

Resource Management: The Fire Element

The Newsletter of the California Fuels Committee



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New Tools for R-5 Fuels Managers Thanks to CFC Efforts

Over the last couple of years, several members of the California Fuels Committee (CFC) have worked hard to make sure fuels management needs were included in stand inventory programs and tools as they were developed in an effort to coordinate as much data gathering as possible. As CFC Chair in 1995, Christie Neill (Eldorado NF) took responsibility for working with the Regional Office to make two such programs a reality: R5FUELS; and FIA WOODY.

Christie stepped down as Chair in February and the committee welcomes the 1996 Chair, Ann Marks (Los Padres NF) and new Vice-Chair Gary Cones (Stanislaus NF). The following articles were written by Christie to transfer information on these tools to California fuel managers. Thanks, Christie, for all your dedicated work!

R5FUELS - Fuel Inventory Software

For those of you who are still counting sticks and computing tons/acre using James Brown's hand-cranked formulas, put away your calculators! A few years ago, the Lassen NF got tired of doing just that and originated a contract with Corvallis Microtechnology Inc (CMT) to have the planar intercept method (Brown's version) converted to software that would work in the field data recorders (FDR) being used by timber personnel to collect stand data. The idea was to be able to calculate tons/acre by size class right in the field.

This was a great idea, but those who wanted a copy of the software needed to come up with \$500 for each data recorder it was to be loaded into. The CFC thought all users in the region should have access and we could thereby get a reduced rate. A proposal was submitted to the Regional Fuels Specialist, Sue Husari (she's the short woman with money and a shoe phone!) to fund a site license for R-5 data recorders so any user could obtain the software free of charge.

As paperwork came and went, various people in the fuels arena submitted modifications to the original contract and an improved, automated version of planar intercept for the FDR's was the result. Bob Olson and Judy Forbes from the Lassen NF and Aaron Gelobter (Sequoia NF) were very helpful in testing and submitting modifications for the improved final product. Thanks to Bill Hay (RO Timber) for putting together the contract and site license.

A copy of the software and User's Guide can be RIsed from the RO; or send your FDR to CMT for installation. Those districts or forests that purchased the original software can send FDR's to CMT for an upgrade. CMT's address is: 413 SW Jefferson Avenue, Corvallis, OR 97333 (c/o Matthew Lehman). Depending on your model of FDR, you may need to purchase additional memory. For technical assistance or information, contact Matt Lehman at (503) 752-5456.

FIA WOODY - Inventorying Woody Debris

To properly manage National Forest lands, an inventory of the existing vegetation, both live and dead, overstory and understory, must be carefully and competently conducted. Any project which involves manipulation of live vegetation, snag and down log populations, or fuel bed structure should be based upon detailed forest inventory data. The Forest Inventory Analysis (FIA) is a source of information for such data and for identifying priorities of vegetation treatments.

Vegetation mapping is done for all acres within the Forest, including private in-holdings. Mapping is based on the CALVEG classification system for all conifer, hardwood, shrub, and grass types. Additionally, for the conifer types, information on tree size and crown closure is included. Vegetation maps are a key layer in each Forest's GIS data base.

(Continued on page 8)

Forging a Prevention/Fuels Link for a Defensible Ecosystem

The Alta Sierra Community Defensible Ecosystem Project on the Greenhorn Ranger District of the Sequoia National Forest is combining "Community-Based Adult Education" with fuels reduction to decrease the risk from wildfire in this wildland urban interface community. This is a Fire Prevention/Fuels Management link being forged by Prevention Officer Linda Adams and Fuels Specialist Julie Thrupp. It is also a Region 5 Fire Management 2000 pilot project.

The Alta Sierra wildland urban interface is an area of extreme fire history, extreme fire hazard, and very high values at risk. More than 400 summer homes, a ski resort, two summer camps, and a 100-site campground are scattered throughout 1000 acres of dense, mixed conifer forest poised at the top of a steep, brush-filled drainage only five miles above a major recreation area and a full-time community.

Six major fires, from the 25,670-acre Red Mountain Fire in 1970 to the 24,200-acre Stormy Fire in 1990, have burned the wildlands around Alta Sierra in the last 20 years. Alta Sierra was evacuated for the Stormy Fire in 1990. Fire occurrence records from 1910 show a 20,000-acre fire burning through the area every 20 years. To mitigate the risks of the interface fire that history predicts about the year 2010, Fire Prevention and Fuels Management have been linked to accomplish both community education and fuels reduction.

On Memorial Day 1995, the Project was introduced to 120 Alta Sierra cabin owners with a poster display and a 20-minute oral presentation. In June, a 40-yard refuse box for raked needles was rented by the Alta Sierra Property Owners' Association. The overwhelming response indicates that

pine needle recycling and/or disposal is critically needed to remove that barrier to Defensible Space. Also in June, 11 Alta Sierra community leaders were trained on the basics of Defensible Space, so that they can assist with Hazard Inspections as part of the Neighborhood Fire Watch Program.

In July, the Bakersfield Californian daily newspaper printed "*Surviving the Aftermath of Fires - Fire Teaches Many to Clear Away Brush - Firefighters Trained to Save Defensible Homes First*" featuring color photos of the local homes destroyed a year ago in the 2436-acre Lakeland Fire, and including the Defensible Space Checklist. Defensible Space Bulletin Boards were installed by the District at the two main entrances to Alta Sierra, and Fire Safe videos can be checked out from the local real estate office in the center of the community.

At their Labor Day Barbecue, the Property Owners' Association presented a one-page handout about their Wildfire Defensible Space Team. This is an exciting step toward the Property Owners taking ownership in this project, making it their project. The handout briefly explains what Defensible Space is, what the purpose of their Team is, what the Forest Service is doing, and what the Property Owner can do. Their goals include communications and education, Defensible Demonstration Lots, a slash and needle recycling site, and all lots cleaned and defensible by 1998.

The project has been included in the Lower Kern Environmental Analysis. Notices on the Alta Sierra Bulletin Boards brought lots of property owners to the Open House and field trips. We are working out the details of an Interagency Partnership with Kern County Fire Department and the Property Owners' Association for crews to clear cabins and vacant lots that violate the CA Fire Hazard Reduction Law.

The costs of the clearance work will be attached to the owner's tax bill.

The Project made a big on-the-ground step forward in early December. A District resource crew of unemployed carrot packers built 78 piles of slash for 16 acres, as the first step in creating a community defense zone along the Forest Service boundary directly behind cabins at Alta Sierra.

So progress is being made at Alta Sierra to mitigate the effects of that fire predicted for the year 2010. We're hoping to continue to use this Prevention/Fuels link to build a relationship with the community that will create long-term results in Defensible Space.

LINDA ADAMS
Greenhorn RD - Sequoia NF

(Missouri continued from pg 2)

role of fire in control of exotic plant species and long-term change in biota. Preliminary results of some of these studies indicate that fire does play a significant role in preservation of the native plant communities of Missouri. Monitoring has also shown that fire in the ecosystem has had a positive effect on critical habitat for birds such as the wild turkey and reptiles such as the collard lizard.

One of the big differences I have noticed is that burning in Missouri has been a lot more fun. Not any easier, just more fun! Maybe because it's less stressful and controversial than it was in the politically sensitive area from which I came.

JIM DESMOND, FMO
Ozark National Park

Sharing Resources Helps Agencies Meet RX Fire Goals

Pulling off a prescribed fire can be a very complex process. Not only must managers meet all the weather and fuels prescription parameters, but they must also have adequate numbers and types of resources on hand to safely and cost effectively complete the project. With more and more emphasis being placed on completing prescribed fire projects each year in all agencies, it becomes more difficult locating resources. Sometimes this is due to the fact that everyone is burning at the same time.

In order to alleviate some of these problems and get as much prescribed burning accomplished as possible, the Modoc National Forest and Lava Beds National Monument worked together during 1995 to meet both agency's goals. The Forest burned 2235 acres which included natural and activity fuels,

underburning in eastside pine as well as slash in logging units. The Monument burned 1300 acres which included 200 acres of natural fuels underburning in eastside pine and burning to reduce hazardous accumulations of fuels and restore fire to the ecosystem.

Both agencies shared resources to accomplish this work. Engines and personnel from each agency were shared throughout the fall season for prescribed fire project work. In some cases, costs for the use of these resources were absorbed by the agency utilizing a particular resource. Funds were transferred between agencies for personnel and equipment costs when needed through a local Interagency Agreement developed in 1993. In one case, the Monument paid the full cost (base 8 and overtime) of one temporary Forest Service employee for two months

while this employee assisted with Monument prescribed fire projects. In another case, the Forest funded two light engines for a two-day project where four-wheel drive was necessary.

Although the Modoc NF and Lava Beds National Monument have been working cooperatively for the past three burning seasons, this past year was undoubtedly the highlight season. Prescribed fire managers of both units will work together more closely than ever to share resources for completing projects. It is evident that through more cooperative efforts such as this, we can be more successful at meeting our prescribed fire and ecosystem management goals.

KEN KERR, FMO
Lava Beds National Monument

The Search for Fallen Firefighters

Your help is needed to collect information on the whereabouts of Wildland Firefighter Memorials throughout the country. Wildland Firefighter Memorials are defined as "official plaques, monuments, statues, crosses, markers or named places such as campgrounds, trails or canyons which commemorate wildfire fatalities".

Paul Gleason (Arapaho/Roosevelt National Forests) is working to support preparation of a listing by Andrew Gulliford, Ph.D. (public history). To help, please send Paul any information you have such as location of memorial, fire event, whether you have actually seen the memorial or just heard about it. He will do all the follow-up work, all

he needs is a few leads. Be sure to send along your name and address so he can contact you.

This is an enormous task which is long overdue. Please don't assume that any memorial you might be aware of is currently listed. Paul can be reached at 240 W. Prospect Rd., Fort Collins, CO 80526; DG: R02F10A; /s=p.gleason/oui=r02f10a@mhs-fswa.attmail.com ; or at firewhirl@aol.com.

PAUL GLEASON
Arapaho & Roosevelt NFs

Proceedings Available

In the fall of 1993, over 200,000 acres of southern California shrublands exploded in massive wildfires. These catastrophic fires, woven between wildlands and urban environments, re-initiated many unresolved debates on resource management strategies in California wildlands.

As a consequence, an outstanding panel of experts in ecology and resource management came together in a symposium and workshop to synthesize our current understanding of these issues. The resulting proceedings, *Brushfires in California Wildlands: Ecology and Resource Management*, include research synthesis and perspectives of resource managers and environmental organizations on topics of prefire and postfire ecology and management. In addition to problems of land planning, a thorough discussion is presented on topics related to aerial seeding of postfire chaparral and coastal sage.

Proceedings can be ordered through the International Association of Wildland Fire, PO Box 328, Fairfield, WA 99012 (800) 697-3443. Cost is \$32.95.

TOM WHITE
Cleveland National Forest



Comparing Managed and Pre-Settlement Landscape Dynamics with GIS

The landscape structure of forests subjected to wildfires fluctuates through time as a result of the episodic nature of these disturbances and long-term variation in the climatic conditions that influence the fire regime. These landscape dynamics influence a variety of important ecosystem processes.

Before European settlement, landscape dynamics in Pacific Northwest forests were driven primarily by the patterns of wildfire. An understanding of these dynamics can provide a unique frame of reference for evaluating current forest management policies and alternatives for the future. Tree-ring data and historical records of forest cutting were used to quantify the range of landscape conditions that existed on two large watersheds (4,000 ha and 11,600 ha) between the late 1400's and 1990. A rule-based simulation model (Wallin et al. 1994) was used to generate landscape patterns that would result from five alternative future forest management scenarios. Our analysis is heavily dependent on the use of a Geographical Information System (GIS) and FRAGSTATS, a software package that can be used to quantify a landscape characteristics (McGarigal and Marks 1995).

Our study focused on two watersheds in the central Oregon Cascades where earlier studies had used tree-ring analysis to map individual fire episodes from the late 1400's to the present (Teensma 1987, Connelly and Kertis 1992). These fire episode maps are thought to represent the distribution of moderate to high severity fires. These two sets of fire episode maps were digitized and used to develop a simplified, multitemporal representation of landscape pattern. Each fire episode map was digitized and our GIS was used to sequentially overlay these

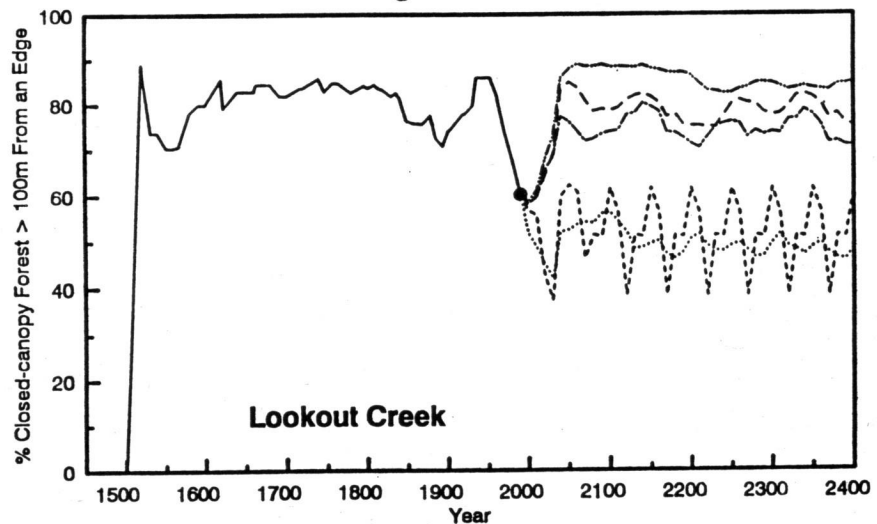
maps. For each 50 m by 50 m grid cell, we tracked the time since the previous fire. Initially, unburned areas were treated as background, but by the mid-1500's, nearly all grid cells in each study area had burned at least once. A simplified representation of landscape pattern at any given point in time was obtained by quantifying the shape, distribution and abundance of patches

of open- and closed-canopy forest. For the purposes of this analysis, open-canopy forests are defined as those that have burned within the last 40 years and closed-canopy forests those not burned for over 40 years.

The effects of alternative future forest cutting scenarios on landscape pattern

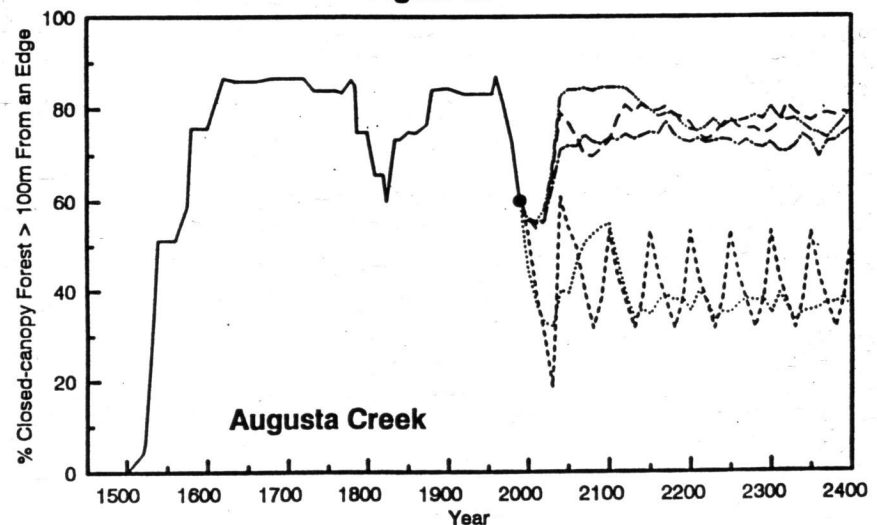
(Continued on page 7)

Figure 8a



Percentage of closed-canopy forest area more than 100 m from an edge in (a) Lookout Creek and (b) Augusta Creek: (—) historical conditions; (---) conditions in 1990. Landscape dynamics after 1990 were generated by using the CASCADE model with rotation lengths of 50 years (—); 100 years (....); 200 years (---); 330 years (---); and a mixture of 100, 200, and 330 years (---). The simulations based on the 100-year rotation used dispersed cutting, and all others used aggregate cutting.

Figure 8b



12 Months of Burning



With a little luck, a large burning window and lots of hard work, the Stanislaus National Forest was able to treat almost 10,000 acres with prescribed fire in the 1995 field season. All four districts contributed acreage with large underburns including the Plum Flat Underburn in January and a 500-acre underburn in red fir last August.

Perhaps the most notable project, however, was the 4800-acre Stanislaus River Underburn. It is believed to be the largest management-ignited prescribed fire in California history. Average slope was 54 percent and fuels ranged from mixed conifer to brush and oak woodland. Elevations ranged from 1100 to 4100 feet and the burn site perimeter was over 18 miles.

Planning, preparation and execution of the Stanislaus River Underburn

took less than a year thanks to the cooperation and commitment of interdisciplinary team members and management support. The site contains three California spotted owl protected activity centers (PAC's), 13 plantations, 27 archaeological sites and two private land holdings. NEPA direction was through a Decision Memo.

The Incident Command system (ICS) was utilized during burning with Gary Cones as the Incident Commander and forest-wide participation to fill ICS positions. The firing was initiated November 6 with no measurable rainfall since June. It took seven days and two nights of ignition to complete at a cost of approximately \$180,000 or \$40 per acre. Project funding was a combination of natural fuels (PF2) and Hill Bill (California Department of Fish and Game) dollars. At peak staffing, resources committed were 2 watertenders, 3 hand crews, 6

engines, 2 dozers, 1 helicopter, and 14 overhead and support personnel. Hand ignition and aerial ignition with the Primo Mark III sphere dispenser were both utilized. A total of 22,000 "ping pong balls" were dropped on the site.

The resource management objectives were to reduce fire hazard, promote regeneration of plants to improve forage for deer and to restore fire to the ecosystem. Although no formal post-burn evaluation has yet been completed, the general consensus is very favorable. Only minor escapes occurred totalling less than two acres.

JOE MOLHOEK
Mi-Wok RD, Stanislaus NF



(GIS continued from page 6)

were evaluated using the CASCADE model (Wallin et al. 1994). This model simulates landscape change in response to cutting and subsequent regrowth. We examined the patterns generated by dispersed cutting on a 100-year rotation and aggregated cutting on rotation lengths of 50, 200, 330 years. We also examined one scenario that used aggregate cutting and 100, 200 and 330-year rotations on different portions of the study area. For both the pre-settlement and alternative future landscapes, a series of indices were calculated, at 20 year time steps, using FRAGSTATS (McGarigal and Marks 1995).

Our results demonstrate that conditions on these two watersheds in 1990 are outside the range of conditions that existed during most of the reconstructed pre-settlement era (see figure). Continued use of short (50-

100-year) timber rotation lengths would push these watersheds even farther outside of this range. The use of much longer rotation lengths (200+ years) could bring these watersheds back to within or very near this range of pre-settlement conditions. Our analysis is more fully described in Wallin et al. (in press).

Our analysis demonstrates a GIS-based approach to quantifying the range of pre-settlement variability for a variety of landscape-level attributes. By ignoring important differences in within-stand structural complexity, our results are likely to underestimate the ecological differences between the pre-settlement landscapes and those generated by forest cutting. A more complete analysis of the ecological consequences of the landscape patterns presented here will require more explicit consideration of structural characteristics at the stand level. Nevertheless, our

results do provide unique insights on some of the differences between managed and pre-settlement landscapes.

DAVID WALLIN
Western Washington University

Connelly, K.P. and Kertis, J.A., 1992. Augusta Creek fire History. Unpublished report to the Blue River RD, Willamette NF.

McGarigal, K., and Marks, B.J., FRAGSTATS: Spatial pattern analysis program for quantifying landscape structure. Pacific Northwest Research Station, USDA Forest Service, PNW-GTR-351, Portland, Oregon. 123 pages.

Teensma, P.D.A., 1987. Fire history and fire regimes of the central western Cascades of Oregon. Ph.D. dissertation, University of Oregon, Eugene, OR, 188 pages.

Wallin, D.O., Swanson, F.J. and Marks, B., 1994. Landscape pattern response to changes in pattern generation rules: land-use legacies in forestry. *Ecological Applications* 4:569-580.

Wallin, D.O., F.J. Swanson, B. Marks, J.H. Cissel and J. Kertis. (In press) Comparison of managed and pre-settlement landscape dynamics in forest of the pacific northwest, USA. *Forest Ecology and Management*.

(Tools continued from page 1)

The resulting information is suitable for use in landscape-level analysis and general land management planning. However, for site specific project work and detailed silvicultural prescriptions additional information must be gathered at the stand level. Data is collected using field data recorders and or "hard cards" R5-1900-1 thru 1900-4 1/93 (available through the GPO). FIA sampling designs and data collection needs are usually initiated by the district silviculturist with input from wildlife, ecology and fire management. Data needs from these groups can be met utilizing an integrated or coordinated inventory concept which FIA supports.

Within FIA, woody debris data can be collected using the data recorder or WOODY DEBRIS cards. The FIA system has self-contained analysis features that allow the user to create customized reports highlighting any of the inventory attributes contained in the raw data, including WOODY DEBRIS. The program has been available since 1994 from the Regional Office or Remote Sensing Lab. Instructions for use are in the FIA Users Guide.

The Woody Debris inventory is based on the "Photo Series for Quantifying Forest Residues". This system involves the visual estimation of fuel levels on-site as compared to the fuel

levels depicted in the photos. Since the photo series is based upon the planar intercept method, inventory crews should be familiar with that method to be able to make accurate ocular comparisons to the photo series. Training on the correct use of the photo series is essential to getting good data in for good data out. Data obtained with FIA WOODY includes tons/acre by size class, duff and fuelbed depth. Accurate fuel loading data is important for landscape- and project-level planning to describe existing and desired conditions, potential wildfire effects and prescribing fuel treatment alternatives to restore and sustain ecosystems.

The best way to learn about FIA and its uses is to consult with your District or Forest Silviculturists. The latest version of FIA was introduced with a workshop lab held in April of 1994 on the Eldorado National Forest, Placerville, CA by Kevin Casey and Tina Terrell of the Remote Sensing Lab. Questions concerning the woody debris collection can be directed to Christie Neill, Eldorado National Forest (916) 622-5061. Contact Kevin Casey (916) 551-3390 at the Remote Sensing Lab Sacramento, CA for the more technical aspects of FIA and woody debris audits.

CHRISTIE NEILL
Eldorado National Forest

(Star thistle cont. from page 3)

additional burning compartments. The Pony Gate compartment will not be burned during the next three years so that yellow star thistle recolonization can be monitored. This analysis will help park resource managers identify the fire regime required to maintain sustainable control of yellow star thistle.

It is extremely difficult to have complete success with burning alone in the park. Prescribed fire is very reliable in reducing yellow star thistle in most park locations, yet problems are presented with burning in proximity to facilities and in roadside locations. Nonflammable, fleshy yellow star thistle does not readily burn during the appropriate phenological stage without sufficient grass fuel to carry the fire. A flame thrower will be used to produce foliar scorch on roadside plants that do not burn during future broadcast burns. Fuel can be provided for large areas dominated by yellow star thistle without a grass component by sowing grass seed the winter prior to a planned prescribed burn. The preferable treatment would be to sow locally collected native seed. Unfortunately, financial limitations may make this option infeasible.

MARLA HASTINGS
Silverado District, CA State Parks
JOSEPH M. DITOMASO
UC Davis, Coop Extension

Calendar of Events

April 8-19	RX 300 Prescribed Fire for Burn Boss, Sierra NF
April 9-11	FARSITE Workshop, Boise, ID
April 23-24	IASC Meeting, (Location TBA)
April 29- May 3	RX 450 Smoke Management Tech (2 staggered sessions), Redding CA
April 29-May 3	Burned Area Emergency Rehabilitation Techniques, Modesto, CA
April 29-May 3	Sixth Biennial FS Remote Sensing Applications Conference, Aurora, CO
May 6-10	Fire Management Practices & Techniques for EM Workshop, Sacramento, CA
May 7-10	20th Tall Timbers Fire Ecology Conference, Boise, ID
May 20-24	Fire History Workshop, Susanville, CA
October 27-31	13th Conference Fire & Forest Meteorology, Lorne, Australia

The California Fuels Committee NEWSLETTER is published three times a year as an informational service to all personnel engaged in resource management. Articles are solicited from all resource disciplines and readers are encouraged to send articles to the attention of Louise Larson, Sierra NF, 1600 Tollhouse Rd., Clovis, CA 93612; DG:R05F15A; (209) 297-0706 ext. 4822 FAX (209) 294-4809.