

U.S. FIRE LEARNING NETWORK FIELD GUIDE

2010 ADDENDUM



















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The U.S. Fire Learning Network is part of the "Fire, Landscapes and People: A Conservation Partnership" agreement among The Nature Conservancy, USDA Forest Service and agencies of the Department of the Interior (Bureau of Indian Affairs, Bureau of Land Management, Fish & Wildlife Service, National Park Service). For more information about the network, please visit www.conservationgateway.org/topic/fire-learning-network

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This document is an addendum to the 2009 U.S. Fire Learning Network Field Guide, which should be consulted for information on all other FLN regional networks and landscapes. See page 5 for a complete list of active projects.

U.S. Fire Learning Network: Restoring Fire-Adapted Ecosystems Across America







The U.S. Fire Learning Network is a system of landscape-scale collaborative projects working to accelerate the restoration of fire-adapted ecosystems at local, regional and national scales. Eighty percent of U.S. ecosystems, major habitat types and conservation areas—America's forests and grasslands—are significantly departed from their historical conditions. In many cases, this departure from a healthy balance is the result of a landscape experiencing too little, too much or the wrong kind of fire.

At the same time only an average of two million acres are treated each year with the fire they need.² The U.S. Fire Learning Network was formed to advance a scientifically and socially appropriate role of fire at land-scape scales. Using effective collaborative processes and tools, the Network's efforts contribute significantly to restoring and maintaining the nation's ecologically, economically and culturally important forests and grasslands.

Collaborative planning, implementation, adaptive management and sharing lessons learned are at the core of the U.S. Fire Learning Network. Workshops, peer learning and training exchanges are just a few of the mechanisms the Network uses. Participants have a common desire to learn and to share their results and insights with one another; this allows landscape teams to more rapidly overcome barriers to sustainable and integrated ecological, economic and social solutions for the long-term conservation of these important lands.

This page, from top: The Conservancy's Broken Kettle Grassland Preserve in the northern Loess Hills of Iowa (© Susanne Hickey / TNC); Jemez Mountains in New Mexico (© Patrick McCarthy / TNC); longleaf pine stands at Onslow Bight in North Carolina (© Mark Daniels / TNC)

Blankenship, K. et al. 2007. An Ecological Assessment of Fire and Biodiversity Conservation Across the Lower 48 States of the U.S. Global Fire Initiative Technical Report 2007-1. Arlington, VA: The Nature Conservancy.

National Interagency Fire Center 2008. Wildland Fire Statistics. http://www.nifc.gov/fire_info/pre-scribed_fires.htm

THE NETWORK APPROACH

Landscapes in the U.S. Fire Learning Network typically are large areas—the mean landscape size is almost 900,000 acres—and all include multiple ownerships and numerous stakeholders. Landscapes coalesce around ecological challenges such as altered fire regimes or invasion by non-native species, and work toward ecologically and culturally appropriate restoration. Participants form their own partnerships to become networks and define their own landscape boundaries and priorities. Network partnerships include federal, state, local and tribal governments, along with private landowners and community members. When landscape collaboratives are initiated, partners generally engage in a facilitated iterative four-step process. The USFLN provides modest financial support for leadership, structured facilitation and planning.

In the Fire Learning Network process, participants establish collaborative goals, determine actions, and direct resources to gain the greatest conservation results. It is an iterative and adaptive approach that operates at multiple scales and has been employed successfully in diverse geographic and cultural settings. This approach and the methods to implement it allow the practitioner community to share experience and learning across geographies and to improve integrated fire management practices over time. Among other things, Fire Learning Network products facilitate effective NEPA preparation and fire management plan development, contribute to forest and land management plans and inform policy. The Network's track record of success and the credibility of its products have allowed the partnership to positively affect management on nearly 150 million acres to date. The regional networks serve as a forum for landscapes to come together once or twice a year for peer review of products and learning exchange. The national Fire Learning Network convenes workshops where landscapes can share knowledge across regions and gain access to restoration tools, products and ideas.

From top: Workshops at the landscape, regional and national levels provide opportunities for peer review (© Jeannie Patton / TNC); site visits involving numerous stakeholders encourage discussion about landscape values, desired conditions and treatment options, while strengthening partnerships (© Tyler Rennfield); crews made up of practitioners from numerous agencies and organizations often work together to implement treatments (© Wendy Fulks / TNC); pre- and post-treatment monitoring allows plan adjustments to be made in a scientific and timely manner (© Roger Cole)













Above: Since its inception in 2002, the Fire Learning Network has assisted over 140 landscapes and 16 regional networks. Regional networks and landscapes have engaged over 650 partners in 37 states, and their work has affected about 150 million acres of the U.S. landscape.

Opposite: The national network currently supports eight regional networks across the U.S. and includes several international linkages.

Launched in 2002, the U.S. Fire Learning Network (USFLN) is a joint effort of The Nature Conservancy, USDA Forest Service, Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service and the National Park Service. Network and landscape teams work together to tackle integrated conservation challenges. For example, the Great Plains network participants focus on grazing and fire interactions; teams from Florida and several Caribbean nations work on fire and invasive plant species interactions; teams in the Appalachians work together accelerating oak-hickory and pine forest restoration, while western landscape collaborations are implementing strategies to restore ponderosa pine, piñon-juniper woodlands and arid shrublands. And across the network, partners are working to incorporate adaptation to climate change in their plans.

Because of the collaborative approach taken and the variety of stakeholders involved, the treatments implemented by FLN projects often have benefits beyond restoring a prairie or improving the resiliency of a forest. Depending on local needs and opportunities, projects are also designed, for example, to create jobs, reduce hazardous fuels near communities or develop sources of biomass energy.











2010

- 57 ACTIVE LANDSCAPE PROJECTS
- 19 STATES (PLUS PUERTO RICO)
- 6 CARIBBEAN COUNTRIES
- 49 MILLION ACRES







For more information about the Fire Learning Network, please contact Lynn Decker at Idecker@tnc.org or (801) 320-0524.

Photos this page, from top: Network partners have recently used fire to restore forest health and reduce fuel loads in Oregon (© Craig Bienz/TNC), California (© Will Harling/Mid Klamath Watershed Council) and Arkansas (© McRee Anderson/TNC), to name but a few projects

Facing page, from top: Site tour and discussion at the Centennial Valley in Montana (© Tyler Rennfield); plot monitoring at the Big Piney Ecosystem Restoration Project in Arkansas (© McRee Anderson / TNC); a Great Plains workshop included a working tour of the Nebraska sandhills (© Susanne Hickey / TNC); members of the Southern Blue Ridge network at Tallulah Gorge, Georgia (© Wendy Fulks / TNC)

2010 NETWORKS & LANDSCAPES

APPALACHIAN FLN

Allegheny Highlands Allegheny Border Cumberland River Keystone Appalachians Shawnee Forest Southwest Virginia

CALIFORNIA KLAMATH-SISKIYOU FLN

Hayfork Basin Trinity Mountains Western Klamath Mountains

FLORIDA-CARIBBEAN FIRE & INVASIVES LEARNING NETWORK

Bahamas Pine Rocklands Guanica Dry Forest Reserve Jamaica Fire-Dependent & Fire-Sensitive Habitats Central Florida / Lake Wales Ridge Madre de las Aguas Nariva Swamp St. Lucia Dry Forests South Florida Pine Rocklands

GREAT PLAINS FLN

Loess Hills Lower Loup Rivers Refugio-Goliad Prairie Southern Iowa Oak Savanna

NORTHWEST FLN

Applegate Watershed Lakeview Stewardship Unit / Sprague Watershed Upper Deschutes Basin



Big Piney Ecosystem Restoration Project Blacklands Ecosystem Restoration Project Bobtail Woodland Restoration Project Buffalo National River Gene Rush Wildlife Management Area (WMA) Gulf Mountain WMA Harold Alexander WMA Hobbs WMA Land Between the Lakes Loafer's Glory WMA Lower Ouachita Madison County WMA Novaculite Uplift Petit Jean WMA St. Francis NF Ecosystem Restoration Project Upland Forest Ecosystem Restoration Project White Rock Ecosystem Restoration Project

SOUTHERN BLUE RIDGE FLN

Balsam Mountains
Central Blue Ridge Escarpment
Great Smoky & Unaka Mountains
Nantahala Mountains
New River Headwaters
Northern Escarpment
South Mountains
Southern Blue Ridge Escarpment

WASHINGTON DRY FORESTS FLN

Sinlahekin Ecosystem Restoration Landscape Tapash Sustainable Forest Collaborative

UNAFFILIATED DEMONSTRATION LANDSCAPES

Centennial Valley Jemez Climate Change Adaptation Project Mimbres Watershed South Puget Sound







About 65 Fire Learning Network leaders, partners and other stakeholders met at a workshop near the Refugio-Goliad Prairie (TX) in November 2010. The workshop included regional presentations as well as sessions on fire, carbon and climate (left) and outreach and communications. Field tours of the Aransas NWR (center) and several private lands (right) highlighted the use of fire to help manage wetlands for whooping cranes and to restore and maintain prairie for both endangered wildlife and ranching.

©Liz Rank, Wendy Fulks (center) / TNC

NEW LANDSCAPES



SINLAHEKIN ECOSYSTEM RESTORATION LANDSCAPE WASHINGTON

Washington Dry Forests Fire Learning Network

102,000 acres





View of Blue Lake in the Sinlahekin Wildlife Area before and after a century of fire exclusion. Note the increased density of trees, the encroachment of trees into the grassland or steppe habitat and the increased abundance and density of shrubs in the former steppe habitat. Less noticeable in these photos is the disappearance of stands of quaking aspen due to shading by conifers. These changes in plant communities and structure have negatively altered habitat for many species. Left: circa December 1910, Frank Matsura / courtesy of Okanogan County Historical Society; Right: July 2006, Dale Swedberg / Washington Department of Fish & Wildlife

THE DRY FORESTS OF THE PACIFIC NORTHWEST have been subjected to an active program of fire suppression for the last 100 years, resulting in highly altered conditions. Management has begun shifting toward a program of thinning overstocked stands and conducting prescribed burns in the understory to reduce the risk of high severity, stand-replacing fires and improve the health and vigor of legacy trees and ecosystem function. In the Sinlahekin, collaborative work is underway to plan, implement and assess innovative treatments to improve the health and resilience of this forest and restore its fire regime using both

prescribed and naturally-occurring fire. Through this process it is hoped that fire will be the primary management tool in the future.

To accomplish this, a series of field-based, hands-on workshops engages restoration specialists local silviculturalists, marking crews, fire ecologists, wildlife biologists and other forestry practitioners. The workshops will improve the integration of a range of natural resource management disciplines—fire and fuels management, ecology, wildlife and fisheries biology, botany, hydrology, geology—into the design, implementation and monitoring of dry forest silvicultural treatments. They will also provide peer-to-peer technical support and foster a culture of collaboration, innovation and excellence amongst land managers in the region, which will increase the effectiveness, rate and scale of dry forest treatments and improve land stewardship throughout the region.

LANDSCAPE OBJECTIVES

Partners have identified the need to increase the use of ecologically-appropriate and innovative treatment design and implementation methods by practitioners in the region to restore forest structure, composition and function to benefit and engender sustainability of these fire dependent dryforest ecosystems, and their associated fish, wildlife and local communities.

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© The Nature Conservancy / Liz Rank

The 14,000 acre Sinlahekin Wildlife Area (SWA) is at the heart of the FLN Sinlahekin demonstration landscape. The Washington Biodiversity Council ranked this area as having the highest biodiversity significance in the Okanagan ecoregion, a result of the rich diversity of habitats—including semi-arid shrub-steppe, ponderosa pine and mixed conifer forests, sheer rocky cliffs and low-lying lakes, streams and wetlands—found in a relatively small area. The SWA is home to a remarkable number of species: 173 birds, 43 mammals, 16 fish, 75 spiders and over 540 plants. The 87 butterfly species represent 62% of all butterfly species found in the state.

The ponderosa pine and shrub-steppe have been identified as focal habitats for restoration, due to habitat loss and degradation; fire exclusion is a significant contributor to the degradation of these fire-dependent systems.

LANDSCAPE PARTNERS

Bureau of Land
Management –
Wenatchee Field Office
Central Washington
University

City of Oroville North Central Washington

Prescribed Fire Council

Okanogan County Board of Commissioners

Okanogan County Historical Society

Okanogan County Conservation District

Oroville School District

The Nature Conservancy – Washington

Tonasket School District USDA Forest Service –

Okanogan-Wenatchee NF

USDA Forest Service – Pacific Northwest Research Station

USDA Natural Resources Conservation Service – Okanogan Field Office

Washington Butterfly Association

Washington Department of Fish & Wildlife

Washington Department of Natural Resources – Highlands District

Washington State
Recreation and
Conservation Office
Washington State University

KEYSTONE APPALACHIANS

PENNSYLVANIA

Appalachian Fire Learning Network

1.2 million acres



LANDSCAPE PARTNERS

Department of Military and Veterans Affairs at Fort Indiantown Gap Pennsylvania Game Commission The Nature Conservancy – Pennsylvania

This oak barrens has been mechanically treated and is now being burned to help restore appropriate structure and functioning of the system.

© The Nature Conservancy / Jenny Case

Oak forests are an important component of the central Appalachian ecosystem, with many wildlife populations closely tied to them. For example, ruffed grouse depend on acorns, and high numbers of chicks are recorded following bumper crops. When acorns are scarce, black bears den earlier, weigh less, produce fewer and smaller cubs and get into more nuisance trouble. The canopy and vegetation structure of an oak forest is also critical to several species of conservation concern, including the golden-winged warbler.

Oak forests are perpetuated by saplings that grow where sunlight enters through canopy openings. Such openings are created by wind, ice storms, insect mortality or timber harvest. Historically, recurring fires maintained oak dominance by thinning fire-intolerant saplings of other species. When canopy breaks occurred, oaks were in a com-

Golden-winged warbler (Vermivora chrysoptera) © Christian Artuso

petitive position to fill the gap. Without fire, oaks lose this advantage to species like maple and birch. Since the mid-1970s

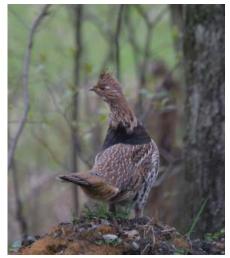
substantial gypsy moth outbreaks have occurred every six to eight years, killing or severely thinning large areas of oak forest. With the suppression of most fire in this system, these canopy openings are being repopulated by fire-intolerant trees and the oak ecosystem is being lost.

Partners in this landscape are now working to use prescribed fire as an integral part of sustainable Appalachian oak management. To do this, they must over-

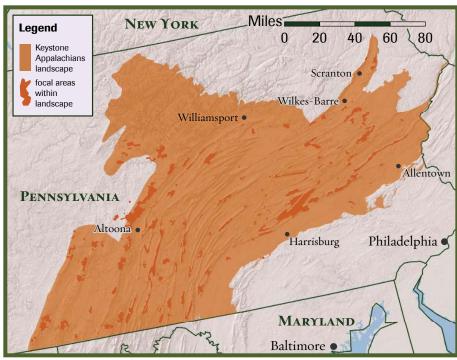
COLLABORATIVE STATEMENT & GOAL

Keystone Appalachian FLN is a partnership of land stewards that strives to incorporate fire to improve forest habitat for game and species of greatest conservation need, promote forest sustainability, reduce fuels, and promote public safety and recreation. To do this, partners are working to re-establish appropriate fire regime to Pennsylvania oak and barrens communities.





come numerous barriers including narrow burn windows, personnel and equipment shortages, a culture that is not used to (and often fears) fire, and landscape complexity due to development and fragmentation. By addressing these barriers, the Keystone Appalachians FLN hopes to promote the critical and unique ecological communities that depend on periodic fire; limit the potential for catastrophic wildfires; and enhance wildlife conservation, hunting, and other recreational opportunities on partner-managed lands.



Keystone Appalachians landscape

© The Nature Conservancy / Liz Rank

Left: Prescribed burn in the Long Pond pitch pine scrub oak barrens (© Jenny Case / TNC); ruffed grouse (Bonasa umbellus) (© Jacob W. Dingel / Pennsylvania Game Commission)

Below: Fall prescribed fire moving through an oak forest habitat (© Ben Jones / Pennsylvania Game Commission)



SOUTHWEST VIRGINIA

VIRGINIA

Appalachian Fire Learning Network

3.9 million acres



Dolomite glade in Lee County, Virginia

© Gary Fleming / Virginia Dept. of Conservation & Recreation

LANDSCAPE PARTNERS

The Nature Conservancy – Virginia

USDA Forest Service – Jefferson National Forest

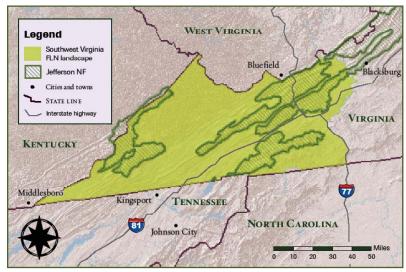
Virginia Department of Conservation and Recreation

Virginia Department of Forestry

Virginia Department of Game & Inland Fisheries

THE SOUTHWEST VIRGINIA LANDSCAPE extends from the New River westward to Cumberland Gap and encompasses portions of three ecoregions—Southern Blue Ridge, Ridge and Valley, and Cumberlands. Partner-managed lands total nearly 525,000 acres, with over three-quarters of that falling within the Jefferson National Forest. Southwest Virginia harbors tremendous biological diversity, both terrestrial and aquatic.

The major habitat types identified as priorities for fire management are dry oak forests and woodlands, pine-oak-heath woodlands, northern red oak forests and early successional patch communities. Facilitating interagency fire management actions and public outreach and education events have been initial priorities for partners in this landscape.



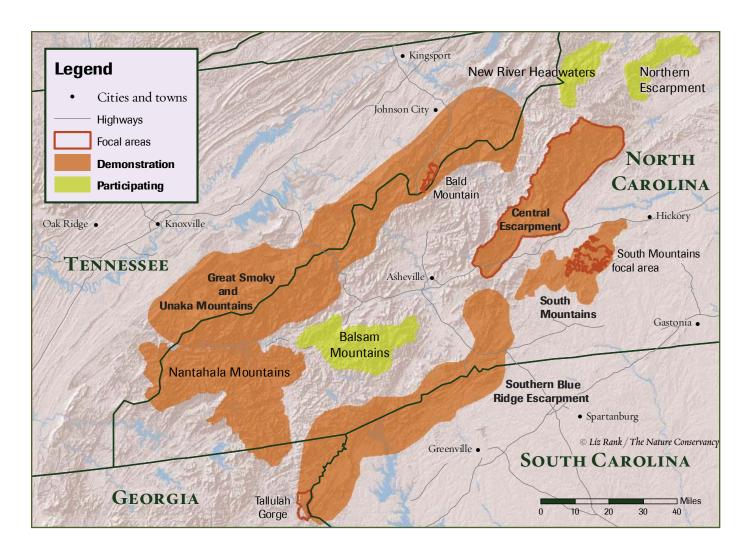
LANDSCAPE GOALS

Southwest Virginia partners seek to promote the restoration and maintenance of fire-adapted ecosystems for ecosystem health and biodiversity by identifying and overcoming barriers and by improving the capacity to apply and manage fires by increasing the collaboration and partnership of interested agencies, organizations and communities.

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SOUTHERN BLUE RIDGE FIRE LEARNING NETWORK



From late 2009 through 2010 the Southern Blue Ridge regional network added four new landscapes: Balsam Mountains, Nantahala Mountains, New River Headwaters and Northern Blue Ridge Escarpment

BALSAM MOUNTAINS

NORTH CAROLINA

Southern Blue Ridge Fire Learning Network

236,000 acres



LANDSCAPE PARTNERS

North Carolina Division of
Forest Resources
North Carolina Wildlife
Resources Commission
The Nature Conservancy –
North Carolina
USDA Forest Service –
Southern Research Station
Western Carolina University

Left: A spring prescribed burn conducted on the Cold Mountain Gamelands in the Balsam Mountains landscape © Dean M. Simon / NCWRC

Below: A view of the Richland Balsams in the Balsam Mountains landscape, taken from the Blue Ridge Parkway © Rob Lamb / Forest Stewards, Inc.

THE BALSAM MOUNTAINS adjoin the Great Smoky Mountains and are dominated by steep side slopes, narrow spur ridges and narrow coves. Most soils in the area formed in schists and gneisses and are acidic with relatively low fertility. However, there are locally significant occurrences of rock formations that produce more neutral soils that support diverse and productive forest communities.

The landscape supports sizeable areas of natural forests that contain several rare communities and plant species. Mature high elevation red oak forest and chestnut-oak forest communities cover most of the higher ridges and slopes. Large parts of the high elevation red oak forest are unusually rich, with a diverse herb layer. Concave slopes, sheltered slopes, and cove bottoms support rich cove forest communities, which are transitional to northern hardwood forest at the highest elevations. Past logging, fire suppression, and other land uses have significantly affected the forests in this region. The reintroduction of fire on appropriate sites is a fundamental component of restoration efforts in this landscape.

LANDSCAPE VISION

Partners will facilitate the reintroduction of fire to fire-dependent plant communities in order to restore and maintain critical forest habitats, and document the effects of fire on forest stand development.



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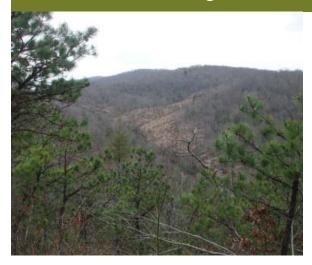
(828) 433-7277

Nantahala Mountains

NORTH CAROLINA, TENNESSEE

Southern Blue Ridge Fire Learning Network

629,000 acres



LANDSCAPE PARTNERS

Alcoa Power Generating, Inc.

Duke Energy

Land Trust for the Little Tennessee

North Carolina Division of Forest Resources

The Nature Conservancy – North Carolina

USDA Forest Service – National Forests of North

Carolina, Nantahala RD

Forest opening in a fire-maintained serpentine site © Gary Kauffman / USDA Forest Service

THE NANTAHALA MOUNTAINS LANDSCAPE, a rugged rural region with elevations from 1,200 to 5,400 feet, contains both old growth and virgin forest in Joyce Kilmer Wilderness and heavily harvested and previously farmed lands across much of the lower elevation areas. Cities and towns are limited, with the largest, such as Franklin and Bryson City, falling on the perimeter of the delineated area. Over 60% of the landscape is managed by FLN partners.

A diversity of species and plant communities occur in the area. Models show that over half of the landscape is in ecological zones where fire-adapted systems would be expected. At the lower elevations shortleaf-pine and southern red oak communities are dispersed with dry-mesic oak-hickory forests. Within the middle elevations pine-oak/heath forests predominate on the steepest ridges intermingling

LANDSCAPE OBJECTIVES

Partners are working to restore a variety of habitat types and monitor vegetation changes to better understand the role of fire in the landscape and determine whether goals are being met. In time, it is hoped that lightening-ignited fires will again be allowed to burn in appropriate landscape settings to the extent possible.

with chestnut oak heath forest and montane oak-hickory forest on those gentler ridges and convex slopes. At the highest elevations high elevation red oak forest dominates on ridges. The majority of these habitats have been impacted by past land use practices or altered fire patterns, where frequency or intensity, or both, have been changed. As a result, parts of the landscape are now dominated by white pine in the midstory and understory, have an unnatural abundance of evergreen shrubs and are not regenerating oaks



Diana fritillary (Speyeria diana)
© Bill Garland / USFWS

or fire-tolerant pines. The rare serpentine barren, with its 22 grass species and unique butterfly fauna, is undoubtedly the most fire-dependent community in the landscape. Many other rare, but more widely distributed, species also require recurring fire to maintain forest openings on which they depend.

Monitoring of recent burns has been initiated and will be continued to better understand the frequency and intensity of fires across different of the landscape, as well as to track the accomplishment of landscape goals.

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New River Headwaters

North Carolina, Tennessee

Southern Blue Ridge Fire Learning Network

95,000 acres



A crew made up of practitioners from five partner agencies and organizations conducted a controlled burn at Bluff Mountain in May 2010 © Debbie Crane/TNC

LANDSCAPE PARTNERS

North Carolina Division of Parks & Recreation – Elk Knob State Park

North Carolina Natural Heritage Program

North Carolina Wildlife Resources Commission

Threetop MountainGamelands

The Nature Conservancy – North Carolina, New River Headwaters Program

THE NEW RIVER HEADWATERS area is one of the most diverse and critically important biological hotspots in the entire southern Appalachians. Many species found here came to the region just one step ahead of the encroaching Ice Age and remained in the high peaks of these rugged mountains after the ice receded 10,000 years ago. The landscape of mountain bogs and boulder field forests is rich with unusual natural communities and endangered plants and animals. It faces threats from rapid development, habitat fragmentation and fire exclusion.

There has been very little prescribed burning in this area, but all partners are eager and willing to begin in earnest. The work of this budding partnership is best illustrated by one of the first large burns, which was conducted in May 2010 at the Conservancy's Bluff Mountain Preserve. The burn crew included members

from the North Carolina Division of Parks and Recreation, Natural Heritage Program and Wildlife Resources Commission, the North Carolina Botanical Garden and local volunteers and well as Conservancy crew. Such partnerships will be crucial to conducting burns on



a meaningful landscape level in the region because of the special challenges posed by rugged landscape coupled with development.

This landscape is home to many rare plants, including the world's largest population of the federally endangered Heller's blazing star (Liatris helleri)

© U.S. Fish & Wildlife Service

LANDSCAPE GOAL

Land managers and researchers will work in partnership across jurisdictional boundaries to return fire to the New River Headwaters. A fundamental part of this effort involves an assessment of fire needs across the landscape. Post-fire monitoring will also be vital to the effort.

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NORTHERN ESCARPMENT

NORTH CAROLINA

Southern Blue Ridge Fire Learning Network

103,000 acres



LANDSCAPE PARTNERS

National Park Service – Blue Ridge Parkway North Carolina Division of Forest Resources North Carolina Division of Parks & Recreation – Stone Mountain State Park

North Carolina Wildlife Resources Commission

– Thurmond Chatham Game Land

The Nature Conservancy – North Carolina

An early-spring burn on Thurmond Chatham Game Land improves wildlife habitat for many species

© Dean M. Simon / NC Wildlife Resources Commission

THE NORTHERN ESCARPMENT was one of the landscapes included in a vegetation mapping and modeling project conducted by the Southern Blue Ridge regional network in 2009. The resulting maps showed that much of the land is in public ownership, and consists mainly of oak habitats—oak-hickory, oak heath

and dry-mesic oak forests—that are in need of fire. There are also table mountain/pitch pine communities across the landscape that have been fire-suppressed and would benefit greatly from fire.

The North Carolina Wildlife Resources Commission has been burning in a portion of this landscape since 1987. Landscape partners see their involvement in the FLN as an opportunity to transfer research findings and lessons learned from these burns to other public land managers in the area, and thus to expand fire restoration to a landscape level and scale where it will have increased benefits for wildlife and forest health.

LANDSCAPE GOALS

Identify fire-suppressed pineoak habitats that can be addressed through partnerships in the next three to five years, and identify obstacles and potential solutions to implementation in priority locations.







A table mountain / pitch pine community before (left) and after seven burn rotations since 1987 (shown in fall (middle) and spring (right)). Burning has increased plant diversity and early successional wildlife habitat on Thurmond Chatham Game Land.

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