



Tucson III

Fire Social Science Workshop

**Final Report
January 10–12, 2005
Tucson, Arizona**

Editors:

**Barbara J. Morehouse
Hanna Cortner
Jonathan G. Taylor**

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1. Introduction

The Tucson III Fire Social Science meeting is an outgrowth of two earlier meetings, both of which aimed to take stock of the current state of social science research and knowledge pertinent to fire management. Like Tucson I (January 2003) and Tucson II (January 2004), Tucson III (January 2005) was supported by funding from the USDA Forest Service North Central Research Station. The Institute for the Study of Planet Earth at the University of Arizona provided organizational support for the Tucson III meeting.

Tucson I¹ brought together 41 social scientists and managers to review the products of social science research having direct pertinence and utility to fire management. Tucson II brought together a smaller group of individuals who were charged with writing chapters for a book synthesizing the relevant, useful, and usable social science research that exists in support of fire management decision making.

Both meetings proved useful for building and reinforcing networks among fire social scientists. The meetings also improved understanding about how to build the kinds of bridges between fire social scientists and fire managers that lead to production of useful, usable, and directly relevant knowledge and insights about individual, community, and broader societal factors. Such factors greatly influence fire risk as well as the types and range of alternatives available to address that risk.

Building upon the synergies and energy of the first two workshops, Tucson III provided an opportunity for participants in the previous workshops to reconvene, and for new participants to join the process of developing a solid social science foundation for wildland fire management. The primary goal of Tucson III was to continue the dialogue on the contributions of social science to managing wildland fire risk by addressing the following questions:

- What have we learned from our synthesis of social science research that is directly useful to decision makers?
- What might a new social science training course for fire managers look like?

- How might knowledge transfer between the fire community and social science researchers be facilitated?
- What are the important social science knowledge gaps?
- What research collaborations are needed to address these gaps?

The Tucson III workshop featured an especially informative panel discussion involving researchers and representatives of southern California communities that were affected by large fire events in the fall of 2003. The discussion focused specifically on communications successes and challenges associated with the Bridge Fire, Old Fire, and Grand Prix Fire. The extended discussion provided a unique opportunity to focus on community preparedness issues and to identify research initiatives designed to address such issues.

Tucson III was designed as a “roll up the shirtsleeves” workshop where the majority of the time would be spent in small groups combined with less structured opportunities for networking, brainstorming, and sharing information. For this reason, only two formal talks were scheduled (see Appendix A, page 16–17, for the complete workshop agenda). The first invited talk, on the Joint Fire Science Program’s (JFSP) technology transfer processes and policies, provided an opportunity for participants to learn about the program’s newly focused efforts to improve technology transfer between researchers and managers and to discuss concerns about the difficulties researchers experience in attempting to acquire JFSP funding to carry out research projects. The second invited talk linked past events, through tree-ring studies, to today’s innovations in bringing together fire science and management.

A special panel on fire communications followed the two invited talks. This discussion proved to be a crucial influence on the breakout sessions that followed, and contributed to the development of an emphasis on community preparedness.

Participants sustained high levels of enthusiasm and interest throughout the workshop. For a complete list

of participants and their contact information, see Appendix D on pages 27–29. As these proceedings highlight, the process led to the identification of important research needs and generated interest in organizing a Tucson IV meeting.

Plenary sessions midway through the meeting provided opportunities for the breakout groups to share interim results. A final plenary session afforded opportunities to gather the threads developed during the working sessions, and to discuss promising next steps.

¹ See Cortner, Hanna J., Donald R. Field, Pam Jakes, and James D. Buthman (eds.). 2003. *Humans, Fires and Forests – Social Science Applied to Fire Management*. Workshop Summary. ERI Papers in Restoration Policy, Ecological Restoration Institute, Northern Arizona University, Flagstaff, Arizona. April 2003. 111pp.



2. Keynote Presentations

Joint Fire Science Program and Technology Transfer

Lee Barkow

Director of the BLM National Science and Technology Center in Denver, Colorado, and Vice Chair of the Governing Board of the Joint Fire Science Program

Summary of Presentation

What is technology transfer? Often it is only a peer-reviewed article or maybe a training session. Technology transfer usually ends when the project ends, which poses a problem because the job is seldom completed at this point. Usually, the main audience for these activities is made up of our peers, with whom we share common interests. However, these are not the only people who should be using our scientific information. We need to figure out how to extend this information to others. Also important, in the research phase, is the clear identification of who will be using the results for what purposes and with what success. Attracting further research money requires demonstrating the use and usefulness of the information developed.

Technology transfer is not a single action, but rather a process of science integration that involves identification, analysis, synthesis, packaging, and dissemination. The identification phase begins in conversations between researchers and managers. Effective applied research is a partnership where managers and researchers jointly identify management needs and the research questions that can be formulated to address these needs. The participants work together on designing and conducting the research to assure that the end product has use for the practitioner. In the end, if this process is followed, issues about the fire community using the product are more likely to be resolved. Unfortunately, the process seldom gets to this point, posing the dilemma of research products going unused. The typical process has been to develop the scientific portion, then look for a problem that the science will solve.

The Joint Fire Science Program (JFSP) was established in 1998, originally with \$8 million—half of which was provided by the USDA Forest Service and the other

half from the U.S. Department of the Interior. In 2000, the allocation was doubled to \$16 million. At the same time, the number of issues Congress has asked JFSP to address has continued to increase.

All principal investigators funded through JFSP are required to include a technology transfer component in their research plans. Challenges remain, however, in moving results from the research to the operations environment. Part of the problem arises because managers did not request the funded research and are not interested in it. Questions about whether JFSP is making sound investment decisions and, if not, how the program can improve the process of deciding what projects to fund, prompted JFSP members to turn toward the technology transfer process itself to investigate alternative strategies. The JFSP board has recognized that the structure of the funding program has had inherent barriers to technology transfer because rewards for technology transfer have not been built into the research system. This recognition has led to the creation of a specific position, and to the recruitment of Tom Wordell, who will develop strategies to improve the technology transfer process.

The JFSP board also recognizes the significance of questions about how managers acquire and use information, what barriers exist to the use of scientific information, what motivates managers to use such information, what their needs are, and how best to deliver the needed information. These questions about utilization of scientific information constitute an area where social science partners could assist JFSP. Of particular interest are social science insights into making technology answers to problems acceptable, and developing workable strategies for such transfers.

JFSP wants better partnerships between natural and social science and a good social science basis as a foundation for what the group does. The desire is for social scientists to work with natural science disciplines to build a better understanding of the social environment, produce useful insights, and help with issues surrounding the transfer and integration of good, usable scientific knowledge into management operations areas.

Summary of Discussion

Several points were raised during the discussion following this presentation. These points are summarized below:

- Much of social science research involves case studies that are followed by generalizations, while natural science research tends to deal in generalizations more immediately. Barkow noted that the board does not have a problem with the case study approach.
- Social scientists need to be involved in JFSP research projects from the beginning, not after the science has been completed and all that remains is making that science understandable. Barkow observed that attempts were made in the mid-1970s to involve social scientists but the process was a “disaster” from which it took a long time to recover. He agreed, however, that social science should be brought in at the beginning as a full partner. A follow-up comment by one workshop participant revealed that, in the 1970s, the National Park Service was very active with fire managers and that there was a focus on local parks. The local manager was always involved with problem definition and with the research strategizing process. The manager was required to give his version of science and how it would be useful for management. There is a poor institutional memory, however, about the lessons learned over time. One of the best processes for integrated science-manager projects involves small teams that have an investment in the process.
- Some participants have had several good proposals turned down by the board, and are reluctant to spend the time and effort required to write additional proposals unless the chances of receiving funding are improved. Barkow agreed that difficulties existed with regard to the review process for social science proposals. This is largely due to the fact that of the current set of reviewers, only two have a basic understanding of social science research. He stressed that JFSP needs help in this regard and encouraged social scientists to volunteer to serve on peer-review panels, do initial screenings, and tell the board what constitutes good, solid social science research. He noted that finding social scientists

who are available for these tasks is difficult. Workshop participants expressed interest in determining ways to improve social scientists' participation in the JFSP proposal review process.

Living with Fire in the Southwest—long-term perspectives and collaborative prospects

Dr. Thomas Swetnam

*Director of the Laboratory of Tree-Ring Research,
University of Arizona*

Summary of Presentation

The wildland-urban interface (WUI) does not show much evidence of structural ecological changes with regard to fire regimes; what have changed are land use patterns. The WUI has been present in other areas for centuries. Major problems are created by factors such as forest changes and severe drought.

The tree-ring record shows a long history of frequent fires in areas where people previously lived and farmed, including the Jemez Mountains area in New Mexico.

Large, high-severity fires occur now, but are generally creating landscape mosaics that provide opportunities for future forest and fire restoration initiatives. Restoration requires both scientific management and public collaboration.

Fire scars in the Jemez Mountains date back to the 1600s. There are now 10 forest stands in the Jemez Mountains with 10 to 50 trees per stand. The record shows a sudden and large-scale interruption in fire occurrence around 1900. Early grazing practices are implicated in this sudden change; the last large fires tended to occur within a few years of the introduction of widespread grazing. Up to 5.5 million sheep and 1.5 million cattle grazed in New Mexico by 1890. The herds were moved across the lands in bands.

A composite of 31 sites in Arizona, New Mexico, and Mexico indicate that the last big fires across the region occurred around 1886. The decrease in fires after this time was dramatic. Indeed, the Sierra de los Ajos in Mexico have the only sites showing continuous fire activity since 1886. Grazing continued in the area but was never as intensive as on the United States side of the border, largely because of the remote location of the mountain range and insufficient water. A notable exception, however, lies in the boot heel (or the far



southwestern tip) of New Mexico, where the Gray Ranch has been running a small number of cows and managing the landscape through fire use. The ranch has burned about 100,000 acres in the past 10 years.

Consideration of humans living on the landscape is important in understanding fire and its effects. Enormous numbers of dwelling ruins exist in the Jemez Mountains; tens of thousands of very small field houses exist within the ponderosa forests.

An estimated 10,000 to 30,000 people lived in the Jemez area at the time of Spanish contact in the 1600s. The Spaniards moved the residents into the canyon bottom but the residents moved back to their homelands after the Pueblo Revolt and stayed there until the early 1700s. Fire scars show that fire existed in these areas at the time; the residents were living with fire and smoke. They dry farmed between the pine trees, and raised corn, beans, and squash. They did not have livestock.

In the 1950s, almost 18 million acres burned in the United States, and as many as 30 million acres burned in the 1910s and 1920s.

In the 1910s and 1920s much of the burning was in the Southeast, where fire use was extensive and socially acceptable during certain times of the year. This was a way of life for more than a century. People learned to live with a lot of fire and smoke. Can we ever return to the point of tolerating smoke on a yearly basis? The situation may be analogous to the dilemma of living with grizzlies and wolves. We need to find what levels of smoke and fire acceptability exist in fire-prone areas.

Today, extraordinary numbers of acres are burning. Landscapes have burned in many places for the first time in 100 years. This presents an opportunity, since fuels have been reduced and fire breaks have been created. These landscapes are less likely to carry fire for some time, providing opportunities to undertake landscape-scale restoration and to think about how to reintroduce fires at frequencies that would sustain open stands without burning houses.

We need to think about how to manage whole mountain ranges, not just WUI areas. We need landscapes where we can safely allow fires that we want and easily extinguish those that we don't want.

A big question remains: How can we make our forests more resilient to the effects of climate change? The

problem is that high densities of trees exist in areas where high-frequency fire regimes have been eliminated. This problem is not universally applicable to other areas. Though it appears thinning is helping fire management, more work needs to be done on the efficacy of thinning strategies.

Attempts at innovative land and resource management practices are under way in the Valles Caldera, in the Jemez Mountains. The area, formerly the Baca Ranch, drew considerable interest from entities who wished to protect the land and resources. However, an agreement could not be reached on efforts to integrate it into the USDA Forest Service or the National Park system. Instead, the area was set up as a trust in 2000 by the U.S. Congress. About 12,000 head of cattle grazed the area in the early 1950s. Today, the goal under the trust arrangement is for the area to continue as a working ranch, with a much-reduced herd of cattle. Roughly 5,000 to 7,000 elk also live in the area; trophy elk hunting is seen to constitute a major potential revenue source for the preserve.

The trust language requires the ranch to achieve financial sustainability in 15 years if possible; after that, the trust is expected to generate sufficient revenue to cover its operating costs. The big question is whether this can be achieved. The former owners earned about \$500,000 from trophy elk hunting, but research is now needed to determine the best way to conduct a lottery for hunting permits. A lottery system for blue-ribbon trout fishing is an additional source of revenue, as are activities such as hiking, van and wagon rides, group and educational opportunities, and special events. Currently, the cattle operation is losing money, and the forested areas of the preserve need to be thinned. The trust is trying to figure out what mixture of activities would be viable for sustaining the preserve.

A unique aspect of the Valles Caldera Preserve is its management structure. The trust is made up of nine trustees appointed by the president of the United States for four-year terms. Trustees include the superintendent of Bandelier National Monument, seven political appointees who must be from New Mexico, and one other person. The trustees must represent specific perspectives such as history, livestock, and wildlife. The governance structure has a public participation component built in. In addition to the assumption that the trustees have links to the public, rules call for all meetings to be open to the public.

Comprehensive management, covering operations, administration, research, and inventory plays a big role. The preserve manager runs the preserve and a preserve scientist assures that science is well integrated into management decisions and actions. The preserve scientist and the preserve manager have equal standing. The preserve scientist, who is charged with ensuring long-term institutional memory of the science carried out on the preserve, is expected to participate with the managers in determining day-to-day management of the preserve. The Valles Caldera Coalition, an independent coalition of about 12 environmental groups, has organized to serve as a watchdog over the Preserve.

Place-based science is a central concept at the Valles Caldera Preserve, and is the reason for collocating scientists with managers. This arrangement reflects the belief that scientists need to be involved on a day-to-day basis in the management of districts, and that these scientists should have a central role in facilitating technology and knowledge transfer as part of their job.

Panel Discussion: Communication Disconnects—plugging into real systems

Jonathan Taylor
US Geological Survey

Ronald Hodgson
Bureau of Land Management, Fire and Aviation Management

Fire Management Participants:

- John Bear, *American Red Cross; Old Fire Joint Information Center*
- Judith Downing, *USDA Forest Service, Cooperative Fire Liaison, PSW Region*
- Laura Dyberg, *Mountain Rim Fire Safe Council; Regional Consortium of Fire Safe Councils, Southern California*
- Steve Faris, *California Department of Forestry and Fire Protection; Fire Intelligence and Damage Assessment*
- Frank Mosbacher, *Public Affairs Specialist, El Dorado National Forest*
- Neil Nottingham, *“Ranger Al” website*

- David Olsen, *Deputy Director of the Old Fire; Fire Communications, National Interagency Fire Center*
- Kristine Scullin, *Rim Family Services, Inc.*
- Michael Scullin, *Manager, Arrowbear Water District manager*
- David Stuart, *Director, Rebuilding Mountain Hearts and Lives*

Summary of Presentation

The panel discussion focused on experiences that a group of communities within the wildland interface had with fire communications before, during, and after the large southern California fires that occurred in fall 2003. The study was funded under the USFS National Fire Plan to examine processes occurring at “both ends of the tunnel” (efforts to communicate and obtain fire-related information). The study focused on the nature of the information being communicated, timing of the communications, and the types of communications media being used. The research project was headed by Jonathan Taylor, Shana Gillette, Ron Hodgson, and Judith Downing, and included active participation by local managers. A report on the research project, entitled “Communicating with Wildland Interface Communities During Wildfire” is available online (<http://www.fort.usgs.gov/products/publications/21411/21411.asp>).

The first of the southern California fires examined during the study was the Bridge Fire. This fire in September 2003 provided initial insights into community-fire manager communications that proved valuable for the research activities and analyses conducted in association with the Old Fire/Grand Prix Fire Complex, which burned in October and November 2003. The research team began by examining communication activities at the Joint Information Center while these two fires were burning. The following March, the researchers returned to the area to conduct focus groups in seven communities about fire communication processes during and after these fires. The tripartite research framework allowed comparisons to be drawn between small and large fire situations as well as before, during, and after fire events.

Summary of Study Findings

Findings of the study reveal that community participants pursued information-seeking strategies such as



contacting neighbors and friends, monitoring emergency frequency radio scanners, consulting posted information, and using call-in lines. In the context of the smaller Bridge Fire, people could turn to friends and neighbors for information and also could obtain information from Fire Safe Council postings, telephone networks, and websites. In all three fire events, the fire incident commander held frequent public briefings. Local phone-in lines were maintained, including one phone line at the water department and one at the local fire department at Running Springs. Individuals monitored scanners, listening for voices they recognized and trusted.

Community members were especially interested in information such as the precise location, size, severity, and direction of fire spread. Among the more effective community networks during the smaller Bridge Fire were the local fire department, the water company, and Fire Safe Councils. These latter groups provided liaison between community members and the fire incident management team. By contrast, during the large Old and Grand Prix Fires, which involved total evacuation, the communications networks broke down. Even the fire and water department telephone lines, while still existing, were unable to function in the same way they had in the small fire situation.

The researchers found that, in general, people tended to want basic but very specific information, including where the fire was located at any given time and updates on whether they needed to evacuate. Although there was an expressed need to make sure the information obtained was accurate, in reality the emphasis tended to focus on simply obtaining access to information. The study also noted that the public needs more information than is currently released under ICS209 fire team documentation rules.

Results also indicate that changes in communication are occurring. Populations at risk are using as many sources of information as they can obtain and are actively involved in creating information sources themselves. Thus, the public itself is becoming part of the sourcing process, a phenomenon largely related to technology innovations such as the internet. During evacuation and re-entry processes, information needs to be disseminated as rapidly, accurately, and broadly as possible. The study highlighted the idea of forming an information network, rather than emphasizing a single official source for outgoing information.

Discussions about the handling of information by the news media revealed that this process is also changing. Traditionally, the fire team would inform the news media which in turn would inform the public. However, regional news media “failed abysmally” in their coverage of these fires. Community members perceived a tendency on the part of television and newspaper media to focus on their larger Los Angeles and San Diego markets rather than on the communities at risk, and a slant toward entertainment rather than dissemination of critical information. The activities of the local KBHR (K-Bear) radio station, which continued broadcasting information as accurately as it could, constituted a notable exception to this pattern. The information flow was sustained during the evacuation period via the related KBHR website.

Other insights from the study revealed that the Joint Information Center was a key organizing element, and that having a pre-fire information collection and dissemination plan was critical. The local Mountain Area Task Force had conducted exercises focused on what would happen when a fire occurred. Through these dry run exercises, local, state, and federal agencies practiced for the sequence of events and the necessary interagency roles that likely would arise during a fire emergency.

The Fire Safe Councils proved to be instrumental in coordinating information with the local communities. The councils believe they could do even more; they want to serve as information sources during fire events and as repositories for the kinds of local knowledge fire fighters need. This effort should be supported, as should efforts to empower local organizations to provide input and assistance to fire teams and news media.

Further, due to differences in communications processes and structures, special attention must be paid to communications during transitions of authority (e.g. when authority shifts from the fire fighting Incident Command Team to the Burned Area Emergency Recovery [BAER] restoration team, and from BAER work back to the original land managing authority, such as the Forest Service). Assigning communications responsibility to the local forest authority could help assure that these transitions are smooth and do not interrupt the flow of information to the public.

Comments by Panelists

Communications During the Fire

The fire caused a loss of power for two weeks. As a

result, people lost the means to communicate, which in turn generated considerable anxiety. The water department experienced two waves of requests for information. The first wave came from the 60 percent of the population who are full-time residents of the area. The second wave was generated by part-time residents and arose after power and communications capabilities had been lost. Information patterns broke down in many areas. The Ranger AI website, the Fire Department's communication board, and the phone lines operating off generators were critical to supporting what communications remained. Even reports saying there was no information to report were deemed preferable to no communication at all.

A telephone communication operation was set up at the Norton Air Force Base evacuation center. This operation provided service to individuals who did not speak English, or who did not have internet access and needed help. Of the 40,000 people registered at the center, 2,000 to 3,000 individuals lacked sources of reliable information. The situation for these individuals in particular was "inhumane."

To make matters more complicated, a wide range of incident management teams—each with its own information officers—and a joint information center were operating in official capacities during the fire. Turf wars arose over who could use or reuse information. In such cases, local sources become the primary and most effective sources of information, especially when the sources are known and trusted.

Ranger AI Website

Panelists expressed high regard for the separate "Ranger AI" website that was initiated during the fire events, indicating that this website provided better information than conventional sources, which were described as being so "sanitized" for liability and other reasons as to be fairly useless. Policies dictating release strictly of official information negatively affected the credibility of fire managers; community members only were able to obtain information about which houses had burned from television or alternative sources such as the Ranger AI website.

Ranger AI is actually Neil Nottingham, a 30-year veteran of the Los Angeles Fire Department. The website was activated two days after the big fires began in an effort to provide informed responses to community members' questions and to address problems with the accuracy of information being provided by fire man-

agers and the media. The website provided accurate information to community members and others about which houses had burned, provided corrections to information sent out by others, and fed information to the media. Local knowledge was essential, particularly since news reporters typically were reporting from remote locations and did not know the area.

Evacuation

Panelists noted that the fire experience was difficult for residents psychologically, especially since they remained evacuated from their homes for several weeks. About 70,000 to 80,000 people were evacuated. Panelists also noted that evacuation disrupted many local informal networks, raising concerns regarding delays in receipt of information, perceived to be caused by fire officials' efforts to exercise quality control over disseminated information, and the need for highly placed-specific information. The actions of the broadcast media drew some criticism as well, particularly with regard to the accuracy of the information being disseminated, and to apparent interest in providing entertaining shows for big-city viewers at the expense of communicating the kinds of information needed by local residents. Notable exceptions were the efforts of a local radio station [KBHR] and a few private websites, such as that operated by Ranger AI, to address local needs.

Need for Information Management

The panel observed a need for real-time information management and consideration of the long-term effects of people's perceptions, particularly in cases where members of the public perceive managers as incompetent. Panelists emphasized the need for fire managers to more clearly identify and work with local community networks. This interaction needs to be sustained before, during, and after fire events; include multiple networks; and work toward wide distribution of more real-time information. Panelists also said fire fighters and the media need to respond in a more positive manner to local groups trying to provide informational services that assure dissemination of accurate information and reports. A Fire Safe Council network in southern California is working to establish such informational networks, but needs official support.

Reflections on Technology Transfer

The fire communications study illustrates that a major policy problem clearly exists with regard to informing the public about what is happening during fire events. Results of the technology transfer portion of the study



indicate that traditional informal networks work well, in a rough way, during fire events. Of particular interest are new media networks organized around the internet, cell phones, digital cameras, email, GPS, instant mapping, and satellite download capabilities. Networks built around these technologies need to be credible, trustworthy (e.g. no deception, no seeding confusion to gain advantage, etc.), competent, and accurate. To attain credibility, websites should provide real-time or near-real-time information. Also, because people want to be sources as well as receivers of information, websites should provide interactive access allowing citizens to post information. The networks need to be reinforced through activities such as good mapping support, and should allow people to check the information provided for accuracy and implications.

It is not individual knowledge, but the knowledge held by the social network that is important. People in a community who have knowledge about specific topics educate others within the network. Indeed, communities will develop their own networks if ones are not set up for them.

It is important to understand a community's affiliations, values at risk, and formal and informal networks. These need not be formal links; one of the best networks encountered in this study was a pizza social club. Understanding how people process and use information and how they assess its reliability is also important, as is developing an understanding of the role of information in anxiety reduction and determining responses to hazards.

Ideally, people should be available who would focus on dissemination of information. These individuals should be equipped with camera cell phones that can send photographs instantly to websites. Web cams also might be employed. Information officers should stand at key points and telephone information to an information hub. Homes and other values at risk should be videotaped and photographed, then sent to the Red Cross for distribution to the appropriate individuals. Mental health specialists should be on hand.

At the same time, the information must work for incident commanders and others involved in fire, such as fire information officers, as well as interfacing effectively with communities. In this regard, innovation diffusion theory is useful, but is not sufficient because it does not recognize individuals as active developers and disseminators of information themselves. For this reason, production and dissemination of information has to be tailored to the place and circumstances.

Influence of Counties and Cities

All of the local municipalities had considerable influence, through their responsibility for code enforcement, solid waste disposal, and other functions. Re-entry issues are substantial after a fire. In this case study, the county's emergency operations center managed these responsibilities impressively well. The Mountain Task Force was pivotal in the planning effort, but the plans ultimately fell short because re-entry issues had not been adequately addressed. A community citizen group structure would be useful in providing certain information, such as what citizens need to do to obtain a permit to rebuild damaged property.

3. Breakout Group Discussions

The Tucson III workshop included four extended breakout sessions. Participants were assigned to one of four groups in a manner that provided a mix of managers, researchers, and community members in each group. Appendix B (page 19) contains a copy of the breakout session discussion questions and Appendix C (page 20) provides the detailed lists generated by the breakout groups in response to the discussion questions.

Human Dimensions Training and Continuing Education for Decision Making

Participants examined the current status of “human dimensions” courses for fire managers and others, and proposed changes and additions to these courses. Participants identified 14 existing courses, as well as five other courses in which human dimensions factors could be enhanced or added. These courses ranged from emergency preparedness classes offered by Fire Safe Councils to seminars aimed at building collaborative learning capacity, a web-based interactive model, and stress management. Group members developed a long list of suggested courses that focused on improving planning processes; training individuals how to perform various types of evaluations; seminars on interactions with social services and information functions; community training in areas ranging from handling post-fire debris and toxic materials to identification of resources; and building better cultural awareness among community members and fire managers. Participants stressed that, in the implementation of new training activities, appropriate groups need to be targeted and courses should be held in local areas where people feel comfortable: training activities need to mirror reality.

Participants viewed building sustainable partnerships as fundamental for building good will, developing mutual respect and trust, and creating new models of community-agency interaction. Providing training to professionals to help them better understand values at risk and providing community members with experiential, hands-on education—planting native seeds in communal areas that have been burned over, for example—also provide valuable means for establishing common goals and values.

Participants noted that BAER teams and similar efforts among other entities need to integrate human dimen-

sions expressly into their activities. Training is needed to help people determine how to tap into existing local networks for fire management and fire response. Agency employees should receive training in conducting rapid assessments of social networks when fire events are underway. More broadly, group members called for an assessment of the merits of collaborative learning versus traditional classroom courses with regard to relative effectiveness in building capacity.

Funding sources for human dimensions courses might include the Department of Homeland Security, the All-Risk Community Training Program, various grant agencies, and the Healthy Food Initiative. Other types of support might include in-kind contributions. Suggestions included a training clearinghouse that identifies the available courses and where to find needed expertise, as well as how much it would cost to bring such resources to a community. Participants identified community buildings and other places where people feel safe and comfortable as venues for holding human dimensions classes. The internet was also mentioned as a useful venue.

Achieving Knowledge Transfer and Building Sustainable Partnerships

Achieving knowledge transfer and building sustainable partnerships constituted a second discussion area for the breakout sessions. Participants stressed that communications must be two-way and that building trust is essential for moving forward. Also important are building sustainable relationships among partners and with groups respected by communities, and developing mechanisms for convening meetings among these entities in venues where all voices are recognized. Other suggested strategies included developing an understanding of ownership patterns and practices; forming teams before fires occur to develop compatible goals; directing funds into local-level projects and initiatives; and focusing less on fires and more on fuel treatment programs, where much community involvement actually occurs. Participants emphasized the need to identify and engage community groups, and characterization of preconditions for community acceptance of proposed plans and strategies. They also stressed the need for insights into how people process information, including



development of trust, credibility, and preference. Breakout group members said county planning departments, utilities, emergency services, and schools potentially could facilitate knowledge transfer.

Participants identified several ethical concerns, such as the need to be inclusive in activities focused on fire threat, and to include consideration of specific populations such as elderly people and those with limited support systems. Participants also noted the need to take community support systems into account. Attendees emphasized the responsibility of fire researchers toward those who are the subjects of such research, and the need to examine what an individual might or might not be able to do from the perspective of their particular position. Participants also stressed the need to maintain confidentiality, to centrally manage donations received after a major fire disaster, and to assure that these funds go to the proper needs and people.

Strong themes echoed throughout the workshop included sustaining community involvement and place-based/watershed-based approaches. Participants voiced the need to understand cultural contexts, including the presence of various forms of cultural diversity. Related suggestions focused on bringing about sustainable changes in lifestyles and habits among community members, and assuring that both new residents and existing residents remain connected with their local landscapes. Other suggestions included identifying individuals within the community who can translate research results into usable and accessible forms.

Creating settings and opportunities for individuals to share their knowledge with managers was seen to be important. State and federal mandates should be instituted requiring government agencies to facilitate and participate in community partnerships, though these agencies should not be expected to lead or initiate activities. Participants also proposed institutional change in the fire management agencies to allow professionals to manage fires in communities where they have local knowledge, engagement, and investment.

Other important suggestions included the creation and funding of local intermediary organizations that would fill facilitator and advocacy roles and collect data. Participants also noted a need to foster ongoing landscape management activities, including development of pre-fire community profiles that encompass important factors, key contact people, and vital community information needs for pre-, during, and post-fire situations.

Other needs included pre- and post-fire vulnerability assessments and policy analyses, and identification of barriers/incentives to community fire planning and mitigation activities. Attendees mentioned characterization of perceptions of fire and how these perceptions need to change; quantification of economic benefits of fire and fire use; and development of local ordinances that have “teeth.” Other key considerations included clear articulation of what people stand to gain from being involved in community partnerships, investigation of ways to build trust, and development of mechanisms for sustaining partnership processes through ongoing meaningful projects and tasks. Participants noted that aspects of agency culture, whereby employees constitute themselves as the experts, pose challenges to institutionalizing these kinds of programs.

Among the organizations that could be helpful in institutionalizing best practices for fire management are the National Association of Counties, county officials, churches, Council of Churches, planning departments, utilities, emergency services units, and emergency managers, schools, Volunteer Organizations Assisting in Disasters (VOADs), Community Emergency Response Teams (CERTs), the USDA Forest Service, environmental non-governmental organizations, fire departments, and Cooperative Extension.

Tractable Human Dimensions Research Themes

Participants noted that research activities have tended to focus on topics such as acceptability of fuel treatments, community preparedness, fire event evaluations, collaboration processes, and diffusion of new ideas. Research also has been done on cognitive modeling, psychological factors, and communications. Social and economic effects of fire remain active topics, as do tourism/recreation and fire, implementation and funding policies, ecosystem services, and leadership. Major gaps identified in research and understanding of human dimensions fell into eight general categories:

Psychological and Behavioral Factors

- Better understanding of psychologies of insecurity and fear
- Community and agency psychologies
- Wildland fires and human behavior issues during those fires

- Improved knowledge about risk perceptions and potentially applicable mitigation strategies
- Collective action and cooperation pre-, during- and post-fire
- People's reasons for adapting to their environments and maintaining preparedness for fire events
- Nature of social processes during crises

Individual and Local Knowledge and Institutions

- Local knowledge structures
- Functions of local versus extra-local knowledge
- Risk perceptions and differences in such perceptions
- Methods for communicating social and bio-physical aspects of local ecology
- Methods for integrating fire management into local knowledge networks
- Improved understanding of local institutions
- Better understanding of processes of collective action and cooperation
- Characterization of shared values

Communications and Education

- Perceptions of media and media influence
- Models for collaborative adult learning that involve agencies, communities, and researchers

Planning and Management

- Best methods for developing plans of various kinds
- Identifying and incorporating local knowledge into decision processes
- Integration of human dimensions into pre-fire planning processes
- Evaluations of pre-fire preparations versus post-fire outcomes

Characterization of Organizations and Communities

- Studies of organizational cultures
- Community typologies and assessments

Communities and their Needs and Resources

- Community needs
- Available information sources and social services
- Examples of successful collaborations that reflect sustained effort among individuals and groups
- Similarities and differences among fire-prone communities

Funding Issues

- Better mechanisms for funding community initiatives

Fire Impacts

- Beneficial aspects of fire
- Evaluation of fire relative to other hazards
- Characterization of fire impacts on various categories of entities
- Vulnerability assessments

Other

- Policy analyses
- Economic analyses
- Citizen satisfaction with service during and after fire

Measures of Success in Human Dimensions Research and Community Engagement

Among the measures of success mentioned as being potentially useful were evidence of changes in behavior and evidence that the knowledge/technology transferred remains in place even when individuals move on. Other suggested measures included evidence of institutionalization and integration of research knowledge into com-



munities and agencies, instances where people are working on things they have determined they can do together, and cultivation of relationships over time.

Participants stressed the value of good evaluative studies to provide baseline information. In this sense, the measure of success would be completion of self-studies before fires occur. This could be accomplished by the

community or by a consulting firm. Modeling can be used to look at before and after scenarios, but should include projects that examine use of knowledge, post-fire healing processes, and assessment of what happens after funding runs out. Group members also mentioned how fire managers decide what information to use, as well as evaluation of pre-fire preparations against post-fire outcomes in terms of what did and did not work.

4. Wrap-up Plenary Discussion

Summary of Suggestions

Discussion during the final plenary session covered a wide range of topics and resulted in a series of suggestions summarized below.

Research and Community Collaboration

- Research questions should emerge from the communities themselves.
- Collaborative research is needed among the social scientists and between researchers and communities.
- More collaboration is needed between people adept at conducting applied research and the people out in the field.
- More efforts such as the “communication disconnect” project are needed.

Education

- There is a need to build more university-level training and to engage people who want to improve research efforts (e.g. teaching graduate students how to write about their research in formats designed for different audiences).

Communication of Scientific Information

- The Southwest Climate Outlook at the University of Arizona’s Climate Assessment for the Southwest project is a good example of how to communicate scientific information to non-scientific audiences. The project involves a lot of time and resources, but has produced excellent products.
- It would be very useful to have a Fire Extension Specialist position, similar to the University of Arizona’s Cooperative Extension position of Climate Extension Specialist. This scientist would serve as a bridge between the researchers, fire managers, and community members.

Information Overload and Trustworthiness

- Reports from meetings such as this should be digestible and easy to read, and should operate on the model of positive (as opposed to negative) messaging.
- The amount of information available now is many times greater than it was 30 years ago. Indeed, there is too much information to assimilate.
- It is difficult sometimes to assess the trustworthiness of information available on the internet. Furthermore, people tend to develop habits with regard to the information sources they do or do not use. It might be useful to integrate these factors into cooperative agreements.
- A question exists about who should have responsibility for sorting out the huge amounts of information and data being amassed. There are so many data to sort through that we are approaching a crisis point where the more data are made easily accessible, the less useful any one item becomes. We need to move toward having an individual whose job it is to synthesize information and provide the syntheses to practitioners.

Another Workshop

- Interest was expressed in following up with a Tucson IV workshop.

Development of Metrics for Success of Research Projects

The Joint Fire Science Program held a series of meetings to address the issue of how to measure the success of the research projects it funds. JFSP has a requirement that the research must show a tangible effect on the forest. However, pulling together research into usable forms should be done separately from the research activity itself, perhaps by an analyst (though such job titles are rare).



The federal sector requires researchers to demonstrate success of research investment, but the metrics of how to measure success are still being worked out. Having a requirement for metrics motivates agencies to connect with broader user communities. The time frame for assessing the usefulness of the agreed-upon standards has not been determined, nor has a decision been reached on whether or not there will be an opportunity to write proposals for funding to carry out this type of monitoring research. It is important for the Office of Management and Budget to have the correct metrics for conducting its assessments.

It also is important to note that assessment of science results is itself a social science research question. Evaluative criteria are not neutral and can provide both positive and perverse managerial incentives. For example, does a criterion measuring results in terms of total acres treated—an action that might yield a high number of acres treated—lead to decisions to burn cheatgrass rather than doing the more difficult work of thinning trees in WUI areas, which might yield fewer acres treated, but effectively address a more critical fire management problem? This example shows why coming up with appropriate metrics is important, and why development and use of metrics should be taken seriously by social scientists. For example, past successes might be used to demonstrate future successes.

From another perspective, a measure of success may in part be found in whom you expect to help. People who have been assisted need to explain how they have benefited from the research.

Another type of metric for success is awards nominated and given. The communications research project, for example, was nominated for a national research award. Also, to measure success of the Tucson social science fire workshops, it is important to identify success in terms of participation in other activities. People associated with the Tucson I, II, and III workshops have volunteered for various committees and other activities. There have been a number of such related spin-off activities.

Potential Funding Sources for Human Dimensions Fire Research

Funding sources identified by participants to support social science fire research include the Joint Fire Science Program, the National Fire Plan Research Program, the U.S. Forest Service, and the U.S. Geological Survey.

Role of Social Science

Tucson III provided a unique opportunity to bring together researchers, managers, and community members. The results could be framed as a dialogue wherein the issues raised by community members can be translated by social scientists into researchable questions. At the same time, it is important not to squelch scholarly relevance; not all research should be client-based.

Social scientists are invited to the table, at the local level, to engage in some of the ongoing planning efforts. The biggest obstacle is knowing how to work with local communities. Creating enjoyable contexts for meetings helps very much.

Other Comments and Recommendations

The results of this workshop should be shared with various entities, including the Joint Fire Science Board, Washington office personnel, state foresters, National Association of County Officials, Western Governors Association, Wildland Fire Leadership Council, and directors of various bureaus. Obtaining their backing could be helpful.

Tucson IV Workshop

Ron Hodgson mentioned that the fire chiefs are sponsoring the Third National Fire Meeting in Albuquerque in February 2005. This led to a suggestion that the group approach the National Association of County Officials about holding a joint meeting.

Appendices

Appendix A: Agenda

January 10, 2005

6:00–8:00 Ice Breaker: Introductions, Workshop Overview

January 11, 2005

8:30–9:00 Keynote Talk: Technology Transfer for Fire Management
Lee Barkow
Wildland Fire Technology Transfer Specialist, Joint Fire Science Program

9:00–9:30 Keynote Talk: Living with Fire in the Southwest
Dr. Thomas Swetnam
Director, Laboratory of Tree-Ring Research, University of Arizona

9:30–10:00 Discussion

10:00–10:30 Break

10:30–12:00 Panel Discussion: Communication Disconnects: Plugging into Real Systems
Jonathan Taylor (US Geological Survey) and Ron Hodgson, (Bureau of Land Management)
Tucson III organizers

Participants:

Laura Dyberg, *Mountain Rim Fire Safe Council*

Mike Scullin, *Arrowbear Water District Manager*

Kris Scullin, *Rim Family Services, FSC*

Dave Stuart, Director, *Rebuilding Mountain Hearts and Lives*

Neil Nottingham, *“Ranger Al” website*

John Bear, *American Red Cross*

Steve Ferris, *California Forestry Department*

David Olsen, *Fire Communications Office, Boise*

12:00–1:00 Lunch

1:00–1:30 Open Discussion
Logistics for Breakout Sessions

1:30–2:15 Breakout: Designing human dimensions training courses for fire managers

2:30–3:15 Plenary: Break-out reports

3:15–3:30 Break

3:30–5:00 Breakout: How to achieve knowledge transfer and build sustainable partnerships



January 12, 2005

- | | |
|-------------|--|
| 8:30–9:30 | Plenary: Summary of results of Day 1 |
| 9:30–10:30 | Breakout: Identification of tractable research themes from Day 1 discussions; prioritization of themes |
| 10:30 | Break |
| 10:45–12:00 | Breakout: Based on the identified research themes, identification of possible funding sources, research collaborations, important partnerships to pursue, proposal authors |
| 12:00–1:00 | Lunch |
| 1:00–2:00 | Plenary: Breakout group reports |
| 2:00–3:30 | Plenary: How do we assure that the results of the research initiatives identified at this meeting produce results that are relevant, useful, usable, and accessible to managers? |
| 3:30 | Adjourn |

Appendix B: Breakout Group Discussion Questions

Breakout #1: Designing human dimensions training and continuing education courses for before, during, and after fire decision making

- What courses already exist?
- What courses should be added?
- What resources are required to offer each of these courses?
- Where and how should the courses be offered (e.g., at a training facility, web-based, workshops at professional meetings, etc.)?
- Prioritize the recommended new courses in order of importance, feasibility, and cost.

Breakout #2: How to achieve knowledge transfer and build sustainable partnerships

- What is needed to build and sustain partnerships between managers, scientists, advocacy groups, and the public?
- What types of knowledge are easy/difficult to transform into useful policies and actions?
- Who/what type of organization is best qualified to undertake these forms of knowledge transfer?
- What sorts of ethical, ownership, and/or legal factors may be involved?
- How would you recommend going about evaluating the success of knowledge transfer projects?

Breakout #3: Identification of tractable research themes from Day 1 discussions; prioritization of themes

- What are the major needs in your organization for information about human dimensions of fire?
- What are the major gaps in social science knowledge about wildland fire?
- What tractable research initiatives are needed to fill these gaps and what types of expertise should be involved in the research? Craft working titles for each of these initiatives (titles that might be used on proposals for funding).
- What should be the priority order in addressing these initiatives? (There can be more than one initiative per ranking.)

Breakout #4: Based on the identified research themes, identification of possible funding sources, research collaborations, important partnerships to pursue, proposal authors

- What partnerships should be pursued to assure that the research results are useful, usable, and relevant to addressing the defined problem(s), and that the new knowledge actually gets used?
- How can potential users be most effectively involved in social science research efforts (e.g., being actively involved in the research enterprise and disseminating results)?
- What sources of funding might be tapped to support the identified research initiatives?
- Who should lead the effort to write proposals for funding these initiatives?
- Who should be involved as collaborators in the different research initiatives identified?



Appendix C: Results of Breakout Group Discussions

“Human Dimensions” Courses

- I. Existing
 - A. Emergency preparedness: Fire Safe Councils
 - B. Fire and ecosystem management
 - C. Collaborative learning capacity (e.g., through Applegate Partnership/Oregon State)
 - D. Master Watershed Stewardship: course by Cooperative Extension for property owners
 - E. Fire-Climate-Society model: Web-based interactive fire risk model for use by communities and fire managers for strategic planning (<http://walter.arizona.edu>)
 - F. Private community wildfire CWPP protection planning
 - G. Stress reduction and emergency preparedness course: Red Cross
 - H. Critical incident stress management
 - I. Training in fuels treatment and defensible space (more is needed): FIREWISE
 - J. Negotiations training courses
 - K. People skills training
 - L. Leadership development courses
 - M. Human factors workshops
 - N. How to manage the unexpected (high reliability organization workshop)
- II. Existing courses needing modification
 - A. Fire and Ecosystem Management Course through NARTC exists, but needs to be updated and built upon existing syntheses of social science research
 - B. Some ICS courses may need to be updated and have social science integrated into them, such as research on impacts of shift changes
 - C. Technical Fire Management course needs to have a human dimensions component
 - D. Integrate social science into incident command courses (e.g., into fire information course 401 series of courses: fire fighters go to universities for courses)
 - E. Short courses being requested; chance for social science course(s) here
- III. New courses needed
 - A. Fuels issues, such as prescribed burns
 - B. County-level course on Healthy Forest Restoration Act
 1. County planning requirements
 2. Availability of funding
 - C. Better evacuation planning; plans are being done, but it would be useful to have a public education course on how to cope/what to do in special situations
 - D. Before- and after-fire courses
 - E. Human dimensions training focusing on pre- and during-fire conditions
 - F. Help and training on use of local equipment and personnel
 - G. Courses for community practitioners and organizations (few such courses exist)
 1. HFRA requires public interaction; this is a potential area for expansion
 - H. Agency DM training that highlights the most effective ways to communicate information to communities
 - I. Training in how to develop comprehensive, multi-disaster, coordinated OES plans
 1. Minnesota and Missouri plans are examples
 - J. A half-day seminar with state foresters and supervisors to increase social science awareness
 - K. Courses that teach people how to evaluate what works and what does not work
 1. How to evaluate performance of agency communications
 2. Lessons learned: post fire critiques
 - L. Post-fire trauma training in how to provide help
 - M. Fire manager interaction with social services and information functions
 - N. Seminars for leaders in agencies
 1. Build awareness of people’s needs, stresses, and anxieties
 - O. Evaluation courses: how to use evaluative tools and critique one’s efforts
 - P. Post-fire trauma services: coordinate stress management classes
 - Q. Train communities to develop information about where to go for help
 - R. Train communities in what to look for with regard to post-fire debris removal
 1. Toxic and hazardous materials
 - S. Train trainers to help communities identify resources available to them
 1. Courses in rapid assessment
 - T. Courses involving community members and fire managers working together to address the big cultural disconnection between Type 1 firefighters and community residents
 1. Part 1
 - a. Focus on local knowledge and participation including after fire
 - b. Hold in communities
 2. Part 2

- a. Exposure to 2–3 different types of communities
 - U. Universal principles
 - V. Local information systems
 - W. Make community focus a priority
- IV. Suggested Ways to Institute the Courses
- A. Joint planning and problem solving with communities
 - 1. Builds trust
 - B. Ensure that training mirrors reality
 - C. Identify and target specific groups
 - 1. It is best to work through existing networks, in venues where people feel comfortable
 - 2. Identify groups that need training; hold courses in places where people feel comfortable
 - 3. Piggyback on existing groups (e.g., senior citizen groups)
 - 4. Tailor training to group and place training being held
 - D. Build sustainable partnerships that generate
 - 1. Good will
 - 2. Understanding that people are part of the ecosystem
 - 3. Mutual respect and trust
 - 4. Relationships over time, with regular contacts around a mutual concern
 - 5. Develop tabletop exercises
 - 6. Work with Healthy Communities initiative
 - 7. New models of community and agency interaction
 - E. Training in interpretation and use of scientific information
 - F. Restoration activities conducted by community volunteers (e.g., as was done with sixth graders in Los Alamos)
 - G. Naturalist walks after fires
 - 1. Staffed tours for residents
 - 2. Model after post-fire activities related to 1988 Yellowstone fire
 - H. Training for fire professionals
 - 1. Understand people better and values at risk
 - 2. Crew bosses
 - 3. Climate change and forest restoration
 - I. Experiential education (e.g., provide seed packets of native seeds to landowners in post-fire situations. Teaching how to plant using communal areas helps these individuals learn how to plant these kinds of seeds on their own properties)
 - 1. Hands-on workshops
 - 2. Evacuation workshops, using materials

- such as Kris Scullen’s “Get Ready, Get Set, Go” but with members choosing elements that are important to them
- 3. A list of resources/categories for these types of activities could be prepared by a social science task group

Post-Fire Resources and Facilities Required

- I. Information on where to go to get help after a fire
- II. Information on debris removal
- III. Red Cross assistance
- IV. FEMA assistance
- V. Catholic Relief

Human Dimensions Course Development Requirements

- I. Funding
 - A. Department of Homeland Security
 - B. All Risk Community Training program
 - C. Grants
 - D. Healthy Food Initiative
- II. In-kind support
- III. A training clearing house that identifies courses and where to get expertise
 - A. How much it would cost to bring the resources to the community
- IV. Facilities
 - A. Community buildings
 - B. Deliver via the internet
 - 1. Some people do not have internet access (e.g., seniors and non-English speaking people)
 - C. Need to be places where people feel safe (one size does not fit all)

Other Training Needs

- I. BAER teams and similar efforts at other levels need to integrate human dimensions into their activities: post fire activities affect what happens subsequently
- II. Need training to figure out how to tap into existing local networks
- III. Need to train local trainers
- IV. Need to train agency people to do rapid assessment of social networks during fire events
- V. Make more of the existing information available online
- VI. Need to assess collaborative learning versus “courses” with regard to effectiveness in capacity building



Research Gaps and Major Human Dimensions that Fire Managers Need to Know About

- I. Psychology of insecurity and fear
- II. People's need for information about things that affect them
- III. Individual post-tragedy assessments
- IV. Community/agency dynamics and psychology
- V. Biophysics
- VI. Societal variables
 - A. Sociocultural
 - B. Demographic
 - C. Economic
- VII. Local knowledge versus extra-local knowledge
- VIII. Risk perception differences
- IX. How to become integral to a community by becoming involved "upstream" and immediately
- X. How to communicate the social and biophysical context of the local ecology
 - A. Do in a convincing way that helps people understand more about the place in which they live
- XI. How to tap into and become part of local knowledge networks
- XII. The institutional condition of the community
- XIII. How to authentically aspire to become part of a place, rather than just acting like a professional
- XIV. How to learn about/obtain existing plans before developing new ones
- XV. Maintaining awareness of the need to deal with the public as part of job
- XVI. Understand one's natural instincts and aptitudes in terms of dealing effectively in community contexts
- XVII. Realize that one does not have all the answers, and must look to local knowledge
- XVIII. For incident commanders, identification of:
 - A. Shared community values
 - B. Access networks
 - C. Cultural movements
 - D. Structures
 - E. Natural environment
- XIX. For incident commanders, how to determine quickly whom to listen to and to adapt fire suppression tactics accordingly
- XX. People want to participate in discussions and to be providers of information; they do not want to be "talked at"
- XXI. Collaborative learning, especially at adult level
 - A. How might different organizations benefit from this and what might be learned
 - B. Identification of the kinds of information communities want

- C. Identification of ways to make collaborative learning part of agency career structures
- D. What questions simultaneously benefit agencies, researchers, communities
- XXII. Research on formal and informal organizational cultures
 - A. How they learn, change
 - B. What is needed to create resilient organizations
 - C. Agency/community interactions during fire
 - D. How disruption and restoration are handled by communities
 - E. Firefighter values: how these might be changed from top-down to community interaction model
 - F. Agency-agency learning processes and cooperation
 - G. Community-community learning processes
- XXIII. Research on collective action and cooperation
 - A. Community predisposition
 - B. Potential for long-term community action
- XXIV. How all sorts of boundaries get crossed
 - A. Who had fire losses and how to cope with loss when community cooperation is affected
 - B. How cooperation is construed at different temporal and spatial scales

Priorities

- I. Integrating human dimension training for officials
 - A. Two-way communication; not just officials figuring out how to get people to do what they want them to do
 - B. Training on how not to be condescending
 - C. Training in how to value public entities and external publics

How to Achieve Knowledge Transfer and Build Sustainable Partnerships

- I. Factors to consider
 - A. Communications must be two-way
 - B. Need build trust, overcome bad experiences with agencies and departments
 - C. Need to build relationships among partners
 - D. Find and build relations with groups that are already respected
 - E. Identify appropriate mechanisms for gathering, convening, facilitating (will vary by community)
 1. Rural conservation districts
 2. Churches
 - F. Need to identify neighborhood groups that may not have official titles but that are good for disseminating information

- II. Respect and trust communities to organize and build local team well
- III. Recognize that people want to be part of the system and have their voice count
- IV. Get stakeholders together into teams before fire to determine work out compatible goals
- V. Understand ownership patterns and practices
- VI. Build sustainable networks of entities that do not have common backgrounds
- VII. Push dollar stream into local-level projects and initiatives
- VIII. Recognize that much of community involvement in fire management is not through fires but through fuels treatment programs
 - A. Set the stage through interactions with such programs aimed at creating manageable landscapes
- IX. Conduct structured research
 - A. Community needs
 - B. Documentation of contributions of information and social services
 - C. Information on local knowledge and structure
 - D. Characterization of fire and events with regard to social/behavioral problems and solutions
 - E. Characterization of pre-fire mitigation and reduction of risk
 - 1. What the public knows about risk
 - 2. What alternatives the community will support
 - F. Identification of conduits for community planning
 - G. Identification of successful collaborations
 - 1. The kind that can sustain efforts among individuals and groups
 - H. Information on how to identify and engage community groups
 - I. Identification of the preconditions for community acceptance
 - J. Information on how people process information
 - 1. How people assign trust, credibility, preference
 - 2. What sorts of traits, actions, communication strategies enhance trust and cooperation
 - K. Information/understanding about people in their communities
 - 1. Is always a two-way street
 - 2. Need trust
 - 3. Sustainable relationships
 - L. Analysis of history, related to issue of trust
 - M. Assessment of the role played in villages by fire employment and management
 - N. Policy analyses linking different scales
 - 1. Household
 - 2. Community
 - 3. State
 - 4. Regional
 - 5. National
- X. Organizations facilitating knowledge transfer
 - A. County planning departments
 - B. Utilities
 - C. Emergency services
 - D. Schools
- XI. Measures of success of technology transfer
 - A. Changes in behavior
 - B. That which was transferred remains in place
 - C. Institutionalization beyond individuals
 - D. Integration into communities and agencies
 - E. Types of expressions of appreciation received
 - F. Hire firm after fire to assess quality of information received, etc.
 - G. Pre-fire: self-studies to establish baseline
- XII. Ethical concerns
 - A. Specific populations considered
 - 1. Elderly people
 - 2. Those with limited financial resources
 - B. Community support systems
 - C. Fire research has a responsibility toward those who are the subjects of research
 - D. Need to examine what can and cannot be done from a specific position in an organization: survival within the organization
 - E. Local money-making strategy development within the law
 - F. Everyone should be part of the fabric with regard to the topic of fire threat
 - 1. Champions
 - 2. Advocates
 - 3. Mavens
 - 4. Implementers
 - G. Donations that flow in after disaster need to be centrally managed
 - 1. Establish trust to assure funds going to right needs and right people
 - 2. Establish procedures to allocate resources
- O. Assessment of how HFRA has affected grass-roots planning
- P. Vulnerability assessments
 - 1. Post-fire restoration
 - 2. Social justice and equity
- Q. Assessment of political climate and how this affects agencies' ability to do a job
- R. Two lines of research are involved
 - 1. Applied
 - 2. Theoretical



3. Establish procedures for dealing with complaints from non-recipients
- XIII. Sustaining community involvement
- A. Foster ongoing landscape management activities
 - B. Emphasize mutual learning rather than “knowledge transfer”
 - C. Develop pre-fire community typology
 1. Include list of factors needing to be taken into account
 2. Key contacts
 - C. Identify community information needs
 1. Pre-fire through post-fire
 - D. Conduct pre-fire and post-fire vulnerability analyses and policy analyses
 - E. Identify barriers and incentives for mitigation, community fire planning
 - F. Characterize perceptions of fire and how these need to change
 - G. Quantify economic benefits of fire, fire use
 - H. Help community identify its research needs; work as partners
 - I. Identify sources and mechanisms for channeling funds to local level
 - J. Ownership by community; support by government
 - K. Need a meeting place
 1. Website
 - L. Marketing/community program
 1. Water bill
 2. Churches
 - M. Need local ordinances that have “teeth”
 - N. Need to listen to each other to identify sub-groups’ disparate issues
 - O. Need to have true two-way interaction—not placation
 1. Way to build trust and partnerships
 - P. Need to identify what is in it for people
 - Q. Need to sustain the process (this is more difficult)
 - R. Requires ongoing, meaningful projects and tasks to be accomplished
 1. Where progress can be seen
 2. Where there is motivation to participate
 - S. Need context and purpose for projects
 - T. May need sensational fires to sustain efforts
 1. A single low-probability event does not promote sustained effort
 - U. Need relationships between partners
 1. MAST is good, but the public is missing
 2. Find a group that is already respected and expand with the public and with social science expertise
3. RCDs may be an example, if these groups are welcome and truly integrate the public, rather than just “accepting input”
- XIV. Much is difficult to institutionalize because of agency culture that takes the view, “we are the experts” – this gets in the way. However, best practices can be transferred
- XV. Existing organizations have manuals and lessons learned
 1. There are differences in process between official and non-official organizations
- XVI. The National Association of Counties may be a means to achieve goals
- XVII. The Council of Churches might work in some communities, pre-fire, to bring parties to the table
- XVIII. Allocation of money is an issue, with regard to who makes the decisions about who gets what
- A. Trust is a factor
 - B. Equity is important
 - C. There are a lot of MOUs that allow sharing resources
 - D. There are legal issues regarding separation of church and state
 - E. Need to have open account books (ethics)
 - F. Different groups are needed for different functions
 - G. Need to address confidentiality with regard to individual clients
- XIX. Address interests and values that will structure incentives and motivate people
- XX. Need to sustain the following:
- A. Fostering respect and equality
 - B. Keeping the focus place-based
 1. At the watershed scale
 - C. Examples of collaboration
 - D. Development of contextually specific ideas
 - E. Availability of specific talents/skills
 - F. Working with existing groups – collaborative learning makes things possible and makes things happen
 - G. Interactions between experts and residents
 - H. Thinking beyond fire
 1. Thinking about the watershed
 - I. Funding
 - J. Reminder to start small
- XXI. Merge ideas and funding with regard to pre- and post-fire activities
- XXII. Take the cultural context into account
- A. Identify how to make connections in non-mainstream communities
- XXIII. Determine how to help partnerships identify their research needs

- XXIV. Create settings, incentives for highly engaged individuals to share what they know and transmit value of this knowledge to managers
- XXV. Rebalance budget funds to “upstream” activities such as organizing efforts that improve fire preparedness
 - A. Fire Safe Councils
 - B. MASTs
- XXVI. Create state or federal level mandates that require government agencies to facilitate and participate in community partnerships
- XXVII. Place government in a partnership role, but do not expect government to lead or initiate these activities
- XXVIII. Create and fund local intermediary organizations, data gathering, and facilitator/advocate roles
- XXIX. Build sustainable networks of stakeholders who may not have a lot in common but who can—and are willing to—come together for a common purpose, establish task/work groups
- XXX. Develop the habit of assessing local community logic and dynamics
- XXXI. Restructure fire management to allow professionals to manage fires in communities where they have local knowledge, investment, engagement
- XXXII. Need to work toward changes in lifestyle that will sustain over time
 - A. Need to recognize that this takes time
- XXXIII. Need to study areas where sustained partnerships (e.g., the Shingleton partnership) exist
- XXXIV. Remember that it is difficult to deal with emotional issues, especially post-fire
- XXXV. Need to change organizational mindsets
- XXXVI. Need be persistent in connecting and reconnecting people to their landscape
 - A. New residents
 - B. Those who have been there a while
- XXXVII. Foster collaboration and partnerships
 - A. Help communities identify their research needs
 - B. Provide mechanisms to help fund community initiatives
 - C. Provide federal and state initiatives to encourage collaboration
- XXXVIII. Conduct research on histories of mistrust, ways to build trust
- XXXIX. Identify individuals who can translate research into usable and accessible forms

Local groups that may be helpful in managing wildland fire

- I. Planning departments
- II. Utilities
- III. Emergency services
- IV. Schools
- V. Volunteer Organizations Assisting in Disasters
- VI. Natural Resources Working Group
- VII. Community Emergency Response Teams
- VIII. USDA Forest Service
- IX. Environmental non-governmental organizations
- X. Fire departments
- XI. Cooperative Extension
- XII. Emergency managers
- XIII. Residents
- XIV. Communities
 - A. Developing organizational mechanisms to produce values of place that build sustainability
- XV. County officials

Measures of Success of Human Dimensions Research and Community Engagement

- I. Modification of behavior is visibly apparent
- II. People move on but the principles remain in place
- III. People work on things they can do together
- IV. Relationships are cultivated over time
- V. Good evaluative studies have a baseline
- VI. Hire a firm and do a survey
- VII. Use modeling to look at “before” and “after”
- VIII. Evaluate models and projects
 - A. Look at knowledge use
 - B. Post-fire healing
 - C. Monitoring what happens after the funding runs out
 - D. Examine how fire managers decide what information to use
- IX. Assess progress toward a goal and be explicit with regard to expectations about what constitutes “success” and “failure”
- X. Evaluation of pre-fire preparations and post-fire outcomes
 - A. What did work
 - B. What did not work

Current Topical Areas of Research Activities

- I. Acceptability of treatments
- II. Community preparedness
- III. Evaluation of fire events
- IV. Collaboration
- V. Diffusion of new ideas



- VI. Emotional/psychological factors
- VII. Cognitive models
 - A. Improving value
 - B. Action
- VIII. Communications
- IX. Tourism and fire, recreation and fire
- X. Politics of fire
 - A. Implementation
 - B. Funding
- XI. Ecosystem services
- XII. Modeling fire as a resource versus a disturbance regime
- XIII. Leadership – fire teams (DM)
- XIV. Social and economic impacts

Themes of needed research

- I. Collaborative adult learning
 - A. Involving agencies, communities, researchers
 - B. Covering dealing with communities
 - C. Providing practical information
- II. Organizational cultures
 - A. Learning, change, resilience
 - B. Interactions among agency and community people during fire
 - 1. What happens
 - 2. What is exchanged
 - C. Disruption and restoration
 - D. Fire fighter values, agency changes
- III. Collective action and cooperation
 - A. Pre-, post-, during-fire
 - B. Community predispositions
 - C. Long-term CA potential
 - D. Prevention from healthy ecosystem management perspective
 - E. Crossing boundaries
 - F. Time and space issues
- IV. Similarities and differences across fire prone communities
 - A. Policies
 - B. SES
- V. Micro-level studies at individual and family level
- VI. Identification of factors affecting non-emergency, fire-related activities such as:
 - A. Forest health
 - B. Community development
 - C. Perceptions of risk and safety
 - D. Sustaining motivators for communities
 - E. Citizen satisfaction of service delivery
 - 1. Before and after fire
 - 2. Expectations
- VII. Assessment of what motivates people to adapt to living in their chosen environment
- VIII. Research on pre-fire planning
- IX. Identify more effective mechanisms for funding community initiatives
- X. Identify the beneficial effects of fire
 - A. Understand community perceptions of fire
 - B. Identify different aspects of fire
 - C. Understand media effects on perception
 - D. Develop a synthesis of research with regard to its timeliness
 - 1. How to improve information transfer
 - a. Outreach
 - b. Community strategies
 - c. Identification of preferences for formatting the information
- XI. Understand barriers and incentives
 - A. Typologies of communities
- XII. Fire as a unique hazard event
 - A. How is it similar to and different from other hazards?
- XIII. Effects of fire events
- XIV. Characterization of different types of fire victims
 - A. Business owners
 - B. Property owners versus renters
 - C. Responders
 - D. Evacuees
 - E. Special populations
 - 1. Children
 - 2. Elderly
 - 3. Non-English speaking
- XV. Community typologies and assessments
- XVI. Nature of social processes during crises
- XVII. Community needs
- XVIII. Status of trust among actors in the communities and agencies
- XIX. Assessment of vulnerabilities
- XX. Policy analyses at multiple scales
- XXI. Assessments of barriers and incentives
- XXII. Perceptions of media and influence
 - A. Value of fire as a media event
- XXIII. Economics
- XXIV. Evaluation of pre-fire preparations and post-fire outcomes
- XXV. Perceptions regarding fire safety and motivations to remain prepared for fire
- XXVI. What motivates people who decide to live in fire-prone areas to make preparations?
- XXVII. Citizen satisfaction with service during/after fire

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