



NORTH CAROLINA PRESCRIBED FIRE COUNCIL NEWSLETTER
(Volume 2, Issue 2)
Summer 2009

N. C. Prescribed Fire Council Annual Meeting
August 11th, 2009

MOORE COUNTY AGRICULTURAL CENTER
CARTHAGE, NC

The fourth annual meeting of the North Carolina Prescribed Fire Council will be a great chance for members of the Council to become more familiar with burning issues and opportunities in the Sandhills region of the state. Speakers will address issues from burning during the growing season to partnerships and working with cooperators. There will be professional talks concerning all areas of the state beyond the Sandhills as well as updates from the committees and opportunities to get involved.

The meeting will be on Tuesday, August 11th from 9:00 am until 4:45 pm in Carthage, NC. A detailed agenda will be sent to all members later this month. It will be held at the Moore County Agricultural Center. Lunch will be provided compliments of The North Carolina Chapter of the Association of Consulting Foresters. Although there is no cost, please register using the form below by July 31 to ensure enough seats and food for all.

We would also like to invite all to bring along displays, posters and brochures on current work, research, products and services having to do with wildland fire management. Please contact Doug Sprouse for more information. Doug.sprouse@ncdenr.gov 919 841-4066. Additionally, if anyone has door prizes that they would be willing to donate for the annual meeting, please contact Doug Sprouse and bring your items to the meeting. Your generosity is greatly appreciated.

**N. C. Prescribed Fire Council Annual Meeting
August 11th, 2009**

**MOORE COUNTY AGRICULTURAL CENTER
CARTHAGE, NC**

Pre-Registration Deadline – Friday, July 31, 2009

First Name	
Last Name	
Title	
Organization	
Mailing address	
City, State, Zip	
Phone w/ voice mail	
Fax Number	
E-mail address	

Because of facility limitations, guaranteed space at the meeting is limited to the first 75 pre-registrants.

Mail, fax, or email completed form to:

*NCPFC c/o Doug Sprouse
NC State Parks - Yorkshire Center
12700 Bayleaf Church Road
Raleigh NC 27614
FAX: 919 870-6843
EMAIL: doug.sprouse@ncdenr.gov*



If you have questions, call Doug at 919-841-4066

FIRE COUNCIL BUSINESS AND COMMITTEE UPDATES

Following are a few highlights from the June 30 NC PFC Steering Committee meeting.

A new brochure produced by the Education and Outreach Committee is posted on our web site at: http://ncprescribedfirecouncil.org/Prescribed_Fire_Brochure_3-09.pdf Hard copies of the publication will be available at the upcoming Annual meeting. The brochure is entitled “Prescribed Fire: what North Carolina citizens need to know”.

A representative from the Governor’s Staff visited with the steering committee to discuss plans for a “prescribed fire awareness week” to be held in February 2010. Our policy and government relations committee will assemble information and coordinate the event with representatives from the Governor’s Office.

The Implementation Committee continues to work to facilitate and assist with outreach to promote training opportunities for professionals and landowners. Several upcoming workshops are outlined in this newsletter.

NC DFR, Montgomery Community College (MCC) and NC PFC are cooperating in an effort to develop a prescribed fire training center by scheduling several training events at MCC, near Troy, this fall. These events will serve as a “test run” to allow evaluation of the facilities and area amenities. Funds to support a part time coordinator position are being pursued through a grant application prepared jointly by NCPFC, MCC, and NC DFR. The application is currently being reviewed within the Department of Environment and Natural Resources.

The membership committee reported that the NCPFC has approximately 250 members.

TEN YEARS LATER

I thought back to a statement made early in my career with the Wildlife Commission. Norman Lantz, a Wildlife Forester, and I were on the Sandhills Game Land looking for longleaf pine natural regeneration and Norman said “most of our longleaf regeneration is the result of mistakes.” At the time most prescribed burns on the Game Land were cool winter burns and what Norman meant was that most of the regeneration we were finding was unplanned and occurred where a summer wildfire had removed the litter layer, controlled the oak midstory, and prepared a seedbed for longleaf pine seedlings to take hold. Today we better understand the effects of prescribed burns of various intensities, have a better ability to predict suitable burning conditions, and conduct many growing season burns. However we still look on the consequences of wildfires or “prescribed” fires that do not behave as prescribed as almost universally negative when viewed in the short term. Our attention is focused narrowly on defoliated pines, dead standing timber, and salvage sales. But as I think back to visits to the site of wildfires or prescribed fires that burned out of prescription the results are vastly different when evaluated *ten years later*.

Now, fast forward more years that I like to think about (maybe 30) and in late May I attended a Sandhills Native Plant Society sponsored field trip to look at some of the interesting, beautiful, and rare plants that thrive in the fire maintained forests on Sandhills Game Land. The trip leader was Bruce Sorie who works with North Carolina Natural Heritage and is amazing in his knowledge of natural history and taxonomy of our native plant communities.

The next to the last stop on the tour was at a series of wetlands that were open and sunny. There we listened to singing Bachman's sparrows as we wandered through a picture perfect Sandhills ecotone plant community including white wicky, a rare shrub that is a close relative to mountain laurel, Ctenium or toothache grass, that will numb your mouth if you chew it, two species of pitcher plants which obtain nutrients by capturing and digesting insects, and a host of other low growing perennials. The area had a wide open canopy of pond pine and longleaf and supported more than the average number of charred heart pine stumps, snags, and downed logs. From a trip earlier in the spring I knew that it also had a good population of pine barrens tree frogs and other rare Sandhill herps.



Above: Yellow Pitcher Plants
Photo by Jeff Marcus



Right: Sandhills Lily
Photo by Brady Beck

As we tromped around through the wiregrass and low shrubs I remembered a day about 10 years ago when a controlled burn got out of hand and roared through that same area. The burn crew came in that afternoon wide eyed, exhausted, and disappointed that one had gotten away from them. The young forester who was in charge of the burn had left his mark and his name became associated with the spot as the trees died and became skeletal monuments. The area is still referred to as the Dawe's fire. But Chris is not alone. I can carry you to other landmarks on the game land that are know as Brian's fire, Lyle's fire, or the El Salvador fire, names to denote the burn crew leader or ignition source for a fire that left a forest of snags or hole in the woods where dying trees were salvaged.

So, like the longleaf regeneration, some of the more spectacular ecological communities on the

Game Land are the result of “accidents or mistakes.” Fires that burned too hot or wildfires started by the military or lightning that roared through killing portions of the overstory. But 10 years later, after a few burn cycles, these are the areas that attract photographers, herpetologists, entomologists, or botanists like Bruce who are drawn there by the diversity of sun loving plants and animals that follow the hot burns around the Sandhills.

I don’t mean to single out the burn bosses on Sandhills Game Land, with whom I wish to remain friends, or to make light of fires that burn out of prescription. My intention here is to get past the lost timber value and destruction that grabs our attention immediately following a fire and to point out some often overlooked and unintended benefits of hot fires. While working as a biologist for the Wildlife Commission I have had an opportunity to visit many sites across the state managed by a variety of agencies, organizations, and individuals, where wildfires or fires that burned out of prescription provided unique windows of opportunity for fire loving plants and animals to thrive.

So the moral of the story is that we shouldn’t be too quick to pass judgment on the wildfire or hot burn that burns out of prescription, kills timber, and becomes a monument named for some unfortunate burner. For many rare species of wildlife and plants the hot fires present a window of opportunity where their seeds can reach mineral soil or the competition is knocked back long enough to allow them to gain a foothold and flourish. There may be other ways of creating similar habitat benefits such as timber sales followed by burns (but there is evidence, discussed in accompanying abstract, that without removing the duff that the plant community response is not as strong). But then again, with proper planning (including identifying appropriate sites and defining specific objectives) and safety mechanisms in place, maybe we shouldn’t completely rule out hot fires by prescription to rehabilitate pocosins, wetland ecotones, mountain pine stands and other habitats favored by stand replacement fires. In the future, the very existence of many plant and wildlife species may depend upon our willingness to do the preparation, outreach, and planning necessary to safely accomplish those technically difficult, but essential burns.



Kinney Cameron Drain, Sandhills Gameland

Photo by Jeff Marcus

Oh, you may be wondering why I didn't mention landmarks named for Norman Lantz, Bill Parsons, or Lincoln Sadler, Wildlife Commission employees who have spent much of their career burning on the Sandhills Game Land. The reason that there is no landmark known as Norman's fire, or Bill's fire, or Lincoln's fire..... is.....uh well.....no one would know which direction to head.

Submitted by Terry Sharpe, Past Chair - NCPFC (sharpetl@etinternet.net)

J. Kevin Hiers,¹ Joseph J. O'Brien,² Rodney E. Will,³ and Robert J. Mitchell¹
Forest Floor Depth Mediates Understory Vigor In Xeric Pinus Palustris Ecosystems

¹ Jones Ecological Research Center, Newton, Georgia 31770 USA

² USDA Forest Service Southern Research Station, Athens, Georgia 30602 USA

³ Department of Forestry, Oklahoma State University, Stillwater, Oklahoma 74078 USA

ABSTRACT. Longleaf pine (*Pinus palustris*) woodlands and savannas are among the most frequently burned ecosystems in the world with fire return intervals of 1–10 years. This fire regime has maintained high levels of biodiversity in terms of both species richness and endemism. Land use changes have reduced the area of this ecosystem by >95%, and inadequate fire frequencies threaten many of the remnants today. In the absence of frequent fire, rapid colonization of hardwoods and shrubs occurs, and a broad-leaved midstory develops. This midstory encroachment has been the focus of much research and management concern, largely based on the assumption that the midstory reduces understory plant diversity through competition via light interception. The general application of this mechanism of degradation is questionable, however, because midstory density, leaf area, and hardwood species composition vary substantially along a soil moisture gradient from mesic to extremely xeric sites. Reanalysis of recently reported data from xeric longleaf pine communities suggests that the development of the forest floor, a less conspicuous change in forest structure, might cause a decline in plant biodiversity when forests remain unburned. We report here a test of the interactions among fire, litter accumulation, forest floor development, and midstory canopy density on understory plant diversity. Structural equation modeling showed that within xeric sites, forest floor development was the primary factor explaining decreased biodiversity. The only effects of midstory development on biodiversity were those mediated through forest floor development. Boundary line analysis of functional guilds of understory plants showed sensitivity to even minor development of the forest floor in the absence of fire. These results challenge the prevailing management paradigm and suggest that within xeric longleaf pine communities, the primary focus of managed fire regime should be directed toward the restoration of forest floor characteristics rather than the introduction of high-intensity fires used to regulate midstory structure.

http://www.jonesctr.org/research/research_publications/Unrestricted/HiersEcolApps_v17p806.pdf

AWARD OPPORTUNITIES



June 10, 2009

Dear Fellow Resource Manager:

N.C. Division of Forest Resources employees are charged with developing, protecting and managing the multiple resources of North Carolina's forests. Managing these resources and meeting the demands of North Carolina landowners and citizens require a significant amount of time and dedication from NCDFR employees. To recognize NCDFR employees for their dedication to our mission, I have worked in partnership with the North Carolina Prescribed Fire Council to create the State Forester's Prescribed Burning Award.

The State Forester's Prescribed Burning Award will be presented annually to a N.C. Division of Forest Resources employee or team of employees who demonstrate leadership and excellence in accomplishing prescribed burning in North Carolina's forest ecosystems. This award recognizes significant achievements in overcoming obstacles to prescribed burning, working successfully with landowners and partners to conduct, support, and facilitate prescribed burns, and promoting the benefits of prescribed burning. The acres burned in a single year are not the sole basis for this award. The recipient(s) of this award will have shown perseverance to accomplish and support prescribed burning for the health of the forest, its inhabitants, and the citizens of the state. The award will be presented by the State Forester at the annual North Carolina Prescribed Fire Council meeting.

I encourage you to nominate a NCDFR employee(s) for this award, and I would like to see nominations from each region in the state. Complete the attached form to submit a nomination. Individuals from within and outside of NCDFR can nominate NCDFR employees.

I will chair the awards committee and will be assisted on the committee by North Carolina Prescribed Fire Council representatives.

Nominations need to be submitted to me no later than July 22. The award presentation for this year will be made at the North Carolina Prescribed Fire Council annual meeting which will be held August 11.

Your participation in our awards program is vital and is greatly appreciated. I feel there are a number of deserving individuals and groups within NCDFR eligible for this award. As such, please take the time to nominate these deserving folks. Thank you for your time and dedication to our forest resources.

Sincerely,

Wib L. Owen, Chair
State Forester's Prescribed Burning Award Committee

Attachment

**State Forester's Prescribed Burning Award
Nomination Form**

I. Date

II. Nominee(s) (should be an employee of the NC Division of Forest Resources)

Fill out the following information for each nominee or team member

Name	_____
Title	_____
Duty station	_____
Address	_____

E-mail address	_____
Phone number	_____

Name	_____
Title	_____
Duty station	_____
Address	_____

E-mail address	_____
Phone number	_____

Name	_____
Title	_____
Duty station	_____
Address	_____

E-mail address	_____
Phone number	_____

Name	_____
Title	_____
Duty station	_____
Address	_____

E-mail address	_____
Phone number	_____

III. Descriptive Title of the achievement.

IV. Quantitative information on the achievement:

Please provide a short description of the nominee's achievement in the following categories where applicable. The information may be attached on additional pages or inserted where appropriate as an electronic file.

- 1) Achievements in overcoming obstacles to prescribed burning
- 2) Partners/Landowners involved
- 3) Conservation and management benefits
 - a) Species influenced (flora and fauna)
 - b) Area (acreage) influenced
 - c) Regional impacts
 - d) Other
- 4) Educational benefits
 - a) Target audiences
 - b) Estimated size of audience reached
 - c) Other
- 5) Scientific contributions
 - a) Dissemination of information through reports, manuals, publications or other media
 - b) Influence on management policies
 - c) Other
- 6) Protection Benefits
- 7) Brief description of economic benefits

V. Narrative Description of the Achievement (1-page)

Provide a detailed description of nominee’s significant contributions to prescribed burning in North Carolina. Include what barriers the recipient(s) overcame, the acres burned, the benefits to the forest, other benefits. Describe leadership and work with partners. Include any other accomplishments or characteristics that make this (these) recipient(s) worthy of this award. Description should be between 300 and 600 words.

VI. Provide the following information for the Nominator: (does not have to be a NCDFR employee)

Name	_____
Employer	_____
Title	_____
Duty station	_____
Address	_____
E-mail address	_____
Phone number	_____

Please submit nominee(s) by mail, fax, or e-mail to:

Wib L. Owen, Chair; State Forester’s Prescribed Burning Award; North Carolina Division of Forest Resources; 1616 Mail Service Center; Raleigh, NC 27699-1616; Tel: (919)857-4844, Fax: (919) 857-4802; Email: wib.owen@ncdenr.gov

CONSERVATION FORESTRY AWARD

The Center for Conservation Solutions seeks nominations of a family forest owner whose early adoption of innovative conservation forestry practices has proven both ecologically and socially beneficial. The family forest owner should demonstrate deliberate and on going efforts to conserve their forestland in alignment with a written management plan, and also perform landowner and community outreach to promote forest ecosystem stewardship. The family forest owner should possess a holistic view of the forest ecosystem that guides progress toward healthy forest conditions.

APPLICATION REQUIREMENTS

Nominations should consist of:

1. Cover letter
2. [Nomination form](#) (see questions below – limit two pages plus four photos or video)
3. Two letters of additional support

Questions for Nominator:

1. How long has the landowner owned/engaged with the property?
2. How has this land owner embodied an exemplary conservation ethic for land stewardship?
3. Describe specific innovative goals, objectives and activities that the landowner has undertaken.
4. What has the forest owner done to increase understanding of the current and potential health of their forest ecosystem?
5. Describe and identify the specific healthy forest ecosystem condition that the landowner is working to achieve.
6. What specific outreach activities has the landowner undertaken to promote forest ecosystem stewardship?
7. What resources have helped the landowner (agencies, non-profits, universities, etc.) to develop his or her stewardship plan?

Submissions Due: An electronic copy of all proposal materials must be received by mmunford@forestfoundation.org prior to 5 p.m. EST on Tuesday, September 1. Photographs and materials submitted become the property of AFF and may be used in publicizing the award.

AFF will acknowledge receipt of all nominations through an email to the nominator. The award includes a \$2,000 cash prize for the winner and a trip for both nominator and winner to Washington, DC for the award ceremony on October 15, 2009.

Please join us in this opportunity to recognize conservation leadership by a family forest owner.

WILDLIFE SURVIVES MYRTLE BEACH AREA BLAZE
Preserve's flora, fauna rebound thanks to prior controlled burn
By Kelly Marshall Fuller - kfuller@thesunnews.com

CONWAY -- Dark, twisted trees contrast with the green boughs and frothy undergrowth waving in the wind Wednesday at Lewis Ocean Bay Heritage Preserve. The fire that swept through the 9,700-acre wildlife preserve in Conway last week still smolders, but signs of life are evident a week after the worst forest fire to hit the protected property in 30 years.

While some wildlife may have to relocate to undamaged areas, there are no signs that large numbers of birds and animals were killed, said Deanna Ruth, a biologist with the S.C. Department of Natural Resources.

The trees that provide habitat to the red-cockaded woodpecker survived the fire, and much of the foliage that provides food for the deer remains in place, she said.

The preserve is a critical piece of the Grand Strand's environment. It is home to protected species of plants that grow only in certain areas of the Carolinas and it provides habitat for the black bear and the red-cockaded woodpecker, according to biologists and wildlife officials.

Officials with the S.C. Forestry Commission and the DNR credit the controlled burns done before the fire with saving at least 1,000 acres from the flames. Controlled burns, meant to clear undergrowth from the forest, helped stop the blaze in its tracks in some areas, Ruth said. "It burned 2,000 acres on the preserve, but if there is no fuel, the fire just creeps," Ruth said. "It's easier to extinguish."

The footprints of the fire are apparent in places where live trees and pine needles remain. Other trees were more heavily damaged, since the blaze ignited the thick underbrush, crept up the tree trunk and killed the upper limbs.

Black bears managed to escape the flames and have been seen rambling through the area, according to DNR officials, who surveyed the property this week. Biologists believe the bears will be seen in more urban areas, since some of their habitat was destroyed. Jim Luken, a biology professor at Coastal Carolina University, said at least one black bear has been seen wandering across the CCU campus this week.

One nesting pair of bald eagles will need to find new living territory, but there is hope that their 12-week-old chick survived the flames, said Charlotte Hope, a biologist with the DNR. The chick was old enough to fly, so there is a good chance the bird escaped the blaze, she said. Another 11-week-old eagle chick being raised in the same area was thought to be too young to fly, Hope said. The adult eagles would have flown away from the fire, and will be looking for new trees to live, she said. "There were two nests there," Hope said. "It will be a large area that was destroyed; they will have to go pretty far to find a suitable tree that has suitable habitat. I'm afraid they'll have to go miles away."

Meanwhile, pitcher plants, Venus' flytraps and other hardy native species were already returning to life, Luken said. The flytraps would have turned brown during the fire, but they quickly rebound after the flames subside, Luken said. They were already showing signs of a healthy appetite Wednesday afternoon. Luken peered inside a tiny plant and found evidence that the flytrap was already digesting a bug. "Venus' flytraps need fire to regenerate," Ruth said.

The red-cockaded woodpeckers remain in the preserve, with no apparent harm done to their numbers, Ruth said. "What we're finding is that there is very little damage to nesting trees," she said. "We're not in as bad shape as we thought. We were very pleasantly surprised. They left very briefly, but they came back."

ANNOUNCEMENTS AND TRAINING OPPORTUNITIES

NC Certified Burner Course

October 27-28

Montgomery Community College, Troy, NC

[Online registration.](#)

For more information,
contact [Melinda Gore](#) at 919-857-4825

RX-410 Smoke Management Techniques

Haw River State Park

11/16-19/2009.

The course will be offered jointly by NCDFR and TNC. Cost approx \$60/day for room and board, no tuition. It will be advertised through DFR and TNC websites in next few weeks.

http://www.dfr.state.nc.us/education/nwecg_training.asp

http://www.tncfire.org/training_fire.htm

The North Carolina Tree Farm Program will hold regional workshops in September. One will be at Camp Grimes Boy Scout Camp in McDowell County on September 17. Advance registration can be made by calling the McDowell County Cooperative Extension Service at 828-652-8104 and ask for Daniel Smith. The other workshop will be at Montgomery Community College on September 19. Advance registration can be made by calling the Montgomery County Cooperative Extension Service at 910-576-6011. There will be speakers on issues of interest to forest landowners in the morning at both workshop followed by lunch and afternoon field trip to a local Tree Farm.

Contact info update needed for Certified Burners

Certified burners please visit the NCDFR Website at:
www.dfr.state.nc.us

In the lower right corner of the home page is a link to Certified Burner update which will take you to a page with the information below.

The NCDFR is attempting to update contact information for persons who have successfully undergone training required to become a state-recognized certified burner as defined in the [North Carolina Prescribed Burning Act](#). If you have undergone such training and wish to continue to be listed with the division as a certified burn boss, please fill out the form on this page. If you are interested in becoming a certified burner, or are uncertain of your certification status, please contact [Melinda Gore](#) at 919-857-4825.

The NC Division of Forest Resources has recently launched a new section on their website http://www.dfr.state.nc.us/fire_control/fc_fire_environment.htm. The “Fire Environment” section of the site has been added in order to provide resource managers and prescribed burners a “One Stop Shopping” location to find useful information on fire management. Subjects covered include Fire Weather, Fire Danger, Smoke Management, Fire Effects, Weather Stations, and the Fire Environment Working Group. Over the next 18 months, with help from the NC State Climate Office, the site will be expanded to include interactive mapping and smoke modeling. For questions about content or suggestions please contact Michael Cheek (Michael.cheek@ncdenr.gov) with the NC Fire Environment Working Group. For a look into the future visit <http://okfire.mesonet.org/> to see interactive weather maps for Oklahoma. NC DFR is working toward similar software to assist NC fire managers.

The Association for Fire Ecology (AFE) is pleased to announce the call for Paper/Abstracts and Poster Presentations for the Fourth International Fire Ecology and Management Congress: Fire as a Global Process. Please note that the special sessions call deadline has been extended to 1 September 2009.

Our key-note speaker will be Bruce Babbitt, former Secretary of the Interior. He will put current and future Global Fire concepts into

perspective. Plenary sessions will feature invited speakers including Winston Trollope, South Africa; David Bowman, Australia; Cliff White, Canada; Ioannis Z. Gitas, Greece; Dale Wade, USA; Dr. Ronald Wakimoto, USA; Oyunsanaa Byambasuren, Mongolia; Dante Arturo Rodriguez-Trejo, Mexico; . The speakers will focus on the regional dichotomy between indigenous cultural use and understanding of fire and modern cultural attitudes toward fire.

The theme for the 4th International Fire Congress is "Fire as a Global Process." The program sessions will include presentations on topics related, but not limited, to the following primary themes:

- * Fire Effects
- * Human Dimensions
- * Integrating Science and Management
- * Fire Behavior
- * Landscape Level Issues
- * Fire History
- * Role of Technology

Authors are invited to submit abstracts by downloading the form online <http://www.fireecology.net/Congress09/Home.html>

Please limit abstract length to 300 words and submit abstracts in pdf format. Submit your completed online submission form and abstract (pdf) by e-mail to micah-john.beierle@ttu.edu . Submissions will be reviewed and placed in the appropriate session by the Program Committee. Authors will be notified of the Program Committee's decisions by e-mail by 21 September 2009.

Authors will also be encouraged to submit papers for a special Congress issue of Fire Ecology: the Journal of the Association for Fire Ecology.

We look forward to seeing you in Savannah!

The 4th International Fire Ecology and Management Congress Steering and Program Committee

Sandra Rideout-Hanzak, PhD (USA)
Steering Committee Chair
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Robert W. Gray (Canada)
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Doug Sprouse	Chair-elect (Vice-Chair)	doug.sprouse@ncdenr.gov
Terry Sharpe	Past Chair	sharpetl@etinternet.net
Faren Wolter	Secretary-Treasurer	fwolter@uncfsu.edu
Jim Gray	At-large steering committee	jmgray1@earthlink.net
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Chris Moorman	At-large steering committee	chris_moorman@ncsu.edu
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- VACANT -	Chair, Data Collection committee	-
Bob Mickler	Co-Chair, Policy committee	rmickler@alionscience.com
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Margit Bucher	Chair, Implementation committee	mbucher@tnc.org
Mark Megalos	Chair, Membership committee	mark.megalos@ncsu.edu

FIRE-ADAPTED PLANT HIGHLIGHT BUILT TO BURN

I have thus far written these articles on individual species and their dependence on fire – where fire can benefit seed germination and reduce competition from woody plants. Most fire-dependent communities typically comprise a suite of plant species that are adapted to fire by possessing deep rootstocks, fire-resistant bark, or having seeds that actually require heat or smoke to germinate. But there are also architectural and chemical characteristics that create a fire-prone plant community that is “built to burn.”

Our North American conifer forests historically undergo stand-replacing fires on a century or longer frequency. Conifers tend to have needles that are high in volatile oils as well as bark and lower (dead) branches that act as ladder fuels. But many of these conifer forest conflagrations exceed ecosystem tolerances because of unnaturally heavy fuel loads or human-caused water table draw-down (such as with the Evans Road Fire).

An unfortunate flip side to the built-to-burn plant community are those that do not contain fire-

adapted plant species, but are invaded by exotic species that are fire-adapted. Examples include cheatgrass (*Bromus secalinus*) in the Great Basin and fountain grass (*Pennisetum setaceum*) in Hawaii, both of which cause fires to burn more frequently and at hotter temperatures than the native plant communities can tolerate.

The best examples of fire-prone communities in North Carolina are those of the Sandhills and Coastal Plain where, for example, an evergreen gallberry (*Ilex glabra*)/wax myrtle (*Morella* spp.) understory burns like the leaves are filled with gasoline. In general, fire is promoted by plants that retain dead branches and have highly flammable litter, as do many pine species. For a recent popular article on this subject, see <http://judson.blogs.nytimes.com/2009/07/07/on-fire/?emc=eta1> by Olivia Judson. But the most interesting part of Judson's article is found in the Notes at the end where many of the primary references on fire ecology and plant adaptations to fire are listed.

With the work of the NC and other state Prescribed Fire Councils, many of those plant communities that are built to burn continue to do so. And with global climate change already affecting rainfall patterns and temperature extremes, we will see shifts in plant community composition, structure, and fire dependence, but that's another story...

Submitted by Johnny Randall, Ph.D., Assistant Director, North Carolina Botanical Garden, The University of North Carolina at Chapel Hill.



RESEARCH UPDATES

POTENTIALLY HARMFUL CHEMICALS FOUND IN FOREST FIRE SMOKE

Science Daily (May 2, 2009) — Researchers have detected common plant toxins that affect human health and ecosystems in smoke from forest fires. The results from the new study also suggest that smoldering fires may produce more toxins than wildfires - a reason to keep human exposures to a minimum during controlled burns.

Finding these toxins -- known as alkaloids -- helps researchers understand how they cycle through earth and air. Smoke-related alkaloids in the environment can change aquatic and terrestrial ecosystems, as well as where and when clouds form. The study, which was of Ponderosa pines, by scientists at the Department of Energy's Pacific Northwest National Laboratory will appear June 1 in *Environmental Science and Technology*.

"Ponderosa pines are widespread in areas that are prone to forest fires," said PNNL physical chemist Julia Laskin, one of the coauthors. "This study shows us which molecules are in smoke so we can better understand smoke's environmental impact."

As trees and underbrush burn, billowing smoke made up of tiny particles drifts away. The tiny particles contain a variety of natural compounds released from the plant matter. Researchers have long suspected the presence of alkaloids in smoke or detected them in air during fire season, but no one had directly measured them coming off a fire. The PNNL researchers had recently developed the technology to pick out alkaloids from the background of similar molecules.

To investigate chemicals given off by fires, the team captured some smoke from test fires organized by Colorado State University researchers. These researchers were doing controlled burns of ponderosa pines, underbrush and other fuels at the Forest Service Fire Science Laboratory in Missoula, Mont.

The scientists collected smoke samples in a device that corrals small particles. Using high-resolution spectrometry instruments in EMSL, DOE's Environmental Molecular Sciences Laboratory on the PNNL campus, they then determined which molecules the smoke contained. At EMSL, the researchers used the new methods to glean highly detailed information about the smoke's composition.

The team found a wide variety of molecules. When they compared their results to other studies, they found that 70 percent of these molecules had not been previously reported in smoke.

"The research significantly expanded the previous observations," said aerosol chemist and coauthor Alexander Laskin.

In addition, 10 to 30 percent of these were alkaloids, common plant molecules that proved to be quite resistant to the high temperatures of fire. Plants often use alkaloids for protection, because

they can poison other plants and animals, including humans. Alkaloids also have medicinal value (caffeine and nicotine, for example, are well-known alkaloids that aren't found in pine trees).

A large percentage of the alkaloids were those that carry biologically useful nitrogen through atmospheric, terrestrial and aquatic environments. Because of this, the results suggest smoke might be an important step in this transport. Also, the nitrogen-containing alkaloids have a basic pH, which can make cloud-forming particles less acidic, and in turn impact cloud formation that is critical to global agriculture and water supplies.

The researchers also found that the abundance of alkaloids depends on how vigorously the fire burns. Smoldering fires such as those in controlled burns produce more of the compounds than blazing fires such as those fanned by high winds. Because some plant alkaloids might be harmful, the result could affect planned fires upwind of human populations.

For future studies, the researchers are developing a method to quantify the alkaloids and related compounds in smoke to better understand their chemical composition and prevalence.

This work was funded by the DOE Office of Science through the Office of Basic Energy Sciences, the Office of Biological and Environmental Research, and the Science Undergraduate Laboratory Internship program.

<http://www.sciencedaily.com/releases/2009/04/090430091057.htm>

Pope, TL, WM Block and P. Beier. 2009. Prescribed Fire Effects on Wintering, Bark-Foraging Birds in Northern Arizona. JWM 73(5):695–700

ABSTRACT:We examined effects of prescribed fire on 3 wintering, bark-foraging birds, hairy woodpeckers (*Picoides villosus*), pygmy nuthatches (*Sitta pygmaea*), and white-breasted nuthatches (*S. carolinensis*), in ponderosa pine (*Pinus ponderosa*) forests of northern Arizona, USA. During winters of 2004–2006, we compared bird density, foraging behavior, and bark beetle activity among burned treatment and unburned control units. Hairy woodpecker density was 5 times greater in burn units, whereas white-breasted nuthatches and pygmy nuthatches had similar densities between treatments. Compared to available trees, trees used by foraging hairy woodpeckers had 9 times greater odds of having bark beetles in control units and 12 times greater odds in burn units. Tree diameter appeared to be the main factor bark-foraging birds used in selecting winter foraging trees. Our results suggest that forest managers can use prescribed fire treatments without detrimental effects to wintering nuthatches, while providing additional food to hairy woodpeckers.

INSTRUCTING TOMORROW'S PRACTITIONERS TODAY: PRESCRIBED FIRE TRAINING IN UNIVERSITY NATURAL RESOURCE PROGRAMS

Mark Melvin, Kevin McIntyre, David Brownlie, Frank Cole and Michael Wimberly

ABSTRACT: Currently, few opportunities exist for students in university natural resource programs to learn applied aspects of prescribed fire as a management tool. In the southeastern United States, fire is an ecological imperative for many coastal plain ecosystems and future natural resource management professionals need training in the use of prescribed fire as a management tool. The Joseph W. Jones Ecological Research Center, located in southwest Georgia, conducts basic and applied research on coastal plain ecosystems and has conservation as well as education programs as part of its mission. The Center is located at Ichauway, a 29,000 acre property that includes 18,000 acres of fire-dependent longleaf pine dominated forests. The Center has an active fire management program, burning over 10,000 acres annually. As part of its education program, a weeklong "Maymester" prescribed fire class is offered to upper-level undergraduate and graduate students. The course gives hands-on experience with all aspects of planning and implementation of prescribed fire as well as the ecological basis and historical uses of fire as a management tool. Instructors include representatives from the Jones Center, U. S. Fish and Wildlife Service, Georgia Forestry Commission, and the University of Georgia (UGA), and the course carries two semester-hour credits through UGA. Participants have included students in forestry and wildlife management from the UGA Warnell School of Forest Resources as well as conservation biology students from the Institute of Ecology. This course fills an important niche in the natural resource management curriculum, emphasizing both the science and the art of prescribed fire as a management tool.

ANOTHER SIDE TO THE CARBON CREDIT COIN

David Ray, Forestry Scientist

The basic theory underlying emerging markets for carbon sequestration by forests was presented in a recent issue of Tall Timbers E-News (Pope and Maine). Forest landowners of all stripes are curious about what this new income opportunity might mean for them, and rightly so. The justification for carbon trading is mitigating the negative impacts of climate change. Trading does have the potential to reward a public service that may be provided by private forests. Forest economists have long struggled to find ways to compensate forest landowners for 'ecosystem services' that extend beyond the boundaries of their ownership: clean air and water, biodiversity conservation, and open space values, to name a few. Carbon credits may well turn out to be the first widely accessible incarnation of this type of market.

Whatever the future may hold in this area, it is useful for landowners to have a sense of how their forests are likely to measure up. The Red Hills landscape (NOTE: The Red Hills is an area around and between Tallahassee Florida and Thomasville Florida that has a large portion of the land devoted to quail plantations. It has 200,000 plus acres of private hunting plantations managed for open pine woodlands with a diverse groundcover.) is unique in many ways, and there is reason to believe that the same factors that make this place special, will figure prominently into any opportunities to generate income from forest based carbon credits, at least

as presently envisioned. At issue here is the current and future state of forest cover and how that fits with the accounting procedures used to allocate credits. For Red Hills' landowners, we are primarily talking about mature forests and fairly open (low density) tree canopies. These forest characteristics turn out to be two big strikes from the perspective of carbon markets- what follows is an attempt to explain why.

A central concept of carbon accounting is 'additionality', where carbon credits accrue in relation to increases in forest biomass. In other words, currently you do not get credit for what already exists at the time of entry into the market. Here in the Red Hills, mature upland pine forests tend to be in an equilibrium state in relation to biomass, due to lightning strikes and selective harvest removals being balanced out by the growth of smaller trees. Under this scenario, no salable carbon credits would accrue. Thus, in order to generate credits, a landowner in this situation would need to increase, and maintain, the amount of forest biomass that exists on their property. And while there are certainly opportunities to accumulate biomass (and thus carbon credits), it is probably not reasonable to expect that credits will accrue at rates similar to those presented for pine plantations. The pine plantation example tends to be the 'model' system used to introduce and promote this market.

Further, it is widely recognized that there is an upper limit to the amount of biomass that upland pine forests can support and still maintain the conservation and aesthetic values that are of primary interest to Red Hills' landowners. Evidence presented in the Red Hills Forest Stewardship Guide indicates these values are best maintained with pine basal areas in the range of 40-60 ft²/ac. This science based recommendation is well below that which could possibly exist, when compared to high density pine plantations (150-200 ft²/ac). Thus, while it would be possible for a landowner who's forest is currently below the upper end of that range, i.e. a basal area less than 60 ft²/ac, to enter into this market without compromising the values for which they own the land, neither the number of credits nor the rate at which they will accrue should be expected to approach those that are possible for intensively managed pine plantations.

Another important consideration here has to do with the maturity of the overstory trees and the multiaged structure that is characteristic of upland pine forests in the Red Hills. Trees like people grow rapidly when they are young, particularly in height, and continue to 'fill out' in diameter over time. As a result young trees accumulate biomass (or carbon) more rapidly than old ones. However, unlike in a plantation situation where all trees are approximately the same height and thus have similar access to sunlight as their neighbors, young trees in multiaged stands tend to grow more slowly due to competition from nearby canopy trees that are much larger.

In order to examine these differences I used a forest growth model to compare the accumulation of carbon credits by upland pine forests typical of Red Hills' hunting plantations with those that might be expected from a young pine plantation. As expected, the difference is dramatic (Figure 1). On average, carbon credits were generated 10 times faster in the pine plantation than in the mature upland pine forests. More densely stocked upland pine forests produced carbon credits at a faster rate, around 1 credit/yr at 60 ft²/ac vs. 0.3 credits/yr at 20 ft²/ac. Given a current value of around \$1.50/credit on the Chicago Climate Exchange, their sale (valued at between \$0.45 and \$1.5/ac/yr) would not cover the costs required to bring them to market (\$2-3/ac according to Pope and Maine). If the price per credit were to rise to \$15/credit, as some are predicting will

happen under mandatory cap and trade legislation, then \$4.5 to \$15/ac/yr would more than offset those up front investments. However, conventional wisdom suggests it is unlikely that mandatory markets will view forestry projects as liberally as the voluntary market represented by Chicago Climate Change. This will likely make the costs of enrollment go higher.

In conclusion, no one really knows how this market is going to develop, and therefore what kind of an opportunity carbon credits may come to represent for forest landowners in the future. What is certain is that this opportunity needs to be evaluated in the context of conditions that exist on the ground, and in light of how related decisions are likely to complement or conflict with the values for which the property is otherwise being managed. As the carbon market information develops we will keep you abreast. I am happy to entertain any questions you may have regarding developments in this area. Contact me by phone, 850.893.4153, x277 or email: dray@trs.org.

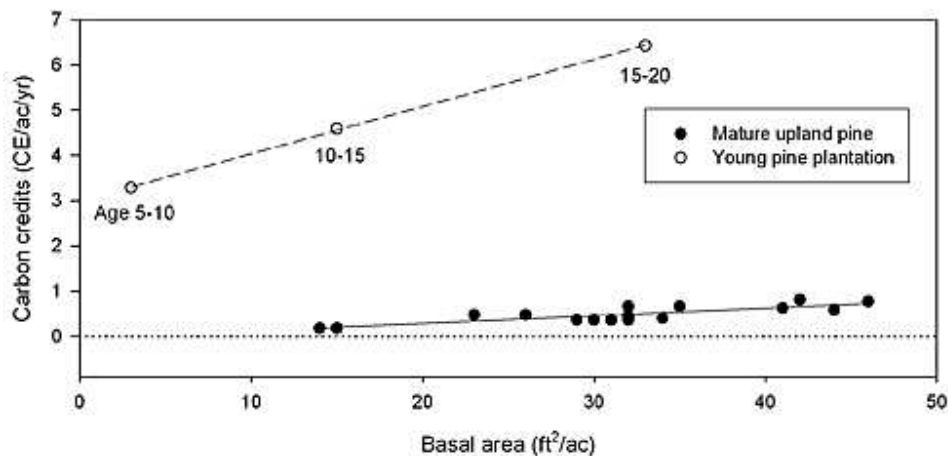


Figure 1. The relationship between forest density (basal area) and the generation of carbon credits under two management systems, mature open-canopy pine uplands and densely stocked pine plantations, as forecast by the Forest Vegetation Simulator. Ages associated with the pine plantation are presented for clarification. Note however that the rate at which credits are generated does not continue to climb for the pine plantation, and in fact drops off sharply after about age 30 (data not shown here) owing to constraints on growth discussed in the article.

Reprinted from Tall Timbers E-News
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<http://www.talltimbers.org/ttnews/news.cfm>

Note regarding the news release below: While it is not the intent of the NC Prescribed Fire Council to endorse or advertise any particular company for any particular product, your NC Prescribed Fire Council newsletter editors felt it was appropriate to share the following news release so that Prescribed Fire Council members are aware that such services are available.

NEWS RELEASE

FOR IMMEDIATE RELEASE

CD RIGDON & ASSOCIATES, LTD. OFFERS NEW CGL PRESCRIBED FIRE POLICY

Naperville, IL—CD Rigdon & Associates, Ltd. has announced the creation of a new Commercial General Liability policy for specialty professionals involved with prescribed fires and grassland burning. Prescribed fire is an important land management tool utilized in most states.

This product is the culmination of nearly 18 months of research into a unique market segment that is grossly underserved by the property casualty insurance industry. “There have been only limited carriers in the U.S. today that have been willing to offer commercial liability coverage for this class of business,” says Chris Rigdon, president of the firm. In 2007 there were over 3,000,000 acres that utilized prescribed fire in U.S. forestland alone, plus thousands of acres of privately owned land. There are literally hundreds of well-trained prescribed fire professionals throughout the country involved in this activity.

The primary coverage being offered is an ISO commercial general liability policy with enhanced options. Initially the product will be offered on an excess and surplus lines basis through an A+ XV rated carrier. The basic policy limit is \$1,000,000/\$1,000,000 with special sublimits for pollution and fire suppression. Coverage may be written on an annual or a “per-job” basis. Applicants are required to complete a “no-obligation” application to secure premium quotes and policy terms.

The ideal candidate for this type of policy would be the professional contractor, landowner or specialty consultant that is regularly conducting prescribed burns. Consideration will be given to a wide range of firms that may also perform forest management and ecological consulting, fire suppression, mechanical clearing, grassland restoration, tree pruning and brush removal. The product is available in all states except California and counties south of a line from Ocala to Daytona Beach, Florida.

CD Rigdon & Associates, Ltd., a casualty insurance brokerage firm, has offices in Illinois, but does business in most states. For additional information please contact via email Chris Rigdon (chrisr@cdrigdon.com) or Doug Rigdon (dougr@cdrigdon.com) or by phone at 800/972-4407.

Prescribed Fire Q&A from CD Rigdon & Associates, Ltd.

Q: What is prescribed fire liability insurance?

A: Prescribed Fire Liability Insurance is a type of General Liability policy, which protects the owner of the policy from claims for bodily injury or property damage to a third party that are a direct result of a prescribed fire that escapes due to adverse conditions or due to smoke that could cause impaired visibility on a road.

Q: Are defense costs covered?

A: Yes. This type of Commercial General Liability coverage has a duty to defend against claims unless or until it is clear that coverage does not apply. As an insurer, we know skilled claims professionals and attorneys in your area who would be assigned in your defense to handle such a matter.

Q: Who needs prescribed fire liability insurance?

A: If you are an employee of the Federal government, you are not likely to need this coverage. If you are not an employee of the Federal government and are operating as a sole practitioner or privately held corporation, you are not immune to the legal costs associated with claims or lawsuits. You should have coverage, even if only for the defense provisions.

Q: Why, as a prescribed fire contractor, would I need liability insurance?

A: If you are a Prescribed Fire Contractor, the people who you perform burns for will want or may require you to carry insurance against claims for injury or property damage arising from escapes and smoke at the minimum. The fact that many contractors have apparently operated in the past without insurance is a surprise, particularly when you measure the potential financial risks associated with uninsured bodily injury or property damage claims.

Q: I have not previously purchased liability insurance, why should I now?

A: As a general statement, insurance companies in the past have not raced into the market to offer prescribed fire liability insurance. Their hesitation is likely due to the nature of the exposure, the class of business or the risk of potential claims, all of which are exactly the same reasons why you should seek out such coverage written by a financially strong carrier.

Q: What coverages are provided by your program?

A: Prescribed Fire Liability coverage responds to claims due to third party bodily injury, property damage, personal injury and advertising injury. Also, there is a special grant of coverage for escaped fire suppression expenses incurred by others to suppress the escape, up to \$10,000 per day, \$100,000 aggregate.

Q: What policy limits are available?

A: Currently limits of up to \$1,000,000 each occurrence, \$2,000,000 aggregate are available.

Q: Are independent contractors covered?

A: Independent contractors are covered for injury or damage they may cause to a third party while they are operating under your direct supervision, but not for injury or damage, which may occur to them.

Q: Who is eligible to receive quotes in this program?

A: Eligible applicants include experienced prescribed fire contractors with credentials such as S-190, S-290, or S-390, and qualifying conservators, landowner co-ops, nature preserves or private landowners who use prescribed fire. Also, if you are a conservator, co-op, or landowner who hires a skilled prescribed fire contractor to perform a prescribed burn for you, you are also eligible.

Q: How difficult is the process to apply for the insurance?

A: All applicants are required to complete a non-binding application for us to provide terms for the coverage. If you are an eligible applicant, a quote to insure your business can usually be created for you in about three to five days from the date the application is sent.

Q: My prescribed fire activity is generally only part-time, heaviest in the spring and then again in the fall. I have several other operations my business is involved with. Would the insurance cover these other operations?

A: Yes. The quote will contain a list of operations for which coverage will apply. Coverage may be offered for herbicide applications, mechanical brush clearing, grassland restoration and other operations if the application is approved. If, after review of a quote, one of your operations is missing from that list, special consideration may be given to include that activity.

Q: Does the insurance contain an exclusion of injury or damage due to prescribed fire smoke on the road?

A: No.

Q: If I am not insured for prescribed fire work, how am I at risk from smoke or from a prescribed fire “escape”, which results in injury or damage to a third party?

A: Different states assign different degrees of liability or responsibility to the person or company performing a burn. But, even in the most favorable states, if injury or damage is significant, your company’s assets are at risk and if you operate as a sole proprietorship or as a partnership, your personal assets may be at risk. If affordable coverage is available, which it now is, we recommend purchasing the coverage as an alternative to exposing your personal and corporate assets.

Q: As a private landowner, I hire a prescribed fire contractor to burn a section of my property. Smoke gets out of control during a prescribed fire and causes a serious automobile accident with injuries. As the landowner, am I responsible? What steps should I take to protect myself?

A: Before you hire a prescribed fire contractor, we recommend that a certificate of insurance be obtained showing coverage similar to what we are offering above. Hypothetically, if a serious claim occurs, a loss may exhaust the limits set forth in the contractor’s policy. To the extent that a private landowner would be additionally liable would totally depend on the specific circumstances of the claim and the judicial precedents in that local area.

Q: For some of my prescribed fire activity, including fire suppression, I operate as a government subcontractor. Do I have immunity from certain liabilities when I operate as such?

A: It is impossible to judge the issue of immunity from liability without seeing a copy of and knowing the content of the contract that you are signing for a particular job or assignment. Immunity may exist to some extent and could be limited on another, depending on the provisions in the contract. We believe on a general basis that immunity decreases as the likelihood of discretionary authority on job performance increases. The contract, however, will specify the extent of your discretionary authority.

Q: As a private landowner, what coverage does my ranchowner/farm policy provide for prescribed fire operations?

A: A ranchowner/farm policy may provide some or complete coverage. We would not be able to judge the extent that private landowner policies cover liability for prescribed fire operations unless we thoroughly review the policy form and all coverage endorsements. As a private landowner we do, however, offer a word of caution: if you are involved with other landowners in a “cooperative” prescribed fire operation on someone else’s property, it is not likely that your personal ranch or farm policy would provide coverage for the “co-op” or you while performing at another location.

If you have other questions or would like additional consultation, please feel free to contact us at: CD Rigdon & Associates—630/696-4043; Toll Free 800/972-4407; or email info@cdrigdon.com



Questions? Comments? Ideas?

Readers are invited to submit any questions, comments, or ideas concerning the NC Prescribed Fire Council Newsletter to the newsletter committee.

Submissions are also welcomed.

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LOOKING AT FIRE MAINTAINED LANDSCAPES THROUGH ART AND POETRY

Member contribution: We tend to look at fire and ecosystems through the eyes of a scientist or manager, but art and poetry are lurking about our landscapes if we slow our pace and take time to enjoy it. Relax a little and enjoy Robert Frost's understanding of fire ecology and the art of Philip Juras's southern fire maintained landscapes!



Blueberries

By Robert Frost

“You ought to have seen what I saw on my way
To the village, through Patterson’s pasture today:
Blueberries as big as the end of your thumb,
Real sky-blue, and heavy, and ready to drum
In the cavernous pail of the first one to come!
And all ripe together, not some of them green
And some of them ripe! You ought to have seen!”

“I don’t know what part of the pasture you mean.”

“You know where they cut off the woods__Let me see__
It was two years ago__or no!__can it be
No longer than that?__and the following fall
The fire ran and burned it all up but the wall.”

“Why, there hasn’t been time for the bushes to grow.

That's always the way with the blueberries, though:
There may not have been the ghost of a sign
Of them anywhere under the shade of the pine,
But get the pine out of the way, you may burn
The pasture all over until not a fern
Or grass-blade is left, not to mention a stick,
And presto, they're up all around you as thick
And hard to explain as a conjuror's trick."

"It must be on charcoal they fatten their fruit.
I taste in them sometimes the flavor of soot.
And after all, really they're ebony skinned:
The blue's but a mist from the breath of the wind,
A tarnish that goes at a touch of the hand,
And less than the tan with which pickers are tanned."

"Does Patterson know what he has, do you think?"

"He may and not care and so leave the chewink
To gather them for him –you know what he is.
He won't make the fact that they're rightfully his
An excuse for keeping us other folk out."

"I wonder you didn't see Loren about."

"The best of it was that I did. Do you know,
I was just getting through what the field had to show
And over the wall and into the road,
When who should come by, with a democrat-load
Of all the young chattering Lorens alive,
But Loren, the fatherly, out for a drive."

"He saw you, then? What did he do? Did he frown?"

"He just kept nodding his head up and down.
You know how politely he always goes by.
But he thought a big thought-I could tell by his eye-
Which being expressed might be this in effect:
'I have left those there berries, I shrewdly suspect,
To ripen too long. I am greatly to blame'"

"He's a thriftier person than some I could name."

"He seems to be thrifty; and hasn't he need,
With the mouths of all those young Lorens to feed?
He has brought them all up on wild berries, they say,

Like birds. They store a great many away.
They eat them the year round, and those they don't eat
They sell in the store and buy shoes for their feet."

"Who cares what they say? It's a nice way to live,
Just taking what Nature is willing to give,
Not forcing her hand with harrow and plow."

"I wish I had seen his perpetual bow-
Ant the air of the youngsters! Not one of them turned,
And they looked so solemn-absurdly concerned."

"I wish I know half what the flock of them know
Of where all the berries and other things grow,
Cranberries in bogs and raspberries on top
Of the boulder-strewn mountain, and when they will crop.
I met them one day and each had a flower
Stuck into his berries as fresh as a shower;
Some strange kind-they told me it hadn't a name."

.....continued

Frost, Robert. 1979. The Poetry of Robert Frost. Henry Holt and Company. New York, NY. 607 pp.

<http://www.philipjuras.com/>

A new way of looking at fire landscapes in the southeast

Check out the photos on the above website. Don't they do a great job of representing the beauty of our southeastern landscape!

After the relaxing art show, you may want to dig deeper and read the accompanying MS thesis for a fresh perspective on our unique fire maintained ecosystems!



!!!!ATTENTION MEMBERS!!!!

If your e-mail address or other contact information has changed,
please contact Mark Megalos to update your records.

To join the **North Carolina Prescribed Fire Council**, complete this form and mail it to the address below. You can also fax the form or contact Mark by email.

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NAME: _____

ORGANIZATION: _____

MAILING ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

PHONE: _____ Email: _____

Are you interested in participating on a Council subcommittee? YES _____ NO _____

If YES, which one? Education and Outreach _____

Policy and Regulatory _____

Membership _____

Implementation _____

Annual Meeting _____