



**THE FEDERAL LAND ASSISTANCE, MANAGEMENT
AND ENHANCEMENT ACT OF 2009
REPORT TO CONGRESS**



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Rural firefighters provide structure protection during the Castle Rock fire in Idaho. Credit: NIFC, Kari Greer.

EXECUTIVE SUMMARY

Wildland fire management across all lands and jurisdictions in the United States involves a complex matrix of fuel types, climate considerations, mission goals, policies, land and resource values, social concerns, and costs. None of these issues are new. However, because each of these elements — individually and collectively — is dynamic, the fire community is continually adapting and evolving to meet the challenges posed by wildland fire.

The past two decades have seen a rapid escalation of extreme fire behavior, increased risk to responders, home and property losses, higher costs, and increased threats to communities and landscapes. These trends call for a broad-based, collaborative and cohesive response to better address these mounting challenges. Congress, the fire community, and the public have recognized a need for a new strategy, a new path forward, and perhaps a new way of thinking about wildland fire.

As is the nature of many evolutionary phases, this current effort has generated collaborative consideration and examination of wide-ranging but pertinent elements in creating a synergistic move forward. While this report addresses the specific elements requested by Congress in the FLAME Act — most cost-effective means for allocating budget resources; reinvest in non-fire programs; employ appropriate management response; allocation of hazardous fuel reduction funding based on priority projects; assessing the impacts of climate change on the frequency and severity of wildfire; and study the effects of invasive species on wildfire risk — a separate but companion document expands upon the elements here and outlines a path toward development of a national cohesive wildland fire management strategy which will provide a foundation from which to build local and regional actions and direction.

Together, these documents address the elements requested by Congress and represent the next stage in an evolving world of wildland fire management with the goal of achieving safer, more efficient, cost-effective public and resource protection goals and more resilient landscapes.

This collaboratively developed report establishes a way forward. In responding to a request from Congress, the report addresses the seven primary elements facing fire and natural resource managers and the fire community at all levels, from local to national and from states to tribes.

A separate companion document titled, *A National Cohesive Wildland Fire Management Strategy*, presents a collaboratively designed approach to a national strategy. It adds to and builds upon the information presented in this report by clearly identifying the national challenges, guiding principles, goals and performance measures. It culminates in presenting a path forward on how the national fire community will proceed, together, to develop and implement the national strategy.

Three primary factors have been identified as presenting both the greatest challenges and the greatest opportunities for making a positive difference in addressing wildland fire problems and costs. They are:

- **Restoring and maintaining resilient landscapes.** The strategy recognizes the current lack of health and the variability of this issue from geographic area to geographic area. Because landscape conditions and needs vary depending on local climate and fuel conditions, among other elements, the strategy will address landscapes on a regional — more localized — scale, instead of a single model.
- **Creating fire-adapted communities.** The strategy will offer options and opportunities to engage communities and work with them to become more resistant to wildfire threats.
- **Wildfire response.** This element considers the full spectrum of fire management, from preparedness to full suppression to managing fire for multiple objectives. The strategy recognizes differences in missions among local, state, tribal and Federal organizations and will offer collaboratively developed methodologies to move forward.

This document and its companion — *A National Cohesive Wildland Fire Management Strategy* do not represent an end-point, but rather a beginning. There is a tremendous amount of work to be done, science to be considered and incorporated, and differences to be resolved. The direction is set and the wheels are in motion to address the significant issues that have increasingly plagued the fire community and the Nation.



INTRODUCTION

Fire has been a natural and integral part of ecosystems for thousands of years.

Early in the last century, wildfires on the landscape often burned in remote areas and, with rare exception, without devastating and widespread effects on homes and citizens. As suppression became a necessary goal, firefighting agencies evolved but remained discrete entities for decades.

Today is different. Trends in urbanization and development patterns have resulted in millions of citizens, homes, and entire communities located in fire-prone environments. Previous decades of aggressive fire suppression have resulted in widespread hazardous accumulations of flammable vegetation. As the climate changed, fire seasons grew longer, hotter, and drier; these factors converged, creating increasingly explosive and risk-laden conditions. Fire programs and firefighting operations grew more complex, costly, and challenging; and it became imperative that fire agencies and organizations work together.

As these changes were evolving, so too, were the political landscape, public perceptions, fire science, fire costs and budgeting. Costs in particular soared, not only for suppression but in costs related to economic, resource, and environmental losses. The challenges of fire management became exacerbated by the diversity of land ownership and jurisdictions as well as a lack of integration between fire and resource management programs and, in some cases, the lack of authority to merge the two. Consistent with and preceding this mix of evolutionary phases, a few notable events in the late years of the last century brought national attention to the wildfire community.

The Yellowstone fires in 1988 burned nearly 800,000 acres in America's oldest national park and sparked an intense national debate about the role of fire in nature and how it is managed. The Oakland Hills wildfires in 1991 killed 25 people and turned more than 3,300 homes to ashes, drawing keen awareness to the risks of living in the wildland-urban fire environment. The 1994 tragedy on Colorado's Storm King Mountain killed 14 firefighters and gave rise to discussions about risks to firefighters versus values being protected. These events foreshadowed what are now identified to be the three primary parts of a cohesive strategy: landscape health, fire-adapted communities, and fire response.



Old Faithful erupting during the Yellowstone fires in 1988. A plume of smoke and the Old Faithful Inn can be seen in the distance. Credit: NPS, Jim Peaco.

These and other incidents led up to the 1995 Federal Wildland Fire Policy and Program Review, the first comprehensive stem-to-stern look at the Nation's wildland fire issues, including fuel management, the role of fire in the environment, and wildland-urban interface issues. This was also the first in what would become a series of reviews, plans, and strategies to move the fire community and the Nation forward safely and more effectively.

The 1995 review was updated in 2001, the same year that saw the birth of the National Fire Plan. This congressionally directed plan was signed to develop a response to severe wildfires, reduce fire impacts on rural communities, and assure sufficient firefighting capacity in the future.



A wildfire in Ohio in 2009. Credit: National Association of State Foresters (NASF).

Each moved us forward as a Nation and fire management community. The science and understanding of fire expanded, critical strategic and tactical efforts were developed, and cooperation and collaboration was strengthened at all levels, locally and nationally. None, however, completely solved the problems, as communities and the wildfire environment are constantly changing, requiring agencies and programs to do the same. An update is needed.

THE FLAME ACT: THE NEXT STAGE IN THE PROCESS OF EVOLUTION

Wildfire suppression costs have grown tremendously in recent years. Projections indicate this trend may increase as a result of unhealthy forests, hazardous fuel build-up, changes in climate conditions, and increasingly populated wildland-urban interface areas.

In 2009, a highly diverse group of interests came together for the specific purpose of advocating a fix for the fire suppression funding challenge. The Partner Caucus on Fire Suppression Funding Solutions--a coalition of 114 environmental, industry, outdoor recreation, and forestry organizations led by National Association of State Foresters (NASF), The Wilderness Society and American Forests, believed that the establishment of a Federal Land Assistance, Management, and Enhancement (FLAME) fund would help to move the USDA Forest Service (Forest Service) and the Department of the Interior (DOI) toward a sustainable suppression funding mechanism better suited to deal with the escalating costs of fighting emergency fires.

Subsequently, Congress passed the Federal Land Assistance, Management, and Enhancement Act of 2009 (the FLAME Act). This legislation established a separate account for funding for emergency wildfire suppression activities undertaken on Department of the Interior and National Forest System lands.

In addition to the funding language, the Act required that within a year of enactment, the Secretaries of Agriculture and the Interior, acting jointly, submit to Congress a report containing a cohesive strategy addressing how the two Departments, working together, will address the wildland fire problems. Further, the report was to be consistent with recommendations described in recent Government Accountability Office (GAO) reports relative to a cohesive strategy and the strategic elements identified to be addressed.

Leadership in both Departments recognized that in order to be truly national in scope, a cohesive strategy must go beyond the DOI and Forest Service and include tribal, state, local, public and stakeholder interests. Wildfire knows no jurisdictional boundaries and the agencies and entities having direct or indirect fire management responsibilities are therefore linked at all levels. Inclusion, collaboration and cooperation are absolute requirements in today's wildland fire environment.

Embarking on a strategy development effort, the Wildland Fire Leadership Council (WFLC) — a consortium of Federal, state, tribal, county and local authorities — established a Cohesive Strategy Oversight Committee (CSOC) consisting of representatives from all levels of fire management and charged them with moving forward.

The subsequent process included a series of forums held in 14 locations across the Country to gain insight and input in identifying problems, challenges, and possible actions to effectively address them. Additional input was gained through smaller meetings, informal conversations, and written comments. Still other input was compiled by a team of scientists convened to inform both the strategy development process and the resulting strategy. Overall, input was gathered from stakeholders, including a cross section of entities having an interest in wildland fire, from Federal, state, tribal and local agencies, to individual citizens and communities, non-governmental organizations, and institutions and academia.



A rural fire engine heads to the Yellow Rail Prairie fire on the Anahuac National Wildlife Refuge in Texas. Credit: FWS.



Firefighters ignite a prescribed fire near homes near the Petit Manann National Wildlife Refuge in Maine. Credit: FWS.

FLAME ACT ELEMENT 1: MOST COST-EFFECTIVE MEANS FOR ALLOCATING BUDGET RESOURCES

The means of allocating budgets within the Federal fire agencies has been a challenge for many years. Historically, the Federal fire agencies had separate systems for distributing their funding with little coordination and overlap. As a result, the level of funding for specific programs within fire and aviation was often inconsistent, and subjective criteria were reflected in decisions. As fire seasons are generally becoming longer and more difficult and more communities are at risk this approach for allocating funds is inadequate.

Currently, through the auspices of congressional budget allocations, a number of programs and activities are funded annually which support not only the Federal wildfire programs but also encompass Federal assistance to states, tribes and local jurisdictions. The level of funding and the relative mix of funds supporting preparedness, suppression, prevention, research, state and volunteer fire assistance, and hazardous fuel is at the center of ongoing discussion. A number of factors affect the relative level of funding allocations across programs and jurisdictions. The resulting decisions must address a multitude of needs at the Federal, state, tribal, and local levels.

Cost-effective strategy characteristics include:

- Approaches that demonstrate advanced risk management based on managing exposure to the public and emergency responders, while meeting reasonable management objectives of multiple partners.
- Responses and approaches that leverage skills and abilities of a variety of involved partners and stakeholders.
- Investments that result in reduced cumulative risk, based on cost/loss assessments, using sound scientific protocols.

Many modeling sources are available to help with landscapes, communities, and wildfire analyses. They include State Forest Resources Assessments, Regional Wildfire Risk Assessments, resource and land management plans, Ecosystem Management Decision Support, Fire Program Analysis, and others. Connection to community-level efforts and revised modeling approaches will be necessary.

As the Cohesive Strategy evolves, various regional strategies will be proposed to include different investment levels and mixes of options for reducing wildfire risk. These differences would reflect varying levels of emphasis on the major goals of a cohesive strategy.

Developing and enhancing tools to support funding decisions remains a work in progress. The principles of monitoring and adaptive management will be applied. To be successful, all jurisdictions need to be aware of what works and what does not, and be willing to take the steps that will guide their efforts along the best possible course.



Fuels reduction project conducted by Florida Division of Forestry, Photo Credit FL Division of Forestry

FLAME ACT ELEMENT 2: REINVEST IN NON-FIRE PROGRAMS

In past years, when the cost of managing Federal wildfires exceeded the funds appropriated by Congress, monies were often shifted from non-fire programs to cover the cost. Over the past decade, the Forest Service fire program has gone from encompassing less than 20 percent of the Agency's budget to nearly 50 percent.

With the enactment of the FLAME Act funding is available to cover the cost of large or complex fire events or for use when the incident meets certain criteria (300 acres, threat to life and property, or when the cumulative cost of suppression exceeds appropriated amounts). Fires that do not meet the criteria are funded through the traditional agency suppression budgets. Once a declaration is made by the appropriate Secretary, the eligible wildfire suppression event can be funded through the FLAME fund.

The Act also allows for the use of new methods when formulating fire suppression funding estimates for the Wildland Fire Management and FLAME fund appropriation accounts. The expectation is for the Secretaries to consider data regarding actual prior-year fire suppression expenditures, predictive modeling and any other criteria they deem appropriate, rather than the inflation-adjusted 10-year average suppression expenditures as has been done in the past. The FLAME Act limits any transfers until after the FLAME funds and the Agencies' regular suppression funds are exhausted.

Once implemented, a cohesive strategy will enable land managers to focus on broader work activities that will contribute to more resilient landscapes and communities – e.g., work to control invasive species, manage wildlife habitat, implement fire prevention and conservation education programs, landowner assistance education, fire management, and management of insect and disease issues.



A father and son kayak a scenic river in the Northwest. Credit: NIFC.

FLAME ACT ELEMENT 3: ASSESSING RISK TO COMMUNITIES

Nationwide, about 70,000 communities are estimated to be at risk from wildfire. Assessing the level of risk to the larger landscape and wildland-urban interface (WUI) — the places where structures and wildland fuel intermingle — is a task that goes far beyond just counting homes in fire-prone areas. The NASF provides guidance for identifying and maintaining state-level data for all communities designated by the state as being at risk from wildfire. National guidance for this effort is provided in the NASF Briefing Paper: *Identifying Communities at Risk and Prioritizing Risk Reduction Projects*. Communities-at-risk should continue to be identified on a state-by-state basis with involvement of all organizations with wildfire protection responsibilities—local, state, tribal, and Federal—along with other interested cooperators, partners, and stakeholders.

Identifying Risks

Risk to communities is generally determined by the number, size and types of wildfires that have historically affected the area; topography; fuel and weather; suppression capability of local and regional resources; where and what types of structures are in the WUI and; what types of pre-fire mitigation activities have been completed. States are expected to provide appropriate community risk analyses and to identify causes of risk that may be addressed through projects. In some locations this has been done on a geographic-area basis.

A number of tools have emerged to identify and define risk and to assess the level of threat to communities. These tools largely assess risk based on common parameters. The tools include the Southern Wildfire Risk Assessment, Northeastern Wildfire Risk Assessment, the Westwide Risk Assessment as well as other agency risk assessments.

Additionally, fire scientists have made important advances in mapping populated areas and measuring wildfire risk to communities in a national assessment using LandScan USA data, which provides new methods for estimating spatial population data. New methods to measure risk to communities have been presented by the fire science community in the regional and forest prototypes using burn probability and intensity pilots, and related risk analyses. Subsequent decisions regarding the specific strategies at regional and national levels will better define how to achieve fire-adapted communities and assess risk to them.

Community Wildfire Protection Planning

On the local level, Community Wildfire Protection Plans (CWPPs) or the equivalent provide a specific risk-assessment to a county or community. The CWPPs are a comprehensive wildfire planning tool for a community or a county and include a specific risk assessment which collaboratively identifies values at risk. Working together to create a CWPP is an important first step in bringing the awareness of shared wildfire risk home to the community. The Healthy Forest Restoration Act of 2003 (HFRA) clearly supports the role of communities in Federal land management planning. This successful model to mitigate wildfire risk has been used in communities without adjacency to Federal lands.



Firefighter removing debris around a house in the wildland-urban interface in Northern California. Credit: NIFC, Kari Greer.

The minimum requirements for a CWPP are defined in the HFRA with more detailed guidance provided in the publication, *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities*, (March 2004) and the *Community Guide to Preparing and Implementing a Community Wildfire Protection Plan*, (August 2008).

The HFRA identifies the following requirements for a CWPP:

- collaboration;
- prioritized fuel reduction; and
- measures to reduce structural ignitability.

The HFRA requires that three entities mutually agree to the final contents of a CWPP:

- the applicable city or county government;
- the local fire department(s); and
- the state entity responsible for forest management.

These plans also include educating homeowners; targeting, prioritizing, and scheduling fuel treatments; and building response capability. Human and financial resources will be needed to build local fire planning capacity.

Local authorities such as fire departments, fire protection associations, county planning and zoning departments, and other authorities conduct risk assessments that help them determine their local needs for fuel treatments, equipment, personnel, training, mitigation needs, local ordinances or code adoption and enforcement. Local assessments can also identify which mitigation programs are best for a given community, such as National Fire Protection Association's "Firewise" and the International Association of Fire Chief's (IAFC), "Ready, Set, Go!"

Regulation through codes and ordinances and subsequent enforcement is a major challenge for communities-at-risk since most of those communities are small. Even if they have authority to adopt codes, many communities do not have the resources to enforce them.

Most communities-at-risk are served by volunteer fire departments, if they have fire protection at all. Many of these departments do not have the resources to take on additional responsibility without additional funding. The paradox is obvious: communities-at-risk that can do the most to make their communities fire-adapted do not have the resources to do so.

Fire-Adapted Communities

Despite the challenges of assessing and countering risks, progress is being made to address the threats. One approach is the concept of "fire-adapted communities," which is one of the three primary elements of a cohesive strategy.

This aspect of a cohesive strategy relies heavily on communication, education, funding, and the willingness on the part of citizens and agencies at all levels to work closely together to map out and carry forth a community vision. This vision, turned into action at the local level and repeated thousands of times across the Country, is the best approach to successfully address communities-at-risk.



More than 600 communities have met the "Firewise" requirements. Credit: NIFC.

A fire-adapted community is one consisting of informed and prepared citizens collaboratively taking action to safely co-exist with wildland fire. An inherent part of becoming a fire-adapted community is to assess the community and the threat posed to it by wildfire. A fire-adapted community generally has achieved or is working toward:

- Implementing “Firewise” principles to safeguard homes and “Ready, Set, Go!” principles to prepare for fire and evacuation.
- Developing adequate local fire suppression capacity to meet community protection needs.
- Designing, constructing, retrofitting and maintaining structures and landscaping in a manner that is resistant to ignition.
- Adopting and enforcing local codes that require fire-resistant home design and building materials.
- Raising the awareness of and creating incentives for growth planning and management that reduces, rather than increases, fire-prone development.
- Properly spacing, sequencing and maintaining fuel treatments across the landscape.
- Developing and implementing a CWPP or equivalent.
- Establishing interagency mutual aid agreements.
- Designating internal safety zones.

Fire-Adapted Communities within a Cohesive Strategy

A key feature of a cohesive strategy is its direction that communities take on the responsibility of becoming fire-adapted. A cohesive strategy is aimed at promoting fire-adapted communities through:

- Fuel treatments that are properly placed, sequenced and maintained.
- Restoring and managing healthy, resilient landscapes to reduce risks to nearby communities.
- Building capacity of local, rural, and volunteer fire departments.
- Public involvement in risk and mitigation activities.

Local Fit, National Programs

“Firewise” and “Ready, Set, Go!” concentrate on assessing community risk and addressing it through community and individual responsibility.

“Firewise” is a national program designed to educate the public about how to reduce fuel around homes, retrofit homes with non-combustible roofs and building materials, clean gutters and yards, trim ladder fuel, move firewood, propane tanks and other combustible fuel away from the house, provide safe access and egress, and take other steps to make the home defensible in case of fire. More than 600 national “Firewise Communities” have met the standards for pre-fire mitigation. Countless other communities have used “Firewise” principles to reduce risk but have not achieved full Firewise Community status.

“Ready, Set, Go!” is a federally funded, national program delivered through local fire departments. “Ready” is the “Firewise” message of being prepared before wildfire strikes. “Set” teaches people in communities at risk to be aware of imminent fire danger and to prepare for successful evacuation. “Go!” emphasizes the importance of evacuating when instructed to do so.



Snake River Helitack crew member limbs trees to reduce fuels around the Tavaputs River Ranch during the Trail Canyon Fire near Price, Utah, on the BLM Moab District.

Fire Safe Councils are another tool available to help assess risk. These councils originated in California as a way to validate mitigation projects in the WUI and grew to provide mitigation education. The Fire Safe Council model delivers the defensible space/Firewise message and has spread to include several other states.

All Must be Involved

Consistent, complete, and up-to-date assessment methods are needed to track both the risk and the reduction of risk to the Nation's communities near wildfire-prone areas. Essential to the success of risk assessments are ongoing, integrated efforts to educate and involve local property owners in a program of continued mitigation.

The NASF briefing paper *Communities at Risk and Prioritizing Reduction Projects*, states, "Federal, state and local governments should collaborate across jurisdictions with a variety of partners and plan community risk reduction projects that complement surrounding jurisdictions. Approval of projects at the state level or Federal regional level should take into account the value of collaborative projects."

As the *2009 Quadrennial Fire Review* noted, to truly achieve fire-adapted communities the Nation must take "...steps for increasing knowledge and commitment, and building a sense of responsibility among private landowners, homeowners, the insurance industry, fire districts, local governments and other key players in interface communities for wildfire prevention and mitigation."



Mescalero Apache Reservation/Lincoln National Forest Boundary. Taken by Bernie Ryan, Senior Forester, BIA. Photo shows a clear delineation of the jurisdictional lines where forest/fuels management projects have been completed on tribal lands to the left and non-treated other Federal lands to the right.

FLAME ACT ELEMENT 4: EMPLOY APPROPRIATE MANAGEMENT RESPONSE

Fire has played an integral role in maintaining healthy North American ecosystems for more than 10,000 years. Native Americans recognized through experiential learning the value and uses of fire to sustain healthy, diverse ecosystems as a means to sustain their quality and style of life. Fire still has an important and special place in the natural order of succession, and this role needs to be recognized.

For much of the past century, prevailing social and resource views led fire management in the United States to be shaped by the Federal “10 a.m. policy” and state nuisance laws, whereby all wildfires were to be extinguished by 10 a.m. the day following ignition. This led to a standard practice across virtually all jurisdictions of immediate and aggressive full suppression of all natural and human-caused ignitions. The policy created a set of social, ecological and financial conditions, and expectations and outcomes that have been under increasing scrutiny and adjustment.

Beginning in the 1970s, there was growing recognition that a full-suppression response policy at all cost had proven unacceptable and unsustainable both ecologically and from a perspective of cost stewardship. This precipitated the National Wildfire Coordinating Group’s (NWCG) creation and evolution of the Federal Wildland Fire Management Policy over the past 15 years. The current Federal Wildland Fire Management Policy allows Federal fire managers the opportunity to manage fires for multiple objectives. Those multiple objects can include cost-effectiveness, safety of firefighters and the public, or resource management goals.

Although the phrase “appropriate management response” is used in Federal fire policy, previous restrictions limited how it was implemented. Revised implementation guidance now provides for a full range of responses appropriate to conditions, risks and plans, including managing wildland fire for multiple objectives. The current paradigm recognizes both the benefit and threat posed by wildfire. This approach also recognizes there are inherent risks which, to a large extent, can be managed and minimized; and that fire is an integral part of the ecosystem and it must play a more natural role on the landscape.

State and local entities, however, have a mission focused less on ecosystem management regarding wildland fire and more on aggressive protection of property and resources that contribute to sustainable state economies. The differences between current Federal and state fire management policy presents a number of challenges and issues of concern, particularly regarding multi-jurisdictional fires.

Moving forward, these issues will continue to require close cooperative management among Federal, tribal, state and local jurisdictions.

In 2009, the NWCG clarified existing Federal fire policy, leading to changes in terminology and implementation guidelines regarding how wildfires are managed. These changes broadened the response options available to Federal fire managers to include the entire spectrum from full suppression to point protection to monitoring, based on fire and land-use planning, conditions, threats and opportunities. This allows Federal fire managers to focus resources, costs and effort on those fires or portions of fires posing a threat to life, property and infrastructure while allowing fire to play its natural role for resource benefits on other fires or portions of the same fire.



Airtanker provides support to the firefighters on the ground as they work to protect a home in southern California. Credit: AP.

This approach has been adopted at the Federal level and has been reasonably successful in most cases. There was a steady increase from 2009 to 2010 in the number of Federal fires being managed under the new implementation guidelines.

While the states generally acknowledge the value of fire's role on the landscape, the dictates of their missions require them to take aggressive suppression action in nearly every instance to protect property and resources. This gives rise to issues related to the risk of Federal wildfires managed for multiple objectives spreading to lands managed by other jurisdictions and threatening lives, property, and resources.

In an effort to proactively address these issues, the NASF has endeavored to capture lessons learned from the 2009 fire season and provide recommendations as to how those lessons can be incorporated in future wildfire incident management. The intent is to improve the level of cooperation and understanding by all parties engaged in or affected by wildfires that are managed for multiple objectives.

Of significant concern to Federal, state, and local agencies are those fires having the potential to become multi-jurisdictional, thus adding to the complexity of an incident and increasing the threats to life and property. Concerns most cited by state and local fire protection agencies regarding this issue include the following:

- Firefighter and public safety
- Threats to private property, or natural resources with economic, social and cultural values on public lands
- Application of decision-making models in the dynamic fire environment
- Effects on interagency relationships
- Impacts to available suppression resources
- Air quality
- Poor public relations due to unclear communication
- Cost
- Critical watersheds and municipal water supplies

About 60 percent of the Nation's forested land is private and, in some areas, multijurisdictional. Roughly 75 percent of all wildfires reported to the National Interagency Coordination Center (NICC) in Boise, Idaho, are under non-Federal jurisdictions (approximately 63,000 fires annually); and, according to NASF, more than 90 percent of these fires threaten structures. These factors result in both a major workload given the high number of complex initial attack fires.

Local, State, Tribal and Federal Fire Suppression Partnership

As a foundation for discussion about how best to move forward, a number of shared assumptions should be noted regarding local, state, tribal and Federal fire management policy, strategies, and interaction. Specifically:

- Safety of firefighters and the public is the first priority in determining a response to a wildfire.
- Continued cooperation and communication are essential to success. State, local, tribal and Federal agencies will continue to work together on an integrated response to wildfires, particularly those on shared protection.
- All wildland fire agencies have the prerogative to determine their management response for any wildfire that lies solely within their jurisdictions. This response may be dictated by a number of factors, including values at risk, natural resource objectives and available fire suppression resources.
- Ultimately, public agencies are accountable to the people they serve and thus are obligated to be as forthright and clear as possible in communicating their intent in responding to wildfires.
- Safe and aggressive initial attack often is the best response to keep unwanted wildfires small and short-term costs down. Local, state, tribal and Federal agencies will continue to support one another with wildfire response.
- Individual circumstances for each wildfire will drive decisions about response.

Protection Expectations and Responsibilities

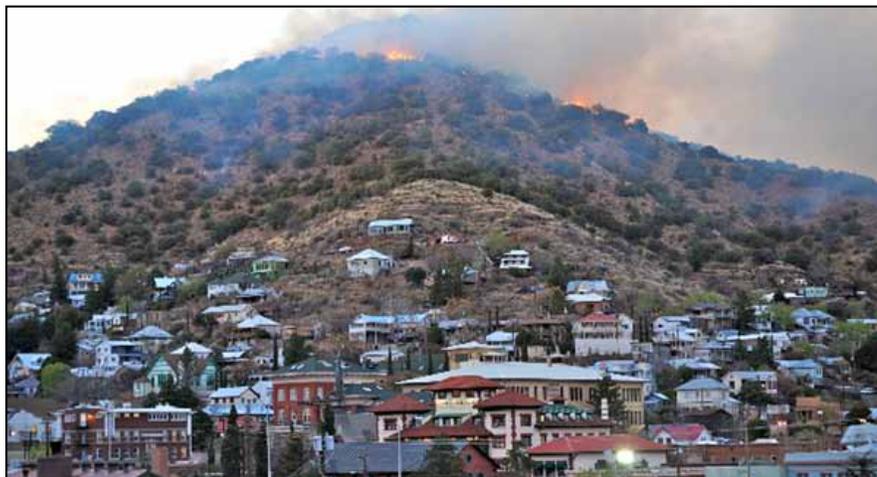
Successfully moving forward with response and decision-making in the dynamic wildfire environment requires that all stakeholders continue to work together, communicate effectively, and be active participants in decisions that could ultimately affect them and the land for which they are responsible. In turn, fire managers must understand and respect the policies and legal mandates of each agency that drive their decisions regarding wildfire suppression decisions and actions, and proceed based on the following expectations.

- Recognizing there is significant and continuing tension among wildland fire protection organizations regarding wildfires spreading across jurisdictional boundaries, response organizations will look at the surrounding landscape and collectively identify high-value areas on either side of incident boundaries and assess and address adverse economic impacts to local communities. Collaborative strategies will be devised to reduce the potential for fire spread in these areas.
- Given that it is common for state and local fire agencies to have dual or overlapping fire protection responsibilities, all response organizations will note locations within their state where there is either no organized wildfire protection or where there is dual or overlapping protection. Further, if either of these situations exist, they will agree to communicate and coordinate their responses (or lack of response) in these areas; and how they will, or will not, share costs.
- Discussions should recognize the potential for transferring safety and financial risk across jurisdictions and over time. Future dialogue will seek to clarify tactical mitigation measures including operational strategies that will keep fire on their own jurisdiction where appropriate and outline mutually developed cost-share expectations for all areas of response. This overall effort will greatly improve the ability to achieve coordinated, efficient fire prevention education, hazard mitigation and suppression operations.
- In areas where fire use is appropriate, stakeholders will continue dialogue aimed at clearly conveying the roles, responsibilities and liabilities that may come with such strategies. Pre-season exercises and discussions are vital to ensure management of such fires address threats to adjacent property and the frustration of affected communities.

Guidance from Mutual Expectations for Preparedness and Suppression in the Interface

As identified in the collaboratively prepared report, *Mutual Expectations for Preparedness and Suppression in the Interface*, once Federal, state, tribal, and local agencies have agreed upon and confirmed their responsibilities, authority and jurisdiction based on the above expectations, they will identify opportunities to realign interface protection expectations and responsibilities among existing organizations to better match respective organizational missions and capabilities. Examples include:

- **Community Wildfire Response Planning.** If Federal, state or tribal-protected lands are adjacent to a community with a fully developed CWPP or an equivalent plan and a robust local response capability, consider developing a joint community wildfire response plan that links to the Federal/state/tribal fire management plan. Such a plan will provide for immediate local government assistance on wildfires originating in pre-defined areas on adjacent Federal/state/tribal protection lands, and provide full Federal/state/tribal reimbursement of suppression costs to local government. This response plan would provide for a local response that greatly exceeds what is typically included in a standard mutual aid agreement.



Moon Canyon Fire above the town of Bisbee, Arizona, March 2008. Credit: BLM.

- **Exchanges of Protection Responsibility.** Identify opportunities for Federal, tribal, state, and local agencies/entities to formally exchange areas of legal fire protection jurisdiction. For example; one objective may be to allow Federal agencies to protect predominately undeveloped state or private forest land, while states could protect Federal land adjacent to areas with significant wildland-urban interface (WUI) development.
- **Trading Initial Response Areas.** Develop agreements among Federal and tribal agencies and state or local government to trade areas of initial response authority to improve the response capability in areas with significant WUI development.
- **Cost-Share / Mutual-Aid Agreements.** Before a wildfire starts, agencies will ensure the various entities responsible for wildfire protection have agreed on available cost-share methodologies and have clarified mutual-aid response expectations.
- **Initial Response Contracts.** As appropriate, identify opportunities to consider contracting with local, state, tribal and/or Federal Government for initial response on adjacent lands.
- **Training.** Wildland firefighting resources will be trained with equivalency in mind, meaning that qualifications under one entity will be recognized by another.

Fire Prevention

Continued fire prevention efforts for the reduction of human-caused wildfires are a shared responsibility across all jurisdictions and one that has served all agencies and the public well for many years. Results, while difficult to measure, indicate that careless and accidental fire starts are effectively reduced through this invaluable cross-agency program. Funding for sustaining and expanding this aspect of our interagency wildland fire management program is a fundamental component of a cohesive strategy.



Over the past 65 years, Smokey Bear has been an icon for fire prevention efforts in the United States. Smokey and Sparky the Fire Dog teamed up at the Treasure Valley Fire Prevention and Safety Coop's Fire Prevention Day in Meridian, Idaho.

FLAME ACT ELEMENT 5: ALLOCATION OF HAZARDOUS FUEL REDUCTION FUNDING BASED ON PRIORITY PROJECTS

Current State of Hazardous Fuel Reduction Projects

Allocating hazardous fuel funds spans all three cohesive strategy principles — restoring and maintaining healthy landscape, fire-adapted communities, and response to wildfires. It is essential that priorities be set correctly and that allocations be made on the basis of effectiveness and efficiency. Otherwise, all three cohesive strategy principles could suffer.

Hazardous fuel reduction projects occur throughout the United States, on all levels — Federal, state, county, tribal and local government and private land. Funding of projects, regardless of the jurisdiction, often occurs through many of the same sources. Hazardous fuel is common to virtually all fire-management jurisdictions and, to address it successfully, must be approached in a united, collaborative way.

There is little question about the value of reducing fuel that often congest forests, woodlands and rangelands. Successful hazardous fuel reduction programs have many benefits. They strengthen landscape resiliency, reduce risks to people and their communities, decrease smoke emissions and improve air quality. Removing hazardous fuel preserves important habitat, diminishes threats to watersheds and water quality, and provides economic opportunities to rural and tribal communities.

Hazardous fuel work is common to many fire organizations from the local level up, using a variety of ways to fund the projects. The scale of hazardous fuel projects ranges from big to small, from multi-jurisdictional landscape-scale treatments covering thousands of acres to individual private lots of less than an acre. Ideally, collaboration occurs in identifying projects and extends into implementation of the project where partnerships join together to share in the work and cost of a project. Expanding partnerships is a key to hazardous fuel treatment efficiencies. New partnerships can treat more land, share costs and responsibilities, and reduce the risk to communities.

Hazardous fuel is reduced through a mix of actions that include prescribed fire, mechanical and chemical treatments, and active forest management. It is a practice that is widely accepted and its benefits are widely recognized.



Excavator with mastication head reduces fuels within the WUI on the Medford BLM District near Grants Pass, Oregon. Credit: Bradley Washa, BLM

Prioritization of Fuel Reduction Work

Federal and state agencies use a hazardous fuel allocation and prioritization system to support decisions and ensure financial resources are directed to the highest-priority projects or programs in the highest-priority areas.

The Federal allocation system uses the Ecosystem Management Decision Support (EMDS) model to identify areas of highest priority by evaluating environmental factors influencing wildfire potential and the negative consequences of wildfire. The states routinely use CWPPs or their equivalent, risk assessments and a competitive grant process.

Other factors are part of the prioritization mix for Federal agencies and states. Considerations include funding needed for continuity of operations, emergency conditions, fiscal-year priority factors not included in EMDS data, multi-year treatments, contracting opportunities, and available funding from other appropriations and partnerships. Woody biomass utilization is another consideration. As noted in a 2003 Memorandum of Understanding signed by the Secretaries of the Interior, Agriculture, and Energy, "... the harvest and utilization of woody biomass by-products can be an effective restoration and hazardous fuel reduction tool ..." capable of assisting with "forest, woodland, and rangeland restoration ..."



Firefighter uses a drip torch to ignite a prescribed fire in the Upper Souris National Wildlife Reserve in North Dakota.
Credit: FWS.

Prioritization of Local Fuel Reduction Work

Identifying priority projects at the local level focuses on where hazardous fuel reduction projects are developed and are based on national and regional direction and local considerations. Local consideration of treatments is shaped by a number of factors:

- Collaboration with partners and stakeholders
- Alignment with CWPPs or their equivalent
- Integration with other projects having a collateral effect of hazardous fuel reduction
- Response to emergencies, such as rapid increases in hazardous fuel associated with hurricanes, insect damage, invasive species, and other landscape-scale disturbances
- Projects that restore fire-adapted ecosystems
- Opportunities to maintain or restore threatened critical native habitats
- Opportunities to restore fire-adapted ecosystems in non-WUI areas
- Opportunities to maintain investments in previous treatments
- Exploring biomass partnerships
- Supporting local economies

Moving Forward

Adaptive management is used to increase effectiveness of hazardous fuel treatments and ensure the greatest areas at risk are given highest priority for funding. Over time, the prioritization process will be reviewed, adjusted, and, if needed, redirected. Prioritization and allocation models and processes also will be refined as scientific advances occur in risk quantification.

Additionally, strong emphasis will continue to be placed on working together at all levels of the fire community to ensure alignment of priorities. It will be of limited value to conduct an intensive fuel reduction project in one jurisdiction, while a neighboring jurisdiction or community does little or nothing. Other considerations in the evaluative process include watersheds, boundary areas at the edges of jurisdiction where wildfire response strategies significantly differ, and other areas containing resources of great value to the public. All of this can add up to a strong, collaborative effort to place most of the treatments in the areas at most risk, regardless of land ownership, and where they will be the most beneficial when unwanted fire breaks out.

Landscapes

Establishing fire-adapted communities and working to reduce fuel in and around them are important. They have become part of the fire landscape, too. But it is only part of the equation. Healthy, fire-adapted ecosystems are essential to restoring and maintaining landscapes. It can be counterproductive to promote fire-adapted communities while minimizing or excluding the importance of fire's role in the larger ecosystems. Both are vital for healthy landscapes and healthy communities. Both deserve attention and support.

Vast, landscape-scale restoration efforts are important to improving the health and resiliency of our forests and public lands. With improved landscape health including integration of fire as part of the natural process, impacts of catastrophic fire on our natural and cultural resources and communities will be reduced.

A cohesive strategy must ensure commitments to collaborative efforts and partnerships that have developed in improving landscape health. Small, piecemeal projects will not achieve the kinds of changes needed to promote healthy, fire-adapted ecosystems.

Reducing hazardous fuel in and near WUI communities rightfully continues to be a high priority and will continue to be the focus of the majority of Federal wildland fire hazardous fuels activities. Any acres treated should be identified through a prioritization process. Most non-WUI treatments on Federal lands are accomplished with restoration funds such as the proposed Forest Service's Integrated Resource Restoration (IRR) funds or with land health and restoration treatment funds within each DOI land management bureaus. For the last decade, emphasis on the importance of and funding has been given to the wildland-urban interface and CWPPs or equivalent plans. Landscape restoration and mitigating hazardous fuels are important and need to be addressed collaboratively. A greater emphasis needs to be placed on risk assessments when determining areas for treatment.

All three cohesive strategy principles need to be factored into funding based on land management objectives and the priority of hazardous fuel reduction projects. A balance among the three principles and prioritization of hazardous fuel projects needs to involve all organizational levels, from those on the ground to national-level direction. Only through such a balanced approach can a successful hazardous fuel program, serving communities and healthy landscapes, be achieved.



Healthy landscapes can decrease the fire risk to communities.
Credit: NIFC, Kari Greer.

FLAME ACT ELEMENT 6: ASSESSING THE IMPACTS OF CLIMATE CHANGE ON THE FREQUENCY AND SEVERITY OF WILDFIRE

It is extremely difficult to accurately assess the impacts of climate change on wildfire in the United States because most climate-change modeling has been completed on a global scale. The wide range of variability in both climate and wildfire behavior is also a factor. Yet, resource management agencies have collected fire records for a considerable length of time, and climate-wildfire research efforts are yielding some valuable results.

Regarding the long-term outlook, the models generally forecast increases in temperature across the western United States during the 21st century. These projections, plus projected further expansion of the WUI indicates catastrophic wildfire will continue to be a problem, particularly in the West.

Additionally, while there seems to be agreement within the models of a general drying trend in the West, there is still considerable uncertainty about seasonal and regional precipitation patterns, and the models are unable to predict the locations of future wildfires. However, because the West encompasses vast landscapes over a wide range of climates, it can be typically assumed at least some portion of the West will experience a severe wildfire season each year.

Magnitude, Scope and Geographic Location of Impacts

While most of the projections relating to climate change in the United States are for the Western region, there is a growing body of research that projects the impacts of climate on wildfire in other regions of the Country as well. In 2001, the U.S. Global Climate Change Program predicted the seasonal severity of fire hazard is likely to increase by 10 percent over much of the United States, with possibly larger increases in the Southeastern region and Alaska, but with decreases in the Northern Great Plains area.

According to a 2004 USDA Forest Service report, the southeast could be severely affected by increased temperatures through drought, insect infestation and wildfire, all of which could possibly change the predominant landscape from forest to grassland or savanna. The report recommended not trying to restore forests to pre-European settlement levels, warning that, “we would be trying to restore against a strong climate signal, like trying to push the tide back out into the ocean.”

Additionally, drought records based on the 110-year Palmer Drought Severity Index (PDSI) show that the decade from 2000–2009 was the third worst drought decade in the past 110 years. During 2009, drought extended over more than one-fourth of the Country.

There is a high level of confidence the West will be strongly affected by climate change, and these impacts are already making significant changes across many landscapes. As average temperature rises, the summers are longer, creating drier conditions. This promotes easier fire ignition and spread. High fire risks are associated with early snowmelt and increased spring and summer temperatures. The greatest increases noted by scientists occurred in mid-elevation, Northern



Aerial survey of the beetle kill in the Deefield Lake area of the Black Hills National Forest in South Dakota. Credit: Forest Service.

Rockies forests. A 2006 study by A.L. Westerling, et al, titled *Warming and Earlier Spring Increase Western U.S. Forest Wildfire*, notes “the projected regional warming and consequent increase in wildfire activity in the western United States is likely to magnify the threats to human communities and ecosystems, and substantially increase the management challenges in restoring forests and reducing greenhouse gas emissions.”

A 2008 study by Ryan, et al for the U.S. Global Climate Research Program, titled *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States*, reports that “fires, insect pests, disease pathogens, and invasive weed species have increased, and these trends are likely to continue.” It also reports “in the western United States, both the frequency of large wildfires and the length of the fire season have increased substantially in recent decades, due primarily to earlier spring snowmelt and higher spring and summer temperatures.”

These changes in climate have reduced the availability of moisture, drying out the vegetation that provides fuel for fires. Alaska also has experienced large increases in fire, with the area burned more than doubling in recent decades. As in the western United States, higher air temperature is a key factor. In Alaska, for example, June air temperatures alone explained approximately 38 percent of the increase in the area burned annually from 1950 to 2003.

Additionally, America’s forests are threatened by insects and diseases. It is uncertain whether infestations are due to a change in climate conditions, or due to a century of fire exclusion or lack of active forest management, or a mix of these and other factors. However, the increase in tree mortality due to insects and disease increase fire severity.

According to *Climatic Change, Wildfire and Conservation*, a 2004 study by D. McKenzie, et al, “If climatic change increases the amplitude and duration of extreme fire weather, we can expect significant changes in the distribution and abundance of dominant plant species in some ecosystems, which would thus affect habitat of some sensitive plant and animal species. Some species that are sensitive to fire may decline, whereas the distribution and abundance of species favored by fire may be enhanced.”

“The effects of climatic change will partially depend on the extent to which resource management modifies vegetation structure and fuel,” the study adds, stating further, “Reasoned discussions amongst decision makers, public-land managers, and stakeholders at local and regional scales can help in the development of resource management strategies that mitigate risk to ecosystems and sensitive species.”

Climate, Wildfire, Biomass and Carbon Management Concerns

Another concern related to the effect of climate change on wildfire is the issue of carbon sequestration and carbon emissions from wildfires. Forests and rangelands are considered a “carbon sink” because vegetation removes carbon from the ecosystem and stores it for long periods of time. The Westerling study found, “...if wildfire trends continue, biomass burning will result in carbon release, suggesting that the forests of the western United States may become a source of increased atmospheric carbon dioxide rather than a sink, even under a relatively modest temperature-increase scenario.” This concern is widely shared in the science community.

Globally, biomass burning contributes half the amount of carbon as fossil fuel. For this reason, and for issues relating to smoke, emissions from wildfires are a source of public concern. If projected trends in increasing temperature and increasing variability and longer fire seasons hold true, then the following could occur: increasing variability may mean extreme events will become more common and record high and record low temperatures may be expected.

Reducing Carbon Emissions

The use of prescribed fire to reduce fuel hazards may have the added benefit of reducing carbon emissions by reducing the quantity of biomass consumed by a wildfire. To reduce the risk of severe wildfire in the dry forests of the western United States, overstocked forests may need to have biomass removed either mechanically or with prescribed burning.

Harvesting trees for timber and biomass is another proven option, actively managing forests to reduce tree stocking levels and corresponding fire danger. Timber and biomass production provides jobs and economic value to rural communities, building products, biomass for renewable energy, and fiber for paper and other products. Wood building products help store carbon for long periods of time, and wood biomass energy helps offset fossil fuel emissions with relatively carbon-neutral sources.

Next Steps

Scientists associated with the development of a national cohesive strategy have described a risk-based analysis to evaluate expected carbon and expected emissions under different fuel treatment scenarios. This information is useful to project the climatic implications of alternative fire management strategies. Where current science is lacking is in understanding the temporal and spatial dynamics of wildfire risk in response to a changing climate. More work is needed at the regional assessment level to better understand climate change effects on wildfire risk. That work can proceed as the cohesive strategy regional assessments are conducted.

On a broader scale, additional scientific information is needed on a range of climate-change impacts related to many issues, including wildfires, agriculture, changes in air quality, hydrology, fish, and wildlife. It is of paramount importance for Federal agencies to coordinate closely with the states to identify the top priorities in these areas so that successful strategies for adaptation planning may be developed, and limited Federal research dollars are spent strategically.

In order to improve the effectiveness of science to inform the decision-making process, priority will be placed on enhanced and sustained support for climate-related monitoring, data accessibility and improved data-oriented decision-support systems. More research is needed to improve predictive capabilities for climate change and related impacts at regional and global levels. Further, enhanced communication and dialogue between the science community and decision makers is essential to help set priorities for scientific investment in information that informs decision makers, and also for maximizing the usability of knowledge created by the science community.

This view is consistent with the regional and local approach of further analyses identified in the *Comparative Risk Assessment Framework for Wildland Fire Management* and the phased approach adopted by the WFLC. This approach also is consistent with the DOI Secretarial Order as well as Interior's implementation documents for science coordination by interagency Climate Science Centers, and the collaboration identified in the Associated Landscape Conservation Cooperatives.



Federal and state fuels crews work year-round alongside local fire departments to remove hazardous fuels on private land. Credit: BLM, Idaho.

FLAME ACT ELEMENT 7: STUDY THE EFFECTS OF INVASIVE SPECIES ON WILDFIRE RISK

Background

A cohesive strategy will ultimately recognize the need for resilient landscapes across all jurisdictions. Landscapes are considered resilient when they can endure a disturbance, such as a wildfire, and recover with little or no intervention. This implies native vegetation is healthy and able to restore itself.

The National Invasive Species Council (Executive Order 13112) defines an invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” More than 100 million acres (an area roughly the size of California) in the United States are suffering from invasive plant infestations. The U.S. Environmental Protection Agency estimates the Country spends at least \$138 billion per year to fight and control invasive plant and animal species.

The problem of invasive species goes beyond just losing one plant species to another and the associated loss of habitat and diversity. Many of the invasive species increase the risk from wildfire. Cheatgrass (*Bromus tectorum*), for example, an invasive species from Central Asia, dominates more than 25 million acres of public land in the Great Basin, according to the Bureau of Land Management. Cheatgrass moves aggressively into disturbed areas and seeds prolifically. It dries out early and is highly flammable.



Muck thistle, an invasive species common in parts of the West. Credit: BLM, Idaho.

Cheatgrass is not the only species that contributes to catastrophic/severe wildfires. In the South, almost 400 non-native vegetative species have been identified. It is conservatively estimated that 80 percent of the species on the invasive plant list are influenced by or influence fire behavior. Three species in particular, cogon grass (*Imperata cylindrica*), kudzu (*Pueraria Montana var. lobata*) and climbing ferns (*Lygodium spp.*) pose particular problems regarding fire behavior and intensity.

A fundamental goal of the Cohesive Strategy will be to “ensure landscapes across all jurisdictions are resilient to disturbance in accordance with management objectives.” Achieving resilient landscapes is a challenge facing all land owners, managers, and land users. Scientists and land managers have expressed the need to develop a strategy for more aggressive invasive species prevention, early detection, and management.

Coordinated National Actions Are Needed

Coordinated, multi-state management, and eradication actions are needed to limit or eliminate intentional and unintentional introductions and improve control of invasive species. Programs for the control and/or eradication of invasive species must incorporate education, prevention, early detection, and rapid response techniques.

Natural resource management agencies, state and local governments, tribes, universities, nonprofit organizations, and the private sector must collaborate and form partnerships with states to prevent the spread of invasive species, avert new unauthorized introductions, and work together to find creative new approaches for protecting and restoring natural, agricultural, and recreational resources.

A coordinated regional approach will assist in invasive species management. Federal agencies should partner with states to develop efficient coordination and communication mechanisms to share information and allow for the most effective and rapid response. Furthermore, Federal and state partners must establish consistent and effective policies and procedures to prevent transport, sale and dispersal of undesirable species, particularly those under eradication in specific states, and increase awareness and support for effective public outreach and education about invasive species.

Invasive Species Research Projects

Invasive grasses pose problems in different regions of the Country. The table below shows an example of the invasive grasses and related studies.

Invasive	Region	Effect	Study	More info
Cheatgrass	Great Basin/ Colorado Plateau cold desert	Increased fire intensity and frequency	Joint Fire Science Project - 5 Studies; SageSTEP; Great Basin Native Plant Selection and Increase Project	www.sagestep.org ; www.fs.fed.us/rm.boise/research/shrub/greatbasin.com
Cheatgrass and medusahead	Great Plains/ Columbia Plateau	increased fuel, reduced grazing	Ecologically Based Invasive Plant Management Project	www.ebipm.org
Buffelgrass	Sonoran Desert	Brings fire to non-fire-adapted environment	Wildfires and Invasives in American Deserts Symposium	www.srmjournals.org/toc/rala/31/3
Red brome	Southwest	Increased fire intensity and frequency	American Deserts Symposium	http://www.fs.fed.us/database/feis/plants/graminoid/brospp/introductory.html
Medusahead wildrye	Pacific Northwest	Greater fire hazard than cheatgrass		http://www.fs.fed.us/database/feis/plants/graminoid/taecap/introductory.html
Cogon Grass	Southern region	Increased fuel loads and shortens fire return intervals	Effects of Imperata Cylindrica invasion on fire regime in Florida Sandhill	http://www.fs.fed.us/database/feis/plants/graminoid/impspp/introductory.html

In the Great Basin and the Eastern Colorado Plateau, cheatgrass invades millions of acres of the cold desert and contributes to the loss of native vegetation and increased fire cycles and fire intensity. In Arizona’s Sonoran Desert, buffelgrass is choking out native species. This exotic species greatly affects fire frequency and intensity, and reduces soil productivity.

The Sonoran Desert evolved without fire and most of its native plants cannot tolerate fire. However, in recent years the encroachment of buffelgrass has carried fire into areas that have never before burned. Another species, medusahead wildrye, occupies millions of acres in eastern Oregon, northeast California and southwest Idaho.

The southern region of the United States extends across three recognized bioregions. Several invasive species inhabit this area. In USDA Forest Service Region 8 alone there are 284 species, including 79 species from subtropical Florida. These species result in increased fire hazards throughout the region; with cogon and kudzu receiving the most attention in prevention, control and eradication. A group of climbing ferns is emerging as an additional problematic invasive species due to alterations in fire intensity and behavior caused by their presence.

Saltcedars are fire-prone and disturb the ecology of the areas they invade by outcompeting native plants for water and increasing fire frequency and intensity. Different varieties of saltcedars are found in the Intermountain West, California, Texas, and in the Great Basin.

These are just a few examples of the invasive species that can increase wildfire risk and severity across the Country. In some parts of the Country, land managers have been working for decades to control some of these species and there is a foundation of achievement to be built upon and expanded. More can and must be done to limit the loss of new ground to invasives.

Federal, state, local, tribal, non-profit, academic, and private land managers are forming partnerships to address this growing problem. These partnerships provide research, technical knowledge transfer and project implementation with the ultimate goal of reducing these species. The science group supporting and informing a cohesive strategy notes specifically that more work is needed at the regional assessment level and during the next phase of development. Overall, a cohesive strategy supports the continued development of partnerships across all jurisdictions and the associated research and actions needed to reduce these species.



Cheatgrass has infested public land throughout the Great Basin. Credit: NIFC, Kari Greer.

RECOMMENDED MANAGEMENT STRATEGIES

For more than a decade, the United States Government Accountability Office (GAO) registered concerns in numerous reports regarding the negative effects of wildfire and questioned the efficiency and cost-effectiveness of management strategies used by Federal wildland fire management officials. Since 1999, GAO has asked officials of the Federal land management agencies to develop a cohesive strategy to “address catastrophic wildfires.”

In 2009, GAO acknowledged, in part, that “the Federal agencies have taken important steps forward, but additional strategic action is needed to capitalize on those steps.” One of the management strategies identified by GAO, as “yet to be accomplished,” was relevant to the development of a cohesive strategy and included:

“laying out various potential approaches for addressing the growing wildfire threat, estimating the costs associated with each approach, and identifying the trade-offs involved.”

GAO believed this information would be helpful to the Federal agencies and Congress when making fundamental decisions about an effective, affordable approach to responding to fires.

The FLAME Act set forth by Congress asked the Secretaries of Agriculture and the Interior to address seven specific elements and to create a cohesive strategy that incorporates a response to the previous GAO concern relative to an effective, affordable approach to responding to wildfires and addressing the trade-offs associated with those approaches. Because the threat of wildfire transcends all boundaries and jurisdictions, the WFLC determined a cohesive strategy would be developed using a national approach encompassing all land ownerships. *A National Cohesive Wildland Fire Management Strategy*, written in collaboration with other Federal, state, tribal, and local governmental and non-governmental partners to assure a national approach, is presented as a companion document to this report.

Approaches for Addressing Wildfire

Wildland fire is not new and is a natural part of the ecosystem. In many areas of the Country, the question is not if a wildfire will occur, but rather when it will occur. Therefore, the approaches to addressing the wildfire in the United States must be proactive in nature, rather than reactive. The threat must be addressed before it occurs, thereby reducing the risks when wildfires happen. Approaches and investments must concentrate on restoring and maintaining landscapes regardless of the boundaries encountered and increasing the numbers of fire-adapted communities across the Nation. Only then will the threat of catastrophic wildfire be effectively reduced.

The approaches are described, and they must be compared with one another and considered in complex social and political environments at multiple scales, in addition to the trade-off analyses described below.

Restore and Maintain Landscapes

Following the historic fires of 1910, wildland fire managers committed to a policy of total fire suppression. By 1935, the “10 a.m. Policy” was implemented and mandated suppression of all fires by the morning following their first report. Attitudes about fire suppression started to change at the Federal level in the 1960s as agencies began to heed the advice of scientists who questioned the exclusion of fire from the ecosystem.

By the 1970s, there was a Federal effort to reintroduce fire into the ecosystem through planned burning. Wildfires in western Montana in 2000 were instrumental in gaining broad state and Federal bipartisan support for a National Fire Plan. Under the National Fire Plan, the Federal agencies received more funding for and greatly expanded hazardous fuel treatments. However, these fuel treatments were seen as only one of several vital components necessary for restoring and maintaining landscapes. In 2008, regarding wildfires only on Federal land, land managers and incident commanders were afforded the flexibility to choose the response action most suitable to conditions, including less than full and aggressive suppression actions. The following year, in 2009, Federal wildland fire agencies with the support of the WFLC introduced new implementation guidelines for the Federal Wildland Fire Management Policy that formalized the greater flexibility in response actions.

Those guidelines allow multiple options for managing wildfires, including the option of managing naturally ignited fires to accomplish natural resource objectives. Some state and local statutes do not afford the opportunity to entertain any tactics other than full suppression, which is notable because 60 percent of the Nation's forest land is private and in most cases will be under protection objectives; and at least 90 percent of all state wildfires threaten structures.

Although wildland fire management practices have evolved over the years and there is a recognition that fire must play a more natural role on the landscape, the consequences of the past century have resulted in a hazardous-fuel treatment and ecological-restoration task of a daunting scale and urgent need. Considerations include the effects of increased development in wildland urban interface, climate variability and climate change, the spread of invasive species, and widespread insect infestations and disease outbreaks. In light of this, the protection of life, property, and natural resources continues to grow ever more complex, demanding and expensive.

Estimated Costs Associated with Approaches

Cost comes in many forms. In order for a cohesive strategy to be successful, it needs to be a "from-the-ground up" effort. Wildland fire management officials, the public and all levels of government need to be actively involved. Solutions to the problems must come from all stakeholders.

Phase II of the Cohesive Strategy is to develop an implementation plan which is outlined in the companion document, that will clearly define regional-specific approaches and costs — monetary and non-monetary — needed to address the wildfire threat across America. Along with the approaches and costs, pertinent trade-offs will likewise be addressed.

Costs are not always preceded by a dollar sign

Throughout history there have been costs, of one type or another, associated with tactics and strategies developed to respond to the threat of wildfire. Those costs, however, do not always come preceded by a dollar sign. They are the cost to the efficiency and effectiveness of getting the job done and are, at times, the hardest to "fund," because resolutions are outside the immediate control of wildland fire managers. Some examples include:

- **Jurisdictional boundaries and conflicting environmental compliance regulations.** There is a need across the United States to improve the vegetation conditions on a landscape scale, regardless of jurisdictional boundaries. Certain laws and different statutes, however, limit wildland fire managers' ability to do so.
- **Conflicting agency roles, policies and missions.** Preservation of wildlife habitat for endangered and threatened species and the reintroduction of the natural role of fire on the landscape are both necessary. Indeed, fire, habitat, and healthy watersheds are not mutually exclusive, but complementary. However, there are conflicting Code of Federal Regulations that may limit or, in some cases, make the actions and intentions required on behalf of both fire and healthy resources in the same areas unlawful.
- **Litigation.** The harvest of trees and other natural resources is often necessary in some areas to reduce the risk of wildland fire. Yet litigation at times halts the needed land management actions on public lands resulting in an exacerbated risk of wildfire, delays in program management and increased costs.
- **Smoke management and air quality regulations.** Air quality regulations can be a major barrier to the use of fire on the landscape. Wildfires and prescribed fires both produce smoke emissions. The management of fire can have both positive and negative, as well as short- and long-term, effects on the carbon cycle and can have similar trade-offs on the potential to affect human health. The solution with the least negative effects may not always be viable in the current regulatory system.

Trade-offs Associated with Approaches and Costs

Building upon the foundation of a cohesive strategy in the first phase, the second will identify regionalized approaches and costs associated with addressing the wildfire threat in America. Once the approaches and costs have been established, trade-off analyses will be developed with the help of risk-informed science and stakeholders input to ensure they are both efficient and effective.



Standing dead trees with young lodgepole pines in Yellowstone National Park in 1998. Credit: NPS, Jim Peaco.

Evaluation of the Trade-Offs

The overarching goal of a cohesive strategy is to provide sound options designed to maximize opportunities to successfully address the Nation's wildland fire problems by focusing on three key principles: restoring and maintaining resilient landscapes; creating fire-adapted communities; and wildfire response. The approaches will be regionalized, in concert with a cohesive strategy goals, guiding principles and performance measures, and will drive the associated costs and trade-offs.

Regionalized Trade-Off Analyses

As the methods are identified, a common analysis approach will be undertaken for each region. Trade-off alternatives will be made at each level by a consortium of stakeholders, agency decision-makers, fire managers, scientists, and others. These analyses will be conducted by an interagency/intergovernmental science team using common tools. Results will include common performance measures, risk levels, assumed levels of treatment in each component area, and will be compiled for the trade-off analysis. Considering the three main focus areas, the analysis will select a strategy for each region based on that which best meets the national goals as measured in the performance measures.

The risk analyses, coupled with other management tools such as the new Wildland Fire Decision Support System (WFDSS) which assists in assessing risk and fire behavior during a fire event and Fire Program Analysis (FPA), used to analyze and compare trade-offs between initial response capability and fuels management practices, among other systems, will aid fire leaders in better managing investments in the short-term and with budget and cost management into the future.

Finally, wildland fire, its management and all affiliated activities are never static for any length of time. Rather, there are multiple moving parts and elements in various stages of evolution. Research, technology, partnerships, conditions on the land, the resources used to manage fire and the very nature of fire itself are subject to change as conditions change. Only through truly cooperative efforts at all levels among Federal, state, tribal and local entities can the Nation adapt, adjust and better manage and benefit from fire.

In Summary

The companion document to this report presents a cohesive strategy to satisfy both the GAO concerns and the Congressional intent described in the FLAME Act.