Final Report, Joint Fire Science Program

Project Title: A national study of the consequences of fire and fire surrogate treatments

Project Location: Wenatchee National Forest (central WA), Wallowa-Whitman National Forest (northeastern OR), University of Montana-Lubrecht Forest (western MT), Modoc National Forest (northern CA), University of California-Blodgett Experimental Forest (central Sierra), Sequoia National Park (southern Sierra), Coronado and Kaibab National Forests (northern Arizona), Santa Fe National Forest (northern New Mexico), Ohio Division of Lands.Mead Paper Co.-Ohio Hill Country (southern Ohio), Clemson University Experimental Forest (western South Carolina), Green River Wildlife Management Area (western North Carolina), Myakka River State Park (southwest Florida), Auburn University-Solon Dixon Forest (southern Alabama).

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Note: This final report describes findings to date and proposed and accomplished deliverables. Details on the study background, objectives, and methods can be found with the attached study plan. Published evidence to support the summarized findings can be found on the FFS project website: http://www.fs.fed.us/ffs/.

Appendices:

1. Correspondence between proposed and delivered outreach.
2. Original Communications Plan
3. Copies of letter from the JFSP Board (September 2004), expressing outreach concerns, and reply letter from us offering ideas on enhanced outreach (October 2004)
4. Publications List
5. List of proposed papers to be given at 3rd International Fire Conference, San Diego, CA, 13-17 November, 2006.

SUMMARY OF FINDINGS TO DATE

INTRODUCTION. Below we provide highlights of some of the results thus far for the National Fire and Fire Surrogate study (FFS). Highlights summarize work that has been published within the last four years (2003-2006), primarily in theses, proceedings, general technical reports, and peer-reviewed journals (http://www.fs.fed.us/ffs/). In the summary below, we highlight site-level work by discussing a collection of papers from the SE Piedmont site, provide examples of both multi-site and multi-variate work, and discuss some additional results we've discovered thus far. As suggested in your website, we provide a crosswalk between our proposed and delivered outreach (Appendix 1), and include our communications plan for reference (Appendix 2). As indicated in the cover letter, we also provide a crosswalk between the enhanced outreach we produced in response to the Board's Letter of Concern (September 2004)(see Appendix 3); this crosswalk is provided at the end of the table comparing proposed versus delivered outreach. We also provide an up-to-date list of citations of all papers, including those in press or in review (Appendix 4: "Publication List, Fire and Fire Surrogate Project", Updated 30 April, 2006), and enclose a CD containing the full text of all papers in print. For some of these papers we have developed summaries that highlight key findings for posting on our website (Appendix 5: Website Summaries of Metlen et al. 2004 - #26; Apigian et al. 2006 - #86; Knapp and Keeley

2006 - #95). Our intent is to prepare similar summaries for key papers currently in review or in preparation, as a means to more rapidly disseminate findings to our primary clients. Finally, in Appendix 6 you will find a list of multi-site and multi-variate papers we plan to present at an all-day FFS symposium at the 3rd International Fire Conference in San Diego, 13-17 November, 2006.

SITE-LEVEL FINDINGS. Thus far, most papers published or submitted for publication represent site-level research describing response of variables within one to a few of the six ecological disciplines studied (vegetation, fuels, soils, wildlife, pathology, entomology). Responsibility and leadership for outreach and publication of these kinds of papers has resided in the site managers (Table 1), and productivity has generally been impressive. A good example of a site-level collection of papers is for the **SE Piedmont**, located in northwestern South Carolina. A series of eight papers (Appendix 4; Publications # 27-31 and 33-35), presented at the12th Biennial Southern Silvicultural Research Conference, describe the initial ecological responses to FFS treatments at this site. Some of this work is also contained within a set of five Master's Theses (Appendix 4; Publications # 11, 12, 13, 22, 25) that describe details of ecological response to FFS treatment at the SE Piedmont site, and an additional paper has also been published more recently (Waldrop and McIver 2006; #73), that summarizes short-term work.

Narrative of Highlights. The SE Piedmont FFS site is located on the Clemson Experimental Forest, managed by Clemson University, in northwestern South Carolina. The forest is dominated by second growth stands of loblolly and shortleaf pines, growing on soils highly degraded by agricultural practices of the past 200 years (Waldrop and McIver 2006; FFS Paper #73). FFS treatments (burn-only, mechanical-only, mechanical+burn, control) were arranged in three replicates, blocked to account for differences in average tree diameter. Mechanical treatment (mechanical-only) was thinning from below to about 13m^2/ha and was applied in the winter of 2000/2001 (Waldrop et al. 2004; #34). The prescribed burn prescription (burn-only) was designed to produce stands in which 80% of the dominant trees would be expected to survive a wildfire burning under 80th percentile fire weather conditions (Weatherspoon 2000; #3). The burn-only treatment was applied in April 2001; burning for the mechanical+burn treatment was applied in March 2002 (Phillips et al. 2004; #33).

The mechanical-only treatment increased radial tree growth in the short-term (Boyle 2002; #12), despite increases in surface soil bulk density (Shelburne et al. 2004; #35), suggesting that this treatment would soon lead to stands dominated by larger trees, which might be less susceptible in the intermediate term to disturbances such as fire and beetles (Boyle et al. 2004; #28). But the mechanical-only treatment also increased slash fuels relative to controls and other active treatments, and thus BEHAVE predicted that a wildfire occurring in the short term would burn with greater fireline intensity in mechanical-only units, at least until slash fuels decay (Mohr et al. 2004; #29). In fact, even the mechanical+burn units would be expected to experience fairly high fireline intensities in the short term, because the slash laid down during the mechanical portion of the treatment was not entirely consumed by the initial prescribed fire (Mohr et al. 2004; #29).

Unique forest floor and soil responses to fire confirm the expectation that mechanical treatments cannot serve as fire surrogates for all variables (Lione 2002; #11). In particular, burn-only units had reduced respiration relative to the mechanical-only treatment, possibly due to fire-induced changes in C pools of the forest floor (Callaham et al. 2004; #31). Thus while C and N dynamics were altered by all treatments, the direction and magnitude of changes were fundamentally different for burn-only versus mechanical-only treatments (Callaham et al. 2004; #31). Similar differences were reflected in total exchangeable capacity, iron, zinc, and proportional mineralization, with burn-only units reduced relative to the other active treatments (Lione 2002; #11). Litter dynamics were also fundamentally different between mechanical-only and burn-only treatments, with fire not only reducing litter significantly more than the

mechanical treatment, but producing conditions in which litter decayed more rapidly in the short-term (Mohr et al. 2004; #29; Callaham et al. 2004; #31).

While all active treatments, especially the burn-only, produced substantial changes in vegetation, fuels, forest floor, and soils, other ecological effects were far more subtle. For example, herpetofauna abundance increased slightly only in mechanical-only units, probably due to positive responses to increases in solar heat reaching the forest floor (Kilpatrick et al. 2004; #27). Overall however, Kilpatrick (2002; #13) argues that treatment effects were generally overwhelmed by other factors, such as proximity to wetland breeding habitat. Similarly, FFS treatments had either no measurable effect or only a subtle effect on breeding birds (Zebehazy et al. 2004; #30), southern pine beetles (Boyle 2002; #12), ground-inhabiting beetles (Staeben 2003; #46), and spiders (Vickers 2003; #36).

In summary, each active treatment at the SE Piedmont site resulted in a unique forest structure, particularly with respect to the forest floor: burn-only removed relatively more litter uniformly across units; mechanical-only removed less litter and introduced spatial heterogeneity; and mechanical+burn created the greatest short-term disturbance. These differences influenced nutrient cycling and decomposition, which in turn can be expected to influence many other variables. The challenge now will be to create models of the critical paths of interactions, so that we can understand in a mechanistic way how these treatments impact whole systems in the short-term, and then predict how these short-term changes may transmit into longer term effects (Waldrop and McIver 2006; #73).

MULTI-SITE FINDINGS. A key feature of FFS is that an identical experimental design was applied at a total of 13 different seasonally-dry forest sites across the country. This feature allows us to understand the extent to which FFS treatments can be expected to produce either general or site-specific results, and can allow us to understand more about the factors behind observed variation in response. The national integrated design represents a significant advantage compared to experimental information available in the literature. Even for variables such as woody fuels, attempts at meta-analysis generally uncover only a sparse relevant literature – Kopper (2002; #23), found only eight published papers that could be used in a meta-analysis of prescribed fire effects on fuels in ponderosa pine systems of the western United States. Moreover, she also found that methods and experimental designs varied markedly among studies, making it more difficult to draw conclusions on the size effects of treatments. The FFS is designed to counter these problems, through consistent methods and design. A few examples of multi-site work include analyses that feature between four and eight of the 12 sites for which we have treatment response data:

1) **Soils**. Working at two eastern hardwood sites (Ohio Hills, S. Appalachian Mts.) and two pine sites (SE Piedmont, S. Cascades), Boerner et al. (2004; #41) found that soil microbial activity varies more as a consequence of changes in the quality and quantity of soil organic matter, rather than variation in vegetation, macroclimate, or geological setting. Data also suggest that thinning does not serve as a reliable surrogate for fire, for either C/N ratio or microbial activity.

2) **Vegetation/Fuels.** Working at two eastern pine sites (SE Piedmont, Southern Coastal Plain.), one eastern hardwood site (Ohio Hills) and four western pine sites (Lubrecht, Hungry Bob, Blodgett, Sequoia), Youngblood et al. (2004; #55): found that: 1) while burning increased height to live crown at some western sites (Hungry Bob and Sequoia), eastern sites were unaffected by fire. Different fuel types and pre-treatment crown closures are likely responsible for this variation; 2) Understory plant species richness effects were subtle and highly variable among sites, suggesting that forests with natural high frequency, low severity fire regimes typical are composed of plant communities that undergo little floristic change

after treatments modeled on historical fire disturbance.

3) **Wildlife.** Working at six western conifer sites (Hungry Bob, Lubrecht, S. Cascades, Sequoia, SW Plateau, Jemez Mts.) and two eastern conifer sites (Gulf Coast, Southern Coastal Plain), Converse et al. (in press; #70): found that: 1) at the species and genus levels, treatment effects on small mammal density had variable short-term response to different treatments, and that the responses varied by site. Variation is most likely due to differences in the degree and kind of habitat response; 2) total small mammal biomass however, varied consistently with treatment *per se*, increasing due to treatment across the network; 3) there was no evidence that mechanical treatments serve as surrogates to fire. The idiosyncratic responses to treatment observed in small mammals, varying as they do across sites, suggests that adaptive management policies may be necessary when applying fuel reduction treatments, in cases where management of small mammals is of interest.

MULTI-VARIATE FINDINGS. A second key feature of FFS is that at the site level, a wide variety of ecological variables were sampled from the same plots. This feature allows us to interpret multi-variate response to treatment, with the hope of better understanding not only how individual variables respond, but their interactions as well. Multi-variate work published to date, in which response of particular variables are interpreted in the context of other variables on a site basis, includes:

1) **Gulf Coastal Plain (Longleaf Pine).** Work by Outcalt (2005; #57) focused on the interaction between vegetation and fuel, in the context of restoration of longleaf pine systems in the southeast. Longleaf pines were once much more common in the southeast, but over the past 100 have succumbed to a combination of logging and fire suppression practices. Typical fire return intervals for longleaf pine are between 2 and 5 years, and fire must be used to control understory competition so that stands can be maintained over the long term. Comparison of FFS treatments indicated that thinning alone was effective in reducing the density of large understory hardwoods, but did not reduce the density of hardwood seedlings and saplings. The burn-only treatment however, was effective only at reducing the density of small hardwood stems. Thus thinning is not a surrogate of burning in this system, but its use in combination with prescribed fire is the most effective way to begin the restoration of longleaf pine stands in which hardwood development is too advanced.

2) **Sequoia (Mixed Conifer).** Knapp et al. (2005; # 62) present results that offer insight on the tradeoffs between effective fuel reduction and changes in the quality and quantity of the down woody resource. Their study compared spring v. fall season burns at Sequoia National Park, within stands that had not burned for 125 years. Prescribed fires during both seasons were effective at reducing fuels, and significantly lowering potential fire risk. Fall burns however, applied during conditions under which fuel moistures were much lower, consumed more fuel overall, reduced log cover, mass, and volume more than early season burns, and burned a higher percentage of the forest floor. Early season burns may therefore be one way to mitigate ecosystem effects – such as large reductions of coarse woody debris required for wildlife habitat -- when treating stands with extremely heavy accumulations of fuel due to long periods of fire exclusion.

3) **Lubrecht (Mixed Conifer).** Within a forest restoration context, Gundale et al. (in press; #83), test the 'resource heterogeneity hypothesis', by exploring the relationship between species richness and the spatial heterogeneity of total inorganic nitrogen (TIN). They discovered a correlation between the treatment-induced increase in plant species richness and the spatial heterogeneity of TIN. With the use of multi-variate analysis, they also found that

high and low TIN quadrats contained very different understory plant communities, suggesting that TIN variation produces higher species richness overall. Moreover, because burn-only and thin-burn treatments created higher TIN heterogeneity than controls, restoration treatments that mimic the natural disturbance regime may be important for long-term maintenance of plant species richness and composition. Their findings demonstrate that management decisions to choose either burn or thin may have meaningful ecological consequences, in addition to restorative changes in stand structure or the fuel bed.

OTHER HIGHLIGHTS

Ecological effects in the context of fuel reduction. A survey of FFS publications indicates that substantial fuel reduction benefits were accomplished at most sites, despite relatively subtle ecological effects. At the central Sierra Blodgett Site, for example, fuel bed mass and predicted fireline intensity was significantly reduced in burn-only and mechanical-burn treatments, compared to controls and mechanical-only treatments (Stephens and Moghaddas 2005; #64). Mechanical-only treatments were an improvement over controls, but only marginally. At the same time, snag numbers (dead trees >15cm DBH) either remained the same (controls and mechanical-only) or increased in burn-only and mechanical-burn treatments, while the volume of coarse woody debris declined significantly only in decay classes 3 and 4 (Stephens and Moghaddas 2005; #65). Furthermore, changes in species richness, abundance, and species composition of arthropod litter fauna (beetles, ants, spiders, etc.) were evident but subtle, despite substantial treatment-induced changes in the fuel bed and stand structure (Apigian et al. 2006; #84). In particular, most of the change in beetles was observed among rare species, in the burn-only and mechanical-burn treatments. Spider response was taxon-specific, and showed no general pattern. Similarly, as mentioned above in the summary of SE Piedmont papers, meaningful fuel reduction was accomplished in the burn-only units, despite subtle effects (or no effects) on herpetofauna (Kilpatrick 2002; #13), breeding birds (Zebehazy et al. 2004; #22), ground-inhabiting beetles (Staeben 2003; #46), or spiders (Vickers 2003; #36). Although all active treatments changed certain soil properties, Lione (2002; #11) commented that in general soil effects tended to be subtle and short-lived. Subtle responses in both flora and fauna may reflect the fact that the species that currently live in dry forest systems have evolved mechanisms to handle the kinds of disturbances that fire and fire surrogate treatments represent (Youngblood et al. 2004; #55).

Mechanical treatments as surrogates. While it is no surprise that mechanical treatments, applied alone without fire, do not serve as surrogates for fire, the breadth of examples that make this point span the range of ecological disciplines studied in the FFS project. Results from our soils work generally support the copious literature on fire, demonstrating the unique ecological role of fire in nutrient cycling, decomposition (Callaham et al. 2004; #31), C/N dynamics (Boerner et al. 2004; #41; Gundale et al. in press; #83), and regulation of the soil micro-flora (Hart et al. 2005; #56; Smith et al. 2005; #59). We've found that fire has other unique effects in soils that are less well known, including the creation of charcoal and its concomitant effect on soil solution chemistry, nutrient cycling, and the growth of native species (Gundale and DeLuca in press; #107). As demonstrated by Iverson et al. (2003; #10: Ohio Hills), Gundale et al. (in press; #83: Lubrecht) and Knapp et al. (2005; #95: Sequoia), prescribed fire introduces spatial heterogeneity within and among stands, which in turn influences a variety of ecological patterns and processes, including species richness and potential fire behavior. Although the effects of active treatments on flora and fauna tended to be subtle, when effects were observed, mechanical-only treatments generally behaved more like untreated controls, in contrast to effects in burn-only and mechanical-burn treatments (Smith et al. 2004; #59; Converse et al. in press; #70). In terms of fire behavior, although the mechanical-only treatment may be effective as reducing flame length, its failure to increase canopy base height in a manner similar to prescribed

fire, may limit its usefulness as a means to inhibit the initiation and spread of crown fire (Lolley 2005; #61). As Outcalt (2004; #57), and Stephens and Moghaddas (2005; #64), have demonstrated however, fire and thinning can be used in a complimentary way to achieve restoration objectives, especially in cases where stand structures and fuel beds have diverged substantially from historical conditions.

UPCOMING CONFERENCE AND 'SPECIAL FEATURES'. In November 2006, at the 3rd International Fire Ecology and Management Conference, (San Diego, CA, November 13-17, 2006), we will present a collection of multi-site and multi-variate papers (Appendix 6), during an all-day FFS symposium, that together with the papers listed in Appendix 4, will represent a culmination of our short-term findings. Many of these papers will be also be published as two collections of 'Special Features', one featuring primarily multi-site papers (*Ecological Applications*), and one featuring both multi-site and multivariate papers (*Forest Ecology and Management*).

Appendix 1. Crosswalk between proposed and delivered FFS outreach activities, as indicated in our Communication Plan, dated May 17, 2001

Proposed	**Delivered**
FFS Network	
Website	http://www.fs.fed.us/ffs/
Publication Series	See attached Appendix 4: Publication List, National Fire and Fire Surrogate Study (Updated April 30, 2006)
Publications	See enclosed CD, containing pdf files of all publications to date, in print
Brochure	See enclosed brochure: White, D. and J. D. McIver, **2001**, The Fire and Fire Surrogate Study. Brochure
Short Powerpoint Talk	White, D. and J. D. McIver, **2001**, A national study on the consequences of fire and fire surrogate treatments. *10 minute slide show*
Long Powerpoint Talk	White, D. and J. D. McIver, **2001**, A national study on the consequences of fire and fire surrogate treatments. *40 minute slideshow*
Poster	White, D. and J. D. McIver, **April 2002**, A national study on the consequences of fire and fire surrogate treatments. Poster
Fact Sheet	McIver, J.D., and S. Stephens, January **2001**, The Fire and Fire Surrogate Study is underway in 9 states……
Study Plan	FFS SMIC, **September 2001**, A national study on the consequences of fire and fire surrogate treatments. Study plan. *Study plan for the Fire and Fire Surrogates study.*
Corporate Database	A complete, functional database, suitable for all conceivable network analysis, is now up and running for vegetation, fuels, soils, and wildlife. We are still in the process of finishing up entomology and pathology.
National Conference	Please see attached Appendix 5: Multi-site and multivariate presentations at the National Fire and Fire Surrogate Symposium, 3rd International Fire Ecology and Management Conference, San Diego, CA, November 13-17, 2006.
Presentations	Keeley, J., Schwilk, D., **March 2006**, The National Fire and Fire Surrogate Study - Effects of alternative fuel. Presentation at 1st Fire Behavior and Fuels Conference, Portland, OR. Moghaddas, J. J., **March 2006**, A Fuel Treatment Reduces Potential Fire Severity and Increases Suppression Efficiency in a Sierran Mixed Conifer Forest. Presentation at 1st Fire Behavior and Fuels Conference, Portland, OR. Stephens, S. L., Moghaddas, J. J., **March 2006**, The Effects of Fire and Fire Surrogate Treatments on Vegetation, Surface Fuels, and Potential Fire Behavior in Western Coniferous Forests. Presentation at 1st Fire Behavior and Fuels Conference, Portland, OR. Stephens, S. L., Moghaddas, J. J., **March 2006**, The Effects of Fire

	and Fire Surrogate Fuel Treatments on the Abundance of Snags and Coarse Woody Debris in a Sierran Mixed Coniferous Forest. Presentation at 1st Fire Behavior and Fuels Conference, Portland, OR. Dylan W. Schwilk, Jon E. Keeley, **November 2005**, The National Fire and Fire Surrogates Study: effects of fuel reductions treatments on understory and overstory communities. Invited presentation for Occidental College. Dylan W. Schwilk, Jim McIver, **October 2005**, The National Fire and Fire Surrogates Study: testing the ecological effects of alternative fuel reductions treatments. Invited presentation for Society of American Foresters Meeting. Dylan W. Schwilk, Jon E. Keeley, **October 2005**, The National Fire and Fire Surrogates Study: effects of fuel reductions treatments on understory and overstory communities. Invited presentation for Society of American Foresters Meeting. Stephens, S., **October 2005**, Presentation on FFS study. Invited presentation for Meeting - Forest Sustainability: Continuing the Conservation, Nevada Union High Nevada City, CA. Waldrop, T.A., **June 2005**, Fire-maintained pine communities in the southern Appalachian Mountains.. Slide show presented at Fire in the Appalachian Workshop. Boerner, R.E.J., Brinkman, J.A., Skinner C.N., Waldrop, T.A.; and Yaussy, D.A., **May 2005**, Incorporating the underground into restoration strategies. Contributed presentation for 9th Biennial Soil Ecology Society Conference, Argonne National Laboratory, Argonne, IL.. Boerner, R.E.J., Waldrop, T.A., Skinner, C.N., Callaham, M.A., Jr., Brinkman, J.A. and Smith, A., **March 2005**, Ecosystem restoration and wildfire management treatments affect soil organic matter and microbial activity in four contrasting forests.. Slide show presented at 14th Central Hardwood Forest Conference,. Waldrop, T.A. and McIver, J., **March 2005**, The National Fire and Fire Surrogate Study - Early results and future challenges. Poster presented at 13th Biennial Southern Silvicultural Research Conference. S.J. Converse, G.C. White, and W.M. Block, **September 2004**, Estimating small mammal population responses to forest fuel reduction treatments. Presentation at The Wildlife Society 11th Annual Meeting; Calgary, Alberta, Canada. *This presentation included data from both the Southwest Plateau and the Jemez*

	Mountains study areas Youngblood, A., Fiedler, C., Metlen, K., McIver, J., **August 2004**, Initial plant response to fuel reduction treatments in ponderosa pine forests of northeastern Oregon and western Montana.. Invited presentation for 89th Ecological Society of America Annual Meeting, August 1-6, 2004, Portland, OR.. *Abstract published on-line or on CD available from ESA.* Youngblood, A., Metlen, K., Knapp, E., Outcalt, K., Stephens, S., Waldrop, T., and Yaussy, D., **August 2004**, Implementation of the Fire and fire Surrogate Study, A national study of the consequences of prescribed fire and fire surrogate treatments for fuel reduction. Presentation at IUFRO international workshop, Balancing Ecosystem Values: innovative experiments for sustainable forestry. August 15-20, 2004, Portland, OR.. Christopher J. Fettig, Pacific Southwest Research Station, USDA Forest Service, 1007 Kennedy Place Ste 8., Davis, CA 95616, **April 2004**, Current entomological and pathological research in the national fire and fire surrogate (FFS) study. Invited presentation for Western Forest Insect Work Conference, San Diego, CA. S.J. Converse, G.C. White, and W.M. Block, **December 2003**, Estimating multi-species responses to forest fuel reduction treatments. Presentation at The 3rd International Wildlife Management Congress; Christchurch, New Zealand. *This presentation included data from both the Southwest Plateau and the Jemez Mountains study areas* McIver, J. D., **December 2002**, Fuel reduction practice as the first step toward long-term restoration of dry forests. Invited presentation for the Conference on Fire Ecology, December 3-5, 2002, San Diego, CA. S.J. Converse and G.C. White, **December 2002**, Information theory and mark-recapture approaches for studying small mammal response to fire and fire surrogate treatments: the utility of Program MARK. Presentation at Fire Conference: Managing Fire and Fuels in the Remaining Wildlands and Open Spaces of the Southwestern United States; San Diego, California, USA. *This presentation included data from both the Southwest Plateau and the Jemez Mountains study areas* McIver, J. D., **October 2002**, The national fire and fire surrogate study: design and implementation of a interdisciplinary experiment. Invited presentation for the Conference on Ecosystem Research of the Sierra Nevada, October 8-10, 2002, Lake Taos, CA. McIver, J. D., **April 2002**, The Fire-Fire Surrogate Study:

	Economics and Ecological Consequences and Alternative Fuel Reduction Treatments. Invited presentation for the Meeting on the National Fire Plan, Madison, WI, April 15-18, 2002. Stephens, S. L. and J. D. McIver, **April 2002**, The Fire-Fire Surrogate Study: Economics and Ecological Consequences and Alternative Fuel Reduction Treatments. Invited presentation for The Conference of Fire, Fuel Treatments, and Ecological Restoration, Ft. Collins, CO. McIver, J. D., **March 2002**, The national fire and fire surrogate project: 2nd progress report. Workshop for The Principle Investigators workshop, Joint Fire Science Program, Organized by Bob Clark (JFSP), March 11-14, 2002, San Antonio, TX. S.J. Converse, B.G. Dickson, G.C. White, and W.M. Block, **December 2001**, Use of mark-recapture techniques to analyze small mammal richness and population response to fire and fire surrogate treatments. Presentation at The 6th Biennial Conference of Research on the Colorado Plateau; Flagstaff, Arizona, USA. *This presentation included data from both the Southwest Plateau and the Jemez Mountains study areas* Stark, Daniel T., A. J. Storer, D. L. Wood and S. L. Stephens, **October 2001**, An overview of the Fire-Fire Surrogate Study: Insects and Disease. Presentation McIver, J. D., **June 2001**, A national study on the consequences of fire and fire surrogate treatments intended for fuel reduction. Invited presentation for JFSP Stakeholders Group Meeting, Salt Lake City, UT. McIver, J. D., **January 2001**, The fire and fire surrogate project: a national study on the economics and ecological consequences of alternative fuel reduction treatments. Invited presentation for Washington D.C. *Presentation to congressional staffers.* McIver, J. D., **January 2001**, The fire and fire surrogate project: a national study on the economics and ecological consequences of alternative fuel reduction treatments. Invited presentation for Washington D.C.. *Presented to the U.S.D.A. Forest Service and U.S. Department of Interior Washington Offices, January 30, 2001, Washington, D.C. Invited by Bob Clark, Joint Fire Science Program.* McIver, J. D., **October 2000**, The national fire and fire surrogate project: 1st progress report. Workshop for the Principle Investigators workshop, Joint Fire Science Program, Organized by Bob Clark (JFSP), October 3-6, 2000, Reno, NV.

	McIver, J. D., P. Weatherspoon, C. Edminster, **April 2000**, A long-term study on the effects of alternative ponderosa pine restoration treatments. Invited presentation for the: Ponderosa Pine Ecosystems Restoration and Conservation: Steps Toward Stewardship, April 25-27, 2000, Flagstaff, AZ. Weatherspoon, C.P., **June 1999**, A proposed long-term national study of the consequences of fire and fire surrogate treatments. Invited presentation for Joint Fire Science Conference, Boise, ID, June 15-17, 1999.
Mission Creek	
Website	This site uses main FFS website
Brochure	Leaflet to be included in main FFS brochure
Tours/Site Visits	G. Scherer, J. Hatten and D. Zabowski, **November 2003**, Graduate Field Seminar in Soils. Field tour at Mission Creek, WA. *Field tour for UW graduate students.* Lehmkuhl, J. and W. Gaines., **May 2003**, Fire and Fire surrogate, Science and Birds. Field tour at Leavenworth Bird Fest, Leavenworth & Mission Creek, WA. Gaines, W., **2003**, Field trip to discuss fire and fire surrogates. Field tour at Mission Creek, WA.
Workshops/Presentations	Harrod, R., **2003**, Fire and fire surrogate science. Invited presentation for Wenatchee, WA. Lehmkuhl, J., **2003**, Implementation of science-based management. Invited presentation for University of Washington. *Graduate-level forest management course.* Harrod, R., **2002**, Lecture to ESC 501. Invited presentation for University of Washington.
Additional Outreach	Agee, J.K., P. Hessburg and J. Lehmkuhl, **2002**, Fire and fire surrogates project. Broadcast on MSN TV Network. *MSN TV interview on fire and fire surrogates project. Includes an article on MSNBC website.*
Hungry Bob	
Brochure	Leaflet to be included in main FFS brochure
Presentations/Posters	Youngblood, A., Ottmar, R., Wright, C., McIver, J. D., **March 2006**, Changes in Fuelbed Characteristics and Resulting Fire Potentials After Fuel Reduction and Restoration Treatments in Dry Forests of Northeastern Oregon. Presentation at 1st Fire Behavior and Fuels Conference, Portland, OR. McIver, J. D., **March 2002**, A pictorial essay on the ecological consequences of fire and fire surrogate treatments at Hungry Bob, NE Oregon. Invited presentation for NE Oregon Native Plant

	Society, Pendleton, OR. McIver, J. D., P. Matzka, **February 2002**, Economics and ecological consequences of fire and fire surrogate treatments to reduce fuel. Invited presentation for the Smallwood Symposium, Organized by Washington State University, February 25-27, 2002, Spokane, WA. Youngblood, Andrew, **April 2001**, Refining silvicultural options for fuel reduction in dry forests. Developing an Integrated and Adaptive Management Approach for Addressing Fire and Fuels Issues in Dry Forests of Eastern Washington.. Presentation Youngblood, Andrew, **February 2001**, Research in silvicultural options for fuel reduction. Presentation Matzka, P.J., L.D. Kellogg, **September 2000**, An economic model for evaluating factors affecting biomass reduction and forest restoration. Invited presentation for the Council of Forest Engineering / Canadian Woodlands Forum Conference, September 11-14, 2000, Kelowna, BC. McIver, J. D., A. Youngblood, C. Niwa, R. Ottmar, J. Smith, A. Tiedemann, **August 1999**, Hypotheses on the ecological effects of alternative fuel reduction methods. Invited presentation for the Society of American Foresters, Annual Convention, Portland, OR, September 11-15, 1999. McIver, J. D., A. Youngblood, C. Niwa, J. Smith, R. Ottmar, P. Matzka, **June 1999**, Alternative fuel reduction methods in Blue Mountain Dry Forests: the Hungry Bob Project. Invited presentation for the Joint Fire Science Conference, Boise, ID, June 15-17, 1999. Matzka, P.J. and L. Kellogg, **March 1999**, Thinning with prescribed fire and timber harvesting mechanization for forest restoration: A review of past and present research. Invited presentation for the 1999 International Mountain Logging and 10th Pacific Northwest Skyline Symposium, March 28-April 1, 1999, Corvallis, OR, USA.
Tours/Site Visits	Youngblood, A., J.D.McIver, **November 2001**, Science-Manager Integration Committee Field Trip. Field tour at Wallowa Valley District, Wallowa-Whitman National Forest, OR. McIver, J.D. October 2004, Joint Fire Science Program Staff Field Trip, Hungry Bob site, Wallowa-Whitman District, Wallowa-Whitman National Forest, OR.
Workshop	McIver, J. D., A. Youngblood, R. Ottmar, P. Matzka, L. Kellogg, K, Metlen, S. Zack, J. Smith, C. Niwa, **January 2003**, Hungry Bob: Economics and ecological consequences of fire and fire surrogate treatments in a ponderosa pine dominated forest. Workshop for

	Eastern Oregon Univerisity, La Grande, OR. *Presentations by nine collaborators.*
Additional Outreach	Youngblood, A., K.H. Coe, **November 2003**, Tree data to Erik Drews for economic analysis. Request for study data to University of California, Davis. *Request for Hungry Bob data to be used for economic analysis of thinning and burning* Aitken, M.J., **October 2003**, Soils maps to Dick Miller. Request for study data to Seattle, WA. *Request for Hungry Bob data to be used for further analysis.* Youngblood, A., K.H. Coe, **September 2003**, Tree data to Olga Helmy for crown bulk density study. Request for study data to Fire Science Lab, Missoula, MT. *Request for Hungry Bob data to be used for crown bulk density study.* Youngblood, A., K.H. Coe, **September 2003**, Tree and vegetation data to Chris Rothenbach for nuthatch study. Request for study data to University of British Columbia. *Request for Hungry Bob data to be used for nuthatch study.* Youngblood, A., K.H. Coe, **April 2003**, Soils data to Dick Miller. Request for study data to Seattle, WA. *Request for Hungry Bob data to be used for further analysis.*
Lubrecht Forest	
Presentations	Fiedler, C.E., University of Montana; M. Harrington, USDA FS RMRS Fire Sciences Laboratory; K.L. Metlen, University of Montana, **December 2005**, Applying hazard reduction/ecological restoration treatments to ponderosa pine/Douglas-fir forests. Slide show presented at Society of American Foresters National Convention. Fort Worth, TX.. Metlen, K.L.; C.E. Fiedler, **August 2005**, Understory response to restoration treatments in pine/fir forests of the Intermountain West varies with temporal and spatial scale. Slide show presented at Ecological Society of America Annual Meeting. Montreal, Canada. Gundale, M.J., University of Montana; T.H. DeLuca, University of Montana; K. Metlen, University of Montana; C.E. Fiedler, University of Montana., **August 2004**, Restoration management in a Montana pine forest: Effect on soil resources and vegetation dynamics.. Slide show presented at Ecological Society of America Annual Meeting. Portland, Oregon. Metlen, K.L., University of Montana.; C.E. Fiedler, University of Montana., **August 2004**, Restoring ponderosa pine/Douglas-fir forests along the route of discovery: Understory response in western Montana.. Slide show presented at Ecological Society of America Annual Meeting. Portland, Oregon.

	Youngblood, A. PNW Research Station; K.L. Metlen, University of Montana; E.E. Knapp, USGS Three Rivers; K. W. Outcalt, Southern Research Station; S.L. Stephens, University of California Berkeley; T.A. Waldrop Southern Research Station; D. Yaussy, **August 2004**, Implementation of the fire and fire surrogate study, a national research effort to evaluate the consequences of fuel reduction treatments.. Slide show presented at Portland, Oregon/IUFRO conference. *Andy gave the talk, we all worked on the paper.* Youngblood, A., PNW Research Station; C. Fiedler, University of Montana; K. Metlen, University of Montana; J. McIver, PNW Research Station., **August 2004**, Initial plant responses to fuel treatments in ponderosa pine forests of northeastern Oregon and western Montana.. Slide show presented at Ecological Society of America Annual Meeting. Portland, Oregon. Six, D. L. University of Montana; K. R. Skov, University of Montana., **April 2004**, FFS - current status of work at Lubrecht Experimental Forest, Montana.. Slide show presented at Western Forest Insect Work Conference, San Diego, CA. Six, D.L., University of Montana., **October 2003**, Bark beetle interactions with biotic and abiotic factors: Montana 2003.. Slide show presented at Annual Meeting of the Regional Research Project W-187. Placerville, CA. Woolf, J.C., University of Montana; L.S. Mills, University of Montana; D. Christian, University of Montana., **September 2003**, Effects of ponderosa pine forest restoration on foraging patterns of bark-gleaning birds.. Invited presentation for 10th Annual Conference of the Wildlife Society. Burlington, Vermont.. Six, D.L., University of Montana., **July 2003**, The role of fire and silviculture in promoting forest health. Slide show presented at Panel: Western States Land Commissioners Association Annual Meeting. Big Sky, MT. Woolf, J.C., University of Montana., **February 2003**, The effects of thinning and prescribed fire on the foraging patterns of bark-gleaning birds.. Invited presentation for Montana Chapter of the Wildlife Society Annual Conference. Lewistown, MT. *Award for best Student Paper* Metlen, K.L., University of Montana., **January 2003**, Undergrowth vegetation response to fire and fire surrogates in northeastern Oregon.. Invited presentation for Hungry Bob: Economics and Ecological Consequences of Fire and Fire Surrogate Treatments in a Ponderosa Pine Dominated Forest. Eastern Oregon University, La Grande, OR.

	Woolf, J.C., University of Montana., **September 2002**, Effects of ponderosa pine forest restoration on birds and small mammals. Invited presentation for University of Montana and Montana State University Wildlife Biology Retreat. Choteau, MT. Fiedler C.E., University of Montana., **June 2002**, A national study of Fire/Fire Surrogate treatments. Invited presentation for Rocky Mountain Collaborative Ecosystem Studies Unit Meeting. Pablo, MT. June 2002. Six, D.L., University of Montana., **April 2002**, The national Fire and Fire Surrogate study: entomology and pathology components at Lubrecht Forest. Invited presentation for Montana Western Forest Insect Work Conference. Whitefish, MT. Woolf, J.C., University of Montana., **March 2001**, Effects of silvicultural manipulations that reduce fuel on passerine birds and small mammals. Invited presentation for Montana Chapter of the Wildlife Society Annual Meeting. Butte, MT. Woolf, J.C., University of Montana., **February 2001**, Effects of silvicultural manipulations that reduce fuel on red-breasted nuthatches. Invited presentation for Pacific Ecology Conference. Bamfield, B.C. Fiedler C.E., University of Montana., **December 2000**, Design and implementation of a National Fire/Fire Surrogates study network. Invited presentation for University of Montana Graduate Seminar. Missoula, MT.
Field Trips	Fiedler, C.E., University of Montana, **October 2005**, Field trip to the FFS plots for the BLM Short Course: Designing Successful Forest Restoration and Fuel Reduction Projects. Lubrecht Experimental Forest, MT. Presented at Lubrecht Experimental Forest, MT. Fiedler, C.E., University of Montana, **September 2005**, Field trip to the FFS plots for the Fire/Fire Surrogates Northwest Regional Workshop for Managers. Presented at Lubrecht Experimental Forest, MT. Fiedler, C.E., University of Montana, **September 2005**, Field trip to the FFS plots with the Rocky Mountain Trench Society, Ecological Restoration Steering Committee - British Columbia. Presented at Lubrecht Experimental Forest, MT. Fiedler, C.E., University of Montana, **August 2005**, Field trip to the FFS plots with University of Montana College of Forestry and Conservation faculty. Presented at Lubrecht Experimental Forest, MT.

	Fiedler, C.E., University of Montana, **July 2005**, Field trip to the FFS plots with BIA and tribal fire and forest management personnel for the BIA-NIFC Short Course: Fire Regime Condition Class and FIREMON Training. Presented at Lubrecht Experimental Forest, MT. Fiedler, C.E., University of Montana, **June 2005**, Field trip to the FFS plots with BIA and tribal fire and forest management personnel for the BIA-NIFC Short Course: Fire Regime Condition Class and FIREMON Training. Presented at Lubrecht Experimental Forest, MT. Metlen, K.L., University of Montana.; E.K. Dodson, University of Montana., **July 2004**, Oklahoma State University forestry camp field trip: Fuel reduction in pine/fir forests of western Montana. Field tour at Lubrecht Experimental Forest, MT. *Steve Hallgren contacted Kerry to do this field trip because of the website.* Fiedler C.E., University of Montana., **June 2003**, Hazard reduction and forest restoration treatments. Field tour at Potomac Valley Retirees Association. Lubrecht Experimental Forest, MT. Fiedler C.E., University of Montana., **June 2003**, Hazard reduction and forest restoration treatments. Field tour at Western Governor's Association Forest Health Summit. Lubrecht Experimental Forest, MT. *For Western Governors, the Secretary of Interior, and the Chief of the Forest Service* Fiedler C.E., University of Montana., **October 2002**, Harvest operations associated with hazard reduction treatments. Field tour at Western Experimental Forest Managers Annual Meeting. Lubrecht Experimental Forest, MT. Harrington, M., USDA FS RMRS Fire Sciences Laboratory, **October 2002**, Fire application in restoration and fuels assessment. Field tour at Western Experimental Forest Managers Annual Meeting. Lubrecht Experimental Forest, MT. Woolf, J.C., University of Montana., **October 2002**, Wildlife research as it relates to different forest management issues. Field tour at Western Research Forest Managers Meeting. Lubrecht Experimental Forest, MT. Fiedler C.E., University of Montana., **August 2002**, The context, need, and interdisciplinary nature of hazard reduction/forest restoration research. Field tour at Bureau of Land Management Science Coordination Committee. Lubrecht Experimental Forest, MT. Harrington, M., USDA FS RMRS Fire Sciences Laboratory,

	August 2002, Prescribed fire use in restoration and initial results from the FFS study. Field tour at Bureau of Land Management Science Coordination Committee. Lubrecht Experimental Forest, MT. Woolf, J.C., University of Montana., **October 2001**, Lolo School 7th Grade Field Trip: Fire/Fire Surrogates research sites - Wildlife discipline. Field tour at Lubrecht Experimental Forest, MT. Fiedler C.E., University of Montana., **May 2001**, Hazard reduction and forest restoration treatments. Field tour at Senatorial Informational Tour. Lubrecht Experimental Forest, MT. *For Senator Max Baucus (D-MT) and staff*
Brochures/Fact Sheets	Leaflet to be included in main FFS brochure
Workshops	Fiedler C.E., University of Montana., **September 2003**, Post-treatment fuels inventory and monitoring.. Workshop for Bureau of Indian Affairs and Tribal Foresters and Fire Management Officers. Lubrecht Experimental Forest, MT.
Publications	Sar K., University of Montana., **February 2003**, U.M.'s forest helps to shed light on wildfire.. Article published in Montana Kaimin 61:9.
Website	Metlen, K.L., University of Montana., **November 2002**, Hazard Reduction/Ecosystem Restoration Study in Pine/Fir Forests-Montana. Web site dedicated to the Fire/Fire Surrogates study at Lubrecht forest. Web site at http://www.forestry.umt.edu/FFSLubrecht.
Additional Outreach	Gundale, M.J., University of Montana; T.H. DeLuca, University of Montana., **November 2003**, Influence of fuel reduction on spatial heterogeneity of resources and vegetation diversity. Poster presented at Annual Meeting of the American Society of Agronomy. Agron. Abst. Denver, CO. Skov, K.R., University of Montana; D. L. Six, University of Montana., **March 2003**, Thinning and burning effects on bark beetles in western Montana–first season after treatments. Poster presented at Inland Empire and Montana Society of American Foresters: Annual Meeting. Missoula, MT. Gundale, M.J., University of Montana; T.H. DeLuca, University of Montana., **November 2002**, Fire and fire surrogates in western Montana: Spatial heterogeneity of nitrogen and vegetation diversity. Poster presented at Annual Meeting of the American Society of Agronomy. Agron. Abst. Indianapolis, IL. Skov, K.R., University of Montana; D. L. Six, University of Montana., **November 2002**, Thinning and prescribed fire effects on three trophic levels in a ponderosa pine forest in western Montana. Poster presented at Entomological Society of America National Meeting. Ft. Lauderdale, FL.
Southern Cascades	

Presentations	Carl N. Skinner, **April 2005**, Effective fuel reduction planning. Invited presentation for Northwest Regional Fire Safe Councils Conference. Carl N. Skinner, **February 2005**, Stand Structure & Fire Severity. Invited presentation for Siskiyou County Fire Safe Councils. Carl N. Skinner; Martin W. Ritchie, **February 2005**, Stand Structure & Fire Severity. Invited presentation for USFS R-5 Leadership Team. Fettig, C. J., J. D. McMillin, and J. A. Anhold, **November 2004**, Effects of hazardous fuel reduction treatments on the amount of bark beetle-caused tree mortality. Presentation at 52nd Annual Meeting of the Entomological Society of America, St. Lake City, UT. Fettig, C. J, **October 2004**, The effects of hazardous fuel reduction treatments on the amount of bark beetle-caused tree mortality in the Sierra Nevada, USA. Presented at Proceedings of the 2004 Society of American Foresters National Convention: One Forest Under Two Flags. Edmonton, Alberta, Canada. October 2-6, 2004. 7 pp. Fettig, C. J., **October 2004**, The effects of hazardous fuel reduction treatments on the amount of bark beetle-caused tree mortality in the Sierra Nevada, USA. Presentation at Society of American Foresters/Canadian Institute of Forestry, Joint 2004 Annual Meeting and Convention, Edmonton, Alberta, Canada. Carl N. Skinner, **July 2004**, Forest Fires & Forest Fuels. Invited presentation for Cottonwood Creek Watershed Council. Fettig, C.J., **February 2006**, The effect of prescribed fire and fire surrogate treatments on the amount and distribution of bark beetle-caused tree mortality: the FFS study. Region 5 fuels and Vegetation Management Conference, Reno, NV. Skinner, C.N., E. Knapp, S. Stephens, S. Zack, J. Miesel, C. Fettig, **February 2006**. California Fire Surrogates Study. Invited presentation for the 2006 Fuels and Vegetation Conference.
Workshops/Field Trips	Carl N. Skinner, **October 2005**, Forest Fires & Forest Fuels. Workshop for Univ. Calif. Forestry Ext. Class: Biomass Thinning for Fuel Reduction and Forest Restoration. Carl N. Skinner, **June 2005**, Forest Fires & Forest Fuels. Workshop for Forestry Institute For Teachers. *K-4 grade teachers* Carl N. Skinner, **October 2004**, Forest Fires & Forest Fuels. Workshop for Univ. Calif. Forestry Ext. Class: Biomass Thinning

	for Fuel Reduction and Forest Restoration. Carl N. Skinner, **August 2004**, Forest Fires & Forest Fuels. Workshop for Univ. Calif. Forestry Ext. Class: Biomass Thinning for Fuel Reduction and Forest Restoration. Carl N. Skinner, **June 2004**, Forest Fires & Forest Fuels. Workshop for Forestry Institute For Teachers. *K-4 grade teachers* Carl N. Skinner, **September 2003**, Forest Fires & Forest Fuels. Workshop for Univ. Calif. Forestry Ext. Class: Biomass Thinning for Fuel Reduction and Forest Restoration. Carl N. Skinner, **July 2003**, Forest Fires & Forest Fuels. Workshop for Univ. Calif. Forestry Ext. Class: Biomass Thinning for Fuel Reduction and Forest Restoration. Carl N. Skinner, **June 2003**, Forest Fires & Forest Fuels. Workshop for Forestry Institute For Teachers. *K-4 grade teachers*
Posters	Miesel, J.R.; Skinner, C.N.; and Boerner, R.E.J., **May 2005**, Impact of ecological restoration treatments on soil resource patterns in mixed conifer forests in the southern Cascade Range of northern California. Poster presented at 10th Biennial Soil Ecology Society Conference, Argonne National Laboratory, Argonne, IL. Carl N. Skinner, **May 2004**, Fire & Fire Surrogates Study: Southern Cascade Ranges. Poster presented at Shasta-Trinity Nat. For. open house.
Brochure	Leaflet to be included in main FFS brochure
Blodgett	
Website	Moghaddas, Jason, **2001**, A Study of the Consequences of Fire and Fire Surrogates: The Blodgett Forest Study Site. Web site at http://www.cnr.berkeley.edu/fire-surrogate-study for Blodgett Forest.
Research Symposium	Greinke, Emily and S. L. Stephens., **January 2002**, Fire and fire surrogate treatments on the soil environment. Presentation at The Blodgett Forest Research Station, Research Symposium 2002: Abstract Presentations, January 25-26. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html* Amacher, Andy and R. H. Barrett, **January 2002**, Wildlife response to fire and fire surrogate treatments at Blodgett Forest. Invited presentation for The Blodgett Forest Research Station, Research Symposium 2002: Abstract Presentations, January 25-26. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html* Apigian, K.O., D.L. Dahlsten, D. L. Rowney and N. Erbilgin, **January 2002**, Effects of fire and fire surrogate treatments on leaf litter invertebrates at Blodgett Forest. Invited presentation for the

	Blodgett Forest Research Station, Research Symposium 2002: Abstract Presentations, January 25-26. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html* Chalmers, Stuart and B. R. Hartsough., **January 2002**, Fuel Reduction Harvesting Systems at Blodgett Forest- A Cost Analysis. Invited presentation for the Blodgett Forest Research Station, Research Symposium 2002: Abstract Presentations, January 25-26. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html* Stark, Daniel T., A. J. Storer, D. L. Wood and S. L. Stephens, **January 2002**, Fire-fire surrogate study: An entomological and pathological pre-treatment analysis. Invited presentation for The Blodgett Forest Research Station, Research Symposium 2002: Abstract Presentations, January 25-26. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html* Stark, Daniel T., A.J. Storer, D.L. Wood, Bonello, Pierluigi and T.R. Gordon, **January 2002**, Bark beetle landing rates as indicators of future tree mortality. Invited presentation for The Blodgett Forest Research Station, Research Symposium 2002: Abstract Presentations, January 25-26. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html* Stephens, Scott L. and Jason Moghaddas, **January 2002**, A long-term study of the consequences of fire and fire surrogate treatments: Progress report and 2002 work plan. Invited presentation for The Blodgett Forest Research Station, Research Symposium 2002: Abstract Presentations, January 25-26. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html* Storer, A.J., D.T. Stark and D.L. Wood, **January 2002**, Presentation: Progress report on the Fire and Fire-Surrogate Study at Blodgett Forest Research Station: Entomology discipline. Invited presentation for Fire/Fire Surrogate (FFS) Entomology Discipline Meeting. Truex, Richard L. and W. J. Zielinski, **January 2002**, Effects of fire and fire surrogate treatments on fisher habitat. Presentation at The Blodgett Forest Research Station, Research Symposium 2002. *Symposium web-site http://www.cnr.berkeley.edu/forestry/properties/blodgett.html*
Brochures	Leaflet to be included in main FFS brochure
Posters	Emily Moghaddas, **June 2005**, Effects of Fire and Fire Surrogate Treatments on Soil Properties. Presentation at 2005 National Silviculture Workshop, Poster Presentation.

	Moghaddas, Jason and the Fire Surrogate Research Team, **2003**, A Long-Term Study of the Consequences of Fire and Fire Surrogate Treatments. Poster presented at Fire Science Laboratory, 360 Mulford Hall, University of California Campus, Berkeley, California. *On permanent display.* Moghaddas, Jason and the Fire Surrogate Research Team, **2003**, A Long-Term Study of the Consequences of Fire and Fire Surrogate Treatments. Poster presented at Vaux Center main conference room. Blodgett Forest Research Station, Georgetown, California. *On permanent display.*
Workshops	Scott Stephens, **November 2005**, Effects of Fire and Fire Surrogate Treatments on Potential Fire Behavior: Preliminary Results from a Multisite Analysis. Workshop for 2005 FFS Blodgett Forest Managers Meeting. Moghaddas, Jason, **October 2002**, Surrogate Study at Blodgett Forest Research Station. Workshop for U.S. Forest Service Silvicultural Prescription Writing Training Session at Blodgett Forest Research Station. Moghaddas, Jason, **October 2002**, Field Tour: The Fire and Fire Surrogate Study at Blodgett Forest Research Station. Workshop for Interagency Air and Smoke Council at Blodgett Forest Research Station. Prentiss, Jennifer, **July 2002**, Presentation: The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Workshop for The Biomass Workshop sponsored by U.C. Cooperative Extension.
Field Trips	Scott Stephens, Jason Moghaddas, Dan Stark, Andrew Amacher, and Emily Moghaddas, **November 2005**, The Fire and Fire Surrogate Study at Blodgett Forest Research Station. Field tour Scott Stephens, **June 2005**, Implementation of the Fire and Fire Surrogate Study at Blodgett Forest Research Station. Field tour at Canadian Forest Service Tour of Blodgett Forest Research Station. Scott Stephens, Jason Moghaddas, Emily Moghaddas, Dan Stark, and Andrew Amacher, **June 2005**, Implementation of the Fire and Fire Surrogate Study at Blodgett Forest Research Station. Field tour at 2005 National Silviculture Workshop, Field Tour. Scott Stephens, **April 2005**, Implementation of the Fire and Fire Surrogate Study at Blodgett Forest Research Station. Field tour at ESPM 181 Fire Science Class. Jason Moghaddas, Emily Moghaddas, **May 2004**, Fire and Fire Surrogate Treatments at Blodgett Forest. Field tour at Blodgett Forest Research Station.

	Rob York, **May 2004**, Fire and Fire Surrogate Treatments at Blodgett Forest. Field tour at Blodgett Forest Research Station. Scott Stephens, **April 2004**, Fire and Fire Surrogate Treatments at Blodgett Forest. Field tour at Blodgett Forest Research Station. Moghaddas, Jason and S.L. Stephens, **October 2003**, The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Field tour at Blodgett Forest Res. Stn.. *For air quality specialists from the California Air Resources Board and several California Air Pollution Control Districts at Interagency Air and Smoke Council Meeting. Web-site http://www.consrv.ca.gov/DLRP/rcd/about_us/index.htm* Stephens, Scott L. and Jason Moghaddas, **October 2003**, The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Field tour at Blodgett Forest Res. Stn.. *For Division 7 (Forest Health) of the International Union of Forest Research Organizations. Web-site http://iufro.boku.ac.at/* Stephens, Scott L., Robert H. Heald and Jason Moghaddas, **October 2003**, The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Field tour at Blodgett Forest Res. Stn.. *For Sierra Nevada Forest Protection Campaign and various organizations. Web-site http://www.sierracampaign.org/.* York, Rob, **October 2003**, The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Field tour at Blodgett Forest Res. Stn.. *For The American River Conservancy. Web-site http://www.arconservancy.org/.* Stephens, Scott L. and Jason Moghaddas, **August 2003**, The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Field tour at Blodgett Forest Res. Stn.. *For representatives from the Sierra Nevada Forest Protection Campaign. Web-site http://www.sierracampaign.org/* Stephens, Scott L., Jason Moghaddas and the Fire Surrogate Research Team., **July 2003**, The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Field tour at Blodgett Forest Res. Stn. Stephens, Scott L., **April 2003**, The Fire and Fire Surrogate Study: Treatment Units. Field tour at Blodgett Forest Res. Stn. *Class web-site http://www.cnr.berkeley.edu/stephens-lab/181main.htm* Stephens, Scott L., **April 2003**, The Fire and Fire Surrogate Study: Treatment Units. Field tour at Blodgett Forest Res. Stn. *Class web-site http://plantbio.berkeley.edu/~bruns/espm134/espm134.html*
Presentations	Scott Stephens, **October 2005**, Mechanical and Prescribed Fire Fuel

	Treatments- The Fire and Fire Surrogate Study at Blodgett Forest Research Station. Invited presentation for Nevada City Regional Workshop on the Management of Natural Resources. Scott Stephens, **August 2005**, Mechanical and Prescribed Fire Fuel Treatments- The Fire and Fire Surrogate Study at Blodgett Forest Research Station. Invited presentation for El Dorado Fire Safe Council. Jason Moghaddas, **June 2005**, Mechanical and Prescribed Fire Fuel Treatments- The Fire and Fire Surrogate Study at Blodgett Forest Research Station. Invited presentation for 2005 National Silviculture Workshop, Lake Tahoe, CA. Andy Amacher, **February 2005**, The Fire and Fire Surrogate Study: Effects of Fire and Mechanical Treatments on Avian Nest Survival. Invited presentation for 2005 Blodgett Forest Research Workshop. Jason Moghaddas, **February 2005**, Effects of Fire and Fire Surrogate Treatments on Potential Fire Behavior: Prelinary Results from a Multisite Analysis. Invited presentation for USFS 2005 Region 5 Vegetation and Fuels Management Workshop. Jason Moghaddas, **October 2004**, Implementation of the Fire and Fire Surrogate Study at Blodgett Forest Research Station. Invited presentation for Burning Issues Workshop, Blodgett Forest, CA. *Audience composed of teachers* Scott Stephens, **August 2004**, Ecological Implications of Fuel Reduction Treatments to Reduce Fire Hazard in Forested Landscapes. Invited presentation for Ecological Society of America 2004 Annual Meeting, Portland, OR. Stephens, Scott L. , Moghaddas, Emily, Apigian, Kyle, Moghaddas, Jason, Dahlsten, Don, **August 2004**, Plant, soil, and ground insect responses to fire hazard treatments in Sierra Nevada mixed-conifer forests. Invited presentation for Ecological Society of America, 2004 Annual Meeting. Amacher, Andy and Reginald. H. Barrett, **April 2004**, Fire and Fire Surrogate Study Wildlife- Initial Results. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data to each other in an effort to develop more refined hypothesis and analysis approaches* Apigian, Kyle, **April 2004**, Fire and Fire Surrogate Study Leaf Litter Invertebrates- Initial Results. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data*

	to each other in an effort to develop more refined hypothesis and analysis approaches Battles, John J., **April 2004**, Approaches to Analyzing Ecological Datasets with High Variability. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data to each other in an effort to develop more refined hypothesis and analysis approaches* Drews, Eric and Bruce. R. Hartsough, **April 2004**, Fire and Fire Surrogate Study Treatment Costs and Yields- Initial Results. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data to each other in an effort to develop more refined hypothesis and analysis approaches* Izzo, Antonio and Bruns, Tom, **April 2004**, Fire and Fire Surrogate Study Mycorrhizal Diversity- Initial Results. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data to each other in an effort to develop more refined hypothesis and analysis approaches* Moghaddas, Emily, **April 2004**, Fire and Fire Surrogate Study: Changes in Soil Physical Characteristics. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data to each other in an effort to develop more refined hypothesis and analysis approaches* Moghaddas, Jason and Stephens, Scott, **April 2004**, Fire and Fire Surrogate Study: Changes in Vegetation, Surface Fuel, and Large Woody Debris Characteristics. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data to each other in an effort to develop more refined hypothesis and analysis approaches* Stark, Daniel T., A.J. Storer, D.L. Wood, **April 2004**, Fire and Fire Surrogate Study Bark Beetle and Deep Wood Boring Insect Activity- Initial Results. Presentation at Fire and Fire Surrogate Interdisciplinary Meeting and Discussion. *This was an I.D. meeting of all BFRS FFS researchers- everyone presented data to each other in an effort to develop more refined hypothesis and analysis approaches* Stark, Daniel T., Storer, A. J., and Wood, D. L., **April 2004**, Landing rates of bark beetles as potential indicators of future tree mortality. Invited presentation for Western Forest Insect Work

	Conference. Amacher, Andy, **February 2004**, The Fire and Fire Surrogate Study: Effects of Fire and Mechanical Treatments on Avian Nest Survival. Presentation at Blodgett Forest Res. Stn.. *Blodgett Forest 2003 Research Symposium* Apigian, Kyle, **February 2004**, Effects of Fire Surrogate Treatments on Leaf Litter Arthropods: Initial Post Treatment. Presentation at Blodgett Forest Res. Stn. *Blodgett Forest 2003 Research Symposium* Barrett, Reginald H, **February 2004**, The Blodgett Fire and Fire Surrogate Study – Wildlife, Camera Trap Results. Presentation at Blodgett Forest Res. Stn. *Blodgett Forest 2003 Research Symposium* Moghaddas, Jason, **February 2004**, The Effects of Mechanical Treatments Fuel Characteristics, Vegetation Structure, and Fire Behavior: Preliminary Results from the Fire and Fire Surrogate Study. Invited presentation for Forest Industry Fuelbreaks. Moghaddas, Jason and S.L. Stephens, **February 2004**, Vegetation Change and Fire Performance in Fire and Fire Surrogate Treatment Units. Presentation at Blodgett Forest Res. Stn. *Blodgett Forest 2003 Research Symposium* Moghaddas, Jason and Stephens, Scott, **February 2004**, The Effects of Mechanical Treatments on Fuel Characteristics: Preliminary Results from the Fire and Fire Surrogate Study. Invited presentation for Region 5 Fuels and Vegetation Management Workshop. Stark, Daniel T., A.J. Storer, D.L. Wood, **February 2004**, Bark beetle landing rates as indicators of future tree mortality. Presentation at Blodgett Forest Res. Stn.. *Blodgett Forest 2003 Research Symposium* Stark, Daniel T., A.J. Storer, D.L. Wood, **February 2004**, The Effects of Fire and Fire Surrogate Treatments on Insects and Pathogens in Sierran Mixed Conifer Forests. Presentation at Blodgett Forest Res. Stn.. *Blodgett Forest 2003 Research Symposium* Wood, David L, **February 2004**, Development of Entomology and Pathology Hypotheses of Long Term Impacts of Fire and Fire-Surrogate Treatments on Sierra Mixed Conifer Forests. Presentation at Blodgett Forest Res. Stn. *Blodgett Forest 2003 Research Symposium* McCaffrey, Sarah and Scott Stephens, **November 2003**, What's it

	look like? Public preference for fuels treatments after seeing on-the-ground fire and fire surrogate study treatments.. Invited presentation for Second International Wildland Fire Ecology and Fire Management Congress, Orlando, Florida. Amacher, Andy, **October 2003**, The Fire and Fire Surrogate Study: Effects of Fire and Mechanical Treatments on Wildlife. Presentation at The Department of E.S.P.M. Environmental Forum, University of California. *A presentation at a graduate seminar entitled "ESPM Environmental Forum."* Freed, Travis R., **October 2003**, Overview: The Fire and Fire Surrogate Study. Presentation at Environmental Science, Policy, and Management 2 Course, University of California. Moghaddas, Jason, **October 2003**, The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Presentation at Blodgett Forest Res. Stn. *A presentation to local Resource Conservation District Managers.* Moghaddas, Jason, **May 2003**, Implementation of the Fire Surrogate Study at Blodgett Forest Research Station. Invited presentation for The Division of Agriculture and Natural Resources, Natural Resources Coordinating Conference, Monterey, California. *Conference web-site http://danr.ucop.edu/wrc/nrcc/03/default.htm* Moghaddas, Jason, **May 2003**, A Long-Term Study of the Consequences of Fire and Fire Surrogate Treatments: Implementation of Prescribed Burns at Blodgett Forest Research Station. Invited presentation for Georgetown Rotary Monthly Meeting. Moghaddas, Jason and the Fire Surrogate Research Team, **May 2003**, Presentation & Field Tour: The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Invited presentation for the Center for Forestry, Public Open House. Stephens, Scott L. and the Fire Surrogate Research Team, **May 2003**, Presentation & Field Tour: The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Invited presentation for Current Research at the Center for Forestry, Blodgett Forest Research Station, Professional Tour. Ludden, Paul., **April 2003**, College of Natural Resources Research Overview: The Fire and Fire Surrogate Study. Invited presentation for Lawrence Berkeley Laboratory. Amacher, Andy and R. H. Barrett, **January 2003**, Presentation: Wildlife response to fire and fire surrogate treatments at Blodgett Forest. Invited presentation for The Blodgett Forest Research

	Station, Research Symposium 2003. Moghaddas, Jason and S.L. Stephens, **January 2003**, Presentation: A Long-Term Study of the Consequences of Fire and Fire Surrogate Treatments: Implementation of Prescribed Burn Treatments- Success, Mistakes, and Lessons Learned. Invited presentation for The Blodgett Forest Research Station, Research Symposium 2003. Moghaddas, Jason and S.L. Stephens, **January 2003**, Presentation: A Long-Term Study of the Consequences of Fire and Fire Surrogate Treatments: Treatment Effects on Surface and Ground Fuels- A Preliminary Assessment. Invited presentation for The Blodgett Forest Research Station, Research Symposium 2003. Stark, Daniel T., A. J. Storer, D. L. Wood and S. L. Stephens, **January 2003**, Presentation: Effects of Fire and Fire Surrogate Treatments on Activity Levels of Wood Infesting Insects. Invited presentation for The Blodgett Forest Research Station, Research Symposium 2003. Prentiss, Jennifer, **October 2002**, Presentation: The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Invited presentation for The Watershed Education Summit. Prentiss, Jennifer, **October 2002**, Presentation: The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Invited presentation for University of Montana's Lubrecht Research Forest. Prentiss, Jennifer, **September 2002**, Poster Presentation: The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Invited presentation for The El Dorado County Harvest Fair. *Fair web-site http://www.atasteofeldorado.com/pdf/Application_harvest_fair_03.pdf* Prentiss, Jennifer, **August 2002**, Presentation: The Fire and Fire Surrogate Study at the Blodgett Forest Study Site. Invited presentation for Black Oak Mine Unified School District. Apigian, K.O., D.L. Dahlsten, D. L. Rowney and N. Erbilgin, **April 2002**, Effects of fire and fire surrogate treatments on leaf litter invertebrates: preliminary data from a pretreatment survey at Blodget Forest. Presentation at Western Forest Insect Work Conference, Whitefish, Montana. Moghaddas, Jason, **April 2002**, Poster Presentation: A long-term study of the consequences of fire and fire surrogate treatments: Abstracts From Blodgett Researchers. Invited presentation for Cal Day, April 20th, 2002. *Cal Day web-site http://www.berkeley.edu/calday/*

	Amacher, Andy, **March 2002**, Wildfire and Wildlife: The Fire and Fire Surrogates Study. Invited presentation for The Wildlife Society- Western Section 2002 Annual Meeting, Visalia, CA. Apigian, K.O., D.L. Dahlsten, D. L. Rowney and N. Erbilgin, **March 2002**, Presentation: Effects of Fire and Fire Surrogate Treatments on Leaf Litter Invertebrates: Preliminary Data from a Pre-treatment Survey at Blodgett Forest. Invited presentation for the Integrated Fire Workgroup Meeting, U. *Meeting web-site http://www.ucfpl.ucop.edu/ER_Fire/Integrated_02/Fire_Workgroup_Meeting_-_2002.htm* Barrett, Reginald H., **March 2002**, Wildfire and Widlife: The Fire and Fire Surrogates Study. Invited presentation for The Wildlife Society- Western Section 2002 Annual Meeting, March 6th, 2002, Visalia, CA. Moghaddas, Jason and S.L. Stephens, **March 2002**, Presentation: The Fire and Fire Surrogate Study- The Blodgett Forest Study Site. Invited presentation for the Integrated Fire Workgroup Meeting, U. *Meeting web-site http://www.ucfpl.ucop.edu/ER_Fire/Integrated_02/Fire_Workgroup_Meeting_-_2002.htm* Stark, Daniel T., A. J. Storer, D. L. Wood and S. L. Stephens, **December 2001**, Fire and Fire Surrogate Study: An Entomological and Pathological Pre-Treatment Analysis. Invited presentation for the Annual Meeting of the Entomological Society of America, San Diego, CA. Stark, Daniel T., A. J. Storer, D. L. Wood and S. L. Stephens, **November 2001**, An overview of Fire and Fire Surrogate Study: Insects and disease. Invited presentation for The Annual Meeting, California Forest Pest Council, November 15th, 2001. *Organization web-site http://www.caforestpestcouncil.org/* Moghaddas, Jason and S.L. Stephens, **August 2001**, The Fire and Fire Surrogate Study- The Blodgett Forest Study Site. Invited presentation for A meeting at Blodgett Forest with the goal of introducing the Fire and Fire Surrogate Study to local stakeholders, August, 2001, Georgetown, CA. Moghaddas, Jason and S.L. Stephens, **August 2001**, The Fire and Fire Surrogate Study- The Blodgett Forest Study Site. Invited presentation for The California Licensed Foresters Association, Monthly Meeting, Placerville, CA. *Association web-site http://www.clfa.org/* Stephens, Scott L., **August 2001**, The Fire and Fire Surrogate Study- National Study Overview. Invited presentation for A

	meeting at Blodgett Forest with the goal of introducing the Fire and Fire Surrogate Study to local stakeholders, August, 2001, Georgetown, CA. Stephens, Scott L., **June 2001**, Fire and Fire Surrogate Study: The Fire and Fire Surrogates Study. Invited presentation for The Forest Trust Musgrove Seminar on Federal Wild land Fire, Simon's Island, Georgia. *Seminar web-site http://www.theforesttrust.org/musgrove.html* Moghaddas, Jason and S.L. Stephens, **January 2001**, A Study of the Consequences of Fire and Fire Surrogates: The Blodgett Forest Study Site: Current Activities and Future Plans. Invited presentation for The Blodgett Forest Research Symposium, January, 2001. *Symposium web-site* *http://www.cnr.berkeley.edu/forestry/properties/blodgett.html*
Additional Outreach	Helms, John A., **April 2002**, The Fire and Fire Surrogate Study. Article published in Forestry@Berkeley Newsletter. Volume 3, Issue 1. *Interview*
Sequoia National Park	
Presentations/Meetings	Eric Knapp, **October 2006**, Plant response to prescribed fire: the role of burning season. Invited presentation for US Forest Service, Northern California Botanists Meeting, Redding, CA. Dylan Schwilk, **February 2006**, Ecological effects of burning season at Sequoia. Invited presentation for Sequoia-Kings Canyon National Parks Fire Research Meeting. Eric Knapp, **February 2006**, Response of forest vegetation of the Sierra Nevada to early and late season prescribed fire. Invited presentation for University of Nevada, Reno. Eric Knapp, **February 2006**, Effects of fire and fire surrogate treatments on tree and understory vegetation. Invited presentation for USDA Forest Service Region 5 Fuels and Vegetation Management Conference, Reno, NV. Dylan Schwilk, Eric Knapp, Scott Ferrenberg, Jon Keeley, **August 2005**, Burning season in mixed conifer forest: understory plant habitat preference predicts response to fire. Presentation at Ecological Society of America Conference 2005. Eric Knapp, **April 2005**, Balancing fire, smoke, and resource management concerns: ecological impacts of prescribed fire season. Invited presentation for Chico State University, Chico, CA. Hamman, S., I. Burke and E. Knapp, **August 2003**, Prescribed burning effects on soil biogeochemistry.. Presentation at Ecological Society of America (abstract). Savannah, GA, August 3-8.

	Hamman, S., and I. Burke, **December 2002**, The effect of prescribed burns on soil biogeochemistry in the mixed-conifer zone of Sequoia National Park, California.. Presentation at 2002 Fire Conference: Managing fire and fuels in the remaining wildlands of the Southwestern United States (abstract), San Diego, CA, Dec. 2-5. Knapp, E. E., J. E. Keeley and N. L. Stephenson., **October 2002**, Ecological Impacts of Season of Prescribed Fire in a Sierran Mixed Conifer Forest. Invited presentation for the Sierra Science Symposium, Oct. Rocca, M. E., D. L. Urban and J. E. Keeley, **October 2002**, Spatial considerations in fire management: the importance of heterogeneity for maintaining diversity in a mixed conifer forest.. Presentation at Sierra Nevada Science Symposium: Science for Management and Conservation (poster), Lake Tahoe, CA, Oct. 7-10. Gagnon, M., K. Farris and S. Zack., **August 2002**, Small mammal and bird responses to prescribed fire. Presentation at Sequoia National Park. Hamman, S., and I. Burke, **August 2002**, Effect of prescribed fire on soil biogeochemistry. Presentation at Sequoia National Park. Hartsough, B. and S. Chalmers., **August 2002**, Economics of Prescribed Burning. Invited presentation for the Fire and Fire Surrogate Study at Sequoia - Symposium I, Sequoia National Park, CA, August 22, 2002. Kane, J. and E. E. Knapp., **August 2002**, Entomological studies in the FFS plots at Sequoia. Presentation at Sequoia National Park. Knapp, E. E., **August 2002**, Vegetation response to season of prescribed burning. Presentation at Sequoia National Park. Knapp, E. E., **August 2002**, Fuel reduction and fire behavior with early and late season prescribed burning. Presentation at Sequoia National Park. Maloney, P., **August 2002**, Tree root diseases and fire. Presentation at Sequoia National Park. Rocca, M. E., D. L. Urban and J. E. Keeley, **August 2002**, Spatial heterogeneity of fire effects. Presentation at Sequoia National Park. Schlexer, R., R. Truex and W. Zielinski, **August 2002**, Effect of prescribed fire on fisher habitat. Presentation at Sequoia National Park. Stephenson, N. and J. Keeley, **August 2002**, Forest Demography

	and seedling recruitment dynamics within the FFS plots at Sequoia. Presentation at Sequoia National Park Symposium I. Knapp, E. E., J. E. Keeley and N. L. Stephenson., **April 2002**, Tree mortality following reintroduction of fire to an old-growth mixed-conifer forest. Invited presentation for the Ecological Society of America/ Society for Ecological Restoration (abstract), pg. Knapp, E. E., **January 2002**, The Fire and Fire Surrogate Study at Sequoia. Presentation at Seminar presentation, Ash Mountain conference room, Sequoia National Park, Jan. 17.
Brochure	Leaflet to be included in main FFS brochure
Field trips	Knapp, E. E., **November 2003**, The Fire and Fire Surrogate Study at Sequoia. Field tour at Field tour for Fresno State forest ecology course, Nov. 1. Knapp, E. E. et al., **October 2003**, The FFS study at Sequoia. Field tour at Field tour for the FFS study, Science and Management Integration Committee, plus National Park Service Resource and Fire Management. Knapp, E. E., **November 2002**, The Fire and Fire Surrogate Study at Sequoia. Field tour at Field tour for Fresno State forest ecology course, Nov. 2.
Website	Knapp, E. E. and D. Ridenour (USGS - webmaster), **October 2003**, Fire and Fire Surrogate Study at Sequoia. Web site at http://www.werc.usgs.gov/fire/ffs-seki/index.html for Sequoia National Park.
Workshops	Knapp, E. E., **June 2003**, Preliminary fuel reduction estimates from the Fire and Fire Surrogate Study, Sequoia National Park.. Workshop for Presentation to NPS Sequoia Fire Management orientation, Ash Mountain Conference room, June 12. Keeley, J.E., **April 2003**, Fire and Fire Surrogates - overview. Workshop
Southwest Plateau	
Presentations	S.J. Converse, W.M. Block, and G.C. White, **November 2005**, Small mammal population responses to forest fuel reduction treatments at the Southwest Plateau Fire and Fire Surrogate Project. Presentation at The 8th Biennial Conference of Research on the Colorado Plateau; Flagstaff, Arizona, USA. Edminster, C. B., C. P. Weatherspoon, D. G. Neary, **March 2000**, The fire and fire surrogates study: providing guidelines for fire in future watershed management decisions. Invited presentation for Land stewardship in the 21st century: the contributions of watershed management, Tucson, AZ, March 13-16, 2000.
Brochure	Leaflet to be included in main FFS brochure
Ohio Hill Country	
Field Trips/Tours	Yaussy, Daniel A., USDA Forest Service, **October 2003**, Site Field

	Tour. Field tour at National Tree Farm Association, Vinton Furnace Experimental Forest. Apsley, Dave, Ohio State University, **September 2003**, Ohio Coverts. Field tour at Vinton Furnace Experimental Forest, McArthur, OH. *Workshop/Training* Yaussy, Daniel A., USDA Forest Service, **July 2003**, Site Field Tour. Field tour at Mid-Atlantic Forest Health Conference, Vinton Furnace Experimental Forest, McArthur, OH. Yaussy, Daniel A., USDA Forest Service, **April 2003**, Site Field Tour. Field tour at Ohio Tree Farmers, Vinton Furnace Experimental Forest, McArthur, OH. Yaussy, Daniel A., USDA Forest Service, **February 2003**, Site Field Tour. Field tour at Hocking College Silviculture Class, Vinton Furnace Experimental Forest, McArthur, OH.
Brochure	Ohio Department of Natural Resources, Division of Forestry, **September 2001**, Fire and Fire Surrogate. Brochure for Ohio Hills Site. *Brochure developed and distributed by the Ohio Department of Natural Resources, Division of Forestry.* Leaflet to be included in main FFS brochure
Presentations/Meetings	Boerner, R., T. Waldrop, M. Callaham, C. Skinner, **March 2004**, Carbon, nitrogen, microbial, and enzyme activity at four fire and fire surrogate sites. Presentation Dickinson, Matthew, USDA Forest Service, **November 2003**, Part I, tissue response to elevated temperatures. Slide show presented at Second international wildland fire ecology and fire management congress and fifth symposium on fire and forest meteorology. *also reported as a publication/proceedings abstract* Iverson, Louis R., USDA FS, **November 2003**, Ecological analysis and modeling via GIS: I. Potential tree redistributions after climate change and II. Effects of prescribed fire on southern Ohio oak forests. Slide show presented at University of Toledo, Ohio. *Invited Presentation* Apsley, Dave, Ohio State University, **October 2003**, Effects of white-tailed deer on forest regeneration in southern Ohio. Presentation at Southeastern Ohio Woodland Interest Group. McCarthy, Brian, Ohio University, **July 2003**, The regeneration ecology of mixed oak forests and the role of fire. Invited presentation for National Science Foundation REU Program in Ecology; Department of Botany, Miami University, Oxford, OH. Boerner, Ralph E.J.; et al, Ohio State University, **May 2003**,

	Structural and functional restoration effects on soil microbial activity in two contrasting forest ecosystems. Slide show presented at 9th biennial Soil Ecology Society meeting, Palm Springs, CA. *also reported as a publication/proceedings abstract* Iverson, Louis R., USDA FS, **May 2003**, Grid Point Data Collection and Analysis. Slide show presented at Ohio Hills FFS study progress symposium, Chillicothe, OH. McQuattie, Carolyn, et al, USDA Forest Service, **May 2003**, Mychorrhizal colonization of American chestnut seedlings from sites exposed to prescribed fire and/or overstory thinning. Slide show presented at Conference of the Ohio Academy of Sciences. *also reported as a publication/proceedings abstract* Yaussy, Daniel A., USDA Forest Service, **May 2003**, Fire: Threat or Tool in Eastern Hardwoods. Slide show presented at Hardwood Research Symposium, Starlight, IN. Iverson, Louis R., USDA FS, **April 2003**, Prescribed fire and thinning in Ohio oak forests: a fine-scale analysis using wavelet transects. Slide show presented at US-IALE Annual Meeting, Banff, Canada. Iverson, Louis R., USDA FS, **March 2003**, Geospatial research tools to help restore Ohio mixed-oak communities via fire and thinning. Slide show presented at Ohio GIS Conference on Agriculture and Natural Resources, Columbus, OH. Apsley, Dave, Ohio State University; Todd Hutchinson, USDA Forest Service, **February 2003**, Effects of white-tailed deer on oak regeneration and herbaceous vegetation in southern Ohio. Slide show presented at Ohio Fish and Wildlife Management Conference. *Invited Presentation* Yaussy, Daniel A., USDA Forest Service, **February 2003**, Restoring mixed-oak ecosystems with prescribed fire. Slide show presented at Ohio Society of American Foresters, Dublin Ohio. Apsley, Dave, Ohio State University, **January 2003**, Impacts of White tail deer on Oak regeneration. Slide show presented at Eastern Ohio Forest Wildlife Management Conference. *Invited Presentation* Yaussy, Daniel A., USDA Forest Service, **January 2003**, Why Burn? Ohio Fire Ecology. Slide show presented at Ohio Parks and Recreation Association, Columbus, OH. *Workshop/Training* Aspley, Dave, Ohio State University, **2003**, Deer's appetite for

	acorns may limit oak regeneration. Presentation Boerner, Ralph E.J., Ohio State University, **December 2002**, Fire in the history and future of Ohio' Oak Forests. Invited presentation for COSI Columbus Electronic Experts Series, Columbus, OH. *This series is simulcast to high schools around the state. Some of the students are connected via interactive video and can directly interact during a question/answer/discussion period.* McCarthy, Brian, Ohio University, **December 2002**, The regeneration ecology of mixed oak forests and the role of fire. Invited presentation for Appalachian Environmental Lab, University of Maryland, Frostburg, MD. Iverson, Louis R., USDA FS, **October 2002**, Prescribed fire and thinning in Ohio oak forests: GIS modeling of fire behavior and factors influencing fire behavior and vegetation pattern. Slide show presented at Upland Oak Ecology Symposium, Fayetteville, AR. Yaussy, Daniel A., USDA Forest Service, **October 2002**, Why Burn? Ohio Fire Ecology. Slide show presented at Ohio Prescribed fire Manager Certification course, Delaware, OH. *Workshop/Training* Yaussy, Daniel A., USDA Forest Service, **September 2002**, Restoring mixed-oak ecosystems with prescribed fire. Slide show presented at Ohio Woodland Owners Workshop, Canter's Cave, Jackson, OH. Riccardi, Cynthia L., Ohio University, **August 2002**, Effects of prescribed fire and thinning on fuel loads in central Appalachian mixed-oak forests. Slide show presented at ESA Annual meeting, Tucson, AZ. *Also reported as a publication/proceedings abstract* Long, R.L., et al, USDA Forest Service, **July 2002**, Effects of fire history on forest composition in southern Ohio. Slide show presented at Joint meeting of the 17th North American Forest Biology Workshop and Western Forest Genetics Association, Washington State University, Pullman, WA. *also reported as a publication/proceedings abstract* Yaussy, Daniel A., USDA Forest Service, **May 2002**, Restoring mixed-oak ecosystems with prescribed fire. Slide show presented at Ohio State University, School of Natural Resources, Seminar Series, Columbus, OH. Albrecht, M.A., Ohio University, **April 2002**, Composition, structure, and diversity of the woody regeneration layer of three mixed-oak forest in southeastern Ohio. Slide show presented at 111th Annual Conference of the Ohio Academy of Sciences,

	Columbus, OH. Iverson, Louis R., USDA FS, **April 2002**, Spatial and temporal distribution of fire temperatures from prescribed fires in the mixed oak forests of southern Ohio. Slide show presented at Central Hardwood Forest Conference. Iverson, Louis R., USDA FS, **April 2002**, Prescribed fire and thinning in Ohio oak forests: landscape patterns of vegetation, fire temperature, soil temperature and moisture, and light. Slide show presented at US-IALE Annual Meeting, Lincoln Nebraska. Riccardi, Cynthia L., Ohio University, **April 2002**, Fuel loads in southeastern Ohio mixed-oak stands. Slide show presented at 111th Annual Conference of the Ohio Academy of Sciences, Columbus, OH. *Also reported as a publication/proceedings abstract* Boerner, Ralph E.J., Ohio State University, **August 2001**, Is prescribed fire effective in restoring eastern forest soils under heavy atmospheric N loading? Slide show presented at ESA Annual meeting, Madison, WI. Riccardi, Cynthia L., Ohio University, **August 2001**, Fuel loads in twelve southeastern Ohio mixed-oak stands. Slide show presented at ESA Annual meeting, Madison, WI. *Also reported as a publication/proceedings abstract* Boerner, Ralph E.J.; Brinkman, Jennifer A., Ohio State University, **May 2001**, Does repeated prescribed fire in oak-hickory forests result in changes in microbial community properties, or, is resistance futile?. Slide show presented at 8th Soil Ecology Society Biennial meeting, University of Georgia, Athens, GA. *Also reported as a publication/proceedings abstract* Knorr; M.A., et al., Ohio State University, **May 2001**, Analysis of soil enzyme activities as an indicator of microbial community activity at three spatial scales in an Ohio deciduous forest landscape. Invited presentation for 8th Soil Ecology Society Biennial meeting, University of Georgia, Athens, GA.
Displays	Brinkman, J.A. and Boerner, R.E.J., **May 2005**, Do wildfire hazard mitigation treatments applied aboveground impact soil organic matter and microbial activity in mixed-oak forest ecosystems?. Poster presented at 9th Biennial Soil Ecology Society Conference, Argonne National Laboratory, Argonne, IL. Huang, J. and Boerner, R.E.J., **May 2005**, Contributions of belowground resource changes to the responses of a common herbaceous perennial to ecological restoration treatments. Poster presented at 9th Biennial Soil Ecology Society Conference,

	Argonne National Laboratory, Argonne, IL. Bova, Anthony S., USDA Forest Service, **November 2003**, Surface fires and stem mortality: physical connections. Poster presented at Second international wildland fire ecology and fire management congress and fifth symposium on fire and forest meteorology. *also reported as a publication/proceedings abstract* Boerner, Ralph E.J.; et al, Ohio State University, **August 2003**, Structural and functional restoration effects on soil microbial activity in two contrasting forest ecosystems. Poster presented at ESA Annual meeting, Savannah, GA. *Also reported as a publication/proceedings abstract* Bova, Anthony S., USDA Forest Service, **August 2003**, Making sense of fire temperatures: a thermocouple heat budget correlates temperatures and flame heat flux. Poster presented at ESA Annual meeting, Savannah, GA. *also reported as a publication/proceedings abstract* McCament, C., Ohio University, **August 2003**, Survival and growth of American chestnut (Castanea dentata) seedlings under various silvicultural regimes in a mixed oak forest. Poster presented at ESA Annual meeting, Savannah, GA. *also reported as a publication/proceedings abstract* McQuattie, Carolyn, USDA Forest Service, **August 2003**, Mychorrhizal colonization of maple and oak seedling roots exposed to prescribed fire and/or overstory thinning. Poster presented at ESA Annual meeting, Savannah, GA. *also reported as a publication/proceedings abstract* Rebbeck, Joanne, et al, USDA Forest Service, **August 2003**, Topkill and mortality of maple saplings following a prescribed fire in the Ohio Hills. Poster presented at ESA Annual meeting, Savannah, GA. *also reported as a publication/proceedings abstract* Riccardi, Cynthia L., Ohio University, **August 2003**, Landscape quantification of fuel loads in central Appalachian mixed-oak forests. Poster presented at ESA Annual meeting, Savannah, GA. *also reported as a publication/proceedings abstract* Rinkes, Z. L., et al., Ohio University, **August 2003**, Eastern wild turkey (Meleagris gallopavo silvestris) litter disturbance and its effect on hardwood regeneration. Poster presented at ESA Annual meeting, Savannah, GA. *also reported as a publication/proceedings abstract* Brinkman, Jennifer A., et al, Ohio State University, **May 2003**, Effects of forest ecosystem restoration treatments on soil chemical

	and biochemical properties. Poster presented at 9th biennial Soil Ecology Society meeting, Palm Springs, CA. *also reported as a publication/proceedings abstract* McCament, C., Ohio University, **May 2003**, Restoration ecology: reintroduction trials of American chestnut, Castanea denata, in a mixed oak forest ecosystem in southeast Ohio. Poster presented at Conference of the Ohio Academy of Sciences. *also reported as a publication/proceedings abstract* Lai, S., et al, Ohio State University, **March 2003**, Influence of fuel loading and pressure profiles on flame spread rates in crib fires. Poster presented at Third joint meeting of the U.S. Sections of the Combustion Institute, Chicago, IL. *also reported as a publication/proceedings abstract* Apsley, Dave, Ohio State University; Todd Hutchinson, USDA Forest Service, **October 2002**, Effects of white-tailed deer on acorns oak regeneration in southern Ohio. Poster presented at Society of American Foresters National Convention, Winston-Salem, NC. *Also reported as a publication/proceedings abstract* Yaussy, Daniel A., USDA Forest Service, **September 2002**, Fire and Fire surrogate treatments for ecosystem research. Poster presented at Vinton Furnace Experimental Forest, McArthur, OH. *On permanent display at the USDA FS Forestry Sciences Lab, Delaware, Ohio and in the REMA Training Center, Vinton Furnace Experimental Forest, McArthur, OH. Copies distributed through the Ohio Department of Natural Resources, Project Learning Tree* Albrecht, M.A., Ohio University, **August 2002**, Effects of prescribed fire and thinning on the woody regeneration stratum in central Appalachian mixed-oak forests. Poster presented at ESA Annual meeting, Tucson, AZ. *Also reported as a publication/proceedings abstract* Hutchinson, Todd F., et al., USDA FS, **August 2002**, Fire history and the recruitment of oaks and maples in southern Ohio forests. Poster presented at ESA Annual meeting, Tucson, AZ. Rubino, D. L., Ohio University, **April 2002**, Distribution of trees, saplings, and coarse woody debris across varying topographic gradients in a mixed-oak forest of southeastern Ohio. Poster presented at 111th Annual Conference of the Ohio Academy of Sciences, Columbus, OH. *Also reported as a publication/proceedings abstract* Yaussy, Daniel A., USDA Forest Service, **April 2002**, Restoring mixed-oak ecosystems with prescribed fire. Poster presented at Conference on Fire, Fuel Treatments & Ecological Restoration.

	Boulder, CO. *Also reported as a publication/proceedings abstract.* Yaussy, Daniel A., USDA Forest Service, **April 2002**, Comparison of a low-tech vs. a high-tech method to evaluate surface fire temperatures. Poster presented at Central Hardwood Forest Conference. *Also reported as a publication/proceedings abstract* Dennis, T., Ohio University, **August 2001**, Effects of forest management practices on avian community structure and productivity. Poster presented at Ecological Society of America, 86th Annual Meeting, Madison, WI. Knorr, M.A., Ohio State University, **August 2001**, Analysis of soil enzyme activities as an indicator of microbial community activity at three spatial scales in an Ohio deciduous forest landscape. Poster presented at ESA Annual meeting, Madison, WI. Dress, W.J., et al., Ohio State University, **May 2001**, Spatial variation of microarthropods and soil fungi in a hardwood forest. Poster presented at 8th Soil Ecology Society Biennial meeting, University of Georgia, Athens, GA.
Workshops	Boerner, Ralph E.J., Ohio State University, **November 2003**, Measuring the effectiveness of forest ecosystem restoration in heterogeneous landscapes. Workshop for Workshop on Resource heterogeneity and restoration success at the 2003 meeting of the Society for Ecological restoration in Austin, TX. Yaussy, Daniel A., USDA Forest Service, **October 2003**, Why Burn? Ohio Fire Ecology. Slide show presented at Ohio Prescribed fire Manager Certification course, Summerford, OH. *Workshop/Training*
Southeast Piedmont	
Presentations/Workshops	Boerner, R.E.J., Brinkman, J.A., Skinner, C.N., Waldrop, T.A. and Yaussy, D.A., **June 2005**, Incorporating the underground into restoration strategies. Slide show presented at 10th Biennial Meeting of the Soil Ecology Society. Jeffers, S. N., and Zwart, D. Z., **April 2005**, Effects of fire and fire surrogate treatments on root pathogens of forest trees in the Carolinas. Slide show presented at Western International Forest Disease Work Conference. Mohr, Helen H. and T.A. Waldrop, **March 2005**, A Simulation Study to Determine the Effectiveness of Fire Treatments for Controlling Wildfire Behavior in Piedmont Forests. Slide show presented at 13th Biennial Southern Silvicultural Research Conference. Waldrop, T.A., **January 2005**, The National Fire and Fire Surrogate Study - Early results and future challenges. Poster presented at SRS

	- All Scientists Meeting. Rideout-Hanzak, S.; Phillips, R.J.; Waldrop, T.A., **November 2004**, Effects of fire intensity on vegetative composition in Piedmont loblolly-shortleaf pine communities: Preliminary results of the National Fire and Fire Surrogate Study. Slide show presented at International Wildland Fire Conference. Orlando, FL. Waldrop, T.A.; Mohr, H.H.; Rideout-Hanzak, S.., **November 2004**, Fuels and fire behavior vary by fuel-reduction treatment and landscape position. Poster presented at International Wildland Fire Conference. Orlando, FL. Waldrop, T.A., **October 2004**, Fire-maintained pine communities in the southern Appalachian Mountains. Slide show presented at The Nature Conservancy - RX310 Course. Youngblood, Andrew; Metlen, Kerry L.; Knapp, Eric E.; Outcalt, Kenneth W.; Stephens, Scott L.; Waldrop, Thomas A.; Yaussy, Daniel., **August 2004**, Implementation of the fire and fire surrogate study, a national study of the consequences of prescribed fire and fire surrogate treatments for fuel reduction.. Slide show presented at Annual meeting of the International Union of Forest Research Organizations, Portland Oregon. Boerner, Ralph E.J.; Waldrop, Thomas A.; Skinner, Carl F.; Callaham, Mac A., Jr,; Brinkman, Jennifer A.; Smith, Annemarie., **March 2004**, Influences of ecosystem restoration and wildfire management treatments on soil organic matter and microbial activity in four contrasting forest types. Poster presented at 14th Central Hardwood Conference. Waldrop, Thomas A. and James McIver, **August 2003**, The national fire and fire surrogate study: an interdisciplinary comparison of methods to reduce fuels and fire risk. Invited presentation for The Annual Meeting of the Ecological Society of America., August 2003, Savannah, Georgia.. *Oral presentation and abstract.* Zebehazy, Laura, **July 2003**, Avian Community Responses to Fuel Reduction Treatments in the Upper Piedmont of South Carolina. Contributed presentation for 2003 Summer Meeting of the South Carolina Wildlife Society. Campbell, J. and J. Hanula., **April 2003**, Efficiency of malaise traps and colored bowls in collecting pollinating insects in pine forests. Contributed presentation for Annual Meeting of the Georgia Entomological Society, Jekyll Island, GA, April 3-5, 2003. *PhD Student paper submitted for competition.* Boyle, M. Forbes II; Roy L. Hedden; Thomas A. Waldrop,

	February 2003, Impact of prescribed fire and thinning on host resistance to the southern pine beetle: preliminary results of the national fire and fire surrogate study. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Callaham, M.A. Jr.; J.C. Staeben; M.E. Vickers; J.D. Culin; P.H. Adler ; T.A Waldrop, **February 2003**, Fuel reduction treatment effects on ground-dwelling arthropods in Piedmont loblolly pine forests. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Callaham, M.A., Jr.; T.A. Waldrop; D.J. Lione; V.B Shelburne, **February 2003**, Fuel reduction treatment effects on nutrient and energy cycling in Piedmont loblolly pine forests. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Kilpatrick, Eran S.; Dean B. Kubacz; David C. Guynn, Jr.; J. Drew Lanham; Thomas A. Waldrop, **February 2003**, The effects of prescribed burning and thinning on herpetofauna and small mammals in Piedmont pine-hardwood forests: preliminary results of the national fire and fire surrogate study. Presented at Twelfth Biennial Southern Silvicultural Research Conference. Lione, Darren J.; Victor B. Shelburne and Thomas A. Waldrop, **February 2003**, Changes to soils and forest floor as a consequence of fuel reduction treatments in Piedmont forest ecosystems. Accepted for the Twelfth Biennial Southern Silvicultural Research Conference. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Loeb, Susan C.; Thomas A. Waldrop, **February 2003**, Effects of fire and fire surrogate treatments on bat activity in the upper Piedmont of South Carolina. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Mohr, Helen H.; Thomas A. Waldrop; Mac A. Callaham, **February 2003**, Effectiveness of fire and fire surrogate treatments for controlling wildfire behavior and mortality in Piedmont forests: a simulation study. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Phillips, Ross J.; Thomas A. Waldrop; Gregg L. Chapman; Helen H. Mohr; Mac A. Callaham; Charles T. Flint, **February 2003**, Effects of fuel reduction techniques on vegetative composition of Piedmont loblolly-shortleaf pine communities: preliminary results of the National Fire and Fire Surrogate Study. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Waldrop, Thomas A.; Helen H. Mohr; Charles T. Flint Jr.; Gregg L.

	Chapman; Ross J. Phillips; Mac A. Callaham Jr., **February 2003**, An evaluation of fire and thinning as methods of fuel reduction in Piedmont pine and hardwood forests: preliminary results of the national fire and fire surrogate study. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Zebehazy, Laura A.; J. Drew Lanham; Thomas A. Waldrop, **February 2003**, Seasonal avifaunal responses to fuel reduction treatments in the upper Piedmont of South Carolina: preliminary results of the national fire and fire surrogate study. Slide show presented at Twelfth Biennial Southern Silvicultural Research Conference. Waldrop, Thomas A., **January 2003**, The National Fire and Fire Surrogate Study – Implementation and Futur. Invited presentation for National Fire Plan Meeting. New Orleans, LA. Waldrop, Thomas A., **October 2002**, Forest fires: a way of life in southern ecosystems. Invited presentation for Clemson University Learning in Retirement Program. Zebehazy, Laura A.; J. Drew Lanham; Thomas A. Waldrop, **April 2002**, The effects of prescribed fire and thinning on wintering bird communities in the upper Piedmont of South Carolina.. Poster presented at The Seventh Annual Graduate Student Research Forum. Clemson University. Phillips, R.J. and T. A. Waldrop, **March 2001**, The national fire and fire surrogate study: ecosystem responses to fuel reduction in the southeastern Piedmont and southern Appalachians. Poster presented at 11th biennial southern silvicultural research conference. Waldrop, Thomas A., **May 2000**, The National Fire and Fire Surrogate Study in the Southeastern Piedmont. Slide show presented at Clemson University Department of Forest Resources seminar series. Waldrop, Thomas A., **February 2000**, The National Fire and Fire Surrogate Study. Invited presentation for Athens, GA Meeting of Southern Station Fire Scientists.
Field trips	Mohr, Helen H. and T.A. Waldrop, **October 2004**, Research on the Southeastern Piedmont Site of the National Fire and Fire Surrogate Study. Field tour at Department of Forestry and Natural Resources Master Tree Farmer Program. Mohr, Helen H. and T.A. Waldrop, **October 2003**, Research on the Southeastern Piedmont Site of the National Fire and Fire Surrogate Study. Field tour at Department of Forestry and Natural Resources Master Tree Farmer Program.

Brochure	Kilpatrick, Eran S.; Lanham, J. Drew; Waldrop, Thomas A., **March 2004**, Snakes, turtles, salamanders, lizards, frogs, and toads. Brochure for Fact sheet for technology transfer for the National Fire and Fire Surrogate Study. Shelburne, V.B., Jr.; Waldrop, T.A, **March 2004**, Research goes underground. Brochure for Fact sheet for technology transfer for the National Fire and Fire Surrogate Study. Leaflet to be included in main FFS brochure
Florida Coastal Plain	
Presentations	Outcalt, Kenneth W. USDA Forest Service, **March 2004**, Developing management options for fuel reduction in pine flatwoods of the Southeast. Poster presented at Atlanta, GA. Southern Research Station, All Scientist Meeting. Outcalt, K. W., and D.K. Kennard, US Forest Service, **November 2003**, Developing Management Options for fuel reduction in pine flatwoods of the Southeast. Poster presented at 2nd International Wildland Fire Ecology and Fire Management Congress, Orlando, FL. Outcalt, K. W., US Forest Service, **September 2003**, Fire and fire surrogates for Management of Southern coastal plain flatwoods. Invited presentation for Natural Areas Conference, Madison, Wisconsin. Outcalt, K. W., **February 2003**, Growing season prescribed burns in Florida pine Flatwoods. Invited presentation for 12th Southern Silvicultural Research Conference, Biloxi, MS. Outcalt, K. W., **October 2002**, Developing management options for pine flatwoods: A fire prone community of the southeast. Invited presentation for 29th Natural Areas Conference, Asheville, NC. Outcalt, K. W., and D. G. Brockway, **August 2002**, Treatments for Restoration of Southern Coastal Plain Flatwoods. Invited presentation for Ecological Society of America, Tucson, AZ. Moody, J. M., **May 2002**, Fire and alternative fuel treatment effect on soil Nitrogen: A case study of Myakka River State Park. Presented at Florida A&M University, Tall., FL. 52p. *M.Sc. Thesis, FL A&M Univ* Outcalt, K. W., and D. G. Brockway, **February 2002**, Developing Treatments for Ecosystem Restoration: Fire and Fire Surrogate Study in the Southern Coastal Plain. Invited presentation for The Annual meeting of the Coastal Plains Chapter of the Society for Ecological Restoration, Pensacola, Florida, February 18-20, 2002.

	Outcalt, K. W., **February 2001**, The National Fire and Fire Surrogate Study - Treatments for Fuel Reduction and Ecosystem Restoration. Invited presentation for the Coastal Plains Chapter of Society for Ecological Restoration Meeting, Savannah, GA, February 20-21, 2001. Outcalt, K. W., **February 2001**, Fire and Fire Surrogate Study in the Southern Coastal Plain- Treatments for Fuel Reduction and Ecosystem Restoration. Invited presentation for The Coastal Plains Chapter of Society for Ecological Restoration Meeting, Savannah, GA, February 20-21, 2001. Outcalt, K. W. and P. A. Outcalt, **2001**, Fire and Fire Surrogate Study in the Southern Coastal Plain- Treatments for Fuel Reduction and Ecosystem Restoration. Poster presented at Myakka River State Park Visitor Center, Sarasota Florida.
Field trips	Outcalt, K. W., **May 2003**, The effect of fire and alternative treatments on vegetation and forage production. Field tour at Florida Coastal Plain. Outcalt, K. W., **November 2002**, Fire Science and Fire Management in Southern Forests Workshop at Myakka River State Park. Field tour at Florida Coastal Plain.
Brochure	Leaflet to be included in main FFS brochure
Workshops	Outcalt, K. W. and T. A. Waldrop, **November 2002**, Implications of the National Fire Surrogate Study for the South. Workshop for Fire Science and Fire Management in southern forests workshop, Sarasota, FL.
Website	Outcalt, Kenneth W. and Outcalt, Patricia A. USDA Forest Service, **June 2001**, Fire and Fire Surrogate Study in the Southern Coastal Plain. Web site at http://www.srs.fs.usda.gov/myakka/ for Florida Coastal Plain. *Size of audience is number of hits per month*
Alabama Solon-Dixon	
Presentations/Workshops	Outcalt, Kenneth W. USDA Forest Service, **October 2004**, Developing treatments to restore structure and composition of longleaf pine ecosystems of the gulf coastal plains. Poster presented at Regional Longleaf Alliance Meeting, Hattisburg, MS. Outcalt, K. W., **November 2003**, Developing treatments to restore structure and composition of Longleaf Pine ecosystem of the Gulf Coastal Plains. Poster presented at Society for Ecological Restoration, Austin, Texas.. Outcalt, K. W., **March 2003**, Developing management options for longleaf communities of the Gulf Coastal Plain.. Presented at Proceedings of Fourth Longleaf Alliance Regional Conference. Longleaf Alliance Report No. 6: 126-129. Outcalt, K. W., **January 2003**, Quantifying the tradeoffs of fire and fuels management options for the longleaf pine ecosystem of the

	Gulf Coastal Plains. Poster presented at New Orleans, LA. Outcalt, K. W., **November 2002**, Developing Management Options for Longleaf Communities of the Gulf Coastal Plain. Poster presented at Fourth Longleaf Alliance Conference, Southern Pines, NC. Outcalt, K. W. and P. A. Outcalt, **May 2002**, Fire and Fire Surrogate Study in the Gulf Coastal Plain– Treatments for Fuel Reduction and Ecosystem Restoration. Poster presented at Solon Dixon Forestry and Education Center, Andalusia, Alabama.. Outcalt, K. W., **March 2001**, Quantifying the tradeoffs of fire and fuels management options. - Longleaf and slash pine ecosystems of the Atlantic and Gulf Coastal Plain provinces.. Invited presentation for the 11th Biennial Southern Silvicultural Research Conference, Knoxville, TN, March 20-22, 2001. Outcalt, K. W., **January 2001**, Quantifying the tradeoffs of fire and fuels management options. -- Longleaf and Slash Pine ecosystems of the Atlantic and Gulf Coastal Plain Provinces.. Invited presentation for the Southern Research Station Fire Research Strategy Session, January 30-31, 2001, Athens, GA.
Field Trips	Outcalt, Kenneth W. USDA Forest Service, **October 2004**, Alternative treatments to prescribed fire for hazard reduction and restoration of longleaf pine. Field tour at Regional Longleaf Alliance Meeting, Hattisburg, MS. Johnson, Rhett and D. Pancake, **October 2003**, Clemson Forestry Extension/Landowners. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **September 2003**, East German Forestry Tour. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **August 2003**, Alabama Electric Cooperatives. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **July 2003**, Gulf Lumber Company. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **July 2003**, US Fish & Wildlife. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **May 2003**, The Nature Conservancy. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **May 2003**, Auburn School Forestry & Wildlife Students. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **April 2003**, Auburn School of

	Forestry Students. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **April 2003**, Callaway Gardens Management Staff. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **March 2003**, The Nature Conservancy. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **March 2003**, Auburn Forestry & Wildlife. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **March 2003**, Pensacola Junior College Forestry Tech Students. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **October 2002**, Arkansas Tech Wildlife students. Field tour at Alabama Solon Dixon. Johnson, Rhett and D. Pancake, **September 2002**, Longleaf Alliance Board of Directors. Field tour at Alabama Solon Dixon.
Brochure	Leaflet to be included in main FFS brochure
Website	Outcalt, Kenneth W. and Outcalt, Patricia A. USDA Forest Service, **June 2002**, Fire and Fire Surrogate Study in the Gulf Coastal Plain. Web site at http://www.srs.fs.usda.gov/solondixon/ for Alabama Solon Dixon. *Size of audience is number of hits per month*
Southern Appalachian Mts.	
Presentations/Workshops	Tomcho, Aimee; Greenberg, Cathryn H.; Lanham, J. Drew; Waldrop, Thomas A., **July 2005**, Effects of fire and fire surrogate treatments for fuel reduction on breeding bird communities of southern Appalachian hardwoods.. Slide show presented at National Silviculture Conference. Zwart D. C.; Jeffers, S. N.; Waldrop, T. A., **October 2004**, Effects of Fire and Fire Surrogate Treatments on Root Pathogens of Forest Trees. Slide show presented at Seminar presented to the Department of Forestry and Natural Resources at Clemson University. Callaham, M.A., Jr.; Waldrop, T.A, **August 2004**, Ecological impacts of fuel reduction treatments in the Piedmont and Southern Appalachian Mountains. Slide show presented at Annual meeting of the Ecological Society of America. Greenberg, K, **August 2004**, Wildlife responses to fuel reduction treatments on the Green River Game Land. Slide show presented at Meeting the Wildlife Management Division of the NC Wildlife Resources Commission. Crossnore, NC. Livings-Tomcho, A; Greenberg, K.; Lanham, J.D.; Waldrop, T.A,

	August 2004, Effects of prescribed fire and understory removal on bird communities in a southern Appalachian forest.. Poster presented at Southeastern Partners in Flight Meeting, Blacksburg, VA.. Livings-Tomcho, A; Greenberg, K.; Lanham, J.D.; Waldrop, T.A, **August 2004**, Effects of prescribed fire and understory removal on bird communities in a southern Appalachian forest.. Slide show presented at The Wildlife Society Annual Meeting. Burlington, VT. Waldrop, T.A., **August 2004**, Fuel reduction treatments in Green River Game Land: an update on interdisciplinary research. Slide show presented at Meeting the Wildlife Management Division of the NC Wildlife Resources Commission. Crossnore, NC. Zwart D. C.; Jeffers, S. N.; Waldrop, T. A, **July 2004**, Incidence of Phytophthora spp. in a hardwood forest site in the southern Appalachian Mountains. Poster presented at Annual Meeting of the American Phytopathological Society in Anaheim, CA. Waldrop, T.A.; Outcalt, K.; Achtemeier, G, **May 2004**, The National Fire and Fire Surrogate Study: an update on the Southern Appalachian and Gulf Coastal Plain Sites. Slide show presented at Annual Meeting for the National Fire Plan, Reno, Nevada. Livings-Tomcho, A; Greenberg, K.; Lanham, J.D.; Waldrop, T.A.; **April 2004**, Effects of prescribed fire and understory removal on bird communities in a southern Appalachian forest. Slide show presented at Seminar presented at the Natural Resources Research Symposium, Clemson University. Zwart D. C.; Jeffers, S. N.; Waldrop, T. A., **March 2004**, Effects of Fire and Fire Surrogate Treatments on Root Pathogens of Forest Trees. Slide show presented at Seminar presented at the Natural Resources Research Symposium, Clemson University. Zwart D. C.; Jeffers, S. N.; Waldrop, T. A., **March 2004**, Effects of Fire and Fire Surrogate Treatments on Root Pathogens of Forest Trees. Slide show presented at Seminar presented to the Plant Pathology & Physiology Division of the Department of Entomology, Soils, and Plant Sciences at Clemson University. Waldrop, Tom, **February 2004**, The National Fire and Fire Surrogate Study – early results and future challenges. Poster presented at Forest Service, Southern Research Station, All-Scientists Meeting, Atlanta, GA. Zwart D. C.; Jeffers, S. N.; Waldrop, T. A., **February 2004**, Effects of Fire and Fire Surrogate Treatments on Root Pathogens of Forest Trees. Slide show presented at 13th Southern Appalachian Forest

	Entomology and Pathology Seminar in Crossnore. Jeffers, S. N., and Zwart, D. C., **January 2004**, Effects of fire and fire surrogate treatments on root pathogens of forest trees in the Carolinas. Invited presentation for FFS Pathology Update Meeting. Zwart, D.C. and Jeffers, S.N., **January 2004**, Effects of fuel reduction treatments on Root Pathogens of Forest Trees. Slide show presented at 13th Annual Southern Appalachian Forest Entomology and Pathology Seminar, Crossnore, NC. Zwart, D.C. and Jeffers, S.N., **October 2003**, Effects of fuel reduction treatments on Root Pathogens of Forest Trees. Slide show presented at Department of Forestry and Natural Resources Seminar Series, Clemson, SC. Zwart, D.C., **June 2003**, Incidence of Phytophthora spp. in a Hardwood Forest Site in the southern Appalachian Mountains. Slide show presented at Southwide Forest Disease Workshop, Asheville, NC. Zwart, D.C., **October 2002**, Effects of fire and fire surrogate treatments on root pathogens of forest trees in the Carolinas. Slide show presented at Department of Plant Pathology Seminar series, Clemson University. Waldrop, Thomas A., **August 2001**, The National Fire and Fire Surrogate Study in the Southern Appalachians. Invited presentation for North Carolina Wildlife Resources Commission Annual Meeting. August 2001, Asheville, North Carolina.
Field trips	Thomas A. Waldrop, **November 2004**, Research on the Appalachian Site of the National Fire and Fire Surrogate Study. Field tour at Southern Appalachian Man and Biosphere Program. Waldrop, T.A., **October 2004**, Research on the Appalachian Site of the National Fire and Fire Surrogate Study. Field tour at Faculty and Students, Clemson University Department of Forestry and Natural Resources. Waldrop, T.A., **October 2004**, The National Fire and Fire Surrogate Study in the southern Appalachians. Field tour at The Nature Conservancy - RX310 Course. Waldrop, Boerner, Greenberg, Hanula, Jeffers, Kapeluck, Bixler, **September 2004**, Research on the Appalachian Site of the National Fire and Fire Surrogate Study. Field tour at Governing Board of the Joint Fire Science Program. Waldrop, Thomas A., **November 2003**, Fuel reduction impacts to southern Appalachian ecosystems. Field tour at Southern

	Appalachian Man and Biosphere Program Annual Meeting.
Brochure	Leaflet to be included in main FFS brochure
Website	See main FFS website
Additional Outreach	Barber, Sherrill, **March 2003**, Fire in the mountains – a way to prevent wildfires and improve hunting. Broadcast on Channel 13, ABC Affiliate Asheville, NC. Metzger, Harrison, **March 2003**, Burning woods: flames set to reduce flammable materials. Article published in Hendersonville Times-News.
Proposed Enhanced Outreach, in response to request by the Board, September, 2004	**Delivered Enhanced Outreach, in response to the Board's Request.**
Regional Workshops	We conducted four regional workshops, at Lubrecht (September 2005), Gulf Coastal Plain (October 2005), Blodgett (November 2005), and S. Appalachian Mts. (January 2006) A primary objective of these workshops was to learn more about how best to package our information, to make it more useable. We are currently working on summarizing that information.
Website Overhaul	Early in 2005, we transformed our website to more of an outreach tool. Its development as this kind of tool is still in progress, but currently it does contain pdfs all of our printed papers. We are also working on a standard format to summarize these printed papers in a form more readily useable by our clients. Examples of possible formats can be found in Appendix 6.
National Symposium	Our proposal for an all-day FFS symposium has been accepted by the Fire Conference organizers; please see Appendix 5 for a list of papers that we intend to present at this important international conference in San Diego, November 13-17, 2006
Journal Special Issues	We have gotten very positive responses to our requests to have portions of special issues of both *Ecological Applications* and *Forest Ecology and Management* devoted to FFS multi-site and multi-variate papers. We plan to begin working on these in the fall of 2006.
FEIS	While we did not promise to work with FEIS (Fire Effects Information Service), we did follow through on our idea to write a 'Research Project Summary' of the Lubrecht Site for FEIS. This should be on-line by the end of May, 2006
FRAMES	We also did not promise to work with FRAMES, but did follow through and have established a relationship with this on-line fire research service. Our project website should be accessible on-line through FRAMES by the beginning of June, 2006
Fire Behavior Models	We have talked with FVS-FFE (Nick Crookston) about getting our fuel bed and stand information incorporated into the appropriate

	variant of FVS-FFE.

Appendix 2. FFS Communications Plan

FIRE AND FIRE SURROGATE STUDY COMMUNICATIONS PLAN

Compiled by Jim McIver

17 May 2001

Introduction

The Fire and Fire Surrogate Study (FFS) is interdisciplinary in its research approach, multi-scale in its spatial and temporal design, and represents a diverse range of seasonally dry forest ecosystems nationwide. Successful implementation of the treatments will require expertise of several professions. Due to the broad scope and scale of the study, it will produce information that is of great interest to a diverse array of audiences. Therefore, a communications plan that can adapt to the needs of all audiences is essential for effective public outreach.

Purpose

The purpose of the FFS Communication Plan is to guide the project through the outreach process by providing both conceptual and process frameworks, at the network and at the site level. These frameworks will help identify target audiences, define the scope and scale of information to transfer to them, and outline a plan to reach them. Consequently, implementation of the communication plan requires the execution of the three objectives listed below.

Objectives and Process

The following three objectives must generally be addressed for successful information transfer to identified target audiences. Each objective represents an integral portion of the planning process. The "product" of these integrated objectives comprises an "outreach effort" which is directed to a target audience(s). To successfully transfer information obtained through the FFS study, we must:

1. Identify the specific audiences we are trying to reach.

2. Define the scope and scale of information we intend to transfer to identified audiences based on the needs of that audience and the information available to transfer.

3. Identify the specific outreach medium through which we will transfer information.

The following is a stepwise description of the general process that will be used to address these three objectives, both for the network-wide communications plan, and for each of the site plans.

Objective 1. Identify the specific audiences we are trying to reach. The broad nature of the Fire and Fire Surrogate Study will produce information consumable by a wide range of audiences of varying scientific, professional, economic, and political backgrounds. We define 8 general groups of potential audiences, listed in order of priority for outreach activities:

1. **The professional land management community**. This includes all persons working in professional fields involved in the assessment, planning, and management of forested ecosystems and/or processes related to forested ecosystems. General examples include foresters, wildlife biologists, entomologists, pathologists, foresters, hydrologists, fire managers, licensed timber operators, land use planners, and developers.

2. **The scientific research community**. This includes all persons directly involved in scientific research of forested ecosystems and/or processes related to forested ecosystems. These are persons whose work directly involves collection and analysis of information for both public and private consumption by all other groups listed. General examples include University researchers and graduate students, agency researchers, researchers working with private industry, and researchers working with non-governmental organizations (NGO'S).

3. **The general public.** Includes members of the general public who may or may not directly use forested ecosystems but who have a collective interest in their management. This group includes all citizens concerned with forest management issues.

4. **The policy-making community**. This includes all persons involved in making policy that directly or indirectly affects both public and private forest ecosystems and/or processes related to forested ecosystems. Examples include the State Boards of Forestry, the state Departments of Forestry, Fire Protection, Water Resources, and Parks, The United States Forest Service, The National Park Service and all other interior agencies, and legislators and their staffs on both the state and federal levels.

5. **The educational community**. This includes all persons and institutions with the primary mission of education. General examples include public and private elementary through high schools, community colleges, and university extension.

6. **The community of forest land owners**. Includes all individuals and organizations that have ownership, a share of ownership, or stewardship of both large and small, public and private forested land holdings. General examples include commercial forestland owners, non-industrial timberland owners, public agencies responsible for forest management, and private consultants overseeing forestland management.

7. **The community of forest land users.** Includes all members of the public who utilize both public and private land for both commercial and non-commercial purposes including recreation, mining, tourism, and forest products.

8. **International interests.** Includes members of the international community who have both commercial and non-commercial interests in the management of forested ecosystems. This includes private citizens, governments, and private commercial interests of the international community.

Objective 2. Define the scope and scale of information to transfer to identified audiences based on the needs of that audience and the information available to transfer. The scope and scale of information to be transferred to audiences in defined groups will vary by the interest, expertise, and size of that group as well as the media used to transfer that information. Conceptually, the process for identifying the scope and scale of information to present to all groups will be similar; while the media used to transfer that information will vary greatly. We identify the following steps in identifying scope and scale of information to be transferred to a target audience:

1. Define the target audience of individuals, organizations, and other interests from those found in audience communities.

2. Determine the range of interest, expertise, and information needs that are represented within the target audience.
3. Determine the range of information that is available to present to the targeted audience.

Objective 3. Identify the specific outreach medium through which we will transfer information. Outreach media are defined as the means by which information is distributed from its source to its users. Outreach media include professional and scientific journals, conferences, workshops, lectures, the internet, e-mail, and word of mouth. The actions below will be utilized to determine the appropriate outreach medium for a particular audience and information type.

1. Determine the type(s) of information that may be transferred using these Audience-specific media.
2. Determine whether the medium is compatible with the type of scope and scale of information you want to transfer. If not, determine how either the information or medium may be modified to effectively complete information transfer.
3. Develop a clear plan by which different outreach media can be most effectively utilized to reach different audiences. This is the implementation of the "interface" step of information presentation. This action involves logistics needed for presentation, publication, or other distribution of information via conferences, newsletters, workshops, publications, or other media.

Current Communication Plans (May 2001)

The following is a summary of the communication plans designed so far for the national FFS network, and for seven of the sites that are currently underway. These plans should be viewed as under development, as we expect there to be changes as projects proceed. In general, they have been designed to address the three objectives listed above, and to follow the actions listed under the objectives. For the network and for each site, products are listed, messages briefly described, and principal audiences given. We expect to submit an updated communications plan, including plans for all 13 sites now within the network, by spring of 2002.

FFS NATIONAL NETWORK.

Website. http://ffs.fs.fed.us This product contains a variety of messages, focusing on a basic description of the FFS project, and its principal investigators. The website is linked to the Joint Fire Science Program website, to websites describing other similar projects (e.g. Teakettle Project), and to any FFS locations that currently have a website themselves. The website is managed by Dan White (Forestry and Range Science Lab, La Grande, Oregon), who routinely posts current and upcoming activities that sites within the FFS network are undertaking. The website is aimed at all audiences that are computer-literate, and so the information is geared toward the informed general public. Developed 1999; updated twice monthly.

Publication Series. A number of papers have already been published describing the FFS study, and they represent the beginning of a publication series, in which all papers will receive a publication number, given in order of printing. In the acknowledgment section of each paper, either of the following two sentences will be included: 1) For work directly supported by JFSP funds: "*This is contribution number XX of the National Fire and Fire Surrogate Research Project, supported by funds from the U.S. Joint Fire Science Program.*"; or 2) For work that uses FFS sites or treatments but does not get direct funding: "*This is contribution number XX of the National Fire and Fire Surrogate Research Project. Although the authors received no direct funding from the U.S. Joint Fire Science Program (JFSP), this work could not have been*

accomplished without JFSP support of existing Fire Surrogate project sites." The intended audiences of most technical papers will be scientists and management professionals. Papers will be published periodically, as they are written. It should be noted that all sites will be active participants in publishing a number of technical papers, aimed at producing four distinct kinds of products: 1) within-disciplinary papers at the site level; 2) inter-disciplinary papers at the site level; 3) among-site papers within each major discipline; and 4) among-site, inter-disciplinary papers. Since publication is a universal aspect of all research, it is assumed that all sites will participate in this activity, and thus scientific papers will not be listed as separate products within each of the site communication plan summaries.

Brochure. A "four-color" brochure aimed at general audiences, is currently in the process of being printed. The brochure describes the design of the FFS project, and provides a map of the site locations. A one-page insert describing details of each site is also being printed, which can be included within the brochure by any of the sites. Available late summer 2001.

"Short" Powerpoint presentation. A 10-minute Powerpoint presentation has been developed, (including video clips to illustrate key dynamic elements), which can be used by any of the FFS principal investigators or collaborators to present to a variety of audiences. Notes to allow an informed person to present it accompany the presentation. Developed February 2001.

"Long" Powerpoint presentation. A 30-minute Powerpoint presentation has been developed, which can also be used by any of the FFS principal investigators or collaborators to present to a variety of audiences. Slides can be extracted to assemble a variety of shows emphasizing different aspects of the study. Developed February 2001

Poster. A large-format poster will be prepared by the fall 2001, containing information similar to the brochure and the Powerpoint presentations.

Fact Sheet. This is a two-page description of the FFS project for use primarily by the principal investigators, when dealing with the press. Developed February 2001.

Study Plan. Aimed at the FFS principal investigators themselves, the study plan is a general description of the study, including its basic design, and descriptions of variables and protocols for their measurement. An appendix is provided that gives more detailed descriptions of study plans for each of the sites that are currently underway. First issue available May 2001; updated annually.

Corporate Database. All data needed for meta-analysis and other network analyses will be archived and structured in a national database available to all principal investigators. First draft of the infra-structure for the database is now completed; database will be populated with data beginning early 2002.

National Conference. Toward the end of the current funding cycle, the FFS team plans to hold a national conference, in conjunction with an annual meeting of the SAF, or similar society, in order to showcase the results of the study.

Mission Creek

The Mission Creek FFS site is finishing pre-treatment sampling this year, and thinning treatments are beginning. Prescribed fire will be applied in Fall, 2002. At this point, we have little to share with managers and the public other than study design. Nevertheless, there are treated areas using prescriptions similar to FFS that are already available in the Mission Creek area. Even after FFS experimental units are treated, their remote location will make it difficult to view them, and particularly more than one in a day. Therefore, we will probably use some of these nearby sites (Pendleton, Beehive) as "surrogates" for our experimental units. They show the treatment applications very well, but have much less research effort being devoted to them. For the first few years of our project, we plan the following outreach activities:

Website. We will maintain a Website of research activities at the Wenatchee Forestry Sciences Lab. The website will be linked to other appropriate sites, including FFS, JFSP, etc. Target audience is general.

Brochure. The Mission Creek site has produced a brochure insert, for inclusion in the FFS national network brochure.

Newspaper and radio. We will offer newspaper interviews and radio interviews as we did when the project started. Target audience is general.

Tours/Site visits. Technical Fire Management group (TFM; 40 persons). Technical details of fire management, offered annually by Jim Agee; Richey Harrod and John Lehmkuhl will offer annual site visits to Okanagon and Wenatchee National Forest managers; Jim Agee will bring his university classes to the area for a variety of lessons during the school year.

Workshops. John Lehmkuhl will offer an annual workshop to local national forest managers.

Evening talks. Jim Agee will offer annual talks to interested publics on several aspects of fire management, fire ecology, and specifics of the FFS project.

During the past year, we have hosted one TFM session, one graduate-level class site visit, and have a workshop on dry forests and an evening public presentation scheduled for April, 2001.

Hungry Bob.

Brochure. The Hungry Bob site has produced a brochure insert, for inclusion in the FFS national network brochure.

Presentations. Several talks have already been given on the design of the Hungry Bob study. Additional talks showcasing results will begin in early 2002, and will continue until the second round of post-treatment data are collected in summer 2004.

Posters. At this juncture, two slightly different posters have been produced for use in scientific and management meetings, both describing the design of the Hungry Bob project, in the context of the national study. Posters showcasing actual data will be developed by early spring 2002.

Tours/Site Visits. Several tours have already been given at Hungry Bob:

July 1998: general public, prescribed fire and logging issues
August 1999: Oregon state governor and aides; fuel reduction issues.
May 2000: local science and manager collaborators; design of the study
September 2001: hosts of annual SMIC meeting, FFS study

We anticipate giving several more tours periodically over the next several years, to illustrate ecological effects of fuel reduction treatments.

Workshop. A 2-day workshop showcasing the immediate post-treatment results of the Hungry Bob study will be presented in La Grande in fall 2002. The workshop will present data on all primary disciplines studied, to resource managers and scientists in the Blue Mountains area.

LUBRECHT.

Technology transfer and communication related to the Fire/Fire Surrogates Study at Lubrecht Forest will be accomplished in a variety of ways: 1) presentations, 2) field trips, 3) brochures and fact sheets, 4) publications, and 5) web site. These approaches are described below in terms of medium, audience, and content.

Presentations.

Medium: Presentation to Graduate Seminar, University of Montana, Missoula, MT, December, 2000; Audience: Graduate students in a variety of natural resource disciplines at the University of Montana; Content: Need and context for F/FS study, funding source, objectives, and experimental design and sampling methods.

Medium: Presentation at Forest Stewardship Meeting, Billings, MT, January, 2001; Audience: Private forest landowners and general public from central and eastern Montana; Content: Need and context for study, funding source, alternative treatments available

for reducing fire hazard, and description of F/FS study designed to determine treatment effects on trees, undergrowth vegetation, fuels, soils, insects, diseases, birds, and small mammals

Medium: Presentation to Forest Consensus Council, Bitterroot Valley, Hamilton, MT, February, 2001; Audience: Forest landowners in the wildland/urban interface in the Bitterroot Valley, and members of the Forest Consensus Council, a diverse group of citizens organized to expedite appropriate hazard reduction treatments in the wildland/urban interface; Content: Need and context for study, funding source, alternative treatments available for reducing fire hazard, and description of F/FS study designed to determine treatment effects on trees, undergrowth vegetation, fuels, soils, insects, diseases, birds, and small mammals

Numerous presentations are anticipated later this year and in 2002-2004, particularly as results begin to appear. Examples include presentations to the Missoula Chapter of the Society of American Foresters, Montana Chapter of the Society of American Foresters, Western Forest Insect Work Conference, North American Forest Insect Work Conference, Montana Wildlife Society, and a variety of other professional meetings in each disciplinary area.

Field Trips. Planned field trips for 2001 include:

March, 2001; Wildlife Conclave, consisting of 400-500 wildlife biology students from across the U.S.; Content: Need and context for F/FS study, funding source, objectives, and experimental design and sampling methods for evaluating alternative treatment effects on birds and small mammals.

April, 2001; Forest Stewardship training, Extension Forestry, Montana State University

April 2001; Multiresource Silviculture class, University of Montana

May, 2001; Forestry Summer camp, University of Montana

Summer, 2001; Western Montana Ecosystem Management Learning Center

July, 2001; Montana Natural Resources Youth Camp

September, 2001; Technical Advisory Committee for the Lubrecht Forest FF/S study, consisting of natural resource managers, biologists, researchers, and educators from across Montana

**Numerous other field trips are anticipated in all disciplinary areas in 2002-2004, particularly as results begin to appear. A highlight would be a field trip for Montana's congressional delegation/staff.

Brochure.

Medium: Brochure placed at trailheads, Lubrecht Forest

Audience: Cross-country skiers, mountain bikers, and hikers, primarily from Missoula and the nearby Blackfoot Valley

Content: Objectives of the F/FS study, funding source, participating scientists, and treatments being evaluated

* This brochure will also be included in the national network brochure.

Fact Sheet.

Medium: Fact sheet at the Castles Forestry Center, Lubrecht Forest

Audience: Visitors to Lubrecht Forest, which includes a wide array of managers, scientists, university students, foreign visitors, K-12 students, and the general public

Content: Objectives of the F/FS study, funding source, participating scientists, treatments being evaluated, and interim results (updated annually)

Newspapers.

Medium: Newspapers and other popular print media, such as university outreach publications

Audience: General public

Content: Context of F/FS study, funding source, highlights of findings

Web site.

Medium: Internet

Content: Context of F/FS study, funding source, objectives of study, participating scientists, photographs of study areas and scientists conducting research, and results as they become available

Audience: Scientists, students, managers, general public, decision makers

BLODGETT FOREST RESEARCH STATION.

Website. http://www.cnr.berkeley.edu/fire-surrogate-study. In January 2001, a website containing information on the Fire and Fire Surrogate Study at Blodgett was launched via the College of Natural Resources web hosting service. The web site includes the site publications, current news, employment opportunities, researcher contact information, and links to the national web site. The site may be viewed by anybody in the world with an internet connection and a web-browser. Currently, the site is updated at least monthly.

Research Symposium. In January 2001, Blodgett Forest Research Station held its annual Research Symposium. At this symposium, the site manager presented information about the Fire and Fire Surrogate Study and its implementation at the Blodgett Forest Study Site. The presentation was followed by a question and answer period. Symposium attendees included University of California scientists and agency personnel working in the mixed conifer forest type. Abstracts were published by Blodgett Forest and the University of California Center for Forestry.

Brochure. The Blodgett site will produce a brochure insert, for inclusion in the FFS national network brochure.

Poster. In January 2001, a poster was prepared for permanent display at Blodgett Forest. The poster describes the Fire and Fire Surrogate Study and its implementation at Blodgett Forest. The poster is displayed alongside others that describe the research projects occurring on-site. The poster may be viewed by all groups and organizations utilizing the conference facility throughout the year. These groups include researchers, natural resource professionals, school groups, and both private and non-profit organizations.

Sequoia.

Meetings. One of the most effective means of disseminating information about the study is through regular meetings with park resource management professionals. Meetings during the planning phases have been very productive, allowing a two-way transfer of expertise and ideas between resource managers and the research team. The proposed research outlined in the study plan is, as a result, weighted towards issues of greatest interest to Park, while also fully coordinated with data collection at the other network sites. Resource managers in the park are enthusiastic about contributing to and benefiting from this project.

Presentations. A PowerPoint slide presentation will be developed, using the national network presentation as well as site-specific images, in order to introduce Park personnel to the FFS project. This slide presentation will be targeted to audiences including resource managers, interpretive programs, and the general public. As data become available, findings will be included in this slide presentation. The study objectives and results will also be described in written brochures and report summaries. All data collected will be added (in summary form) into the park database.

Interpretive Exhibits. The proximity of our plots to roads in the vicinity of major tourist attractions at Sequoia National Park presents uncommon opportunities for transfer of information to the general public. Nearly 1.4 million people visited Sequoia and Kings Canyon National Parks in 2000. We plan to work with the park visitor interpretive program personnel to potentially develop interpretive exhibits and programs about the FFS study. Offices and labs of key researchers and contributors to the FFS study at Sequoia NP are located within the park in close proximity to the study plots, which will additionally facilitate information exchange.

Brochure. The Sequoia site has produced a brochure insert, for inclusion in the FFS national network brochure.

Ohio Hill Country

Tours. A number of tours are planned from 2000 on, aimed at policy-makers, collaborators, resource management professionals, the media, students and the general public.

Brochure. The Ohio Hill Country site will produce a brochure insert, for inclusion in the FFS national network brochure.

Meetings. Several quarterly meetings have taken place or are planned, aimed at collaborators and management specialists.

Popular publications. Several popular publications are planned, aimed at the public, students, and management specialists.

Displays. Displays designed for the public and resource management professionals will be prepared, in 2001 and 2003.

Workshops. A major workshop will be given in 2004 to present research results to the public and resource management professionals.

Interviews. A series of interviews covering policy and aimed at the media, have been given and continue to be given periodically. A press release has been prepared to aid in dealing with the media.

Signage. Several signs have been or will be displayed at the site (by 2001), aimed at a variety of audiences.

Myakka River State Park

Website. Aimed at general audiences, a website is currently under development. The site will be linked to the FFS national site, to the JFSP, and to other relevant projects.

Brochure. A four-color brochure has been developed, aimed also at general audiences. A one-page insert has also been developed, and will be included within the national FFS brochure.

Poster. We will produce multiple copies of a poster. One copy will be prominently displayed in the Park Visitor Center where it should receive good exposure to the general public. The poster and brochure will both contain the web site address so interested parties can look up the latest information. The poster will be taken to meetings for exposure among other researchers and resource managers. For example, it will be displayed at the Coastal Plains Chapter Meeting of the Society for Ecological Restoration in February as an example of large-scale ecosystem restoration research. It will also be shown at the 11th Biennial Southern Silviculture Research Conference in March.

Workshops. The site manager will work with Auburn University to do workshops. They have the experience and personnel to effectively handle this task. The first workshop will be for land managers and researchers and will be held on site sometime in the last quarter of this year or the first quarter of 2002.

Tours. A demonstration tour for interested public will be given in the spring of 2002 where we can demonstrate what the different treatments look like and give a short general presentation on findings to date.

Appendix 3. JFSP Outreach Concerns about FFS, and FFS Response

JFSP GOVERNING BOARD CONCERNS ABOUT FFS OUTREACH
Email memo sent to McIver by Erik Berg (JFSP Manager), 19 September 2004, in anticipation of JFSP staff tour of Hungry Bob, conducted early October 2004

JFSP Comments/Questions for McIver/Youngblood at Hungry Bob:

Hungry Bob is one part of a large, ambitious, and extremely well-funded project. The Fire-Fire Surrogate Study is attempting to answer questions on fire and fuels effects at an unprecedented scale. However, we have heard very little information about study progress. We need to take this opportunity to brief the JFSP staff on the status and progress of FFS in its entirety (this is the rationale for the staff tour).

FFS front page website appears not to be updated and links do not appear to be correct. It is very important (that) information concerning the FFS is available, up-to-date and correctly linked to other project web pages.

The long-term nature of this project will make it difficult to "end". Site treatment and activity schedules vary widely. Have milestones been established to provide users with a synopsis of "lessons learned" along the way? What will the final product look like? Will the final product be written with "one voice" – can or should it be?

What story will the project tell? A wide array of refereed journal publications and symposia proceedings have and will continue to portray detailed findings, but how will results be synthesized for managers in easy-to-understand formats?

How has local management benefited by the process and what knowledge have they gained? In what ways are they applying this information to current practices? If there are positive outcomes and recommendations from site specific research, how widespread are they and how are these findings being delivered?

What have we learned to date and how can or should we share it now – do we know anything that should be shared, especially in terms of the replicated nature of the FFS?

How does upper management feel about this kind of project (large/partnered with field units/and costly in terms of what other projects get)? Has there been a user/needs assessment for the management community to determine how they feel about the Fire and Fire Surrogate Study? Do they even know that the FFS study exists and how can we apply After Action Review and Lessons Learned concepts to this type of research?

TECHNOLOGY TRANSFER AND THE NATIONAL FIRE AND FIRE SURROGATE STUDY

Written by Jim McIver and reviewed by the SMIC, 25 October 2004

What follows is our response to the questions and concerns on technology transfer the JFSP Governing Board posed for us in September 2004. Many of these issues were discussed during the JFSP staff field trip to Hungry Bob (FFS site, NE Oregon) on October 5. We discuss the types of 'stories' we have already produced and will continue to produce, emphasizing their inter-disciplinary and multi-site nature. We talk about the temporal aspects of the study, from the short-term (within the next two years) through the intermediate term (5-10 years from now), to the long-term (10-25 years from now). We review some of the more significant technology transfer efforts we will be engaged in for the short term (including our web site), and discuss some potential ideas on how we can extend our reach. We talk about local management benefits, and the ideas we have for reaching upper-level managers. Finally, we discuss some of the lessons we've learned over the years – what has worked well, and what things should have been done differently. This document serves as only the latest in our ongoing conversation on how best to reach our primary audience. We anticipate that we will re-visit this issue again as the project continues to mature.

The FFS as a Long-term Study. While it is true that most of us believe that the FFS project is truly long-term (15 years minimum to get at some of the more pressing stand structural questions), this does not mean that we don't intend to produce a considerable amount of information in the short (within 2 years from now) and intermediate (within 5-10 years from now) term. First, I emphasize that we have already produced 51 papers during our first four years, about one-third project descriptions, and the rest data publications, mostly M.S. theses on single disciplines at single sites. This is exactly the kind of production we expected at this point. Soon both site-level interdisciplinary papers and multi-site papers will begin to emerge, as the data continue to pour in. Second, as you can see with the attached list of our primary outreach products we have been very productive, across most of the network. For example, at the Blodgett Experimental Forest (our central Sierra site), we have reached over 3,000 people through presentations and field tours alone.

In the near future, in addition to dozens of site-level publications, tours, presentations, workshops, etc., the SMIC as a group is planning the following coordinated outreach efforts within the next two years: 1) regional workshops for upper-level management staff (forest and regional level technical staff and some line officers), in which sites within each 'region' (PNW, California, eastern deciduous, southeast) plan together to offer 2-day tour-oriented workshops. The objective is to showcase the interdisciplinary, replicated nature of the FFS, provide detailed information on effects, and demonstrate where district-level managers can go to get more information; 2) a national symposium (either with SAF or with the Association of Fire Ecologists) during which we provide the highlights of what we've found, both at the site and the network level. Audience would be fire managers and silviculturists, and staff from upper management levels. Objective is to demonstrate the kind of information that will continue to be available, and to provide information on principle effects; and 3) Produce publications in two major journals, for both site and network level papers. We have already received invitations from *Forest Science and Forest Ecology and Management* (and have just asked *Ecological Applications*) to host sets of FFS papers. The forest journals would likely host sets of site-level papers, and the ecology journal would be the best target for hosting network-level papers. The objective is to publish in one or two places the major highlights of the short-term results of the

study. These collections of papers could then be distributed to a significant mailing list of key managers.

Please bear in mind that the effort to get this information out will be on-going. We do not believe there will soon be a 'final' product. While each time we produce as a group a set of information, we may consider it 'final' for the time being, we all realize that the study is ongoing and that conclusions reached at one stage may be improved upon or superceded by conclusions reached at the next stage. And while it is likely that the special issues will each contain a synopsis paper, this paper will be more of a summary rather than a 'one-voice' synopsis. Finally, one of the payoffs for maintaining this group through time will likely be the production of a book, similar to the volumes produced by the Hubbard Brook study, that would augment the special issues that we produce within the next few years. We all understand that the FFS study is too valuable and has too much invested ($20 - $25 million, including JFSP, Fire Plan, USDA-NRI, and contributed funds) to allow it to languish in the short-term.

FFS web site. The problem that Susan encountered in reaching the web site was due to the fact that the PNW Station was tuned into the wrong server. Three and a half years ago we switched servers from the PSW Station to the Washington Office. The PNW Station webmaster apparently did not pick up on that transition. This problem has been corrected. Our current web site has been refreshed regularly, and can be reached through any of the web search engines, and also from the JFSP web site itself.

During our 6th Annual SMIC meeting in Missoula the week of September 13, we discussed how we could better deliver our information to our primary clients (managers, public). One item we discussed was improving the web site so that it is much more effective at transmitting information to managers. One of these recommendations was to highlight in easy to understand bullet form each of our 'data' papers that have been published so far (we now list 51 publications, about half of which contain data, mostly from single-discipline, site-level studies). These bulleted highlights will appear on our web site within the next few weeks. Another operating change with our web site is for the network coordinator and webmaster to meet each month to freshen the web site with new information, which is constantly flowing. This will require the other members of the SMIC team to regularly submit new information, including data, treatment implementation highlights, new insights, etc. In general, we need to transform the web site into a product that becomes widely known to be an attractive source for FFS findings, not just general information about the project. This is an important transformation, because within the next two years many interesting stories will be produced.

Alternative Technology Transfer Ideas. During the JFSP staff tour of Hungry Bob this past week, we had a lengthy discussion on some alternative ways to get the FFS information out to our primary clients. Some alternative ideas include:

1. The production of highly condensed summaries of information that could serve as 'user's guides' for managers. These might be especially useful for critical issues such as soil management, and the management of sensitive species. We recognize that one of the most important points for our information to be applied is during the planning process (at every scale in the management organizations), and so we must be able to place it in the hands of managers who are involved in planning. While peer-reviewed publications form the backbone of our information, and are the ultimate reference point, translation of the information into more readily useable form would likely increase the speed and accuracy of it's application.
2. Direct insertion of our information into various fire models, such as FOFEM, BEHAVE, FVS-FFE, etc. Thus instead of relying on someone else to eventually dig relevant information out of the literature, we could work directly with the developers of these models.

3. Similarly, we could provide our information more directly to information databases and storehouses such as FEIS, FRAMES, and FIREHOUSE.
4. Work with nature writers to package our stories for the general public. We had a nature writer on our Hungry Bob tour, who expressed interest in being involved in translating the information to the public in more easily readable format.
5. Make all of our information available on our website, and continue to expand the linking of this website to other sites. We realize that we are essentially competing for the attention of managers with a vast amount of other information. One way to compete effectively is to provide a single tool (e.g. the website) that can be as easily accessed from the managers' desk as other computer tools, such as the numerous fire models managers use.

I will be sharing these ideas with the SMIC as we continue the process of getting our information out.

Local management benefits. During our Hungry Bob tour, we asked the local managers whether or not they had learned things from our work there and applied the lessons learned in any way. Their response indicated to me that it was quite clear that the question was premature. While we have a very good relationship with management at Hungry Bob, have taken many tours with them that have showcased results, and have conducted a major workshop for them, we have yet to publish any major papers. Thus they have no 'hard' evidence as yet to hold up and use to support their management decisions. Furthermore, the stories we've told to them so far are the 'what' stories, and reflect just the initial effects of the treatments themselves. It is the 'why' stories that will stick in their minds, and these are just beginning to come out. Likely it will take years for us to demonstrate the extent to which local managers actually apply our information. That said, for now the FFS study is strong and effective in part because of the relationships we have built with our manager partners, and we intend to continue these relationships for the intermediate and long-term.

Lessons learned to date. During the course of the FFS study, we have learned much about how to conduct an integrated national study of this kind. Certainly there are details that we would do differently if we had a chance to do it all over again. Most of the hard lessons have to do with aspects of the study that none of us have ever encountered before at this scale. These include the timely construction of a network database, and a sampling design that is optimal for conducting among-site interdisciplinary work. The lessons we've learned will be published as we near the end of this first round, likely in a journal that will be read widely by those who may contemplate undertaking studies of similar scope. That said, despite having encountered some difficulties that could have been avoided with more insight, implementation of the study has been generally spectacular. This is largely because at the site level, the scientists involved have: 1) had excellent relationships with managers, which has led to timely application of treatments; 2) had connections with other scientists, which has led to formation of strong interdisciplinary teams; and 3) had considerable experience in carrying out field-oriented projects.

Finally, there is no question that each site has experienced unexpected events that have reduced the power of our inference, at least in the short-term. Delays in treatment implementation due to management constraints, weather, escaped prescribed burns, wildfires, etc. have occurred (and were expected to occur), but the integrity of the network is still quite strong. Thus our ability to use the replicated nature of the study in still very much intact, and will result in the kind of 'conditional' information that has high value to managers.

Upper Management. While our regional workshops next year will be aimed at upper managers, our primary objectives for this group are to inform them of the existence of the FFS, tell them what kind of information we have, and indicate how their local managers can best get at the

information. We did not set out to produce a 'user needs' assessment for this project, nor did we plan to apply 'After Action Review' or 'Lessons Learned' concepts to this research. While these are important questions for the Board to consider, we did not feel that they should be critical features of our research effort during this first phase of study site establishment and initial implementation of treatments. If these are activities that the Board feels need to be accomplished, then we would be happy to consider them as we proceed. For now, we are fully engaged with trying to get the sites implemented, the data collected and delivered, and the priority information products out.

Appendix 4: Publication List, National Fire and Fire Surrogate Study
(Updated April 30, 2006)

Note: A "publication" is defined as a paper that has a format in which acknowledgment statement can be included. Typically these papers receive some degree of peer-review; examples include theses, dissertations, proceedings, GTRs, and journal papers.

ACKNOWLEDGMENT LANGUAGE

For work directly supported by FFS funds:
"This is Contribution Number XX of the National Fire and Fire Surrogate Project (FFS), funded by the U.S. Joint Fire Science Program."

For other work that uses the FFS sites/treatments but does not get direct funding: **"This is Contribution Number XX of the National Fire and Fire Surrogate Project (FFS). Although the authors received no funding from the FFS, this research could not have been accomplished without the support of the FFS by the U.S. Joint Fire Science Program."**

For work performed on the sites funded by the National Fire Plan: **"This is contribution number XX of the National Fire and Fire Surrogate Research (FFS) Project. This research was funded by the USDA Forest Service through the National Fire Plan. Although the authors received no direct funding for this research from the U.S. Joint Fire Science Program (JFSP), it was greatly facilitated by the JFSP support of existing FFS project sites."**

CURRENT PUBLICATION LIST

This document provides the citation and status of each FFS publication for which a publication number has been requested and granted. The table below each citation indicates whether a citation is complete (X), whether FFS coordinator has received a hard copy (X), and whether text, abstract, or summary of the publication has been posted on the FFS website. Underlined number indicates that publication has at least been cited on FFS Website.

1. Matzka, P. and Kellogg, L. 1999. Thinning with prescribed fire and timber harvesting mechanization for forest restoration: A review of past and present research. P. 293-302 In: Proceedings of the 1999 International Mountain Logging and 10th Pacific Northwest Skyline Symposium, March 28-April 1, 1999, Corvallis, OR, USA.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X	X	X	

2. Coulter, E.D. 1999. Hungry Bob harvest production study: mechanical thinning for fuel reduction in the Blue Mountains of northeast Oregon. M.S. Thesis, Oregon State University, Corvallis, OR, 96 p.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X			X

3. Weatherspoon, C.P. 2000. A proposed long-term national study of the consequences of fire and fire surrogate treatments. Pages 117-126 In: *Proceedings Joint Fire Science Conference*, Boise, ID, June 15-17, 1999. University of Idaho Press, Moscow, ID

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X	X	X	

4. McIver J.D., Youngblood A., Niwa C., Ottmar, R., Smith J., Tiedemann A. 2000. Hypotheses on the ecological effects of alternative fuel reduction methods. Pages 552-555 In: *Proceedings Society of American Foresters, Annual Convention*, Portland, OR, September 11-15, 1999. SAF Publication 00-1.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X	X	X	

5. Edminster, C.B., Weatherspoon, C.P., Neary, D.G. 2000. The fire and fire surrogates study: providing guidelines for fire in future watershed management decisions. Pages 312-315 In: Land stewardship in the 21st century: the contributions of watershed management, Tucson, AZ, March 13-16, 2000. Proceedings RMRS-P-13, U.S.D.A. Forest Service, Fort Collins, CO.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X			

6. McIver, J.D., Youngblood, A., Niwa, C., Smith, J., Ottmar, R., Matzka, P. 2000. Alternative fuel reduction methods in Blue Mountain Dry Forests: the Hungry Bob Project. *Proceedings Joint Fire Science Conference*, Boise, ID, June 15-17, 1999. University of Idaho Press, Moscow, ID

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X	X	X	

7. Matzka, P.J., Kellogg, L.D. 2000. An economic model for evaluating factors affecting biomass reduction and forest restoration. In: Proceedings of the Council of Forest Engineering/Canadian Woodlands Forum Conference, September 11-14, 2000, Kelowna, B.C.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X	X	X	X

8. McIver, J.D., Weatherspoon, P., Edminster, C. 2001. A long-term study on the effects of alternative ponderosa pine restoration treatments. Pages 104-109 In: *Ponderosa Pine Ecosystems Restoration and Conservation: Steps Toward Stewardship*, April 25-27, 2000, Flagstaff, AZ. USDA Forest Service Proceedings RMRS-P-22, Ogden, UT.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X	X	X	

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85. Apigian, K.W. 2005. Forest disturbance effects on insect and bird communities: insectivorous birds in coast live oak woodlands and leaf litter arthropods in the Sierra Nevada. PhD Dissertation, Department of Environmental Science, Policy, and Management. UC Berkeley. 166 pp.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X			

86. Goetz, J. and others. In press. *Alternaria malorum*: A Mini-Review with New Records for Hosts and Pathogenicity

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Press					

87. Campbell, J. In review. Efficiency of malaise traps and colored pan traps for collecting pollinating insects from forested ecosystems. *Journal of Environmental Entomology*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

88. Campbell, J. In review. Effects of prescribed fire and fire surrogates on insect pollinators of the Blue Ridge Province in North Carolina. *Journal of Insect Conservation*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

89. Campbell, J. In review. Effects of prescribed fire and fire surrogates on insect pollinators of the Coastal Plain Province in Alabama. *Journal of Environmental Entomology*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

90. Campbell, J. In review. Effects of prescribed fire and fire surrogates on forest Coleoptera of the Blue Ridge Province in North Carolina. *Forest Ecology and Management*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

91. Campbell, J. In review. Effects of prescribed fire and fire surrogates on forest Coleoptera of the Coastal Plain Province in Alabama. *Forest Ecology and Management*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

92. Metlen, K.L., and C.E. Fiedler. 2006. Restoration Treatment Effects on the Understory of Ponderosa Pine/Douglas-fir Forests in Western Montana, USA. *Forest Ecology and Management* 222:355-369.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X			

93. Schwilk, D.W., Knapp, E.E., Ferrenberg, S.M., Keeley, J.E., Caprio, A.C. In review. Tree mortality from fire and bark beetles following early and late season prescribed fires in a Sierra Nevada mixed-conifer forest. *Forest Ecology and Management*.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

94. Miesel, J.R, C.N. Skinner, R.E.J. Boerner. In review. Impact of fire on soil resource pattern sin a Northern California montane ecosystem. Proceedings, Tall Timbers Fire Ecology Conference.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

95. Knapp, E.E. and J.E. Keeley. 2006. Heterogeneity in fire severity within early season and late season prescribed burns in a mixed conifer forest. ***International Journal of Wildland Fire*** 15:1-9.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Print	X	X	X		

96. Boerner, R.E.J., Waldrop, T.A., Shelburne, V.B. In review. Wildfire mitigation strategies affect microbial activity and soil organic matter in South Caroline pine forests. *Forest Ecology and Management*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

97. Monroe, M.E., and Converse, S.J. In review. The effects of prescribed fires in different seasons on small mammals in a Sierra Nevada mixed conifer forest. Submitted to ???

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

98. Youngblood, A., Metlen, K.L., and K. Coe. In review. Changes in stand structure and composition after fuel reduction and restoration treatments in low elevation dry forests of northeastern Oregon. *Forest Ecology and Management*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

99. Greenberg, C.H., A. Tomcho, J. D. Lanham, T. Waldrop, J. Tomcho, R. Phillips and Dean Simon. In review. Effects of fuel reduction treatments on breeding birds in a southern Appalachian upland hardwood forest. *Journal of Wildlife Management.*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

100. Campbell, J.W., J.L. Hanula, and T.A. Waldrop. In review. Observations of the Diana Fritillary (*Speyeria diana*) utilizing forested areas in North Carolina that have been mechanically thinned and burned. *Southeastern Naturalist*.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

101. Moghaddas, Jason, J. and Stephens, Scott, L. 2005. In review. Fire Performance in Traditional Silvicultural and Fire Surrogate Treatments in Sierran Mixed Conifer Forests: A Brief Summary. Proceedings, 2005 National Silviculture Workshop, North Lake Tahoe, California. June 6-10, 2005.
http://www.fs.fed.us/forestmanagement/infocenter/nsw2005/index.shtm

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

102. Kobziar, Leda, Moghaddas, Jason, and Stephens, Scott. In review. Tree mortality patterns following replicated prescribed fires in a mixed conifer forest. *Canadian Journal of Forest Research*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

103. Graham, J.B., and McCarthy, B.C. In review. Forest floor fuel dynamics in mixed-oak forests of southeastern Ohio. *International Journal of Wildland Fire*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

104. Greenberg, C.H., D.L. Otis, and T. Waldrop. In review. Response of white-footed mice (*Peromyscus leucopus*) to fire and fire surrogate fuel reduction treatments in a southern Appalachian hardwood forest. *Forest Ecology and Management*.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

105. Kilpatrick, Eran Stephen. 2006. Effects of prescribed burning and thinning as fuel reduction treatments on herpetofauna, small mammals, and avifauna in the Upper Piedmont of South Carolina. Ph.D. Dissertation, Clemson University, Clemson, SC.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

106. Coates, Thomas Adam. 2006**.** Response of forest soil resources to fuel reduction in the southeastern Piedmont and southern Appalachian Mountains. M.S. Thesis, Clemson University, Clemson, SC.

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Review					

107. Gundale, M.J. and T.H. DeLuca. In press. Charcoal effects on soil solution chemistry and growth of Koeleria macrantha in the ponderosa pine/Douglas-fir ecosystem. *Biology and Fertility of Soils.*

Status	Citation	Hard Copy	Web Text	Web Abstr	Web Summ
Press					

Summary of Publications Status (as of April 30, 2006)					
Type of Paper	**In Review**	**In Press**	**In Print**	**Total**	**On Website**
Study Description			5	5	5
Review			2	2	2
Data Papers:					
Theses			20	20	18
Dissertations			4	4	3
Proceedings/GTRs	2	2	28	32	21
Journal	21	7	16	44	16
Total	**23**	**9**	**75**	**107**	**65**

Appendix 5. Examples of Paper Summaries for Posting on the FFS Website

Fire and fire surrogate treatment effects on the understory of a NE Oregon ponderosa pine forest*

Citation: Metlen, K.L.; C.E. Fiedler; A. Youngblood. 2004. Understory response to fuel reduction treatments in the Blue Mountains of northeastern Oregon. Northwest Science 78:175-185.

Fire and fire surrogate (FFS) treatments, like prescribed burning and harvesting, can reduce risk of severe wildfire, but their comparative effects on understory vegetation are largely unknown. This study evaluated the response of undergrowth vegetation to fuel reduction treatments in ponderosa pine/Douglas-fir forests at the Hungry Bob FFS site in northeastern Oregon. These conditions are representative of dry mixed-conifer forests of the Inland Northwest.

Short-term responses to thin-only, burn-only, and thin/burn treatments were assessed one growing season after burning and three growing seasons after thinning. The thin-only treatment involved thinning-from below, with all trees > 30 cm DBH retained, and slash left on site. Prescribed burning was conducted in the fall, and burns were low intensity and fairly uniform.

Highlights: Despite fire-risk reduction benefits (Stephens and Moghaddas), overall impacts of treatment on the plant understory were subtle to moderate:

- The thin-only treatment reduced understory species richness and forb cover
- The burn-only treatment reduced shrub and overall cover, but increased frequency of fire-adapted species
- The thin/burn treatment reduced forb, shrub, and total cover
- Species that responded to fire did so most strongly in the thin/burn


Fire in slash -- thin+burn stand


Forbs growing in the spring after burn

* This study is part of the National Fire and Fire Surrogate project, funded by the Joint Fire Science Program

Fire and fire surrogate treatment effects on leaf litter arthropods in a western Sierra Nevada mixed-conifer forest*

Frequent, low-intensity fires were a common feature of Sierran forest ecosystems, but fire suppression over the past century has left many forests at risk of uncharacteristically severe wildfires. Fire and fire surrogate (FFS) treatments, like prescribed burning and harvesting, are tools designed to reduce risk of more severe wildfire, but their effects on forest litter fauna are largely unknown for Sierra forests. This study looks at how prescribed burning, overstory thinning + understory mastication, and their combination, affect forest litter beetles, ants, and spiders. Because these animals play many important roles in forest ecosystems, profound treatment effects on them could alter forest processes. Thus, we need to understand more about the balance between fuel reduction benefits on the one hand, and species effects on the other.

* *This study is part of the National Fire and Fire Surrogate project, funded by the Joint Fire Science Program*

Ground beetle *Pterostichus lama*

Fire treatment at Blodgett Forest

HIGHLIGHTS

• All FFS treatments reduced predicted fire-line intensities and tree mortality, compared to controls and to pre-treatment conditions

• Greatest effects were observed in the fire-only and mechanical + fire treatments

• Despite fire risk reduction benefits, overall impacts of treatment on litter arthropods were subtle to moderate

• In particular, rare species may increase due to higher within-compartment heterogeneity in burn and mechanical + burn treatments

• These results can be applied to other western Sierra mixed-conifer forests that have experienced a long period of fire suppression

Scientific papers that directly support these conclusions:

Apigian, K., D. Dahlsten, and S.L. Stephens. 2006. Apigian, K., D. Dahlsten, and S.L. Stephens. 2006. Fire and fire surrogate treatment effects on leaf litter arthropods in a western Sierra Nevada mixed-conifer forest. *Forest Ecology and Management* 221:110-122. . *Forest Ecology and Management* 221:110-122.

Stephens, S. L. and Moghaddas, J. 2005. Experimental Fuel Treatment Impacts on Forest Structure, Potential Fire Behavior, and Predicted Tree Mortality in a Mixed Conifer Forest. *Forest Ecology and Management* 215:21-36.

Patchiness of prescribed burns in a Sierra Nevada mixed-conifer forest*

Frequent, low- to moderate-intensity fires were a common feature of forest ecosystems of the Sierra Nevada, but fire suppression over the past century has left many forests with higher and more continuous fuel loads. Prescribed burning is a tool designed to reduce the risk of severe wildfire, but there are concerns that such fires will produce spatially more homogeneous effects than historical fires did. Patchiness of a burn may play an important role in post-fire recovery of organisms sensitive to fire and influence erosion rates. This study measured and evaluated the patchiness of prescribed fires in a mixed conifer forest (Sequoia National Park, southern Sierra Nevada) conducted in the early season (late spring/ early summer) and late season (fall).

Prescribed fire in Sequoia National Park

Patchiness of an early season prescribed fire

**This study is part of the National Fire and Fire Surrogate project, funded by the Joint Fire Science Program*

HIGHLIGHTS

- **Both early and late season prescribed burns produced considerable patchiness in fire severity, as measured by scorch height on tree crowns and on the forest floor.**
- **Scorch height was greatest on steeper slopes, where tree basal area was higher, where a greater percentage of trees were pines, and with higher fine fuel loads. Percentage of ground area burned was greatest in areas with less bare ground and rock (greater fuel continuity), on steeper slopes, and in plots burned in the late season (higher fuel moisture).**
- **Thus topographic position and biotic factors still contributed to patchiness in burn severity in spite of the high fuel loading conditions.**
- **Interestingly, burning in the early season when fuel moisture was higher led to levels of patchiness possibly more similar to what might have occurred with historical fires burning under normal fuel loading conditions.**

Scientific papers that directly support these conclusions:

Knapp, E.E. and J.E. Keeley. 2006. Heterogeneity in fire severity within early season and late season prescribed burns in a mixed conifer forest. *International Journal of Wildland Fire* 15:1-9.

Appendix 6. Multi-site and multivariate presentations at the National Fire and Fire Surrogate Symposium, 3rd International Fire Ecology and Management Conference, San Diego, CA, November 13-17, 2006.

1) Introduction to the national fire and fire surrogate study (Jim McIver, Project Coordinator, Oregon State University) **(15 min)**

2) Multi-site vegetation responses to fuels treatments (Jon Keeley and Dylan Schwilk, US Geological Survey, Sequoia Kings Canyon National Parks) **(30 min)**

3) Delayed mortality of eastern hardwoods – a function of fire behavior, site, or pathology? (Tom Waldrop, USFS Southern Research Station, Clemson, South Carolina, and Dan Yaussy, USFS North Central Research Station, Delaware, OH., Ralph Boerner, Ohio State University) **(30 min)**

4) Delayed mortality of ponderosa pine in northeastern Oregon: structural equation modeling of causal factors (Andrew Youngblood, USFS PNW Research Station, La Grande OR., James Grace USGS, and Jim McIver, Oregon State University)**(30 min)**

5) Socio-economic (**total 45 minutes**)
   - Incremental cost of fire-hazard reduction according to treatments (Geoff Donovan and Jamie Barbour)
   - Cost and Productivity Analysis of Mechanical and Burn Treatments to Remove Biomass on FFS Sites (Hartsough and Drews)
   - Social responses to fire and fire surrogate treatments in the central Sierra Nevada, California (Sarah McCaffrey, USFS North Central Research Station, Evanston, IL., Jason Moghaddas, USFS Plumas National Forest, and Scott Stephens, UC Berkeley)

6) Interactions of bark beetles and tree mortality from mixed conifer forests at Sequoia National Park (D.W. Schwilk, E.E. Knapp, S.M. Ferrenberg, J.E. Keeley and A.C. Caprio). **(30 min)**

7) A western US comparison of ponderosa pine responses to fire and fire surrogate fuels treatments. (Carl Edminster, USFS Rocky Mountain Research Station, and John Bailey, Oregon State University). **(30 min)**

8) Multi-disciplinary effects of fire and fire surrogate treatments in ponderosa pine forests in Montana (Carl Fiedler, Kerry Metlen, Tom DeLuca, Scott Mills, Diane Six, University of Montana, and Michael Harrington, USFS Rocky Mountain Research Station)**(30 min).**

9) Simulated wildfire performance of the western US fire and fire surrogate treatments (Jason Moghaddas, US Forest Service and Scott Stephens, UC Berkeley). (**30 min)**

10) Soil Responses (**total 45 minutes**)
   - Multi-site soil chemical and physical responses to the fire and fire surrogate treatments. (Ralph Boerner, Ohio State University)
   - Multi-site carbon and nitrogen dynamics in the fire and fire surrogate treatments. (Steve Hart, Northern Arizona University)

Soil microbial community response to the fire and fire surrogate treatments: contrasting structural and functional indices (Steve Hart and Ralph Boerner).

11) Wildlife Responses (**total 45 minutes**)

Multi-site responses of the small mammal community (Sarah Converse, Wildlife Conservation Society).

Network avian analysis (Kerry Farris and Steve Zack, Wildlife Conservation Society).

Network herp analysis from the southeast United States (Eran Kilpatrick)

12) Bark beetle responses to burning and thinning treatments of the fire and fire surrogate study, a multi-site approach. (Christopher Fettig, USFS PSW Research Center, Davis, CA.) **(30 min)**

13) Summary of the fire and fire surrogate study: where do we go from here? (Panel of presenters of this session led by Jim McIver, or a concise wrap-up, providing highlights of the day) **(30 min)**