WILDLAND FIRE USE BARRIERS AND FACILITATORS

Anne Black, Martha Williamson, Dustin Doane

The Forest Service authorizes broadscale wildland fire use (WFU) both inside and outside wilderness areas in many western forests; but, will agency authorization alone lead to implementation?

Understanding barriers and facilitators to WFU implementation is critical for establishing realistic program expectations and providing a foundation for any efforts to change program outcomes.

This paper synthesizes our current understanding of factors influencing WFU decisionmaking (see Table 1 for a summary of previous research). Our intent is to capture the fire community's dispersed wisdom and provide policymakers and decisionmakers with an objective basis for future actions designed to affect WFU program outcomes and effectiveness.

Methodology

Our background data come from:
• Previous formal studies (*<http://leopold.wilderness.net/staff/black.htm>)*,
• Two information collection team efforts organized by the Wildland Fire Lessons Learned Center,
• A series of targeted interviews, and
• Numerous discussions with members of the fire community.

Anne Black is an ecologist for the Aldo Leopold Wilderness Research Institute, Forest Service, Rocky Mountain Research Station in Missoula, MT; Martha Willliamson is a fire management specialist for the Humboldt-Toiyabe National Forest in Sparks, NV; and Dustin Doane is a Forest Service smokejumper at the McCall Smokejumper Base in McCall, ID.

Research suggests that a host of factors influence the go/no-go decision.

Table 1. *Considerations for fire use (WFU or prescribed) decisionmaking identified in previous studies.*

External political issues:
Intergovernmental relationships; public support and knowledge about WFU, public attitudes, understanding, and level of trust in the agency; and smoke regulation.
Arno and Brown 1991, Cleaves and others 2000, Cortner and others 1990, Czech 1996, Daniels 1991, Parsons and Landres 1998, WFLLC 2005, WFLLC 2006.

Internal policies:
WFU authority, size of MMA, burn window prescriptions, whether adjacent landowners are accepting of WFU.
Cleaves and others 2000, Miller and Landres 2004, Parsons and Landres 1998, FMP 1995, FMP 2001, NWCG 1995, WFLLC 2005, WFLLC 2006, Zimmerman and Bunnell 1998.

Biophysical considerations:
Fuels, weather, topography, ignition location and timing, potential smoke production, potential fire behavior, and ease of control versus risk of escape.
Cleaves and others 2000, Miller and Landres 2004, Pyne 1995, NWCG 1995, WFLLC 2006.

Economic considerations:
Potential cost, availability of funding to restore structures and resources if damaged, potential cost savings, threats to private property, and potential WUI or other hazards.
Bonney 1998, Calkin and others 2005, Cleaves and others 2000, Czech 1996, Daniels 1991, Miller and Landres 2004, NWCG 1995, Zimmerman 2003.

Natural resources:
Potential for conflicting objectives, potential to achieve resource benefits, pose risks, potential to reduce fuels hazard.
Cortner and others 1990, Czech 1996, Miller and Landres 2004, Parsons and Landres 1998, White and others 2000, WFLLC 2006, Zimmerman 2003.

Human resource considerations:
Availability of qualified personnel and for extended periods, level of other fire activity, potential to minimize firefighter exposure to danger.
Arno and others 2000, Benedict and others 1991, Bonney 1998, Cleaves and others 2000, Cortner and others 1990, Daniels 1991, Miller and Landres 2004, NWCG 1995, Tomascak 1991, WFLLC 2005, WFLLC 2006.

Individual decisionmaker considerations:
Perception of program value, attitudes towards and experience with risk, and towards potential career consequences and legal liability.
Arno and Brown 1991, Arno and Fiedler 2005, Bradley 1995, Bunnell 1995, Calkin and others 2005, Daniels 1991, Jolly 1995, Kilgore 1991, Pyne 1995, Stanton 1995. van Wagtendonk 1995, Williams 1995, White 1991.

Through two recent master's thesis projects (Williamson, Doane), we sought to determine which of the myriad factors (Table 1) affecting decisions to plan for or manage WFU are most important to fire staff making recommendations and line officers making decisions about wildland fire.

Factors Affecting WFU Decisions—from the Fire Staff's Perspective

Doane (2005) sought to understand WFU barriers and facilitators on all wilderness lands. He compared factors in areas where WFU was a management option to places where it was not. He focused on Forest Service district fire management officers and assistant fire management officers and their views on the issues surrounding Forest Service ranger districts with wilderness areas. Although Doane's survey response rate falls beneath statistical rigor at 14 percent, it remains the largest such investigation known. We present his results for the wildland fire management community to consider as it moves from WFU in wilderness only to WFU on all lands.

Table 2 summarizes responses to key survey questions. Respondents were asked to answer to what extent they felt particular statements were responsible for an outcome (the decision on the most recent candidate ignition, lack of authorization in a fire management plan, or lack of authorization in the land management plan).

Responses across all categories suggest significant biophysical constraints on WFU (e.g., location of ignition relative to locations where fire is not desirable, lack of natural ignitions). Such constraints are not likely to go away, although it is possible to ameliorate some of them, such as by making the built environment more fire resilient.

Responses also indicate the importance of coordination across ownership and management boundaries and the interconnection of landscapes and the significance of internal support for WFU. This latter is intriguing because while the former have gained management and research attention, this issue has not.

Supporting this finding, institutional support was most frequently mentioned as a *facilitator* by fire management officers located in areas where WFU is authorized (Table 3). Specific support cited as most useful included:
• Supporting the fire manager's decision,
• Encouraging WFU from higher levels,

What kinds of internal support of wildland fire use would be most useful?

Table 2. *Top barriers to wildland fire use (WFU) as identified by Forest Service wilderness fire managers (n = 72).*

WFU authorized	Not authorized in Fire Management Plan	Not authorized in Land Management Plan
Fire behavior likely to threaten boundary (9**)	Values at risk outside boundary (9)	Insufficient natural ignitions (11)
Fire behavior likely to result in negative resource outcomes (9)	Lack of time/resources to incorporate into FMP (9)	WFU not cultural norm (10)
		Values at Risk outside boundary (9)

*Sample drew 6-10 responses from every Forest Service region but Alaska. Table shows only those statements that garnered more than 30 percent of all responses in that outcome category (WFU authorized, not authorized in fire management plans, not authorized in land management plans).
**Number includes responses to questions asking to what extent a particular statement was responsible for the outcome and sums across positive extents: fairly, very, or almost entirely responsible.

Table 3. *Most frequently mentioned ideas for increasing use of WFU program described by Forest Service district fire management officers and assistant fire management officers in districts with wilderness responsibility (n = 68).* (Adapted from Doane 2005.)

	WFU authorized (n = 25)*	WFU not authorized (n = 13)*
Institutional support	11	2
Education	7	4
Flexibility	8	3
Increase lands available	5	2

*Number of responses to open-ended question regarding WFU program facilitators.

- Providing managers with incentives to use WFU,
- Counting WFU acres toward targets, and
- Protecting managers and their decision.

Facilitators most frequently mentioned by fire managers in areas where WFU is currently *not* authorized include: 1) educating internal and external audiences, including evaluating the adverse effects of suppression decisions and 2) increasing management flexibility, including allowing WFU even under high national preparedness levels, managing fires remotely, and changing Wildland Fire Implementation Plan Stage I timelines.

Line Officer's Perspective

Williamson (2005) addressed barriers and facilitators to WFU by asking how line officers make their go/no-go decision. She obtained a high response rate (85 percent) among a study population of district rangers with existing WFU authority in the Forest Service's Northern Region, Southwest Region, and Intermountain Region.

Williamson's analysis revealed that the primary factor differentiating district rangers likely to use WFU from those who are not is the ranger's perception of the WFU program's value. A high level of trust in the ranger's staff was also important.

On the other hand, top considerations that inhibit the WFU go decision included:
- External factors such as time of year, fire danger indices, ignition location, threatened and endangered species;
- Public perception; and

- Human resource availability and the lack of resources (ground and aerial), WFU qualifications, and agency support.

Williamson's results mirror research from other industries that show productivity is positively correlated to alignment with organizational values and priorities (cf. Vogus 2004) and suggests that any changes in WFU program outcomes will require attention to how organizational values are articulated, prioritized, and transferred to line officers.

> Changing program outcomes of wildland fire use will require attention to how organizational values are articulated, prioritized, and transferred to line officers.

Summary of Factors

Graphical representation of the myriad facilitators and barriers highlights their distribution across economic, social, and ecological realms (fig. 1). These factors include characteristics of individuals and organizations at district, forest, and national levels, as well as broader political and public attitudes.

From our work, the following appear to be key influences on program productivity:
- Biophysical constraints and public perceptions,
- Internal human resource capacity and availability,
- Internal agency support, and
- Individual commitment to the WFU program.

Further analysis of the relative influence of these factors on WFU programs might be necessary to guide or support future policy actions. (Figure 1 provides testable hypotheses.) However, a number of policy changes in 2005 have already started to address some of these barriers by creating a more supportive environment for fire use. These include:
- Changing policy, such as increased time for making the initial go/no-go decision (Stage I of the Wildland Fire Implementation Plan) from 2 to 8 hours, a new Wildland Fire Implementation Guide, more WFU capacity through additional training, and discussions to define interagency definitions for fire use modules;
- Increasing the number of authorized acres through amendments to existing, and the development of new land management plans, as well as frameworks and tools for assessing potential resource benefits and risks from fire;
- Addressing resource availability by allowing type 2 teams to manage WFU events and by placing long-term fire behavior analysts (LTAN) on these teams, sharing fire use managers (FUMA) among several events, allowing type 4 incident commanders to manage low-complexity WFU events, and placing emphasis on mentoring to build line officer confidence and experience with WFU;
- Increasing internal support and communication, facilitated by the Wildland Fire Lessons Learned Center, to share lessons learned, collect and distribute effective practices, and promote skill and knowledge through sponsorship of "Managing the Unexpected" workshops and after action reviews; and
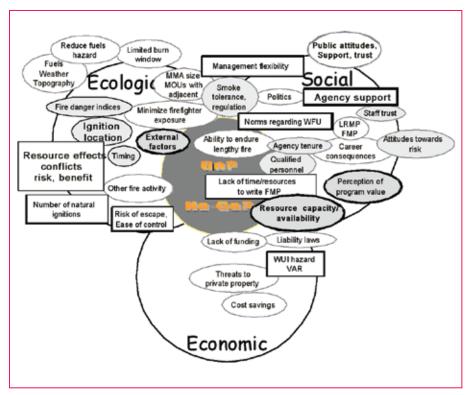
Figure 1. *Considerations for wildland fire use mentioned in the literature highlighting aspects of potential greatest significance from the perspective of Forest Service staff and managers with responsibility for wilderness areas. Rectangles indicate considerations from Doane 2005. Shaded ovals indicate results from Williamson, 2005. Bold fonts indicate convergence across studies, with heavier borders indicative of greater weight.*

• Increasing support for line officers when success is less than expected, changing policy, such as the Implementation Guide, and sponsoring workshops to build skills.

These changes highlight the dynamic nature of fire management and the rapidity with which at least some changes can be made. Changing the organizational culture will take longer, in part because changes related to the social environment—relationships, values, culture, organizational leadership—have received the least attention to date.

Acknowledgements

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