revegetation of reclaimed mine lands including research plantings of American chestnut and American elm, which is why per acre costs are high.
- Acres of forest vegetation improved (TSI): includes understory and mid-story treatments to improve oak-hickory restoration, and release of oak and hickory saplings.
- Manage noxious weeds and invasive plants: acres do not include retreatment; costs do include retreatment.
- Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions: this is where we report our abandoned mine lands restoration work, closure of illegal OHV trails (miles converted to acres), and fire line rehabilitation.
- Miles of property line marked/maintained to standard: CFLRP acres and funding are based on expected needs in order to implement the additional proposed treatments.
- Acres of WUI high priority hazardous fuels treated to reduce the risk of catastrophic wildland fire: number of units include “integrated” acres treated for other purposes, funding includes only WFHF funding for prescribed burning and mechanical fuels treatments.

Some of the proposed types of treatment “ramp up” over time, as shown in tables 2 and 3 in the *Proposed Treatments* section. Therefore the funding requested in Attachment F increases over time accordingly, from \$1.75 million requested in 2011 to \$2.16 requested in later years. The variation in funding for monitoring reflects a late start to the Collaborative Forest Landscape Restoration Program in 2011, additional costs for developing protocols as well as start-up costs for multi-party monitoring for the next few years, then higher amounts in years five and ten anticipating that some monitoring items will be most meaningful at five-year intervals.

An anticipated \$2 million to \$3 million in partner funding for restoration of the Monday Creek watershed is anticipated in the next ten years for projects on the National Forest, with an additional \$ 5 million for projects on other ownerships within the watershed. Another complementary project, known as Truetown Seep, that may come to fruition within the next ten years would restore water quality to the adjacent Sunday Creek watershed which was similarly impacted by past coal mining. A dedicated group of partners including the WNF is seeking pilot test funding for a proposed treatment plant for that project.

In 2009-2010, USDA Natural Resources Conservation Service (NRCS) Ohio funded over 90 invasive species treatment projects for \$247,000 on privately owned forest lands within counties where WNF is located. In 2010, NRCS funded 60 forestry management plan projects for \$31,000 within these counties; much of this was for timber stand improvement work that complements this proposal. NRCS funding was through the Environmental Quality Incentives Program (EQIP) and is expected to continue at similar levels in future years. A Special Forestry Invasive Species Project was created for application in southeastern Ohio forest landscapes as a direct result of the Ohio Forest Resources Partnership. In Ohio, most of the practices in EQIP are forestry, and those practices also have the highest completion rate in the state. This is a reflection of forest landowner commitment and quality delivery of program services by state Service Foresters. Funding for the Special Forestry Invasive Species project was allocated at a level of \$300,000 for the past three years, ending in 2011. It is anticipated to continue, however, a new Farm Bill is on the horizon for 2012.

Another major recent investment was the Ohio Department of Natural Resources’ Woodland Job Corps program. ODNR’s Division of Forestry received \$4.4 million in 2009 and 2010 through the American Recovery and Reinvestment Act for projects to improve woodlands on state forests, many of which are within our southeastern Ohio landscape (Attachment G: Map 1). The Ohio Woodlands Job Corps was created and provided training, certification, and work experience to 130 conservation workers as they performed treatments including invasive species control, timber stand improvement, wildfire training, trails and road restoration and

tree planting. This project accelerated restoration on state lands near WNF and we would like to follow this with an accelerated effort on NFS lands.

The Ohio Division of Forestry was also the recipient of a Forest Service State and Private Forestry competitive grant for integrated forest management for non-native invasive species in Appalachia Ohio and was funded \$500,000 from 2009 through 2011. The Division has submitted applications February 1, 2011 for two more projects in Appalachia Ohio. One project, entitled “Comprehensive Mitigation of Wildland-Urban Interface Fire Risk and Enhancement of Oak Dominated Forests in Ohio through the use of prescribed fire, community wildfire protection plans and invasive plant control” will build upon existing work in Appalachia Ohio and could bring an additional \$600,000 of partner investment to the project area. A second proposal is entitled “Marketing Invasive Plant Control to Private Woodland Owners” will build upon the Division’s current non-native invasive species project and could also bring an additional \$600,000 of investment to the project area.

Attachment A, partner funding column, and Attachment F lines for partner cash and in-kind contributions, list examples of anticipated investments on NFS lands and private lands within the project area. The anticipated funding is based on the investments made by these partners in recent years. Attachment F quantifies some of the investments made by partners on other ownerships associated with an all-lands approach, though there are many more that could not be quantified within the timeframe of preparing this proposal.

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