

Social Science at the Wildland Urban Interface: Creating Fire-Safe Communities

Future Research Needs—3/18/09

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The following report derives from a project funded by the Joint Fire Science Board, *Social Science at the Wildland Urban Interface: Creating Fire-Safe Communities*. The purpose of this project is to summarize our current science knowledge, identify research gaps, and develop effective technology transfer products to communicate research findings in ways most useful to agency personnel and local communities. Although not an explicit part of the proposed project, our extensive methods led to the identification of a set of future research needs that may be beneficial to the JFSP Board. Indeed, JFSP staff and board members have expressed considerable interest in this idea. In the following sections we describe this project in more detail and the process used to determine social science research needs for future consideration. Then we provide a set of recommended research questions arranged by topic areas. These are presented in general order of importance—in four tiers—as determined by research scientists and managers.

The Project

The first phase of this project involved a capstone workshop of 18 of the nation's most prominent social scientists working on wildfire issues to examine the collective research in the area to date. The intent was to highlight important findings, explore lessons learned across study areas, and identify locations where real success has been achieved. A comprehensive report from this workshop is in progress. We will draw on this research to feature successful communities in a digital video program for use by agency practitioners and their stakeholders. An accompanying field guide will provide a stepwise approach to implementation. The PI's will also conduct meetings in participating regions to help organize local strategies.

The Workshop: Wildland Fire Summit: A Decade of Social Science Research

Eighteen social scientists from throughout the U.S. met in Portland, Oregon for the Wildland Fire Summit workshop in August 2008. The research team completed considerable pre-work including a written synthesis of research findings to date for review by participants for completeness prior to arrival. The resulting document provided a foundation for our discussion and represents a significant output from our work. At the workshop there were no power-point presentations or papers presented. We invited these individuals for their intellect and ability to discuss their experience and to deliberate ideas for creating fire-safe communities. Two days of facilitated discussion provided agreement on the most relevant findings, discussion of how managers are using this information, and a brainstorming session on the most important areas for future research. JFSP Manager John Cissel attended the entire workshop and John Laurence of the JFSP Board participated in the opening session. Collectively, we agreed to utilize the workshop to discuss gaps in existing research and to identify future research needs and pass them along to the Board.

Assessment Process

Based on workshop discussions, the PI's compiled a set of potential future research themes. Each theme also included a set of research questions or issues raised by workshop participants. This document was distributed to participating scientists for review, comment, and identification of the most important questions for future research. On the suggestion of John Cissel, we also assembled a diverse group of agency personnel to capture their perspective on these same issues. Eleven individuals in a range of positions received the document and provided enthusiastic cooperation and feedback. At the same time, three external scientists reviewed the complete package and offered suggestions.

Participating Scientists

Jim Absher, U.S. Forest Service, PSW Research Station
Dale Blahna, U.S. Forest Service, PNW Research Station
Mark Brunson, Utah State University
Jim Burchfield, University of Montana
Matt Carroll, Washington State University
Terry Daniel, University of Arizona
Linda Kruger, U.S. Forest Service, PNW Research Station
Sarah McCaffrey, U.S. Forest Service, Northern Research Station
Cass Moseley, University of Oregon
Kristen Nelson, University of Minnesota
Carol Raish, U.S. Forest Service, Rocky Mountain Research Station
Bruce Shindler, Oregon State University
Toddi Steelman, North Carolina State University
Vicky Sturtevant, Southern Oregon University
Eric Toman, Ohio State University
Alan Watson, U.S. Forest Service, Rocky Mountain Research Station
Dan Williams, U.S. Forest Service, Rocky Mountain Research Station
Greg Winter, Cornerstone Strategies, Inc.

Management Participants

Dave Campbell, Dist. Ranger, West Fork Ranger District, Bitterroot NF
Judith Downing, Asst. Director, F&AM, Region 5, USFS
John Gerritsma, Field Manager, Ashland (OR) Resource Area, Bureau of Land Management
Mark Hansen, Wildfire Extension Specialist, Michigan State University
Abbie Jossie, Field Manager, Grants Pass (OR) Resource Area, Bureau of Land Management
Bill Kaage, PWR Deputy FMO, National Park Service
Brian Kurtz, The Nature Conservancy, NY (formerly w/ the Colorado State Forest Service)
Will May, Fire Chief Alachua Co., Florida (FL)
Maribeth Pecotte, Fire Information Officer, Boulder RD, Arapahoe-Roosevelt NF
Sue Rodman, Forester, Anchorage, AK Fire Dept.
Sam Scranton, Deputy Fire Use Specialist, Bureau of Indian Affairs—NIFC

External Reviewers

Courtney Flint, University of Illinois
Pam Jakes, USFS, Northern Research Station
Robert Ryan, University of Massachusetts

Future Research Needs

Participants were asked to review the identified research themes and provide feedback as to appropriateness of the questions/issues and whether any important topics were missed. From the total of 37 separate questions, they were also asked to select the six questions they felt were the most important areas for future research. Overall feedback from both scientists and managers was that it was a comprehensive and well-reasoned set of research needs. Nearly all questions received some level of support and many participants noted it was challenging to limit their choices to only six. However, natural divisions occurred allowing us to rank questions into four levels (tiers) of priority. In addition, several interesting points emerged. First, both scientists and managers were in agreement on many items, particularly those in the first tier. Second, there were certain questions that were clearly more important to managers, while others were more important to scientists. In general, managers were more spread out in their choices, perhaps reflecting different issues they face in their respective management units.

Wildland Fire Social Science Prominent Research Themes and Future Research Needs

In this section, we present the results of the assessment process and subsequent revisions. Questions are organized by six thematic areas and presented according to level of agreement on their importance for future research. In the scientist/manager assessments each thematic area was introduced with a brief statement to provide context for questions. For background purposes, these statements are provided here. These are followed by the prioritized research needs.

Theme Research Summaries

Fire preparedness and mitigation

A growing body of research finds that at a general level there is substantial public support for agency treatments (i.e., mechanized thinning, prescribed fire) to decrease fire risk and that a majority of residents in fire prone areas are taking some action to mitigate risk on their own property. There is additional evidence that community-based programs (e.g., CWPP's, Fire-Safe, Fire Smart, Firewise, local legislation) can facilitate homeowner preparedness, while personal perceptions of risk and tradeoffs with other values also influence the actions of property owners. Collectively, these efforts can contribute to community capacity

Fire management and public response

Research to date has largely focused on public response to agency fuels management approaches such as thinning and prescribed fire. Research is limited about public response to, participation in, and trust of the entire fire management process, particularly as the approach shifts away from a focus on full suppression. New research will go beyond public views of different approaches, but also assess factors that influence agency fire management decisions (wildland fire use, suppression techniques, etc.) and interactions with local residents and groups.

Temporal connections

Research often focuses on problems and decisions as case studies that reflect a single point in time. Longitudinal research will provide a better understanding of the temporal connectivity of fire issues—prevention and fuel reduction activities, decisions and experiences during an event, and

post-fire decision-making and recovery. Agency managers can benefit from insights about how current actions and choices may influence future events and their ability to make good decisions.

Community capacity and sustainability

Research has highlighted the importance of local capacity in successful wildfire mitigation activities and sustaining these efforts. Diverse factors including human capital (skills and knowledge of individuals), social capital (cohesiveness of social networks and experience in working together), and physical infrastructure all contribute to community capacity when they can be utilized to achieve a common goal. Although higher capacity is useful in gauging the potential for communities to adapt to fire events, it is not necessarily predictive of success as communities with limited levels of human or social capital have also demonstrated effective preparations or response to wildfires.

Coordination of planning efforts

With the rapid expansion of the WUI into fire prone ecosystems, risk of a wildfire causing damage to human settlements has increased dramatically. Coordinating planning efforts at all levels of government can significantly reduce this risk, and efforts have begun in many places to incorporate wildfire risk and citizen involvement into planning activities. However, elsewhere (e.g., midwest, northeast) fire planning may be a lower priority than other objectives. Additional focused research will help in understanding how these efforts affect fire management.

Organizational effectiveness

Research specifically on this topic is limited but suggests that internal barriers from lack of support (e.g., money, staffing, leadership, etc.) can significantly limit an agency's ability and/or willingness to engage in the full range of fire mitigation and restoration activities. Recently internal initiatives have emerged that could have a significant effect on agency abilities to, for example, maintain firefighter safety and engage in cost-effective fire management while meeting other mission priorities (e.g., recreation, invasive species management). Further assessment of such efforts can provide agencies with tools to meet these challenges.

Research Priorities

- * indicates research question received substantially greater support from managers
- ** indicates research question received substantially greater support from scientists

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Tier One

(Questions rated as a high priority by a high proportion of managers and researchers)

Fire preparedness and mitigation

- Synthesize findings from research at both the individual homeowner and community level. This analysis would help clarify influencing factors and processes regarding preparedness, assess differences in approaches in how CWPP's are developed and implemented, identify related barriers, and examine how trade-offs are made between conflicting values.

- How do public perceptions of risk (short-term and long-term) differ from the risks that management agencies contend with? How do these change over time? How does risk perception vary across cultural and social groups?*

Fire management and public response

- Thus far, research has shown concerns about smoke to be primarily a health issue, and, in some areas, a traffic management issue. What public communication approaches can enable managers to work through the complexities of smoke from various sources (i.e., prescribed burns, wildfire, manager-controlled wildfire) to more effectively achieve fire management objectives? Develop guidelines (or a checklist) of important considerations for making smoke-related decisions.
- Evaluate pros and cons of evacuation and alternative models to evacuation. For example, examine the “prepare to leave or stand and defend” as well as other models and their considerations for effectiveness in the U.S.*
- To better place research on trust in context there is a need to synthesize what has been learned to date specifically related to fire management. Such work would develop a better understanding of complexity and multiple components of trustworthy citizen-agency relations specific to fire. For example, how do the basic tenants of trust (e.g., honesty, fairness, openness, competence) found in other agency-public interactions apply to different stages of fire management? Develop a set of “dimensions of trust” from which managers can self select and adapt to a given situation to improve performance and relationships.

Temporal connections

- Limited research indicates that communication needs and opportunities for engaging the public differ before, during, and after a fire event. Which communication and outreach strategies are most effective at each stage and how are they influenced by factors facing managers (e.g., time, funding, immediacy, community resources capabilities, credibility, relations with local citizens)?

Coordination of planning efforts

- Examine the influence/effectiveness of local level planning efforts related to wildfire and also National Forest planning processes. How has local/state/county/multi-scale land use planning worked to reduce wildfire exposure? Assess factors contributing to success.

Organizational effectiveness

- To build a better understanding of relationships and points of opportunity identify methods to “map” the fire management system (i.e., pre-fire, during an event, post-fire). Such work could include communication networks, linkages between people and agencies, types of required training and experience of members, critical inputs, the role of local fire personnel (city/county, volunteer fire departments), etc.
- What are the consequences when federal land management agencies focus most functions around the fire problem, particularly suppression? For example, is fire becoming a separate entity within federal agencies, thereby becoming isolated from other management units? How does this segregation of fire management affect other forest management functions? How does it affect public engagement strategies?*

Tier Two

(Questions rated as high priority by a moderate number of scientists and/or managers)

Fire preparedness and mitigation

- Evaluate and compare development and effectiveness of CWPP's across locations. How and why is change occurring? Does flexibility within CWPP guidelines enable them to be tailored to local needs and capacity? Is plan effectiveness influenced by the involvement of local residents in plan development versus those prepared by an agency or contractor?

Fire management and public response

- Examine public understanding and opinions of fire suppression strategies as well as wildland fire use (WFU). This should include acceptability of different, potentially contentious, practices (e.g., bull dozing, back burning, creation of smoke, various forms of containment) and associated expenditures.
- Evaluate the role of volunteer fire departments in the wildfire management system. How integral are they to the process? What are the main limiting factors toward their effective contribution?*

Temporal connections

- Examine the long-term viability of local groups that form around the threat of fire? As fires are rare, how are groups sustained if the fire never arrives? How do groups who come together to address fire risk translate that capacity and experience to address other natural resource or community issues (and vice versa)?
- What are the long-term implications of various incentive programs to encourage adoption of fire risk reduction activities? Are these programs effective over time or are other programs necessary to encourage maintenance of treatment activities? Where and how do other factors emerge to replace initial (often financial) motivations?*

Community capacity and sustainability

- Develop concrete methods to identify the various forms of capacity external to agencies in fire-prone areas. How can agency personnel use these measures to adapt wildfire programs to the abilities, needs, expectations, and resources within communities? How can this information be made more visible for agency administrators so that personnel at the ground level are given greater flexibility to implement programs?***
- Examine the ability of different communities to prepare for wildfire. Are there attributes that can offset shortcomings? What are the most effective actions agencies can take to help more vulnerable communities build capacity to plan for and recover from wildfire?

Coordination of planning efforts

- Identify and evaluate factors that contribute to the willingness of state, county, or local officials to pass ordinances requiring mitigation measures. Once in place, which factors most contribute to the effectiveness of these measures?

Tier Three

(Questions rated as high priority by a small number of scientists and/or managers)

Fire preparedness and mitigation

- Assess the effectiveness of policy guidelines and interpretation/enforcement at the federal level versus state and local levels. For example, investigations might include mandatory versus voluntary implementation, locus of responsibility with agencies or public, incentive versus disincentive/punishment for inaction, building capacity of local citizens to do work or doing the work for them.
- Identify specific factors that influence property owner maintenance of treatments over time and assess their implications for managers.

Fire management and public response

- What factors shape public opinion toward wildland fire use? For example, are there different attitudes toward the use of wildland fire (or prescribed fire) to support wilderness and nonwilderness values?
- Assess public opinions and attitudes toward restoration/rehabilitation/recovery of ecosystems after fire. Evaluate the effectiveness of various planning processes for post-fire management activities, particularly decisions about salvage logging and other forms of active management vs. "letting nature take its course". For example, how do tradeoffs about aesthetics, native vs. non-native species, costs, economic vs. ecological benefits factor into the equation
- What is the long-term benefit for efforts and resources spent to build trusting citizen-agency relations (e.g., where agencies have long-term investments in building relationships do communities respond differently to an escaped burn)? What are the conditions/consequences of losing trust and the actions necessary for rebuilding it in the context of fire management?
- What are the potential implications of new concerns (i.e., carbon storage, climate change) on public acceptance of forest and fire management practices?*
- Is there a difference in public trust for agency land managers versus agency firefighters? If so, what effect does this have on fire management programs?
- What dynamics cause some managers to have limited trust in certain segments of the public? What are the consequences for fire management?

Temporal connections

- What are the impacts and implications of Incident Management Teams on communities? How does the behavior of Type 1 teams during fire events effect long-term relationships between local agencies and communities?

Community capacity and sustainability

- Examine the ability of intermediary organizations and social networks to help build community capacity for wildfire mitigation. How do networks come together to address topics that appear

to be outside their area of expertise/interest? How do individuals overcome potential cultural differences (e.g., long term rural residents and new ex-urbanites)?

- Assess the role and contributions of local, state, and federal agencies in building and maintaining community capacity. How do federal policies affect the ability of agencies and communities/homeowners to build capacity? What are the best indicators of success?

Coordination of planning efforts

- While substantial work has provided guidance on how agencies can interact effectively with citizens, limited research has examined the pitfalls of these interactions. Assess factors that hinder agency managers from taking collaborative approaches. In what situations is collaboration more appropriate than others? What are associated implications for managers?

Organizational effectiveness

- What are the implications of shifting more fire costs to local governments? How will this affect the long-term relationships between agencies and communities?
- What is the impact and/or effectiveness of stewardship contracting authority?*

Tier 4

(Questions receiving limited support)

Fire preparedness and mitigation

- Examine the dynamics between community-level programs and actions taken by individual property owners (e.g., leadership, funding programs, peer pressure). How do these translate to support for agency programs in the WUI and elsewhere?

Fire management and public response

- Examine the benefits and limitations associated with incorporating local citizens' skills and knowledge into fire suppression and recovery efforts.

Temporal connections

- How do positive or negative influences carry over from pre-fire activities to fire suppression and post-fire planning and implementation? How can agencies at different scales contribute to and sustain desired actions?

Organizational effectiveness

- How do internal changes such as consolidation/closure of ranger districts, outsourcing work, consolidating services (e.g., Albuquerque Service Center), workforce transition (which may result in loss of corporate knowledge/skill), and other restructuring affect firefighter safety and agency abilities to engage in long-term cost-effective fire management?
- Identify methods for those in oversight positions to provide better support and more flexibility for those at the ground-level to be more effective in their fire management roles.