Fire Management today

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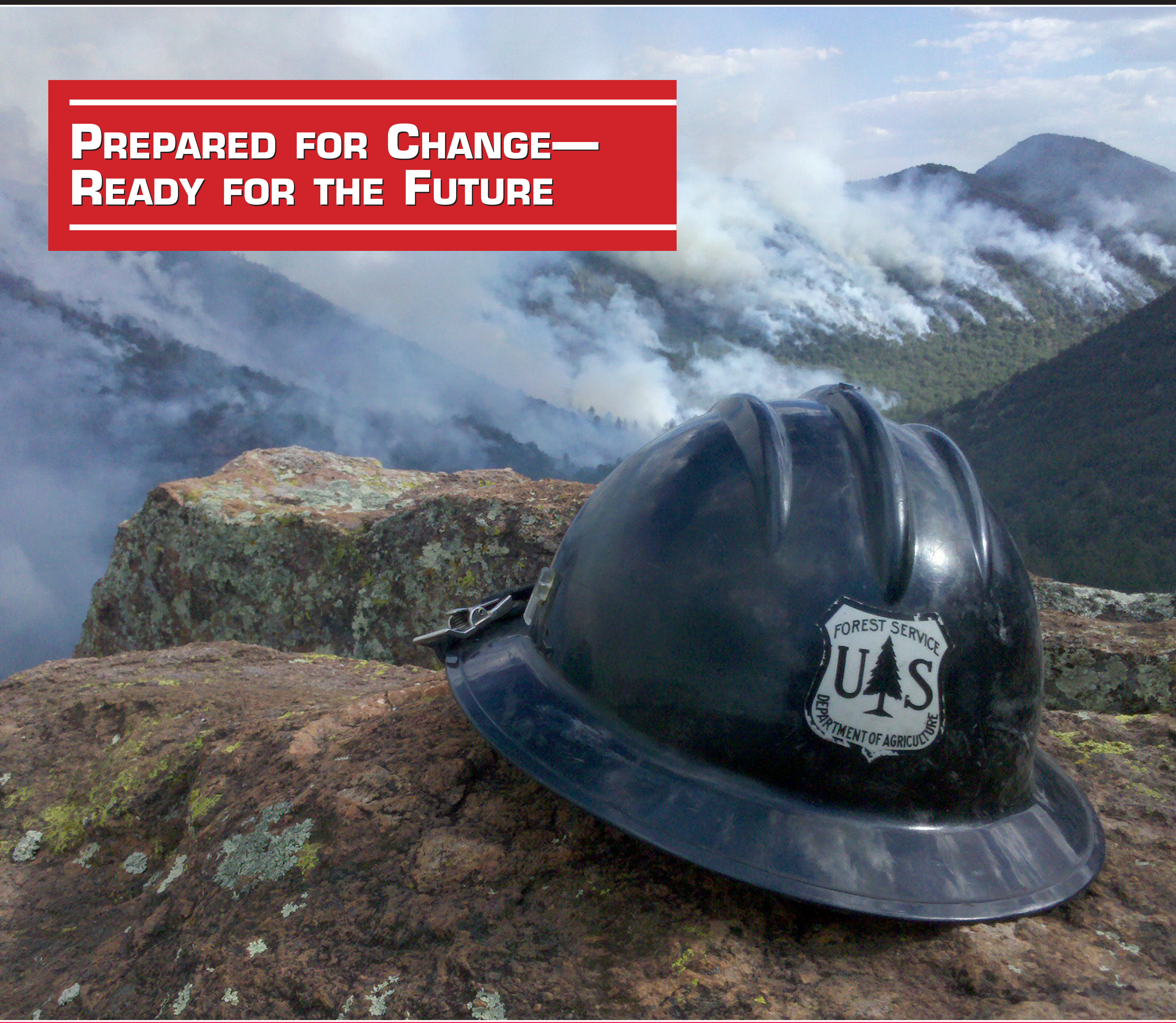
Prepared for Change—Ready for the Future



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On the Cover:

This photo shows the Brushy Fire of 2010, Chiricahau Mountains, Coronado National Forest. With the help of Delayed Aerial Ignition Devices, crews were able to secure the road in John Long Canyon. Photo taken by Taylor Amos.

The USDA Forest Service's Fire and Aviation Management Staff has adopted a logo reflecting three central principles of wildland fire management:

- *Innovation:* We will respect and value thinking minds, voices, and thoughts of those that challenge the status quo while focusing on the greater good.
- *Execution:* We will do what we say we will do. Achieving program objectives, improving diversity, and accomplishing targets are essential to our credibility.
- *Discipline:* What we do, we will do well. Fiscal, managerial, and operational discipline are at the core of our ability to fulfill our mission.

Firefighter and public safety is our first priority.

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Anchor Point

by Tom Harbour
Director, Fire and Aviation Management
Forest Service, Washington, DC

Be Prepared for Change—Ready for the Future

"*Change is inevitable—except from a vending machine*." The quote is attributed to Robert C. Gallagher. And, he makes a great point—change is inevitable; it is not specific to a particular Department, agency, or office. Look around you; nearly every day whether in the newspaper, on the television or radio, or in the hallways, someone is talking about change—especially within the Federal Government. We will do our part in Fire and Aviation by continually focusing on the quality of the decisions we make. We'll make decisions coherent with our doctrine. We'll make decisions that are based on risk management. Change is in the air. We must *be prepared for change and ready for the future*.

If we base our future on a doctrine of speed, agility, and focus, we will be successful.

How will we prepare ourselves for the perpetual change—I believe the answer is founded in our doctrine. True doctrine properly understands changes in behavior. The changes in the Forest Service Fire and Aviation Management (FAM) program need to be first and foremost derived from a doctrine, a philosophy, and an articulated set of principles to guide our actions. We need to understand that our FAM program is not an amalgamation of several hundred ranger districts, over a hundred national forests, and nine regions across the United States; but we are an organization that is interwoven across nearly 200 million acres with a responsibility to manage and protect alongside our many Federal, State, tribal, and local partners.

Defining a doctrine that will provide cohesion across the diversity of our land and our people is challenging to say the least. But, it is an effort that must happen, and the National Cohesive Wildland Fire Management Strategy can help us to get there. It is our blueprint to the future.

No one single entity can face and conquer the many current and future challenges of wildland fire management—but together, we can be successful.

There is no need to fear change. The need for fire on the landscape to manage the forests and rangelands within our responsibility has not changed. The need, therefore, for a professional wildland fire and aviation management program will not change either. Our appreciation for collaboration—and recognition that we need to take it to the next level, capitalizing on the opportunities to work together and making a difference regardless of jurisdictional boundaries—will poise us for success into the future. If we base our future on a doctrine of speed, agility, and focus, we will be successful.

Success, however, cannot happen without good risk management practices. Our future needs to be founded in the identification of an appropriate threshold of risk for the land and people. We will only be successful when we manage for that risk.

The Forest Service FAM organization is huge, the biggest wildland fire organization in the world, and one of which I am very proud. Today, we field nearly 15,000 FAM employees, over 10,000 firefighters, nearly a thousand engines, and close to 100 Interagency Hotshot Crews. We have a variety of tools in the toolbox to include fixed and rotor wing aircraft to accomplish our mission. But, what of our future?

If we are going to be successful in the age of continual change, we need to design the organization of the future—one that will most likely be very different than the current organization. The future organization will likely differ from our current asset mix. We must coherently work toward its implementation.

Be prepared for change and ready for the future. The future will be one where our professionalism demands that we leave our "shift" work better than we found it, and that we affect the appropriate change to ensure that those who become engaged in our program during the next decade and beyond have the benefit of our best altruistic thinking—the benefit of our experience. ■

Depending on Each Other: A Case Study of the Honey Prairie Fire, Okefenokee National Wildlife Refuge

Terri Jenkins

The reality of today's fire management concerns in southeastern Georgia is not so different from that in other areas of the United States. How do we manage fire with less staff, less funding, and fewer resources? How do we deal with drought, shorter recovery cycles between large-scale wildfires, and competition for limited resources? Knowing that we need fire in our landscape, how do we manage fire with more intelligence and with even more assistance and cooperation than has been used in the past? One solution for us has been working with State partners with clearly communicated and agreed-upon goals. This account of the Honey Prairie Fire provides a distinct sense of what is most likely in store for the coming years and what we need to do to manage effectively with the challenges we face.

Here at the Okefenokee National Wildlife Refuge (the Swamp, as we lovingly call it) in Folkston, GA, we began preparing for the next "big one" in early November 2010. We were in a drought—a serious one—with a long-term prognosis. The National Weather Service and our own service meteorologist were providing dire forecasts for the entire Southeast and for the greater Okefenokee area in particular. The Swamp, which is 402,000 acres or roughly 38 miles long and 25 miles wide, includes 353,981 acres of nationally designated wilderness. Most of the Swamp is composed of a large, peat-filled bog, or swamp. There, organic soils, or peat, can literally burn while floating in water, and our staff and those who have engaged in fire here can attest to this fact. In 2007, the Swamp and surrounding area experienced the largest recorded wildfire in history. That year, more than 560,000 acres had burned across private and Federal lands. Although fires usually start within the Swamp from lightning strikes, in 2007, fires had begun on private lands to the north, running across the Okefenokee, and finally south into Florida. So, in 2011, although we wondered how much could burn with only a 3-year rough, we knew better and were concerned. While in the midst of this record-setting drought, recreational use of the Swamp was limited, and then suspended, as miles of watercraft trails were drying up and grassing in. Some of the lowest recordings of waterflow since the 1930s were posted from the St. Mary's and Suwannee Rivers. We could not dispute two facts: (1) the entire area was experiencing large fires with decreasing recovery periods, and (2) drought was occurring with greater frequency and intensity.

One solution for us has been working with State partners with clearly communicated and agreed-upon goals.

Terri Jenkins is a team member, Georgia, U.S. Fish and Wildlife Service.

As with many Federal agencies, our fire and refuge staff was smaller in 2010 than it had been in 2007. Our State partners in Georgia and Florida also were experiencing reduced budgets and resources. We realized early on that we had to work closely as State and Federal partners to make up for these shortfalls and that effective communication and cooperation were critical elements for our success.

Hard learned lessons from the 2007 fires weighed heavily in our thoughts. Even with a rich and long history of large wildfires, the use of unified command was a rare occurrence in Georgia. External communication had been poor, and there was considerable confusion among local cooperators as to which message or instruction should be followed. We were fortunate that large-scale community evacuations had not been necessary. We also realized we might not be that fortunate again. We listened to the feedback of local fire departments, governments, and cooperators—their message was clear. We needed to speak with one voice and communicate a clear message. January 2011 marked the beginning of an aggressive campaign of internal and external meetings with cooperators. To address communication lessons learned from 2007, the refuge hosted a coordination meeting for all Southern Area Incident Commanders and the Georgia Forestry Commission. During this meeting, we again reviewed lessons learned and struck a defined strategy for a more effective transition to unified command should the need come to pass. Everyone was willing to do his or her part, but still we knew it would not easy to step out of traditional roles. We knew we needed each other if a large-scale fire happened. Our work was cut out for us.

We began working with the Georgia Forestry Commission to initiate a joint project in identifying, cataloging, and mapping private residences within 1 mile of the refuge. In many cases, this work was extended to 3 miles from the refuge boundary. Collectively, we reached out to local fire departments, county emergency management offices, and local city and county governments to inform them of our concerns for a busy wildfire season. Partnering with the Georgia Forestry Commission, we began an intensive Firewise and fire education campaign. We activated a fire prevention team and started a spring blitz with open public informational meetings to inform everyone about the increasing fire potential. The Florida Forest Service provided Firewise programs to Baker County, FL, residents, strategically completing an educational awareness outreach that completely surrounded the greater Okefenokee area.

> We wanted our neighbors to know and understand that we need and want fire within the Swamp, while concurrently acknowledging that we have obligations to protect our neighbors from unwanted wildfire.

Even with this effort to inform, educate, and increase awareness, we realized that we needed to do more to get the word out. So we provided every Georgia elementary student within a three-county area of the Swamp with an educational packet of information on Firewise concepts. We provided information about the drought and fire potential, and we informed them of our efforts to mitigate the potential of catastrophic fire. We carefully crafted a message that explained how essential fire is to the ecological processes of the Swamp and that, without fire, the Swamp would die. We wanted our neighbors to know and understand that we need and want fire within the Swamp, while concurrently acknowledging that we have obligations to protect our neighbors from unwanted wildfire. We asked: Is it possible to have both? At the same time, we highlighted our presuppression efforts. Prompted by the 2007 wildfires, the refuge and the Georgia Forestry Commission had already commenced on numerous projects to enhance firebreaks, roads, and helicopter dip and drafting sites around the Swamp. Many of these projects focused on community protection as well as protection of the local timber industry, which is critically important to the local economy. Most of the State's efforts were funded from economic stimulus dollars and targeted very specific fuel-mitigation projects adjacent to the Swamp.

Work on these projects continued through the spring and was complemented by strategic prescribed burning on the refuge targeted to protect select areas and facilities. Prescribed burning was very limited, however, because of the worsening drought, and we were

approaching traditional wildfire season.

It is difficult to describe the atmosphere at that time; personnel had a sense of both anticipation and dread. We were certain that there would be fire; the only question was when and where. In March 2011, in a nearby Georgia county, a large State fire, which began in a swamp with conditions similar to the Okefenokee Swamp, reignited. That fire had initially started in August 2010 and had smoldered for months. The Arabia Bay Fire's resurrection further confirmed our concerns. Holdover fires were common during this period, and flights over the Okefenokee Refuge highlighted a shocking lack of water. State initial attacks began increasing and, when requested, the refuge assisted. Still, no major lightning struck (the primary ignition source in the Swamp)—but no rain fell either. Finally, all the waiting came to an end. On April 28, 2011, the Honey Prairie Fire was born from a lightning strike from a small storm that produced little rain.

On April 29, at approximately 5:30 p.m., staff at Okefenokee National Wildlife Refuge received preliminary reports of wildfire on the southwest portion of the Swamp, south of Honey Island. Initial reports quantified the fire at about 65 acres. The presence of fire is an important natural occurrence in wetland ecosystems that sustains the diversity and richness of the wide variety of species that makes the Okefenokee a world-famous natural area. Fires are vital to this natural ecological process. We need fire but, with the drought conditions, we were concerned there could be too much of it. It is impossible to access most of the Swamp, except by watercraft, so there was little question that the fire would grow. The issue was how large it would become. Past experience had shown that conventional fire suppression tactics do not work well within the Swamp, which consists largely of scrub shrub and organic soils. People have never really been successful at extinguishing fire within the Swamp; only "mother nature" has. Past attempts have been extremely costly, firefighting resources have been used ineffectively, and firefighters have too frequently been put in dangerous situations and locations with limited escape routes. Given the current conditions on April 29, we realized we were engaged in this fire for the long haul. Historical accounts of fires within the Swamp often referred to fires as burning for months on end, some even burning for more than a year. Would the same be true for us? We knew the Honey Prairie Fire would be a long-duration incident in which the best option for putting out the fire would be a drought-ending tropical rain event, or "rain with a name," as described by Jim Burkhart, a local U.S. Fish and Wildlife Servie retiree pressed back into action as an administratively determined (AD), public information officer. As with most campaign fires (that is, large or complex fires requiring substantial firefighting resources and several days or weeks to suppress), the use of ADs was critical. We needed personnel with experience and knowledge to provide continuity and fill critical shortages. We discovered that many people and resources could not extend their tours, which is understandable, given the extremely busy southern wildfire season, but from a management and financial perspective, is also very debilitating with long-duration incidents.

We agreed on strategies to largely let the fire burn within the Swamp and engage it when it threatened private and commercial properties. Even then, ground equipment and personnel could only access the fire as it came up on the hill or left the Swamp for the sand rim and drier palmetto-pine transitional areas. Aircraft could be effective in slowing the fire's march, but their use is costly. In 2007, wildfire suppression costs exceeded $130 million, so we wanted to concentrate our efforts where it counted the most. Because of the inaccessibility to the fire, ground resources would be deployed, as necessary, to ensure the protection of private resources, surrounding communities, and the safety of firefighters.

> We had to make hard decisions concerning how to attack new fires and which resources to commit.

In the days and months that followed, the fire grew. As it grew, transitions from Incident Management Teams (IMTs) constantly rotated from a Type 3 to a Type 2 to a Type 1. With those changes came more and more cooperators, each playing an important role. From the beginning, the Refuge and Georgia Forestry Commission immediately used Unified Command. As the fire grew, so did Unified Command. At the height of the fire's activity on June 27, 2011, the Honey Prairie Complex had grown to 283,673 acres and firefighting resources included 202 engines, 112 dozers, 20 water tenders, 12 helicopters, and 6 crews with a total of 1,458 personnel assigned. Unified Command grew to include cooperators that were both conventional well known to the refuge to those that were relatively unknown with little exposure to incident management.

Many cooperators came from private industry and included private and commercial industry members. Commercial industry around the Swamp is composed of private and commercial timber companies. Most are Greater Okefenokee Association of Landowners (GOAL) members, who routinely meet with refuge and State forestry agencies to share information and promote cooperative efforts that largely relate to fire management but also include cooperative resource and forest management issues. The formation of GOAL has helped immensely with logistical fire management concerns and opened vital communication lines. As the fire grew, so did the number of cooperators—all working together to provide public and firefighter safety and to limit catastrophic loss. Cooperators included the cities of Folkston and Homerville, GA; Charlton, Clinch, and Ware Counties, GA; Florida Department of Transportation; Florida Forest Service; Georgia Aviation Authority; Georgia Department of Corrections; Georgia Department of Natural Resources; Georgia Department of Transportation; Georgia Emergency Management Agency; Georgia National Guard; Georgia State Police; Langdale; multiple county fire departments; Rayonier; Superior Pine; and Toledo Manufacturing Company. All cooperators are vital to success, and no one entity has the ability to manage an incident as complex as the Honey Prairie Fire and for the duration this fire has burned.

Over the course of the summer, we experienced days of both gain and loss. Shortly after attaining our highest level of resources, an immediate drawdown of resources began. As the Honey Prairie Fire had grown, fire activity had increased across the entire Southeastern United States. We began to compete for resources. Eventually, Federal and State resources assigned to the Honey Prairie Fire represented every State except Hawaii. We used private engine contractors and firefighters at levels previously unheard of. We experienced many moments of high anxiety as order after order was returned—unable to fill. There were simply no resources to pull from. The fire would ebb, and then grow again. New fires started, and the Honey Prairie Complex was born. Valuable commercial timber lands were burning, and we were competing for resources internally. We had to make hard decisions concerning how to attack new fires and which resources to commit.

Some of the losses were heartbreaking. Thousands of acres of private and commercial timber were destroyed. Midsummer, the refuge lost its mile-long boardwalk, the only access into the Swamp not by watercraft. In today's fiscal and political environment, there is little hope for replacement. The loss of recreational and educational opportunities has affected thousands of visitors to the Okefenokee National Wildlife Refuge, as well as the refuge concessionaire, Okefenokee Adventures. Likewise, our neighbors at Stephen Foster State Park also lost a section of their own boardwalk, and Okefenokee Swamp Park, a special use permittee adjacent to the refuge, has experienced loss of revenue. Most facilities were closed, and services were suspended for the summer. The good news is that no other major facilities were lost, and no firefighters suffered serious injuries. To date, we consider this accomplishment our greatest. Fall came and was leaving as we wrote this article, but the Honey Prairie Fire continued to grow, although at a much slower rate now, and gradually made the transition back to a Type 4 incident under Refuge management, although it still required daily staffing.

In an incident more than 8 months in duration, a number of significant events have occurred. Some events required actions to manage an incident within an incident, such as the firefighter bitten by a rattlesnake and medivaced to a local hospital. Fortunately, the strike was a "dry" bite, meaning that no venom was injected. Another potentially dangerous instance was when a foreign object became dislodged from a helibucket and fell through an open vehicle window landing squarely in the lap of an IMT member, who ironically was a safety officer. The object struck the individual with such force that considerable bruising occurred on the victim's leg and thighs. The object was a live turtle that had obviously been minding his business at a nearby dip site when his daily routine was seriously interrupted. The turtle was not scooped into the helibucket but rather became entangled somehow in the outside strings and literally took the ride of his life until he made his first freefall. Had the victim been struck in the head, had the window not been open on the vehicle, the resulting meeting could have been tragic for both turtle and man. Both turtle and man were stunned, but both survived without serious repercussions.

The refuge staff and State forestry personnel, who literally lived on site for the incident's duration, also experienced cumulative fatigue and stress, which affects concentration, productivity, and overall mental and physical health. Although we appeared to be textbook examples of prolonged stress, we combated the effects. Adequate rest is an absolute must, as well as frequent mental health checks. Long-duration incidents require mandated disengagement and, although some may argue that they are not necessary, they are absolutely necessary for the individual and his or her coworkers. As the Honey Prairie Fire subsided in activity, careful steps were implemented to ensure adequate rest for long-term recovery. We are attempting to manage for what comes next, which we believe will be renewed fire activity sometime in the spring of 2012. We have every reason to believe that the Honey Prairie Complex will be active for a year, if not longer.

We are using this respite in anticipation of the coming year. We have worked, pushed, debated, argued, and fought together. We have completed tasks through sheer will and determination. We have cried and laughed together. We know we could not have survived without our cooperators, coworkers, friends, and families.

The Honey Prairie Fire has been an incredible instrument for building vital partnerships. We intend to continue building on these partnerships; our survival in fire management depends on it. It takes all of us working together to achieve success—to be safe, to be productive, and to achieve our goals. We depend on each other. ■

National Wildfire Coordinating Group Distance Learning Program: The Digital Age Requires Digital Learning

Wendell R. Welch and Michael E. Williams

Three firefighters, three locations, three sets of problems—one potential solution.

Doug, a rural fire chief in eastern Montana, works hard to get himself and his fellow volunteer firefighters to training events and classes. The amount of time it takes to get to and from training courses, however, combined with the costs to send firefighters long distances to train are draining his budget. Doug is looking for ways to train more efficiently and less expensively.

Rhonda is a career-minded hotshot crew squad leader who enrolled in several fire training courses in the late spring, but her crew was activated earlier than expected for fires in the Southwest, which forced her to cancel her course attendance. Rhonda is disappointed about the situation because she needs to get those courses under her belt. She is also frustrated because, during the downtime on her fire assignment, she knows she could be doing coursework.

Roberto is a seasonal firefighter. In the off season, he works in construction and takes classes at a community college. Although he is working on an associate degree in business, he likes fighting fire and is thinking about making wildland firefighting a career. He could take some fire training courses but, between work and school, he has no time to attend the courses that are offered in locations that are 100 to 300 miles away from where he lives.

Although these three situations have differences, they share a potential solution—distance learning.

> The availability and quality of distance learning content are increasing every day.

Wendell R. Welch is the training branch distance learning unit leader for the National Wildfire Coordinating Group, Bureau of Land Management. Michael E. Williams is an instructional systems specialist at the National Advanced Fire and Resource Institute, Forest Service.

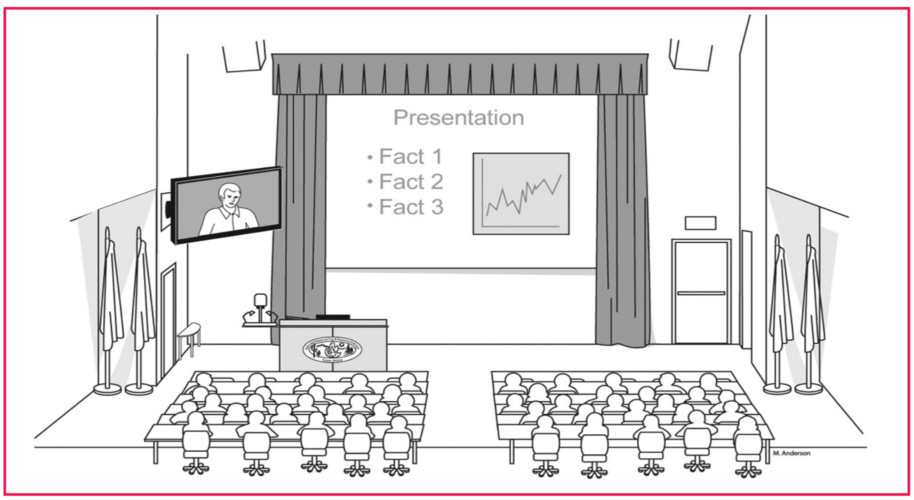
NWCG Distance Learning Program

Distance learning can best be described as the process of transferring knowledge to learners (students) who are separated from the instructor (teacher) by time or physical distance. It makes use of technology components, such as the Internet, video, CDs, tapes, and other forms of educational technology, to accomplish learning.

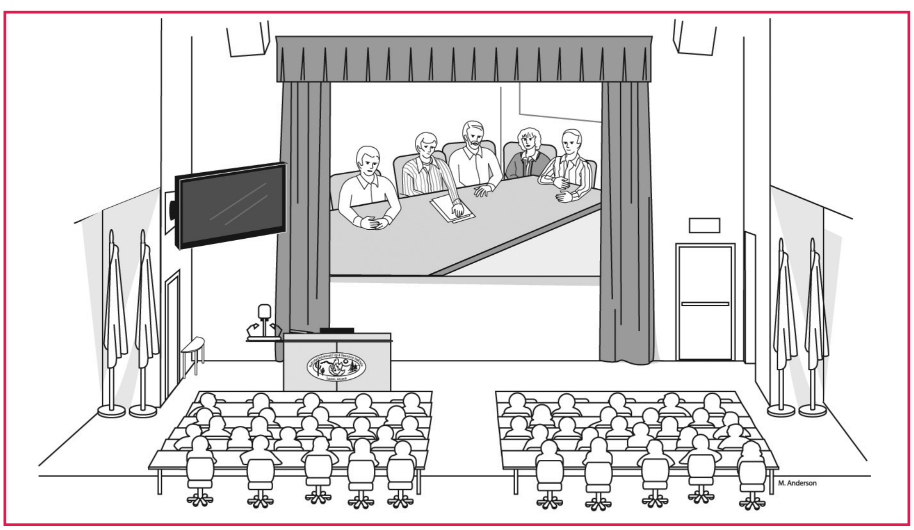
As professionals in the National Wildfire Coordinating Group (NWCG) point out, the Internet's immediacy and functionality of distance learning has made it a first choice for many learners. As expectations and demand for distance learning increase, information technology will continue to be used to distribute the learning material, keep students in touch with teachers, and provide access to communication between students.

Distance learning is not a new phenomenon (e.g., correspondence courses), although online learning is a more recent option for distance learning. Distance learning programs are usually specially designed to help meet the needs and requirements related to learning outside a traditional classroom setting. Today, most distance learning takes place using the Internet.

In 2001, NWCG created a Distance Learning Unit, with the intent of using distance learning technologies and methodologies to provide alternative learning solutions to issues similar to those in the introductory scenarios. The NWCG distance learning program's overarching goal is to deliver wildland fire training to individuals and agencies through the application of new and emerging communication and data technologies.



Instructor broadcasting to classes located at multiple locations.



A panel of experts from a different location interacting with classes located at multiple locations.

Classroom training in wildland fire and aviation is not going to be eliminated. With today's budgetary considerations, however, distance learning provides potential solutions. Also, in 2007, ICF International conducted an independent review of NWCG curriculum and concluded that all courses could benefit from some aspect of distance learning.

During the past few years, NWCG has been gradually shifting wildland fire course design from a classroom-focused program to one that incorporates computer-assisted learning activities, when appropriate. This approach is referred to as blended learning—the process of mixing different learning environments by combining the traditional face-to-face classroom methods with more modern computer-mediated activities.

Deciding how a course should be offered depends on an analysis of three components: the nature of the learning audience, the audience's location, and the instructional resources available. Depending on the cross-analysis of these three parameters, the course designer will choose one of the three options: (1) an online-only course, (2) a traditional classroom course, or (3) a course that blends online learning with the traditional classroom.

The NWCG's program includes more than providing staff and courses. It also includes a learning content management system (LCMS) for automating the development, management, maintenance, delivery, and publication of modular and personalized learning—including online courses, instructor guides, student workbooks, mobile training, and assessments. The NWCG Training Branch researched various off-the-shelf LCMSs and selected the Outstart Evolution LCMS in August 2010 to support NWCG's goal of providing a single-source curriculum to publish all forms of training products.

The target audience for NWCG training is wildland fire-funded personnel within Federal agencies, State government fire management organizations, and local fire/emergency partners. NWCG's secondary audiences include the following:

- Contracted personnel within the Federal agencies, State government fire management organizations, and local fire/emergency partners.
- International wildland fire agencies.
- Universities and colleges that deliver NWCG training through formal agreements.
- Communities (e.g., emergency response teams).
- U.S. military.

Many NWCG cooperators find it difficult to be away from their home unit to attend classroom instructor-led training. Distance learning provides a critical link to career training and reaches external cooperators to help ensure a well-trained wildland fire workforce.

Distance Learning Program Accomplishments

The NWCG Distance Learning Unit currently offers nine courses. Of these courses, six (three online-only and three blended) are hosted on line by the U.S. Fire Administration, National Fire Academy (NFA) and its "NFA Online: Distance Learning for the Fire and Emergency Services," working in partnership with the NWCG. One online-only course is hosted by MetEd, an organization sponsored by the National Oceanic and Atmospheric Administration's National Weather Service (NWS). The remaining two courses (online-only) are offered from the NWCG Training and Qualifications Web site. As of September 2011, more than 10,000 students had completed these distance learning courses.

NWCG debuted its first online offering in July 2007. These courses were S-130, Firefighter Training (blended), and S-190, Introduction to Wildland Fire Behavior (online-only). Although the original target audience of the online S-130 and S-190 courses was structural firefighters, other Federal training organizations are incorporating these courses into their programs. In addition, international wildland fire organizations, college and high school students, job seekers, and others who are merely curious—have logged on to the courses.

Other Distance Learning Highlights

S-290, Intermediate Wildland Fire Behavior (online-only)—Forecasters are required to have completed the S-290 course before they can achieve qualification as an incident meteorologist; however, the NWS found it difficult to get individuals to the classroom. The agency negotiated with NWCG to develop this course for online delivery. The course offering began in mid-2010, and as of December 2011, more than 2,000 students had completed it.

S-260, Interagency Incident Business Management (online-only)—An analysis of this course's content showed the course objectives were primarily in the cognitive learning domain, suggesting it would be a good candidate for online delivery. The S-260 course is the first from NWCG to be offered exclusively on line. The course became available in July 2011 and, as of December 2011, 196 students had completed this course.

In April 2011, the S-495, Geospatial Fire Analysis, Interpretation, and Application course, was conducted with most of the class located at the National Advanced Fire and Resource Institute (NAFRI) in Tucson, AZ. To reduce time and travel costs, however, a group of learners, an instructor, and a coach participated in the class using video-teleconferencing (VTC) in Fairbanks, AK. This multilocational meeting was accomplished by connecting three Federal agencies' VTC systems together for the entire 5-day course.

In addition, NWCG training has been using VTC capabilities the past few years to bring both individual instructors and panels to the students in the classroom, saving time and travel cost while presenting valuable information to learners.

Benefits of Distance Learning

Distance learning is finding a growing niche because of its multiple benefits to learners.

- Distance learning is flexible and convenient. It provides users with an unprecedented freedom for where and when they receive training (e.g., office, home, library, while traveling). Users can access learning day or night, during downtime from other activities, or whenever it is convenient to log on and learn.
- Help for learners is only an email or phone call away from instructors, subject matter experts, and peers. Distance learning support is comparable with what learners would get in a traditional classroom setting.
- After being developed, distance learning is an economical form of training. In addition, online courses do not depend on a certain number of registrations to prevent a course cancelation. In an era of flat budgets, managers may find these alternative delivery solutions advantageous for their organization, and beneficial to their employees.
- Across the distance learning spectrum, educational and training products are readily available on almost any subject, including wildland fire. The availability and quality of distance learning content are increasing every day.
- Another benefit of distance learning is its appeal to contemporary learning styles. The younger generation lives in a connected world. Wireless devices widely used are not simply phones; they are electronic portals to communication, social life, research, entertainment, and learning.

The wired world has become omnipresent. It enables us to conduct business meetings in airport waiting areas or to work a project in the confines of an airplane or hotel room. Distance learning technologies are inevitably going to become larger parts of professional development.

Future of NWCG Distance Learning

When funding is available, NWCG plans to increase the number of courses offered on line to meet the growing demand for distance learning.

"We have an exciting challenge in front of us in NWCG training," Deb Fleming, NWCG Training Branch Manager, said. "To meet the expectations and needs of our wildland fire community, we need to continue to provide alternative delivery solutions. Increasing distance learning capabilities is one way we will be able to address the future needs of our multigenerational learners in the discipline of wildland fire."

The NWCG Distance Learning Unit creates opportunities to improve educational efficiency and cost effectiveness by giving managers options. It also provides instructors with a means for interacting with students through educational technology to strengthen the talent pipeline. It enables students to start a Position Task Book or classroom session with an enhanced understanding of the competencies they will need. Further, it provides lifelong learning and continuing education opportunities for those who are already certified in a wildland fire position.

Although distance learning technologies do not make us learn, when used appropriately they can optimize and enhance adult learning. So, just as the iconic Pulaski was once a new tool to wildland firefighting, distance learning is a tool that NWCG can use to deliver career-essential education and training, free of time and location constraints. ■

Exploring the Mega-Fire Reality 2011: The *Forest Ecology and Management* Conference

Dan Binkley

In many parts of the world, both the area and intensity of wildland fires have increased alarmingly. Not only are fires increasing in number, but the nature of these fires is also changing. These fires have been called "mega-fires," a term that we use in this conference to imply "greatness" (mega is used widely in the biological and other literature in that sense). We see mega-fires of increasing size and intensity in many parts of the world, including Alaska, Canada, Siberia, and the United States, and particularly in Asia and Australia. Knowledge and insights about mega-fires are increasing along with the magnitude and severity of fires. The Mega-Fire Reality Conference convened scientists and managers from 20 countries around the world.

Mega-fires have occurred in the past century, but the scale and frequency may be increasing (table 1). In 2009, the Black Saturday mega-fire in Australia burned 450,000 hectares, destroyed more than 2,000 homes, and killed 173 people. As we prepared for this conference, the Wallow Fire that started on May 29, 2011, in east-central Arizona burned through 540,000 hectares and is the largest fire in Arizona's history. These mega-fires raged despite the highest preparedness budgets for firefighting and fire suppression on record.

Dan Binkley is the professor of Forest Ecology at the Department of Ecosystem Science and Sustainability and Natural Resource Ecology Laboratory at Colorado State University.

What Qualifies a Fire As a Mega-Fire?

Conference discussions focused on large, high-impact fires from around the globe, and it was clear that the definition of a mega-fire goes beyond the simple number of hectares burned or the intensity of combustion. A working group will continue to refine the definition of mega-fire (led by Amber Soja of National Aeronautics and Space Administration's Langley Research Center); our working definition focused on a fire ranking high on three or more than one of these factors: very large area burned, very large carbon emissions (such as smoldering peat fires), human health impacts (especially deaths), and destruction of homes and towns. A simpler definition might also be "more severe than professionals imagined could happen."

Mega-fires might be categorized into four useful types, with very different characteristics and implications.

1. Stand-replacing fires of extreme size; typical of some boreal forest landscapes of the northern hemisphere.
2. Stand-replacing fires in landscapes that occur after a century of fire absence in landscapes that were characterized historically by recurring low- or mid-severity fires with return intervals of several years or decades; southwestern U.S. forests are an example.
3. Novel ecosystems that now cover large areas; examples from the Mediterranean region include areas of agricultural abandonment around the Mediterranean region (now with unprecedented accumulation of highly flammable vegetation), dense plantations of pines and eucalypts, and high human densities in nearby areas.
4. Novel fire regimes is a broad class to cover various situations such as increasing fire in tropical forests (with human ignition) and severe (unprecedented) fire weather conditions that may develop with changing climate patterns.

The Mega-Fire Reality Conference convened scientists and managers from 20 countries around the world.

Insights

Jerry Williams (former National Director of Fire and Aviation Management, Forest Service) highlighted some general features of recent mega-fires.

- Virtually all mega-fires occurred during periods of record-setting drought and under severe fire weather conditions.
- People caused one-half of the fires.
- Several mega-fires began in the backcountry, far from populated areas, and were initially assigned relatively low priorities, while other incidents, burning simultaneously, were of more immediate concern.
- Many mega-fires became large from the get-go, suggesting that initial attack efforts were overwhelmed by extreme burning conditions.
  - Early on, many mega-fires exhibited rates of spread that

Table 1. *Examples of mega-fires from around the world.*

Year	Size (millions of ha)	Fire	Location	Biome
1987	> 7	Great Black Dragon	China and Russia	Asia and Boreal forest
1998	9.4	Asian part of Russia	Russia	
1915	1.4	Northern Eurasia	Russia	
1919	2.8	The Great Fire	Saskatchewan and eastern Alberta, Canada	North American coniferous forests, boreal, subalpine, and temperate
1989	2.5	Manitoba	Manitoba, Canada	
1988	1.4	Yellowstone National Park	Wyoming, USA	
1910	1.2	Great Fire of 1910	Idaho, Montana, and Washington, USA	
1825	1.2	Miramichi Fire	New Brunswick, Canada	
1851 1938 1944 2003 2007 2009	5.0 1.5 1.0 1.1 1.2 0.5		Victoria (Australia) South Australia	Eucalypt forest, shrublands, and grasslands
1983 1987 1997–98	5.0 2.0 9.5		Indonesia	Tropical rainforest, primary and secondary forests, forest plantations, and crops
2008	3.6	Ghanzi Fire	Botswana	Grassland savanna
1999	3.8	Roraima	Brazil	Tropical rainforest, primary and secondary forests, deforested areas, savanna, grasslands, and crops
2003–05	0.5	> 100 fires	Portugal	Mediterranean woodlands, pine and eucalypt plantations
2007	0.3	> 50 fires	Greece	Mediterranean woodlands

Note: Data compiled by R. Vallejo, J. San-Miguel-Ayanz.

> Success in addressing mega-fires will depend on how well professionals can engage with policymakers, the public, and the huge variety of groups and organizations affected by forests.

far exceeded line production rates, even when aerial attack assets were (or could have been) brought to bear.

  - Perimeter growth maps show that, although some mega-fires exhibited somewhat steady growth for some time preceding their eventual blowup, most accounts indicate that, at initial attack and beyond, firefighters struggled with very high fuel loads and very high resistance to control, often in areas where access or the lack of safety zones were limiting factors.

- Mega-fires occurred in undeveloped and developed countries. Even units with enormous firefighting capacity suffered mega-fires.
- Mega-fires account for less than 1 percent of all wildfires, greater than 95 percent of total area burnt by all wildfires, and greater than 95 percent of the total cost of wildfire suppression.

Mega-fire planning, response, and recovery need to engage a broad array of people, far beyond the types of specialists who contributed to the conference. The public's attention can be hooked when a mega-fire occurs, but the opportunity for education and engagement may fade quickly. Our ability to anticipate and respond may depend on our success in moving people from the categories of mega-fire deniers (these sorts of fires will never happen here) and resigners (we're powerless in the face of these fires) into the category of mega-fire realists (the threat is real, we do have some options, and there is work to be done).

Several conclusions developed from discussions. It is clear that the mega-fire fight cannot be won with response actions; the intersection of severe weather, extreme fuels, and ignitions offers little opportunity for management responses to be effective. Advanced planning and investment in effective, landscape-scale activities before fires develop provide the only effective ways for reducing the loss of forest health, property, and lives. The success of management programs needs to be evaluated in terms of long-term reduction in risk to forest health, property, and lives; short-term tallies of the number of acres receiving fuel treatments are not useful indicators of progress.

What Is Next?

For professionals: A set of presentations at the conference will be developed for a special issue of Forest Ecology and Management that should be published late in 2012. Conference participants have new contacts and new ideas to develop in their own programs.

For the other 99.99 percent: Success in addressing mega-fires will depend on how well professionals can engage with policymakers, the public, and the huge variety of groups and organizations affected by forests. How can the future possibility of a mega-fire be communicated effectively to nonprofessionals? The best answers to this far-reaching question will likely come from professionals of other types, such as experts in communication using classic media (newspapers and television) and the wide range of emerging social media. The global breadth of mega-fire issues is so large that we have unlimited options for developing communication targeted for specific audiences and geographic locations. Could we develop some visual, graphic scenarios of what a mega-fire would look like in our own backyards? Could we develop opportunities to work with people who develop dramatic shows and movies in which a realistic scenario of a mega-fire could form part of the context for the characters' development? Clearly, these opportunities reach far beyond the expertise of the conference participants, and these bridges with professionals in entirely different fields should be exciting and hugely productive. ■

Effects of Salvage Logging on Fire Risks After Bark Beetle Outbreaks in Colorado Lodgepole Pine Forests

Byron J. Collins, Chuck C. Rhoades, Michael A. Battaglia, and Robert M. Hubbard

Most mature lodgepole pine (*Pinus contorta var. latifolia* Engelm. ex Wats.) forests in the central and southern Rocky Mountains originated after stand-replacing wildfires or logging (Brown 1975, Lotan and Perry 1983, Romme 1982). In recent years, mountain pine beetle (*Dendroctonus ponderosae* Hopkins) outbreaks have created a widespread, synchronous disturbance (i.e., greater than 1.4 million hectares of pine forests in Colorado and southeastern Wyoming since 1996) (USDA 2010) that will shape forest dynamics for the coming century. Compared with the ample knowledge of how lodgepole forests recover after fire and harvesting (Lotan and Perry 1983), the trajectory of stand development and forest disturbance set in motion by bark beetle outbreaks is poorly understood.

Concern about wildfire and threats to infrastructure and human safety from falling beetle-killed trees has prompted harvesting of infested stands (Collins et al. 2010, 2011; Fettig et al. 2007). Logging within these forests reduces surface and canopy fuels and disrupts the fuels' horizontal and vertical continuity in an attempt to minimize crown fire hazard (Agee and Skinner 2005, USDA 2005). By removing large woody fuels (i.e., tree boles), these operations diminish fire-line intensity, aid wildfire suppression, and minimize soil-heating effects caused by prolonged smoldering (Monsanto and Agee 2008, USDA 2005). Removal of standing, dead pine restricts potential wildfire activity to surface fuels in the years immediately following treatment, yet, as new stands develop, the implications of harvesting for fire behavior and fire effects will be less certain.

Tree mortality that results from mountain pine beetle and associated harvesting will influence forest dynamics, fuel loads, and fire behavior for many decades following the current outbreak. We need to understand whether post-beetle salvage logging will have major effects on stand development and fire risks, or if the effects would be small compared with the other factors that change with forest development after beetle outbreaks. To address this need, our objectives were to answer the following questions:

1. Does salvage logging in beetle-killed forests change the species composition or density of trees compared with untreated stands?
2. What is the effect of salvage logging on surface and canopy fuel loads compared with untreated forests?
3. How will potential differences in species composition and fuel loads brought about by salvage logging affect potential fire behavior in harvested and untreated stands during the coming century?

Byron J. Collins is a research associate; Chuck C. Rhoades is a research biogeochemist; Michael A. Battaglia is a research forester; and Robert M. Hubbard is a research ecologist for the Forest Service, Rocky Mountain Research Station. This article was extracted from Collins, B.J.; Rhoades, C.C.; Battaglia, M.A.; Hubbard, R.M. 2011. Salvage logging reduces fire risks after bark beetle outbreaks in lodgepole pine forests. Ecological Applications. (In review).

Current Forest Conditions

Lodgepole pine forests of the Medicine Bow-Routt and Arapaho-Roosevelt National Forests and the Colorado State Forest have lost 79 to 91 percent of their overstory basal area (equivalent to 77 percent of the stand total) to bark beetles since 2003. The understory of these pine-dominated forests contains subalpine fir, Engelmann spruce, and quaking aspen. Management projects responding to the insect outbreak in the region remove the dead overstory to reduce the risk of crown fire and to interrupt the horizontal and vertical fuel continuity. In spite of an extensive management response, salvage logging is likely to treat less than 15 percent of the affected landscape (Collins et al. 2010).

Key Findings

Stand Development in Harvested and Untreated Beetle-Killed Stands

Seedling colonization in both untreated and salvage-logged, beetle-killed stands is abundant. Three-fourths of all new seedlings colonizing harvested areas were lodgepole pine; 10 times more new pine seedlings were in the cut areas compared with untreated stands. Aspen sprouts were seven-fold more abundant in harvest units compared with untreated stands. In untreated areas, subalpine fir accounted for 70 percent of all new seedlings.

Stand development projections based on these field measurements suggest abundant sprouting in the first four decades after beetle infestation will increase the presence of aspen in untreated and harvested stands (fig. 1). In harvested areas, lodgepole pine will once again become the dominant species as aspen declines. In untreated stands,

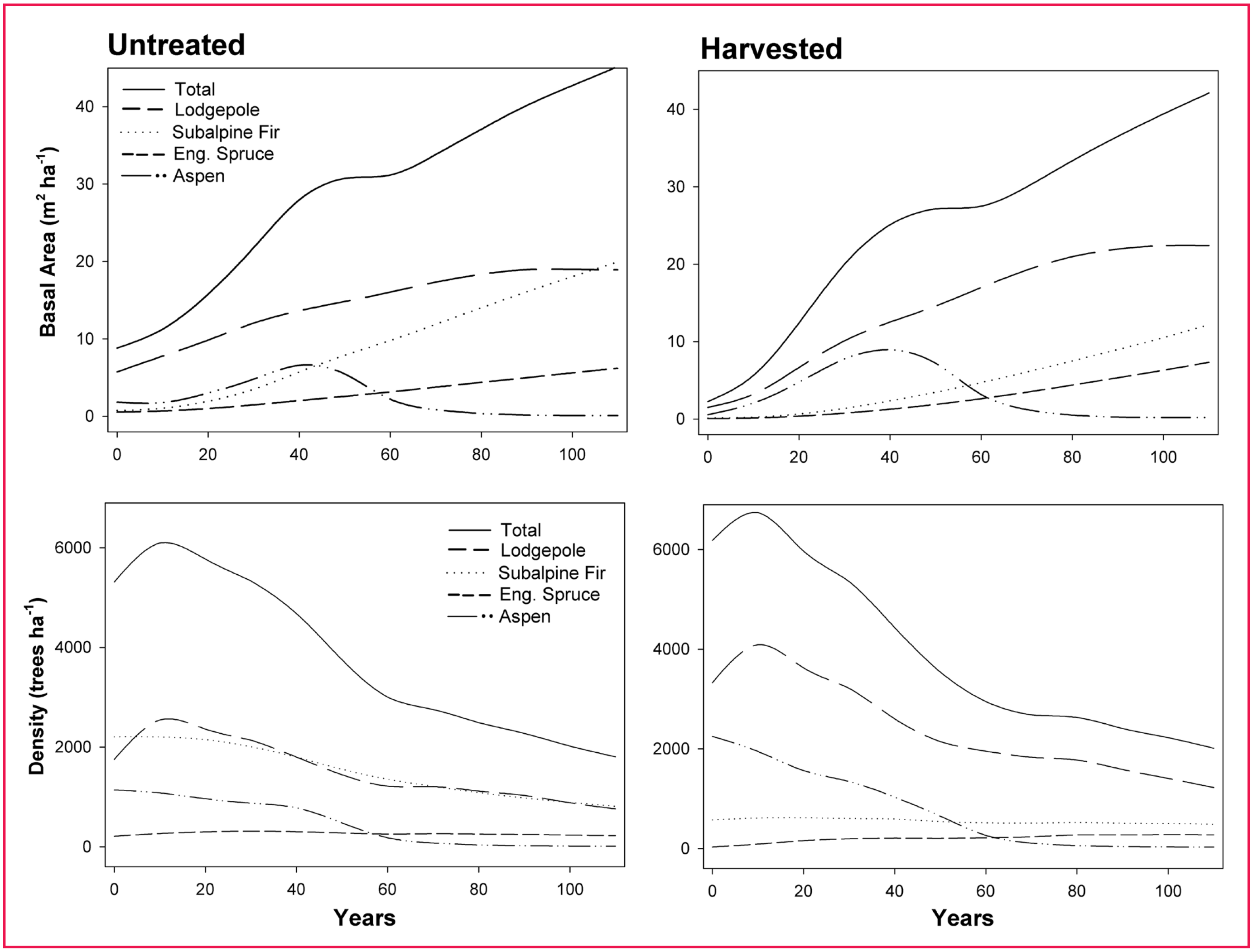


Figure 1.—*Projected stand development based on initial observations in harvested (n = 24) and untreated stands (n = 24). Growth was simulated using the Forest Vegetation Simulator (Dixon 2002). Projections were based on observed regeneration, overstory conditions, and site index.*

subalpine fir and lodgepole pine are projected to be the dominant species a century after the beetle infestation. Pre-outbreak stand conditions (about 35.5 m^2 ha^{-1} of basal area; quadratic mean diameter of 13.5 cm) are expected to recover after 75 and 90 years in untreated and harvested stands, respectively (fig. 1). Due to an increased presence of subalpine fir in untreated stands, canopy bulk density is expected to reach pre-infestation levels (i.e., 0.15 kg m^{-3}) three to four decades sooner than in harvested areas.

Fuel Dynamics in Harvested and Untreated Beetle-Killed Stands

Salvage logging increased the total mass of woody surface fuels 2.7 times compared with untreated stands following salvage logging (17.6 versus 47.8 Mg ha^{-1}). Harvesting increased the mass of fine (i.e., less than 7.6 cm in diameter) and sound (coarse 7.6 cm in diameter or greater) fuels 3.3- and 3.5-fold compared with untreated stands, respectively. The observed increases in fine-surface fuels are expected to be transient, however, declining within three decades as a result of decomposition and low input from the developing canopy (fig. 2).

Standing dead trees are projected to deteriorate and fall within the first three decades after beetle attack, adding branches and boles as surface fuels. Coarse wood mass is expected to increase 5.5-fold above preinfestation levels as dead trees topple in untreated stands (fig. 2). Tree boles are expected to decompose slowly, keeping coarse fuel loads high in untreated stands for more than a century after the outbreak.

> Our findings suggest that salvage logging in beetle-killed, gray-stage, lodgepole pine stands will dampen the behavior and severity of potential future wildfires.

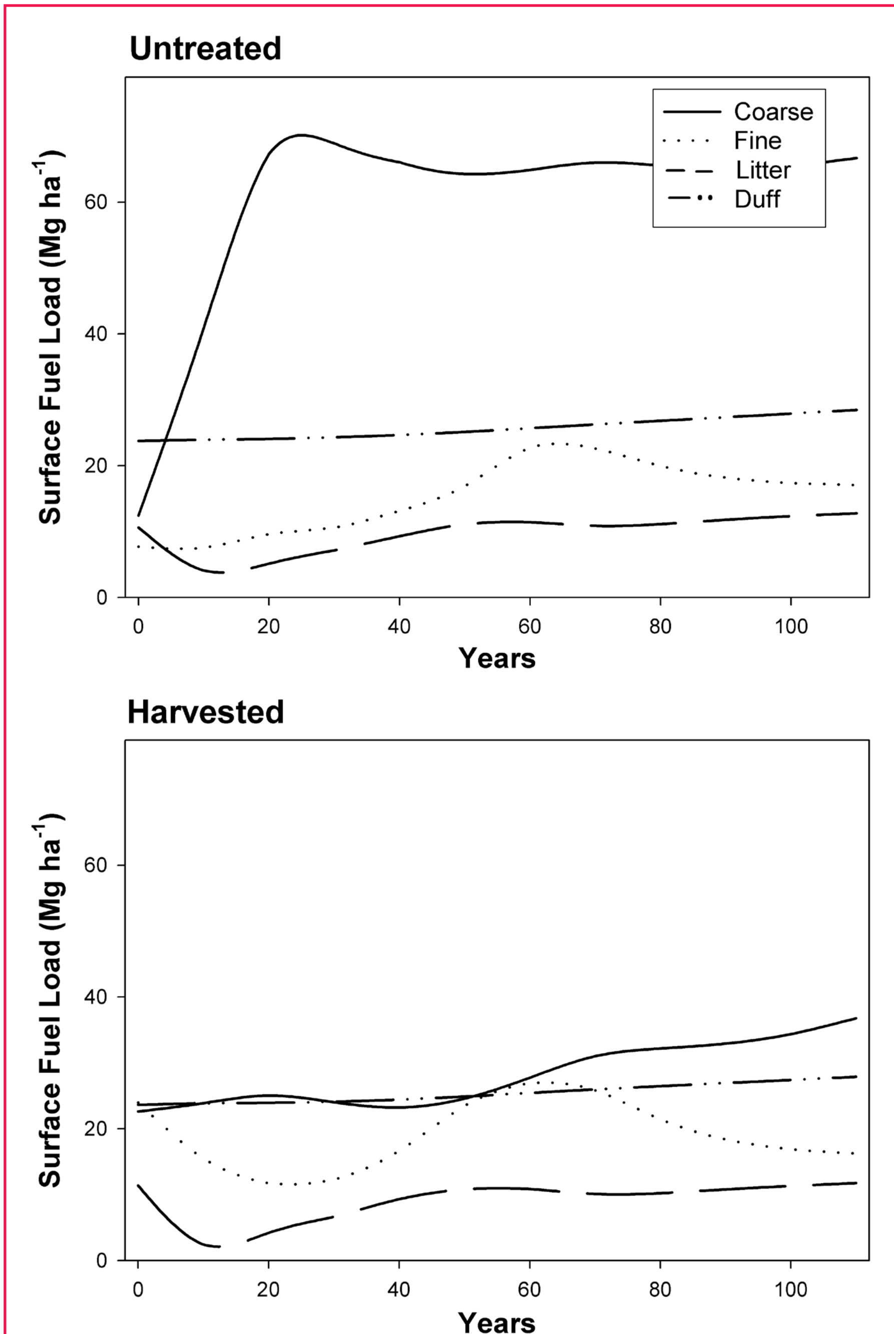


Figure 2.—*Changes in surface fuel loads in harvested and untreated mountain pine beetle management areas as estimated by the Forest Vegetation Simulator (FVS) (Dixon 2002). Projected changes based on initial observations of fuel loads in 24 untreated and 24 harvested areas. Fine woody fuels are less than 7.6 cm in diameter (3 in); coarse fuels are greater than or equal to 7.6 cm in diameter.*

Potential Fire Behavior in Untreated and Harvested Beetle-Killed Stands

Salvage logging in beetle-infested Colorado forests is expected to affect future fires by favoring regeneration of pine and aspen over subalpine fir, a species with a dense crown and branches that extend to the ground. Abundant subalpine fir in untreated, beetle-killed stands will act as ladder fuels that allow fires burning on the surface to spread into the forest overstory. Initial measurements indicated harvest treatments increased woody surface fuels compared with untreated stands, but potential fire behavior did not differ between treatments because of the sparse overstory canopy (fig. 3). Elevated coarse fuel loads will increase the potential for larger and more severe wildfires by increasing soil heating, increasing the production of airborne burning material, and hindering fire suppression. We expect harvesting will substantially alter potential fire behavior in beetle-killed forests, although salvage operations will treat only a small fraction of infested Colorado forests.

The difference in tree species composition and the higher fuel loads in untreated, beetle-killed stands creates the potential for more extreme fire behavior compared with harvested areas (fig. 3). Following the loss of foliage in dead trees (i.e., gray-stage), a lack of canopy fuels will result in similar fire behavior in untreated and harvested areas. As the forest overstory develops, however, abundant subalpine fir will increase the canopy bulk density and lower canopy base height of untreated stands. These crown conditions allow for torching at lower wind speeds and increase active crown fire potential during extreme weather. As a result, passive crown fires (i.e., fires that ignite individual tree crowns but do not spread between canopies) are expected to occur in untreated stands under average weather conditions (i.e., 50th percentile weather); in contrast, under similar weather conditions, surface fires are expected in harvested areas (fig. 3).

Implications

Our findings suggest that salvage logging in beetle-killed, gray-stage, lodgepole pine stands will dampen the behavior and severity of potential future wildfires. Harvesting favored establishment of lodgepole pine seedlings and aspen sprouts (figs. 1 and 3) and decreased the

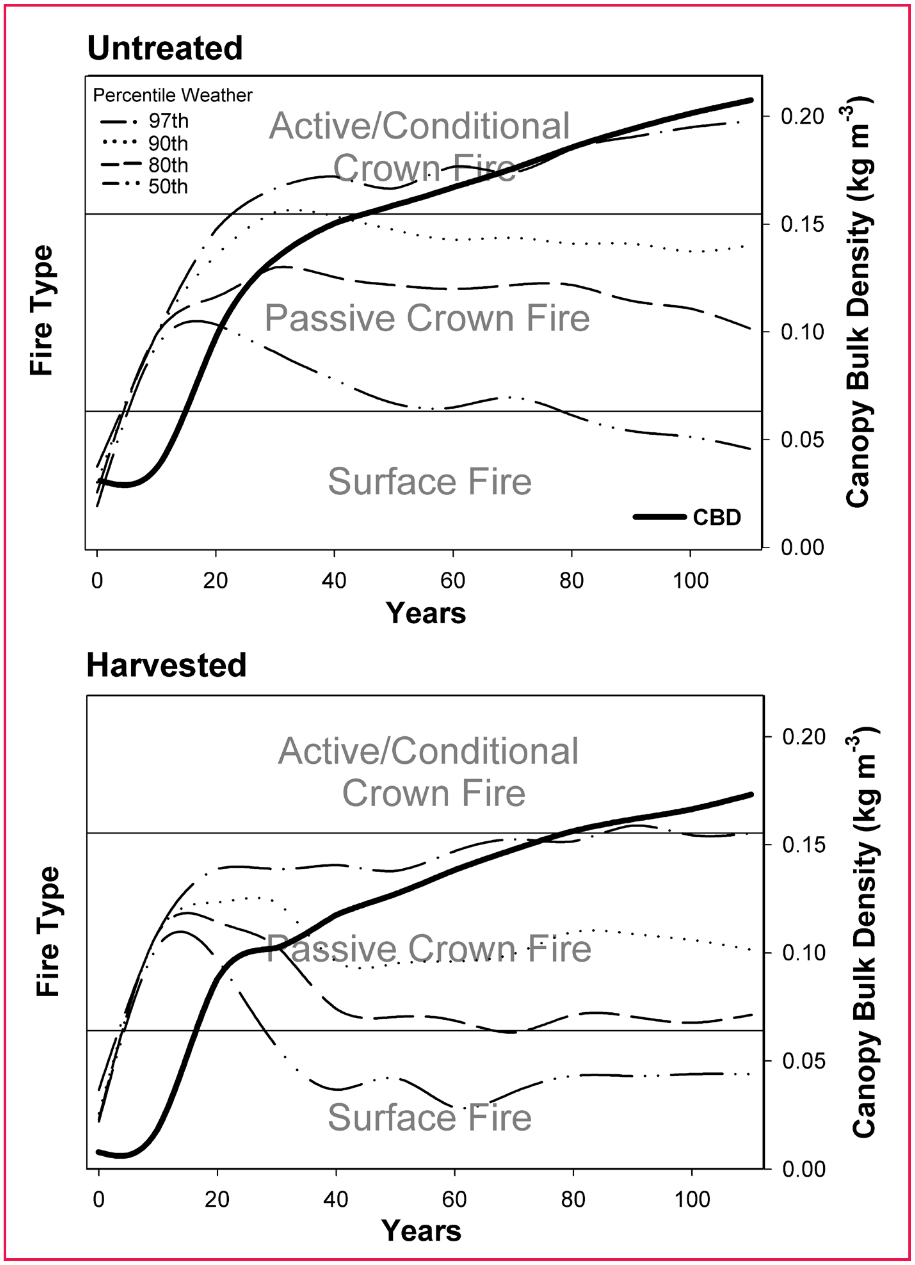


Figure 3.—*Potential fire behavior and canopy bulk density based on inventory of untreated (n = 24) and harvested beetle-killed stands (n = 24). Fire behavior was predicted from measured observations of tree regeneration, stand structure conditions, fuel loads, site productivity, and historic weather data (Reinhardt and Crookston, 2003, WRCC 2011). The canopy bulk density of preinfestation lodgepole pine dominated-forests averages 0.15 kg m*$^{-3}$ *(Klutsch et al. 2011).*

dominance of subalpine fir in recovering stands (lowering crown bulk density 25 percent). These differences in species composition and stand structure translate to lower risk of active crown fire and higher post-fire survival rates as treated stands mature. Harvesting also reduced coarse fuel loads by greater than 50 percent compared with untreated stands. In the event of a post-infestation wildfire, the removal of coarse fuels would reduce the duration and magnitude of soil heating associated with combustion of heavy fuels, which is known to damage plant root systems and soil biota, to increase soil losses, and to delay post-fire ecosystem recovery (Monsanto and Agee 2008, Moody and Martin 2001).

Acknowledgments

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FEPP Success
Mitchell County, KS

Aircraft Fuel Tender Converted Into Attack Pumper for Local Firefighting

Eric Ward

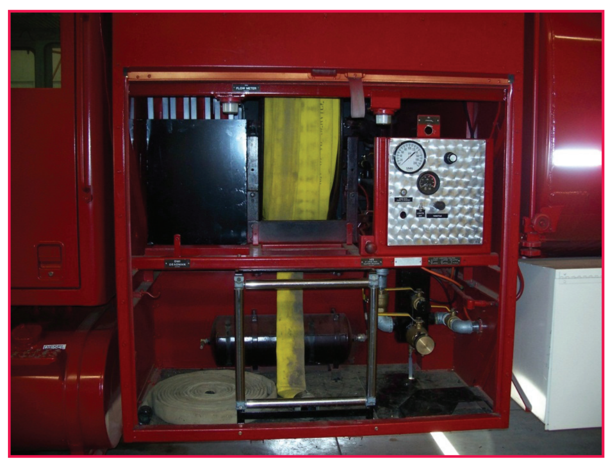
Mitchell County Fire District #1 in Kansas launched a massive conversion effort on the 1991 Oshkosh R-11 aircraft fuel tender it received by way of the Kansas Forest Service (KFS), which obtained the tender through the Federal Excess Personal Property program. With its 5,000-gallon tank, the truck is unusually large for a tender on a single chassis, and it does not fit into the stations of most volunteer fire departments.

Eric Ward is the excess property manager at Kansas Forest Service, in Manhattan, KS.

The truck has since become a very effective tender for fighting all sorts of fires in the district.

After receiving the truck, the firefighters of District #1 painted it red and removed much of the original plumbing and hardware because they did not need the extensive filtering, metering, and other systems required for aircraft fuelling. Because the pump is very effective for pumping water, they filled the hose reel with a 3-inch fire hose. They converted all the discharges and intakes to fire hose threads from the various adapters that were used for filling aircraft tanks.

The truck has since become a very effective tender for fighting all sorts of fires in the district. Chief Larry Heidrick said that, with this much water arriving in the early stages of a fire, they rarely need to conduct shuttle operations. Departments can nurse the attack pumper for an extended period of time, and other tenders can keep the pumper refilled, should the need arise. ■



The pump compartment with fire hose replacing aircraft refueling hose

Firewise Success
New Jersey

Mobile Firewise Exhibit Educates Residents

Maris Gabliks

The New Jersey Forest Fire Service uses an exhibition trailer pulled by a recycled vehicle to take its fire prevention program on the road, into neighborhoods, and to regional fairs and expos. The educational messages of the roving exhibit reach adults and children across the State: be Firewise and prevent wildfires.

This educational exhibit takes the Firewise message on the road. (Photo by the New Jersey Forest Fire Service)

Addressing Challenges and Priorities

Each year, the New Jersey Forest Fire Service responds to an average of 1,600 wildfires, most of which occur in two places: (1) where wild lands and human dwellings overlap and (2) in the Pine Barrens region of the State, which is very susceptible to large and devastating wildfires. In response to the challenges it faces in reducing the vulnerabilities of these geographical areas, New Jersey has established two important priorities—(1) preventing wildfires and (2) making the public more aware of how to make their properties less susceptible to wildfire.

To address these priorities, the New Jersey Forest Fire Service teaches homeowners how to reduce fire risk by applying techniques developed by the National Fire Protection Association as part of its Firewise Communities/USA® program. Through the program, it teaches homeowners how to make their properties Firewise by adopting preventive practices such as clearing brush and woody debris near their home and increasing the spacing between plantings. Having homeowners apply Firewise concepts to their landscapes is critical in protecting homes from wildfires and limiting damage to homes affected by a wildfire.

Yet, educating homeowners depends on staff time and educational tools. Conducting individual outreach programs requires extensive staff time, and delivering programs at large outdoor fairs and events requires a marketing tool to attract viewers to a Firewise educational display.

Developing a Roving Solution

In response to the challenges it faced and the priorities it established, the New Jersey Forest Fire Service used Federal funding from a State Fire Assistance/Hazard Mitigation grant to help purchase and develop an attractive mobile Firewise and fire prevention trailer exhibit. Each of the roving unit's two sides meets separate educational needs: one side actively engages an audience, and the other side provides displays and educational videos. To get the trailer on the road, the New Jersey Forest Fire Service acquired a vehicle through the Federal Excess Personal Property Program to pull the

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Maris Gabliks is a cooperative fire specialists for the Forest Service, State and Private Forestry, Northeastern Area.

> Because these young people are tomorrow's homeowners, these educational efforts will pay off well into the future.

Firewise exhibition trailer. The staff branded the companion vehicle to match the exhibition trailer's messaging scheme.

Resulting Benefits

Now rolling down the road in communities throughout the State, the educational trailer delivers Firewise and fire prevention messages to small and large audiences alike. It requires a limited amount of time to gather and set up displays. The staff uses the entirely self-contained mobile unit, with its audiovisual capabilities and portable power generator, across a large regional area without needing to transfer equipment and supplies, which reduces the staff time necessary for planning and preparing for educational events.

Sharing Success

When the New Jersey Forest Fire Service rolls the Firewise educational trailer into events such as regional fairs and expos, children of all ages clamor to play the carnival-style Firewise Wheel. When they spin the wheel, answer a question, and learn something about becoming Firewise, preventing wildfires, or both, they can also receive a Smokey Bear fire prevention item. Because these young people are tomorrow's homeowners, these educational efforts will pay off well into the future.

Firewise and other fire prevention programs help prevent human-caused wildfires and educate the public about reducing fire risk to their homes and property. ■

Contributors Wanted!

Fire Management Today is a source of information on all aspects of fire behavior and management at Federal, State, tribal, county, and local levels. Has there been a change in the way you work? New equipment or tools? New partnerships or programs? To keep up the communication, we need your fire-related articles and photographs! Feature articles should be up to about 2,000 words in length. We also need short items of up to 200 words. Subjects of articles published in *Fire Management Today* may include:

- Aviation
- Communication
- Cooperation
- Ecosystem management
- Equipment/Technology
- Fire behavior
- Fire ecology
- Fire effects
- Fire history
- Fire science
- Fire use (including prescribed fire)
- Fuels management
- Firefighting experiences
- Incident management
- Information management (including systems)
- Personnel
- Planning (including budgeting)
- Preparedness
- Prevention/Education
- Safety
- Suppression
- Training
- Weather
- Wildland-urban interface

National Fire Plan Funds Support Maine's Defensible Space Chipping Program

R. "Fitz" Fitzhenry

National Fire Plan funds in 2008 and 2009 that helped equip Maine's Defensible Space Chipping Program have changed the landscape for many of Maine's population who live in the wildland-urban interface (WUI). In the WUI, where structures intermingle with natural vegetation and wildfires threaten lives, homes, and property, more than 300 homeowners have increased their defensible space, 944 acres have been treated, and 368 tons of hazardous fuels have been removed since the State received the funding.

The success of the program is good news for two-thirds of Maine's population, or about 780,000 residents, who live in the WUI. Their risks were initially addresses in 2004, when the Maine Forest Service's Division of Forest Protection established a Wildland-Urban Interface Committee to facilitate completion of Community Wildfire Protection Plans in these areas. The committee assessed more than 4,500 homes to determine their risk factors. Of the homes surveyed, 88 percent were at "extreme" or "high" risk of ignition in a wildfire because of fuels buildup.

The solution to these potential incidents was to create defensible space around homes by removing fuels and clearing vegetation. Through the Hazard Mitigation Grant Program of the Forest Service's Northeastern Area State and Private Forestry program, the Maine Forest Service used National Fire Plan funds to acquire a wood chipper in 2008 and a truck in 2009 to use in the Defensible Space Chipping Program.

R. "Fitz" Fitzhenry, State and Private Forestry, Forest Service, U.S. Department of Agriculture.

To participate in this statewide program, communities must complete a Community Wildfire Protections Plan to identify and prioritize hazardous areas. As part of that plan, Maine forest rangers educate homeowners about ways to reduce the chance of structure fires. Residents can improve their defensible space by removing brush which can be placed at the roadside for collection by State forest rangers, local fire department personnel, and community volunteers. The brush can be used for community projects or converted to wood pellet fuel.

Several communities have also used the Forest Protection Division's brush cutters, which are carried on the chipper truck and used to clear vegetation around dry hydrants and along rights-of-way.

The Defensible Space Chipping Program, which has increased awareness among homeowners and within communities, resulted in recognizing two local communities—Lake Arrowhead and Indian Point—as Firewise Communities/USA®. Participating homeowners now understand Firewise terms and share their knowledge with neighbors.

The Maine Forest Service continues to build partnerships with local fire departments, community groups, and the media to promote awareness of the need for homeowners to maintain adequate defensible space and efficiently dispose of hazardous fuels.

For additional information about the program, visit the Maine Forest Service Web site at http://www.maineforestservice.gov. ■

Best Practices Programming for Bendix King Portable Radios

Pete Lawrence and John Brooks

In 2011, the California Department of Forestry and Fire Protection (CalFire), like many radio users, tone-protected its tactical frequencies. Other frequencies, such as Air Guard and local government dispatch, support, and tactical (Tac) channels, are also tone-protected. To open the carrier squelch (CS) on a receiving radio with tone protection, the user must make sure the proper tone is being transmitted. The Bendix King (BK) EPH, GPH, and DPH portable radios allow for user-selectable tones. The way in which these radios select the tone from the frequency list provides challenges for the average user, however, when trying to remember the proper tone to select or even when to change tones. The goal of this article is to reduce the confusion and safety concerns for the user as much as possible by incorporating some best practices into how the radio is programmed, both at the home agency and on an incident. By following these best practices, the user is not required to memorize the various tones associated with each channel and can simply use the talk-around function to quickly switch between the required repeater tone and the preprogrammed direct-mode tones on Tac channels, Guard, etc.

Pete Lawrence is an operations battalion chief with the Oceanside (CA) Fire Department and is the chair of the FIRESCOPE Communications Specialist Group. John Brooks is an engineer for the San Marcos (CA) Fire Department and also is trained as an incident communications center manager and all-hazard communications unit leader.

Best Practices for Radio Programming

1. Check the Transmit on Encode Only and Enable User Code Guard boxes on the left-hand side of the BK programming software for each group.
2. Assign the top left rocker switch (A) to Repeater Talk Around. Many times this switch is shown on the label as HI and LO and was designed to adjust the power level. Portable radios do not need to be programmed for low power. Radio users need to remember that the HI position is for repeater operation (HI = mountaintops, where repeaters are located) and the LO position is for Talk Around. (LO = canyons, where the user needs to go direct).
3. Program user-selectable tones (up to the channel capacity per group) in order and assign them to the proper channel in each group (e.g., tone 1 goes in the Transmit (TX) Channel Guard (CG) spot for channel 1, tone 2 goes in the TX CG spot for channel 2). This programming enables the radio operator to select a specific transmit tone by pressing the appropriate number(s) on the keypad (e.g., 16 for tone 16, 2 for tone 2). It is important to remember that the radio changes the TX CG for all frequencies in the group when a user-selectable tone is active (e.g., the entire group transmits tone 8 when 8 is pressed on the keypad).
4. Place the required CG tones for frequencies with tone protection in the Receive (RX) CG spot for each frequency. Common examples of frequencies are—
   - Tone 1 (110.9) for Air Guard
   - Tone 8 (103.5) for CalFire Command 1-10
   - Tone 16 (192.8) for CalFire Tac 1-23

Best Practices for Radio Operation

1. Turn the squelch knob off of the detent (clockwise) so the radio is not in the CG position. It is now hearing all radio traffic transmitted on each channel.
2. It is important to remember that, when setting the radio to a specific tone, the user must use a repeater associated with the command network; this setting changes the tone for the entire group. To allow for use on a tactical channel with tone protection (e.g. CalFire always requiring tone 16) or Air Guard (tone 1), etc., as well as to allow for repeater access on Command, the user must follow these steps:
   a. Set the tone for the Command Channel by pressing the appropriate key(s) on the keypad.

b. When working on the Command Channel and wanting repeater access, make sure the top left rocker switch (A or HI-LO) is toward the front (HI) of the radio. This switch position pulls the tone and frequency from the transmit side of the radio, enabling repeater access.

c. When working on the CalFire Tacs, Air Guard, Support Net channels, or any other channel requiring a specific tone, place the radio in the talk-around mode by pushing the top left rocker switch (A or HI-LO) back to the LO position. The talk-around mode will ensure your radio transmits in direct mode using the tone and frequency preprogrammed into the receive side of the radio. ■

Success Stories Wanted!

We'd like to know how your work has been going! Provide us with your success stories within the state fire program or from your individual fire department. Let us know how the State Fire Assistance (SFA), Volunteer Fire Assistance (VFA), the Federal Excess Personal Property (FEPP) program, or the Firefighter Property (FFP) program has benefited your agency. Feature articles should be up to about 2,000 words in length; short items of up to 200 words.

Submit articles and photographs as electronic files by email or through traditional or express mail to:

Robert West
USDA Forest Service
Fire and Aviation Management
1400 Independence Ave., SW
Mailstop 1107
Washington, DC 20250

Tel. 202-205-1510
E-mail: robertwest@fs.fed.us

If you have any questions about your submission, you can contact one of the FMT staff at the email address above or by calling 202-205-1090.

Performance of Satellite Data Sets in Monitoring Burn Events on the Refugio-Goliad Prairie Landscape

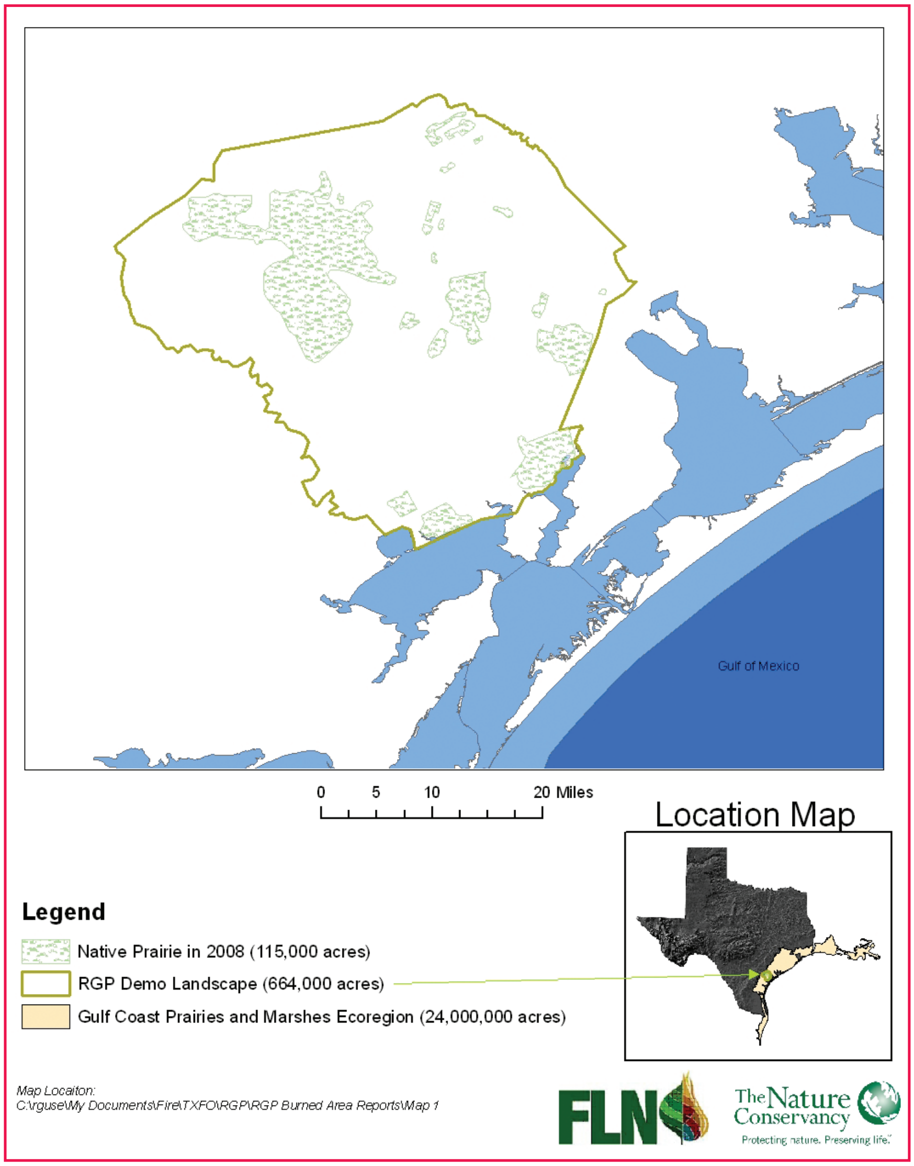
Ray Guse and Kirk Feuerbacher

The Refugio-Goliad Prairie (RGP) Fire Learning Network (FLN) Demonstration Landscape (664,000 acres) is located on the Texas Gulf Coast within the Gulf Coast Prairies and Marshes Ecoregion (map 1). To maintain and restore prairie, we must reinvigorate the vanishing culture of fire in private landowners to meet conservation and socioeconomic goals. This study is an attempt to quantify and set a baseline for monitoring landowner burning and other fire events since 2001.

This ecoregion extends approximately 600 miles from Louisiana to Mexico in a narrow band from the coastline to an elevation of approximately 150 feet, spanning 24,000,000 acres. Within this privately owned landscape resides the largest remnants of native prairie within the ecoregion totaling approximately 115,000 acres. A frequent-fire-return interval of no more than 4 years is needed to manage invasive woody vegetation and maintain a prairie habitat within a natural range of successional states, but interruption of endemic and anthropogenic fire regimes has led to a predominance of invasive native woody species. In 2003, The

Ray Guse is a former prescribed fire specialist and Kirk Feuerbacher is a coastal prairies project director at The Nature Conservancy, Victoria, TX. Guse now works for Washington Department of Fish and Wildlife as the eastern dry forests fire restoration ecologist based in Loomis, WA.

To maintain and restore prairie, we must reinvigorate the vanishing culture of fire in private landowners to meet conservation and socioeconomic goals.



Map 1.—*Refugio-Goliad prairie demonstration landscape.*

Nature Conservancy (TNC) established a program on this landscape to implement prescribed fires. Local knowledge indicates that, at that point, burning as a land management tool implemented by ranchers had all but ceased, and it is surmised this is the result of the buildup of human infrastructure making fire management a hazardous practice. TNC identified this effort to reinvigorate this vanishing culture of fire management among landowners—through demonstration, education, training, and outreach—as a primary strategy because it is the most efficient way to bring fire to the needed scale for maintenance and restoration of this grassland landscape and also create burn areas that will help with controlling of wildfires.

Methods

It is widely believed that TNC, FLN, and a host of partners have had a positive effect on increasing the frequency and spatial extent of managed fire on RGP, but this belief is difficult to measure on such a vast landscape. Timing and amount of precipitation dictate long-term fuel loading, along with daily burn conditions that are the drivers of active prescribed fire seasons that tend to be 2- to 3-year cycles; and most burning occurs in winter. The scope of this investigation is limited to two active winter prescribed burn seasons, for which comparable data exist, that include known prescribed burns conducted by TNC and aerial surveys conducted to determine all other fire events (prescribed fire and wildfire). It is not possible to differentiate between landowner-implemented prescribed fires and wildfires in aerial surveys; hence, they are lumped together as fire events. December 2007 through March 2008 is the first active season of this study (Season 1 [S1]); so, in April 2008, FLN funded a fixed-wing aircraft survey when burned management units were clearly identifiable due to highly contrasting vegetation. The airplane followed transects with 2-mile spacing guided by technicians using the ESRI ArcPad program loaded in a palm computer with an attached GPS (Global Positioning System) locator. The technicians collected the GIS (Geographic Information System) shapefiles of burn events and later edited the polygons to delineate actual burned areas based on fuel breaks visible in satellite imagery base layers. December 2010 through March 2011 is the second active season (Season 2 [S2]); so, the survey methodology was replicated in March 2011, which was FLN again funded. This flight was conducted too late in the growing season, however, and vegetation contrast was difficult to identify; therefore, the data were perceived to be unreliable.

TNC investigated remote sensing with analysis of Moderate Resolution Imaging Spectroradiometer (MODIS) satellite data sets as a possible method to validate the questionable S2 aerial survey and to determine if MODIS could provide a surrogate for the fixed-wing aerial surveys. TNC GIS specialists acquired two MODIS data sets—one depicting burned areas and the other depicting point fire detections (infared hot spots)—and compared the two data sets against each other. The MODIS Burned Area (BA) product (Roy et al. 2002, 2005, 2008) detects the approximate date of burning at 500 meters by locating the occurrence of rapid changes in daily surface reflectance time-series data. The algorithm maps the spatial extent of recent fires and not of fires that occurred in previous seasons or years. TNC GIS specialists obtained the data set for S1 and S2 from http://modis-fire.umd.edu/Publications.html#3. The Fire Detection (FD), or infared hot spot product identifies fires and other thermal anomalies detected at a spatial resolution of 1 kilometer (km) (each 1 km fire detection represents the geographic location of a detected fire but not the actual fire size and often more than one detection for a single fire). The actual size of a detected fire can be much smaller than the 1-km spatial resolution of the data. TNC GIS specialists obtained FD data sets for 2001 through 2003 from the Forest Service Remote Sensing Applications Center (RSAC) at http://activefiremaps.fs.fed.us/gis-data.php.

Results

Season 1 (December 2007 Through March 2008)

We are confident the S1 aerial survey and prescribed burns that TNC conducted comprise all fire events on RGP. The survey and burns provide a solid foundation for determining the likelihood of MODIS data sets identifying these occurrences. In the aerial survey, 23 fire events covering 19,858 acres were identified; of those, 26 percent (N = 6) were detected using BA and 57 percent using FD (N = 13 fires, 45 individual detections). The two data sets combined detected 69.5 percent of the fires (fig. 1, table 1, and map 2).

During S1, TNC conducted 17 prescribed fires on the landscape covering 8,762 acres. MODIS BA detected 47 percent of fires (N = 8), and FD detected 35 percent (N = 6, 21 individual detections). The two data sets combined detected 64.7 percent of those fires (fig. 2, table 2, and map 2).

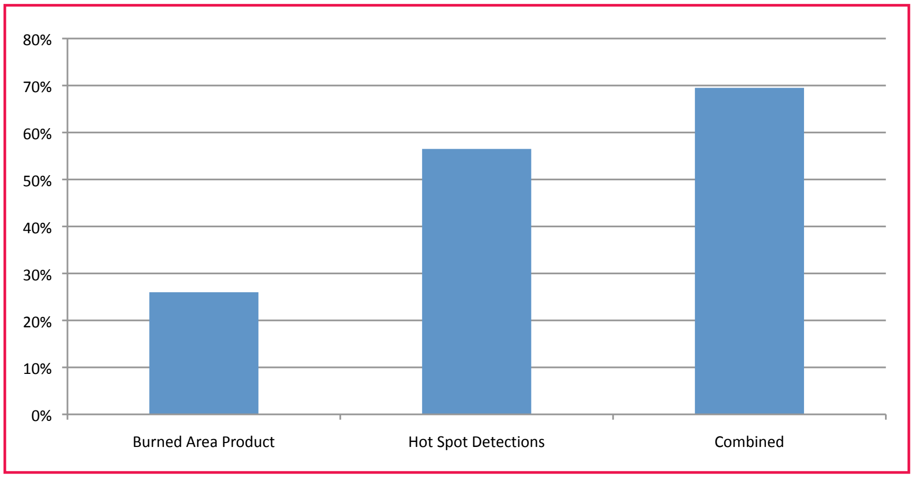
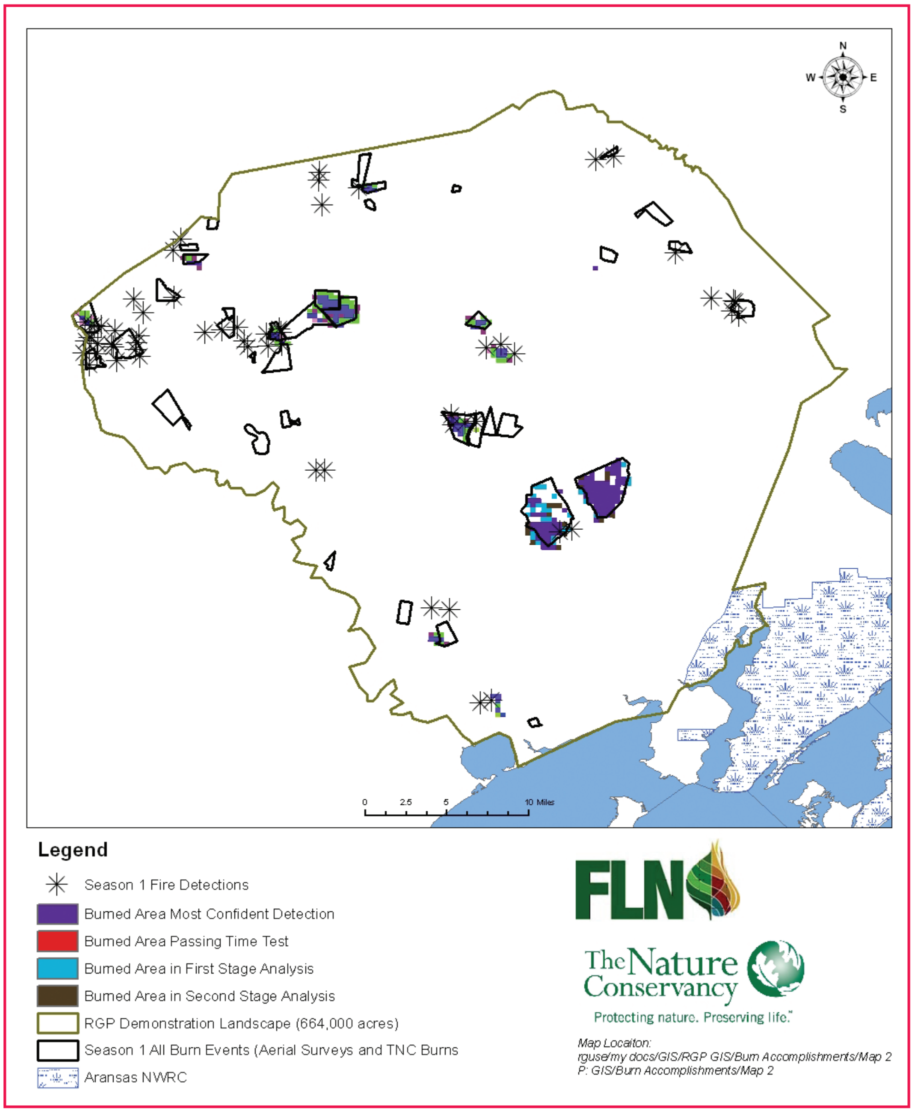


Figure 1.—*Percentage landowner prescribed burns and wildfires (Fire Events) detected in S1 (March 2008 aerial survey) (N = 23, $\bar{x}$ = 863 acres, median = 612 acres, and range = 22–1,627 acres).*



Map 2.—*Season 1—All burn events, MODIS burned areas and fire detections.*

Season 2 (December 2010 Through March 2011)

Aerial surveys conducted in April 2011 for S2 yielded questionable results because green-up allowed little contrast in burned versus unburned areas and they were difficult to distinguish. The technicians believed they identified 32 fire events covering 16,907 acres. BA confirmed 18.7 percent (N = 6) of those events and FD confirmed 37.5 percent (N = 12 fires, 67 individual detections). The two data sets combined confirmed 43.8 percent (N = 14) (fig. 3, table 3, and map 3).

During S2, TNC conducted 21 prescribed fires on the landscape covering 8,579 acres. BA detected 9.5 percent of these fires (N = 2) and FD detected 47.6 percent (N = 10, 26 individual detections). The two data sets combined detected 52.3 percent of these burns (fig. 4, table 4, and map 3).

All Fire Detections (2001 Through 2011)

The FD data sets are readily obtainable going back to 2001, so all fire event records were collected and analyzed through 2011, and a total of 808 fire detections were on RGP; some fires log multiple detections. TNC began its engagement on this landscape in 2003, implementing four burns covering 2,164 acres. Few fire events occurred on the landscape before 2004 (fig. 5), then a steady increase of events occurred through 2011. Spikes in the data for 2004, 2005, 2008, 2009, and 2011 indicate favorable conditions for active prescribed burn seasons. Although the amount of burning TNC accomplished in those five active seasons was relatively static due to limited implementation capacity, we have witnessed less than 10 fire events in 2001 increasing to more than 160 in 2009 on

Table 1.—*S1 aerial burn events survey.*

ID number	Notes	Date detected	Acres	Hectares	BA	FD	Combined
0	Burn		66.0	26.7	0	0	0
1	Burn		711.3	287.9	0	0	0
2	Burn	03/04/08	488.0	197.5	0	1	1
3	Burn	02/27/08	1,109.9	449.2	0	1	1
4	Burn	03/21/08	123.4	49.9	0	1	1
5	Burn—12/07	12/30/07	348.9	141.2	1	0	1
6	Burn		643.0	260.2	0	0	0
7	Burn	01/30/08	329.3	133.3	0	1	1
8	Burn	02/27/08	611.9	247.6	0	1	1
9	Burn		82.1	33.2	0	0	0
10	Burn	02/18/08	634.6	256.8	0	1	1
11	Burn	03/04/08	1,681.3	680.4	1	1	1
12	Burn		781.1	316.1	0	0	0
13	Burn	12/05/07	4,020.5	1,627.1	1	0	1
14	11/26/07, 11/28/07, 12/16/07	12/16/07	4,336.8	1,755.0	1	1	1
15	Burn	03/12/08	374.5	151.5	1	1	1
16	Burn	03/02/08	54.5	22.1	0	1	1
17	Burn	03/04/08	899.2	363.9	0	1	1
18	Burn		138.0	55.9	0	0	0
19	Burn	11/02/07	176.7	71.5	0	1	1
20	Burn	12/17/07	513.9	208.0	0	1	1
21	Burn		1,076.0	435.4	0	0	0
22	02/08	02/01/08	657.1	265.9	1	0	1
Totals			**19,858.1**	**8,036.3**	**6**	**13**	**16**
23 units						**45 detected**	
Percentages					26	57%	69.50%
Average	863.4						
Median	611.9						
Range	22–1,627						

BA = MODIS Burned Area product. FD = Fire Detection product. S1 = season 1.

Table 2.—*S1 TNC prescribed burns on RGP.*

ID number	Acres	Hectares	Date	BA	FD	Combined
0	356.4	144.2	02/23/08	1	1	1
1	239.8	97.0	02/29/08	0	0	0
2	75.8	30.7	02/29/08	0	0	0
3	195.4	79.1	02/25/08	0	0	0
4	205.5	83.2	02/25/08	0	0	0
5	615.0	248.9	02/24/08	0	1	1
6	470.9	190.6	02/29/08	0	1	1
7	159.9	64.7	02/29/08	0	1	1
8	863.6	349.5	02/19/08	1	0	1
9	1,224.9	495.7	02/19/08	1	0	1
10	1,207.1	488.5	02/07/08	1	1	1
11	675.0	273.2	01/30/08	1	0	1
12	459.8	186.1	02/22/08	1	0	1
13	419.5	169.8	01/14/08	0	0	0
14	1,099.2	444.8	03/07/08	1	1	1
15	149.4	60.5	12/19/07	0	0	0
16	344.3	139.3	02/10/08	1	0	1
Totals =	8,761.6	3,545.7		8	6	11
N = 17					21 detected	
Percentages				47%	35%	64.70%
Average	515.4					
Median	419.5					
Range	76–1,225					

BA = MODIS Burned Area product. FD = Fire Detection product. RGP = Refugio-Goliad Prairie. S1 = season 1. TNC = The Nature Conservancy.

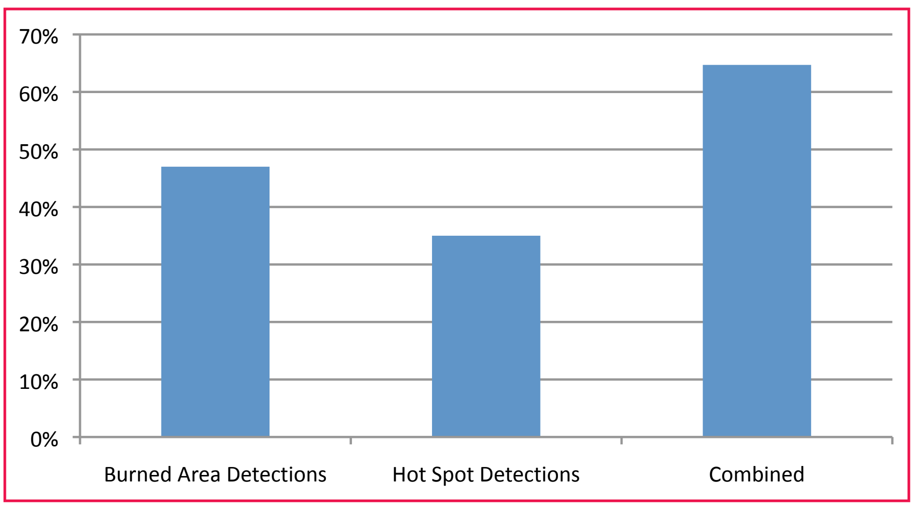


Figure 2.—*Percentage of TNC burns detected in S1 (December 2007 through March 2008) (N = 23, $\bar{x}$ = 863 acres, median = 612 acres, and range = 22–1,627 acres).*

Table 3.—*S2 aerial burn events survey.*

ID number	Notes	Date detected	Acres	Hectares	BA	FD	Combined
0	02/12/11, 03/01/11, 02/14/11	03/01/11	1,064.3	430.7	0	1	1
1			194.9	78.9	0	0	0
2			172.0	69.6	0	0	0
3			64.5	26.1	0	0	0
4	12/02/11, 12/06/11, 12/13/11, 02/07/11		790.2	319.8	1	1	1
5			99.6	40.3	0	0	0
6	Likely wildfire	03/01/11	36.1	14.6	0	1	1
7		03/01/11	390.6	158.1	0	1	1
8		03/01/11	364.8	147.6	0	1	1
9		01/01/11	471.1	190.7	1	0	1
10		03/03/11	1,159.8	469.4	1	1	1
11		02/10/11	1,131.9	458.1	0	1	1
12		03/10/11	1,497.0	605.8	0	1	1
13			58.2	23.5	0	0	0
14			28.7	11.6	0	0	0
15			60.5	24.5	0	0	0
16		01/18/11	1,644.5	665.5	1	1	1
17			401.6	162.5	0	0	0
18	01/06/11, 01/21/11		5,119.3	2,071.7	1	1	1
19		02/25/11	274.2	111.0	0	1	1
20		02/25/11	296.2	119.9	0	1	1
21			37.6	15.2	0	0	0
22	12/10	12/02/10	316.8	128.2	1	0	1
23	Chemical treatment		244.3	98.9	0	0	0
24			49.1	19.9	0	0	0
25	Known burn		351.0	142.0	0	0	0
26	Known burn		164.5	66.6	0	0	0
27			72.5	29.3	0	0	0
28			120.0	48.6	0	0	0
29			61.2	24.8	0	0	0
30			147.3	59.6	0	0	0
31			23.5	9.5	0	0	0
Totals			16,907.9	6,842.4	6	12	14
N = 32						67 detected	
Percentages					18.70%	37.50%	43.80%
Average	528.4						
Median	219.6						
Range	24–5,119						

BA = MODIS Burned Area product. FD = Fire Detection product. S2 = season 2.

Table 4.—*S2 TNC prescribed burns on RGP.*

ID number	Acres	Hectares	Burn date	MODIS_BA	MODIS_Detc	Any MODIS detection
0	39.6	16.0	12/14/10	0	1	1
1	130.4	52.8	12/14/10	0	1	1
2	569.4	230.4	12/16/10	0	1	1
3	384.3	155.5	01/07/11	0	0	0
4	321.5	130.1	01/12/11	0	0	0
5	282.5	114.3	01/13/11	1	1	1
6	975.3	394.7	01/21/11	0	1	1
7	90.2	36.5	02/08/11	0	0	0
8	102.7	41.6	02/10/11	0	0	0
9	126.5	51.2	02/10/11	0	0	0
10	341.7	138.3	02/11/11	0	0	0
11	437.4	177.0	02/12/11	0	1	1
12	501.6	203.0	02/14/11	0	1	1
13	424.9	172.0	02/14/11	0	1	1
14	492.8	199.4	02/15/11	1	0	1
15	156.2	63.2	02/17/11	0	0	0
16	182.5	73.8	02/18/11	0	0	0
17	184.3	74.6	03/06/11	0	0	0
18	653.4	264.4	03/07/11	0	0	0
19	664.9	269.1	03/08/11	0	1	1
20	1,517.3	614.0	03/15/11	0	1	1
Totals	8,579.3	3,471.9		2	10	11
21 units burned					26 detections	
Percentages				9.50%	47.60%	52.30%

BA = MODIS Burned Area product. RGP = Refugio-Goliad Prairie. S2 = season 2. TNC = The Nature Conservancy.

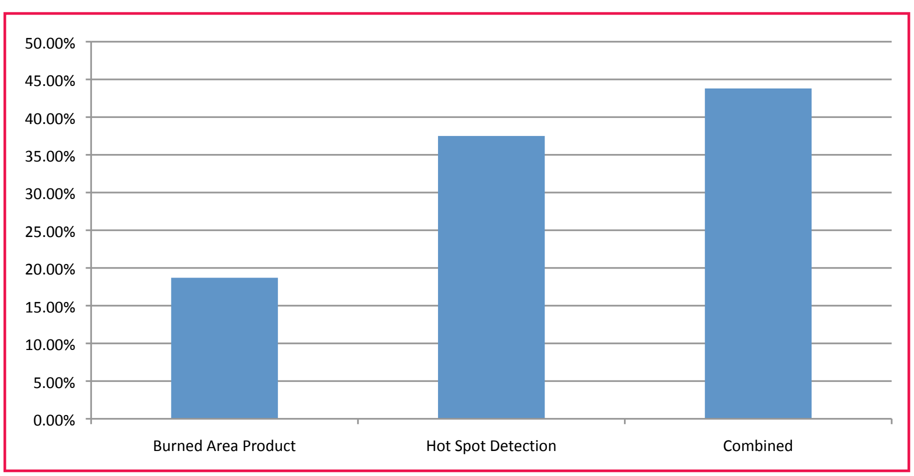


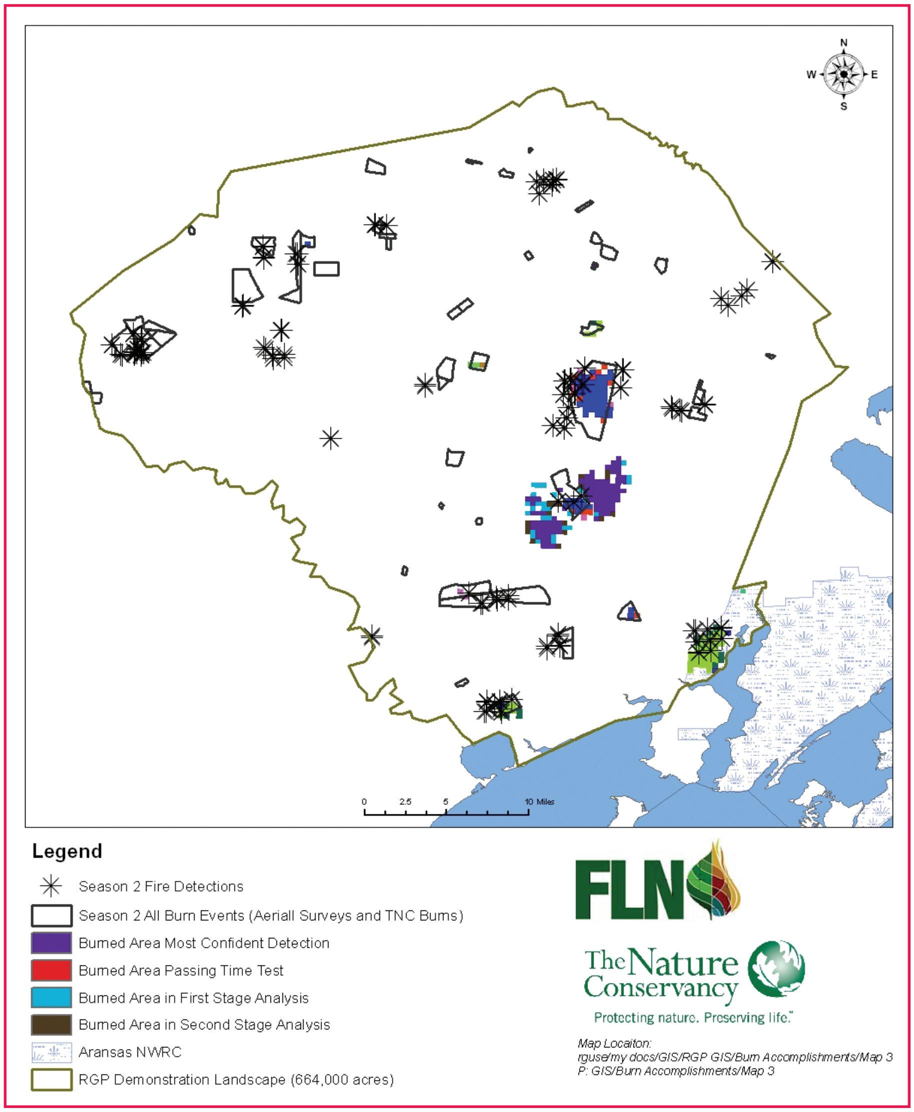
Figure 3.—*Percentage landowner prescribed burns and wildfires (Fire Events) detected in S2 (April 2011 aerial survey) (N = 32, $\bar{x}$ = 528 acres, median = 220 acres, and range = 24–5,119 acres).*

the landscape. Map 4 demonstrates that these events are well distributed throughout the landscape. It is worrisome, however, that much of the remnant prairie areas does not appear to have been experiencing the frequent fire return intervals needed to maintain them.

Conclusions

This article presents a very brief and coarse analysis of the wealth of information that can be gleaned through similar remote sensing techniques and studies on this landscape. The BA data set, which can provide an approximation of the spatial extent of burn events, validated 18 percent of surveyed burn events and 25 percent of TNC prescribed burns in S1. The FD data set detected 37.5 percent of surveyed burn events and 57 percent of TNC prescribed burns in S1, but, of course, FD cannot indicate the size of fires on the landscape. Our analysis of S2 revealed that the BA data set performed poorly, detecting only 9.5 percent of the TNC burns, but it is very odd that it confirmed 47 percent of surveyed burn events that were questionable due to green-up which inhibited our ability to differentiate burned areas from unburned areas in the 2011 aerial surveys. In S2, the FD data set was again more predictable by detecting 47 percent of the TNC burns and 35 percent of surveyed burns.

To monitor and measure conservation progress on this landscape, temporal and spatial data for all fire events is invaluable information. Although promising, within the three sets of known fire events, the BA product detected an average of only 27 percent of fires, and it failed to detect five fires more than 1,000 acres in size. In this analysis, BA is incapable of providing the complete package of spatial information we desire. The FD product detected 46.5 percent of the same three sets of known fire events, but it cannot tell us the size of fires; it did, however, indicate a 30-fold increase trend in fire events. For instance, when we combined all the FD data sets from 2001 through 2011 (fig. 7 and map 4), the year's



Map 3.—*Season 2—All burn events, MODIS burned areas and fire detections.*

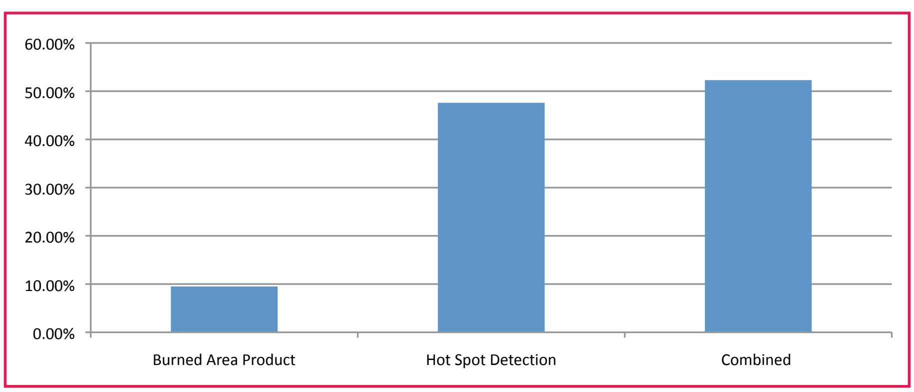
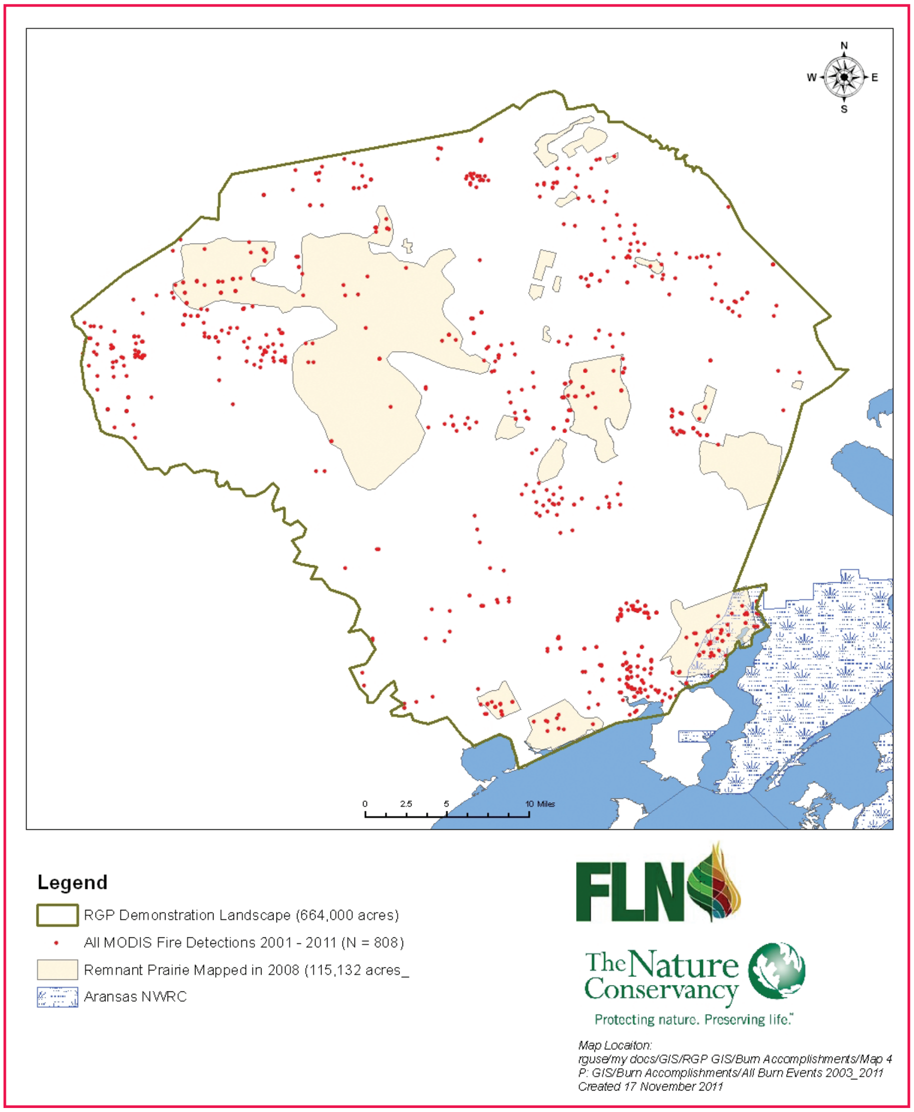


Figure 4.—*Percentage of known TNC burns detected in S2 (December 2010 through March 2011) (N = 808).*

most conducive for burning are clearly identifiable, and, most importantly, the dramatic increase in non-TNC fire events. No nearby landscapes/controls exist to validate that this increase is the result of landowners once again embracing fire management, but it can easily be construed that it is. Although continuing to track trends using the FD data sets is a valuable metric for monitoring conservation strategies, for now we must continue to fund aerial surveys.



Map 4.—*All MODIS fire detections 2001 to 2011 (some fires did log multiple detections).*

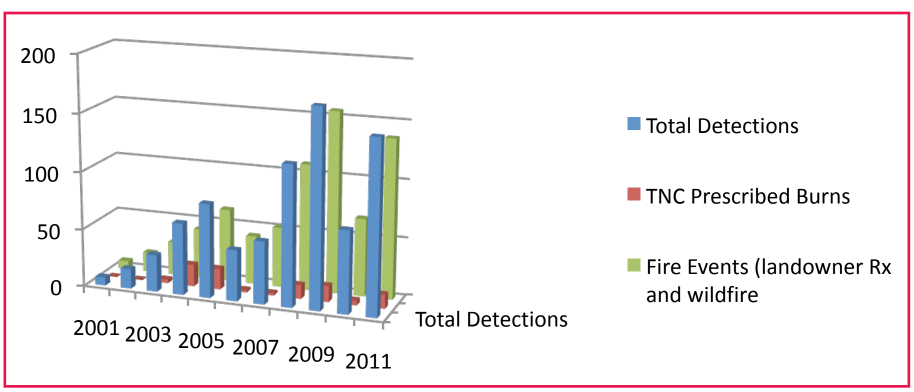


Figure 5.—*All MODIS hot spot fire detections 2003–2011 (does not include burned area product data sets) (N = 21, $\bar{x}$ = 409 acres, median = 363 acres, range 40–1,517 acres).*

The fact that relatively large prairie remnants persist despite FD indicating that fire is not occurring as frequently is likely attributed to the proximity of woody vegetation seed sources. As this vegetation continues to spread, we can assume the pressure on the prairie remnants is increasing exponentially. The challenge and burden of protecting these grasslands on this privately owned landscape lie heavily on the landowners. Managed fire will greatly enhance the economic viability of their ranching operations, and that in turn lessens the threat of habitat fragmentation should they be forced to sell their properties. Maintaining these grasslands and reclaiming the grasslands that have been lost to woody vegetation so they can persist to support the suite of endemic species are challenges that can be won only through continuing and increasing our work of reaching out to private landowners. We must continue to help them find the means to restore the role that fire plays on this vast and precious landscape, and we need to monitor the results.

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Fire Management Today Announces 2011 Photo Contest Winners

As part of an ongoing series, *Fire Management Today* hosted a photography contest in 2011 in order to present images of firefighting scenes and operations to its readers. Photos are recognized here for their superb depiction of firefighting conditions and efforts.

We asked interested people to submit images in one or more of six categories:

- Wildland fire,
- Prescribed fire,
- Wildland-urban interface,
- Aerial resources,
- Ground resources, and
- Miscellaneous (fire effects, fire weather, fire-dependent communities or species, etc.).

Judging and Award Criteria

We evaluated photos submitted in three steps. First, we looked at each photograph for technical characteristics, such as focus, clarity, and resolution. Then, the judging panel made sure that images depicting firefighting operations demonstrated accepted safety standards and practices— unless the intent of the image was to convey the opposite. Finally, the judging panel viewed and rated the images on the following representative criteria:

Composition

- Is the composition skillful and dynamic?
- Is the image balanced or unbalanced? Is the balance or imbalance appropriate? If there is a main center of interest, is it well placed in the frame?

Lighting

- Does the lighting show off the subject well?
- Is the contract level appropriate and effective?

Subject/Interest

- Does the subject have interesting connotations or associations?
- Are the colors and patterns effective?
- Does the image contain interesting textures?
- Does the image contain interesting juxtapositions?

Originality

- Does the image show an original subject or an original approach to a conventional subject? Is it anonymous in approach, or does it show a visual signature or convey a personal vision?

Story/Mood

- Does the image effectively tell a story or convey a mood?

Digital manipulation of an image was not a disqualifier for high rating, but digital effects were judged independently on their effectiveness.

Awards

Based on the responses to these and related questions, we made the awards based on both relative and absolute merit. For example, in a category with numerous high-quality images, photographs were given First, Second, and Third Place Awards with Honorable Mention awards for photographs that also merited acknowledgement. Otherwise, for categories in which only a limited number of photographs could be rated as excellent, awards were restricted to those photographs.

The resulting award-winning photographs are presented on the following pages. Images of interest that are not presented here will be retained for future use in *Fire Management Today*, either as issue covers or to enliven pages throughout the publication as space allows. Our thanks go out to everyone who participated in the contest. We appreciate their efforts, first of all, in service to our natural resources and, then, in taking the added effort in recording the conditions of that service. ■

First Place, Wildland Fire. *Photo by Steve Bingham. A smoky sunset in a burned area of the Great Dismal Swamp National Wildlife Refuge in Virginia, as seen from Riddick Ditch Road, 2011.*

Second Place, Wildland Fire. *Photo by Jayson Coil. A massive ball of fire rolls up the east flank of Amberian Point in Greer, AZ, during the Wallow Fire, 2011.*

Third Place, Wildland Fire. *Photo by Terra Fondriest. Toward the end of shift mopping up the Hiko Fire on the Ely district of Nevada, the sun is hiding behind a cloud as a crewmember stands amongst the charred vegetation, 2005.*

First Place, Aerial Resources. *Photo by Jayson Coil. Helicopter 795 supports ignition operations by suppressing spot fires in an effort to successfully minimize the damage the Wallow Fire did to the community of Greer, AZ, 2011.*

Second Place, Aerial Resources. *Photo by Bill Gabbert. Air Tanker 07 flies into the smoky Ferguson Canyon to protect structures on the Whoopup Fire in western South Dakota, 2011.*

Third Place, Aerial Resources. *Photo by Katie Isacksen. Heavy air resources were used to slow the Shadow Lake fire when it approached a youth camp, Willamette National Forest, 2011.*

First Place, Wildland-Urban Interface. *Photo by Kent Nelson. A devastating spring structure fire caused by careless disposal of wood ash nears the firewood pile, Washington County, Maine, 2011.*

Second Place, Wildland-Urban Interface. *Photo by Jayson Coil. Fire moves up the East Fork of the Little Colorado River and into the community of Greer, AZ, destroying many homes during the Wallow Fire, 2011.*

Third Place, Wildland-Urban Interface. *Photo by Anthony Conte. Saving the Church. Structure protection at the Buffalo Trail Boy Scout Ranch on the Rock House Fire in Fort Davis, TX, 2011.*

First Place, Prescribed Fire. *Photo by Susan Blake. Prescribed fire conducted at the Osceola National Forest in Olustee, FL, to eliminate excess fuels, 2011.*

Second Place, Prescribed Fire. *Photo by Ben Wagner. The 1,200 acre long leaf pine/wiregrass understory burn. The Maple Grove Prescribed fire in the Ocala National Forest was taken during aerial ignition operations while the burn was being conducted, 2011.*

Third Place, Prescribed Fire. *Photo by Susan Blake. Assistant Fire Management Officer Byron Hart ignites fuels in the Osceola National Forest, FL, during a prescribed fire, 2011.*

First Place, Ground Resources. *Photo by Jayson Coil. Overhead from Reinarz Type 1 IMT work to develop a plan to protect Los Alamos National Laboratory during the first night of the Los Conchas Fire, 2011.*

FMT Photo Experts

Judges for this year's photo contest were drawn from personnel well acquainted with firefighting operations and communications. The judging panel took the role of safety experts, who could review the photographed scenes for accepted safety practices, and content experts, who rated images on their individual merits. Our thanks go to these judges for their willingness to share their time and knowledge. The judging panel included the following.

Safety Judges

Gary Jarvis is a Type 2 Safety Officer, Fire Behavior Analysis, Type 3 Incident Commander and Division Supervisor. Jarvis has 4 years of experience on a hotshot crew and more than 20 years working on incident management teams throughout the United States. In his 25 years of wildland firefighting, he has completed fire assignments in 32 different States. Jarvis currently works in the Washington Office on the Fire and Aviation Staff as the fuels program manager.

James Fortner works in the Washington Office, Fire and Aviation Management Staff of the Forest Service where he serves as the cooperative fire program manager. His primary duties include managing the State Fire Assistance Program and the Volunteer Fire Assistance Program, as well as building cooperative relationships with State forestry agencies and other partners. Prior to coming to work with the Forest Service, he served as the training and exercise coordinator for the U.S. Department of Agriculture's Homeland Security and Emergency Coordination Office. Fortner has more than 24 years of experience in both structural and wildland fire suppression. In his spare time, he serves as assistant chief of the Falls Church Volunteer Fire Department in Falls Church, VA.

Photo Judges

Keith Riggs is an award-winning photographer, radio-television producer, and video director-editor. He has taught at the U.S. Air Force Photo School and Oregon State University. His work has appeared in numerous publications and television programs such as *Aviation Progress, CBS Morning News,* and *National Collegiate Athletic Association Films.* During his career, Riggs has worked with notables including The Oak Ridge Boys, actor Steve Martin, science fiction legend Gene Roddenberry, two-time Nobel Prize winner Linus Pauling, National Basketball Association greats A.C. Green and Gary Payton, and outdoor personalities Curt Gowdy and Jack Dennis. He is currently a public affairs officer with the Forest Service's Office of Communication in Washington, DC.

Dennis Neitzke is the district ranger of the Gunflint Ranger District, Superior National Forest. He's held several positions as a forestry technician, forester, and wildlife biologist. Through the past 34 years, Neitzke has been involved in fire management including several positions in operations to the deciding official for type 1 prescribed fire to agency administrator for type 1 wildfires. As an amateur photographer for 30 years, his studies in photo techniques have been primarily with landscapes. Neitzke has also done photo editing for presentations and publications related to natural resource and fire management.

Beth Card has been working in fire for nearly 24 years. She has spent most of her career with the National Park Service and has worked for the Forest Service for the past 6 years. Card has had the opportunity to work in a variety of operations jobs around the country, under multiple management strategies—Yosemite National Park and Golden Gate National Recreation Area in central California, Big Cypress National Preserve in south Florida, and Theodore Roosevelt National Park and the Dakota Prairie Grasslands in western North Dakota. Card is currently the deputy center manager at the Eastern Area Coordination Center in Milwaukee, WI.

First Place, Miscellaneous. *Photo by Jayson Coil. Hotshot crews conduct burnout operations along the forest adjacent to Highway 180 near Alpine, AZ, during the Wallow Fire, 2011.*

Second Place, Miscellaneous. *Photo by Jayson Coil. After spot fires established themselves east of Highway 180 on the Wallow Fire, the forest erupted into an inferno, 2011.*

Third Place, Miscellaneous. *Photo by Jayson Coil. An old windmill is backlit by the flames of a burnout operation on the Wallow Fire, 2011.*

Honorable Mention, Wildland Fire. *Photo by Kyle Cannon. A dust devil, caused by localized instability during initial attack aviation operations, on the 464-acre Washington Creek Fire, 2011.*

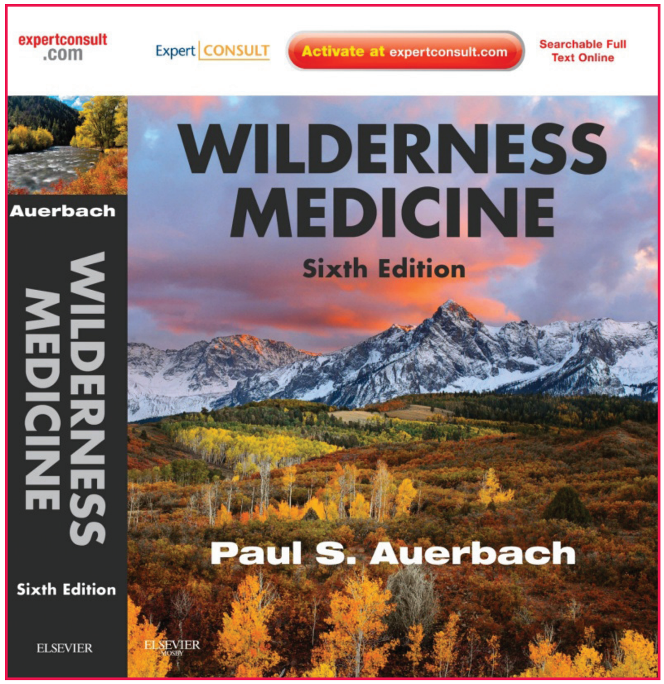
Honorable Mention, Wildland-Urban Interface. *Photo by Patrick Leyba . Las Conchas Fire, night image on the Fourth of July, from Santa Fe, NM, Santa Fe National Forest.*

Honorable Mention, Miscellaneous. *Photo by Steve Bingham. The railroad ditch entrance to the Great Dismal Swamp National Wildlife Refuge, VA, is obscured by smoke from the lateral west fire, 2011.*

Update to Wildland Fire Safety Chapter in *Wilderness Medicine*

Martin E. Alexander

The chapter "Wildland Fires: Dangers and Survival" (Alexander et al. 2012) in the 2012 edition of the book *Wilderness Medicine* includes the latest information, a new author, and additional photos. The sixth edition of the book, under the editorial leadership of Paul S. Auerbach of the Stanford University Medical Center, is available in print and electronic formats (Auerbach 2012). The chapter has been included in the book since the inaugural edition was printed in 1983 (Alexander 2008).



Spine and cover of the latest edition of the book Wilderness Medicine*, as edited by Paul S. Auerbach. Image courtesy of Helena Stefaine, Elsevier, Philadelphia, PA.*

What's New?

The "Wildland Fires" chapter (Alexander et al. 2012) incorporates the latest information on developments in the field based on research findings and real-world events (e.g., statistics on recent wildland firefighter fatality trends, implications of the 2009 Black Saturday fires in Victoria, Australia). Colin Bucks, a clinical instructor in the Division of Emergency Medicine at the Stanford University School of Medicine, who has some frontline experience in wildland fire suppression, contributed greatly to the revision of the content on firefighter health-related issues. Several new photos illustrate concepts presented in the text.

Dr. Marty Alexander is an adjunct professor of wildland fire science and management in the Department of Renewable Resources and Alberta School of Forest Science and Management at the University of Alberta in Edmonton, Alberta, Canada.

Wilderness Medicine, consisting of 2,304 pages, 13 sections, and 114 chapters, covers a myriad of topics. One new feature of the sixth edition is a fully searchable online text capability via http://www.expertconsult.com.

Still a Valuable Reference

In the foreword to a reprint of the fifth edition of the chapter, funded by the Wildland Fire Lessons Learned Center in 2007, retired Forest Service regional fuels specialist Dave Thomas regarded the chapter on "Wildland Fires: Dangers and Survival" in *Wilderness Medicine* as "one of the best surveys on the subject of wildland fire safety that has been published in some time" (Thomas 2007). Presumably, the latest version of the chapter holds this same claim.

For additional information about the sixth edition of *Wilderness Medicine*, visit the following links: http://www.us.elsevierhealth.com/ and http://www.expertconsultbook.com/.

References

Alexander, M.E. 2008. "Wildland fire safety" featured in wilderness medicine book. Fire Management Today. 68(1): 41–42.

Alexander, M.E.; Mutch, R.W.; Davis, K.M.; Bucks, C.M. 2012. Wildland fires: dangers and survival. In: Auerbach, P.S., ed. Wilderness medicine. 6th ed. Philadelphia: Elsevier: 240–280.

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Thomas, D.A. 2007. Foreword to reprint of fifth edition of "Wildland fires: dangers and survival." Available at http://www.wildfirelessons.net/documents/Thomas_2007_Foreword.pdf (accessed 16 February 2012).

Fire Management today

2013 Photo Contest

Deadline for submission is 6 p.m. eastern time, Friday, December 7, 2013

Fire Management Today (FMT) invites you to submit your best fire-related images to be judged in our photo competition. Entries must be received by close of business at 6 p.m. eastern time on Friday, December 7, 2013.

Awards

Winning images will appear in a future issue of *FMT* and may be publicly displayed at the Forest Service's national office in Washington, DC.

Winners in each category will receive the following awards:

- 1st place: One 20- by 24-inch framed copy of your image.
- 2nd place: One 16- by 20-inch framed copy of your image.
- 3rd place: One 11- by 14-inch framed copy of your image.
- Honorable mention: One 8- by 10- inch framed copy of your image.

Categories

- Wildland fire
- Aerial resources
- Wildland-urban interface fire
- Prescribed fire
- Ground resources
- Miscellaneous (fire effects, fire weather, fire-dependent communities or species, etc.)

Rules

- The contest is open to everyone. You may submit an unlimited number of entries taken at any time, but you must submit each image with a separate release/application form. You may not enter images that were judged in previous *FMT* contests.
- You must have the authority to grant the Forest Service unlimited use of the image, and you must agree that the image will become public domain. Moreover, the image must not have been previously published in any publication.
- *FMT* accepts only digital images at the highest resolution using a setting with at least 3.2 mega pixels. Digital image files should be TIFFs or highest quality JPGs. Note: *FMT* will eliminate date-stamped images. Submitted images will not be returned to the contestant.
- You must indicate only one category per image. To ensure fair evaluation, *FMT* reserves the right to change the competition category for your image.
- You must provide a detailed caption for each image. For example: *A Sikorsky S-64 Skycrane delivers retardant on the 1996 Clark Peak Fire, Coronado National Forest, AZ.*
- You must submit with each digital image a completed and signed Release Statement and Photo Contest Application granting the Forest Service rights to use your image. See http://www.fs.fed.us/fire/fmt/release.pdf.

Disclaimer

- A panel of judges with photography and publishing experience will determine the winners. Their decision is final.
- Images depicting safety violations, as determined by the panel of judges, will be disqualified.
- Life or property cannot be jeopardized to obtain images.
- The Forest Service does not encourage or support deviation from firefighting responsibilities to capture images.
- Images will be eliminated from the competition if they are obtained by illegal or unauthorized access to restricted areas, show unsafe firefighting practices (unless that is their expressed purpose), or are of low technical quality (for example, have soft focus or camera movement).

To help ensure that all files are kept together, e-mail your completed release form/contest application and digital image file at the same time.

E-mail entries to: firemanagementtoday@fs.fed.us

Postmark Deadline is 6 p.m., Friday, December 7, 2013

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