Wildland Fire Use — Challenges Associated With Program Management Across Multiple Ownerships and Land Use Situations

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Abstract—*The application and use of wildland fire for a range of beneficial ecological objectives is rapidly expanding across landscapes supporting diverse vegetative complexes and subject to multiple societal uses. Wildland fire use originated in wilderness and has become a proven practice successful in meeting ecological needs. The use of wildland fire in non-wilderness is emerging as an important practice but its success is predicated on the acknowledgment of the fundamental inseparability and equal importance of ecological, social, and economic needs and requirements. The 2005 western fire season resulted in the single largest scale application of wildland fire use in non-wilderness to date and illustrated that managing wildland fire use in these areas is associated with a higher level of complexity driven by a number of elements including: spatial scale differences; presence of multiple ownerships and increased values to be protected; increased needs to plan and implement mitigation actions; temporal scale differences for implementing mitigation actions; greater social and economic concerns and needs; and increased public information needs. Continuing expansion of wildland fire use implementation across federal, state, and private land ownerships and all land use situations will encounter additional influences and new challenges, situations not previously experienced, and ancillary implementation questions which could potentially limit program growth and development.*

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Introduction

Wildland Fire Use (WFU) is the application of the appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined designated areas outlined in Fire Management Plans (USDA/USDI 2005). What is currently wildland fire use has its origins in ground-breaking management decisions and actions in wildernesses, national parks, and other areas managed as de facto wildernesses over three and one-half decades ago. As this program expanded and evolved, planning processes, assessment procedures, and implementation techniques continued to progress. But, to successfully accomplish objectives as a land management practice in support of ecosystem maintenance, restoration, and community protection at the necessary scale, both temporal and spatial increases must be achieved and sustained. Consequently, wildland fire use applications must expand beyond wilderness into other suitable areas and broaden from a wilderness only application to one having potential applications across all land-use situations.

Managing wildland fire in wilderness has prompted development of specific procedures and processes in response to risks and challenges and has become a proven and widely applied practice to meet ecological needs. Actual accomplishments by all agencies shows the average annual level of achievement from 2001 – 2005 to be about three times higher than the average annual output for the previous five years (figure 1). Managing WFU in non-wilderness, while having been applied since the late 1990's, has not achieved widespread use. However, the 2005 fire season exemplified the expanding nature of this program; the single largest scale application of WFU in non-wilderness in the United States occurred. The advent of WFU expanding into non-wilderness adds a substantial management component and accomplishments can be expected to increase over historic levels. Figure 1 illustrates WFU accomplishments since the implementation of the Federal Fire Policy in 1995 and the 2005 non-wilderness accomplishment.

Continued programmatic expansion of wildland fire use is presenting new challenges, previously unexplored situations, and additional implementation questions which could potentially limit implementation. To support sustained program expansion, these questions need addressed, management efficiency must be improved, potential barriers to success should be eliminated, and all prerequisites to continued implementation must be defined and in place.

Existing Challenges to Wildland Fire Use

Wildland fire use, regardless of the land use situation it is applied in, is affected by a large number of factors that are supportive or potentially limiting to this activity. These factors as experienced from a predominantly wilderness land use situation are shown in table 1.

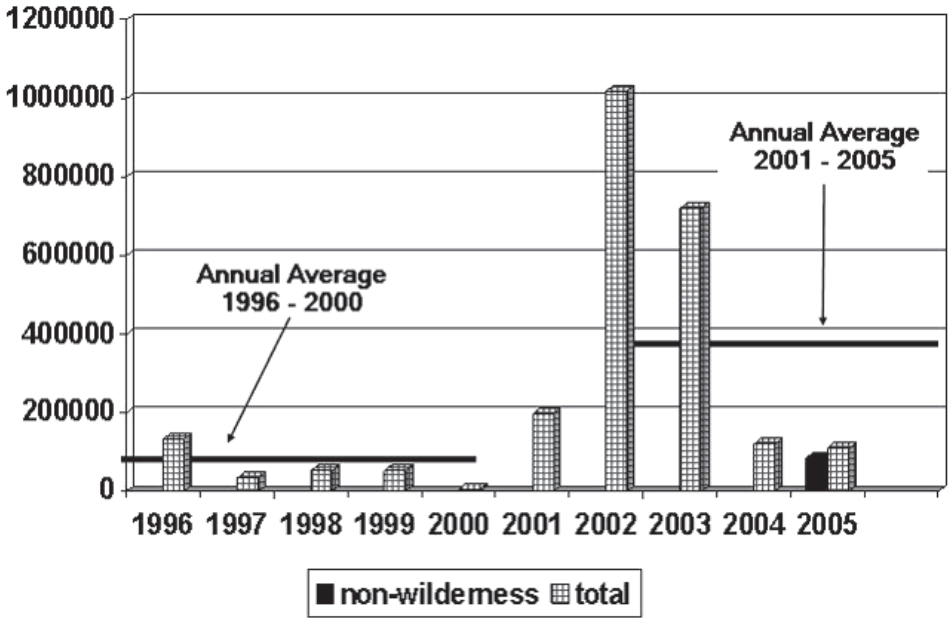

Figure 1—Wildland fire use accomplishments for all agencies, 1995-2005; comparison of annual total and non-wilderness for 2005 (source USFS, NPS data on file at National Interagency Fire Center, Boise, ID and National Fire Plan Annual Performance Reports, 2001- 2004. NOTE: NFP data is tabulated by fiscal year, not calendar year.)

Table 1—Current supportive and potentially limiting factors to wildland fire use (adapted from Zimmerman, in press).

Supportive Factors	Potentially Limiting Factors

▪ To date, the most supportive federal fire policy for using wildland fire as part of the full spectrum of appropriate management responses,
▪ To date, the highest level of advocacy for using wildland fire to accomplish resource benefits,
▪ To date, the highest level of scientific support for and technical capabilities to use fire,
  o Fire behavior prediction models,
  o Long-term risk assessment techniques,
  o Geographic information system capabilities,
  o Satellite imagery useful in assessing live fuel moisture, smoke production and dispersion, and fire locations,
  o Improved meteorological analysis and record keeping,
  o Fire effects prediction models,
  o Fuel measurements techniques,
▪ To date, the highest level of knowledge of fire effects and the natural role of fire,
▪ Higher levels of public awareness and understanding,
▪ Better definition and clarification in land management planning process in regard to the use of fire.
	▪ More dominant temporal limitations in response to changing fuel complexes,
	▪ More assertive social demands, needs, and tolerances which strongly sway public opinion, affect management opportunities, and in combination with continually expanding wildland-urban interfaces and associated protection concerns, dramatically affect the ability to apply fire across a wide spatial spectrum,
	▪ Significant influence of threatened and endangered species and sensitive natural and cultural resource considerations, protection, and management in fire use decision-making,
	▪ Changing fuel complexes and fire spread and intensity rates effects on increasing risk and complexity levels,
	▪ Continuing needs for expanded public information,
	▪ Smoke management concerns.

Emerging Challenges to Wildland Fire Use

The array of factors exerting influence on wildland fire use in non-wilderness encompasses the full set of factors listed in table 1. However, programmatic expansion into non-wilderness has encountered new situational elements presenting additional difficulty and complexity in wildland fire use management. It is apparent that prerequisite to full implementation in non-wilderness is the acknowledgement of the inseparability and equal importance of ecologic, social, and economic needs and requirements. During the past 35 years, wildland fire use has focused on ecologic needs and requirements as the most important objective. This focus is shifting as implementation moves out of wilderness and specific challenges are emerging during non-wilderness wildland fire use involving social and economic needs, planning considerations, and implementation procedures. Areas where concerns and questions associated with managing wildland fire use in non-wilderness have surfaced are shown in table 2.

Table 2—Emerging challenges supportive to, adding more management considerations, and potentially increasing complexity for wildland fire use, based on the 2005 fire season non-wilderness applications.

Supportive Factors	Concerns and Questions - Planning, Implementation, and General Understanding	Additional Complexity Influences
▪ Communication, education, and community relations opportunities ▪ Private landowner support for using wildland fire by on private lands in conjunction with federal activities, ▪ State agency support for using wildland fire for resource benefits by in cooperation with federal agencies, ▪ Support for State-led efforts to improve forest and watershed health and reduce potential wildfire effects ▪ Expansion of ecosystem restoration and maintenance and hazardous fuel strategy and accomplishments into all land use situations. ▪ Expanded implementation capability and greater accessibility.	▪ Number and kind of mitigation actions needed for successful management of the fire ▪ Size constraints/limitations on WFU in non-wilderness, specifically in regard to minimum size limits or thresholds (size thresholds) and a perceived similarity between non-wilderness wildland fire use management and prescribed fire ▪ Managing fire immediately adjacent to an MMA ▪ Equivalency to non-fire treatments ▪ Internal support for wildland fire use ▪ Communication, education, and community relations opportunities ▪ Cost containment	▪ Inclusion or exclusion of private lands within the MMA and wildland fire use affected areas ▪ Economic concerns – protection of necessary natural resources or establishment of alternatives ▪ Allotment fence protection – protection of necessary social-economic values ▪ Proximity to values – additional hazards ▪ Increased smoke management needs ▪ Fuels and fire behavior of lower elevational zones ▪ Susceptibility of non-wilderness to post-fire proliferation of invasive species

Supportive Factors

Communication, Education, and Community Relations—Perhaps one of the best opportunities to accomplish local communication and outreach is available during implementation of wildland fire use events in non-wilderness. The proximity of these fires to communities and increased public and media awareness due to the fire visibility, while likely adding difficulty to management actions, creates a virtual "classroom" where program and fire benefits can easily be explained and illustrated to increase public understanding and support. Such opportunities should be fully explored and utilized.

Increased Collaboration in the Use of Wildland Fire to Accomplish Beneficial Effects—

- Private Landowner Support for Using Wildland Fire on Private Lands—Much of the public and many but not all, private landowners are recognizing the value of restoring and maintaining fire-adapted ecosystems. This year, as wildland fire use expanded outside wilderness and

proximate to private lands, significant interest in support of managing fires and numerous requests to include private lands in management areas were received. This unprecedented level of interest and request for collaborative involvement and management by private landowners illustrates a growing trend toward greater support for the use of wildland fire where feasible. Management agencies are actively responding to this interest in all possible ways and future wildland fire use applications in non-wilderness will be collaborative efforts, with federal, state, and private partners involved.

- State Agency Support for Using Wildland Fire for Resource Benefits—New initiatives aimed at the improvement of ecosystem health are providing an impetus to capitalize on all possible fuel treatment activities, biomass utilization opportunities, increased use of wildland fire, and the restoration of fire-adapted ecosystems throughout western states (State of New Mexico 2004, State of Arizona 2005). As implementation plans are developed, collaborative activities are receiving increasing attention. While some State agencies are limited in their authority to use fire, they recognize the role of fire in restoration and maintenance of forest and watershed health and are providing increasing support to Federal agencies in the use of wildland fire. In situations where authorities permit it, State agencies are becoming actively involved in planning and implementing wildland fire use. Increasing collaborative implementation of wildland fire use is occurring. This type of cooperative involvement includes federal agencies, state agencies, private organizations, and private landowners to some degree and will lessen barriers to implementation, potentially reduce costs, and advance the use of wildland fire for resource benefits.

Additional Support for State-Led Efforts to Improve Forest and Watershed Health and Reduce Potential Wildfire Effects—As State agencies seek to implement forest and watershed health initiatives and programs, they are incorporating all viable strategies. Since wildland fire has been such an important factor influencing the structure and composition of many ecosystems, fire risk reduction in many areas can be achieved by restoration of natural fire and community protection capability can be enhanced by WFU. Wildland fire use is a viable and increasingly important management option, especially as expanding experience demonstrates the mitigating role fire can perform. Expanding application of WFU directly supports state-led efforts and compliments new initiatives and programs.

Expanded Implementation Capability and Greater Accessibility—Managing wildland fire in non-wilderness presents a different capacity for implementation than in wilderness. Specifically, most areas have a well-defined road network and improved access. A wider range of tools and tactics to complete mitigation actions is available and improved access increases the ability to implement mitigation actions. However, fires are often closer to Wildland-Urban Interface (WUI) areas. This spatial situation can affect timing, duration, and kind of mitigation actions that can or must be applied.

Concerns and Questions – Planning, Implementation, and General Understanding

Wildland fire use implementation in non-wilderness will by necessity, frequently, but not always, be implemented on a smaller scale than in wilderness.

This requires closer attention to maximum manageable areas, potentially more in-depth operational planning, and a need for greater mitigation actions to successfully manage the fire within the desired area, respond to other societal concerns, influence fire behavior, and protect sensitive areas. A primary difference between this application and wilderness implementation is, commonly in wilderness, size and time are the primary mitigation measures used to ensure the fire will remain within the desired area and mitigate potential threats.

Number and Kinds of Mitigation Actions—Management of WFU does not have a strict requirement of no on-the-ground action; in fact, smaller area management actions must be commensurate with values to be protected, desired objectives, and are described in detail in Wildland Fire Implementation Plans (WFIP). The number of management actions identified in WFIPs will always be in response to the fire risk (based on values, hazards, and probability) (USDA/USDI 2005). Non-wilderness fires are proving in general, to present a slightly higher risk level. Consequently, more management actions are often necessary in these areas than for comparable size wilderness wildland fire use events.

In addition to the amount of mitigation actions, the kind of actions also can vary. While wilderness fire implementation can have a high focus on monitoring, mapping, and closures with some on-the-ground holding or checking actions, non-wilderness fires frequently require more intense containment actions including wider use of standardized firefighting operations. The scale of burn out operations can vary dramatically and range from small site-specific actions that carry fire along a road, fence line, or property boundary to larger applications of burning through sensitive resource areas or adjacent to private property with ground or even large-scale aerial ignition. These types of focused and more intense management actions, seemingly inconsistent with the original philosophy of restoring fire to wilderness, are not inconsistent with objectives of ecosystem restoration and maintenance in all land use situations. In fact, they may be a necessity on a specific piece of ground and are no more than the specific situational requirements of using wildland fire to accomplish resource benefits.

Size Thresholds and Similarity to Prescribed Fire—Questions have arisen regarding size thresholds of non-wilderness WFU applications; specifically, are more intense efforts to manage long-duration wildland fires justified for smaller areas or would prescribed fire more efficiently accomplish this? Wildland fire use is a viable tool for accomplishing landscape scale ecosystem restoration and maintenance. Prescribed fire has high applicability for site-specific applications conducted on small to mid-scale levels. As scale increases, prescribed fire becomes a longer duration proposition with less specificity in objectives. A key difference between prescribed fire and wildland fire use is the degree of precision necessary to accomplish objectives. For site-specific actions identifying specific measurable objectives, greater precision in application may be required. Small-scale prescribed fire affords the ability to obtain higher precision through more control over area burned, time of burning, direction of spread, rates of spread, intensity and severity, duration of burning, and potential fire effects. But, the larger the scale, the more difficult it becomes to exercise and maintain this level of specificity. Wildland fire use affords more influence over restoration of fire as a natural process but less influence over specific effects. When objectives relate to process restoration across a landscape with differential fire behavior, differential fire effects, and alteration of fuel complexes, stand structure, and stand composition as

desired attributes; wildland fire use is an effective tool. In non-wilderness, size thresholds for WFU have limited value; there is no clearly definable lower size limit for WFU application. Wildland fire use in non-wilderness, while at times appearing operationally similar to prescribed fire, is appropriate to restore fire as a natural process and accomplish ecosystem maintenance and restoration objectives across landscapes, and in the majority of situations, will be as effective ecologically and economically. It should be considered/applied in all cases where it can accomplish landscape level effects (could occur in relatively small areas; the majority of all wildland fire use events are small size, short duration, inactive, and ecologically insignificant) and total application size will be influenced primarily by fuel types and continuity, just as wilderness fires are. But, a key difference will be the effect of land-use activities and land ownership patterns on implementation activities.

Managing Fire Adjacent to MMAs—Managing WFU in smaller landscapes creates numerous situations where the fire is immediately adjacent to a MMA. Past experience portrays this scenario as an undesirable situation. Textbook examples of MMAs nearly always show a fire well within an MMA in order to provide potential spread area for the fire and increased opportunities for management action points to mitigate or eliminate threats throughout the life of the fire. The smaller areas encountered in non-wilderness present situations where the fire can be immediately adjacent to the MMA from the onset or management actions burn out fuels between the fire and the MMA causing the fire to be adjacent to the MMA. These situations may be encountered during WFU implementation, will be more frequent in non-wilderness applications than in wilderness situations, and are not inappropriate or undesirable. Having fire against the MMA is only inappropriate when it taxes control capabilities, results from situations not described in the WFIP management actions, and/or is unanticipated. So long as management actions facilitate the accomplishment of objectives, having fire immediately adjacent to the MMA is acceptable.

Equivalency to Non-Fire Treatments—Managing WFU in non-wilderness in smaller areas or within the bounds of established road systems where additional mitigation actions are needed or where the fire is adjacent to the MMA introduces the question of whether objectives can be accomplished easier, quicker, and/or less expensively through the application of non-fire fuel treatments. Again, the precision of the objectives dictates what the most appropriate treatment technique should be. It is very difficult for non-fire treatments to simulate a natural fire and its effects. The timing of natural fire, its ability to present differential fire behavior and its indefinite duration across a range of weather conditions all contribute to the effects of fire. Non-fire treatments are more structured, lack the range of effects, and can be completed in finite timeframes that may be shorter than for a natural fire. In terms of expense, wildland fire use is proving to be less expensive than non-fire treatments, depending upon the final size. The long-term benefits of wildland fire use in terms of hazardous fuel removal, restoration of overall ecosystem health as reflected through changed fire regime condition class levels, restoration of fire as a natural process, and reduction of the threat of future wildfire spreading across landscapes and land ownerships outweigh short-term economic investments.

Internal Support for Wildland Fire Use—Some internal agency and interagency groups are resistant to accept wildland fire use as a legitimate fire

management option. The individuals and groups are either "holding on" to old traditions or lack a complete understanding of the Federal Wildland Fire Management Policy. While the concentration of such attitudes vary among agencies and organizations, this current position must mature before WFU can be totally integrated into fire management strategies.

Communication, Education, and Community Relations Opportunities—Objectives of WFU, associated risks, planning procedures, implementation practices, and potential tradeoffs have not always been understood and were sometimes not well accepted. An understanding of the guiding principles and objectives of the WFU program by the public and media is essential for social and political acceptance and endorsement. Currently, this understanding is increasing and may be at an all time high, but there is still a continuing need to establish and maintain a proactive communication and education effort for both the program and individual fire level.

While general public awareness of the role of fire in western ecosystems is increasing, smoke on the horizon will remain unsettling to much of the public, particularly as more fires are managed in proximity to and visible from urban areas adjacent to wildlands. An understanding of the full range of appropriate management responses to wildland fire is needed as opposed to an oversimplified belief that all fires can and should be extinguished, preferably by fire retardant dramatically delivered by large air tankers.

Increasing programmatic accomplishments can provide a basis for improving long-term community relations in regard to the wildland fire use program. Fire restoration in highly visible areas can graphically demonstrate that wildland fire use operational actions are safe, well planned, adequately funded, and effectively executed. Strengthened awareness of the natural role of fire and fire effects, the role and value of ecosystem restoration needs in all land use situations, and removal or reversal of professional and public controversies surrounding fire management perspectives and philosophy can result from successful implementation. Landowners and community leaders may be stimulated to complete Community Wildfire Protection Plans and become much more proactive in hazard fuel reduction.

Cost Management—Cost management has become a significant topic of concern by agency administrators regarding both suppression fires and WFU events. High scrutiny and review of large fire suppression costs seem to be fostering a general feeling that equates low cost as a principle measure of success. Implementing an appropriate management response that is truly the best action for a given set of circumstances will have an associated cost. This cost should always be monitored and managed at an efficient level. But, it must be accepted as the price of implementing the proper action and not be the cause for reactive alteration of strategies and tactics.

Additional Complexity Influences

Inclusion of private lands—In many previous applications of the use of wildland fire to accomplish resource benefits, it was common to protect private lands and, in the process, exclude fire from burning outside federal lands. In 2005, there was considerable interest on the part of private landowners to be included in many wildland fire use applications if possible. Since this is converse to past planning and implementation practices, procedures to include private lands are not clear.

Wildland fire use is part of the full range of appropriate management response actions consistent with the Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy (WFLC 2003). Some States support the implementation of WFU and are prepared to serve as cooperators in the management of the wildland fire including the development of systems and methods for the use of wildland fire on private lands. In addition, several states have developed statewide plans that address forest and watershed health. Other states are currently developing new policy to allow for the orderly proposal and designation of areas where alternative suppression strategies may be employed consistent with values at risk, fire ecology, and historic fire return intervals, and potential fire severity. This policy will provide a process to manage wildland fires under predetermined conditions, criteria, and prescriptions on federal, state, county, and private lands, as appropriate.

Specific authorities allow the Forest Service to enter into agreements with willing State governments and landowners for the protection, restoration, and enhancement of fish and wildlife habitat, and other resources on public or private land that benefit those resources within the watershed. The Wyden Amendment provides for benefits that include improving, maintaining, or protecting ecosystem conditions through collaborative administration and/or implementation of projects; improving collaborative efforts across all ownerships, not just limited solely to adjacent Forest Service lands; and increase operational effectiveness and efficiency through coordination of efforts, services, and products.

Collaboration to explore and utilize all opportunities to maximize ecological restoration activities and cross-jurisdictional, landscape efforts has yielded procedures for wildland fire use implementation adjacent to or potentially impacting private lands. Three scenarios have been developed to date: where State agencies can represent private landowners and collaboratively work with Federal agencies to implement WFU, where State agencies are limited in their capacity to implement WFU and agreements between Federal agencies and private landowners must be developed, and where agreements between Federal agencies and County governments must be developed. These scenarios are:

- State representation of private landowners and collaborative implementation—In some states, the state agency will be a cooperator in the management of the fire, including the development of systems and methods for the use of wildland fire on private lands. The State agency will provide the Federal agency with a Delegation of Authority to the Incident Commander or Fire Use Manager that directs them to manage the fire across private lands under State authority with the appropriate management response that could move across/around/remain outside of private lands.
- Individual Landowner Agreements—In some states, the State Forester may furnish advice to the people of the state on forestry matters and has the authority to prevent and suppress any wildfires on state and private lands located outside incorporated municipalities, and if subject to cooperative agreements, on other lands located in this state or in other states. The State Forester has the responsibility to prevent and suppress wildfires only on lands covered by cooperative agreements. However, no provision exists for the responsibility of wildland fire on private lands to rest with the State Forester. Therefore, he/she cannot re-delegate authority to the Forest Service to include private lands as part of WFU activities. So, procedures for WFU implementation adjacent to

or potentially impacting private lands in these states must either involve excluding private lands from the WFU area or developing individual landowner agreements between the Federal agencies and landowners.

- Pre-existing agreements with County Governments—During the period between 1999 and 2001, the Bureau of Land Management (BLM), in coordination with the USDI Solicitors Office, developed an agreement format to utilize when developing pre-existing agreements allowing for wildland fire use (on file, BLM Colorado State Office). The National Fire Plan emphasized that local and county governments should develop fire management plans for their jurisdictions that may or may not incorporate wildland fire use into their management schemes.

Economic Concerns – Protection of Necessary Natural Resources or Establishment of Alternatives—From an economic standpoint, wildland fires in non-wilderness potentially pose increased economic threats. A notable example is the impact to livestock operators. In some cases, these impacts can be mitigated by movement of livestock to alternative areas, delaying or checking the spread of fire through a specific area, or by maintaining a set of alternate grazing areas (vacant allotments, seasonal exceptions, etc.) that could constitute "grass banks." Whatever the specific action taken is, managers face additional concerns that must be planned for and effectively implemented. If not fully accounted for and addressed, these situations could severely limit wildland fire use applications.

Allotment Fence Protection – Protection of Necessary Social-Economic Values—Using wildland fire to accomplish resource benefits is almost universally accepted as producing only beneficial effects. But in fact, these are wildland fires, burning with differential fire behavior from random points of ignition and across widely ranging and partially mitigated areas. While fires have definite ecological benefits, they can also have some social and economic impacts. Allotment and pasture fences represent an additional concern, if not properly planned for, could limit or restrict wildland fire use applications. Many fences across federal lands are constructed of wood posts and stays. Even low intensity surface fires can remove most or all of these wood materials. There are also fences on private lands that can be impacted. If the allotment or pasture integrity is lost from fire damage, economic impacts to livestock operators can be incurred from movement of livestock or loss of grazing opportunities. Long-term impacts can result from inability to re-construct fences on both public and private lands; there is no avenue currently available to the federal land management agency to assist landowners in repairing or replacing damaged structures on private lands.

Threats to fences must be addressed as a social-economic concern during the planning process and mitigation actions must be developed that protect the fences or allow for movement of livestock to alternative sites. Such mitigation actions would need to be coupled with a strategy for either protection or reconstruction to eliminate longer-term impacts.

Proximity to Values – Additional Hazard—Many wildland fires in non-wilderness will be situated in closer proximity to private lands and even to communities and developed areas. Decreased distance from values to be protected can result in higher probabilities of rare fire spread events, greater spread potential depending on fuel types, and a likelihood of more area covered by finer fuel types. Overall, non-wilderness land use situations will present a higher hazard and correspondingly, increasing risk.

Proximity to Values – Increased Need for Communication, Education, and Community Relations—While an aggressive and efficient communication and education effort for wildland fire use programs and for each wildland fire that is managed is important, it is imperative for this to occur when fires are closer to developed areas or are visible daily. Without this, inaccurate perceptions, assumptions, or beliefs could strongly sway public opinion, affect management opportunities, and have fast-acting impacts on our ability to use fire across diverse landscapes.

Increased Smoke Management Need—Having fires closer to urban areas increases concerns over smoke management. Since WFU events may be of longer durations, smoke production will ebb and flow according to weather and fire behavior and present an increased element of complexity. Some weather combinations will result in undesirable smoke conditions. Additional planning will be required to ensure fires can be managed while meeting air quality and smoke management needs.

Fuels and Fire Behavior of Lower Elevation Zones—Public lands are managed with significant industrial, commercial, agricultural and recreational use on-going almost on a year-round basis. Fuel types typically found on lower elevation areas tend to support fire behavior characterized by rapid spread rates and high intensity. Using wildland fires to accomplish resource benefits in such areas can be difficult and require a much more aggressive timetable to complete planning requirements as well as constant awareness and attentiveness to the escalating fire situation in order to maintain the ability to implement timely mitigation actions. Various levels of pre-planning can help but generally, all planning and implementation activities after ignition occurs must take place in a more accelerated timeframe than in areas supporting less flammable fuel types.

Susceptibility of Non-Wilderness to Post-Fire Proliferation of Invasive Species—A concern in much of the arid western United States is the invasion of burned areas by non-native and noxious species. Though managed fire is beneficial in the long term, short-term protection against invasive species until native plants are established may be needed. If invasive species invade an area, fire hazard can become considerably more severe. There are no simple methods available to mitigate the potential for invasive species entering a burned area once the fire has passed. Current policies do not permit the use of emergency stabilization funds on WFU events. This has created the need for fire and land managers to pursue a variety of means to implement short-term mitigation actions that reduce or minimize the risk of invasive species spread and intensification and soil erosion on burned areas. In some instances, a lack of mitigation options has caused agency administrators to choose a suppression strategy so that emergency rehabilitation and stabilization funds can be accessed.

Summary

The long history of fire suppression and protection of natural resources has fostered definitive and well-established attitudes regarding “good” and “bad” aspects of wildland fire. As wildland fire became increasingly important to accomplish beneficial effects, general understanding and acceptance did not

keep pace. A "let burn" perspective that evolved over the years pervaded the general thinking about fire management. Confusion associated with seemingly conflicting objectives of fire suppression and fire management resulted and general program endorsement suffered. Appreciation and understanding of the natural role of fire and fire effects are now reaching an all time high and attitudes are changing accordingly, although slowly.

Wildland fire use has proven to be an effective management practice in wilderness and is now expanding into non-wilderness situations with highly successful results. The use of wildland fire in non-wilderness must be applied under certain circumstances and within specific bounds. Even though success has been achieved, this practice is not suitable in all non-wilderness situations, and may not even be feasible in others. As this program expands across multiple ownerships and land use situations, new challenges, higher complexity, and needs to address additional management concerns, on-the-ground mitigation actions, and public concerns are surfacing. Specific challenges facing managers in these areas include: private lands, protection of economic concerns, values to be protected and their proximity, increased smoke management concerns, and numerous planning, implementation, and interpretation questions.

Expansion of wildland fire use outside wilderness has the potential to increase vegetation mosaics, decrease long-term wildfire potential, and increase community protection capability. Expanding wildland fire use beyond wilderness and across all land-use situations will broaden fire management accomplishments, strengthen ecosystem maintenance and restoration and community protection strategies, and advance land management practices. But, successful management must be predicated upon continued and proactive collaboration among federal and state agencies, private organizations, and private landowners.

References

State of Arizona. 2005. The Report of the: Governor of Arizona Forest Health Oversight Council. Executive Order 2003-16. AZ Dept. Commerce. Phoenix, AZ. 26 p.

State of New Mexico. 2004. The New Mexico Forest and Watershed Health Plan, An Integrated Approach to Ecological Restoration. New Mexico Forest and Watershed Health Planning Committee. New Mexico Forestry Division, Energy, Minerals, and Natural Resources Department. Santa Fe, NM. 33 p.

USDA/USDI. 2005. Wildland fire use: implementation procedures reference guide. USDA Forest Service. 71 p.

Wildland Fire Leadership Council (WFLC). 2003. Interagency strategy for the implementation of federal wildland fire management policy. National Interagency Fire Center, Boise, ID.

Zimmerman, G.T. in press. Management implications of fire use in wildland areas subject to mixed severity fire regimes in the Southwestern United States. Spokane, WA, November 2004. Washington State University Pullman.