



FIRE LEARNING NETWORK

FIELD GUIDE

MARCH 2012 EDITION





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The Fire Learning Network is part of the “Promoting Ecosystem Resiliency through Collaboration: Landscapes, Learning and Restoration” cooperative 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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Contents

U.S. Fire Learning Network	1
An introduction to the network and its goals and approach – Map of landscapes	
Washington Dry Forests Fire Learning Network	5
Sinlahekin Ecosystem Restoration Landscape – Tapash Sustainable Forest Collaborative	
Northwest Fire Learning Network	11
Rogue Basin – Upper Deschutes Basin – Lakeview Stewardship Unit / Fremont-Winema National Forest	
California Klamath-Siskiyou Fire Learning Network	19
Trinity Mountains – Western Klamath Mountains	
Great Plains Fire Learning Network	25
Loess Hills – Lower Loup Rivers – Refugio-Goliad Prairie	
South Central Fire Learning Network	33
Big Piney Woodland Ecosystem Project – Blacklands Ecosystem Restoration Project – Bobtail Oak Woodland Restoration Project – Buffalo National River – Indiana Bat Habitat Restoration Project – Land Between the Lakes – Lower Ouachita – Novaculite Uplift – St. Francis National Forest Ecosystem Restoration Project – Upland Forest Ecosystem Restoration Project – White Rock Ecosystem Restoration Project – Wildlife Management Areas (Gene Rush, Gulf Mountain, Harold Alexander, Hobbs, Loafer’s Glory, Madison County, Petit Jean)	
Appalachian Fire Learning Network	49
Allegheny Highlands – Allegheny Border – Cumberland River – Keystone Appalachians – Southwest Virginia	
Southern Blue Ridge Fire Learning Network	59
Balsam Mountains – Central Blue Ridge Escarpment – Great Smoky & Unaka Mountains – New River Headwaters – Nantahala Mountains – Northern Escarpment– Southern Blue Ridge Escarpment – South Mountains	
Florida-Caribbean Fire Learning Network	75
Bahamas – Central Florida – Cuba – Dominican Republic – Jamaica – Puerto Rico – South Florida – St. Lucia – Trinidad & Tobago	
Additional Demonstration Landscapes	87
Centennial Valley – FireScape Monterey – Jemez Climate Change Adaptation Project – Parashant Partnership – Yakima Basin Shrub-Steppe and Fire Project	
Appendices	98
A: Landscapes with Various Partner Types	
B: Landscapes with Forest Service Collaborative Forest Landscape Restoration Projects	
C: Landscapes that are Conservancy Restoring America’s Forests Demonstration Sites	
D: Lead & Partner Contact List	



FIRE LEARNING NETWORK: PARTNERS RESTORING FIRE-ADAPTED ECOSYSTEMS ACROSS AMERICA

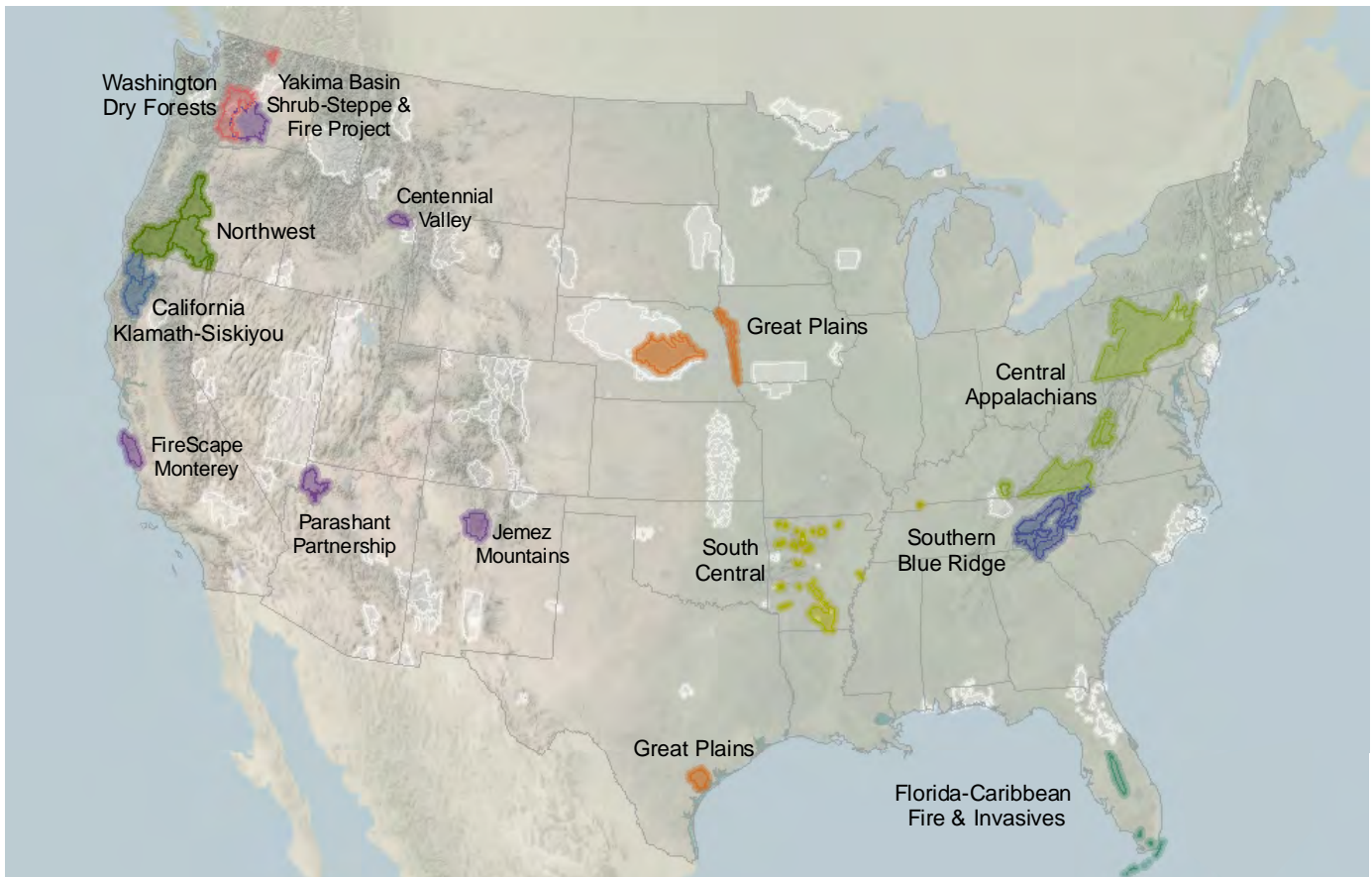
The Fire Learning Network (FLN) is a system of landscape-scale collaborative projects that work to accelerate the restoration of fire-adapted ecosystems at local, regional and national scales. Collaborative planning, implementation, adaptive management and sharing lessons learned are at the core of the Network. 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, social and economic solutions for the long-term conservation of these important lands.

A Network of Landscapes

Landscapes in the FLN typically are large areas—the median landscape size is over 400,000 acres—and 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 culturally and ecologically appropriate, integrated, all lands 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.

“We’re now looking at long-term, landscape planning from a different perspective ... looking at our district at a landscape level rather than just specific areas or specific treatments ... and started a really strong collaboration process.”

*FLN landscape leader, BLM,
on what the FLN has changed*

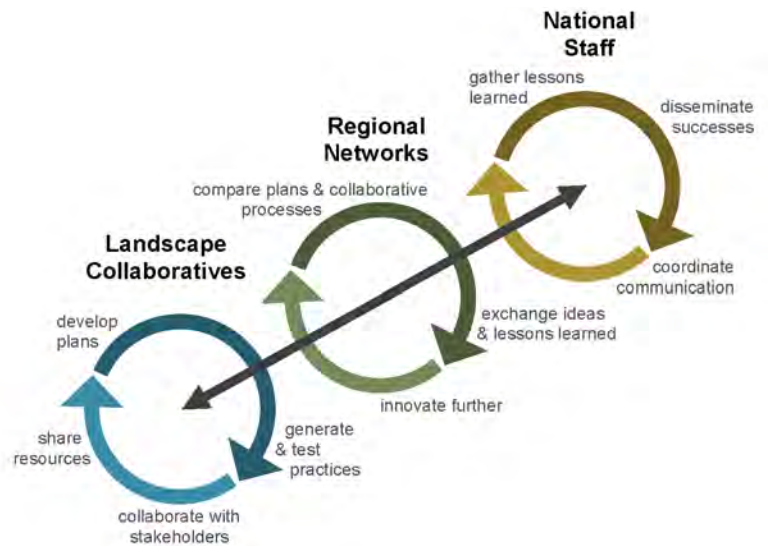


Landscapes active in 2011 are shown in color; those that have been active in the FLN at other times since its inception in 2002 are shown in white

The FLN Model

In the Fire Learning Network process, participants establish collaborative goals, determine actions, and direct resources to gain the greatest conservation results. It is a highly successful iterative and adaptive approach that operates at multiple scales and has been employed in diverse geographic and cultural settings to meet a wide variety of landscape goals. 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 at multiple scales and fire management plan development, contribute to forest and land management plans, guide state and county plans, and inform policy.

As the FLN has evolved and landscape partnerships have matured, some landscapes have applied collaborative methods to address restoration challenges in a variety of other ways as well. Advanced networks have developed new models to scale up efforts with their partners, and to address larger issues than those originally conceived. For example, the South Central FLN has scaled-up at the state level, developing close partnerships with state agencies and laying the groundwork for significant state and federal restoration funding that they are using to implement restoration treatments across the state of Arkansas. The Centennial FLN in Montana is addressing the issue of uncertainty and lack of agreement over optimal treatment types by setting up restoration demonstration projects across several habitat types; their workshops are a series of field visits, where partners discuss and learn together, with the evidence right before them. Across the Great Plains grasslands, as in many places, skilled fire capacity is a limiting factor; landscapes in the Great Plains FLN, working with national training staff, have reached out to local fire practitioners like ranchers and volunteer fire departments and engaged them, finding the overlap between the needs of ecological burning for habitat, ranching, and community safety. And in the Jemez Mountains, numerous projects, from climate change adaptation to salamander research, are integrated in the same landscape; the FLN provides the core of collaborative relationships that feed—and link—many of these projects.



The FLN's planning methods are based on the Open Standards for Conservation. According to research conducted by Bruce Goldstein and colleagues, the Network can best be conceived of as a multiscalar process of iterative adaptive management.

Diagram adapted from Butler, W. H. and B. E. Goldstein (2010). "The US Fire Learning Network: Springing a Rigidity Trap through Multiscalar Collaborative Networks." Ecology and Society 15(3):21.

FLN Numbers ~ 2002-2011

- 15 regional networks
- 163 landscapes
- 162 million acres
- 1,125 partners
- 39 states (plus Puerto Rico)
- 6 foreign countries
- 1 innovation project
- 358,000 acres treated
- > \$16.4 million in restoration & other funds leveraged (includes CFLRP to FLNs)

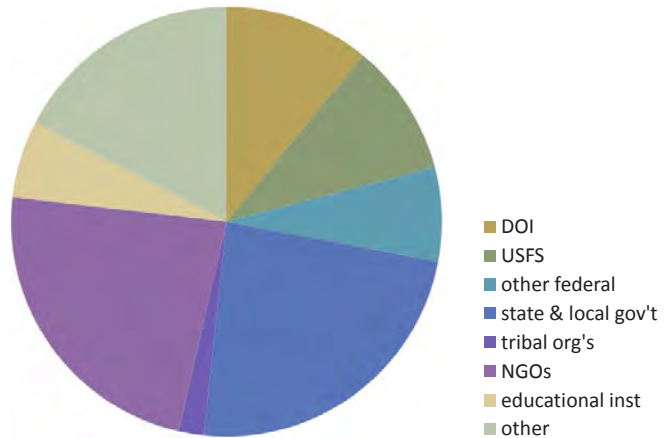


Partners from eight landscapes in six countries dealing with the interactions between fire and invasive species at an herbicide demonstration at a Florida-Caribbean regional workshop
© Lourdes Bernier/Puerto Rico DNER

Connection and Credibility

Regardless of the details of how an FLN functions or what its goals are, when asked to reflect, leaders and partners had very similar conclusions about what is most valuable about the FLN. The process is very good. The science is very good. Financial support is always helpful. But two words that came up repeatedly were “credibility” and “connection”—being part of a larger whole. This was expressed in many ways. For some, working in remote areas, having a community of like-minded people to be a part of, to bounce ideas off, to have as a resource makes the difference between success and frustration. For others, working at small NGOs, the credibility that comes from being connected to the FLN gives a foot in the door with the bigger players in the area. For others, working at large agencies, it assures stakeholders that plans and decisions have come from a well thought out, collaborative process. And for many, workshops and other gatherings provide a reminder of what can be done—what others have, in fact, accomplished—and participants return home recharged and ready to tackle the seemingly impossible one more time.

The bottom line is that people engage in the Network because it helps them more quickly and effectively achieve their goals, and gives them credibility with their



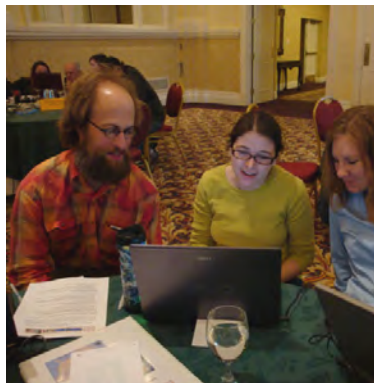
FLN Landscape Partners, by Affiliation

FLN landscapes engage partners from a wide variety of organizational affiliations, including federal and state agencies; county and other local governments; a range of NGOs; volunteer fire departments; timber, ranching and other commercial enterprises and universities

partners, the public and funding entities. Eight years in, the FLN’s record of getting large projects to implementation without litigation remains intact.

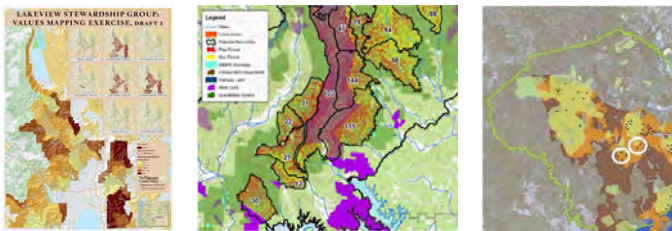
“That was a really empowering experience, where we were able to be among peers from across the country that were doing good things with regard to fire....So there was a lot of cross-pollination of ideas, but also a chance to come to some collective vision of how we could work together to try and evolve fire policy in our region to reflect some of the positive changes that are going on nationally.”

FLN landscape leader on attending a national FLN workshop



Regional workshops serve as a forum for partners from several landscapes in the region to come together once or twice a year for peer review of products and learning exchange. The national Fire Learning Network also convenes workshops where partners can share knowledge across regions and gain access to new restoration tools, products and ideas.

From left: Refugio-Goliad Prairie, TX field tour at national FLN workshop (© Liz Rank/TNC); Two-Hearted River, MI team at LANDFIRE-Efroymson workshop (© Liz Rank/TNC); Southern Blue Ridge regional workshop field tour (© Margit Bucher/TNC)



From left: The Northwest FLN led collaborative mapping of values at risk; the maps, on which dark areas indicate high agreement among stakeholders that restoration treatments are needed to protect valued aspects of the landscape, have been used by federal agencies to prioritize treatments. A multi-agency team in the Southern Blue Ridge FLN created a model for prioritizing burn units on one ranger district; the work inspired several other landscapes to adapt the model locally. Refugio-Goliad Prairie developed aerial survey methods to identify and document private burning on the 664,000-acre landscape; this allows FLN partners to determine where their own burns will have the greatest effect, track progress across the entire landscape and provide scientific rationale for programs they support

“[It] was a really empowering experience, where we were able to be among peers from across the country that were doing good things with regard to fire. And that there were things that were happening in the Appalachians . . . that were dictated by the same federal regulations that are managing the work in our area. So there was a lot of cross-pollination of ideas, but also a chance to . . . to come to some collective vision of how we could work together to try and evolve fire policy in our region to reflect some of the positive changes that are going on nationally.”

FLN landscape leader, western US on attending a national FLN workshop

The Research

The FLN and its promise and progress as an approach to meeting large-scale conservation challenges were the subject of five peer-reviewed publications by Bruce Goldstein, Will Butler and colleagues.

“We conclude that the FLN nurtures expertise in ecological fire restoration and collaborative planning by linking multi-stakeholder collaboratives to regional communities of practice. Moreover, this linkage creates and sustains a network of collaboratives that amplify the potential for fundamental change in the culture and practice of fire management.”

Key Findings on the FLN

Nurtures and Distributes Expertise

- low cost
- customized, contextually relevant
- collaborative and topical

Grows and Sustains Collaborative Networks

- catalyzes new collaborative processes
- promotes network expansion
- distributes expertise

Amplifies Potential for Change

- fosters cohesion without disabling control
- inspires collective action
- magnifies impact on policy and institutions

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Washington Dry Forests Fire Learning Network

2.4 million acres

The dry forest ecosystems of the Inland Northwest have changed significantly in ecological character over the last century. One of the main causes of the changing forest character is nearly a century of fire exclusion across these landscapes. The result has been that forests in these landscapes are less resilient and more susceptible to insects, diseases and large wildfires, resulting in reduced values for nature and people. To reverse negative trends in forest health, there is increased recognition of the need to work in larger landscapes, work across ownership boundaries, grow collaborations and coalitions, and learn while implementing. High level barriers to landscape-level restoration include policy issues, a lack of public understanding of the benefits and tradeoffs of managing fire for resource benefits, and the loss of forest product infrastructure that offset the cost of restoration treatments. Also needed are more robust, efficient planning, and innovative funding mechanisms. The Washington Dry Forest FLN is focusing on supporting the establishment of a Washington state prescribed fire council and two landscapes—the Tapash and the Sinlahekin—to devise and test strategies to break down these barriers.



Conner's Lake, Sinlahekin Wildlife Area

© WA DFW

Network Vision

Across Eastern Washington, we envision healthy and resilient forest landscapes cared for by the people whose livelihoods and cultures they support.



Mount Rainier and Nelson Ridge, viewed from a Bald Mountain site recently acquired by partners in the Tapash Sustainable Forest Collaborative
© David Hagen

In 2011, FLN partners:

- Worked with the North Central Washington Prescribed Fire Council to expand its charter to encompass the entire state and developed a conference on forming a Washington State Prescribe Fire Council that is scheduled for March 2012 in Wenatchee, WA;
- Drafted Forest Assessments on the Washington State Department of Fish and Wildlife Methow Wildlife Area; and
- Negotiated an allowance for regulated amounts of prescribe burning where there had been a burn moratorium in the Yakima Valley.

For more information:

Washington State Prescribed Fire Council
www.waprescribedfire.org

Sinlahekin Wildlife Area
wdfw.wa.gov/lands/wildlife_areas/sinlahekin

Tapash Sustainable Forest Collaborative
www.tapash.org

Tapash Sustainable Forest Collaborative
Sinlahekin Ecosystem Restoration Demonstration Landscape



map © 2011 Liz Rank /TNC

Network Partners

- Center for Natural Lands Management
- Stewardship Forestry Alternatives
- The Nature Conservancy—Washington
- USDA Forest Service—Okanogan-Wenatchee National Forest
- USDA Forest Service—Pacific Northwest Research Station
- Washington Department of Fish and Wildlife—Methow Wildlife Area, Sinlahekin Wildlife Area
- Washington State Prescribed Fire Council



Washington Guides and Outfitters on their annual “ride to rendezvous” in Pipestone Canyon at the Methow WMA © Tom McCoy/WA DFW

Partners have begun looking to the Methow Wildlife Area, west of the Sinlahekin, which is also managed by the Washington Department of Fish and Wildlife. This 31,000-acre area in the Methow River watershed in Okanogan County in north-central Washington includes about 5,000 forested acres. Neighboring land owners include the Methow Ranger District, BLM, Washington State Department of Natural Resources, and a diverse public—including ranchers, farmers, and recreationists (the valley is a prime recreation destination in the state). FLN partners are working on an assessment of forest restoration need, prioritization and development of treatment prescriptions. This work is intended as a catalyst to:

- engage stakeholders in a new or expanded landscape;
- define landscape-level future desired conditions and forest restoration needs;
- define treatment and implementation strategies;
- further define shared, compatible ownership objectives, barriers and cross-ownership implementation projects;
- estimate the costs to implement treatments to reach future desired conditions, and secure the needed funding.

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Sinlahekin Ecosystem Restoration Demonstration Landscape

Washington Dry Forests FLN
Washington
102,000 acres

The Sinlahekin Wildlife Area, situated in North Central Washington within the Sinlahekin Valley, is managed by the Washington Department of Fish and Wildlife (WDFW). These lands consist of a mosaic of shrub steppe, lakes and wetlands, and dry, low elevation forest. The Washington Biodiversity Council ranked this area as having the highest biodiversity significance in the Okanagan ecoregion, a result of this rich diversity of habitats found in a relatively small area. The 14,300-acre Wildlife Area 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 percent 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 the primary contributor to the degradation of these fire-dependent systems.

The Sinlahekin Wildlife Area is an active anchor of restoration work with nearby federal, state, and private forests. The partners' goal for this landscape is to determine whether synergies can be developed among land managers such that they are able to develop shared, landscape-level objectives—in other words, objectives that meet individual ownership needs, and add up to a restored landscape—and to implement treatments.

Landscape Vision

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.



Before and after photos of a prescribed burn on the Sinlahekin FLN landscape. This was one of several spring burns that together treated 530 acres. These were the first prescribed burns conducted as part of the Sinlahekin Ecosystem Restoration Project, which is funded through a State Lands Restoration grant from the Washington State Recreation and Conservation Office and a Wildlife Habitat Incentives Program grant through the Natural Resources and Conservation Service. In the fall of 2011, an additional 350 acres were burned under prescription. In total, these grants will allow fuels reduction and reconfiguration treatments, including logging and hand thinning, on about 2,000 acres.

© Justin Haug/Washington Department of Fish & Wildlife

The Sinlahekin Wildlife Area is home to 173 species of birds, 43 mammals, 16 fish, 75 spiders and over 540 plant species.

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map © 2011 Liz Rank /TNC

Landscape Partners

- Bureau of Land Management
Stewardship Forestry
Alternatives
- The Nature Conservancy—
Washington
- USDA Forest Service—
Okanogan-Wenatchee
National Forest
- Washington Department of Fish
& Wildlife—Methow Wildlife
Area
- Washington Department of Fish
& Wildlife—Sinlahekin
Wildlife Area

Treatment Progress

Between fall 2010 and spring 2011, about 200 acres were mechanically treated or hand thinned, and the slash fuels allowed to cure through the summer. Prescribed burning efforts began in fall 2010 with fire-line layout and construction, and in March 2011 prescribed burning began in light fuels (grasses and forbs); partners completed 535 acres of prescribed burning by late April. Fall burning began in October, again in primarily light fuels. Treatments of heavier fuels were delayed by the extensive unit preparation required (for example, 4,000 feet of hose-lay with sprinklers was needed), rains, and the onset of hunting season; nonetheless, another 350 acres were accomplished by the time the season ended in November. About 200 acres of slash units remain to be burned; this treatment is planned for spring 2012.

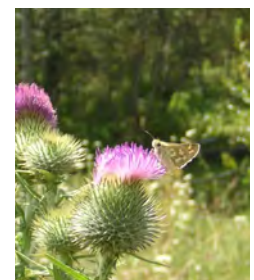
Phase 2 of the Sinlahekin Ecosystem Restoration Project recently received funding. This phase targets an additional 960 acres for thinning and burning treatments.



Top: Partners toured several restoration sites in May 2011.

Bottom: Photos were taken just before (left) and 12 days after (right) the area was treated with prescribed fire in mid-April, demonstrating good response to the treatment.

© Dale Swedberg/WA DFW



Wildlife found in the Sinlahekin includes (left to right) white-breasted nuthatch, bighorn sheep, gopher snake, showshoe hare and Juba skipper butterfly. Photos: www.wdfw.wa.gov/lands/wildlife_areas/sinlahekin/gallery; snake: Andreas and Christel Nöllert

Tapash Sustainable Forest Collaborative

Washington Dry Forests FLN
Washington
2.3 million acres

From the forests of the East Cascades to the arid, sage-dotted hills of the Columbia Basin, the rugged hills and canyons of this landscape support some of the few remaining mature groves of ponderosa pine in the state and provide habitat for white-headed woodpeckers, golden eagles, Rocky Mountain elk and mountain lions. These forests, riparian areas and faunal communities have changed dramatically in ecological character over the last century.

The landscape faces threats common to many in the west: Fire regimes have been altered by decades of fire exclusion. Drought, disease and insects are taking a toll, and long-held industrial forest lands are being sold, expanding wildland-urban interface and making fire management more complicated.

All of these factors are exacerbated by the difficulty of land management coordination due to a checkerboard ownership pattern that developed in the 19th century. Stakeholders now agree that it is beyond the ability of any single group to ameliorate these threats and restore the forests and the communities they support.

In 2011, the Collaborative worked to expand its membership and create an improved structure for partnership communication and involvement. Partners were also able to re-negotiate an allowance for some prescribed burning, which had been disallowed under a burn moratorium in the Yakima Valley. On lands



Standing on a ridge in the original 10,000 acre Tieton checkerboard acquisition project are participants in the 2009 Tapash Leadership Tour, including the Commissioner for Public Lands, Regional Forester, Forest Supervisor, Acting Director for the Washington Department of Fish and Wildlife, Conservancy State Director, Acting Director of the Yakama Nation Tribal Government and leaders from Tapash Collaborative affiliate sponsor organizations. In the background is the next 10,000 acre checkerboard project the group is buying together. © Julie Conley/TNC

purchased in the Tieton, 1,200 acres of restoration treatments have been identified across Washington Department of Fish & Wildlife and Conservancy lands; implementation will begin in the summer of 2012 with mechanical treatments that will set up forest conditions for the safe and effective use of prescribed fire.

Collaborative Statement

The Tapash Sustainable Forest Collaborative is a coalition of public, non-profit and tribal land managers that was born out of a defined need to more efficiently manage forest across a checkerboard of alternating ownerships.

The Tapash is organized under a Memorandum of Understanding to work cooperatively to meet shared objectives. The Tapash Collaborative provides coordination, funding, facilitation and engagement with interest groups, local citizens and academia. Joint problem-solving generates projects that integrate economic, cultural, social and ecological values to find solutions.

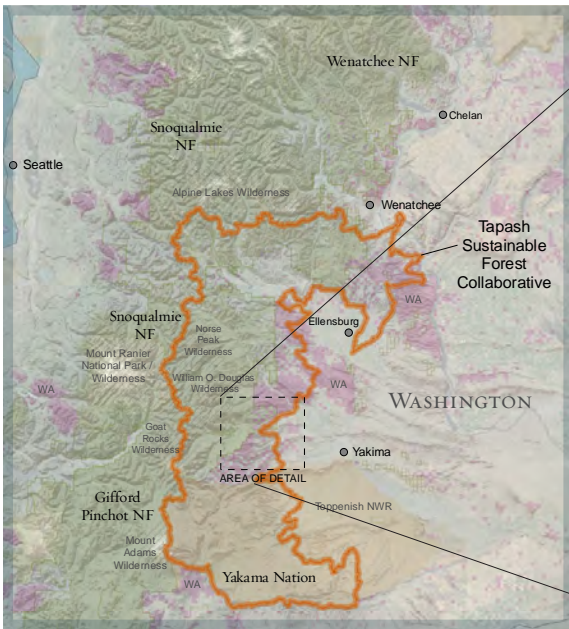


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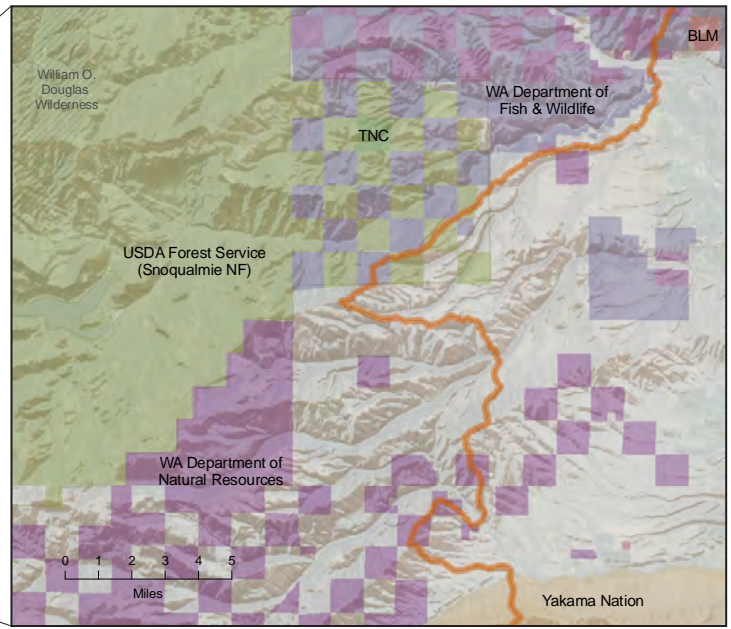
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map © 2011 Liz Rank /TNC



Detail of the boxed area in map at left; at this scale, the checkerboard land ownership pattern in this landscape is clear. Partners are working both to acquire lands and to work across boundaries so that lands can be managed at appropriate scales. *ownership data from TNC-WAFO, December 2011*

Landscape Partners

- American Forest Resource Council
- Conservation Northwest
- Rocky Mountain Elk Foundation
- The Nature Conservancy—Washington
- The Wilderness Society
- USDA Forest Service—Okanogan-Wenatchee National Forest
- Washington Department of Fish & Wildlife
- Washington Department of Natural Resources
- Yakama Nation

Mount Rainier and Nelson Ridge, viewed from a Bald Mountain site recently acquired by Tapash partners © David Hagen



Related Projects

Collaborative Forest Landscape Restoration Program (CFLRP)

The Tapash Sustainable Forests Collaborative is one of 10 projects across the country selected by the Forest Service in 2010 for CFLRP restoration implementation funding. Among the Tapash Collaborative's CFLRP accomplishments in its first year are 5,100 acres of hazardous fuels reduced near communities and 600 acres of forest habitat improved.

Integrated Landscape Assessment Project (ILAP)

In partnership with the Conservancy's ILAP and a research team affiliated with the Forest Service Pacific NW Research Station, Oregon State University and the Institute for Natural Resources, the Collaborative is using a suite of analytical models to develop a shared long-term and landscape-scale vision for forest restoration and management methods. The ILAP models will allow the Collaborative to directly compare the predicted ecological and economic outcomes of different management scenarios over time. Examples of management scenarios being modeled include: continuing the current rate of mechanical thinning and prescribed fire, doubling the current rate of mechanical thinning and prescribed fire, applying prescribed fire only, and using mechanical thinning only.

The ILAP models explicitly incorporate the main drivers of forest ecosystems within the Tapash Landscape—fire, insects, disease, growth, harvest/active management—and forecast forest structure/composition, species habitat, annual timber and biomass production, and annual fire-insect disturbances. Tapash partners are currently developing input for current treatment rates across the Tapash will meet early in 2012 to compare the outcomes of current and alternative treatment scenarios. This process will enable Tapash partners to evaluate whether their current cross-ownership treatment efforts are effectively meeting collaborative goals, and will guide adjustments in strategy if that is required.

Northwest Fire Learning Network

8.4 million acres

Ponderosa pine and dry mixed-conifer forests in eastern and southwestern Oregon manifest numerous symptoms of degraded forest health. These include uncharacteristically severe, large, and frequent wildfires and insect outbreaks and diminished biodiversity and wildlife habitat. Stressed trees are vulnerable to drought, and mortality in old growth and large trees is outside the historic range of variability. Ecological, aesthetic and recreation values are all compromised.

Uncharacteristic wildfires are a consequence of over-dense forest conditions resulting from fire exclusion, past forest management practices, and grazing. These fires pose a significant threat to local communities, forests, wildlife habitat and overall ecosystem health. Unfortunately, the pace and scale of treatments are woefully short of what is required to reverse this trend. Based on Conservancy calculations, approximately 126,000 acres are treated annually; to treat all the acres that are in need within 25 years, the scale of treatments must more than triple.

Landscape-level planning provides a framework for evaluating the problem at the scale it occurs and for prioritizing treatments so that they protect the values that are at greatest risk and/or are irreplaceable. In addition, by placing treatments strategically, the health of nearby untreated acres can be improved and the use of prescribed and natural fire for restoration and stewardship can be facilitated. Landscape-level plans to manage for these values are difficult to achieve without the support of diverse stakeholders. Through the NW FLN, local communities, scientists and agencies are working collaboratively to develop desired conditions and fuels management plans for ponderosa pine and mixed-conifer ecosystems in the region.



The FLN engages stakeholders to open communication and inform projects.
© Darren Borgias/TNC



Ponderosa pine stands historically were dominated by large-diameter trees, with the low density and understory maintained by fires.

© Maret Pajutee/USFS

Network Goals

The goal of the Northwest FLN is to increase the scope, scale and pace of ecological restoration of dry, fire-adapted forests, reducing the risk posed by uncharacteristic fire, insects and disease, and increasing forest resiliency to these natural disturbances. This will help these dry forest ecosystems adapt to a changing climate and continue to deliver the ecosystem services upon which human and natural communities depend.

The NW FLN provides the framework to accelerate ecological restoration by bringing together stakeholders from local communities, scientists and agency staff to participate in collaborative landscape assessments. Network partners work together to merge sound scientific and GIS analyses with local stakeholder values to establish treatment priorities. This transparent process builds understanding and trust among participants, helping to overcome the social, economic, political and scientific barriers to action necessary to achieve restoration goals.

Each FLN site works at the landscape and project scale to demonstrate, test and improve knowledge and strategies to implement ecological restoration. This on-the-ground engagement in adaptive management encourages the use of best science and adaptive management while simultaneously reducing the risk of uncharacteristic disturbance, restoring forest pattern and process, engaging communities in the restoration dialogue, and increasing the efficacy of the collaborative model for forest restoration going forward.

Lakeview Stewardship Unit / Fremont-Winema National Forest
Rogue Basin
Upper Deschutes Basin



map © 2011 Liz Rank/TNC

In 2011, conservation partners in this network began developing Plant Association Group-level principles of restoration across the region (Oregon, east of the Cascades, and portions of eastern Washington). Generally speaking, restoration treatments, and the level of support for them, differ by forest type. Therefore, these forest-type specific guidelines are needed to develop the ecological foundation of dry forest restoration and clearly articulate where broad support exists for restoration projects. This product has been identified as a high priority by Defenders of Wildlife, OregonWild and The Nature Conservancy for the last three years.

Network Partners

- Northern Arizona University—Ecological Restoration Institute
- The Nature Conservancy—Oregon
- USDA Forest Service—Region 6

More information about this network:
<http://nw.firelearningnetwork.org/>



Partners inspecting fire scars after the Coyote prescribed burn (above) and on the Lakeview landscape (left). © Craig Bienz/TNC

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Rogue Basin

Northwest FLN
Oregon
2.8 million acres

The mixed-conifer forests of the Rogue Basin benefit from a Mediterranean climate: mild winters are followed by dry summers in which frequent fires thin young trees from under old growth. As a result, these dry forests were historically dominated by large, open-grown, fire-scarred ponderosa pine, sugar pine, Douglas-fir, California black oak and Pacific madrone. With fires excluded over the last century forest stands have grown denser and the forested landscape more homogeneous, promoting the spread of larger, more severe fires and insect outbreaks.

This landscape has a long history of human habitation and influence, and continues to provide abundant resources for the highly-engaged local communities. Changing social values in the late 20th century led to conflict over timber practices, road building and the endangered species that require closed-canopy forest and healthy streams. Despite policy changes, lingering unease and resistance to active forest management continue to slow restoration in federal forests.

A 2008 FLN assessment of the Applegate watershed identified a high community regard for a sustainable forest economy, fire safe environs, and key attributes of the local quality of life—recreation, quiet, solitude, natural beauty, and opportunities for collaborative land management. In 2010, partners collaboratively mapped priority forest ecological values to highlight overlapping restoration opportunities. The map helped shape the 50,000-acre Applegate Pilot Project, sponsored by the Department of the Interior, which was launched in 2011.

Partners are now focused on promoting ecosystem resilience across the dry forests of the wider Rogue Basin. The FLN brings strong scientific and technical support to collaborative landscape planning and project implementation. By providing ecological references and historic ranges of variability for the forests, key gaps in the scientific foundations for active forest management are being filled, and public support for the work is being built.

The Rogue River Basin drains the northern part of the Klamath Range and the western slopes of the Southern Cascades. It supports a mosaic of forest, woodland, chaparral and grassland, and has been a refuge for biodiversity over eons of geologic upheaval and climate change.

© Rick McEwan



The northern spotted owl lives primarily in West Coast old-growth forests, including in the Ashland watershed. Federally listed as threatened, the species is at the center of many discussions about these forests.

© Rick McEwan

Landscape Goal

Partners are working together to develop science and deliver technical support to collaborative efforts that implement restorative forest treatments in strategic locations in order to return innate resistance and resiliency to fire-maintained forests. Our work advances a future in which large-scale controlled burns—alongside harvest and other management, including application of Appropriate Management Response to wildland fire—are applied to protect wildlife habitat, abundant clean water and fish, while promoting compatible recreation, economic development and safe communities.



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Partners prepare to release a sedated Pacific fisher. Forest Service scientists collared the animal, a member of the weasel family, to study the use of the old-growth forests in the Ashland Forest Resiliency Project area by this species. The west coast population of fishers is listed as a federal candidate species. © Dave Clayton/USFS

Ongoing Projects of the FLN Partnership

Forest Service Ashland Forest Resiliency Stewardship Project (22,000-acres, project area)—a master stewardship agreement funded by the American Recovery and Reinvestment Act supports collaborative landscape-scale forest restoration

- Multiparty monitoring supports adaptive management and builds trust among stakeholders.
- Restoration on adjacent private land begins in 2012, with federal funds secured by landscape partners.

Ecological References for the Rogue Basin—research on historical fire patterns and forest characteristics to clarify the range of fire frequencies and forest structure and composition to inform stand-thinning prescriptions

The Applegate Demonstration Project—a replicated and controlled trial of three thinning approaches

Support for the **Southern Oregon Forest Restoration Collaborative**—collaborative forest assessment and prioritization for a 10-year work plan and project areas for restorative forest management across the Rogue Basin

Support for the **Medford BLM Applegate Pilot Project**—collaboration with stakeholders on project design

- 300 acres of restorative timber harvest units were sold in 2011.
- Planning is underway for a 23,000-acre project area.

Rogue Basin Oak Woodland Restoration Assessment—priority restoration areas will be proposed based on mapped change in the range of oaks and expected effects of climate change on the future range of the species

Landscape Partners

- Applegate Partnership
- Black Oak Forest Restoration
- Bureau of Land Management—Medford District
- City of Ashland
- Josephine County Stewardship Group
- Klamath Bird Observatory
- Klamath Siskiyou Wildlands Center
- Lomakatsi Restoration Project
- Oregon State University Extension
- Southern Oregon Forest Restoration Collaborative
- Southern Oregon University
- U.S. Fish and Wildlife Service
- USDA Forest Service—Forest Health Protection, Pacific Southwest Research Station, Rogue River-Siskiyou NF



Top: Workers cut small-diameter trees to reduce density in forest grown over-crowded in the absence of fire. © Darren Borgias/TNC

Bottom: After thinning the surface and ladder fuels, piles are burned. © Marko Bey/Lomakatsi Restoration Project

Upper Deschutes Basin

Northwest FLN
Oregon
2.0 million acres

With ecosystems ranging from alpine forests and lush meadows, mixed conifer and dry ponderosa forests to dry juniper and sagebrush, and ownership by government agencies, private landowners and tribal organizations, this landscape is a true mosaic. With so many variables, land managers often face challenges when looking for data on property beyond their own boundaries, or in managing the land at effective scales. In addition, the fire-dependent ponderosa pine forests of the eastern Cascade Range have been deprived of fire for decades; as a result, fire burns less often, more uniformly and often with greater intensity and severity than was the historic norm.

In this environment of changed ecosystems and numerous—and sometimes divergent—interests of human communities, the Upper Deschutes Basin FLN landscape formed in 2004 with the goal of bringing stakeholders together to improve the availability of tools needed to assess the landscape and set priorities for treatment. Landscape partners are collaboratively developing a common vision for the landscape, using the best available science and incorporating a wide array of values. A shared vision encourages stakeholders to find solutions to manage the landscape at appropriate scales and in ways that balance restoration, fuels treatment and other community values. The FLN is also integrating community planning efforts, like Community Wildfire Protection Plans, with agency efforts to generate a robust vision for future land management. The Upper Deschutes Basin FLN also provided the organizational structure to unite multiple collaborative efforts in



Collaborative group stakeholders gather to discuss forest restoration goals in Glaze Meadow on the Sisters Ranger District, Deschutes National Forest. © Amy Waltz/TNC

the area into the Deschutes Collaborative Forest Project (DCFP) under the Collaborative Forest Landscape Restoration Program (CFLRP). The DCFP is one of three demonstration landscapes in Oregon that are part of the Conservancy's Restoring America's Forests program.

The goal for practitioners in this landscape is to restore forest ecosystems to be resilient to natural disturbances, like fire and insects, and to protect natural resources and values identified by the Deschutes Land Management Plan, the Northwest Forest Plan, Whychus Creek Watershed Action Plan (Upper Deschutes Watershed Council), Community Wildfire Protection Plans, and local efforts to assess multiple stakeholder values. The desired outcome is a forested landscape that can be managed within a natural range of variability. This is critical to a variety of ecological, social, and economic values including providing a diversity of habitats for flora and fauna; safeguarding surrounding communities by reducing the risk of high-severity fire within the wildland-urban interface; protecting water quality in two watersheds that provide municipal drinking water; preserving the scenic and environmental quality of extremely high use recreation areas; facilitating the re-introduction of anadromous fish in the Upper Deschutes Basin; protecting the future Skyline Community Forest; and providing restoration jobs and wood fiber for local economic benefit.

FLN Goals

The Upper Deschutes Basin FLN works collaboratively with diverse stakeholders on local forest and fire management issues to accelerate the restoration of fire-adapted systems. The network's goals are to:

- Develop a common vision for the landscape;
- Address technical gaps need for a scientifically defensible cross-ownership landscape assessment; and
- Develop communication tools necessary to keep both partners and external audiences informed on forest restoration activities.

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map © 2011 Liz Rank/TNC

Landscape Partners

American Forest Resource Council
 Central Oregon Fire Management Service
 Central Oregon Intergovernmental Council
 City of Bend
 City of Sisters
 Deschutes County
 Oregon Department of Fish and Wildlife
 Oregon Department of Forestry
 Oregon Wild
 Project Wildfire
 Sierra Club
 The Nature Conservancy—Oregon
 U.S. Fish & Wildlife Service
 Upper Deschutes River Natural Resource Coalition
 USDA Forest Service—Deschutes National Forest
 Warm Springs Confederated Tribes



to be thinned photo point legacy tree



thinned photo point legacy tree

Left: Ponderosa pine stands commonly have a high density of small diameter trees, as seen in this view of the Cosmo Unit on the Sisters Ranger District.
Right: The same view, after thinning and mowing, illustrates the goal of spatial heterogeneity attained through variable density thinning, which contributes to more historic and resilient conditions. Treatments also help reduce ladder fuels and drought stress on legacy trees. © Deschutes NF

For more information on all landscapes in the Northwest FLN, visit:
<http://nw.firelearningnetwork.org/>

Lakeview Stewardship Unit / Fremont-Winema National Forest

Northwest FLN
Oregon
3.6 million acres

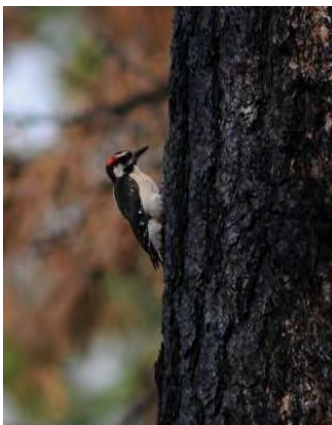
The Northwest Fire Learning Network expanded in 2007 to engage the Lakeview Stewardship Group, a 10-year-old collaborative that has been working to develop a healthy, diverse and resilient forest ecosystem that can accommodate human and natural disturbances in the Lakeview Stewardship Unit. This group found that the FLN process provides the action mapping tools as well as integrated modeling efforts that help the group test collaborative management goals through time. The Stewardship Unit is about 500,000 acres. Analysis at this scale provides a model that, when expanded to the Upper Klamath Basin watershed, will protect communities and restore forests and wildlife habitats over three million acres.

The Klamath Basin is over 70 percent forested. Lying within the rain shadow created by the Cascades, the forests are characterized by drought-tolerant tree species such as juniper and ponderosa pine, with abundant stands of white fir and lodgepole pine at high elevations. These transition to lower-elevation juniper and sagebrush with some juniper grasslands. Stream valleys and the broad, sediment-filled basins generally have extensive marshes. This vast system hosts threatened fish and newly-discovered aquatic species, and is a vital nesting spot and migratory stop-over for thousands of waterfowl and other bird species. As in other forests on the Cascades' east side, years of fire exclusion has shifted the forest. There are smaller diameter trees, less space between the stems, and an increased proportion of lodgepole pine and white fir with fewer aspens and reduced biodiversity. Such stands are more susceptible



Prescribed burn on the Lakeview Stewardship Unit © Craig Bienz/TNC

to drought stress and associated outbreaks of insects and disease, which increases the risk of large-scale wildfires. Working together, stakeholders have developed the first 10-year stewardship contract on Forest Service land in Oregon, and on planning that will ensure the long-term health of the forests and watersheds and the human communities in the region.



Hairy woodpeckers nested in the area the first season after a controlled burn was conducted.

© Craig Bienz/TNC

Landscape Goal

The partnership envisions a sustainable forest ecosystem that, through a new understanding of the interrelationships between the people and the land, will ensure the quality of life for present and future generations.

Partners and local communities will work together to accelerate the restoration of fire-adapted ecosystems to sustain and restore the land's capacity to absorb, store, and distribute quality water, while protecting communities from wildfire.

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map © 2012 Liz Rank/TNC

Landscape Partners

Concerned Friends of the Fremont-Winema
 Defenders of Wildlife
 Klamath Tribes
 Lake County Chamber of Commerce
 Lake County Resource Initiative
 Lakeview High School
 Oregon Department of Economic and
 Community Development
 Oregon Wild
 Sustainable Northwest
 The Collins Companies
 The Nature Conservancy—Oregon
 The Wilderness Society
 USDA Forest Service—Fremont-Winema
 National Forest



Restored ponderosa pine forest

© Craig Bienz/TNC

In 2011, partners in this landscape:

- Submitted a Collaborative Forest Landscape Restoration Project proposal, which was awarded \$3.5 million in 2012. Over the next 10 years, work on the Lakeview Stewardship Project is projected to create 88 jobs and provide forest restoration through 53,773 acres of commercial thinning treatment, 77,423 acres of fuels reduction (with potential biomass removal), and 128,570 acres of prescribed fire.
- Conducted a Dry Forest Restoration Principles and Prescriptions workshop.
- Developed a Master Stewardship Agreement for the Fremont-Winema National Forest. Two Supplemental Project Agreements are being developed under the agreement to provide forest restoration on over 25,000 acres.
- Developed a video—"The Art of Burning"—for use as a teaching tool about the importance of fire and the altered forest conditions that are a result of fire suppression. The video highlights the value of collaboration, the risks with wildfire and the benefits of prescribed fire.

California Klamath-Siskiyou Fire Learning Network

3.0 million acres

The Klamath-Siskiyou region of northwestern California is a globally significant hotspot of biological diversity. It contains the greatest variety of coniferous tree species in the world, provides habitat for several critical runs of anadromous Pacific salmon species and is home to myriad other rare and important species. Tucked amidst the rugged mountain ranges of the Marbles, Salmons, Scotts and Trinity Alps are small rural communities struggling to thrive as stewards of this complex system. Fire exclusion and resource extraction have significantly altered historical fire regimes and forest ecosystem structure. Uncharacteristic wildfire now threatens ecological values and human communities alike.

In an effort to connect managers, researchers, practitioners and communities around ecosystem restoration, the California Klamath-Siskiyou Fire Learning Network (CKS FLN) was organized in 2009. Since then, over 300 individuals have participated in events, dialogues and workshops to share science, values and experience, building a cooperative network of people living and working in the Klamath-Siskiyou. The CKS FLN has since launched the Northern California Prescribed Fire Council; hosted a listserv for sharing locally relevant research, learning and opportunities; and worked with partners to continue engaging in regional and local planning efforts and partnerships that are leading to landscape-scale adaptive restoration for the Klamath-Siskiyou.

In 2011 the network co-sponsored the Klamath Fire Ecology Symposium, sponsored two meetings of the Northern California Prescribed Fire Council, supported the completion of an educational video on prescribed fire and continued working to engage new partners to sustain and strengthen collaborative planning processes throughout the region.



Looking east from Hayfork Bally, this part of the southwestern Klamath Mountains encompassing Grass Valley Creek and the South Fork Trinity River watersheds, contains some of the gentlest slopes in the entire CKS landscape. © Caleb Dean/WRTC

Network Vision

The California Klamath-Siskiyou region is rich in diverse ecological and human communities. These communities, and their associated values, are threatened by past and present land use practices and by the impending impacts of climate change.

We intend to use the CKS FLN as a venue for improving landscape-scale planning and implementation, scaling up strategies to protect and restore the valuable ecology and communities of the region through collaborative, region-wide, ecologically and socially appropriate ecosystem restoration and sustainable stewardship of natural resources.

Trinity Mountains (including Hayfork Basin)

Western Klamath Mountains



map © 2011 Liz Rank/TNC

Network Partners

Bureau of Land Management
 –Redding Field Office
 CAL FIRE
 Firestorm WFS Inc.
 Humboldt State University
 Karuk Tribe
 Mid Klamath Watershed
 Council
 Northern California
 Prescribed Fire Council
 Orleans /Somes Bar Fire
 Safe Council
 Trinity County Resource
 Conservation District
 USDA Forest Service–Pacific
 Southwest Research
 Station
 USDA Forest Service–
 Klamath, Shasta-Trinity and
 Six Rivers National Forests
 USDA Natural Resource
 Conservation Service
 Watershed Research and
 Training Center

The Northern California Prescribed Fire Council

From the beginning, leaders in the California Klamath-Siskiyou FLN recognized that increasing the scale and sophistication of prescribed fire and effective wildfire management would require processes for sharing ideas and innovations, overcoming policy and social barriers and increasing investment in training and workforce development. With leadership from Dr. Morgan Varner (Humboldt State University) and Will Harling (Mid Klamath Watershed Council and Orleans/Somes Bar Fire Safe Council), The Watershed Research and Training Center was able to bring funding together with support from the Fire Learning Network to launch the Northern California Prescribed Fire Council; the Council was one of the first created in the West.

In 2011, the Council launched its website, held its fifth and sixth semi-annual meetings, developed a work and development plan and committed to hosting its first local prescribed fire training exchange. Participation in the Council has continued to grow, and it has inspired the first stirrings of a council forming in the southern part of the state. It is clear to partners that prescribed fire is going to be a growing part of this landscape’s restoration future.

More information: www.thewatershedcenter.com
 Follow links to the California Klamath-Siskiyou FLN
 and the Northern California Prescribed Fire Council

Top: The headwaters of Cold Camp Creek represent only a small fraction of over 200,000 acres of fire that burned across the Trinity Mountains landscape in 2008, seen here in 2009.
Bottom: Partners from the Hayfork Basin Demonstration Landscape participants in a field tour to discuss strategies that integrate community wildfire protection and forest restoration.

© Nick Goulette/WRTC; Josh Smith/WRTC



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Trinity Mountains

California Klamath-Siskiyou FLN

California

1.9 million acres

The Trinity Mountains dominate the southern extent of the California Klamath-Siskiyou ecoregion. Like the rest of the region, forests and watersheds in the Trinity Landscape are at risk from the effects of uncharacteristic wildfire. With nearly a million acres burned over the last two decades—including over 200,000 acres in 2008 alone—residents and fire managers are becoming accustomed to the costs and benefits of large-scale wildfire events. Most agree that achieving a balance of ecological and social benefits from the region's ecosystems will require a significant measure of active management through forest thinning and prescribed fire to ensure that landscape's resilience is enhanced and maintained.

Federal agencies, which manage nearly 80 percent of the landscape, are working with state agencies, non-profit partners, conservation organizations, industry and local communities to forge broadly-supported strategies for advancing landscape scale restoration. Partners from the Trinity Mountains landscape are working together to advance active restoration through new collaborations and partnerships.

In 2011, the Trinity Stewardship Group formed as a collaboration of local stakeholders committed to forging common ground and advancing adaptive management of local forest resources through community wildfire protection, forest restoration and sustainable forestry projects. The group is working with local Forest Service staff on building broadly supported projects and will be helping to host a series of science lectures in 2012 to help elevate the collective awareness of local citizens, stakeholders and managers of the best available science that should help guide management planning and actions.

Also new in 2011, landscape partners came together under the auspices of the Trinity Integrated Fire Management Partnership. With support from Scaling-up to Promote Ecosystem Resiliency, an initiative of the

Landscape Goals

Partners work to develop science-based, broadly supported plans and strategies that will advance landscape-scale restoration, and implement projects at meaningful scales that will enhance the resilience of the region's forests, wildlife and communities.



Ranchland owners in the Hayfork Valley are working with The Watershed Center, The Nature Conservancy, and local and federal land and fire management agencies to begin implementing cross-boundary prescribed burning projects for ecological restoration and other resource and community benefits.
© Nick Goulette/WRTC

Forest Service and The Nature Conservancy, local fire managers are coordinating with state and federal fire managers and local landowners throughout the Trinity landscape to implement cooperative prescribed burning. Joint activities will include multi-property burn planning to improve alignment and efficiency; shared training to build qualifications, relationships and capacity; and implementation of cooperative burning on thousands of acres over the next two years. With this, the vision of the Trinity Mountains landscape partners will begin to be realized on the ground.



Partners from Trinity County participated in an integrated watershed management planning process for Hayfork's Municipal watersheds that is now yielding coordinated landscape restoration projects including forest thinning, oak woodland restoration, watershed restoration and prescribed burning on both public and private lands.
© Nick Goulette/WRTC

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The forest surrounding Ewing Reservoir, which serves the community of Hayfork, will be treated with prescribed fire in 2012. By removing excess fuels, the watershed will have a reduced risk of severe wildfire that would leave the soil bare and subject to erosion. © WRTC

Over the 2011 field season, private lands in the Hayfork Basin were treated in an effort to set the stage for the landscape-scale prescribed fire initiative which will begin in the spring of 2012. Preparations for this initiative have spanned the past 10 years and include participation in the Community Wildfire Protection Plan process, interviewing private landowners regarding attitudes toward prescribed fire, implementation of defensible space treatments and fuel management zones on public and private lands, and, most recently, conducting training and workforce development to prepare local citizens to lead prescribed burns in the Hayfork Basin.

Bringing fire back to the people by integrating this management practice into the local culture will yield social, economic and ecological benefits. Empowering local people with this stewardship tool holds promise as a low-cost and effective management prescription, and also as an agent of positive community engagement and participation.

The initiative's first planned burn—scheduled for implementation in 2012—spans ownership boundaries and includes oak woodland restoration, community water supply protection, rangeland improvement and invasive species control measures.

FLN History

The Hayfork Basin landscape joined the U.S. Fire Learning Network in 2006 as an independent demonstration landscape. It became the anchor site for the regional Klamath-Siskiyou FLN, which was created in 2008. In 2011, the Hayfork Basin and surrounding Trinity Mountains landscape merged, to better work at landscape scale. Activities are coordinated by the Watershed Research and Training Center, a community-based group founded in 1993 and based in Hayfork, California.

Landscape Partners

- Bureau of Land Management
 - Redding Field Office
- CAL FIRE
- Hayfork Volunteer Fire Department
- Post Mountain Volunteer Fire Department
- The Nature Conservancy
- Trinity County Fire Safe Council
- Trinity County Resource Conservation District
- USDA Forest Service—Pacific Southwest Research Station, Shasta-Trinity National Forest, Six Rivers National Forest
- USDA Natural Resources Conservation Service
- Watershed Research and Training Center
- Weaverville Volunteer Fire Department

Western Klamath Mountains

California Klamath-Siskiyou FLN

California

1.1 million acres

The Western Klamath Mountains landscape joined the Fire Learning Network in the summer of 2009. The majority of this landscape falls within the Klamath and Six Rivers National Forests and the ancestral territory of the Karuk Tribe. Only five percent of this landscape is privately owned, but fire management strategies focus primarily on protection of private lands. As part of the FLN, partners are working together to create a landscape-level fire and fuels management strategy that meets the needs of its numerous stakeholders.

The landscape has one of the most complex fire environments in the U.S., with a complicated assemblage of slope, aspect, soil and vegetation types spread across elevations ranging from 500 to 9,000 feet. Characterized by warm, dry summers and cool, wet winters, lightning-caused and anthropogenic fires are important ecological processes in the Klamath Mountains. A century of fire suppression has caused much of the landscape's fire return intervals to lengthen past their normal range, leaving forests susceptible to the uncharacteristically intense fires that have become an annual experience in recent years.

The strategic reintroduction of fire at the landscape level is necessary to preserve and enhance the cultural and natural resources of the region, from forests that contain the highest diversity of conifers in the world to streams that support threatened populations of wild spring Chinook and coho salmon.



Smoke from the 2008 wildfires rises from behind Offield Mountain. The Klamath River (foreground) provides one of the only dependable fuelbreaks in this rugged landscape. © Will Harling/MKWC

“Support from the FLN has allowed stakeholders to move much closer to a common vision for landscape-level fire management in the Western Klamath Mountains. Focused planning efforts have created opportunities for collaborative fuels reduction and prescribed fire projects designed to enhance existing and potential strategic fuelbreaks bridging multiple land ownerships.”

*Will Harling, Executive Director
Mid Klamath Watershed Council*



The 2008 Ukonom Complex fires burn through a snag patch created by the large wildfires of 1987. Research has shown that fires that occur within 10 years of a previous fire can have beneficial effects on forests and forest soils, while longer fire return intervals result in fires that burn at higher intensities. © Wind Beaver/MKWC

Landscape Vision

The partnership is working to reinstate historical fire regimes in a way that protects life and property, improves forest health and enhances resources valued by all stakeholders. The partnership will create a plan that will protect communities from severe wildfires and will guide the planning and implementation of restoration, management and research projects that will ultimately allow for the reintroduction of low to moderate intensity fire across much more of the landscape.

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Recent Accomplishments

In 2011, partners from this landscape:

- Coordinated and hosted the 2011 Klamath Fire Ecology Symposium; presentations from this are posted on the Mid Klamath Watershed Council web-site at www.mkwc.org.
- Participated in the Northern California Prescribed Fire Council, including work on the steering committee.
- Participated in the Forest Service Region 5 Fuels Management strategic planning effort.
- Coordinated seven prescribed burns (75 acres) on key parcels of private property.
- Continued to work on a video highlighting issues and opportunities in prescribed fire in northwest California; this video highlights Jim Agee (fire ecologist, author, professor emeritus at University of Washington), Mike Beasley (Six Rivers NF Deputy FMO), Kathy McCovey (Karuk Tribe basketweaver), Tim Ingalsbee (Firefighters United For Safety, Ethics and Ecology) and others.
- Were invited by the Forest Service to participate in Wildfire Decision Support System (WFDSS) training and coordination meetings. The FLN provided key data for improved pre-fire planning, and is expected to be involved during wildfire events, enabling better communication and decision-making; the Western Klamath Mountains FLN is one of the first to be engaged in this collaborative use of wildfire planning tools.

Landscape Partners

Firestorm Wildland Fire Suppression, Inc.

Karuk Tribe

Mid Klamath Watershed Council

Orleans / Somes Bar Fire Safe Council

USDA Forest Service—Klamath and Six Rivers National Forests



Left: Klamath Fire Ecology Symposium participants discuss strategies for managing dense fir stands that have resulted from fire exclusion.



Right: In the spring of 2011, the Mid Klamath Watershed Council, Orleans Somes Bar Fire Safe Council and Firestorm WFS, Inc, implemented a prescribed burn on private property to maintain the effectiveness of a large fuelbreak protecting a group of midslope homes in the Ishi Pishi neighborhood.

© Will Harling/MKWC

Great Plains Fire Learning Network

5.3 million acres

The Great Plains Fire Learning Network (GP FLN) spans the central U.S. from South Dakota to the Gulf Coast of Texas. The Loess Hills (Iowa), Lower Loup Rivers (Nebraska) and Refugio-Goliad Prairie (Texas) are the focal landscapes in the network. These sites provide leadership, share lessons learned from successes and failures, and maintain a link to the national Fire Learning Network for a number of less formally engaged landscapes—Prairie Coteau (South Dakota), Niobrara-Sandhills and Central Platte (Nebraska), Lower Cedar (Iowa), Southern Iowa, Flint Hills (Kansas) and Milnesands (New Mexico)—that are working to advance the use of fire in prairies and other grasslands.

Together, Great Plains landscapes share and network to develop collaborative strategies primarily focused on engaging private landowners and local fire practitioners.



Broken Kettle preserve in the northern Loess Hills © Susanne Hickey/TNC



Participants from the Pottawattamie County Conservation Board and Spanish Forest Service confer on the Top of the World Burn in the Loess Hills, April 2011. Great Plains FLN landscapes have hosted numerous prescribed fire training exchanges over the last four years. These events treat significant acreage, build local capacity, and encourage the exchange of knowledge among far-flung partners. © Kyle Lapham/TNC

Network Vision

The Great Plains FLN brings together landscapes and partners to develop strategies to integrate private lands into landscape-scale fire management activities that serve ecological restoration objectives

Loess Hills
Lower Loup Rivers
Refugio-Goliad Prairie

Central Platte
Flint Hills
Lower Cedar
Middle Niobrara-Sandhills

Milnesands
Prairie Coteau
Southern Iowa

Prescribed Fire Training Exchanges

Over the last several years, landscapes in the Great Plains FLN have worked with national FLN staff to develop a program of prescribed fire training exchanges that are designed to simultaneously fill several needs. The exchanges that have been developed are designed to create opportunities for agency prescribed fire practitioners to work on their professional credentials, completing assignments in position task books and receiving evaluations from qualified trainers. In addition, private land managers participate in the exchanges to build their capacity to use prescribed fire—and contribute local knowledge to the events and to the larger fire community. The host units get a capacity boost, with a large temporary crew of qualified workers to help with large or complex burn events.

The experience goes far beyond working on position task books or “blackening acres,” however. For example, hosts typically schedule activities to demonstrate the role of fire in conservation and local fire management practices, highlight local fuel types and fire ecology, and allow fire practitioners to work with stakeholders and natural resource managers. This integration of various aspects of fire helps practitioners prepare for the multitude of challenges that an increasingly complex fire environment presents. Each exchange also has its own focus, a function of host landscape needs and the composition of the participating crew. For example, in 2011, the Texas exchange, hosted by the Refugio-Goliad Prairie landscape, allowed burn bosses from the U.S. Fish & Wildlife Service and Conservancy to develop regional teams; in the Loess Canyons (near Gothenburg, Nebraska), the exchange was designed to promote the use of local burn associations; at the Niobrara, Nebraska exchange, students from the University of Idaho’s College of Natural Resources gained practical experience alongside working professionals; and in the Flint Hills (Kansas), the exchange integrated state forestry, Conservancy, National Park Service and U.S. Fish and Wildlife Service crews.

All told, in 49 days of work together, 120 participants accomplished all these objectives—along with the treatment of 14,785 acres of land in need of fire.

“... The burned units will be beautiful later this spring, and ideal for providing some tours for folks in the area who are not familiar with the benefits of prescribed burning, and likely hesitant to venture into this management practice on their own lands. The potential education and demonstration values are tremendous ...”

—host unit landowner



USDA Forest Service, state and private practitioners conduct a site inspection and briefing for a burn that took place on private land in the Lower Loup landscape the next day. © Mike Peterson/USFS

Network Partners

Lower Loup Natural
Resources District
Prescribed Burn Task Force
The Nature Conservancy—
Iowa, Texas



In 2011, the Great Plains FLN hosted prescribed fire training exchanges near (top to bottom) Callaway (NE) and Niobrara (NE) and in the Flint Hills (KS).

© Mike Peterson/USFS; Jim Wills/Firestorm; Dennis Caril/USFS

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Loess Hills

Great Plains FLN

Iowa

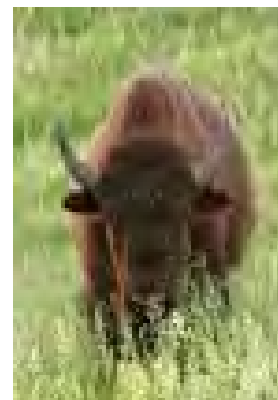
649,000 acres

The Loess Hills of western Iowa are of primary importance to local, state and regional conservationists because of the relatively intact prairie and oak woodland habitat, providing habitat to numerous declining and rare species. The area provides habitat for over 49 grassland species of special concern including the regal fritillary butterfly, birds such as the bobolink and dickcissel, reptiles like the ornate box turtle and Great Plains skink, and Iowa's only known population of prairie rattlesnakes. Historically the area was periodically swept by fires and grazed by bison and elk; together, these disturbances kept Iowa's prairies healthy. Today, the natural role of fire has been significantly altered, resulting in accelerated woody encroachment into grasslands and a decline in the regeneration of oak woodland. This alteration, coupled with increased residential development and other incompatible land use, threatens to harm the area's fragile natural areas.

The Loess Hills Alliance, in which this FLN is an active partner, is a coalition of individuals and stakeholders from the seven-county Loess Hills region of western Iowa that provides leadership and a forum for developing and implementing strategies to restore and protect the natural areas of the hills. Similar to the other landscapes in the Great Plains, the Loess Hills are predominantly privately owned (and primarily agricultural), so restoration must involve numerous landowners across large areas. Acceptance of prescribed fire and grassland restoration varies across the landscape, but can be accelerated by creating jobs in rural communities. Tree shearers, fire crew professionals and native seed producers can enable compatible economic uses, such as livestock grazing and native seed production. Through collaboration, partners will find compatible activities that meet the ecological and economic needs of both natural areas and landowners.



June burn on the Conservancy's Broken Kettle Grasslands Preserve, in the northern Loess Hills © Kyle Lapham/TNC



The diverse fauna and flora of the Loess Hills region includes (clockwise) the bison, regal fritillary butterfly, downy paintbrush and painted turtle.

© Chris Helzer/TNC



Landscape Vision

The partnership will restore and maintain viable ecological communities, provide protection from unwanted wildland fire and improve productivity and value of the land through implementation of a regional fire management plan.

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Students in the basic wildland fire training (\$130/ 190) offered by the Loess Hills Alliance prepare for a day of field exercises. Completion of this course allows the students to participate in prescribed fire training exchanges that meet NWCG standards. © Kyle Lapham/TNC

Landscape Partners

Iowa Department of Natural Resources—
Forestry, Loess Hills State Forest, Wildlife
Loess Hills Alliance
Loess Hills Alliance Stewardship Committee
Pottawattamie County Conservation Board
The Nature Conservancy—Iowa
U.S. Fish & Wildlife Service



In a large cooperative effort, partners completed two burns at the Little Sioux Scout Ranch in October 2011, restoring an area badly damaged by a 2008 tornado. The first burn (640 acres) involved 50 personnel and the second (173 acres), 28 personnel. DNR-Wildlife led the burns, with crews and equipment provided by five County Conservation Boards, the Boy Scouts, the Mondamin VFD, five branches of the Iowa DNR (Wildlife, Forestry, Law Enforcement, Fisheries, Parks), The Nature Conservancy and private landowners. © Kyle Lapham/TNC; Susanne Hickey/TNC



With a new fire coordinator position in the Loess Hills, the partnership has renewed its outreach efforts to landowners as well as volunteer fire departments to build local capacity for putting fire on the ground. Efforts are currently focused on this kind of capacity building, rather than on the operation of a mobile fire crew, in part for financial reasons, but also as a means to reestablish fire use in the culture of landowners in the area, a core strategy in the region. The highly-divided landscape also challenges the partnership to the develop cross-property solutions, and this strategy contributes to that as well.

As with other landscapes in the Great Plains FLN, the Loess Hills landscape emphasizes capacity-building through training experiences and hands-on fire opportunities. Building on the successes of prescribed fire training exchanges in Nebraska and on the Refugio-Goliad Prairie in Texas, the Loess Hills plans to host a national training exchange in spring 2012. The Loess Hills provides a unique opportunity to develop multi-owner burn units and to incorporate private lands with state, county and Conservancy-owned lands. The Loess Hills partnership is also modifying the national exchange model by establishing “local-training burns” using a day-crew hire model and linking new fire practitioners to planned burns during 2011. The partnership’s Fire Coordinator is able to organize and manage new practitioners who work on burns planned by the Conservancy, County Conservation Boards and the Department of Natural Resources; this provides a relatively inexpensive and logistically simpler opportunity to host “mini-trainings” while also meeting individual partner burn objectives.

On a larger scale, working with the Refugio-Goliad Prairie and the Lower Loup Rivers teams, the Loess Hills continues to provide leadership to the Great Plains regional FLN, making connections across the region, sharing lessons learned and seizing opportunities to build a stronger network of fire and restoration practitioners within the region.

Lower Loup Rivers

The Lower Loup Natural Resources District project area comprises all or parts of 16 counties and covers 7,923 square miles in central Nebraska, including the Central Loess Hills and parts of the southern Sandhills region. About half of the district is tilled agricultural land; the remaining 2.5 million acres are native grasslands, which are severely threatened by eastern redcedar encroachment. Numerous landowner cooperatives have formed to manage this threat, and their numbers are increasing in the region. Lessons learned from their efforts are shared with other landscapes in the Great Plains FLN that face similar issues.

Recent Accomplishments

This project conducts ongoing outreach to volunteer fire departments, landowner training and burn plan development to develop further capacity in the landscape. The Prescribed Burn Task Force is extending its reach, and is now offering training in area beyond the founding four counties.

In 2011, a major accomplishment in this landscape was the formation of the Custer County Prescribed Burn Association, which was spearheaded by Ben Wheeler and



Regrowth on the 2011 Ernest Bruha fire, Custer County, Nebraska
© John Ortmann/Lower Loup NRD

Landscape Vision

Partners wish to maintain the biologically unique Central Loess Hills Prairie as prairie, both by reversing brush encroachment and by improving and restoring diverse native plant communities. To this end, the primary strategy is to empower the area's private landowners and managers to take control of fire in their own hands, safely, economically, and effectively, to preserve their economic well-being and the region's ecological integrity.

Great Plains FLN

Nebraska

5.1 million acres



The North Loup River seen from Happy Jack Peak, part of the planned spring 2012 Prescribed Fire Training Exchange

© John Ortmann/Lower Loup NRD

Pheasants Forever; this Association, which also includes Valley County, encompasses an area of over two million acres.

Planning has also been completed for a spring 2012 prescribed fire training exchange on 5,200 acres, and has begun for another two training complexes scheduled for spring 2013. These training events enable significant acreage to be treated with fire in a short period of time--while providing a long-term boost in prescribed fire capacity by providing training for local and national practitioners from federal and state agencies, private practitioners and university students.

"I burned to control eastern redcedar trees, but I was amazed at the grass response. The pastures were stocked with yearlings, which gained 3.2 pounds per day, and I got a performance bonus from the livestock owner. I'm going to start burning for livestock performance."

*Ernest Bruha,
rancher*

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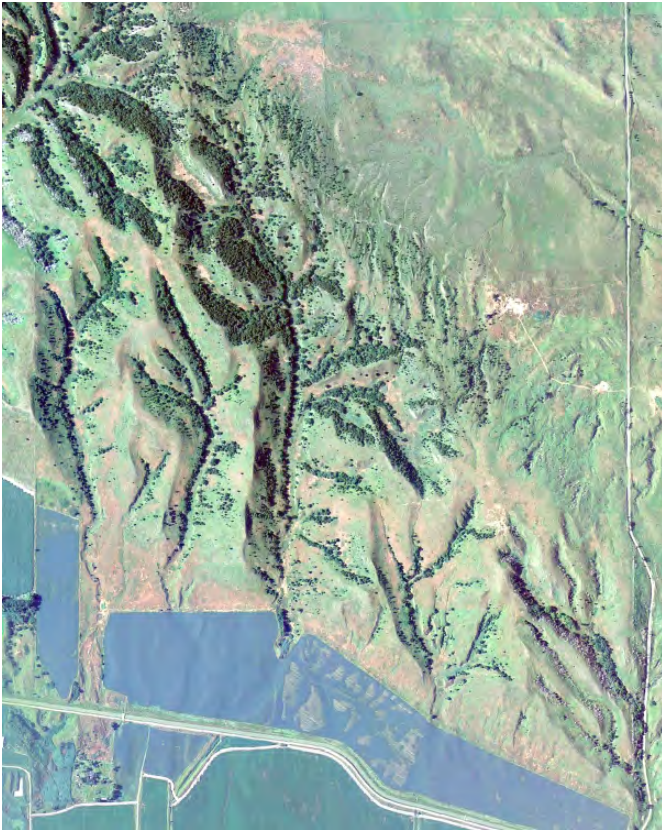
© John Ortmann/Lower Loup NRD

Landscape Partners

Lower Loup Natural Resources District
 Nebraska Game and Parks Commission
 Pheasants Forever
 Prescribed burn associations
 Prescribed Burn Task Force
 Private landowners
 USDA Natural Resources Conservation Service
 Volunteer fire departments

In the central Loess Hills, terrain can be a problem—or it can be an opportunity for getting to scale. Deep loess soils have the properties of being highly erosive, and being able to hold a high angle of repose. This results in extremely rugged terrain, which makes the traditional approach of burning single pastures difficult and risky. However, using a “landscape-scale” method—burning large units configured so that boundaries are placed on good existing firebreaks—converts the terrain from an enemy to a friend of prescribed burning. Not only are units safer to burn, but greater fire intensity can be used, which is more effective on eastern redcedar. By increasing unit size, fire is more economical, and the landscape is treated at an effective scale.

Local landowners have developed methods and prescriptions to safely maximize eastern redcedar kill. Informal landowner groups pool time, labor and equipment to crew large, hot fires, acting as their own contingency force. Increasingly, formal prescribed burn associations are joining the fire scene because they offer the same benefits, plus learning opportunities and an incentive to reach out to previously unengaged landowners. The FLN is working to support this revived fire culture for the benefits it brings to plains communities, both human and natural.



Views before (*left*, 2003) and after (*right*, 2010) cooperative burning that allowed effective removal of invasive redcedar

© FSA

Refugio-Goliad Prairie

Great Plains FLN

Texas

664,000 acres

Refugio-Goliad Prairie (RGP) is a privately-owned landscape that contains one of the largest and highest-quality expanses of coastal tallgrass prairie remaining in Texas; such prairie once spanned 800 miles from Louisiana to Tamaulipas, Mexico covering 24 million acres. This landscape was historically a fire-dependent ecosystem. However fire was largely removed for a century or more and this disruption of the historical fire regime has allowed woody plant encroachment on the prairie. Habitat for many grassland-dependent wildlife species such as Attwater's prairie chicken is greatly reduced by this woody plant invasion. Private landowners also incur economic losses through a decrease in available livestock forage and lost opportunities for fee hunting of some wildlife species dependent on grasslands.

In 2003, the Conservancy staffed and equipped a prescribed fire module to assist landowners in implementing prescribed fire. The fire module has assisted more than 33 cooperating landowners (who together manage 289,208 acres) by applying prescribed fire on 71,631 acres in 181 burn days within the Refugio-Goliad Conservation Area. In addition, prescribed fire burn plans that meet National Wildfire Coordinating Group (NWCG) standards have been written for 191,051 acres, and can be implemented when conditions allow. Because the Conservancy adheres to NWCG standards, the module is able to partner with the nearby Aransas National Wildlife Refuge Complex where the focal species is the last wild migrating population of whooping cranes. With careful management, the population of this imperiled species has consistently grown by 4% per year; in 2011 a record 300 cranes are wintering on the refuge. The Conservancy's fire module has assisted Aransas on 76 burns totaling 56,757 acres to maintain habitat for the cranes.

During restoration, units need to be burned multiple times, and once restored they must be burned on a four-year rotation to maintain the grassland. The acreage needing prescribed fire on RGP for restoration and maintenance of grasslands is beyond the capacity the Conservancy's prescribed fire module, or that of any other single entity in the area. Consequently, this FLN is working on methods to prioritize prescribed burn efforts and strategies to further engage partners such as volunteer fire departments, Texas Parks and Wildlife Department, Coastal Bend Prescribed Burn Association, Texas Forest Service and the US Fish & Wildlife Service in order to bring treatments to the needed scale. The Refugio-Goliad continues to be a leader in training fire professionals around the country from federal, state, municipal and private organizations to increase qualifications levels and incorporate ecological goals into prescribed fire application.

Landscape Vision

The Refugio-Goliad Prairie will be an ecologically functional coastal tallgrass prairie network, capable of supporting its historic richness and diversity of plants and wildlife, as well as local agricultural enterprises.



Top to bottom: A squad boss trainee from South Metro (CO) Fire and Rescue directs ignition at an August 2010 training event; a squad boss trainee from the Conservancy's Washington chapter on a prairie restoration burn with chemically treated dead brush at a February 2011 training exchange; a 1,300 acre burn on the Aransas NWR under a burn boss trainee from the South Nevada BLM was also part of the February training; a barn owl hunts along the leading edge of an October 2011 NWR fire conducted to improve whooping crane habitat

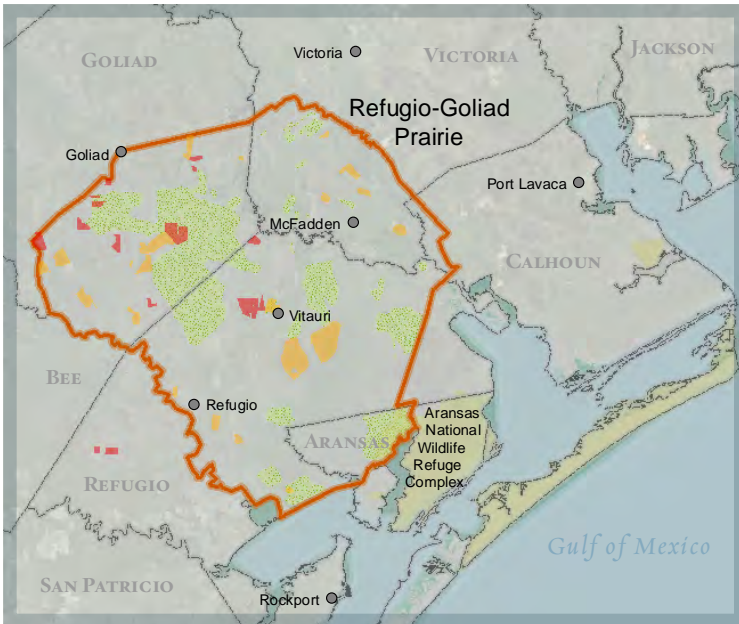
Photos: training events © Dave Reid/South Metro Fire and Rescue; owl © Jeff Adams/US FWS

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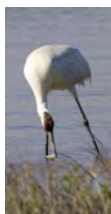
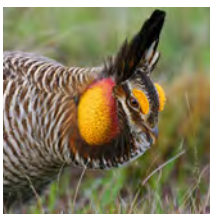


A March 2008 aerial survey documented 119,000 acres of prairie in good condition (light green stippled areas). The survey also showed 23,000 acres of burning on private lands in the landscape (orange), in addition to known burns conducted by Conservancy crews (red).

Such aerial surveys are expensive and must be conducted in a fairly narrow time window to be accurate. In 2011 the FLN used the 2008 data to test the use of satellite data sets for this kind of monitoring. Using archived satellite datasets, they were able to demonstrate a 20-fold increase in the number of fire events in the landscape over the past ten years. This dramatic increase is likely due in large part to the FLN's education and outreach efforts, which are renewing a fire management culture among private landowners. *map © 2011 Liz Rank/TNC*

The Coastal Prairie Conservation Initiative, a partnership among private landowners, the Grazing Lands Conservation Initiative, the U.S. Fish and Wildlife Service, the Texas Parks and Wildlife Department, the Natural Resources Conservation Service and The Nature Conservancy was formed to restore coastal prairie habitat.

Until the early 1990s, the area supported one of the last known wild populations of Attwater's prairie chicken, federally listed in 1967 and one of the most endangered bird species in North America. The birds are currently being reintroduced at a US FWS refuge, a Conservancy preserve in Texas and two private ranches on RGP. Due to its expanse and limited habitat fragmentation, RGP is considered the best location to establish a sustainable population of this species. Prairie chicken reintroductions on RGP began in 2007, and these efforts continue on two private ranches in the heart of the largest remnant of intact prairie. Continuing to increase the geographic scope and frequency of habitat enhancement through prescribed fire is needed on RGP to support a viable population of prairie chickens over the long-term.



Left: An Attwater's prairie chicken male displaying © Lynn McBride/TNC

Right: The US FWS Aransas Wildlife Refuge Complex, which overlaps the RGP, was created to protect winter habitat for the only naturally migrating population of whooping cranes. © Steve Hillebrand/US FWS

Landscape Partners

- Bureau of Land Management—National Interagency Fire Center
- Coastal Bend Prescribed Burn Association
- De-Go-La Resource Conservation and Development Inc.
- Grazing Lands Conservation Initiative
- National Wild Turkey Federation—Coastal Bend Chapter
- South Metro Fire and Rescue
- Texas Forest Service—Victoria Region
- The Nature Conservancy—Texas
- USDA Natural Resources Conservation Service —Victoria, TX District
- U.S. Fish & Wildlife Service—Aransas National Wildlife Refuge Complex
- U. S. Fish & Wildlife Service—Partners for Fish & Wildlife and Coastal Programs (Coastal Prairies Conservation Initiative)
- West Metro Fire and Rescue

"Texas is experiencing a prolonged drought of historic proportions that has dramatically affected many people. Historically, conditions such as this promoted the fire that created and maintained the grasslands we work to protect—so we are working with a newly established state Burn Ban Working Group to provide information to government officials and the public and influence the ability to conduct prescribed fires under these conditions. Kansas is also experiencing drought conditions and has reached out to our fire module for guidance in conducting prescribed fires in these extreme drought conditions."

Ray Guse,
FLN landscape lead

More information:

The Conservation Action Plan for this landscape is available at www.nature.org/media/texas/refugio_goliad_prairie_cap.pdf

South Central Fire Learning Network

1.9 million acres

The South Central Fire Learning Network encompasses eighteen sites in four ecoregions (Ozarks, Ouachita Mountains, Upper West Gulf Coastal Plain, Interior Low Plateau) that span four states (Arkansas, Kentucky, Missouri, Oklahoma). Each site has ongoing fire restoration projects that are addressing the altered fire regime threat with working partnerships. Partners are working to continue the development of the current regional network of fire restoration projects and to institutionalize fire restoration programs within the SC FLN.

Projects in this network continue to focus on achieving tangible, long-term landscape-scale fire restoration progress. This includes transferring lessons learned in adaptive fire management, building technical and operational capacity, and institutionalizing the creation and development of the best available science throughout the process. These landscape-scale projects learn from the successes and failures of similar projects as they move forward with the restoration of altered fire regimes at a scale significant to the conservation of biodiversity. It is not intended that this network be limited to the sites or projects described here, but that the network idea be institutionalized, with projects, personnel and sites joining the network and the network adapting to the needs of the regional multi-partnership base and fire community through time.



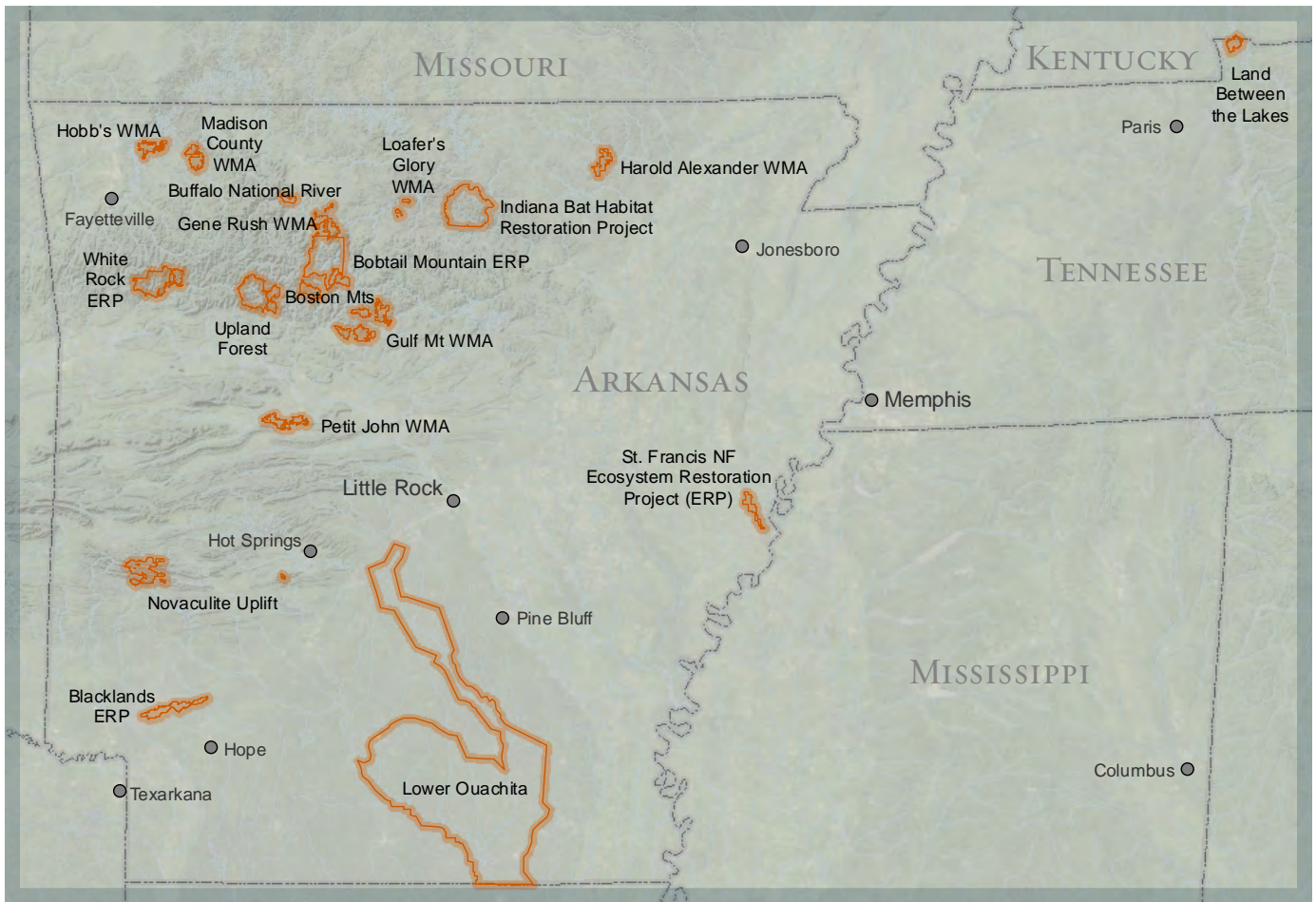
Regular fire is needed to maintain a healthy mix of forest and prairie and a diversity of species in the blackland prairie ecosystem

Network Vision

The South Central Fire Learning Network's vision is derived from ongoing partner conversations and the identification of a critical need throughout the region to restore fire-adapted ecosystems and enhance forest health. The Network will seek out, identify and engage key regional resource management partners. These partners will have reached a "critical mass" stage in their fire programs and have a strategic need for developing landscape-scale fire restoration and hazardous fuels reduction projects within the context of a core science-based, peer-supported learning group. In addition, the Network seeks to rapidly increase state and regional fire capacity by assisting with the development of institutionalized fire management programs.

Big Piney Woodland Ecosystem Project
Blacklands Ecosystem Restoration Project (ERP)
Bobtail Oak Woodlands Restoration Project
Buffalo National River ERP
Indiana Bat Habitat Restoration Project
Land Between the Lakes
Lower Ouachita
Novaculite Uplift (Caddo & Trap Mt. ERP)
St. Francis National Forest ERP
Upland Forest Restoration Projects

White Rock ERP
Arkansas State Wildlife Management Areas:
Gene Rush WMA
Gulf Mountain WMA
Harold Alexander WMA
Hobbs WMA
Loafer's Glory WMA
Madison County WMA
Petit John WMA



map © 2011 Liz Rank /TNC

Recent Accomplishments

The Arkansas state Wildlife Management Areas (WMAs) and partners in the Interior Highlands were recently awarded funding under the Scaling-up to Promote Ecosystem Resiliency initiative to implement woodland restoration across the WMAs. This will enable partners to complete commercial and non-commercial density-reduction treatments on more than 500 acres and conduct 4,500 acres of prescribed burns. The project also includes treatments for invasive species, and assessment of glade habitats for restoration.

A cooperative partnership for the 85,000-acre Indiana Bat Woodland Restoration Project was initiated, which will result in habitat improvements for the federally-listed Indiana bat.

Seven partner field trips were conducted in 2011, attended by over one hundred people from twelve organizations from across the many restoration areas in the network. These field trips engage partners and university staff and researchers in learning about and applying an adaptive management approach to ecosystem restoration.

Network Partners

- Arkansas Game and Fish Commission
- The Nature Conservancy—Arkansas
- USDA Forest Service—Daniel Boone, Ozark-St. Francis and Ouachita National Forests
- USDA Forest Service—Land Between the Lakes National Recreation Area



Left: During a workshop, partners tour a Bobtail Oaks site that had been burned the previous summer. © McRee Anderson/TNC
 Below: Woodlands sunflower, columbine, Gulf fritillary and giant swallowtail are found in the Ozark and Ouachita National Forests. © Rhea Rylee/USFS (sunflower); Berlin Heck/USFS (fritillary); Clark Reames/USFS



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Big Piney Woodland Ecosystem Project

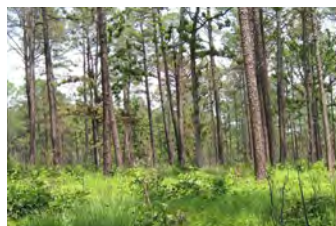
South Central FLN

Arkansas

60,000 acres

The Ozark and Ouachita Mountains—collectively known as the Interior Highlands—are cloaked in forests rich with wildlife, valuable timber, recreation opportunities and a high diversity of plants and animals. Unfortunately, the frequent, low-intensity fire regime under which the ecosystem evolved has been disrupted. About a century ago, these woodlands were heavily logged and the fire return interval was drastically reduced. This has led to a significant increase in fuel loads and tree densities, a shift in species composition and a decrease in forest health. Over 60 percent of National Forest lands in the Interior Highlands are experiencing die-offs of red oak; as a result, the composition and structure of an entire ecosystem is changing. Restoring fire to these forests is necessary to sustain the forests and the services they provide, as well as to protect people and communities.

In the past year, partners in this landscape have been collaborating to identify ways to reduce the cost of restoration activities by using non-commercial thinning. To accomplish this, they have worked with local loggers to develop a market for low-value wood. The first fruit of this labor was the development of a stewardship agreement to accomplish 103 acres of non-commercial thinning at a cost that is five percent below that of traditional contracting. This process has also significantly reduced the fuels left by thinning activity, which partners believe will reduce the time it takes to restore the areas. Partners also completed 762 acres of non-commercial thinning accomplished through more conventional methods and conducted 3,600 acres of prescribed burning in 2011. In addition, NEPA analyses



Pine-oak woodlands are becoming more common in the Interior Highlands as more controlled burns are implemented.

© McRee Anderson/TNC



Partners from Arkansas Natural Heritage Commission, USDA Forest Service and the Conservancy count herbaceous plants on one of over 120 macro plots scattered throughout the demonstration site. Monitoring has taken place each summer from 2003-2009. © McRee Anderson/TNC

have been completed for restoration activities that will begin to connect two of the six restoration areas in the Woodland Ecosystem Project.

In the next couple of years, partners have plans to burn 12,000 acres, and to continue to work with local loggers to expand the ability to trade some of the lower-value wood products to more efficiently accomplish non-commercial thinning. The third monitoring cycle for the 96 vegetation monitoring plots in the project area will also be completed.

Landscape Partners

Arkansas Forestry Commission
Arkansas Game & Fish Commission
Arkansas Natural Heritage Commission
National Wild Turkey Foundation
Private landowners
The Nature Conservancy—Arkansas
USDA Forest Service—Ozark-St. Francis
National Forest (Big Piney Ranger District)

Landscape Objectives

Collaborative work to restore the primarily-oak ecosystems in the Ozark-St. Francis National Forests began in 2001, with the Woodland Ecosystem Project (WEP). Since then, a diverse coalition of partners has completed forest restoration work on thousands of acres. The project is now moving toward monitoring forest health, making adjustments to the restoration work and sharing its findings to aid in the restoration of other landscapes.

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Blacklands Ecosystem Restoration Project

South Central FLN

Arkansas

22,000 acres

Blackland prairies and their associated woodlands occur primarily in northeast and east-central Texas, with smaller outcrops in southwest Arkansas, northwest Louisiana, Mississippi and Alabama. The region is characterized by gently rolling topography, with scattered blackland prairies and woodlands. These communities are found in discrete areas where blackland soils have formed from calcareous substrates. The state's blackland prairies and associated woodlands and bottomlands harbor more than 600 plant and 315 animal species, including many that are classified as rare.

All of the blackland plant communities depend on fire to maintain their species diversity and structure. As in many grasslands, fire in the blackland prairies has been suppressed in the past century. As a result, prairie openings have declined in size and quality due to encroaching woody vegetation. Restoration of fire is thus essential for maintaining these rich systems.

Partners are continuing to work to protect, preserve, and restore what remains of the state's blackland ecosystems. This involves moving additional lands into conservation ownership and actively managing conserved areas to maintain or increase native plant and animal diversity. Because fire is the most important ecological process maintaining the distribution, composition, and diversity of blackland prairie, woodland and forest communities, a primary goal is to restore a regular fire regime to these areas. The Landowner Incentive Program has been one of the key conservation strategies to ac-



A fireline is prepared as part of a late summer controlled burn to reduce woody encroachment onto the prairie. © McRee Anderson/TNC

complish fire restoration on private lands. The Nature Conservancy and other partners will continue to expand fire restoration on private lands throughout the area with over 1,500 acres per year enrolled in the program.

In the past year, partners in this landscape teamed up to conduct prescribed burns on over 2,400 acres of state land and 855 acres on private lands—a total of 3,265 acres treated with prescribed fire in the blacklands ecosystem. In addition, a cooperative landscape grant started in 2010 to work on privately-owned lands resulted in 2,121 acres of mechanical and prescribed fire treatments in its first year, thus starting the restoration of plant and animal diversity to these degraded blackland sites.



Painted bunting (left), Bachman's sparrow, Henslow's sparrow and Harlan's hawk are among the rare bird species found in this landscape © Judge Rock

Landscape Vision

The Blacklands Ecosystem Restoration Project partners will restore, maintain and conserve a functional ecosystem that encompasses a diverse landscape with the full mosaic of blackland communities and ecological processes, while providing educational, recreational and economic opportunities.

Landscape Partners

Arkansas Forestry Commission
Arkansas Game and Fish Commission
Arkansas Natural Heritage Commission
National Wild Turkey Federation
Quail Unlimited
The Nature Conservancy–Arkansas
U.S. Fish & Wildlife Service–Arkansas Field Office

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Bobtail Oak Woodlands Restoration Project

South Central FLN

Arkansas

86,000 acres

The Bobtail Oak Woodlands Restoration Project is located in the northeast portion of the Big Piney Ranger District of the Ozark National Forest and is a landscape typical of the Ozark Mountain region. The Fire Learning Network collaborative was formed in 2006 to develop a landscape-scale vision for the project, one that was not limited by project perimeters but that looks at how treatments today will influence the return of fire to the greater landscape. The project links restoration projects on adjacent federal and state lands to improve overall ecosystem health, and provides educational opportunities that will gain public support for restoration and improve the ability of the public to participate in project development.

The project team first focused on filling data gaps: developing the wall-to-wall vegetation and resource maps, forest condition maps and action maps prioritizing treatable areas. Information thus developed through the FLN can be integrated into Forest Service planning analyses, inform Community Wildfire Protection Plans and, along with agency and government efforts, help generate a collaborative vision for future land management.

In the past year, partners in this landscape have been successful in obtaining over \$265,000 for implementation of activities under the Bearcat Hollow Stewardship Agreement, which will be used to restore or enhance 2,928 acres. Activities under this agreement include invasive species control, forest opening maintenance,

Collaborative Objectives

- Address forest health issues;
- Control or reduce invasive species;
- Reduce hazardous fuels to prevent catastrophic fire;
- Connect restoration activities among Gene Rush WMA, Buffalo National River, Woodland Ecosystem Project and Gulf Mountain WMA;
- Improve habitat for threatened and endangered species and for other sensitive species identified by the regional forester;
- Improve water quality;
- Increase stream integrity and habitat diversity;
- Improve dispersed recreation opportunities and management of existing dispersed recreation; and
- Retain wilderness character and values.

Restoration treatments on a landscape scale provide habitat for wide-ranging species such as black bears.

© Dwayne Rambo/USFS



thinning and chemical treatments (foliar spraying to control stump sprouting in thinned areas).

Partners also treated 4,034 acres with prescribed fire and held a public work day. The public work day was designed to get local citizens directly involved with the project to give them some ownership, and allow them to see what was being accomplished on the ground. More than 80 people attended the event and participated in constructing two gates, removing old fence, and brush-hogging and over-seeding existing openings. Many of the people who attended expressed their appreciation and a wish to return next year—an early indication of the project's success.

Going forward, partners are completing NEPA analyses for the Bearcat Phase 2 project, which will connect the Buffalo National River, Gene Rush Wildlife Management Area, Bearcat Phase 1 and the Middle Fork Ecosystem Restoration area. In order to implement this project, work on a second stewardship agreement to begin implementing these activities is underway.



In addition to three species of bats federally listed as endangered—the gray bat, Indiana myotis and Ozark big-eared bat—habitat is managed for the eastern small-footed bat (*Myotis leibii*), identified as a sensitive species by the regional forester. © AI Hicks/NY DEC

Landscape Partners

Arkansas Game and Fish Commission
Arkansas Wildlife Federation
National Forest Foundation
National Wild Turkey Foundation
Rocky Mountain Elk Foundation
The Nature Conservancy—Arkansas
USDA Forest Service—Ozark-St. Francis NF

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Buffalo National River Ecosystem Restoration Project

South Central FLN
Arkansas
4,000 acres

This landscape encompasses the stretch of the Buffalo River between the Erbie and Pruitt access points, and lies within the boundaries of Buffalo National River managed by the National Park Service. The terrain is varied, with ridges rising up to 500 feet above the level of the river. The vegetation consists of an oak-hickory woodland mosaic interspersed with cedar glade, post oak savanna, short leaf pine, riparian zones and open fields. About 20 percent of the landscape falls into Fire Regime Condition Class (FRCC) 3, meaning that it is highly departed from its historic condition.

Partners on this project are focused on ecological restoration and the maintenance of cultural landscapes. Priorities include a review of existing scientific research and identification and filling of data gaps. The team is developing vegetation maps and assessing historic data that will guide an adaptive management strategy. Participation in the Fire Learning Network has allowed the team to refine its work and build a common vision, and provides opportunities to share and synthesize data and information.

Fire has now been reintroduced to about 4,000 acres on a four-year return interval. In the coming year, mechanical treatments will be applied to about 120 acres, and prescribed fire to about 1,000 acres, including 400 acres of woodland and 200 acres of open fields. As treatments return the vegetation composition to more natural conditions the fire return interval will be extended, to mimic natural processes.



Glades—sparsely wooded openings with bedrock near the surface—rely on disturbance such as storms, fires, and droughts for their maintenance. Without disturbance, glades fill with eastern redcedar, a pioneer species able to thrive in shallow soils and harsh environmental conditions; soil then forms, and other tree species invade, displacing the unique flora and fauna of the glade. © Tony Collins/NPS

Landscape Goals

The goals of the Erbie-Pruitt project are to preserve native plant communities, restore species and habitat diversity and reduce the accumulation of hazardous fuel levels.

Landscape Partners

Arkansas Game and Fish Commission
National Park Service
Rocky Mountain Elk Foundation
The Nature Conservancy—Arkansas
USDA Forest Service—Ozark National Forest

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Indiana Bat Habitat Restoration Project

South Central FLN
Arkansas
87,000 acres



The Indiana Bat Habitat Restoration Project, in development on the Sylamore Ranger District of the Ozark National Forest, will move habitat used by the endangered Indiana bat toward the desired conditions outlined in the forest's Revised Land and Resource Management Plan. To do this, prescribed burns will be conducted on 15,000 acres annually, along with other woodland restoration treatments on 7,000 acres annually, to increase habitat and bat foraging opportunities. Other benefits from this project will be increased sustainability of the forest, increased diversity of native plant species, restoration of glades and improved conditions for the rare plant and animal species associated with them, improved habitat conditions for game and nongame wildlife species, reduced hazardous fuel loads, improved quality of scenery, and improved dispersed recreation experiences.

Implementation on this project will begin in the summer of 2012.

Project Description

Restoration of habitat for the endangered Indiana bat will be done through timber management, prescribed fire and associated actions within the primary and secondary conservation zones using an adaptive management approach.

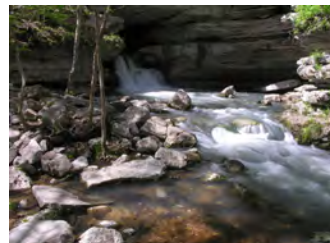
Above: Indiana bats (*Myotis sodalis*) hibernate in large concentrations in caves. © Ann Froschauer/US FWS

Right: During the summer, the bats roost under peeling bark, such as that of shagbark hickory.

© Ryan Somma

Below: Blanchard Spring Stream, on the Sylamore Ranger District

© USFS



Landscape Partners

Arkansas Forestry Commission
Arkansas Game and Fish Commission
Arkansas Natural Heritage Commission
Arkansas State University
National Wild Turkey Federation
Oak Ecosystem Team
The Nature Conservancy—Arkansas
USDA Forest Service—Ozark-St. Francis NF

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Land Between the Lakes

South Central FLN
Kentucky, Tennessee
9,000 acres

The 5,000-acre Prior Creek oak/grassland restoration project is located in the central part of the Land Between the Lakes landscape. The project area was selected due to its proximity to environmental education facilities and to the South Bison Range, both of which are popular tourist attractions, to facilitate education and interpretation. Because fire alone will not allow restoration goals to be met in an efficient time frame, forest management includes mechanical thinning—selection of single trees and small groups of trees—on up to 2,600 acres of dry and xeric forest to reduce stand density from approximately 100 trees per acre to 50 trees per acre in patches on these dry and xeric sites.

Partners were able to efficiently complete all required National Environmental Policy Act (NEPA) analyses for the Prior Creek site; the entire project area—about 5,000 acres—has been treated with prescribed fire. In addition, non-commercial understory thinning was completed on 700 acres, along with mechanical treatments through local contractors to accomplish the same treatment objectives on another 1,200 acres. The early results have been dramatic: Native grasses and forbs are increasing with every growing season and animal populations are beginning to shift from typical dry forest species to a more diverse mix of grassland, shrub and forest associates. Due in part to the success of the Prior Creek FLN site, the project area has been expanded by 3,000 acres; the new acreage was treated with prescribed fire in 2010, with mechanical thinning taking place in 2011.

The University of Tennessee Center for Native Grasslands Management is documenting avian responses to woodland restoration treatments at the Prior Creek site, along with similar sites on the Daniel Boone National Forest and the Tennessee state Catoosa Wildlife Management Area, and a guide for private land managers interested in fire restoration will be produced. Lessons learned in the



View of desired spacing and understory response following one prescribed burn followed by treatment (timber sale) for thinning © USFS

Prior Creek project area have already informed treatments in the Crooked Creek project area, a site in the northern part of the Land Between the Lakes NRA. That project area—just over 4,000 acres—has been burned under prescription, and, as with the Prior Creek site, results have been dramatic and positive.

More information:
<http://lbl.org/NRMOakGrassland.html>

Landscape Partners

Central Hardwoods Joint Venture
National Wild Turkey Federation—Tennessee State Chapter
Quail Unlimited—Jackson Purchase Chapter
The Nature Conservancy—Arkansas
USDA Forest Service
U.S. Fish & Wildlife Service—Frankfort Field Office

Landscape Vision

Partners work to ensure landscape ecosystem components and processes are maintained within their historical ranges of variation through the use of periodic planned fire events and ecologically-based resource management.

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Lower Ouachita

South Central FLN
Arkansas
1.4 million acres

The Lower Ouachita landscape includes big rivers—the Ouachita and Saline—bottomland hardwood forests, terrace pine-oak flatwood forests and upland matrix pine-oak woodlands, pine-grass savannas, salt slick barrens and sand prairies, and is home to a population of the endangered red-cockaded woodpecker. The land is still largely forested, with hydrologic and other ecosystem functions relatively intact. Maintaining ecologically compatible forestry practices is an essential element in achieving landscape-scale conservation results in this landscape.

The Warren Prairie site was selected by Lower Ouachita landscape partners for further study based on fire management and conservation forestry accomplishments, existing partnerships, planned red-cockaded woodpecker (RCW) reintroduction and current site management planning. Participating in the South Central Fire Learning Network since 2005, partners have implemented prescribed fire, ecological thinning and monitoring to move the site toward its desired condition; one goal of this is to restore at least four breeding pairs of red-cockaded woodpeckers to the area.



Big Unit at Warren Prairie Conservation Area in spring, about a month after a prescribed burn; the area had also been treated with thinning, some grinder work and four previous burns. It is now home to a colony of red-cockaded woodpeckers. This stand structure represents the desired ecological condition for pine flatwoods. © Mike Melnechuk/TNC



Range-wide, management of longleaf pine has been successful in supporting the recovery of the red-cockaded woodpecker, with the population increasing nearly 30 percent over 10 years.

© John Maxwell/US FWS

Landscape Vision

This project strives to use conservation forestry to enhance natural community structure and composition on public and private lands and to maintain or increase populations of rare plants and animals.

Significant progress with fire and conservation has recently been made in this landscape:

- In the last three years, The Nature Conservancy, Arkansas Natural Heritage Commission, U.S. Fish and Wildlife Service and Arkansas Forestry Commission have conducted over 10,000 acres of prescribed burns and over 3,000 acres of mechanical thinning or grinder work to treat various sites.
- The Warren Prairie Conservation area has more than doubled in size and now incorporates over 5,000 acres of conservation ownership. Red-cockaded woodpeckers were successfully reintroduced to the site in 2010 and there are now 12 active colonies of birds. Just a few miles to the south of the Warren Prairie area, the Conservancy and Arkansas Natural Heritage Commission recently purchased the Saline-Longview Natural Area and Preserve, which contains 2,215 acres of saline barrens and pine-oak flatwoods. Management of this site will begin in 2012.
- At Kingsland Prairie Conservation Area, an additional 240 acres were purchased, bringing the conservation area to over 1,000 acres. Prescribed burns and ecological thinning projects continue at the site, and many areas could be considered near the desired

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map © 2011 Liz Rank/TNC

Landscape Partners

- Arkansas Forestry Commission
- Arkansas Game and Fish Commission
- Arkansas Natural Heritage Commission
- National Wild Turkey Federation
- Quail Unlimited
- Southwest Fire Use Training Academy
- The Nature Conservancy—Arkansas
- USDA Forest Service—Ouachita and Kisatchie National Forests
- U.S. Fish & Wildlife Service—Arkansas Field Office



ecological conditions determined by FLN partners. Just to the south of the Kingsland Prairie, the Arkansas Natural Heritage Commission and the Conservancy purchased the Hall Creek Prairie, which is 647 acres of saline barrens and pine-oak flatwoods. Ecological thinning has occurred and fire management will start at the site in 2012.

- The Conservancy recently purchased over 3,000 acres of RCW stands adjacent to Felsenthal NWR from Plum Creek Timber. These areas, combined with Felsenthal, harbor the largest population of RCWs in the state outside of the Ouachita NF. The Conservancy and US FWS will be conducting cooperative prescribed burns and other activities at the site, and plan to burn over 7,000 acres in this area in 2012.

Top: Blazing star after a burn at Kingsland Prairie

Bottom: Saline barrens in bloom after a spring burn at Warren Prairie Conservation Area

© Mike Melnechuk/TNC

Novaculite Uplift

South Central FLN

Arkansas

34,000 acres

The Novaculite Uplift project consists of the Caddo Ranger District's 33,000 acre restoration site, the Conservancy's Trap Mountain site and other lands managed for resource extraction and conservation. It is part of the Ouachita Mountain ecoregion of Arkansas and Oklahoma, a landscape of more than eight million acres of rugged mountain ridges, broad valleys and the headwaters of several large river systems. The complex geological formations and soils of this forested landscape have created diverse habitats for a wide variety of species including numerous birds, two dozen species of butterflies, white-tailed deer and black bear. The four major habitats types are glades, woodland slopes, riparian forests and wooded seeps.

The woodlands in this landscape are made up of shortleaf pine, oaks and hickories with shrubs, grasses and wildflowers forming the understory. Partners are using prescribed fire and other treatments to restore these woodlands to a more open structure.

In July 2011, a 5,000-acre wildland fire was allowed to burn in the project area. Because the fire occurred during the summer—a common fire season historically in this ecosystem—project partners seized the opportunity to conduct a first-order fire effects monitoring. Flame heights, char, coverage, rates of spread and impacts on vegetation were documented, and when analyzed will help managers better incorporate, and provide rationale for, seasonality in their prescribed fire program.

In addition, over 17,000 acres of prescribed fire treatments were completed in the project area, with more than half of the burns conducted during the early growing season, which, although more challenging to conduct than dormant-season burns, partners have found results in better ecosystem response..

Landscape Vision

At the landscape scale, this partnership will design and implement management activities that ensure ecosystem components and processes are maintained within the historical range of variation through a combination of prescribed fire, mechanical, chemical and other alternative treatments.



Novaculite ridges with shortleaf pine (*Pinus echinata*) at Trap Mountain Preserve

© McRee Anderson/TNC

Landscape Partners

Arkansas Forestry Commission

National Wild Turkey Federation

Oak Ecosystem Restoration Team

Quail Unlimited

The Nature Conservancy—Arkansas

USDA Forest Service—Ouachita National Forest

U.S. Fish & Wildlife Service—Arkansas Field Office

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St. Francis NF Ecosystem Restoration Project

South Central FLN

Arkansas

11,000 acres

Much of the St. Francis Ecosystem Restoration Project is located on Crowley's Ridge in the St. Francis National Forest and consists in large part of loess slope upland forest. Emphasis in this part of the landscape is primarily on maintaining and, where necessary, restoring the oak component within the forest community. Limiting the abundance and influence of non-native invasive species such as kudzu is also of great importance. Silvicultural practices such as prescribed fire, herbicide application, pre-commercial thinning and timber sales are used to encourage oak regeneration and maintain oak dominance. Fire is an important factor for maintaining open forest conditions and stimulating understory development within this community type.

Also of concern in this landscape is the population of Swainson's warblers (*Limnothlypis swainsonii*) that uses the giant cane (*Arundinaria gigantea*) stands scattered throughout the project area. The Fire Learning Network collaborative team was formed in 2008 to develop a vision for the landscape, and to learn and manage how fire affects this rare bird. Most Swainson's warbler nests found have been in cane, which is thought to be a fire-dependent community; it is thought, therefore, that fire should be of benefit to the warblers, but few data exist to test this. The project is working to discover how to create the best plant community response to fire, while simultaneously balancing concerns of the effects of early season burning on turkey nesting.

Teams in the landscape are currently implementing prescribed fire in a mix of seasons: 1,500 acres of growing season fire and 700 acres of dormant season were conducted in 2008, with another 2,200 acres similarly distributed in 2009, and a small dormant season burn in 2010. In 2012, 1,300 acres of fire are planned, as either hot, dormant-season fire or a good growing season burn.

Landscape Objectives

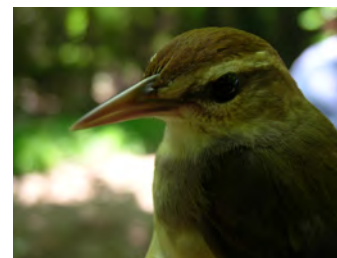
To restore this landscape, partners are working to:

- Maintain fire in the upland forest on a three to seven year rotation
- Encourage oak regeneration and discourage yellow poplar reproduction
- Create openings and add fire to encourage cane-break restoration in the upland and bottomland forest



An early growing season fire is used to promote oak regeneration.

© John Crockett/USFS



The Swainson's warbler (*Limnothlypis swainsonii*, above) is a historically common species that has been identified as being of conservation concern in the southeastern U.S. The species is supported in this on the St. Francis by managing for stands of giant cane (*Arundinaria gigantea*, left) scattered throughout this landscape

© Andy Jones/Cleveland Museum of Natural History; Jerry Oldenettel

Landscape Partners

Arkansas Forestry Commission
Arkansas Game and Fish Commission
Arkansas Natural Heritage Commission
Arkansas State University
National Wild Turkey Federation
Oak Ecosystem Team
The Nature Conservancy—Arkansas
USDA Forest Service—Ozark-St. Francis
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Upland Forest Restoration Projects

South Central FLN

Arkansas

51,000 acres

The Pleasant Hill Ranger District experienced a severe, unprecedented outbreak of the red oak borer in 2002-2003. Large-scale outbreaks like this, along with root disease fungi and canker fungi, are seriously affecting oak ecosystems throughout the Ozark Highlands. To improve forest health, partners in this project are working to re-establish the historic fire return interval in this landscape, with a goal of re-establishing healthy pine and oak woodlands on 24,000 acres of the project area by 2016. Because many private lands are intermingled with lands administered by the Forest Service, much of this project will also be designed to protect communities in the wildland-urban interface.

National Environmental Policy Act (NEPA) analyses have been completed for periodic prescribed fire use on the entire project area and for tree thinning treatments on 29,500 acres. The thinning treatments are intended to re-establish the historical tree density, based on 1830s Government Land Office survey records. To date, over 44,000 acres have been treated with prescribed fire, while non-commercial thinning has been done on 340 acres and timber sales to thin overstocked stands have occurred on 5,570 acres; a further 12,000 acres of restoration treatments are planned.

A comprehensive monitoring program was established at the beginning of the project to document ecosystem responses to prescribed fire and vegetation treatments. The monitoring program is designed to assess overstory, understory and herbaceous plant communities; fuel loads; soils and vegetation; breeding and wintering bird communities; white-tailed deer and stream water quality. The baseline monitoring has been completed and a draft monitoring report has been published.



This restoration area in the West Morgan Ecosystem restoration Area has been treated with midstory removal and prescribed fire.

© Greg Taylor/USFS

Landscape Partners

Arkansas Forestry Commission

Arkansas Game and Fish Commission

National Wild Turkey Federation

Quail Unlimited

Southwest Fire Use Academy

The Nature Conservancy—Arkansas

USDA Forest Service

U.S. Fish & Wildlife Service—Arkansas Field Office

Landscape Vision

Partners envision a landscape in which:

- Ecosystem components and processes are maintained within the historic range of variation by periodic fire use and ecologically-based resource management;
- Vegetation is in Fire Regime Condition Class 1—an indication of good condition—providing healthy watersheds and safety for communities at risk; and
- Ecosystems that are within the historic range of variation achieve biodiversity goals and provide multiple recreational opportunities.

Partners will also promote and facilitate ecosystem restoration at other sites and enhance public support of and involvement in such restoration.

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White Rock Ecosystem Restoration Project

South Central FLN
Arkansas
41,000 acres

The White Rock Ecosystem Restoration Project area includes 16 sites on the Boston Mountain Ranger District of the Ozark-St. Francis National Forest. Restoration areas are in the oak woodland, mixed forest, old growth, riparian corridors and high-quality forest products management areas. This landscape joined the Fire Learning Network in 2008 to develop a landscape-scale vision that was not limited by project perimeters, but rather looked to large-scale treatments to help return of fire to the landscape. To do this, the project links restoration projects on adjacent federal and state lands to improve overall ecosystem health. The team also provides educational opportunities for the public and a monitoring program that incorporates requirements of the Forest Plan and contributes to the District's ability to apply adaptive management methods.

Since 2009, partners here have conducted over 14,000 acres of prescribed fire; nearly the entire area identified for restoration in the landscape has received at least two treatments on a three-year rotation. Most of the fires have taken place in March and April; the team has found that fires taking place late in this period—about mid-April, early in the growing season—are the most successful in reducing fuel loads and produce the best plant community response.

The good plant-community response to early growing season burns is being balanced against public and agency concern about the effects of this timing on turkey nesting. Partners are monitoring various fire effects—including a project begun in 2011 to monitor the effects on turkey nesting. The results will help partners assess and balance these needs so that all aspects of the landscape can be restored to a resilient and sustainable condition.

More information on the wild turkey research:
www.coopunits.org//Arkansas/Research/Active/3.1350112257E10/

Landscape Vision

Partners are working to restore and maintain a healthy forest ecosystem that will provide optimal wildlife habitat for both game and non-game species and that will provide multiple-resource/use objectives, through periodic fire and mechanical treatments. To accomplish this, partners:

- Use adaptive ecosystem management to reach multiple-use and multiple-resource objectives;
- Develop public support through partnerships and education; and
- Develop partnerships to address research questions.



Clockwise from top: White Rock landscape; oak-pine woodland; partners visit a restoration site where commercial thinning treatments are have been employed
© Doug Zollner/TNC

Landscape Partners

Arkansas Forestry Commission
Arkansas Game and Fish Commission
Arkansas Natural Heritage Commission
National Wild Turkey Federation
Oak Ecosystem Team
Quail Unlimited
Southwest Fire Use Training Academy
The Nature Conservancy—Arkansas
USDA Forest Service
U.S. Geological Survey—Arkansas
Cooperative Fish & Wildlife Research Unit

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Arkansas State Wildlife Management Areas

South Central FLN

Arkansas

86,000 acres

The seven Wildlife Management Areas in the Fire Learning Network are in typical Ozark Mountain terrain: steep mountains, deep hollows and broad, flat mountaintops. The vegetation consists of extensive upland hardwood and shortleaf pine woodlands and savannas, systems that fire once played a key role in maintaining. Pre-settlement tree density in the Interior Highland oak ecosystem has been estimated as about 50 trees per acre; densities in much of the region now range from 300 to 1,000 stems per acre. This high density leads to increased competition for nutrients, sunlight and moisture. During periods of drought, trees that are already stressed by competition become vulnerable to disease and insect attack. As a result, these ecosystems are declining in extent, ecological health and sustainability.

The Wildlife Management Areas, however, provide some of the best hunting, fishing and outdoor recreation opportunities in the state. Partners have therefore agreed that habitat management practices for these landscapes should be adopted that promote the diversity of species, while providing recreational opportunities, and that special consideration will be given to ecologically sensitive areas. The projects participating in this network have set goals using FLN methods and planning tools, and each site has a prescribed fire program, as well as commercial and non-commercial timber management objectives, to help reach the goals that have been set.

Partners are working to:

- Restore remnants of historic wildlife habitat for a range of native and migratory species;
- Enhance public recreational use, both consumptive and non-consumptive, by increasing wildlife use and carrying capacity on restored sites;
- Increase public support for the system through interpretative displays and educational programs promoting science-based restoration treatments;
- Re-establish the historic fire return interval throughout these landscapes; and
- Develop pine and oak woodlands where appropriate to promote wildlife species.

These project areas benefited early on from the FLN's development of a 320,000-acre landscape incorporating federal and state lands that share similar long-range goals for restoration of historic rare communities. Two of the WMAs are part of what is now known as the



Post oak in late summer after a single spring burn

© McRee Anderson/TNC

Doris Duke Landscape, in honor of a grant from the Doris Duke Charitable Foundation; to date, \$100,000 of restoration project work has been completed across this landscape.

Implementation: Over 32,000 acres have been treated with prescribed burning. Monitoring of changes in plant diversity, bird and other species responses continues to demonstrate the increase in overall biodiversity being experienced in the restored communities.

Funding: Five state wildlife grants—totaling over \$1.1 million—have been awarded to these projects for restoration of woodland, savanna and glade communities. Most recently, the partners were awarded \$300,000 under the Scaling-up to Promote Ecosystem Resiliency initiative of the Promoting Ecosystem Resiliency through Collaboration cooperative agreement to implement restoration work on two of the WMAs.

Landscape Vision

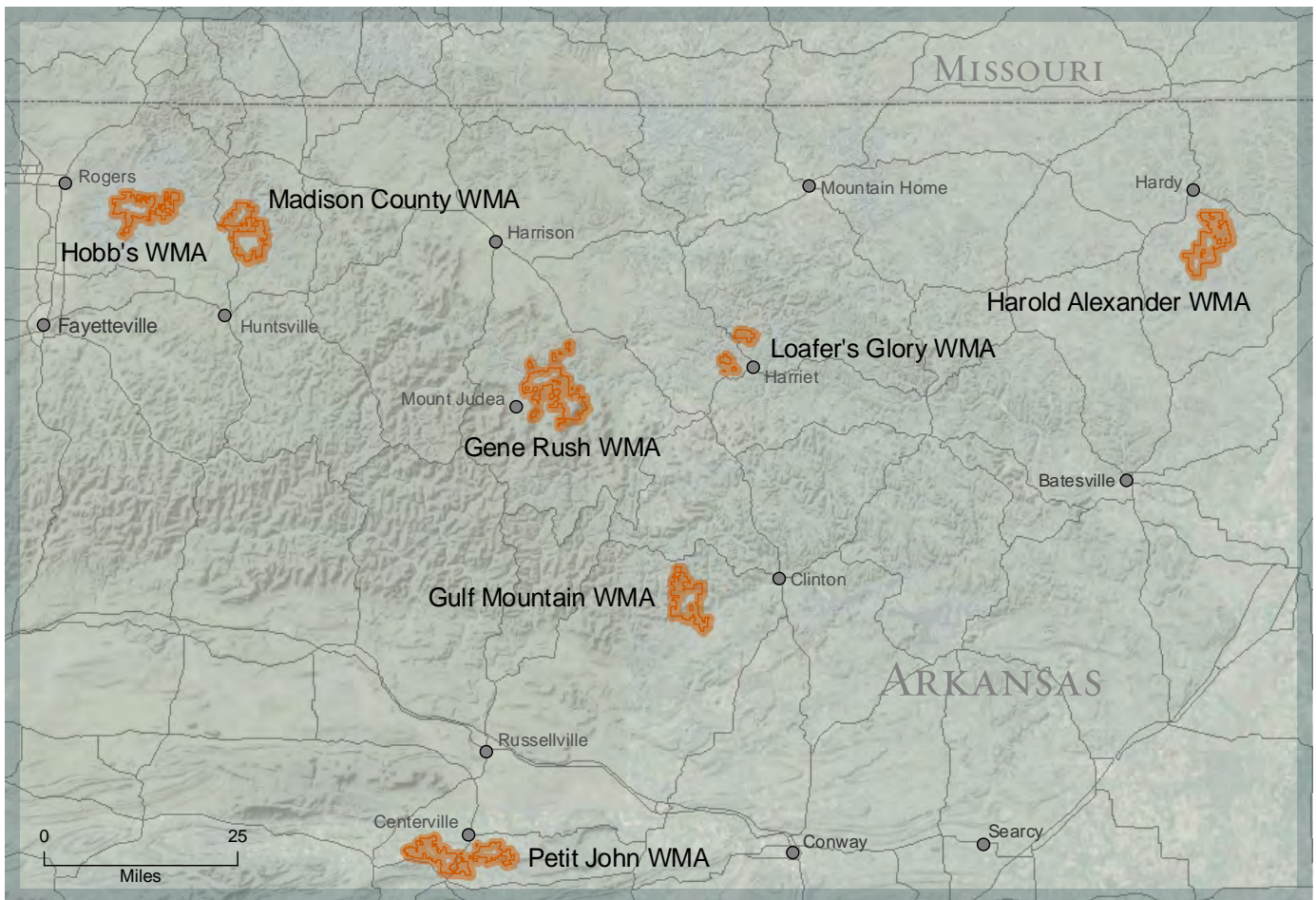
Partners work will ensure that ecosystem conditions within the historic range of variation are restored and maintained by management actions that promote natural process and native plant and animal communities, and are based on best available scientific and historical information. They will also work to increase public support, recreational uses, consumptive and non-consumptive uses and educational materials that contribute to successful wildlife habitat management.

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map © 2011 Liz Rank /TNC

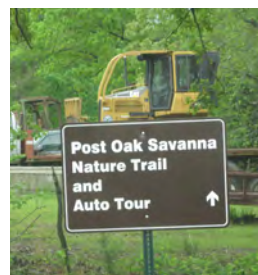
Gene Rush WMA	17,000 acres	Loafer's Glory WMA	3,000 acres
Gulf Mountain WMA	12,000 acres	Madison County WMA	14,000 acres
Harold Alexander	14,000 acres	Petit John WMA	15,000 acres
Hobbs WMA	12,000 acres		

Outreach: Partners developed an “Oak Woodland and Watchable Wildlife Auto Tour,” which interprets various management actions occurring across the WMAs. They have also conducted tours for both the media and professional resource managers to highlight the benefits of forest thinning and the use of fire to restore sites, and presentations to the editorial staffs of news media outlets in north Arkansas have led to a better understanding of prescribed burning benefits and the technical aspects of use of fire; very positive articles have been published as a result. Partners also engage the public by offering private-landowner training workshops on management strategies needed to restore woodland conditions.

Landscape Partners

- Arkansas Forestry Commission
- Arkansas Game and Fish Commission
- National Park Service—Buffalo National River
- National Wild Turkey Federation
- Quail Unlimited
- The Nature Conservancy—Arkansas
- USDA Forest Service—Ozark-St. Francis NF
- U.S. Fish & Wildlife Service—Arkansas Field Office

Interpretive signage is an important amenity offered at Wildlife Management Areas. © McRee Anderson/TNC



Appalachian Fire Learning Network

1.4 million acres

The Appalachian Fire Learning Network engages multiple federal, state and private land management agencies in a collaborative effort to enhance capacity to implement ecological fire management in the Central Appalachian Forest, Western Allegheny Plateau, and Cumberlands and Southern Ridge and Valley ecoregions. Together, these ecoregions include portions of five states—Kentucky, Pennsylvania, Ohio, Virginia and West Virginia. They are characterized by rolling and mountainous terrain, hardwood and mixed-pine hardwood forest, pine-oak-heath shrublands and woodlands, small-patch grasslands including hillside prairies and cedar glades and high levels of species endemism.

Within this biologically diverse region, the Network seeks to:

- Collaborate with stakeholders to strengthen the scientific basis for landscape scale fire management, and develop landscape-scale desired future condition and fire management objectives for the Central, Southern, and Western Appalachian Region;
- Transfer knowledge and lessons learned throughout the Network to facilitate ecological objective setting, effective stakeholder engagement, efficient compliance with regulatory requirements, and successful funding of ecological fire management projects;
- Identify critical barriers to implementing restoration of fire adapted ecosystems, and develop strategies to overcome these barriers;
- Achieve tangible and measurable progress in restoration of fire adapted ecosystems at demonstration sites throughout the Network.

In 2011, the regional network's partners held two workshops, which allowed the three newest landscapes—Allegheny Border, Keystone Appalachians and Southwest Virginia and—to complete the four-part FLN planning process. The more established landscapes



An inter-agency, cross-boundary controlled burn conducted on Warm Springs Mountain in the Allegheny Highlands © Sam Lindblom/TNC

mentored these teams, and also came away from the workshops with fresh insights into their own work and updates on tools ranging from modeling methods to ignition techniques.

Due to the successful partnerships developed in the Allegheny Highlands and Allegheny Border landscapes, the Central Appalachians was selected as a demonstration landscape for the Conservancy's Restoring America's Forests (RAF) program. The RAF network of 13 sites from around the country is working to demonstrate the effectiveness of ecosystem-scale, multi-ownership (i.e. public and adjacent private lands) forest management to achieve multiple benefits for people.

Partners in the Allegheny Highlands and Allegheny Border landscapes were also awarded support under the Scaling-up to Promote Ecosystem Resiliency program of the Promoting Ecosystem Resiliency through Collaboration cooperative agreement; this will allow partners to expand cross-boundary and -jurisdictional controlled burns, non-native invasive species control, and other habitat restoration activities to state parks, state wildlife management areas, Conservancy preserves and other private lands in this biologically-rich forested landscape.

Network Vision

The Appalachians Fire Learning Network envisions project sites throughout the region having adequate technical capacity, funding and stakeholder support for increased restoration of fire-adapted ecosystems.

Landscapes will also demonstrate measurable progress toward achieving ecological management objectives.

Allegheny Border
Allegheny Highlands
Cumberland River

Keystone Appalachians
Southwest Virginia



map © 2012 Liz Rank/TNC



Right: A 20-person AmeriCorps crew assisted with a 200-acre controlled burn in the Allegheny Highlands, including the 140-acre Bear Loop burn unit. Bear Loop was burned in May 2008, so this marks the first unit to be burned twice in the Warm Springs Mountain Restoration Project. Partners are looking forward to analyzing vegetation monitoring results after the next growing season. A planned 5,800-acre burn on the Big Wilson unit, encompassing adjacent Conservancy and National Forest lands, was postponed due to a very wet spring in 2011, but will be conducted when weather permits. © Marek Smith /TNC



Left: Charcoal remains from an FLN controlled burn gathered by a Virginia Tech geography graduate student are being used to clarify the relationship between vegetation type and fire intensity and the resulting soil charcoal. Older charcoal remains can then be used to help reconstruct the fire history of the region. © Stewart Scales/Virginia Tech

Network Partners

- Department of Defense
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Forestry
- The Nature Conservancy
- USDA Forest Service
- Virginia Department of Conservation & Recreation
- Virginia Department of Forestry
- Virginia Department of Game & Inland Fisheries



Appalachian regional network partners met in Harrisonburg, Virginia in February 2011. In addition to landscape updates and peer-review, there was a presentation on an ecological zones modeling and mapping project for the George Washington National Forest that models historic and desired future conditions, and a panel discussion that covered key management issues, including frequency and seasonality of burn and ignition techniques. © Marek Smith/TNC

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Allegheny Highlands

Appalachian FLN
Virginia
636,000 acres

Mixed-hardwood and pine forests—with large patches of older-growth oak and hickory, south-facing patches of yellow pine, stands of sugar maple, basswood, ash and poplar in coves and eastern hemlock in ravines along steep riparian zones—are hallmarks of this landscape. Drier, fire-dependent pine-oak-heath woodlands—communities of chestnut oak, pitch pine, Table Mountain pine and species of blueberry and mountain laurel—are found on ridge tops and exposed south- and west-facing slopes. The only Virginia occurrences of rare montane pine barrens, which appear as dwarfed shrublands, are found on Warm Springs Mountain in the heart of the Allegheny Highlands. In addition to providing habitat for several rare natural communities and an amazing diversity of plant and animal species, this unbroken forest landscape helps safeguard the region's lands and waters.

Land managers and ecologists from several Appalachian states met in 2006 to help develop fire management approaches for Warm Springs Mountain in Virginia's Allegheny Highlands. This workshop helped launch the Appalachian Fire Learning Network, when participants discovered a common interest in working together to meet the challenge of restoring Appalachian forests. Using the Fire Learning Network methodology, partners in this landscape have developed strong conceptual ecological models, collaborative goal statements, maps of current and desired conditions, and a robust vegetation monitoring program, all of which evolve continually to help guide management decisions and implementation plans across this large landscape.

Landscape Vision

Partners promote ecosystem health and biodiversity by fostering restoration and maintenance of fire-adapted ecosystems while ensuring public safety. They also work to improve the capacity to apply and manage fires by increasing collaboration and partnerships of interested agencies, organizations and communities.



Since May 2008, the Conservancy and Forest Service have led joint fire operations on approximately 10,000 acres of challenging terrain in the Allegheny Highlands, with equipment and staff from multiple federal and state agencies and staff from the Conservancy. © Sam Lindblom/TNC

Recent Activities & Accomplishments

To detect long-term, landscape-scale changes in bird communities in response to changing vegetation structure, the FLN partnered with the Appalachian Mountain Joint Venture to design a unique avian point count monitoring protocol. This product uses the latest time removal methodology, accounts for the different detectability of species, and allows for more precise density estimates than other methods. Along with vegetation monitoring, avian monitoring allows the Allegheny Highlands team to document the extent to which prescribed fires meet their goals, informs management decisions, and allows partners to communicate the benefits of fire to forest advocacy groups and others concerned about this important forest.

The Allegheny Highlands FLN has also adopted a landscape fire prioritization model developed by the Southern Blue Ridge FLN and is working on adapting for use within this landscape. This model incorporates both ecological and logistical factors, to help develop treatment strategies that are both effective and efficient for reaching desired conditions.

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map © 2011 Liz Rank/TNC

Landscape Partners

National Park Service—
Shenandoah National Park
The Nature Conservancy—
Virginia
USDA Forest Service—George
Washington & Jefferson
National Forests
USDA Forest Service—
Monongahela National
Forest
USDA Forest Service—
Northern Research Station
Virginia Department of
Conservation & Recreation
Virginia Department of
Forestry
Virginia Department of Game
& Inland Fisheries
Virginia Tech



Left: In 2011, 108 avian point-counts were conducted during the peak of breeding season in the 18,000-acre Warm Springs Mountain Restoration Project area. A total of 768 individual birds of 51 species were detected, including such focal species as ovenbird, scarlet tanager, hooded warbler, black-and-white warbler and cerulean warbler.

© Nikole Swaney/TNC



Left: FLN partners are collaborating with Virginia Tech on the Virginia Appalachian Coyote Study, designed to determine the demography, diet and spatial ecology of coyotes in an under-studied region. Fire restoration projects are providing graduate students in the Department of Fish & Wildlife Conservation with an opportunity to examine habitat preferences, small mammal and other prey densities, and foraging behavior of coyotes in burned and unburned areas. Since May 2011, the university team has captured and radio-collared six coyotes, estimated initial prey species abundance and collected more than 650 DNA and 450 scat samples.

© David Montague/Virginia Tech



By conducting multi-agency, cross-boundary burns—such as the 2008 Mare Run burn (*top*) or the winter 2012 Cowbane Prairie burn (*below*)—partners have been able to dramatically increase the efficiency and ecological effectiveness of their burn programs.

© Sam Lindblom/TNC; Jen Dalke/TNC

Allegheny Border

Appalachian FLN
West Virginia
483,000 acres

A westward extension of the Allegheny Highlands site, this landscape joined the network in 2009. It contains a diverse mix of hardwood forests and woodlands, limestone glades and barrens, cedar woodlands, high elevation pine-heath barrens, rocky summits, cliffs and balds, and subalpine coniferous forests. Over 120 rare animals, plants and natural communities have been identified in this area, making it one of the richest concentrations of biological diversity in the eastern United States. The cedar glades support a number of species restricted to this part of the Appalachians, including Smoke Hole bergamot, and the high, dry crests of North Fork Mountain support the largest pine barrens of the Central Appalachians—hundreds of acres of pines gnarled and dwarfed by the harsh conditions and by thousands of years of recurring wildfires. The summits also support virgin red pine and spruce forests, dramatic tundra-like communities of boreal plants and a wealth of rare Appalachian and boreal species.

After observing the progress of the three original landscapes in the regional FLN, partners in the Allegheny Border embarked on their own four-step restoration planning process. They have now identified three broad fire-adapted system types, defined ecological management objectives and desired future conditions for these conservation targets, identified barriers to implementation and potential strategies to overcome these barriers, and defined key locations within the landscape to begin implementation. A primary objective of the group is to increase cross-boundary coordination between the Monongahela and George Washington-Jefferson National Forests; this requires bridging forest boundaries, Forest Service region boundaries and the Virginia-West Virginia state line. Efforts now underway will build the partner capacity needed to plan, implement and coordinate restoration in the landscape's fire-adapted systems.

Landscape Vision

Partners will advance fire at a landscape scale in fire-adapted systems by maintaining and restoring ecological processes across the full range of biophysical settings to promote resilient ecosystems. This will be encouraged across management boundaries using multi-organizational and multi-partner cooperation and resource sharing. Partners will enhance public awareness and understanding of the role of fire in fire adapted systems and use the best available science to guide management, including the collection of baseline data and follow-up monitoring, providing for adaptive management from lessons learned.



A ridge top pine-heath community as seen from the Conservancy's Bear Rocks Preserve
© Kent Mason

The Allegheny Border landscape hosted partners from across the Appalachian regional network in late June 2011 to share lessons learned and plan upcoming work together. Fire history of the Pike Knob site was introduced in a presentation and then discussed in the field.

© Sam Lindblom/TNC



Landscape Partners

Arcadia University

The Nature Conservancy—West Virginia

USDA Forest Service—George Washington & Jefferson National Forests, Monongahela National Forest, Northern Research Station
Virginia Department of Game and Inland Fisheries

West Virginia Department of Forestry

West Virginia Department of Natural Resources

West Virginia University

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Cumberland River

Appalachian FLN
Kentucky
252,000 acres

The Cumberland River and its tributaries sustain an unusually large variety of fish and mollusk species, and the ravines surrounding them are among the richest wildflower areas in the country. However, what was once a remote wilderness now attracts increased recreational use and second-home development, placing new pressures on habitat and water quality—the Daniel Boone NF has 23 species of plants and animals listed as threatened or endangered.

Ridge tops on the Cumberland Plateau are now generally dominated by oak-hickory stands, with mixed oak-pine in drier areas. Historically these ridges were mostly covered in short-leaf pine or oak-pine woodlands and savanna systems that have all but disappeared with decades of fire exclusion. Even the existing oak-hickory forest matrix needs fire to be maintained, as fire exclusion has reduced oak regeneration and allowed more mesic species to become a part of the canopy. Other signs of stress on the system are the outbreaks of southern pine beetle now evident on many ridge tops.

This region's forest communities and species evolved with fire. The landscape's participation in the Fire Learning Network was originally driven by the desire of Daniel Boone National Forest managers to reintroduce fire on the landscape and to provide habitats for species that rely on fire-adapted ecosystems. The FLN's collaborative process quickly brought stakeholders together and provided a roadmap to develop shared ecological management objectives.



American chaffseed (*Schwalbea americana*) is one of the 23 listed species in this landscape. Most of the remaining populations—including all of the most vigorous populations—are in areas that experience frequent fire.

© Jim Stasz/USDA-NRCS PLANTS Database



The project area includes Daniel Boone National Forest, Cumberland Falls State Resort Park, US Army Corps of Engineers and private lands.

© John Omer/USFS

In 2011, Cumberland FLN partners worked together to identify actions needed to better zero in on restoration potential. As a result, an intensive GIS mapping project was completed, identifying existing and potential vegetation types within the FLN focus area. This information is invaluable for predicting vegetative response expected after reintroducing fire. The FLN has used this information as a guide for placing additional vegetation monitoring plots throughout the landscape. Data gathered from these plots will enable partners to identify and track success towards reaching the desired future condition, and will help determine more favorable parameters and seasonality of fire management practices.

Landscape Partners

Kentucky Department of Fish & Wildlife Resources
Kentucky Division of Forestry
The Nature Conservancy—Kentucky
University of Kentucky—Forestry
University of Tennessee
USDA Forest Service—Daniel Boone NF

Landscape Vision

Through partnership efforts and community support, our forests and watersheds will be improved by the restoration and maintenance of fire-adapted ecosystems. Fire will be integrated into the management of our natural resources, will be evident upon the landscape and will lead to enhanced habitat diversity.

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Keystone Appalachians

Appalachian FLN Pennsylvania 12.2 million acres

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 competitive 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 overcome 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.



This oak barrens was mechanically treated and then burned to help restore appropriate structure and functioning of the system.

© Jenny Case/TNC

In 2011, FLN partners addressed their capacity challenges by offering 10 NWCG courses—S290, S200, S230, L280, I200, S234, and two sessions each of S131 and S133—to a total of 327 students, and refresher training (RT130) to 60 students; agencies and organizations served by these courses included the Fort Indiantown Gap, Natural Lands Trust, Pennsylvania Bureau of Forestry and Game Commission, USDA Forest Service, Pheasants Forever and The Nature Conservancy. They also burned cooperatively on 3,732 acres of partner lands—accomplished in spite of the wettest year on record, with 170% of normal precipitation. Partners were also actively engaged in the Pennsylvania Prescribed Fire Council (<http://paprescribedfire.org/>).

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.

Contact:

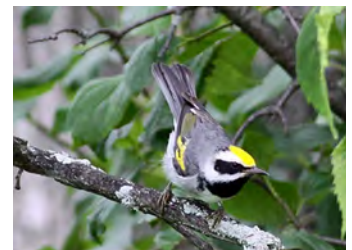
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map © 2011 Liz Rank/TNC



Ruffed grouse (*Bonasa umbellus*, left) and golden-winged warblers (*Vermivora chrysoptera*, above) are among the many species that depend on the health of oak woodlands.

© Jacob W. Dingel/PA Game; Amy McAndrews

Left, top: Students in a Crew Boss course (S230) hosted by this landscape play out scenarios in sand table exercises. © Jenny Case/TNC
Left, bottom: Students conduct an exercise in a Field Leadership Assessment course (L280). © Jenny Case/TNC

Landscape Partners

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

Southwest Virginia

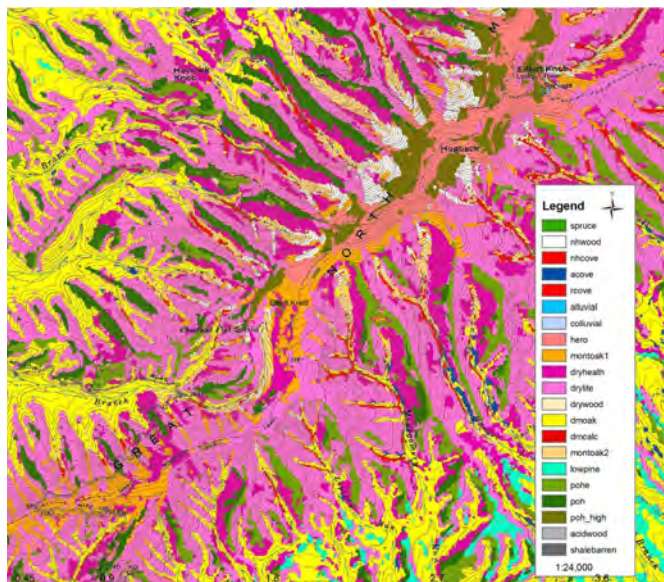
Appalachian FLN
Virginia
3.9 million acres

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 inter-agency fire management actions and public outreach and education events have been initial priorities for partners in this landscape.



Dolomite glade in Lee County, Virginia. The open structure of a glade requires regular disturbance for its maintenance. © Gary Fleming/VA DCR



Recent Activities & Accomplishments

Partners are contracting for an ecological systems modeling project which will map potential natural vegetation across a five million acre landscape in southwestern Virginia, including all of the Jefferson National Forest. Completion of this model, a finer resolution, field-verified version of LANDFIRE's biophysical settings, will fill an important geographic gap between modeling that has already been completed in the Southern Blue Ridge of North Carolina (Southern Appalachians) and the Allegheny Highlands of Virginia (Central Appalachians).

Left: Maps with field-verified vegetation data at an appropriate scale will help inform management decisions and can be used in monitoring efforts and models used to assess and prioritize restoration treatments.

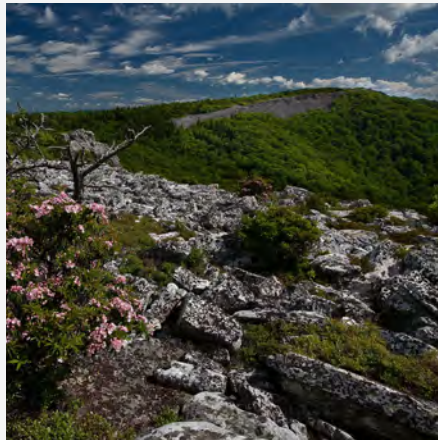
Landscape Goal

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.

Landscape Partners

The Nature Conservancy—Virginia
USDA Forest Service—George Washington & Jefferson National Forests
Virginia Department of Conservation & Recreation
Virginia Department of Forestry
Virginia Department of Game & Inland Fisheries

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Ridge top pine-heath community in the
Allegheny Border landscape © *Kent Mason*

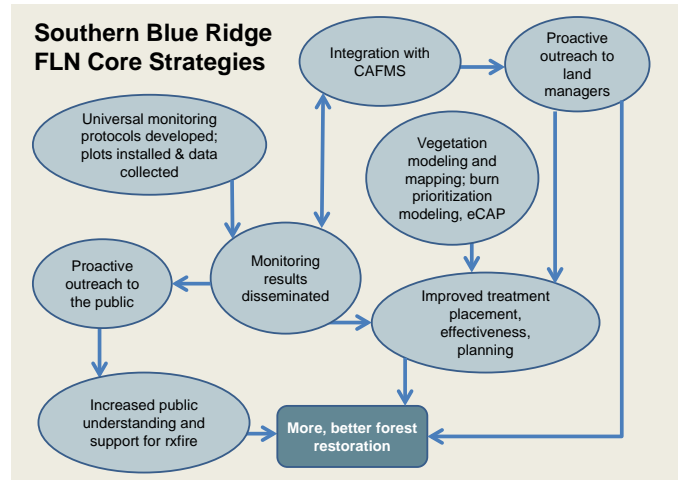
Southern Blue Ridge Fire Learning Network

4.2 million acres

The Southern Blue Ridge FLN encompasses a subset of the southern Appalachian Mountain region, including the four-state intersection of Tennessee, North Carolina, South Carolina and Georgia. In this ecologically diverse landscape, the FLN has identified four target vegetation communities in greatest need of fire regime restoration: shortleaf pine-oak forest, pine-oak heath, dry-mesic oak-hickory forest and high elevation red oak forest. These systems cover about 60 percent of the area within the network region and historically burned on a short fire return interval. Currently about 50,000 acres of this landscape burn each year through controlled burns or wildfires; 200,000 to 400,000 acres need fire (or surrogate treatments) each year to maintain forests in a resilient condition. The SBR FLN works to define a healthy, resilient landscape and to identify where, when and how to restore these ecosystems. Expertise in numerous aspects of restoration is distributed among partners and researchers involved in the collaboration. Sharing this knowledge among partners and with other networks accelerates restoration.



Pine-oak heath is one of the plant communities targeted for restoration by the SBR FLN. Beneath Table Mountain and pitch pine and chestnut oak, the heath component (in this case, mountain laurel, a tall shrub) has taken over the understory, and even the midstory, because of fire exclusion. Pines and oaks can no longer germinate, and grasses and herbs have become uncommon. © Beth Buchanan/USFS



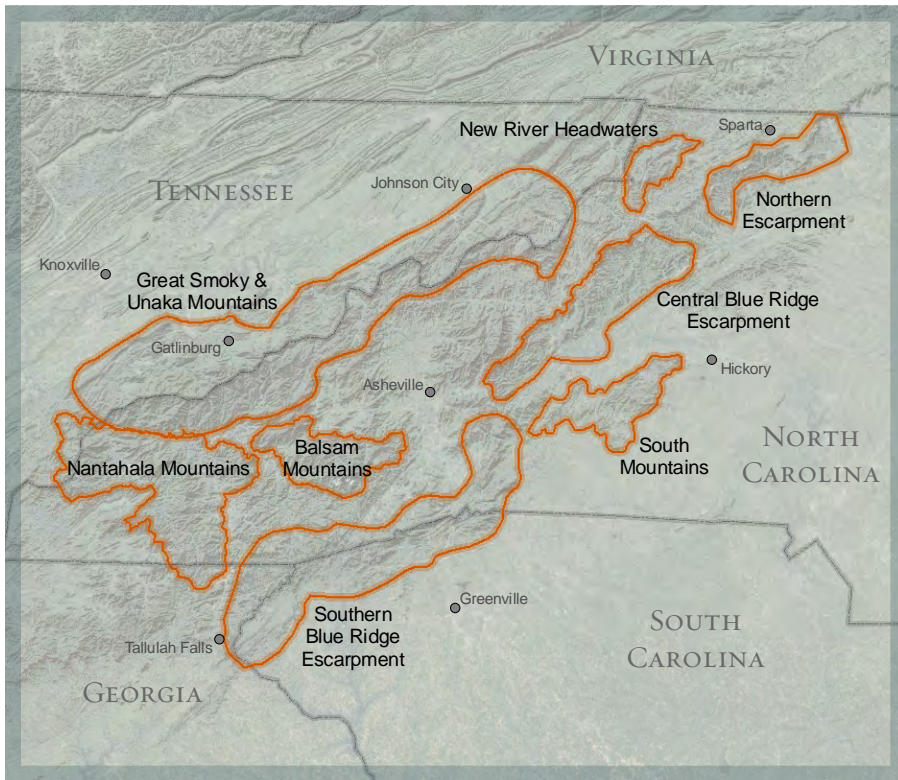
Network Vision

Partners across the SBR FLN landscape have identified and characterized fire-benefitted ecosystems in the landscape and identified restoration goals for four vegetation communities—pine-oak heath, shortleaf pine-oak, dry-mesic oak-hickory and high elevation red oak. Together, partners advance restoration in the region by agreeing to:

- Use monitoring, modeling and expert opinion to develop and implement collaborative management plans that have the support of public agency partners, local communities and other stakeholders.
- Establish and maintain a network of monitoring plots to learn about the effectiveness of the management activities and guide adaptive management, and share findings with agency staff and the public to ensure understanding and continued support, or at least tolerance, for the work.
- Collaborate with the Consortium of Appalachian Fire Managers and Scientists (CAFMS) to keep partners informed of research findings, and provide managers an opportunity to identify research questions that need to be addressed for effective restoration efforts.

Balsam Mountains
Central Blue Ridge Escarpment
Great Smoky & Unaka Mountains
Nantahala Mountains

New River Headwaters
Northern Escarpment
South Mountains
Southern Blue Ridge Escarpment



map © 2011 Liz Rank/TNC

In 2011, much of the work of the SBR FLN addressed hurdles to restoring priority areas by applying and sharing two tools refined in the region: the “ecomath” tool and Enhanced Conservation Action Planning (ECAP). The ecomath tool is a spatial model that helps planners identify the areas where treatments are ecologically most important and most effective; it was refined by a team on the Central Escarpment landscape. It has since been successfully applied on the South Mountains and Great Smoky & Unaka Mountains landscapes as well. Additionally, national forest districts outside of the SBR area have followed suit, thus emphasizing the value of this newly-developed planning approach. Enhanced Conservation Action Planning has been piloted on the North Zone of the Cherokee National Forest, part of the Great Smoky & Unaka Mountains landscape. This planning process allows stakeholders to compare current and pre-European settlement conditions for targeted ecosystems and project the results of different treatments into the future. A cost-benefit module helps collaborative groups identify the most cost-effective restoration approaches. Lessons being learned on the Cherokee are being shared across the FLN and with other interested groups.

SBR FLN partners also continued to explore efficient and fruitful cooperation with the Consortium of Appalachian Fire Managers and Scientists (CAFMS), feeding research needs to the CAFMS board and research findings back to managers. Partners also reached out to other landscape-level planning efforts—such as the Cherokee National Forest’s Landscape Restoration Initiative and implementation of Community Wildfire Protection Plans by the North Carolina Department of Forest Resources—to find synergies in planning and implementation.

Finally, representatives of the SBR and the Appalachian FLN, the regional FLN immediately to the north, regularly attend each other’s meetings to exchange ideas, knowledge and lessons learned.

Network Partners

Consortium of Appalachian Fire Managers and Scientists
 Georgia Department of Natural Resources—State Parks & Historic Sites Division
 Georgia Department of Natural Resources—Wildlife Resources Division (Nongame)
 Land Trust for the Little Tennessee
 National Park Service—Great Smoky Mountains NP
 North Carolina Division of Forest Resources
 North Carolina Division of Parks and Recreation
 North Carolina Wildlife Resources Commission
 The Nature Conservancy—Georgia, North Carolina, South Carolina, Tennessee
 USDA Forest Service—National Forests in NC, Chattahoochee-Oconee NF, Cherokee NF, Southern Region Regional Office, Southern Research Station
 Western Carolina University
 Western North Carolina Alliance

More information:

recording of webinar on ecomath planning tool
www.conservationgateway.org/link/ecological-burn-prioritization-model-webinar-recording

eCAP on the Cherokee NF
www.communityplan.net/cherokee/

Consortium of Appalachian Fire Managers and Scientists
www.cafms.org

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Balsam Mountains

Southern Blue Ridge FLN North Carolina 236,000 acres

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.

Mature high elevation red oak forest and chestnut-oak forest communities cover most of the higher ridges and slopes with an unusually diverse herb layer. Rich cove forest communities are found on more sheltered, concave slopes and coves, and transition 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 re-introduction of fire on appropriate sites is a fundamental component of restoration efforts in this landscape.

Current Activities and Accomplishments

Partners are developing a fire prioritization plan for this landscape using an ecological fire prioritization model based on a template developed on the Grandfather Ranger District (Pisgah National Forest) in 2011; adaptation of the model has been completed for two of the National Forests in NC districts encompassing the Nantahala Landscape. The model was used to evaluate fire units based on several key variables identified by managers:

- percentage of acreage of fire-adapted pine or oak dominated vegetation (weighted to give the greatest importance to pine, less to xeric oak, and the least to mesic oak);
 - presence of rare, fire-adapted species (with greater weight given to globally rare species versus those rare in the region or state);
 - presence of existing high quality fire-adapted vegetation, as tracked at the national, regional and state level (with greater weight given to nationally important sites); and
 - units with wildlife benefits from maintained openings.
- In 2012, the fire units will be evaluated with the ecological prioritization model, and more sites—including some from the North Carolina Wildlife Resources Commission and other partners—will be added for evaluation.



A spring prescribed burn conducted on the Cold Mountain Game-lands in the Balsam Mountains landscape © Dean M. Simon/NC WRC

There are currently two FLN demonstration units in this landscape, both located in the Cold Mountain Game-lands and focusing on the restoration of high elevation red oak forests. One of the units has undergone two spring burns, and the other has had one spring burn; both units will be burned at three- to five-year intervals, as conditions allow. Nearly 60 permanent plots have been established in these units to assess fire effects. Initial results indicate that prescribed burning has reduced overstory density, altered vegetative composition, and reduced litter and duff thickness. However the changes vary greatly from place to place within each burn unit, so analyses are underway to link specific fire effects to pre-burn stand conditions, topography and other factors in order to improve fire management.

This landscape will host the SBR FLN regional workshop in May 2012.

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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	Peter Bates	bates@email.wcu.edu	(828) 227-3914



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: These photos show the degree of variation in regeneration response to two spring burns within the same burn unit located in the Balsam Mountains landscape. In the area shown in the photo at top, two spring burns resulted in nearly a three-fold increase in regeneration density, while in the area shown in the photo on the bottom, two spring burns resulted in nearly a 25 percent decrease in regeneration density. Understanding why these differences occurred will help managers to more effectively use prescribed burning in forest restoration efforts.

© Peter Bates/Western Carolina University



A view of the Richland Balsams in the Balsam Mountains landscape, taken from the Blue Ridge Parkway

© Rob Lamb/Forest Stewards, Inc.



Central Blue Ridge Escarpment

Southern Blue Ridge FLN
North Carolina
425,000 acres



A prescribed fire in the Globe area of the Blue Ridge Escarpment

© David M. Combs

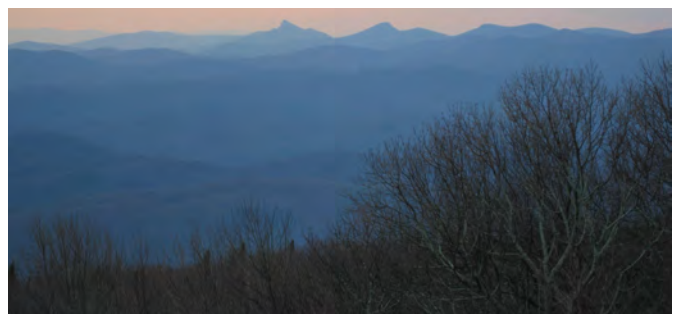
The Central Blue Ridge Escarpment characterizes the descent from the western mountains toward the piedmont in North Carolina, and consists of steep slopes and elevations from 1,000 to 6,000 feet. At the lower elevations the natural communities include chestnut-oak, pine-oak heath and acidic cove forests, and at higher elevations northern red oak forests are common. Across the landscape, thickets of rosebay rhododendron and mountain laurel make up much of the understory and shrub layer. The density of these two heath species is indicative of land management legacy stretching back over a century: After decades of farming and grazing, settlers sold their land to logging companies that removed most of the remaining large timber via railroad. The railways frequently sparked fires in the logging slash, resulting in severe wildfires, which in many areas reduced the vegetation to bare soil. The dry, infertile conditions allowed fast-growing, opportunistic shrubs to capture areas once populated by pine and oak forests with diverse herb layers. In fact, the land was so damaged and in need of restoration that the first

eastern-U.S. purchase for the newly-established Forest Service was made within this landscape.

While these severe fires altered the structure of the forests, fire has always been a natural part of the Central Blue Ridge Escarpment landscape, and it is arguably the most fire-adapted portion of the Pisgah National Forest and Blue Ridge Parkway. Lying in the rain shadow of the Black Mountains to the west, the landscape is subject to dry thunderstorms, which produce numerous lightning strikes with little or no rainfall. The oak forests of the landscape benefit from these fires, as do many other fire-adapted species, including turkey-beard and Table Mountain pine, which produces serotinous cones that require fire to germinate. Mountain golden heather, a low-growing shrub, is one of the most fire-dependent species in the landscape, and is found nowhere in the world except in the Central Blue Ridge Escarpment. Heller's blazing star, another federally listed plant, also benefits from fire, and is being maintained with recurrent fire in the landscape.

Landscape Goal

We continue to work cooperatively as land managers and conservation groups to move towards the desired future conditions defined and illustrated by our collaborators that are both ecologically acceptable and achievable. Our team will continue to strive to further our understanding of the role of fire in the Central Blue Ridge Escarpment and continue to facilitate and promote prescribed and natural fire across the landscape.



Grandfather RD from the Blue Ridge Parkway © Bart C. Kicklighter/USFS

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Josh Kelly

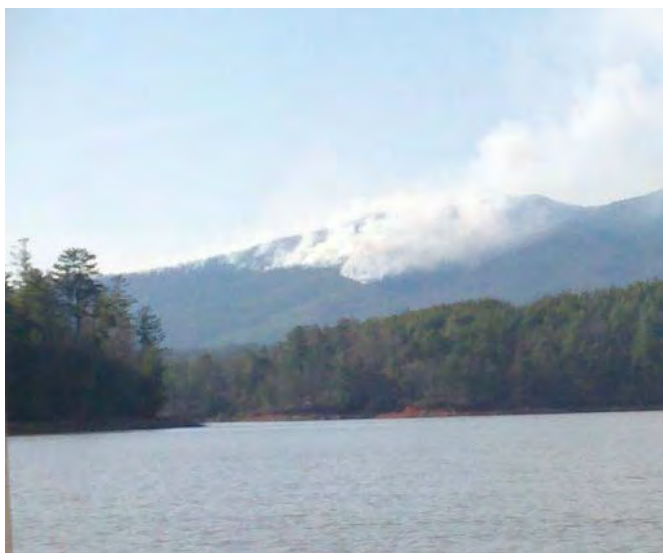
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Throughout 2011, cooperators of the Central Blue Ridge Escarpment worked together to develop a treatment planning model that incorporates both ecological and logistical factors, which is currently being used to prioritize areas across the landscape that are in need of ecological restoration using prescribed fire. The modeling was developed collaboratively with all partners in the landscape and has helped expedite planning, preparation and implementation of current and future prescribed burns.

Other accomplishments in 2011 include:

- Completion of the first cooperative prescribed burn between the Forest Service and North Carolina Wildlife Resources Commission. This burn and others helped comprise the nearly 5,500 acres of prescribed fire that were implemented across the landscape in 2011.
- Data collection for burn effects monitoring in the landscape, with immediate post-burn data collected following the Lake James burn and second year post-burn data collection completed on the Lost Bear East unit.
- Installation of two new monitoring plots in anticipation of the Singecat Ridge burn, which is scheduled to be implemented in 2012. A total of more than 6,750 acres of prescribed fire has been planned in this landscape for 2012.



Landscape Partners

National Park Service—Blue Ridge Parkway
 North Carolina Wildlife Resources Commission
 The Nature Conservancy—North Carolina
 USDA Forest Service—Grandfather Ranger
 District
 Western North Carolina Alliance

“The work accomplished within this landscape paints a clear picture of what collaboration should look like. I have been pleased with the partnership, particularly the efforts to complete the burn prioritization model. The model has served as a beneficial tool to help jumpstart our planning efforts to increase burning on the district”

John Crockett

District Ranger, Grandfather Ranger District



Above: Monitoring plots are used to track the effects of fire and other treatments on the rosebay rhododendron (*Rhododendron maximum*) and mountain laurel (*Kalmia latifolia*) that dominate many slopes of this area to the detriment of oak and pine regeneration.

© Bart C. Kicklighter/USFS

Left: The Lake James prescribed burn was conducted by partners from the Central Blue Ridge Escarpment in March of 2011.

© Ryan Jacobs/NC WRC

Great Smoky & Unaka Mountains

Southern Blue Ridge FLN
North Carolina, Tennessee
1.6 million acres

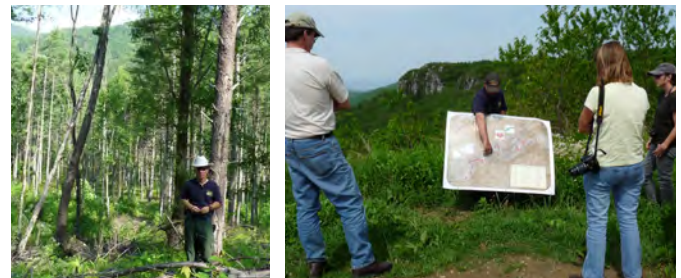
The Great Smoky Mountains and Unaka Mountains

form a typical southern Appalachians site. Running along the Tennessee/North Carolina state line with elevations of 2,000 to 4,500 feet, they are home to oak-pine heath, high elevation northern red oak, dry-mesic oak-hickory forests and other community types.

Like many landscapes, these mountains have suffered from a lack of appropriate fire. While fire has not been completely excluded from this landscape—on the Cherokee NF, about 20,000 acres a year are burned—partners see a need for a major reduction in hazardous fuels, as well as restoration of forest structure to ensure its long-term health and resiliency. However, getting appropriate fire into the forest meets with some public concern. More comprehensive monitoring of the effects of fire and dissemination of information about its benefits are key to alleviating these concerns. Monitoring and adaptive management programs will also improve planning, allow managers to confirm that objectives are being met and provide the feedback needed to adjust management as needed. Ultimately, the result of the monitoring and enhanced communication should speed planning and permitting processes, allowing fire to be reintroduced over a greater range in the region.

2011 accomplishments and activities of this landscape included:

- hosting the SBR FLN regional workshop in May.
- working with FLN partners to develop a burn prioritization model to assist fire managers in determining the most appropriate locations for future prescribed burns on the forest.
- hosting a Landscape Restoration Initiative Team which is using Ecological System Mapping, Enhanced Conservation Action Planning, and LANDFIRE models to help determine forest restoration management priorities and processes; one of the team recommendations emphasizes the use of prescribed burning to help in the restoration process. When finalized, these recommendations will aid in determining emphasis areas for prescribed burning on the forest.
- gathering data on nine existing fire monitoring plots and conducting four spring burns (3,025 acres) and five fall burns (2,636 acres); an additional 2,600 acres planned for 2011 were shifted to spring 2012 due to unfavorable weather patterns.



The May 2011 field trip on the Unaka District emphasized the broad and diverse range of the fire management program. Management activities being implemented there include: woodland restoration, field restoration, management for blight-resistant American chestnut, Table Mountain pine and shortleaf pine restoration, oak restoration, and fuels reduction programs. An overview of the prescribed burn program that started in the early 1990s was also discussed.

© Margit Bucher/TNC

Landscape Partners

Appalachian Trail Conservancy

National Park Service—Great Smoky Mountains
National Park

Private landowners

The Nature Conservancy—North Carolina,
Tennessee

Tennessee Department of Agriculture—Forestry
Division

USDA Forest Service—Cherokee National Forest

Landscape Goal

Partners are working toward a healthy and diverse ecosystem that includes appropriate proportions of structural stages/age classes for the full range of fire-adapted vegetation native to the site. This will include regeneration adequate to sustain populations of *Pinus echinata*, *P. pungens*, *P. rigida*, *Quercus montana*, *Q. rubra* and other *Quercus* species. It is expected that such conditions will also increase the health and diversity of populations of many other biological taxa.

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New River Headwaters

Southern Blue Ridge FLN
North Carolina
95,000 acres

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 rare plant and animal species. It faces threats from rapid development, habitat fragmentation and fire exclusion.

In 2009, vegetation was mapped for the landscape; about 60% of the area was found to be fire-dependent mesic oak hickory and high elevation red oak forest. Monitoring plots were established by FLN partners in 2010. Analysis of these data showed that—while oaks still predominate in the canopy—mountain laurel and rhododendron are shading the ground, and maples are leading regeneration and are will replace oaks in the canopy if fire is not reintroduced to the landscape.

In the fall of 2011, two successful burns in high-elevation red oak forest were conducted. These were possible by strong collaborative efforts with many partners, including North Carolina Wildlife Resources Commission, The Nature Conservancy, North Carolina Division of Parks and Recreation, North Carolina Forest Service (including inmate crews) and local volunteers. Both of these important burns took place in areas that include permanent monitoring plots: ecological effects monitoring was conducted pre-burn and immediately following the burns, and they will be monitored again in the summer of 2013.

Landscape Partners

North Carolina Division of Parks and Recreation

North Carolina Forest Service

North Carolina Natural Heritage Program

North Carolina Wildlife Resources Commission—Threetop Mountain Gamelands

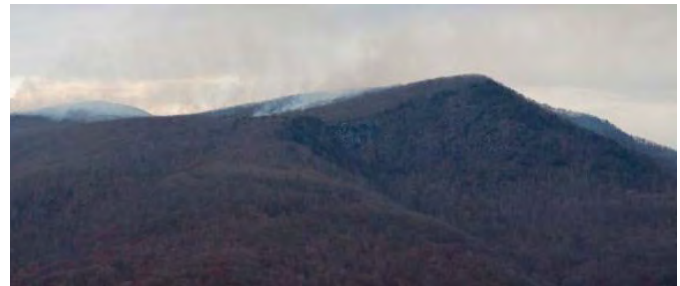
The Nature Conservancy—North Carolina (New River Headwaters Program)



Above: Three Top Mountain Gamelands burn conducted by partners in October 2011 © Dean M. Simon/NC WRC

Below: Bluff Mountain Burn, November 2011

© Kim Hadley



“This strong partnership would not be possible without the support of the Fire Learning Network—and it is critical to conducting burns on a meaningful landscape level in this region.”

Megan Sutton

Mountain District Stewardship Program
The Nature Conservancy—North Carolina

Landscape Goal

Land managers and researchers are working 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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Nantahala Mountains

Southern Blue Ridge FLN
North Carolina, Tennessee
629,000 acres

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 few, 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 occurs in the area. Vegetation assessment 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 intermixed with dry-mesic oak-hickory forests. At the middle elevations pine-oak/heath forests predominate on the steepest ridges intermingling 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 forests dominate on ridges. The majority of these habitats have been impacted by past land use practices or altered fire patterns, where frequency and/or intensity has 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 or fire-tolerant pines. The rare serpentine barren, with its 22 grass species and unique butterfly fauna, is perhaps the most uncommon fire-dependent community in the landscape, but the landscape contains many other rare, but more widely distributed, communities that also depend on fire.

Current Activities and Accomplishments

Partners continue to develop a fire prioritization plan for this landscape using an ecological fire prioritization model based on a template developed on the Grandfather Ranger District (Pisgah National Forest) in 2011;

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 lightning-ignited fires will again be allowed to burn in appropriate landscape settings to the extent possible. Partners are also developing strategies to facilitate the implementation of prescribed burning on private lands in this landscape.



The 730-acre Yellow Creek joint prescribed burn, which included lands owned by the Land Trust for the Little Tennessee and the Forest Service, also encompassed a right-of-way supporting millions of dollars of high-voltage power transmission lines. Both Duke Energy and Alcoa Power and Light Company were pleased with the outcome of this burn and plan to expand their burning program in western North Carolina.

© USFS, Cheoah District

adaptation of the model has been completed for two of the National Forests in NC districts encompassing the Nantahala Landscape. The model was used to evaluate fire units based on several key variables identified by managers:

- percentage of acreage of fire-adapted pine or oak dominated vegetation (weighted to give the greatest importance to pine, less to xeric oak, and the least to mesic oak);
- presence of rare, fire-adapted species (with greater weight given to globally rare species versus those rare in the region or state); and
- presence of existing high quality fire-adapted vegetation, as tracked at the national, regional and state level (with greater weight given to nationally important sites).

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Eighty-six separate burn units, totaling 51,500 acres, were initially scored; units varied in size from 17 to almost 2,600 acres. The resulting prioritization scores ranged from a low of 1 to 161, and will be used in making decisions about where to allocate fire resources across the landscape. In 2012, more fire units—including sites from the North Carolina Wildlife Resources Commission and other partners—will be evaluated with this ecological prioritization model.

There are currently four permanent monitoring plots in this landscape, as part of the monitoring taking place across the SBR FLN. Three of the units are dominated by shortleaf pine-oak communities, and the fourth is primarily high-elevation red oak. The initial burn has been completed on each unit (three were spring burns and one was a fall burn). Post-burn monitoring was completed in the summer of 2011 for the Yellow Creek burn unit, and post-burn data will be collected for the other three sites during the summer of 2012.

After 16 years of burning, this fire-dependent, globally-rare woodland community, known as a serpentine barren, is nearly restored. These areas contain many rare understory plants that require fire, and are typically surrounded by other fire-adapted community types. The woodland structure is visible in both the foreground and background of the photo below.

© Gary Kauffman/USFS

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 Ranger District)



Northern Escarpment

Southern Blue Ridge FLN
North Carolina
200,000 acres

The Northern Escarpment is where prescribed burning in forest ecosystems in the mountains of western North Carolina began, with the North Carolina Wildlife Resources Commission burning at the Thurmond Chatham Game Land in 1987. The 25th anniversary of this continuing endeavor will be marked in 2012, with partners poised to take fire restoration in this landscape of nationally-significant natural heritage values to a new level.

While more than a third of this landscape is in clustered public ownership, that ownership is split among several state and federal agencies. Past fire activities of several of these agencies have focused elsewhere. FLN partners are recognizing, however, the great potential of this landscape to benefit from jointly-conducted burns that cross ownership boundaries. There are significant private holdings in the landscape that are good candidates for contributing to larger-scale fire restoration, providing a key role for the North Carolina Forest Service and land trust partners.

All of the partners in this landscape had previously worked together in other FLN landscapes, but met to discuss fire restoration opportunities in this landscape for the first time in 2011. Together they refined landscape boundaries, drafted a five-party memorandum of understanding, and began discussion of adapting burn prioritization models to the Northern Escarpment.

Goals for 2012 include designating potential burn units that include interagency and public-private cooperative projects; adapting burn prioritization models to fit the landscape's ecosystems, ownership patterns, and agency authorities; designing one or more jointly-controlled burn projects; and conducting outreach to owners of key private tracts.

Landscape Goal

Partners are working to identify fire-suppressed pine-oak 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.

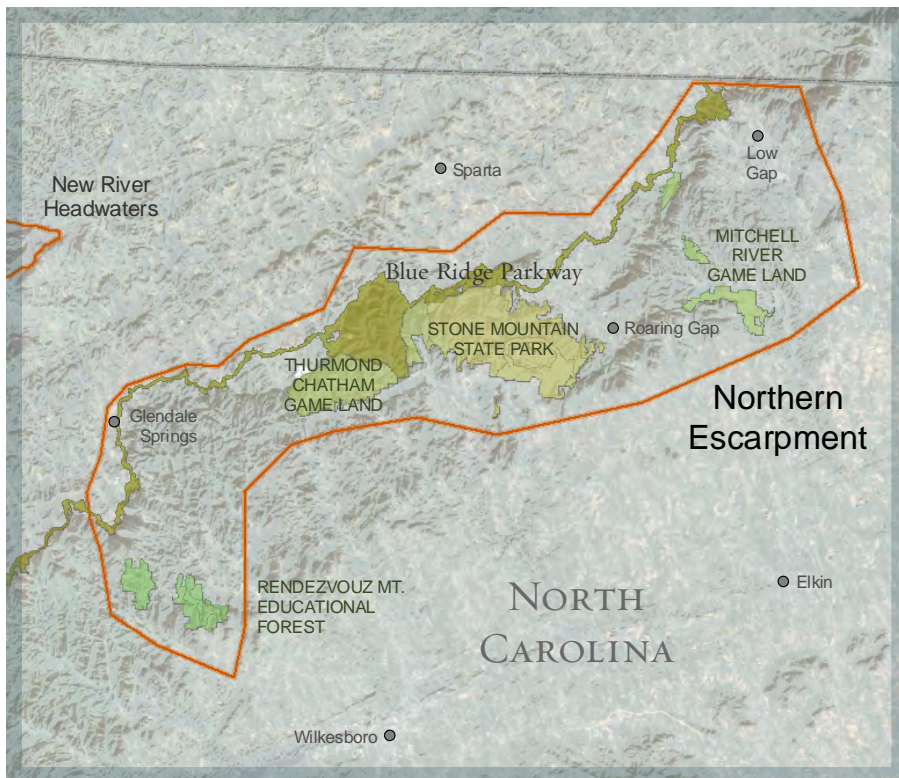


An early-spring burn on Thurmond Chatham Game Land improves wildlife habitat for many species. © Dean M. Simon/NC WRC



Partners visit site of multi-burn Table Mountain pine/pitch pine restoration project at Thurmond Chatham Game Land. © David Ray/TNC

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Landscape Partners

- National Park Service—Blue Ridge Parkway, Doughton Park
- North Carolina Division of Parks and Recreation—Stone Mountain State Park
- North Carolina Forest Service—Rendezvous Mountain Educational State Forest
- North Carolina Wildlife Resources Commission—Mitchell River Game Lands, Thurmond Chatham Game Land
- Piedmont Land Conservancy
- The Nature Conservancy—North Carolina

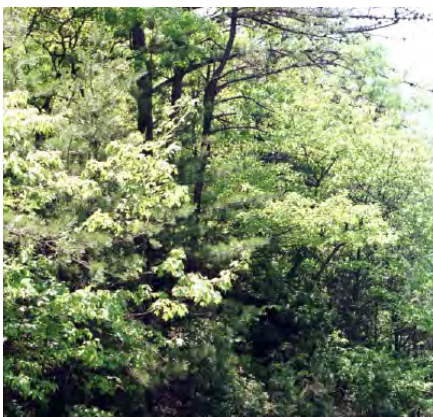
map © 2011 Liz Rank/TNC



Helen Mohr, of the Consortium of Appalachian Fire Managers and Scientists (CAFMS), discusses fire effects research data with Dean Simon and other partners. © David Ray/TNC

“Because of our long history of collaborating with scientists at the Southern Research Station as we put fire on the ground here, we have a strong baseline for understanding fuels, fire behavior, and fire effects in this landscape. By working with FLN partners across ownership boundaries, we can now take that knowledge to scale.”

*Dean Simon
North Carolina Wildlife Resources Commission*



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 at Thurmond Chatham Game Land. © Dean M. Simon/NC WRC

Southern Blue Ridge Escarpment

Southern Blue Ridge FLN

Georgia, North Carolina, South Carolina

868,000 acres

Tallulah Gorge, at the far southwest edge of the Southern Blue Ridge Escarpment landscape, is best described as a transitional zone between the southern Appalachian piedmont to the south and the Southern Blue Ridge Mountains to the north. Numerous upland ridges and south-facing woodland slopes are embedded in a larger mesic forest matrix. The ecological system to which these upland habitats most closely conform is the Southern Appalachian low-elevation pine forest (NatureServe). This system occurs in a variety of topographic and landscape settings and is dominated by either shortleaf pine (*Pinus echinata*) or Virginia pine (*P. virginiana*) and also contains numerous dry-site oak species, such as southern red oak (*Quercus falcata*), chestnut oak (*Q. prinus*) and scarlet oak (*Q. coccinea*). In addition, numerous pitch pine and Table Mountain pine specimens can also be found scattered throughout the landscape, particularly in the most rugged terrain near bluffs and cliffs.

Within this landscape, a diverse group of partners are working to use prescribed fire and mechanical treatments to restore the natural structure and function of the upland pine and oak ecosystems and to maintain a rich array of rare plants and animals. Historically, frequent low-intensity fires occurring every 3-5 years were responsible for maintaining a bi-layered forest structure, with widely spaced pines and oaks in the overstory and a rich and diverse grass, forb and shrub layer in the understory (oak/pine heath).

Currently, this type of forest habitat—generally described as pine-oak-heath woodlands—is declining throughout the region, primarily due to fire suppression and other incompatible land use practices. Such woodlands are ideal habitat for a variety of sun-loving plants, as well as for numerous wildlife species that depend on the bi-layered structure. Wildlife species that will benefit from treatments that restore this structure include black bear, white-tailed deer, eastern wild turkey, ruffed grouse,



View looking toward Tallulah Gorge from South Carolina. Low-elevation pine habitat is visible in the foreground, and the Blue Ridge Mountains rise in the background. The project area is tucked in the transition area up against the mountains. © Mike Brod/USFS



An open woodland structure maintained by fire supports a variety of grasses, forbs and shrubs in the understory. © Mike Brod/USFS

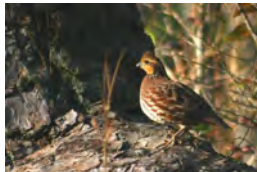
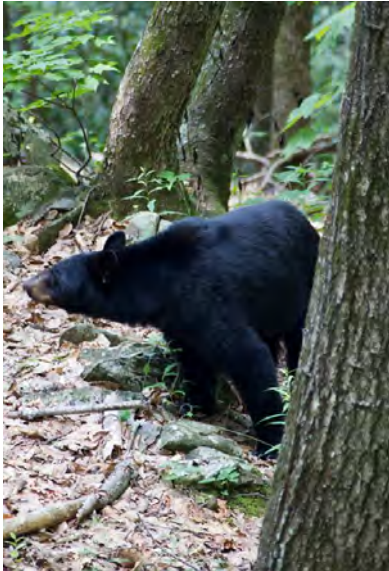
Landscape Goal

A variety of partners will work together across jurisdictional boundaries to effectively and efficiently restore pine-oak woodland habitats on suitable sites in the Tallulah Gorge area, developing methods that are applicable to the larger Southern Blue Ridge Escarpment landscape.

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northern bobwhite, the rare Bachman's sparrow and the declining brown-headed nuthatch and eastern wood pewee. In addition, a number of rare plants, including turkeybeard, sundews, and a number of grasses and forbs associated with tallgrass prairies—such as cone-flower, big bluestem and silphium—occur in these fire-maintained habitats.



Landscape Partners

Georgia Department of Natural Resources—
State Parks and Historic Sites Division
Georgia Department of Natural Resources—
Wildlife Resources Division, Nongame
Conservation Section
Georgia Forestry Commission
North Carolina Division of Forest Resources
The Nature Conservancy—Georgia, North
Carolina, South Carolina, Tennessee
USDA Forest Service—Chattahoochee-Oconee
National Forest (Chattooga River Ranger
District)
USDA Forest Service—Nantahala National Forest
(Wayah Ranger District)

Wildlife species benefitting from treatments in this landscape includes black bears, brown-headed nuthatches and bobwhite quail.

© Michael Gerard Fitzpatrick; Les Howard; George Dissmeyer

Recent Accomplishments

Partners have treated approximately 6,500 acres with prescribed fire since 2007. This includes the first multi-jurisdictional prescribed burn in the area, which was held in winter 2010. The burn included lands managed by State Parks and USDA Forest Service, and was implemented with numerous assisting agencies, including the Atlanta Botanical Gardens, Georgia Forest Service, Georgia Power and U.S. Fish and Wildlife Service. In 2012, the group plans to implement another cooperative prescribed burn of about 3,000 acres that will again include multiple land jurisdictions and the contributions of a variety of local agencies. In addition to fire treatments, partners have mechanically treated about 300 acres to restore ecosystem health and function.

Ecological and a prescribed burn prioritization models are now being developed for the landscape, and will be used in future ecosystem restoration planning.

Research plots to monitor rare species, such as persistent trillium, have been installed in burn units and a multi-year research project has been initiated with Georgia Southern University.

In cooperation with Western Carolina University, fire effects monitoring plots have been installed at key points within the landscape.

Due to the success of the landscape's collaborative efforts, the Consortium of Appalachian Fire Managers and Scientists is now highlighting the FLN's Tallulah Gorge demonstration site as a good example of a collaborative fire restoration project.



© Nathan Klaus/GA DNR

South Mountains

Southern Blue Ridge FLN

North Carolina

217,000 acres

The South Mountains landscape is a large area of dissected high hills rising from the rolling upper piedmont region and foothills of the Blue Ridge escarpment. Most of this landscape consists of steep slopes, narrow ridges and narrow ravines or stream gorges, with elevations ranging from 1,000 to 3,000 feet. These mountains are typical of the southern Blue Ridge in ruggedness, fire history and forest communities, which include chestnut-oak, montane oak-hickory, pine/oak-heath, rich coves and acidic coves. Scattered stands of pitch pine and Table Mountain pine are indicative remnants of historical fire influence on the landscape, but the absence of fire has resulted in encroachment by white pine, maple, mountain laurel and rhododendron on many sites. Many areas have been affected by earlier logging as well as fire exclusion. The South Mountains plant communities also include a diverse collection of rare herbaceous plant species, including a large population of white irisette, a federally-listed plant that benefits from fire.

The core of the South Mountains includes South Mountains State Park and South Mountains Game Land—about 40,000 acres of the landscape is made up of state-owned lands owned and managed by the North Carolina Wildlife Resources Commission and North Carolina State Parks. Agency partners from these lands are working together to reestablish ecologically appropriate fire regimes and the use of fire in the South Mountains through collaborative, jointly-implemented prescribed burns across the landscape. As a result, nearly 5,000 acres are currently in a prescribed burn rotation.

Landscape Goal

Through cooperative partnership and collaboration, land managers will work across jurisdictional boundaries to implement prescribed burning and capitalize on other fire occurrences with a common goal of restoring and maintaining fire-adapted ecosystems. Management strategies employed will target increasing the ability to apply fire and reduce obstacles to conducting prescribed burning. A fundamental part of this effort will include monitoring of sites and assessing changing environmental conditions and forest community characteristics as fire is applied across the South Mountains landscape.



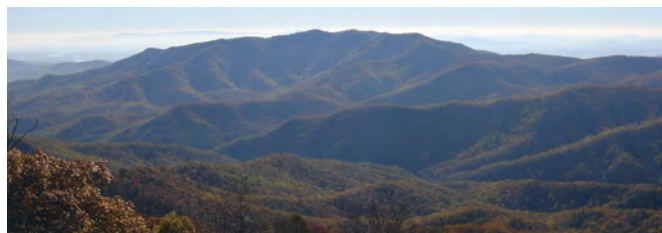
An early spring 2009 prescribed fire burns in the High Peak focal area.

© Ryan Jacobs

In 2011, development of a burn prioritization model was one of the most important accomplishments in this landscape. Use of this model will help partners better manage the 87 percent of the landscape is in fire-adapted forest types. As part of a project that spans the entire Southern Blue Ridge Fire Learning Network, installation of monitoring plots was also completed and pre-burn data were collected for a burn of nearly 1,700 acres that is scheduled for 2012.

Landscape Partners

North Carolina Natural Heritage Program
North Carolina Division of Parks and Recreation
North Carolina Wildlife Resources Commission
The Nature Conservancy—North Carolina



Narrow ridges and steep slopes are typical of the South Mountains landscape.

Ryan Jacobs

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In the field, Unaka Mountains, at a SBR regional workshop
© Margit Bucher/TNC

Florida-Caribbean Fire & Invasives Learning Network

6.6 million acres

Tropical islands are host to some of the richest biodiversity in the world. They are also home to some of the most vulnerable landscapes. Increasing the capacity of land managers to foresee, prevent and control threats before habitat is compromised is the only recognized method to efficiently and successfully ensure healthy landscapes.

Although fire and invasive plant management are typically seen as two separate land management needs, the increase of invasive grasses, vines and other plants that promote or are promoted by fire has forced practitioners on both sides to learn the others' tools—although often too late to abate the threat efficiently or effectively.

Advancing the needs and tools of both the fire and invasives communities requires a proactive approach that explores the connections between fire and invasives across the greater landscape, while building the capacity of practitioners on the ground. A regional learning network addressing these dynamics is an ideal format to identify priorities, develop and disseminate information and tools, and build the overall capacity of the region to effectively mitigate the threats of invasive species and fire.

The Caribbean-Florida Fire & Invasives Learning Network seeks to collaborate with practitioners across the region in order to:

- Assess the state of knowledge about the interactions of fire and invasive plants, including fire management practices related to control and susceptibility, influence of invasive species on fire regimes, influence of fire on invasive species, and influence of land use and land management practices on invasive species and fire;
- Identify and prioritize management information needs and related research needs;
- Identify critical barriers to the prevention of invasion and successful implementation of restoration projects and fire, and develop strategies to overcome these barriers;
- Develop integrated management plans that appropriately coordinate the management of fire and the control of invasive species;
- Transfer knowledge and lessons learned throughout



Puerto Rico hosted partners from across the region for the 2010 annual workshop. In 2011, to allow a broader range of participation, the network hosted a series of bi-monthly webinars, culminating in a web-based workshop in December. © Alison Higgins/TNC

the Network to facilitate ecological objective setting, effective stakeholder engagement, efficient on-the-ground efforts, and successful funding of ecological fire/invasives projects;

- Achieve tangible and measureable progress in maintaining or increasing the health of fire-dependent and fire-sensitive habitats throughout the network by increasing on-the-ground abatement of fire/invasives threats; and
- Build a peer-to-peer network of practitioners and experts that can share information and experiences, build capacity and develop appropriate tools and methodologies to address fire and invasive threats.

Network Vision

The Network aims to investigate the connections between fire and invasive species, build the capacity of on-the-ground practitioners, develop and disseminate information and tools; and build the overall capacity of the region to effectively mitigate associated threats. Ideally, project sites throughout the region will have adequate knowledge, technical capacity, funding, policies and stakeholder support for managing fire/invasives interfaces, and will be able to demonstrate measurable progress towards achievement of ecological management objectives.

Bahamas
Central Florida
Cuba

Dominican Republic
Jamaica
Puerto Rico

South Florida
St. Lucia
Trinidad & Tobago



map © 2011 Liz Rank /TNC

Strategies identified by Fire & Invasives Learning Network (FILN) partners through results chain planning process:

- Build capacity and knowledge through training
- Develop and use effective communications tools within the FILN
- Develop bilingual communications hub for the FILN
- Develop tools to promote effective communication with stakeholders
- Document findings for wide practitioner base concerned with fire and invasives
- Educate country program institutions about the FILN
- Gain official status for the FILN within countries
- Keep FILN focused and accelerating learning
- Research funding sources

More information:

The FILN maintains a library of recordings of web presentations covering both landscape updates and topics of regional interest:

<http://vimeo.com/channels/crfl#27013261>

Network Partners

CABI

Grupo Caras del Fuego

National Park Service– Florida and Caribbean Exotic Plant Management Team

The Institute for Regional Conservation

The Nature Conservancy

U.S. Fish & Wildlife Service– Region IV Invasives Strike Team



A fire and invasives training session held at the Caroni Swamp visitors' center during a Trinidad and Tobago team meeting in November 2011

© Blane Heumann/TNC

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Bahamas

Florida-Caribbean Fire & Invasives Learning Network 432,000 acres

Fire-dependent Bahamian pine forests comprise 23 percent of the terrestrial ecosystems in this archipelago. These forests of Bahamian pine (*Pinus caribaea* var. *bahamensis*) are the largest and most intact forests of their kind; the only other pine rocklands are found in southeast Florida, the Florida Keys and the Turks & Caicos Islands. Although these forests are in good condition, the long-term health of the forests—and the numerous globally imperiled and endemic species they support—is threatened by fire that has become too frequent and by the presence of invasive tree species such as Australian pine (*Casuarina glauca*) and monkey tamarind (*Mucuna pruriens*).

In the Bahamas, fire and invasive species threats have not been considered together. However, it is recognized that invasive species threaten the integrity of pinelands and that more research on the connection between fire and invasive species is needed. There are also questions about the impact of climate change on fire-dependent and fire-sensitive ecosystems. Such information is recognized as integral in making informed management decisions. The Bahamas seeks to participate in exchange and mentorship opportunities with the network.

At a stakeholder meeting in late 2011, partners reviewed the country's formal plan for controlling invasive melaleuca, as well as the 2010 Forestry Act and Draft Forestry Regulations, and discussed means of enhancing prescribed burning awareness. The FILN also met with the Bahamas National Trust to discuss further development the management plan for Abaco National Park.



Prescribed fire training in the ecotones separating pine rocklands from coppice will help to keep both habitats healthy. © Chris Bergh/TNC

Landscape Partners

Bahamas Department of Lands & Surveys
Bahamas Ministry of Environment
Bahamas National Trust
Friends of the Environment
Royal Bahamas Police Force
The Nature Conservancy



Immediate actions for this network include steps to control melaleuca (*Melaleuca quinquenervia*). This includes establishing a task force to finalize the existing draft National Melaleuca Control Plan, increasing public awareness and implementing a program of monitoring, mapping and treatments. Climbing fern (*Lygodium* spp.) prevention and bracken fern (*Pteridium* spp.) control are also high priorities. © Chris Bergh/TNC

Regional Goal

The overall goal in the Bahamas, as described in the National Biodiversity Strategy and Action Plan, is to control invasive alien species as a threat to biodiversity. In terms of fire management, it is envisioned that efforts will lead to a sustainably managed healthy pine forest, maintaining the uniqueness of the Bahamian pineland and the conservation priorities which exist within the ecosystem.

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Central Florida

Florida-Caribbean Fire & Invasives Learning Network 552,000 acres

Lake Wales Ridge in central Florida was once—650,000 years ago, when sea levels were higher—part of a small chain of islands. As is often the case with islands, species diverged from those on the mainland. The island heritage remains today, in the high concentration of rare species found in the area. This rich scrub landscape is subject to numerous pressures, including development, changes in fire regime and invasion by non-native plants.

Partners in this network are addressing the latter two threats together, because fire and invasive species are intimately bound together here: The three plant species of most concern are *Lygodium*, cogon grass and natal grass. The first two of these cause fires to burn hotter, and natal grass then thrives in the openings left by fire.



Treating invasive *Lygodium* (climbing fern) helps keep fire from spreading to tree crowns.
© Steve Morrison/TNC

In 2011, The Lake Wales Ridge Ecosystem Support Team conducted numerous controlled burns throughout central Florida and, when conditions were unsuitable for fire, treated for invasive plant species on the Avon Park Air Force Range and Conservancy preserves.

The Heartland CISMA (Cooperative Invasive Species Management Area):

- Hosted a webinar for the regional FILN, with presentations on coordinating fire and invasives treatments and using GIS grids to track invasive work;
- Held two invasive species identification and treatment workshops for beginner and intermediate naturalists;
- Had an Early Detection Scavenger Hunt with prizes to encourage more people to be able to identify invasives and enter them on a database through www.lveGot1.org;
- Created and disseminated Early Detection, Rapid Response (EDRR) weed decks, with species prioritized as our most likely new invaders in this region; and
- Launched a website (<http://www.floridainvasives.org/Heartland/Projects.html>) and a Twitter page (@Heartland-CISMA) to maintain communications internally and with the public.

Landscape Objectives

Partners are working to:

- Identify how fire and invasives interests overlap, identify what is known, fill gaps in this knowledge and adopt guidelines to reduce the spread of invasives during burning;
- Seek funding for an invasives “mop-up” crew to follow strike team burns and wildfires;
- Train the fire team to identify the Top 10 invasive plants on the Ridge and report them; and
- Incorporate the integration of fire and invasives into the new Cooperative Invasive Species Management Area on the Ridge.

Landscape Partners

Bok Tower Gardens
Florida Division of Parks and Recreation
Florida Fish and Wildlife Conservation
Commission
Institute for Regional Conservation
National Park Service—Florida and Caribbean
Exotic Plant Management Team
The Nature Conservancy—Florida
U.S. Fish & Wildlife Service—Region IV
Invasives Strike Team

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Florida-Caribbean Fire & Invasives Learning Network 4.6 million acres

The Cuban archipelago is located in the Greater Antilles and comprises 4,196 islands and keys. Much of the biota is unique: over 50 percent of the flora and 32 percent of the vertebrate fauna are endemic to Cuba. Invasive alien species have been identified by the National Environmental Strategy as a serious threat to Cuban biodiversity and one of the principal causes for biodiversity loss. Vulnerability is due to the insular condition and the high level of endemism, as well as the vast diversity of species and ecosystems.

Although Cuba has four species of the fire-adapted pine trees (*Pinus* spp.), Cuban law prohibits the use of fire in forests and or within 200 meters of forests. Fire is frequently used, however, by the agricultural community as a management tool in their fields. Partners in the FILN have some local, preliminary experience in managing fire and invasive species together, but have not yet considered them together general way, or at the landscape scale. Cuba has also been working for some time on predictions and scenarios related to climate change, but has not directly related this to work with invasive species and fire. The FILN will allow partners to better assess fire and invasive species together, and develop management options to control some species in specific areas. In their first year in the FILN, partners have identified some protected areas as pilot sites to develop management plans and begun to design and implement a monitoring system.



Cuba's savannas, which are dependent on fire, are dominated by various species of palms, the majority of which are endemic to the island.

© Ron Myers/TNC

Recent Activities & Accomplishments

Cuban stakeholders are working towards hosting a workshop that will include field visits to several sites with fire and/or invasive species issues followed by hands-on training covering both conceptual and practical subject matter. Likely topics include hands-on fire training and herbicide application training.

The Zapata Swamp has been identified as a potential small-scale—but very visible—pilot site for management actions; successful implementation there will help ease concerns about collateral damage in herbicide control of *Melaleuca quinquenervia*.



Left: The impenetrable thickets formed by marabu (*Dicrostachys cinera*) have made this invasive exotic one of Cuba's top priorities for control. © Alison Higgins/TNC

Below: *Colubrina asiatica*, a very problematic invasive of pristine shoreline areas in the United States, was identified in Cuba by FLN coach Chris Bergh on a recent visit.

© David Eickhoff



Regional Objectives

Partners aim to safeguard globally-significant biodiversity in vulnerable ecosystems by building capacity at the systemic level to prevent, detect, control and manage the spread of invasive alien species in Cuba.

Landscape Partners

Cuba Forest Guard Service
Cuba Forest Service
Cuba Ministry of Science, Technology and Environment
Global Environment Facility
Santa Clara Flora and Fauna Reserve
Sierra del Rosario Biosphere Reserve
The Nature Conservancy

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Dominican Republic

Florida-Caribbean
Fire & Invasives Learning Network
720,000 acres

The Madre de las Aguas region in the central mountain range of Hispaniola Island is the source of water for hydroelectric power, domestic water supplies and irrigation systems that together benefit more than 70 percent of the country's population. The area also has high levels of biodiversity and endemism: about 90 percent of the amphibians and reptiles, half the butterflies, 35 percent of the birds and 40 percent of the plants in the area are unique to the area. Both fire and invasive species have been recognized as threats to this landscape, and both have been addressed individually; however, strategies to date have not focused on both simultaneously, or on their interactions. Partners are now working to remedy this.

As part of the FILN, partners were asked to identify the top five fire-related invasive species in their region. Using five criteria—presence in different environments, presence in a protected area, speed of propagation, permanence in a location, possibility of cost-effective action—the Dominican Republic team selected five species to focus on. Plans for managing these invasives, with strategies ranging from public education and equipment cleaning protocols to grazing management and policy change, have been developed for five pilot projects:

- *Acacia mangium* in Quita Espuela
- *Calliandra calothyrsus* in Valle Nuevo
- *Leucaena leucocephala* in Sierra de Bahoruco National Park
- *Melinis minutiflora* in José del Carmen Ramírez
- *Senna spectabilis* in Nalga de Maco

After an Early Detection, Rapid Response eradication effort to eradicate *Mimosa pigra* in Uvero Alto, La Altagracia Province, park rangers and managers of the Ministry of Environment were trained to conduct a monitoring program to avoid re-sprouting of the species.

Regional Objectives

Partners in the Dominican Republic are working to:

- Improve habitat quality and restore natural conditions in protected areas to sustain the healthy biodiversity of Hispaniola Island;
- Promote a participatory process to prevent, control and eradicate invasive alien species in the country; and
- Facilitate management tools, training and regulatory mechanisms to implement strategies that will reduce fire and invasive species threats.



Leucaena leucocephala

© Francisco Núñez/TNC

A training program on fire and invasives was established with support of the Environmental Protection Program sponsored by USAID and implemented by The Nature Conservancy, ProNatura and the Ministry of Environment. More than 180 community members and park rangers have been trained in six locations along the Dominican Republic-Haiti border.

An Invasive Alien Species National Strategy has been completed; the Strategy incorporates the relationship of fire and invasive species as one of the elements to be considered in policies and regulations developed to reduce the threats of invasives to the country.

Landscape Partners

Dominican Republic Ministry of Environment & Natural Resources
ProNatura
República Dominicana Viceministerio Áreas Protegidas
Santo Domingo National Botanical Gardens
The Nature Conservancy—Dominican Republic

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Jamaica

Florida-Caribbean Fire & Invasives Learning Network 224,000 acres

The island of Jamaica consists of a highland interior with a backbone of peaks, hills and plateaus running the length of the island, surrounded by flat coastal plains. Forests, which account for about 30 percent of the landcover, are the main repositories of biodiversity; as with many islands, there is a high level of endemism. Although about a third of the island's forests are in designated protected areas, they remain threatened by both non-native invasive species and changes in the frequency and type of fires now experienced.

Although both fire and invasive species have long been managed, there has been little integration of the two, and protected area plans do not always address these issues. A coordinated approach, in which species are prioritized and treatments are funded would be desirable, as is the adoption and use of a National Invasive Species Strategy adopted and applied. As part of the Fire & Invasives Learning Network, partners are working to increase the available knowledge and focus attention on fire, invasive species and the interactions between them in both fire-dependent and fire-sensitive landscapes across the island, and throughout the Caribbean.

Recent Activities & Accomplishments

As part of their FILN work, partners have evaluated the risks and fire effects of a number of invasive species. Root Cause Analysis—methodical tracing back to discover why a species has become invasive—has been completed for four species: *Pitosporum undulatum*, *Bambusa vulgaris*, *Panicum maximum* and *Melinis minutiflora*. With this information in hand, effective management strategies can be planned and implemented. Partners in Jamaica have also begun researching the control and management of invasive plants in the Lower Black River Morass, the largest freshwater wetland ecosystem in the Caribbean. The Morass has been designated a wetland of international importance under the Ramsar Convention; it therefore requires very “light on the land” control methods to populations of melaleuca (*Melaleuca quinquenervia*) and ginger (*Alpinia allughas*)



Melaleuca, a highly flammable, fire-adapted tree, has invaded some of the most inaccessible wetland areas in the Lower Black River Morass.
© National Environment and Planning Agency

that have escaped there. Melaleuca is a very flammable fire-adapted tree, and can release hundreds of seeds when disturbed; treatments therefore require follow-up. The current project includes mapping of the infestation, consultation and testing of various control methods, training of local conservation workers, and monitoring of progress. Implementation begins in 2012.



Melaleuca flower (left) and fruit (right); each fruit capsule contains 200-300 tiny seeds.

© Ann Murray/University of Florida/IFAS CAIP; used with permission

Landscape Partners

Institute of Jamaica
Jamaica Forestry Department
Jamaica National Environment & Planning Agency
The Institute for Regional Conservation

Regional Goal

Partners wish to integrate the management of invasive plant species and fire so that forests can be restored to their natural fire regimes and native species can flourish.

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Florida-Caribbean Fire & Invasives Learning Network 10,000 acres

The Guanica Dry Forest Reserve, a designated United Nations Biosphere Reserve, consists of 10,000 acres of dry land inhabited by over 600 species of plants and animals, including 48 endangered species and 16 species endemic to Puerto Rico. This fire-sensitive habitat is considered one of the best examples of Caribbean dry forest.

The forest has an altered fire regime due to invasion by non-native grasses that support seasonal fires. Partners have identified the elimination of the invading grasslands as a desired future condition, which will allow the current cycle of annual dry season fires to be broken.

To accomplish this, fire planning and implementation of restoration actions have been identified as the primary needs, followed by increased funding and improved coordination among local and federal agencies. Lessons learned in this landscape will provide the basis for improved management in other parts of Puerto Rico.

In the last year, the USDA Forest Service has renewed its interest in participation in this region's stakeholder group. This is particularly important, because cuts in state government have made the Forest Service the driving force among agencies in terms of both invasives and fire issues, and has been instrumental in funding and guiding a wildland firefighter training program on the island. In late 2011, stakeholders met to formalize island-wide strategies in relation to fire and invasive species management.

Breaking the Fire/ Invasion Cycle

1. Work to limit unplanned human-caused ignitions by increasing awareness and detection.
2. Strategically place fuel breaks to limit fire spread into high-value forest areas.
3. Use fuel reduction burns to control grass fuels in fire prone areas near roads or adjacent to forest.
4. Begin native forest reforestation activities to switch fuel types from flammable grass to less fire-prone native woody vegetation.

Regional Objectives

Team members are working to:

- Improve awareness about fire, invasive species and their interactions at the local government level and in agencies with jurisdiction over tasks related to them;
- Increase the level of priority for these issues;
- Enhance technology transfer and training; and
- Coordinate all planning and implementation tasks.



Invasive grasses fuel inappropriate fires in fire-sensitive habitats on the Guanica Dry Forest Reserve. © US FWS

Landscape Partners

Puerto Rico Department of Natural and
Environmental Resources
Puerto Rico Environmental Quality Board
University of Puerto Rico
USDA Forest Service
USDA Natural Resource Conservation
Service, Caribbean Headquarters

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South Florida

Florida-Caribbean Fire & Invasives Learning Network 26,000 acres

Florida's pine rockland forests are dominated by a single canopy tree, slash pine (*Pinus elliottii*), with a diverse hardwood and palm understory, and a rich herbaceous layer. The assemblage of plants is a unique combination of tropical and temperate taxa, including many endemic species; these support a wide array of wildlife, including five federally-listed animals. There are about 20,000 acres of pine rockland in Everglades National Park, 2,000 in the Florida Keys and another highly-fragmented 4,000 acres scattered across Miami-Dade County. Periodic fire is required to eliminate invading hardwoods, aid nutrient cycling and reduce litter. Fire exclusion and invasion by non-native species—and the interactions between the two—are altering the very character of this system.

Recent Activities

FILN partners met in conjunction with the South Florida Prescribed Fire Council Meeting in October 2011. Topics covered at this practitioner workshop included invasive species to watch for, equipment decontamination methods, presentations by expert burners on their successes, failures, and lessons learned.

The Florida Keys Cooperative Invasive Species Management Areas (CISMAs) recently documented and revised its invasives control list as well as its Early Detection, Rapid Response (EDRR) priority plant list. The Everglades CISMA held its annual Invasive Species Summit in July with stakeholder reports from agencies across the region.

Partners from this region contributed significantly to the Network's report to the Fire Effects Information System (FEIS) database, providing information on natal grass (*Melinis repens*).

Full report: http://www.fs.fed.us/database/feis/research_project_summaries/FILN11/all.html

Regional Goals

Goals for this landscape include returning it to a more natural fire regime of frequent (3-15 year interval) surface fires, increasing the capacity to burn in pineland areas owned by smaller land managers, managing existing invasions by non-native species and preventing new invasive species from becoming established.



Fire exclusion has contributed to the invasion by non-native species that alter the fire regime in various ways from its historic pattern of frequent, low-intensity surface fires. For example, Brazilian pepper trees can shade out native grasses and herbaceous plants, reducing flammability; on the other hand, Burma reed increases the fuel load and raises the fuel height, which can lead to excessive pine mortality.

© Amy Ferriter/South Florida Water Management District

Landscape Partners

Florida Division of Parks and Recreation
Florida Fish and Wildlife Conservation
Commission
Institute for Regional Conservation
Miami-Dade County
National Park Service—Florida and Caribbean
Exotic Plant Management Team
South Florida Water Management District
The Nature Conservancy—Florida
U.S. Fish & Wildlife Service—Region IV
Invasives Strike Team

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Florida-Caribbean Fire & Invasives Learning Network 12,000 acres

Dry forests are found in small pockets on several of the Caribbean's Windward Islands—Curacao, Grenada, Martinique, St. Lucia and St. Vincent. Characterized by steep topography and found between the rugged interior mountains and flatter, xeric coastal areas, these fire-sensitive areas are under increasing pressure from agriculture and other development. More frequent fires and invasion by non-native species are two of the threats associated with this development.

Progress has been made in the management of both fire and invasive species in the last few years. A Wild-fire Management Plan has been developed, based on stakeholder meetings and consultations, the Strategy for the Cooperation of the Caribbean on Management of Wildfires, the Jamaica National Fire Management Plan (2002) and the Central American Strategy for Fire Management (2005-2015). Funds were allocated in the national budget (under the National Emergency Management Agency) for training, equipment and public outreach. The country has both an invasive species working group and a National Invasive Species Strategy. Partners are working to ensure that efforts are integrated, both between disciplines and across the Caribbean.

Recent Activities

The St. Lucia Forestry Department (and its units), St. Lucia Fire & Emergency Service, Durrell Wildlife Conservation Trust and the national invasive alien species team held an April 2011 meeting with the theme of "Fire and Invasive Plant Management Awareness." A Forest Officer from the FILN team gave an updates on lemon grass (*Cymbopogon citrates*), as well as a report on Florida-Caribbean Fire & Invasives Network workshop held in Puerto Rico (December 2010). He also participated in the discussions of Draft Action Plans concerning invasives and some ornamentals.

Landscape Partners

St. Lucia National Emergency Management Organisation
St. Lucia Fire Service
St. Lucia Ministry of Agriculture, Forestry and Fisheries—Forestry Department
St. Lucia National Trust
The Nature Conservancy



Fires that occur in fire-sensitive dry forests expose steep slopes to erosion that can result in mudslides and long-term ecological and economic damage.
© St. Lucia Fire Service

In September, a fire manager from the Florida chapter of The Nature Conservancy travelled to St. Lucia to discuss fire training needs in the country that the Florida chapter could assist with. It was agreed a few participants from the St. Lucia Fire & Emergency Service and the St. Lucia Forestry Department should be sent to Florida in order to participate in courses there (including basic wildland fire training S130/S190, and possibly S212, L180, S131 and S133) to develop a core crew of skilled practitioners. The Conservancy would offer the courses at no cost to the crew; the remaining financial arrangements are being investigated.

Regional Goals

Partners wish to minimize the negative impact of wild-fires and invasive species on human life, biodiversity and infrastructure.

Trinidad & Tobago

Florida-Caribbean Fire & Invasives Learning Network 28,000 acres

Many parts of Trinidad and Tobago—including Nariva Swamp, deemed of international importance under the Ramsar Convention on Wetlands—face threats from fire and from invasive species that promote or take advantage of fire. Of particular concern are *Leucaena leucocephala* (a prolific seed bearer), *Acacia mangium* (which colonizes after fire), various fire-hardy vines, and bamboo. Until the Fire & Invasives Learning Network began its work, the management of fire and invasives had not been considered together.

Partners in Trinidad and Tobago are now working to strengthen the collaborative efforts that will support existing management efforts; these include an active fire prevention and education program during the fire season, fire patrols, monitoring fire behavior, controlled burning in teak plantations, removal of fire hazards along roads in plantations, and clearing trees infested with invasive vines. In addition, they are working to gain recognition for the importance of invasive species, add an invasives management component to an existing fire protection unit, increase staffing in the unit that looks after invasives and promote the use of fire in the management of ecosystems for community benefit.

Landscape Partners

CABI

The Nature Conservancy

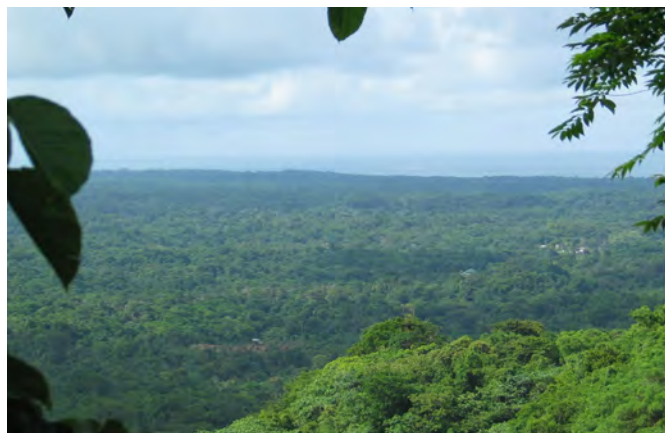
The University of Trinidad & Tobago

Trinidad & Tobago Department of Natural
Resources and the Environment

Trinidad & Tobago Ministry of Agriculture,
Lands and Marine Resources—Forestry
Division

Regional Objectives

Partners are working to minimize the risk of invasive species and to reduce the frequency and intensity of fire in fire-sensitive habitats.



The role of fire at Aripo Savannas Scientific Reserve is currently being studied. It has been assumed that all fire was detrimental for the habitat, but early indications are that the situation is more complex.

© Seepersad Ramnarine/Trinidad Department of Forestry

In February 2011, the Trinidad & Tobago team presented a webinar for the regional network highlighting two research programs:

- Dr. Puran Bridgemohan (University of Trinidad) applied a weed risk assessment to biofuel species being considered for widespread planting. Key findings included that the industry-favored *Jatropha carcus* and *Ricinus communis* had only slightly higher yields of oil than other species, but had very high potential for escape and invasion into natural areas; based on this study, *Moringa oleifera* is recommended as a preferred biofuel.
Recording: <http://vimeo.com/channels/crfl#21445115>
- Mr. Seepersad Ramnarine (Trinidad Department of Forestry) reported on a project investigating the effects of fire on the flora of the Aripo Savannas Scientific Reserve and Environmentally Sensitive Area. In addition to establishing a pictorial library of all plants within the savannas, fire effects on sundew and bladder worts, and on seed banks will be documented.
Recording: <http://vimeo.com/channels/crfl#21444498>

Trinidad and Tobago's stakeholders met for four days in November 2011, visiting both islands and progressing on regional goals. More training in fire behavior, ecology and prescribed burning has been identified as a major goal across the region. Partners have found funding to help make this happen in 2012.

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Unaffiliated Demonstration Landscapes

While most of the landscapes in the FLN function as part of a regional network of landscapes that face similar issues, a few large landscapes do not. They do, however, engage with others in the FLN nationally that face similar challenges. And like other FLNs, partners use collaborative planning and implementation in an adaptive management framework to meet their shared goals.



Centennial Valley, Montana © Liz Rank/TNC

Centennial Valley

Montana

359,000 acres

The Centennial Valley Fire Learning Network advances landscape-scale fire restoration in the western portion of the Greater Yellowstone Ecosystem (GYE) and the High Divide region through focused multi-agency projects, sharing of lessons learned and the use of rigorous science to guide managers. The project is the first of its kind in the area, and works to continuously engage more closely with other projects in Montana and Idaho to transfer lessons learned and expedite action on restoration priorities.

The 400,000-acre Centennial Valley of southwest Montana has been identified as a hotspot of biological diversity and is the last large, undeveloped, low-elevation valley in the Greater Yellowstone Ecosystem. The long-term viability of several ecological systems in the Centennial Valley depends upon ecologically appropriate fire. As in most of the West, a century of fire exclusion and altered fire regimes has substantially altered several of these ecosystems, threatening the viability of a number of species as well as the systems themselves. Warming spring temperatures and earlier snowmelt are increasing the length and intensity of the burn window in the Centennial Valley. The primary strategies for mitigating the climate-fire threats to people and forests are improving the resilience of ecosystems to fire and increasing the ability for managers to promptly respond to threats and learn through active adaptive management frameworks.

Recent Accomplishments:

In 2011, partners in the Centennial Valley:

- Launched the Sage Grouse Initiative with NRCS to engage private land owners in sagebrush steppe conservation;
- Initiated a new partnership among U.S. Fish & Wildlife Service, Montana Fish, Wildlife & Parks, The University of Montana Western and The Nature Conservancy to study insect response to fire and grazing;

Landscape Mission

Partners work to restore the critical role of fire to fire-adapted ecosystems through collaborative learning, demonstrating best practices, and safely facilitating prescribed fires and appropriate use fires on a variety of ownerships and at ecologically meaningful scales.



- Participated in the development of the Gravelly Landscape Collaborative to advance a new approach to managing forests on the Madison Ranger District of the Beaverhead-Deerlodge National Forest;
- Conducted nearly 1,000 acres of collaboratively-developed aspen and Douglas-fir treatments on BLM lands;
- Completed two projects on private lands within the Lakeview WUI; and
- Worked with over 80 high school students on volunteer projects in sagebrush and aspen habitats.



During a two-day field workshop in August 2011, partners and other stakeholders visited sites where the BLM is applying several types of restoration treatments (including commercial thinning, *top row*) to discuss and evaluate results. The second day (*bottom row*) was spent exploring ways to further engage Forest Service lands in need of restoration.

© Liz Rank/TNC

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map © 2011 Liz Rank/TNC

Strategies:

- Engage all stakeholders proactively to incorporate their considerations into projects on the front end to reduce later conflict
- Lead with demonstration projects that incorporate measures of success, and share those tangible efforts with stakeholders to facilitate effective prescriptions on the ground at ecologically meaningful scales
- Share lessons learned and collective priorities with partners, professionals, and the public at large

Tactics:

- Field learning exchanges to treatment sites with stakeholders
- Documenting effects of treatments on habitat characteristics through assessments and monitoring
- Demonstration of various treatments to initiate and lead active adaptive management programs in our landscapes
- Use of Conservation Action Planning (CAP) to integrate and summarize expert analysis and data
- Promoting research through university partnerships to inform critical conservation challenges
- Use of after action reviews to facilitate learning and progress in logistics and science

Landscape Partners

- Bureau of Land Management—Dillon Field Office
- Greater Yellowstone Coalition
- Montana Department of Natural Resources & Conservation—Dillon Resource Area
- Montana Fish, Wildlife & Parks—Region 3
- Montana State University
- Private ranch operations
- The Nature Conservancy
- The University of Montana Western
- USDA Forest Service—Beaverhead-Deerlodge NF (Madison RD)
- USDA Natural Resources Conservation Service—Dillon Office
- U.S. Fish & Wildlife Service—Red Rock Lakes NWR
- Wildlife Conservation Society

FireScape Monterey

California

977,000 acres

For decades, intense fires in the Monterey District of the Los Padres National Forest and surrounding area have been a source of controversy and loss—and a necessary ecological process. Communities built of redwood are at risk of wildfire, firefighting sends bulldozers into the treasured Ventana Wilderness, yet native plant enthusiasts appreciate the renewal that fire brings to endemic species. In February 2011, the Forest Service reached out to the Fire Learning Network for help in starting a collaborative planning process to bring stakeholders in this complex fire landscape together. Dubbed FireScape Monterey, the initial effort has revolved around the Open Standards for the Practice of Conservation as a guide to engage stakeholders in landscape-scale problem solving. As the process unfolds, the collaboration developed through this planning will provide stakeholder support for landowners and managers navigating the numerous regulatory processes necessary to implement the group's shared vision.

Starting in February 2011, FireScape Monterey partners began holding a series of events in which they—and other stakeholders—can together learn and plan for a more resilient future. Over the course of the year a total of 83 stakeholders participated in four planning workshops, three field learning trips, a fire-education field day and a fire symposium. As a result, partners with widely divergent backgrounds—representing 25 organizations from across the landscape—have gained a better shared understanding of the region's fire issues and share a vision for working together.

Landscape Vision and Values

FireScape Monterey promotes protection of both life and property affected by wildfire and healthy resilient ecosystems through collaborative stewardship.

The group pursues this vision by focusing on five values articulated during its first collaborative workshop:

- Fire-adapted human communities
- Watersheds
- Native biodiversity
- Cultural resources
- Aesthetic, natural and wilderness qualities of the northern Santa Lucia Mountains



At the July 2011 workshop, participants engaged in a hands-on exercise in basic fire behavior prediction for a fire in short grass. Flagging tape was used to represent the flame lengths and participants walked at the speed they predicted for fire spread. The exercise was one of several that helped stakeholders from a variety of backgrounds develop a common understanding of the complex fire issues in the region. © Jeff Kwasny/USFS

In the coming year, FireScape Monterey participants will move into the action planning and monitoring phase of the Open Standards process. Using the analyses of threats and opportunities completed in 2011, the group is mapping locations where actions such as fuels treatments, home retrofits or bulldozer line recovery could benefit all five of the landscape values they have identified. Proposed actions will be examined using state-of-the-art fire modeling as well as by using the knowledge of local firefighters and equipment operators. Actions that seem most promising will then be considered by each participating agency. Before actions can be taken, land managers will need to work through their required regulatory processes such as NEPA for federal land and CEQA for state and private land—processes that will be made more efficient by the collaborative efforts of FireScape.

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map © 2011 Liz Rank/TNC



Left: At the May 2011 workshop, the Chief of the Mid-Coast Fire Brigade described what it is like to fight fire and live surrounded by the fire-prone vegetation near the community of Palo Colorado; her home is perched atop the steep hill located above and to the right of this photo.

Below: Later, partners from the US Fish & Wildlife Service, Sierra Club and Coast Property Owners Association worked together on a conceptual model for the target of “redwood-dominated forests,” an example of which they had toured at the Pico Blanco Boy Scout camp the previous day.

© Mary Huffman/TNC



Landscape Partners

Big Sur Community
 Big Sur Land Trust
 CAL FIRE
 California Native Plant Society
 California State Parks
 California State University at Monterey Bay— Watershed Institute
 California Wilderness Coalition
 California Wilderness Project
 Coast Property Owners Association
 El Sur Ranch
 Jamesburg-Cachagua Neighbors United
 Los Padres ForestWatch
 Mid-Coast Fire Brigade
 Monterey Bay National Marine Sanctuary
 Monterey County Water Resources Agency
 Monterey FireSafe Council
 Monterey San Benito Range Improvement Association & Wildland Fire Safe Council
 Santa Lucia Conservancy
 Sierra Club—Ventana Chapter
 The Wilderness Society—California Region
 University of California at Davis—Plant Pathology
 USDA Forest Service—Los Padres National Forest
 USDA Natural Resources Conservation Service
 U.S. Fish & Wildlife Service
 Ventana Wilderness Alliance
 Ventana Wildlife Society

More information:
<http://firescape.ning.com/>

Jemez Mountains Climate Change Adaptation Project

New Mexico

1.4 million acres

The Jemez Mountains Climate Change Adaptation Project is one of four linked climate change adaptation pilot areas in the Southwest Climate Change Initiative (SWCCI). SWCCI is a Conservancy-led four-state collaborative effort with a goal of developing and sharing practical strategies that help ecosystems adapt to expected changes in climate. Within the Jemez Mountains project area, the land is managed primarily by federal agencies and Native American tribes. The Santa Fe National Forest and Valles Caldera National Preserve manage most of the mountains; significant acreage is also managed by Bandelier National Monument, the Department of Energy (around the Los Alamos Scientific Laboratory) and the Pueblos of Jemez and Santa Clara. Support from the Fire Learning Network over the last nine years has helped Conservancy, federal and tribal managers build their expertise in forest restoration and fire management by bringing together scientists and local natural resource managers. In recent years, efforts have shifted to incorporate an emerging understanding of climate change and its effects in the Jemez Mountains. In 2009, Conservancy and SWCCI collaborators conducted a climate change adaptation planning workshop with 50 managers and local scientists to develop adaptation strategies to improve forest and stream resilience to the expected effects of a drying, warming climate in the Southwest. In 2010, this initial effort was expanded, with the Conservancy assisting the Carson and Santa Fe National Forests, and scientists from the Forest Service and USGS to design and deliver a week-long climate change workshop for the two national forests and key partners from other state and federal agencies.

Current work includes implementing a Collaborative Forest Landscape Restoration Program project, the SW Jemez Mountains Restoration Strategy, which was awarded Forest Service funding in 2010. This 210,000-acre project on the Santa Fe National Forest and the Valles Caldera Preserve will improve stream conditions, reduce the risk of large crownfires and restore the natural role of fire at an ecologically meaningful scale. The Conservancy is a primary partner in the monitoring strategy for the 10-year project, and serves on its steering committee.

The project was also awarded a New Mexico Collaborative Forest Restoration Program grant in 2010 and is working with the U.S. Fish and Wildlife Service, New Mexico Department of Game and Fish, U.S. Geological Survey, New Mexico Forest and Watershed Restoration Institute and the University of Arizona to address climate change threats to the unique Jemez Mountains salamander by conducting additional surveys and developing best management practices for forest restoration projects. Destructive crown fires are expected to become more frequent as the climate warms, and accelerated thinning and controlled burning in mixed conifer forests is important to reduce the threat to salamander forest habitat.



The Jemez Mountains, a volcanic range at the southernmost edge of the southern Rocky Mountains, form a sky island of water and forests in an arid land. They are an important center of biological diversity, and provide a critical source of water for major urban areas. Dark areas in the photo are forests and woodlands. Visible as lighter patches are the extensive high-elevation grasslands in the heart of the ancient volcano. These unique undeveloped grasslands are one of many features that make these mountains important to conserve.

NASA Earth Observatory image created by Jesse Allen and Robert Simmon, using United States Geological Survey Landsat data (May 22, 2002)

In 2011, the Conservancy and local resource experts began a “climate smart” Conservation Action Plan, designed to more systematically include climate change considerations into managing the watersheds and diverse species habitat throughout the Jemez Mountains.

Also in 2011, partners have responded to the human-caused Las Conchas Fire that devastated over 156,000 acres of the eastern Jemez Mountains. The Conservancy is helping agency partners work across boundaries by organizing sessions of the East Jemez Resources Council, giving participants the chance to share burned area assessment information and to develop joint response plans to this severe fire and the subsequent flood damage.

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map © 2011 Liz Rank/TNC

Project Goal

The Jemez Mountains Project goal is to develop science-based climate change adaptation strategies and on-the-ground projects that increase ecosystem resilience and native species conservation under a changing climate.

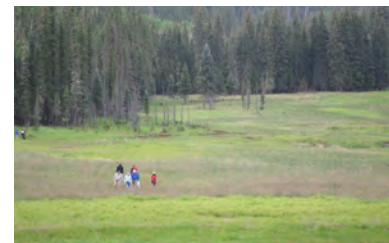


An outcome of the Jemez landscape's 2009 climate change workshop was an additional collaborative effort focused on adaptation strategies for the rare endemic Jemez Mountains salamander (*Plethodon neomexicanus*). Reducing uncharacteristic crown fire and improving current stand conditions were priorities actions identified by managers and scientists participating in two salamander workshops. To develop more specific strategies, Conservancy, federal, state, tribal and university partners are now working to develop reference conditions for Jemez mixed conifer forests and Jemez Mountain salamander habitat.

© Anne Bradley/TNC

Landscape Partners

Bureau of Indian Affairs
 Forest Guild
 Jemez Pueblo
 Los Alamos National Lab
 National Park Service—Bandelier National Monument
 New Mexico Department of Game & Fish
 New Mexico Energy, Minerals & Natural Resources Department
 New Mexico Highlands University—Forest & Watershed Restoration Institute
 New Mexico State Forestry Division
 New Mexico Trout
 Santa Ana Pueblo
 Santa Clara Pueblo
 The Nature Conservancy—Colorado, New Mexico
 Trout Unlimited
 University of Arizona
 USDA Forest Service—Santa Fe National Forest
 USDA Forest Service—Region 3
 USDA Forest Service—Rocky Mountain Research Station
 U.S. Fish & Wildlife Service
 U.S. Geological Survey
 Valles Caldera National Preserve
 Wildlife Conservation Society



Partners en route to the southernmost occurrence of bog birch (*Betula pumila*) in North America, in the Valles Caldera National Preserve © Anne Bradley/TNC

More information:

www.nature.org/ourinitiatives/regions/northamerica/unitedstates/newmexico/climate-change-in-new-mexico-jemez-mountains.xml

Parashant Partnership

Arizona

1 million acres

The Grand Canyon-Parashant National Monument in northern Arizona is a remote and undeveloped landscape and includes some of the most scenic and wildest places in America. The monument was set aside in 2000 by presidential proclamation to protect the unique and rich biological, geological, paleontological and cultural resources in the area. The primary purpose for the management of this monument is to ensure that the objects of interest identified in the proclamation that set aside the monument are protected.

Restoring fire regimes is key to the restoration of the Parashant National Monument landscape. The absence of fire in ponderosa forests has resulted in tree densities almost 20 times those of a century and a half ago; these forests have moved from high-frequency, low-intensity fires toward a condition in which the potential for unnaturally high intensity fire is substantial—and likely to increase as the climate changes. In the Great Basin region, young pinyon-juniper stands are encroaching into the sagebrush and grasslands because lingering effects of past management practices have tipped the competitive balance between the species towards the trees. In the grasslands, non-native species such as cheatgrass and medusahead outcompete native perennials following wildfire, and then alter the fire cycle after achieving dominance, making it virtually impossible for native shrubs and grasses to recover unaided.

Partners in this landscape are coming together to learn from current projects, develop management tools, and inform future management actions so that fire and other natural and human processes can coexist and the landscape can be restored to ecological health and resiliency. Partners and stakeholders from the Parashant National Monument, which is co-managed by the Bureau of Land Management and National Park Service, conducted their first FLN-sponsored field workshop in late 2010. At that workshop, and others held since, participants have gone into the field together and held symposia that bring together scientific expertise, practical experience and deep cultural knowledge of the area; these workshops are serving to develop knowledge of the conditions and characteristics of the Monument in the context of the surrounding landscape, with particular attention to the land's future and resilience.



Both Native Americans and more recent European Americans have lived and raised families and built communities in this vast, wild and scenic landscape. In spite of its apparent austerity, the Parashant sustains those who have settled here.

Above: landscape, petroglyphs, schoolhouse at Mt. Trumbull © Scott Jones

The landscape, with elevations ranging from the banks of the Colorado River to the peaks of Mount Logan and Mount Trumbull, also supports a rich diversity of wildlife, including (below) the federally-listed Mojave desert tortoise (*Gopherus agassizii*) and California condor (*Gymnogyps californianus*).

tortoise © NPS; condor © Michael Quinn/NPS



Draft Vision Statement

The vision of the Parashant Partnership is to provide a framework that facilitates collaborative dialogue from which sustainable care for and restoration of the remote, unspoiled and rugged character of the Grand Canyon-Parashant National Monument is maintained, ensuring its use and enjoyment for present and future generations consistent with the monument proclamation.

Draft Mission Statement

The mission of the Parashant Partnership is to provide a foundation of trust and mutual respect among stakeholders in order to redefine relationships, share knowledge and learning, and help inform and provide counsel to proactively drive the decision-making process involving ecological restoration in the Grand Canyon-Parashant National Monument.

statements drafted July 2011

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map © 2011 Liz Rank /TNC

Landscape Partners

Arizona Game & Fish Department
 Bar 10 Ranch
 Bureau of Land Management –Arizona State Office
 Bureau of Land Management –Arizona Strip District Office
 Citizens for Dixie’s Future
 Friends of Gold Butte
 Friends of the Arizona Strip
 Grand Canyon Trust
 Grand Canyon Wildlands Council
 Grand Canyon-Parashant National Monument (Bureau of Land Management & National Park Service)
 Kaibab Band of Paiute Indians
 Mojave Sportsman Club
 National Park Service–Lake Mead
 National Park Service–Mojave Desert Monitoring and Inventory
 Northern Arizona University –Ecological Restoration Institute
 Shivwits Band of Paiute Indians
 Sierra Club–Grand Canyon Chapter
 The Nature Conservancy
 The Wilderness Society
 USDA Forest Service–Rocky Mountain Research Station
 U.S. Geological Survey–Las Vegas Field Station



At the October 2011 workshop, partners traveled to the Pakoon Basin to observe and discuss plant communities and the effects of various restoration treatments. The trip was cut short by the rare and beautiful occurrence of thunderstorms rolling across the desert. © Richard Spotts/BLM



Plants of the Mojave ecoregion evolved under a fire regime with low fire frequency and small size wildfires. Cheatgrass is a challenge and threat in the region, as it fills the interstitial spaces, creating a continuous fuel bed through which fire can spread. This is changing the fire regime to one of high frequency, large size fires to which native plants are poorly adapted.

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Yakima Basin Shrub-Steppe & Fire Project Fire Learning Network

2.8 million acres

The Yakima Basin Shrub-Steppe and Fire Project encompasses the largest contiguous area of sagebrush habitat left in the state of Washington. The remaining shrub-steppe in Washington—now at less than a third of its original extent—experiences uncharacteristically frequent and severe fire. Shrub systems that support sage grouse and other at-risk obligates are being converted through fire to grasslands, thereby reducing shrub-steppe biodiversity. Agencies, rural fire districts and private landowners have typically spent their limited resources on suppression, with little focus on developing effective collaboration to integrate landscape restoration, innovative prevention techniques and landowner engagement to address fire at a landscape level.

The Yakima Basin Shrub-Steppe and Fire Project seeks to change how fire districts, public agencies and private landowners approach fire in this imperiled landscape, leading to a regional integrated fire management approach. In 2011, the Project embarked on the first phase of this process. Partners began actively connecting existing agency workgroups focused on fire restoration in shrub-steppe with rural fire districts and shrub-steppe and range landowners/managers by using a Community Wildfire Protection Planning (CWPP) process to help conservation specialists, landscape restoration experts, fire districts and private landowners work together to develop a model Plan in a specific focus area. Instead of working within the narrow parameter of Wildland Urban Interface (WUI) defense techniques, as many CWPPs do, this process is highlighting restored landscape function. In the longer term, this project will be used to leverage additional funding for shrub-steppe landscape restoration tasks, rural fire district training, and outreach and educational programs for agencies, fire professionals and landowners.



maps © 2011 Liz Rank /TNC



In April 2011, the network hosted an Ecological Integrity Assessment training excursion on Cowiche Mountain, visiting an area of a recent burn that inspired the development of a shrub-steppe CWPP (*left*) and an unburned area of the same site (*right*). © Joe Rocchio/WA DNR

Network Vision

The Yakima Basin Shrub-Steppe Fire Project envisions a new functional alignment among motivated, but currently disconnected regional practitioners in shrub-steppe fire: agency experts in shrub-steppe landscape ecology, fire professionals, and land managers, both private and public.

Landscape Partners

- Bureau of Land Management
–Wenatchee Field Office
- Central Washington Shrub-Steppe and Rangelands Partnership
- Cowiche Canyon Conservancy
- West Valley Fire-Cowiche Fire

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Appendices

Appendix A

Landscapes with Various Partner Types

Landscapes	Network	pg.	USFS	BIA	BLM	FWS	NPS	state gov't	local gov't	NGO	VFD	Fire Safe	tribal	military	univ/educ
Allegheny Border	APPE	85	■	—	—	—	—	VA, WV	—	—	—	—	—	—	■
Allegheny Highlands	APPE	81	■	—	—	—	■	VA	—	—	—	—	—	—	—
Bahamas	FL-OR	77	—	—	—	—	—	■	—	■	—	—	—	—	—
Balsam Mountains	GBR	81	■	—	—	—	—	NC	—	—	—	—	—	—	■
Big Piney WEP	80	55	■	—	—	—	—	AR	—	■	—	—	—	—	—
Blacklands ERP	80	98	—	—	—	■	—	AR	—	■	—	—	—	—	—
Bobtail Oak Woodland	80	57	■	—	—	—	—	AR	—	■	—	—	—	—	—
Buffalo National River	80	58	—	—	—	—	—	AR	—	■	—	—	—	—	—
Centennial Valley	87	87	■	—	■	■	—	MT	—	■	—	—	—	—	■
Central Escarpment	GBR	85	■	—	—	—	■	NC	—	■	—	—	—	—	—
Central Florida	FL-OR	78	—	—	—	■	■	FL	—	■	—	—	—	—	—
Cuba	FL-OR	78	—	—	—	—	—	■	—	■	—	—	—	—	—
Cumberland River	APPE	84	■	—	—	—	—	KY	—	—	—	—	—	—	■
Dominican Republic	FL-OR	80	—	—	—	—	—	■	—	■	—	—	—	—	—
FireScape Monterey	88	88	■	—	—	■	—	■	■	■	—	■	—	—	■
Great Smoky & Unaka Mts	GBR	85	■	—	—	—	■	TN	—	■	—	—	—	—	—
Indiana Bat Habitat	80	98	■	—	—	—	—	AR	—	■	—	—	—	—	■
Jamaica	FL-OR	81	—	—	—	—	—	■	—	—	—	—	—	—	—
Jerez	91	91	■	■	—	■	■	■	—	■	—	—	■	—	■
Kayakum Apps	APPE	85	—	—	—	—	—	PA	—	—	—	—	—	■	—
Lakeview	NW	17	■	—	—	—	—	—	—	■	—	—	■	—	—
Land Between the Lakes	80	40	■	—	—	■	—	—	—	■	—	—	—	—	—
Loosa Hills	EP	27	—	—	—	■	—	IA	■	■	—	—	—	—	—
Lower Loup	EP	28	—	—	—	—	—	NE	—	■	■	—	—	—	—
Lower Duchita	80	41	■	—	—	■	—	AR	—	■	—	—	—	—	—
Nantahala Mountains	GBR	87	■	—	—	—	—	NC	—	■	—	—	—	—	—
New River Headwaters	GBR	86	—	—	—	—	—	NC	—	—	—	—	—	—	—
Northern Escarpment	GBR	86	—	—	—	—	■	NC	—	■	—	—	—	—	—
Novaculla Uplift	80	45	■	—	—	■	—	AR	—	■	—	—	—	—	—
Parashant Partnership	95	95	■	—	■	—	■	AZ	—	■	—	—	■	—	—
Puerto Rico	FL-OR	82	■	—	—	—	—	PR	—	—	—	—	—	—	■
Refugio-Bolton Prairie	EP	51	—	—	■	■	—	TX	■	■	■	—	—	—	—
Regua Basin	NW	15	■	—	■	■	—	OR	■	■	—	—	—	—	■
SEB Escarpment	GBR	71	■	—	—	—	—	BAND	—	■	—	—	—	—	—
Sinkhole	WA Dry	7	■	—	■	—	—	WA	—	—	—	—	—	—	—
South Florida	FL-OR	85	—	—	—	■	■	FL	■	■	—	—	—	—	—
South Mountains	GBR	75	—	—	—	—	—	NC	—	—	—	—	—	—	—
Southwest Virginia	APPE	87	■	—	—	—	—	VA	—	—	—	—	—	—	—
St. Francis NF	80	44	■	—	—	—	—	AR	—	■	—	—	—	—	■
St. Lucia	FL-OR	84	—	—	—	—	—	■	—	■	—	—	—	—	—
Tapash	WA Dry	8	■	—	■	—	—	WA	—	■	—	—	■	—	—
Trinidad & Tobago	FL-OR	85	—	—	—	—	—	■	—	—	—	—	—	—	■
Trinity Mountains	DKG	21	■	—	■	—	—	CA	■	■	■	■	—	—	—
Upland Forest	80	45	■	—	—	■	—	AR	—	—	—	—	—	—	—
Upper Deschutes	NW	18	■	—	■	—	—	■	■	■	—	—	■	—	—
Western Klamath Mts	DKG	25	■	—	—	—	—	—	—	■	—	■	■	—	—
White Rock ERP	80	48	■	—	—	—	—	AR	—	■	—	—	—	—	—
WWAs (AR state)	80	47	■	—	—	—	■	AR	—	■	—	—	—	—	—
Yakima Basin	95	95	—	—	■	—	—	—	■	■	—	—	—	—	—

Note: Several partner types (e.g. private landowners, commercial interests, prescribed burn associations and some federal agencies) are not listed here; for a complete list of partners for each landscape, see its page(s). The Conservancy is a partner in virtually all landscapes. Foreign government agencies are noted in the "state" column.

Appendix B

Landscapes with USDA Forest Service Collaborative Forest Landscape Restoration Projects



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Labels are the names of CFLRP projects.

Rust color indicates FLN landscapes associated with national forest projects that have been awarded CFLRP implementation funding.

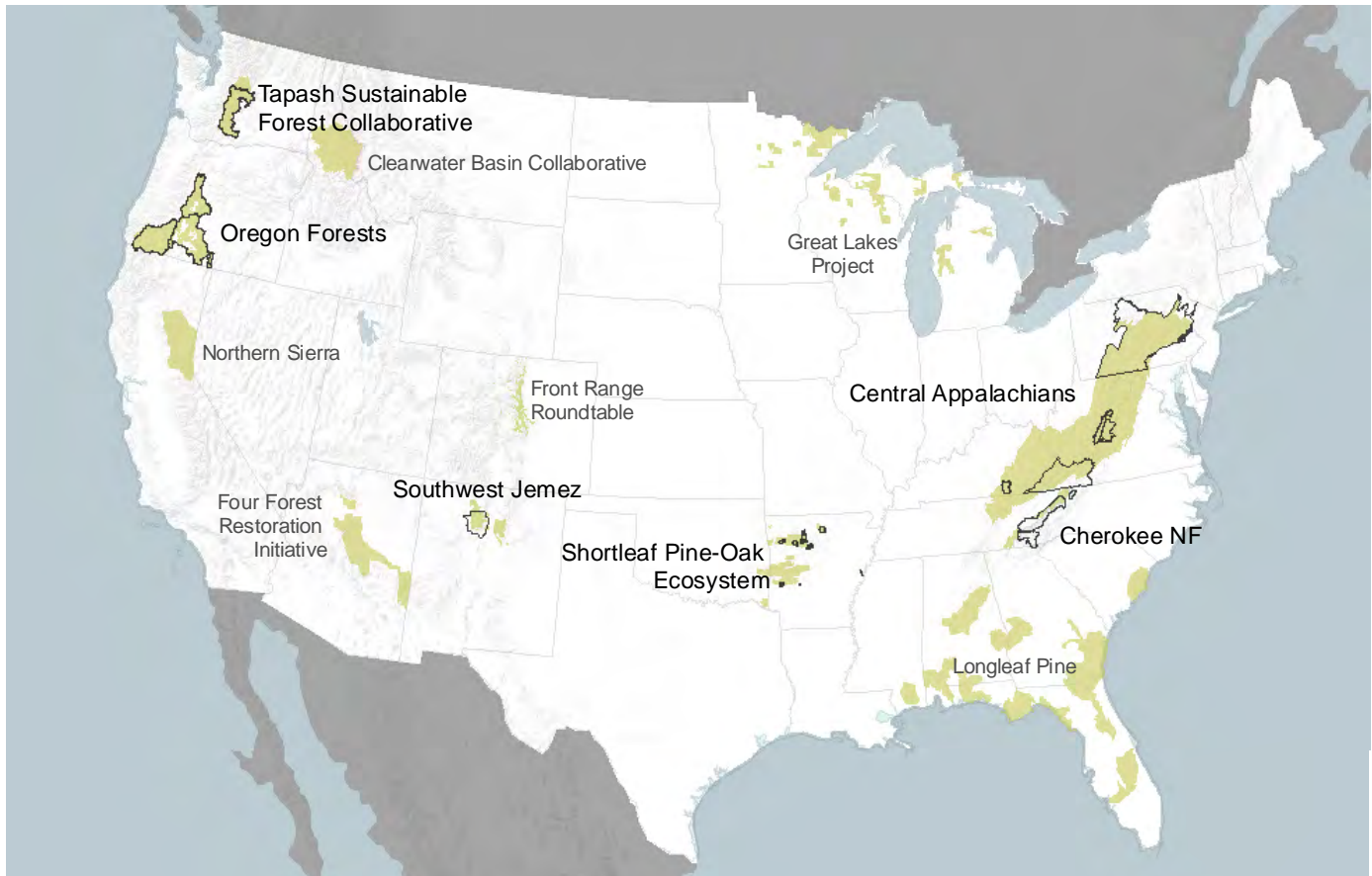
Green color indicates FLN landscapes associated with a project that received special funding based on its CFLRP proposal.

More information:

<http://www.fs.fed.us/restoration/CFLR/index.shtml>

Appendix C

Landscapes with The Nature Conservancy Restoring America's Forests Demonstration Projects



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Green indicates the 13 Restoring America's Forests (RAF) demonstration landscapes.

FLN landscapes that are part of the RAF landscapes are outlined in black:

- Tapash Sustainable Forest Collaborative
- Lakeview Stewardship Unit / Fremont-Winema NF
- Rogue Basin
- Upper Deschutes Basin
- Jemez Climate Change Adaptation Project
- South Central FLN landscapes
- Southern Blue Ridge FLN landscapes
- Appalachians FLN landscapes

Appendix D

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In the Western Klamath Mountains, partners have conducted a number of burns that provide both fuel breaks and improved habitat for wildlife. © MKWC



The Fire Learning Network is a project of the cooperative agreement “Promoting Ecosystem Resiliency through Collaboration: Landscapes, Learning and Restoration” among the USDA Forest Service, Bureau of Indian Affairs, Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service and The Nature Conservancy.



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