National Park Service Fire Effects Monitoring Program

Rx Effects

Volume 1, Issue 6

Spring 2006

Fire in Southern California Shrublands—Proceed with Caution

Marti Witter, Fire Ecologist and **Robert S Taylor**, Fire GIS Specialist, Mediterranean Coast Network

Southern California has one of the North America's most hazardous fire landscapes and periodically burns in large, dramatic, and dangerous wildfires. In the Santa Monica Mountains National Recreation Area where fire frequencies have increased along with population and urbanization, we have been concerned that short fire return intervals may exceed the resilience of native shrubs to recover after fire. In a project funded by NPS fire science, we worked with Anna Jacobsen and Stephen Davis at Pepperdine University and Stephanie Fabritius at Southwestern University, TX to determine if short fire return intervals could inhibit recovery of chaparral shrubs.

Four sites with fire return intervals of ≤6 years were sampled. Each site was matched to a nearby control site of similar slope aspect and elevation with a fire return interval of ≥12 years. A point-quarter sampling method was used to measure

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Inside this issue:

Burn Severity Effects in Spruce-Fir Forests of Northwestern Wyoming

Jen Hooke, Fire Ecologist, Yosemite National Park

Burn severity is the ecological response of an area to fire (Turner et al. 1994; Key and Benson 2003). Exploring the ecological effects of the burn severity mosaic is fundamental to understanding ecosystem recovery and resilience following fire. Organism survival is negatively correlated with burn severity. The number and distribution of biological legacies affect successional patterns and community composition and structure, which contribute to landscape diversity.

Key and Benson's (1999a,b) Normalized Burn Ratio and Composite Burn Index methodologies were used to classify burn severity in three sites dominated by Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) forests in Grand Teton National Park and the Bridger-Teton National Forest. These three sites (the Enos, Moran, and Wilcox fires) experienced lightning-ignited wildfire in August of 2000. Sixty plots (twenty in each fire) were installed and sampled in the summer of 2003 to investigate the effects of burn severity (unburned, low, moderate, and high severity classes) on understory vegetation and some components of the soil environment. Variables investigated included vegetation and soil microbial community composition, vegetation species richness (the number of species per plot), and tree regeneration.

The vegetation community showed significant differences based on burn severity classification using a nonparametric test for group differences (Blocked Multi-Response Permutation Procedures or MRBP; p = 0.0073). Indicator Species Analysis (ISA), a method using relative abundance

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Clear Trap Prescribed Fire: Short Term Treatment Results Zion National Park

Kelly Fuhrmann, Fire Ecologist, Zion National Park

Introduction

The region known as the East Zion Focus Area, including the Clear Trap Prescribed Fire project in Zion National Park, was identified by state and federal management agency administrators as one of the original six Wildland/Urban Interface Focus Areas requiring priority fuels treatment in the Color Country Interagency Fire Management Area. The region includes private and Federal lands and is administered by the State of Utah Division of Forestry, Fire and State Lands, Cedar City District BLM, and Zion National Park (NPS).

Fuels in the project area, rated Condition Class 3, consist primarily of mountain brush species and include the following: Gambel oak (*Quercus gambelii*), pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), with some Rocky Mountain juniper (*Juniperus scopulorum*) in the drainages, basin big sage (*Artemesia tridentata*), Utah serviceberry (*Amalanchier utahensis*), squaw apple (*Peraphyllum ramosissimum*), and greenleaf manzanita (*Arctostaphylos patula*). Timber fuels consist of mature Gambel oak (*Quercus gambelii*) and ponderosa pine (*Pinus ponderosa*) stands.

The 4,400 acre Clear Trap Burn Unit is the largest prescribed fire project ever undertaken by Zion National Park, and the first of several NPS projects treated in the East Zion Focus Area. This treatment was an initial entry burn over the majority of the burn unit (with the exception of ~300 acres). The prescribed fire was accomplished during a drought year.

The primary goals of the Clear Trap Prescribed Fire were to improve and strengthen the defensibility of the park boundary and help restore fire to the ecosystems of Zion National Park.

Clear Trap 2004 Rx Objectives and Acceptable Range of Results

- To consume 40-60% of the surface layer fuels (total fuel loading in tons/acre) immediately post-burn. Fuels include heavy dead and down, needle cast, leaf litter, and duff within the mature Gambel oak and ponderosa pine communities.
- To reduce mountain brush density (stems/acre) 40-80% within 1 year post-burn.

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Northern Great Plains News: An update on collaborating with the NGP I&M Program

Cody Wienk, Fire Ecologist, Northern Great Plains Network

Last summer we spent a significant portion of our time working on a pilot project with the Northern Great Plains I&M Network to compare the efficiency and efficacy of two methods to measure vegetation cover in major vegetation types of the northern Great Plains parks. Our decision to use two sampling protocols to estimate cover was based on several factors, including: 1) the method must have high repeatability among observers, 2) the method must be efficient enough to allow for adequate sample sizes, and 3) the data collected must be relevant to park management decisions and relatively easy to interpret. We decided to compare the point-intercept method and an ocular cover method. Plot layout was basically the same as an FMH forest plot, two parallel 50-m transects 20-m apart. Ocular cover was estimated to the nearest percent along each transect in 10 0.5-m^2 frames. Cover was estimated with the point-intercept method at 100 points along each transect. To compare repeatability of the two methods, eleven of the plots were double sampled. When a plot was designated for double sampling, the first team sampled the plot and removed tapes when finished. A second team would then relocate and sample the plot. Care was taken to ensure that team members did not sample the same transect on both visits. We also recorded the time to collect data using each method and a list of all species observed within the 20 × 50 m plot. When it was all said and done, 46 plots representing 8 vegetation types in 5 park units were included in this study.

Analyses are not yet complete and have not been through the peer review process. However, our indications so far are these. We found that the point-intercept method consistently produced a higher estimate of cover than ocular estimates. I was a little surprised by how consistent the difference was and based on a little investigation, it appears that the grass species are primarily driving this difference. In terms of repeatability, both methods were highly repeatable at least within a field season and among a single group of observers. I suspect that point-intercept would be more repeatable across years with turn-over of personnel. The most significant weakness of point-intercept was the ability to capture overall plot species richness and quantitatively measure rarer species (Fig. 1). When we compared the percent of plot species richness captured by each method, point-intercept captured less than 44% while ocular captured just over 68%. This difference came with a cost however; the ocular method took significantly more time to complete

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20 Years of Prescribed Burning in the Big Creek Unit, Yosemite National Park

Jen Hooke and **Monica Buhler,** Yosemite National Park

Introduction The health of montane mixed conifer forests in Yosemite National Park has been a concern to fire and resource managers for decades. These forests traditionally experienced anthropogenic or lightning fire every three to fourteen years. Many years of aggressive fire suppression have resulted in uncharacteristically high fuel loadings and altered forest composition, structure, and function. Prescribed fire and mechanical thinning treatments have been applied by park managers since the late 1970s to restore forest health. Management actions have been guided by treatment objectives, and monitoring of treatment effectiveness has been conducted since the early 1980's

Twenty one Fire Effects Monitoring plots have been sampled over the past twenty years in the 464-acre Big Creek unit. This area is dominated by ponderosa pine (*Pinus ponderosa* = PIPO) mixed conifer forest, including components of incense cedar (*Calocedrus decurrens* = CADE), white fir (*Abies concolor* = ABCO), sugar pine (*Pinus lambertiana* = PILA), and black oak (*Quercus kelloggii* = QUKE). The Big Creek unit was treated with prescribed fire in October of 1985, and again in May of 2004.

Prescribed fire objectives for the Big Creek Unit have been refined over time. Objectives have remained focused on reducing fuel loading and restoring healthy forest composition and structure. Data from the Big Creek Fire Effects Monitoring plots are being used to evaluate whether management objectives are being met through prescribed fire treatments. The Big Creek plots also yield information about trends in fuel loading and changes in forest density and regeneration. Plot data such as these are valuable tools for the application of adaptive management.

	1985 Rx Fire Objectives	2004 Rx Fire Objectives
Fuels	Reduce between 50-90% of the duff layer & the dead & downed woody fuels	Reduce total fuel load so that: 20-40% = 5-30 tons/acre 20-50% = 30-60 tons/acre 5-20% = > 60 tons/acre
Trees	Thin understory trees (DBH < 6") by 50-90%	Create tree density as follows: 4-91 trees/acre < 31.5" DBH 4-30 trees/acre > 31.5" DBH Create overstory composition of 60-95% pine, 15-40% cedar, 1-10% oak

Methods Protocols for measuring these fire effects monitoring plots were developed in 1978. Plots are arranged

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A Surface and Canopy Fuel Appraisal Photoseries for Andesitic Forests in Yellowstone National Park

Miller E.A., R.J. Seifert, S.J. Jackson, E.R. Moss, and **S.C. McEldery** Yellowstone National Park

A fuel appraisal photoseries provides a quick and easy method to estimate fuel information where in-depth surveys are not possible. Since photoseries plots are selected to represent the various fuel conditions that are likely to be encountered on the landscape, they may be used in any situation where estimates must substitute for observed values. We compiled a photoseries to provide basic surface and canopy fuel information for northern Yellowstone National Park.

In 2003 developed areas in the park were being considered for hazard fuel reduction to reduce the risk of crown fire impinging on structures and compromising fire-fighter safety. A basic question arose: how much to treat canopy fuels to achieve objectives balanced against retaining the esthetics of a national park forest? Developments in estimating canopy fuel factors from easily measured tree characteristics al-

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Teton Interagency Fifth Annual Fire Effects Symposium
From Data to Decisions: Implications of Fire Effects Monitoring

Kate Cueno, Teton Interagency Fire and **Diane Abendroth**, Grand Teton National Park

The fifth annual Teton Interacency Fire Effects Symposium was hosted on January 31, 2006 by Grand Teton National Park and Bridger-Teton National Forest. The Symposium was held at the newly completed Jackson campus of the Teton Science School. Many area agencies were represented at the meeting, including: Wyoming Game & Fish Department, the Bureau of Land Management, Caribou-Targhee, Wasatch-Cache, and Uinta National Forests, The Nature Conservancy, Jackson Hole Land Trust, and the Teton Science School. Also represented were Colorado State University and the Missoula Fire Sciences Lab.

Providing a link between monitoring and management was the theme for the day. Talks were grouped into three sessions: tools to utilize monitoring data, reports from the field, and applications toward decision making. Presentations included overviews of several tools: the fire effects monitoring and inventory system, FIREMON and its integration with NPS's FEAT; the Forest Vegetation Simulator Fire and Fuels Extension (FVS-FFE); vegetation mapping by the BTNF; and fuels modeling currently in the making at GTNP. Reports from the field ranged from local projects, such as the Diamond L, Jackson Interagency Habitat Initiative prescribed burn, to whitebark pine fire regimes in the Greater Yellowstone Ecosystem, and fire history sampling in northeast Wyoming by the Lander BLM. Application of fire effects data was exemplified by the Teton Science School's use of FVS to implement a fuel management plan on conservation easements, as well as by The Nature Conservancy's use of fire to manage the Tensleep Preserve in northeast Wyoming. The Symposium day concluded with a manager's panel. Several area managers outlined the importance of monitoring in their adaptive management processes followed by audience- and panel-initiated discussion.

Recurring themes for the day were agency monitoring plans, project level monitoring, the importance of documentation, and monitoring within adaptive management. Grand Teton NP and Bridger-Teton NF monitoring plans were introduced and explained with project examples. The steps taken in project level monitoring were outlined, and their importance as inputs toward adaptive management, were stressed. Clear and complete monitoring documentation was brought up again and again as an essential process within the monitoring framework.

The fire effects symposium continues to be a good forum for sharing information and discussion among fellow monitors, researchers, and managers. Based on the good camaraderie of this year's participants, perhaps future years will branch out to an even wider geographic region of interest and participation.

June is FEAT Awareness Month!

MaryBeth Keifer, Fire Ecologist, Pacific West Regional Office

We will be continuing the series of FEAT online demonstrations with the following encore sessions offered in June, so mark your calendars:

June 8 - FEAT User Support: How to use the FEAT Forum and online user guide
June 22 - Replication: Masters, Clients, and Subscriptions - What does it all mean for me?
June 29 - Introduction to the GIS module
July 6 - Using the PDA with FEAT

Northern Great Plains (Cont'd)

(Continued from page 2)

than point-intercept (Fig. 2). On average, it took about 2 hours more to complete the plot using the ocular method than point-intercept. In fact, it was often double the time required to complete the plot with the ocular method than point-intercept. Finally, time to finish the plot with the ocular method increased significantly as plot species richness increased while the time to complete the plot with point-intercept was relatively consistent as plot species richness increased.

As a result of this study, it appears the recommendation will be that the NGP I&M program utilize the point-intercept method as the primary method for estimating cover on long-term vegetation monitoring plots. I am very pleased with this result, because I think it will make it much easier to collaborate and potentially integrate with the NGP I&M program as they move into the monitoring phase of their program. At the very least, shared methodologies will simplify the exchange of data sets between the two programs.

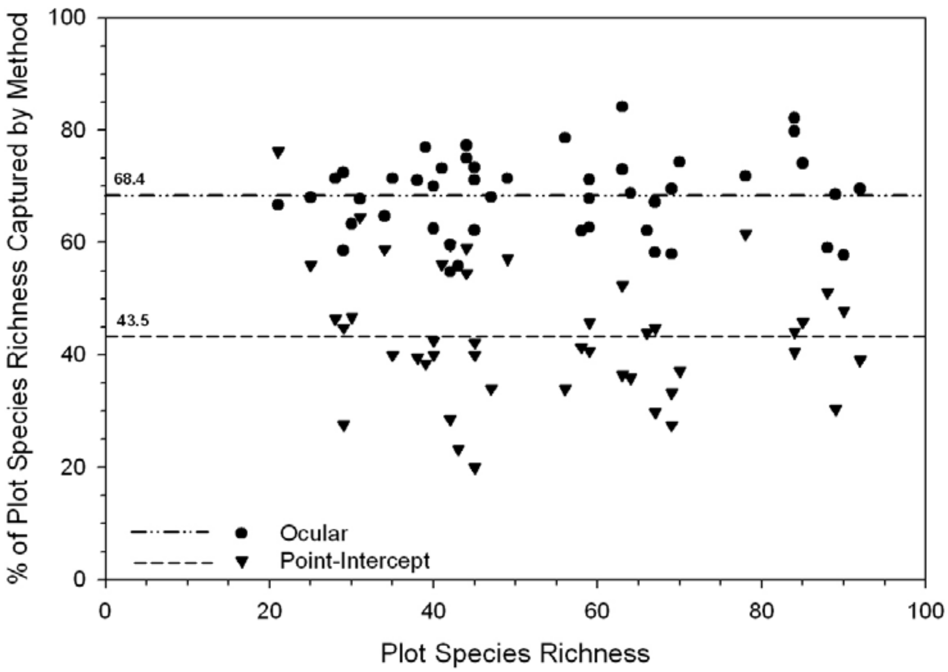
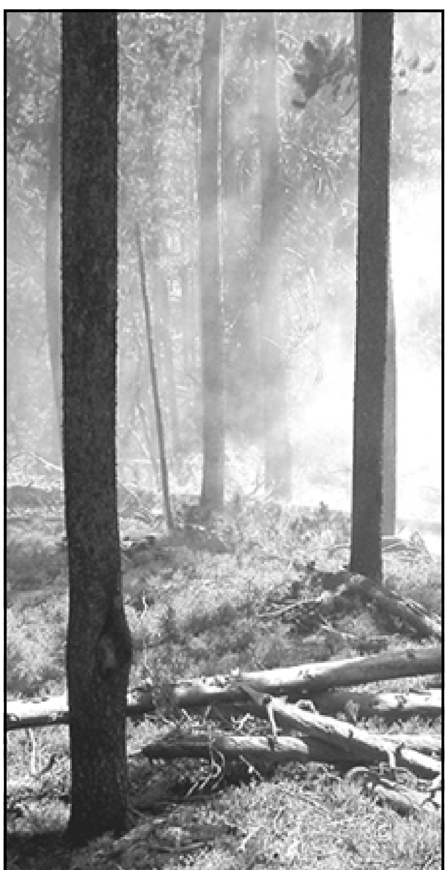


Figure 1. The ocular method captured more than 68% of the species on the plot, while the point-intercept method encountered less than 44%. This was not surprising given the much larger area sampled by the ocular method.



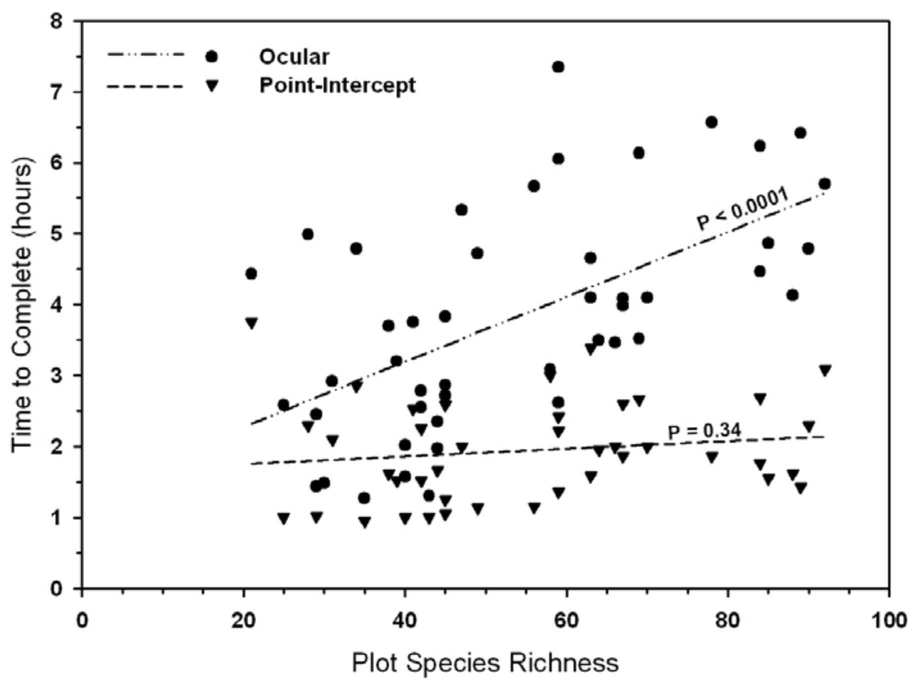


Figure 2. The time to complete the cover estimates using the ocular method increased significantly with increasing plot species richness. For the point-intercept method, time to complete was constant across plot species richness levels. On average, it took 2.1 hours longer with the ocular method.

So. Cal. Shrublands (Cont'd)

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chaparral shrubs in tandem with a canopy-coverage sampling method for exotic weeds and grasses. Sites that experienced a short fire interval (≤6 years) contained significantly fewer non-sprouting species and significantly more coastal sage scrub species than adjacent control sites ($p = 0.007$ for both; Figure 1). The relative density of facultative or obligate sprouting species or non-native shrub species between short fire interval and control sites were not different ($p > 0.05$; Figure 1). There was a strong correlation between the number of years of the shortest fire return interval and the percent loss in relative density of non-sprouting species relative to the control site ($r^2 = 0.94$, $p = 0.033$; Figure 2).

Repeated fires have the ability to type convert native chaparral to degraded ruderal plant communities dominated by non-native annual grasses and forbs (Figure 3). We have concluded that the use of prescribed fire in a high fire frequency environment such as urbanized southern California, needs to be sensitive to the age of chaparral stands in order to prevent the local extinction of native shrub species that recruit from seed following wildfire.

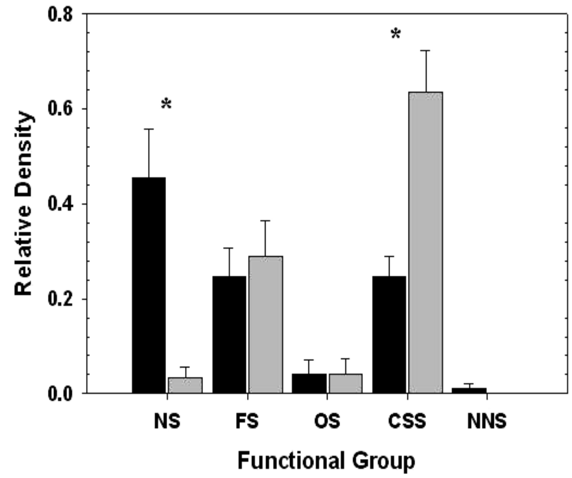

Figure 1. Relative density of evergreen shrubs displayed by functional group. Functional groups include non-sprouting chaparral species (NS), facultative-sprouting chaparral species (FS), obligate-sprouting chaparral species (OS), coastal sage scrub species (CCS), and non-native shrub species (NNS). Black bars represent control sites (intervals between fires ≥12 years) and gray bars represent sites with short intervals between fires (≤6 years). Bars represent + 1 SE. Asterisks indicate significant difference between control sites and sites with short interfire intervals ($p < 0.05$)

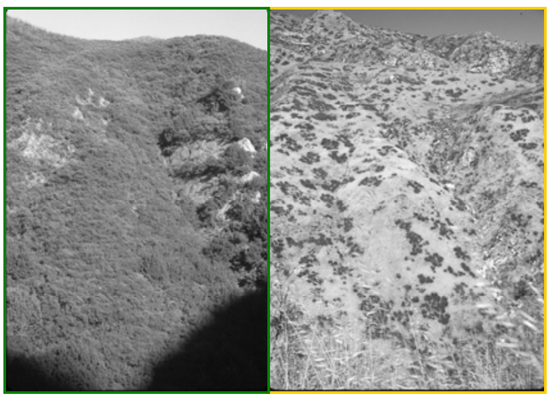

Figure 3. Postfire type conversion of chaparral in Malibu Canyon to an annual grass-dominated community. *Photo by Stephen Davis and Anna Jacobsen.*

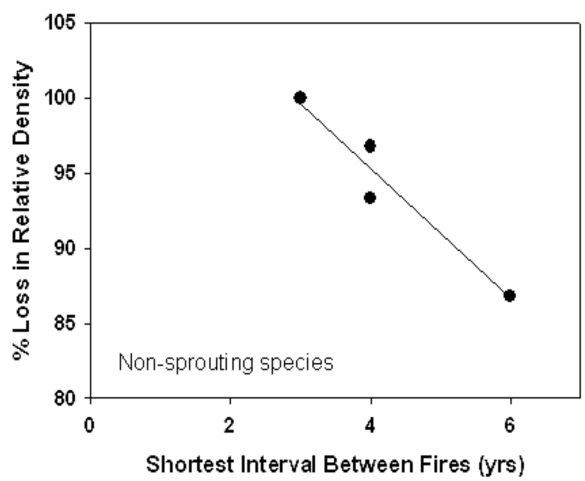

Figure 2. Shortest interval between fires versus the percent loss in relative density of non-sprouting species in frequent fire sites (r2 = 0.94, p = 0.033).

Handy fire monitoring tip:
Digital images contain a time stamp that you can view in the image's properties. Rates of spread can be reconstructed by dividing the distance a fire has traveled by the difference in the time stamps on the two images.

Rx Effects has a New Home!
In April the newletter went up to the NIFC website. Tina Boehle will capably manage the web end of things in Boise.
http://www.nps.gov/fire/fire/fir_eco_rxeffects.html

Hooke (Cont'd)

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(cover) and relative frequency of each species to represent the association of a species with a particular group, was used to identify plants with a particular affinity to each burn severity class. ISA showed that exotic species such as prickly lettuce (*Lactuca serriola*) and goatsbeard (*Tragopogon dubius*) and native, seedbank species such as snowbrush (*Ceanothus velutinus*) and mountain hollyhock (*Iliamna rivularis*) were indicators ($p < 0.05$) of high burn severity, while fireweed (Chamerion angustifolium) and aspen (*Populus tremuloides*) were indicators ($p < 0.01$) of moderate burn severity. Indicator species ($p < 0.05$) associated with low burn severity included reedgrass (*Calamagrostis montanensis*) and thickleaf ragwort (*Senecio crassulus*); indicator species ($p < 0.01$) associated with unburned areas included grouse whortleberry (*Vaccinium scoparium*), sickletop lousewort (*Pedicularis racemosa*), buffaloberry (*Shepherdia canadensis*), and bracted honeysuckle (*Lonicera involucrata*). Vegetation species richness differed significantly among burn severity classes using a test for group differences (Analysis of Variance or ANOVA; $p = 0.0049$), and species richness was greatest in the moderate burn severity class and lowest in the high burn severity class. Tree regeneration also differed significantly among burn severity class ($p = 0.0005$), with dominance shifting from fir and spruce in the unburned and low burn severity plots to aspen in moderate and high burn severity plots.

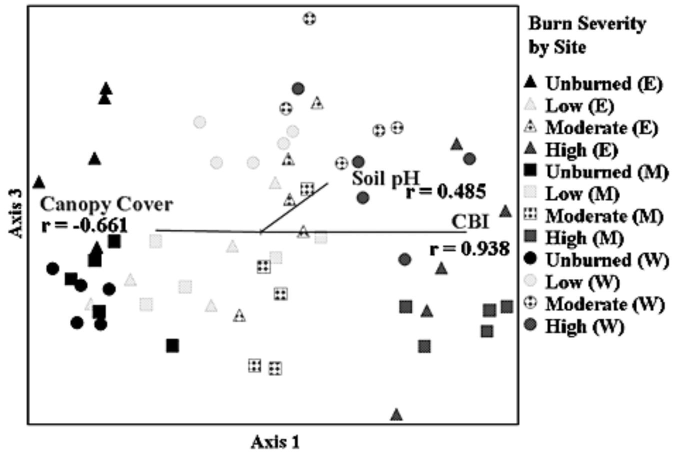

Figure 3. Ordination of sample plots along axes 1 and 3. Burn severity classes are coded in color and study sites (Enos, Moran, and Wilcox) are indicated by shapes.

The vegetation and soil microbial communities were assessed using Nonmetric Multidimensional Scaling (NMS), which is an ordination method that identifies compositional patterns in the data and allows the correlation between community distribution and measured environmental variables. The relationship of these variables to the community data is expressed by a joint plot of vectors overlain on the ordinations. The length of the vector represents the strength of the variable's correlation with the ordination scores, and the relationship of the vector to each ordination score is expressed by Pearson's correlation coefficient (r). Figures 2 and 3 illustrate that the vegetation community is strongly shaped ($r = 0.938$) by burn severity class or CBI score. CBI is measure of burn severity expressed along an ordinal axis with 0.0 representing unburned conditions and 3.0 indicating the highest burn severity. Figure 3 shows that other variables (soil pH and canopy cover) are correlated with the vegetation community distribution, which are related to burn severity. Soil pH generally tends to increase and canopy cover decrease following fire. Elevation was also strongly correlated ($r = 0.840$) with the ordination, showing a site-specific difference among the three fires. The Enos fire was located at a higher elevation than the Moran and Wilcox fires.

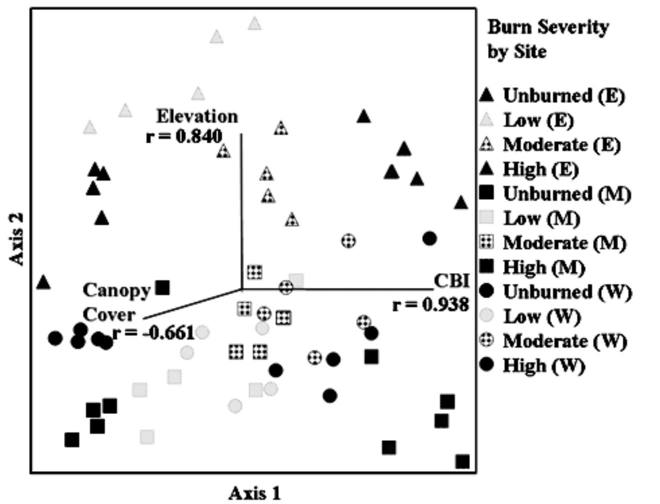

Figure 2. Ordination of sample plots along axes 1 and 2. Burn severity classes are coded in color and study sites (Enos, Moran, and Wilcox) are indicated by shapes.

The soil microbial community (bacteria, fungi, and protozoa) was measured using Phospholipid Fatty Acid (PLFA) analysis. Phospholipids are essential components of cell walls and "signature" phospholipids can be used to distinguish among different groups of organisms, providing a "fingerprint" of the microbial community at the time of sampling. MRBP was used to test for differences in the soil micro-

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Yosemite (Cont'd)

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along three parallel transects 20 m apart. Plots are also 20 m apart.

Overstory trees (> 6" DBH) are measured in variable radius plots using a 30' BAF prism. Species, DBH and damage are recorded.

Fuels are sampled by a planar intercept method. Seedlings are sampled in a milhectare (1.78 m radius) circle. Understory trees (< 6" DBH) are sampled in a milhectare (1.78 m radius) circle.

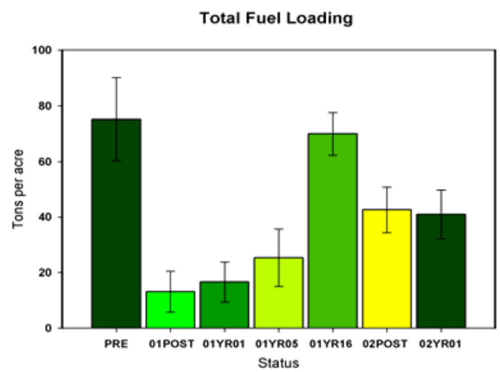
Results and Discussion

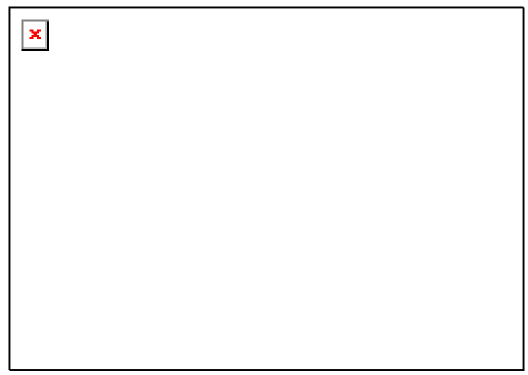
•Fuel Loading

Fuel loading in all size classes was dramatically decreased by prescribed burning. The first burn reduced duff levels by 98%, woody fuels by 50%, and total fuels by 78%, achieving management objectives. The second burn reduced total fuels by 38%. One year after the second burn, average total fuel loading was 41 tons/acre, which is well within the range of target conditions.

Plot Re-read Schedule

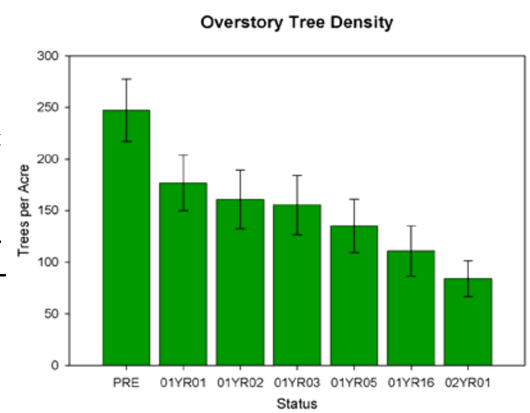
PRE–1985	Preburn
01POST–1985	Immediately postburn
01YR01–1986	One year postburn
01YR02–1987	Two years postburn
01YR05–1990	Five years postburn
01YR14-1999	Fourteen years postburn
01YR16–2001	Sixteen years postburn
02POST–2004	Immediately after the second burn
02YR01–2005	One year after the second burn





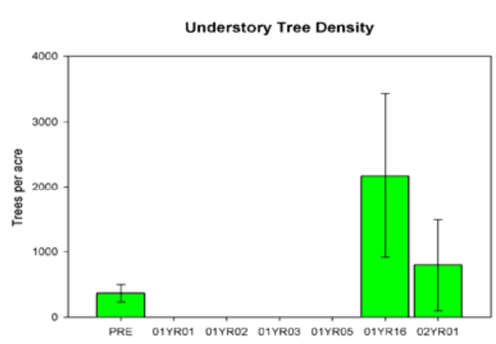
•Overstory Trees

Overstory tree density steadily decreased in the 20 years after the first entry burn but target conditions were not met until after the second entry burn. Nearly all mortality was in trees < 31.5" DBH. There was a significant shift in dominance from CADE to PIPO in the 20 years of monitoring indicating that we are approaching target conditions. PILA occurrence has declined significantly, perhaps due to infection with the exotic pathogen White Pine Blister Rust (*Cronartium ribicula*). The proportion of QUKEs in the overstory has increased as total density has decreased, so treatments have been effective at retaining this species in the canopy.



•Understory Trees

Understory tree densities were relatively low before the first entry burn, were eliminated postburn, and did not recover until 16 years postburn. Total density was reduced again after the second entry burn. There was a large shift in species composition from CADE dominance before the first entry burn to PIPO dominance 14 years after the burn. Preburn canopy cover was probably high, favoring shade-tolerant species such as CADE. The postburn environment became more pine-friendly with exposed mineral soil, a more open canopy, and lower fuel loading. After two burn entries, regeneration has shifted to align with target conditions, excepting the oak (*Quercus*) component. Oak regeneration is an issue that warrants more attention and we will be looking into this in the near future.



•Fall vs. Spring Burning

The first entry burn was conducted in the fall while the second entry burn was conducted in the spring. A 78% reduction in fuels was accomplished by the first entry burn (fall 1985), where duff was the largest component of the total fuel loading. The second entry burn (spring 2004) caused a 38% reduction in fuels. There were significantly more 1000 hour (> 3" diameter) fuels 16 years after the first burn. Due to higher fuel moistures in the spring, fewer 1000 hour fuels were consumed.

Hooke (Cont'd)

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bial community based on burn severity classification, but no significant difference was found. NMS was also used to identify any strong patterns shaping the soil microbial community composition. Burn severity did not emerge as a strong factor shaping this community. Since the vegetation community showed such a pronounced response to burn severity class, it was surprising that the soil microbial community did not show the same response. The vegetation and soil microbial communities interact and depend on each other in many ways that we are just now starting to understand and appreciate. This discrepancy may be due to the time elapsed postburn, as data were collected three years after the fires and any immediate postburn effects may have been undetectable at this time. The soil microbial community was also sampled from the top 10 cm of mineral soil, which is where soil microorganisms are concentrated in abundance and activity. Soil is an efficient insulator; other studies have found fire effects restricted to within the top 2 cm of mineral soil. Perhaps including the lower and potentially unaffected soil layers caused a dilution of fire effects. Additionally, the soil environment possesses enormous heterogeneity and diversity. The crude tools used in this study identified broad groups of organisms in a community "fingerprint;" individual species might respond very differently to fire even though they belong to the same organism group.

Burn severity in this study is a significant force shaping the composition of vegetation communities three years after fire. The rate at which the burn severity mosaic fades over time is unknown, as is its influences on determining long-term patterns in vegetation dynamics. Other studies suggest that disturbance severity can continue to influence the vegetation community for a century or more, perhaps until the next large fire. How does the burn severity mosaic affect your ecosystem, and how long do those effects persist on the landscape?

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•Key, C.H. and N.C. Benson. 1999b. A general field method for rating burn severity with extended application to remote sensing. (http://nrmsc.usgs.gov/research/cbi.htm)

•Key, C.H. and N.C. Benson. 2003. Landscape Assessment (LA): Sampling and analysis methods. (http://www.fire.org/firemon/LAv3_Methods.pdf)

Yosemite National Park Fire Science Symposium

Yosemite National Park held its first Fire Science Symposium on May 9-10, 2006. The purpose of the symposium was to gather researchers and park employees to share their fire-related work in the park. The Fire Science Symposium was sponsored by Yosemite Fire Management and the Division of Resources Management & Science and the USGS Yosemite Field Station.

Dr. Jan van Wagtendonk made the Keynote Address on the History of Fire Management and Research in Yosemite National Park. Speakers from around the country discussed their findings on various topics including vegetation and fuel mapping; cultural resources and Native American burning; GIS analyses for fire management including the development of burn severity atlases; climate change and air quality; fire effects on spotted owls; forest structural and compositional changes; fire history; landscape fire effects; and trends from fire effects monitoring data. Yosemite NP hopes to hold future symposia every two years to foster the exchange of ideas and information.

The Yosemite Fire Science Symposium program and audio files (mp3s) of talks are available for download at this ftp site: ftp://ftp.den.nps.gov/incoming/YOSE/ or by contacting Jen Hooke (jen_hooke@nps.gov) at 209-375-9596.

Yosemite (Cont'd)

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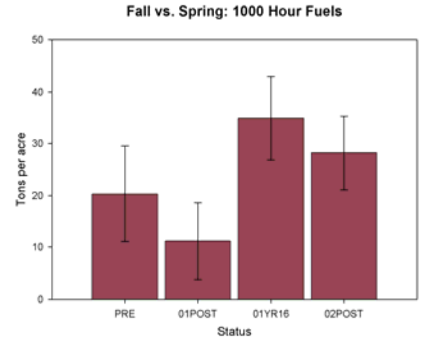
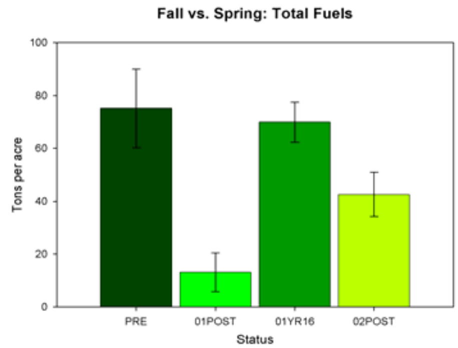
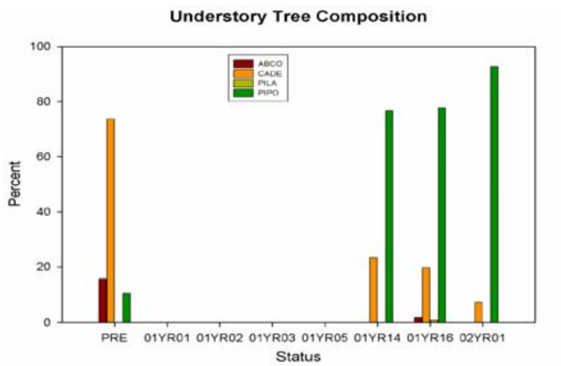
Conclusions

The Big Creek data show that forest restoration is a slow, incremental process. The first prescribed fire entry was effective at killing small-diameter trees and reducing fuel loading. The fire-killed trees decayed and came down with weather events to create a pulse of restoration-related fuel loading. The second entry burn was a critical time for reducing fuels related to meeting target conditions for overstory tree density and composition and fuel loading. A second entry fall burn might have been more effective at reducing heavy fuels than burning in the spring, however a "cooler" spring burn may have mitigated against higher burn severities. Third and fourth entry burns will be essential components of restoring forest health and prescribed fire treatment schedules will be vigilantly maintained. Monitoring efforts will continue to assess whether management objectives are being met and are a critical part of our Fire Management program.





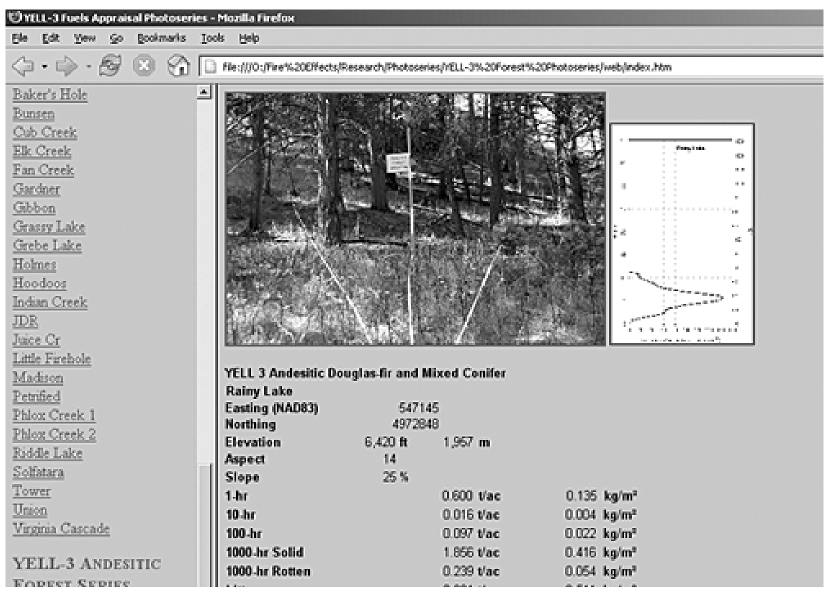


YELL Photoseries (Cont'd)

(Continued from page 3)

lowed the creation of a fuel appraisal photoseries that included canopy layers (FPS 2005). Ottmar et al. (2000) had already completed a surface and canopy fuel photoseries for rhyolitic soils on the Yellowstone Plateau. We therefore focused on andesitic soils in the northern third of the park from lower elevation Douglas-fir forests to higher elevation spruce-fir and mixed conifer forests.

The photoseries is in web-browsable HTML format, includes 14 photo plots and contains all the inputs necessary to run "dynamic" surface spread models. It also contains the canopy fuel inputs necessary for American and Canadian based crown fire models (canopy base height, bulk density, fuel load etc). The photoseries is already in use in preparing and implementing burn plans and hazard fuel reduction projects in the park.



Sample page from the photoseries

•FPS, Fire Program Solutions, LLC. 2005. Crown Mass Module version 3.0.7 of Fuels Management Analyst Software Suite version 3.0.1.
•Ottmar, R. D., R.E. Vihnanek, and C.S. Wright. 2000. Stereo photo series for quantifying natural fuels. PMS 832 NFES 2629, National Wildland Fire Coordinating Group.

Clear Trap (Cont'd)

(Continued from page 2)

- To reduce 40-80% of Gambel oak overstory and pole-size trees within 1 year post-burn.
- To cause no more than 20% mortality in the mature (greater than 24" DBH) ponderosa pine within 1 year post-burn.
- To reduce ponderosa pine regeneration (4-12" DBH) density to 40-60 trees/acre 1 year post-burn after a first entry fire treatment.
- To increase relative surface cover of native grasses and forbs 60-80% 2-5 years post-burn in ponderosa pine, Gambel oak, and mountain brush communities.

Results and Discussion

The assessment of results in relation to the project objectives must be taken in context with small sample sizes, mosaic burning patterns and standard deviation relationships. Four monitoring types were incorporated into this analysis. Ten forest plots and one brush plot are represented. Seven of the 11 plots were in the first-entry burn area; the remaining four were second-entry. The combining of monitoring types may lead to higher variability in some results such as fuel loading.

The analysis reveals some short term objectives were over-achieved. The fuels results (surpassed by 15%) suggest that desired reduction of fuel loads may not have been set high enough. It also suggests that conditions may have been drier than anticipated. All sampled brush species were used to determine the mean brush density. This target was also surpassed (+13%) possibly because the Gambel oak component was resprouting at the time of the first year read and not as much oak was present initially. Gambel oak was effectively treated from a tree-size reduction perspective, because of its response to the higher heat element in pockets of this prescribed fire. Data from the ponderosa pine element of the analysis should be considered carefully. A one year assessment is probably of limited usefulness for this vegetation type. While ten forest plots were located in the burn unit, only three had trees of the 24"+ DBH size class used in the analysis. One plot demonstrated the only sampled mortality in the burn unit, in which half of the larger diameter trees died. Therefore the calculated mortality was higher than the acceptable range (+13%). For the 4-12" size class, the sample size was under-represented in the burn unit with only 2 plots being burned. However, the actual density of this size class was lower pre-burn (~24 trees/acre) than the target desired density of 40-60 trees per acre. An element of this analysis that showed promising results was the increase (+79%) in relative surface cover of native grasses and forbs. This goal (60-80% increase) was met, which is an encouraging short term result for the represented vegetation communities. The increase in cover is partially due to an abundant snow pack in 2005. This may also be a result of seasonality of the burn in combination with burn intensity in several areas where plots were located. Longer term goals set for the burn will be reviewed after the 2 and 5 year plot reads to measure success and revaluate the treatment.

Conclusion

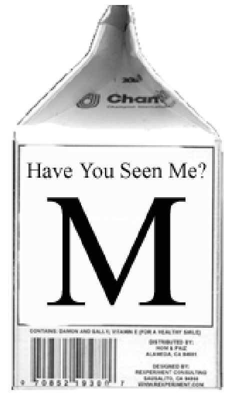
This overview of the Clear Trap project provides a short term (1 year) glimpse of management action results. Considering sample sizes of respective vegetation types represented in the project area and associated standard deviations, for the purposes of adaptive management, these results illustrate that burn objectives should be set carefully and reassessed according to timing of the burn and conditions present.

The **Northern Great Plains** plot geeks found an alternative use for sampling frame parts. Details beginning on page 2.

Historic Moments in Fire Effects Monitoring
24 May 2006 13:34
Yellowstone Fire Effects Monitoring Crew achieves plot closure within 3 cm.

THE LIGHTER SIDE

2007 International Fuel Model M Congress, Region 7, Ames, Iowa.



This conference will be the first in a series planned to elucidate the often misunderstood NFDRS Fuel Model M which occurs uniquely in USFS Region 7. The main focus of the conference is to clarify the confusing array of seasonal inputs: Live 1000-hour fuel moisture, hydrologic year "Scratch for Cash" lottery pay-out, meso-scale convective complex tornado green-up date, and last year's Iowa Cyclones win-loss record. Modeling fire behavior is not a focus of the conference, however, participants will be introduced to fuel vectoring and comagrams. The target audience is fire and fuel managers, mystics, and pyro-psychics seeking to establish an astral connection with fuel model M in the context of the NFDRS system. **Featured speakers** will be noted fire danger rating gurus:

- Mitjel Björgaard[1456] "Region 7: The Land that Time Forgot"
- Jean-Michele Frisliè[2456] "Model M: Forlorn and Forgotten" and
- Erik Von Mueller[3456] "Model M: Genetically Engineered Supermodel or Mutant Menace to Society?"

Questions and training nominations should be directed to:

USDA Forest Service, Region 7
Boreal Heartland and
Fynbos Experiment Station
1 April Street
Ames, IA 90210, USA

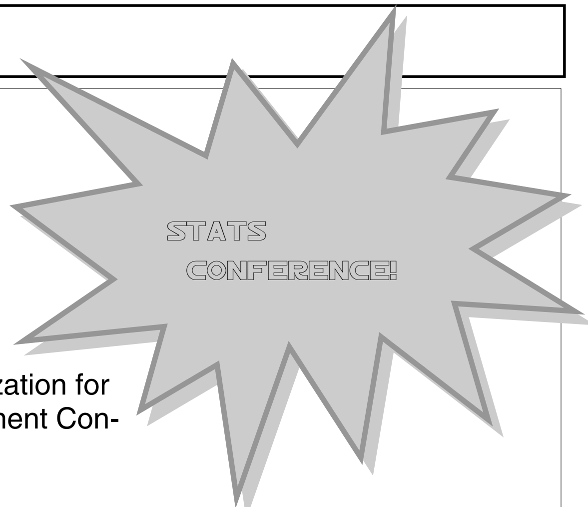
[1] Íslenzkur Bandaleg Brenna Tré
[2] Association Nationale du Fuelle et Feudynamiques
[3] Deutsch Verband für Feuer und Feuerungsmaterial
[4] Denotes recent graduate of S-491
[5] Not his real name
[6] Not his real affiliation

Fuel Model M as it originally appeared in Anderson's draft guide to fuel models. M was an NFDRS cast-off that didn't work out for Anderson because M is the thirteenth letter in the alphabet and he already had a fuel model 13. M was last seen under a bridge in Topeka, Kansas in June 1978.

What is the use of
Using acres for success
While much chaos exists
—Paul Reeberg

Become a **BIG TIME AUTHOR!** Write for Rx Effects. Why? Because it's cool!
Everybody's doing it. Be one of the gang! See page 13 for details.
www.nps.gov/fire/fire/fir_eco_rxeffects.html

2006 Fire Effects Statistics Workshop



Wanted: Fire Ecologists and Lead Monitors
For: Torturing Data into Meaningful Results
When: September 25-29, 2006 in Fort Collins, Colorado

If you see any loose data please bring them in immediately to Ken Gerow for further questioning.

The timing of the workshop is to facilitate data summarization for presentations and posters at the 2006 Fire Ecology & Management Congress (see below).

Kara Paintner is looking for interested people to help shape the workshop. Please contact her if you are interested in helping shape the agenda and topics. (970-267-2121 / kara_paintner@nps.gov).

3rd International Fire Ecology & Management Congress

Sponsored by the Association for Fire Ecology. San Diego, California, November 13-17, 2006. The Congress provides a week long focus on science and technology that are the basis for management of wildland fire. The theme of the opening plenary session is "Changing fire regimes: Context and consequences," featuring invited speakers who will further explore this topic that is so significant for fire management.

The Association for Fire Ecology http://www.fireecology.net/
3rd International Fire Ecology & Management Congress http://emmps.wsu.edu/firecongress/

RxFx Submission Suggestions

Caffiene intake: For you over-achievers, I recommend a single cup of coffee in the morning to help keep your submitted content **under 2 pages** (and I'm mostly looking at you here, Jen). The influx of material is great but remember that this is a newsletter requiring just the highlights.

RxFx Subscription and Submission Information

Rx Effects is the newsletter of the Fire Effects Monitoring Program in the National Park Service. It is an outlet for information on Fire Effects Monitoring, FMH, fire research, and other types of wildland fire monitoring. The newsletter is annually produced for the National Park Service but we encourage anyone with an interest in fire ecology to submit information about their program or research. Examples of submissions include: contact information for your program, summaries of your program's goals, objectives, and achievements, monitoring successes and failures, modifications to plot protocols that work for your park, hints for streamlining collection of data, data entry, and analysis, event schedules, and abstracts of papers or posters resulting from your program. Submissions will be accepted in any format (e.g., hard copy through the mail or electronic files through e-mail). Please see our website for author instructions. The goal of the newletter is to let the Fire Effects Monitoring community know about you and your program.

Rx Effects is issued each year in the Spring. The **deadline for submissions** is the last Friday in April. If you would like a subscription or more information please see our website **www.nps.gov/fire/fire/fir_eco_rxeffects.html** or contact Eric Miller 307-344-2474 / eric_miller@nps.gov. Fire Management Office, P.O. Box 168, Yellowstone National Park, WY 82190-0168.

Rx EFFECTS
National Park Service Fire Effects Monitoring Newsletter
FIRE MANAGEMENT OFFICE
P.O. BOX 168
YELLOWSTONE N.P., WY 82190-0168

National Park Service Fire Effects Monitoring
http://www.nps.gov/fire/fire/fir_ecology.html
Rx Effects, The Newsletter of the NPS Fire Effects Monitoring Program
http://www.nps.gov/fire/fire/fir_eco_rxeffects.html